Department for Energy Security & Net Zero

Energy Trends

UK, January to March 2023

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 1 2022, primary energy basis

(mtoe basis)	Production	Imports	Exports	Demand
Total energy	**-7.9%**	**+3.7%**	**-2.5%**	**-3.4%**
Coal	**-51%**	**-18%**	**+3.8%**	**-33%**
Primary oil	**-12%**	**-0.02%**	**-15%**	**-2.2%**
Petroleum products	**-2.0%**	**+23%**	**-4.2%**	**+5.2%**
Gas	**-1.3%**	**-0.2%**	**+41%**	**-6.2%**
Electricity	**-11%**	**+38%**	**+19%**	**-11%**

Renewable generation reached a record share of 47.8 per cent of total generation, up from 5.8 per cent in the same quarter of 2010. Renewable generation was boosted with a new **offshore wind record of 19.2 per cent** up from 0.6 per cent in the same quarter of 2010.

Final consumption of energy dropped on the same period last year. On an adjusted basis that reflects seasonal and temperature trends, **industrial consumption was down 11 per cent, and consumption by households down by 9.5 per cent** continuing the recent run of lower consumption figures that have accompanied increased energy and other household costs. Transport demand increased by 9.0 per cent, with increases in road and particularly aviation fuel use.

Energy production fell 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, down 22 per cent on the same quarter last year due to outages in all plants, and reduced capacity compared to the same time last year.

Trade continues to differ from recent norms. **Gas exports to Europe remain high** as the UK continues to support European markets as they move away from Russian gas. **Electricity imports into the UK reached a record** high due to pricing differentials, a contrast to last year when the UK was exporting record levels of electricity to help make good European shortfalls. Net import dependency was 43.6 per cent for the quarter up 5.0 percentage points on last year.

Section 1: UK total energy

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Key headlines

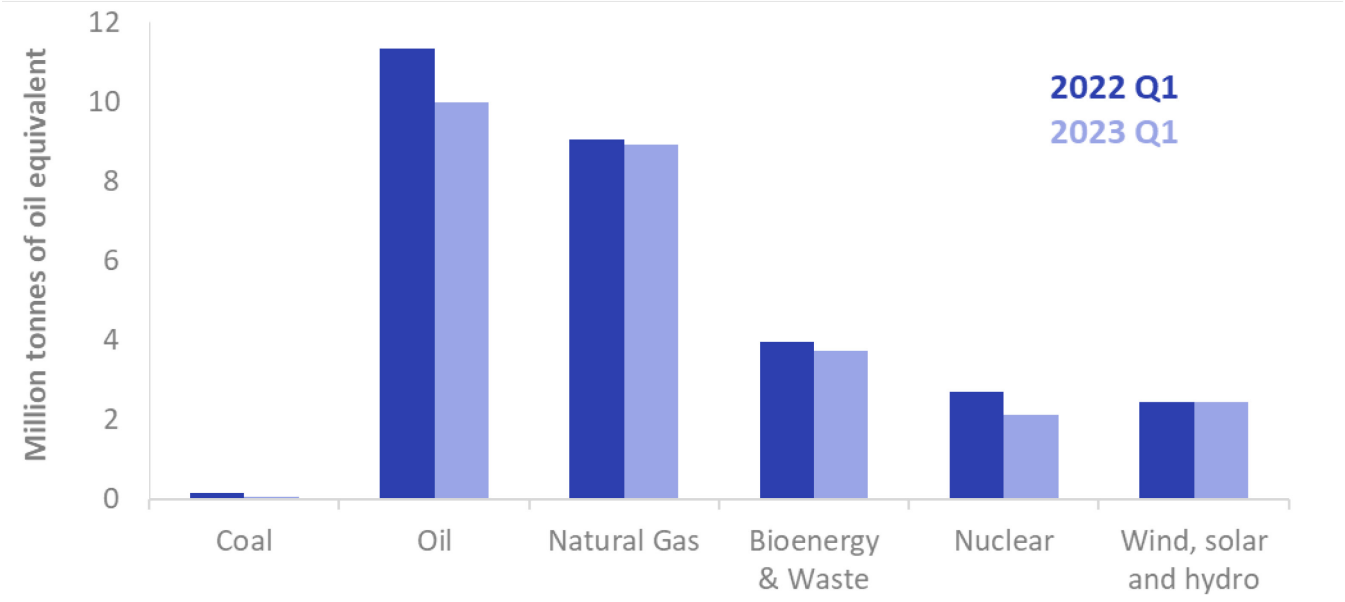
In the first quarter of 2023 **total primary energy production was 27.3 million tonnes of oil equivalent, 8.0 per cent lower** than in the first quarter of 2022.

Total primary energy consumption for energy uses fell by 2.8 per cent. When adjusted to take account of weather differences, primary energy consumption fell by 2.4 per cent.

Total final energy consumption (excluding non-energy use) was 1.6 per cent lower compared to the first quarter of 2022. Transport consumption rose by 8.7 per cent, but domestic consumption fell by 7.4 per cent, despite slightly colder weather than a year earlier. Industrial consumption fell by 6.8 per cent, and other final users (mainly from the service sector) consumption fell by 2.4 per cent. On a seasonally and temperature adjusted basis, final energy consumption fell by 1.9 per cent, with a rise in transport, but falls in all other sectors which continues the recent run of lower consumption figures that have accompanied increased energy and other costs.

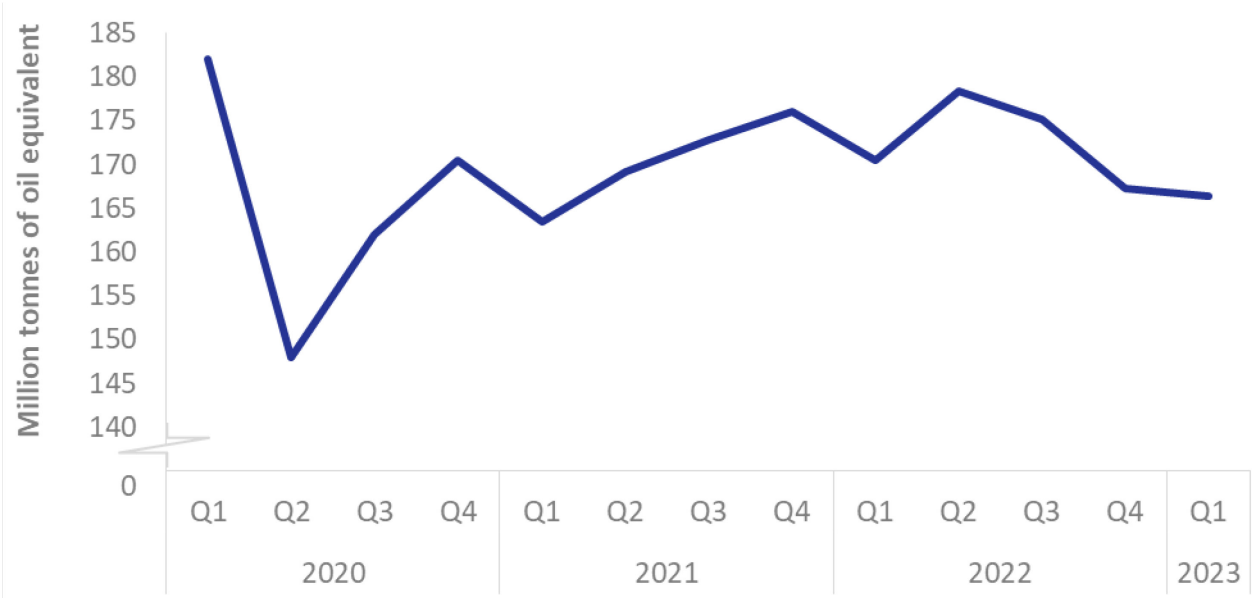
Net import dependency was 43.6 per cent in the first quarter of 2023, up 5.0 percentage points on the same quarter of 2022, with imports at the highest level since the fourth quarter of 2019.

Chart 1.1 UK Primary energy production (Energy Trends Table 1.1)



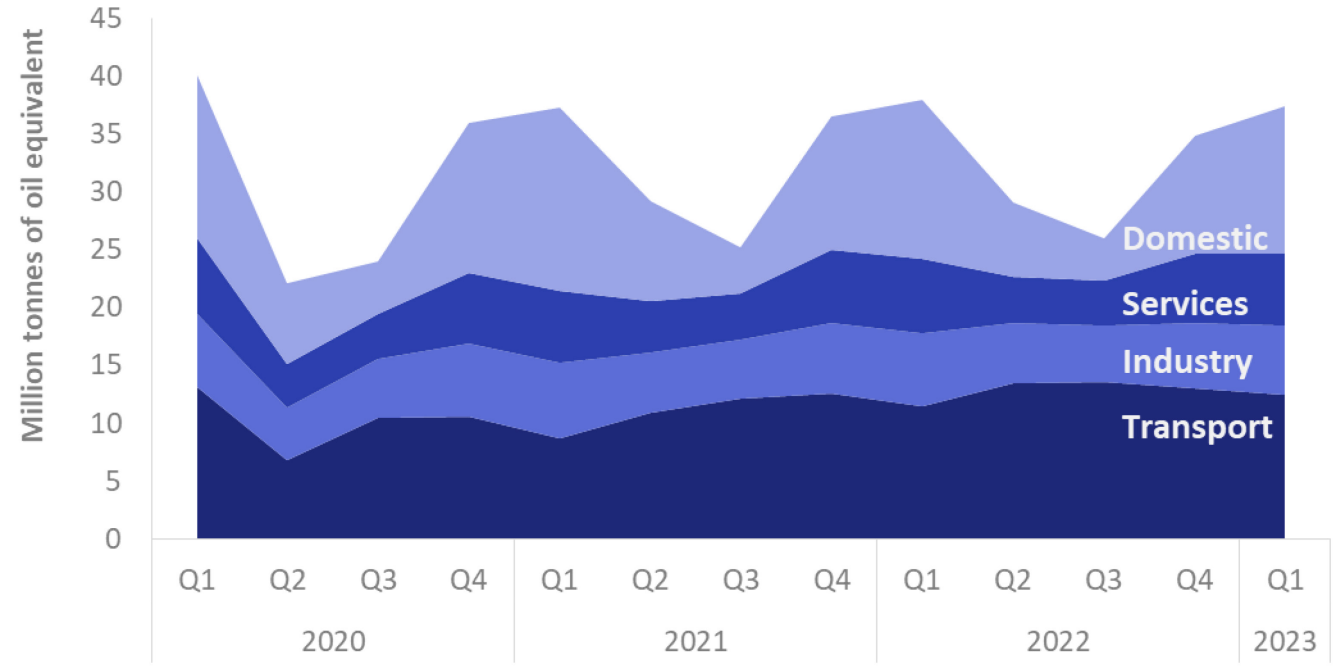
In the first quarter of 2023 **total primary energy production was 27.3 million tonnes of oil equivalent, 8.0 per cent lower** than in the first quarter of 2022. Production of all fuels fell compared to the same quarter in 2022 with the exception of offshore wind. Coal output in the first quarter of 2023 fell by 57 per cent and was at a record 21st century low quarterly level, whilst oil and gas production levels which have increased since maintenance in Summer 2021 both fell and are down by 34 per cent and 7.5 per cent respectively on pre-pandemic (2019) levels. Nuclear output fell by 22 per cent due to reduced capacity and was also at a record 21st century low quarterly level due to outages at all five of the UK's operational nuclear plants. Wind, solar & hydro output rose by 0.8 per cent with a rise in offshore wind generation due to increased capacity offsetting falls in onshore wind, solar and hydro generation due to less favourable weather conditions.

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



In the first quarter of 2023 **total inland consumption** (which includes not only fuel use by consumers, but fuel used for electricity generation and other transformation) was 166.4 million tonnes of oil equivalent, 2.4 per cent lower than in the first quarter of 2022 on a seasonally adjusted and annualised basis that removes the impact of temperature on demand. Primary energy demand is 10 per cent lower than pre-pandemic (2019) levels.

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



In the first quarter of 2023 **total final energy consumption (excluding non-energy use) was 1.6 per cent lower** than in the first quarter of 2022, with falls in all sectors aside from transport. Transport consumption rose by 8.7 per cent with consumption levels returning closer to pre-pandemic (2019) levels. Domestic consumption fell by 7.4 per cent despite slightly colder temperatures and industrial sector energy consumption fell by 6.8 per cent, with both sectors recording the lowest level of consumption for the first quarter of the year this century; service sector consumption fell by 2.4 per cent. The falls in consumption levels are attributable to the impact of higher energy and other consumer costs.

