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A record year for British solar

Record-breaking solar power in the spring and summer helped balance electricity from lower wind speeds across Britain

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Summary

For 98% of days in the year, it is either windy or sunny in Great Britain. In the first half of 2025, a low-wind start was balanced by record-breaking solar generation.

Record solar power balanced low wind generation in the first half of the year, limiting an initial increase in gas power. Clean power generation in the early summer of 2025 displaced gas generation - pushing gas to record lows for two months in a row. This was despite an overall increase in gas power in the period from January to June, which compensated for lower power imports.

- **Low-wind days coincide with low solar days just 2% of the time.** Wind and solar are well balanced in Britain's climate across days and seasons. While 2025 has been a slow year for wind, it has been a bumper year for solar.
- **Solar power rose by a third in the first six months of the year to produce a record 9.91 TWh.** Solar broke generation records for five months in a row since March.
- **Gas fell to just 21% of electricity generation in June.** However, gas power increased overall in the first half of 2025 to fill a gap in power imports.
- **Clean flexibility tools can cut gas use for rare extended periods of low renewable energy.** While a strategic gas reserve remains useful, energy storage capacity is targeted to double by 2030, reducing the need for expensive regular gas and biomass back-up in the future power system.

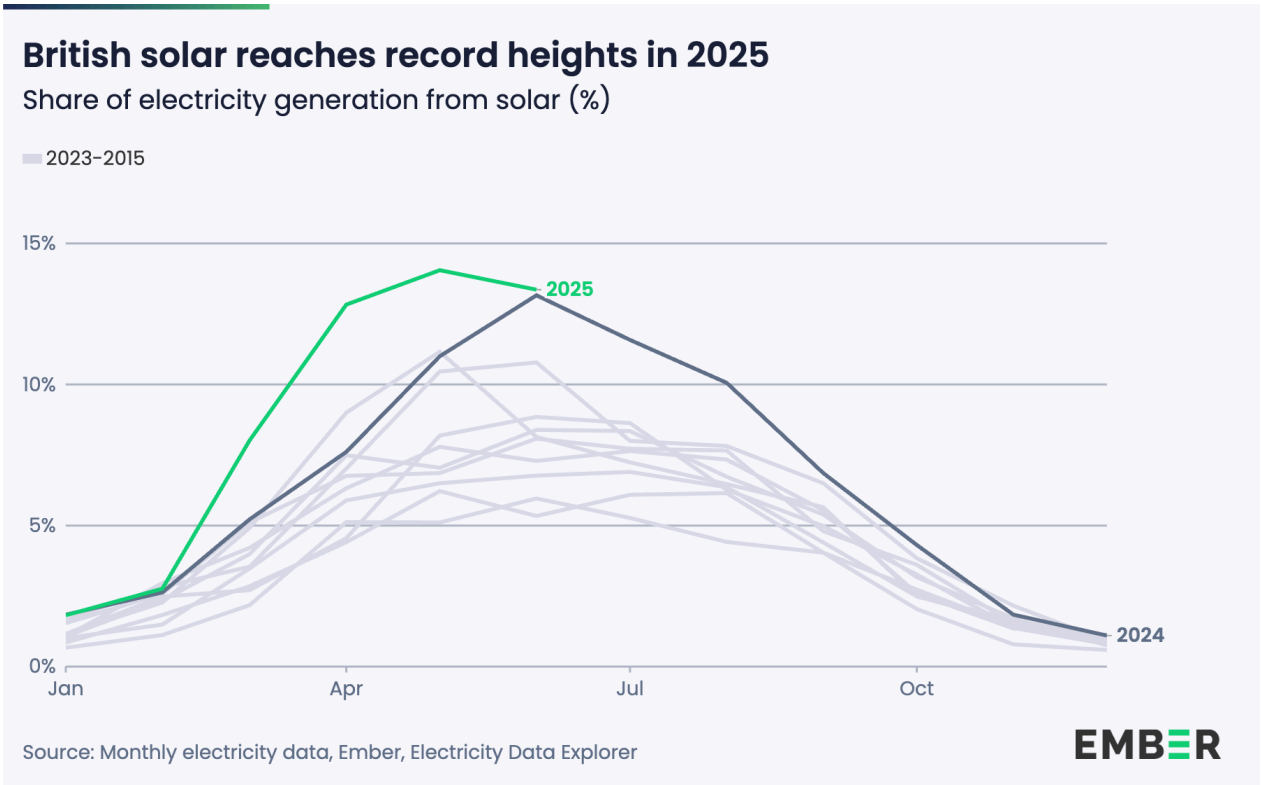
Solar works for households, it works for businesses and it works for the country. Developing both solar and wind projects is essential to ensure that we have a strong, stable and clean power system year round.

