Department for Energy Security & Net Zero

UK ENERGY IN BRIEF 2024

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This booklet summarises the latest statistics on energy production, consumption, prices and climate change in the United Kingdom. Figures are primarily taken from the 2024 edition of the “Digest of UK Energy Statistics”, published on 30 July 2024. Details of the Digest and other Department for Energy Security and Net Zero (DESNZ) statistical publications on energy and climate change can be found on pages 49 and 50 of this booklet and are available at: https://www.gov.uk/government/organisations/department-for-energy-security-and-net-zero/about/statistics

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INTRODUCTION TO THE CHARTS AND TABLES

UK Energy in Brief aims to provide a summary of some of the key developments in the UK energy system: how energy is produced and used and the way in which energy use influences greenhouse gas emissions. It takes data from the main Department for Energy Security and Net Zero (DESNZ) energy and climate change statistical publications; the Digest of UK Energy Statistics, Energy Trends, Energy Prices, Energy Consumption in the UK, the annual Fuel Poverty statistics report and the quarterly Smart Meters report and statistical releases on emissions, and combines these with data produced by the Office for National Statistics and other Government Departments.

The booklet contains separate sections on the economics of the energy industry, overall energy production and consumption and trends in production and consumption of the major fuel sources, climate change and fuel poverty. Also discussed are developments in combined heat and power and renewable energy. Information is also given on energy efficiency and energy prices.

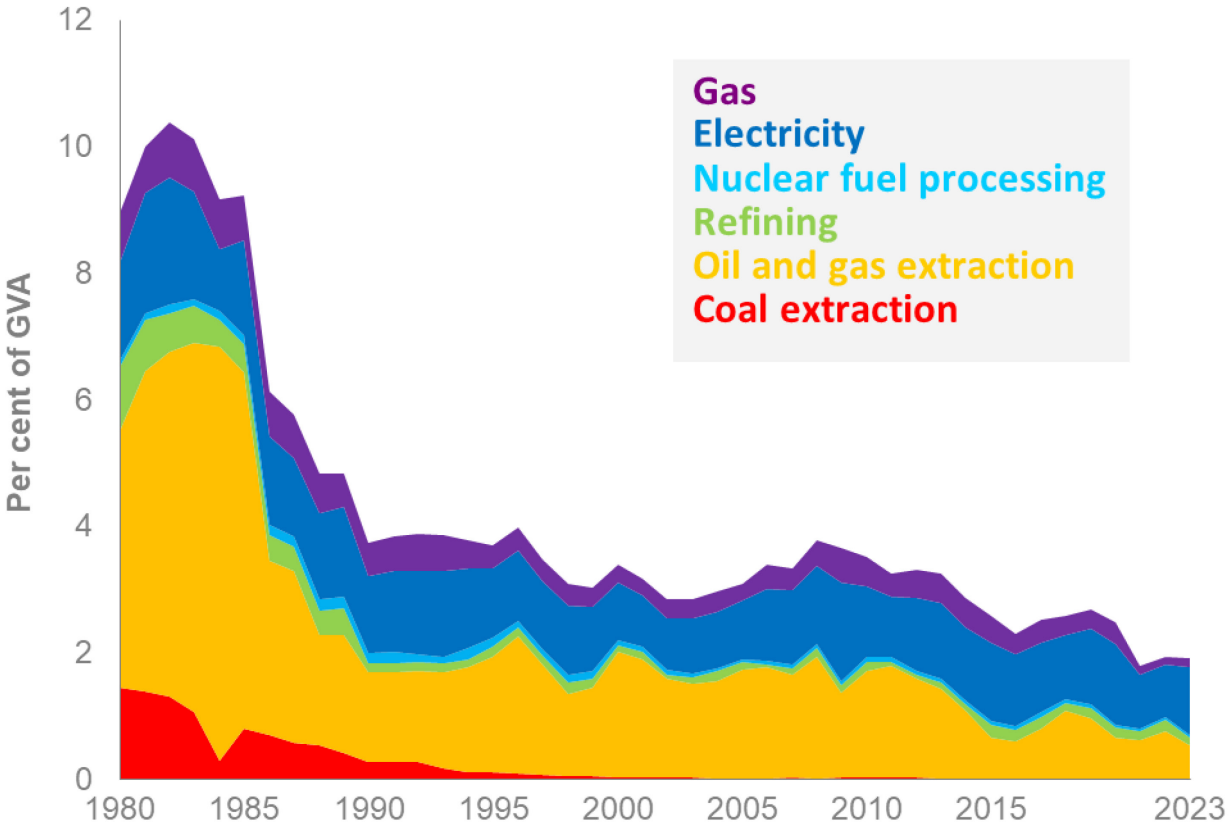
The detailed background data on energy production and consumption can be found in the Digest of UK Energy Statistics 2024 available at:
https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes

Other statistical outputs produced by DESNZ and drawn on in this publication are listed on pages 49 and 50.

THE ENERGY INDUSTRIES' CONTRIBUTION TO THE UK ECONOMY IN 2023

- 1.9% of GVA (Gross Value Added).
- 149,500 people directly employed (5.3% of industrial employment) and more indirectly (e.g. in support of UK Continental Shelf production).
- 6.9% of total investment.
- 24.6% of industrial investment.

Contribution to GVA by the energy industries, 1980 to 2023

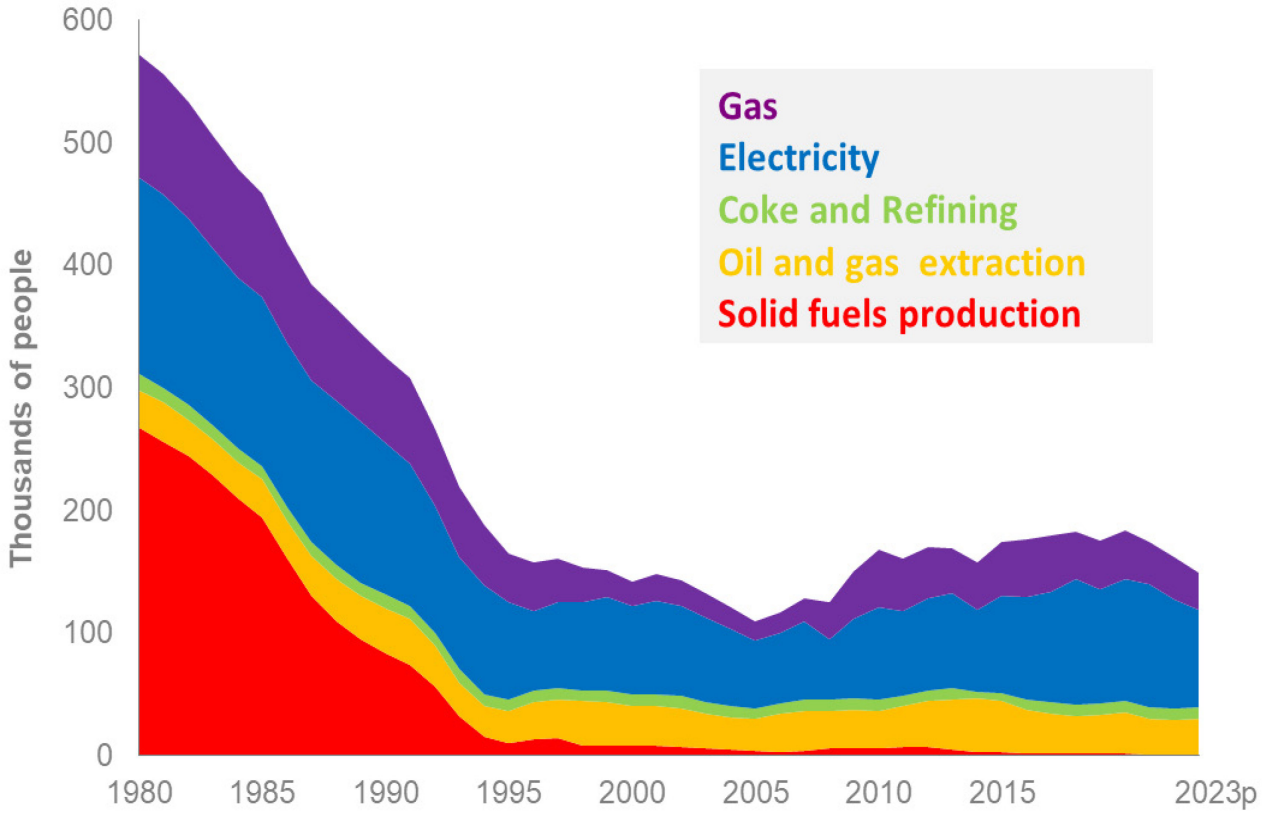


Source: Office for National Statistics

The contribution to the UK economy by the energy industries peaked in 1982 at 10.4%. In 2023, the contribution by the energy industries to the UK economy was 1.9% of GVA, broadly similar to 2022.

Despite its significant fall in 1986, oil and gas extraction has been the major energy contributor to the UK economy (with its value dependent both on production and the price of oil and gas). However, since 2014 electricity has become the major energy contributor. Of the energy total in 2023 electricity (including renewables) accounted for 57%, oil and gas extraction accounted for 24%, and gas accounted for 7%.

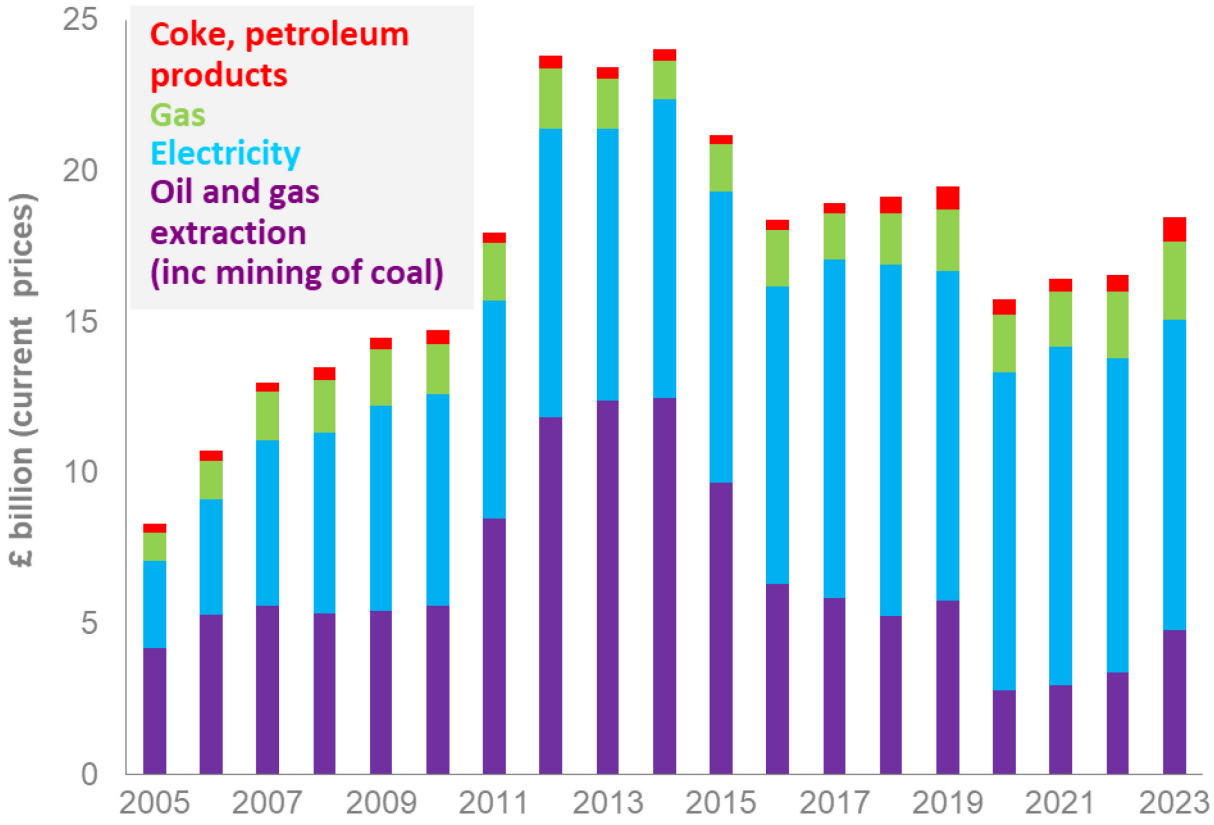
Trends in employment in the energy industries, 1980 to 2023



Source: Office for National Statistics (Data from 1996 onwards based on SIC 2007 classifications)

Employment in the energy production and supply industries fell rapidly throughout the 1980s and mid-1990s largely as a result of closures of coal mines. Between 1995 and mid-2000s employment declined more slowly but since 2006 it has increased gradually, driven largely by growth in the electricity and gas sectors. However, since 2020 employment in the energy industries has fallen back. In 2023 employment fell by 7.4% on the previous year to 149,500 which was 37% above the 2005 level and accounted for 5.3% of all industrial employment. Of the energy total in 2023 electricity (including renewables) accounted for 53%, gas accounted for 20%.and oil and gas extraction accounted for 20%.

Investment in the energy industries, 2005 to 2023

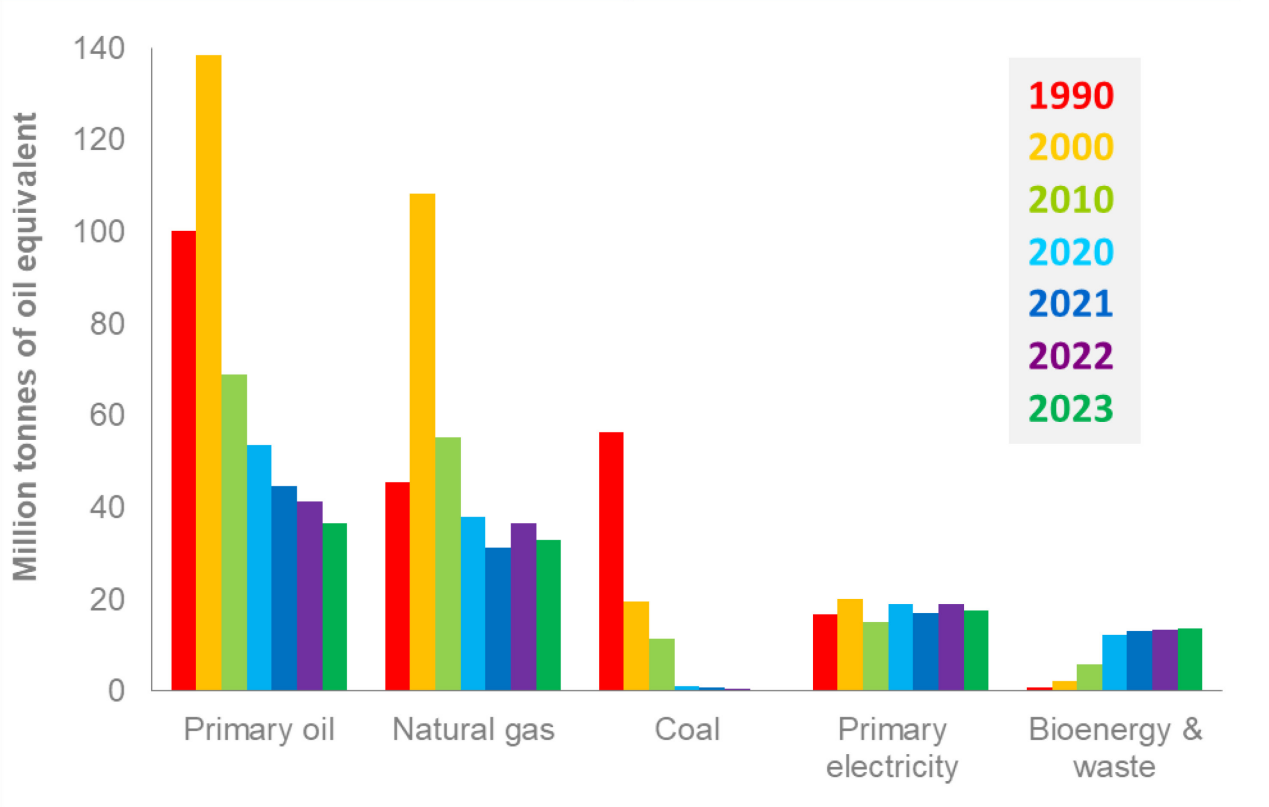


Source: Office for National Statistics

In 2023 investment in the energy industries at £18.5 billion (at current prices) was 12% higher than in 2022.

Of the total invested electricity contributed 56% (down 7.4 percentage points on 2022), oil and gas extraction (including a small proportion of less than 0.01% for coal extraction) contributed 26% (up 5.5 percentage points on 2022), gas contributed 14% (up 1.0 percentage points on 2022), with the remaining 4% in coke & refined petroleum products industries (up 0.9 percentage points on 2022).

Production of primary fuels, 1990 to 2023



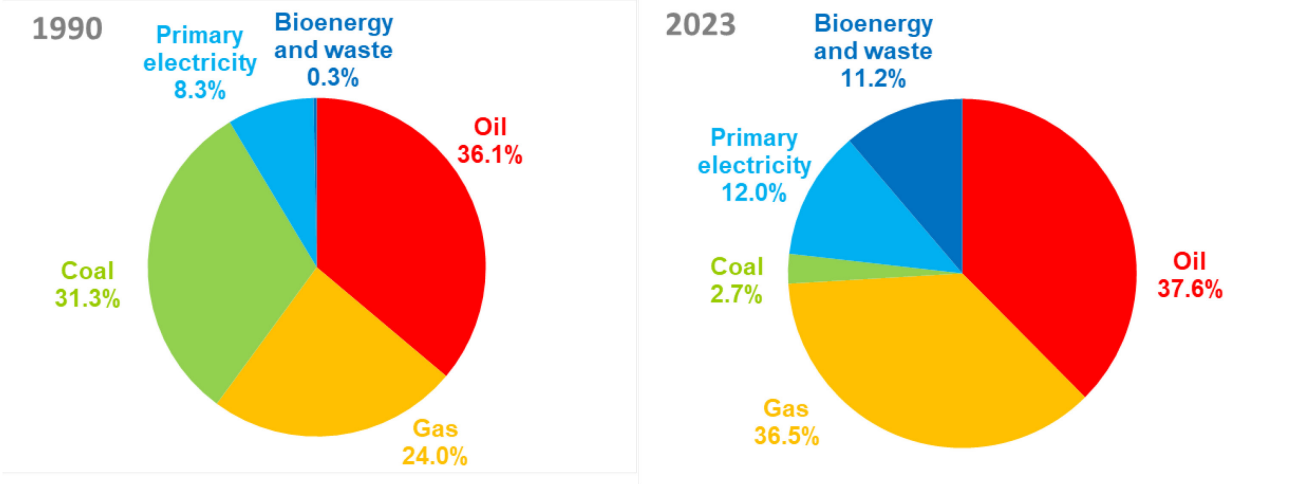
Million tonnes of oil equivalent

	1990	2000	2010	2020	2021	2022	2023
Primary oil	100.1	138.3	69.0	53.6	44.7	41.3	36.6
Natural gas	45.5	108.4	55.3	37.8	31.3	36.4	32.9
Coal	56.4	19.6	11.4	1.2	0.7	0.5	0.4
Primary electricity	16.7	20.2	15.1	18.9	17.0	18.8	17.5
Bioenergy & waste	0.7	2.3	5.8	12.1	13.1	13.3	13.7
Total	**219.4**	**288.7**	**156.7**	**123.6**	**107.0**	**110.3**	**101.2**

Total production of primary fuels, when expressed in terms of their energy content, fell by 8.3% in 2023 to a record low level of 101.2 million tonnes of oil equivalent. In 2023 output from coal, oil and nuclear were all at record low levels, whilst gas output fell by 10%. The fall in 2023 was partially offset by rises in bioenergy & waste and renewables output which was boosted by increased capacity for offshore wind and solar technologies. Primary oil (crude oil and Natural Gas Liquids) accounted for 36% of total production, natural gas 33%, primary electricity (consisting of nuclear, wind, solar and hydro) 17%, bioenergy and waste 14%, while coal accounted for just 0.4%.

Total production increased rapidly between 1990 and 2000, mainly due to the growth of oil and gas. Production in 2000 was at record levels for natural gas, whilst in 1999 it was at record levels for overall energy and petroleum. Production has been on a general decline since 2000, but increased between 2015 and 2018, before falling again from 2019 onwards. Oil production is still 36% below pre-pandemic (2019) levels, whilst gas production is still 12% below pre-pandemic (2019) levels. Total production is now 66% lower than its peak in 1999. Since 2000, oil and gas production levels have fallen by 74% and 70% respectively.

Inland energy consumption, 1990 and 2023



Note: Primary electricity includes nuclear, wind, solar, hydro and net imports.

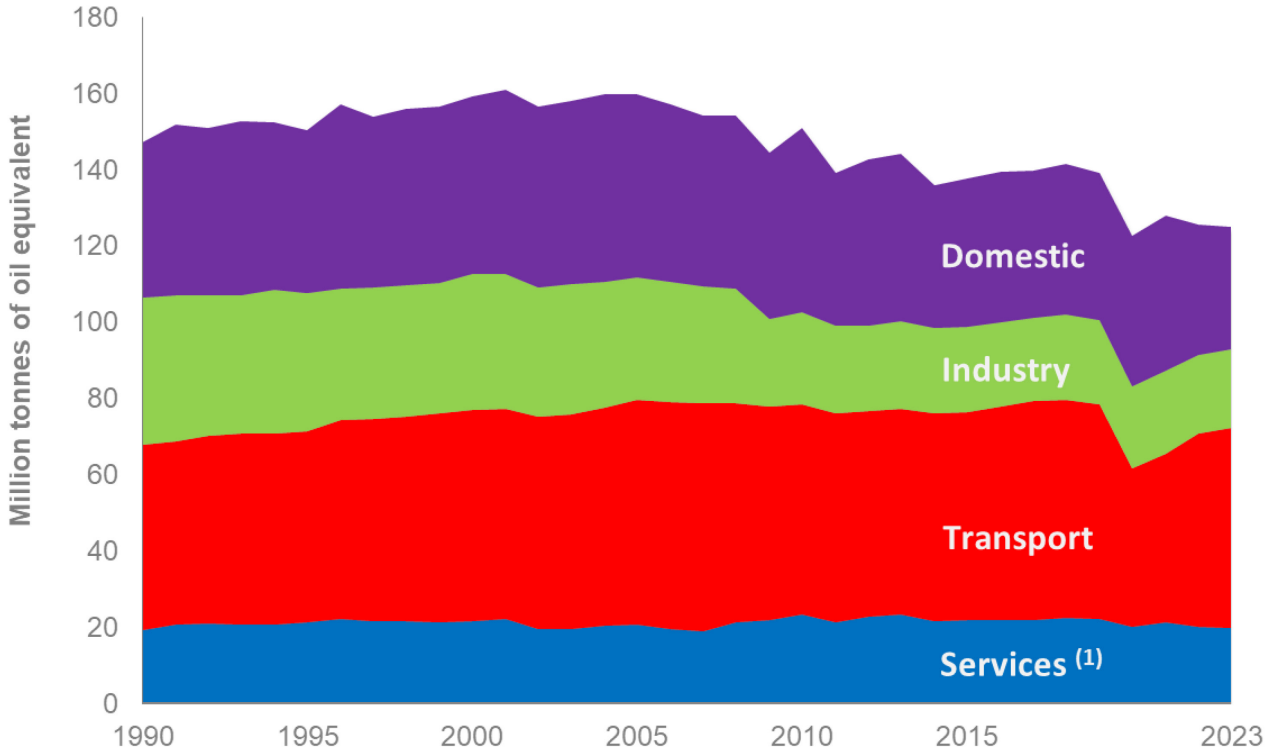
Million tonnes of oil equivalent

	1990	2000	2010	2020	2021	2022	2023
Total inland primary energy consumption[1]:	213.6	234.8	220.0	164.7	170.9	168.6	163.8
Conversion losses:		53.8	50.2	28.1	29.6	29.4	25.5
Distribution losses and energy industry use:	66.4	20.7	18.0	13.8	12.9	13.3	12.9
Total final energy consumption:	147.3	159.4	150.8	122.5	128.1	125.8	125.0
Final consumption of which:							
Industry	38.7	35.5	23.9	21.3	21.6	20.6	20.4
Domestic	40.8	46.9	48.3	39.4	40.9	34.3	32.2
Transport	48.6	55.5	55.3	41.7	44.4	50.8	52.6
Services[2]	19.2	21.5	23.2	20.1	21.2	20.0	19.8
Temperature corrected total inland consumption:	221.6	240.2	211.5	167.3	170.6	171.6	165.9

(1) Excludes non-energy use.
(2) Includes agriculture, commercial, public administration and miscellaneous.