Section 2: Coal and derived gases

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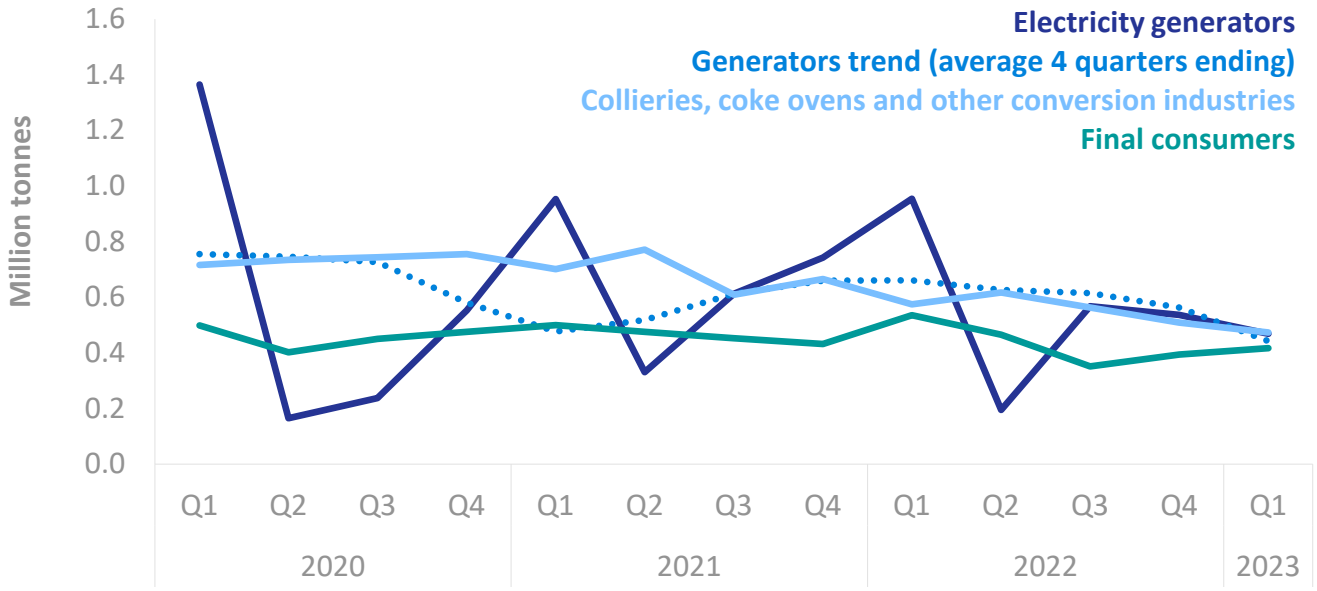
Key headlines

In the first quarter of 2023, demand for coal by electricity generators fell to 468 thousand tonnes, 51 per cent lower than in Quarter 1 2022 (Chart 2.1).

Overall coal production **for the first quarter of 2023 fell to 95 thousand tonnes,** down 52 per cent on the first quarter of 2022. Surface mining production fell to 69 thousand tonnes with a further surface mine closure.

In Quarter 1 2023, **coal imports fell to 1.3 million tonnes**, 18 per cent down on last year and far below a decade ago when coal imports in Quarter 1 2012 totalled 10.4 million tonnes. Net imports accounted for 78 per cent of total coal supply in Quarter 1 2023. The largest provider was the USA (46 per cent). This was followed by Australia (28 per cent) and the European Union (9 per cent).

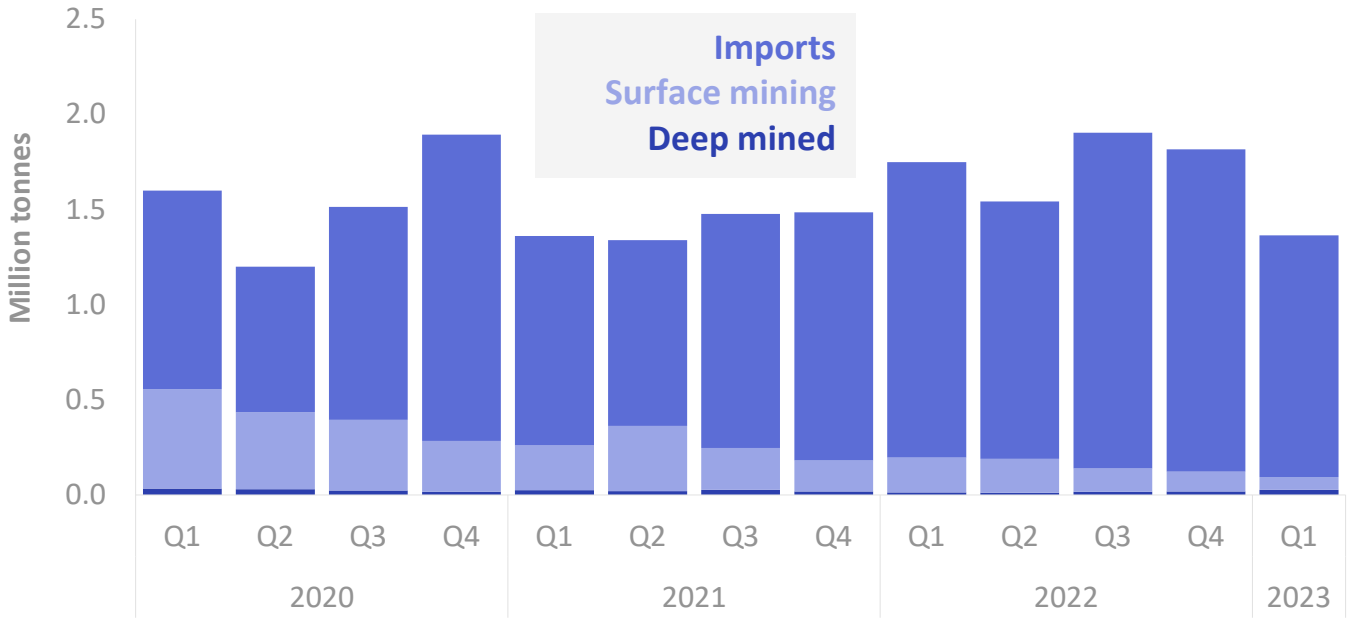
Chart 2.1 Coal Consumption (Energy Trends Table 2.1)



Coal demand for coal-fired electricity generation fell from 954 thousand tonnes in Quarter 1 2022 to 468 thousand tonnes in Quarter 1 2023, a decrease of 51 per cent. This was due to reduced electricity demand and strong performance from offshore wind meant that there was less need for coal-fired generation (see Energy Trends 5.4 for information on generation). Four coal-fired power plants were available for use in the UK in winter 2022/23. Drax, West Burton, Ratcliffe-on-Soar and Kilroot. The plants that were due to be mothballed in March 2022 agreed to remain open to ensure security of electricity supply if needed. The government remains committed to ending coal use for electricity generation by October 2024.

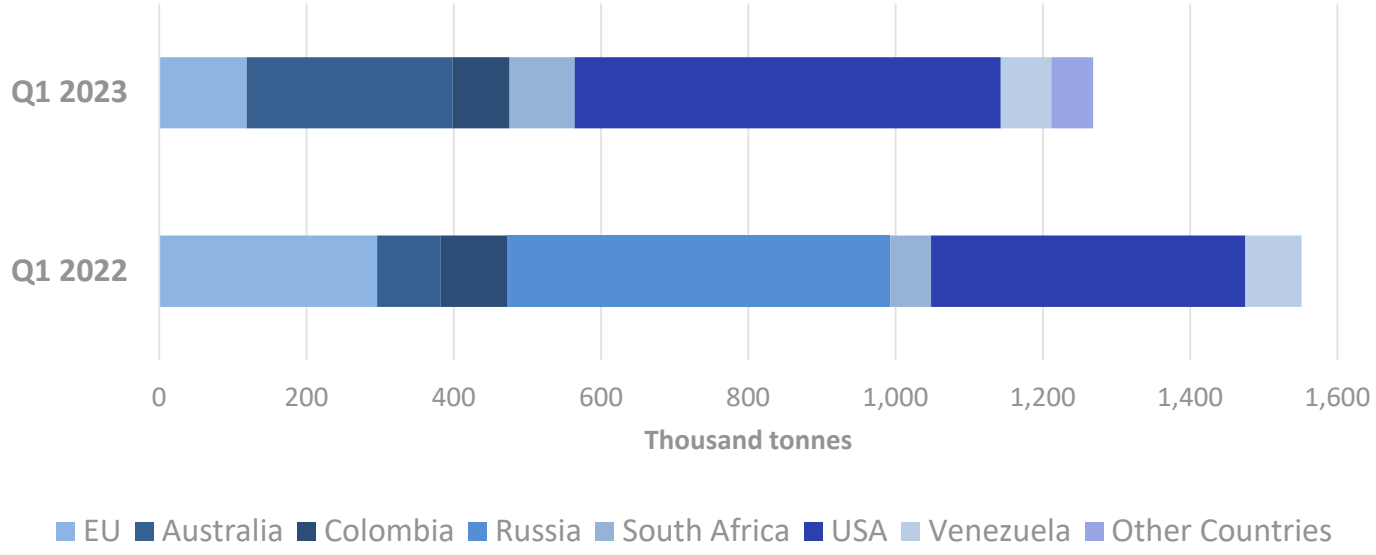
Demand for coal-fired generation is seasonal, peaking in winter when conditions are cold and dark but these peaks have declined as coal-fired generation became less competitive economically and gas and renewable sources displaced it.

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 2023, imports of coal were 1.3 million 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 2012, the UK imported 10.4 million tonnes of coal whilst in the first quarter of 2023 this fell to 1.3 million tonnes. This comprised 1.0 million tonnes of steam coal (76 per cent of imports), 0.3 million tonnes of coking coal (23 per cent of imports) and 0.01 million tonnes of anthracite (1 per cent of imports).

In Quarter 1 2023 the largest provider was the USA (46 per cent). This was followed by Australia (22 per cent) and the European Union (9 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 12 per cent in Quarter 1 2023 compared to Quarter 1 2022. Production volumes decreased following extensive maintenance in the Summer of 2022 and have not fully recovered, though they have been relatively stable in recent quarters.

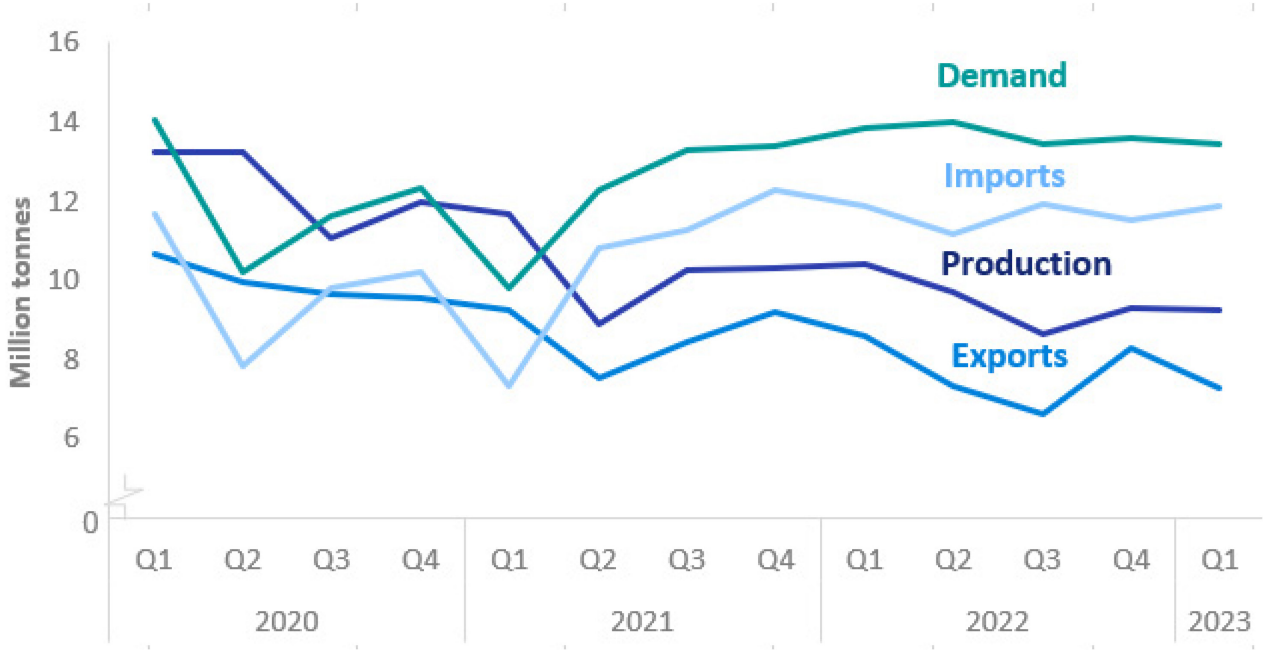
The UK was a net importer of primary oils by 4.6 million tonnes despite imports remaining stable compared to the same period in 2022 because of a 15 per cent drop in exports that accompanied the drop in the UK's production.

