Department for
Business, Energy
& Industrial Strategy

UK ENERGY IN BRIEF 2022

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- meet identified user needs
- are well explained and readily accessible
- are produced according to sound methods, and
- are managed impartially and objectively in the public interest

Once statistics have been designated as National Statistics it is a statutory requirement that the Code of Practice shall continue to be observed.

UK ENERGY IN BRIEF 2022

This booklet summarises the latest statistics on energy production, consumption, prices and climate change in the United Kingdom. Figures are primarily taken from the 2022 edition of the “Digest of UK Energy Statistics”, published on 28 July 2022. Details of the Digest and other Department for Business, Energy and Industrial Strategy (BEIS) statistical publications on energy and climate change can be found on pages 47 and 48 of this booklet and are available at: www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy/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 Business, Energy and Industrial Strategy (BEIS) 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.

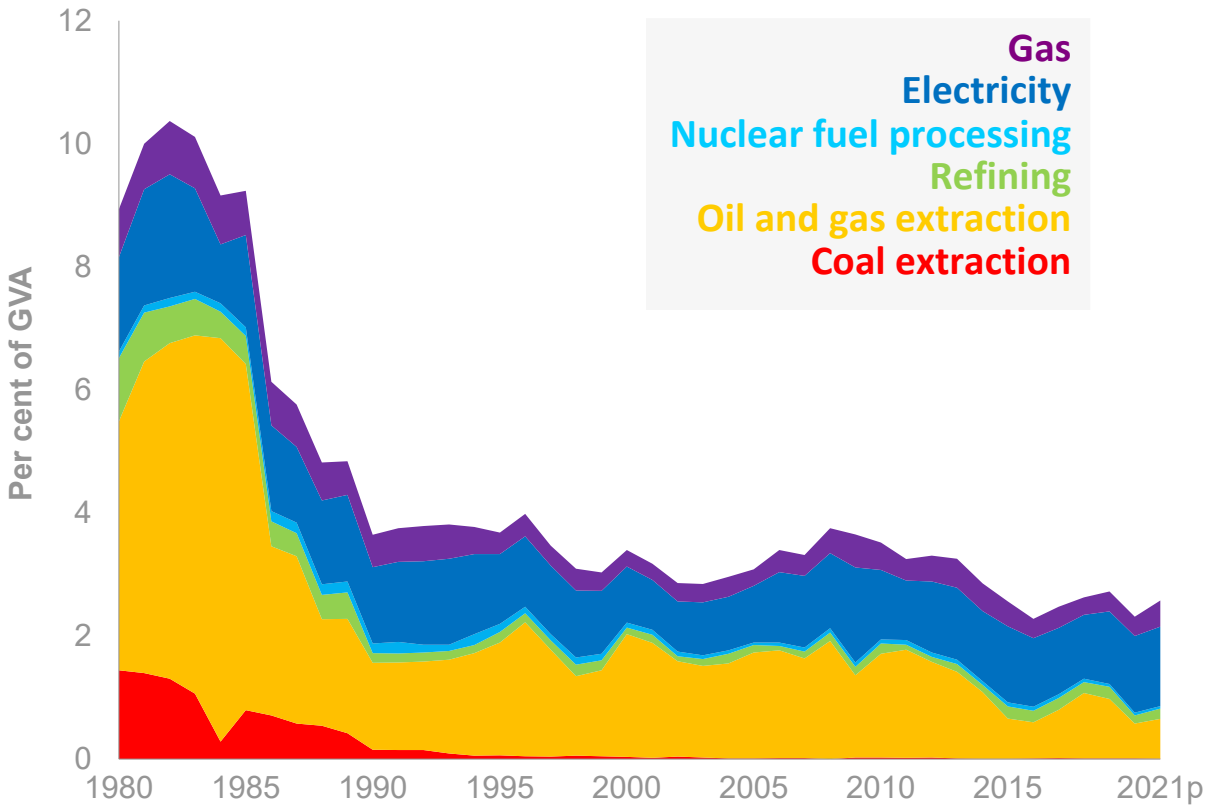
The detailed background data on energy production and consumption can be found in the Digest of UK Energy Statistics 2022 available at:
www.gov.uk/government/collections/digest-of-uk-energy-statistics-dukes

Other statistical outputs produced by BEIS and drawn on in this publication are listed on pages 48 and 49.

THE ENERGY INDUSTRIES' CONTRIBUTION TO THE UK ECONOMY IN 2021

- 2.5% of GVA (Gross Value Added).
- 175,000 people directly employed (6.3% of industrial employment) and more indirectly (e.g., in support of UK Continental Shelf production).
- 8.0% of total investment.
- 26.2% of industrial investment.
- 1.3% of annual business expenditure on research and development in 2020.

Contribution to GVA by the energy industries, 1980 to 2021

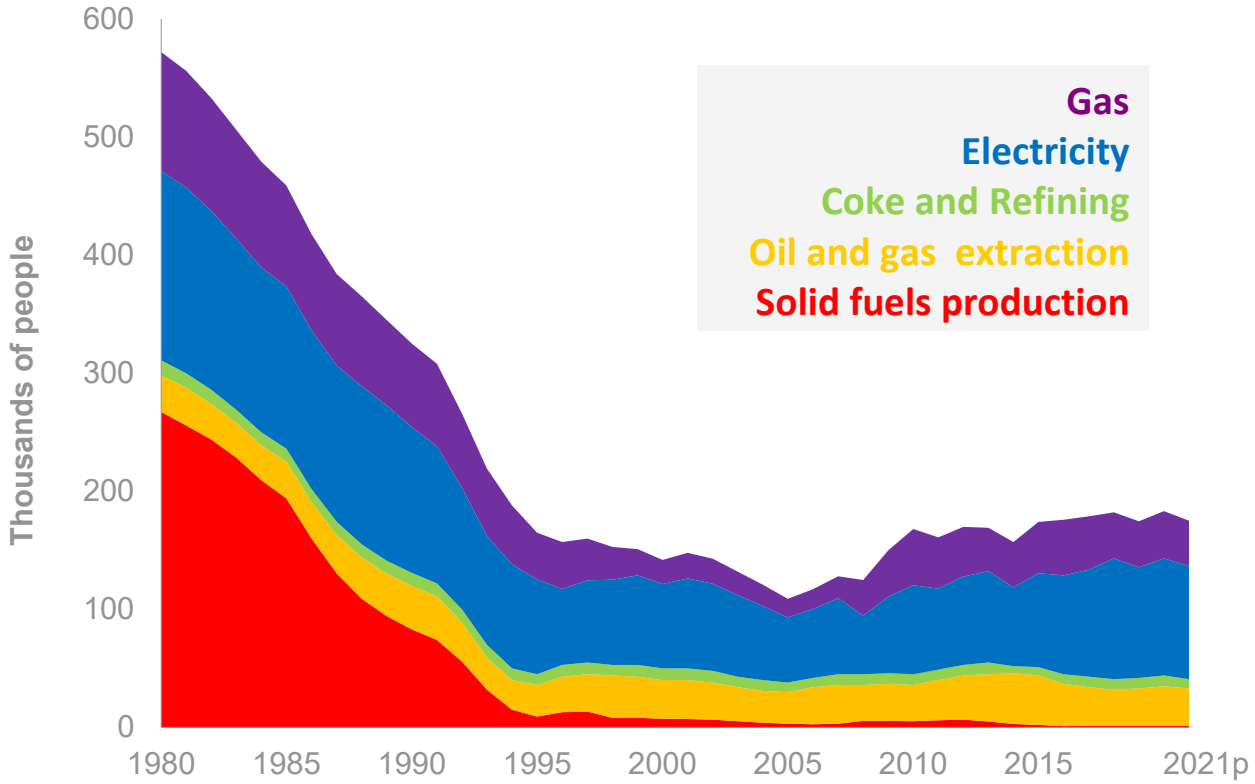


Source: Office for National Statistics

The contribution to the UK economy by the energy industries peaked in 1982 at 10.4%. In 2021, the contribution by the energy industries to the UK economy was 2.5% of GVA, 0.3 percentage points higher than in 2020.

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, with the exception of 2018, electricity has become the major energy contributor. Of the energy total in 2021 electricity (including renewables) accounted for 51%, oil and gas extraction accounted for 23%, and gas accounted for 17%.

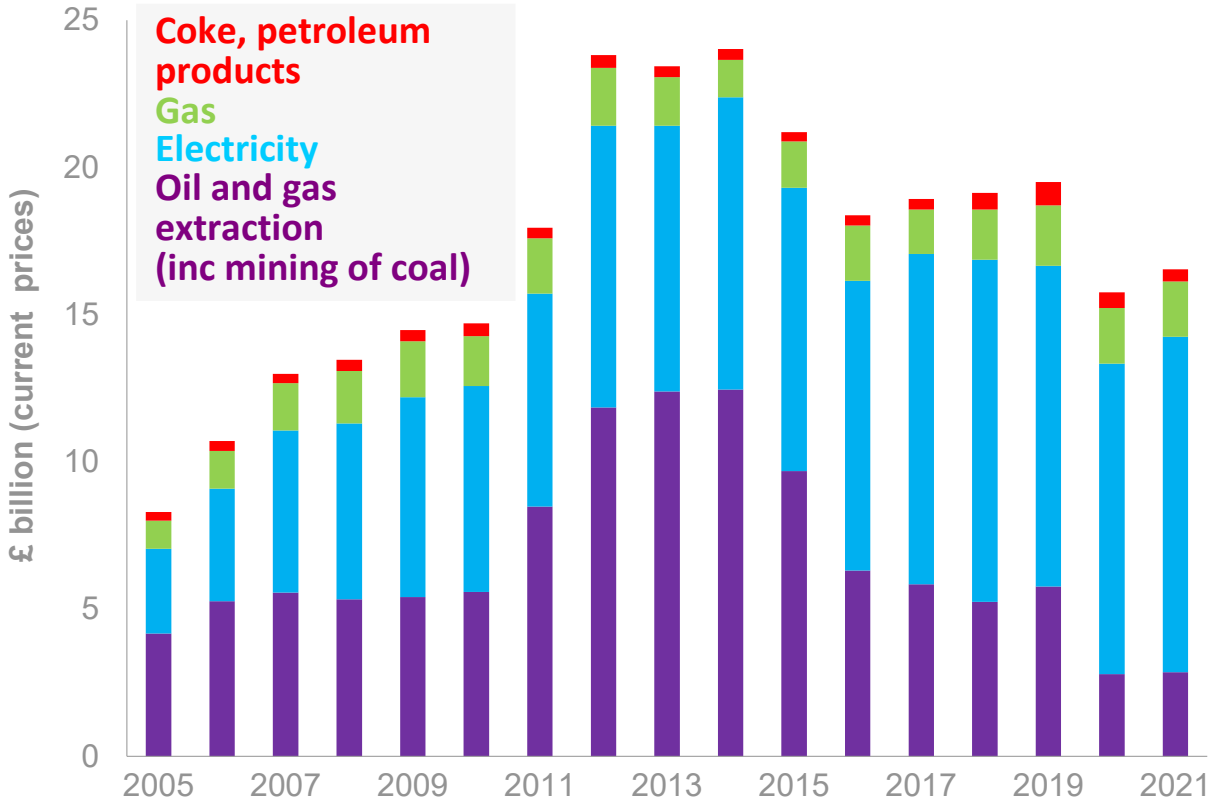
Trends in employment in the energy industries, 1980 to 2021



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, in 2021 employment in the energy industries fell by 4.4% on the previous year to 175,000 which was 61% above the 2005 level and accounted for 6.3% of all industrial employment. Of the energy total in 2021 electricity (including renewables) accounted for 55%, gas accounted for 22%.and oil and gas extraction accounted for 18%.

Investment in the energy industries, 2005 to 2021

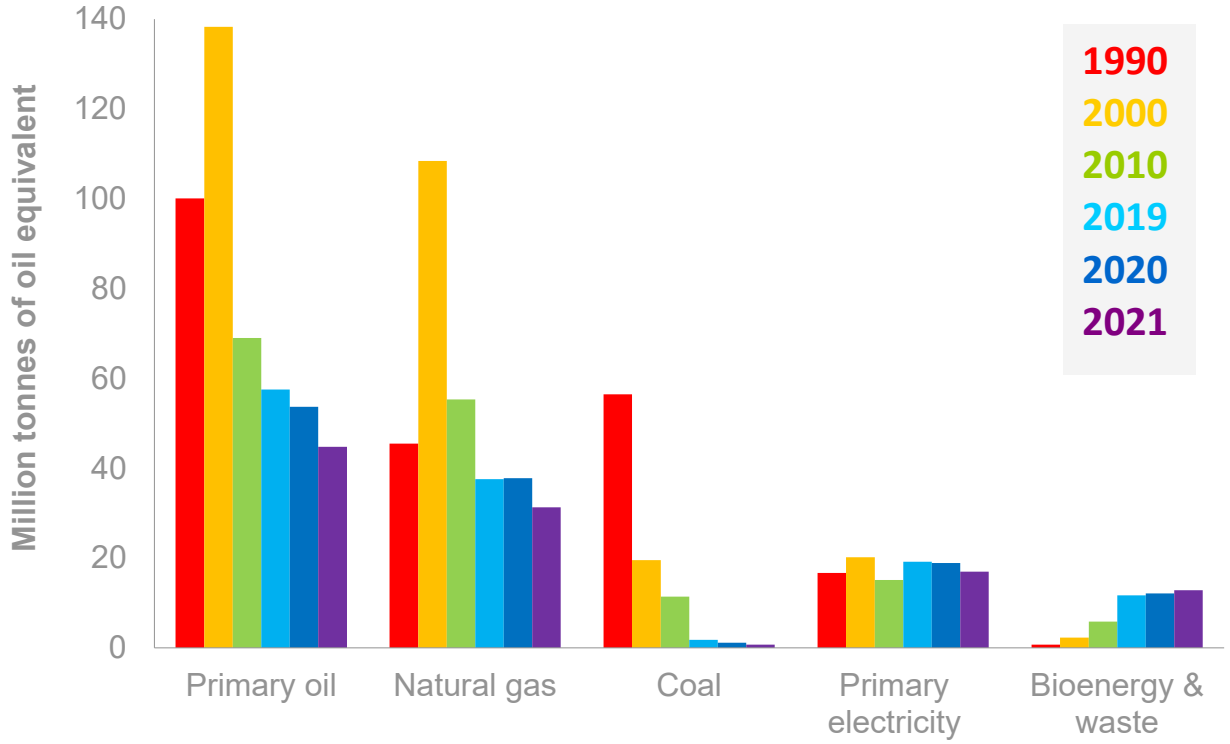


Source: Office for National Statistics

In 2021 investment in the energy industries at £16.5 billion (at current prices) was 5.0% higher than in 2020.

Of the total invested electricity contributed 69% (up 1.9 percentage points on 2020), oil and gas extraction (including a small proportion of less than 0.01% for coal extraction) contributed 17% (down 0.4 percentage points on 2020), gas contributed 11% (down 0.5 percentage points on 2020), with the remaining 2% in coke & refined petroleum products industries (down 0.9 percentage points on 2020).

Production of primary fuels, 1990 to 2021



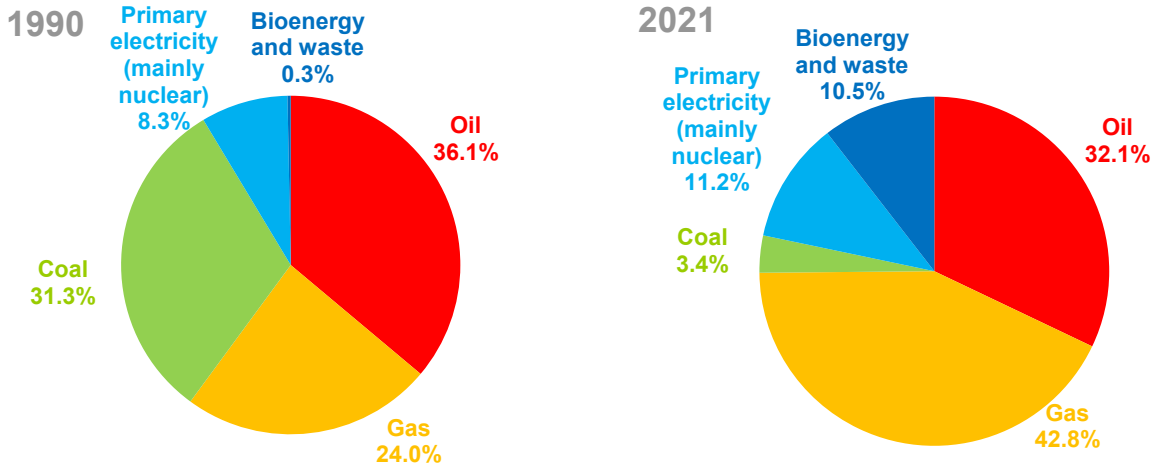
Million tonnes of oil equivalent

	1990	2000	2010	2019	2020	2021
Primary oil	100.1	138.3	69.0	57.5	53.6	44.7
Natural gas	45.5	108.4	55.3	37.5	37.8	31.3
Coal	56.4	19.6	11.4	1.8	1.2	0.7
Primary electricity	16.7	20.2	15.1	19.2	18.9	17.0
Bioenergy & waste	0.7	2.3	5.8	11.7	12.1	12.8
Total	**219.4**	**288.7**	**156.7**	**127.7**	**123.7**	**106.6**

Total production of primary fuels, when expressed in terms of their energy content, fell by 14% in 2021 compared to 2020, to the lowest level in the series commencing from 1970. Growth in renewable sources (bioenergy & waste) was offset by reduced fossil fuel and nuclear output, due to delayed North Sea maintenance activities caused by the Covid-19 pandemic, and numerous outages at UK nuclear power stations. Wind, solar and hydro output fell due to less favourable weather conditions, whilst coal production fell to a record low level in 2021. Primary oil (crude oil and Natural Gas Liquids) accounted for 42% of total production, natural gas 29%, primary electricity (consisting of nuclear, wind, solar and hydro) 16%, bioenergy and waste 12%, while coal accounted for the remaining 1%.

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 since been on a general decline, however production levels increased since 2014 until the falls in 2019 and 2020, as new oil fields have opened, combined with the growth in output from bioenergy and waste and the increased capacity of wind and solar technologies. Production is now 64% lower than its peak in 1999. Since 2000, oil and gas production levels have fallen by 68% and 71% respectively.