Primary energy consumption fell by 2.9% in 2023 compared to 2022, with the fall due to households reducing consumption for heating due to higher energy and other prices and warm weather. In 2023, the average temperature was 0.1 degrees Celsius lower than 2022; on a temperature corrected basis, primary energy consumption was 3.3% lower than in 2022. In the last 34 years, consumption of natural gas and primary electricity have risen, whilst consumption of oil and coal have fallen. However, over the past decade, the growth in consumption of bioenergy and waste has more than doubled.

Final energy consumption, 1990 to 2023



2023					Million tonnes of oil equivalent
	Industry	Transport	Domestic	Services[1]	Total
Coal & manufactured fuels	1.0	0.0	0.3	0.0	**1.2**
Oil	2.2	48.9	2.1	3.5	**56.6**
Gas	7.5	0.1	20.4	7.7	**35.6**
Electricity	7.4	0.9	8.0	6.8	**23.1**
Bioenergy and heat	2.3	2.6	1.6	1.8	**8.4**
Total	**20.4**	**52.6**	**32.2**	**19.8**	**125.0**

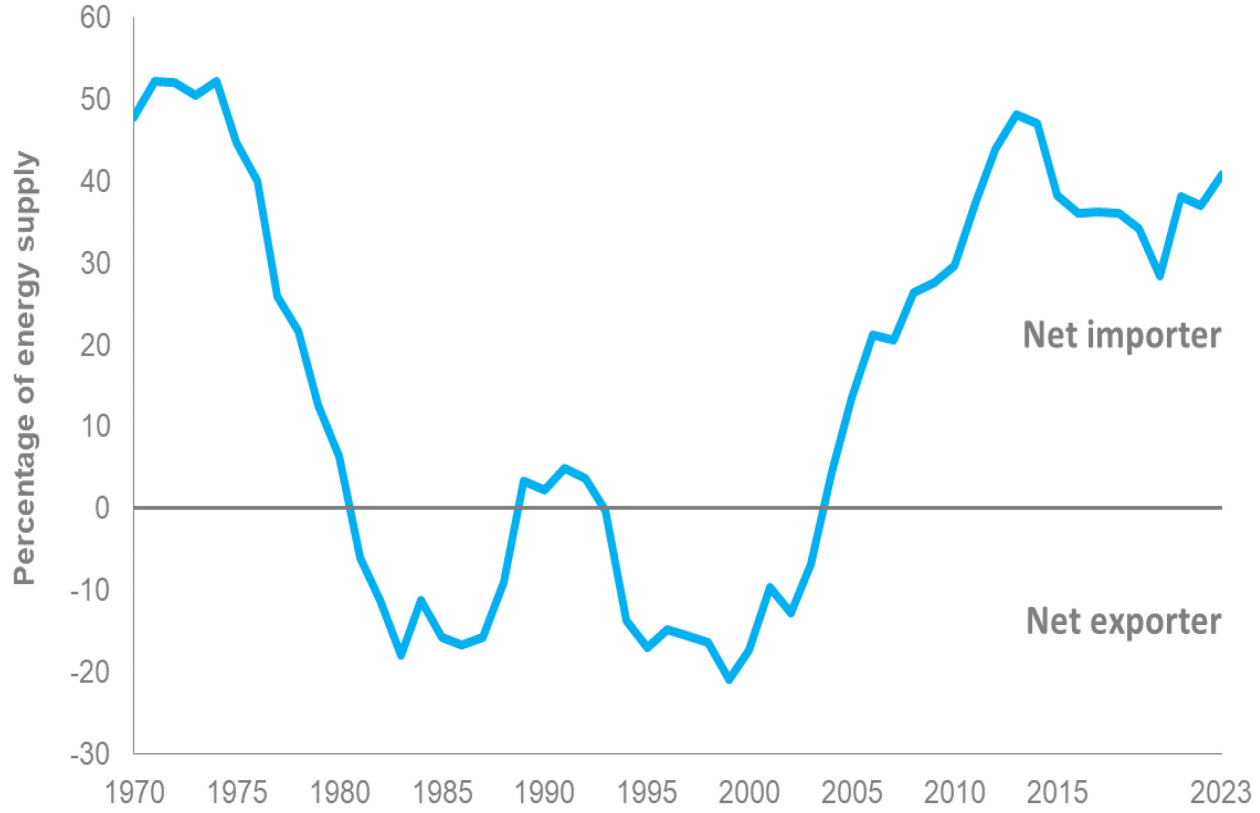
(1) Includes agriculture, commercial, public administration and miscellaneous.

Total final energy consumption (excluding non-energy use) was 0.6% lower in 2023 compared to 2022, with a rise in the transport sector offset by falls in all other sectors. Transport sector consumption rose by 3.6 per cent, with road transport (primarily petrol and diesel) consumption rising by 0.2 per cent and air consumption rising by 16 per cent on 2022 levels but remaining 7.2 per cent below pre-pandemic (2019) levels. Domestic sector consumption fell by 6.0 per cent to a record low level due to warm weather as well as changes in consumer behaviour arising from higher energy and other prices. Industrial sector consumption fell by 1.1 per cent to a record low level and service sector consumption fell by 1.3 per cent with the impact of higher energy and other prices likely a key factor in the reduced consumption levels.

Overall final energy consumption, when seasonally and temperature adjusted, was down by 2.1 per cent, with transport consumption up 3.5 per cent but domestic consumption down by 7.8 per cent.

In terms of fuel types, final consumption of gas, the main fuel used for heating, fell by 5.3%. Oil use rose by 2.7%, bioenergy use rose by 5.4%, but electricity use fell by 1.2%.

Import dependency, 1970 to 2023

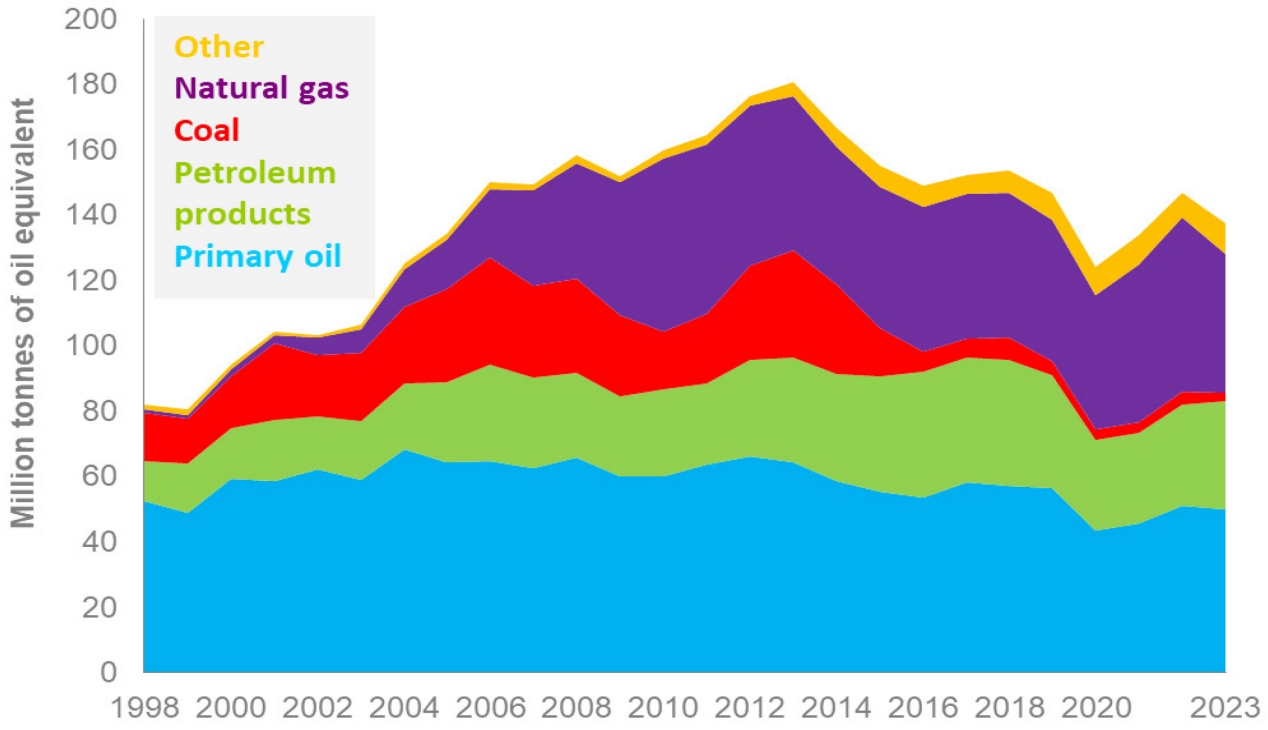


Percentage

	2000	2005	2010	2020	2021	2022	2023
Coal	39%	71%	52%	47%	51%	94%	63%
Gas	-11%	7%	40%	46%	57%	46%	46%
Oil	-55%	-3%	15%	12%	25%	37%	47%
Total	**-17%**	**13%**	**30%**	**28%**	**38%**	**37%**	**41%**

In the 1970's the UK was a net importer of energy. Following development of oil and gas production in the North Sea, the UK became a net exporter of energy in 1981. Output fell in the late 1980's following the Piper Alpha disaster, with the UK regaining a position as a net exporter in the mid 1990's. North Sea production peaked in 1999, and the UK returned to being an energy importer in 2004. In 2013 imports of petroleum products exceeded exports following the closure of the Coryton refinery. The UK is now a net importer of all main fuel types, although in 2022 became a net exporter of electricity for the first time in over 40 years to help meet demand in France from reduced nuclear output there, before reverting to a net importer again in 2023. In 2023, 40.8% of energy used in the UK was imported, up 3.8 percentage points on 2022.

Key sources of imports, 1998 to 2023



Note: Other includes manufactured solid fuels, bioenergy & waste and electricity.

Since 1999, when UK energy production peaked, there has been a sharp rise in imports. Over this period imports doubled, reaching a peak in 2013. In 2010 imports exceeded UK production, but because the UK still exports large volumes net imports remain below production levels. However, in 2021 imports exceeded UK production as the UK imported more fuel to meet increased demand following the Covid-19 pandemic, and again in 2022 as the UK's substantial Liquefied Natural Gas (LNG) regasification infrastructure operated as a land-bridge for increased imports, which were then exported to mainland Europe to help reduce its dependence on Russian gas. Imports again exceeded production in 2023.

In 2023 imports fell by 6.5%, with rises in imports of petroleum products and electricity, but falls in imports of coal, primary oil, gas and bioenergy and waste.

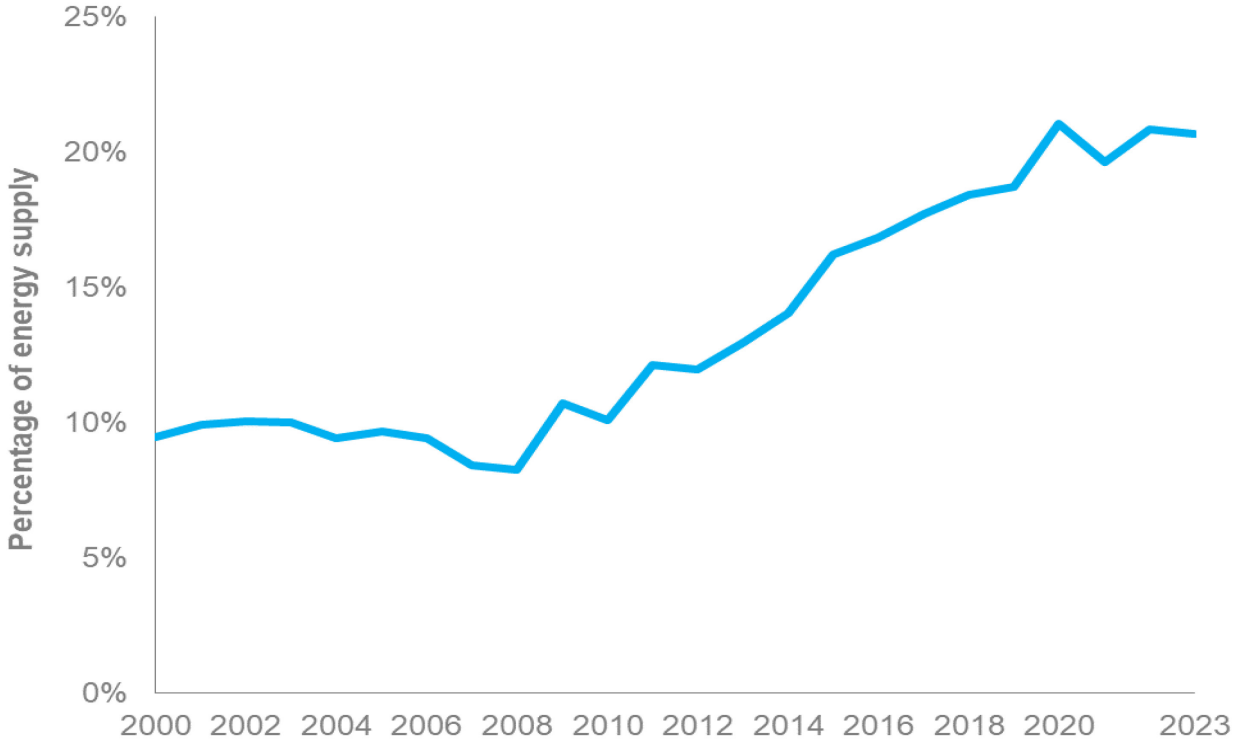
Imports are sourced from a wide variety of countries.

Crude oil: The key source of imports has historically been Norway, but in recent years the US has also become a key source of crude oil imports. In 2023 Norway accounted for 36%, whilst the US accounted for 33% of UK crude oil imports.

Petroleum products: The UK imports a wide variety of petroleum products, while remaining a net exporter of certain fuels including petrol. Traditionally the Netherlands, which acts as a major trading hub, has been the largest source of imports. As such, the Netherlands is the largest supplier of transport fuels. Aviation turbine fuel is generally sourced from the Middle East.

Gas: Norway accounted for 58% of UK gas imports in 2023, up from 55% in 2022, with the pipelines from Belgium and The Netherlands used to export rather than import for the majority of the year. The remaining 42% arrived as LNG of which 61% was from the US, 14% was from Qatar and 9% was from Peru.

Proportion of UK energy supplied from low carbon sources, 2000 to 2023



Percentage

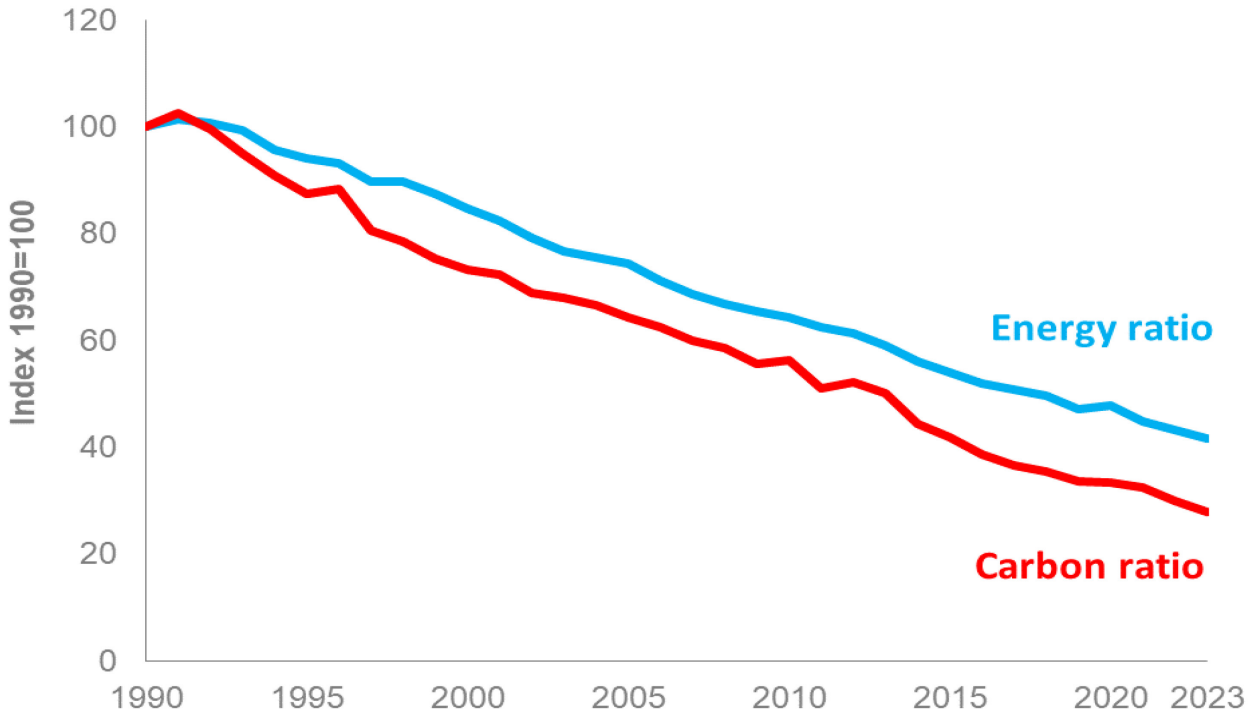
	2000	2005	2010	2020	2021	2022	2023
Nuclear	8.4%	7.8%	6.3%	6.5%	5.8%	6.1%	5.4%
Wind	0.0%	0.1%	0.4%	3.9%	3.3%	4.1%	4.3%
Solar	0.0%	0.0%	0.0%	0.7%	0.6%	0.7%	0.8%
Hydro	0.2%	0.2%	0.1%	0.4%	0.3%	0.3%	0.3%
Bioenergy	0.9%	1.6%	2.3%	7.4%	7.6%	7.2%	7.2%
Transport fuels	0.0%	0.0%	0.6%	1.1%	1.0%	1.4%	1.6%
Heat pumps	0.0%	0.0%	0.4%	0.7%	0.7%	0.7%	0.8%
Other	0.0%	0.0%	0.0%	0.3%	0.3%	0.3%	0.4%
Total	**9.4%**	**9.7%**	**10.1%**	**21.0%**	**19.6%**	**20.8%**	**20.7%**

In 2023 the UK obtained 20.7% of its primary energy from low carbon sources, down marginally on 2022, with 35% of this from bioenergy, 26% from nuclear, and 21% from wind.

Energy supply from bioenergy fell by 3.1% due to outages, whilst nuclear fell by 15% due to reduced capacity and outages. Heat pumps rose by 4.0% and solar rose by 3.9% with capacity up by 9.0% but less sun hours than in 2022.

Energy supply from wind rose by 2.2% in 2023, with capacity up by 4.9% and wind speeds 0.2 knots lower than in 2022. Eight named storms affected the UK during 2023, two in August (Antoni and Betty) followed by a further six from Agnes (late September) to Gerrit (late December).

Energy and carbon ratios, 1990 to 2023



Index 1990=100

	1990	2000	2010	2020	2021	2022	2023
Primary energy consumption*	100	108.4	95.4	75.5	77.0	77.4	74.8
Carbon dioxide emissions	100	93.7	83.6	52.9	55.8	53.7	50.2
GDP	100	128.1	148.4	158.1	171.9	179.3	179.5
Energy ratio	**100**	**84.6**	**64.3**	**47.7**	**44.8**	**43.2**	**41.7**
Carbon ratio	**100**	**73.2**	**56.3**	**33.4**	**32.5**	**29.9**	**27.9**

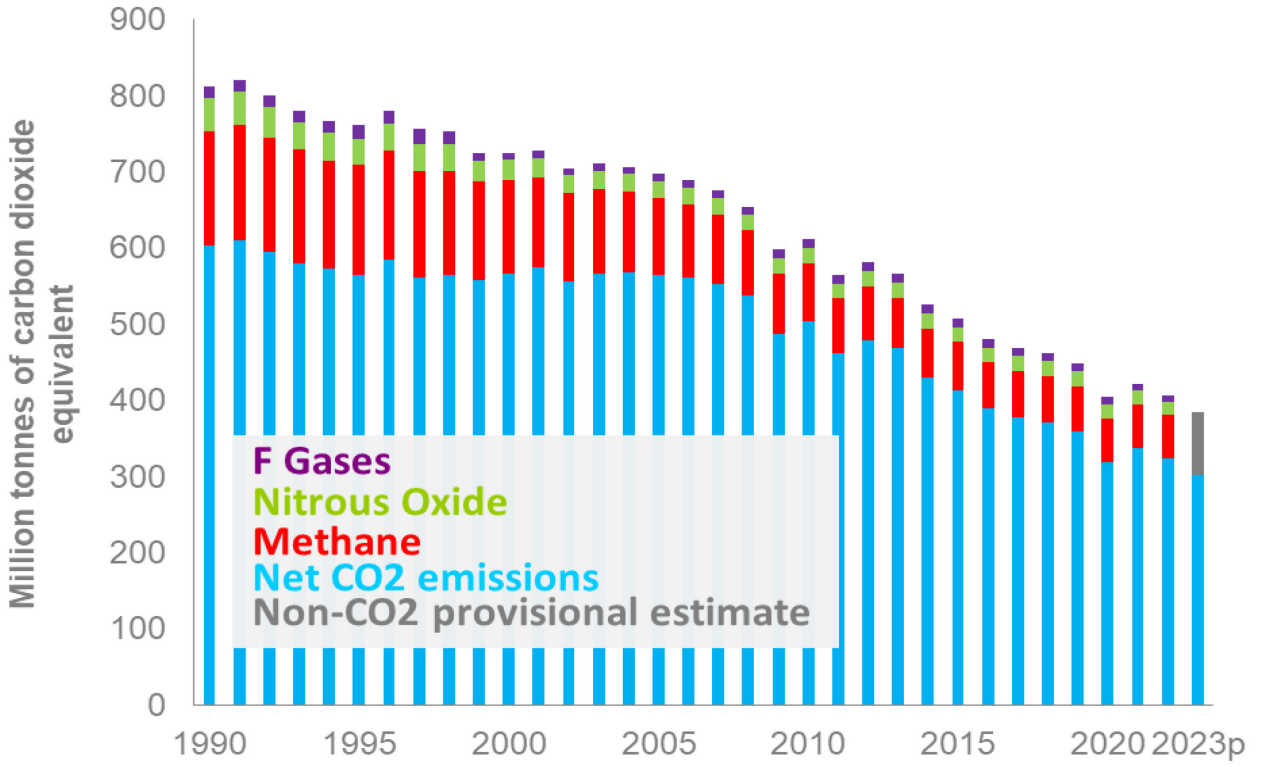
* Temperature corrected primary energy consumption.

The energy ratio is calculated by dividing temperature corrected primary energy consumption by GDP at constant prices, with the carbon ratio similarly calculated by dividing carbon dioxide emissions by GDP. Both ratios have fallen steadily, with the energy ratio declining by around 2½% per year and the carbon ratio declining at a faster pace of just over 3½% per year.

