



Department for
Energy Security
& Net Zero

Energy Trends

UK, January to March 2024

Percentage change from Quarter 1 2023, primary energy basis

| (Mtoe basis) | Production | Imports | Exports | Demand |
|---------------------------|--------------|--------------|--------------|--------------|
| Total energy | -8.9% | -10% | -23% | -2.0% |
| Coal | -78% | -67% | +7.0% | -32% |
| Primary oil | -13% | -10% | -18% | -5.1% |
| Petroleum products | -4.7% | +4.7% | -1.9% | -1.4% |
| Gas | -7.1% | -19% | -66% | -1.9% |
| Electricity | -4.9% | +24% | +12% | -4.9% |

About this release

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

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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](#).

Renewable electricity generation reached a near record share of 50.9 per cent of total generation in the first quarter of the year, second only to the last quarter of 2023. Wind contributed more electricity than gas generation for the second consecutive quarter, with strong performance despite outages.

Despite warmer weather compared to the same period last year, **final energy consumption was stable on last year.** On an adjusted basis that reflects seasonal and temperature trends, industrial consumption was flat but **consumption by households was up by 3.1 per cent** breaking a recent run of declining quarter-on quarter energy consumption that was associated with higher energy prices from Summer 2022. Transport demand decreased 1.7 per cent, with increases in petrol and aviation fuel use but a drop in diesel demand.

Energy production fell 8.9 per cent on the same period last year, mainly due to continued low oil production which has not fully recovered since the extensive maintenance carried out in the summer of 2021. Nuclear output hit a record low as a result of maintenance and unplanned outages, down 16 per cent on the same quarter last year.

Gas trade is reverting to close to normal, following higher than usual trade in recent quarters as the UK supported European gas markets following Russia's invasion of Ukraine. **Imports of electricity reached a new record high of 11.2 TWh** as imports from France reached a new high. UK net import dependency was 44.4 per cent for the quarter up 1.2 percentage points on last year.

Section 1: UK total energy

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Key headlines

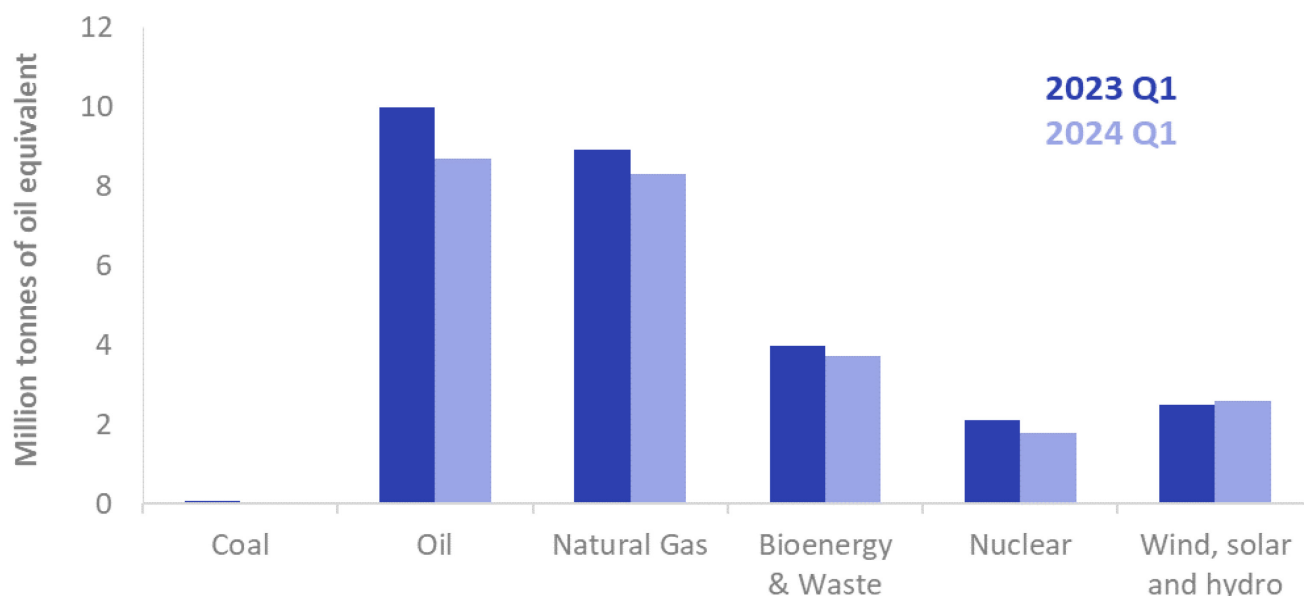
In the first quarter of 2024 **total primary energy production was 25.1 million tonnes of oil equivalent, 8.9 per cent lower** than in the first quarter of 2023.

Total primary energy consumption for energy uses fell by 1.7 per cent. When adjusted to take account of weather differences, primary energy consumption fell by 1.0 per cent.

Total final energy consumption (excluding non-energy use) was 0.1 per cent lower compared to the first quarter of 2023. Domestic consumption and other final users (mainly from the service sector) consumption both rose by 0.3 per cent. Industrial consumption fell by 0.7 per cent and transport consumption fell by 0.4 per cent. On a seasonally and temperature adjusted basis, final energy consumption rose by 0.4 per cent.

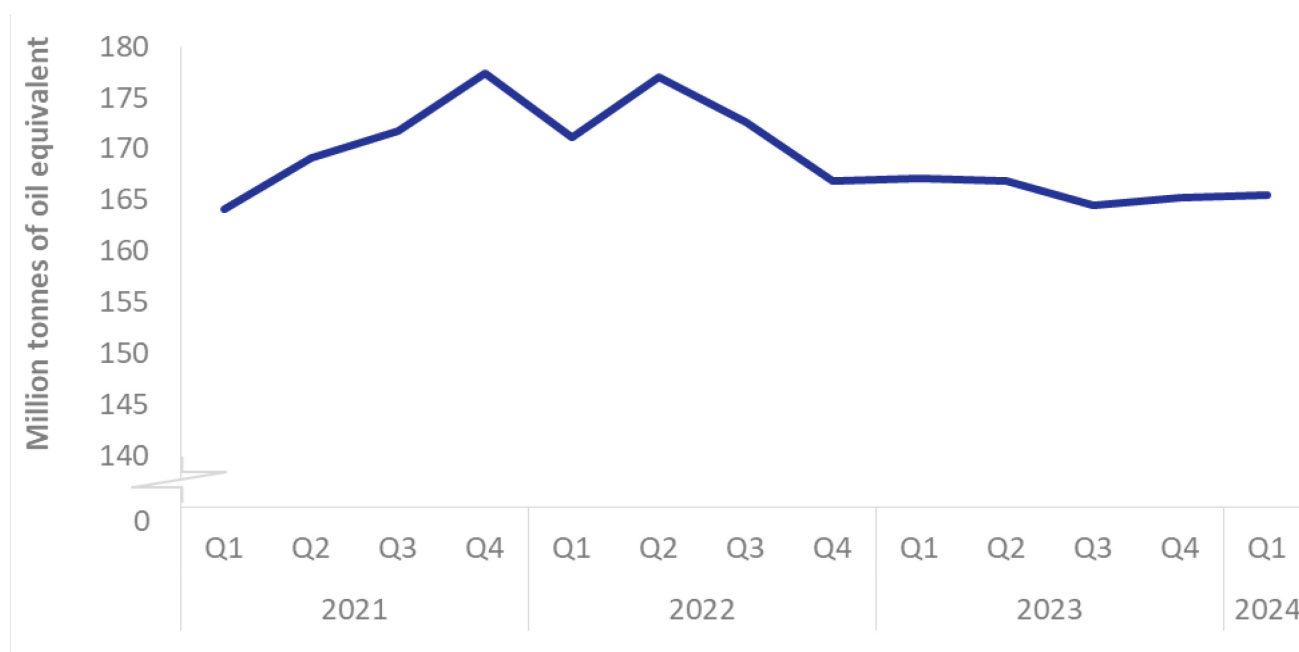
Net import dependency was 44.4 per cent in the first quarter of 2024, up 1.2 percentage points on the same quarter of 2023, with exports at the lowest quarterly level this century. Export levels had previously been higher since early 2022 as the UK supported European efforts to reduce dependence on Russian gas.

Chart 1.1 UK production ([Energy Trends Table 1.3](#))



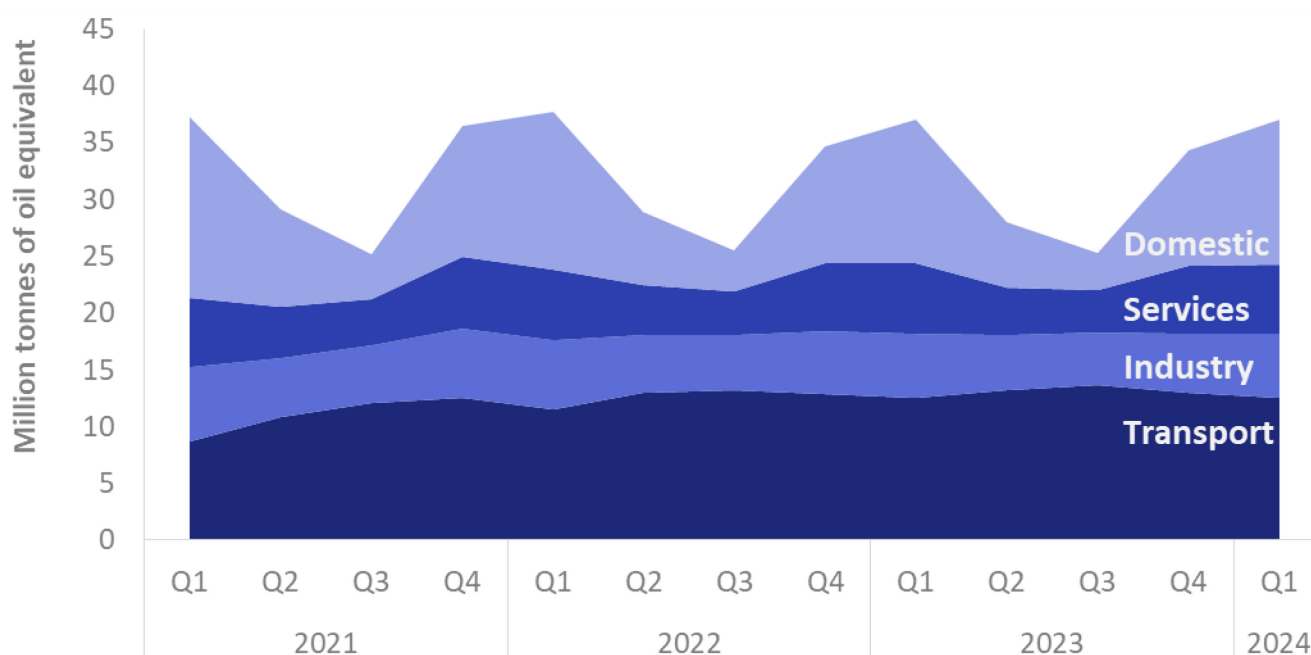
In the first quarter of 2024 **total primary energy production was 25.1 million tonnes of oil equivalent, 8.9 per cent lower** than in the first quarter of 2023. Production of all fuels fell compared to the same quarter in 2023 with the exception of wind, solar and hydro. Coal output in the UK is now de minimis due to the last large surface mine Ffos-y-Fran closing at the end of November 2023. Oil and gas production levels fell by 13 and 7.1 per cent respectively, with output from both still down by 42 per cent and 14 per cent respectively on pre-pandemic (2019) levels. Nuclear output fell by 16 per cent to a record 21st century low quarterly level due to outages across the UK's nuclear fleet. Wind, solar & hydro output rose by 4.0 per cent due to increased capacity and more favourable weather conditions.

