Department for Energy Security & Net Zero

Energy Trends

UK, April to June 2025

About this release

Information on energy production, trade, and consumption in the UK for total energy and by specific fuels.

In this release

Data tables

Additional data are available online as part of the Energy Trends series:

Total energy
Coal and derived gases
Oil and oil products
Gas
Electricity
Renewables

This publication is based on a snapshot of survey data from energy suppliers. New data are incorporated in line with the revisions policy.

Percentage change from Quarter 2 2024, primary energy basis

(Mtoe basis)	Production	Imports	Exports	Demand
Total energy	**+0.9%**	**-5.3%**	**+4.2%**	**-5.0%**
Coal	**+55%**	**+8.1%**	**-38%**	**-48%**
Primary oil	**+4.5%**	**-3.6%**	**-2.6%**	**-2.1%**
Petroleum products	**+3.0%**	**-0.7%**	**+2.6%**	**+0.9%**
Gas	**+3.6%**	**-14%**	**+27%**	**-8.7%**
Electricity	**-3.4%**	**-10%**	**+20%**	**-3.4%**

- **The share of electricity generation from renewable sources during the second quarter of 2025 reached a new record level of 54.5 per cent of all generation**.
- A 10 per cent increase in offshore wind generation to 10.8 TWh and a 27 per cent increase in solar output to a record 7.1 TWh contributed to the new record. Solar generation was at a record high share of 11.0 per cent of all generation, with both record sun hours and increased capacity contributing.
- Despite a 13 per cent fall in nuclear output, **the low carbon generation share reached a record high of 69.8 per cent, with fossil fuel share reaching a record low of 26.7 per cent.**
- **The 2024 outturn for the Clean Power 2030 targets are included in Energy Trends this quarter for the first time**. Further information on these metrics can be found in Chapter 5, and the accompanying methodology note included as a special article in this document.
- **UK energy production during the second quarter of 2024 was up 1 per cent on last year's near record low**, with increases in both oil, gas and wind and solar output offsetting falls in nuclear and bioenergy. Energy production remains low by historic standards, down 25 per cent on the second quarter of 2019 as output from the UK's mature continental shelf continues to decline.
- **Total final energy consumption was 3.2 per cent lower than in the second quarter of 2024,** with a 15 per cent fall in domestic consumption being notable. Record high temperatures for the quarter were a factor in this fall, but seasonally and temperature adjusted domestic consumption are near historic lows. Transport demand increased by nearly 4 per cent with rises in petrol and jet fuel offsetting falls in diesel demand.

Section 1: UK total energy

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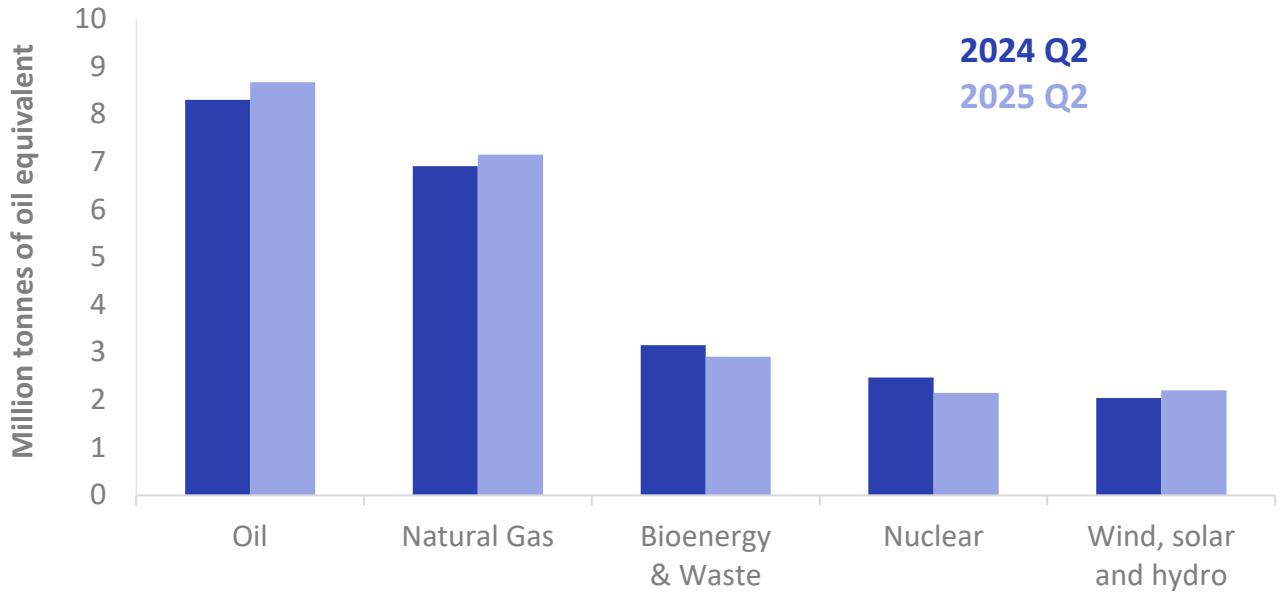
Key headlines

In the second quarter of 2025 **total energy production was 23.1 million tonnes of oil equivalent, 0.9 per cent higher** than in the second quarter of 2024, with rises in all primary fuels except bioenergy & waste, nuclear and hydro.

Total primary energy consumption for energy uses fell by 4.5 per cent, with motor spirit and jet fuel consumption up but diesel consumption down, gas for heating down due in part to record temperatures for the quarter, whilst solar output increased boosted by record sun hours for the quarter. When adjusted to take account of weather differences, primary energy consumption fell by 3.9 per cent.

Total final energy consumption (excluding non-energy use) was 2.6 per cent lower compared to the second quarter of 2024. Domestic consumption fell by 15 per cent to the lowest level recorded for the second quarter this century due in part to record warm temperatures. Other final users (mainly from the service sector) consumption fell by 4.5 per cent, industrial consumption fell by 4.4 per cent, whilst transport consumption rose by 3.9 per cent. On a seasonally and temperature adjusted basis, final energy consumption fell by 2.2 per cent, with falls in all sectors except transport which rose by 3.7 per cent.

Chart 1.1 UK production (Energy Trends Tables 1.1 & 1.3)

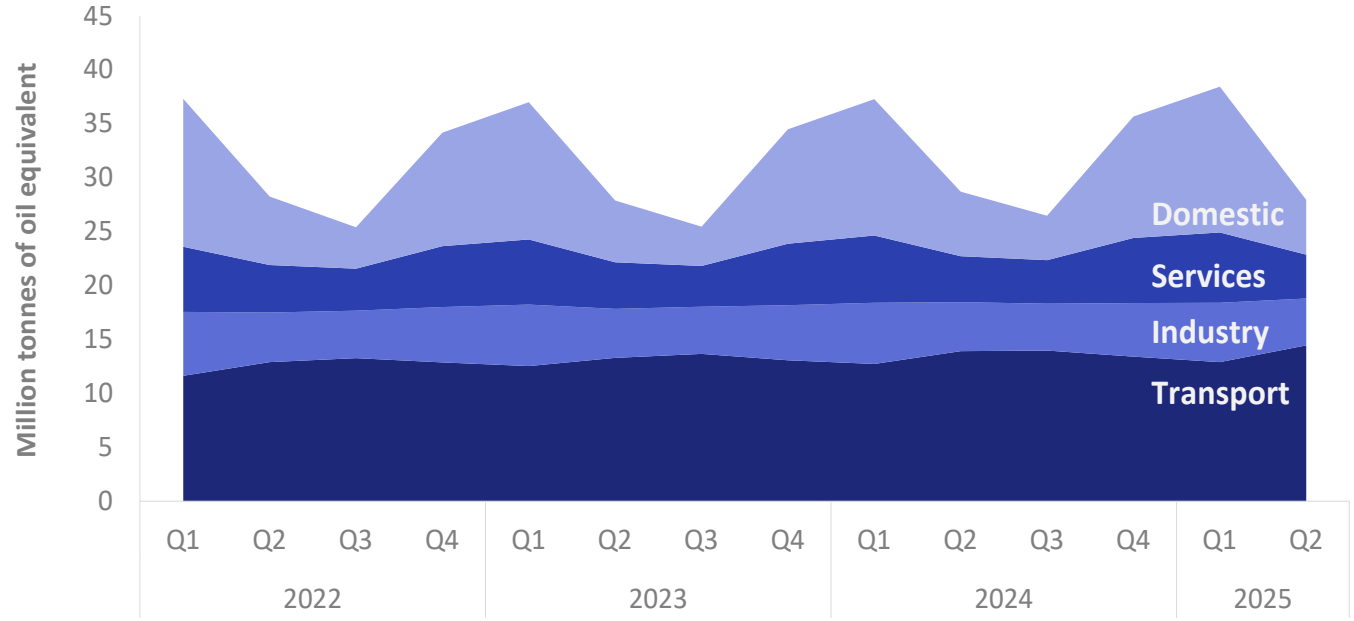


In the second quarter of 2025 **total production was 23.1 million tonnes of oil equivalent, 0.9 per cent higher** than in the second quarter of 2024 with rises in all primary fuels except bioenergy & waste, nuclear and hydro. Production from fossil fuels rose with oil rising by 4.5 per cent and gas by 3.5 per cent; although production levels have increased since the planned maintenance schedule in early summer 2021, total oil and gas production is now 33 per cent below pre-pandemic (2019) levels. Bioenergy and waste fell by 7.6 per cent, whilst nuclear output fell by 13 per cent due to outages. Wind, solar and hydro output rose by 7.8 per cent mainly due to increased capacity and record sun hours for the quarter, and accounted for 10 per cent of total production in the quarter. Coal output in the UK is now de minimis due to the last large surface mine Ffos-y-Fran closing at the end of November 2023.

Chart 1.2 Total inland consumption (primary fuel input basis) (Energy Trends Table 1.2)

In the second quarter of 2025 total inland consumption (including not only fuel used by consumers, but for electricity generation and other transformation) was 161.6 million tonnes of oil equivalent, 3.9 per cent lower than in the second quarter of 2024. This is on a seasonally adjusted and annualised rate that removes the impact of temperature on demand. Consumption of all primary fuels fell, except for petroleum, wind and solar.

Chart 1.3 Final energy consumption by user (Energy Trends Table 1.3)



In the second quarter of 2025 **total final energy consumption (excluding non-energy use) was 2.6 per cent lower** than in the second quarter of 2024. Average temperatures were the warmest recorded for the second quarter this century with June 2025 being notably warmer than June 2024, with domestic consumption falling by 15 per cent to the lowest level recorded for the second quarter this century. Once temperatures and seasonality are accounted for, domestic consumption still fell almost 10 per cent on the same period last year with consumption in both the first and second quarter of this year lower than that observed in 2024.

Consumption by services fell by 4.5 per cent, industry consumption fell by 4.4 per cent, whilst transport consumption rose by 3.9 per cent.

Section 2: Coal and derived gases

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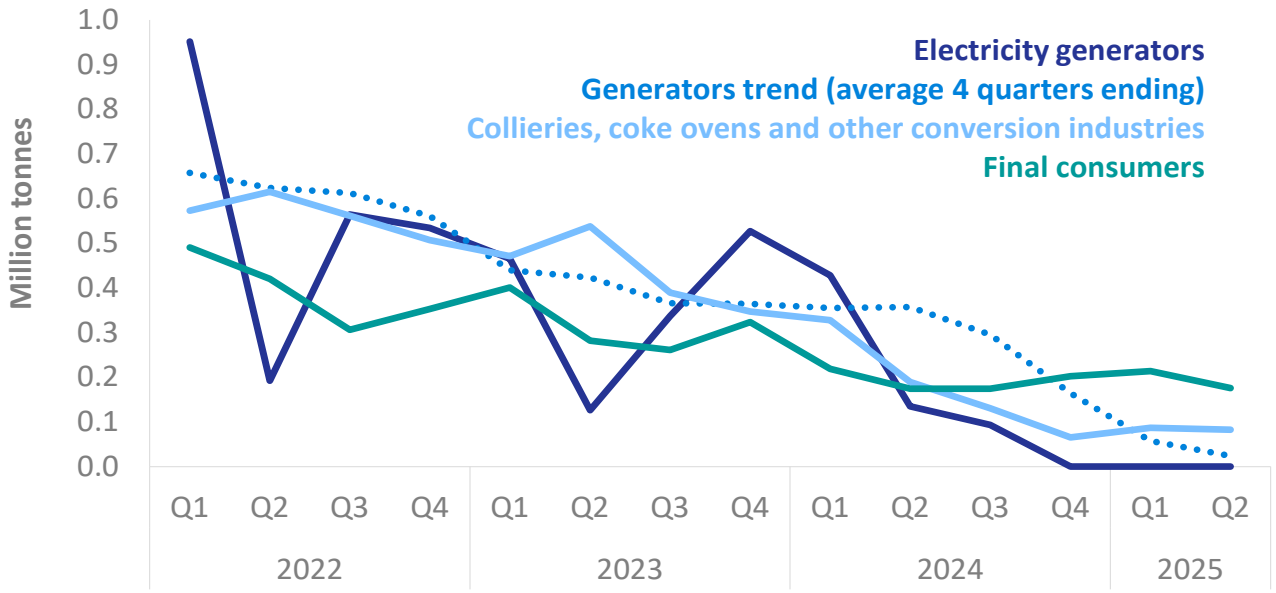
Key headlines

In the second quarter of 2025, UK coal demand fell to 258 thousand tonnes, 48 per cent lower than in Quarter 1 2024. There was no coal-fired power station generation and there was no coke oven gas production as all coke ovens had closed.

Overall coal production **for the second quarter of 2025 rose from 19 thousand to 29 thousand tonnes.** This was all deep-mined coal as the last large surface mine Ffos-Y-Fran closed at the end of November 2023. Coal production in the UK is now a small component of the UK's total energy production.

In Quarter 2 2025, coal imports rose to 444 thousand tonnes, 12 per cent up on last year, but was far below the peak of 13.4 million tonnes in Q2 2013. The largest provider of coal to the UK was Colombia (48 per cent). This was followed by South Africa (17 per cent) and the Venezuela (15 per cent).

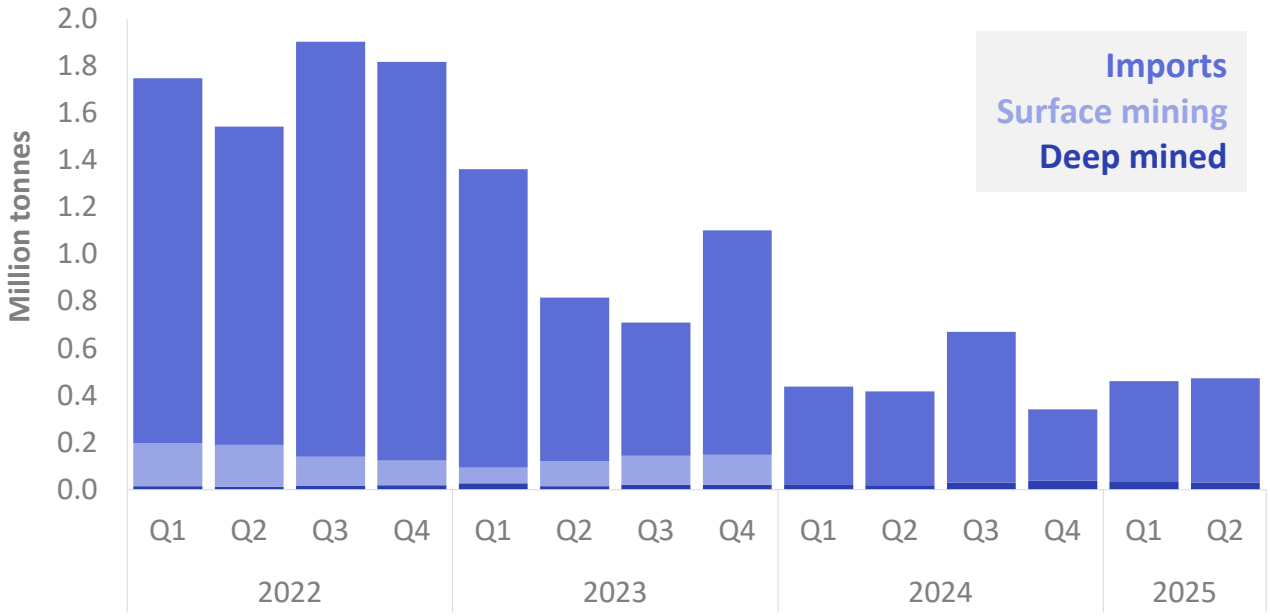
Chart 2.1 Coal Consumption (Energy Trends Table 2.1)



There was no coal-fired generation from power stations in the second quarter of 2025. The last coal-fired power plant - Ratcliffe-on-Soar - closed on 30 September 2024. Coal use has been phased out as electricity generation now favours gas, nuclear and renewables.

Domestic coal production has fallen steadily because of coal mine closures and reduced demand. **In Q2 2025, UK coal production rose to 29 thousand tonnes**, up 55 per cent compared to Q2 2024. However, there is a downward trend, and production was only 1.8 per cent of the value in Quarter 4 2015 when the last large deep mines closed. The last large surface mine Ffos-y-Fran closed at the end of November 2023. There is currently no surface mining in the UK.

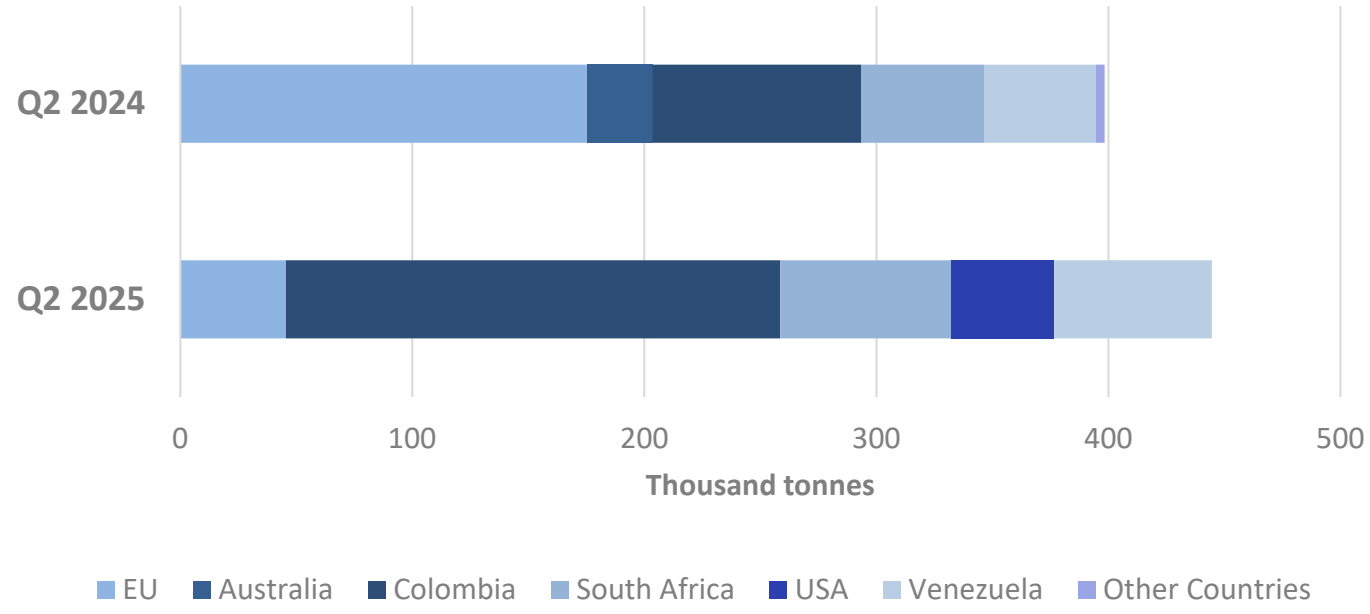
Chart 2.2 Coal Supply (Energy Trends Table 2.1)



In Quarter 2 2025, coal imports rose to 444 thousand tonnes, 12 per cent up on the same period last year. However, volumes are low due by historical standards due to low demand for coal (import peaked at 13.4 million tonnes in second quarter of 2013). Coal imports in Quarter 2 2025 comprised 386 thousand tonnes of steam coal (87 per cent of imports), 48 thousand tonnes of coking coal (11 per cent of imports) and 11 thousand tonnes of anthracite (2 per cent of imports).

The largest provider of coal to the UK during Quarter 2 was Colombia (48 per cent). This was followed by South Africa (17 per cent) and Venezuela (15 per cent). The UK banned Russian coal imports in August 2022. This reflects a decreasing reliance on Russian energy in line with that seen for both oil and gas.

Chart 2.3 Coal Imports (Energy Trends Table 2.4)



Section 3: Oil and oil products

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Key headlines

Indigenous production of primary oils rose by 3.9 per cent in Quarter 2 2025 compared to same period in the previous year but the long-term trend remains down, with production down 40 per cent on pre-pandemic values.

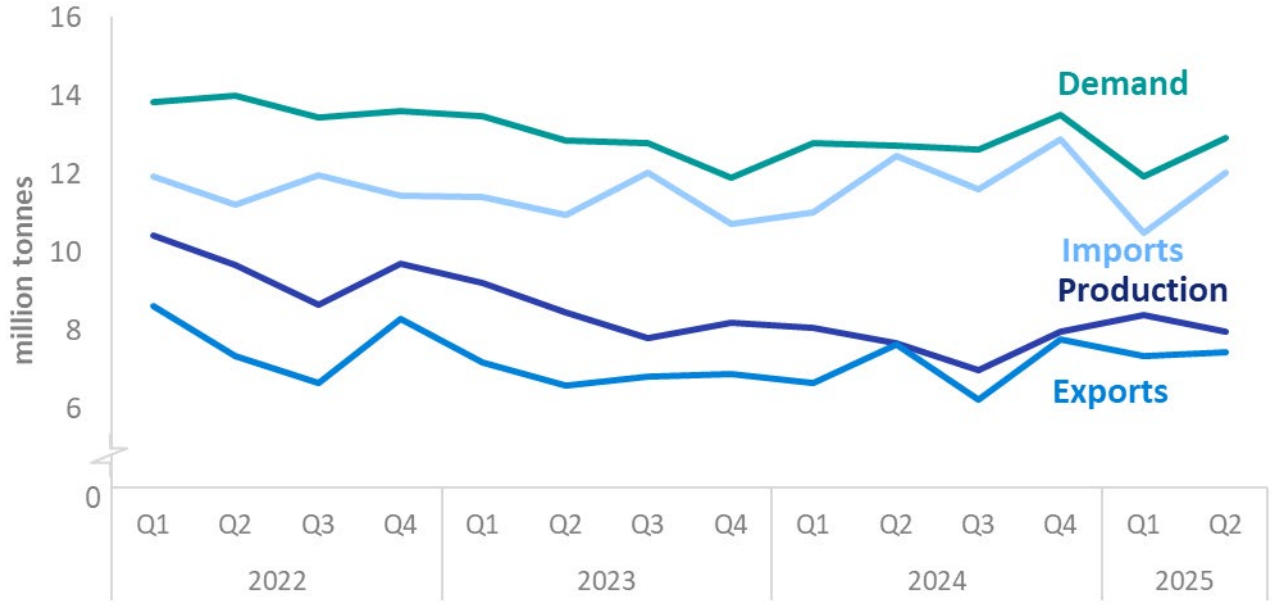
The UK was a net importer of all oils by 8.1 million tonnes, down 4.8 per cent compared to the same period in the previous year.

Demand for petroleum products was up by 1.0 per cent with broadly stable imports and exports up by 2.4 per cent. Refinery production was up by 3.1 per cent despite the closure of the Grangemouth refinery in April this year, partly because of less maintenance requirements across the sector this year compared to last.

Final consumption was up by 1.5 per cent, largely due to increases in demand for all transport fuels, but non energy use dropped by 17 per cent to a new record low during a period of maintenance.

Despite the long-term downward trend in production from the North Sea basin, indigenous production of primary oils was up by 3.9 per cent in Quarter 2 2025 compared to the same period in 2024. Over the longer term, there has been a sustained decline in oil production, with a quarterly rate of fall averaging around 7.0 per cent since 2019.

Chart 3.1 Production and trade of crude oil and NGLs (Energy Trends Table 3.1)



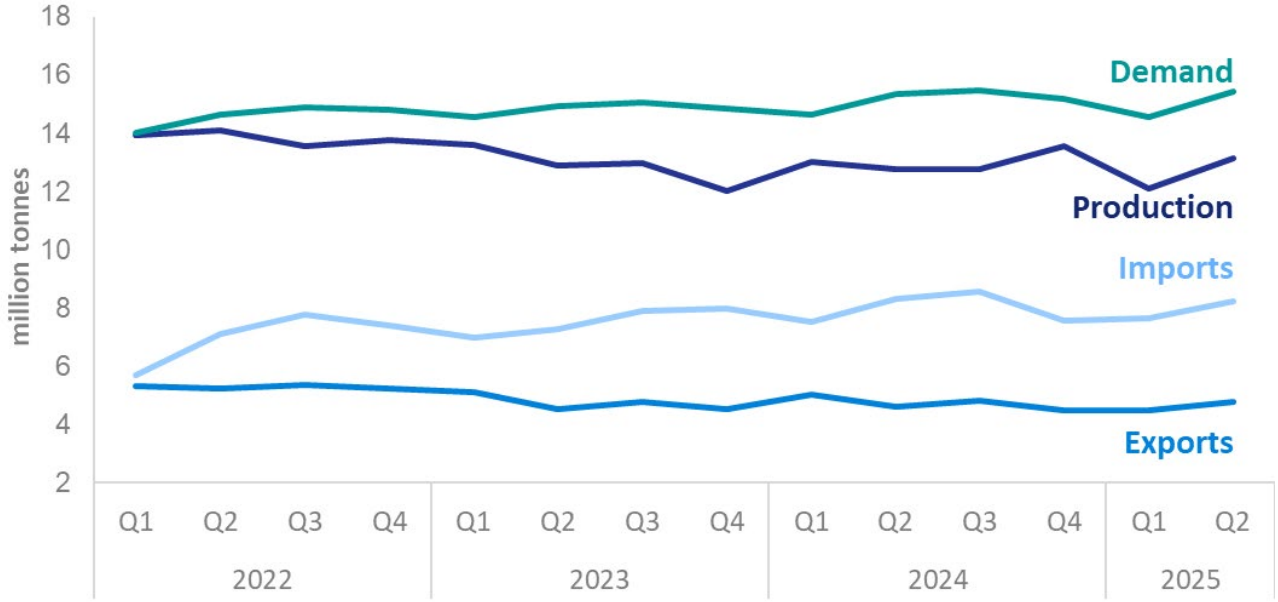
Imports of primary oils dropped by 3.5 per cent in Quarter 2 2025 compared to Quarter 2 2024 while exports were down by 2.6 per cent. The UK continues to be a net importer of primary oils and in Quarter 2 2025 net imports of primary oils, at 4.6 million tonnes, were down 4.9 per cent on the same period in 2024.

Refinery production was up by 3.1 per cent compared to Quarter 2 2024 - despite the closure of Grangemouth refinery in April - because of a drop in refinery losses this year, and less maintenance this year compared to last.