The downward trends are due to several factors, with improvements in energy efficiency and the decline in the relative importance of energy intensive industries affecting both ratios.

Carbon dioxide emissions were 6.6% lower than 2021 and are now 16% lower than 2019. In 2023 electrical supply emissions were down 20%, industry emissions were down 8.2%, buildings and products uses emissions were down 6.3%, and domestic transport emissions were down 1.3%. The largest driver of the long-term fall in emissions has been the decrease of emissions from power stations, due to the shift in fuel use from coal to gas and renewables.

Territorial greenhouse gas emissions by gas, 1990 to 2023



Million tonnes of carbon dioxide equivalent

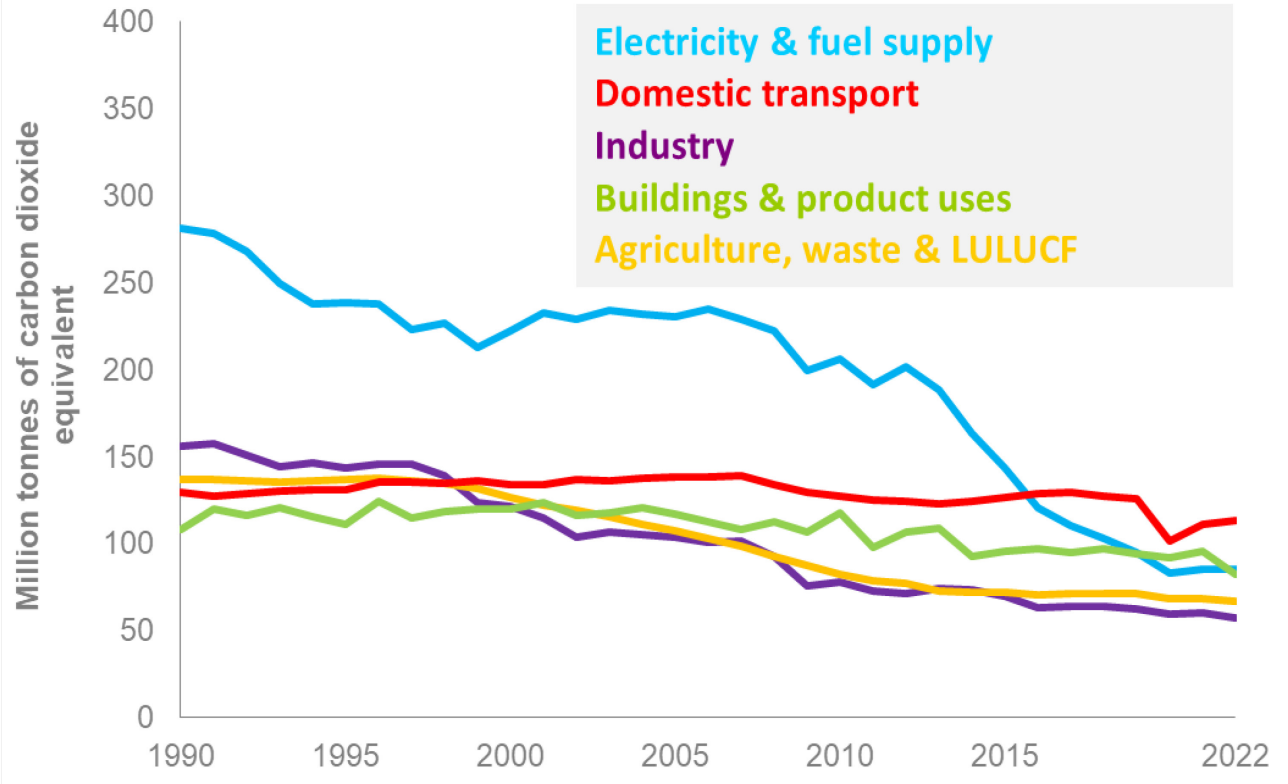
	1990	2000	2010	2020	2021	2022	2023p[1]
Net carbon dioxide (CO_2) emissions	603.6	565.6	504.6	319.1	337.0	324.2	302.8
Methane (CH_4)	150.2	123.7	75.2	57.6	56.9	56.4	:
Nitrous oxide (N_2O)	43.9	26.3	20.3	18.5	18.9	18.1	:
Hydrofluorocarbons (HFC)	12.1	6.4	10.5	8.2	7.6	7.1	:
Perfluorocarbons (PFC)	1.5	0.5	0.3	0.2	0.2	0.2	:
Sulphur hexafluoride (SF_6)	1.2	1.9	0.7	0.4	0.4	0.3	:
Nitrogen trifluoride (NF_3)	0.0	0.0	0.0	0.0	0.0	0.0	:
Non-CO_2 provisional estimate	:	:	:	:	:	:	81.4
Total greenhouse gas emissions	**812.4**	**724.4**	**611.6**	**404.0**	**421.1**	**406.2**	**384.2**

Source: DESNZ (2022 final UK figures and 2023 provisional UK figures)
1 Provisional estimates are not made for individual non-CO_2 gases separately.
: data not available.

Carbon dioxide (CO_2) emissions in the UK are provisionally estimated to have decreased by 6.6% in 2023 from 2022, to 302.8 million tonnes (Mt), and total greenhouse gas emissions by 5.4% to 384.2 million tonnes carbon dioxide equivalent ($MtCO_2e$). Total greenhouse gas emissions were 52.7% lower than they were in 1990.

This decrease in 2023 is primarily due to a reduction in gas use for UK electricity generation and domestic heating.

Territorial greenhouse gas emissions by territorial emissions statistics sector, 1990 to 2022



Million tonnes of carbon dioxide equivalent

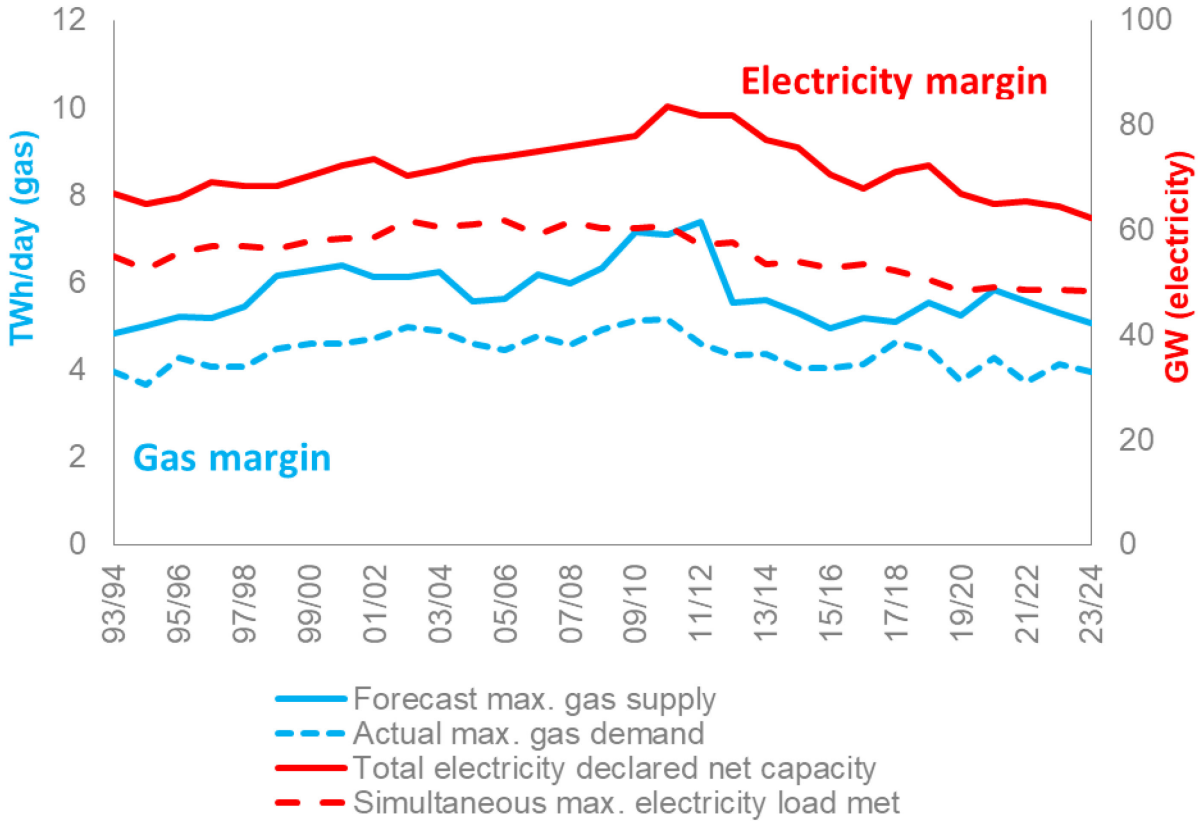
	1990	2000	2010	2020	2021	2022
Electricity and Fuel Supply	281.2	222.3	206.0	83.3	85.5	85.6
Buildings and Product Uses	108.4	120.0	117.8	91.6	95.4	82.8
Agriculture, Waste and LULUCF	137.2	126.7	82.1	68.1	68.2	67.2
Industry	156.4	121.2	78.1	59.7	60.5	57.4
Domestic Transport	129.3	134.2	127.5	101.3	111.4	113.2
Total greenhouse gas emissions	**812.4**	**724.4**	**611.6**	**404.0**	**421.1**	**406.2**

Source: DESNZ (2022 final UK figures)
LULUCF – land use, land use change and forestry

In 2022, net territorial greenhouse gas emissions in the UK were estimated to be 406.2 $MtCO_2e$, a decrease of 3.5% compared to the 2021 figure of 421.1 $MtCO_2e$ and 50.0% lower than they were in 1990. Domestic transport was the largest sector of greenhouse gas emissions in 2022, accounting for 28% of total emissions. Emissions from domestic transport increased by 2% in 2022 from 2021 as Covid-19 restrictions were eased, although were still 10% lower than in 2019. They were down 12% from 1990 levels.

In 2022, GHG emissions from the electricity and fuel supply sectors accounted for 21% of total emissions and have decreased by 70% since 1990 due to changes in the mix of fuels being used for electricity generation. Emissions from the buildings and product uses sector accounted for 20% of total emissions in 2022 and since 1990 emissions from this sector have decreased by 24%.

Reliability – gas and electricity capacity margins – maximum supply and maximum demand 1993/94 to 2023/24



Source: National Gas and DESNZ, note gas data shown in gas years (Oct-Sep)

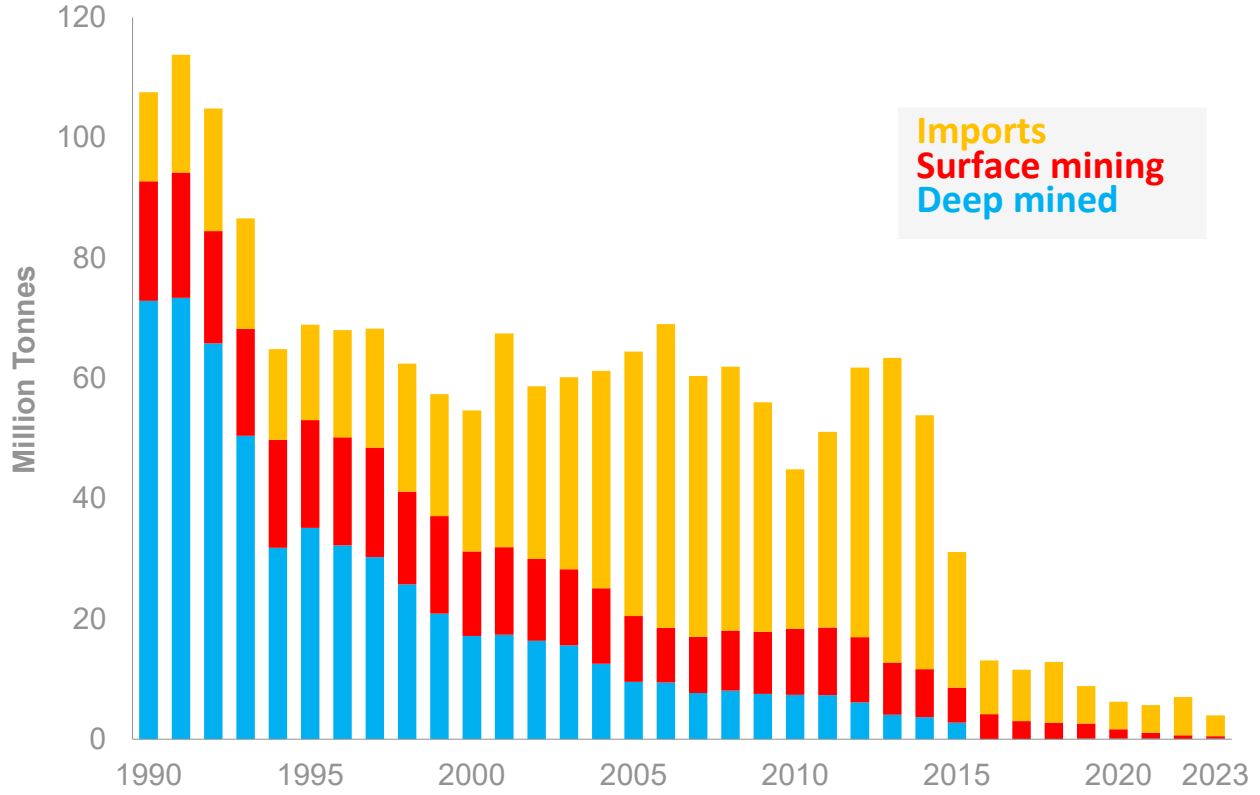
Energy security is complex to measure, subsequent charts on individual fuels provide some insight, this chart aims to provide a view by looking at the difference between forecast maximum supply and actual maximum demand for gas and electricity.

From 2007/08 to 2014/15 the electricity capacity margin mainly increased year on year, due to both a decrease in peak demand and an increase in capacity. However, from 2013/14 to 2016/17 the capacity of major power producers fell faster than peak demand due to plant closures and conversions. This resulted in the capacity margin falling from a peak of 44% in 2013/14 to 27% in 2016/17, the lowest since 2008/09. Whilst embedded renewables capacity increased over that period, the intermittent nature of solar and wind meant it did not cover the drop due to closures of major power producers. A drop in peak demand in 2018/19 and an increase in renewable generation capacity saw the margin rise to 43% before falling back around 29% in 2023/24 as additional renewables, particularly offshore wind, did not fully offset the closure of coal-fired and nuclear plants.

The margin between forecast[1] maximum gas supply and actual maximum gas demand was 78 per cent in 2023/ 24, stable on 2022/23. This is broadly similar to the 10-year average. 2017/18 saw a notable peak following severe weather when the UK was hit by the ‘Beast from the East’.

[1] Forecast maximum gas supply is National Gas 5-year view and comparable scenarios for historic data revised from 2012/13 resulting in a step change where historic data was unavailable.

Coal production and imports, 1990 to 2023



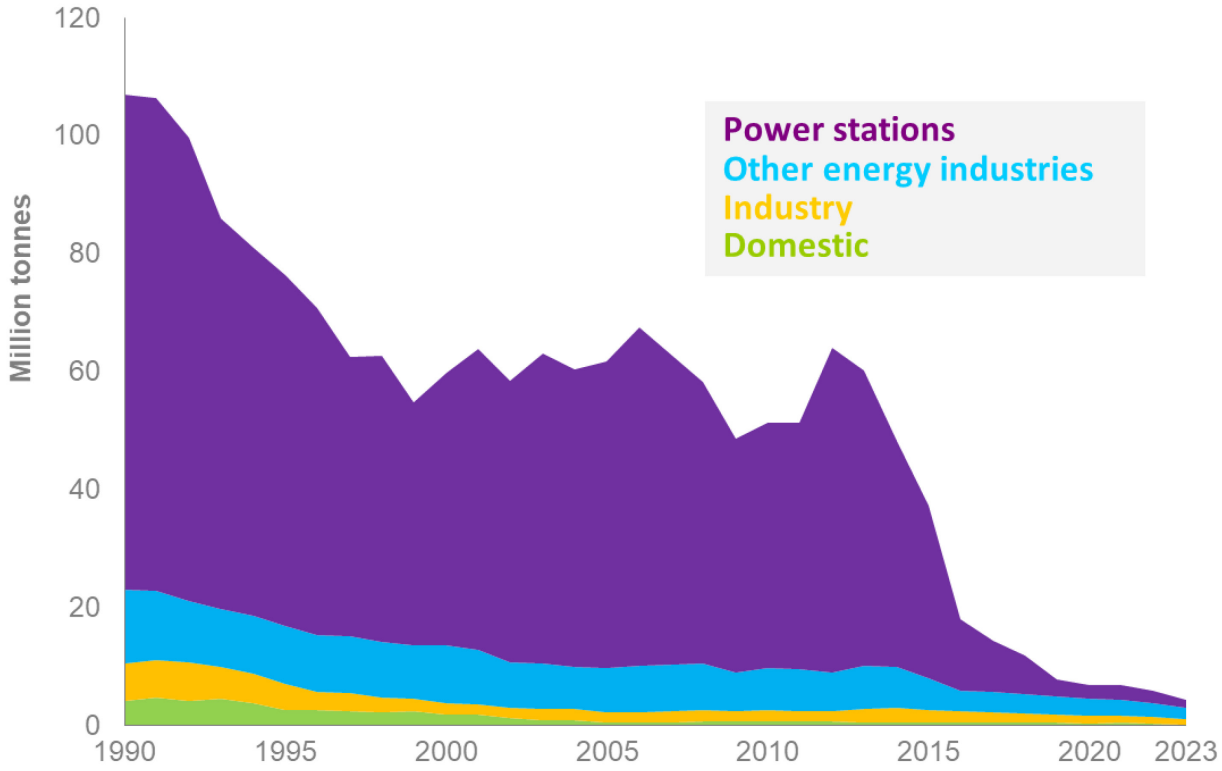
Million tonnes

	1990	2000	2010	2020	2021	2022	2023
Deep mined	72.9	17.2	7.4	0.1	0.1	0.1	0.1
Surface mining (including slurry)	19.9	14.0	11.0	1.6	1.0	0.6	0.4
Total	**92.8**	**31.2**	**18.4**	**1.7**	**1.1**	**0.7**	**0.5**
Coal imports	14.8	23.4	26.5	4.5	4.6	6.4	3.5

Coal production in 2023 was 0.5 million tonnes, 22 per cent lower compared to 2022 and the lowest level recorded. Deep mined production rose 29 per cent to 81 thousand tonnes and was 16 per cent of total production. However, against historic volumes, deep mined production was only 2.9 per cent of 2015 production levels. In 2015 deep mined production provided nearly a third of total coal production. This was the year that the last large three deep mines in operation closed - Hatfield, Thoresby and Kellingley. Surface mine production was down 28 per cent, to a new record low of 425 thousand tonnes with UK production over the last year being further affected by mine closures and declining demand for coal use

Imports of coal began in 1970 and grew steadily. In 2001 imports exceeded the level of UK production for the first time. As annual levels of UK coal production continued to fall, imports continued to grow and in 2006 reached a new record of 50.5 million tonnes. Demand from electricity generators declined over the next five years and imports fell accordingly. However, in the three years from 2011, higher gas prices led to greater demand for coal from electricity generators and imports rose again up to 2013 when they stood at 50.6 million tonnes, just above the 2006 record. From 2014 to 2017 imports fell once more, rose in 2018 before falling again in 2019 and 2020. After rising in 2021 and 2022 imports fell to an all-time low of 3.5 million tonnes in 2023.

Coal consumption, 1990 to 2023



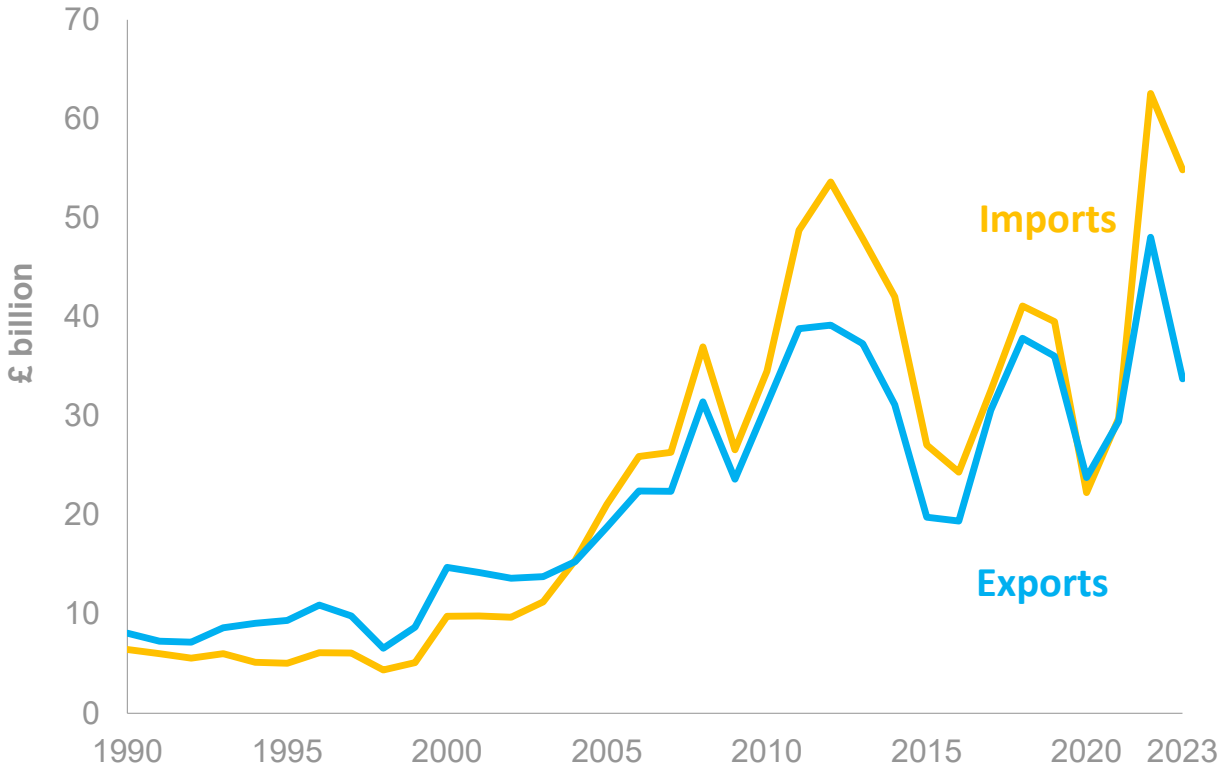
Million tonnes

	1990	2000	2010	2020	2021	2022	2023
Power stations	84.0	46.2	41.5	2.3	2.6	2.3	1.5
Domestic	4.2	1.9	0.7	0.5	0.5	0.4	0.2
Industry	6.3	1.9	2.0	1.2	1.2	1.1	1.0
Services	1.2	0.1	0.1	0.04	0.04	0.04	0.03
Other energy industries	12.5	9.8	7.1	2.9	2.7	2.3	1.7
Total consumption	**108.3**	**59.9**	**51.4**	**6.9**	**7.0**	**6.1**	**4.4**

In 1990 coal generation was 84 million tonnes and fell steadily after 1991 until 1999. Following an 11 year high in 2006 (57 million tonnes), coal used by generators fell steadily between 2006 and 2009 before stabilising then increasing sharply in 2012 due to high gas prices. Coal use in electricity generation has fallen since 2012, due to an overall decline in coal power station capacity. After falling to a record low in 2020, coal for electricity generation fell rose to 2.6 million tonnes in 2021, although this was from a low baseline following record periods without coal generation in Great Britain in 2020. In 2023 coal for electricity generation fell again to a new record low of 1.5 million tonnes, while the fuel mix continues its shift towards other sources of fuel as coal is being phased out.