Inland energy consumption, 1990 and 2021



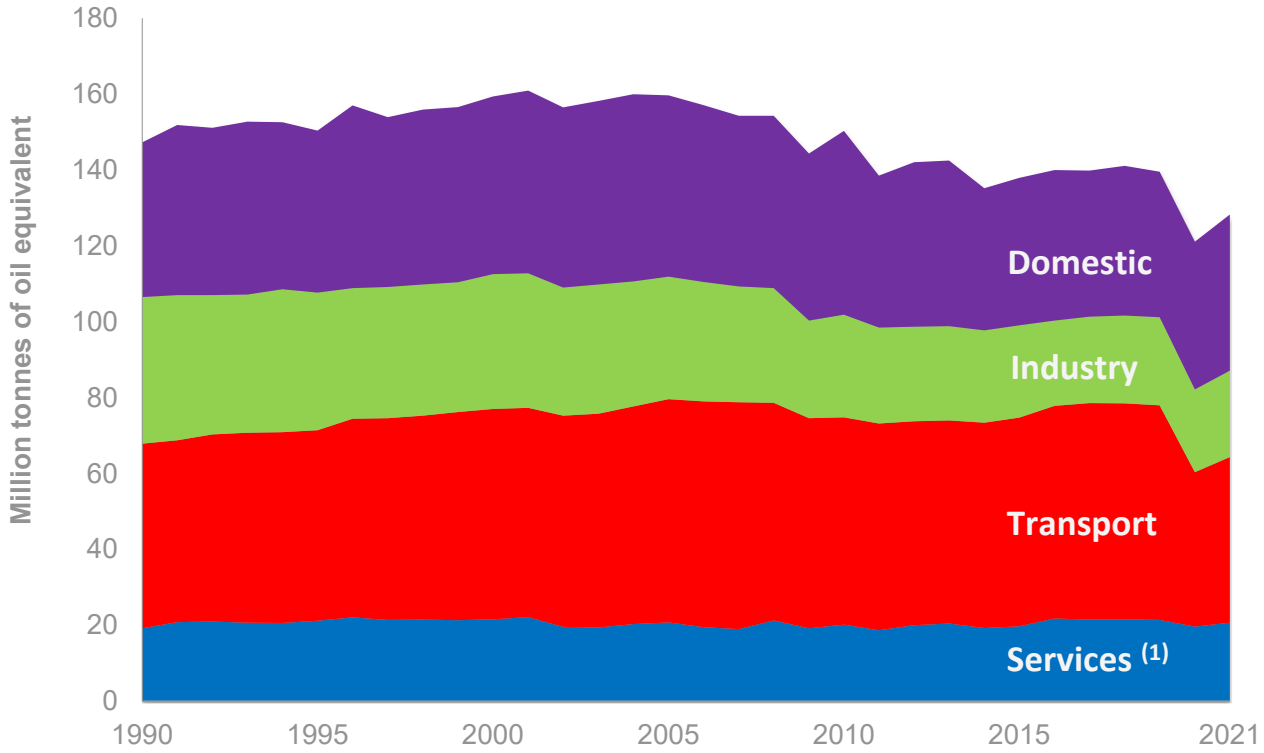
Million tonnes of oil equivalent

	1990	2000	2010	2019	2020	2021
Total inland primary energy consumption[1]:	213.6	234.8	219.3	184.5	162.5	170.1
Conversion losses:		53.8	50.3	30.7	28.1	29.2
Distribution losses	66.4					
and energy industry use:		20.7	18.0	14.9	13.9	13.1
Total final energy consumption:	147.3	159.4	150.3	139.6	121.1	128.2
Final consumption of which:						
Industry	38.7	35.5	27.0	23.2	21.8	22.8
Domestic sector	40.8	46.9	48.4	38.3	38.9	41.1
Transport	48.6	55.5	54.6	56.6	40.7	43.6
Services[2]	19.2	21.5	20.2	21.5	19.7	20.7
Temperature corrected total inland consumption:	221.6	240.2	211.9	187.3	167.1	170.7

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

Primary energy consumption rose by 4.7% in 2021 compared to 2020, with the rise due to the easing of the Covid-19 pandemic lockdown restrictions on energy supply. In addition, the average temperature in 2021 was 0.4 degrees Celsius cooler than in 2020; on a temperature corrected basis, primary energy consumption was 2.1% higher than in 2020. In the last 32 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 2021



2021 **Million tonnes of oil equivalent**

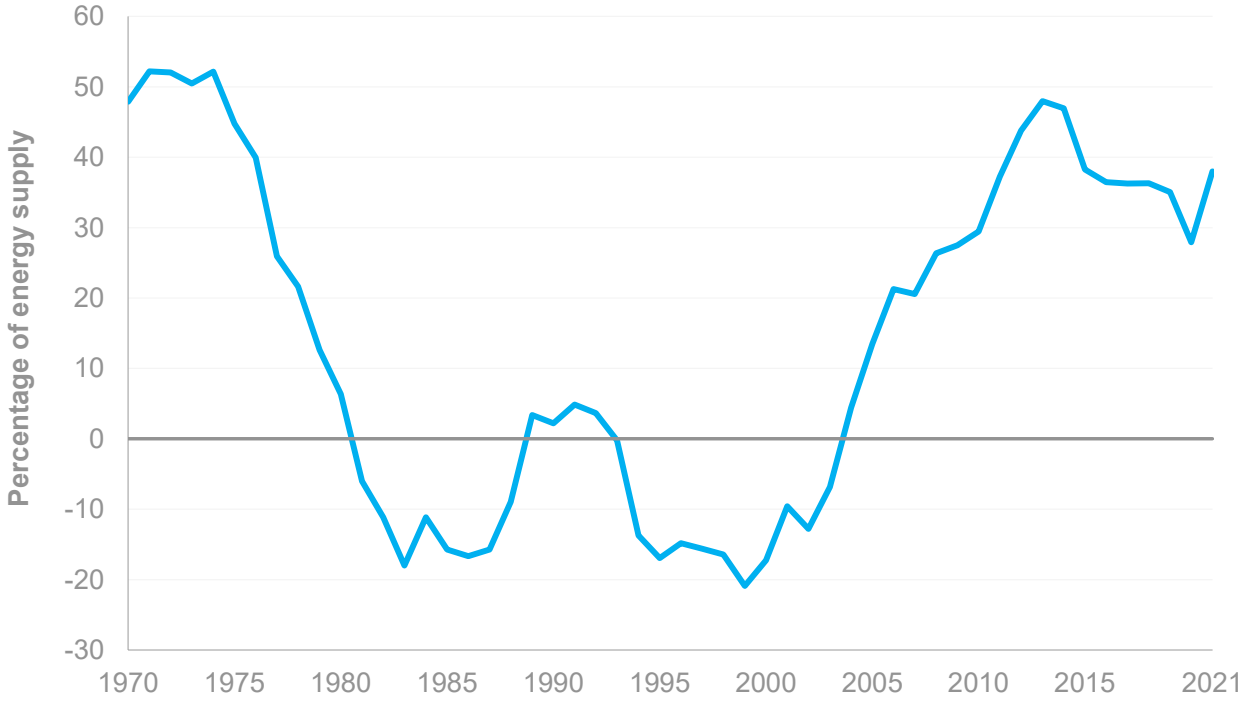
	Industry	Domestic	Transport	Services[1]	Total
Coal & manufactured fuels	1.3	0.5	0.0	0.0	**1.8**
Gas	9.2	27.4	0.1	7.9	**44.6**
Oil	2.6	2.5	41.0	3.7	**50.3**
Electricity	7.3	9.4	0.5	7.4	**24.6**
Bioenergy and heat	2.4	1.4	1.5	1.7	**7.0**
Total	**22.8**	**41.1**	**43.6**	**20.7**	**128.2**

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

Total final energy consumption (excluding non-energy use) was 5.9% higher in 2021 compared to 2020 due to the easing of the Covid-19 pandemic lockdown restrictions. It rose by 5.8% in the domestic sector due to increased home working, by 5.2% in the service sector as many schools, shops and workplaces were re-opened, by 4.2% in the industry sector and by 7.3% in the transport sector. The rise in the transport sector saw road fuel demand approaching normal levels by the end of the year, but with demand for aviation fuel remaining low due to the closure of international travel corridors. Overall final energy consumption, when adjusted for temperature, was up by 3.9%, in 2021.

In terms of fuel types, final consumption of gas, the main fuel used for heating, rose by 7%. Oil use rose by 8%, electricity consumption rose by 2%, whilst bioenergy consumption remained broadly unchanged.

Import dependency, 1970 to 2021

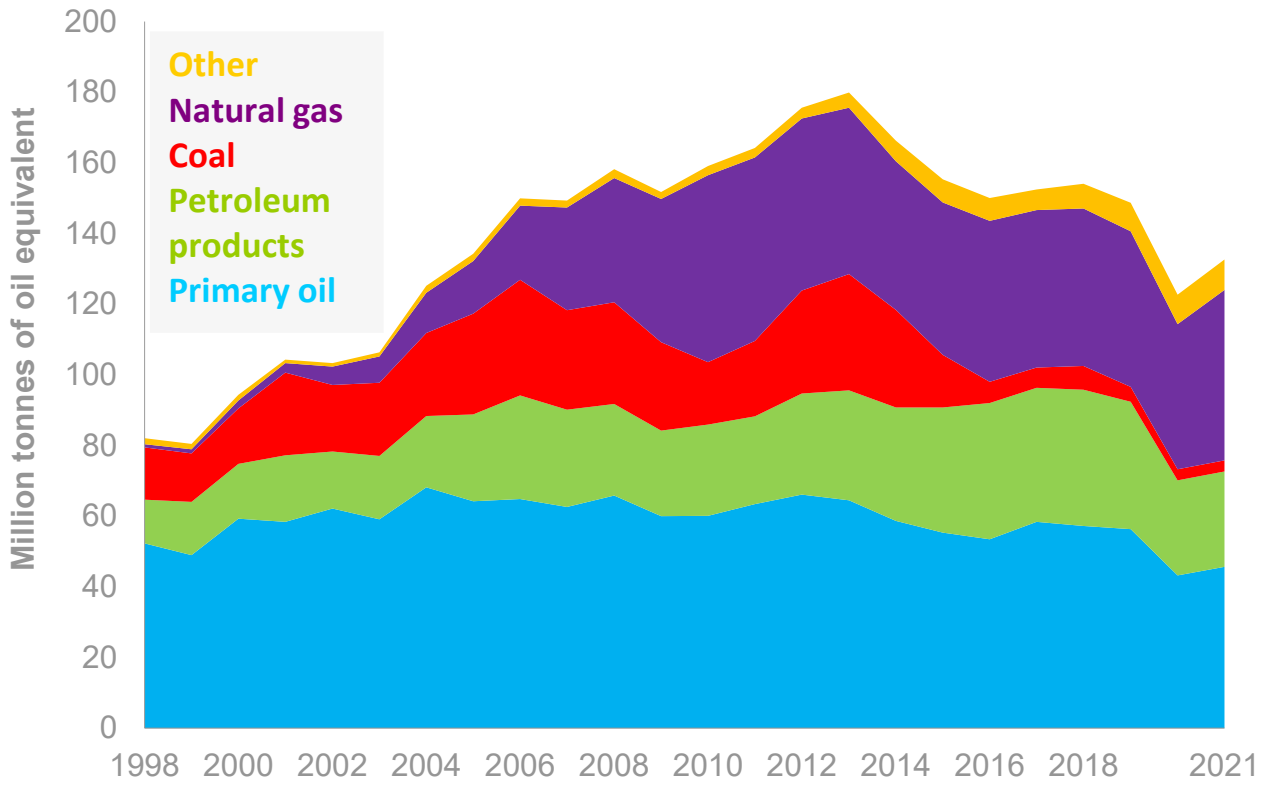


Percentage

	2000	2005	2010	2019	2020	2021
Coal	39%	71%	52%	68%	47%	49%
Gas	-11%	7%	40%	50%	46%	57%
Oil	-55%	-3%	14%	27%	10%	25%
Total	**-17%**	**13%**	**29%**	**35%**	**28%**	**38%**

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 back 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 2020 became a net exporter of primary oils for the first time since 2004, as well as remaining a net exporter of some petroleum products such as petrol and fuel oil. In 2021, 38% of energy used in the UK was imported, up sharply from the 2020 level and at the highest level since 2015 due to the easing of the Covid-19 pandemic lockdown restrictions as well as reduced UKCS production due to maintenance which resulted in the UK importing more fuel to meet increased demand.

Key sources of imports, 1998 to 2021



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, since when they have fallen before rising again in 2017 and 2018, and then falling back in 2019 and 2020. 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, as well as to offset reduced UKCS production due to maintenance.

In 2021 imports rose by 8.2%, with rises in imports of coal, primary oil, petroleum products, gas and electricity, but a fall in imports of bioenergy and waste.

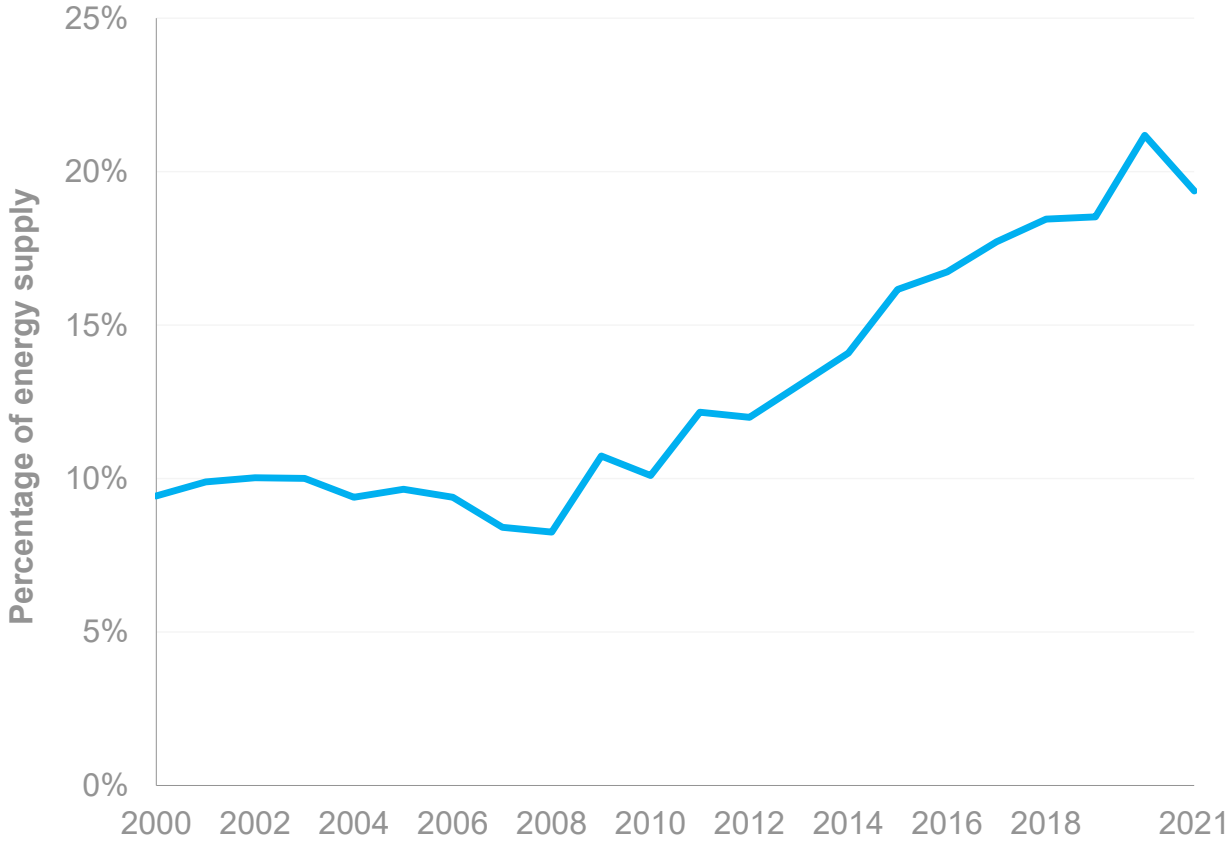
Imports are sourced from a wide variety of countries.

Crude oil: The key source of imports has historically been Norway, with its share of UK imports increasing from 34% in 2020 to 36% in 2021, whilst the share of US imports fell back from 32% in 2020 to 30% in 2021.

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 63% of UK gas imports in 2021, up from 56% in 2020, with pipelines from Belgium and The Netherlands supplying 4% and 5% respectively. The remaining 29% arrived as Liquefied Natural Gas (LNG), of which 39% was from Qatar, down from 48% in 2020. In 2021, Qatari, Russian and US LNG imports accounted for 86% of all LNG imports, broadly unchanged on 2020.

Proportion of UK energy supplied from low carbon sources, 2000 to 2021



Percentage

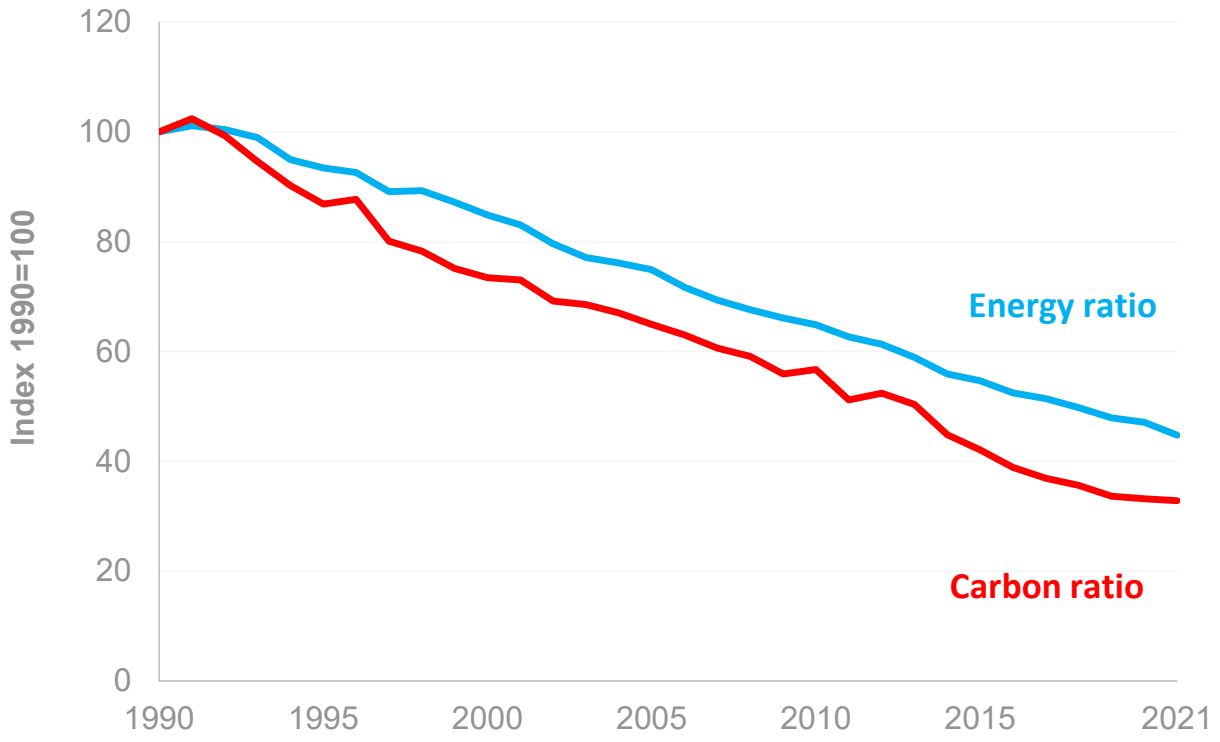
	2000	2005	2010	2019	2020	2021
Nuclear	8.4%	7.8%	6.3%	6.6%	6.6%	5.8%
Wind	0.0%	0.1%	0.4%	3.0%	4.0%	3.3%
Solar	0.0%	0.0%	0.0%	0.6%	0.7%	0.6%
Hydro	0.2%	0.2%	0.1%	0.3%	0.4%	0.3%
Bioenergy	0.9%	1.6%	2.3%	6.3%	7.5%	7.5%
Transport fuels	0.0%	0.0%	0.6%	0.9%	1.0%	0.9%
Heat pumps	0.0%	0.0%	0.4%	0.6%	0.7%	0.7%
Other	0.0%	0.0%	0.0%	0.3%	0.3%	0.3%
Total	**9.4%**	**9.7%**	**10.1%**	**18.5%**	**21.2%**	**19.4%**

In 2021 the UK obtained 19.4% of its primary energy from low carbon sources, with 39% of this from bioenergy, 30% from nuclear, and 17% from wind.

Energy supply from bioenergy rose by 4.9%, heat pumps rose by 3.8%, whilst solar fell by 5.6% with capacity up by 2.8% but less sun hours than 2020. The supply of nuclear fell by 7.6% due to numerous outages at UK power stations during 2021.

Energy supply from wind fell by 14% in 2021, with capacity up by 5.3% but wind speeds 1.2 knots lower than in 2020. Five named storms affected the UK during 2021, including Storm Arwen in November 2021.

Energy and carbon ratios, 1990 to 2021



Index 1990=100

	1990	2000	2010	2019	2020	2021
Primary energy consumption*	100	108.4	95.6	84.5	75.4	77.0
Carbon dioxide emissions	100	93.7	83.6	59.4	53.0	56.4
GDP	100	127.7	147.4	176.4	160.1	172.0
Energy ratio	**100**	**84.9**	**64.9**	**47.9**	**47.1**	**44.8**
Carbon ratio	**100**	**73.4**	**56.7**	**33.6**	**33.1**	**32.8**

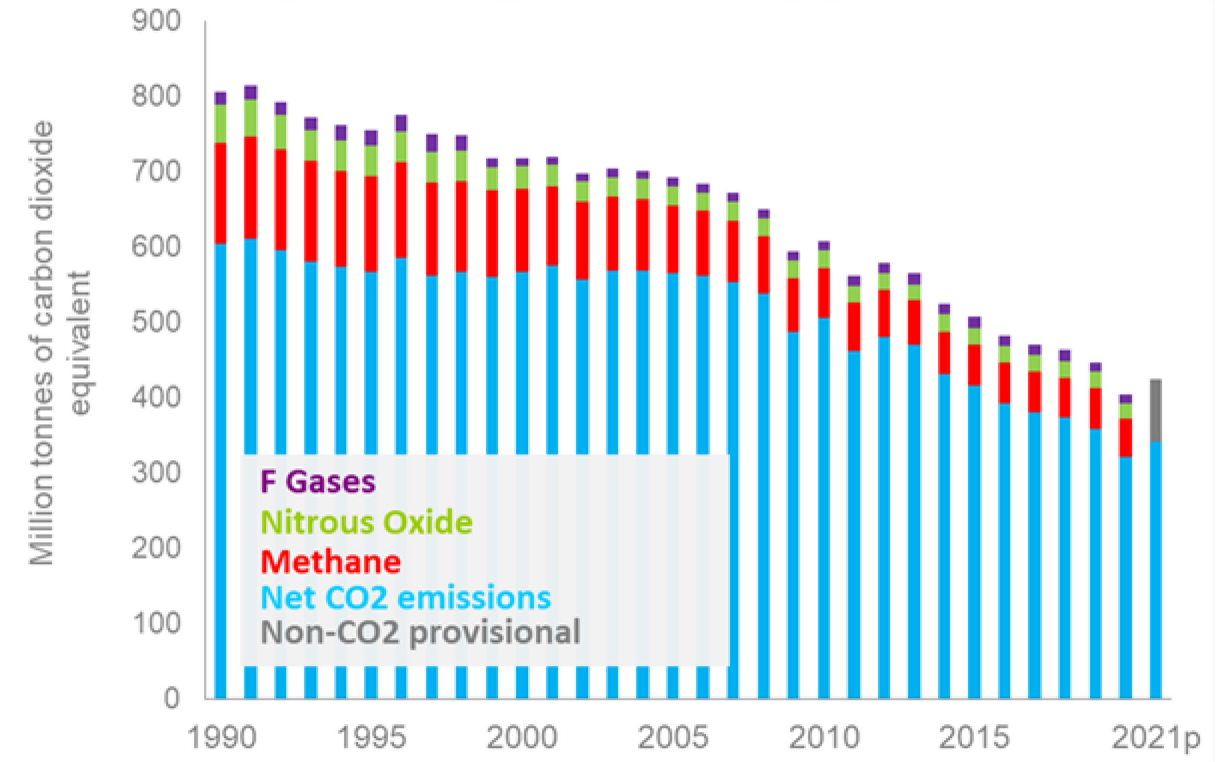
* Temperature corrected primary energy consumption.

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 3½% per year.