Frankie Mayo, Senior Energy Analyst - UK, Ember

Record-breaking sunshine pushes British solar to new heights

So far, 2025 is the UK's strongest year for solar on record

Solar power in Great Britain had a record-breaking start to 2025, with solar up 32%, to produce a record 9.91 TWh, breaking generation records for five months in a row since March 2025. A further record was broken on the 8th of July with the highest ever level of solar power on the grid at 14 GW. This level is repeatedly being raised. For comparison, this is 44% higher than 5 years prior when the solar peak in 2020 was just 9.7 GW. The continued deployment of new solar panels means that in 2025, one of the sunniest years on record to date has been successfully translated into high levels of power generation.



Solar power capacity is targeted to grow significantly to 2030 and beyond

Solar power is cheaper than wind, at below £72/MWh in the most recent Contracts for Difference subsidy auction, compared with £73/MWh for onshore, and £78/MWh for offshore wind (2025 prices). The British 2030 solar target of just under 60 GW was recently confirmed in the Solar Roadmap - a government publication which identified 62 actions to meet the ambitious target of tripling solar capacity.

The solar sector is showing strong performance at the household level

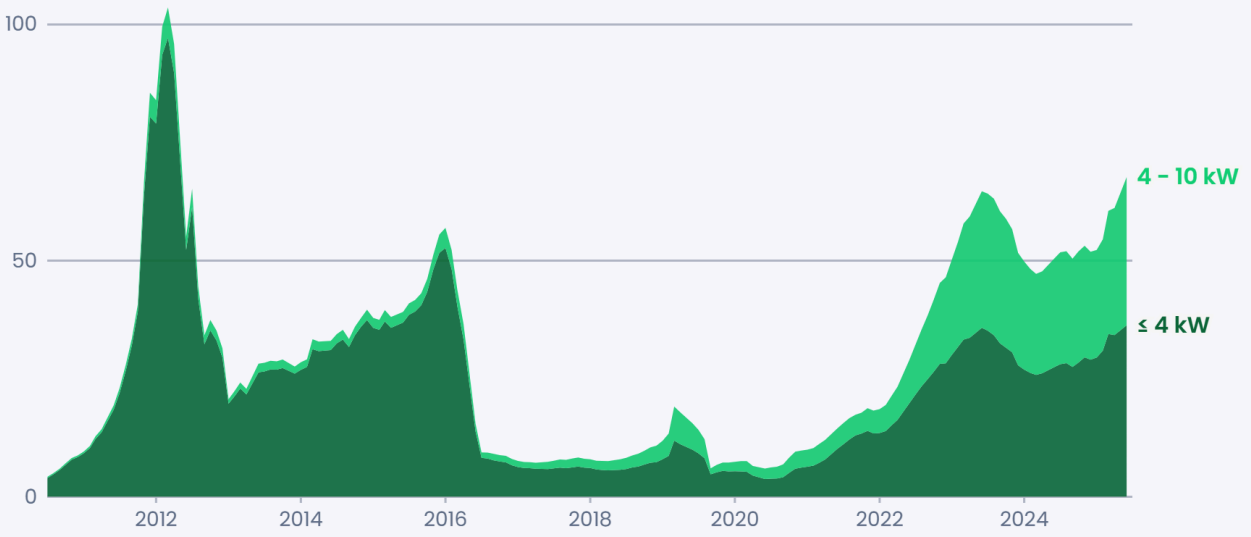
Ember analysis shows that average domestic-scale solar installations are at their highest in over a decade, incentivised by falling panel prices and increasing energy bills. Furthermore, newly built homes will have solar panels 'by default' according to new government regulations - the 'Future Homes Standard' - which will come into effect before the end of 2025.