Production of petroleum products remained stable despite the increase in demand for petroleum products. Imports of petroleum products in Quarter 1 2023 increased by 23 per cent to meet the higher demand.

Key transport fuels continue to recover from the pandemic with aviation fuel and petrol up by 40 and 7.1 per cent respectively. This increase in transport demand resulted in final consumption increasing by 5.3 per cent compared to Quarter 1 2022.

Total stocks held in the UK fell 4.2 per cent, to 9.0 million tonnes. At the end of Quarter 1 2023, the UK held over 210 days of net imports in stocks, remaining substantially above the IEA stocking requirement of 90 days.

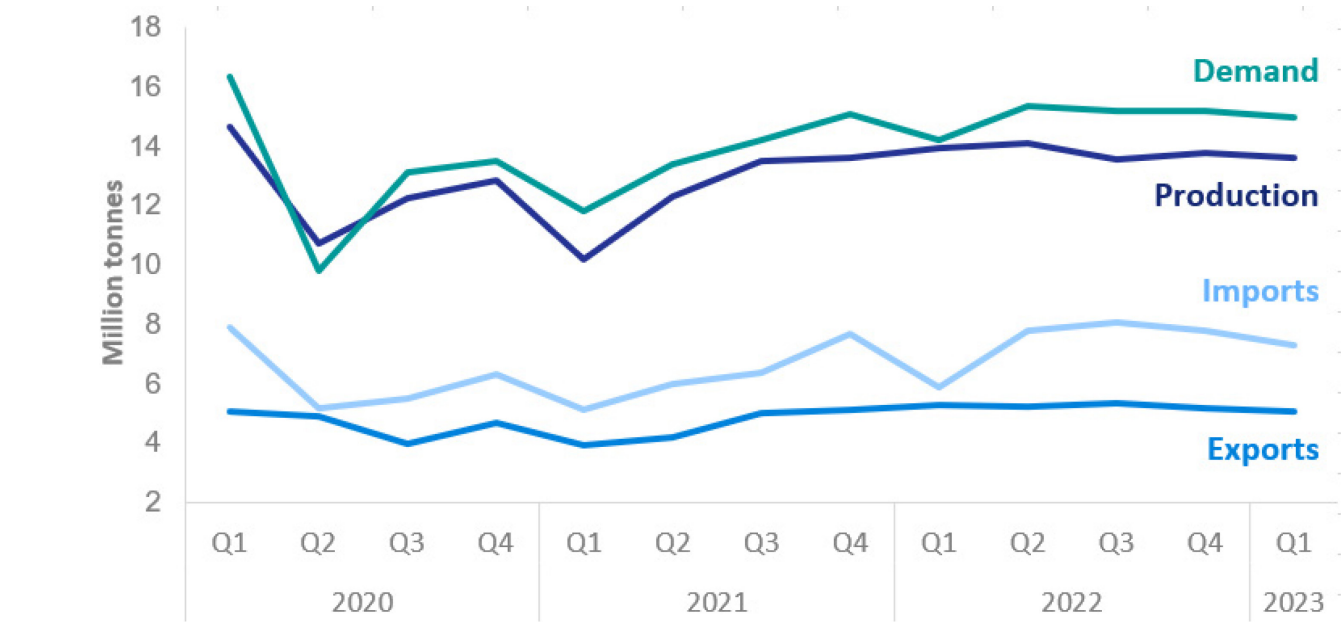
Chart 3.1 Production and trade of crude oil and NGLs (Energy Trends Table 3.1)



Demand for primary oils remained stable in Quarter 1 2023 compared to the same period in 2022. Indigenous production of primary oils decreased 12 per cent on last year. Production volumes reduced following significant maintenance in the summer of 2022 but have been relatively stable in recent quarters.

Imports of crude oil and NGLs have remained stable in this period, alongside the demand for primary oils. The decrease in indigenous production of primary oil is reflected in the reduction of exports by 15 per cent. In Quarter 1 2023, the UK was a net importer of primary oil by 4.6 million tonnes, up 40% on the same period in 2022.

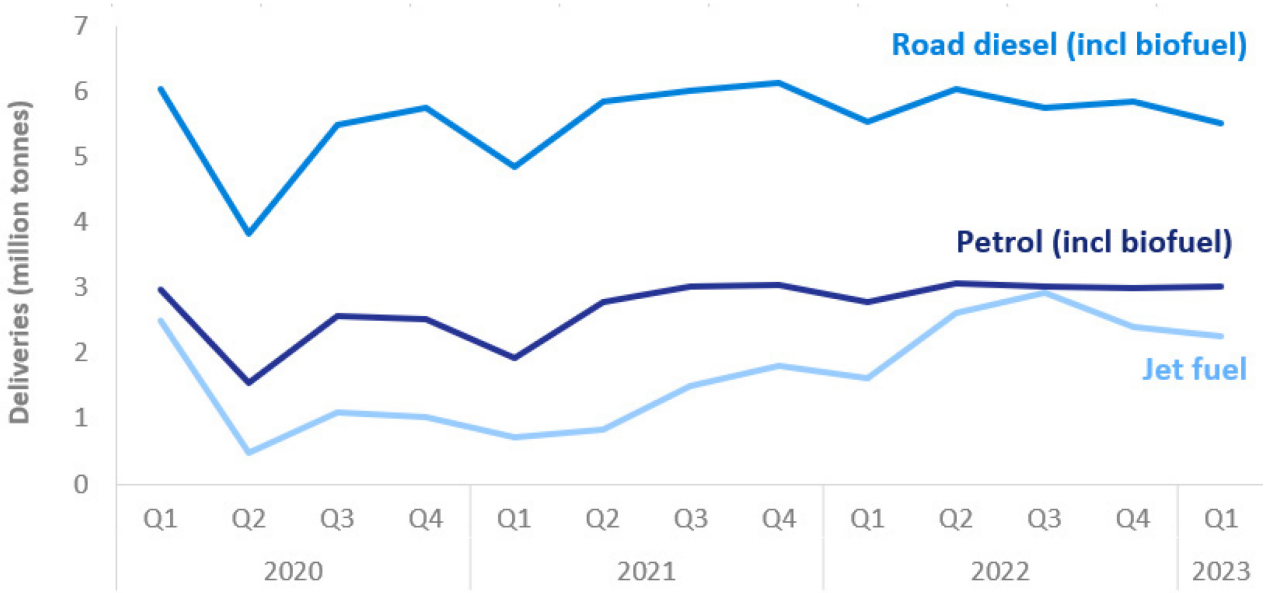
Chart 3.2 Production and trade of petroleum products (Energy Trends Table 3.2)



Total demand for petroleum products increased by 5.3 per cent in Quarter 1 2023, compared the same quarter last year. Production of petroleum products remained stable, so demand was met by an increase in imports of 23 per cent and a decrease in exports increased by 4.0 per cent. The UK remained a net importer of petroleum products by 2.2 million tonnes.

Final consumption increased by 5.0 per cent; most of this increase was seen in the transport sector which was up 8.1 per cent. Demand in the domestic sector increased by 7.4 per cent as temperatures were cooler than the same period in 2022. Consumption in the non-energy use and other industries fell by 15 and 7.4 per cent respectively.

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



Key transport fuels are continuing to recover from the significant drop in demand over the COVID-19 pandemic. Aviation fuel demand was up 40% in Quarter 1 2023 compared to the same period in 2022 and has more than tripled in demand since Quarter 1 2021. Demand for non-biofuel petrol was up 7.1 per cent and diesel demand remained stable.

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 a minimum of 90 days of net imports in reserve 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. The reduction in compulsory obligations meant that at the end of Quarter 1 2023 the UK held 9.0 million tonnes of stock, 4.2 per cent lower than that held in the previous year. However, we still held more than 210 days of net imports in stocks, more than meeting the 90-day requirement set by the IEA.

UK oil stocks can either be held within the UK or held abroad under international agreements. The UK can also hold stock on behalf of other countries. Physical stocks held within the UK rose by 3.3 per cent at the end of Quarter 1 2023, with particularly large increases in jet fuel and diesel stocks. However, stocks held under international agreements reached a net negative during the first quarter this year for the first time, meaning that more stock was held in the UK on behalf of other countries than was held abroad for the UK.

Section 4: Gas

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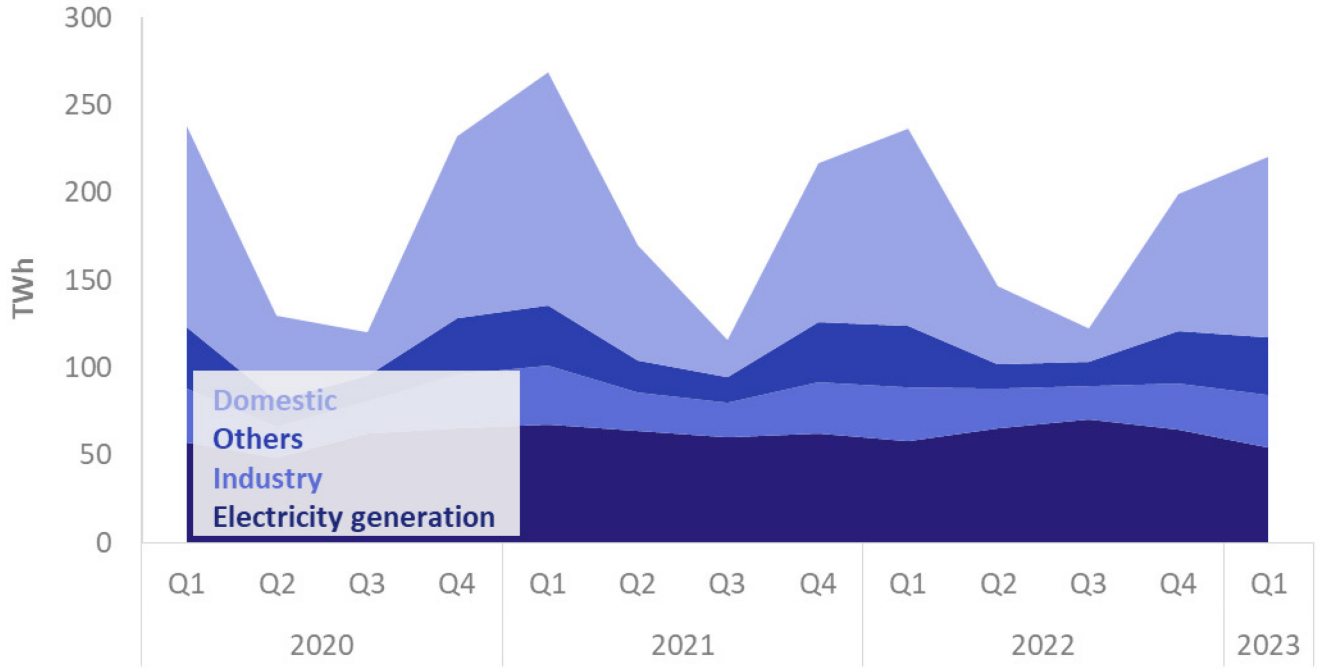
Key headlines

In Quarter 1 2023 gas demand fell by 6.1 per cent compared with the same period last year, despite colder temperatures. This reflects lower consumption by households, industry and other final users that is likely to be driven by higher prices. Gas used for generation also fell, due to reduced electricity demand and strong output from renewable sources.