Demand for petroleum products remained relatively stable, up by 1.0 per cent compared to the same period last year. Petrol, jet fuel, fuel oil and burning oil all saw increases in demand, which was partially met

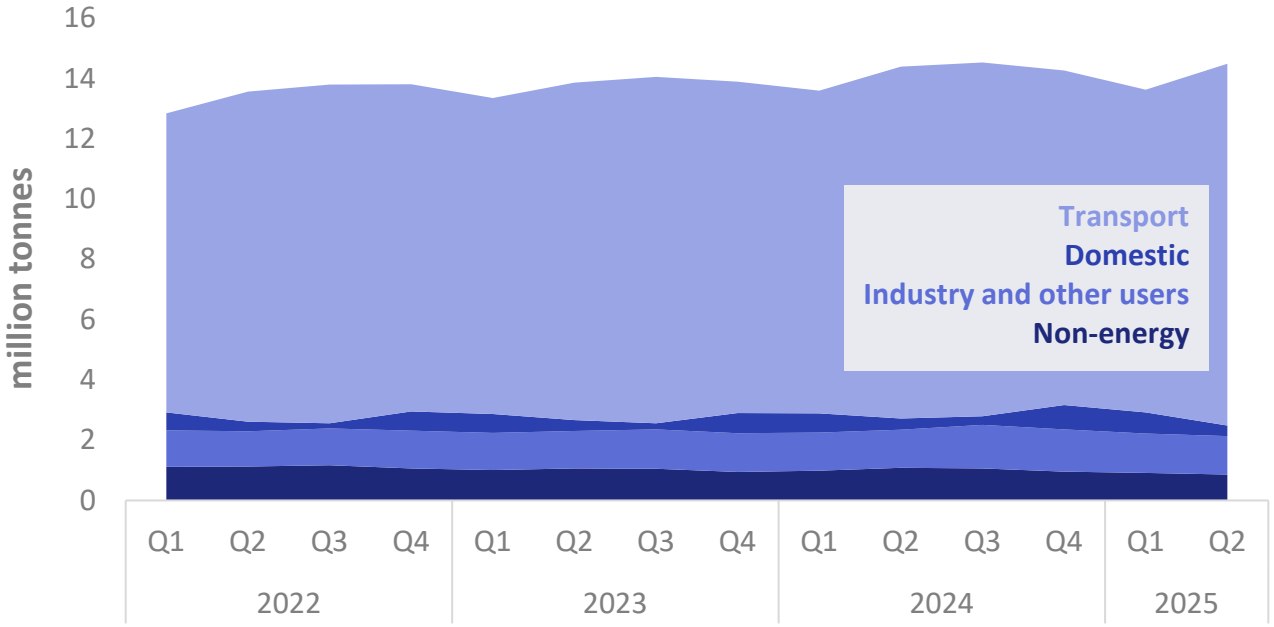
through the increases in production. With stable demand largely met by increased production, imports were broadly stable (down just 0.8 per cent) as exports increased by 2.4 per cent. The UK remained a net importer of products by 3.5 million tonnes, a decrease of 4.8 per cent.

Chart 3.2 Production and trade of petroleum products (Energy Trends Table 3.2)



Within demand, final consumption increased by 1.5 per cent. Transport saw a 400 thousand tonne (3.4 per cent) increase and industry was up by 1.2 per cent. Within transport, petrol was up by 6.5 per cent (195 thousand tonnes), diesel by 2.7 per cent (140 thousand tonnes), and jet fuel by 2.1 per cent (65 thousand tonnes). This was counterbalanced by decreases of 2.2 per cent and 17 per cent in domestic and non-energy use, respectively, with non-energy use dropping to a record low during a period of extensive maintenance.

Chart 3.3 Sector demand for petroleum products (Energy Trends Table 3.4)



The UK held 10.5 million tonnes of stock at the end of Quarter 2 2025, 6.4 per cent more than the previous year. Primary and product stocks increased by 8.1 and 4.8 per cent, respectively. Net bilaterals increased by 60 per cent to 1.3 million tonnes and stocks held in the UK were up by 1.4 per cent. At 9.2 million tonnes, stocks held in the UK were nearly 90 per cent of total stocks.

UK stocks were equivalent to more than 90 days of net imports, above the minimum requirement set through membership of the International Energy Agency.

Section 4: Gas

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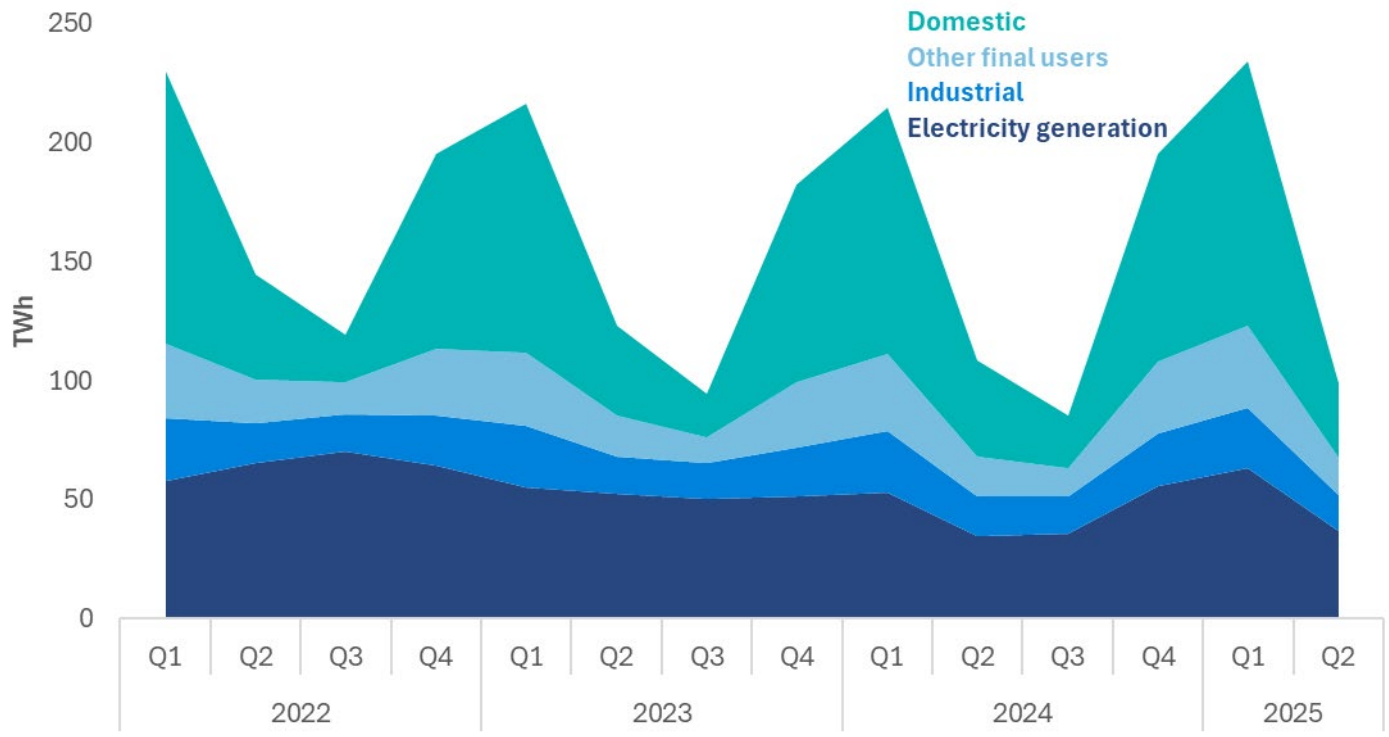
Key headlines

Demand for natural gas was down 8.6 per cent in Quarter 2 2025, compared to the same period in 2024 as the warmest Quarter 2 on record helped drive lower final consumption. Domestic (household) consumption saw the largest decrease down 23 per cent. Consumption by other final users (mainly commercial and public administration) and industrial sectors also fell. Gas demand for electricity generation increased in the period due in part to lower electricity imports compared with last year.

Imports decreased and exports increased as Norwegian outages impacted trade. Pipeline imports decreased by 19 per cent in Quarter 2 2025 compared to the same period in 2024, whereas liquified natural gas (LNG) imports increased. Exports to Belgium and the Netherlands increased by 47 and 30 per cent respectively.

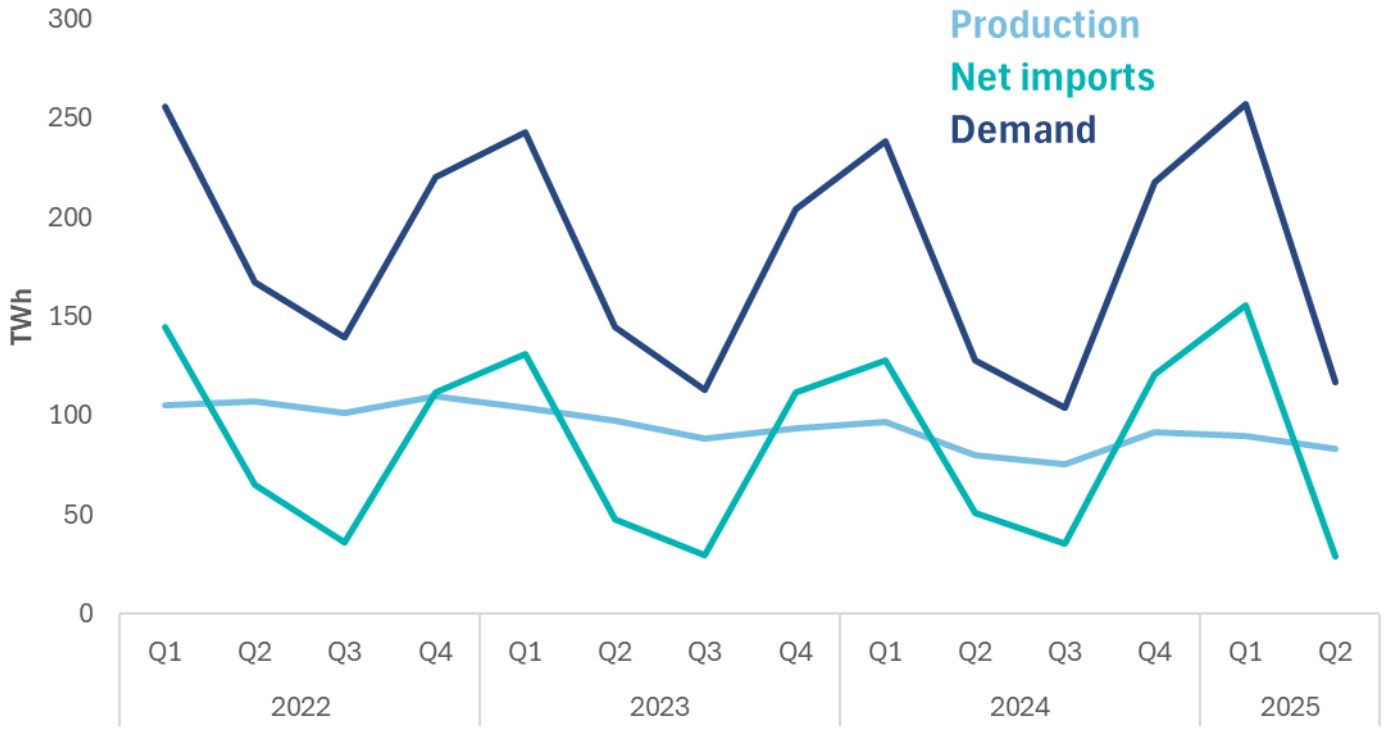
Gas production increased, up 3.6 per cent in Quarter 2 2025 compared to the near record low seen during the same period last year. Gas production remains low by historic standards and is down 21 per cent on pre-pandemic levels seen during the second quarter of 2019.

Chart 4.1 Natural gas demand by domestic, other final users industrial and electricity generation sectors in the UK (Energy Trends Table 4.1)



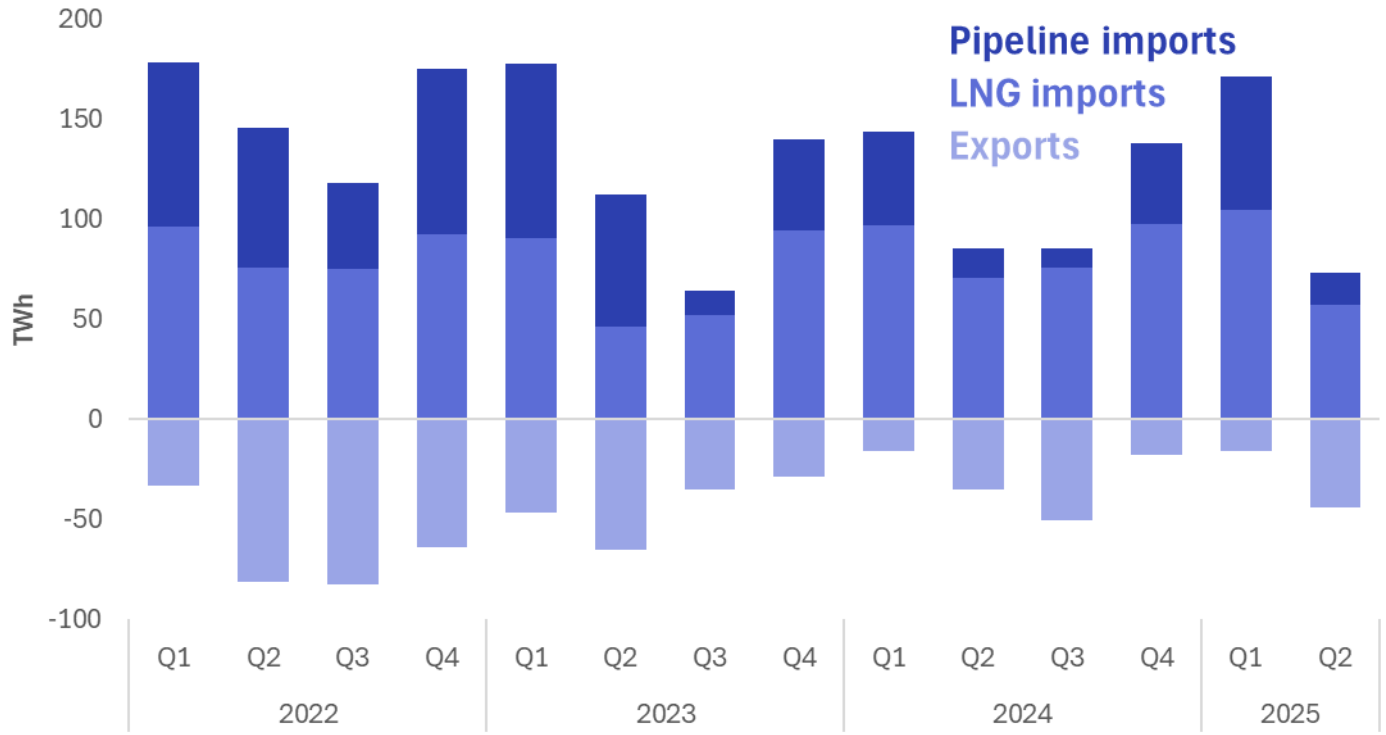
Gas demand was down 8.6 per cent in Quarter 2 2025 compared to the same period in the previous year. This was largely driven by low domestic (household) gas consumption, which fell 23 per cent in the same period due in part to warm temperatures. Higher average temperatures also impacted consumption by other final users (mainly commercial and public administration sectors) which fell by 7.4 per cent. Industrial gas demand was down 9.3 per cent in Q2 2025 compared to Quarter 2 2024. Conversely, gas demand for electricity generation increased, up 6.2 per cent, in the same period due in part to reduced imports of electricity compared with the same period last year (see Chapter 5 for more information).

Chart 4.2 Natural gas production, trade and demand in the UK (Energy Trends Table 4.1)



Gas production was up 3.6 per cent compared to the near record low seen during the same period last year. Gas production remains low by historic standards and is down 21 per cent on pre-pandemic levels seen during the second quarter of 2019. Net imports were down 43 per cent in Quarter 2 2025 compared to the same period in 2024 as exports increased and imports decreased.

Chart 4.3 Natural gas imports and exports in the UK, (Energy Trends Table 4.3 and Energy Trends Table 4.4)



Imports decreased by 14 per cent in Quarter 2 2025 compared to the same period in 2024.
Trade in the quarter was affected by outages at Norwegian gas fields which reduced the amount of gas entering the UK and mainland Europe. UK imports decreased mainly a result of a 19 per cent fall in imports from Norway. Despite decreased imports, UK exports to Europe increased, largely via low domestic demand, as European imports from Norway also fell; exports to Belgium and the Netherlands increased by 47 and 30 per cent respectively. Imports of liquified natural gas (LNG) increased 6.8 per cent in the same period, with a 54 per cent increase in LNG imports from the US.

Section 5: Electricity

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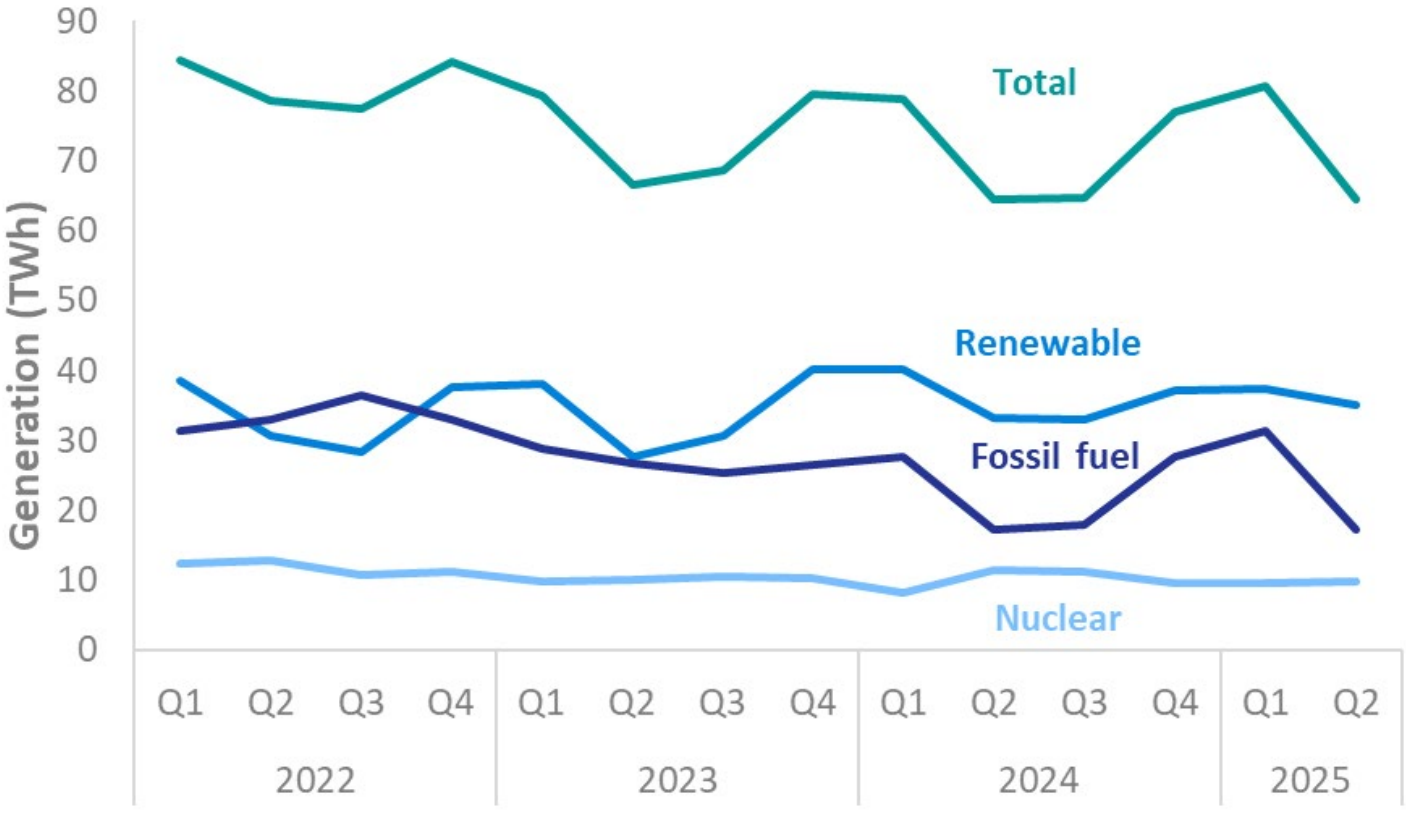
Key headlines

At 35 TWh of generation, the second quarter of 2025 saw a record share of renewable generation, rising 2.8 percentage points on last year to 54.5 per cent, due in part to increased wind capacity and the highest average daily sun hours in our time series.

The increase in renewable generation offset a large fall in nuclear output and led to a **record low carbon share of 69.8 per cent. Fossil fuel generation equalled previous record lows at 26.7 per cent** with wind yet again outpacing gas.

Electricity demand fell by 2.6 per cent to 72 TWh, the second lowest value within the recorded time series, due in part to record temperatures during the quarter. Total consumption of electricity by end users fell 1.2 per cent from Quarter 2 2024 to 63 TWh. Domestic consumption and consumption from other users, including commercial users and transport, both fell while industrial consumption rose slightly.

Chart 5.1 Electricity generated, by fuel type (Energy Trends Table 5.1)



Renewable electricity generation rose 5.5 per cent to 35.1 TWh in Quarter 2 2025, with the share of generation from renewables reaching a new record of 54.5 per cent. Following record average sun hours, solar generation increased 27 per cent to 7.1 TWh and saw the largest change in generation shares, up 2.3 percentage points to 11 per cent. Wind generation rose 5.0 per cent from the same period last year, reaching 17.9 TWh and overtaking gas in the generation mix for the third time in a quarterly period. New capacity for offshore wind sites outweighed a slight drop in average wind speeds (see chapter 6 for further details).

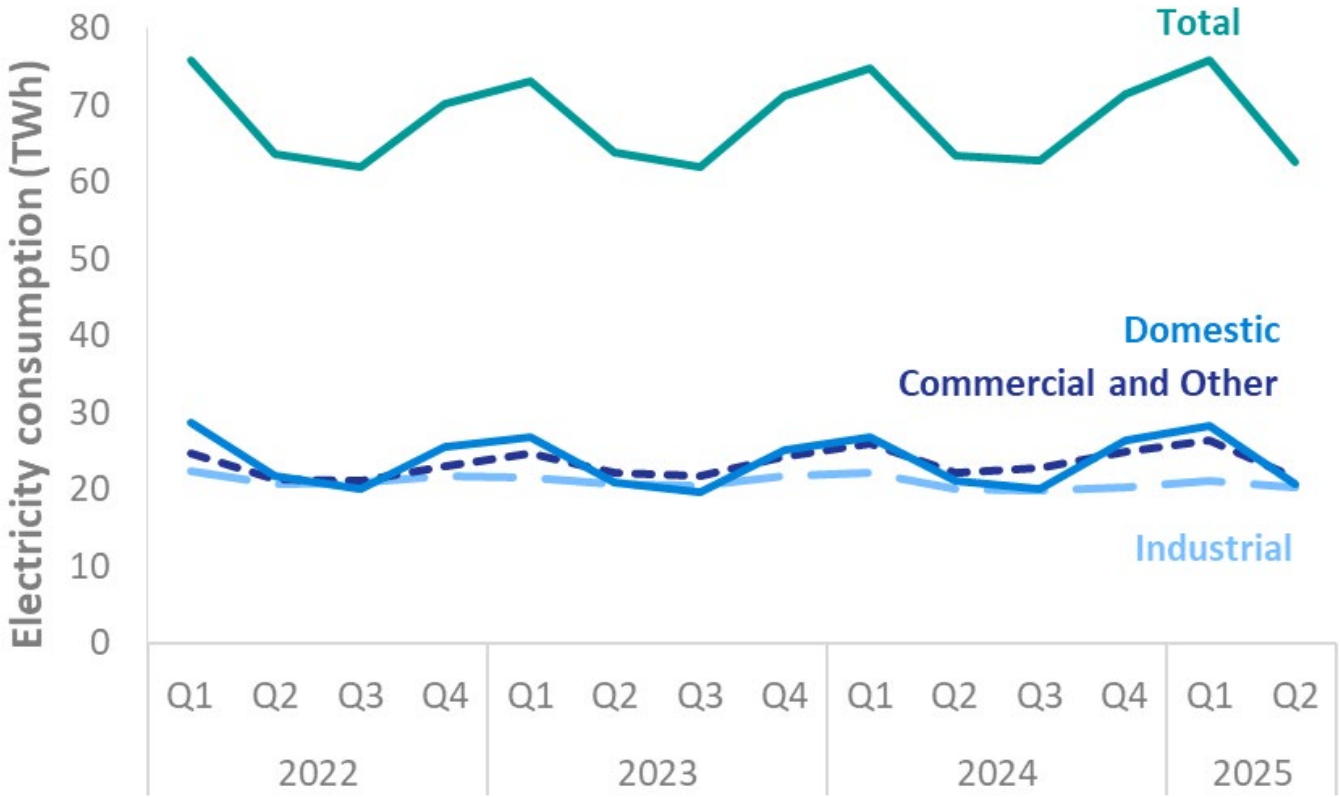
During Quarter 2 of 2025, nearly all of the UK's remaining nuclear sites experienced outages, and nuclear fell 13 per cent on the same quarter last year to 9.9 TWh. Whilst this decrease offset much of the increase in renewable generation, **low carbon generation still reached a record 69.8 per cent share of generation,** up from the previous record of 69.3 per cent recorded in the same quarter last year.

For metrics detailing progress against the Clean Action Plan, please see the break-out box on the following page.

Despite a 2.4 per cent increase gas generation to 16.8 TWh, **fossil fuel generation was at record lows of 17.2 TWh of generation output and 26.7 per cent share of total generation** due to the drop in coal generation.

UK electricity generation remained stable from the same period last year at 64 TWh. With reduced demand, net imports fell 20 per cent from Quarter 2 2024's record high to 7.4 TWh and were equivalent to 10 per cent of UK electricity demand for Quarter 2 2025. Interconnector price differentials were less favourable towards imports compared to the same period in 2024 and will have displaced some of gas-fired generation met by imports.

Chart 5.2 Electricity consumption by sector (Energy Trends Table 5.2)



Electricity demand fell 2.6 per cent from Quarter 2 2024 to 72 TWh, the lowest level since the first COVID-19 lockdown. Total consumption of electricity by end users was 63 TWh in Quarter 2 of 2025, down 1.2 per cent from Quarter 2 2024. Consumption from other users, including commercial users and transport, constituted the largest change – falling 2.9 per cent to 22 TWh. This was despite the increase in electricity used for transport which rose due to increased electric vehicle numbers.

Domestic consumption decreased 2.0 per cent from Quarter 2 2024, to 21 TWh, with warmer average temperatures in Quarter 2 2025. Industrial consumption saw a 1.4 per cent increase to 20 TWh in Quarter 2 2025 in line with increases in the Index of Production.

Clean Power 2030 metrics

The UK's Plan for Change aims to make Britain a Clean Energy Superpower through clean sources producing at least 95% of Great Britain's generation. In addition to this overarching target, the Clean Power 2030 Action Plan states that in a typical weather year, the 2030 power system will see clean sources produce at least as much power as Great Britain consumes in total, reducing the carbon intensity of electricity generation to well below 50gCO_2e/kWh in 2030.

The Clean Power 2030 Action Plan covers Great Britain's power system whilst Energy Trends covers UK electricity supply and demand, and UK generation cannot be used as a substitute for the GB targets expressed in the Action Plan. A detailed note on the methodology used to calculate GB's data in line with the definitions used in the Clean Power Action Plan is available at: https://www.gov.uk/government/statistics/clean-power-2030-metrics.

Using this methodology, the 2024 outcome metrics are:

I. *Clean sources produce at least 95 per cent of Great Britain's generation.* In 2024, 73.8 per cent of GB's power system generation came from low carbon technologies, up 5.5 percentage points from 2023.
II. *Clean power sources produce at least as much power as Great Britain consumes in total*. Low carbon generation met 63.6 per cent of qualifying GB demand in 2024, up 2.1 percentage points from 2023.
III. *Carbon emissions intensity of Great Britain's electricity generation is well below 50g CO_2e/kWh by 2030*. In 2024, Carbon intensity of the GB power system dropped 19 per cent to 105g CO_2e/kWh.

A more detailed table showing the breakdown of the calculation and a time series is shown at: https://www.gov.uk/government/statistics/clean-power-2030-metrics

Section 6: Renewables

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Key headlines

In Quarter 2 2025, total renewable generation increased by 5.5 per cent on the same period last year to 35.1 TWh, due to increased capacity and more favourable conditions for solar generation.

Solar PV generation increased to a record 7.1 TWh, up by more than a quarter on last year. Generation was driven by additional capacity and an increase in average sun hours, with this the sunniest quarter in our time series. In contrast, hydro generation decreased as this quarter was drier than last year.

Wind generation increased by 5.0 per cent to 17.9 TWh, with a 10 per cent rise in offshore generation partly offsetting a fall in generation from onshore sites. Offshore generation grew despite lower wind speeds, due to new capacity.