Household-scale solar installations are getting larger

Larger arrays now make up half of all new household-scale solar capacity, spurring the overall increase in domestic solar. The 2010-19 'Feed-in Tariff' solar subsidy had preferential rates for smaller installations - those under 4 kW. Now households can maximise roofspace regardless of the project size. In 2015, the 4-10 kW band made up just 5% of capacity installed below 10 kW, 10 years later in 2025 this had risen to 50%.

Larger installations push new domestic-scale solar to a 12-year high

Monthly capacity installations in Britain for all solar projects under 10 kW. Rolling six-month average (MW)



Source: Ember analysis, DESNZ Solar photovoltaics deployment

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2025 has so far been less windy, but more sunny

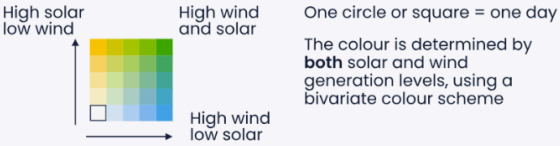
The British climate is well balanced for clean power; windy days are typically more cloudy, whereas sunny days tend to be less windy

Ember analysis shows that just 2% of days in a typical year have both low wind generation and low solar generation (below 20th percentile for both). This incredibly low number holds true for the eight and a half year period analysed from January 2017 to June 2025.

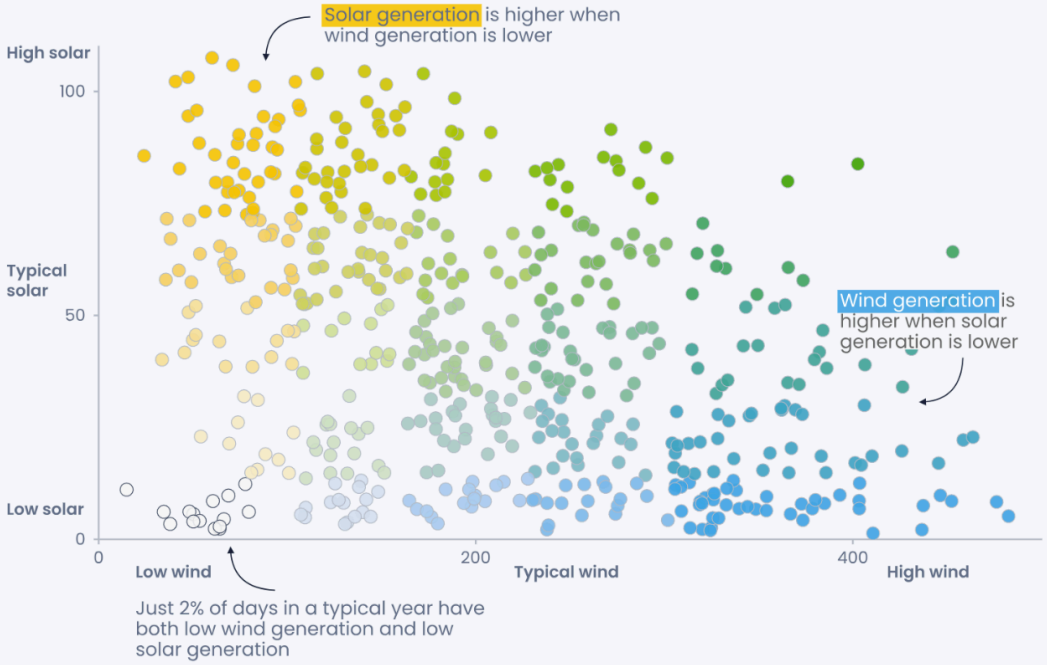
Wind and solar complement each other in Britain

Wind and solar generation by day, 2024 and first half of 2025 (GWh)