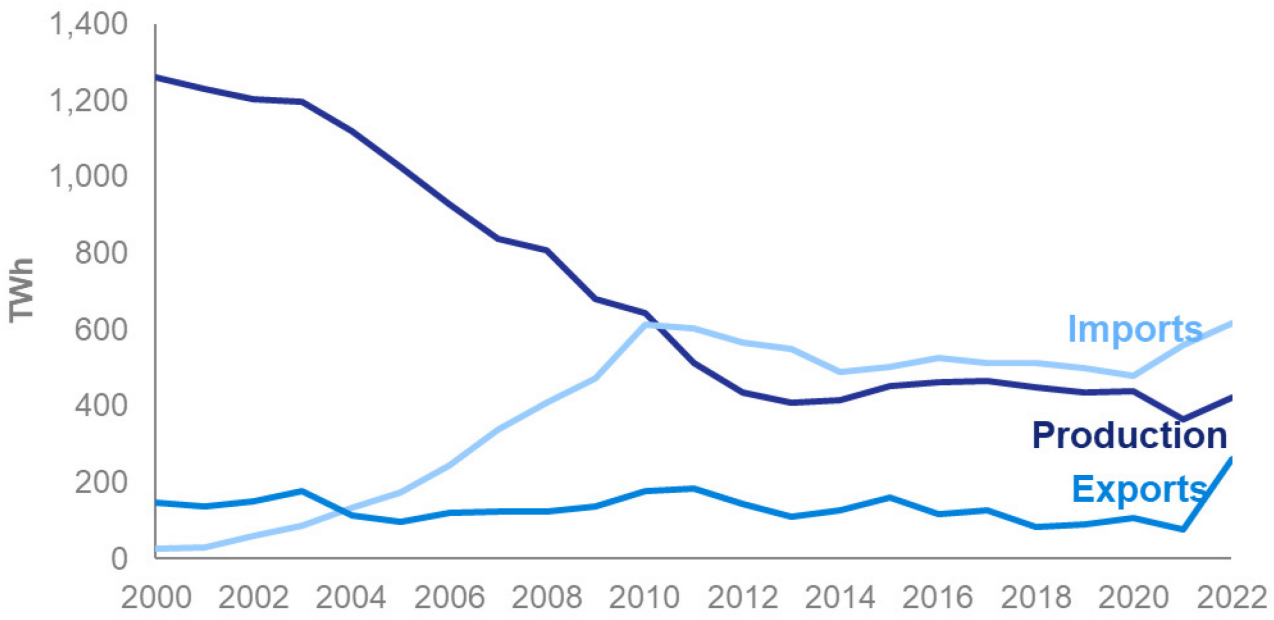
Exports of gas remained substantial and were up 41 per cent compared to Quarter 1 2022 as the UK continued to support the European move away from Russian gas. Export volumes were facilitated by low demand with total imports stable on the same period last year. Imports were broadly stable on last year, with an increase in imports of Liquified Natural Gas (LNG) offsetting the decrease of gas from Norway.

Chart 4.1 UK demand for natural gas (Energy Trends Table 4.1)



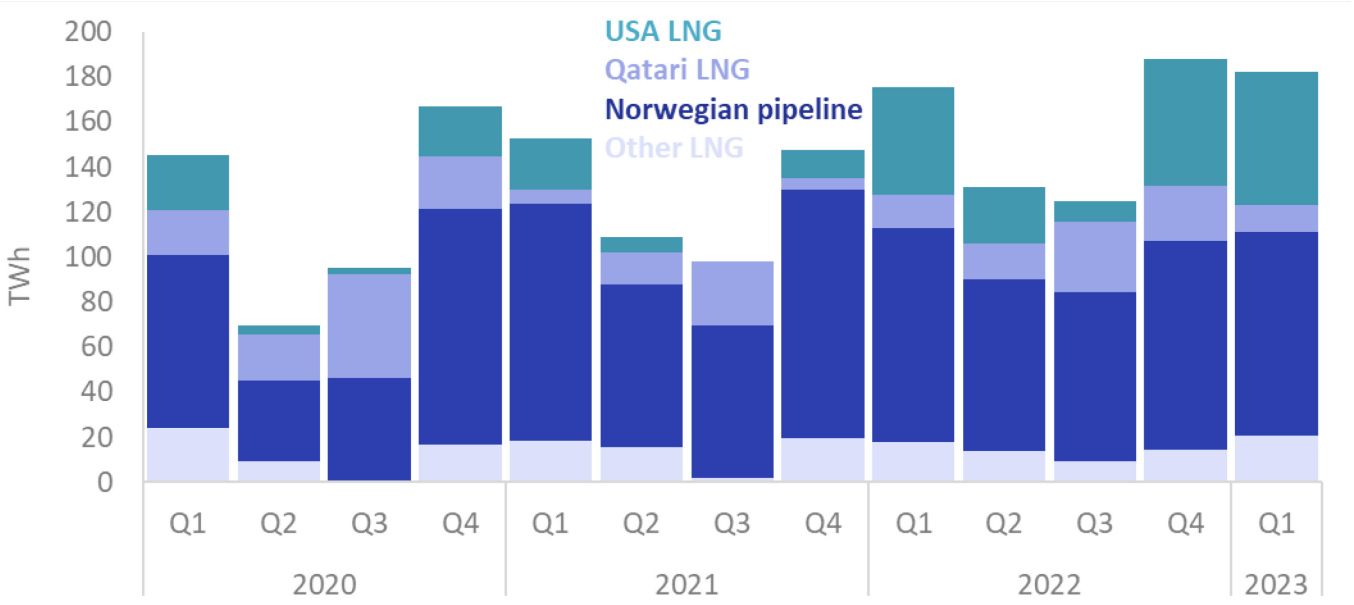
Demand for natural gas fell by 6.1 per cent in Quarter 1 2023, compared with Quarter 1 2022, despite colder temperatures. Gas consumption fell in all sectors in addition to reduced demand for electricity generation. Domestic (household) demand was down 8.0 per cent, likely the result of changing consumer behaviour in light of increased prices. Consumption by other users, largely made up of commercial and public admin sectors, and industry also fell, down 5.9 and 2.7 per cent respectively. Gas used for electricity generation fell by 6.7 per cent, due reduced demand for electricity and increased availability of renewable sources (for further information, please see Energy Trends Table 5.1).

Chart 4.2 Production and trade of natural gas (Energy Trends Tables 4.2)



UK exports of natural gas remain high, up 41 per cent in Quarter 1 2023, compared to the same period in the previous year; this was largely facilitated by reduced demand in the UK. Indigenous production and total imports were stable on Quarter 1 2022, however imports of Liquified Natural Gas (LNG) increased by 8.0 per cent and offset the drop of gas imports from Norway. The UK has the second largest LNG regasification infrastructure in Europe allowing it to operate as a land bridge for Europe supporting efforts to pivot away from reliance on Russian gas.

Chart 4.3 Imports by origin (Energy Trends Table 4.4)



LNG imports from the USA made up nearly 70 per cent of total LNG imports in Quarter 1 2023. LNG imports from Qatar fell by more than 50 per cent, while LNG imports from other sources including Angola, Peru, Nigeria, and Egypt remained high. Norwegian imports were slightly down and imports from Belgium and the Netherlands remain close to zero as interconnectors are utilised for exports. The UK has not imported LNG from Russia for more than a year, the last cargo of Russian LNG was received in March 2022.

Section 5: Electricity

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Key headlines

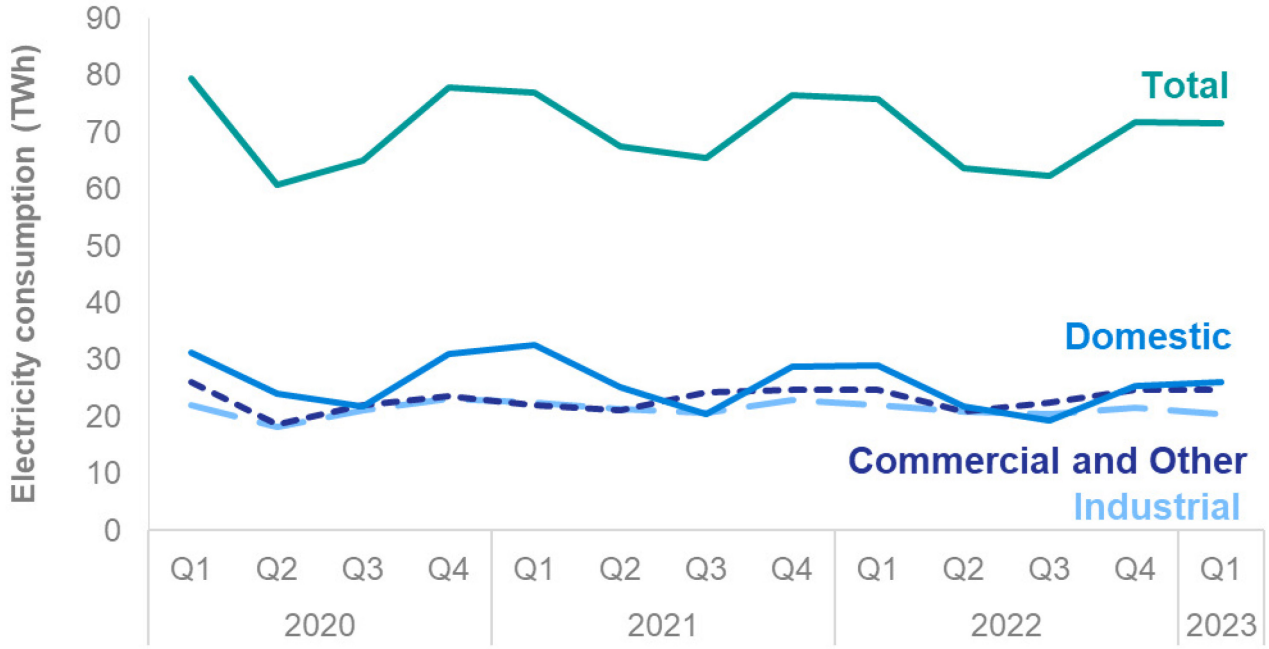
Quarter 1 of 2023 saw lower electricity demand and generation compared to Quarter 1 2022. Supply and demand both decreased by 4.5 per cent. In line with this lower demand, generation decreased by 7.4 per cent with a substantial increase in net imports (up 44 per cent) accounting for the difference. Total imports rose to a record 9.0 TWh, with a record 2.3 TWh from Norway across the North Sea Interconnector.

Demand decreased substantially for domestic and industrial users in Quarter 1 2023, with a small increase for other final users. Domestic (household) consumption of electricity decreased 9.7 per cent**,** with higher prices reducing consumption despite colder temperatures. Industrial consumption decreased 7.0 per cent but consumption by other final users (including commercial users) increased by 0.3 per cent.

Total electricity generation decreased in Quarter 1 2023, but with a record 47.8 per cent share coming from renewable sources. Renewable generation was down 2.4 per cent with less favourable weather conditions for generation and outages for bioenergy sites. Nuclear generation fell to 9.8 TWh, the lowest quarterly value on the published data series with plant closures and outages. Despite these decreases, the lower total generation meant that low carbon sources generated 60.3 per cent of the total in Quarter 1 2023, a slight increase compared to the previous year. Generation from fossil fuels fell substantially, down 10 per cent to 27.8 TWh, the second lowest quarterly value on the published data series and equal to a share of 35.5 per cent.

Total consumption of electricity by end users was 71.5 TWh in Quarter 1 2023, a decrease of 5.7 per cent compared to 2022. There were substantial decreases in consumption by industrial and domestic users, with a small increase for commercial and other users.