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

Carbon dioxide emissions were 6.3% higher than 2020, yet 5.0% lower than 2019, reflecting the impacts of the Covid-19 pandemic restrictions. There were rises in emissions from all sectors in 2021, with transport emissions up 10% and energy supply (including power stations) up 3.3%; 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 2021



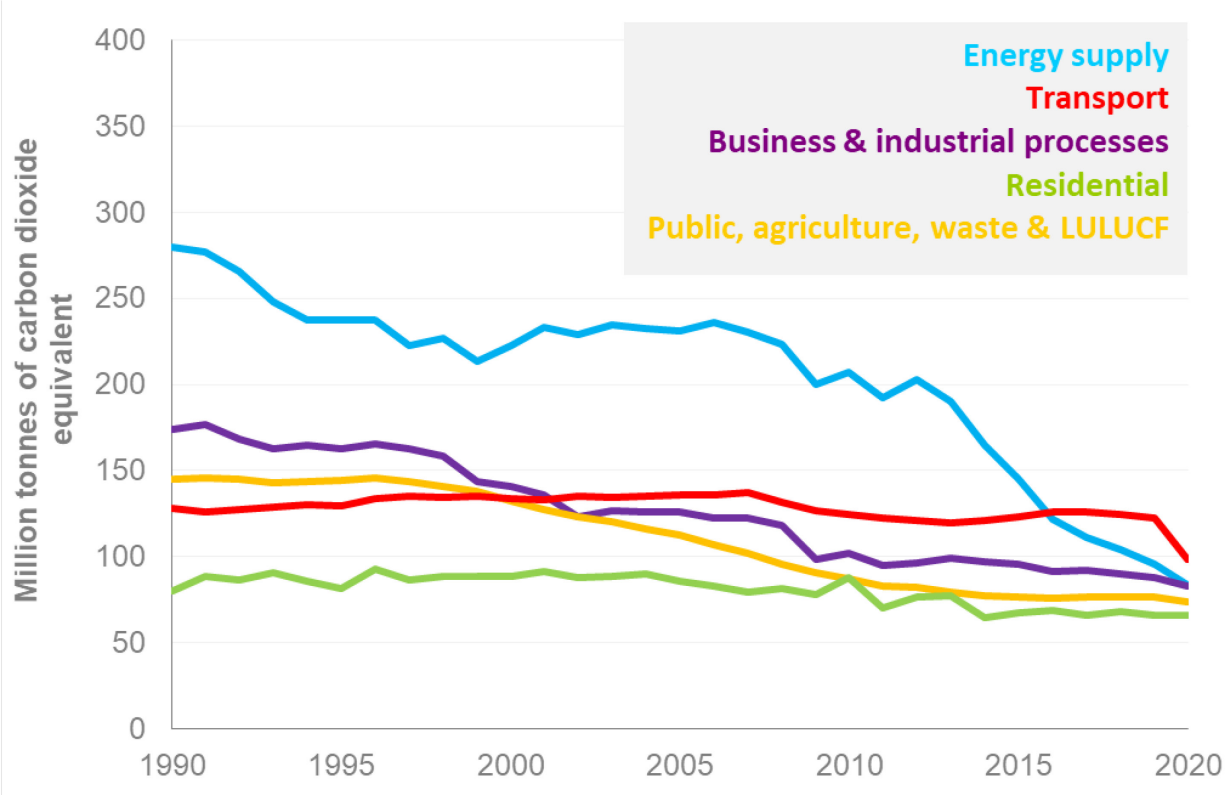
	Million tonnes of carbon dioxide equivalent					
	1990	**2000**	**2010**	**2019**	**2020**	**2021p[1]**
Net carbon dioxide (CO_2) emissions	605.4	567.4	506.1	359.3	321.1	341.5
Methane (CH_4)	134.1	110.7	66.8	53.4	51.3	:
Nitrous oxide (N_2O)	49.5	30.0	22.9	22.0	20.9	:
Hydrofluorocarbons (HFC)	14.4	7.8	11.8	12.5	11.7	:
Perfluorocarbons (PFC)	1.6	0.6	0.3	0.2	0.2	:
Sulphur hexafluoride (SF_6)	1.2	1.8	0.7	0.5	0.4	:
Nitrogen trifluoride (NF_3)	0.0	0.0	0.0	0.0	0.0	:
Non-CO_2 provisional estimate	:	:	:	:	:	83.1
Total greenhouse gas emissions	**806.3**	**718.2**	**608.6**	**447.9**	**405.5**	**424.5**

Source: BEIS (2020 final UK figures and 2021 provisional UK figures)
1 Provisional estimates are not made for individual non-CO_2 gases separately.
: data not available.

The coronavirus (COVID-19) pandemic and the resulting restrictions introduced across the UK had a major impact on various aspects of society and the economy in 2020 and 2021 and this had a significant impact on greenhouse gas emissions in the UK over this period.

Carbon dioxide (CO_2) emissions in the UK are provisionally estimated to have increased by 6.3% in 2021 from 2020, to 341.5 million tonnes (Mt), and total greenhouse gas emissions by 4.7% to 424.5 million tonnes carbon dioxide equivalent ($MtCO_2e$). Total greenhouse gas emissions were 47.3% lower than they were in 1990.

Territorial greenhouse gas emissions by National Communication sector, 1990 to 2020



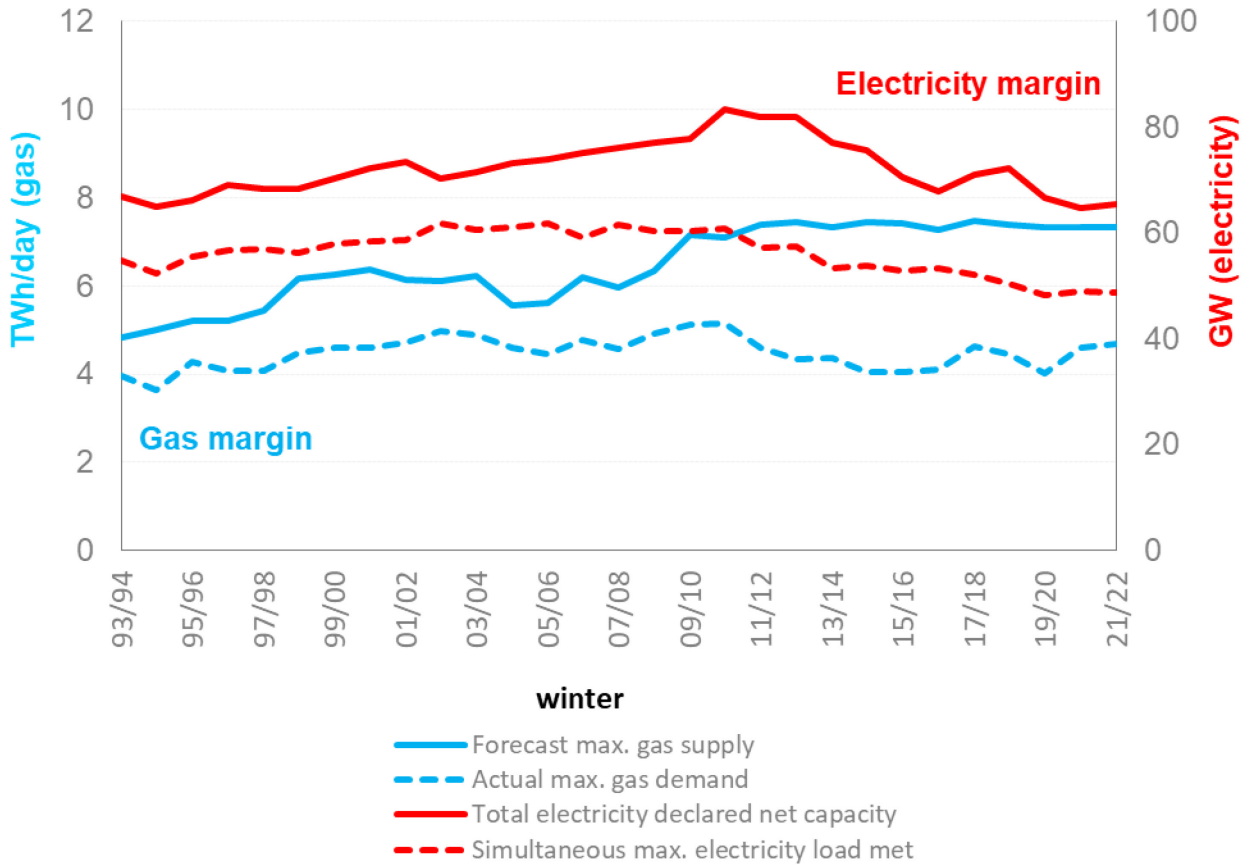
Million tonnes of carbon dioxide equivalent

	1990	2000	2010	2018	2019	2020
Energy supply	279.5	222.8	207.4	104.0	95.6	84.0
Residential	80.0	88.9	87.5	68.4	65.7	66.3
Public, Agriculture, Waste management and LULUCF	144.9	132.3	87.0	76.5	76.8	73.5
Business and Industrial processes	173.6	140.8	102.2	90.2	87.6	83.0
Transport	128.1	133.4	124.5	124.4	122.3	98.8
Total greenhouse gas emissions	**806.3**	**718.2**	**608.6**	**463.5**	**447.9**	**405.5**

Source: BEIS (2020 final UK figures)
LULUCF – land use, land use change and forestry

In 2020, net territorial greenhouse gas emissions in the UK were estimated to be 405.5 $MtCO_2e$, a decrease of 9.5% compared to the 2019 figure of 447.9 $MtCO_2e$ and 49.7% lower than they were in 1990.The transport sector was the largest single source of GHG emissions in 2020, accounting for 24% of total emissions. Between 1990 and 2020, emissions from this sector decreased by 23%. Although, in 2019 transport emissions were only down 5% from 1990 levels. In 2020 GHG emissions from the energy supply sector accounted for 21% of emissions and have decreased by 70% since 1990 due to changes in the electricity mix. Emissions from the residential sector accounted for around 16% of emissions in 2020; and since 1990 emissions from this sector have decreased by 17%.

Reliability – gas and electricity capacity margins – maximum supply and maximum demand 1993/94 to 2021/22



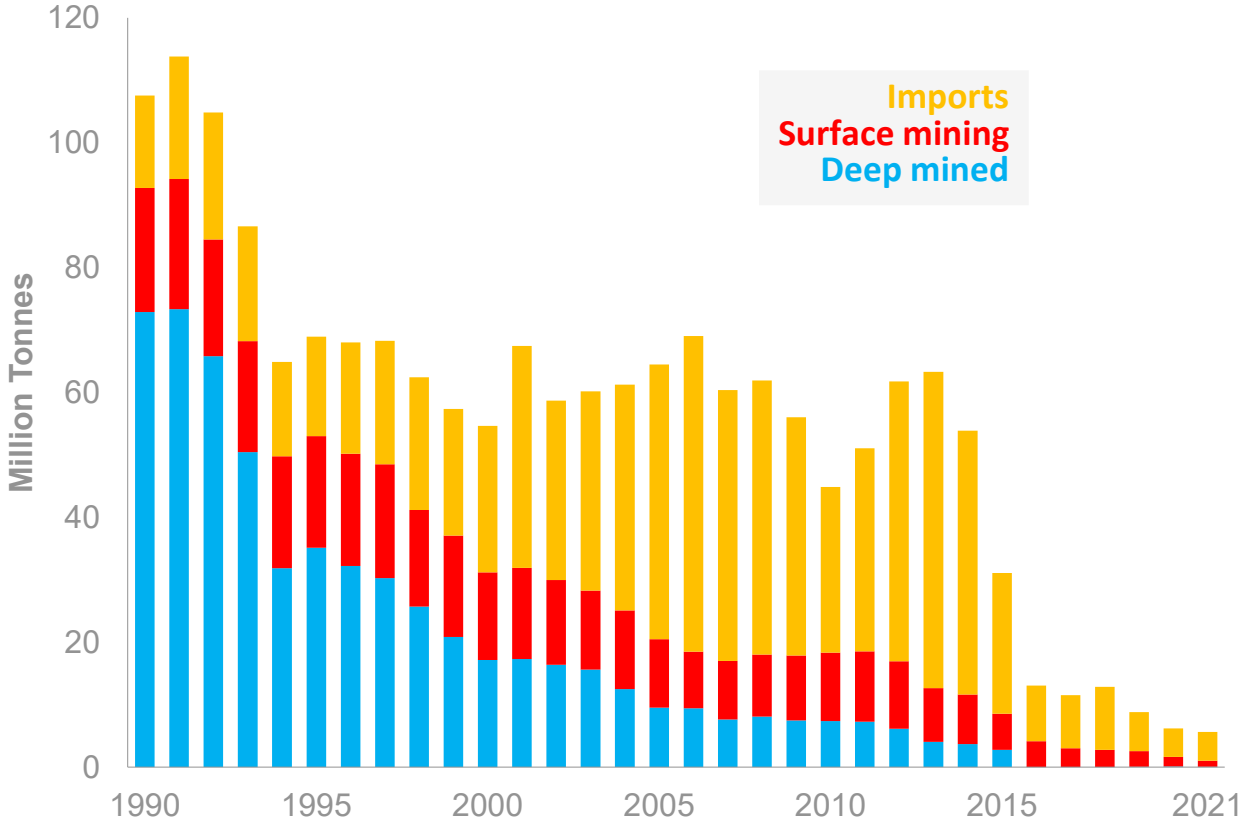
Source: National Grid and BEIS

Whilst energy security is complex to measure and subsequent charts on individual fuels provide fuller insight, this chart aims to provide a view on it by looking at the difference between maximum supply and 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 to 32% in 2020/21 due to the closure of coal-fired plants. The margin rose to 34% in 2021/22 due to additional renewables, particularly offshore wind.

Since 2008/ 2009 the gas capacity margin has been wider than historically seen because of increased supply from three liquefied natural gas (LNG) terminals which came onstream in 2008. A recent peak in maximum demand was seen in 2017/18, the highest since the winter of 2010/11 and following severe weather brought over by the ‘Beast from the East’. Despite this the capacity margin remained one-third higher than demand. The supply margin in 2021 remains just over 60 per cent of maximum capacity.

Coal production and imports, 1990 to 2021



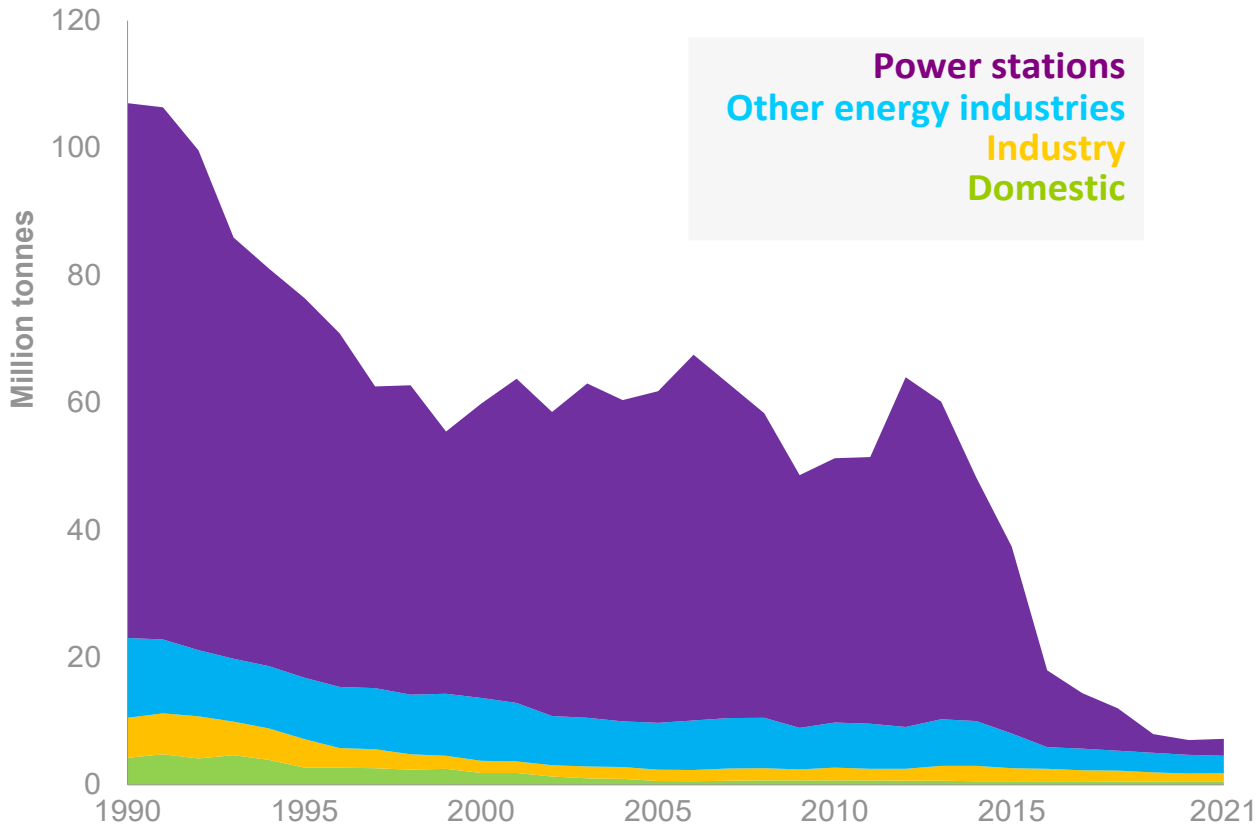
Million tonnes

	1990	2000	2010	2019	2020	2021
Deep mined	72.9	17.2	7.4	0.1	0.1	0.1
Surface mining (including slurry)	19.9	14.0	11.0	2.5	1.6	1.0
Total	**92.8**	**31.2**	**18.4**	**2.6**	**1.7**	**1.1**
Coal imports	14.8	23.4	26.5	6.2	4.5	4.6

In 2021 UK coal production fell to an all-time low of 1.1 million tonnes, 37% lower than in 2020. Following closure of the last three deep mines in 2015 (Hatfield, Thoresby and Kellingley), production fell to a fraction of the previous values. At 94 thousand tonnes, deep mined coal comprises 9% of total production. In 2021 surface mine production fell by 39% to a new record low of 1.0 million tonnes. This was due to mine closures and production restrictions due to Covid-19 and flooding.

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 a 37-year low in 2020, imports rose slightly in 2021 to 4.6 million tonnes.

Coal consumption, 1990 to 2021



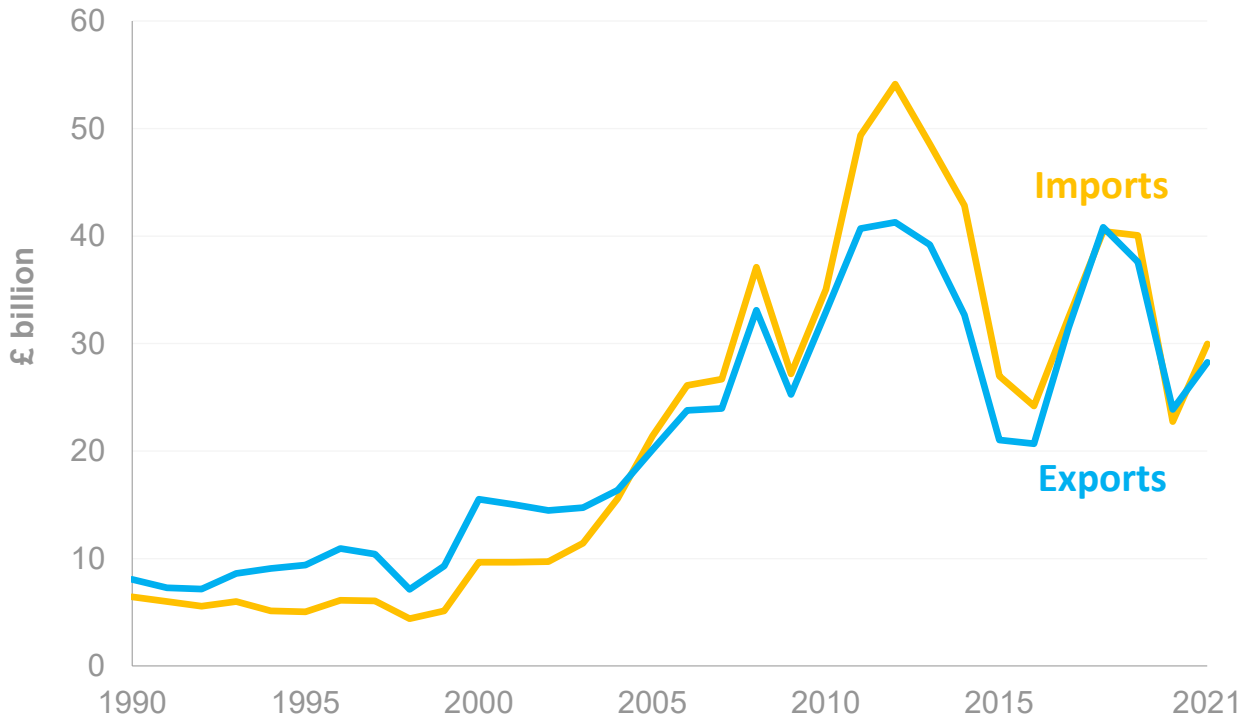
Million tonnes

	1990	2000	2010	2019	2020	2021
Power stations	84.0	46.2	41.5	2.9	2.3	2.7
Domestic	4.2	1.9	0.7	0.5	0.5	0.5
Industry	6.3	1.9	2.0	1.4	1.3	1.4
Services	1.2	0.1	0.1	0.1	0.04	0.1
Other energy industries	12.5	9.8	7.1	3.1	2.9	2.7
Total consumption	**108.3**	**59.9**	**51.4**	**8.0**	**7.0**	**7.4**

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, electricity generation fell rose to 2.7 million tonnes in 2021, although this was from a low baseline following record periods without coal generation in Great Britain in 2020. This is a temporary deviation from the downward trend while the fuel mix has shifted towards other sources of fuel as coal is being phased out. Also, the fall in renewable generation (due to less wind and rainfall) and the fall in nuclear generation due to outages also contributed to the recent upturn.