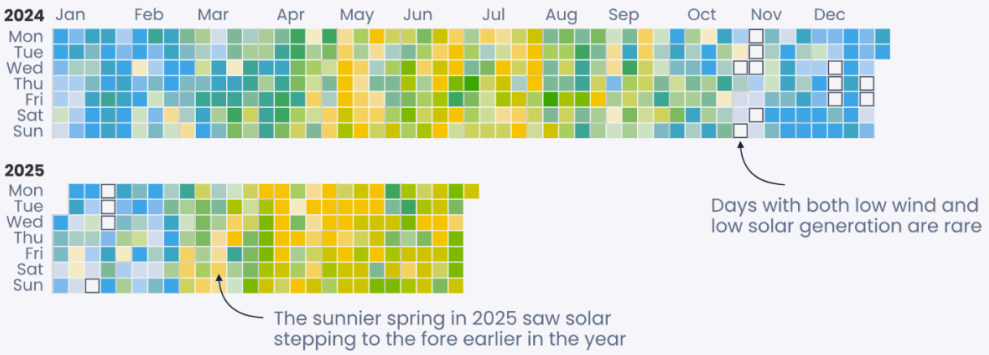
How to read this chart



British wind and solar are complementary - when one drops, the other delivers



There are very few days a year where Britain has both low wind and low solar



Source: ESO, BMRS, DESNZ

Low generation is defined as the bottom 20% of days within a year. A low-wind, low-solar day is defined as the concurrence of low-generation for both technologies.

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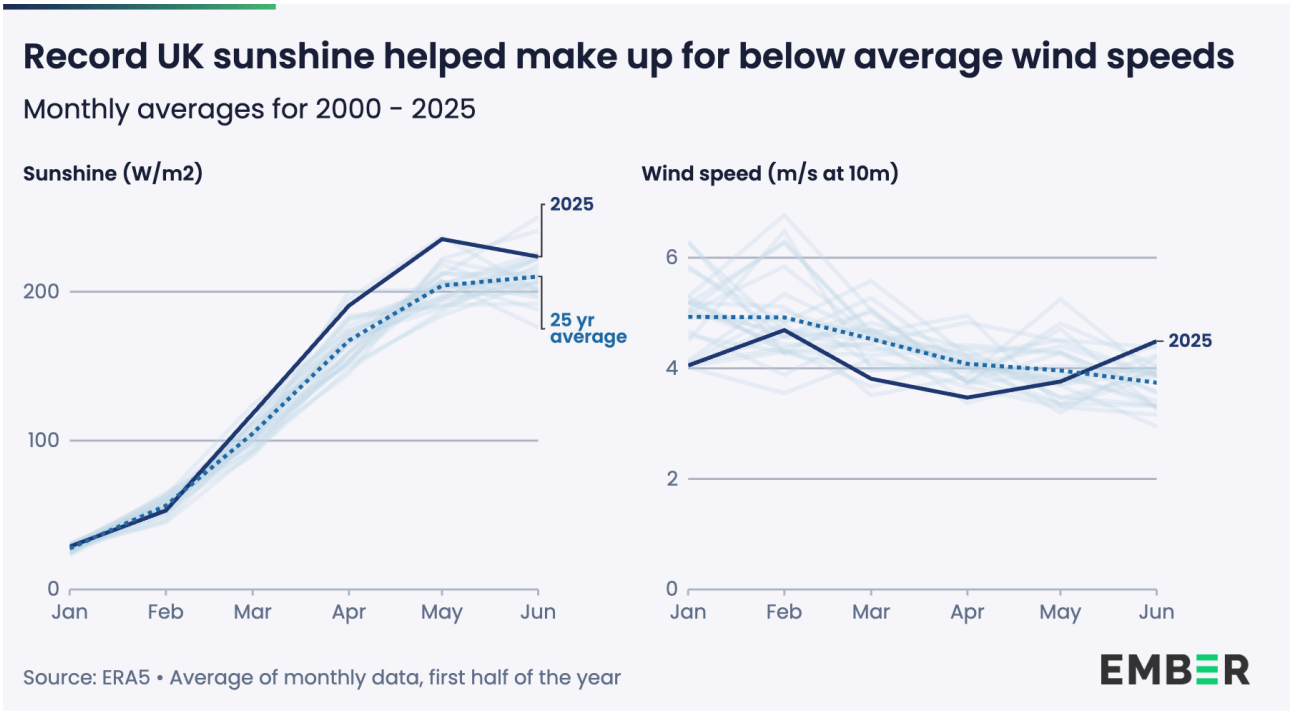
2025 started with slow wind speeds, but evolved into a sunny, windy spring and summer