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



In the first quarter of 2024 **total inland consumption** (which includes not only fuel use by consumers, but fuel used for electricity generation and other transformation) was 165.4 million tonnes of oil equivalent, 1.0 per cent lower than in the first quarter of 2023 on a seasonally adjusted and annualised basis that removes the impact of temperature on demand.

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



In the first quarter of 2024 **total final energy consumption (excluding non-energy use)** was **0.1 per cent lower** than in the first quarter of 2023. Transport consumption fell by 0.4 per cent and industrial consumption fell by 0.7 per. Domestic consumption and other final users consumption both rose by 0.3 per cent.

On a seasonally and temperature adjusted basis total final energy consumption was 0.4 per cent higher than in the first quarter of 2023, within which domestic consumption rose by 3.1 per cent but transport consumption fell by 1.7 per cent.

Section 2: Coal and derived gases

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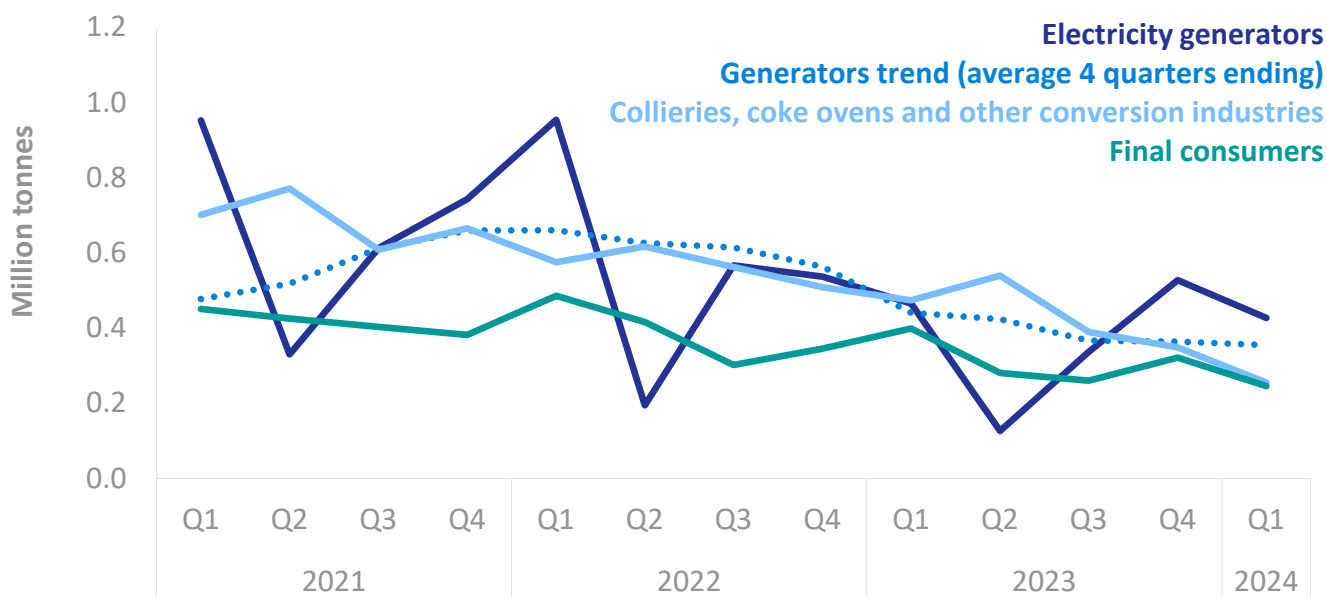
Key headlines

In the first quarter of 2024, demand for coal by electricity generators fell to 427 thousand tonnes, 8.3 per cent lower than in Quarter 1 2023 (Chart 2.1).

Overall coal production **for the first quarter of 2024 fell to 20 thousand tonnes** (a new record low), down 78 per cent on the first quarter of 2023. This was due to the last large surface mine Ffos-Y-Fran closing at the end of November 2023. Surface mining production fell to 1 thousand tonnes.

In Quarter 1 2024, **coal imports fell to 417 thousand tonnes**, 67 per cent down on last year and far below a decade ago when coal imports in Quarter 1 2014 totalled 12.7 million tonnes. Net imports accounted for 21 per cent of total coal supply in Quarter 1 2024. The largest provider of coal to the UK was Colombia (32 per cent). This was followed by South Africa (24 per cent) and the European Union (21 per cent).

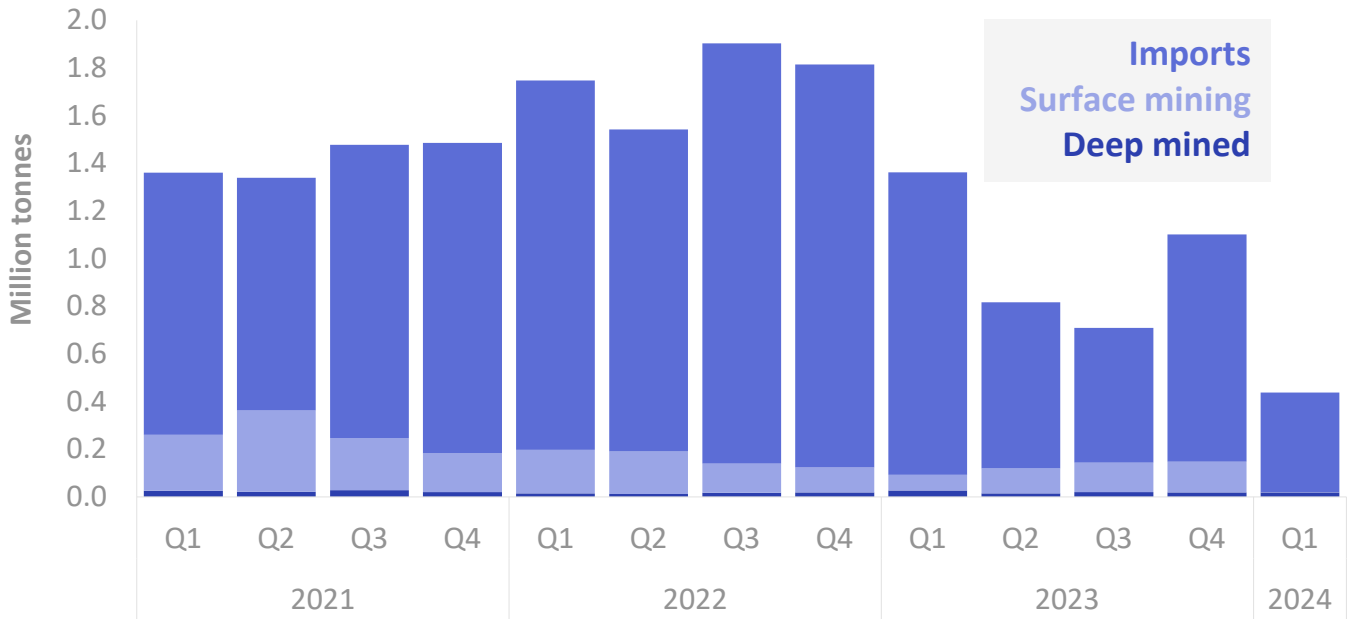
Chart 2.1 Coal Consumption ([Energy Trends Table 2.1](#))



Coal demand for coal-fired electricity generation fell from 466 thousand tonnes in Quarter 1 2023 to 427 thousand tonnes in Quarter 1 2024, a decrease of 8.3 per cent. Coal use is being phased out with electricity generation favouring gas, nuclear and renewables. During the first quarter only one coal-fired power plant was operational in the UK, Ratcliffe-on-Soar, as Kilroot closed at the end of September 2023. West Burton closed on 31 March 2023 and Drax closed on 25 April 2023. The government remains committed to ending coal use for electricity generation by October 2024.

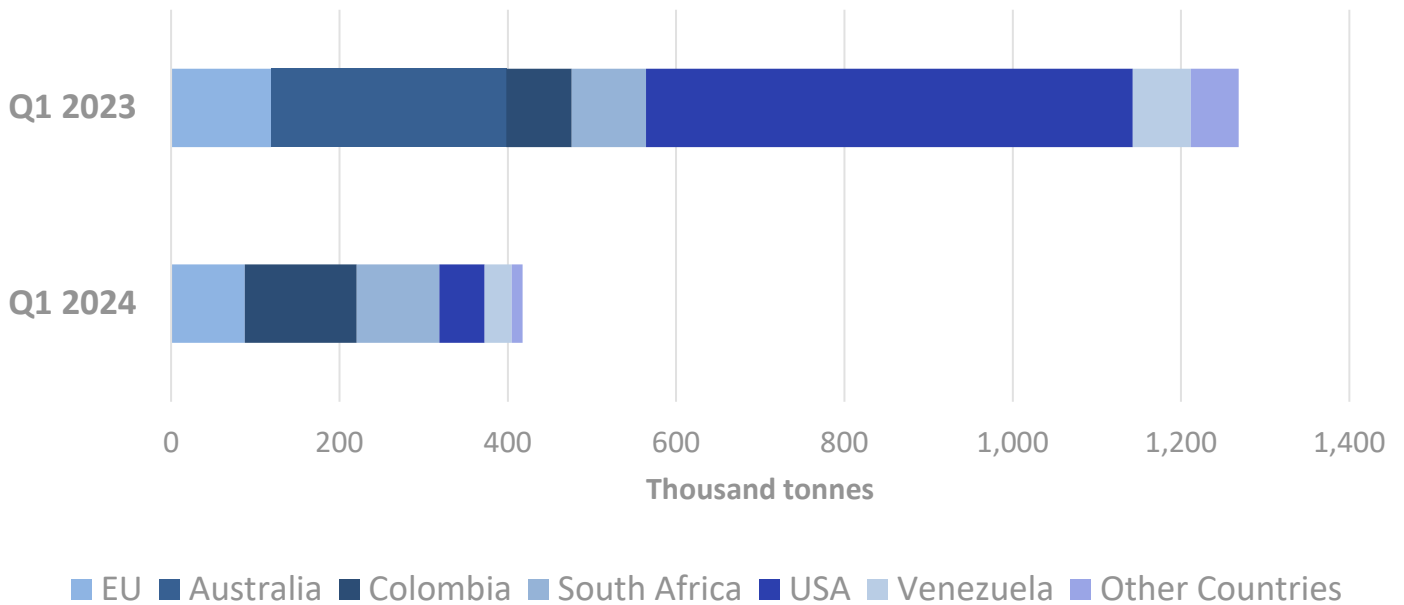
Demand for coal-fired generation is seasonal, peaking in winter when conditions are cold and dark but these peaks have declined as coal-fired generation became less competitive economically and gas and renewable sources displaced it.

Chart 2.2 Coal Supply ([Energy Trends Table 2.1](#))



Domestic coal production has fallen steadily because of mine closures and reduced demand. Imports filled the gap but have gradually fallen from the peak of 13.4 million tonnes in the second quarter of 2013 as overall demand dropped. In the first quarter of 2024, imports of coal were 417 thousand tonnes.

Chart 2.3 Coal Imports ([Energy Trends Table 2.4](#))



As coal's place in the UK's generation mix has diminished, imports have decreased significantly. In the first quarter of 2014, the UK imported 12.7 million tonnes of coal whilst in the first quarter of 2024 this fell to 417 thousand tonnes. This comprised 300 thousand tonnes of steam coal (72 per cent of imports), 110 thousand tonnes of coking coal (26 per cent of imports) and 8 thousand tonnes of anthracite (2 per cent of imports).

In Quarter 1 2024 the largest provider of coal to the UK was Colombia (32 per cent). This was followed by South Africa (24 per cent) and the European Union (21 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.

Section 3: Oil and oil products

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Key headlines

Indigenous production of primary oils fell 13 per cent in Quarter 1 2024 compared to Quarter 1 2023. Production has been trending downwards in both the longer term and since 2019 following reports of reduced investments in the mature North Sea basin. Production remained low compared to pre-pandemic levels.