Chart 5.1 Electricity consumption by sector (Energy Trends table 5.2)

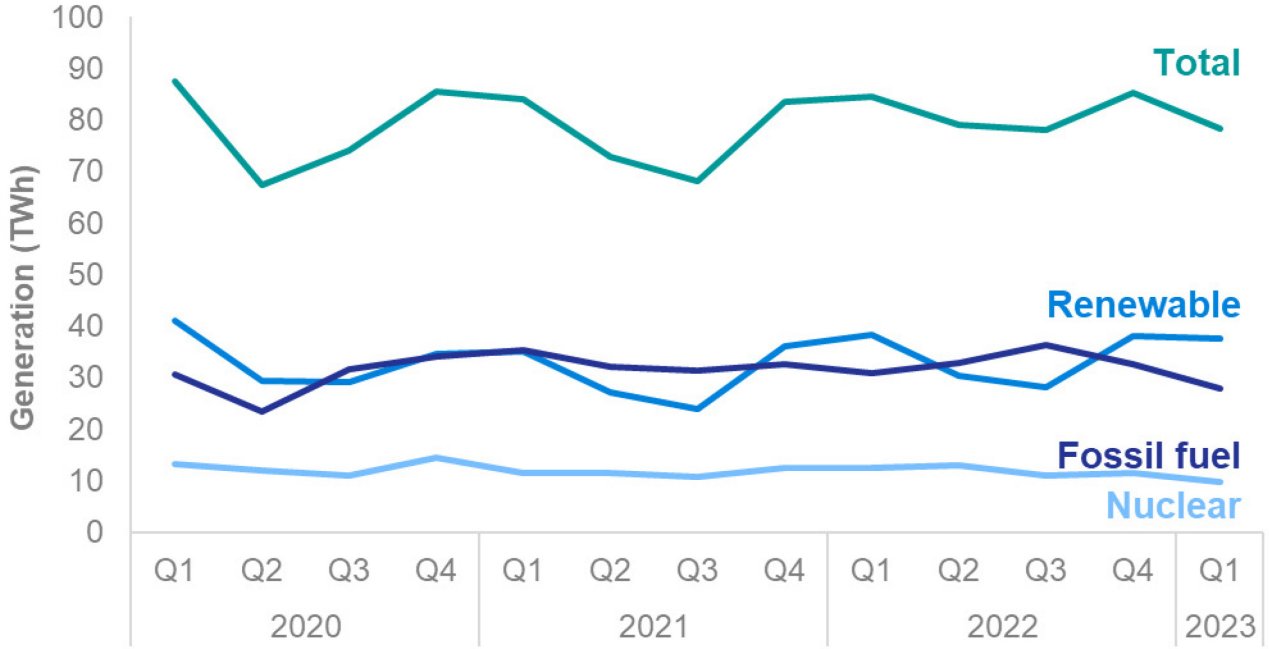


Domestic consumption of electricity saw a decrease in Quarter 1 2023, down 9.7 per cent to 26.2 TWh. This unusually large decrease shows reduced consumption likely as a result of higher costs to consumers. Temperatures were cooler on average in Quarter 1 2023, particularly in March, which would usually increase domestic consumption of electricity for heating, but instead the opposite trend was seen.

Industrial consumption decreased substantially in Quarter 1 2023 but there was a small increase in consumption for other users. Electricity consumed by the industrial sector decreased by 7.0 per cent compared to Quarter 1 2021, with a corresponding decrease in the manufacturing Index of Production. Consumption by other final users (including the commercial sector) increased by 0.3 per cent, with cooler temperatures increasing demand for heating. The relatively small increase in this sector may also indicate some reduced consumption because of higher electricity prices, as the lower temperatures would usually lead to a larger increase in electricity consumption.

Quarter 1 of 2023 saw total electricity generation of 78.4 TWh, which was 7.4 per cent lower than Quarter 1 2022. With total supply and demand 4.5 per cent lower over the same period, a large increase in net electricity imports (up 44 per cent compared to Quarter 1 2022) 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 2023, with total imports a record 9.0 TWh, and exports also up by 19 per cent.

Chart 5.2 Electricity generated, by fuel type (Energy Trends table 5.1)



Renewable electricity generation represented a record 47.8 per cent share of generation in Quarter 1 2023 but with lower total generation. Renewable generation was 37.5 TWh in Quarter 1 2023, 2.4 per cent lower than Quarter 1 2022. This decrease reflects lower hydro and solar generation as a result of less favourable weather conditions as well as a 12 per cent decrease in bioenergy generation, with ongoing outages at key bioenergy sites. In contrast, there was a 3.1 per cent increase in generation from wind, with increased capacity leading to higher generation despite lower average wind speeds.

Nuclear generation decreased to 9.8 TWh in Quarter 1 2023, the lowest quarterly value on the published data series and 22 per cent lower than the same period in the previous year. Hunterston B ceased generation in January 2022 and Hinkley Point B began decommissioning in August 2022. In addition, all five of the UK's remaining nuclear power stations experienced outages at some point during Quarter 1 2023. Despite decreased nuclear and renewable generation, the lower demand for electricity meant that low carbon sources generated 60.3 per cent of the total generation in Quarter 1 2023, up 0.2 percentage points on the previous year.

Fossil fuels generated 27.8 TWh in Quarter 1 2023, 10 per cent lower than Quarter 1 2022 and the second lowest quarterly value on the published data series. This reflected lower demand for electricity reducing the need for fossil fuel generation as well as a 44 per cent increase in net imports helping to meet demand. Gas remained the fuel with the highest generation at 26.2 TWh but decreased by 6.2 per cent compared to Quarter 1 2022. Coal generation also decreased, down 54 per cent compared to Quarter 1 2022 to 1.1 TWh. Coal generation represented a 1.4 per cent share of the total generation, 1.5 percentage points lower than the share for Quarter 1 2022.

Section 6: Renewables

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Key headlines

Renewable's share of total electricity generation reached a record 47.8 per cent in Quarter 1 2023, 1.0 percentage point higher than the previous record set in Quarter 1 2020, and 2.4 per cent higher than the same period last year.

Renewable installed capacity increased by 5.1 per cent in Quarter 1 2023, mostly in offshore wind and solar PV.

Despite new capacity, **renewable generation fell by 2.5 per cent** with the effects of additional capacity being offset to some extent by less favourable weather conditions for solar PV and also for wind where wind speeds are below the 20-year mean average.

New capacity continues to be dominated by offshore wind and solar PV which saw an additional 1.2 GW and 0.9 GW respectively. Over the last 12 months, their shares of total new capacity are 45 per cent and 34 per cent respectively.

Chart 6.1 Changes in renewable generation and capacity between Q1 2022 and Q1 2023 (Energy Trends Table 6.1)

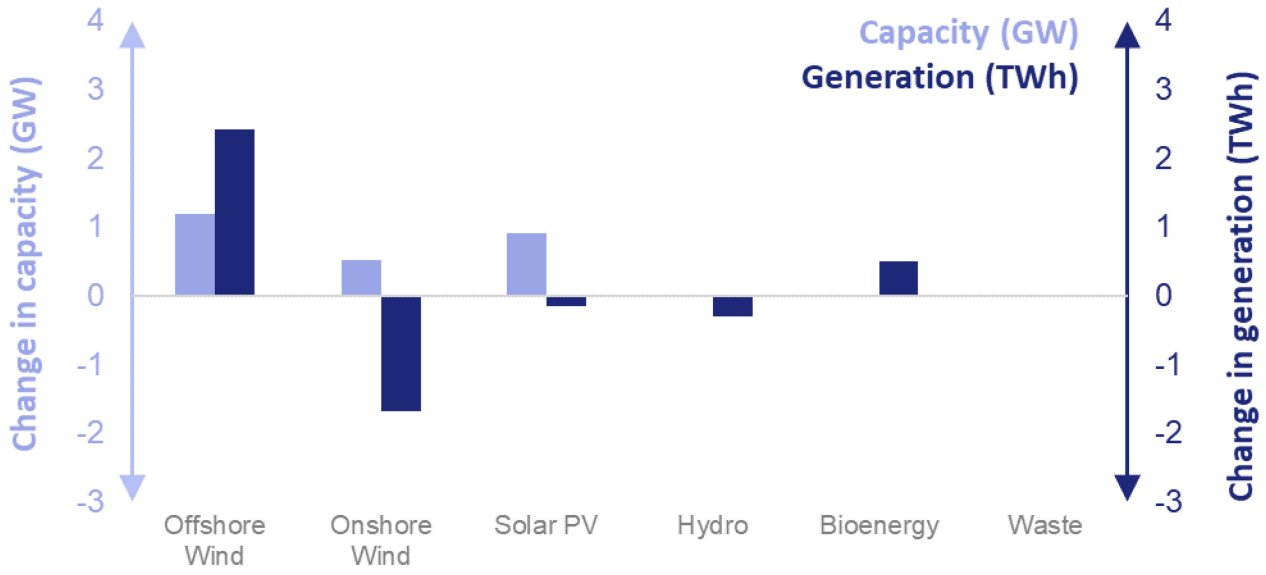
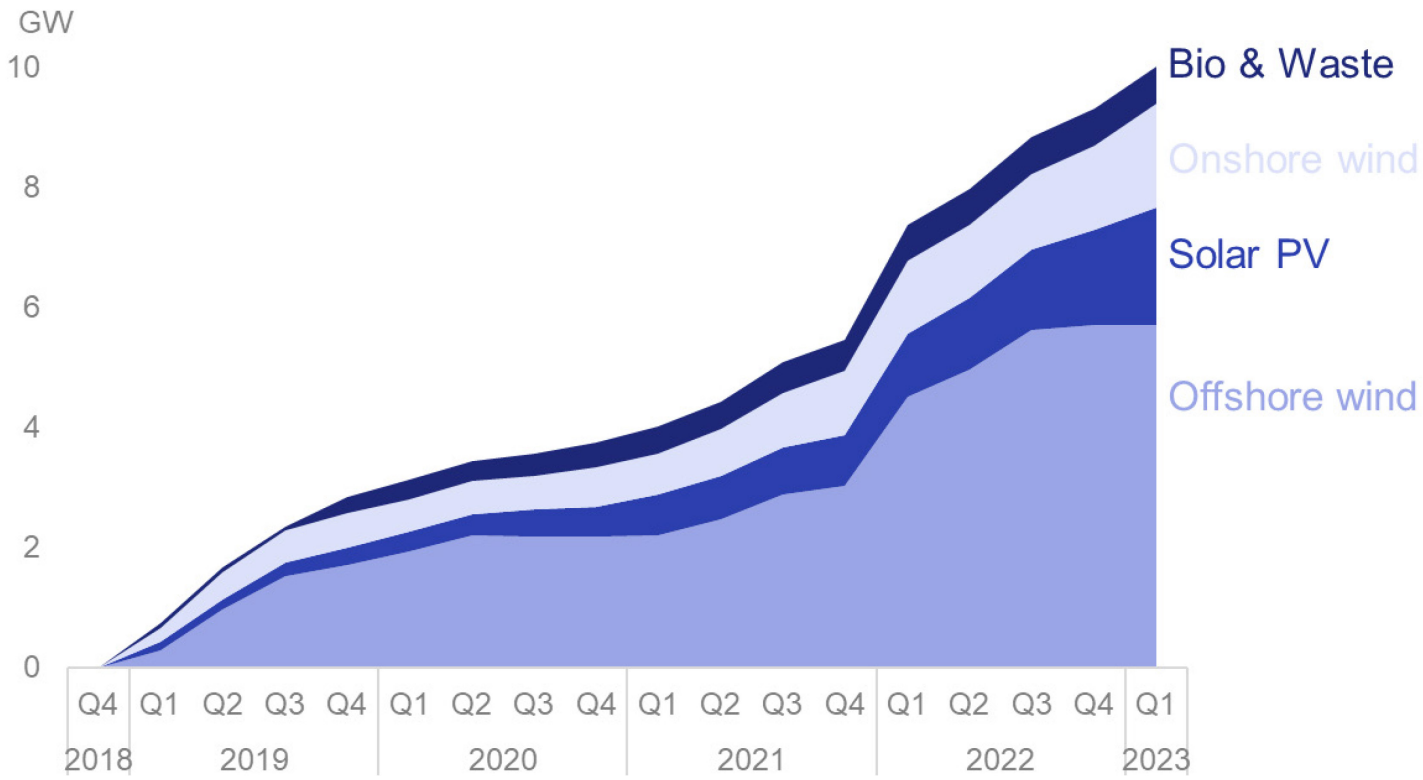