Wind speeds in the first half of this year were below average, but at the same time Great Britain has had one of the sunniest springs on record. This is partly due to the temporary, northern, position of the jet stream this year, which has meant Britain has experienced much more consistent, settled weather this spring and summer.



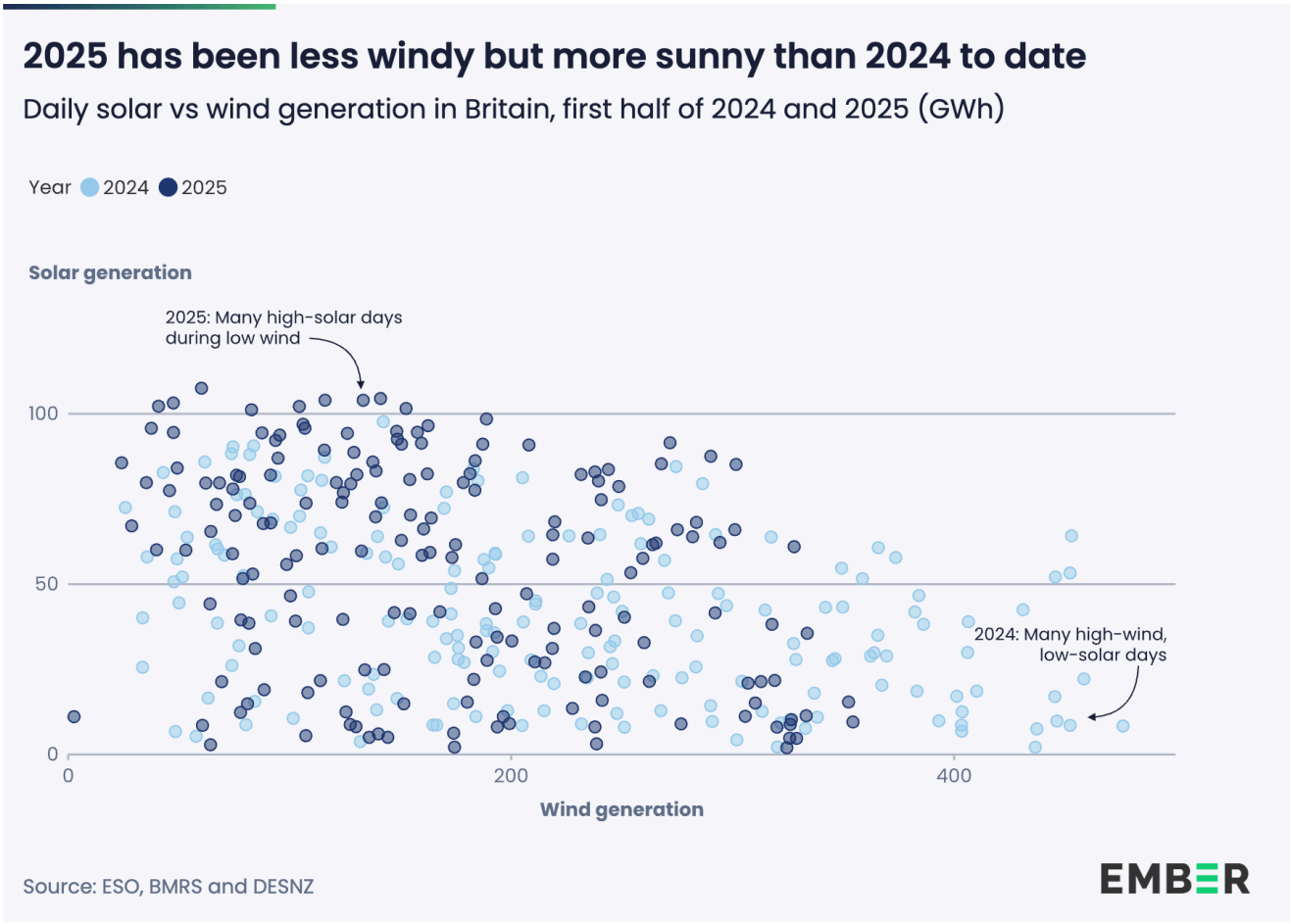
Comparing the first half of 2024 to 2025, the solar share of total generation increased by 2.4 TWh, helping to balance out the 2.8 TWh reduction in the wind share. The result of the balance between wind and solar is that there is only a 0.4 TWh reduction, and likely to improve as wind speeds have returned to long-term averages. These diverse energy sources therefore help balance each other out both on a daily and a seasonal basis.