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. Carbon price is a charge on those who emit CO2 for their emissions. Also, the increase in nuclear and renewables production contributed to the decline of coal use. With the Drax coal units mothballed at the end of March 2021, just three coal plants remain operational in the UK, with coal use for electricity generation expected to cease completely by October 2024.

Foreign trade in crude oil and petroleum products, 1990 to 2021



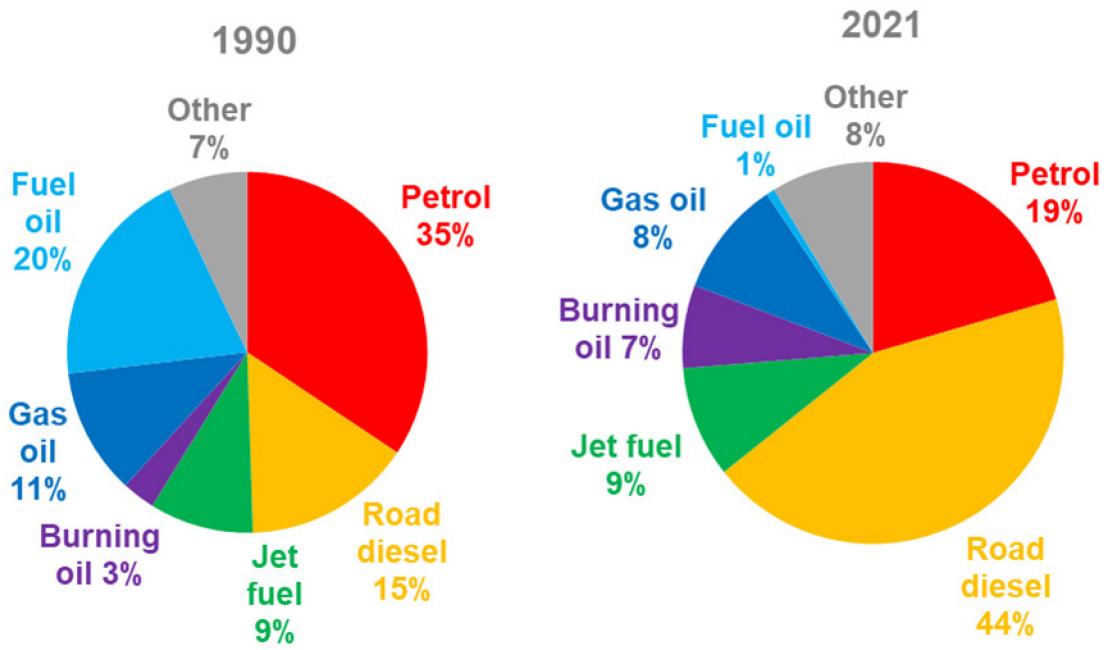
Crude oil and petroleum products **£ billion**

	1990	2000	2010	2019	2020	2021
Exports	8.1	15.5	32.9	37.6	23.9	28.3
Imports	6.4	9.7	35.0	40.1	22.7	30.0
Net Imports	**-1.6**	**-5.8**	**2.1**	**2.5**	**-1.1**	**1.7**

Source: Office for National Statistics

Between 1980 and 2004, a surplus in trade led to oil contributing more than £93 billion to the UK balance of payments. The largest surplus of £8 billion in 1985 reflected high crude oil production and prices. However, in 2005, the UK became a net importer of oils with a deficit of £1.3 billion, though still an exporter of some oil products. Between 2005 and 2017 the cumulative deficit amounted to £65.8 billion. Since the peak of £12.8 billion in 2012, the deficit has fallen steadily, and in 2018 returned to a surplus as net imports of oils fell. The UK returned to being a net importer in 2019 as exports dropped by £3.2 billion. The Covid-19 pandemic has impacted 2020 and 2021 crude oil trade in the UK. In 2020, the UK was a net exporter as both imports and exports fell by £17.3 billion and £13.7 billion respectively. 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 by £7.2 billion and £4.4 billion respectively in 2021 with the UK becoming a net importer. The cumulative deficit in trade between 2018 and 2021 amounted to £2.6 billion.

Demand by product, 1990 and 2021



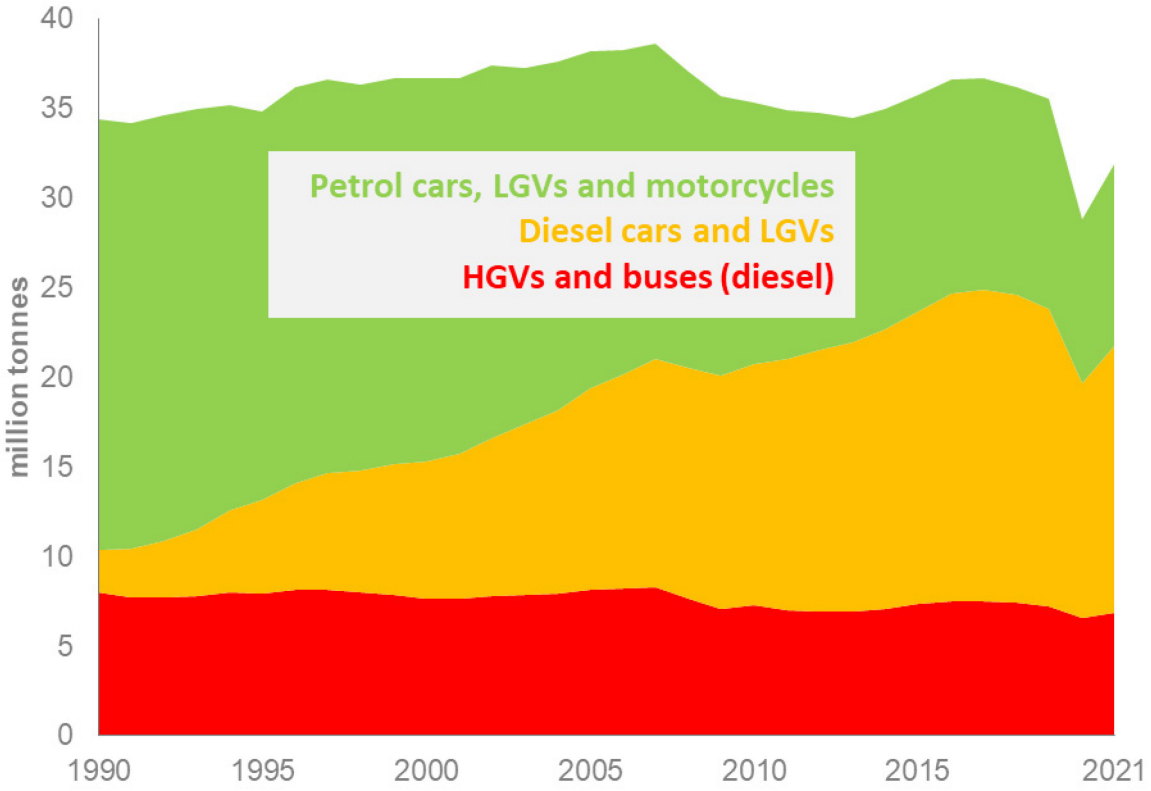
Million tonnes

	1990	2000	2010	2019	2020	2021
Energy uses*						
Petrol	24.3	21.4	14.6	11.7	9.1	10.2
Road diesel	10.7	15.6	20.7	23.8	19.7	21.7
Jet fuel	6.6	10.8	11.1	12.3	5.1	4.7
Burning oil	2.1	3.8	4.0	3.4	3.5	3.5
Gas oil	8.0	6.8	5.1	5.2	4.4	4.9
Fuel oil	14.0	3.3	1.9	0.5	0.3	0.4
Other	5.0	5.3	6.1	5.2	4.3	4.3
Total energy uses	70.7	67.1	63.6	62.0	46.4	49.6
Of which:						
Transport fuels	43.5	49.5	48.1	49.3	35.0	37.7
Industry	7.2	5.5	5.1	2.5	2.2	2.3
Refinery fuel use	5.1	5.3	4.4	3.3	2.6	2.7
Non-energy uses	9.2	10.1	7.1	6.3	5.9	5.0
Total demand	**79.8**	**77.2**	**70.7**	**68.4**	**52.4**	**54.6**

* 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. Total demand increased by 4.1 per cent on 2020, most of this increase was from the transport sector as demand for road fuels began to recover following the pandemic. However, demand for jet fuel continued to decline as the aviation sector continued to contend with the effects of global international travel restrictions, which were eased at a slower rate than domestic restrictions. The share of total oil demand for transport remains more than 70 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 2021



Since the early 1990s demand for diesel has increased whilst for petrol this 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. In 2021 total diesel consumption increased by 10 per cent, this was 11 per cent for petrol, as demand for road fuels began to recover from the pandemic. 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. As travel restrictions were eased fully by mid-2021, fuel demand by cars and taxis increased by 15 per cent. Similarly fuel demand by buses and coaches increased by 28 per cent but remained below 1 million tonnes.

Demand for road diesel by vehicle type — **Thousand tonnes**

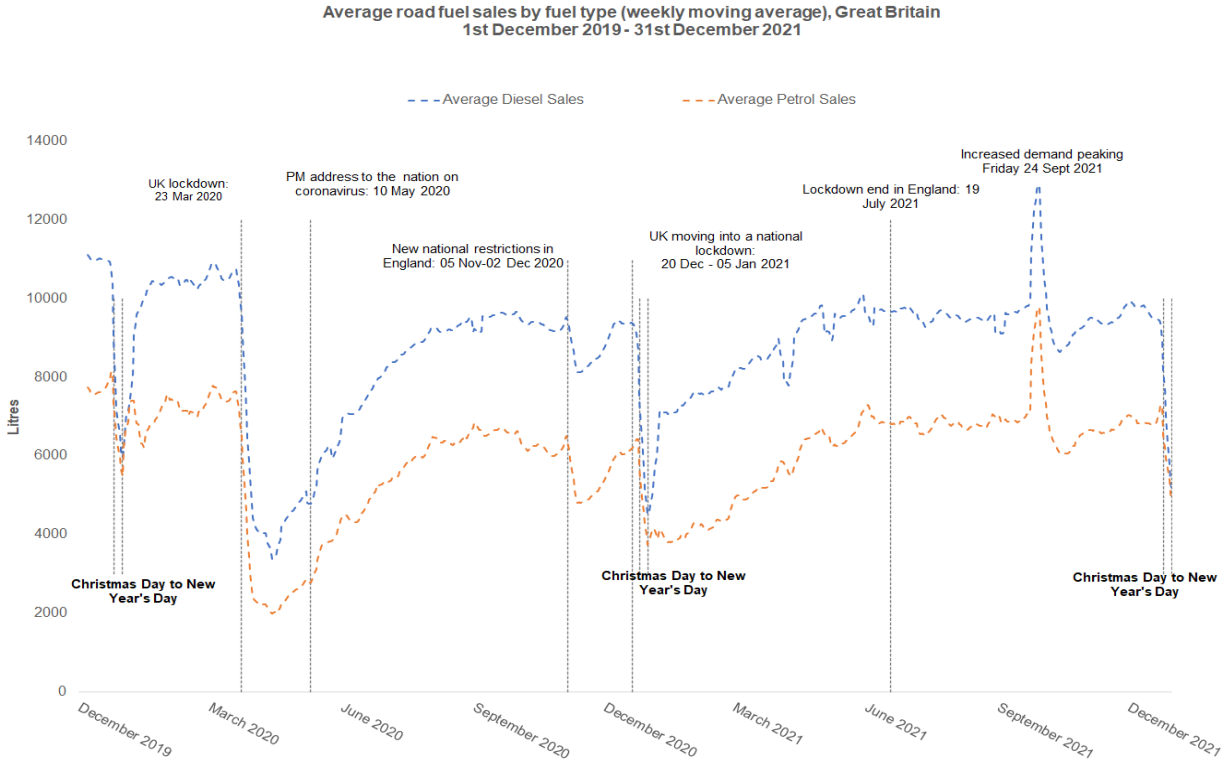
	1990	2000	2010	2019	2020	2021*
Car & taxi	980	4,110	8,590	11,057	8,118	9,710
Light goods vehicles	1,370	3,530	4,830	5,508	4,981	5,172
Heavy goods vehicles	6,370	6,150	5,940	6251	5,921	5,984
Buses & coaches	1,640	1,530	1,380	990	674	861
Total	**10,370**	**15,310**	**20,740**	**23,806**	**19,693**	**21,727**

*Based on modelling by Ricardo Energy & Environment using data from the National Atmospheric Emissions Inventory.

Demand for petrol — **Thousand tonnes**

	1990	2000	2010	2019	2020	2021
Total	24,300	21,400	14,600	11,713	9,144	10,159

Road fuel demand during the Covid-19 pandemic



Prior to the COVID-19 response, weekly metrics on forecourt sales of road fuels were not provided. Throughout the pandemic it became increasingly clear that road fuel sales were an effective indicator of activity during lockdowns, as well as being informative for industry capabilities. As a result, throughout the pandemic weekly public updates of road fuels have been published. Data provided is based on a sample of around 4,700 road fuel filling stations, representing around 55-60% of total filling stations and over 80% of road fuel sold in retail sites across Great Britain.

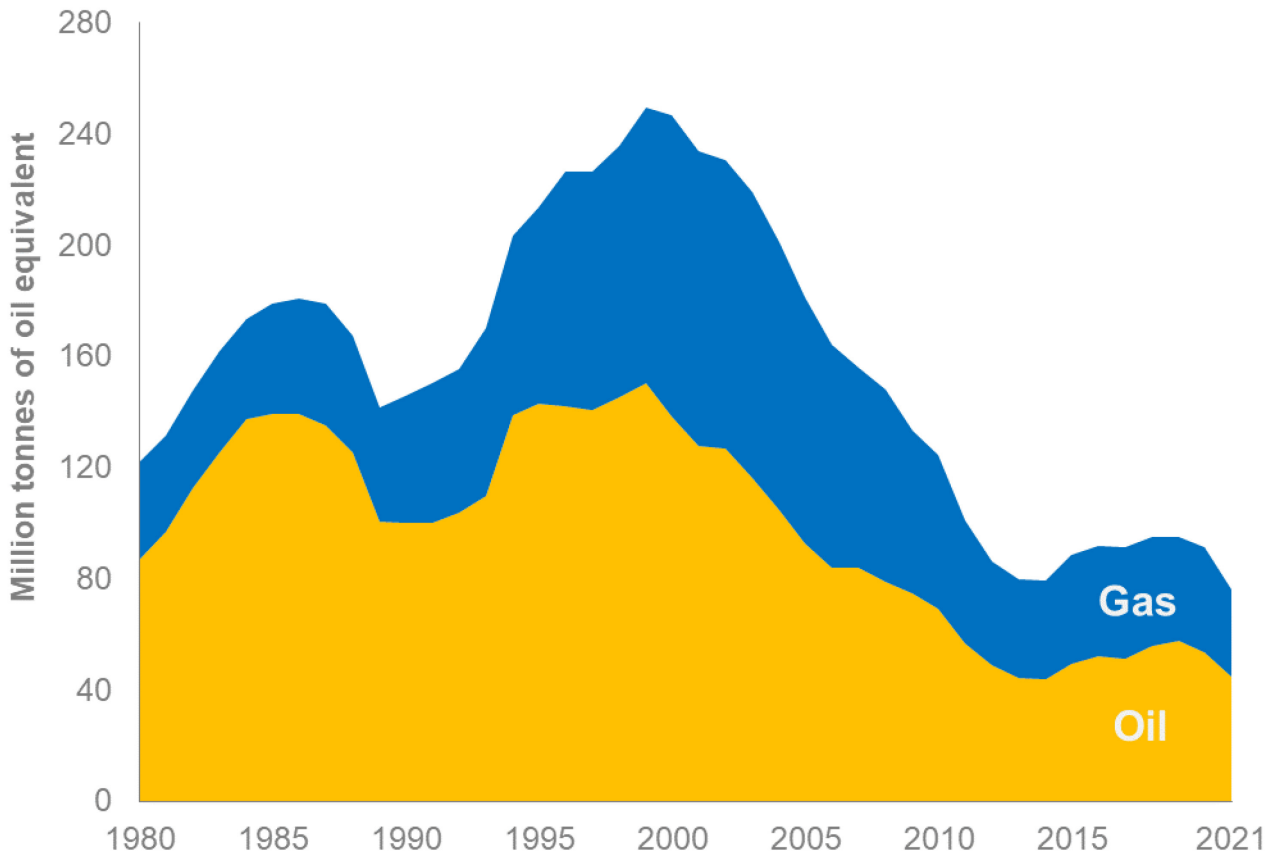
Following the implementation of lockdown restrictions on 23rd March 2020, both Diesel and Petrol demand dramatically reduced. During the first eight weeks of national restrictions, Diesel demand was down to 43% of typical demand* whilst Petrol was down to 34%. After the Prime Ministers address to the nation on the 10th May 2020, demand for both fuels increased steadily. For the period 7th September to 19th October 2020, demand for Diesel was 91% of typical demand and Petrol was 88%. The greater impact on average Petrol sales is largely due to the use of Diesel in commercial vehicles.

On 19th July 2021 most legal limits on social contact were lifted, and all sectors of the economy reopened in England. From lockdown ending to 22nd September 2021, demand of diesel and petrol continued to recover, and averaged at 92% and 94% of typical levels respectively.

24th September 2021 saw a large spike in consumer demand following reports of HGV driver shortages in the media. Sales reached 180% of typical with over 1,800 sites in sample forecourts selling out of fuel at close that day. However, demand soon normalised, with action taken by industry and government boosting supply, bringing stocks to healthy levels by mid-October 2021.

* Typical demand is calculated as the average demand levels for the eight weeks prior to first lockdown restrictions, from 27th January 2020 to 22nd March 2020.

UK Continental Shelf production, 1980 to 2021



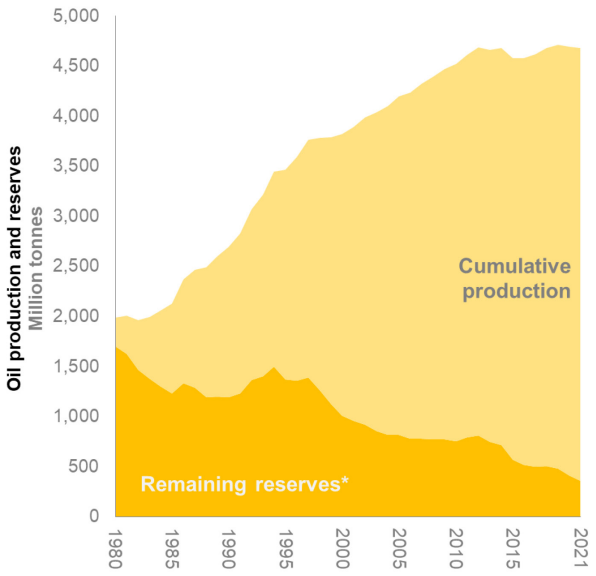
				Million tonnes of oil equivalent		
	1990	**2000**	**2010**	**2019**	**2020**	**2021**
Oil	100.1	138.3	69.0	57.5	53.6	44.7
Gas	45.5	108.4	55.3	37.5	37.8	31.3
Total	**145.6**	**246.7**	**124.3**	**95.0**	**91.5**	**76.1**

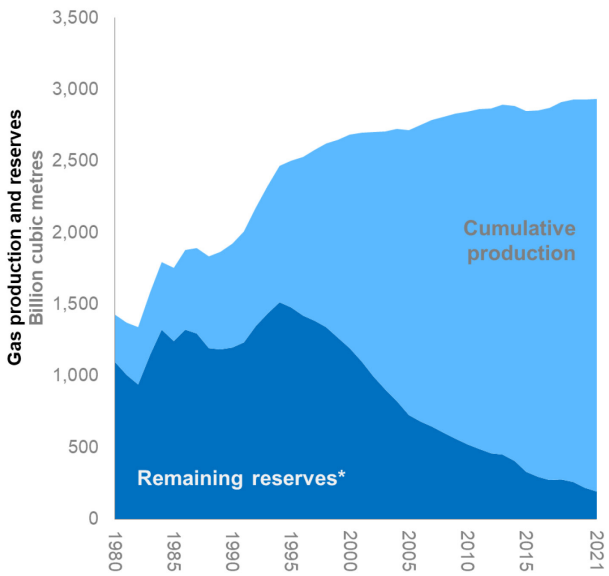
Total indigenous oil and gas production was down 17 per cent in 2021 on 2020.

Oil production in 2021 is 70 per cent lower than the 1999 peak and was down 17 per cent on the previous year. From the turn of the century production consistently decreased until 2014, from which point it remained relatively stable. Production then decreased in 2020 and 2021 the result of restrictions in place to curb the Covid-19 pandemic followed by extensive maintenance including the shutdown of the Forties Pipeline System (FPS), which serves a substantial portion of UKCS infrastructure.

Gas production in 2021 was 71 per cent lower than the 2000 peak and 17 per cent lower than 2020. Since the turn of the century production decreased until 2015 when new fields opened. The largest annual decrease of 20 per cent was seen in 2011, production decreased by 46 per cent in the four years to 2012. The decrease in gas production in 2021 was due to an extensive maintenance schedule including the shutdown of the FPS.