Generation from bioenergy was down 1.8 per cent on last year at 9.5 TWh. Generation from landfill gas, sewage gas and animal biomass were all down but this was partly offset by an increase for plant biomass.

Since Quarter 2 2024 2.6 GW of new renewable capacity was added, of which more than a half was solar PV and over a third was offshore wind. This represents a 4.3 per cent increase in total capacity on the same period last year.

Renewables' share of electricity generation was a record 54.5 per cent, breaking the current record of 51.7 per cent set in the same quarter of 2024. This was driven by higher renewable generation, lower generation from nuclear and lower demand. Generation from fossil fuels was at a similar level to 2024 (see Chapter 5).

Chart 6.1 Change in renewable generation and capacity between Q2 2024 and Q2 2025 (Energy Trends Table 6.1)

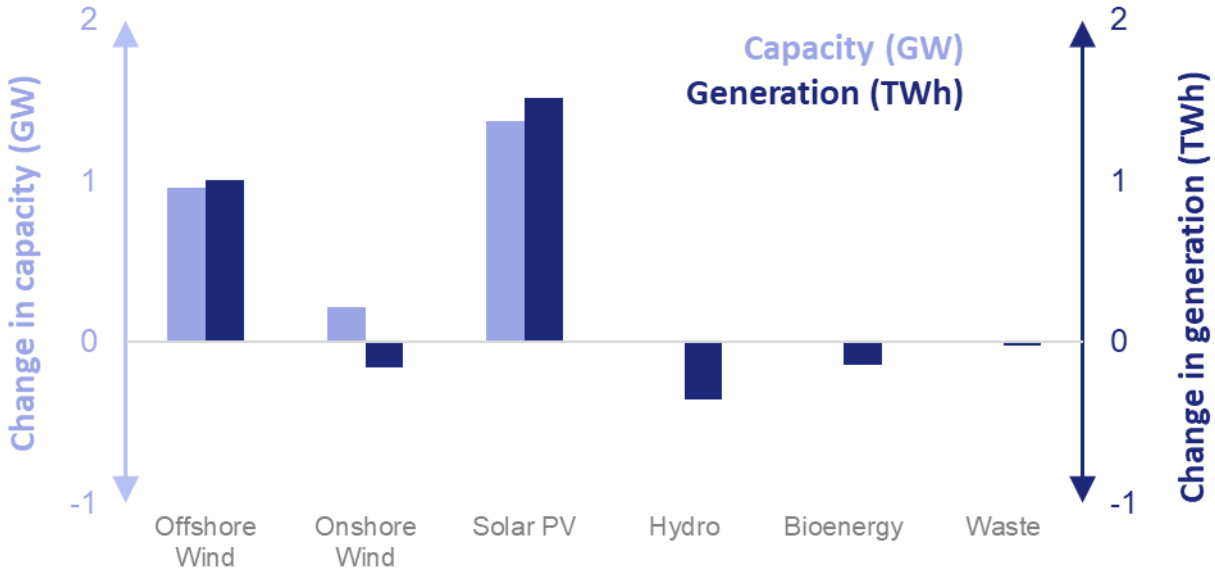


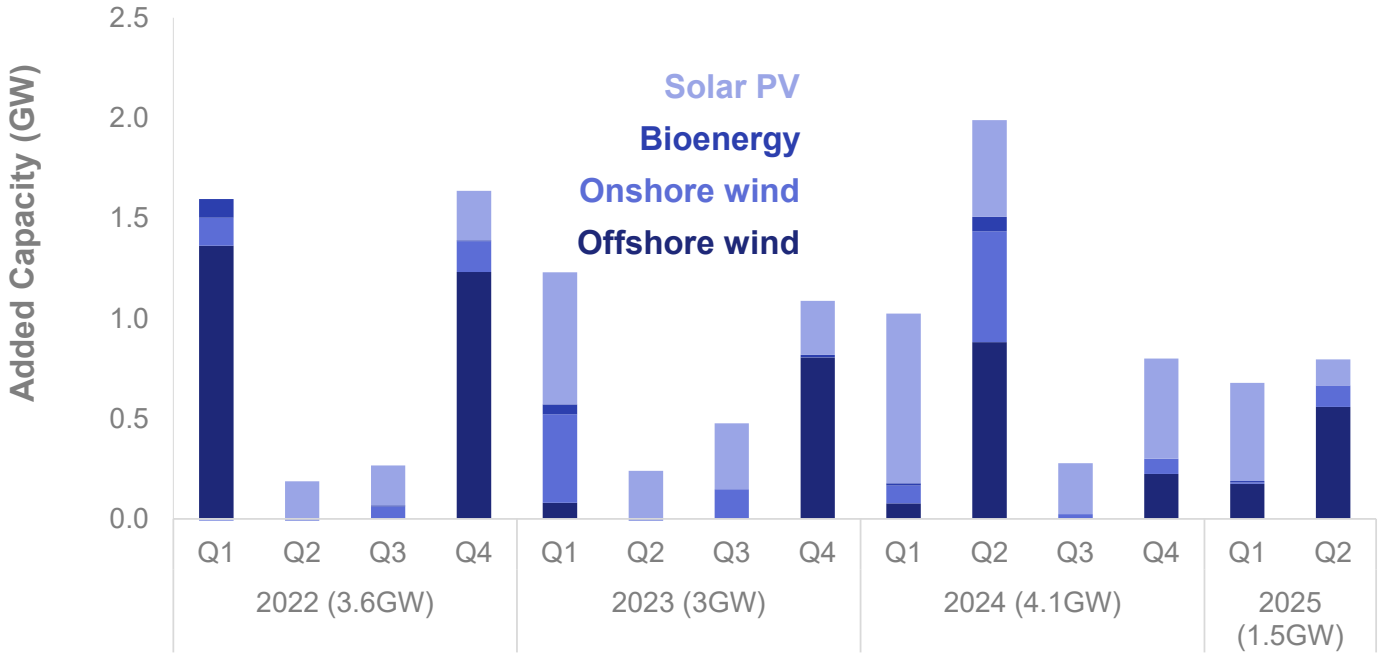
Chart 6.1 shows strong growth in both capacity and generation in the latest quarter from solar PV and offshore wind. A combination of an additional 1.4 GW in solar PV capacity (an increase of 7.8 per cent), and the highest average sun hours since our time series began (in 2001), resulted in record generation of 7.1 TWh. Similarly, new capacity in offshore wind (1.0 GW) drove a 10 per cent increase in generation, though unlike

solar PV which experienced more favourable weather conditions, wind speeds were 2.7 per cent lower. A cable failure which had impacted generation in 2024 has now been rectified further offsetting the impact of lower wind speeds. New onshore wind capacity (0.2GW) wasn't sufficiently large to offset the less favourable wind speeds and generation fell by 2.2 per cent. Overall, wind generation increased by 5.0 per cent which, along with offshore wind generation, was a record for a second quarter.

Hydro generation was down by a third on 2024 to 0.7 TWh due to lower rainfall. Quarter 1 also saw very low rainfall, and this is likely to have had a knock-on effect into Quarter 2.

Total bioenergy generation fell by 1.8 per cent to 9.5 TWh, driven by lower generation from landfill gas (down 11 per cent) as extraction rates continue to decline, sewage gas (down 20 per cent), animal biomass (down 14 per cent) and anaerobic digestion (down 3 per cent). The only bioenergy technology to increase was plant biomass, which although is the dominant technology in absolute terms, growth at 0.6 per cent was insufficient to offset the overall decrease.

Chart 6.2 Added capacity since 2022 for the leading technologies (Energy Trends Table 6.1)



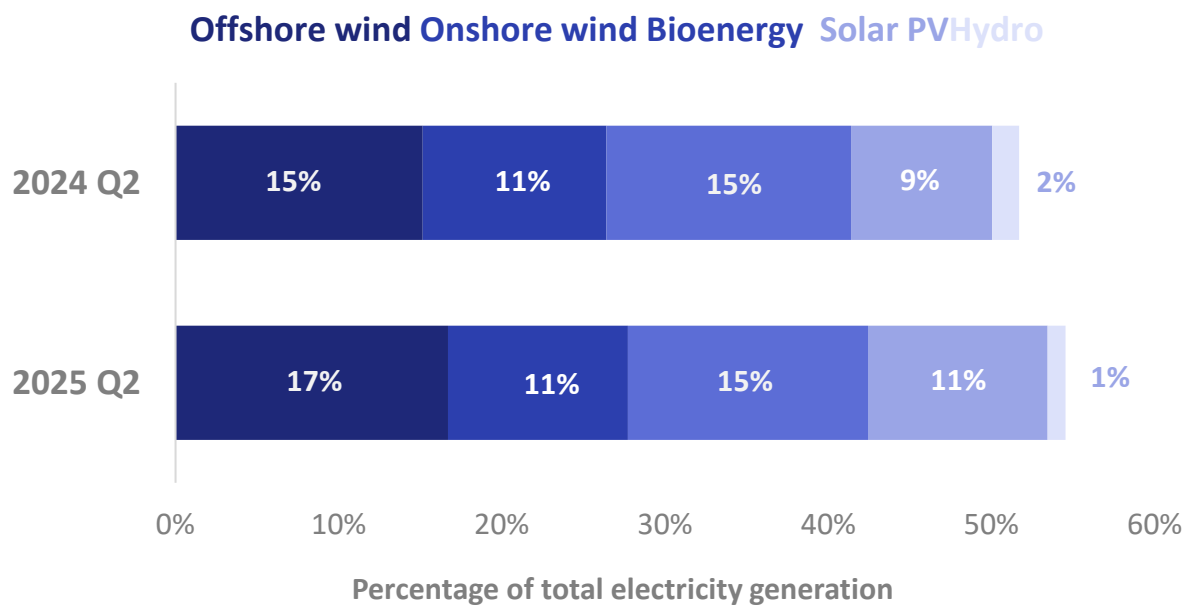
Installed capacity increased by 4.3 per cent (2.6 GW) compared to Quarter 2 2024, bringing the total to 62.1 GW. More than half of the new capacity was solar PV, and offshore wind contributed more than a third. Within the latest quarter, there was 0.8 GW installed, up on the 0.7 GW installed in Quarter 1 but down on the 2.0 GW installed in Quarter 2 2024 when two large wind sites were installed.

Of the 2.6 GW new capacity installed over the last year, 1.4 GW was solar PV. This includes several new sites each consisting of roughly 50 MW: Crouch Solar Farm, Darlington Road, Layer Farm and Scurf Dyke. There has also been a large number of domestic and small-scale installations (under 10 kW) and taken together, these accounted for around half of the capacity (0.7 GW) added since Quarter 2 2024. (see Solar Deployment tables for more detail: Solar photovoltaics deployment - GOV.UK)

The new offshore wind capacity (1.0 GW in total) includes additional capacity at NNG and Moray West in Scotland, as well as the first stages of Dogger Bank, off the east coast of England.

There has been very little new capacity for hydro or bioenergy over the last 12 months.

Chart 6.3 Renewables' share of electricity generation – Q2 2024 and Q2 2025 (Energy Trends Table 6.1)



In Quarter 2 2025, renewables' share of generation was a record 54.5 per cent, 2.8 percentage points higher than Quarter 2 2024 (the previous record), and twice as high as fossil fuels' share (26.7 per cent). Whilst renewable generation increased on last year, the share of total generation attributed to renewables increased at a proportionally higher rate due to lower indigenous production for overall electricity in response to reduced demand (see Chapter 5 for more details). Offshore wind's share of generation increased from 15.1 per cent to 16.7 per cent. Taken together, wind accounted for 27.7 per cent of total generation, an unusually high share for a second quarter when wind speeds tend to be lower than average.

Data tables and special articles

Data in this release

Data are collected by DESNZ through surveys of energy suppliers. This publication highlights key stories in energy in the UK for the specified period. Additional data are available in the quarterly and monthly statistical tables for each fuel and total energy. The tables are generally in commodity balance format, showing the flow from the sources of supply through to final use.

Special articles

Special articles that explore current topics of interest are available alongside this summary report. Included in this publication are:

Clean Power 2030 metrics: methodology

Competition in UK electricity markets, 2024

Competition in UK gas markets, 2024

Diversity of supply for oil and oil products in OECD countries in 2024

Hydrogen production and demand in the UK, 2022-2024

Regional renewable electricity in 2024

Statistical tables*

Data tables available as part of the Energy Trends series:

Total energy

Solid fuels and derived gases

Oil and oil products

Gas

Electricity

Renewables

The full range of special articles is available here: https://www.gov.uk/government/collections/energy-trends-articles

Additional sources of information

Index of Production, published by the Office for National Statistics:
https://www.ons.gov.uk/economy/economicoutputandproductivity/output/bulletins/indexofproduction/previousReleases

Index of Services, published by the Office for National Statistics:
https://www.ons.gov.uk/economy/economicoutputandproductivity/output/bulletins/indexofservices/previousReleases

Detailed annual Digest of UK Energy Statistics:
http://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes

Tables showing foreign trade flows of energy:
https://www.gov.uk/government/statistics/dukes-foreign-trade-statistics

Weather tables produced by DESNZ using Met Office data:
https://www.gov.uk/government/collections/weather-statistics

Information on Energy Prices:
http://www.gov.uk/government/collections/quarterly-energy-prices

*Hyperlinks will open the most recently published table. If you require a previously published version of a table, please contact DESNZ at: energy.stats@energysecurity.gov.uk

Technical information

Methodology and revisions

More detailed notes on the methodology used to compile the figures and data sources are available on the collection pages for each fuel. The figures have not been adjusted for temperature or seasonal factors except where noted.

Percentage changes relate to the corresponding period a year ago. They are calculated from unrounded figures. They are shown as (+) or (-) when the percentage change is very large. Quarterly figures relate to calendar quarters. All figures relate to the United Kingdom unless otherwise indicated. Further information on Oil and Gas is available from the North Sea Transition Authority at https://www.nstauthority.co.uk/

Table of conversion factors

To	ktoe	TJ	GWh	million therms	To	toe	GJ	kWh	therms
From	Multiply by				**From**	Multiply by			
ktoe	1	41.868	11.63	0.39683	**toe**	1	41.868	11,630	396.83
TJ	.023885	1	0.27778	0.0094778	**GJ**	0.023885	1	277.78	9.4778
GWh	.085985	3.6	1	0.034121	**kWh**	0.000085985	0.0036	1	0.034121
million therms	2.52	105.51	29.307	1	**therms**	0.00252	0.105510	29.307	1

ktoe = thousand tonne of oil equivalent toe = tonne of oil equivalent

Sector breakdowns

Categories for final users are defined by Standard Industrial Classification 2007:

Fuel producers	05-07, 09, 19, 24.46, 35
Final consumers	
Iron and steel	24 (excluding 24.4, 24.53 and 24.54)
Other industry	08, 10-18, 20-23, 24.4 (excluding 24.46), 24.53, 24.54, 25-33, 36-39, 41-43
Transport	49-51 (part*)
Other final users	
Agriculture	01-03
Commercial	45-47, 52-53, 55-56, 58-66, 68-75, 77-82
Public administration	84-88
Other services	90-99
Domestic	Not covered

* Note – transport sector includes only energy used for motion/traction purposes. Other energy used by transport companies is classified to the commercial sector.

Revisions policy

Figures for the latest periods are provisional and are liable to subsequent revision. The DESNZ statistical revisions policy sets out the revisions policy for these statistics, which has been developed in accordance with the UK Statistics Authority Code of Practice for Statistics.

Glossary

Tonne of Oil Equivalent

A common unit of measurement which enables different fuels to be compared and aggregated, and equal to 41.868 gigajoules. Usually expressed in Trends as ktoe (Thousand tonnes of oil equivalent) or Mtoe (Million tonnes of oil equivalent).

Indigenous production

The extraction or capture of primary fuels: for oil this includes production from the UK Continental Shelf, both onshore and offshore. Production by fuel is shown in Table 1.1. As with all data in Tables 1.1 to 1.3, these data are presented in either Million tonnes of oil equivalent or Thousand tonnes of oil equivalent. Various conventions are involved in the presentation of these data (e.g. for nuclear production the energy input is the heat content of the steam leaving the reactor) and these conventions are detailed in the Table notes and methodology documents (see link at end of glossary).

Primary supply

Primary supply is the sum of production, other sources, imports (+), exports (-), stock change, marine bunkers and transfers. A breakdown of supply by fuel is shown in Table 1.3.

Primary demand

Primary demand is the sum of the transformation, energy industry use, losses and final energy consumption by the industry sectors including non-energy use. A breakdown of demand by fuel is shown in Table 1.3.

Primary inland energy consumption

The sum of primary supply less non-energy use (Table 1.2).

Final energy consumption

Energy consumption by final user, i.e., which is not being used for transformation into other forms of energy. Final energy consumption is shown by sector and for individual fuels in Table 1.3.

Non-energy use

Includes fuel used for chemical feedstock, solvents, lubricants, and road making material, see Table 3.2.

Imports

Goods entering the UK, e.g. via pipeline from Norway or LNG cargoes from Qatar and the US for gas (Table 4.3) and interconnectors for electricity from The Netherlands (Table 5.6).

Exports

Goods leaving the UK, e.g. via LNG regassification cargoes to Europe for gas (Table 4.4) and interconnectors for electricity to France (Table 5.6).

Transformation

Transformation covers those activities that transform fuels into a form which is better suited for specific uses. Most of the transformation activities correspond to particular energy industries whose main business is to manufacture the product associated with them. Certain activities involve transformation to make products that are only partly used for energy needs (e.g. coke and oven coke) or are by-products of other manufacturing processes (e.g. coke oven and blast furnace gases). A breakdown of transformation by fuel is shown in Table 1.3.

Seasonally and temperature adjustment

The temperature corrected series of total inland fuel consumption, Table 1.2 indicates what annual consumption might have been if the average temperature during the year had been the same as the average for the years 1991 to 2020. Table 1.3 shows seasonal and temperature adjusted final consumption.

Primary oil

Crude oil, natural gas liquids and feedstocks. (Table 3.1)

Petroleum products

Motor spirit, diesel, gas oil, aviation turbine fuel, fuel oils, petroleum gases, burning oil and other products. (Table 3.4)

Transport fuels

Motor spirit and diesel for road and aviation turbine fuel for aviation. (Table 3.4)

Electricity generation

Electricity generation represents the quantities of fuels burned for the generation of electricity. The activity is divided into two parts, covering the Major Power Producers such as those generating electricity for sale, as their main business activity, and autogenerators such as those generating electricity for their own needs but who may also sell surplus quantities (Table 5.1).

Fossil fuels

Coal, oil and natural gas. The percentage share of electricity generation by fossil fuels is shown in Table 5.1.

Renewables

Renewable energy includes solar power, wind, wave, tidal, hydroelectricity, and bioenergy. Solid biomass includes wood and wood pellets, straw, short rotation coppice, and the biodegradable component of wastes (the non-biodegradable component is shown as a memo item in Table 6.1). Liquid biofuels include bio diesel and bioethanol, along with new and emerging fuels such as bio LPG (liquified petroleum gas). Biogases include landfill gas, sewage gas, and anaerobic digestion. The percentage share of electricity generation by renewables is shown in Table 5.1.

Low carbon

Nuclear and renewables. The percentage share of electricity generation by low carbon sources is shown in Table 5.1.

Additional information

A more detailed glossary is available in The Digest of United Kingdom Energy Statistics (DUKES), Annex B, whilst the energy balance methodology note provides background detail on the compilation of an energy balance, as well as an explanation of each of the key energy balance flows. Notes in individual Energy Trends tables and individual fuel methodology notes (see links below) provide further detail.

Coal methodology note

Oil methodology note

Gas methodology note

Electricity methodology note

Renewables methodology note

Related publications

Recent publications of interest

Energy Consumption in the United Kingdom (ECUK)
Detailed data on end use estimates of energy in the UK: www.gov.uk/government/collections/energy-consumption-in-the-uk

Sub-national total final energy consumption
Findings of the sub–national energy consumption analysis in the UK for all fuels, for the period covering 1 January to 31 December, with gas consumption covering the annual period from mid-May: www.gov.uk/government/collections/total-final-energy-consumption-at-sub-national-level

Sub-national electricity consumption
Electricity consumption by consuming sector for Great Britain and devolved administration areas. Data are based on the aggregation of Meter Point Administration Number readings as part of DESNZ's annual meter point electricity data exercise: www.gov.uk/government/collections/sub-national-electricity-consumption-data.

Sub-national gas consumption
Gas consumption by consuming sector for Great Britain, and devolved administration areas. Data are based on the aggregation of Meter Point Reference Number readings throughout Great Britain as part of DESNZ's annual meter point gas data exercise. Data are subject to a weather correction factor to enable comparison of gas use over time: www.gov.uk/government/collections/sub-national-gas-consumption-data.

Sub-national road transport consumption
Road transport fuels consumption in the UK at regional and local authority level. Data is modelled and provided to DESNZ by Ricardo Energy & Environment, with estimates based on where the fuel is consumed, rather than where it is purchased.
www.gov.uk/government/collections/road-transport-consumption-at-regional-and-local-level

Sub-national consumption of residual fuels
Non-gas, non-electricity and non-road transport fuels consumption in the UK. Includes coal, petroleum, solid fuels, and bioenergy not for generation or road use: www.gov.uk/government/collections/sub-national-consumption-of-other-fuels

Further information

Accredited official statistics

These statistics are accredited official statistics. Accredited official statistics are called National Statistics in the Statistics and Registration Service Act 2007.

These accredited official statistics were independently reviewed by the Office for Statistics Regulation (OSR) in June 2014. They comply with the standards of trustworthiness, quality and value in the Code of Practice for Statistics.

Our statistical practice is regulated by the Office for Statistics Regulation.

OSR sets the standards of trustworthiness, quality and value in the Code of Practice for Statistics that all producers of official statistics should adhere to.

You are welcome to contact us by emailing energy.stats@energysecurity.gov.uk with any comments about how we meet these standards.

Alternatively, you can contact OSR by emailing regulation@statistics.gov.uk or via the OSR website.

Pre-release

Some ministers and officials receive access to these statistics up to 24 hours before release. Details of the arrangements for doing this and a list of the ministers and officials that receive pre-release access to these statistics can be found in the DESNZ statement of compliance with the Pre-Release Access to Official Statistics Order 2008.

User engagement

Users are encouraged to provide comments and feedback on how these statistics are used and how well they meet user needs. Comments on any issues relating to this statistical release are welcomed.

This publication is available from: https://www.gov.uk/government/collections/energy-trends

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Clean Power 2030 metrics: methodology

Matt Laycock 0300 068 6968 electricitystatistics@energysecurity.gov.uk

Key headlines

This article documents the methodology used to calculate the Clean Power 2030 metrics, as set out in the Clean Power 2030 Action Plan, page 26.

The metrics are based on the same data used to produce official statistics and will be updated annually[1] alongside Energy Trends and published here.

The metrics reflect actual electricity supply and demand in each period and are not weather corrected.

Background and key terms

The Plan for Change aims to make Britain a Clean Energy Superpower by clean sources producing at least 95% of Great Britain's generation. In addition to this overarching target, the Clean Power 2030 Action Plan states that in a typical weather year, the 2030 power system will see clean sources produce at least as much power as Great Britain consumes in total, reducing the carbon intensity of electricity generation to well below 50gCO_2e/kWh in 2030.

From this, the three Clean Power 2030 targets are, in a typical weather year:

- Clean sources produce at least 95% of Great Britain's generation
- Clean power sources produce at least as much power as Great Britain consumes in total
- Carbon emissions intensity of Great Britain's electricity generation is well below 50gCO_2e/kWh

The metrics to measure progress against these targets are based on the same data used to publish official statistics. They are calculated over a calendar year, to ensure the statistics are not complicated by seasonal variations in electricity generation. For example, electricity demand is higher in the winter when conditions are cold and dark. Wind speeds are typically higher over winter months and sun hours higher over summer months.

The metrics are based on actual generation and do not reflect 'a typical weather year'.

Differences compared to Energy Trends Table 5.1

The Clean Power 2030 Action Plan covers Great Britain's power system whilst Energy Trends aims to cover all UK electricity supply and demand. Additionally, and in order to align with Clean Power 2030 definition, the below elements are excluded from the metrics.

- Northern Ireland generation – in line with the Clean Power 2030 Action Plan.
- Energy from Waste (EfW) – EfW is excluded on the basis that this is primarily a waste management solution, in line with the Technical Annex of the Clean Power 2030 Action Plan, p. 7.
- Combined Heat & Power (CHP) – CHP is excluded because CHP plants are primarily a heat solution, with electricity being cogenerated alongside[2].

[1] Dates for the publication of the 2025 metrics will be announced in line with the Department's usual practice and noted here.

[2] This is a refinement from the Technical Annex of the Clean Power 2030 Action Plan, p.7

- Electricity discharged from pumped storage and battery storage – to avoid double counting of electricity generation. Storage losses are included in GB electricity demand.

The metrics are calculated as follows:

Clean sources produce at least 95% of Great Britain's generation

From the data used to produce Energy Trends Table 5.1, excluding (for the reasons outlined above):

- Northern Ireland generation
- Energy from Waste (EfW)
- Combined Heat & Power (CHP)
- Electricity discharged from pumped storage and battery storage

Great Britain's generation includes electricity generation from power plants, non-CHP autogeneration, and microgeneration such as domestic, commercial, and industrial rooftop solar panels.

Clean power sources produce at least as much power as Great Britain consumes in total

Total UK demand from Energy Trends Table 5.2, minus Northern Ireland electricity demand from the regional electricity article = Great Britain electricity demand.

Demand met by Energy from Waste and Combined Heat & Power in Great Britain is deducted (for the reasons outlined above) = qualifying Great Britain electricity demand.

Great Britain clean generation calculated above is divided by qualifying Great Britain electricity demand.

Carbon emissions intensity of Great Britain's electricity generation is well below 50gCO2e/kWh

Annual power sector emissions from the Greenhouse Gas Inventory, divided by total electricity supplied in Great Britain (excluding Energy from Waste, Combined Heat & Power, and storage discharges, as above). Electricity supplied = generation minus electricity used by generators.

Power sector emissions for 2024 are not yet available with sufficient detail to align with the metric scope and have therefore been estimated using the latest energy data and 2023 carbon intensity by fuel.

This publication is available from: https://www.gov.uk/government/collections/energy-trends

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Competition in UK electricity markets, 2024

Tahreem Zubida **07395 5358055** electricitystatistics@energysecurity.gov.uk

Key headlines

Following privatisation in 1990, the number of UK major electricity suppliers has increased from 16 in 1989 to 36 in 2024. In 2024, 1 company DESNZ surveyed ceased trading, while 5 suppliers rose above the 0.1% market share threshold required to be classed as a major electricity supplier.

In 2024, market concentrations increased across all three sectors. This differs from the trend seen from 2022 to 2023, when electricity market concentrations remained relatively stable.

The market share of smaller suppliers (outside the top nine) has risen from 2.7 per cent in 2010 to 21.9 per cent in 2024, as new suppliers entered the market and others grew.

The number of major power producers has increased from 6 in 1989 to 56 in 2024.

The top nine MPPs' share of generation increased to 75.3 per cent in 2024, up 0.2 percentage points on 2023 levels. Their share of capacity additionally decreased from 67.9 per cent to 67.5 per cent, primarily due to increased renewable installations.

Background

This article includes information relating to competition in the UK electricity markets, examining the two parts of the industry where there is competition for provision: generation and sales. For both markets, the article describes the number of companies operating, and the market concentrations. The electricity sales market is examined in more detail due to the distinct sectors suppliers sell electricity to – domestic consumers, industrial consumers, and commercial consumers. This article covers the major suppliers surveyed by DESNZ comprising approximately 96% of the market. Major electricity suppliers are classed as those which sold over 0.1% of traded electricity in the reference year – further information on the definition of major suppliers is given in the methodology note at the end of this article.

The Herfindahl-Hirschman index is used to provide the market concentration of the electricity sales market as it provides extra emphasis on the contribution of participants with the largest shares; for more information on this measure see the methodology note at the end of this article.