Strong generation performance in May and June means that renewable energy generation has recovered from a slow start at the beginning of the year. Wind speeds in the first few months of 2025 were at the low end of the typical range,

with a notable absence of major storms after January. However, since a turnaround in the spring, higher wind generation, combined with record solar, means that clean power generation in 2025 has caught up with the 2024 half-year totals.

Comparing between years shows how well wind and solar power complement each other

While 2024 was windier and less sunny overall, the start of 2025 has been the opposite, with wind at the lower end of the typical range and solar outperforming previous records. As a result, the first half of 2024 was notable for its high wind generation and low solar generation days, whereas in 2025 there have been many high solar generation days during times of low wind generation.



Managing low-renewable periods

The clean power transition is developing quickly. As this progresses, rare extended low-renewable periods will be a challenge, but clean solutions are available to help reduce reliance on expensive gas.

Gas power increased in winter, but has fallen dramatically this spring and summer

Gas generation in May and June this year was the lowest ever recorded for those months, displaced by strong wind and solar generation. As a share of total generation, gas power fell below 25% in May and to 21% in June. In the long term, clean power and flexibility technologies will reduce the use of gas power plants, which are currently important for providing back-up generation and grid stability services.

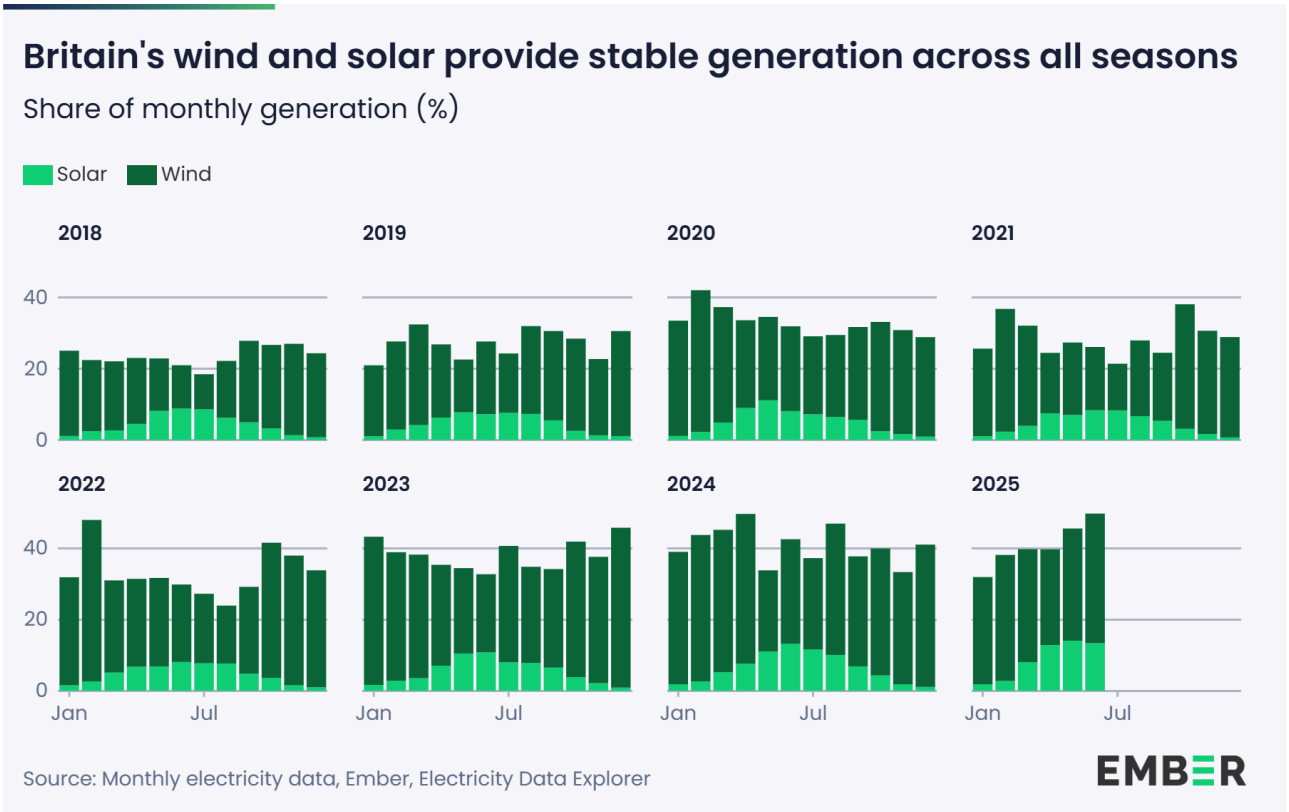
Lower electricity imports from Europe in 2025 have temporarily incentivised higher gas generation