Demand for coal-fired electricity generation had continued to fall as production favoured gas, partly due to the carbon price per GWh being higher for coal. The carbon price is a charge on companies emitting CO2. The increase in other sources of energy for electricity also contributed to the fall in coal-fired electricity. However, electricity generation for major power producers as a whole fell by 12 per cent in 2023, with wind generation being the only fuel recording an increase. Wind generation was up 2.2 per cent to a record 82.3 TWh due to increased capacity. Just one coal plant Ratcliffe-on-Soar remains operational in the UK, with plans to close by October 2024.

Foreign trade in crude oil and petroleum products, 1990 to 2023



Crude oil and petroleum products **£ billion**

	1990	2000	2010	2020	2021	2022	2023
Exports	8.1	14.7	31.2	23.8	29.5	48.0	33.7
Imports	6.4	9.8	34.5	22.3	29.8	62.6	54.8
Net Imports	**-1.6**	**-4.9**	**3.3**	**-1.5**	**0.3**	**14.5**	**21.1**

Source: Office for National Statistics

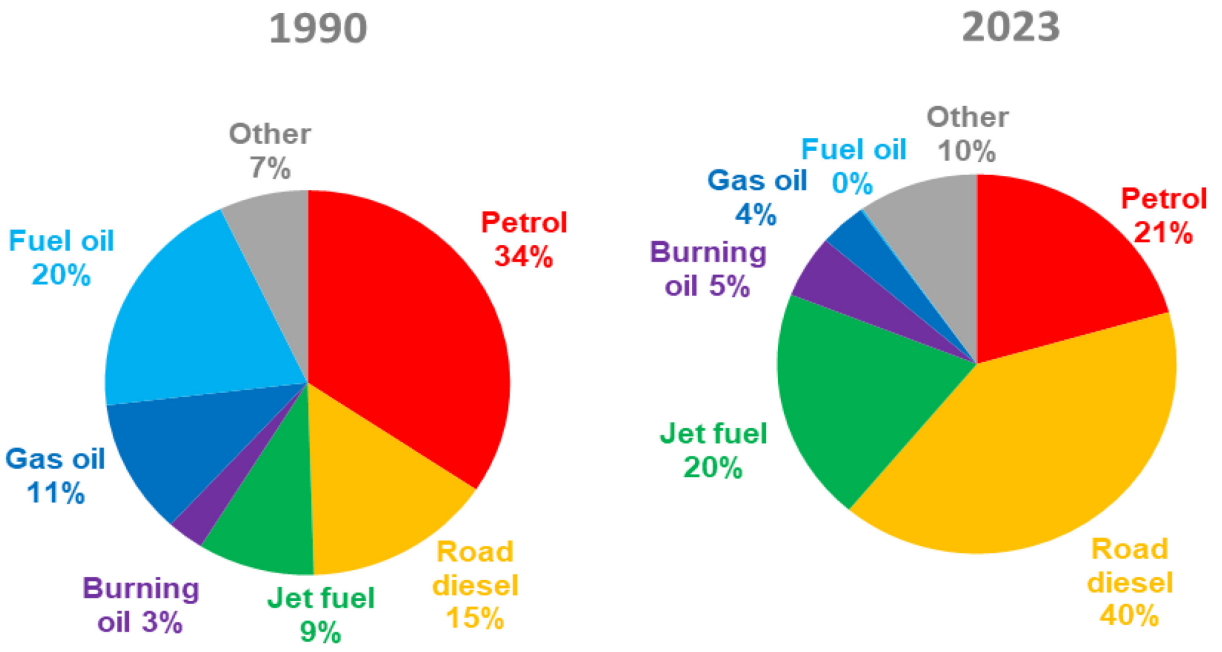
Between 1980 and 2003, a surplus in trade led to oil contributing more than £87 billion to the UK balance of payments. The largest surplus of £8 billion in 1985 reflected high crude oil production and prices.

However, from 2004 to 2019, the UK became a net importer of oils, though still an exporter of some oil products. Between 2004 and 2019 the cumulative deficit amounted to just under £89 billion.

Since the peak of £14.5 billion in 2012, the deficit fell steadily. The UK briefly returned to being a net exporter in 2020 as both imports and exports fell (by £16.5 billion and £12.8 billion respectively) due to the Covid-19 pandemic. There was also a sharp fall of 34 per cent in crude oil price (in £ terms) in the same period.

Both imports and exports grew since 2021 with and the UK becoming a net importer again. In 2023, UK net imports were £21 billion, 46% higher than the previous peak in 2012.

Demand by product, 1990 and 2023



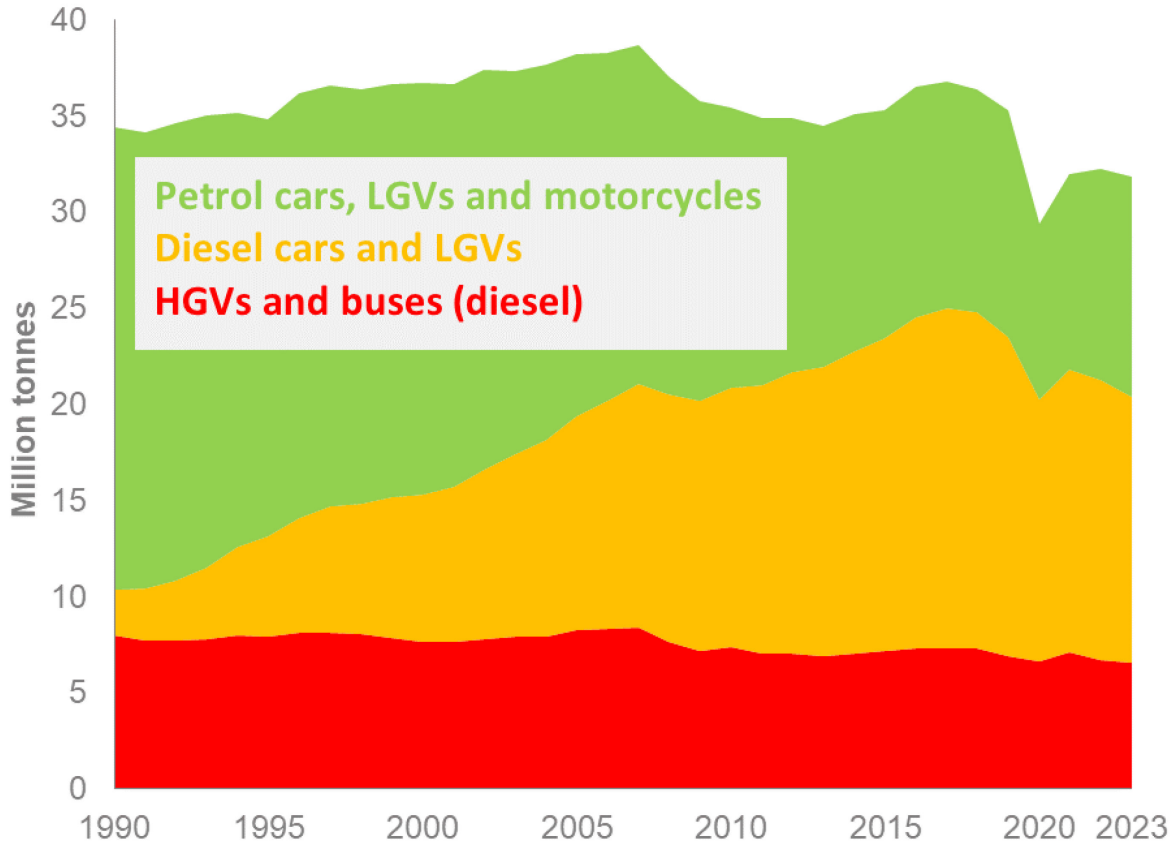
Million tonnes

	1990	2000	2010	2019	2020	2021	2022	2023
Energy uses*								
Petrol	24.3	21.4	14.6	11.8	9.1	10.2	11.0	11.4
White diesel	10.7	15.6	20.9	23.5	20.3	21.8	22.9	22.9
Jet fuel	6.6	10.8	11.6	12.1	5.2	4.8	9.5	11.1
Burning oil	2.1	3.8	3.7	3.3	3.5	3.2	2.8	3.0
Gas oil	8.0	6.8	5.4	5.1	4.4	4.8	3.0	2.2
Fuel oil	14.0	3.3	1.8	0.3	0.4	0.4	0.5	0.3
Other	5.0	-71.9	6.3	5.2	4.4	4.4	4.5	4.7
Total energy uses	70.7	67.1	64.2	61.3	47.3	49.7	54.2	55.5
Of which:								
Transport fuels	43.5	49.5	48.7	48.9	35.7	38.0	43.1	44.3
Industry	7.2	5.5	2.2	2.0	2.0	2.1	2.0	2.0
Refinery fuel use	5.1	5.3	4.4	3.3	2.6	2.6	2.9	3.0
Non-energy uses	9.2	10.1	7.1	6.1	5.9	4.8	4.5	4.1
Total demand	**79.8**	**77.2**	**71.3**	**67.4**	**53.3**	**54.5**	**58.7**	**59.6**

* Energy uses includes uses for transformation (e.g., electricity generation) and energy industry own use (e.g., refinery fuels)

Demand for oil products has declined since 1990; this trend was accelerated by the Covid-19 pandemic. The mix of products consumed has changed over time and in 2023 total demand increased by 1.6 per cent on 2022. Most of this increase was from the transport sector, where demand for jet fuel increased by 16 per cent as the international aviation sector continues recovery after the Covid-19 pandemic. Jet fuel demand has more than doubled since 2020, the first year of Covid-19 in the UK. However, demand remains 8.2 per cent down on pre-pandemic 2019. The share of total oil demand taken up by the transport sector increased to 74 per cent. Transport's share of total oil demand is substantially larger than in 1990 because the use of fuel oil for electricity generation has declined.

Demand for road fuels, 1990 to 2023



Since the early 1990s, demand for diesel has increased whilst for petrol has decreased, and in 2005 demand for diesel became larger than the demand for petrol. This was caused by an increase in use of diesel-fuelled cars and increase in light goods vehicles (LGVs). However, demand started to decline from 2018 following tax increases on diesel vehicles. In 2020 this fall in diesel demand was exacerbated by the Covid-19 pandemic and subsequent restrictions on travel. Diesel and petrol demand recovered as restrictions eased in the latter half of 2021. In 2023, petrol demand continued its recovery with an increase of 4.4 per cent compared to 2022. Diesel demand was less affected by the pandemic as commercial motor fleets (light and heavy goods vehicles) continued to operate during periods of restricted travel. Compared to 2022, total diesel demand remained stable in 2023.

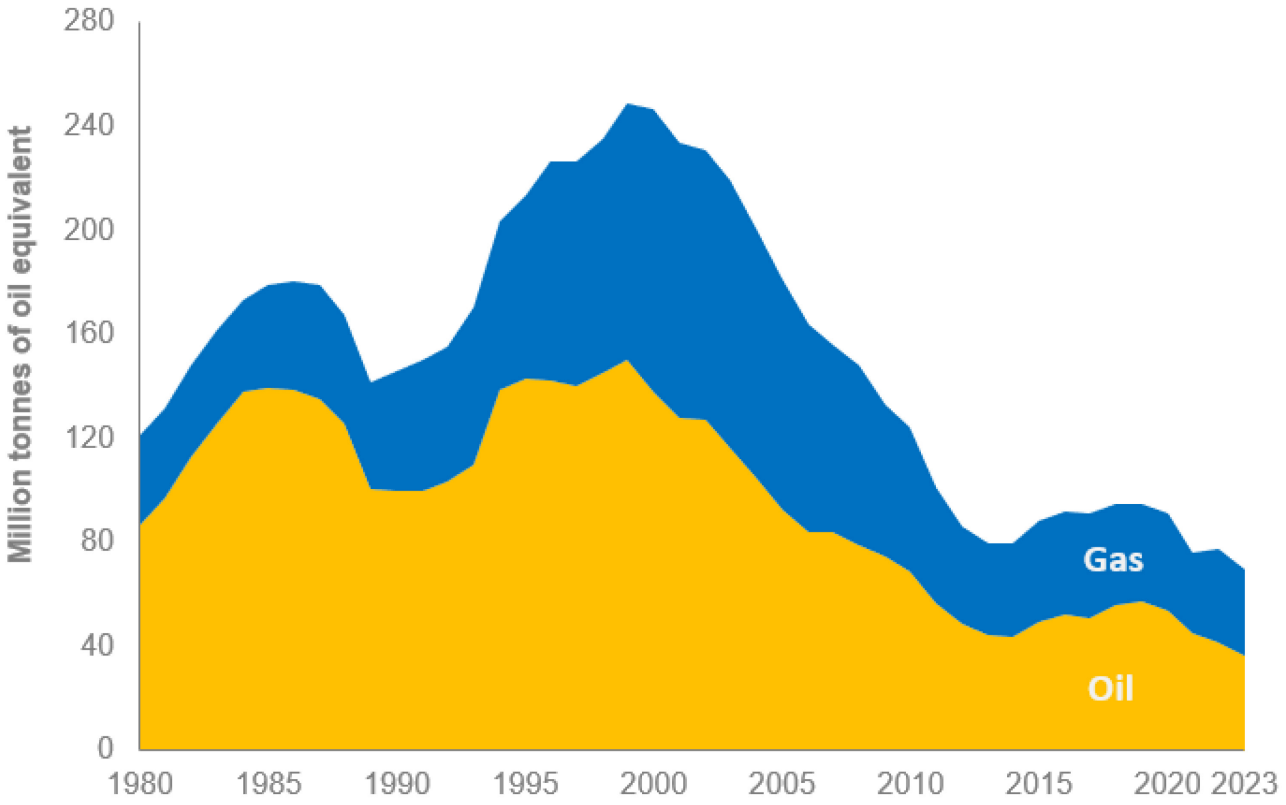
Demand for road fuels, with diesel demand by vehicle type

Million tonnes

	1990	2000	2010	2020	2021	2022	2023
Demand for petrol	**24.3**	**21.4**	**14.6**	**9.1**	**10.2**	**11.0**	**11.5**
Demand for road diesel	**10.4**	**15.3**	**20.9**	**20.3**	**21.8**	**21.3**	**20.4**
By vehicle type:							
Car & taxi	1.0	4.1	9.0	8.4	9.0	8.8	8.4
Light goods vehicles	1.4	3.5	4.5	5.2	5.8	5.7	5.4
Heavy goods vehicles	6.4	6.2	6.0	6.0	6.4	6.0	5.9
Buses & coaches	1.6	1.5	1.3	0.6	0.7	0.8	0.7

Demand by vehicle type based on modelling by Ricardo Energy & Environment using data from the National Atmospheric Emissions Inventory.

UK Continental Shelf production, 1980 to 2023



Million tonnes of oil equivalent

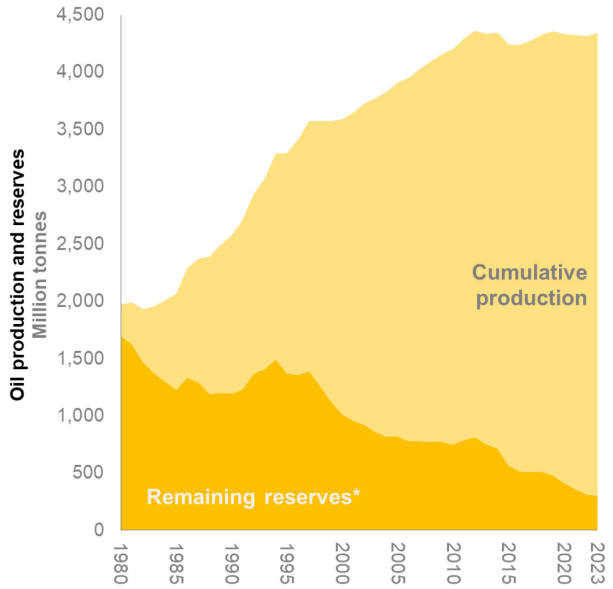
	1990	2000	2010	2020	2021	2022	2023
Oil	100.1	138.3	69.0	53.6	44.7	41.3	36.6
Gas	45.5	108.4	55.3	37.8	31.3	36.4	32.9
Total	**145.6**	**246.7**	**124.3**	**91.5**	**76.1**	**77.8**	**69.5**

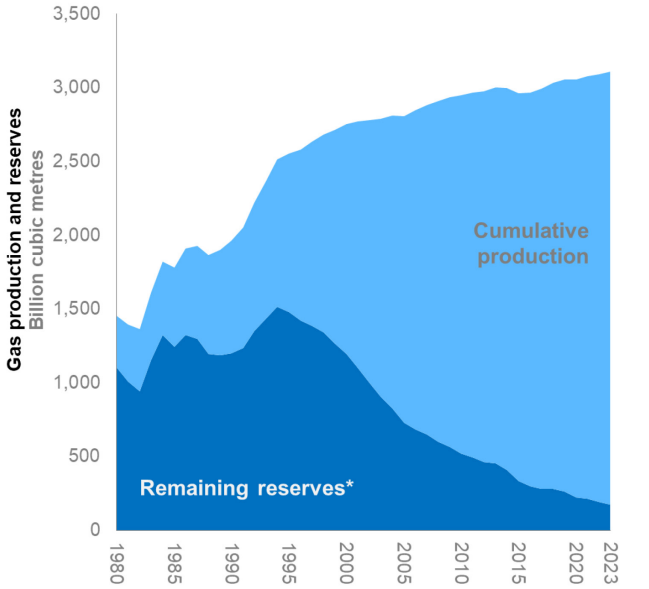
In 2023, total indigenous oil and gas production was 69.5 million tonnes of oil equivalent down 11 per cent on 2022.

Gas production decreased by 9.6 per cent in 2023 compared to 2022 as North Sea output declines. In 2023, gas production was 70 per cent lower than the 2000 peak. Since the peak, gas production generally declined until 2015 when new fields opened. Gas production reached a record low in 2021 due to extensive maintenance but despite somewhat recovering in 2022 fell in 2023 to just 5.1 per cent above this record.

Oil production decreased by 11 per cent in 2023 compared to 2022 reaching a new record low. In 2023, oil production was down 76 per cent lower than the 1999 peak. Following this production has been consistently down except from 2015-2019 when there were increases due to new fields opening. Production fell in 2020 and 2021 due to restrictions in place to curb the Covid-19 pandemic and an extensive planned maintenance schedule including the shutdown of the Forties Pipeline System. Declines in 2022 and 2023 are in line with expected reductions as North Sea output declines.

Oil and gas production and reserves, 1980 to 2023



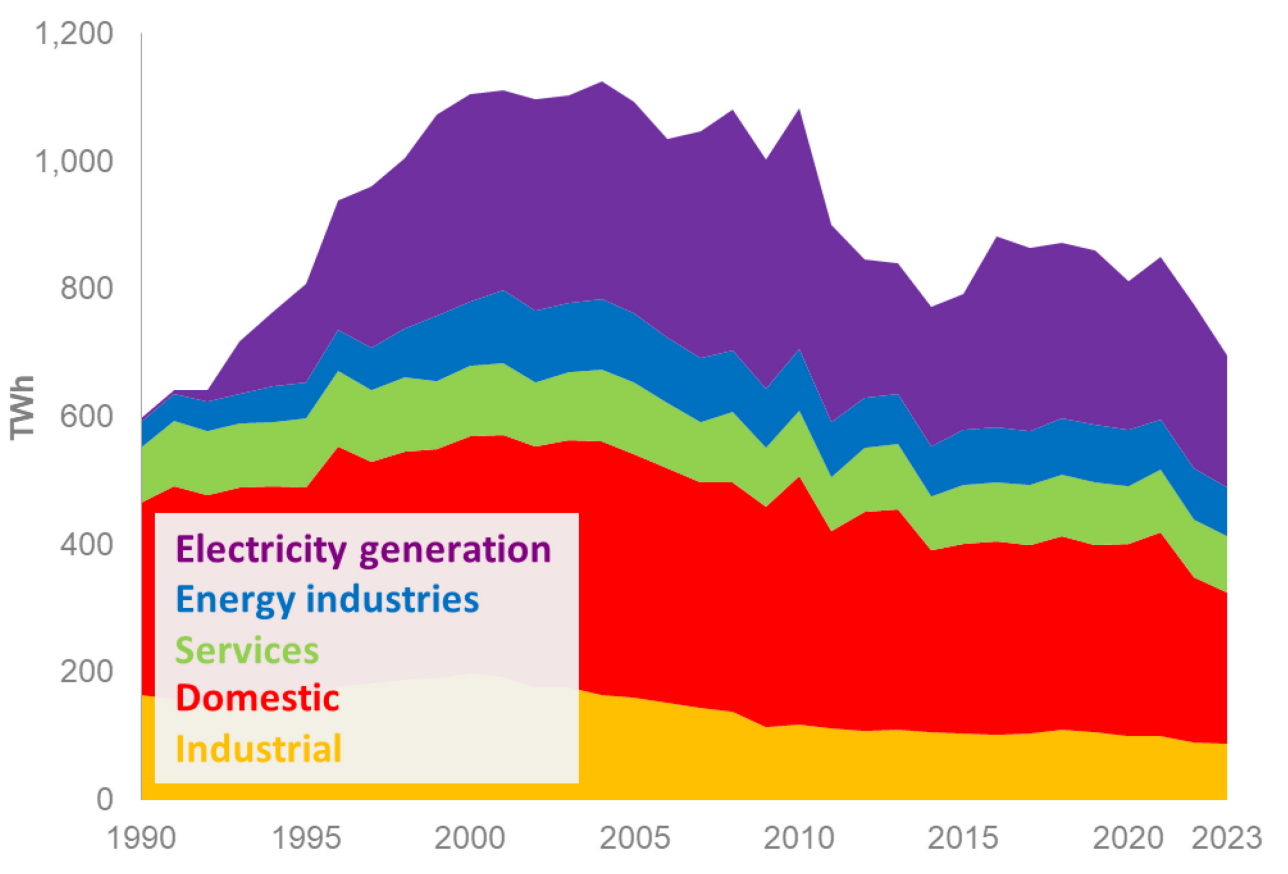


* From 2015, contingent resources have been re-categorised and removed from the probable and proven reserves category.

	1990	2000	2010	2020	2021	2022	2023
Oil: Million tonnes							
Cumulative production	1,383	2,579	3,454	3,926	3,967	4,005	4,039
Proven plus probable reserves	1,195	1,010	751	411	357	313	302
Total	**2,578**	**3,589**	**4,205**	**4,337**	**4,324**	**4,318**	**4,341**
Gas: Billion cubic metres							
Cumulative production	762	1,560	2,429	2,833	2,866	2,904	2,938
Proven plus probable reserves	1,200	1,195	520	221	213	189	173
Total	**1,962**	**2,755**	**2,949**	**3,054**	**3,079**	**3,093**	**3,111**

From 1980, total reserves grew substantially reflecting new discoveries of oil and gas and the development of new technologies which allowed the exploitation of resources that were previously regarded as non-commercial. In addition, known fields were included as they moved from *prospective* to *probable* status. Since the mid-90s, estimated proven and probable reserves have declined as fewer discoveries were made whilst cumulative production continued to grow.