Oil and gas production and reserves, 1980 to 2021





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

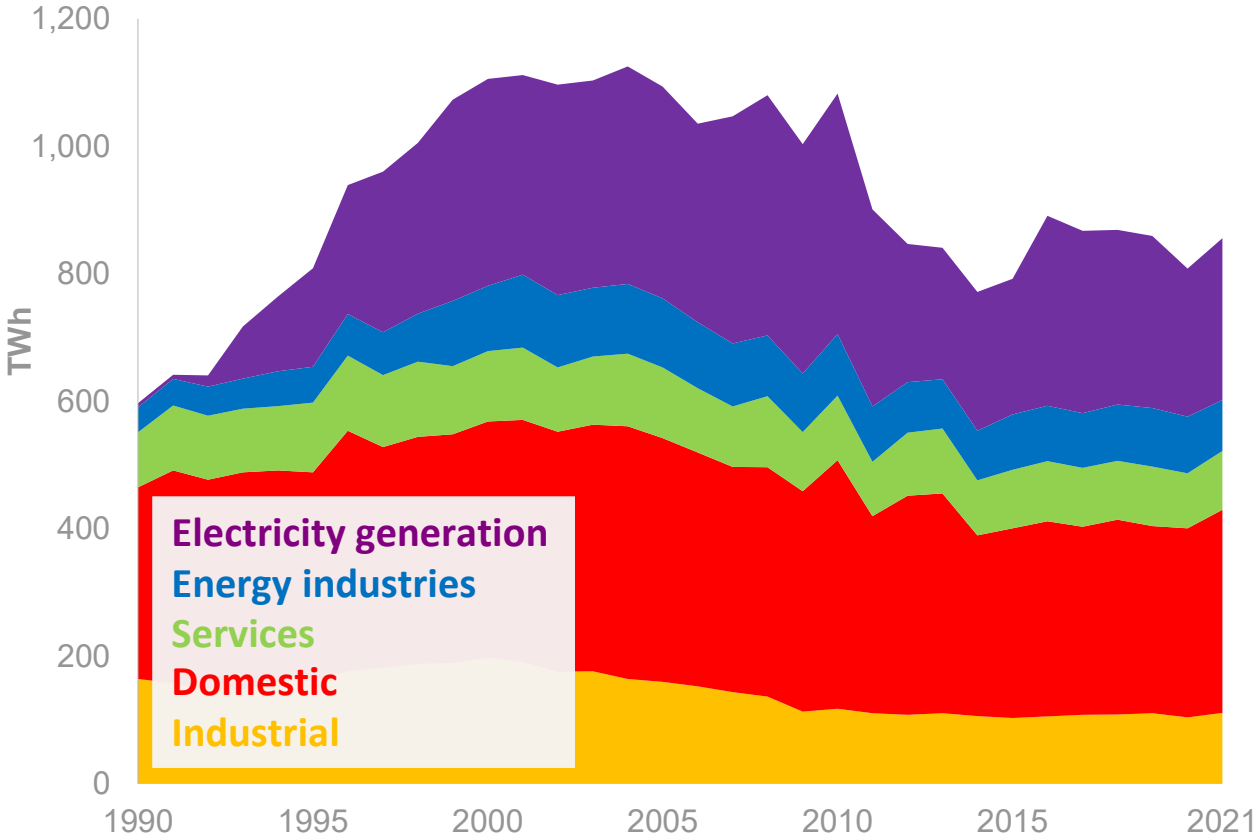
	1990	2000	2010	2019	2020	2021
Oil					**Million tonnes**	
Cumulative production	1,499	2,810	3,769	4,229	4,282	4,327
Proven plus probable reserves	1,195	1,010	751	481	411	357
Total	**2,694**	**3,820**	**4,520**	**4,710**	**4,693**	**4,684**
Gas					**Billion cubic metres**	
Cumulative production	725	1,491	2,323	2,671	2,709	2,740
Proven plus probable reserves	1,200	1,195	520	260	221	195
Total	**1,925**	**2,686**	**2,843**	**2,931**	**2,930**	**2,935**

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. In the last 10 years, estimated proven and probable reserves have declined as fewer discoveries were made whilst cumulative production continued to grow.

Gas data does not include shale gas or Glengorm.

The drop in reserves in 2015 was due to re-classification of some reserves that had not yet been sanctioned - these will be reintroduced as sanctioned.

Natural gas demand, 1990 to 2021



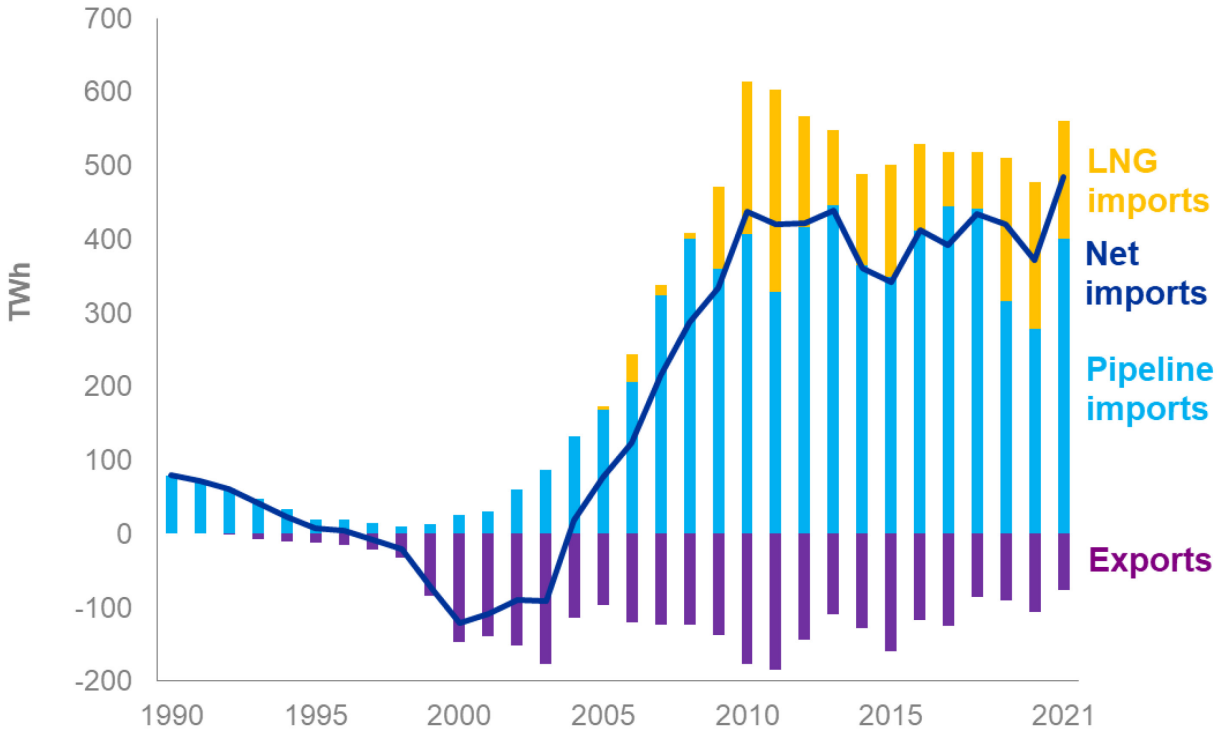
TWh

	1990	2000	2010	2019	2020	2021
Electricity generators	6.5	324.6	376.5	269.6	232.3	254.0
Energy Industries	39.2	102.1	95.9	91.7	88.7	79.4
Industry	164.6	198.5	118	110.9	104.4	111.6
Domestic	300.4	369.9	389.6	293.7	296.6	318.4
Services	86.4	110.5	101.6	93.2	86.2	92.4
Transport	..	..	..	0.5	0.9	1.0
Total	**597.0**	**1,105.5**	**1,082.2**	**859.6**	**809.1**	**856.7**

Following the expansion of UK natural gas production in the early 1970s, demand grew rapidly reaching a record high in 2004 of 1,125 TWh. Since then, demand has seen an overall decline, and in 2021 was nearly 25 per cent lower than the 2004 peak at 861 TWh. Longer-term trends are driven by prices and changes to energy efficiency, whilst annual changes are mainly driven by temperature and short-term price fluctuations.

Overall gas demand in 2021 increased by 5.9 per cent when compared with 2020. Demand increased across all sectors, as restrictions in place to curb the Covid-19 pandemic were eased. Consumption by industry and services increased by 7.2 and 6.0 per cent respectively. Domestic demand increased by 7.4 per cent, as colder temperatures in the beginning of the year coincided with increased time spent at home due to restrictions. Gas used for electricity generation increased by 9.3 per cent, largely due to reduced renewable output.

UK trade in natural gas, 1990 to 2021



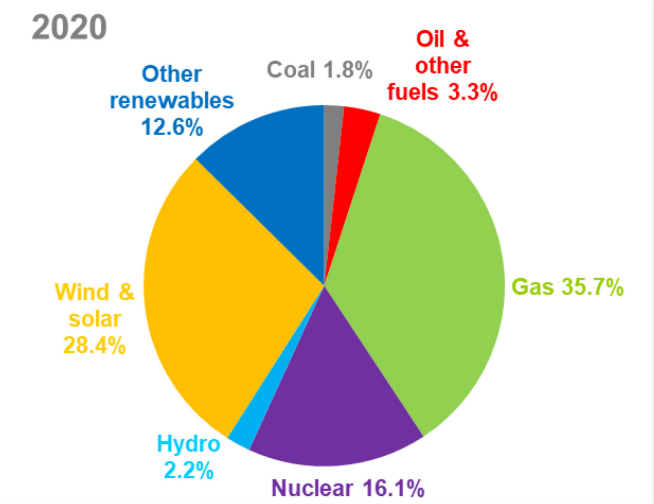
TWh

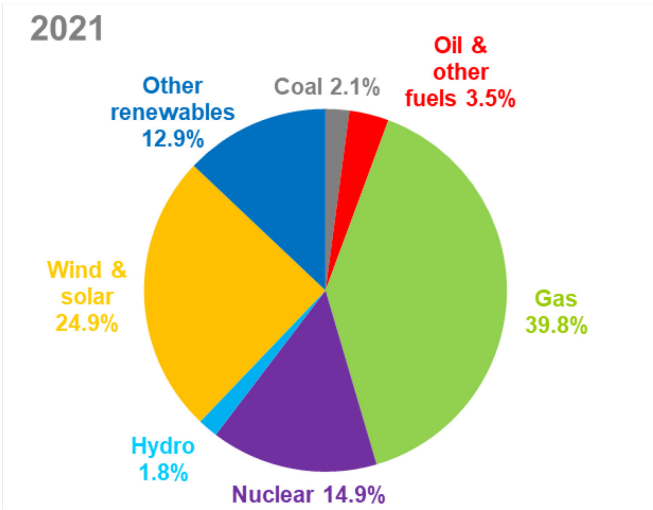
	1990	2000	2010	2019	2020	2021
Natural gas production	528.8	1,260.2	642.5	436.2	439.4	364.0
Imports	79.8	26.0	614.5	511.2	478.2	560.8
of which LNG	-		*206.8*	*194.4*	*200.1*	*159.9*
Exports	-	-146.3	-176.4	-90.4	-105.9	-75.7
Net imports (+) or exports (-	+79.8	-120.3	+438.1	+420.8	+372.3	+485.1

UK gas production peaked in 2000 and has since been declining, making the UK increasingly reliant on imports to meet demand. Net imports increased in 2021, to 485 TWh, as imports increased and exports were down compared to 2020. Imports were up in 2021 in order to meet demand amid low indigenous production, whilst exports were at their lowest level since 1996 and remain below the long-run average. Imports accounted for over half of UK supply in 2021.

Imports of Liquefied Natural Gas (LNG) remained substantial in 2021, however they decreased by 20 per cent on 2020 to160 TWh. By contrast, pipeline imports increased significantly to 401 TWh. Pipeline imports from the Netherlands more than doubled, imports from Belgium were over five times the levels seen in 2020 and imports from the UK's key supplier, Norway, increased by 91 TWh (35 per cent) to 355 TWh. As a result, LNG share decreased to 29 per cent of total imports. Norway remains the UK's most important trading partner and pipeline imports from Norway accounted for 63 per cent of imports in 2021.

Electricity generated by fuel type, 2020 and 2021





TWh

	1990	2000	2010	2019	2020	2021
Coal	229.9	120.0	107.6	6.9	5.5	6.5
Oil & other fuels*	20.7	13.6	10.5	9.2	10.2	10.9
Gas	0.4	148.1	175.7	131.9	111.4	122.7
Nuclear	63.2	85.1	62.1	56.2	50.3	45.9
Hydro	5.6	5.1	3.6	5.9	6.9	5.5
Wind & Solar	-	0.9	10.3	76.3	88.5	76.8
Other renewables	-	4.3	12.3	37.4	39.3	39.9
Total electricity generated	**319.7**	**377.1**	**382.0**	**323.8**	**312.1**	**308.1**

*Includes generation from pumped storage.

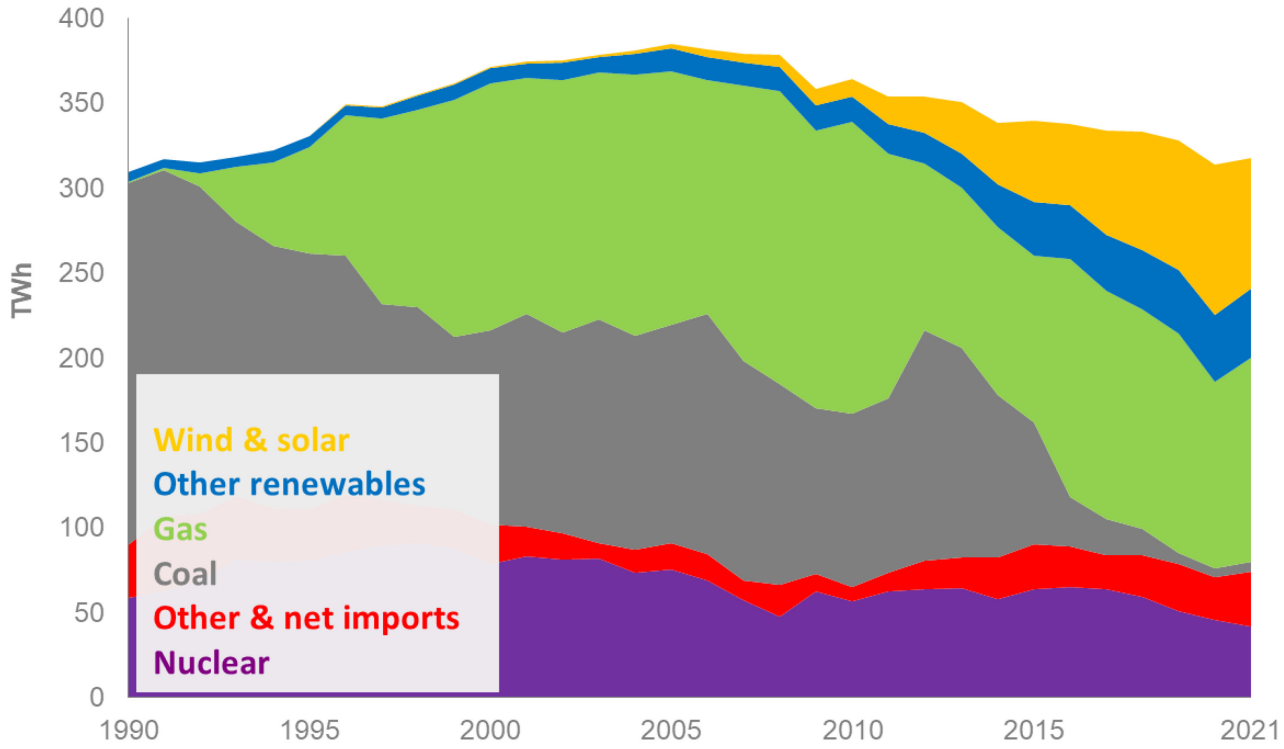
Total electricity generated decreased by 1.4 per cent between 2020 and 2021, in contrast to a 1.1 per cent increase in demand. High net imports accounted for the difference, reducing the need for UK-based generation.

The share of generation from renewables decreased from 43.2 per cent in 2020 to 39.7 per cent in 2021. This was still the second highest share of renewable generation recorded and came as less favourable weather conditions in 2021 decreased generation from wind, solar and hydro generators. At the same time, generation from nuclear continued its long-term downward trend, with its share decreasing from 16.1 per cent to 14.9 per cent.

Fossil fuel generation shares increased in 2021 to account for the lower renewable and nuclear generation. There was a substantial increase for gas, up from 35.7 per cent to 39.8 per cent. The share of electricity generated from coal in 2021 increased 0.3 percentage points from 2020 to 2.1 per cent, though this was from a low baseline in 2020.

Further details on renewable electricity generation can be found on page 33.

Electricity supplied by fuel type, 1990 to 2021



The mix of fuels used to generate electricity continues to evolve. Since 1990, the decline of coal, the rise of gas, and in more recent years renewables, have been the most marked features, but none of these fuels have followed a smooth path.

Coal recorded its 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 from coal, then rose in 2012 due to high gas prices. Subsequently, supply from coal has fallen to a record low of 5.2 TWh in 2020, before a slight increase to 6.0 TWh in 2021.

Between 1990 and 2008, supply from gas rose significantly from 0.4 TWh to a peak of 173 TWh in 2008. Subsequently, supply has fluctuated with a large increase in 2016, but decreases in 2017 and 2018. Gas supply fell to 109.3 TWh in 2020 as the Covid-19 pandemic reduced electricity demand but recovered to 120.5 TWh in 2021.

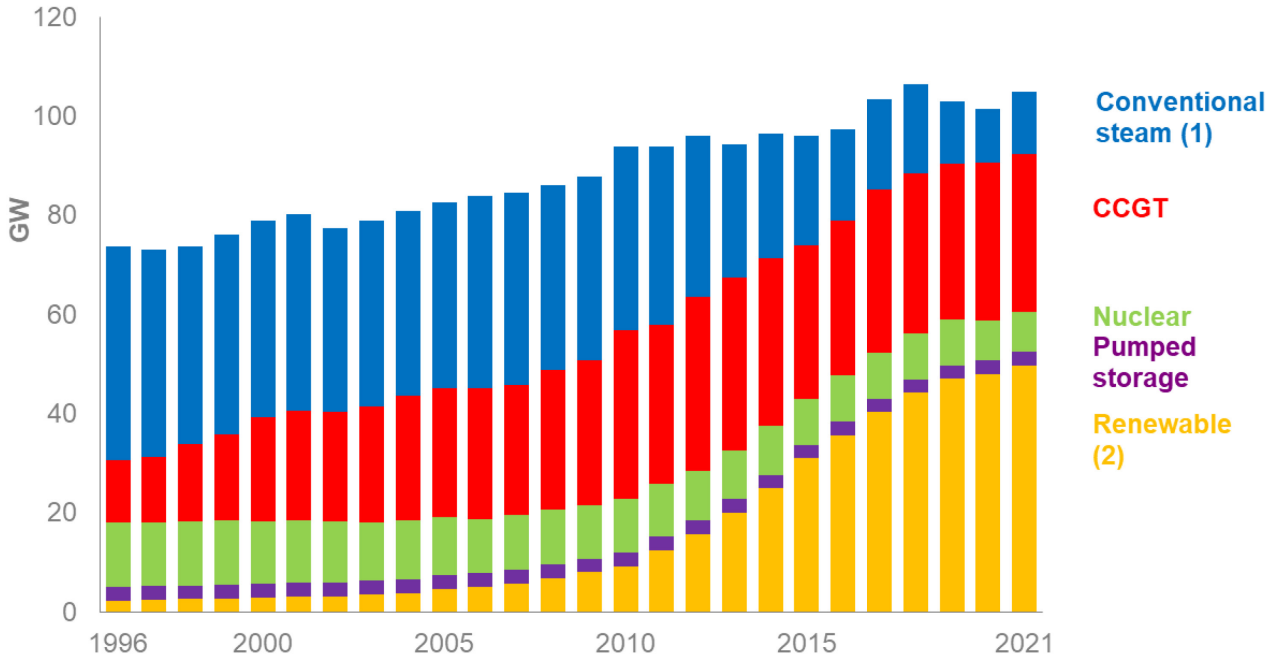
Supply from nuclear peaked in 1998 before falling back, particularly during 2006 to 2008, as station closures and maintenance outages reduced supply. Nuclear supply has fluctuated since 2010 and has decreased year on year since 2016. Nuclear supply dropped 9% from 2020 to 2021, to 41.7 TWh, because of outages and reduced capacity.

Supply from wind and solar increased year on year from 2000 to 2020 as generation capacity increased each year, peaking at 88.5 TWh in 2020. In 2021, supply from wind and solar decreased 13% on 2020 to 76.8 TWh because of unusually low wind speeds and average sun hours. This decrease was seen despite increased capacity in 2021.

From 2020 to 2021, supply from other fuels and net imports increased by 37% to a record high of 24.6 TWh. This was driven by high net imports, including new interconnectors.

Total electricity supplied rose 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 and weather factors with supply in 2021 17% lower than that in 2005. However, total electricity supplied increased 1.5% from 2020 to 2021 as demand recovered from the Covid-19 pandemic.