Gas generation in the first half of 2025 was 5.7 TWh higher than in the first half of 2024. This filled a 3 TWh gap in power imports, which fell three times more than the smaller 1 TWh fall in the low-carbon share, as solar helped make up for low wind generation. The decrease in power imports from the high levels recorded in 2024 reflects a reduced price differential between Britain and its neighbouring countries, making trade less attractive.

Clean solutions already exist to reduce gas reliance.

Wind and solar are well balanced across seasons, but clean flexible energy is needed for occasional low periods

According to monthly data, wind and solar generation provide largely stable generation across seasons. Therefore, while the hourly and seasonal generation is well balanced, greater deployment of clean flexibility such as energy storage is required for the rare but occasional multi-day periods of low wind and solar generation.



The challenge for clean power systems is to reduce gas reliance for low wind and solar periods

While a reserve of gas power ensures back-up stability, it is also very expensive. Gas generation increased during a low-wind period in January 2025, however cleaner solutions, such as pumped hydro and long-duration energy storage,

also exist which can reduce dependence on expensive gas. Minimising the frequency and volume of expensive gas back-up requirements is a core part of reducing the cost of the transition to a clean power system.

Clean flexibility solutions will rise with an increasingly electrified economy over the next 10 years

Responsive power demand sources at both the large and small scale will unlock further opportunities to avoid gas imports, while dedicated energy storage capacity is targeted to double by 2030. Increased development of these clean flexible solutions reduces the overall requirement for a gas power supply, which will remain a small part of the power system in the immediate future.

Looking ahead to a strategic phase-down

In the long-run, gas power and biomass power plants should be moved to a strategic reserve, perhaps as soon as the early 2030s. Large-scale biomass power plant Drax emits more than the six largest gas power plants combined, and thus an equivalent phase-down plan is required. Not only polluting, but expensive too, power plants maintained only for supply back-up should be removed from the existing wholesale market to minimise the impact of these expensive power sources to consumers.

Supporting information

Methodology

Solar installations

Domestic-scale solar is defined in this analysis as anything below 10 kW in government solar installation tracking data for Great Britain. In reality, some large domestic users post-FiT may exceed this range, and some non-domestic users may fall within the range, but these are assumed to be negligible within the overall data, and not affect the overall large changes in installment rates per band.

Generation overlap data

Daily data for 2017 to the first half of 2025 was used to calculate percentiles for each year for solar and wind generation. Days with wind generation below the year-specific 20th percentile and solar generation below the within-year solar 20th percentile occur in only 2% of the days studied.

Acknowledgements

Contributors

Report and analysis by Frankie Mayo. Data visualisation by Lauren Orso. Edited by Alison Candlin.