Competition in electricity sales

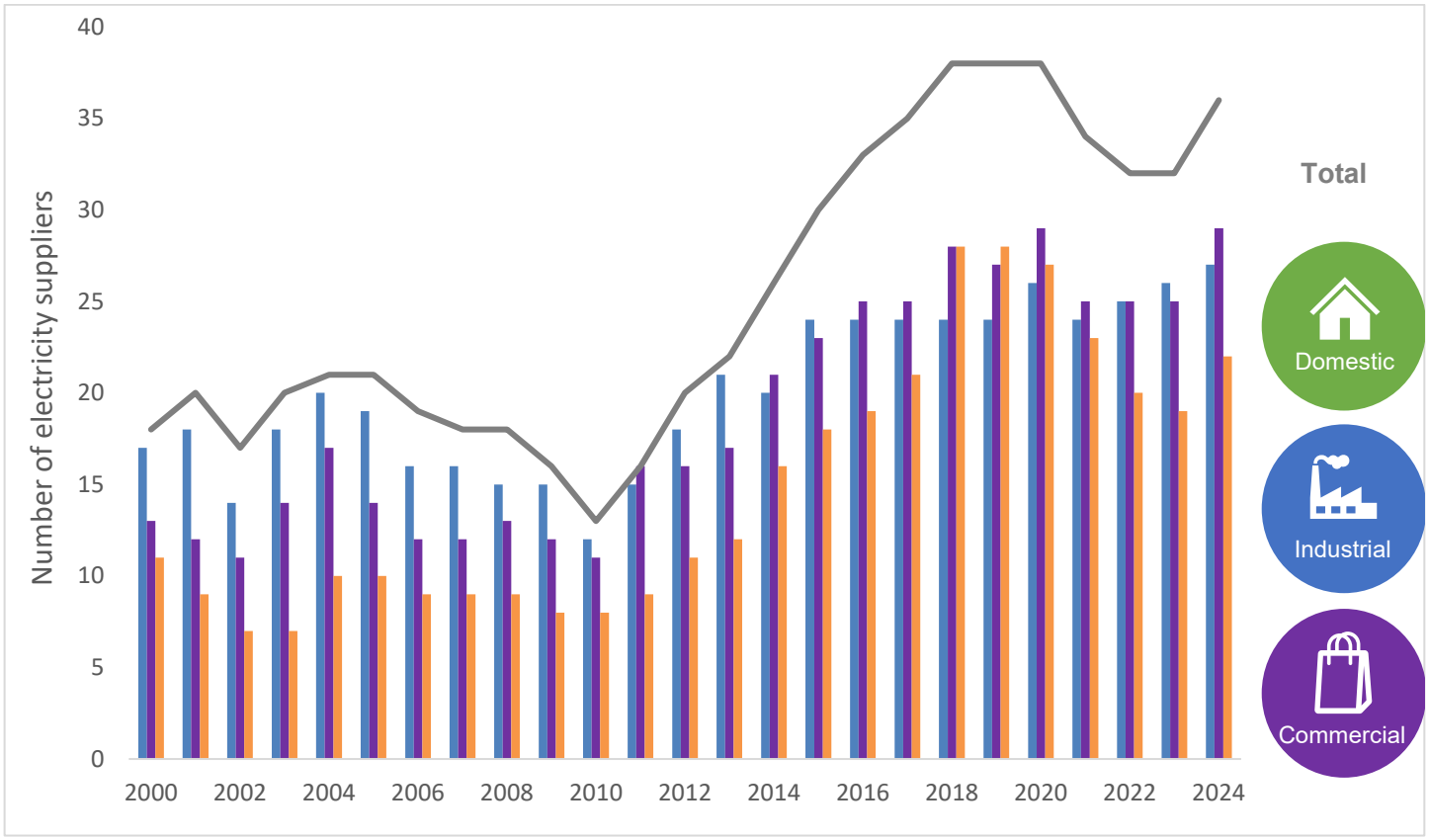
Number of UK electricity suppliers

Following privatisation in 1989, the number of electricity suppliers initially rapidly increased from 16 to an early peak of 21 in 2004. From 2004 to 2010, the number of companies reduced to 13, as despite new market entrants, other companies were either taken over or bought additional power stations to add to their portfolios. After 2010, the number of companies increased again, reaching their highest level in 2018 at 38 companies. This reflected new market entrants and DESNZ engaging with new, smaller companies to maintain coverage in the more fragmented market.

From 2021 to 2022, sharply rising wholesale gas prices significantly increased the cost of generation for electricity. This led to widespread disruption in the UK electricity market and contributed to the discontinuation of 3 energy suppliers with over 0.1 per cent of the market share, reducing the number of major electricity suppliers to 32. During 2024, 1 company surveyed by DESNZ exited its sector, while 5 suppliers rose above the 0.1% market share threshold, resulting in there being 36 major electricity suppliers at the end of the year.

The number of companies supplying electricity to each sector along with the total number of companies supplying electricity between 2000 and 2024 is shown below in Chart 1.

Chart 1: Number of companies supplying electricity [note 1]



[note 1] Companies can supply into more than one market and are counted in each market they supply to. Only includes companies that sold over 0.1% of total traded electricity in the reference year.

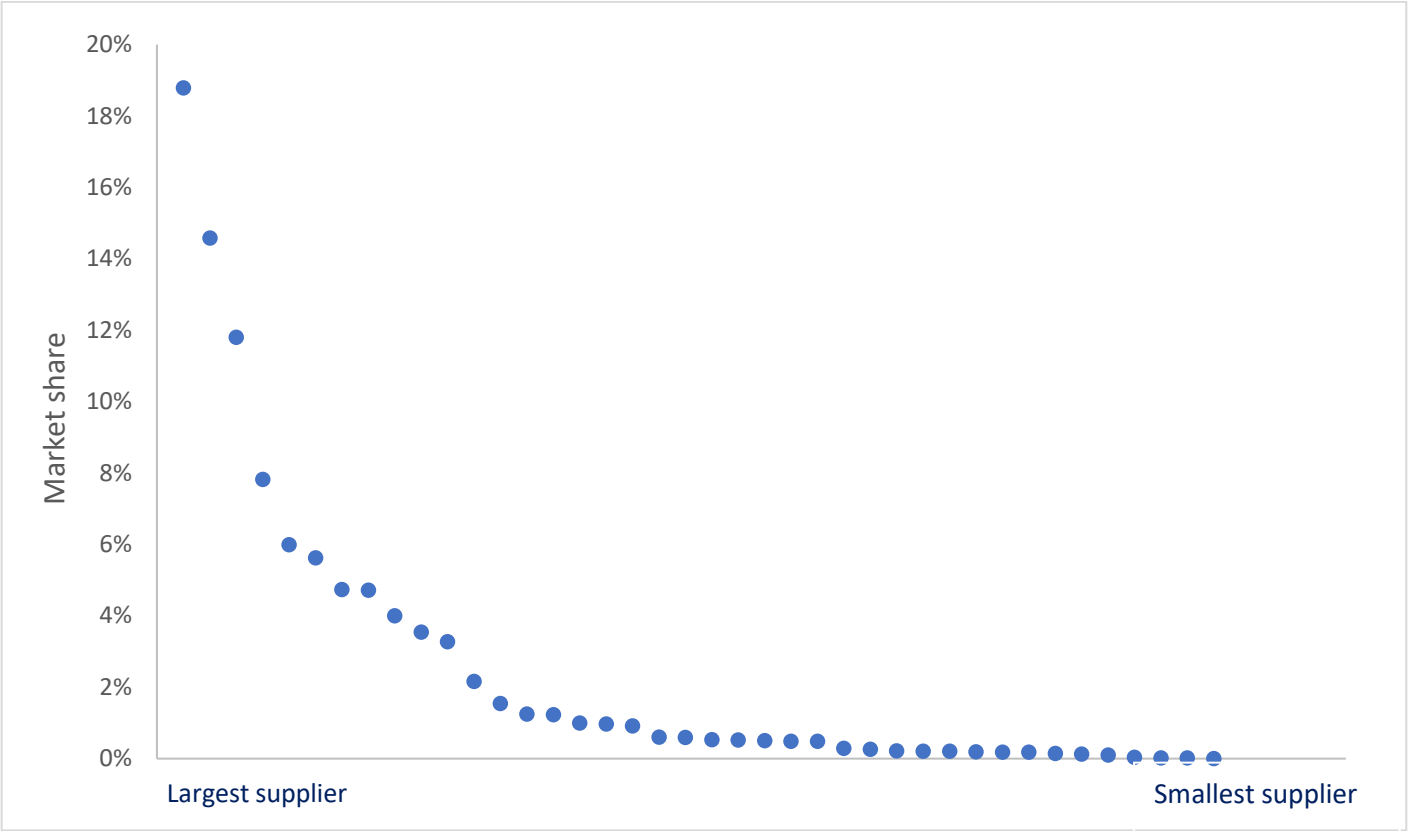
In 2024, one major electricity supplier surveyed by DESNZ transferred all its customers to another electricity supplier and exited its sector. This company had previously only supplied to the domestic sector. Furthermore, five supplier's market shares rose above the 0.1 per cent threshold. The largest of these supplied to the industrial and commercial sectors and the third largest supplied to all three sectors, while the rest mainly supplied domestic.

Market share of UK electricity suppliers

Since privatisation, the electricity supply market has been characterised by the majority of supply being controlled by a handful of large suppliers. In 2010, the top 6 suppliers controlled a combined total of 91 per cent of total supply. Over time, this share has fallen as smaller suppliers have grown. In 2024, the top 6 suppliers held 65 per cent of the total market share, the same as in 2023. The only time the share of the top 6 suppliers has grown since 2010 was from 2020 to 2021, when it rose by 4.4 percentage points as two companies within the top 6 merged and rising wholesale electricity prices contributed to some smaller suppliers ceasing to trade.

Chart 2 below shows the percentage market share of electricity suppliers above the threshold in 2024. Here we can see the top 3 suppliers control a large portion of the market – 45 per cent of the total. Across the sectors, these three suppliers hold 44 per cent of supply to industrial consumers, 49 per cent of supply to commercial consumers and 44 per cent of supply to the domestic market.

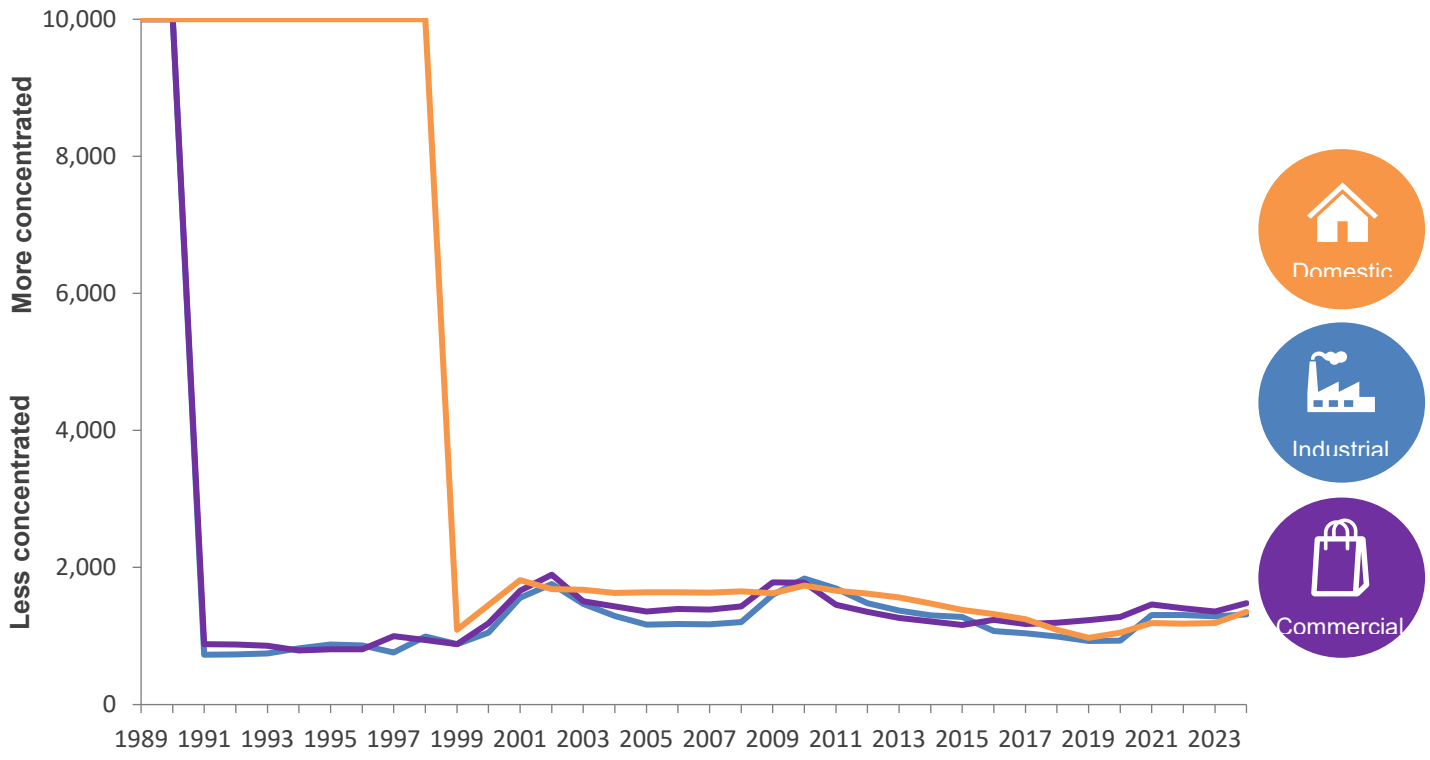
Chart 2: Percentage shares of total electricity supplied to all consumers in 2024



Market concentration of UK electricity suppliers

Chart 3 below shows the market concentration as expressed through the Herfindahl-Hirschman Index. In the chart, higher numbers show more concentration while lower numbers indicate a more diverse market. Further information on the Herfindahl-Hirschman index can be found at the end of this article.

Chart 3: Herfindahl-Hirschman Index for electricity sales market concentration, 1989 to 2024



Following privatisation, the industrial and commercial market concentrations saw initial sharp decreases followed by rises between 1998 and 2002, caused primarily by a spate of mergers. The domestic market's concentration remained at 10,000 before 1999, being dominated by the Regional Electricity Companies (RECs) which each had regional monopolies on the market. Market concentration fell in 1999 as domestic sales became more competitive, then rose until 2001 due to mergers between former RECs. Between 2002 and 2008 there was little variation in the domestic market's index, however the industrial and commercial indexes fell in this period. The market concentration of all sectors then rose in 2008 spurred by the closure of several market participants. From 2010 to 2019, market concentration declined in the domestic and industrial sectors as many new smaller suppliers entered the market.

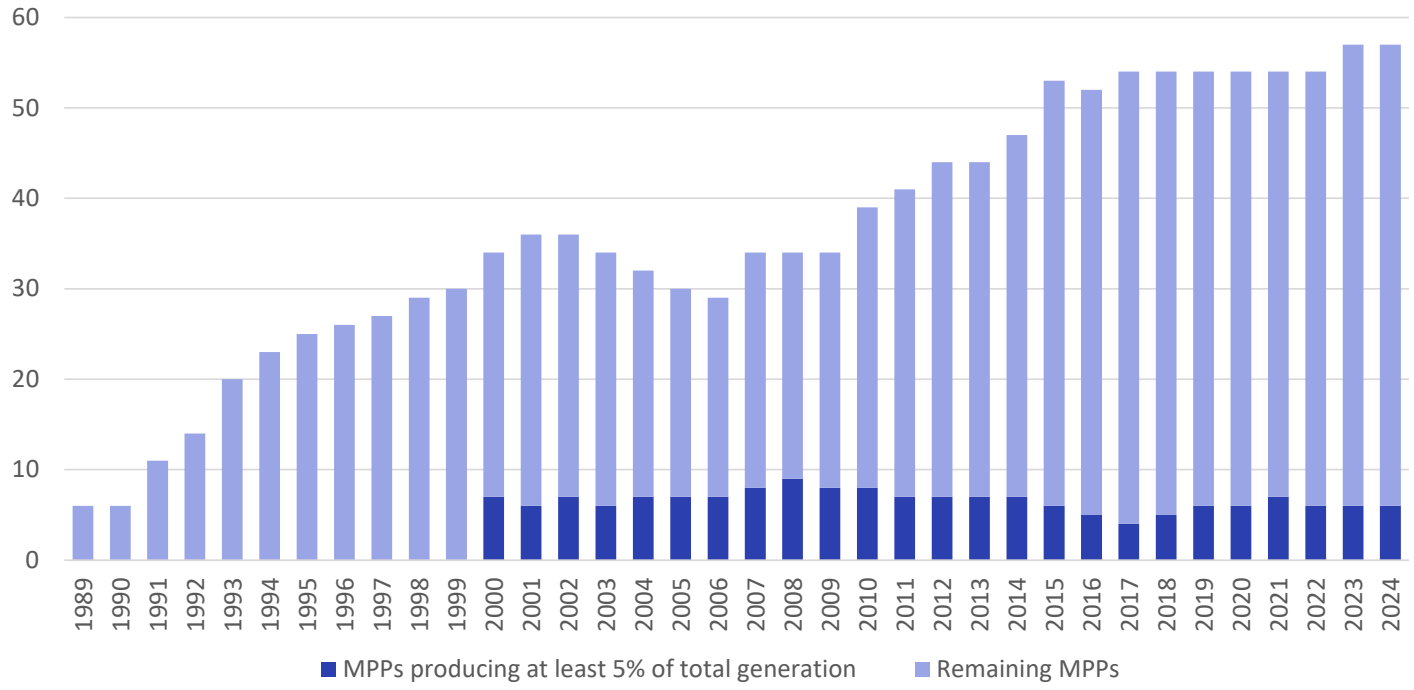
From 2019 to 2021 both the domestic and commercial market concentration increased due to mergers between large suppliers and suppliers exiting the market. The industrial market concentration remained stable between 2019 and 2020, however sharply increased in 2021 due to mergers between large suppliers and another supplier exiting the market. From 2021 to 2023, all market concentrations remained relatively stable. The commercial market saw the most notable change, reducing by 104 points as the market share of the largest suppliers fell and the share of their smaller competitors grew. In 2024, market concentrations increased across all sectors, with domestic rising by 162 points, commercial by 120 points and industry by 28 points. This was largely due to some of the largest suppliers increasing market share.

Competition in electricity generation

Number of Major Power Producers

Companies with a generation portfolio over 100 MW, or over 50 MW if they own wind or solar sites, are classed as Major Power Producers. Chart 4 shows the number of companies that are counted as Major Power Producers (MPPs) since 1989. The number of companies increased rapidly, from six before privatisation up to an early peak of 36 in 2001, before mergers caused numbers to fall back to 29 in 2006. Starting in 2007, several renewable generators were reclassified as MPPs, leading to an increase in the number of MPPs to 34; this remained stable through to 2009. Since 2010, the number of MPPs has steadily increased as new generators came online, reaching a peak in 2017 of 54. This remained stable up to 2023, when 2 additional MPPs came online.

Chart 4: Number of Major Power Producers [note 2]

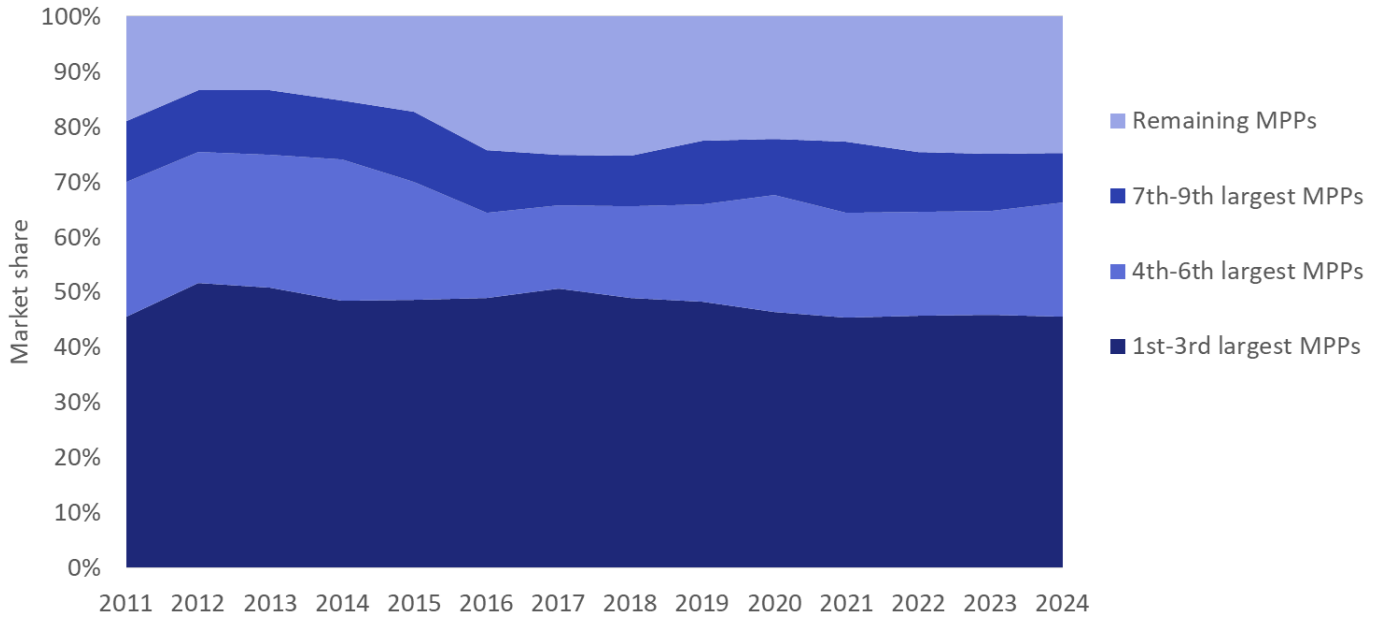


[note 2] Data on the number of MPPs producing at least 5% of total generation is not available from 1989-1999. During this period, all MPPs are shown under 'Remaining MPPs'.

Market share of Major Power Producers

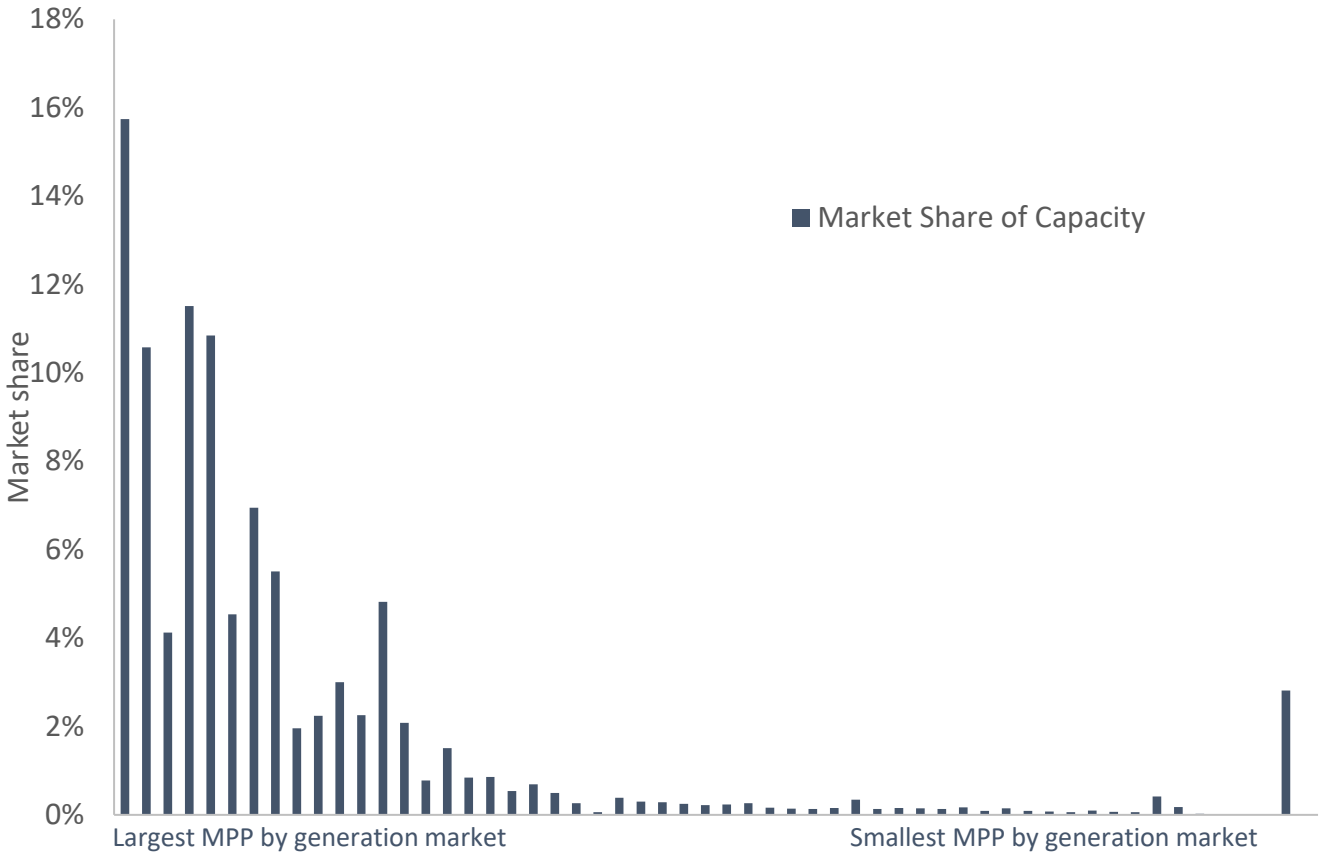
Chart 5 shows the MPPs aggregated share of generation from 2011 to 2024. The market share of the top 9 generators in this period peaked in 2013 at 86.7 per cent declining to 74.8 per cent in 2018, as new smaller companies entered the market. This share increased in 2019 and 2020, before decreasing again for the past three years, reaching 75.1 per cent in 2023. It increased marginally in 2024 to 75.3 per cent.

Chart 5: Percentage shares of total MPP generation



Over all periods, the top 9 generators have held a lower share of capacity (67.5 per cent in 2024) compared to generation. This indicates a greater proportion of their generation came from non-renewable sources, which are able to operate closer to full capacity as they are not limited by environmental factors. This, alongside factors such as outages, is a primary reason for the low correlation between capacity market share and generation market share shown in Chart 6 below.

Chart 6: Capacity market shares of MPPs in 2024, sorted by generation market share of the MPP



Data for this article

The data used to produce this article can be found in Tables 1 to 6 of the associated Competition in UK Electricity Markets workbook. Revisions to data in this article are noted here.

Further Sources of Information on competition in UK electricity markets

Ofgem release their own statistics on competition in GB generation and the domestic suppliers' market.

Ofgem list all companies that hold licenses in generation and supply.

The Competition and Markets Authority published a report on competition in energy.

Methodology notes

In this article, **'electricity supplier'** refers to the major electricity suppliers surveyed by DESNZ, covering approximately 96% of all UK electricity sales in 2018. '**Major electricity suppliers'** include suppliers that sold over 0.1% of traded electricity in the reference year, this was 246 GWh in 2024. This differs from previous editions of this article where all suppliers surveyed by DESNZ were included. The change allows DESNZ to increase its survey coverage whilst still presenting comparable trends in this article. Please see the DESNZ Electricity statistics data sources and methodologies for more details.

The Herfindahl-Hirschman measure attempts to measure market concentration. It places extra emphasis on the contributions of participants with the largest shares. The measure is commonly used to assess whether mergers should go ahead and whether they will significantly affect the balance of the market in a particular sector. It is expressed by the following equation: Herfindahl-Hirschman measure = the square of each participant's market share added together across all participants in the market. Values vary between zero, which signifies a perfectly competitive industry, and ten thousand, for a pure monopoly.

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Competition in UK gas markets, 2024

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Key headlines

In 2024, the number of large gas suppliers decreased to 23, from 24 in 2023[1], as one large supplier moved into the small supplier category following a drop in sales.

In 2024, the top three suppliers accounted for 45 per cent of the market (with the top two accounting for 34 per cent), increasing by one per cent compared to 2023, and remaining at the highest share in ten years.

The industrial sector reached its highest level of concentration since the 1990s, driven by considerable increases in market share for the top three suppliers in this sector. The domestic sector also saw an increase in concentration, while the commercial sector saw a slight decline in concentration from its 2023 peak.