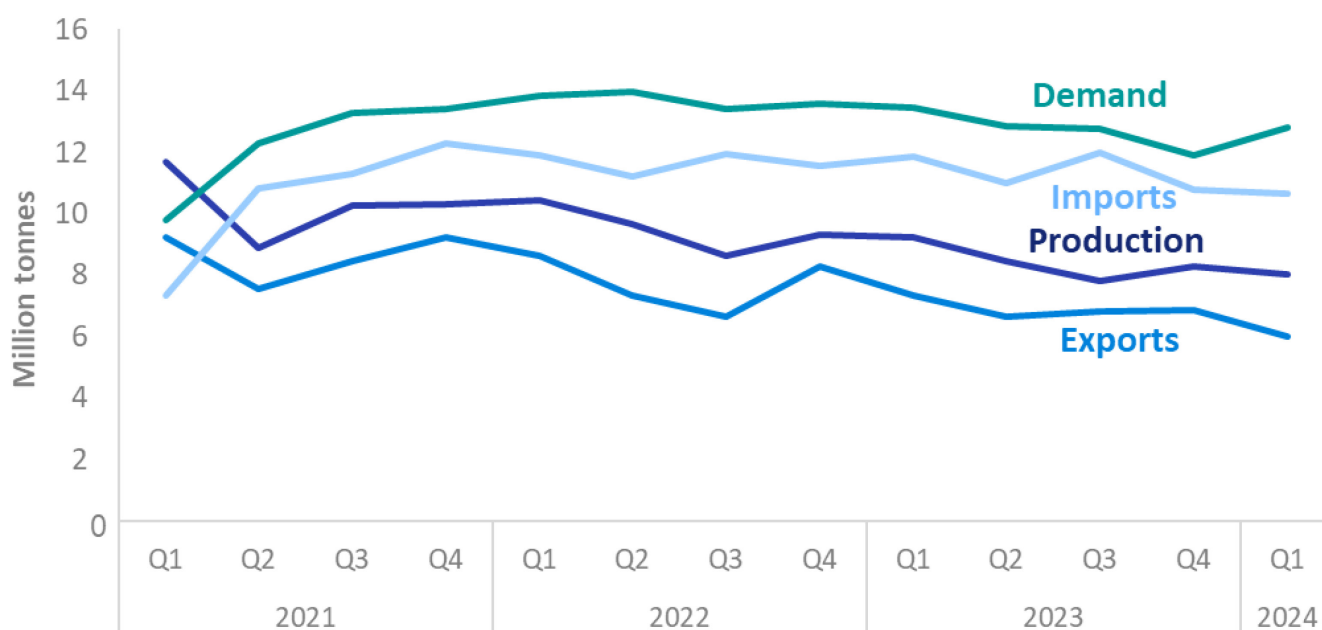
The UK was a net importer of primary oils by 4.6 million tonnes, up 1.9 per cent compared to the same period in the previous year.

Production of petroleum products decreased by 4.4 per cent with demand down by 1.4 per cent. Exports of products decreased by 1.7 per cent while imports rose by 4.3 per cent, leaving net imports at 2.5 million tonnes.

Demand for diesel decreased 5.2 per cent while petrol was up by 3.3 per cent. Jet fuel continues its post-pandemic recovery with an increase of 9.9 per cent on the same period last year, having more than tripled since the same period in 2021 (that saw lockdown to curb the spread of Covid-19).

Total oil stocks held in the UK was 10 million tonnes at the end of Quarter 1 2024. The UK held over 150 days of net imports in stocks, remaining substantially above the IEA stocking requirement of 90 days.

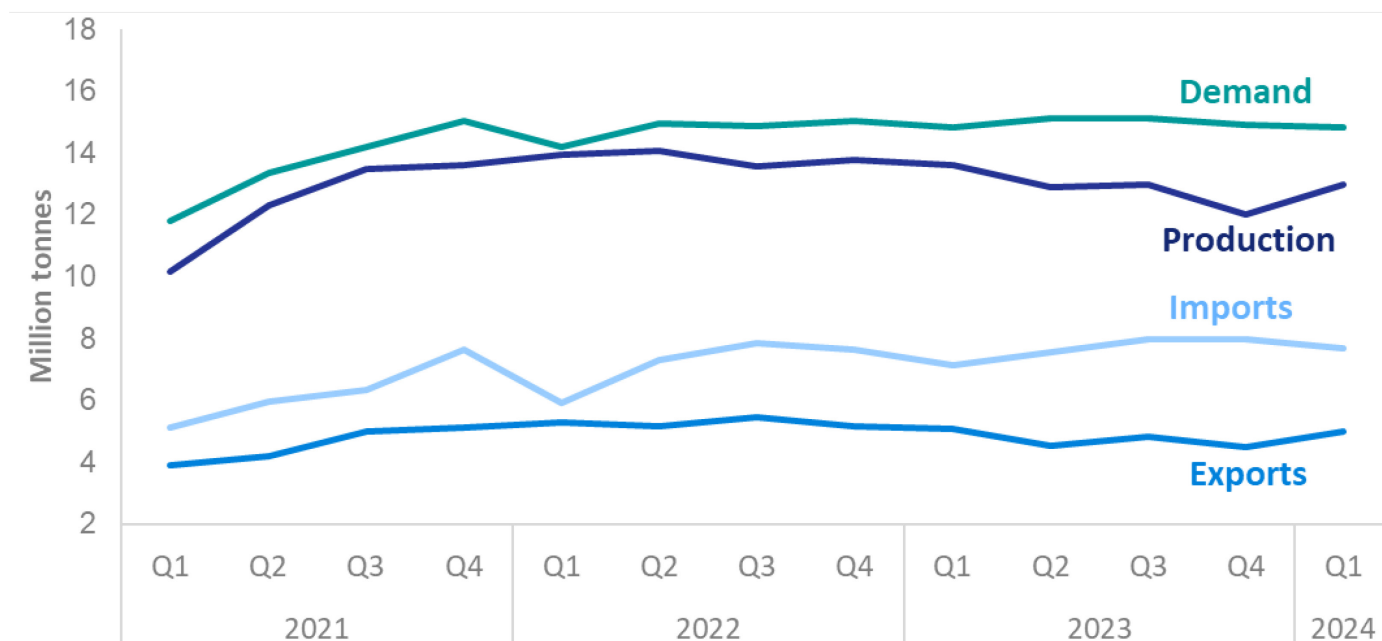
Chart 3.1 Production and trade of crude oil and NGLs ([Energy Trends Table 3.1](#))



Demand for primary oils was down by 5.0 per cent in Quarter 1 2024 compared to the same period in 2023 because of maintenance at UK refineries. Indigenous production of primary oils decreased 13 per cent on last year continuing the longer-term downward trend in production following reports of reduced investment in the North Sea.

Imports of crude oil and Natural Gas Liquids (NGLs) dropped by 11 per cent because of the reduced demand due to refinery maintenance. The decrease in indigenous production was also reflected in the reduction of crude and NGL exports, down by 19 per cent. In Quarter 1 2024, the UK was a net importer of primary oil by 4.6 million tonnes, up 1.9% on the same period in 2023.

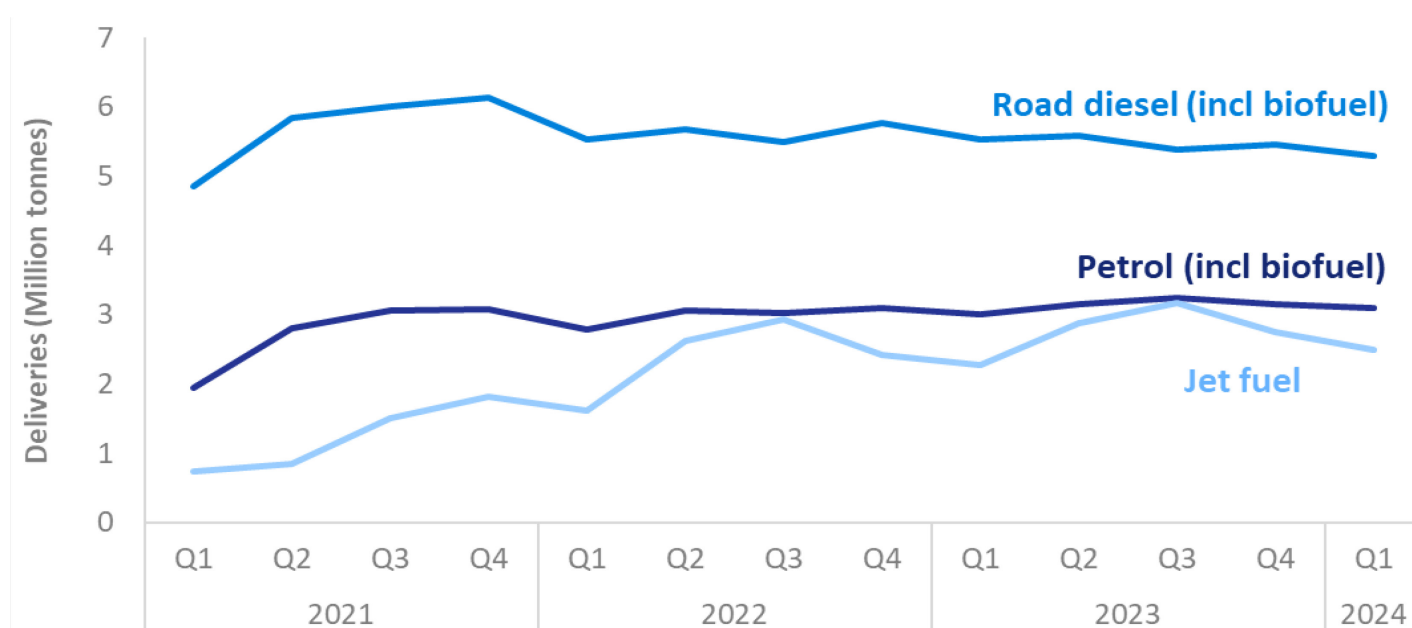
Chart 3.2 Production and trade of petroleum products ([Energy Trends Table 3.2](#))



Total demand for petroleum products was down by 1.4 per cent in Quarter 1 2024 compared to the same quarter last year due to a 14 per cent reduction in refinery fuel use during maintenance, leading to production of petroleum products being 4.4 per cent down on Quarter 1 2023. Exports of petroleum products were down by 1.7 per cent. To compensate imports rose by 4.3 per cent, leading to net imports of 2.5 million tonnes, an increase of almost a fifth.

Final consumption was stable on the year before. Increases in industry and commercial demand were offset by decreases in domestic and other user demand (which includes agriculture and public administration) due to warmer temperatures in 2024 compared to 2023. Within final consumption non-energy use hit a quarterly record low of 0.9 million tonnes.

Chart 3.3 Deliveries of transport fuels ([Energy Trends Table 3.5](#))



Demand for jet fuel continues its recovery from the low caused by the COVID-19 pandemic, being 9.9 per cent up in Quarter 1 2024 compared to the same period last year and saw a five-fold increase since the first quarter of 2020, before the UK saw full lockdown. Non-bio diesel demand was down by 5.2 per cent while non-bio petrol demand increased by 3.3 per cent. To meet this increased demand amid stable production, imports of petrol rose by 29 per cent.

The UK holds emergency reserves of oil in case of a supply disruption. Through membership of the International Energy Agency the UK is required to hold stocks equivalent to a minimum of 90 days of net imports to help protect global oil markets from supply shocks. UK government meets this by obligating major suppliers to the inland market to hold compulsory stocks.

Since March and April 2022, the UK has temporarily lowered the compulsory oil stocking obligations by 6.6 million barrels as part of a [coordinated release of stock by the International Energy Agency \(IEA\)](#) in response to Russia's invasion of Ukraine. This has since been rebuilt in three phases, with the final phase completed at the end of Quarter 1 2024 when **the UK held 10 million tonnes of stock**, 12 per cent higher than the previous year and equivalent to more than 150 days of net imports, more than meeting the 90-day requirement set by the IEA.