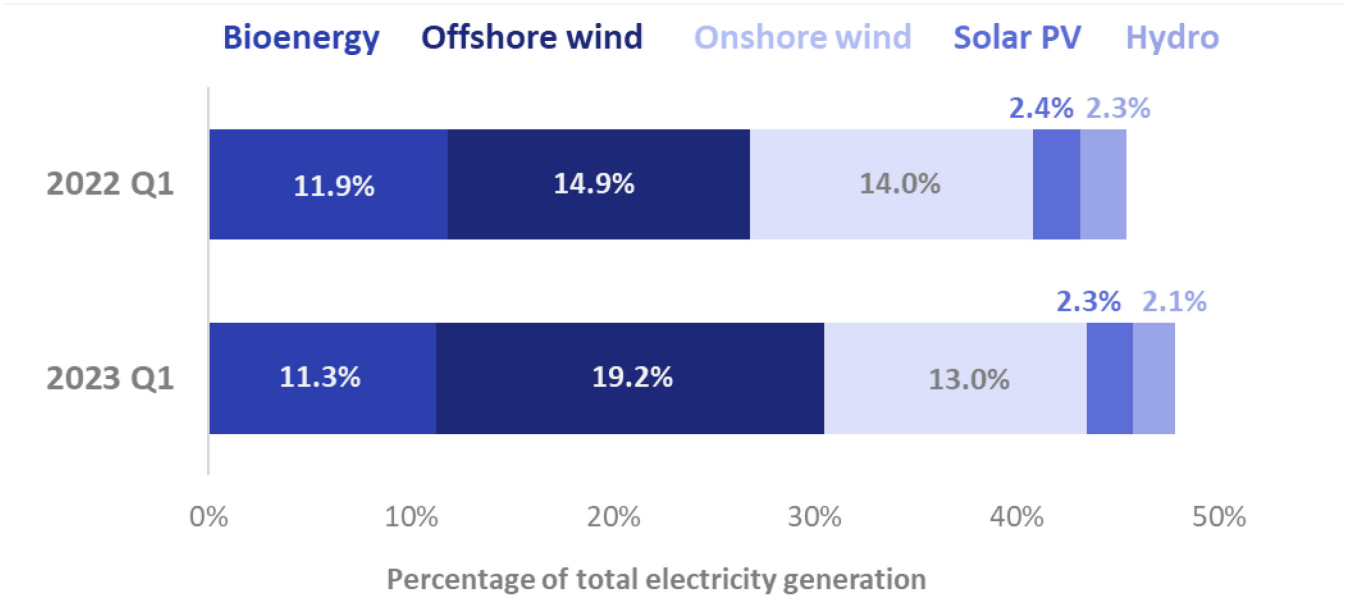
Chart 6.1 shows how each technology has contributed to the overall change in generation and capacity between Quarter 1 in 2022 and 2023. Most notable this quarter is how generation has fallen despite new capacity for onshore wind and solar PV due to lower wind speeds and sun hours. Solar PV generation was 9.4 per cent lower than in 2022 with lower sun hours in 2023 (2022 saw unusually high sun hours), more than offsetting the impact of new capacity. Offshore wind did, however, see an increase in generation; new capacity was greater than for onshore wind and variations in wind speeds may have also had an effect. A significant amount of new offshore capacity was added during Quarter 1 2022. These new installations did not operate at full capacity for the entirety of that that quarter but are fully operational now which has uplifted the year-on-year comparison. Bioenergy and waste generation was 12 per cent lower than in 2022, generation was affected by outages. Hydro generation also fell, driven mostly by lower rainfall (capacity is stable).

Chart 6.2 New capacity (cumulative) since 2019 for the leading renewable technologies (Energy Trends Table 6.1)



Offshore wind has dominated new installed capacity since 2019, representing 57 per cent of the total, with solar PV at 20 per cent, and onshore wind, 17 per cent. Bioenergy and waste had the lowest share of new capacity at 6.0 per cent and hydro's capacity is stable being a mature technology. In the latest quarter, 0.3 GW in offshore wind was installed and 0.4 GW of solar PV. The largest new solar plants were Streetfield (50 MW) and Northfield (26 MW), both in England. Around half of the new capacity was small scale solar including domestic solar panels.

Chart 6.3 Renewables' share of electricity generation – Q1 2022 and Q1 2023 (Energy Trends Table 6.1)



In Quarter 1 2023, renewable share of total generation was 47.8 per cent, a new record. This is 1.0 percentage point higher than the previous record achieved in Quarter 1 2020 and 2.4 percentage points higher than the same quarter in 2022. Although renewable generation was 2.4 per cent lower than in 2022, overall generation (the denominator), was 7.4 per cent lower as a result of lower demand than last year. Offshore wind's increasing share of generation continues to dominate with a 4.3 percentage point increase compared to Quarter 1 2022; offshore wind capacity has almost doubled since Quarter 1 2018.

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:

UK Electricity capacity and generation by fuel between 1920 and 2020

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 Kevin Harris:

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e-mail: kevin.harris@beis.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 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	0.105510	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.

Related publications

Recent publications of interest

Smart Meters
Statistics on the roll-out of Smart Meters in Great Britain, covering meters operating and meters installed: www.gov.uk/government/collections/smart-meters-statistics

Household Energy Efficiency
Statistics on the Energy Company Obligation (ECO), Green Deal and homes insulated. Monthly updates of ECO measures and quarterly updates of in-depth ECO statistics, carbon savings and the Green Deal schemes: www.gov.uk/government/collections/household-energy-efficiency-national-statistics

Renewable Heat Incentive
Statistics on deployment data for the domestic and non-domestic Renewable Heat Incentive (RHI) to support the uptake of renewable heat: www.gov.uk/government/collections/renewable-heat-incentive-statistics

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

National statistics

This is a National Statistics publication. National Statistics status means that our statistics meet the highest standards of trustworthiness, quality, and public value, and it is our responsibility to maintain compliance with these standards.

The Office for Statistics Regulation confirmed continued designation of Energy Trends as National Statistics in 2018 following a compliance check. A full assessment against the Code of Practice was last conducted in June 2014.

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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Please tell us what format you need. It will help us if you say what assistive technology you use.

UK Electricity capacity and generation by fuel between 1920 and 2020

Toby McGarry **07927 583590** Toby.McGarry@beis.gov.uk

Key headlines:

- In 1920, UK electricity generation capacity stood at just 2.5 GW. Over the next 100 years, capacity increased substantially, and by 2020 total installed capacity stood at 101.1 GW, a 41-times increase in total installed capacity over the period.
- The fastest rate of change occurred between 1955 and 1975, when the UK was gaining an average of nearly 2.5 GW of capacity per year.
- From the 1970s onwards the UK's capacity mix began to change considerably. Coal capacity dominated the previous decades, but the 1970s saw diversification into oil-fired and nuclear capacity. The privatisation of the energy industry in the 1990s and the subsequent 'Dash for Gas' led to coal-fired capacity dropping below 50 per cent of total capacity for the first time. 2000 onwards saw wind and solar as the fastest growing form of generation capacity.
- By 2020, coal fired capacity had fallen below 1930 levels.
- Much like capacity, electricity generation increased steadily from 1920 onwards, and experienced the fastest rate of change during a similar period to capacity, growing rapidly from 1950 until 1970. Electricity generation peaked in 2005, after which increased efficiency resulted falling generation.
- Generation follows a similar trend to capacity, with coal dominating the earlier period, up until around the mid-1950s. Diversification of the generation mix occurred from the 1970s onwards, and by the end of the period, gas had emerged as the dominant fuel type used in generation.
- Key historic events such as the miner's strikes on the 1970s and 1980s are clearly noticeable in the timeseries, as well as the shift to gas generation in the 1990s, demonstrating the responsiveness of the UK's energy generation sector to external circumstances.

Introduction

This special feature article examines the changes and trends in the UK's electricity capacity and generation mix by fuel type between 1920 and 2020. In particular, the article draws attention to the dominance of coal-fired capacity and generation early on, before greater diversification occurred from the 1970s onwards. The data in this article are taken from chapter 5 of the Digest of United Kingdom Energy Statistics (DUKES) 2022, historic copies of DUKES, DUKES long term trends tables (Electricity since 1920, DUKES 5.1.3), UK Energy in Brief, and supplementary internet research. Capacity data beyond 2000 is complemented by the more in depth 2021 Energy Trends special feature article 'Capacity of UK Electricity Generation Assets in the 21st Century, 2000 to 2019'. Data from 1996 to present can be found in DUKES table 5.7 for capacity by fuel and DUKES table 5.6 for generation by fuel. The accompanying excel spreadsheet to this article, 'Electricity capacity and generation from 1920 to 2020', features all the underlying capacity and generation data which informs this article, as well as a list of power stations which have operated in the UK during the period.

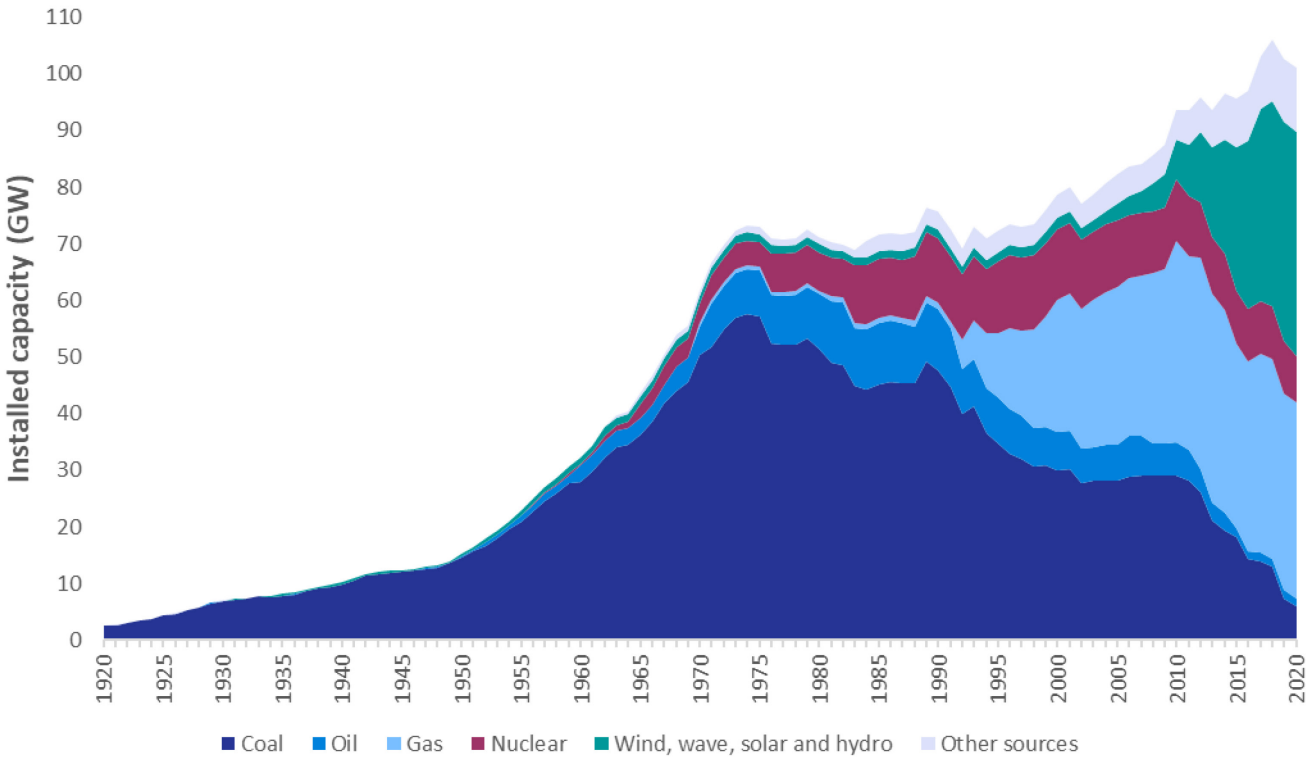
As a disclaimer, the data within this article and accompanying excel spreadsheet are experimental statistics and may be subject to revisions in the future. Brief caveats are stated at the start of each section, explaining the reasons for estimates having been made. For further information on caveats, as well as why and how estimates have been made, please see the Methodology Note at the end of this document.

UK electricity generation capacity between 1920 and 2000

Historically, capacity data in DUKES has been presented as a total only, or split by technology. This article aims to track a timeseries of installed capacity split by fuel for the first time. In addition to this, throughout the history of DUKES capacity has been measured in several different ways, each with merit for doing so at the time. This however presents a challenge when attempting to produce a single coherent timeseries. All references to capacity in the article are to total installed capacity, which refers to the maximum amount of electricity that a generating station can produce given the equipment, such as turbines, installed at the station. Existing data for installed capacity data from DUKES, estimates based on alternative capacity measures, and supplementary internet research have all been used to collate a list of power plants which have existed in the UK since 1920, and to calculate approximate measures for installed capacity by fuel. Further details of the approach can be found in the methodology note at the end of this document.