Electricity capacity, 1996 to 2021



GW

	1996	2000	2010	2019	2020	2021
Conventional Steam (1)	43.0	36.8	36.3	12.4	10.8	12.6
CCGT	12.7	22.9	34.1	31.5	31.8	31.8
Nuclear	12.9	12.5	10.9	9.3	8.1	8.1
Pumped Storage	2.8	2.8	2.7	2.7	2.7	2.7
Renewable (2)	2.3	3.0	9.3	47.0	47.9	49.7
Total	**73.6**	**77.9**	**93.2**	**102.9**	**101.3**	**105.0**

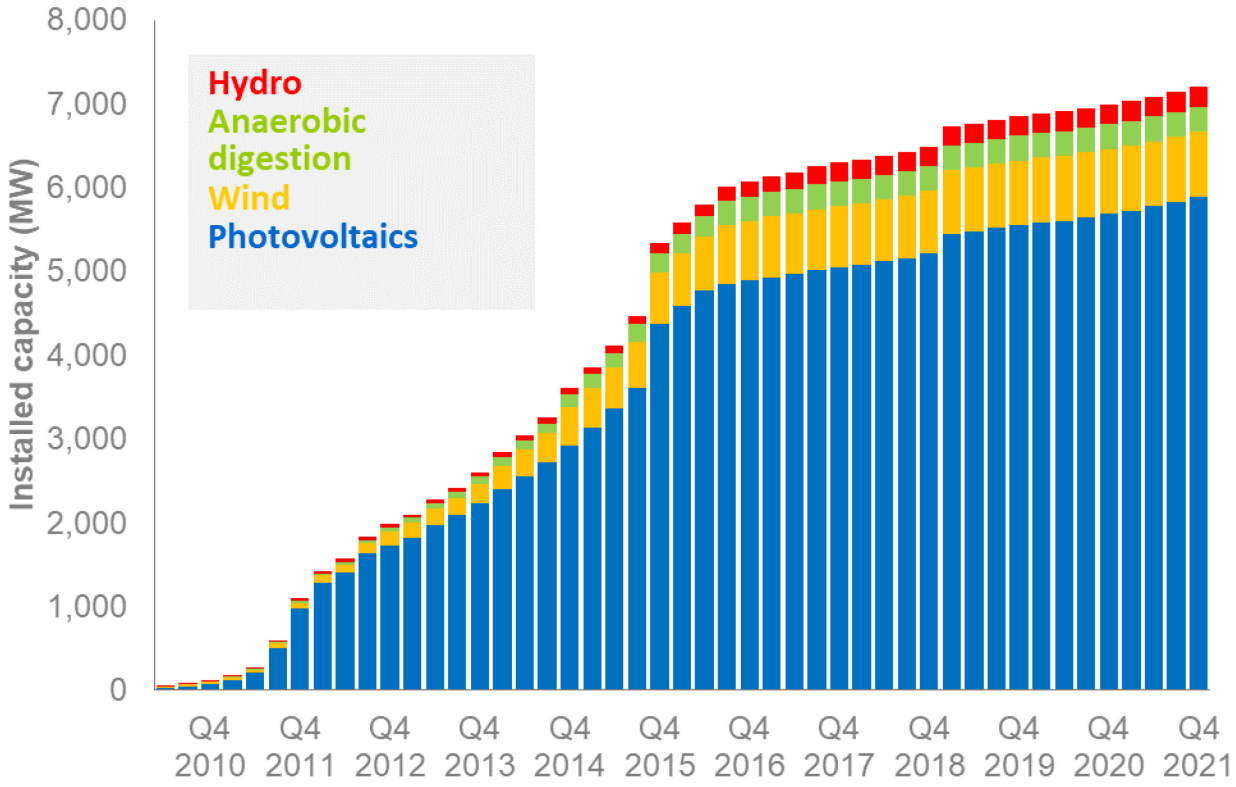
(1) Includes coal, non-CCGT gas, oil and mixed/dual fired. Does not include thermal renewables.
(2) Renewable capacity is on an Installed Capacity basis. Data for other fuels/technologies relates to Declared Net Capacity from 1996 to 2005, data for 2006 onwards is transmission entry capacity (TEC)

Installed capacity for electricity generation in the UK increased gradually between 1996 and 2018, from 73.6 GW to 106.4 GW. 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. In 2019 and 2020, total capacity fell following the closure of several large coal-fired plants, and the mix of plants shifted towards renewable technologies. 2021 saw total capacity increase to 105.0 GW, with increased renewable and conventional steam capacity.

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, but was 31.8 GW in both 2020 and 2021. Conventional steam capacity has been falling since 2010 but increased in 2021 to 12.6 GW with additional bioenergy capacity.

Nuclear capacity in 2021 was 8.1 GW. The capacity reduced to this level in 2020 due to the decision not to restart generation at Dungeness B after a prolonged outage. Renewables capacity has seen a substantial increase, with an installed capacity in 2021 of 49.7 GW. This is more than 20 times the capacity in 1996. Most of the renewable technologies saw an increase in capacity between 2020 and 2021, with a particularly large increase in capacity for offshore wind (up 8.4 per cent).

Small scale renewable capacity, 2010 to 2021



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

	2010	2012	2014	2016	2019	2020	2021
Micro CHP	0	1	1	1	1	1	1
Anaerobic Digestion	5	50	151	292	296	296	296
Hydro	12	41	78	183	230	236	236
Wind	21	167	449	702	770	776	776
Photovoltaics	79	1,728	2,928	4,896	5,551	5,684	5,897
Total	**117**	**1,986**	**3,607**	**6,074**	**6,848**	**6,992**	**7,206**

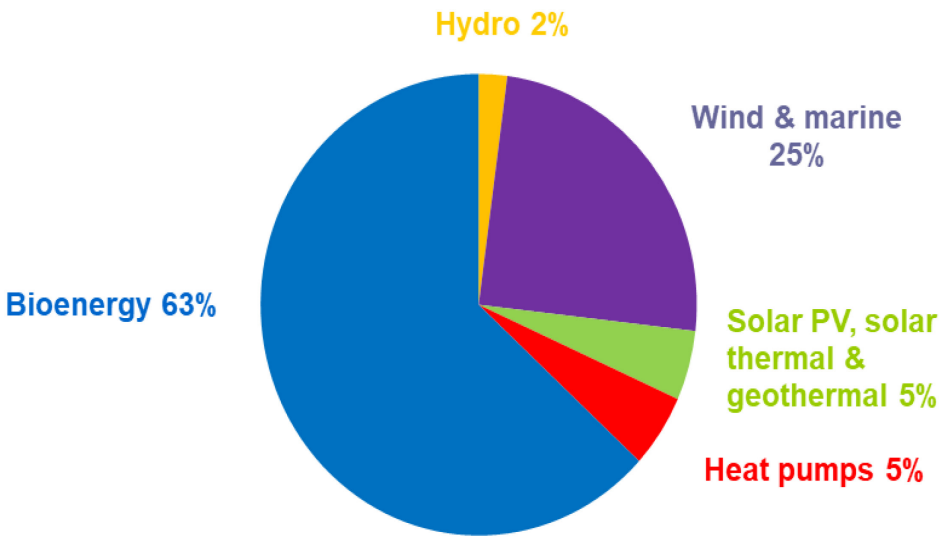
Source: Microgeneration Certification Scheme (MCS) and Central FITs register (CFR).

At the end of 2021 7,206 MW of capacity (around 1,096,000 installations) was installed, around 3.1% more confirmed capacity (and 5.9% more installations) than at the end of 2020. Nearly all of the installations and new capacity was Solar PV. Small scale capacity increased rapidly between 2010 and 2016 but has slowed since. The number of small-scale solar PV installations increased sharply in 2021, installations slowed in 2020, partly due to the COVID pandemic but the volume in 2021 was the highest since 2015.

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.

The methodology for solar PV capacity statistics has recently been reviewed, see article published in Energy Trends at: https://www.gov.uk/government/publications/energy-trends-march-2022-special-feature-article-review-of-solar-pv-capacity-publications

Renewable energy sources, 2021



Total renewables used = 22,495 thousand tonnes of oil equivalent (ktoe)

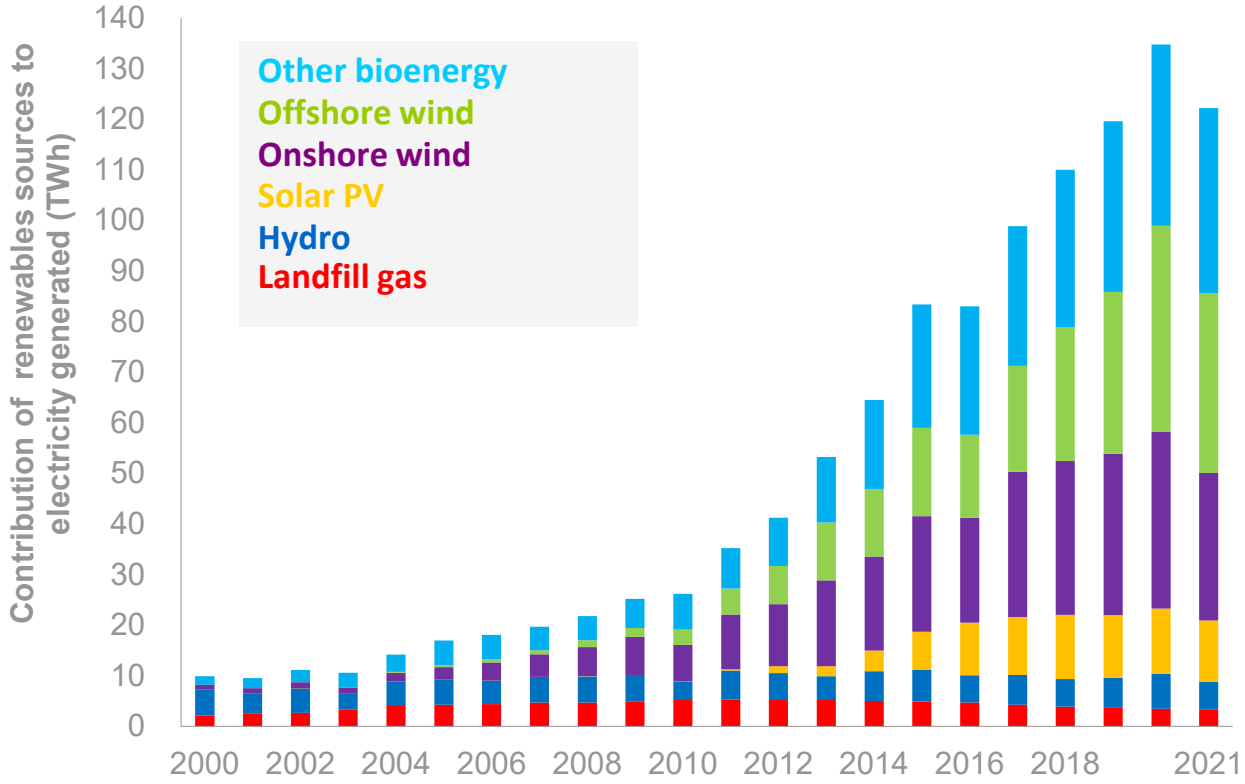
	Thousand tonnes of oil equivalent					
	1990	**2000**	**2010**	**2019**	**2020**	**2021**
Solar PV, active solar and geothermal	6	12	42	1,122	1,164	1,099
Wind and marine	1	81	885	5,490	6,503	5,560
Hydro (small and large scale)	448	437	309	510	590	473
Landfill Gas	80	731	1,725	879	849	805
Sewage gas	138	169	295	323	327	320
Wood (domestic and industrial)	174	458	667	1,098	1,101	1,227
Municipal Waste Combustion	101	375	632	1,618	1,672	1,773
Heat pumps	1	0	778	1,070	1,116	1,158
Transport biofuels	0	0	1,218	1,736	1,639	1,463
Cofiring	0	0	625	0.3	0.0	0.0
Biomass*	72	265	1,054	7,764	8,202	8,618
Total	**1,021**	**2,529**	**8,229**	**21,610**	**23,161**	**22,495**

**Includes plant and animal biomass, anaerobic digestion and biogas injected into the gas grid*

In 2021, bioenergy accounted for about 63% of renewable energy sources used, with most of the remainder coming from wind (25%), heat pumps (5.1%) and solar (4.9%).

Of the 22.5 million tonnes of oil equivalent of primary energy use accounted for by renewables, 16.8 million tonnes were used to generate electricity, 4.3 million tonnes were used to generate heat, and 1.5 million tonnes was used for road transport. Renewable energy use fell by 2.9% between 2020 and 2021 but has increased almost nine-fold on the 2000 total.

Electricity generation from renewable sources since 2000



Note: Hydro bar includes shoreline wave/tidal (0.005 TWh in 2021)

TWh

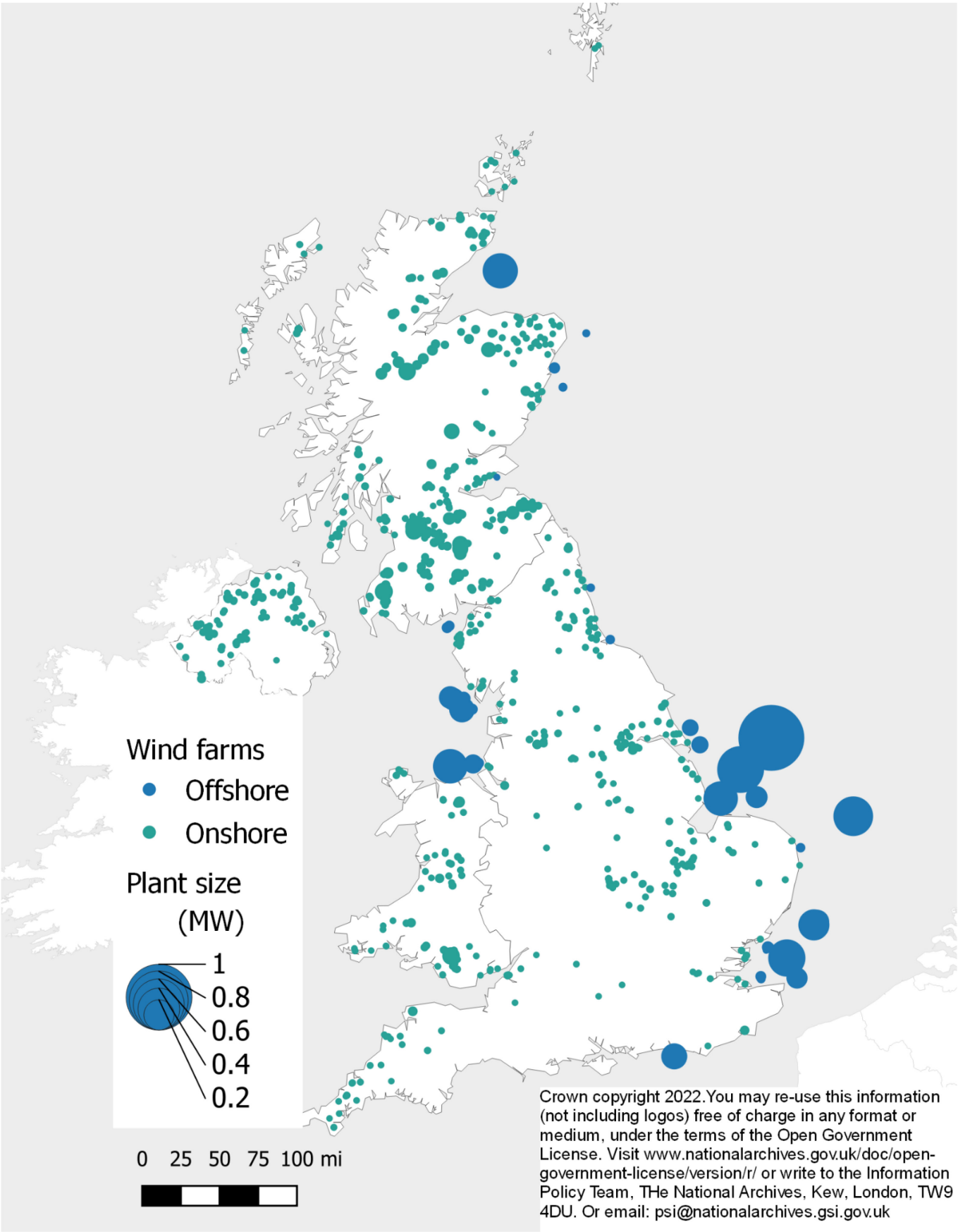
	2000	2010	2019	2020	2021
Onshore wind	0.9	7.2	31.9	34.9	29.2
Offshore wind	-	3.1	32.0	40.7	35.5
Solar PV	-	0.0	12.4	12.9	12.1
Hydro	5.1	3.6	5.9	6.9	5.5
Landfill Gas	2.2	5.2	3.6	3.5	3.3
Other Bioenergy	1.7	7.0	33.8	35.9	36.6
Total Renewables	**9.9**	**26.2**	**119.6**	**134.7**	**122.2**

Electricity generated from renewable sources decreased by 9.3% between 2020 and 2021 to 122.2 TWh, though this is still the second highest annual figure on record. 2020 had been a record for renewable generation. The decrease is mostly due to less favourable weather conditions. Capacity grew by 3.7%, a higher growth rate than 2020 (where new capacity was hampered by the COVID pandemic) but slower than in previous years.

Total wind generation decreased by nearly 15% to 64.7 TWh, there had been exceptionally strong wind speeds in 2020. Hydro generation decreased by nearly 20% in 2020, this was largely due to a fall in average rainfall. Generation from solar PV decreased by 5.9%, a small increase in capacity was cancelled out by a decrease in average sunlight hours. Generation from bioenergy increased by 1.3%. Within this, generation from anaerobic digestion grew sharply but it had been deflated in 2020 by outages.

Renewable electricity accounted for a record 39.7% of electricity generated in the UK during 2021, 3.5 percentage points lower than in 2020 but higher than any previous year. The map on page 34 shows the size of onshore and offshore wind farms across the UK.

UK Onshore and Offshore Wind Capacity



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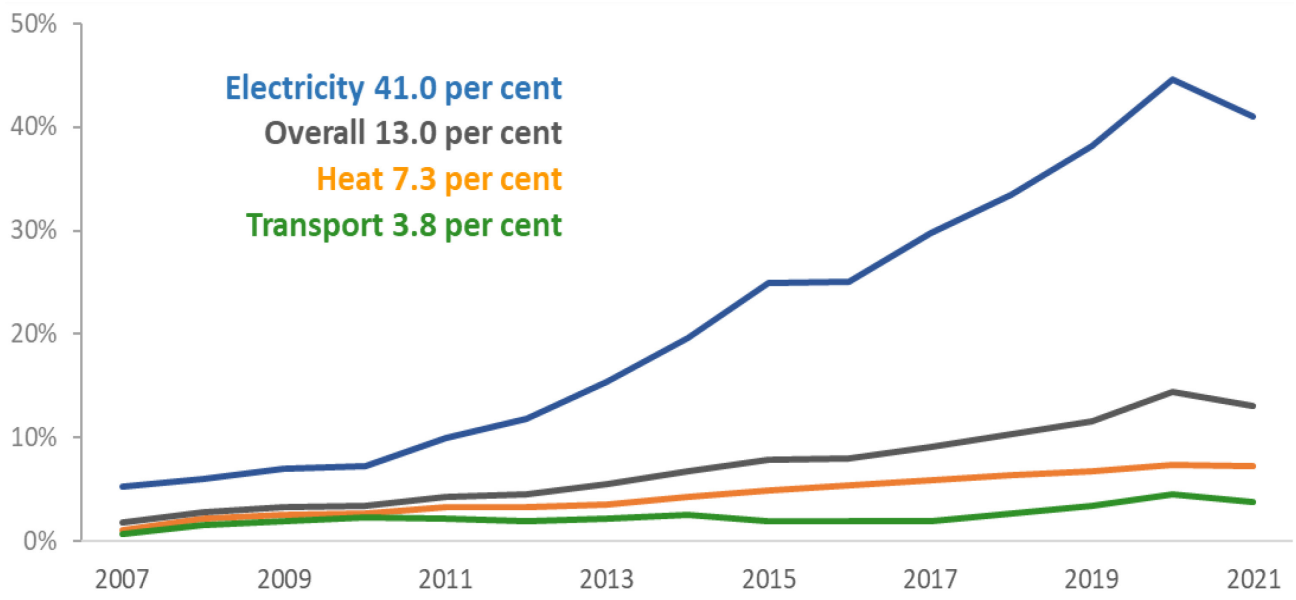
Renewable proportion of Gross Final Consumption

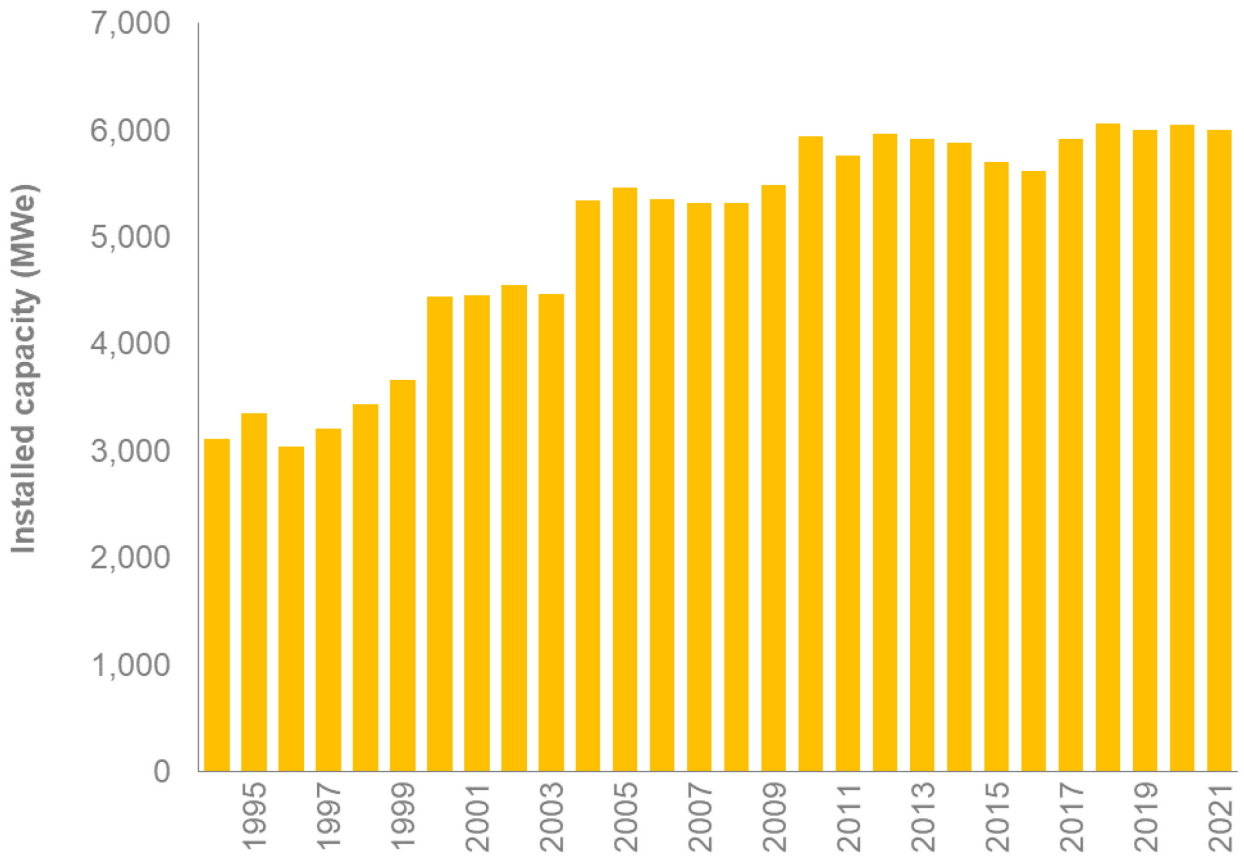


The Gross Final Consumption proportions in the chart reflect the proportion of renewable electricity and heat consumption before losses; the transport measure is on an actual consumption basis. The electricity measure excludes the use of electricity in transport which is allocated to that sector's measure.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

The proporiton of electricity generation from renewables fell in 2021 to 41.0 per cent, in line with the actual generation measure, reflecting the less favourable weather conditions when compared to 2020. The proportion of heat from renewable sources has steadily increased from 1.8 per cent in 2007 to 7.3 per cent in 2021. Although the proportion fell slightly from 7.4 per cent in 2020, this was largely due to additional gas consumption rather than a fall in renewable heat.