UK oil stocks can either be held within the UK or abroad under international agreements. The UK can also hold stock on behalf of other countries. Physical stocks held within the UK rose by 2.8 per cent at the end of Quarter 1 2024 compared with the previous year, with particularly large increases in terminal crude stocks and stocks of kerosene including jet fuel.

Section 4: Gas

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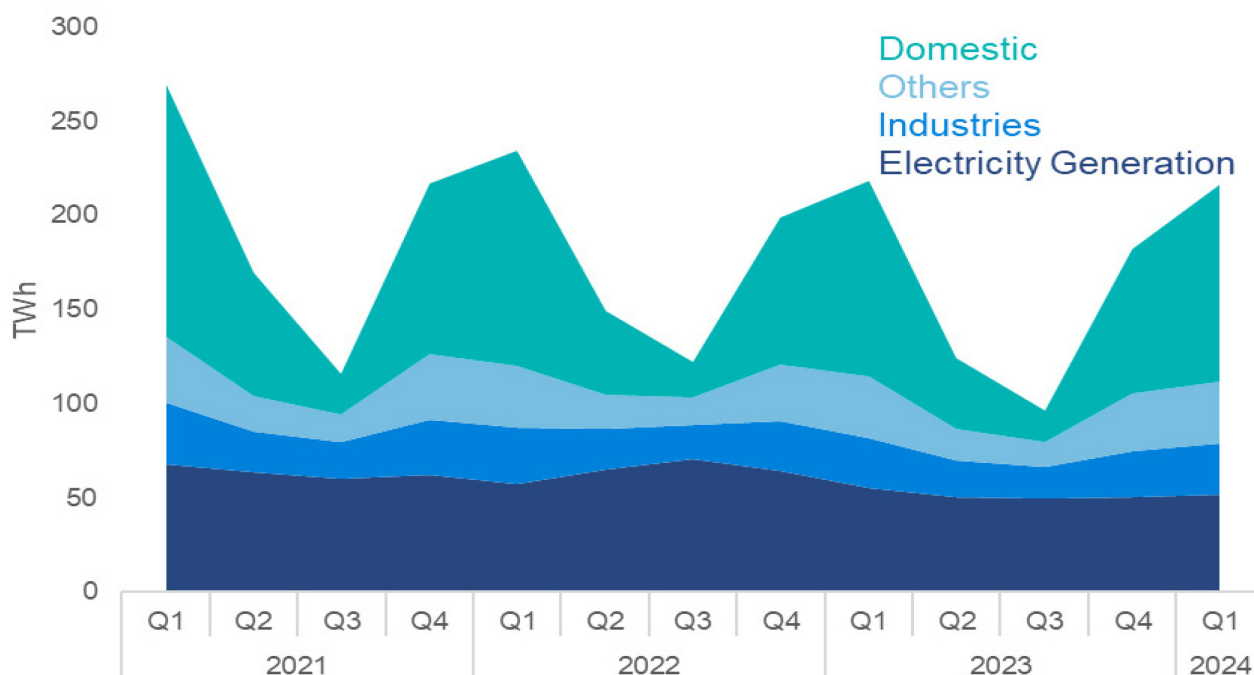
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Key headlines

Gas demand was broadly stable in Quarter 1 2024 down just 1.9 per cent on Quarter 1 2023. Despite warmer temperatures, consumption was flat in domestic (household), industrial and services sectors while demand for generation fell by 5.8 per cent.

Production, imports, and exports fell in Quarter 1 2024 compared to the same period in the previous year. Gas production was down 7.1 per cent as output from the aging North Sea basin continues to decline. Imports and exports fell 19 per cent and 66 per cent respectively following close to record highs in the previous year when the UK saw substantial exports to Europe supporting efforts on the continent to move away from Russian gas.

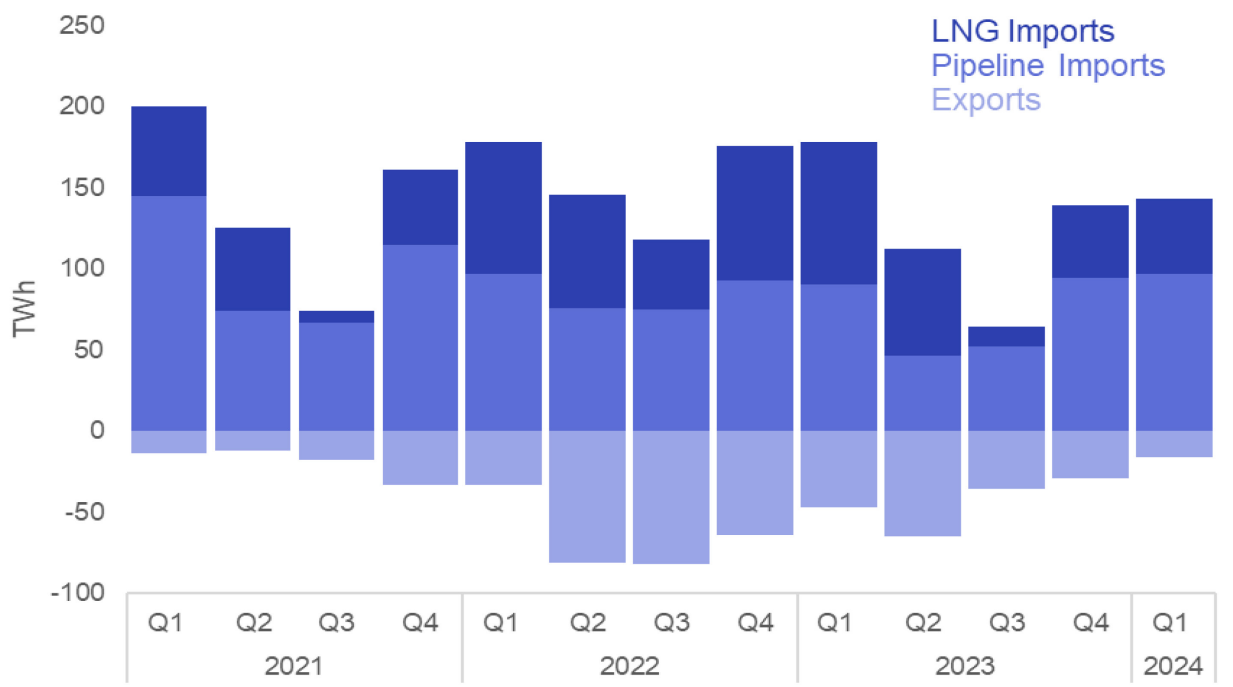
Chart 4.1 Demand for natural gas ([Energy Trends Table 4.1](#))



Gas demand was broadly stable, down 1.9 per cent in Quarter 1 2024 compared with the same period in 2023. Despite warmer temperatures, consumption in the domestic (household), industrial and service sectors (this includes commercial and public admin sectors) was at very similar levels to what we saw last year, potentially indicating some recovery in consumer spending on energy following the drop in bills from last year's record highs.

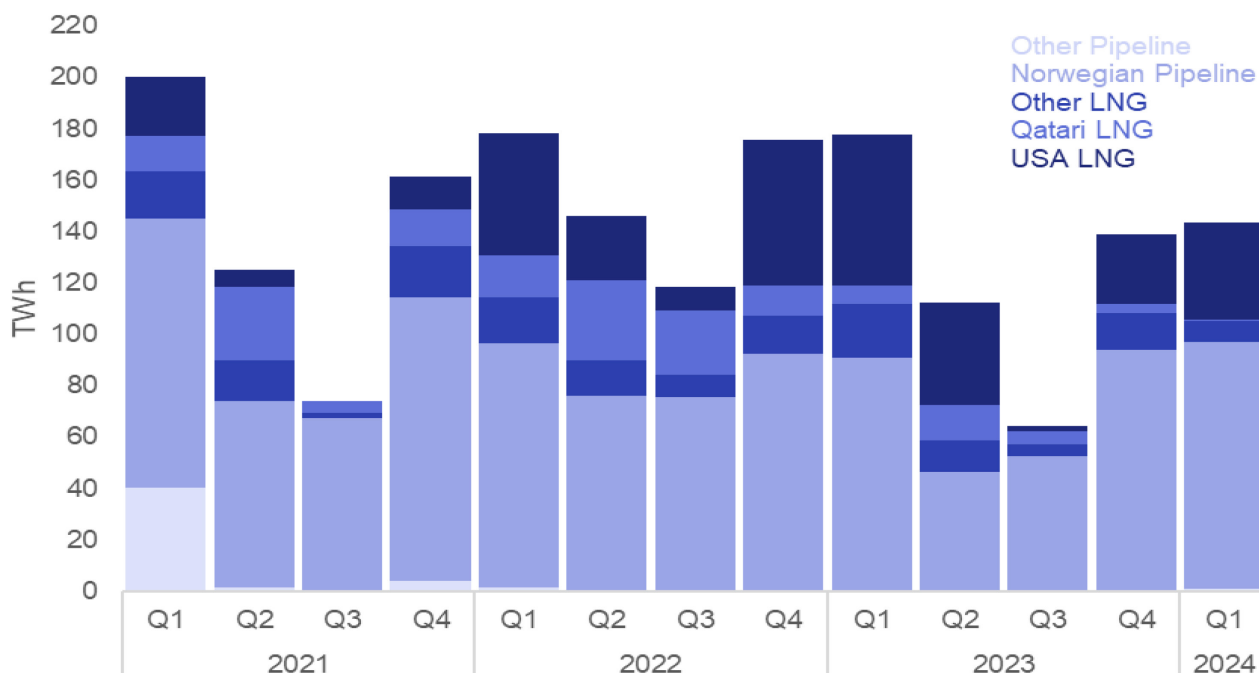
Gas used for electricity generation fell by 5.8 per cent in Quarter 1 2024 compared to same period in the previous year due to low demand, continued strong generation from renewables, and sustained high imports (for further information see Chapter 5)

Chart 4.2 Trade in natural gas ([Energy Trends Tables 4.3 and 4.4](#))



UK exports of natural gas fell by two thirds in Quarter 1 2024 compared to the same period in the previous year. This follows close to record highs when the UK saw substantial exports to Europe supporting efforts to move away from Russian gas throughout 2022 and into early 2023. Exports to Belgium returned to more typical levels, a 95 per cent decrease compared to the same period in the previous year. Overall exports remained higher than average for the time of year.

Chart 4.3 UK natural gas import origins ([Energy Trends Table 4.3](#))



Imports fell by almost a fifth in Quarter 1 2024 compared the same period in 2023. This follows reduced requirements for transshipments through the UK with LNG imports falling the most, dropping by 47 per cent compared to Quarter 1 2023. Imports of Qatari LNG saw a notable decline, falling 87 per cent, the lowest level for Quarter 1 since Quarter 1 2008. Despite the fall in imports, Norway and the US remained the largest source of imports, accounting for 93 per cent of total UK imports in Quarter 1 2024.