Between 1920 and 2020 total electricity generating capacity in the United Kingdom increased substantially. The world's first coal-fired power station, the Edison Electricity Light Station, was built in London in 1882. The plant had an installed capacity of 93 kW (0.093 MW) and was used to power 3000 incandescent lamps in the Holborn area. By 1920, the UK had 2.5 GW of generation capacity, 98.7 per cent of which was coal-fired power stations. By 2020, total generating capacity increased almost 4000 per cent to 101.1 GW. The mix of capacity also changed considerably during this period. Chart 1 presents approximate electricity generation capacity in the UK throughout the period, split by fuel type.

Chart 1: Approximate installed capacity of UK electricity generation assets by fuel type from 1920 to 2020.



Coal capacity maintained a share of over 90 per cent well into the 1950s, though towards the end of the decade dedicated oil burning plants began to make up a more noticeable share of capacity. Bankside B was the UK's first station to be constructed specifically to be oil-fired, though many existing coal-fired stations were converted to use oil. By 1955, more than 5 per cent of capacity was oil-fired. The following year saw the commissioning of the UK and the world's first commercial nuclear power station, Calder Hall, a 220 MW

Magnox reactor. By the end of the 1950s coal-fired generators still accounted for over 85 per cent of the UK's 30 GW total generating capacity.

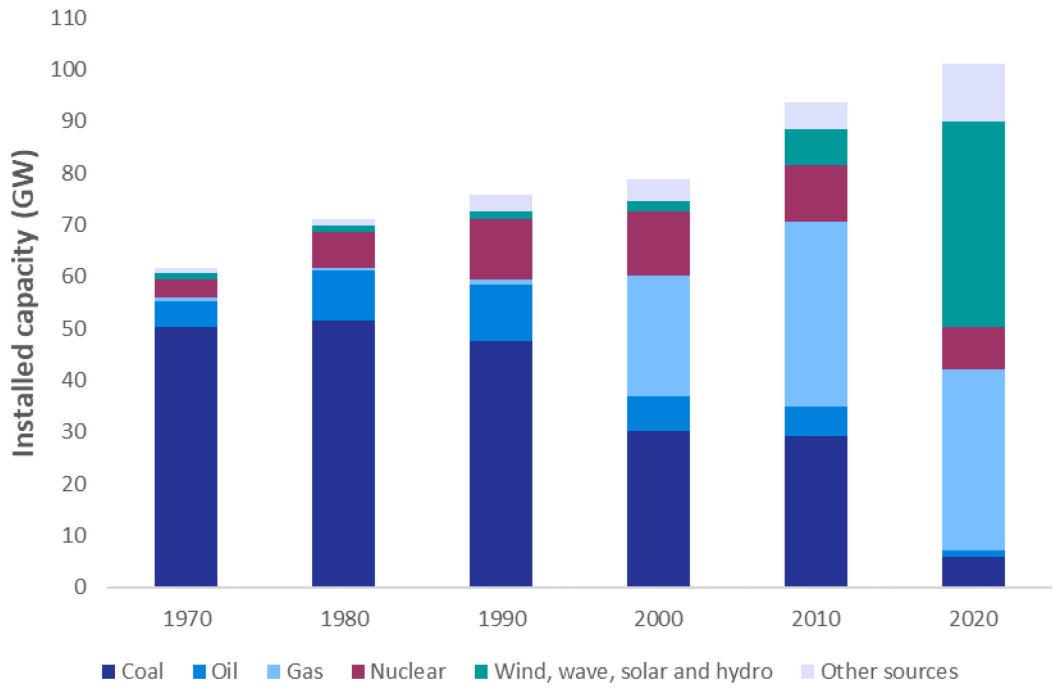
The 1960s saw coal continue to dominate as the UK's capacity mix slowly began to diversify. Oil-fired capacity continued to increase towards a 10 per cent share, equating to just shy of 5 GW of capacity by 1970. Nuclear capacity saw the greatest increase during this period. The opening of several stations of 400 MW capacity and above, including the 500 MW Hinkley Point A, saw nuclear capacity increase from 0.4 GW at the start of the decade to 3.4 GW by the end. The 1960s also saw the introduction of pumped hydro storage stations, with 360 MW Ffestiniog opening in 1963, followed by 440MW Cruachan in 1965. These provided a limited facility to store electricity for later use.

Coal continued to make up at least three quarters of the UK's capacity into the early-1970s, and it was during this period that peak coal-fired capacity was reached. In 1974, coal-fired generators provided 57.5 GW of the UK's total 72.1 GW capacity. Oil-fired capacity, the next largest total, stood at just 8.1 GW. 1974 was also significant as it saw the commissioning of the UK's largest power station to date, the coal fired Drax. By the time it was completed in 1986, Drax had a total installed capacity of 3,960 MW – this meant the capacity of Drax alone was 1.5 times greater than the capacity which had existed in the entire country in 1920.

It took until the early-1980s for the UK's coal capacity to drop below 70 per cent of total installed capacity, by which point more coal power stations were closing each year than were newly opened. Oil-fired capacity plateaued during the 1980s, maintaining just under 11 GW of capacity throughout the decade, which included three 2 GW sites; Pembroke A, Fawley, and Littlebrook D. Nuclear capacity almost doubled during the decade with 5.7 GW of new capacity.

Chart 2 shows that, from 1970 onwards, the UK's generation capacity mix has undergone a major diversification. The share of coal-fired capacity stood at 81.8 per cent in 1970; by 2020 it had declined drastically to a 5.9 per cent share.

Chart 2: The diversification of the UK's generation capacity mix between 1970 and 2020



The 1980s saw the commissioning of numerous small single cycle and open cycle gas plants, however it was not until the early-1990s, and the introduction of the Combined Cycle Gas Turbine (CCGT), that gas-fired capacity began its rapid expansion. In 1991 the UK's first CCGT plant opened at Roosecote. Still at just 229 MW, Roosecote was soon eclipsed by much larger plants, such as the 1,875 MW Teeside plant in 1992, 1,380 MW Connahs Quay in 1996, or the nearly 1,500 MW Didcot B in 1998.

The sudden expansion in gas fired generation capacity was the result of multiple determinants in what became known as the 1990s 'Dash for Gas'. Factors included privatisation of the UKs electricity industry in 1990, high interest rates encouraging the construction of quicker to build gas turbine power stations versus coal and nuclear plants, as well as the rapid decline in wholesale gas prices. In 1990 UK gas capacity stood at just over 1 GW, which represented just 1.3 per cent share of total capacity. By 2000 this capacity had increased substantially to 23 GW, which represented a 29.6 per cent share. The largest gas power plant in the UK to date is Pembroke CCGT, commissioned in 2012, with an installed capacity of 2,200 MW.

The expansion of gas, alongside continued coal plant closures, meant that by the mid-1990s coal-fired capacity fell below 50 per cent for the first time, constituting 48 a per cent share of the UK's 72.2 GW capacity in 1995. By 2000, coal capacity stood at 30 GW, and 38.2 per cent of the UK's 78.7 GW of total electricity generating capacity.

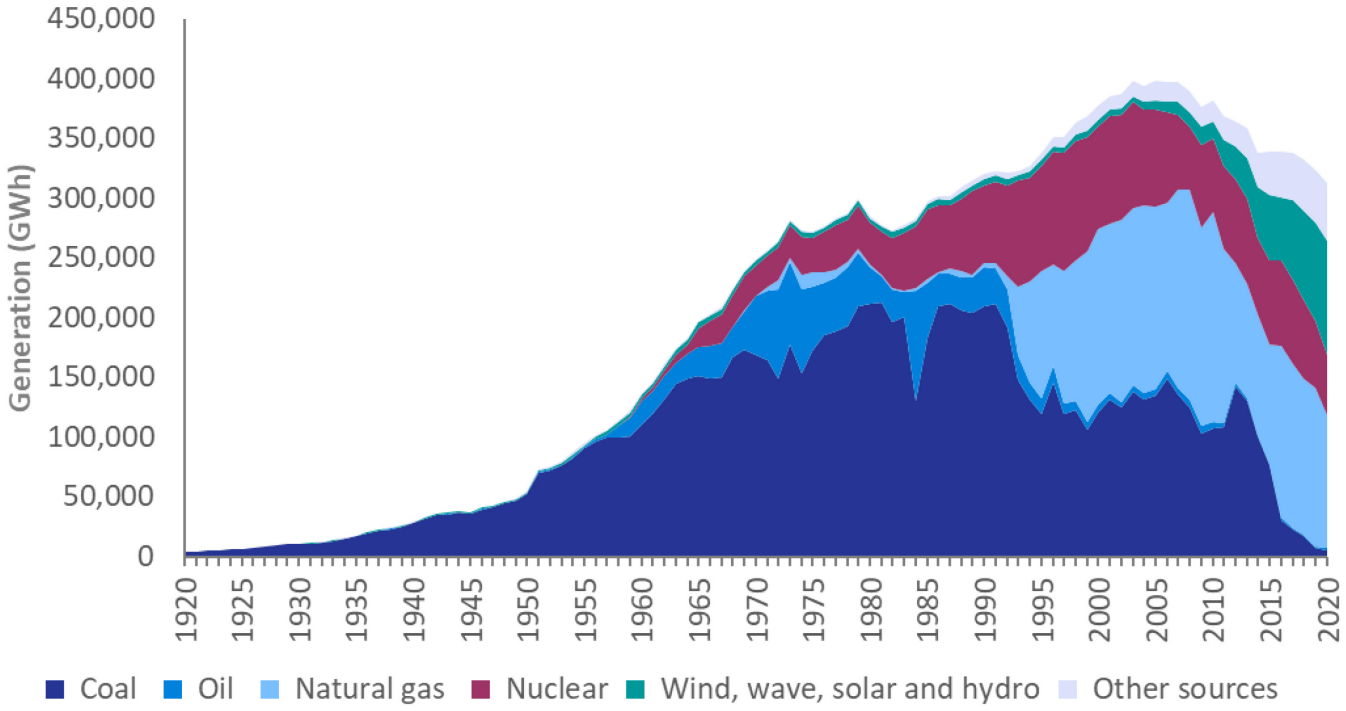
From 2000, and particularly from 2010 onwards, non-thermal renewables saw the largest increase in capacity. In 2000, capacity from wind, wave, solar, and hydro generators stood at just 1.9 GW. By 2010, this had increased to 7.0 GW, and by 2020 it had reached 41.3 GW. The substantial rise in non-thermal renewable capacity has primarily been driven by wind and solar projects, which have seen their combined capacity rise over 9000 per cent since the millennium. The growth of renewable capacity is covered further in a previous Energy Trends article '[Capacity of UK electricity generation assets in the 21st century, 2000 to 2019]'.

Whilst this century has seen gas-fired capacity remain consistently above a 30 per cent share, coal-fired and oil-fired capacity has declined considerably. Today, in 2023, total installed coal-fired capacity stands at just 4.2 GW across only 4 sites. Today, gas-fired capacity is the single largest fuel type.

Electricity generation by fuel

Electricity generation by fuel was not reported in the DUKES tables prior to 1996. With coal the dominant fuel for much of the time series, the historical data was broken down by power plant type rather than by fuel. In addition, much of the data was for electricity supplied rather than electricity generated, excluding electricity used in the process of generation. The section below presents estimates of electricity generation by fuel based on the historical electricity supplied and fuel input data as well as average efficiency proportions and average measures of electricity used in the process of generation. Further details of the approach to estimation are in the methodology note.

Chart 3: Estimated electricity generation by fuel, 1920 to 2020



Electricity generation followed a generally increasing trend throughout the period, and peaked in 2005, with increased efficiency since this point reducing the need for such high electricity generation. The estimated split by fuel highlights the dominance of coal, which represented more than 90 per cent of generation until 1957 and more than 75 per cent of generation until 1965. The estimates also show the effects of coal miners' strikes in 1972, 1974, and most noticeably 1984/85, where coal generation dipped below the usual trend and oil generation increased. Up until 2014, coal still provided over 100 TWh of electricity yearly, however since then generation has fallen dramatically. By 2020, coal provided just 0.55 TWh of generation, the lowest figure since 1922, and made up just 1.8 per cent of total generation.