Background

The Department for Energy Security and Net Zero (DESNZ) collect data from companies who are licensed to supply gas. Large suppliers are defined as those who supply more than 1,750 GWh of gas per year; large suppliers' data are collected monthly. For small suppliers (those who supply less than 1,750 GWh of gas per year), data is collected annually.

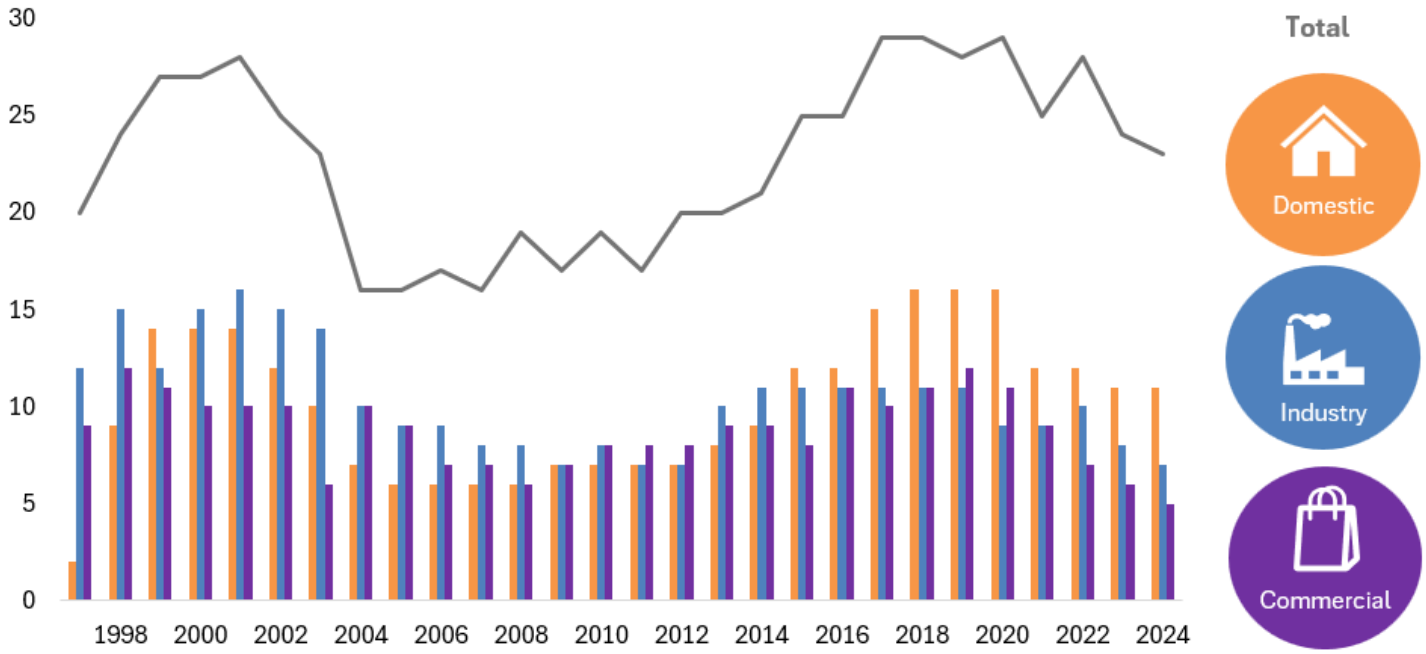
Gas is used by many sectors of the UK economy; generally, gas demand can be split into three with electricity generation, domestic (household) users and other sectors each making up around a third of demand. This article considers gas supplied for final consumption therefore does not include electricity generation and further disaggregates 'other' into industrial and commercial sectors.

The aim of this article is to analyse the number and size of companies supplying gas to the UK and the market concentration of the domestic, industrial and commercial sectors. Market concentration is assessed using the Herfindahl-Hirschman index; for more information see the methodology note at the end of the article.

[1] Comparisons based on revised 2023 data, see accompanying data tables for further information.

Number of UK gas suppliers

Chart 1: Number of large gas suppliers, split by sector, 1997 to 2024[2,3]



Gas supply in the UK was denationalised between 1986 and 1992. This restructuring of the gas market led to an increase in the number of gas suppliers until 2000 from which point numbers decreased due to company mergers. From 2008, favourable market conditions meant numbers generally increased, with the number of large suppliers peaking at 29 in 2017. They then remained relatively stable until 2021 when the number of large suppliers fell to 25 due to record high gas prices which contributed to market exits. Despite increasing in 2022, the number of has fallen again in recent years, sitting at 23 large suppliers in 2024 due to some suppliers reducing sales. Note that some change is driven by suppliers moving into and out of the large supplier category as they move above and below the 1,750 GWh threshold.

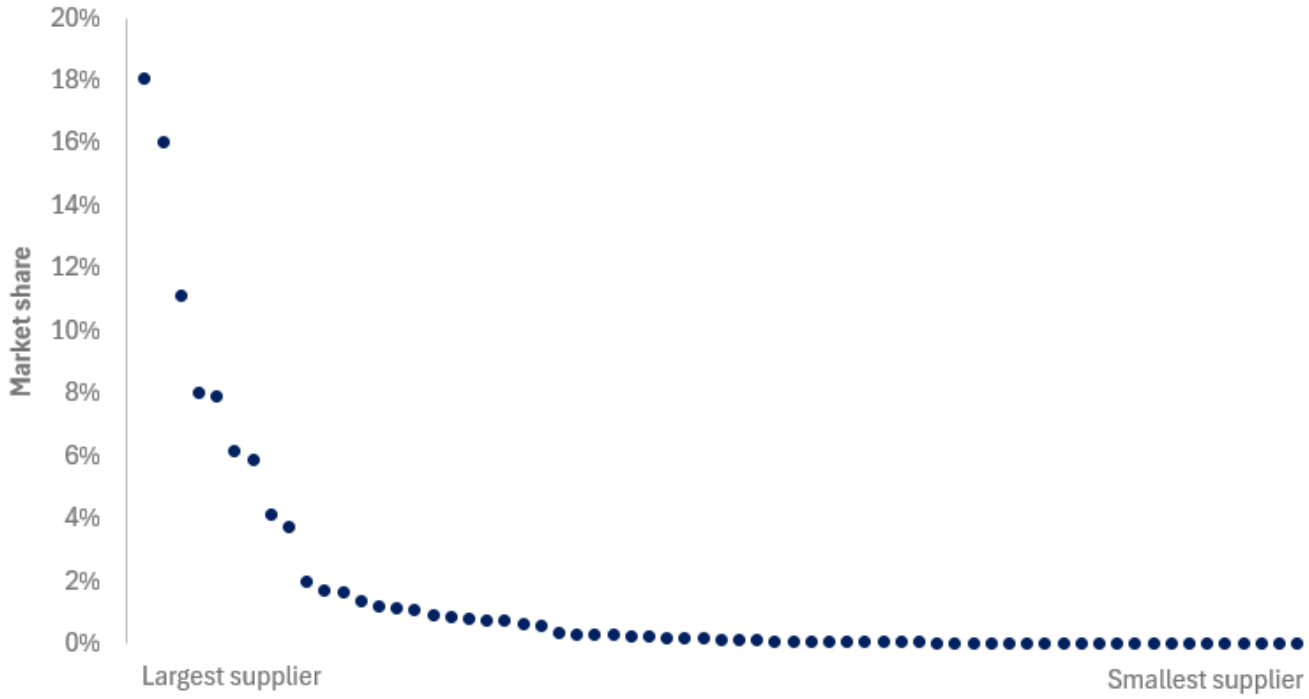
The number of large **domestic** suppliers has generally followed the same trend as the total number of large suppliers. In the domestic sector, the number of large suppliers steadily increased between 2005 and 2020 as smaller suppliers entered the market and gained market share. In 2021, the number of large domestic suppliers decreased from 16 to 12 due to market exits, primarily driven by market conditions. In 2024, this number remained at 11 (compared with 2023), collectively accounting for 98% of the UK domestic gas market.

In the **industrial** and **commercial** sectors, the number of large suppliers peaked in 2019 at 11 and 12 respectively. Since then, the number of suppliers has fallen each year as the impact of the Covid-19 pandemic and then, to a greater extent, market conditions meant suppliers reduced in size or exited the market. In 2024, there were seven large industrial suppliers accounting for 88 per cent of the market; for the commercial sector this was five accounting for 76 per cent of the market.

[2] Note some suppliers appear in more than one sector
[3] Large suppliers are those that supplied more than 1,750 GWh in the reference year

Market share of UK gas suppliers

Chart 2: Market share of all gas suppliers, all sectors, 2024



Historically, the gas market has been dominated by a few major suppliers and to some extent this remains the case today. The two largest gas suppliers each make up around 16-18 per cent of the market, with the third largest supplier making up 11 per cent. Around four suppliers each make up between 6 and 8 per cent of the market, with a further five suppliers each making up between 2 to 4 per cent of the market. Over 50 suppliers each make up less than 2 per cent of the market.

In 2024, the market share of the top three largest suppliers was 45 per cent, similar to 2023, remaining the highest share in over ten years. This is similar across the sectors with the top three suppliers holding the least market share in the **domestic** sector, at 60 per cent, which has more suppliers in total. The top three suppliers hold the most market share in the **industrial** sector at 69 per cent, followed by **commercial** at 66 per cent.

To assess the competitiveness of a market, it is useful to examine a standardised measure of market concentration. One such metric is the Herfindahl-Hirschman Index (HHI), where higher numbers show more concentration, and lower numbers indicate a more diverse market. Further information on the Herfindahl-Hirschman Index can be found in the methodology note at the end of this article.

Chart 3: Herfindahl-Hirschman Index for market concentration, 1986 to 2024

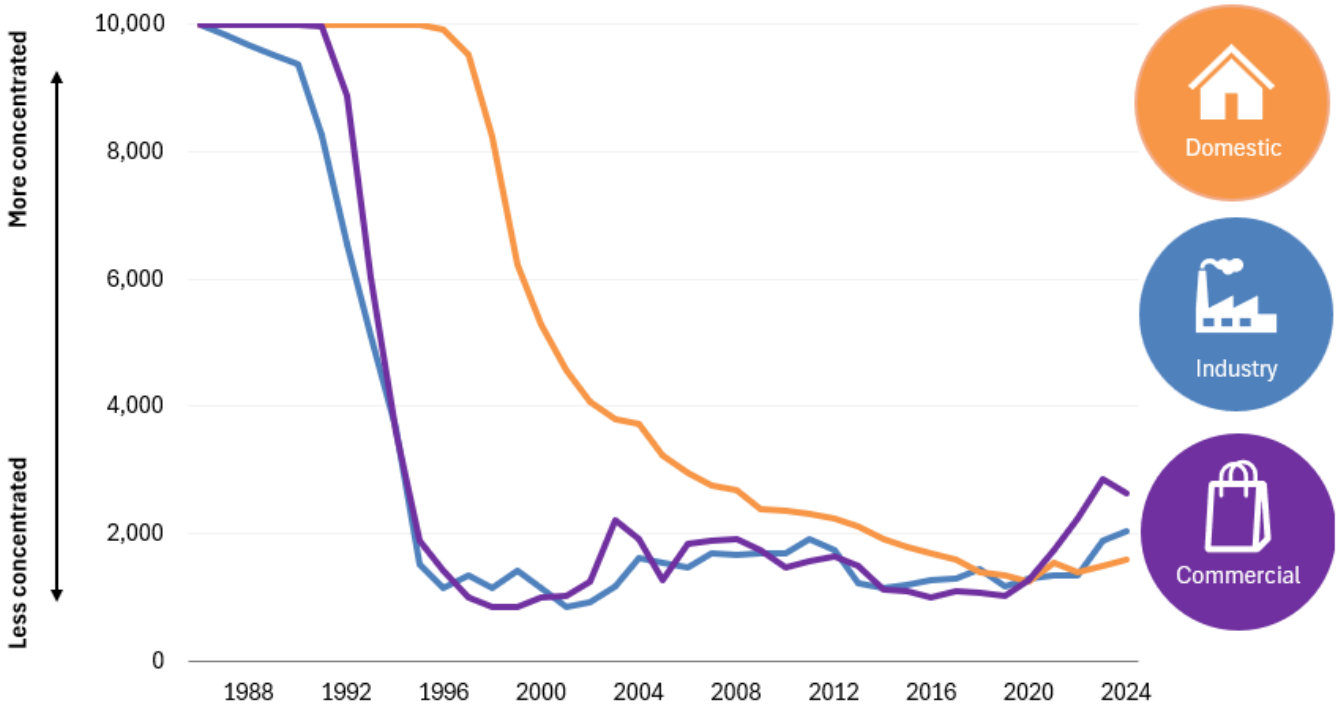


Chart 3 shows gas market concentration as expressed through the Herfindahl-Hirschman index, across the domestic, industrial and commercial sectors. Following the denationalisation of the gas market from 1986 there has been a substantial reduction in market concentration across all three sectors.

The **domestic** sector saw a consistent year-on-year decrease in concentration until 2021, when the concentration of the domestic market increased reflecting market exits and increased market share of large suppliers. Although concentration dipped slightly in 2022 and 2023, it increased again in 2024, as some large suppliers expanded their market share.

Concentration in the **commercial** sector has been rising consistently since 2019, peaking in 2023 with the highest HHI since the 1990s, driven by a reduction in the number of large suppliers to six, the lowest since 2008. In 2024, the number of large suppliers fell further to five. However, the HHI declined slightly from its 2023 high as smaller suppliers gained market share. Despite this dip, concentration levels remain above those seen in the last two decades (2000-2020).

Concentration in the **industrial** sector has been relatively stable in recent years. However, like commercial, 2023 saw the highest HHI since the 1990s for industry caused by a drop in large suppliers from ten to eight and a considerable increase in market share for the top three suppliers. In 2024, the HHI increased again as the number of large industry suppliers fell further to seven, increasing market concentration for the largest suppliers.

Methodology Note

The data used to produce this article are published in Competition in UK gas markets 2024 - data tables.

The Herfindahl-Hirschman index

The Herfindahl-Hirschman measure attempts to measure market concentration. It places extra emphasis on the contributions of participants with the largest shares. The measure is commonly used to assess whether mergers should go ahead and whether they will significantly affect the balance of the market in a particular sector.

It is expressed by the following equation:

Herfindahl-Hirschman index = the square of each participant's market share added together across all participants in the market.

Values vary between zero, which signifies a perfectly competitive industry, and ten thousand, for a pure monopoly.

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Diversity of supply for oil and oil products in OECD countries in 2024

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Key headlines

The UK maintains diversity scores well above the OECD average across transport fuels. The UK consistently sources crude oil and refined products from a wide range of countries, resulting in diversity scores that exceed OECD averages for petrol, diesel, and jet fuel.

The UK remained self-sufficient and a net exporter for petrol. The UK's domestic production of petrol in 2024 exceeded national demand, making it a net exporter for the fuel and one of 16 OECD countries to achieve petrol self-sufficiency.

The UK continues to remain dependent on imports for crude, diesel and jet fuel. The UK's domestic demand for crude, jet and diesel exceeded its indigenous production in 2024, with imports making good the shortfall.

Background

Countries meet their oil demand through a combination of domestic production and international trade. This article examines how OECD countries manage crude oil and transport fuel demand, drawing on data from the International Energy Agency (IEA), with a particular focus on how the UK compares in securing oil supply.

In 2024, demand for oil products continued to recover across OECD countries following the lifting of COVID-19 travel restrictions. Total product demand increased by 2.0 per cent compared to 2023, with jet fuel experiencing the most significant growth, rising by 5.5 per cent as international air travel approached pre-pandemic levels.

Despite the increasing demand, domestic supply in the UK's production of primary oils fell to a record low of 31 million tonnes, aligning with the long-term decline of the mature North Sea basin. Refinery output also remained subdued, with total production of oil products reaching just 51 million tonnes.

To meet rising demand and compensate for declining domestic production, the United Kingdom's net oil imports increased by 12 per cent in 2024, the highest level recorded since 2014. This trend was consistent with broader patterns across the OECD, where total oil imports rose by 1.4 per cent compared to the previous year. Following the implementation of sanctions on Russian oil imports in response to the 2022 invasion of Ukraine, the UK expanded its network of trading partners. The UK continued this in 2024, diversifying supply to further enhance energy security.

Overall, the UK remains relatively well-positioned within the OECD in terms of oil supply security, maintaining strong self-sufficiency in petrol and consistently achieving diversity scores above the OECD average across all oil types. This article explores these developments in the context of broader OECD trends and the UK's evolving energy security landscape.

Charting oil self-sufficiency and diversity of supply

- **Self-sufficiency** is the proportion of a country's demand that could be met through indigenous production (as shown on the vertical axis). A score of one indicates that a country produces as much oil as it uses, a score of 0 indicates that no demand was met with indigenous production.
- **A diversity score** is calculated using the number of sources from which a country imports oil, and their respective political stability - defined by the World Bank's governance indicators (See Appendix 1 for methodological note).
- **Consumption** is represented by the circle or bubble, the area of which indicates the level of consumption for 2024 for each OECD country.

Bubble charts show the relationship between consumption (size of the bubble), indigenous production (self-sufficiency) and the diversity and political stability of import sources. Countries shown above the horizontal line (crossing the x-axis at 1.0) are self-sufficient.

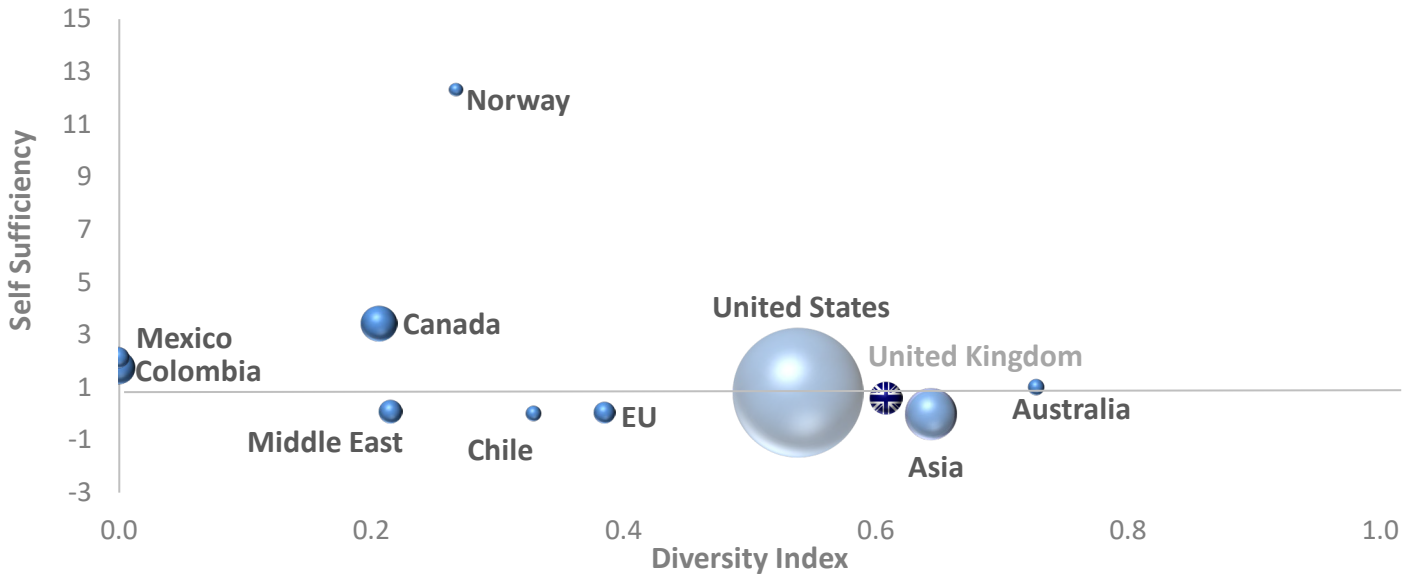
Bar charts provide a means of comparing OECD countries by self-sufficiency and diversity (count and political stability) of imports. The sum of these two components is used as a simplified metric for security of supply, and thus does not represent a full description of security of supply beyond import diversity, stability and self-sufficiency. Appendix 2 shows the underlying data.

Choropleth maps show a visual representation of where OECD countries' oil imports come from. Darker shades represent a higher proportion of imports originate from that country.

Crude Oil[1]

Chart 1 shows the self-sufficiency scores for each country analysed, with EU, Middle East, and Asia countries grouped (see Appendix 3 for groupings). The average self-sufficiency score of the 31 countries analysed[1] was 0.72, indicating that OECD countries were generally reliant upon imports of crude oil to meet refinery demand in 2024. Five OECD countries were self-sufficient in terms of crude oil production in 2024 (see Appendix 2 for more detail).

Chart 1: Diversity and self-sufficiency of crude oil for OECD countries, 2024

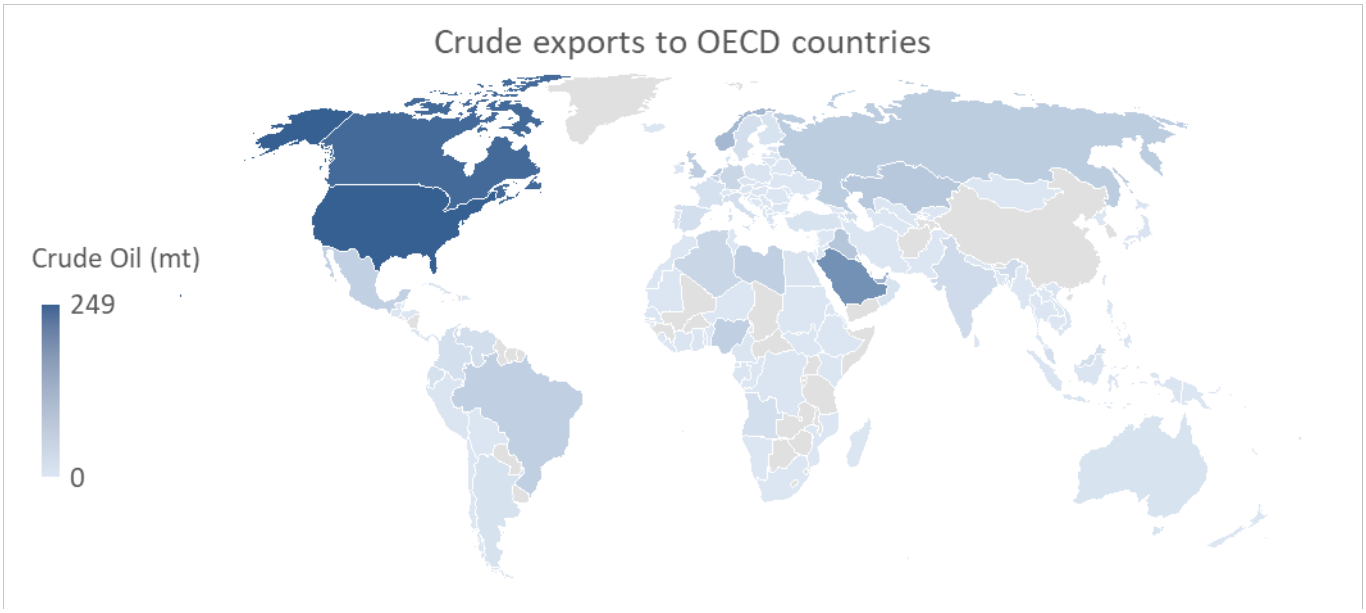


Norway remained a net exporter of crude oil and the country with the highest self-sufficiency score, producing more than 12 times its consumption. The UK had a self-sufficiency score of 0.59, a 12 per cent decrease from the previous year and in line with declining production from the North Sea basin, which reached a record low in 2024. This sees the UK ranking 7th out of OECD countries and below the average of 0.72.

[1] *Estonia, Iceland, Latvia, Luxembourg, Slovenia, and New Zealand do not have a refining industry so have not been included in this analysis. Crude data not available for Costa Rica.*

Map 1 illustrates the origin of crude oil exported to the OECD in 2024. The US, Canada and Saudi Arabia represent the largest exporters of crude oil to OECD countries. The US overtook Canada as the largest exporter in 2024, supplying a total of 249 million tonnes. Of exporters to OECD countries, the UK ranked tenth, supplying 24 million tonnes.

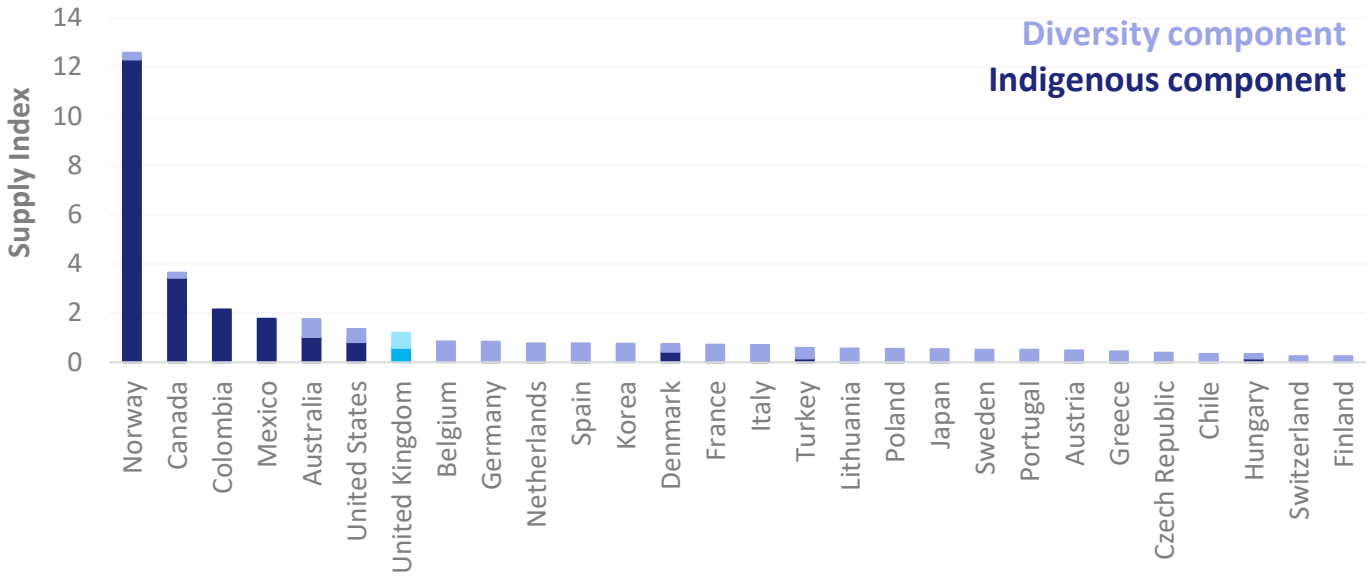
Map 1: Worldwide crude oil exports to OECD countries (million tonnes), 2024



The UK had a diversity score of 0.61 well above the OECD average of 0.35, reflecting its broad and growing range of politically stable import sources. In 2024, the UK imported crude oil from 22 countries, an increase from 18 in 2023. The UK is drawing from increasingly diverse sources over time by trading with new partners to compensate for the loss of supply from Russian imports, which were banned following the invasion of Ukraine in 2022. The US and Norway remained the UK's largest sources of crude oil, together accounting for two-thirds of crude oil imports in 2024. Notably, 2024 marked a record year for US crude oil imports to the UK, reaching a total of 16 million tonnes and underscoring the UK's increasing dependence on US supply. For more information on energy imports please see Energy Trends Table 3.14.

Chart 2 shows that many countries in the OECD with a refining industry are reliant on imports to meet demand for crude oil. The simplified index of security of supply shows that most OECD countries fulfil supply of crude oil through trade (pale shading), with a relatively small contribution from indigenous production (dark shading). Of the 31 OECD countries that refined crude oil for which data was available, 13 either did not produce crude oil indigenously or met less than one per cent of demand through production.