Section 5: Electricity

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Key headlines

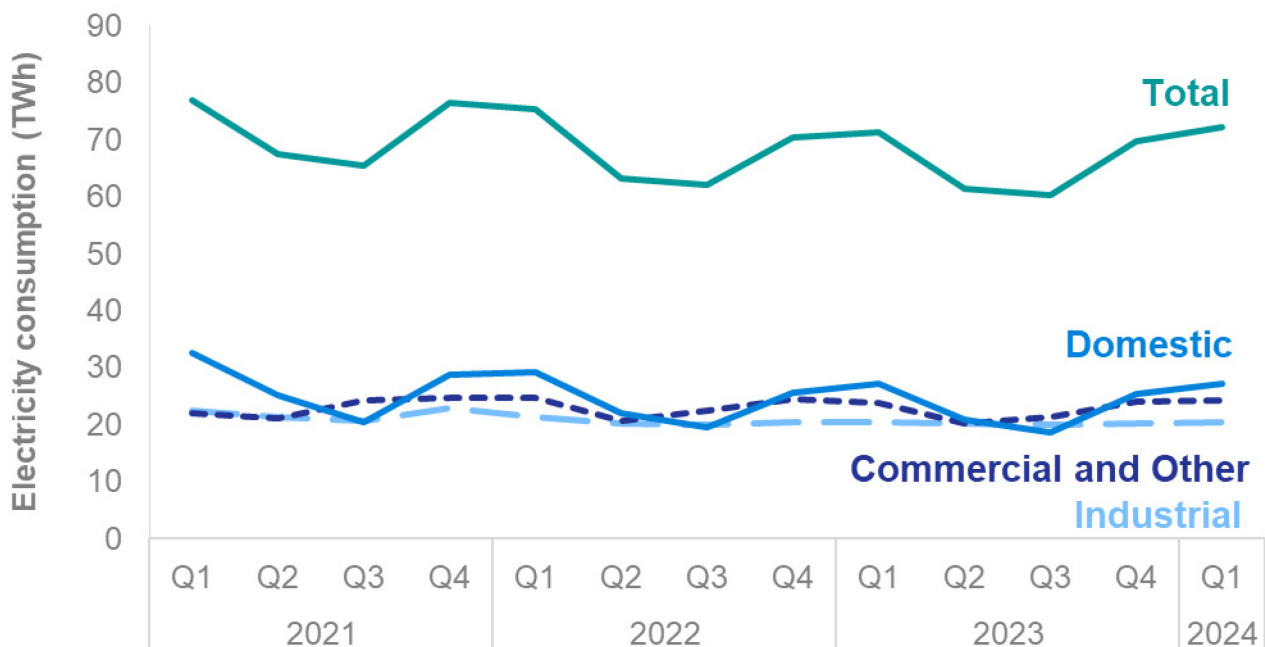
Quarter 1 of 2024 saw electricity demand rise 1.2 per cent compared to Quarter 1 2023, to 86 TWh. Generation decreased by 0.7 per cent to 77 TWh with a substantial increase in net imports (up 27 per cent) accounting for the difference. Total imports rose to a record 11.2 TWh, with a record 5.1 TWh from France and 1.4 TWh across the new interconnector with Denmark.

Despite warmer weather compared with last year, consumption amongst final users was broadly stable. Domestic (household) consumption of electricity rose slightly (+0.8 per cent). Industrial consumption was broadly stable and consumption by other final users (including commercial users) increased by 0.3 per cent.

Renewable electricity generation rose 3.7 per cent to 39 TWh in Quarter 1 2024 compared to Quarter 1 2023, with wind generating more electricity than gas for the second quarter in succession. Wind generation rose 3.0 per cent to 26.1 TWh whilst gas generation fell 3.8 per cent to 25.4 TWh. Nuclear generation fell to 8.3 TWh, the lowest quarterly value on the published data series due to outages. Low carbon sources generated 61.7 per cent of the total in Quarter 1 2024, a slight increase compared to the previous year. Generation from fossil fuels fell 2.5 per cent to 27.5 TWh, to a share of 35.7 per cent.

Total consumption of electricity by end users was 72.1 TWh in Quarter 1 2024, an increase of 1.0 per cent compared to 2023. Consumption by domestic users rose 0.8 per cent, commercial and other users by 0.3 per cent, and use in transport rose by an estimated 20 per cent from 2.1 TWh to 2.5 TWh due to greater numbers of electric vehicles.

Chart 5.1 Electricity consumption by sector ([Energy Trends Table 5.2](#))

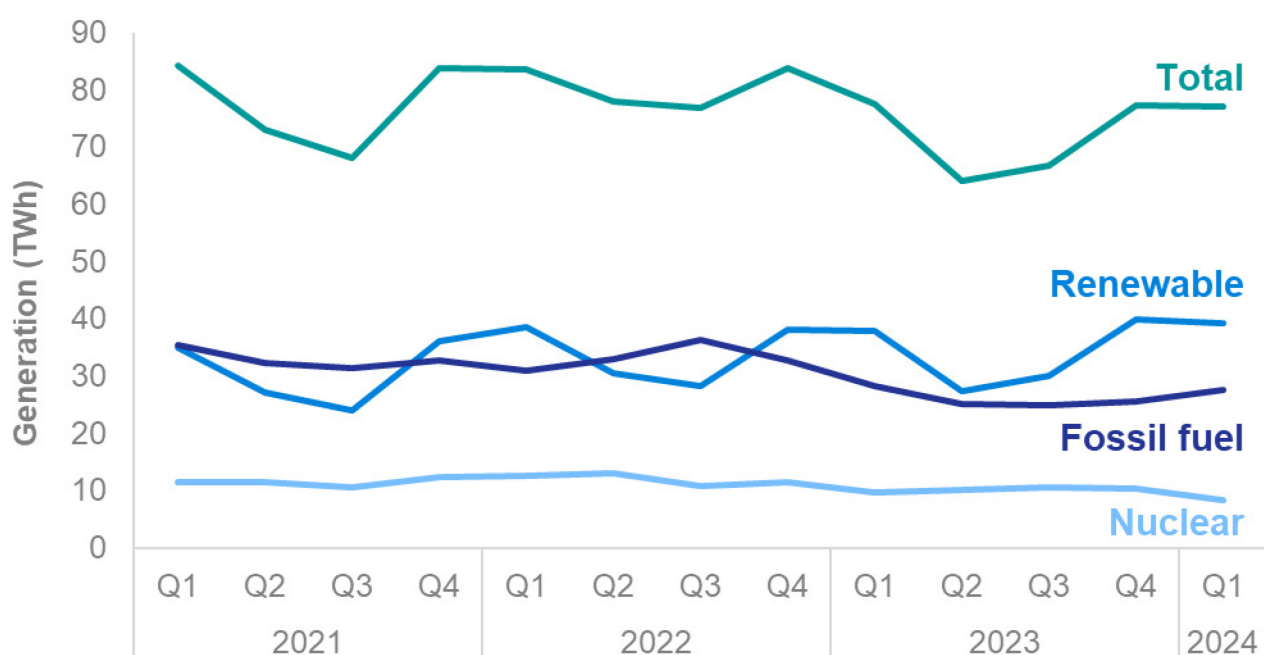


Domestic consumption of electricity rose by 0.8 per cent in Quarter 1 2024, to 27.2 TWh. Temperatures were warmer on average in Quarter 1 2024, which would usually reduce domestic consumption of electricity for heating, but instead the opposite trend was seen. Quarter 1 2023 saw low electricity consumption, likely due to higher prices in that period. The increase in consumption in the first quarter of this year could indicate some recovery in consumer spending on energy following the drop in bills from last year's record highs.

Consumption by other users, including commercial users, increased by 0.3 per cent in Quarter 1 2024, and industrial consumption was also stable. Consumption by other final users (including the commercial sector) rose 0.3 per cent despite warmer temperatures which would typically lead to lower demand for heating. Electricity consumption in Quarter 1 2023 was lower than expected and may have indicated some reduced consumption due to higher electricity prices in that period. Electricity consumed by the industrial sector was stable (down 0.1 per cent) compared to Quarter 1 2023.

Quarter 1 of 2024 saw total electricity generation of 77.0 TWh, 0.7 per cent lower than Quarter 1 2023. With total demand 1.2 per cent higher over the same period, a large increase in net electricity imports (up 27 per cent compared to Quarter 1 2023) made up the difference. Electricity imports and exports are driven by price differentials across each interconnector. Interconnector utilisation in both directions was relatively high in Quarter 1 2024, with total imports a record 11.2 TWh, and exports also up by 12 per cent.

Chart 5.2 Electricity generated, by fuel type ([Energy Trends Table 5.1](#))



Renewable electricity generation represented a 50.9 per cent share of UK generation in Quarter 1 2024, at 39.2 TWh, 3.7 per cent higher than Quarter 1 2023. This increase reflects a 7.4 per cent rise in generation from onshore wind due to higher wind speeds. Total wind generation rose 3.0 per cent to 26.1 TWh and was the largest contributor to UK generation, providing more electricity than gas plants for the second quarter in a row. Hydro generation rose 22 per cent to 2.0 TWh, solar PV up 2.7 per cent to 1.9 TWh, and bioenergy was up 2.5 per cent to 9.2 TWh.

Nuclear generation decreased to 8.3 TWh in Quarter 1 2024, the lowest quarterly value on the published data series and 15 per cent lower than the same period in the previous year. Four of the UK's five remaining nuclear power stations experienced outages at some point during Quarter 1 2024. Whilst the drop in nuclear generation outweighed the increase in renewable generation, the lower total electricity generation meant that low carbon sources generated 61.7 per cent of the total generation in Quarter 1 2024, up 0.3 percentage points on the previous year.

Fossil fuels generated 27.5 TWh in Quarter 1 2024, 2.5 per cent lower than Quarter 1 2023. This reflected increased renewables, reducing the need for fossil fuel generation as well as a 27 per cent increase in net imports helping to meet demand. Gas remained the fuel with the second highest generation at 25.4 TWh but decreased by 3.8 per cent compared to Quarter 1 2023. Coal generation also increased slightly to 1.3 TWh, compared to 1.1 TWh in Quarter 1 2023. Coal generation represented a 1.6 per cent share of the total generation, 0.2 percentage points higher than the share for Quarter 1 2023. The UK's last remaining coal plant is expected to close in September 2024.

Section 6: Renewables

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Key headlines

Renewable generation increased by 3.7 per cent (1.4 TWh) in Quarter 1 2024 to 39.2 TWh with most of the increase being in onshore wind generation.

The renewable share of total electricity generation reached 50.9 per cent in Quarter 1 2024, 2.2 percentage points higher than the same period last year and second only to the record set in the previous quarter.

Renewable installed capacity was 2.5 GW (4.6 per cent) higher than in Quarter 1 2023, the lowest quarter on quarter growth since Quarter 4 2021. Solar PV accounted for 60 per cent of the new capacity and offshore wind a third.

Chart 6.1 Changes in renewable generation and capacity between Q1 2023 and Q1 2024 ([Energy Trends Table 6.1](#))