Generation from oil began to make a substantial contribution in 1958 and was an important counterpart to coal through until 1992, when it was first overtaken by generation from gas during the 'Dash for Gas'. The 1990s saw a rapid expansion in gas generation, which was just 1.1 per cent of the total in 1990 but by 2000 gas generation represented a 39.3 per cent share. Generation from gas was higher than coal for the first time in 1996, providing 136.1 TWh of generation compared to 100.2 TWh from coal. Generation from gas peaked in 2010, when 175.7 TWh of generation provided 46.0 per cent of the UK's total output. Gas remains the single largest fuel source for generation in the UK, representing a 35.7 per cent share in 2020.

Nuclear generation began in 1956 with the opening of Calder Hall and represented around a tenth of generation from 1966 to 1980. The introduction of Advanced Gas-cooled Reactors (AGR) in the 1970s saw the UK's fleet of nuclear reactors expand by the 1980s, and this resulted in generation increasing substantially to a peak in 1998 at 99.5 TWh, 27.4 per cent of generation. Since then, nuclear generation has declined steadily, falling to 45.9 TWh in 2020, 14.9 per cent on generation.

Generation from other sources covers generation from coke oven gas, waste products from chemical processes, pumped storage generation and more recently, bioenergy and energy from municipal solid waste. It is not possible to separate these so a renewable total cannot be identified. Pumped storage generation has remained relatively consistent over time, so it is likely that most of the increased generation in this category comes from bioenergy and the non-renewable component of waste (reported under 'other fuels' in DUKES and

Energy Trends). The first bioenergy and waste plants were built in the 1970s but capacity did not increase substantially until after 2010.

Non-thermal renewable generation is present throughout the time series with a small amount of generation from hydro sources recorded from 1920 onwards. These non-thermal renewable generators accounted for between 1.0 and 2.0 per cent of total generation from 1930 onwards, largely providing the only alternative to coal generation in the early period. Most of the generation in this category came from hydro, with the first wind generators commissioned in the early 1990s, with wave and tidal capacity introduced in 2000 and solar generators from the mid-2000s. In 2020, 30.5 per cent of generation came from Wind, wave, solar and hydro generators. Further information on the growth of renewables is covered in the Energy Trends article 'Capacity of UK electricity generation assets in the 21st century, 2000 to 2019', whilst generation data for individual renewables from 1996 onwards can be found in DUKES 5.6.

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Methodology note

Data sources

The data in this article are taken from chapter 5 of the Digest of United Kingdom Energy Statistics (DUKES) 2022, historic copies of DUKES, DUKES long term trends tables (Electricity since 1920, DUKES 5.1.1, DUKES 5.1.3) and UK Energy in Brief, supplemented by desk and internet research.

Electricity capacity

Historically, a coherent timeseries of electricity capacity by fuel has not been recorded in the annual DUKES statistics. Capacity has been reported in several different ways, including installed capacity, grid export capacity, and declared net capability, as well as changing between measures for the whole UK, Great Britain only, and calendar years versus financial years. Historic tables also typically separated capacity by plant type rather than fuel.

These issues meant that constructing a timeseries based solely on existing DUKES data was not possible. To fill in the gaps, a combination of supplementary internet research and estimates have been used. This section explains the approach and assumptions made to do this.

General principles and assumptions

From 1996 onwards, generation by fuel is taken from DUKES 5.7. Prior to this point, the following assumptions were used to guide estimations for data that was not available:

- It is assumed that prior to 1991 the only non-thermal renewable capacity came from hydro plants.
- Pumped storage totals post 1984 have been taken from DUKES, and so are not true installed capacity.
- Nuclear data is sourced from 'Energy Trends: March 2019, special feature article - Nuclear electricity in the UK' for consistency.
- Where municipal solid waste (MSW) sites are concerned, capacity has been split 50/50 between bioenergy capacity and other fuels capacity, as is the standard treatment in DUKES publications.
- Where possible, UK total capacity was matched to the UK total capacity previously published in DUKES. Where this was not available, GB installed capacity was taken from DUKES with supplementary Northern Ireland data added produce a UK total.
- Where differences were identified between the supplementary research and published DUKES numbers, the missing/excess values were split between coal and oil, depending on the years under consideration. These splits are detailed below.

Time series differences

The following subheadings provide an overview of the methodology and assumptions applied in each time period, as different issues applied to the data depending on what had previously been published.

1920 to 1969

The total capacity figures are the sum of previously published GB installed capacity and supplementary research for Northern Ireland data. The split by fuel is sourced as follows:

- Capacity for hydro, oil, and other fuels is based on previously published DUKES totals and supplementary research.
- Pumped storage data is taken directly from previously published DUKES data.
- Coal data is based predominantly on supplementary research. This is due to previous editions of DUKES only reporting by plant type (e.g. conventional thermal), rather than splitting by fuel. Supplementary research was used to determine which sites were coal, and which were oil and other fuels.
- For this period, where the sum of research did not match the previously published total capacity, all missing capacity has been allocated to coal. This is due to coal being the dominant fuel during this

period. Percentage shares of any other fuel were too small to confidently allocate without artificially overinflating capacity data for that fuel type.

1970 to 1989

The total capacity figures are the sum of previously published GB installed capacity and supplementary research for Northern Ireland data. The split by fuel is sourced as follows:

- Hydro capacity is a combination of DUKES figures and supplementary research, with the additional data used to fill in gaps in the DUKES series.
- Gas capacity data has been sourced from supplementary research. In this period, the percentage share of gas capacity was too small to have any missing capacity allocated to it without the risk of overstating capacity.
- Coal and oil data comes predominantly from supplementary research, though again this was mainly to determine which sites were coal and which were oil.
- For this period, once again where the sum of research did not match the previously published total capacity, missing capacity has been allocated between coal and oil based on their percentage shares from the existing supplementary research. Oil has been included because the numbers in the supplementary research appeared too small initially.

1990 to 1995

This period has particular challenges as total capacity in DUKES was published for financial years rather than calendar years. In order to remain consistent with the rest of the time series, a scale factor was used in order to estimate total capacity for calendar years. The split by fuel is sourced as follows:

- Hydro capacity is a combination of DUKES figures and supplementary research, which was used to fill in gaps in the DUKES series.
- The ‘Other fuels’ category includes orimulsion in this period.
- Other renewable capacity is based on supplementary research, and includes the UK’s first onshore windfarm. Renewable capacity here is not derated.
- For this period, where the sum of research did not match the previously published total capacity, missing capacity has been allocated between coal and oil based on their percentage shares from the existing supplementary research. Missing capacity was not allocated to gas as it disrupted the time series too much.

1996 to 2000

For 1996 to 2000, all data is taken from the existing published DUKES 5.7 table. The only change is that renewable capacity is no longer derated. This has been done to stay consistent with the rest of the timeseries.

Site level capacity table

The site level capacity table reports a full list of sites identified in the DUKES dataset and from supplementary research for all sites of 5 MW or above. The table includes the site’s maximum installed capacity which is the highest installed capacity recorded at each site. This was chosen due to being a more robust measure than tracking changes over time, particularly due to data limitations in the earlier years of the timeseries.

This dataset is not exhaustive of the UK’s power generating capacity through time. Sites will be missing from this database, particularly in the early section of the timeseries where data is most limited. Capacities are reported based on the best available research and may be revised if new data becomes available.

Electricity generation by fuel

Generation by fuel was not recorded prior to the current layout of DUKES tables, which began in 1996. Up until this point, the published data focused on electricity supplied rather than electricity generated and the data was split by generator type (conventional thermal, CCGT etc.) rather than fuel. This reflected the dominance of coal for electricity generation which made the split by fuel less insightful. In order to show a full time series for generation by fuel, data prior to 1996 had to be estimated from the historic data. This section explains the approach and assumptions made.

Data sources

Electricity supplied data was taken from 'Historical electricity data: 1920 to 2021' and DUKES table 5.1.3. Fuel used data was taken from DUKES table 5.1.1.

Data on electricity supplied was scaled up to estimate total generation using data from DUKES table 5.6.

Efficiency was estimated using generation and fuel used data from DUKES table 5.6.

1920 to 1950

These years have generation from hydro and conventional thermal only so the calculations are relatively simple.

1. Hydro generation is estimated by scaling up from supply using a 20-year average of generation divided by supply from DUKES 5.6 (1996-2015).
2. The estimated hydro generation is subtracted from the published total generation to give estimated conventional thermal generation.
3. An efficiency factor by fuel is calculated using a 20-year average of generation divided by fuel use from DUKES 5.6 (1996-2015). This scales the total fuel used by the average efficiency for that fuel.
4. Estimated conventional thermal generation is apportioned to a fuel using the efficiency-scaled fuel used data.

1951 to 1989

These years include additional categories of supply for which estimated generation had to be calculated. These included 'Other generators' i.e. any generators that do not meet the criteria for Major Power Producers, nuclear generators and pumped storage. The estimated generation for these categories were calculated as follows:

- Thermal supply for other generators was calculated by subtracting non-thermal (wind, solar and hydro) supply from the total. Thermal generation was estimated using a 20-year average of generation / supply from DUKES 5.6 (1996-2015) for other generators. Since the historic data on other generators' supply was not fuel specific, the average for all thermal fuels was used.
- Non thermal supply from other generators refers to supply from hydro, wind, solar and tidal generators. It was assumed that generation was equal to supply for these technologies. This is always assumed to be the case for wind, solar and tidal generation and there was no data available to split out the supply from other hydro generators.
- Nuclear generation was scaled up from supply using a 20-year average of generation / supply from DUKES 5.6 (1996-2015).
- Pumped storage generation was scaled up from gross supply from pumped storage in the historical data series. Gross supply does not subtract the electricity used in pumping. This was scaled using a 20-year average of generation / supply from DUKES 5.6 (1996-2015).

The estimated thermal generation for Major Power Producers and other generators was then apportioned using efficiency-scaled fuel used values, as for the 1920-1950 data. Estimated generation from all other categories was reported without apportioning.

1990 to 1995

All the calculations above continued in this time period, with the addition of estimated generation from Combined Cycle Gas Turbines (CCGT). Supply from CCGT was included in the historic time series from 1990 when these plants were introduced.

Generation from CCGT was scaled up from supply using a 20-year average of generation / supply from DUKES 5.6 (1996-2015). CCGT supply from Major Power Producers and other generators was scaled up using the same factor.

It was assumed that generation from CCGT was all attributable to gas. The split between gas input to CCGT compared to gas input to other forms of generation was estimated using a 20-year average taken from DUKES 5.3 (1996 –2015). The fuel used in CCGT plants was subtracted from the total gas used to give estimated gas used in non-CCGT plants.

The estimated thermal generation for Major Power Producers and other generators was then apportioned using efficiency-scaled fuel used values, as for the 1920-1950 data. The non-CCGT gas used was used in apportioning conventional thermal generation along with the other fuels. Estimated generation from all other categories was reported without apportioning. Generation from non-CCGT plants apportioned to gas was added to the estimated generation from CCGT to give an estimated total generation from gas.

Assumptions

Data is not available prior to 1996 to determine fuel used in the process of generation. This has been estimated using a 20-year average from DUKES table 5.6 for 1996-2015. This assumes that there has not been any material change in the amount of electricity used in generation for specific fuels.

Data is not available prior to 1996 to determine the efficiency of generation from specific fuels. This has been estimated using a 20-year average from DUKES table 5. 6 for 1996-2015. This assumes that there has not been any material change in the efficiency of generation.

References

Digest of UK Energy Statistics 2022 (DUKES) – Electricity (Chapter 5):
https://www.gov.uk/government/statistics/electricity-chapter-5-digest-of-united-kingdom-energy-statistics-dukes

Historical electricity data: 1920 to 2021:
https://www.gov.uk/government/statistical-data-sets/historical-electricity-data

Electricity Statistics: data sources and methodologies
https://www.gov.uk/government/publications/electricity-statistics-data-sources-and-methodologies

Energy Trends: March 2021, special feature article - Capacity of UK electricity generation assets in the 21st century, 2000 to 2019:
https://www.gov.uk/government/publications/energy-trends-march-2021-special-feature-article-capacity-of-uk-electricity-generation-assets-in-the-21st-century-2000-to-2019

Energy Trends: March 2019, special feature article - Nuclear electricity in the UK:

https://www.gov.uk/government/publications/energy-trends-march-2019-special-feature-article-nuclear-electricity-in-the-uk

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