Given the dominance of renewable electricity in the overall renewable measure, the impact of lower renewable electricity supply in 2020 has pushed down the overall measure from 14.4 per cent in 2020 to 13.0 per cent in 2021.

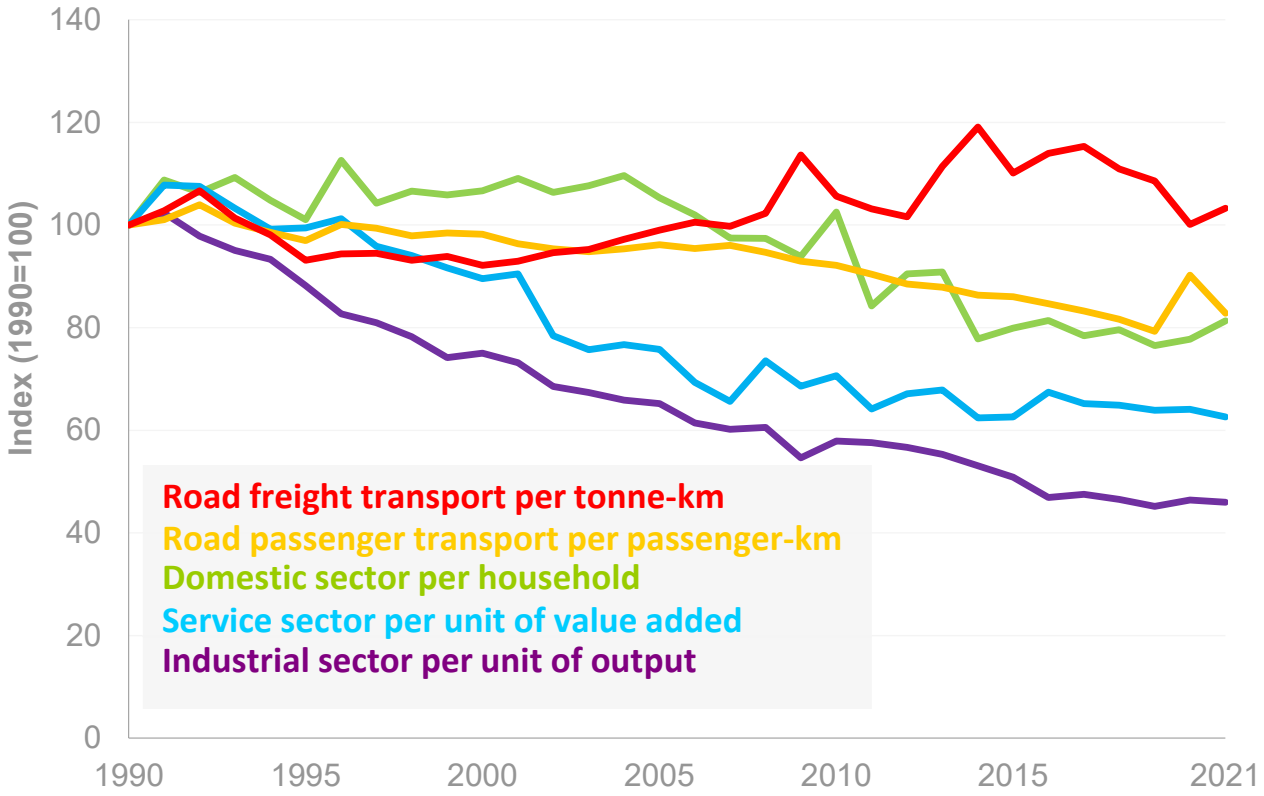
Combined heat and power, 1994 to 2021



	1995	2000	2019	2020	2021
CHP electrical capacity (MWe)	3,354	4,451	6,004	6,049	6,004
CHP electrical generation (GWh)	14,777	25,245	23,265	22,100	21,687
CHP heat generation (GWh)	56,830	54,877	41,240	40,751	40,273
Number of CHP sites					
<= 100 kWe	620	560	467	454	344
> 100 kWe to 1 MWe	397	533	1,226	1,253	1,124
>1 MWe to 2 MWe	26	41	207	215	219
> 2 MWe to 10 MWe	113	141	251	260	262
> 10 MWe +	63	64	67	70	68
Total	**1,219**	**1,339**	**2,218**	**2,252**	**2,017**

In 2021 CHP electrical capacity fell marginally by 0.7% compared to 2020 with the number of schemes decreasing by 10 per cent. BEIS have undertaken a review of the schemes included in the CHP database and have taken the step to remove schemes if no new data have been received for nine years. Since a sizable number of schemes were added in 2012, this has resulted in an apparent large fall in 2021. These schemes, however, were of small capacities so the impact of their removal in electrical capacity terms is minimal. Electricity and heat generation in 2021 decreased by 2.0% and 1.2% respectively when compared to 2020. 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 2021 CHP schemes accounted for 7.0% of the total electricity generated in the UK and 7.2% of UK gas demand.

Energy intensity, 1990 to 2021



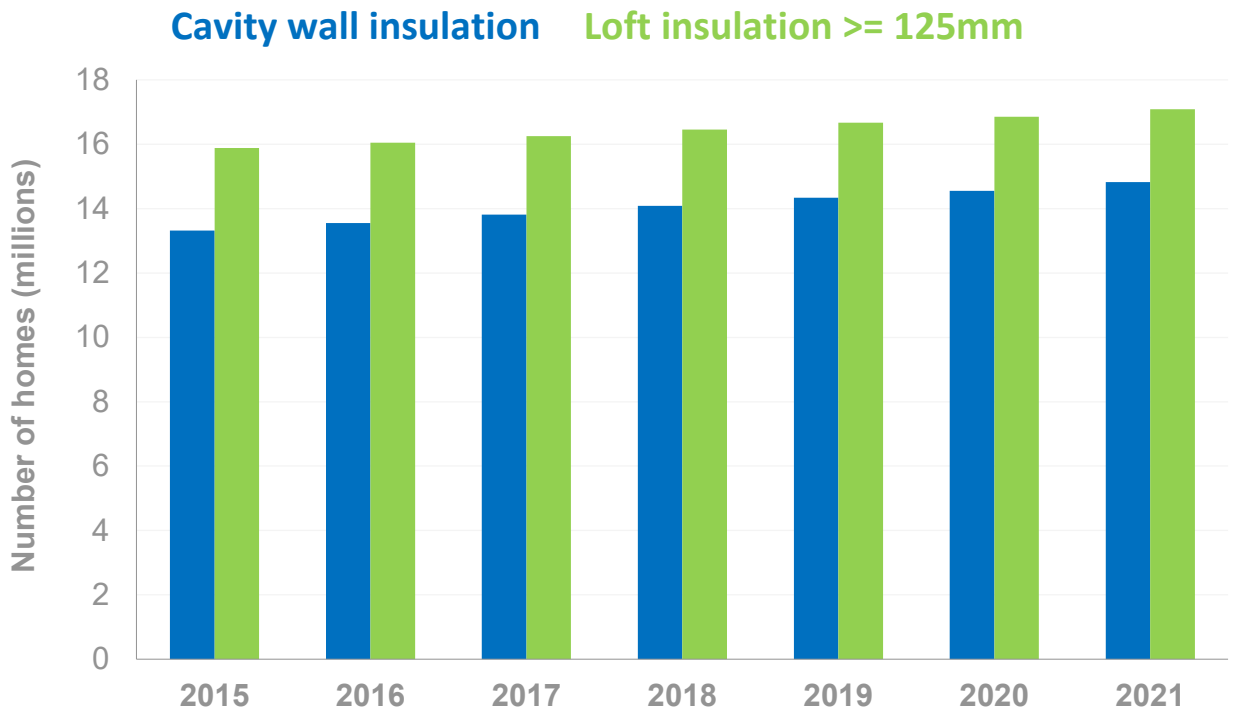
Tonnes of oil equivalent

	1990	2000	2010	2019	2020	2021p
Industrial energy consumption per million units of GVA	186.0	139.5	107.7	84.0	86.3	85.5
Domestic energy consumption per household	1.8	1.9	1.8	1.4	1.4	1.5
Service sector energy consumption per million units of GVA	22.1	19.8	15.6	14.1	14.2	13.9
Road passenger energy consumption per million passenger-kilometres*	42.7	41.9	39.3	33.8	38.5	35.3
Road freight energy consumption per million freight-kilometres*	86.6	79.8	91.4	94.0	86.7	89.4

* BEIS estimates for 2021.

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 over the last thirty years or so 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 since 2005, due to improvements in energy efficiency measures. The changes in the road passenger and freight categories in 2021 are a direct result of the easing of the Covid-19 pandemic travel restrictions.

Number of homes with energy efficiency measures, December 2015 to December 2021



Insulated homes in Great Britain (Thousands)

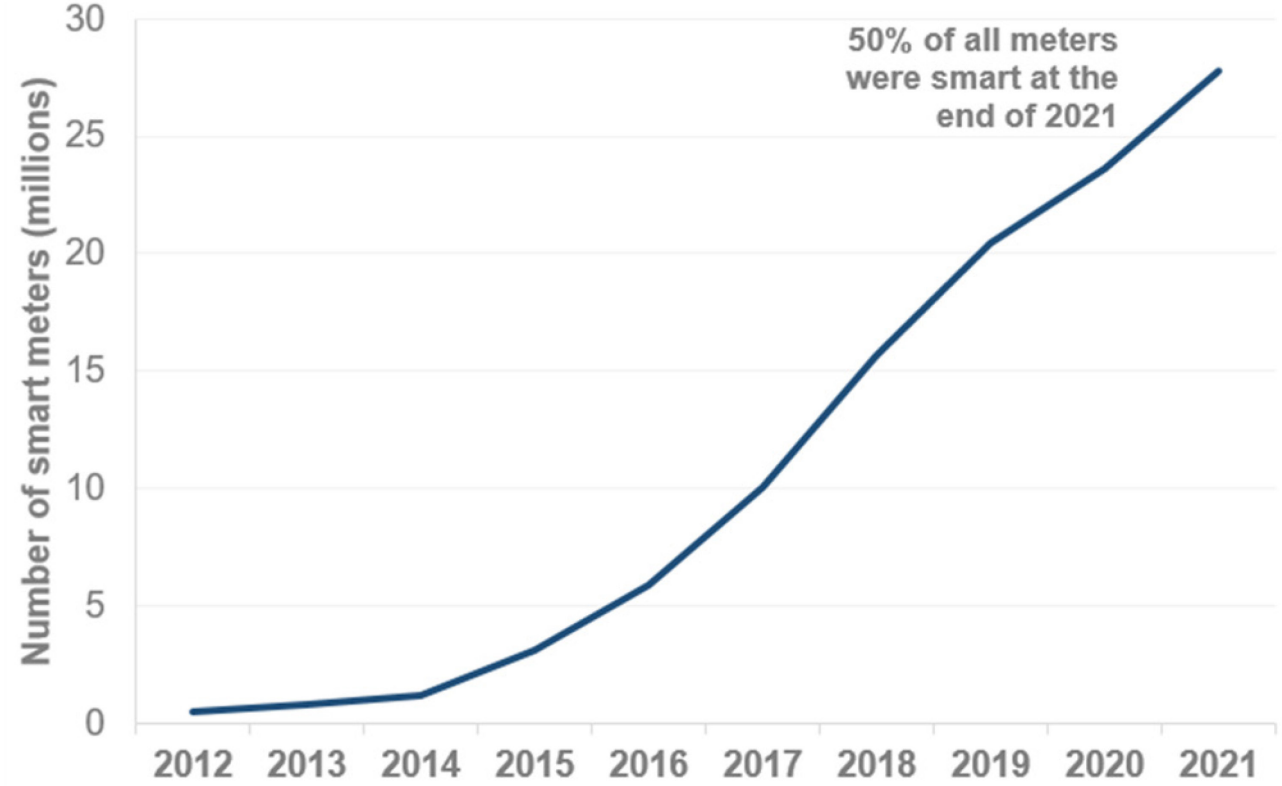
End of year	2015	2017	2018	2019	2020	2021
Cavity wall insulation	13,320	13,810	14,090	14,340	14,560	14,830
Loft insulation >= 125mm	15,890	16,250	16,460	16,670	16,860	17,090

Source: BEIS, Household Energy Efficiency (HEE) National Statistics, detailed report 2021. 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 11% between the end of December 2015 and December 2021 such that 14.8 million of the 21.1 million homes with cavities, are insulated. The number of homes with loft insulation, of a depth of at least 125mm, has increased by 8% between the end of December 2015 and December 2021 meaning that 17.1 million of the 25.7 million homes with lofts are insulated to this level.

Smart meters in Great Britain, December 2012 to December 2021



Total meters (Thousands)

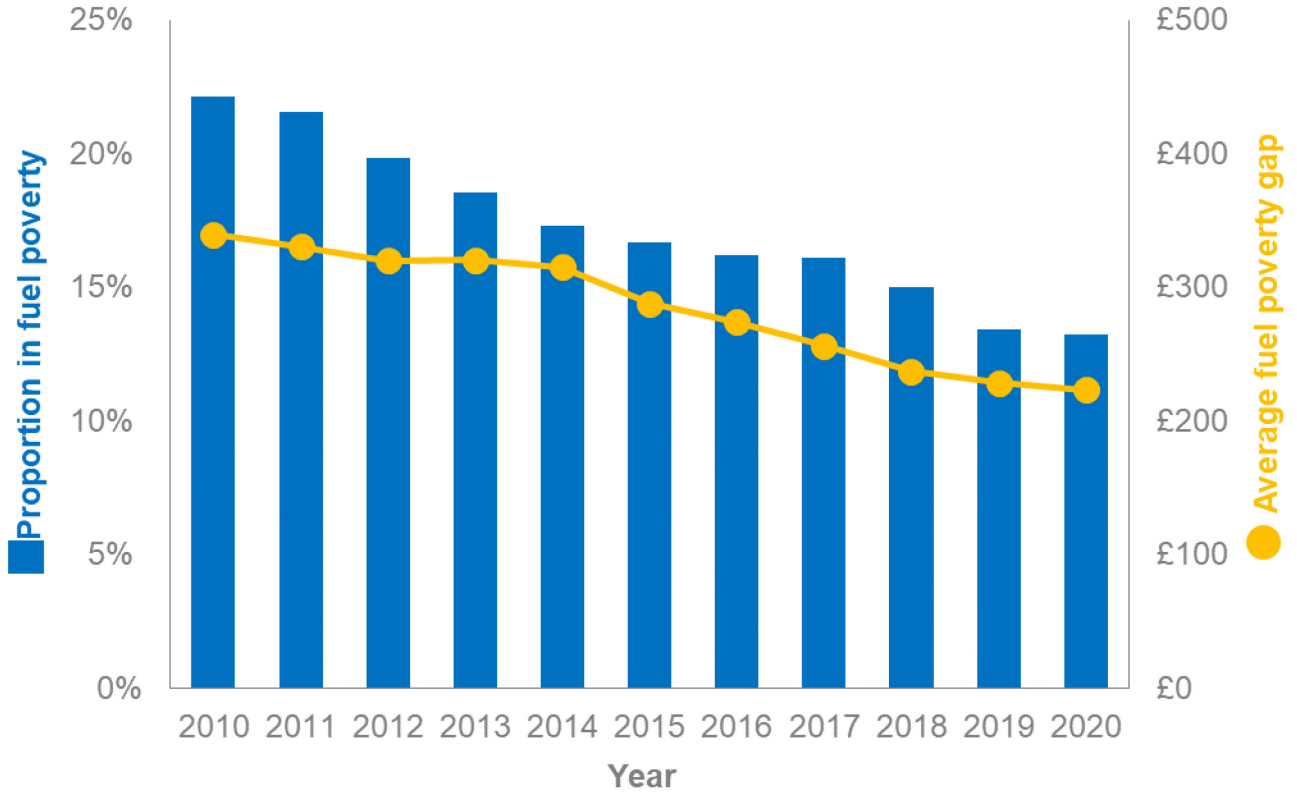
End of year[1]	**2012**	**2017**	**2018**	**2019**	**2020**	**2021**
Domestic						
Smart	3	8,976	14,514	19,164	22,170	26,135
Non-smart	47,726	41,583	36,522	32,681	30,267	26,588
Non-domestic[2]						
Smart	454	1,061	1,135	1,313	1,476	1,643
Non-smart	2,424	2,270	2,092	1,887	1,807	1,688
Total						
Smart	457	10,036	15,648	20,477	23,646	27,778
Non-smart	50,150	43,853	38,614	34,568	32,073	28,276

Source: BEIS, Smart Meter Statistics in Great Britain, Quarterly update December 2021.
1. Data for 2013-2016 are not included in this table. All annual data can be found in the UK Energy in Brief 2022 dataset
2.Non-domestic sites include small 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 an essential infrastructure upgrade for Great Britain. Smart meters enable consumers to track their energy use, prepayment customers to top-up credit from home, automatic meter reads and accurate billing, and technologies such as electric vehicles to be cost-effectively integrated with renewable energy sources. These data show the growth in the number of smart meters operating in Great Britain between 2012 and 2021.

At the end of December 2021 there were 27.8 million smart meters operating in Great Britain. Of these, 23.6 million were smart meters operating in smart mode or advanced meters. At the end of 2021, 50% of all meters in domestic households were smart, compared to 49% in smaller non-domestic sites. Overall, 50% of all meters in domestic or smaller non-domestic sites were smart, an increase of seven percentage points from the end of 2020.