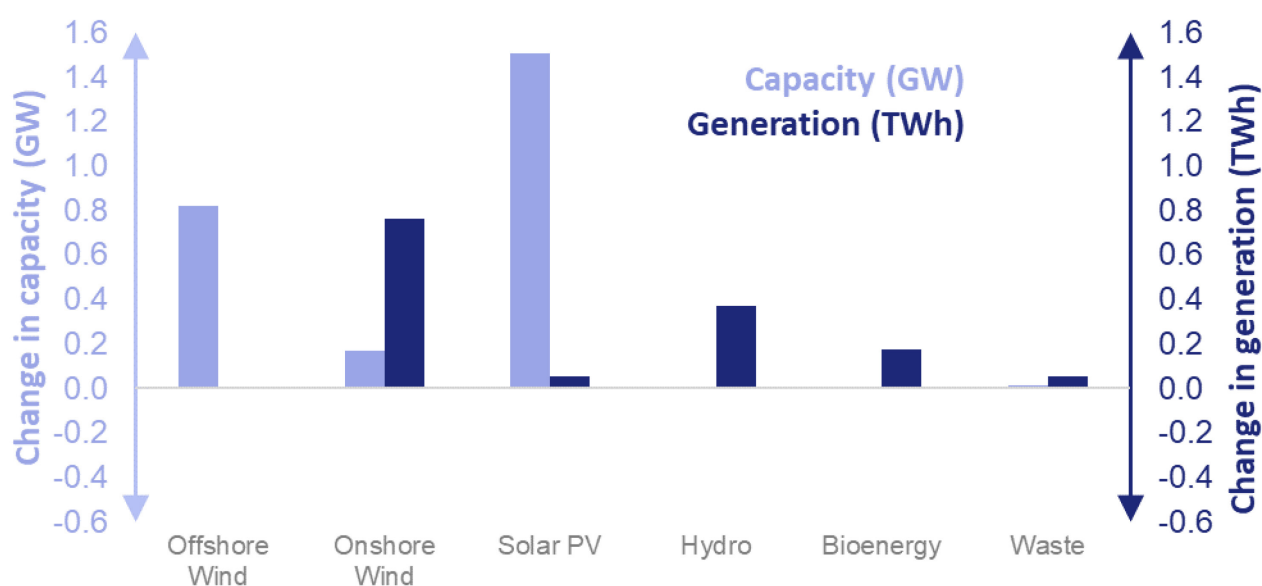
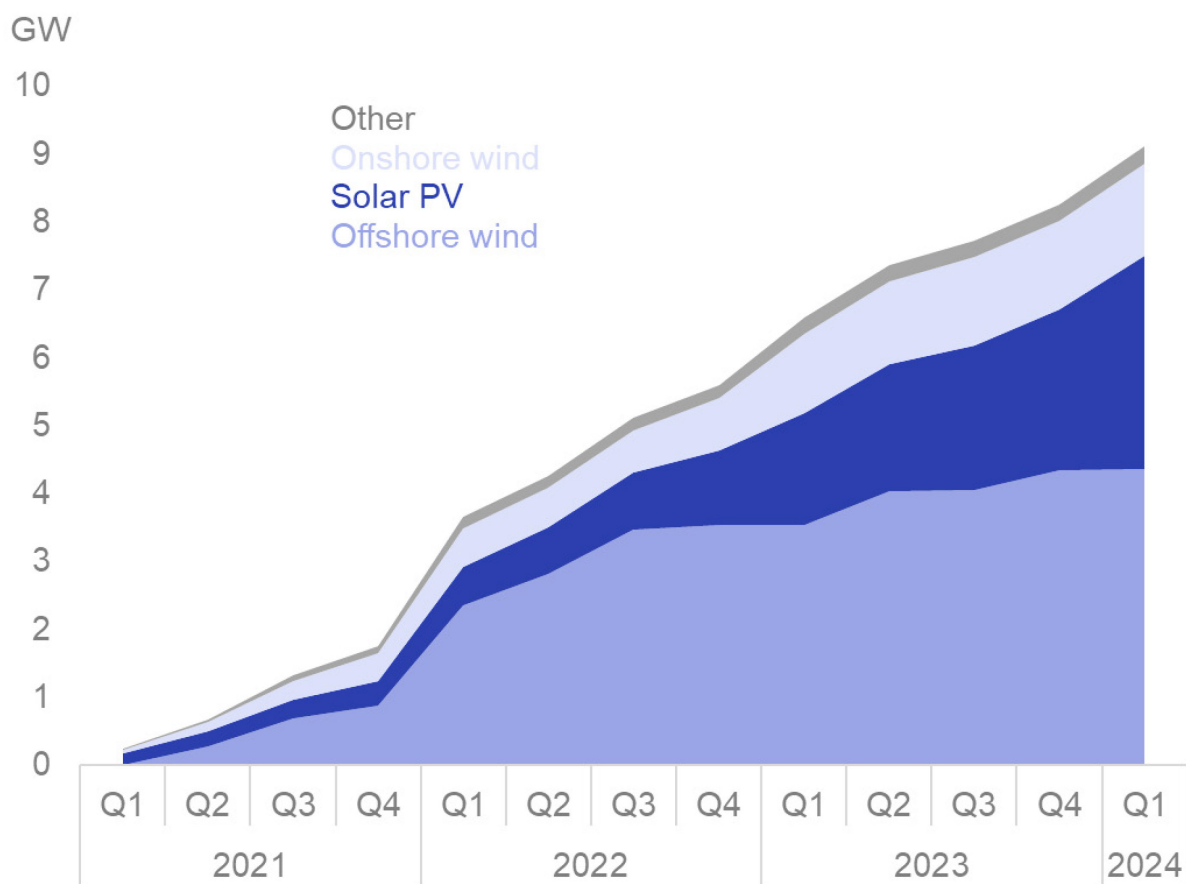


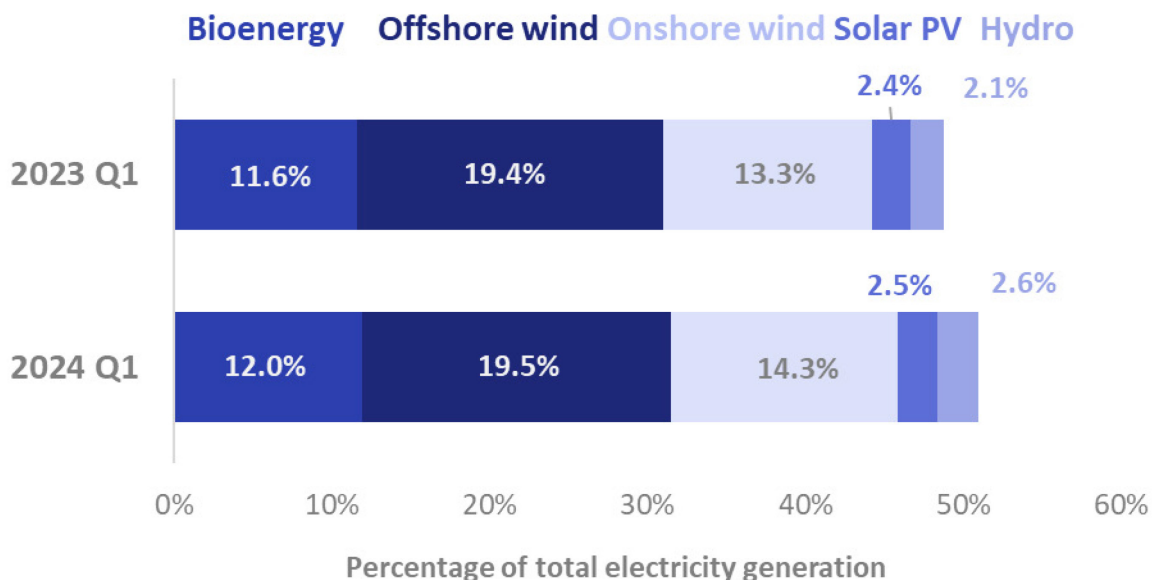
Chart 6.1 shows how each technology has contributed to the overall change in generation and capacity between Quarter 1 in 2023 and 2024. Most notable this quarter is the limited impact of new offshore wind and solar PV capacity on generation in part due to weather effects (sun hours) and maintenance outages (offshore wind). Wind speeds were slightly higher compared to Quarter 1 2023 which boosted onshore wind and generation from most offshore plants. However, outages at one major offshore plant offset overall generation. Solar PV generation increased by just 2.7 per cent compared with a 9.9 per cent increase in new capacity due notably lower sun hours in Quarter 1 2024. Hydro generation increased by 22.3 per cent, the highest increase in percentage terms of the renewable technologies; with capacity stable, the key driver is higher rainfall in Quarter 1 2024. Bioenergy and waste generation was up 2.5 per cent compared to Quarter 1 2023 which had been hampered by outages. Within this generation from renewable waste, animal and plant biomass were up while generation from landfill gas was down.

Chart 6.2 New capacity (cumulative) since 2021 for the leading renewable technologies ([Energy Trends Table 6.1](#))



Offshore wind and solar PV have dominated new capacity installed since 2021; offshore wind accounts for almost half, with solar PV accounting for around a third. Although new installed capacity began to pick up during 2022, certainly for offshore wind, new capacity began to tail off over the last few quarters. Conversely, new solar PV capacity has continued to grow mostly in small scale and domestic solar PV, but also including some larger scale sites such as Gorse Lane, Thaxted, and Colldham. Notable new offshore capacity includes the expansion at Seagreen (an additional 560 MW) which initially came online in 2022 reaching completion during 2023.

Chart 6.3 Renewables' share of electricity generation – Q1 2023 and Q1 2024 ([Energy Trends Table 6.1](#))



In Quarter 1 2024, renewables' share of total generation was 50.9 per cent, second only (by 0.6 per centage points) to the current record of 51.6 per cent in Quarter 4 2023. This is 2.2 percentage points higher than the same quarter in 2023 due to a combination of lower total generation and higher renewable generation. Onshore wind's share increased by 1.1 percentage points, the highest of the technologies. This is followed by a 0.5 per centage point raise in hydro, reflecting the increased generation due to wetter weather. Bioenergy's share increased by 0.4 per centage points.

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:

Methodology changes: oil, gas and electricity balances

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 (see links at end of glossary). 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 rounded 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 | 0.023885 | 1 | 0.27778 | 0.0094778 | GJ | 0.023885 | 1 | 277.78 | 9.4778 |
| GWh | 0.085985 | 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 | 0.10551 | 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, the energy balance methodology note and methodology notes for individual fuels (see links 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.



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

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Methodology changes: Oil, Gas and Electricity

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Key headlines

This article explains methodology changes that we intend to make to the oil, gas and electricity balances in the July edition of the Digest of UK Energy Statistics (DUKES), to be published on Tuesday 30 July 2024.

Demand estimates for oil by types of final consumers will likely be revised following a new survey of oil wholesalers and more detailed analysis of existing administrative datasets. Consumption estimates for gas will also be reviewed to reflect improved data quality following an update to our surveys, and increased work with data suppliers.

For electricity improvements have been made to the calculation of electricity used in the process of generation. This change makes better use of available data but does not have a large impact on previously published data. Data on grid scale battery storage has also been added to the electricity tables covering electricity input to batteries, output from batteries, and their capacity.

Update on improving sector demand estimates for oil products

Difficulty with determining end users of oil products sold

The Department publishes oil supply and demand in Energy Trends and the Digest of UK Energy Statistics (DUKES)¹. The data is based on our monthly survey of oil majors, which is a census of every company that supplies at least 50 thousand tonnes of key oils to the UK in a 12-month period². Combined with other data sources, evidence indicates that over two-thirds of oil is consumed for transport purposes, seven per cent as feedstock for petrochemical plants and a further six per cent by the energy industry (Energy Trends Table 3.2, March 2024¹). These sectoral estimates are based on sound data.

It is more complex to estimate the many different users of commercial fuels (gas oil, fuel oil and other kerosene). The supply chain is complex, passing between producers, importers and wholesalers before reaching the various relatively small, but high number, of end users, making a direct survey of consumers disproportionately burdensome. We exploit existing and alternative data sources to better understand sector demand (see Annex A), but we needed to find an alternate way to identify end users of the roughly eight million tonnes of oil a year that is delivered to final consumers, which is not directly captured in our current data framework.

In 2019 we ran a pilot survey of oil wholesalers to improve sector data and published results in the June and July 2019 editions of Energy Trends and DUKES³. We were able to re-allocate around a million tonnes of oil a year from industry (unclassified) to the commercial, public administration and agricultural sectors. This reduced the three to four million tonnes reported as 'unclassified' each year to around two million tonnes but introduced a discontinuity in the time series for some industrial sectors between 2015 and 2016.

Recent improvements to the evidence base

The 2020 COVID-19 pandemic substantially disrupted oil demand patterns, pausing further development work in this area, but trends have appeared to be stable since the start of 2022. We decided to expand on the results of the 2019 pilot and ran a survey of oil wholesalers in 2024, capturing data from pre-pandemic 2019 through to the end of 2023. As with all new surveys, data completeness and quality will need to be improved, but we feel that even in this first year of the survey there is sufficiently sound evidence to show sector demand

¹ Oil statistics collection: <https://www.gov.uk/government/collections/oil-statistics>

² Substantial suppliers are obligated to hold emergency reserves of oil in case of a supply disruption. Further information and a template DORS form can be found here: <https://www.gov.uk/government/publications/emergency-oil-stocking-international-obligations>

³ Energy Trends: June 2019 - Change to method of estimating sector demand for oil products: <https://www.gov.uk/government/publications/energy-trends-june-2019-special-feature-article-change-to-method-of-estimating-sector-demand-for-oil-products>

from before the pandemic, throughout the period of lockdowns, and for demand that has been typical since the start of 2022.