Natural gas demand, 1990 to 2023



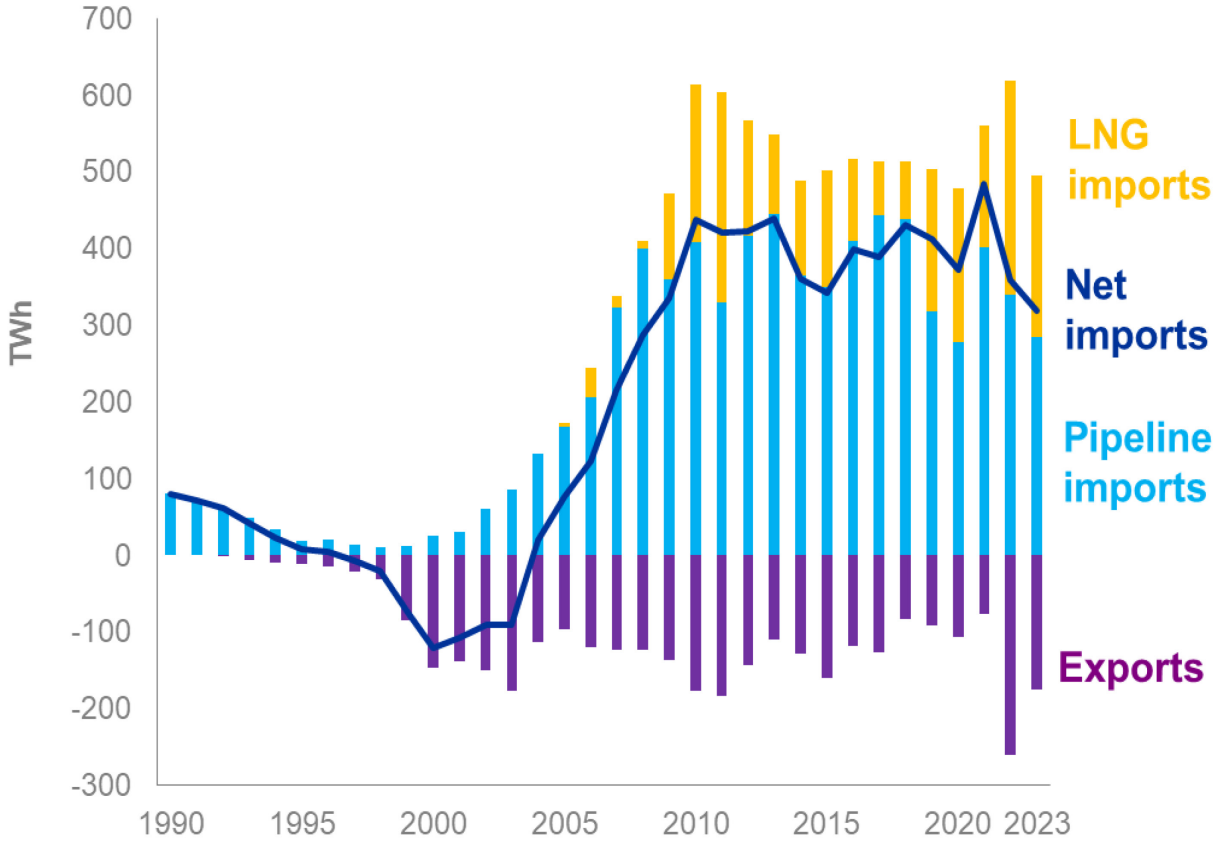
TWh

	1990	2000	2010	2020	2021	2022	2023
Electricity generators	6.5	324.6	377.1	232.8	254.5	258.3	205.9
Energy Industries	39.2	102.1	95.9	88.7	79.0	80.2	75.6
Industry	164.6	198.5	118.0	100.7	99.3	89.1	87.7
Domestic	300.4	369.9	389.6	300.2	318.8	259.1	237.1
Services	86.4	110.5	101.6	89.4	98.5	90.2	89.0
Transport	..	..	..	0.9	1.0	1.0	1.0
Total	**597.0**	**1,105.5**	**1,082.2**	**812.6**	**851.2**	**777.9**	**696.3**

Following the expansion of UK natural gas production in the early 1970s, demand grew reaching a record high in 2004 of 1,125 TWh. Since then, demand has seen an overall decline, and in 2023 was almost 40 per cent lower than the 2004 peak. Following several years of relatively stability demand began to fall in 2022 due to record high temperatures and gas prices. High temperatures and prices continued in 2023, demand decreasing a further 10 per cent compared to the previous year.

This decrease was largely the result of reduced gas demand for electricity generation, which fell 20 per cent due to lower overall electricity demand and record high electricity imports. Demand by the domestic sector fell 8.5 per cent, reaching lows last seen in the 1970's. Consumption by services and industrial sectors were stable on the previous years lows.

UK trade in natural gas, 1990 to 2023



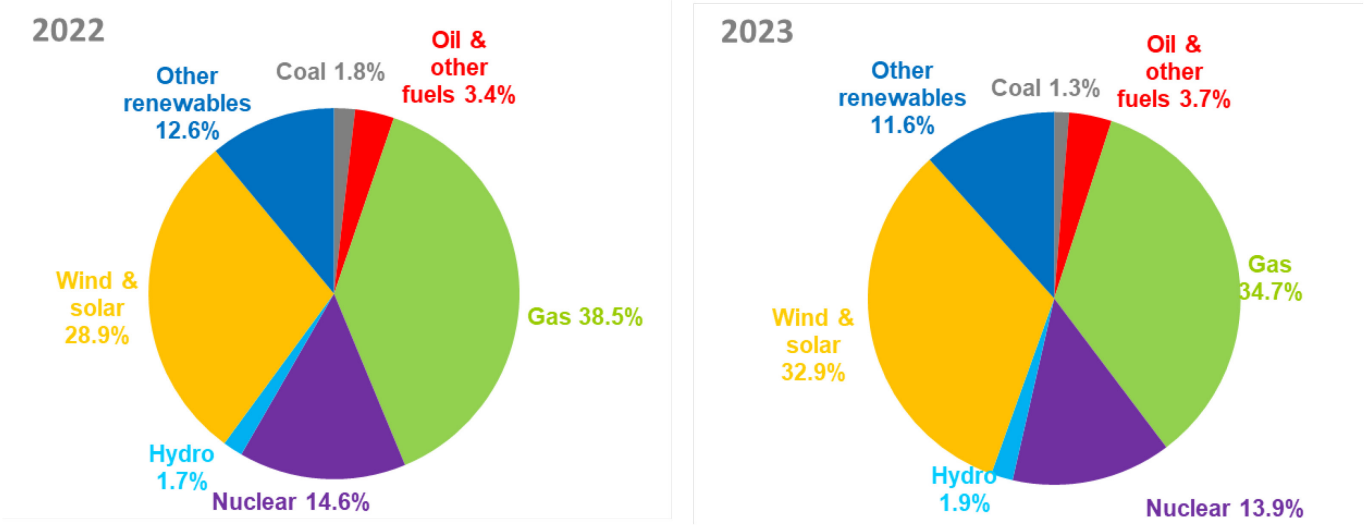
TWh

	1990	2000	2010	2020	2021	2022	2023
Natural gas production	528.8	1,260.2	642.5	439.4	364.0	423.6	382.7
Imports	79.8	14.2	606.3	478.2	560.8	618.3	494.9
of which LNG	-	-	*206.8*	*200.1*	*159.9*	*277.8*	*210.9*
Exports	-	-134.5	-168.2	-106.0	-76.1	-259.9	-175.6
Net imports (+) or exports (-)	+79.8	-120.3	+438.1	+372.2	+484.8	+358.4	+319.3

Following peak indigenous gas production in 2000 the UK has been increasingly reliant on imports to meet demand. In 2023, the UK remained a net importer of gas. Imports and exports fell by 20 per cent and 32 per cent respectively, in 2023 compared to record highs in 2022. 2022 saw record high imports and exports as the UKs liquification and pipeline infrastructure was utilised as Europe looked to move away from Russian gas.

LNG imports fell by 24 per cent in 2023 compared to the high reached in 2022 but remained substantial. The US was the largest import source of LNG for the second year in a row; Qatar remained second largest but Qatari LNG imports fell by 64 per cent in the same period. Pipeline imports were down by 17 per cent, but Norway remained the largest import source accounting for 57 per cent of total imports in 2023.

Electricity generated by fuel type, 2022 and 2023



TWh

	1990	2000	2010	2020	2021	2022	2023
Coal	229.9	120.0	107.6	5.7	6.8	5.9	3.8
Oil & other fuels*	20.7	13.6	10.5	8.8	9.7	11.1	10.8
Gas	0.4	148.1	175.7	111.9	122.8	125.1	101.7
Nuclear	63.2	85.1	62.1	50.2	46.1	47.4	40.6
Hydro	5.6	5.1	3.6	6.9	5.4	5.7	5.5
Wind & Solar	-	0.9	10.3	88.2	77.1	93.9	96.2
Other renewables	-	4.3	12.3	38.6	40.0	35.8	34.1
Total electricity generated	**319.7**	**377.1**	**382.0**	**310.3**	**307.9**	**324.9**	**292.7**

*Includes generation from pumped storage.

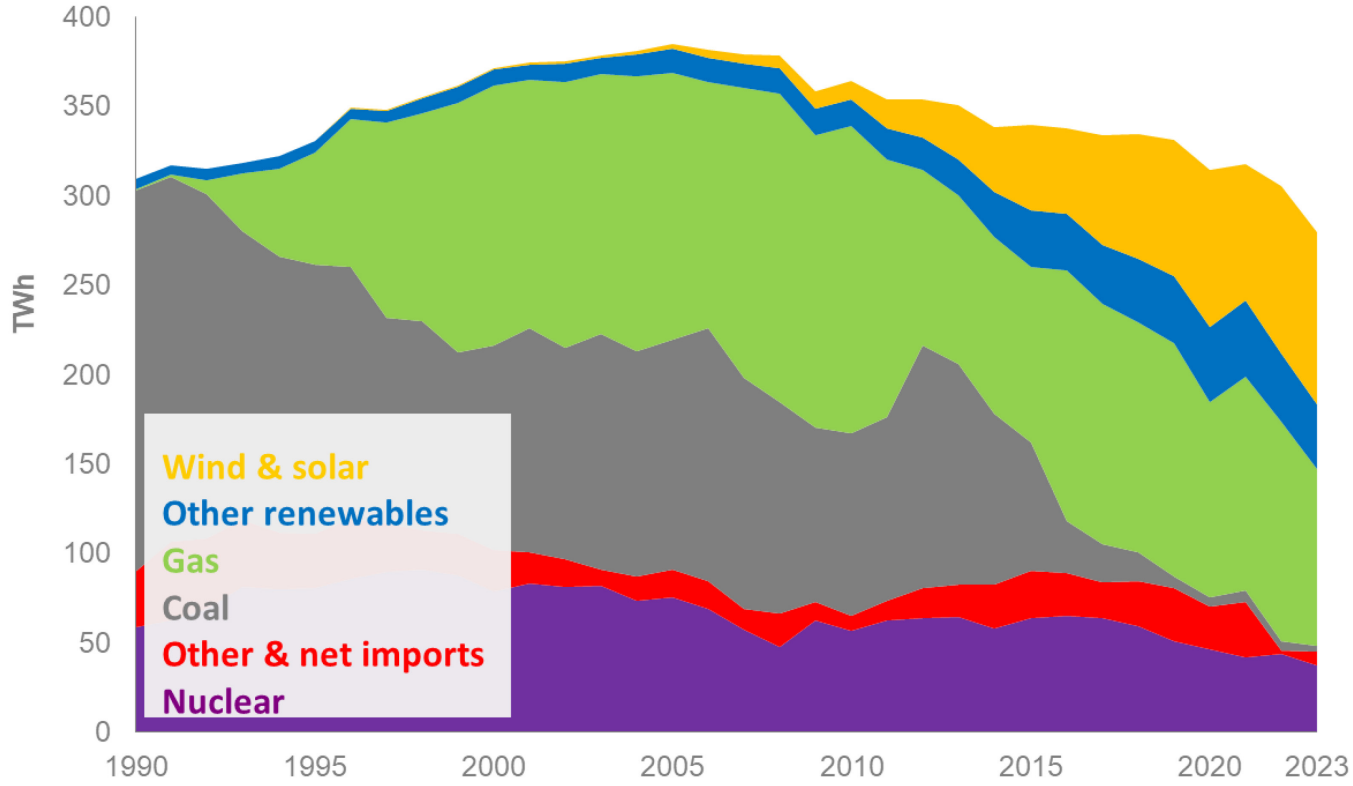
Total electricity generated decreased by 10 per cent between 2022 and 2023, alongside a 1.1 per cent drop in demand to 316.8 TWh. This drop in generation was due to record electricity imports, lower UK demand and lower exports compared to highs seen in 2022.

The share of generation from renewables increased from 41.7 per cent in 2022 to 46.4 per cent in 2023, the increase due to lower generation with absolute values broadly stable at 135.8 TWh compared to 135.3 in 2022. Wind and solar generation reached a record high at 32.9 per cent combined share, due to increases in capacity offsetting slightly less favourable weather conditions. Generation from nuclear energy fell to 13.9 per cent due to outages across the nuclear fleet.

Fossil fuel generation shares fell in 2023 in response to strong renewable generation and increased imports. Gas-fired generation remained the largest single fuel but fell from 38.5 per cent to 34.7 per cent. The share of electricity generated from coal in 2023 fell 0.5 percentage points from 2022 to a record low 1.3 per cent.

Further details on renewable electricity generation can be found on page 32.

Electricity supplied by fuel type, 1990 to 2023



The mix of fuels used to generate electricity continues to evolve, the most marked features the decline of coal, the rise of gas, and in more recent years renewables.

Coal reached the highest level for ten years in 2006 as nuclear station availability was reduced and as a substitute for high priced gas. Coal use trended downwards until 2010 when higher winter electricity demand resulted in an increase until 2012 due to high gas prices. Subsequently, supply from coal has fallen to a record low of 3.2 TWh in 2023.

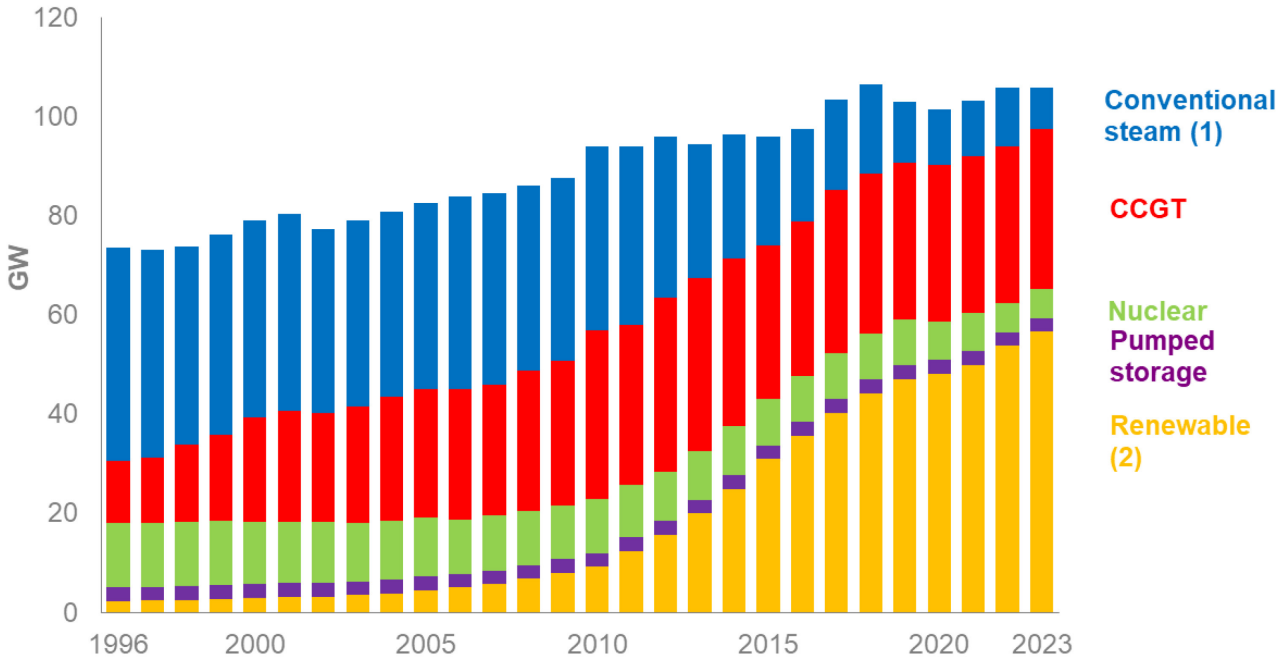
Between 1990 and 2008, supply from gas increased significantly from 0.4 TWh to a peak of 173.0 TWh in 2008. Subsequently, supply has fluctuated with a large increase in 2016, but decreases in 2017 and 2018. Generation from gas fell to 109.1 TWh in 2020 as the Covid-19 pandemic reduced electricity demand but recovered to 122.3 TWh in 2022. However, gas demand fell again in 2023 to 98.9 TWh due to lower demand for electricity and record high imports.

Supply from nuclear peaked in 1998 before falling back, particularly during 2006 to 2008, as station closures and maintenance outages reduced supply. Nuclear supply has generally declined each year since 2016 due to outages and reduced capacity, falling to 37.3 TWh in 2023.

Supply from wind and solar increased from 2000 to 2023 as generation capacity increased, reaching a record 95.7 TWh in 2023, despite wind speeds below the ten-year average.

Total electricity supplied increased continuously from 1997 to reach a peak in 2005. It has subsequently followed a downwards trend, reflecting lower demand due to improved energy efficiency as well as economic factors. Continued high electricity prices and temperatures in 2023 following 2022 further reduced demand, with supply in 2023 27 per cent lower than that in 2005.

Electricity capacity, 1996 to 2023



GW

	1996	2000	2010	2020	2021	2022	2023
Conventional Steam (1)	43.0	36.8	36.3	11.0	11.1	12.0	8.2
CCGT	12.7	22.9	34.1	31.6	31.6	31.5	32.3
Nuclear	12.9	12.5	10.9	7.8	7.8	5.9	5.9
Pumped Storage	2.8	2.8	2.7	2.7	2.7	2.7	2.7
Renewable (2)	2.3	3.0	9.3	48.1	49.9	53.5	56.6
Total	**73.6**	**77.9**	**93.2**	**101.3**	**103.1**	**105.9**	**105.7**

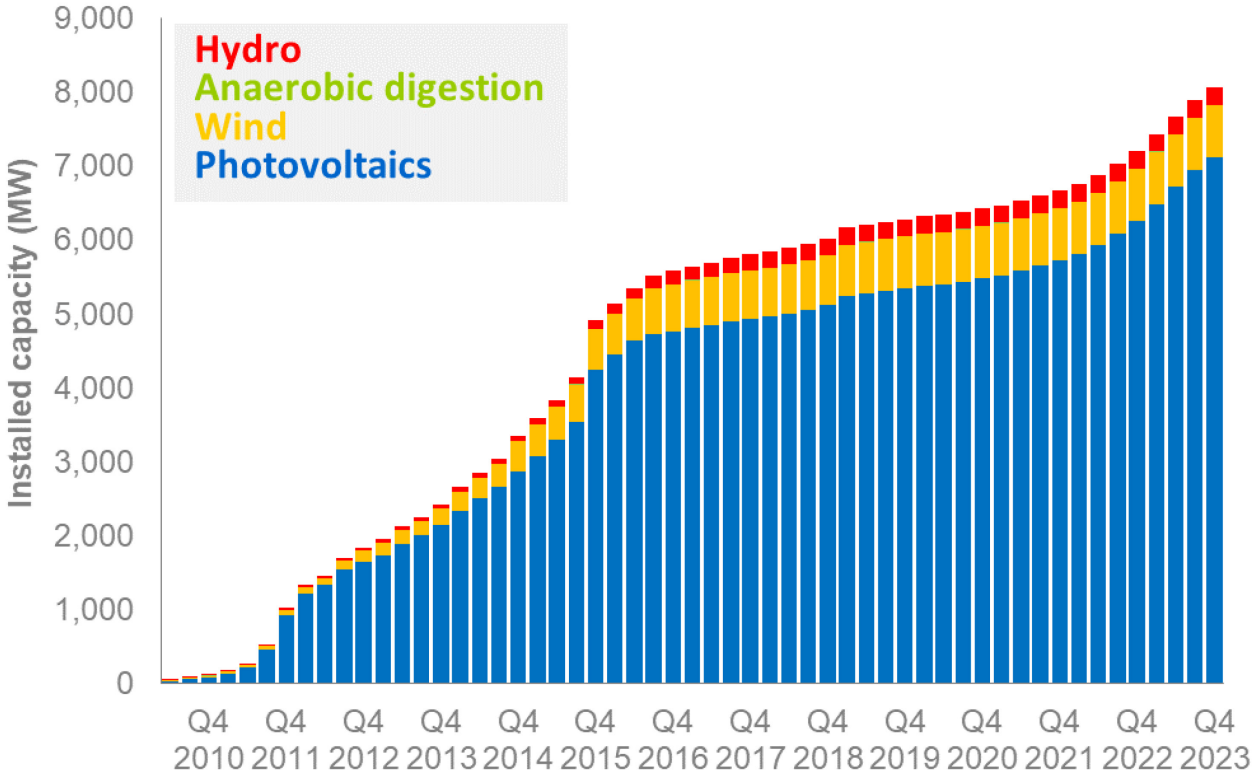
(1) Includes coal, non-CCGT gas, oil and mixed/dual fired. Does not include thermal renewables.
(2) Renewable capacity is on an Installed Capacity basis. Data for other fuels/technologies relates to Declared Net Capacity from 1996 to 2005, data for 2006 onwards is transmission entry capacity (TEC)

Installed capacity for electricity generation in the UK increased gradually between 1996 and 2018, from 73.6 GW to 106.4 GW before falling back as coal-fired and nuclear plants closed. Overall, there has been a decline in conventional steam, outweighed initially by an increase in combined cycle gas turbines (CCGT) and more recently by an increase in renewables. From 2019, the mix of plants shifted towards renewable technologies with the closure of large coal-fired and nuclear power plants. 2023 saw total capacity decrease slightly to 105.7 GW as three of the UK's remaining coal-fired plants closed. This was mitigated by increased renewable capacity, in particular a 6 per cent increase in offshore wind to 14.7 GW and a 9 per cent increase in solar photovoltaics to 16.2 GW.

CCGT capacity increased almost threefold over the period from 1996 to 2012, from 12.7 GW to 35.1 GW. This figure fell over the following years before increasing between 2016 and 2017. Since 2018 CCGT capacity has fallen slightly to 32.3 GW in 2023. Conventional steam capacity has fallen since 2010 with the closure of coal-fired power plants, to 5.4 GW in 2023.

Nuclear capacity declined in 2022 to 5.9 GW as Hunterston B and Hinkley Point B closed. Renewables capacity continued to rise, with an installed capacity in 2023 of 56.6 GW. This is nearly 25 times the capacity installed in 1996. Offshore wind and solar saw the largest increase from 2021 to 2023.

Small scale renewable capacity (GB), 2010 to 2023



Cumulative Installed Capacity (FITs and MCS) – GB only **MW**

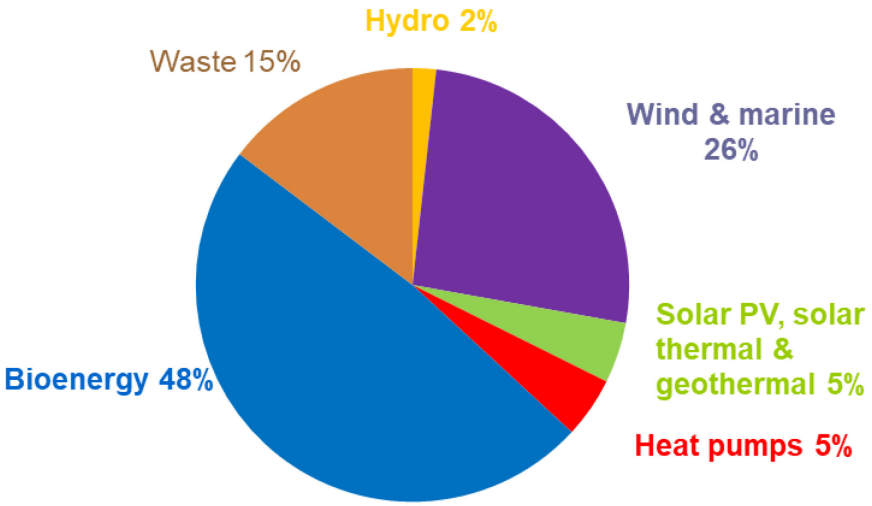
	2010	2012	2014	2016	2020	2021	2022	2023
Micro CHP	6	168	291	496	532	532	532	532
Anaerobic Digestion	1	2	2	3	6	6	6	6
Hydro	12	40	77	183	236	237	237	237
Wind	20	153	405	632	704	704	704	704
Photovoltaics	86	1,640	2,869	4,769	5,482	5,726	6,261	6,492
Total	**125**	**2,004**	**3,645**	**6,082**	**6,961**	**7,204**	**7,740**	**7,971**

Source: Microgeneration Certification Scheme (MCS) and Central FITs register (CFR).