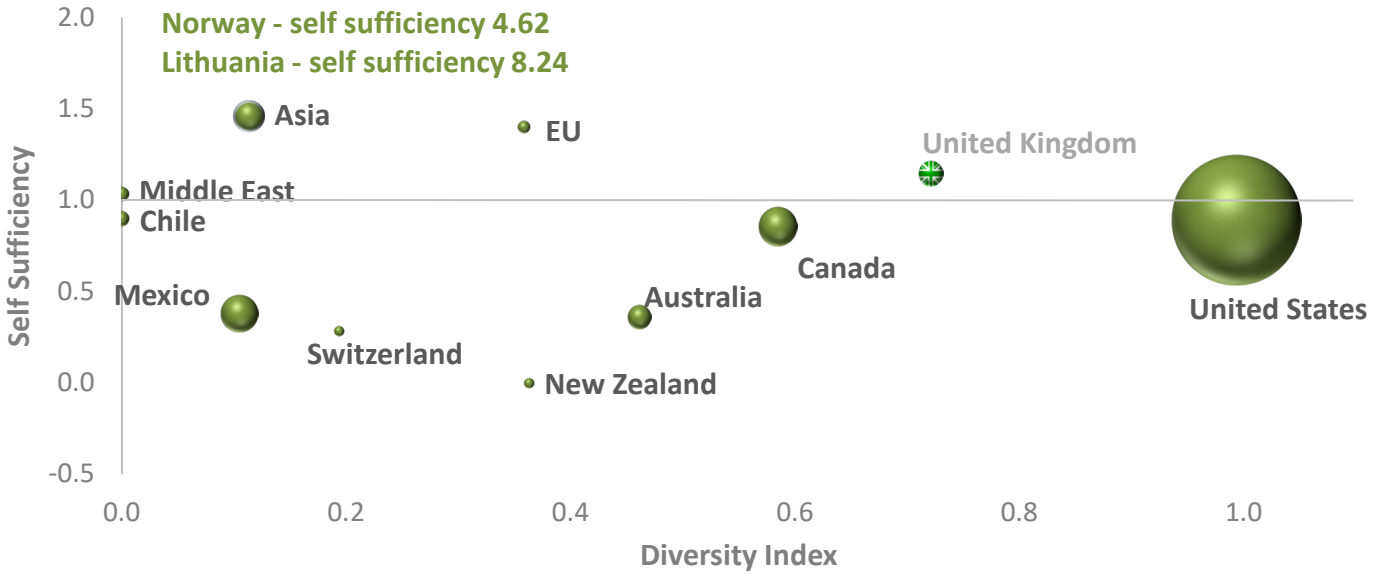
Chart 2: Security of supply of crude oil for OECD countries, 2024



Petrol

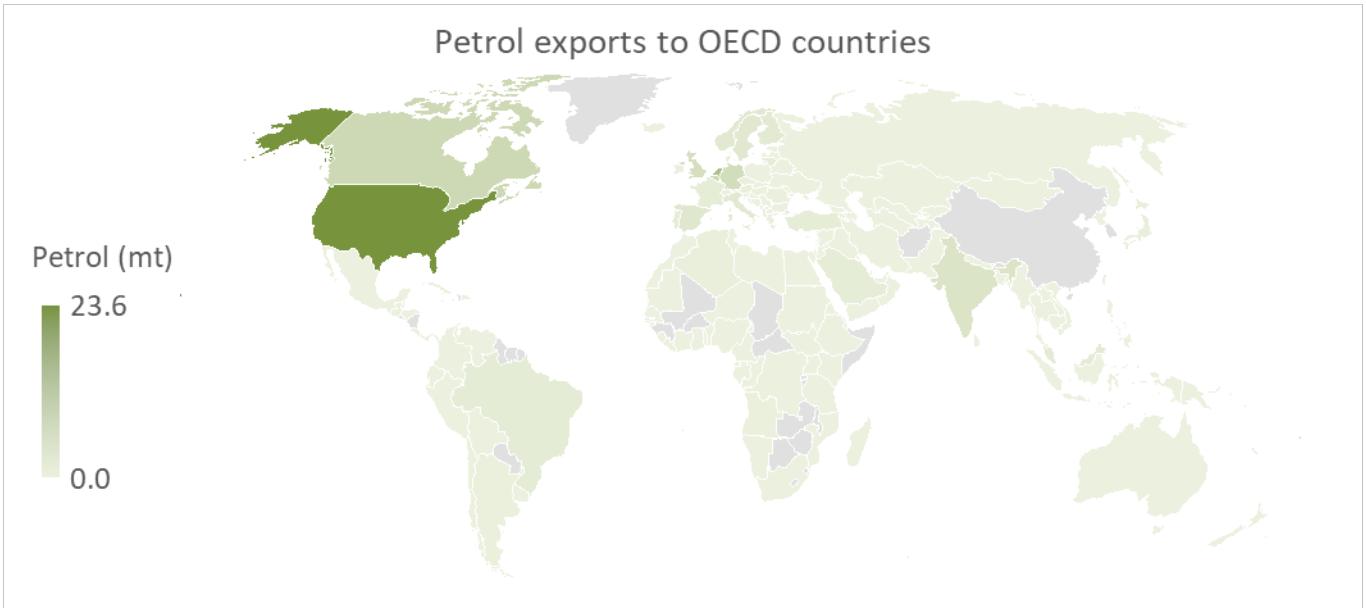
Petrol imports had an average diversity score of 0.33, mainly because OECD countries are on average self-sufficient for petrol (with a score of 1.24) so do not need to import from many sources. Sixteen out of the 38 OECD countries were self-sufficient in terms of petrol supply, a notable contrast to the just five countries that achieved self-sufficiency for crude oil. Chart 3 shows the self-sufficiency and diversity scores for petrol for each country analysed, with EU, Middle East, and Asia countries grouped.

Chart 3: Diversity and self-sufficiency of petrol for OECD countries, 2024



Lithuania had the highest petrol self-sufficiency score in 2024, producing more than eight times its domestic consumption. This is largely due to the Mazeikiai refinery, the only refinery in the Baltic region, which has the capacity to produce oil products well beyond Lithuania's domestic needs. As a result, Lithuania is a net exporter of refined products, supplying neighbouring countries such as Latvia, Ukraine, Poland, and Estonia, as well as more distant markets including the Netherlands and the US[2]. The US remained the largest consumer of petrol in the OECD, accounting for 60 per cent of total OECD petrol consumption (and 62 per cent of its production). Despite this, the US was not completely self-sufficient in 2024, as reflected by its self-sufficiency score of 0.89. In contrast, the UK achieved a score of 1.15, indicating that domestic production more than met national petrol demand and making the UK a net exporter of petrol.

Map 2: Worldwide petrol exports to OECD countries (million tonnes), 2024

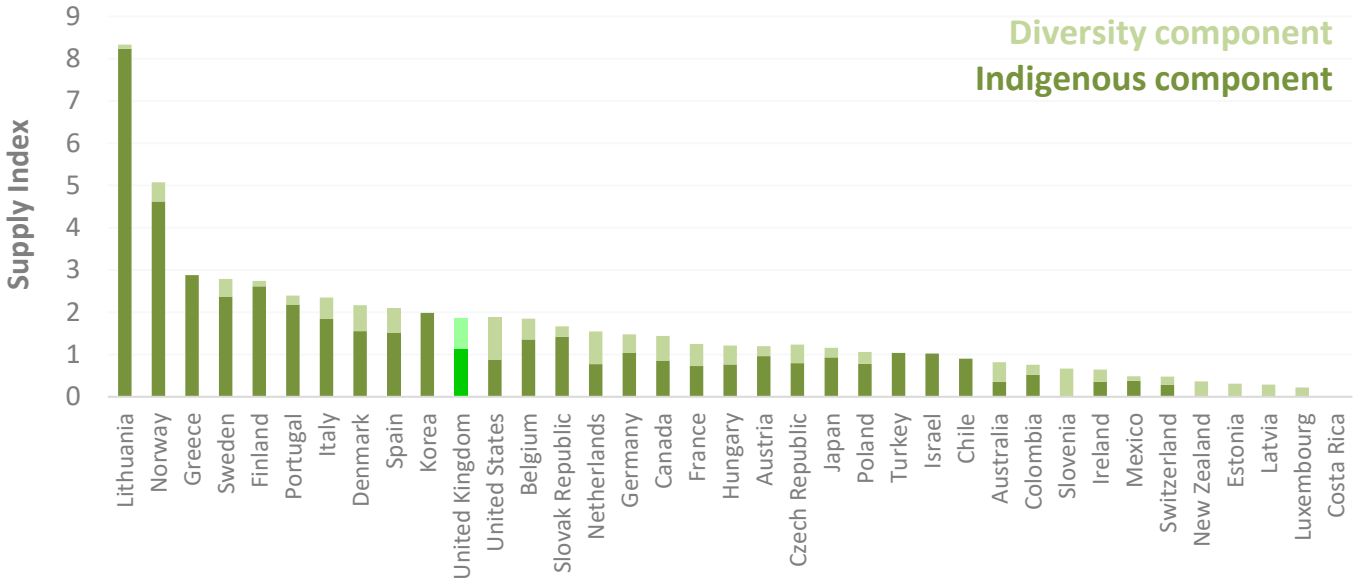


[2] https://www.iea.org/articles/lithuania-oil-security-policy

The largest exporter of petrol to OECD countries globally was the US, exporting 23.6 million tonnes of petrol in 2024; the US made up 27 per cent of OECD petrol imports and just under a fifth of global petrol imports. EU countries also played a significant role, collectively exporting 39.1 million tonnes of petrol, which represented just under half of the OECD's total petrol exports of 84.3 million tonnes. The Netherlands, a major global oil trading hub, exported 12.3 million tonnes, making it one of the largest individual exporters. Of exporters to the OECD, the UK ranked as the seventh largest petrol exporter within the OECD (and the eighth globally), exporting 4.4 million tonnes to other member countries.

Chart 4 shows that most OECD countries produce a large proportion of the petrol they consume (the darker shading), unlike the pattern for crude oil. The UK ranks eleventh for security of petrol supply in this simplified index.

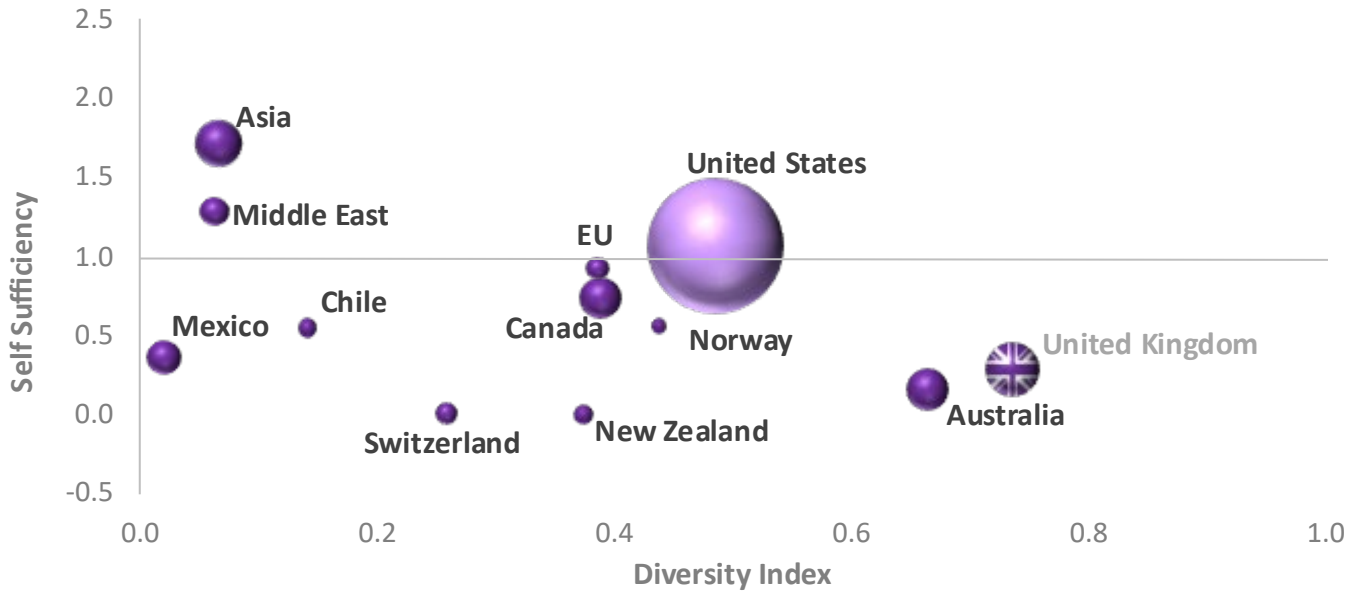
Chart 4: Security of supply of petrol for OECD countries, 2024



Jet Fuel

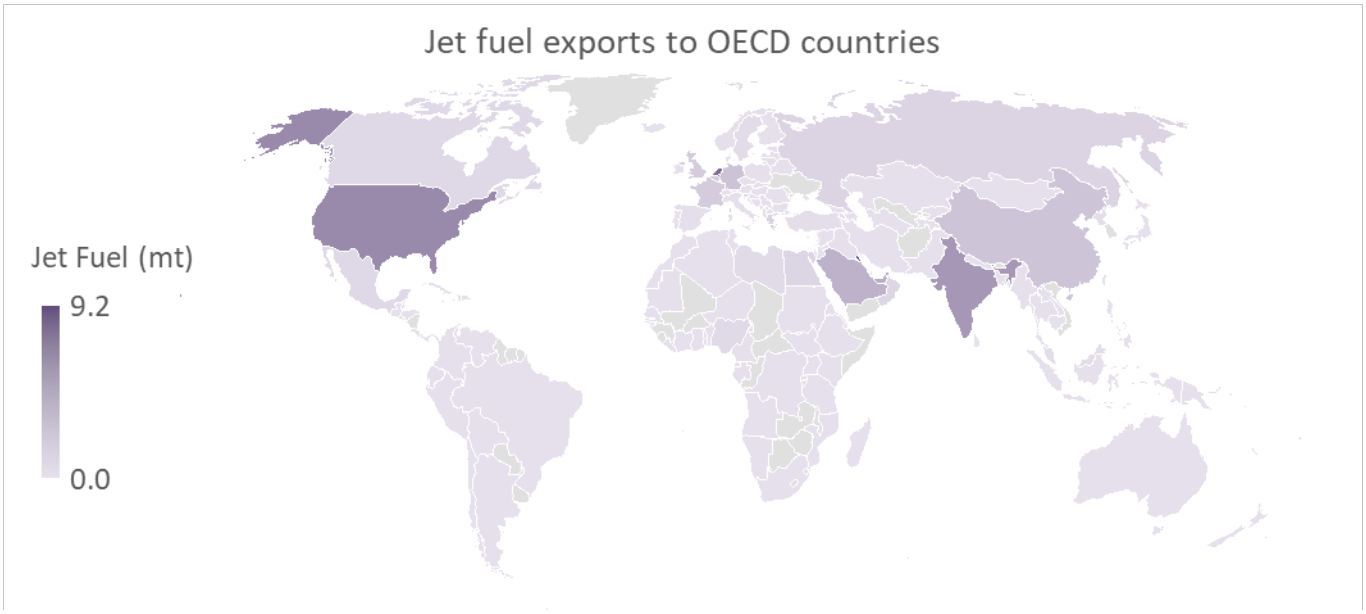
Jet fuel imports had an average diversity score of just 0.33, the same as for petrol but combined with a lower average self-sufficiency score of 0.84 compared to 1.24 for petrol. This reflects the limited number of countries capable of producing and exporting jet fuel in large volumes.

Chart 5: Diversity and self-sufficiency of jet fuel for OECD countries, 2024



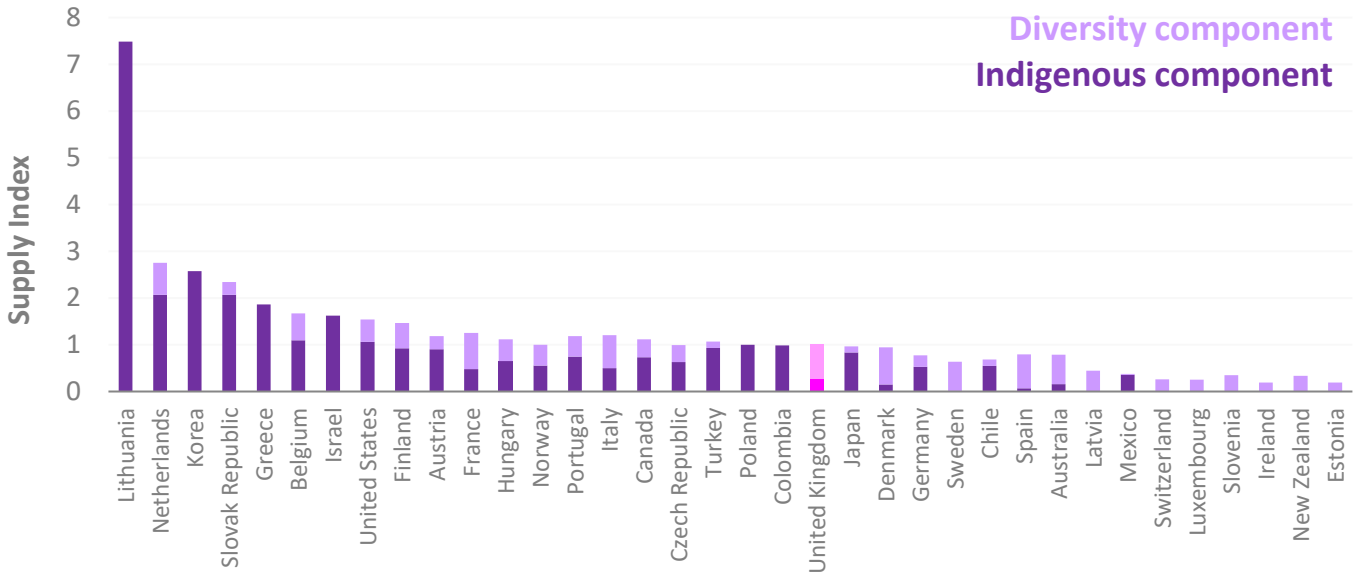
Demand for jet fuel increased by 5.5 per cent in 2024, continuing the recovery of international travel following the lifting of COVID-19 restrictions, and production increased by only 3.1 per cent. As a result, the average self-sufficiency score for jet fuel across OECD countries declined from 0.95 in 2023 to 0.84 in 2024. Lithuania was again the most self-sufficient country analysed with a score of 7.48, meaning it produced over seven times its domestic consumption, followed by Korea who overtook the Slovak Republic in second place (Korea having ranked third in 2023). Like petrol, the United States was the largest consumer of jet fuel, using 78.4 million tonnes and accounting for 42 per cent of total OECD demand.

Map 3: Worldwide jet fuel exports (million tonnes), 2024



Unlike crude and petrol, very few countries export jet fuel in large quantities. Globally, the largest exporters to OECD countries were Kuwait, Korea, and the Netherlands. Both Kuwait and Korea exports increased in 2024 (making up 14 and 12 per cent of imports, respectively), each overtaking the Netherlands (at 11 per cent of imports) as a jet supplier to the OECD. The UK received 4.1 million tonnes of jet fuel from Kuwait, accounting for 38 per cent of UK jet fuel imports. The UK exported 1.5 million tonnes of jet fuel to other OECD countries, with Ireland receiving 97 per cent of this volume. This made the UK the sixth largest exporter among OECD countries.

Chart 6: Security of supply of jet fuel for OECD countries, 2024

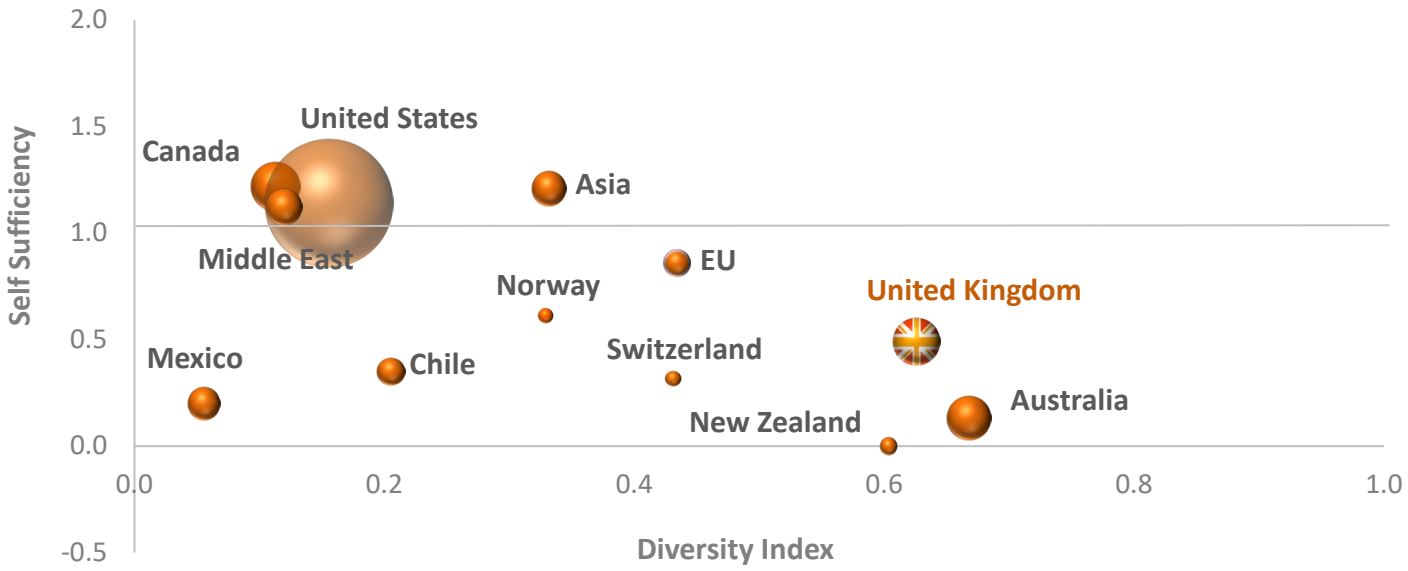


Within OECD countries, the UK ranked second behind the US in jet fuel demand in 2024, stemming from Heathrow airport which is one of Europe's busiest aviation hubs. The UK has comparatively low indigenous production, meaning the self-sufficiency score is low at 0.28, down from 0.30 in 2023. However, the UK mitigates this through imports from a diverse range of stable suppliers, reflected in its diversity score of 0.74 which is significantly higher than the OECD average of 0.33.

Road Diesel

OECD countries remain reliant on imports to meet demand for diesel, with an average self-sufficiency score of 0.78 and a diversity score of 0.35. In 2024, thirteen countries were self-sufficient in terms of diesel supply, and seven countries did not produce any diesel at all. Chart 7 shows the UK's self-sufficiency score in 2024 was 0.49 which remained unchanged from 2023 but remaining below the OECD average of 0.78. Despite this, the UK had a diversity index of 0.63, well above the OECD average of 0.35.

Chart 7: Diversity and self-sufficiency of diesel for OECD countries, 2024



Historically, Russia has been a key supplier of diesel to the UK, EU, and wider OECD. However, following the implementation of sanctions in 2022, in 2023 Russia fell to fourth place and remained there in 2024, exporting 11.4 million tonnes (stable on 2023) behind the United States (28.3 million tonnes), the Netherlands (21.4 million tonnes), and Korea (12.3 million tonnes), which took Belgium's third position from the year before.

Map 4: Worldwide diesel exports to OECD countries (million tonnes), 2024

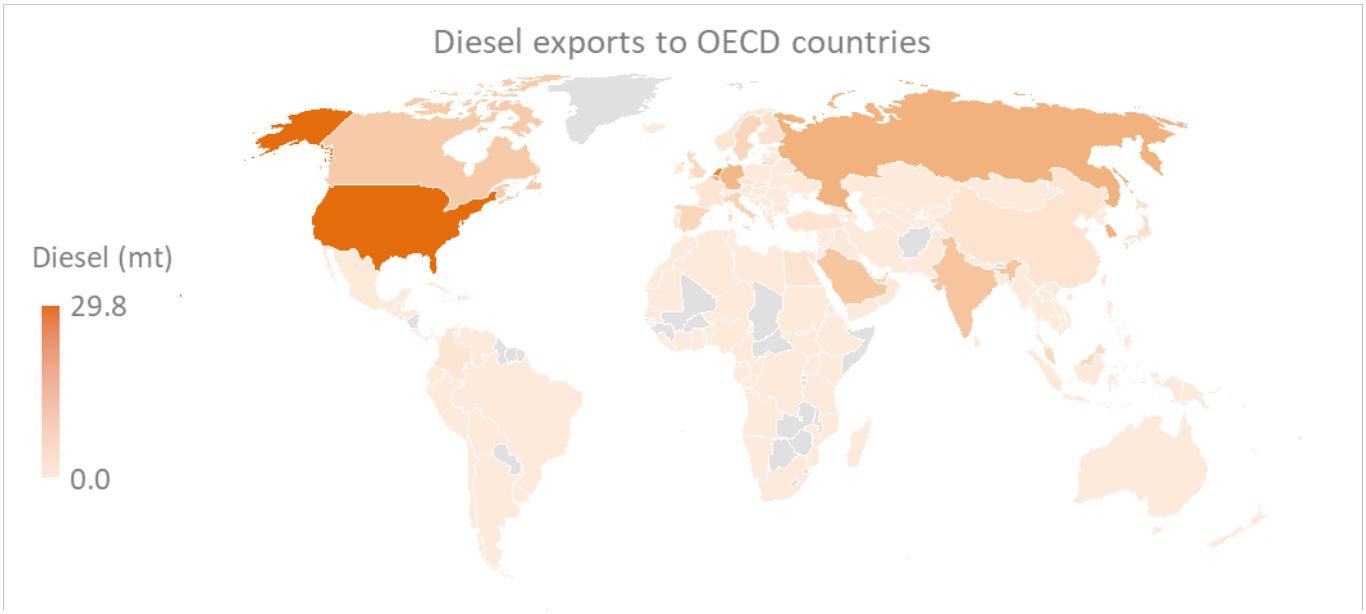
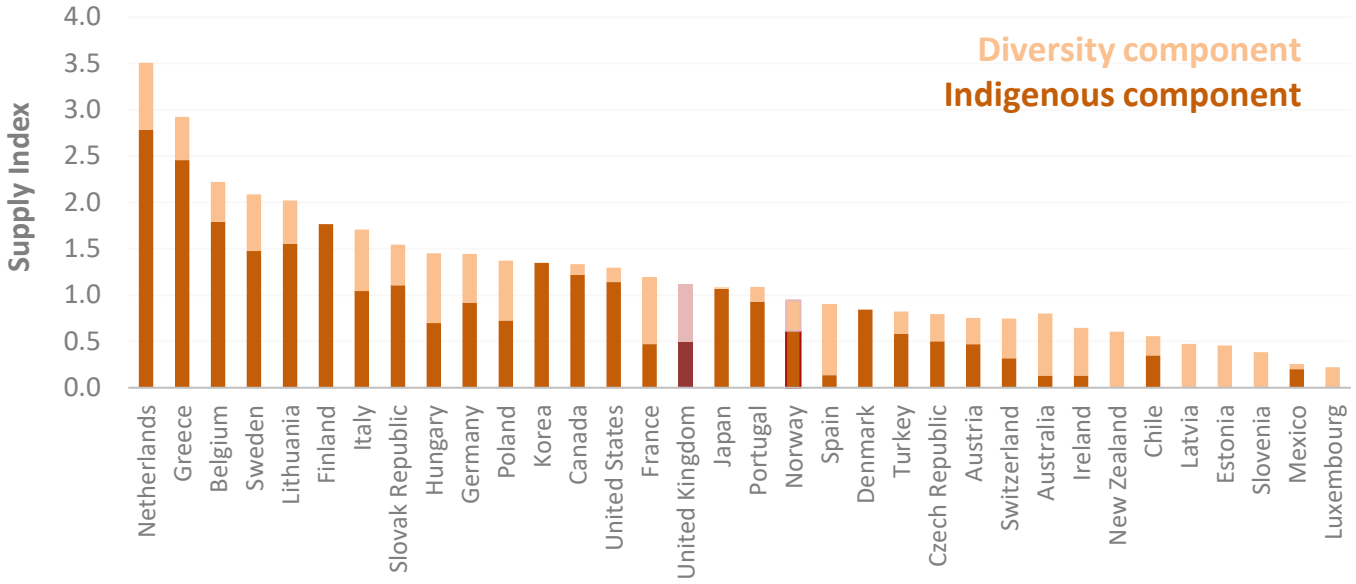


Chart 8 shows that a large proportion of diesel demand was met through indigenous production, but many countries relied upon a combination of both indigenous and diversity components. Korea and Finland were the only countries to not import any diesel – and both produced more diesel than there was demand for.