We use data from the EU (now UK) Emissions Trading Scheme (ETS), and Climate Change Agreements (CCA) to cross-reference our demand estimates. We have now analysed this data in more depth and have been able to use results to supplement survey results and improve some industrial subsector demand estimates.

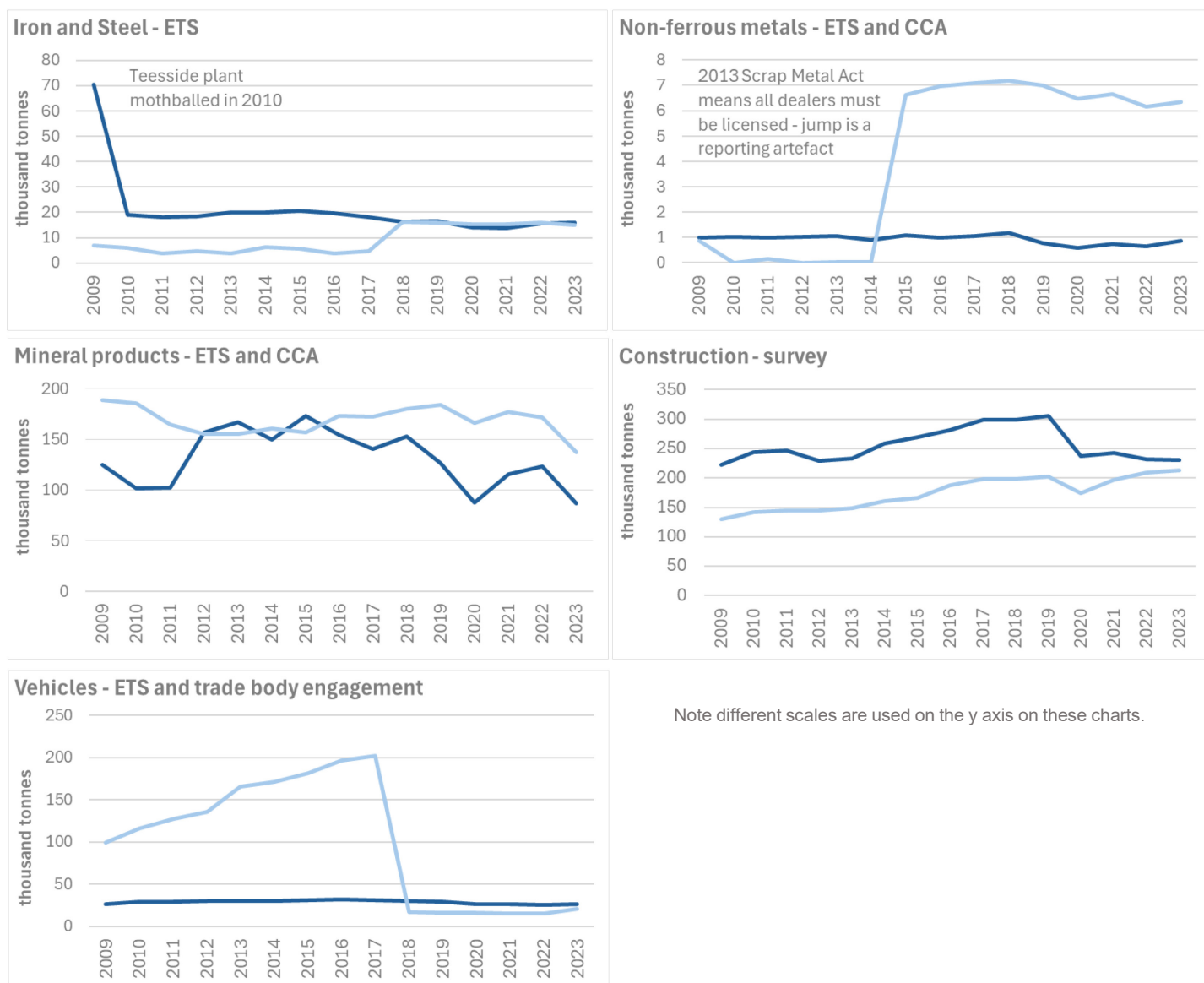
Impact on oil sector demand estimates

Different key benefits have been brought by the new survey and more extensive analysis of the ETS and CCA data. A key change has been to further reduce the amount of oil reported in industry (unclassified) – we intend to re-allocate between 300 to 500 thousand tonnes a year out of unclassified to other industrial subsectors, and in some cases to non-industrial users as per the detail below.

Broadly the re-allocation of demand for oil across industry subsectors does not materially affect industry total demand of around 2.5 million tonnes per year. The panel of charts for the industrial subsectors shows the likely revisions that will be made to Iron and Steel, Mineral products, Non-ferrous metals, Construction and Vehicles sectors. Scales of revisions vary across sub-sectors because the demand for oil varies from around one thousand tonnes (1kt) for Non-ferrous metal to a high of 300kt for Construction. The data used to revise demand is shown in each chart title.

Impacts on industry subsectors

Revised Published



All Iron and Steel manufacturers are in the ETS meaning this is a census of the sector. We previously revised Iron and Steel and Vehicles back to 2018 using this data and are now extending the revisions to 2009.

Revisions to Mineral Products show a pronounced drop in energy demand from 170kt in 2015 to less than 100kt in 2023 resulting from factors such as sales of assets, mergers and fuel switching. The non-ferrous metals data shows that energy balances have been overestimating demand for oil since 2015 (it has more likely been roughly stable at around 1kt each year) and that the sudden jump in demand in published 2014 data is likely a reporting artefact following the introduction of the Scrap Metal Act 2013 that required all metal dealers to be licenced.

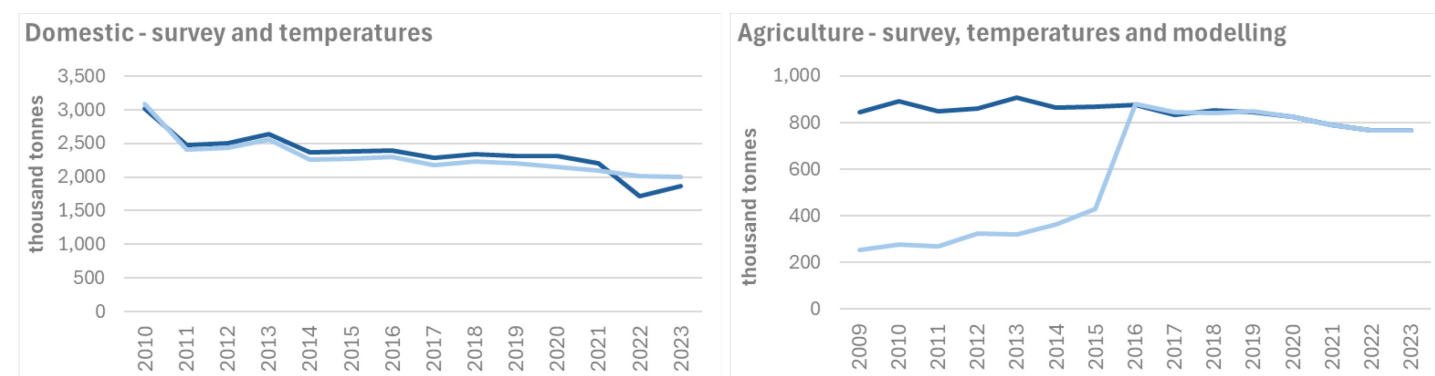
The construction industry does not have good representation in either the ETS or CCA data, likely because of the very high number of relatively smaller businesses meaning it is not economical to join either scheme. However, the wholesalers survey data identified a new floor for construction demand of around 240kt in recent years and 300kt in 2018 and 2019 pre-pandemic. We have used reported demand from the survey (demand is likely higher but we do not yet have evidence to scale our sample) and revised back to 2009 using trends in output from the Index of Construction published by the Office for National Statistics.

Impacts on other users

The two other key areas that will be revised are the domestic – or residential – and agricultural sectors. Again, please note the different scales in demand from between 1.6 to 3 million tonnes for the domestic sector to around 800kt for agriculture.

The wholesaler survey showed a sharper drop in 2022 than we have previously indicated, and this revision represents the biggest departure from the currently published series. The survey provided a new basis to calculate annual litres of oil used per household. The 2022 drop was seen in this surveyed data and was not because of lower customer numbers. To obtain UK demand we combined the types of fuels used by households with estimates of the number of households in the UK that use oil for heating to give total UK domestic demand and combined with temperature data to give a revised back series (see crude oil and petroleum products: methodology note⁴).

Revised Published



We previously revised demand in agriculture back to 2016 using data from an earlier analysis of the CCA data. We have kept the higher amount of oil derived from this analysis post 2016 but used modelling to extend revisions to 2009 to give a consistent time series. We used survey data to more accurately identify breakdowns of oil types used in the sector, and to achieve quarterly seasonality we accounted for the proportion of types of farming in the UK, fuel required for each main farming activity, and the pattern of activities across the seasons.

Next steps for oil sector demand estimates

The revisions to sector estimates described in this article are indicative only as we continue to develop the analysis before publication of DUKES on 30 July 2024. Going forward, we will continue to consider further analysis to continue improving sector demand estimates, which will remain subject to further revision because they are based on new and developing data collections. We will be working closely with wholesalers and continue to engage with industry and trade bodies as we move forward in this iterative process. Another area under consideration is the use of oil products in the petrochemical sector. We have again looked at this in the ETS and CCA data, and conducted a survey of petrochemical plants in the UK and hope to implement the results of this work when we are confident in any revisions.

⁴ Crude oil and petroleum products: methodology note: <https://www.gov.uk/government/publications/crude-oil-and-petroleum-products-methodology-note>

Our intention with the evidence that is currently available is to provide greater confidence in sector demand estimates and a consistent back-series in DUKES 2024, and to consider further revisions as new data come to light.

As ever, we welcome comments on these changes.

Update on improving sector consumption estimates for natural gas

Recent improvements to evidence base

The Department uses a variety of data sources to estimate gas use in the UK, including data from two administrative schemes, the Emissions Trading Scheme and the Climate Change Agreement scheme. It also conducts its own survey of energy suppliers.

In 2023 the Department increased the frequency of its principal data collection of large⁵ gas suppliers and prioritised working with data suppliers to improve data quality in this area (for more information see [Natural gas statistics: data sources and methodologies](#)). As part of this ongoing work, we held discussions with energy suppliers on end use data. As per oil and other fuels, data on gas end use is collected using Standard Industrial Classification (SIC) codes but providing accurate data is challenging, especially for those customers who are not charged the domestic rate of value added tax.

Impact on gas sector consumption estimates

The Gas Statistics Team have worked with data suppliers to improve the quality of survey data and improved analytical processes resulting in more accurate sectoral consumption estimates. These improvements will result in revisions to the sectoral consumption data published in balances as part of DUKES and Energy Trends publications from July 2024.

Of note these revisions are likely to include a reduction of gas consumed by industry with gas reallocated between other sectors from 2020. For industry this will result in revisions of up to minus ~10 per cent annually with a knock-on effect of revisions of less than ~5 per cent for domestic and services sectors.

Additionally, non-energy use of gas, which is currently considered as ammonia production only, has been reduced to reflect (to the best of our current knowledge) the closure of all large ammonia production sites in the UK in 2023. The charts below reflect our current estimates, but these are not in their final form and further work will be required in the run-up to the DUKES publication at the end of July.



Note different scales are used on the y axis on these charts.

⁵ Supply >1,750 GWh per year

Next steps for gas sector demand estimates

In the coming year the Gas Statistics Team will continue to work with data suppliers to improve our understanding of the quality of survey data. This will include broadening the scope of sectors to include energy industry and losses as well as continuing work to improve the quality of consumption estimates. Furthermore, the team will consider whether the current definition of non-energy use accurately represents this sector whilst a hydrogen economy expands in the UK.