At the end of 2023 7,971 MW of capacity (nearly 1.5 million installations) was installed, around 3.0% more confirmed capacity (but 15% more installations) than at the end of 2022. Nearly all of the new installations and capacity was Solar PV. Small scale capacity increased rapidly between 2010 and 2016 but slowed between 2017 and 2020. The number of small-scale solar PV installations recovered in 2021 and then increased sharply in 2022 and 2023, with 2023 seeing the most installations in a calendar year since 2015. Figures have been revised upwards this year following the receipt of a revised database from the MCS.

These figures are based on MCS data for installations with a capacity lower than 50 kW and the Central FITs register for installations between 50 kW and 5 MW. Registering with MCS was a pre-requisite for the Feed in Tariff (FiT) scheme. The FiT scheme was introduced on 1st April 2010 and is a financial support scheme for eligible low-carbon electricity technologies. The FiT scheme closed to new entrants at the end of March 2019.

Renewable energy sources, 2023



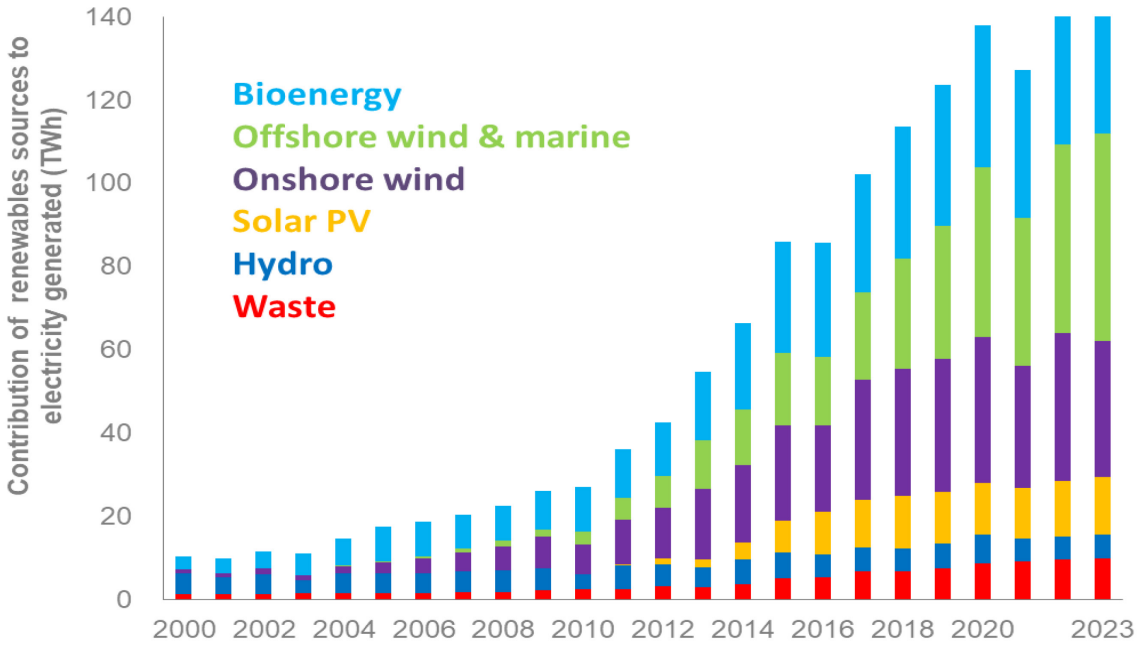
Total renewables used = 27,154 thousand tonnes of oil equivalent (ktoe)

	Thousand tonnes of oil equivalent						
	1990	2000	2010	2020	2021	2022	2023
Solar heating & photovoltaics, geothermal	7	12	31	1,115	1,080	1,183	1,230
Wind & Marine	1	81	885	6,503	5,583	6,926	7,078
Hydro	448	437	309	591	466	487	476
Heat pumps	0	0	778	1,077	1,121	1,182	1,229
Solid biomass	246	724	2,303	8,478	9,043	8,249	7,750
Biogases	218	900	2,063	2,581	2,680	2,696	2,766
Bioliquids	0	0	1,218	1,892	1,790	2,310	2,636
Waste	183	704	1,165	3,437	3,781	3,732	3,990
Total	1,103	2,859	8,751	25,675	25,544	26,765	27,154

In 2023, bioenergy accounted for 48% of renewable energy sources used, with most of the remainder coming from wind (26%), waste (15% for both renewable and non biodegradable waste), heat pumps and solar (4.5% each).

Of the 27.2 million tonnes of oil equivalent (mtoe) of primary energy use accounted for by renewables, 19.1 mtoe were used to generate electricity, 4.7 mtoe to generate heat, 2.3 mtoe in transport with 0.6 mtoe of biogas injected into the grid. Renewable energy use grew by 1.5% between 2022 and 2023 and has increased more than nine-fold since 2000.

Electricity generation from renewable sources since 2000



TWh

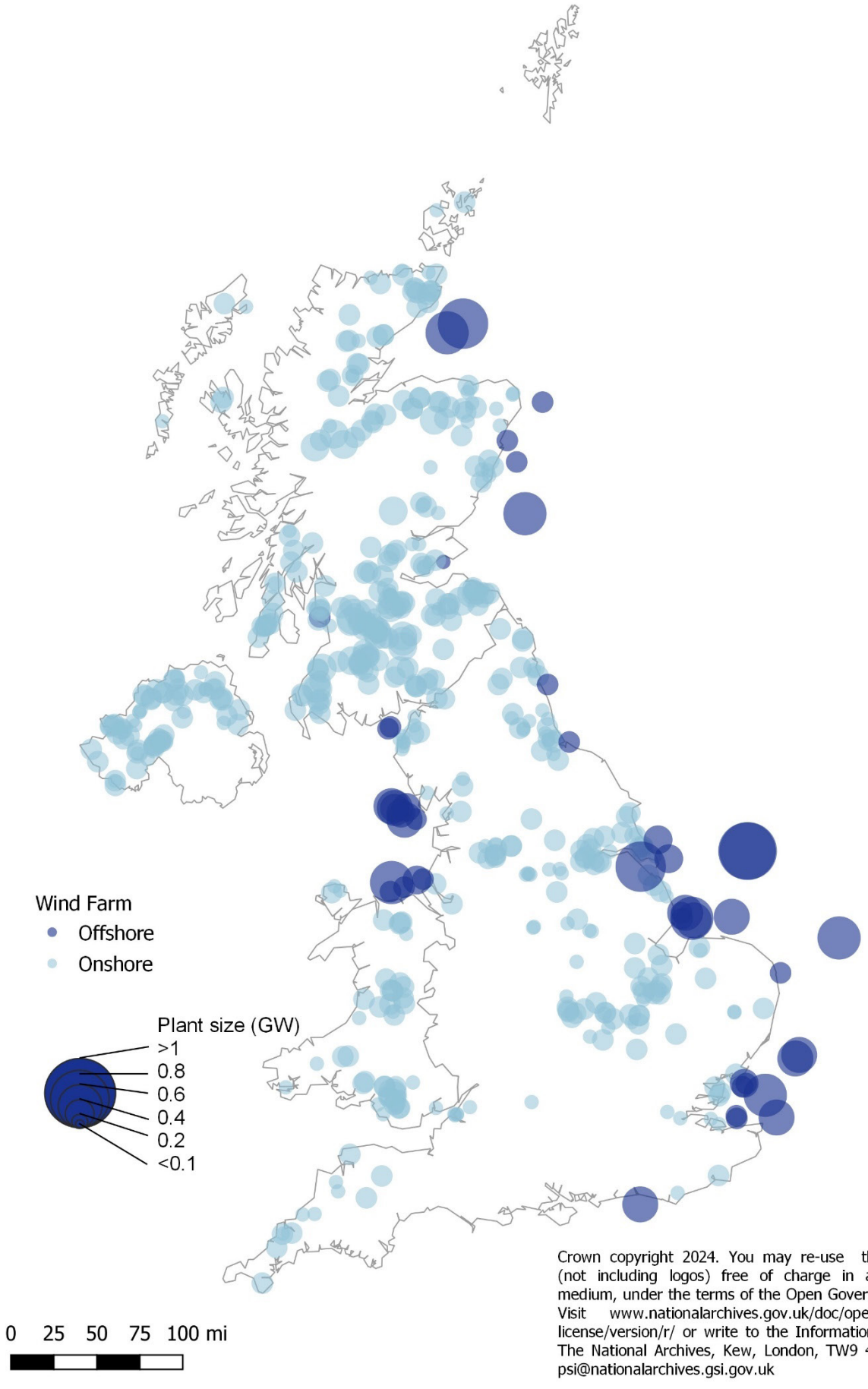
	2000	2010	2020	2021	2022	2023
Onshore wind	0.9	7.2	34.9	29.3	35.4	32.6
Offshore wind	-	3.1	40.8	35.6	45.1	49.7
Solar PV	-	0.0	12.5	12.1	13.3	13.9
Hydro	5.1	3.6	6.9	5.4	5.7	5.5
Landfill Gas	2.2	5.2	3.5	3.3	3.1	3.0
Other Bioenergy	1.7	7.0	35.1	36.7	32.7	31.1
Total Renewables	**9.9**	**26.2**	**133.6**	**122.5**	**135.4**	**135.8**

Electricity generated from renewable sources increased by 0.3% between 2022 and 2023 to 135.8 TWh, a new record figure. The increase on last year is due to more wind and solar PV capacity, which was partly offset by less favourable weather conditions. Generation was marginally ahead of 2022, the previous record and 2020, where generation had been boosted by unusually favourable weather conditions. Capacity grew by 5.0%, this is a smaller increase than the 7.7% seen in 2022 but up on growth rate seen in 2020 and 2021 where new capacity was hampered by Covid-19 restrictions.

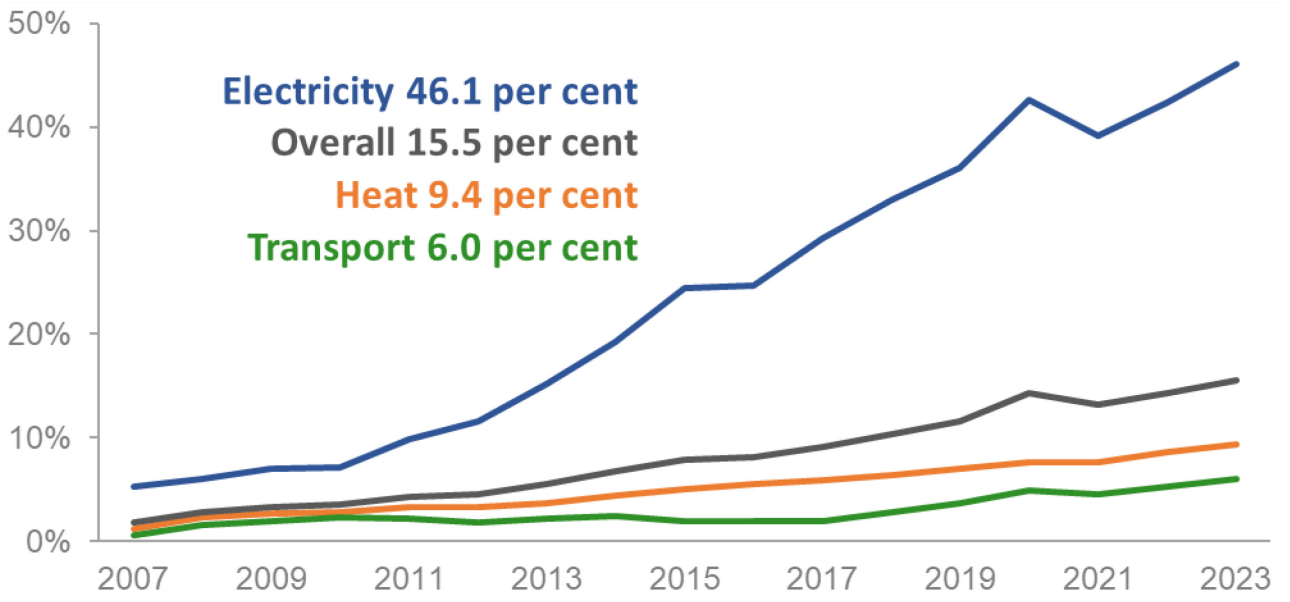
Despite lower average wind speeds and sun hours, 2023 saw record generation for offshore wind and solar PV, driven by new capacity. There were also records for anaerobic digestion and energy from renewable waste. Plant biomass generation decreased by 8.5% due to outages. Onshore wind generation decreased by 10% due to outages and lower average wind speeds. Renewable electricity accounted for a record 46.4% of electricity generated in the UK during 2023, 4.7 percentage points higher than in 2022 because the sustained renewable output was against a backdrop of lower total generation in 2023.

The map on page 33 shows the capacity of wind farms across the UK with a capacity of 5 MW or more. The locations are representative and not exact.

UK Onshore and Offshore Wind Capacity



Renewable proportion of Gross Final Consumption

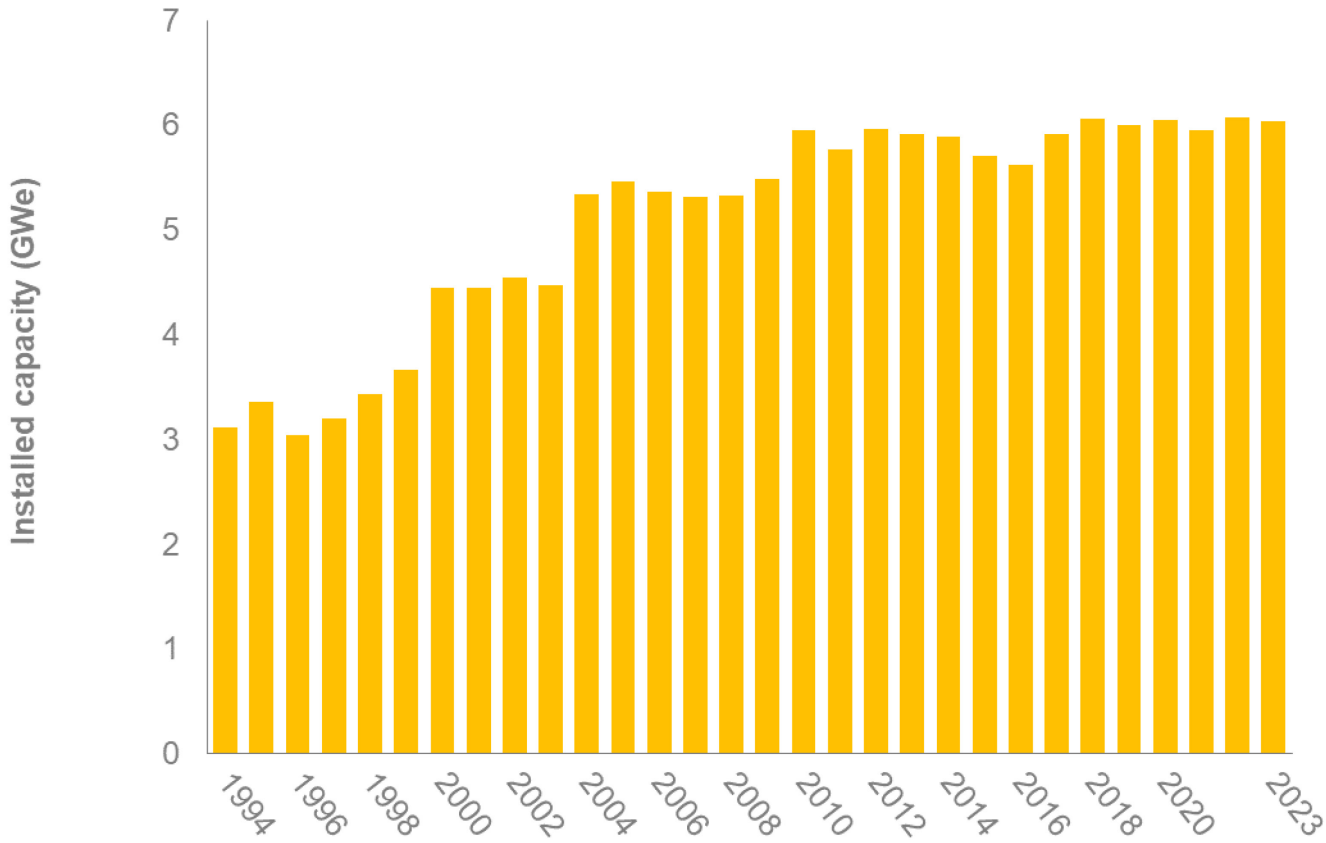


The Gross Final Consumption proportions in the chart reflect the proportion of renewable electricity and heat consumption before losses; the transport measure is on an actual consumption basis. The electricity measure excludes the use of electricity in transport which is allocated to that sector's measure. Heat represents final consumption for fuels other than electricity but includes heat sold.

The proportion of electricity generation from renewables increased in 2023 to 46.1 per cent, in line with the actual generation measure; although renewable generation increased only marginally (by 0.3%), total electricity consumption dropped. The proportion of heat from renewable sources has steadily increased from 1.8 per cent in 2007 to 8.4 per cent in 2022, rising by a further 1.0 percentage point to 9.4% in 2023. This reflects the combination of both lower gas consumption and increasing renewable heat.

Given the dominance of renewable electricity in the overall renewable measure, the impact of higher renewable electricity supply in 2020 has pushed up the overall measure from 14.3 % in 2022 to 15.5% in 2023.

Combined heat and power, 1994 to 2023

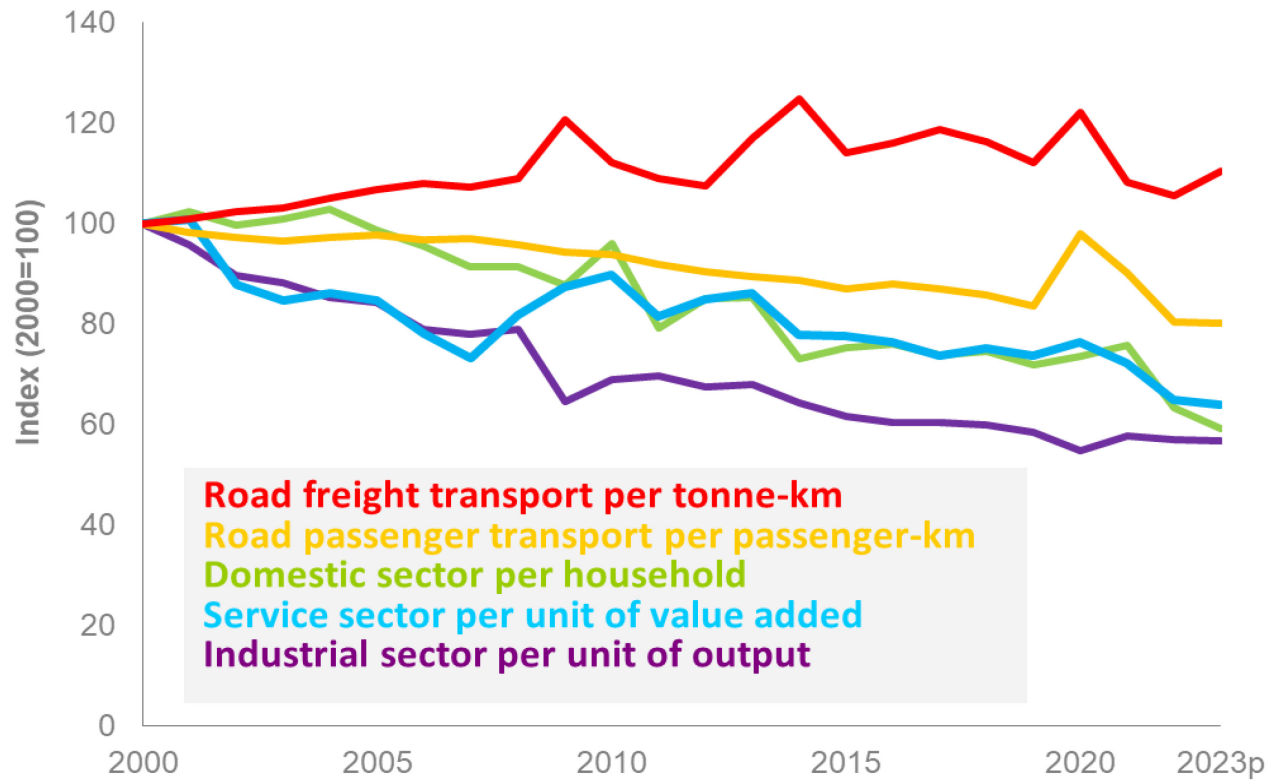


	1995	2000	2020	2021	2022	2023
CHP electrical capacity (MWe)	3,354	4,451	6,049	5,958	6,070	6,033
CHP electrical generation (GWh)	14,777	25,245	22,100	21,834	23,772	22,128
CHP heat generation (GWh)	56,830	54,877	40,735	39,500	39,620	38,735
Number of CHP sites						
<= 100 kWe	620	560	454	352	359	354
> 100 kWe to 1 MWe	397	533	1,253	1,139	1,185	1,187
>1 MWe to 2 MWe	26	41	215	221	227	225
> 2 MWe to 10 MWe	113	141	260	264	270	265
> 10 MWe +	63	64	70	68	68	68
Total	**1,219**	**1,339**	**2,252**	**2,044**	**2,109**	**2,099**

In 2023, the number of CHP schemes and total electrical capacity both fell slightly; by 0.5% and 0.6% respectively.

Electricity generation decreased by 6.9% in 2023, while heat generation decreased by 2.2% when compared to 2022. Schemes larger than 10 MWe represent 69% of the total electrical capacity of CHP schemes whereas schemes less than 1MWe constitute the majority (73%) of the number of schemes. In 2023 CHP schemes accounted for 7.6% of the total electricity generated in the UK and 8.4% of UK gas demand.