Chart 8: Security of supply of diesel for OECD countries, 2024



Summary

The OECD has a higher security of supply for oil products compared to crude oil. This is because of higher levels of refinery production compared to crude extraction. Nevertheless, the scores for transport fuels are dependent on refining crude oil and therefore should only be considered independently with caution. The average self-sufficiency score for crude oil being 0.72 shows OECD countries are still dependent on imports of crude oil to meet refinery demand. The average diversity score for crude oil was 0.35 and was equal to diesel but still reflects a limited range of import sources.

As demand continued to increase in 2024 compared to 2023 the average self-sufficiency scores for transport fuels decreased. Petrol had the highest average self-sufficiency score (1.24) and the highest count of countries that were self-sufficient (16 of the 38), suggesting OECD countries are well-placed to meet demand for petrol. Due to the high self-sufficiency countries on average do not have a wide range of import sources for petrol, meaning its diversity score was equal to jet fuel at 0.33.

Jet had the second highest average self-sufficiency score of 0.84 out of all the oil types. However, jet fuel had the joint lowest diversity score with petrol because there are fewer exporting countries to source jet from. Jet fuel demand continued to rise in 2024 as international travel recovered following restrictions previously in place to curb the spread of COVID-19. Demand for jet in the UK increased by 7.9 per cent compared to 2023, but with a diversity score of 0.74 the UK remains in a relatively secure position compared to the OECD average. Diesel had a lower self-sufficiency score of 0.78, though more countries (13) were self-sufficient in diesel than in jet fuel (nine).

The UK consistently has diversity scores higher than the OECD average for all oil types considered here. The UK is self-sufficient in petrol (and a net exporter). The UK is not self-sufficient for crude oil, diesel or jet fuel, but meets its needs through a diverse range of stable import sources as well as indigenous production.

Appendix 1 – Methodology

Data for crude oil and transport fuel self-sufficiency

Data for crude oil, petrol and jet fuel were extracted from the IEA database. For diesel, data were provided on request from the IEA. Self-sufficiency was determined from data on indigenous production and consumption (production (kt) ÷ consumption (kt)).

Crude oil and transport fuel diversity indices

The diversity index used here is a product of a standard diversity index and an index for political stability. As a basic index for measuring diversity, we used the Shannon-Wiener diversity index. The Shannon-Wiener index is of the form:

$$\sum_{i=1}^{n} -x_i \ln(x_i)$$

Where x is the proportion of total fuel supply represented by the ith source country and n represents the final source country. A value below 1 signifies a country that is dependent on a small range of import sources, a value above 2 represents a country with a wide range of import sources. The minimum value of zero denotes a country that has one imported fuel source or relies entirely on indigenous production.

A previous comparative study on import diversities in Energy Trends March 2011 used the Herfindahl Index as the basic diversity index. Although both indices have their advantages, the Shannon-Wiener was chosen here as this represents the data with less skew, as well as placing more weight on the diversity of contributions from smaller countries and lessening the impact of larger nations.

Political stability was determined using data from the World Bank worldwide governance indicators. Specifically, the index reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically motivated violence and terrorism. These data were standardised between 0 and 1.

Source: World Bank (http://info.worldbank.org/governance/wgi/index.aspx#home)

Once Shannon-Wiener and political stability indices were determined, these were multiplied and summed:

$$\sum_{i=1}^{n} -x_i \ln(x_i)\, b_i$$

Where b is an index of political stability of the country exporting. This is called the SWNI (Shannon-Weiner-Neumann index), in line with previous work.

Each SWNI index was normalised for each petroleum product between 0 and 1, to have a standardised index. This was done by working out a maximum diversity score, by assuming maximum diversity was equivalent to importing products in line with proportional contributions of exporting countries (e.g. if a single country were responsible for exporting 50 per cent of all product, and five other countries were responsible for 10 per cent each, we assumed maximum import diversity at a ratio of 5:1:1:1:1:1). This maximum diversity score then acted as our upper score of 1, with all other scores divided by this maximum to standardise the data.

Appendix 2 – Provisional data for 2024

	CRUDE			PETROL			JET FUEL			DIESEL		
	DI	S-S	Demand	DI	S-S	Demand	DI	S-S	Demand	DI	S-S	Demand
Australia	0.73	**1.02**	12,474	0.46	0.36	12,017	0.63	0.16	7,171	0.67	0.13	22,100
Austria	0.43	0.06	8,097	0.23	0.96	1,737	0.28	0.90	946	0.28	0.47	5,582
Belgium	0.85	0.00	30,799	0.50	**1.35**	2,688	0.58	**1.10**	1,840	0.43	**1.79**	5,538
Canada	0.21	**3.43**	59,984	0.58	0.86	33,853	0.38	0.74	7,141	0.11	**1.22**	26,704
Chile	0.33	0.01	10,074	0.00	0.90	4,623	0.14	0.55	1,316	0.21	0.35	8,455
Colombia	0.00	**2.14**	19,247	0.24	0.52	6,918	0.00	0.99	1,687	0.03	0.83	6,171
Costa Rica	-	-	-	0.00	0.00	1,009	0.00	0.00	293	0.00	0.00	1,113
Czech Rep.	0.37	0.01	6,569	0.44	0.80	1,783	0.36	0.63	454	0.29	0.50	5,316
Denmark	0.30	0.43	6,824	0.62	**1.55**	1,259	0.79	0.15	972	0.00	0.84	2,207
Estonia	0.00	0.00	0.00	0.31	0.00	209	0.19	0.00	55	0.46	0.00	789
Finland	0.24	0.00	8,145	0.13	**2.61**	1,329	0.54	0.92	739	0.00	**1.77**	2,163
France	0.70	0.01	45,295	0.52	0.73	11,646	0.77	0.48	7,485	0.72	0.47	33,354
Germany	0.81	0.02	86,100	0.44	**1.04**	18,716	0.25	0.53	8,911	0.52	0.92	31,395
Greece	0.43	0.00	23,819	0.00	**2.88**	2,201	0.00	**1.86**	1,759	0.46	**2.46**	3,047
Hungary	0.18	0.16	6,779	0.45	0.76	1,512	0.46	0.65	383	0.75	0.70	3,509
Iceland	0.00	0.00	0.00	0.00	0.00	136	0.00	0.00	298	0.00	0.00	395
Ireland	0.12	0.00	1,993	0.29	0.36	796	0.20	0.00	1,064	0.51	0.13	3,056
Israel	0.00	0.04	12,971	0.00	**1.03**	3,146	0.00	**1.63**	715	0.00	**1.66**	2,234
Italy	0.63	0.07	61,369	0.51	**1.84**	8,630	0.70	0.50	4,968	0.66	**1.04**	24,129
Japan	0.53	0.00	115,101	0.23	0.94	32,914	0.13	0.84	10,987	0.01	**1.07**	20,379
Korea	0.75	0.00	139,417	0.00	**1.98**	11,142	0.00	**2.58**	7,097	0.00	**1.35**	19,238
Latvia	0.00	0.00	0.00	0.29	0.00	153	0.44	0.00	126	0.47	0.00	761
Lithuania	0.56	0.00	8,845	0.10	**8.24**	334	0.00	**7.48**	121	0.47	**1.56**	1,795
Luxembourg	0.00	0.00	0.00	0.22	0.00	403	0.25	0.00	648	0.22	0.00	1,035
Mexico	0.00	**1.77**	49,942	0.10	0.38	32,035	0.02	0.36	4,267	0.06	0.20	11,529
Netherlands	0.77	0.01	47,203	0.77	0.77	4,398	0.69	**2.07**	3,505	0.72	**2.78**	5,217
New Zealand	0.00	0.00	0.00	0.36	0.00	2,135	0.34	0.00	1,393	0.60	0.00	3,197
Norway	0.27	**12.32**	7,231	0.45	**4.62**	813	0.45	0.56	833	0.33	0.61	2,425
Poland	0.51	0.03	26,000	0.28	0.78	5,797	0.00	**1.00**	1,295	0.65	0.72	17,938
Portugal	0.51	0.00	10,555	0.21	**2.19**	1,185	0.44	0.75	1,818	0.16	0.93	4,532
Slovak Rep.	0.16	0.00	4,711	0.25	**1.42**	655	0.27	**2.07**	42	0.44	**1.11**	2,096
Slovenia	0.00	0.00	0.00	0.67	0.00	442	0.35	0.00	20	0.38	0.00	1,548
Spain	0.76	0.00	64,336	0.59	**1.50**	6,518	0.73	0.07	7,389	0.76	0.14	21,759
Sweden	0.51	0.00	17,905	0.42	**2.37**	2,083	0.62	0.01	667	0.61	**1.48**	5,038
Switzerland	0.25	0.00	2,548	0.19	0.28	2,137	0.26	0.00	1,797	0.43	0.32	4,589
Turkey	0.43	0.15	34,882	0.00	**1.04**	4,894	0.13	0.94	5,898	0.24	0.58	26,047
UK	0.61	0.59	47,570	0.72	**1.15**	13,084	0.74	0.28	12,215	0.63	0.49	27,457
US	0.54	0.81	804,261	0.99	0.89	386,352	0.48	**1.06**	78,414	0.16	**1.14**	186,829
OECD Asia average	**0.64**	**0.00**	**127,259**	**0.11**	**1.46**	**22,028**	**0.07**	**1.71**	**9,042**	**0.01**	**1.21**	**19,808**
OECD EU average	**0.38**	**0.03**	**25,853**	**0.36**	**1.40**	**3,244**	**0.39**	**0.92**	**1,978**	**0.43**	**0.86**	**7,922**
OECD Middle East average	**0.22**	**0.09**	**23,927**	**0.00**	**1.03**	**1,574**	**0.07**	**1.28**	**3,307**	**0.12**	**1.12**	**14,141**
OECD average	**0.35**	**0.72**	**57,453**	**0.33**	**1.24**	**16,231**	**0.33**	**0.84**	**4,914**	**0.35**	**0.78**	**14,491**

Items in bold highlight those countries where indigenous production exceeded domestic consumption.

DI = Diversity Index
S-S = Self-sufficiency

Demand is in thousand tonnes (kt)

Source IEA (http://data.iea.org/)

Appendix 3 – List of OECD countries in category averages

Asia
Japan
Korea

EU
Austria
Belgium
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Italy
Latvia
Lithuania
Luxembourg
Netherlands
Poland
Portugal
Slovak Republic
Slovenia
Spain
Sweden

Middle East
Israel
Turkey

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Hydrogen production and demand in the UK, 2022 to 2024

Official Statistics in Development

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The Department for Energy Security and Net Zero has collected, quality assured and analysed hydrogen data for the years 2022 to 2024. This data has been used to publish this article as Official Statistics in Development to involve users and stakeholders at an early stage in assessing their suitability and quality (for more information see Appendix 1: supporting information). As these statistics are in development, they carry a higher degree of uncertainty than Official Statistics. The Department will continue to evaluate their quality to ensure the data and statistical methods are robust. As part of this review, we are requesting user feedback.

To provide feedback please contact gas.stats@energysecurity.gov.uk

Key headlines

- Hydrogen production and demand is small relative to other fuels. Between 2022 and 2024, the UK produced around 14 TWh of hydrogen annually, equivalent to 4 per cent of natural gas production. Demand was also 14 TWh, around 2 per cent of natural gas demand.
- Hydrogen production is concentrated in the refining and chemical sectors with most of the UK's production being a by-product of other processes. In 2024, more than 80 per cent of production was as a by-product, with nearly 70 per cent of total production being produced by catalytic reformers. Comparatively steam methane reforming was smaller at 13 per cent in the same period.
- Whilst refinery processes produce hydrogen as a by-product, refineries also have substantial demand for hydrogen, with 70 per cent of total demand in 2024. The chemicals industry and non-energy use accounted for 27 per cent of hydrogen demand in 2024, the second and third largest consumers respectively.

Hydrogen Production

Hydrogen is not a primary energy product, it must be produced from other fuels. Currently, global hydrogen production and demand, including in the UK, is concentrated in the refining and chemicals sectors.

Annual hydrogen production was 14 TWh in the UK on average between 2022 and 2024. This is equivalent to 4 per cent of UK natural gas production in the same period. Hydrogen is commonly produced as a by-product of other activities; whereby chemical reactions used to produce other products also produce hydrogen. More than 80 per cent of production was as a by-product in 2024, the remainder was produced using natural gas. Hydrogen production from other fuels fell to zero in 2024, having made up 1-2 per cent of production in 2022 and 2023.

Hydrogen production by type in the UK, annual average 2022-2024

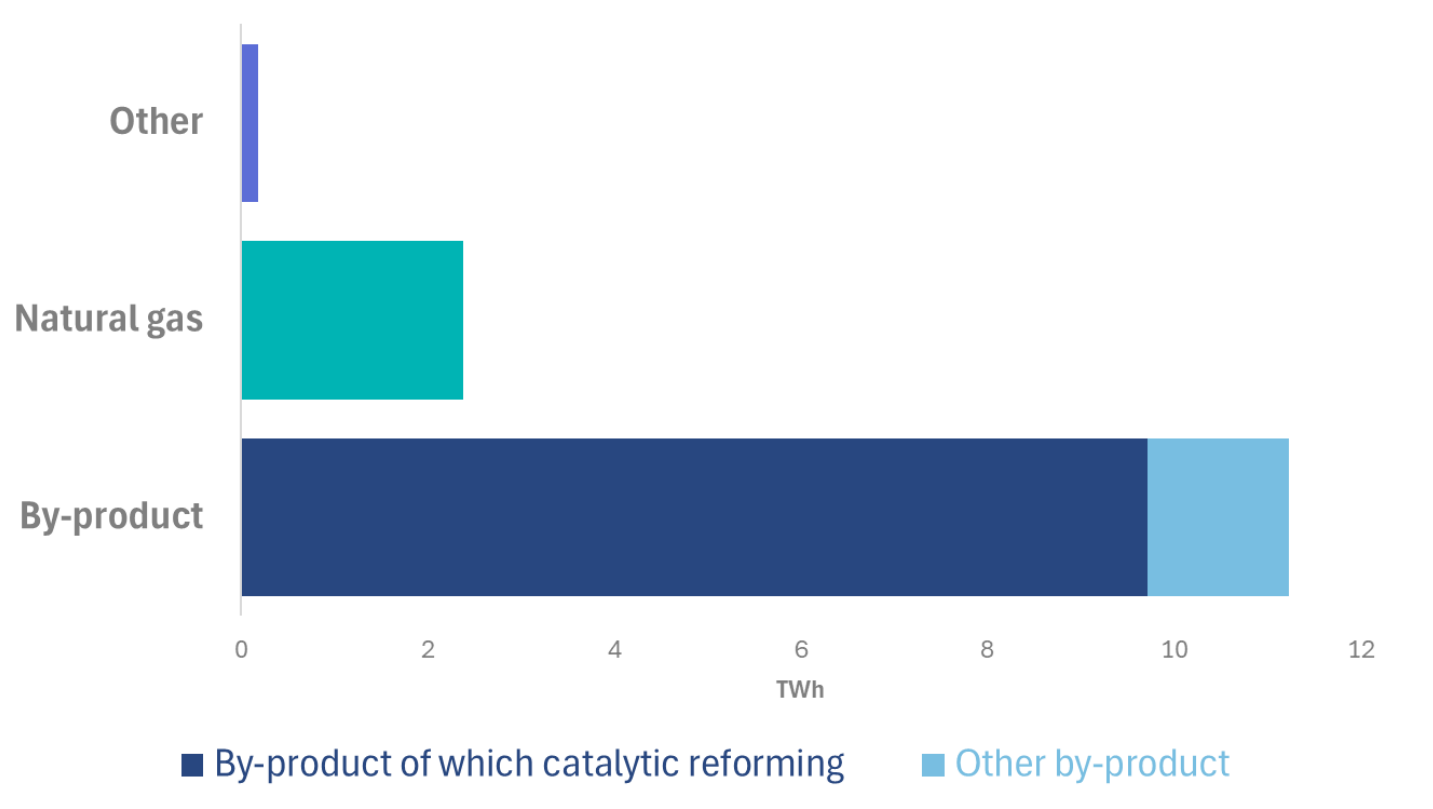
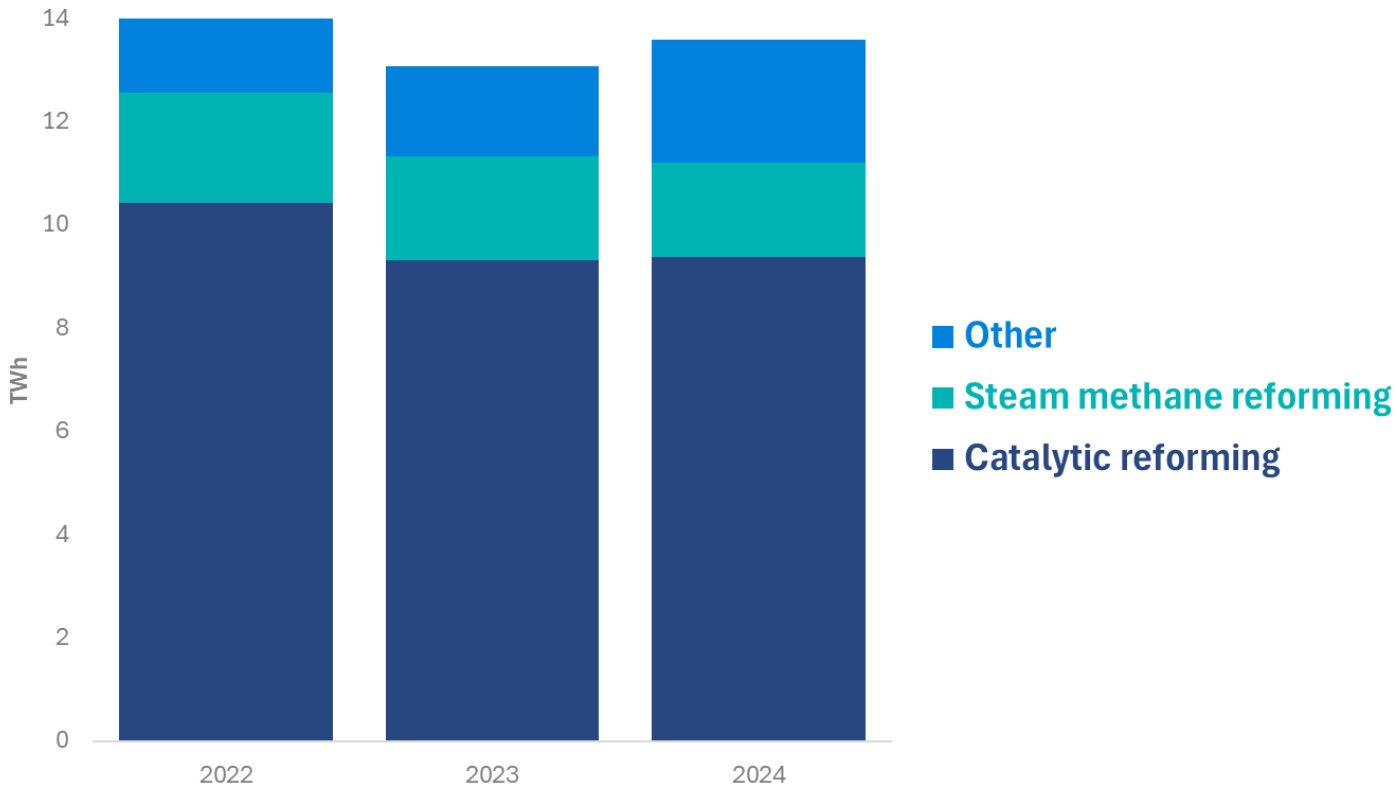


Chart updated February 2026 due to error.

The most substantial type of by-product production is through catalytic reforming. Catalytic reformers are used by refineries to produce the components of petroleum products from derivatives of crude oil; they produce hydrogen as a by-product. Nearly 70 per cent of hydrogen was produced using catalytic reformers in 2024.

A further 13 per cent of hydrogen was produced using steam methane reformers. Steam methane reformers use natural gas to produce hydrogen. Unlike catalytic reformers, the primary purpose of steam methane reformers is hydrogen production. The remaining production technologies have been aggregated to protect identifiable information (see Disclosure Control for more information).

Hydrogen production by technology in the UK, 2022-2024



Hydrogen Demand

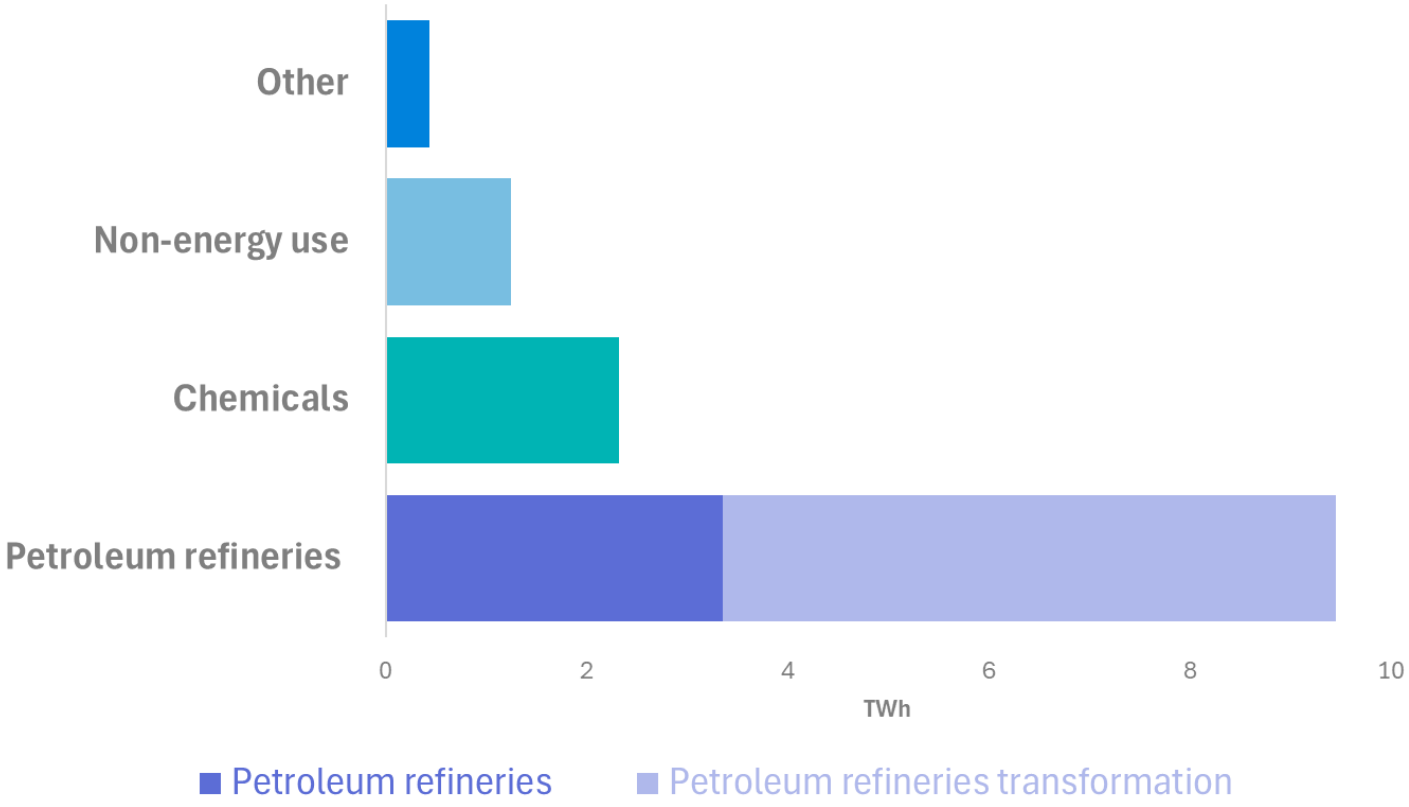
Like production, hydrogen demand in the UK is small relative to other fuels. Hydrogen demand was approximately 14 TWh on average between 2022 and 2024, equivalent to around 2 per cent of natural gas demand in the same period. It is common for hydrogen production to take place within the facility where it is consumed.

Whilst refineries produce hydrogen as a by-product of catalytic reforming, they also have high demand for hydrogen. Refinery demand was 70 per cent of total hydrogen demand in 2024. During refinery processes hydrogen can be incorporated into other fuels rather than being burnt as a fuel directly. In Energy Statistics this is known as transformation, where one type of energy is ‘transformed’ into another. The majority (>60 per cent) of refinery demand for hydrogen is for transformation; the remainder is used in support of other refinery processes.

Hydrogen is also used by the chemicals industry as a fuel for high temperature processes and as a feedstock to produce chemicals. Where hydrogen is incorporated into chemicals this is considered non-energy use. Together the chemicals sector and non-energy demand for hydrogen accounted for 27 per cent of total demand in 2024.

Hydrogen is used in other sectors including other industries, transport and by other final users. In these sectors hydrogen is likely used in fuel cells to power buildings or vehicles. Based on the data collected, each of these sectors made up less than 1 per cent of total hydrogen demand in 2024.

Hydrogen demand in the UK, 2024



Appendix 1: supporting information

1. Official Statistics in Development

These statistics were produced using a new data collection of existing hydrogen producers. They are in development, therefore carry a higher degree of uncertainty than Official Statistics. It is not currently possible to quantify this uncertainty precisely; however, information has been included to allow users to assess quality and judge whether fit for their intended use.

The data collection aimed for 100 per cent coverage of existing hydrogen producers. However, unlike other fuels, there is no centralised register of hydrogen suppliers in the UK. The department utilised relationships with industry, including trade associations, to gather information. Whilst we anticipate all substantial hydrogen producers have been included; it is possible that some are missing.

Once these statistics have been accessed to be of sufficient quality, the department are aiming to include them within our regular publications the Digest of UK Energy Statistics (DUKES) and Energy Trends. Whilst this is subject to data quality review, anticipated timelines are outlined below:

30th September 2025	International Energy Agency reporting deadline
30th September 2025	Hydrogen production and demand in the UK, 2022-2024 special feature article published in Energy Trends
2nd February 2026	Final date for user feedback which can be incorporated in publication cycle for 2025 data
25th June 2026	Energy Trends publication including annual data for 2025, anticipate inclusion of hydrogen data for the first time
30th July 2026	DUKES publication including annual data for 2025, anticipate inclusion of hydrogen data for the first time

To provide feedback please contact gas.stats@energysecurity.gov.uk

2. Disclosure Control

In line with guidance data may have been aggregated or omitted to ensure identifiable information has not been published.

3. Units and Conversions

Data were collected in mass units (kg) of pure hydrogen; this was converted to energy units using a gross calorific value of 141.8 megajoules per kilogram (MJ/kg).

This publication is available from: https://www.gov.uk/government/collections/energy-trends

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Regional renewable electricity in 2024

William Spry **07825 194608** william.spry@energysecurity.gov.uk

Key headlines

Renewable generation in the UK increased by **5.1 per cent** from 136.8 TWh in 2023 to 143.7 TWh in 2024. This was a result of increased wind and plant biomass generation. Within this:

- Generation in England was **up 4.4 per cent**
- Generation in Northern Ireland was **down 6.1 per cent**
- Generation in Scotland was **up 11.5 per cent**
- Generation in Wales was **down 8.2 per cent**

Overall capacity increased by **7.3 per cent** from 56.5 GW at the end of 2023 to 60.6 GW at the end of 2024. Within this:

- Capacity in England was **up 5.7 per cent**
- Capacity in Northern Ireland was **up 1.5 per cent**
- Capacity in Scotland was **up 12.9 per cent**
- Capacity in Wales was **up 4.1 per cent**

Background

This article provides information and analysis on the amount of electricity from renewable sources, disaggregated below the UK level. It includes information on capacity, generation, and number of operational sites, as well as derived load factors, for the four UK countries, the nine English regions and, from 2014, UK Local Authorities. It updates the previously published figures in the October 2024 edition of Energy Trends.