Methodology changes in electricity own use

The Department have made changes to the way in which we calculate and report electricity used in the process of generation (called 'own use' in some tables). The changes have been introduced as part of the production process for DUKES 2024 and have been applied to all data from the start of 2020.

For all fuels and technologies, these changes mean that we report electricity used in the process of generation from survey returns where available and model it where data are not available. We will also report this for wind and solar generators for the first time. This reflects our analysis of the data given in returns as well as consultation with sector experts.

We have also updated the way we report on plants who have used more than they have generated in a particular time period. Previously this would give a negative supply as these plants drew electricity from the grid, where the new method sets supply to zero and counts all the electricity used but not generated on site as 'own use' in the tables.

These changes reflect better use of available data and system improvements but do not have a material impact on the reported data. The new methodology increases reported generation and supply by less than 1 per cent and each separate fuel/technology by less than 0.5 per cent. Similarly, the new methodology changes the shares of generation by fuel by less than 0.2 percentage points.

Background and key terms

The electricity tables make a distinction between 'generation' and 'supply'. Generation refers to all the electricity generated by a power plant or turbine where supply is the amount of electricity that was supplied to the grid or available for use. The difference between these is the plant/turbine's 'own use' i.e. electricity that was consumed on site as part of the process of generation.

The changes to methodology mainly affect the data for Major Power Producers (MPPs). Previously, only the electricity supplied value was taken from the MPP survey. This was scaled up using standard factors to give calculated generation for that company and the difference between these was reported as calculated own use. There were specific factors for each fuel and for different generator types, but no own use reported for wind or solar generators. For all other forms of generation, an average scaling factor was used. The aggregation was done at a company level across all the company's sites. This approach had several issues:

- Single factor for each fuel/technology did not reflect diversity of sites in the sample
- No own use counted for wind or solar did not fully reflect how these technologies operate
- Factors had been kept consistent over time but then did not reflect improvements in technology
- Not making best use of data we had available from survey respondents

New approach

Where any site (including wind and solar) has generation, own use and supply data in their return, we will use that data. We will also use that data to calculate scaling factors each month which will then be applied to the MPP sites who do not give the data. The biggest impact of this will be to report own use data for solar and wind sites. There will be smaller changes for other fuels and technologies where own use data is already reported, but the new method will improve the way in which this is calculated.

MPP sites will be included in the calculation if they have generation and own use data and have supplied electricity to the grid in that month. A separate factor is calculated for each fuel/technology and each year (e.g. solar in 2023) and then applied to all sites of that type in that year who have only reported supply data. The factors will be revised every month when the MPP process is run to take account of any revisions to these data, but we will use the factor from the most recent complete year to prevent variability in the early parts of the year where there is not as much data. The only exception to this is pumped storage sites, where own use will continue to be taken from their returns, to accurately report on the amount of electricity used in pumping.

For sites that are not part of the MPP sample, there will be no change to own use for most fuels and technologies. Because own use and supply is not collected for these sites, these are estimated using standard scaling factors for each fuel and technology, as detailed in the [methodology document for electricity statistics](#). As part of this methodology change, we have added an estimated scaling factor of 0.5 per cent own use for wind and solar sites. This is in line with the analysis of MPP data above and means that wind and solar is consistently handled for both MPP and non-MPP sites.

Negative supply (MPP only)

Within the MPP survey, a site's supply could be recorded as a negative value if it had little or no generation but had still reported own use. The electricity used would most likely have come from another generator via the National Grid so it did not make sense for this to be recorded as part of the MPP data. Under the new methodology, if MPP supply is negative for a site, this will be counted as 0 for the purposes of reporting. This will mean that negative supply does not affect the total supply reported by MPPs. Own use by that site will still be counted as this is included under 'energy industry use' in the electricity balances. Similarly, if a site has generated less than the amount reported as own use, the difference between the two will be the amount that the site has consumed from the National Grid and will be counted under 'energy industry use'. Negative supply generally only occurs when a site is on outage and excluding it increases reported supply by less than 0.5 TWh.

Addition of battery storage to the electricity balances

Background

Grid-scale battery storage sites provide short-term energy storage for the grid. Over the last decade the UK battery market has grown rapidly, with the total annual electricity output from batteries going from approximately 0.5 GWh in 2017 to approximately 1000 GWh in 2023 – now approaching electricity from pumped storage, which in 2023 was approximately 1800 GWh.

In July 2024, figures on battery storage will be published for the first time in DUKES with data back to 2017. This note outlines the methodology used to produce these figures.

Users of the data described in this article should note these data are under development and will be subject to revision as the methodology and data sources improve.

Methodology

Input and output electricity

Data on the electricity input to and output from batteries comes from [Elexon's BM Unit Aggregation Report](#), which quantifies the volume of electricity input/output to GB's Balancing Mechanism by all Balancing Mechanism Units (BMUs). A list of the Balancing Mechanism Unit IDs of batteries has been produced using data provided to the Department by Elexon on the primary fuel type of each unit, alongside supplementary research. Note that batteries co-located with generation sites were excluded from this list to prevent double counting of generation. Using this list of IDs, data referring to only batteries is extracted from the BM Unit Aggregation Report. The data is then aggregated by year, giving the total electricity input from and output to the balancing mechanism to/from batteries in each year. Where multiple settlement runs were available for a given day, the most recently published run is used.

Using the total electricity output to the GB balancing mechanism from batteries, we can estimate the total electricity input to/output from batteries to all markets in the UK. We estimated that half of battery output electricity is attributed to the Balancing Mechanism, with the rest attributed to other markets. Taking the contribution from Northern Ireland batteries to be small relative to the GB total, we estimate the total UK battery input and output electricity to be double the total battery input and output electricity from/to the balancing mechanism. Work is ongoing to identify suitable sources of data for volumes provided to/from each of the other markets to allow us to improve this methodology.

Capacity

Batteries have two forms of capacity: power capacity and energy capacity. Power capacity measures the rate of electricity input/output and is commonly measured in units of MW. Energy capacity measures the amount of electricity stored by a battery and is commonly measured in units of MWh.

Data on the power capacity of batteries is sourced from Elexon's list of registered BM units, available daily via their [data portal](#). Batteries are identified in this file using the same list of IDs compiled for the input/output of electricity. The power capacity of a battery is taken to be the generation capacity in this file. As the majority of battery sites are registered with the balancing mechanism, capacity data is not scaled up to account for the other markets.

No suitable data source has yet been identified which can provide energy capacity figures. Work is ongoing to identify a data source.

Changes to DUKES tables

Adding battery storage data to DUKES requires the modification of existing tables, alongside the introduction of a new table which summarises data on all forms of energy storage sites. In existing tables, rows referring to pumped storage will be changed to 'energy storage', and figures will be the sum of all forms of grid-scale energy storage. Rows referring to the electricity output from 'other sources' will now include battery storage. A full list of changes made to existing tables are described in Table 1.

DUKES 5.16 is a new set of three tables which brings together all data on energy storage, broken down by storage type. 5.16A shows the quantity of electricity output by these sites, while 5.16B shows the electricity input to them. 5.16C lists the total power capacity of all sites operational at the end of May in each year.

In addition to the changes to DUKES, equivalent changes will be made to the tables published in Energy Trends.

Table 1: Details of changes to each table

| DUKES table | Changes |
|--------------------|---|
| 5.1 | <ul style="list-style-type: none"> • ‘Other sources’ (row 7) now includes electricity output from batteries. • ‘Pumped storage’ (row 24) renamed to ‘Energy storage’, and now includes energy input to batteries/ |
| 5.2 | <ul style="list-style-type: none"> • ‘Other sources’ (row 8) now includes electricity output from batteries. • ‘Pumped storage’ (row 22) renamed to ‘Energy storage’, and now includes energy input to batteries. |
| 5.5 | <ul style="list-style-type: none"> • ‘Pumped storage’ (rows 10 and 16) renamed to ‘Energy storage’, and now includes energy input to batteries. |
| 5.6 | <ul style="list-style-type: none"> • New ‘Battery storage’ rows added below each MPP ‘Pumped storage’ row (rows 18, 39, 58, 85, and 179), |
| 5.11 | <ul style="list-style-type: none"> • 5.11 summary: new ‘Battery storage’ row added below MPP ‘Pumped storage’ (row 17) • 5.11 Full list: battery storage sites added |
| 5.1.2 | <ul style="list-style-type: none"> • Electricity output from batteries added to ‘Electricity Available’ column |
| 5.1.3 | <ul style="list-style-type: none"> • New ‘Electricity supplied (gross) from battery storage (major power producers)’ and ‘Electricity supplied (gross) from battery storage (all generators)’ columns added. |

Impacts on the electricity balances

Adding battery data to the electricity balance causes previously published total supply and demand figures to increase. The increases in supply range from approximately 0.5 GWh in 2017 to approximately 1000 GWh in 2023. As batteries are on average approximately 70-80% efficient, the increases to demand are slightly higher at approximately 1 GWh in 2017 and approximately 1300 GWh in 2023. Due to the electricity lost to efficiency, the net effect of adding battery data to the electricity balance is additional demand ranging from approximately 0.5 GWh in 2017 to approximately 100 GWh in 2023.

Annex A: Basis for previous sector oil demand estimates

The main survey that underpins estimates of oil demand by sector is the Downstream Oil Reporting System, the monthly survey of all substantial suppliers of oil to the UK (defined as supplying at least 50 thousand tonnes of key fuels to the UK in a 12-month period²). This includes all refiners and major importers, covering more than 97 per cent of UK supply of oil. However, these major suppliers do not tend to sell direct to the end user. Instead, around 80 per cent of deliveries are to wholesalers who resell the oil, making it difficult for substantial suppliers and the Department to identify the end users of commercial fuels.

Historically we have taken steps to identify alternative sources of data to inform estimates of demand for each sector. These have included:

- Working with trade bodies of industry sectors that use commercial fuels such as the Food and Drinks Association and the Society of Motor Manufacturers and Traders.
- We collaborated with Liquid Gas UK trade body members to develop a direct survey of sales to better understand demand by user type for Liquefied Petroleum Gas.
- Working with petrochemical companies to better understand supply and demand in that sector.
- Cross-referencing our estimates with administrative data such as from the EU (now UK) Emissions Trading Scheme⁶ and Climate Change Agreements⁷.
- More recently, the Office for National Statistics (ONS) re-started the Annual Purchasers' Survey to identify where businesses spend money, including for energy, and we worked closely with ONS to quality assure and improve this data source.
- Benchmarking against datasets including:
 - His Majesty's Revenue and Customs excise data for road fuels
 - Weekly sales of road fuels that are published by the Department using data from forecourt wetstock management data
 - Civil Aviation Authority data on aircraft movements across the country for jet fuel demand
 - Indices of Production, Services and Construction published by ONS to align time series trends with output
 - Weather data to calibrate estimates of oil used for heating such as kerosene in the domestic and public administration sectors.

To further improve sector estimates, in 2016, 2017, and 2018 the Department ran a survey of all substantial suppliers to construct a full customer base and used that data to correctly classify the ~20 per cent of deliveries from substantial suppliers that are delivered direct to the end user. This survey also identified the larger oil wholesalers who sell to end users in the UK, and we ran an initial pilot data collection of the largest resellers in 2019.

As a result of this new evidence we were able to improve our sector estimates and re-apportion volumes, mainly of other kerosene (or burning oil), from industry (unclassified) to the commercial, public administration and agricultural sectors. This reduced the three to four million tonnes reported as 'unclassified' to around two million tonnes, as described in a special article in Energy Trends June 2019³. We revised sector demand back to 2016 and published new estimates in the June 2019 edition of Energy Trends and July 2019 edition of DUKES.

⁶ Participating in the UK ETS:

<https://www.gov.uk/government/publications/participating-in-the-uk-ets/participating-in-the-uk-ets>

⁷ Climate change agreements: <https://www.gov.uk/guidance/climate-change-agreements--2>



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