Energy intensity, 2000 to 2023



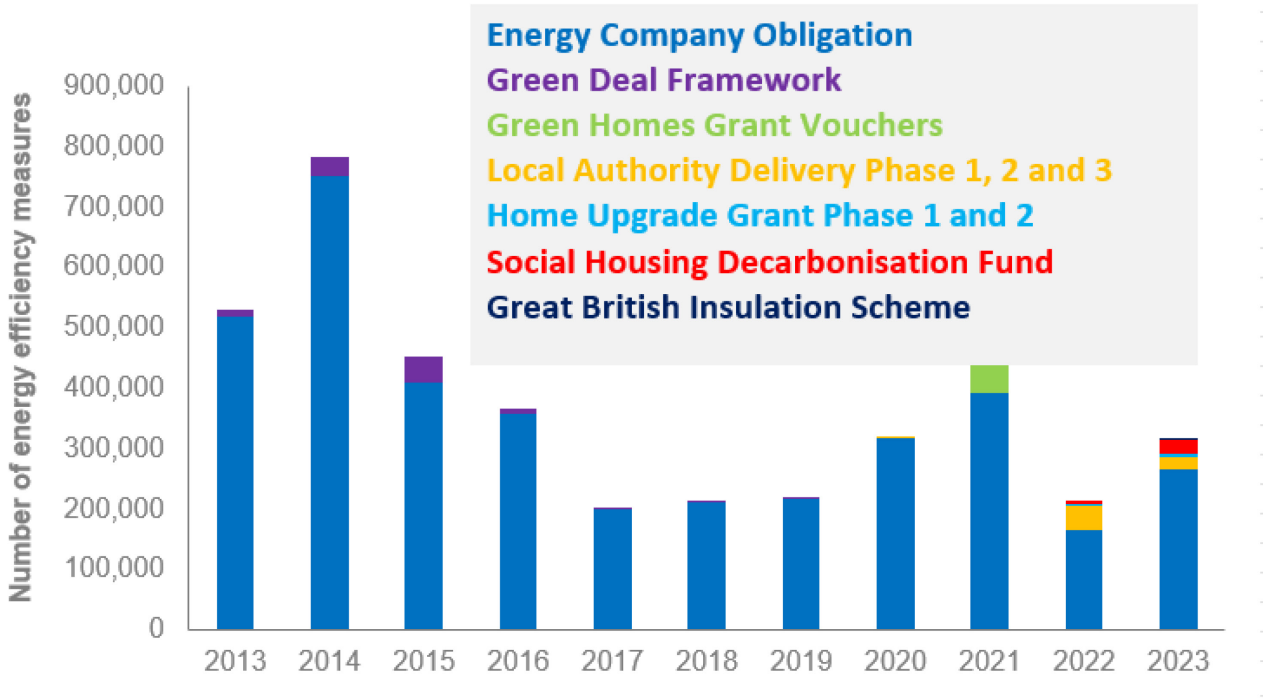
Tonnes of oil equivalent

	2000	2010	2020	2021	2022	2023p
Industrial energy consumption per million units of GVA	140.0	96.6	76.6	80.7	79.8	79.3
Domestic energy consumption per household	1.9	1.8	1.4	1.5	1.2	1.1
Service sector energy consumption per million units of GVA	20.0	17.9	15.2	14.4	13.0	12.8
Road passenger energy consumption per million passenger-kilometres*	38.5	36.1	37.7	34.7	30.9	30.8
Road freight energy consumption per million freight-kilometres*	81.4	91.2	99.2	88.0	85.9	89.9

* DESNZ estimates for 2023.

Energy consumption per unit of output, known as energy intensity, gives a broad indication of how efficiently energy is being used over time. Changes in energy intensity occur for several reasons: process change, technological change and structural change (in the case of industry and the service sector) as well as efficiency change. The largest falls in energy intensity in the 21st century have occurred in the industrial sector, mainly due to structural change in the period before 2000, and in the service sector due to general energy efficiency improvements. In the domestic sector there has been a general downward trend in domestic consumption due to improvements in energy efficiency measures, and more recently due to the impact of higher energy and other prices. The changes in the road passenger and freight categories since 2020 are a direct result of the Covid-19 pandemic and the subsequent easing of travel restrictions.

Energy efficiency measures delivered through Government schemes, 2013 to 2023



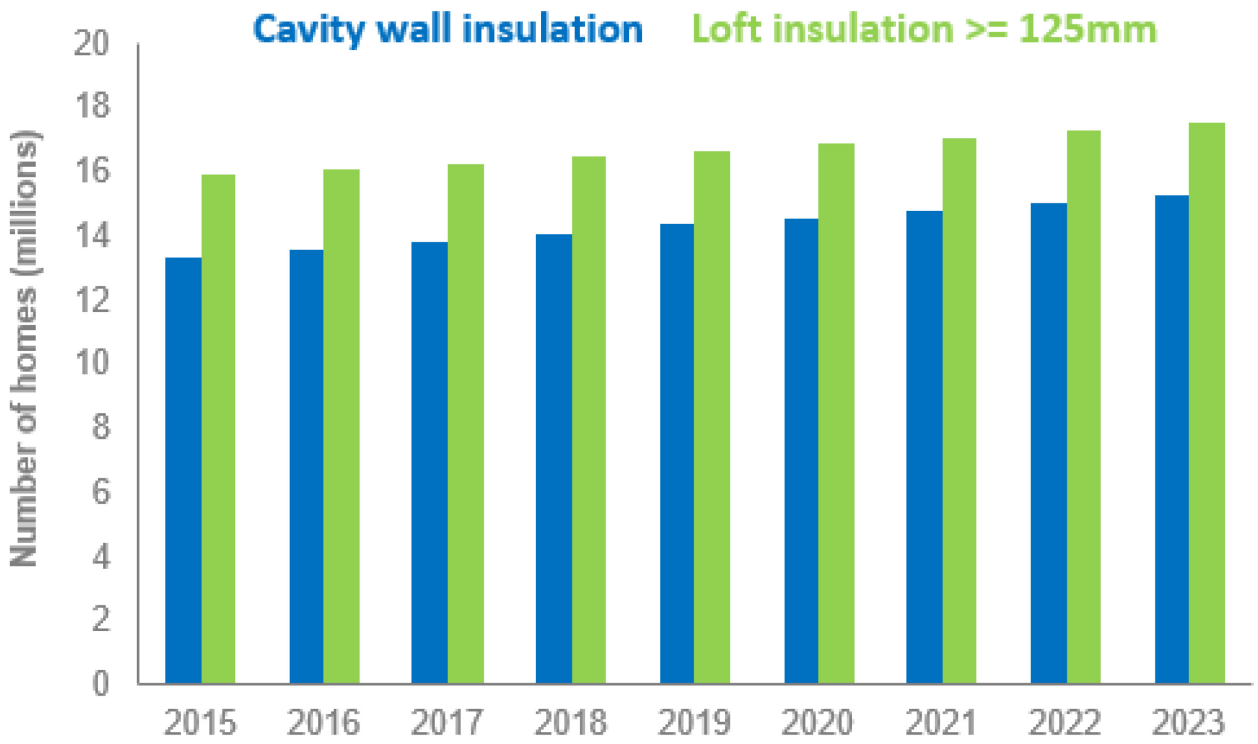
Source: DESNZ, Household Energy Efficiency (HEE) National Statistics, detailed report 2023

The Government has introduced several schemes since 2013 to improve the energy efficiency of households. The biggest of these schemes is the Energy Company Obligation (ECO) which was introduced in January 2013 to reduce energy consumption and support people at greater risk of living in fuel poverty. The larger energy companies are set obligations to install insulation and heating measures to achieve reductions in energy usage and heating costs. ECO is now in its fourth iteration since it began. ECO4 is set to run from April 2022 to March 2026.

Other government schemes introduced since 2013 include the Green Homes Grant Voucher (GHGV) scheme which ran from the end of September 2020 to March 2021. Measure delivery funded through Green Deal (GD) finance plans began in 2013. The Local Authority Delivery (LAD) scheme launched in 2020. Phases 1 to 3 of the scheme ran from October 2020 to December 2023. Phase 1 of the Home Upgrade Grant (HUG) scheme launched in early 2022 and phase 2 launched in mid-2023. The Social Housing Decarbonisation Fund (SHDF) began delivery in March 2022. The Great British Insulation Scheme (GBIS) is the newest scheme which began at the end of March 2023. This scheme runs along ECO4 and focuses on installing the most cost-effective single insulation measures to the least energy efficient homes.

From January 2013 to the end of December 2023, around 4.1 million energy efficiency measures were installed in 2.7 million properties under these schemes. In 2023, 265,000 measures were delivered through ECO, 23,600 measures were delivered through SHDF, 20,400 measures through LAD, 5,600 measures through HUG, and 4,000 measures through GBIS.

Number of homes with energy efficiency measures, December 2015 to December 2023



UK Insulated homes (Thousands)

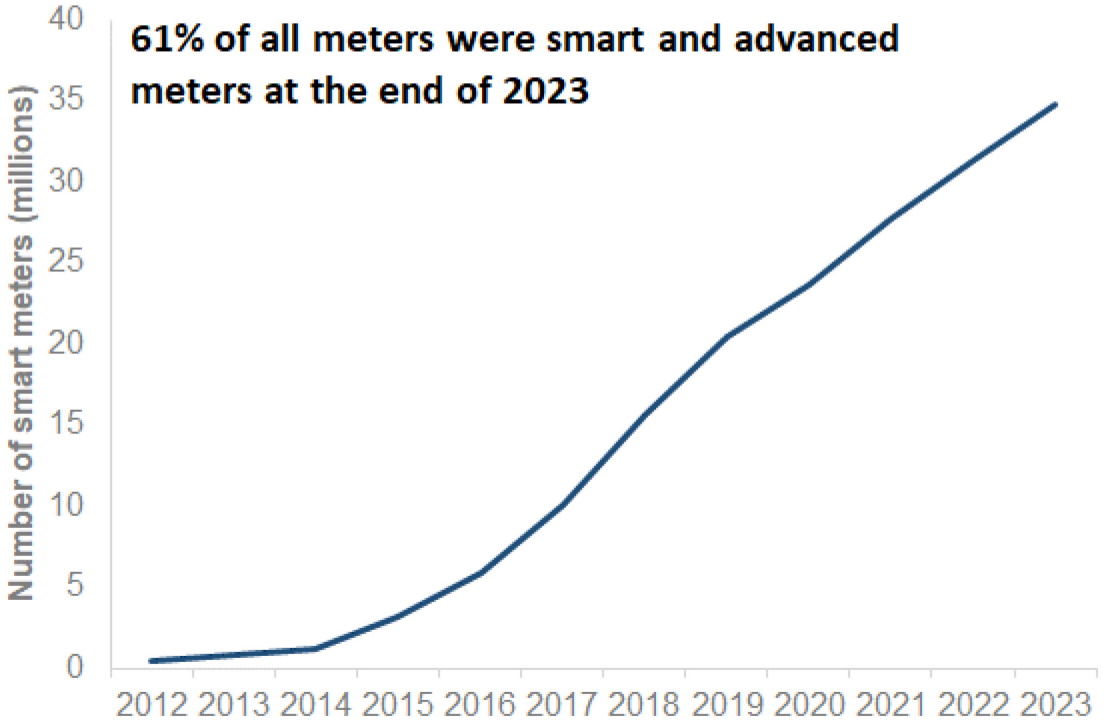
End of year	2015	2017	2019	2021	2022	2023
Cavity wall insulation	13,310	13,800	14,330	14,800	15,050	15,260
Loft insulation >= 125mm	15,870	16,230	16,650	17,070	17,280	17,510

Source: DESNZ, Household Energy Efficiency (HEE) National Statistics, detailed report 2023 – GB level data are scaled up to UK level. Full details on how these estimates are constructed, based on the new methodology, can be found in the HEE statistics methodology note. Figures are rounded to the nearest ten thousand.

Cost effective methods of improving energy efficiency in homes are to install cavity wall and loft insulation where these measures are practical. Building Regulations require new homes to reach thermal efficiency standards which would typically be met by installing these measures. In addition, existing homes have had these measures retrofitted through Government schemes or through a DIY loft insulation. These data show the change in the number of insulated homes as a result of new build and retro fitting insulation via Government schemes.

The number of homes with cavity wall insulation has increased by 15% between the end of December 2015 and December 2023 such that 15.3 million of the 21.6 million homes with cavities, are insulated. The number of homes with loft insulation, of a depth of at least 125mm, has increased by 10% between the end of December 2015 and December 2023 meaning that 17.5 million of the 26.2 million homes with lofts are insulated to this level.

Smart meters in Great Britain, December 2012 to December 2023



Total meters (Thousands)

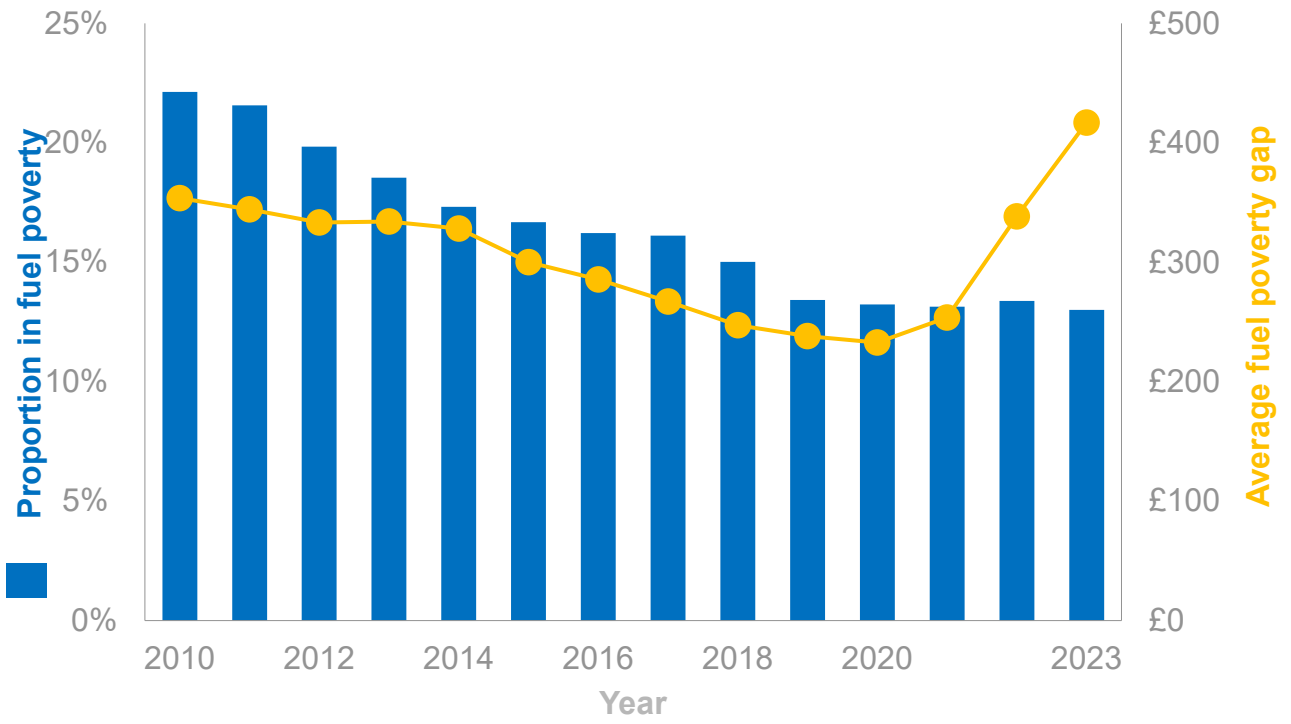
End of year[1]	2012	2018	2019	2020	2021	2022	2023
Domestic							
Smart	3	14,514	19,164	22,170	26,135	29,572	32,909
Non-smart	47,726	36,522	32,681	30,267	26,588	23,771	20,842
Non-domestic[2]							
Smart	454	1,135	1,313	1,476	1,634	1,745	1,896
Non-smart	2,424	2,092	1,887	1,807	1,696	1,586	1,423
Total							
Smart	457	15,648	20,477	23,646	27,769	31,318	34,805
Non-smart	50,150	38,614	34,568	32,073	28,285	25,357	22,264

Source: DESNZ, Smart Meter Statistics in Great Britain, Quarterly update May 2024.
1. Data for 2013-2017 are not included in this table but can be found in the UK Energy in Brief 2024 dataset.
2. Non-domestic sites include small businesses and microbusinesses; Smart in non-domestic sites includes both Smart and Advanced meters.

Smart meters are replacing traditional gas and electricity meters as part of a national infrastructure upgrade that will make our energy system more efficient and flexible, enabling us to use more renewable energy and reduce our reliance on imported fossil fuels. They can tell customers how much energy they are using and how much it costs through an In-Home Display (IHD) which helps customers manage their energy use, save money and reduce emissions. Smart meters communicate automatically with energy suppliers, which avoids manual meter reads and provides customers with accurate bills.

At the end of December 2023 there were 34.8 million smart meters operating in Great Britain. Of these, 31.0 million were smart meters operating in smart mode or advanced meters. At the end of 2023, 61% of all meters in domestic households were smart, compared to 57% in smaller non-domestic sites. Overall, 61% of all meters in domestic or smaller non-domestic sites were smart, an increase of six percentage points from the end of 2022.

Households in fuel poverty, 2010 to 2023



Fuel poverty in England is measured using the Low-Income Low Energy Efficiency (LILEE).

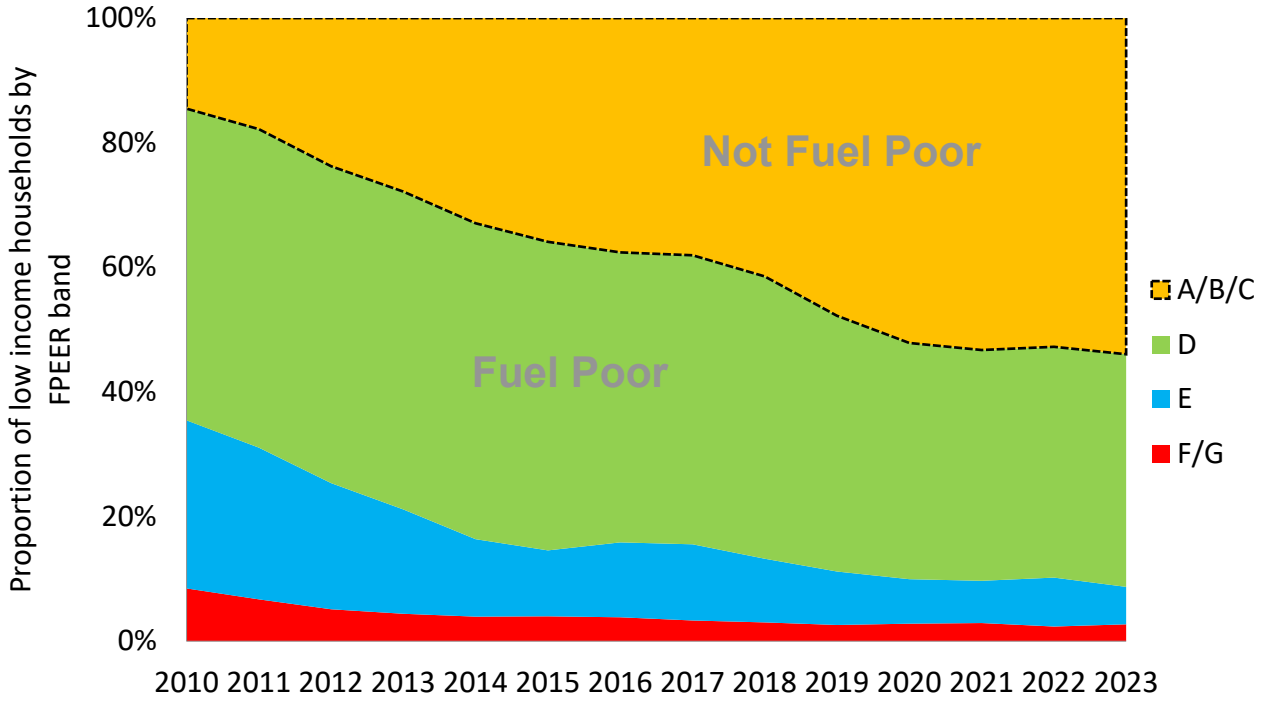
Under LILEE, a household is considered to be fuel poor if: they are living in a property with a fuel poverty energy efficiency rating of band D or below; and were they to spend the required amount to heat their home, they would be left with a residual income below the official poverty line.

- In 2023, there were an estimated 13.0 per cent of households (3.17 million) in fuel poverty in England under the Low Income Low Energy Efficiency (LILEE) metric, effectively unchanged from 13.1 per cent in 2022 (3.18 million).
- In 2023, the average fuel poverty gap (the reduction in fuel bill that the average fuel poor household needs in order to not be classed as fuel poor) in England was estimated at £417, up by 20 per cent from £348 in 2022, in real terms.
- The higher number of households in fuel poverty and increase in the average gap also caused the aggregate fuel poverty gap for England to continue to increase in 2023 (by 20% in real terms) to £1.32 billion (from £1.1 billion in 2022).

Key drivers of fuel poverty, 2022-2023

- Housing and Energy Impact: Rising housing costs led to an estimated 51,000 new cases of fuel poverty, while a 19% increase in real-term gas and electricity prices from 2022 to 2023, after government support, is estimated to increase fuel poverty by around 238,000 households.
- Income and Efficiency Benefits: Targeted income support and cost of living payments for 2022/23 and 2023/24 have lifted around 179,000 households out of fuel poverty, with energy efficiency improvements and the Warm Home Discount further reducing the number by 112,000 households.

Low income households by FPEER[2] band, 2010 to 2023



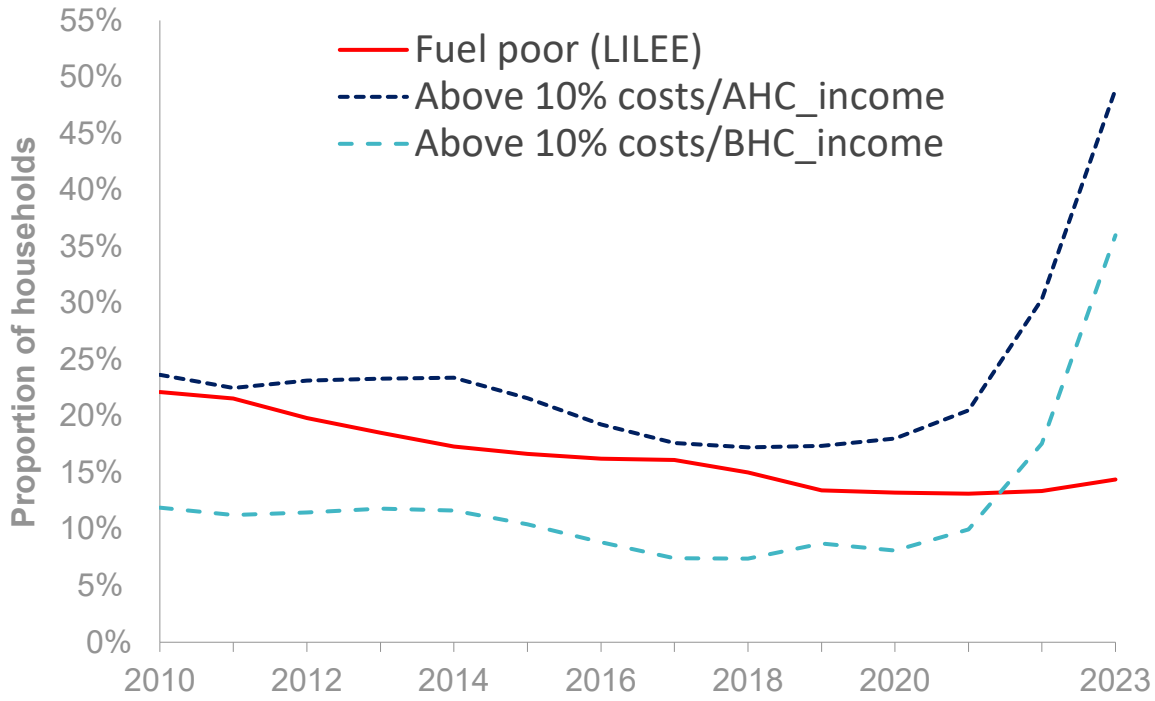
In December 2014 the Government introduced a new statutory fuel poverty target for England. The target is to ensure that as many fuel poor homes as reasonably practicable achieve a minimum energy efficiency rating of Band C by 2030 (with interim milestones to lift as many fuel poor homes in England as is reasonably practicable to Band E by 2020; and Band D by 2025). Under the LILEE metric a household that achieves a fuel poverty energy efficiency rating of band C or above would not be fuel poor, and therefore fuel poverty would be eradicated if all low-income households achieved an energy efficiency band C rating. Progress towards the fuel poverty target is now measured as the share of all low-income households who achieve an energy efficiency band C in 2030 and the interim milestones.