These data are consistent with those published in the Digest of United Kingdom Energy Statistics 2025 (DUKES)[1], and use similar categories[2]. The UK totals for 2024 published here are consistent with the figures published in Energy Trends. In addition, data for 2022 and 2023 have been revised to reflect DUKES, except for a small revision to solar capacity in 2022 which will be revised in DUKES next year.

The UK totals published here are consistent with the figures published in Energy Trends. However, there are small differences between the totals published for England, Northern Ireland, Scotland and Wales published here and those published in ET 6.1. Some sites cannot be allocated to local authorities where it would disclose the generation of individual schemes. This leads to some differences for generation between DUKES and these tables for 2022, 2023 and 2024.

Generation from **liquid biofuels** (biodiesel) is not included here. This is because there are a relatively small number of sites that generate from biodiesel and publishing their totals would be disclosive. In total there are:

- 55 sites that generate from biodiesel, with 53 in England
- Their total capacity is 35.5 MW
- In 2024, they generated 144 GWh in total (0.1 per cent of total renewable generation).

[1] https://www.gov.uk/government/statistics/renewable-sources-of-energy-chapter-6-digest-of-united-kingdom-energy-statistics-dukes

[2] On occasion, it has been necessary to combine some renewable sources into categories so that information about individual sites, provided in confidence to DESNZ, is not disclosed.

In addition, there are small differences between the totals published for England, Northern Ireland, Scotland and Wales published here and those published in ET 6.2. This is because some sites cannot be allocated to local authorities where it would disclose the electricity generated by individual schemes.

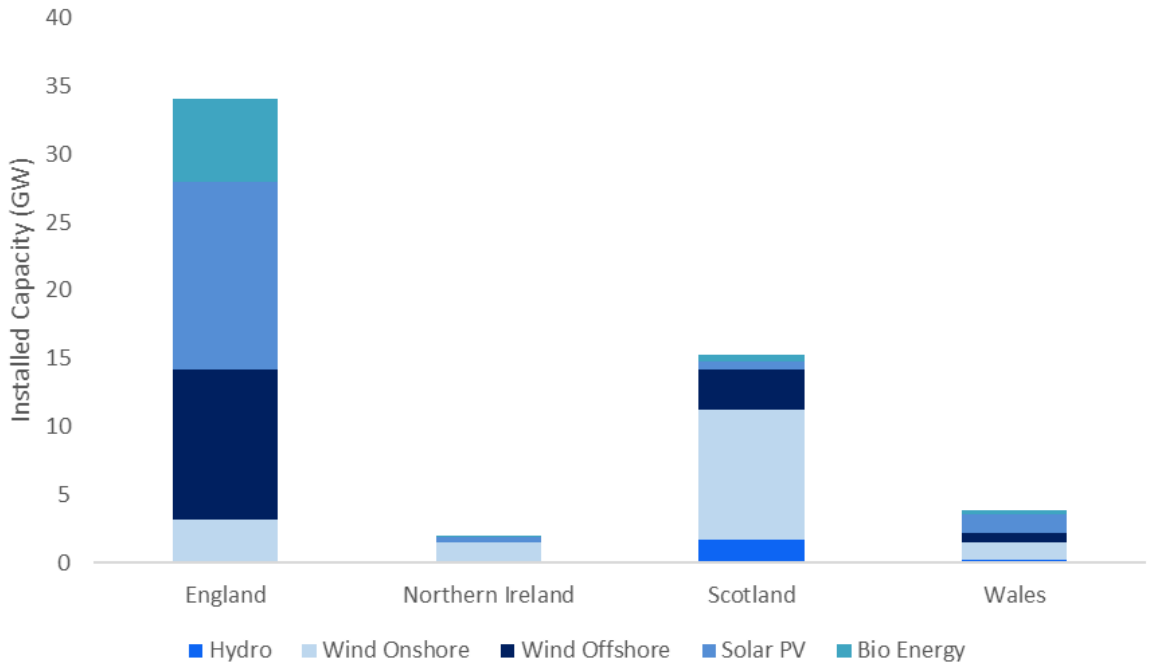
Time-series data are available as Excel spreadsheets at: www.gov.uk/government/statistics/regional-renewable-statistics. The regional tables include data for 2003 – 2024 and the Local Authority (LA) tables include data for 2014 – 2024. The spreadsheets include detailed data and additional charts for generation, capacity, number of sites, generation per GVA, and load factors.

Capacity

- England had the most renewable capacity and generation, roughly two and a half times that of Scotland. This is largely because England has 88 per cent of the UK's bioenergy capacity (including Drax and the Ferrybridge Multifuel Power Station, both in Yorkshire and the Humber, as well as Lynemouth in the North East), 86 per cent of the solar PV capacity, and 70 per cent of the offshore wind capacity.

Chart 1 shows a breakdown of capacity at the end of 2024 by technology and country.

Chart 1: Renewable capacity at the end of 2024 by technology and country



- **Solar PV** capacity in the UK increased by 12.9 per cent, contributing to 50 per cent of the overall growth in the country. An additional 1 GW of capacity has been added, 88 per cent of this new capacity was in England.

- **Offshore wind** capacity grew by 8.1 per cent (1.2 GW). Scotland accounted for nearly all of this additional capacity, primarily from Moray West (882 MW) and Neart Na Gaoithe (224 MW). In addition, the first turbines were installed at Dogger Bank in England.

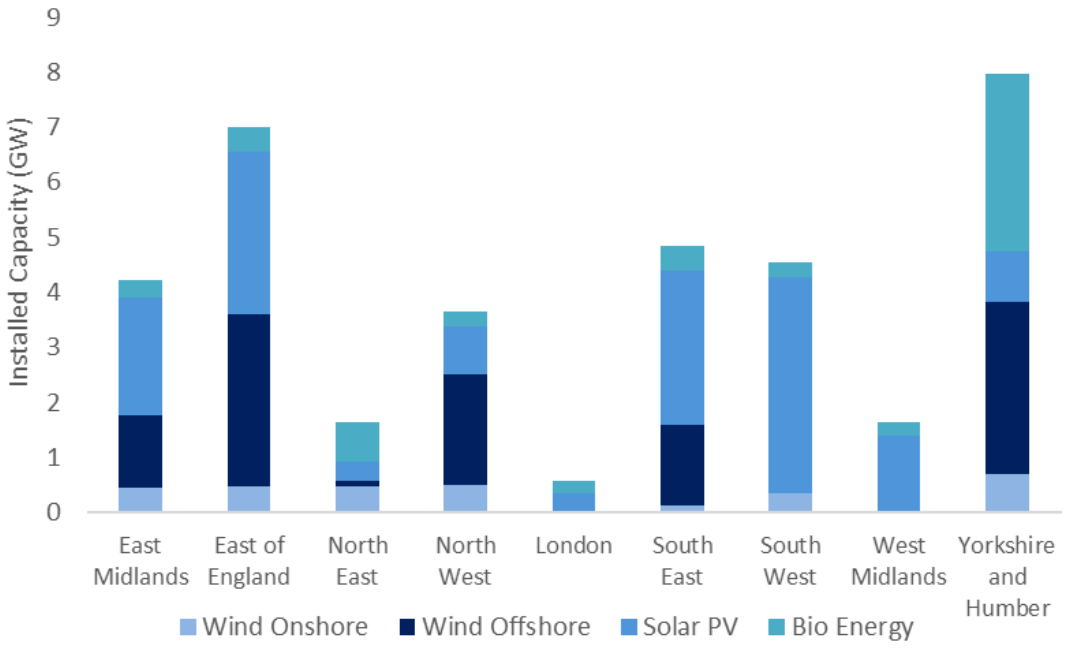
Within England, the breakdown of renewable capacity varies by region as shown in Chart 2. The regions with the highest capacity in England are:

- Yorkshire and the Humber – 8,044 MW (39 per cent from offshore wind – the largest plants being Hornsea phase 1 and 2 and 41 per cent from bioenergy - mostly from Drax and Ferrybridge).
- East of England – 7,194 MW (43 per cent from offshore wind and 41 per cent from solar PV).
- South East – 5,044 MW (56 per cent from solar PV and 29 per cent from offshore wind).

Table 1 - Largest new schemes (including capacity increases) in 2024:

Offshore wind	Moray West	Scotland	882 MW
	Neart Na Gaoithe	Scotland	224 MW
Onshore wind	Viking Wind Farm	Scotland	443 MW
	Broken Cross	Scotland	43 MW
Solar PV	Breach Solar	East of England	67 MW
	Darlington Road, Skeeby	Yorkshire and Humber	55 MW
	Layer Farm, Crouch Solar Farm, and The Grange (Hawton)	East of England and East Midlands	Each at 49 MW
Biomass	Teesside Renewable Energy Plant	North East	45 MW

Chart 2 – Renewable capacity at the end of 2024 by English region and technology



Generation

- Renewable generation in England was around two and a half times that for Scotland. However, this gap has narrowed from three times higher in 2021 as Scotland's wind generation increased more rapidly than England's over this period. The breakdown of renewable capacity and generation is different in each nation; England has a lot of bioenergy and solar capacity while Scotland has a lot of onshore wind capacity. Bioenergy tends to have higher load factors (see below) than wind, but this is offset by England having more solar PV capacity which has a lower load factor.

Number

- Excluding solar PV, England continues to have the largest number of renewable generating sites (6,093) followed by Scotland (4,738), Northern Ireland (1,356), and Wales (1,208). Wales has more sites than Northern Ireland when solar PV is included.

- Excluding solar PV, regions with the most sites in England are the South West, East of England, and Yorkshire and the Humber which each have over 1,000 installations. When solar PV is taken into consideration, the South East has the highest number of sites followed closely by the South West and the East of England.

Capacity and Generation per GVA

- Economic activity in each country or region is measured in terms of Gross Value Added (GVA)[3]. Scotland shows the largest renewable generation per £ of GVA followed by Yorkshire and the Humber and Wales.

Load Factors

Load factors are the ratio of how much electricity was generated as a proportion of the total generating capacity. UCLFs or "load factor on an unchanged configuration basis" describes the amount of electricity generated from sites that have been operating throughout the whole of the calendar year with the same installed capacity[4].

The UCLFs and load factors on a standard basis can be found in the load factor time-series spreadsheets. A summary by country is given in Table 2:

[3] GVA as published in Regional Gross Value Added (Income Approach), December 2015 at:
https://www.ons.gov.uk/economy/grossdomesticproductgdp/bulletins/regionaleconomicactivitybygrossdomesticproductuk/1998to2022
https://www.ons.gov.uk/economy/grossvalueaddedgva/datasets/nominalandrealregion

[4] The formula for calculating this is:

$$\frac{\text{Elelctricity generated during the year (MWh)}}{\text{Installed capacity of schemes operating throughout the year with unchanged capacity configuration (MW)} * \text{hours in year}}$$

Table 2 - Load factors (UCLFs) by country and technology - 2024:

	Onshore Wind	Offshore Wind	Solar PV	Hydro	Biomass and Waste
England	25.7%	40.2%	9.9%	41.6%	66.8%
Northern Ireland	21.4%	n/a	7.4%	36.8%	58.8%
Scotland	26.4%	35.0%	9.8%	49.6%	68.9%
Wales	25.9%	30.2%	10.0%	23.3%	67.7%
UK average	**25.7%**	**38.7%**	**9.8%**	**44.6%**	**66.8%**

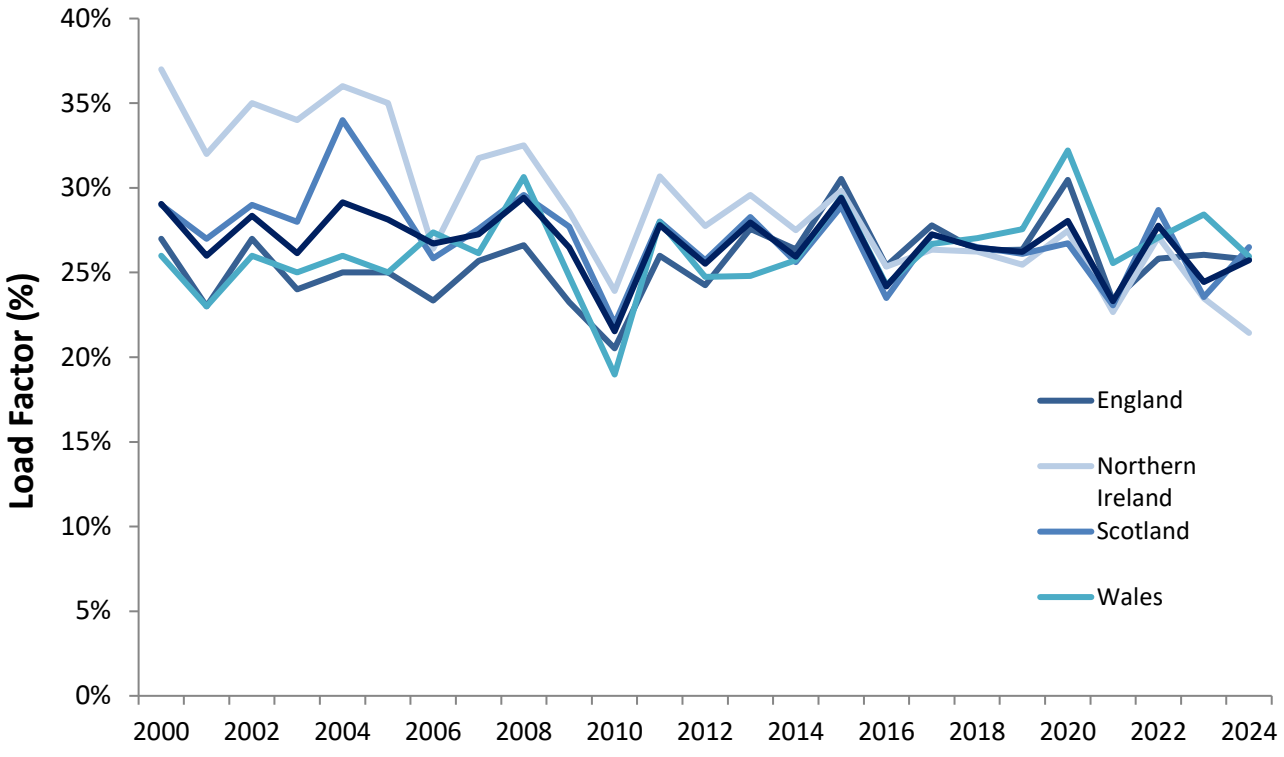
- Scotland has the highest **onshore wind** load factor (26.4 per cent), followed by Wales, England, and Northern Ireland. Load factors can be affected by differences in regional average wind speeds as well as curtailments and planned maintenance.

- England continues to have the highest load factor for **offshore wind** (40.2 per cent), followed by Scotland (35.0 per cent) and Wales (30.2 per cent).

- Wales has the highest average load factor for **solar PV** (10.0 per cent), followed by England, Scotland and Northern Ireland.

Load factors for other technologies are included in the related spreadsheets.

Chart 3 – Onshore wind Unchanged Configuration LFs since 2001 by UK country

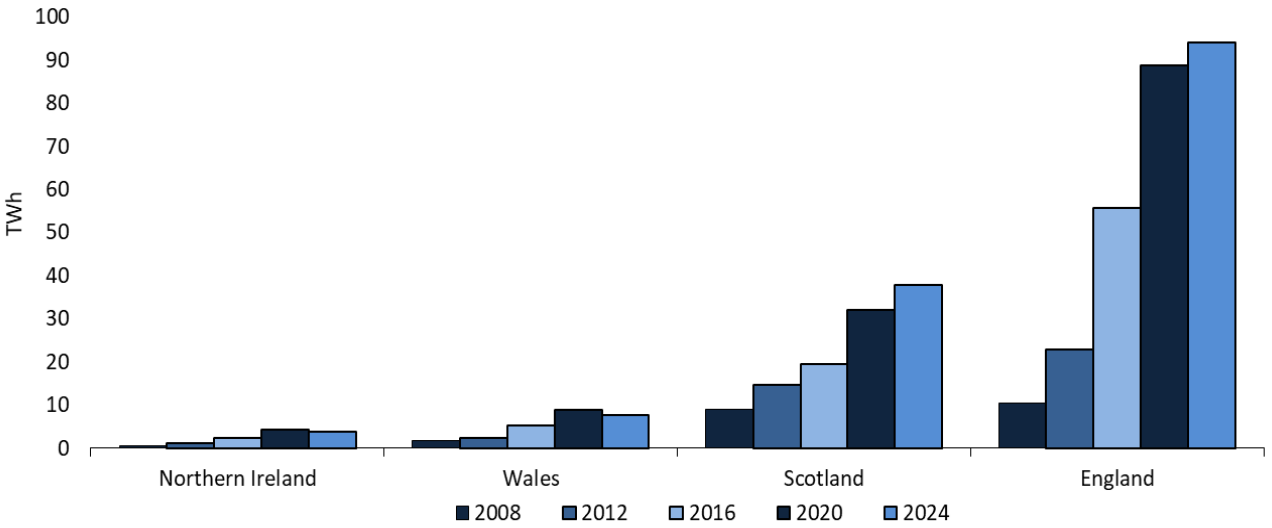


Time series

Capacity and generation have grown at different rates in different regions for each technology, which is partly dependent on the availability of support schemes - Renewables Obligation (RO), Feed in Tariff (FiT) and Contracts for Difference (CfD).

Renewables grew strongly in each country between 2012 and 2020. Renewable generation was at a record level in 2024 in England and Scotland, however the rate of growth has slowed since 2020. Renewable generation in Wales and Northern Ireland were both down on 2023 and both lower than the level in 2020 as shown in graph 4:

Chart 4 – Total renewable generation by country 2004 – 2024



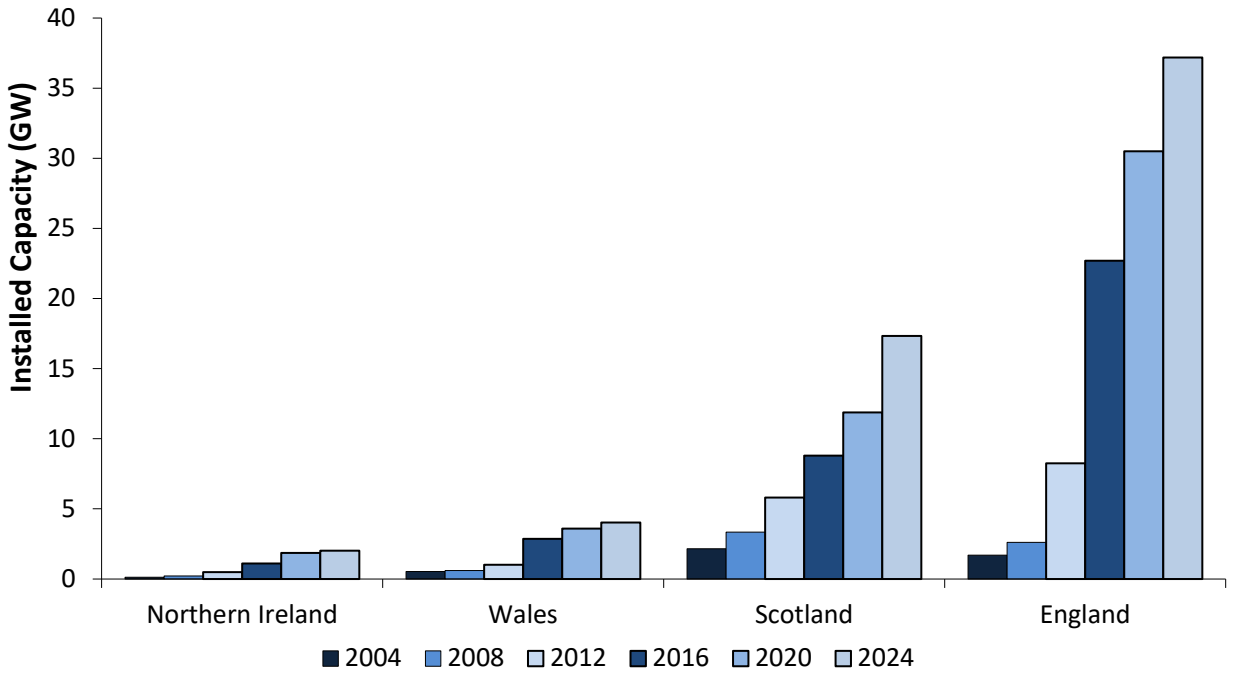
Solar PV: following a period of rapid growth encouraged by the RO and FiT support mechanisms, the initial fast rate of growth has slowed down, which is also reflected in the corresponding generation figures; this is probably due to a combination of effects including the closure of the RO and FiT and the rapid exploitation of prime development sites. Similar patterns are seen for other technologies (onshore wind, landfill gas, sewage gas, and hydro). However, in 2024, strong growth was observed in small-scale and domestic solar installations across each region of the UK.

Offshore wind continues to grow. In total, offshore wind capacity grew by 8.1 per cent, most of this growth came from Moray West in Scotland.

Landfill gas: the rate of exploitation of prime sites reached saturation more than a decade ago but there is no similar plateauing of generation data which instead decreases with time. This is because biogas production rates reduce with time as less organic waste is sent to landfill.

Chart 5 shows how capacity has grown over time in each country:

Chart 5 – Total renewable capacity by country 2004 – 2024



Tables 3 to 5 rank the top five Local Authorities[5] (LAs), by number of installations, installed capacity, and generation for key technologies.

- **Number of sites:** data are summarised in Table 3. Cornwall remains the top-ranked (31,493), reflecting the large number of solar PV schemes installed in the South West. The Orkney Islands has the most onshore wind sites. Highland has the most hydro sites. Somerset has the most plant biomass sites.

- **Capacity**: data are summarised in Table 4. North Yorkshire is the top ranked local authority, primarily from Bioenergy. This is followed closely by Highland, which has more hydro and onshore wind capacity than any other LA.

- **Generation**: data are summarised in Table 5. North Yorkshire is the top ranked local authority, primarily from plant biomass, including Drax, the largest biomass plant in the UK. Highland has the second most generation, due to the large amount of hydro and onshore wind generation there. Highland has more than twice as much renewable generation as Lancaster, the next LA in the list.

- Cornwall continues to have the most **solar PV** in terms of number, capacity and generation. Wiltshire is second and Somerset third in terms of capacity and generation. North Yorkshire has the third highest number of sites and Aberdeenshire the fifth. However, they have significantly lower capacities and generation due to the high proportion of small-scale domestic solar in these local authorities.

[5] Where disclosure of confidential generation data was likely at the site level, the data have been removed, and added to the unallocated row at the bottom of the Local Authority listings.

- Highland's overall capacity and generation is driven by the construction of large-scale, **onshore wind** farms. Whilst the Orkneys has the highest number of wind sites (almost three times that of Highland) it has much smaller capacity and generation, suggesting these tend to be smaller projects meeting local needs.

- 'Armagh, Banbridge and Craigavon' have the highest number of Anaerobic digestion facilities, followed by Shropshire and 'Derry and Strabane'. However, East Riding, Shropshire and East Cambridgeshire have the largest capacities.

Table 3: Local Authority: Number of sites generating electricity from renewable sources, 2024										
Onshore Wind		Solar PV		Hydro		Bioenergy		Total		
Orkney Islands	803	Cornwall	31,024	Highland	309	Somerset	59	Cornwall	31,493
Aberdeenshire	590	Somerset	24,603	Argyll and Bute	126	Shropshire	52	Somerset	24,753
Cornwall	433	North Yorkshire	22,983	Gwynedd	120	North Yorkshire	49	North Yorkshire	23,297
Dumfries and Galloway	318	Wiltshire	19,794	Perth and Kinross	90	Armagh, Banbridge and Craigavon	49	Wiltshire	19,826
Highland	275	Aberdeenshire	17,381	Dumfries and Galloway	84	Dumfries and Galloway	39	Aberdeenshire	18,005
UK Total	**9,782**		**1,696,872**		**1,578**		**1,976**		**1,710,278**

Table 4: Local Authority: Installed capacity of sites generating electricity from renewable sources, 2024								MW	
Onshore Wind		Solar PV		Hydro		Bioenergy		Total [2]	
Highland	2,044	Cornwall	650	Highland	819	North Yorkshire	2,722	North Yorkshire	3,043
South Lanarkshire	1,506	Wiltshire	600	Argyll and Bute	300	Northumberland	456	Highland	2,945
Dumfries and Galloway	929	Somerset	535	Perth and Kinross	278	Wakefield	192	North East Lincolnshire	2,894
South Ayrshire	691	Dorset	381	Dumfries and Galloway	157	Bedford	131	Moray	2,087
Scottish Borders	688	South Cambridgeshire	296	Stirling	86	Halton	127	East Suffolk	1,759
UK Total	**16,166**		**18,280**		**1,899**		**8,328**		**60,631**

Table 5: Local Authority: Generation of electricity from renewable sources, 2024								GWh	
Onshore Wind		Solar PV		Hydro		Bioenergy		Total [b]	
Highland	4,583	Cornwall	536	Highland	3,024	North Yorkshire	10,472	North Yorkshire	10,838
South Lanarkshire	3,413	Wiltshire	482	Perth and Kinross	804	Breckland	530	Highland	7,826
Dumfries and Galloway	2,192	Somerset	429	Argyll and Bute	568	Fife	495	South Lanarkshire	3,569
Scottish Borders	1,518	Dorset	302	Dumfries and Galloway	359	North Lincolnshire	470	Lancaster	3,527
South Ayrshire	1,480	South Cambridgeshire	257	Stirling	306	Sheffield	434	East Suffolk	3,260
UK Total	**34,744**		**14,364**		**5,796**		**40,108**		**143,708**

a Top five ranked Local Authorities (LAs). Where more than five schemes are listed, this indicates that more than one LA has the same ranking.

b Totals include offshore wind sites allocated to nearest Local Authority.

Annex A – Capacity Growth

Table 6 summarises capacity growth and the major new sites in each region:

Table 6: Regional capacity growth

Region	Technology	Growth (MW)	Major New Sites
East Midlands	Solar PV	184.9	The Grange, Crifton Lodge, White Cross Lane, Sudbury, Alfreton, Inkersall Road, Pretoria Road
East of England	Solar PV	316.9	Breach, Crouch, Layer Farm, Periwinkle Hall, Maldon Wycke, Pentlow Hill, Bracon Ash, Wicken
London	Solar PV	2.7	Biggin Hill Airport & 8 other small sites
North East	Solar PV	9.3	Unipres Building & 11 other small sites
	Biomass	49	Teesside Renewable Energy Plant
North West	Solar PV	22.1	Chamber House, Little Hulton, Amazon, Altham Business Park, Burneside Mill
	Onshore Wind	0.9	Rassau Industrial Estate
South East	Solar PV	128.1	Whirlbush Farm, Three Maids Hill, Hamer Warren, Ray Valley, Gander Down, Kingshill, Diamond Light, Syzygy Renewables Limited
	MSW	25	Greatmoor EfW
South West	Solar PV	72.7	Stokeford Farm, Beavor Grange, Aller Court Farm, Dorset Green, Markham Brook, Pattemores, Lag Farm
	Onshore Wind	0.9	Lower Tregeen
West Midlands	Solar PV	88.1	Larport, Bishampton, Lower Strensham, Bourne Road, Ricoh UK Products
Yorkshire and the Humber	Solar PV	88.6	Darlington Road Skeeby, Broken Scar, Castle Hill, Winterton, Elmsall Way Warehouse
	Biomass	0.9	R G Walter & Sons, Golden Acre Site
Northern Ireland	Solar PV	0.2	Hillmount
	Onshore Wind	1	Murley & 12 other small sites
Scotland	Solar PV	32	FE Irvine, Dunfermline EDI4, Aviva Headquarters, Eden Campus
	Offshore Wind	1,106	Moray West, Neart Na Gaoithe
	Onshore Wind	623.3	Viking, Broken Cross, Pines Burn, Sneddon Law, Strathallan, Kirk Hill, Rigmuir, Irvine Wind, Easter Drumclair Wood, Carlincraig
	MSW	34.5	Earls Gate EfW, Millerhill EfW
	Small Hydro	2.6	Allt na Moine, Ceitlein
Wales	Solar PV	46.4	Hopkins, Milford Energy Ltd, Royal Mint, Bluestone Resort
	Onshore Wind	1.8	Nantygwyddo, Kenfig Industrial Estate
	Anaerobic Digestion	0.5	Ystum Colwyn Farms Ltd

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