In 2023, slight progress was made towards the 2030 fuel poverty target, with 54.0 per cent of low-income households living in properties with an energy efficiency rating of A, B or C, an increase of 39.4 percentage points since 2010 and an increase of 0.9 percentage points since 2022.

Target year	Fuel poverty target	2010 (%)	2023 (%)	Percentage point change
2025	Band D or above	64.6	91.3	26.7
2030	Band C or above	14.6	54.0	39.4

[2] Fuel poverty energy efficiency rating (FPEER)

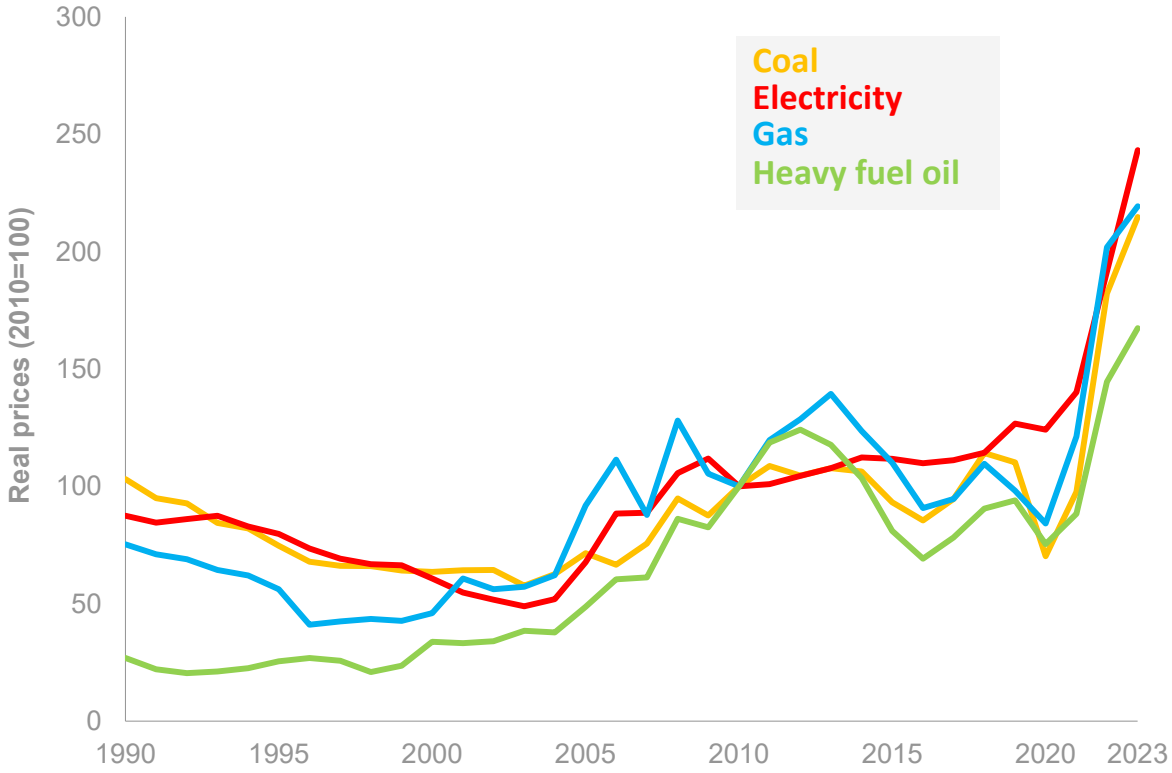
Energy affordability metrics, 2010 to 2023



The share of fuel poor (LILEE) households decreased steadily between 2010 and 2019 driven by energy efficiency improvements. Since 2019 this has showed very little change as energy efficiency progress was offset by income changes during the pandemic followed by rising energy prices.

Energy prices have risen sharply since 2020, so even those not in fuel poverty as measured by the main Government metric for England may struggle with their energy bills. Two different measures are presented looking at shares of money spent on energy both after housing costs have been accounted for (AHC), and before housing costs (BHC). These 10% affordability measures are much more sensitive to energy prices. Using the AHC indicator, the percentage of households exceeding this threshold more than doubled from 18.0 per cent in 2020 to 48.9 percent in 2023 but is projected to start falling in 2024 as prices are projected to fall. The BHC measure will always be lower than AHC and up to 2021 was lower than the LILEE metric. This is estimated to have doubled to 36.0 per cent in 2023 from 17.6 per cent in 2022.

Fuel price indices for the industrial sector, 1990 to 2023



Real prices, 2010 = 100

	1990	2000	2010	2020	2021	2022	2023
Coal	103.1	63.5	100.0	70.3	97.7	182.2	214.8
Electricity	87.5	60.8	100.0	124.2	140.1	191.5	243.2
Gas	75.3	46.0	100.0	84.2	121.3	201.9	219.3
Heavy fuel oil	26.9	33.8	100.0	75.4	88.4	144.6	167.4
Industrial prices	**77.4**	**52.6**	**100.0**	**110.8**	**129.9**	**187.2**	**229.9**

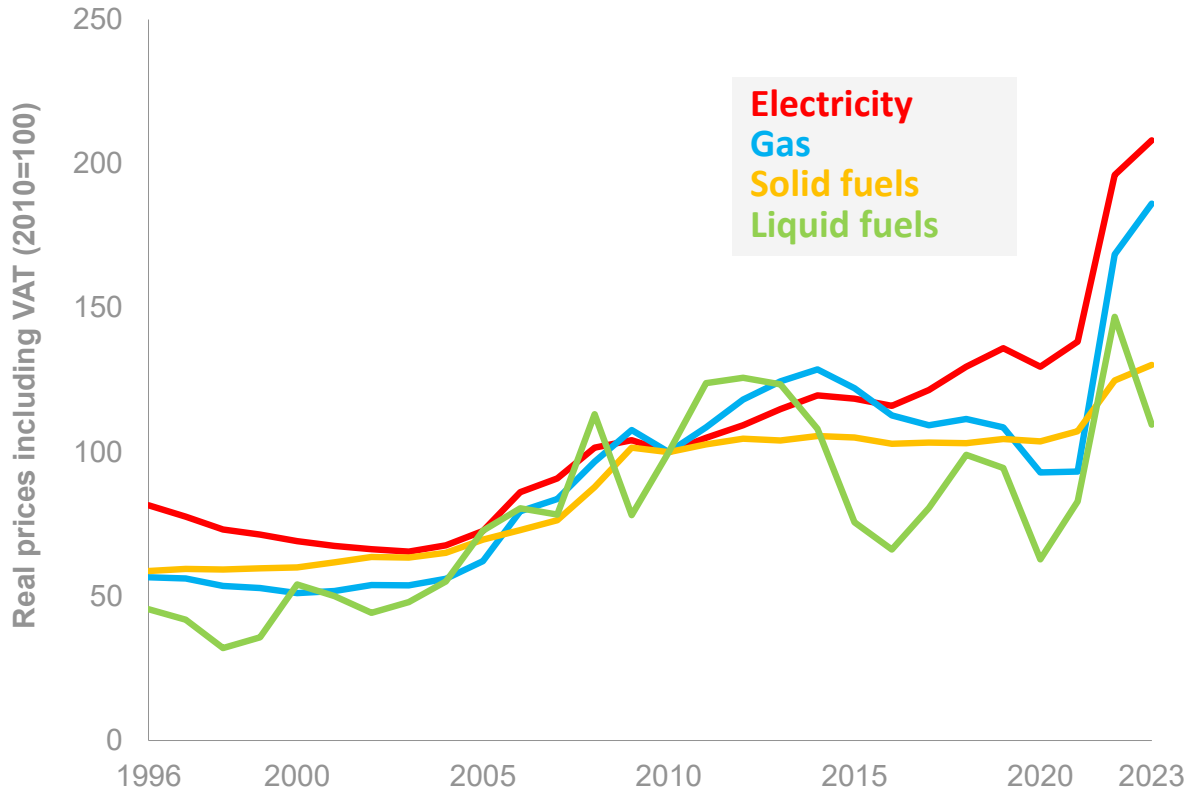
Includes the Climate Change Levy that came into effect in April 2001

Industrial prices, in real terms, steadily fell from the mid-1980s until 2003 where they were at their lowest. Industrial prices then rose again reaching a peak in 2013 before steadily falling and rising again to a new peak in 2019. Industrial prices fell in 2020, however, in 2021 coal, electricity, gas and heavy fuel oil prices all increased and in both 2022 and 2023, saw further increases.

Compared to the previous year, in 2022 industrial electricity prices, in real terms, were up by 27% and were the highest on record. Gas prices were up by 8.6%. Coal prices paid for by industry were up by 18%. Industrial heavy fuel oil prices in real terms were up by 16%.

Over the last five years industrial gas prices, in real terms, have increased by 100% and electricity prices have increased by 113%.

Fuel price indices for the domestic sector, 1996 to 2023



Real prices including VAT, 2010 = 100

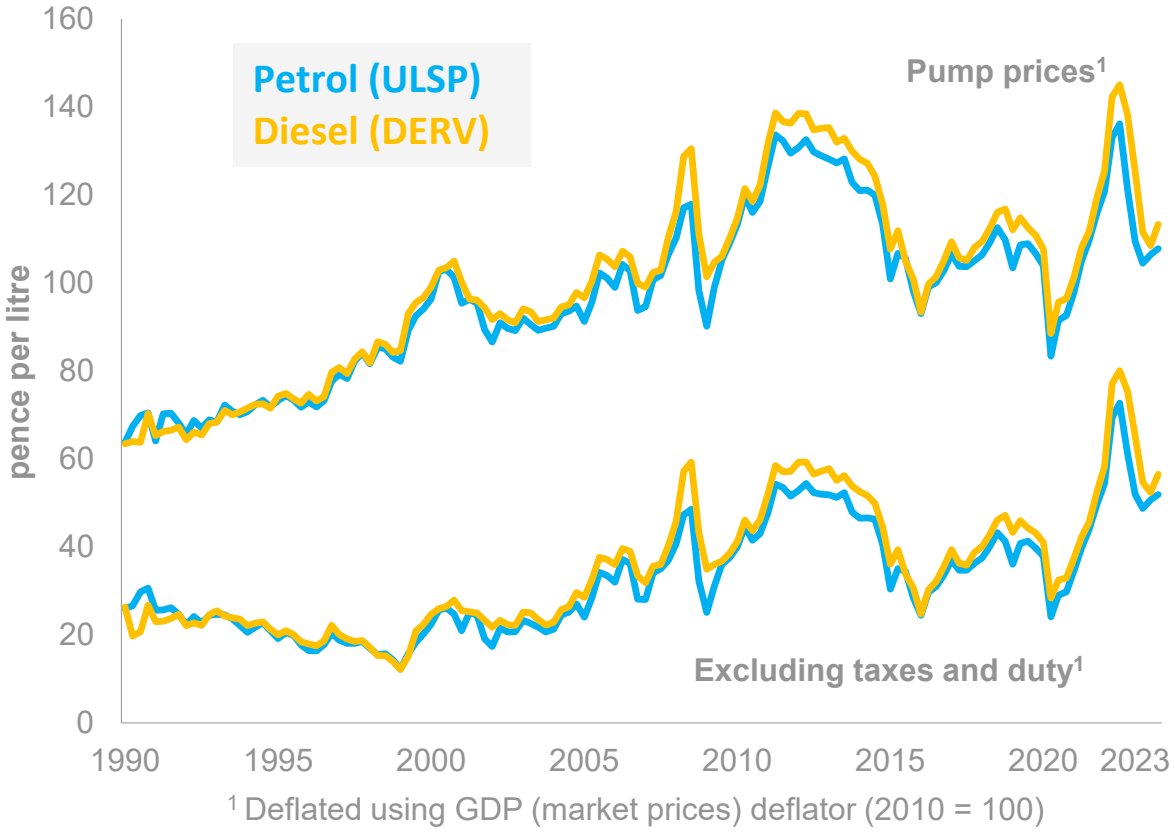
	1996	2000	2010	2020	2021	2022	2023
Solid fuels	58.7	60.0	100.0	103.7	107.2	124.8	130.2
Electricity	81.5	69.1	100.0	92.9	93.2	168.5	186.1
Gas	56.6	51.1	100.0	129.6	138.3	196.1	208.1
Liquid fuels	45.5	54.1	100.0	62.8	82.9	146.9	109.5
Domestic fuels	**67.4**	**60.5**	**100.0**	**111.3**	**116.7**	**182.7**	**196.9**

Source: Consumer Price Index, Office for National Statistics

Compared to 2022, total domestic energy prices in total for 2023 increased in real terms by 7.8%. Over the same period, liquid fuels decreased by 25%, gas prices increased by 10%, electricity prices increased by 6.1% and solid fuels increased by 4.3%.

Comparing prices in 2023 with prices 10 years prior, real prices for domestic fuels overall increased by 64%. The real price of electricity increased by 81%, solid fuels increased by 25%, gas increased by 50% and liquid fuel prices decreased by 11%.

Petrol and diesel prices, 1990 to 2023

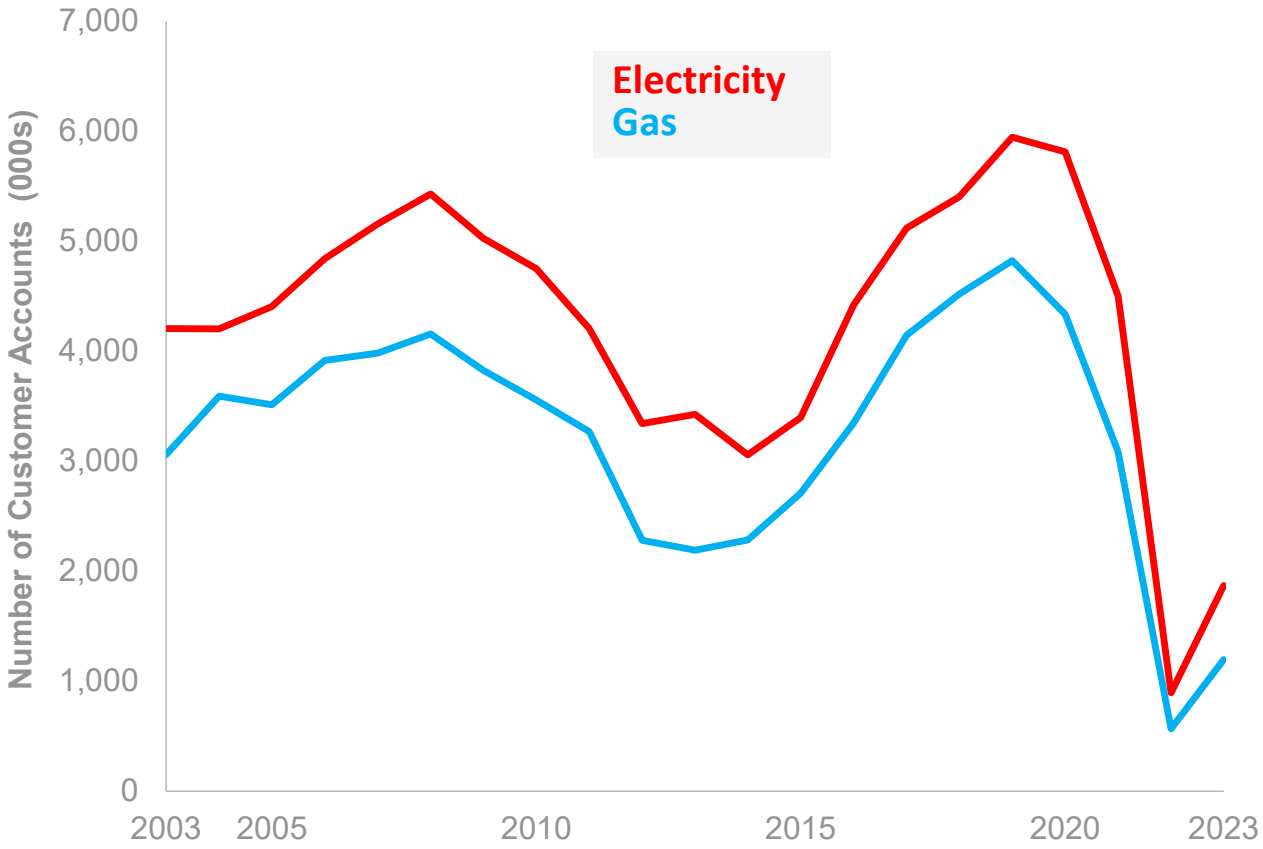


Current retail prices	Pence/litre	
	Petrol (ULSP)	Diesel
1990	42.0	40.5
2000	79.9	81.3
2005	86.8	90.9
2010	116.9	119.3
2015	111.1	114.9
2020	113.9	119.1
2021	131.3	134.9
2022	164.7	177.7
2023	147.7	158.2

In cash terms the price of Ultra Low Sulphur Petrol (ULSP) cost 17 pence per litre less and diesel cost 19 pence per litre less in 2023 than in 2022.

In real terms the price of petrol was 16% lower and diesel was 17% lower in 2023 compared to 2022. In 2023 taxes and duty accounted for 53% of the retail price of unleaded and 50% of the price of diesel.

Domestic supplier transfers, 2003 to 2023



Number of households switching domestic energy supplier, 2003 to 2021, in 000s

(000s)	2003	2005	2010	2020	2021	2022	2023
Electricity	4,204	4,405	4,750	5,811	4,502	893	1,867
Gas	3,059	3,511	3,556	4,336	3,082	566	1,195

Please note: the number of customers switching supplier shown in the graph is based on the number of meter points a supplier gains from another following a customer choice to change their supplier. This number does not include either internal switches among white labels or brands associated with the same supplier or customer transfers resulting from corporate changes, company mergers and Supply of Last Resort events.

Source: Transfer Statistics, Ofgem

The number of households that switched energy suppliers in Great Britain increased by 111% for gas and increased by 109% for electricity between 2022 and 2023.

The increase in transfers in 2023 were affected by reductions in the Ofgem Default Tariff cap (the price cap[3]) and allowing for more competitive tariffs being offered from energy companies for both electricity and gas.

[3] https://www.ofgem.gov.uk/energy-policy-and-regulation/policy-and-regulatory-programmes/default-tariff-cap

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Natural gas consumption	Alice Heaton	0775 277 8975	gas.stats@energysecurity.gov.uk
Electricity	Vanessa Martin	0776 757 3907	electricitystatistics@energysecurity.gov.uk
Renewables	William Spry	0782 519 4608	renewablesstatistics@energysecurity.gov.uk
Combined Heat and Power	Liz Waters	0747 135 8441	energy.stats@energysecurity.gov.uk
Energy Efficiency Installations	Tom Joss	0774 170 1212	energyefficiency.stats@energysecurity.gov.uk
Smart Meters	Mita Kerai	0747 135 8256	smartmeter.stats@energysecurity.gov.uk
Fuel Poverty	Georgina Smalldridge	0774 170 1232	fuelpoverty@energysecurity.gov.uk
Energy prices	William Nye	0787 603 8720	energyprices.stats@energysecurity.gov.uk

To convert from the units on the left-hand side to the units across the top multiply by the value in the table.

	to:	**Thousand toe**	**TJ**	**GWh**	**Million therms**
from:	**Thousand toe**	1	41.868	11.63	0.39683
	TJ	0.023885	1	0.27778	0.0094778
	GWh	0.085985	3.6	1	0.034121
	Million therms	2.52	105.51	29.307	1

Data relating to the energy content of fuels are on a gross calorific value basis.

Prices are presented in real terms i.e., the effect of inflation has been removed by adjusting each series using the GDP deflator.

The symbol '-' is used in the tables where the figure is nil or not separately available, and '..' is used to indicate 'not available'.

The Department for Energy Security and Net Zero is the source of all data except where stated.

All data within this publication are classified as National Statistics, except those on page 39 which are classified as Official Statistics.

All figures are for the United Kingdom, except for pages 37, 38, 39, 40, 41, 42 and 46.

The Department for Energy Security and Net Zero (DESNZ) also produces the following energy and climate change statistics publications:

The **Digest of United Kingdom Energy Statistics** is the annual energy statistics publication of DESNZ. With extensive tables, charts and commentary covering all the major aspects of energy, it provides a detailed and comprehensive picture of the last three years and a detailed picture for the last five years. It includes detailed information on the production and consumption of individual fuels and of energy as a whole. The 2024 edition, published on 30 July 2024, is available at:
https://www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes

The **Energy Flow Chart** is an annual publication illustrating the flow of primary fuels from home production and imports to their eventual final uses. They are shown in their original state and after being converted into different kinds of energy by the secondary fuel producers. The 2024 edition of the chart, published on 30 July 2024, shows the flows for 2023 and is available at: https://www.gov.uk/government/collections/energy-flow-charts

Energy Trends is a quarterly publication of statistics on energy in the United Kingdom. It includes tables, charts and commentary covering all major aspects of energy. It provides a comprehensive picture of energy production and use, to allow readers to monitor trends during the year. https://www.gov.uk/government/collections/energy-trends
Monthly updates to tables in Energy Trends split by fuel source are also available.

Energy Consumption in the United Kingdom brings together statistics from a variety of sources to produce a comprehensive review of energy consumption and changes in intensity and output since the 1970s, with a particular focus on trends since 2000. The information is presented in five key themes covering overall energy consumption, energy intensity by sector, primary energy consumption, end uses and electrical products consumption and stock.
https://www.gov.uk/government/collections/energy-consumption-in-the-uk

UK Greenhouse Gas Emissions statistics are produced by DESNZ to show progress against the UK's goals, both international and domestic, for reducing greenhouse gas emissions.
https://www.gov.uk/government/collections/uk-greenhouse-gas-emissions-statistics

Household Energy Efficiency statistics are published by DESNZ on the Energy Company Obligation (ECO) and Green Deal (GD). The headline release presents monthly updates of ECO measures and quarterly updates of in-depth ECO statistics, carbon savings and the Green Deal schemes. The detailed report presents annual updates on in-depth Green Deal statistics and insulation levels.
https://www.gov.uk/government/collections/household-energy-efficiency-national-statistics

Smart Meters statistics are produced by DESNZ on the roll-out of smart meters in Great Britain, and covers both operating and installed meters.
https://www.gov.uk/government/collections/smart-meters-statistics

Fuel Poverty statistics are produced by DESNZ to support the Fuel Poverty Strategy for England.
https://www.gov.uk/government/collections/fuel-poverty-statistics

Energy Prices is a quarterly publication that contains tables, charts and commentary covering energy prices, to domestic and industrial consumers, for all the major fuels. It also presents comparisons of fuel prices in the European Union and G7 countries.
https://www.gov.uk/government/collections/quarterly-energy-prices

Sub-National Energy Consumption statistics are produced by DESNZ to emphasise the importance of local and regional decision making for energy policy in delivering a number of national energy policy objectives.
https://www.gov.uk/government/organisations/department-for-energy-security-and-net-zero/about/statistics

DESNZ has constructed a **National Energy Efficiency Data-framework (NEED)** to enable detailed statistical analysis of energy efficiency. The data framework matches the gas and electricity consumption data collected for DESNZ sub-national energy consumption statistics and records of energy efficiency measures in the Homes Energy Efficiency Database (HEED) run by the Energy Saving Trust (EST), as well as typographic data about dwellings and households.
https://www.gov.uk/government/collections/national-energy-efficiency-data-need-framework

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 September 2018. 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.

Any enquiries regarding this publication should be sent to us at: energy.stats@energysecurity.gov.uk

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

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