Households in fuel poverty, 2010 to 2020



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

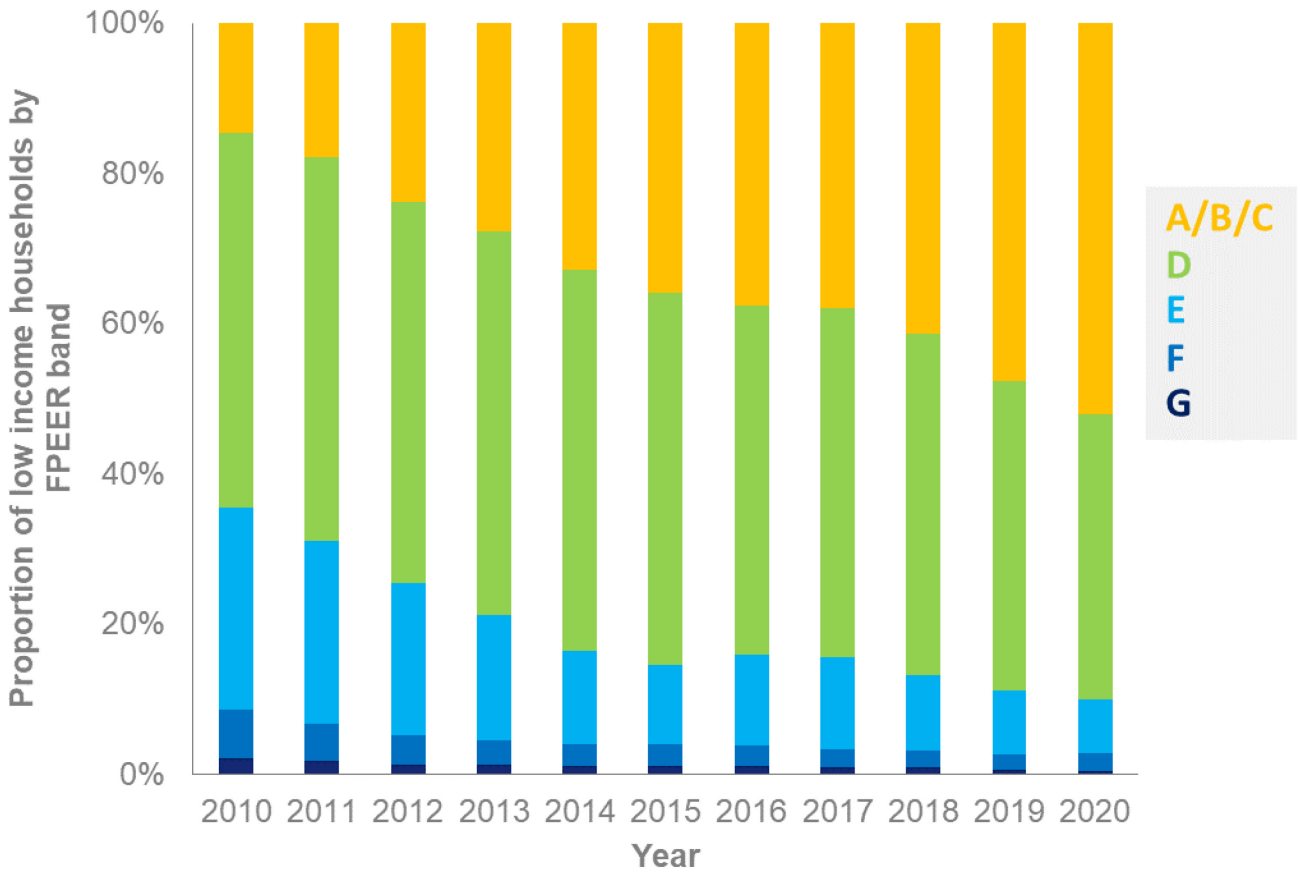
Under LILEE, a household is considered to be fuel poor if: they are living in a property with a fuel poverty energy efficiency rating of band D or below; and were they to spend the required amount to heat their home, they would be left with a residual income below the official poverty line.

- The proportion of households in England in fuel poverty was estimated to have decreased by 0.2 percentage points from 2019 to 13.2% in 2020 (approximately 3.16 million households).
- In 2020, 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 £223, down slightly from £229 in 2019 in real terms following a steady downward trend since 2014.
- The lower number of households in fuel poverty also caused the aggregate fuel poverty gap for England to continue to decrease in 2020 (by 2.8% in real terms) to £705 million.

Key drivers of fuel poverty, 2019-2020

- Energy efficiency – improvement in energy efficiency between 2019 and 2020 has brought more low income households to band C which removes them from fuel poverty.
- Incomes – Growth occurred in all income deciles, but the rate of growth was less in lower income deciles when compared with the median income growth.

Low income households by FPEER[1] band, 2010 to 2020



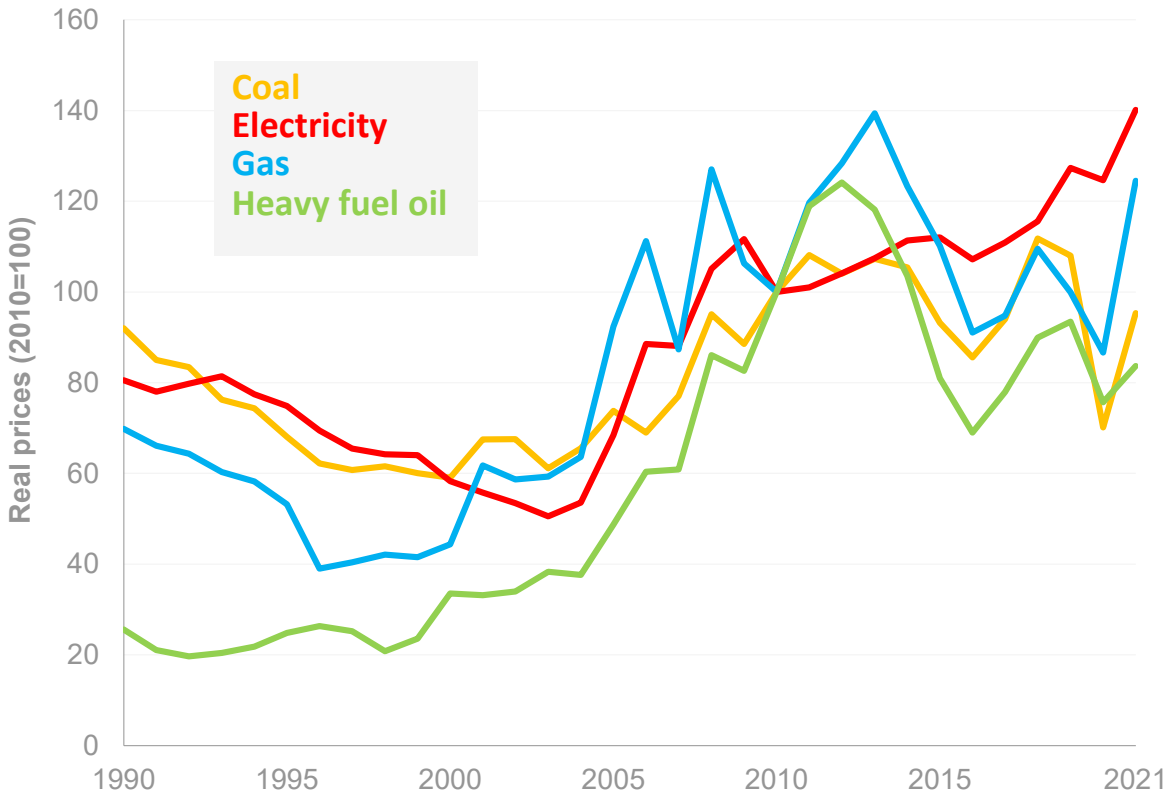
In December 2014 the Government introduced a new statutory fuel poverty target for England. The target is to ensure that as many fuel poor homes as reasonably practicable achieve a minimum energy efficiency rating of Band C by 2030 (with interim milestones to lift as many fuel poor homes in England as 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 2020, further progress was made towards the 2030 fuel poverty target, with 52.1 per cent of all low income households living in a property with a fuel poverty energy efficiency rating of band C or better.

Target year	Fuel poverty target	2010 (%)	2020 (%)	Percentage point change
2020	Band E or above	91.5	97.2	5.7
2025	Band D or above	64.6	90.1	25.5
2030	Band C or above	14.6	52.1	37.5

[1] Fuel poverty energy efficiency rating (FPEER)

Fuel price indices for the industrial sector, 1990 to 2021



	Real prices, 2010 = 100					
	1990	**2000**	**2010**	**2019**	**2020**	**2021**
Coal	92.0	59.1	100.0	108.0	70.1	95.4
Electricity	80.5	58.3	100.0	127.4	124.7	140.2
Gas	69.8	44.4	100.0	99.9	86.7	124.5
Heavy fuel oil	25.6	33.5	100.0	93.5	75.7	83.7
Industrial prices	**71.3**	**50.7**	**100.0**	**117.9**	**110.8**	**129.8**

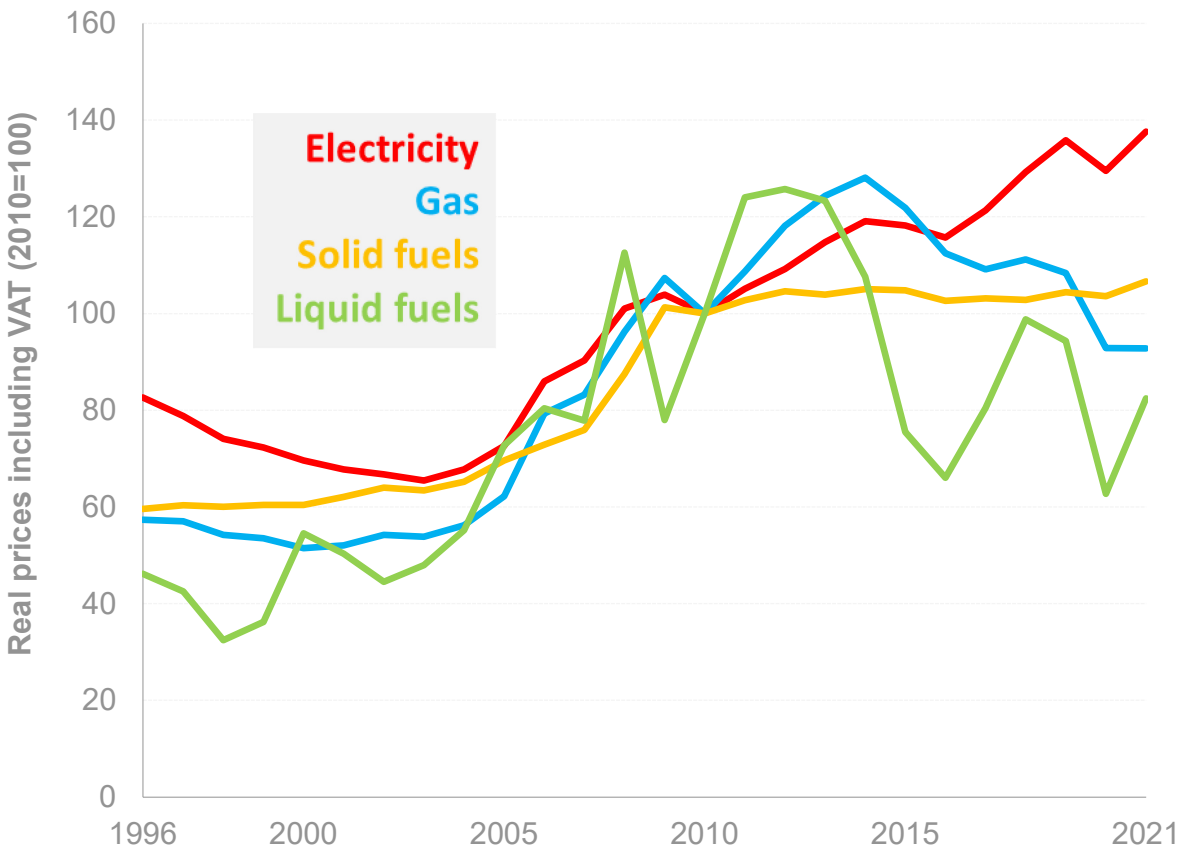
Includes the Climate Change Levy that came into effect in April 2001

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.

Compared to the previous year, in 2021 industrial electricity prices, in real terms, were up by 12% and were the highest on record. Gas prices were up by 44%. Coal prices paid for by industry were up by 36%. Industrial heavy fuel oil is used less than other fuels affected by bulk buying and stockpiling and prices in real terms were up by 11%.

Over the last five years industrial gas prices, in real terms, have increased by 37% and electricity prices have increased by 31%.

Fuel price indices for the domestic sector, 1996 to 2021



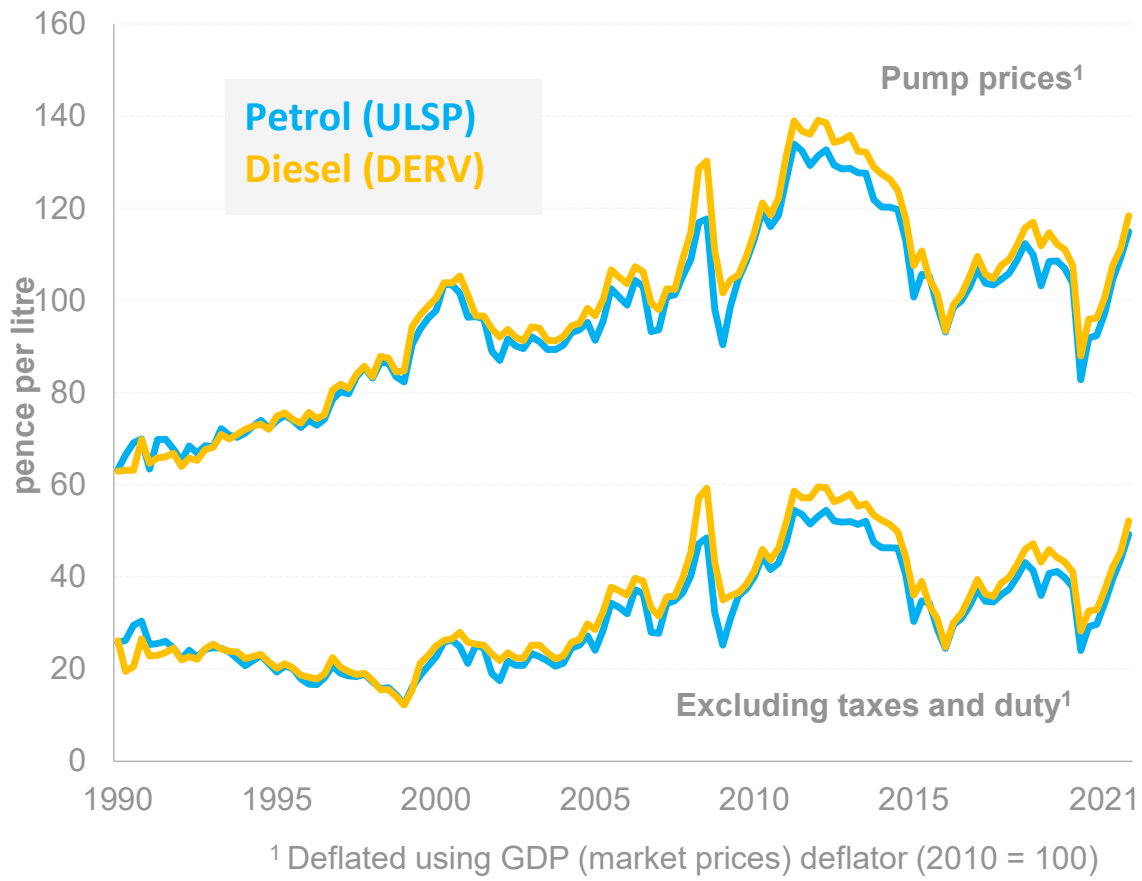
	Real prices including VAT, 2010 = 100					
	1996	**2000**	**2010**	**2019**	**2020**	**2021**
Solid fuels	59.6	60.4	100.0	104.4	103.6	106.6
Electricity	82.7	69.6	100.0	135.9	129.5	137.6
Gas	57.4	51.5	100.0	108.4	92.8	92.8
Liquid fuels	46.2	54.5	100.0	94.3	62.7	82.4
Domestic fuels	**68.4**	**61.0**	**100.0**	**122.5**	**111.2**	**116.1**

Source: Consumer Price Index, Office for National Statistics

Compared to 2020, total domestic energy prices in 2021 increased in real terms by 4.4%. Over the same time period, liquid fuels increased by 31%, gas prices decreased by 0.1%, electricity prices increased by 6.3% and solid fuels increased by 2.9%.

Comparing prices in 2021 with prices 10 years prior, real prices for domestic fuels overall increased by 7.8%. The real price of electricity increased by 31% and solid fuels increased by 3.8%. However, the real price for gas decreased by 15% and liquid fuel prices decreased by 34%.

Petrol and diesel prices, 1990 to 2021

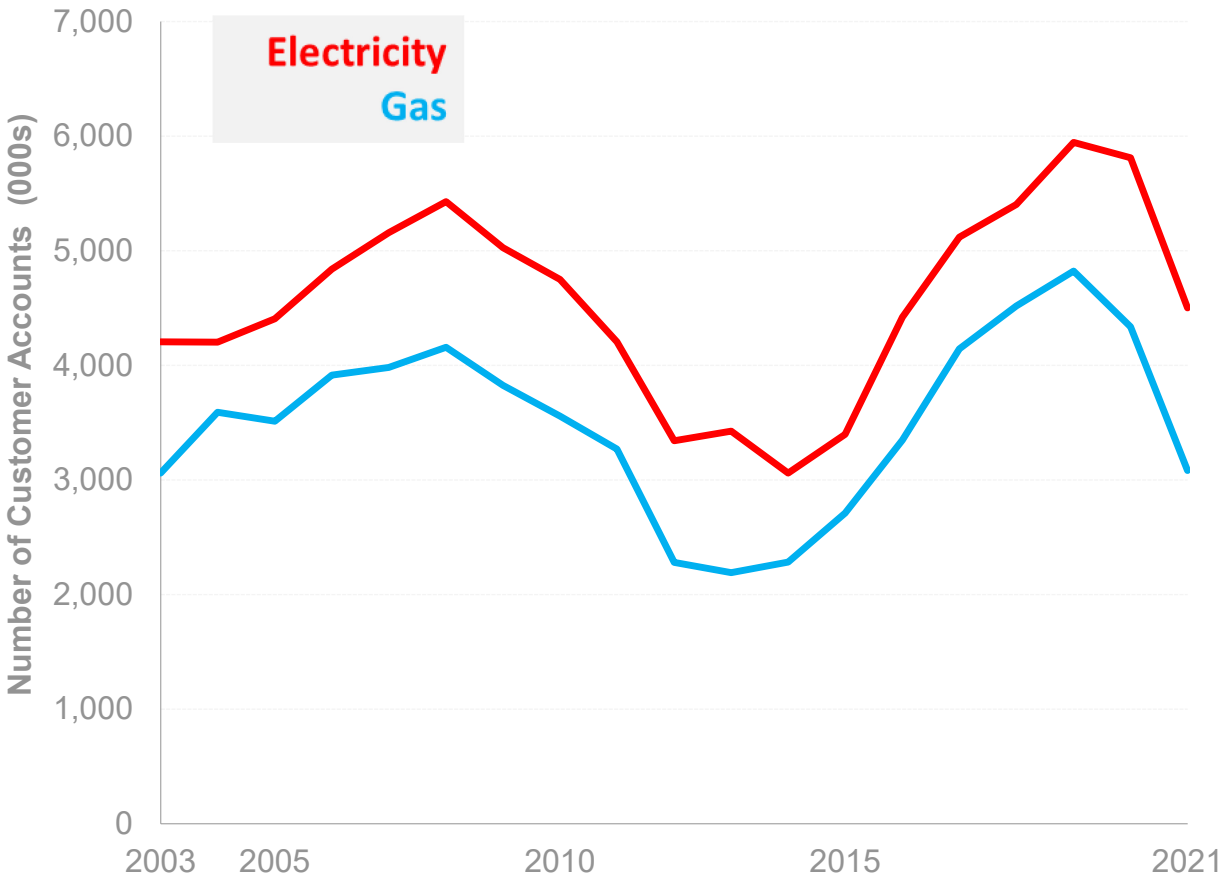


Current retail prices		Pence/litre
	Petrol (ULSP)	Diesel
1990	42.0	40.5
2000	79.9	81.3
2005	86.8	90.9
2010	116.9	119.3
2015	111.1	114.9
2019	124.9	131.5
2020	113.9	119.1
2021	131.3	134.9

In cash terms the price of Ultra Low Sulphur Petrol (ULSP) cost 17 pence per litre more and diesel cost 16 pence per litre more in 2021 than in 2020.

In real terms the price of petrol was 15% higher and diesel was 13% higher in 2021 compared to 2020. In 2021 taxes and duty accounted for 61% of the retail price of unleaded and 60% of the price of diesel.

Domestic supplier transfer statistics, 2003 to 2021



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

(000s)	2003	2005	2010	2019	2020	2021
Electricity	4,204	4,405	4,750	5,946	5,811	4,502
Gas	3,059	3,511	3,556	4,822	4,336	3,082

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

In order to strengthen competition in the energy market Ofgem encourages consumers to switch energy suppliers to reduce bills.

The number of households that switched energy suppliers in Great Britain decreased by 29% for gas and decreased by 23% for electricity between 2020 and 2021. The drop in transfers in 2021 followed increases in wholesale gas prices which meant both electricity and gas tariffs offered by companies were less competitive. The variable tariffs being offered were increasingly charged closer to or at the Ofgem Default Tariff cap (the price cap[2]) level and fixed tariffs, where available, were offered above the cap.

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

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CONVERSION FACTORS AND DEFINITIONS

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

		Thousand toe	TJ	GWh	Million therms
	to:				
from:	**Thousand toe**	1	41.868	11.630	0.39683
	TJ	0.023885	1	0.27778	0.0094778
	GWh	0.085985	3.6000	1	0.034121
	Million therms	2.5200	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 Business, Energy and Industrial Strategy is the source of all data except where stated.

All data within this publication are classified as National Statistics, except those on pages 23 and 39 which are classified as Official Statistics.

All figures are for the United Kingdom, except for pages 23, 38, 39, 40, 41 and 45.

The Department for Business, Energy and Industrial Strategy (BEIS) also produces the following energy and climate change statistics publications:

The **Digest of United Kingdom Energy Statistics** is the annual energy statistics publication of BEIS. 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 2022 edition, published on 28 July 2022, is available at:
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 2022 edition of the chart, published on 28 July 2022, shows the flows for 2021 and is available at: 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. 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.
www.gov.uk/government/collections/energy-consumption-in-the-uk

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

Household Energy Efficiency statistics are published by BEIS 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.
www.gov.uk/government/collections/household-energy-efficiency-national-statistics

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

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

REFERENCES

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.
www.gov.uk/government/collections/quarterly-energy-prices

Sub-National Energy Consumption statistics are produced by BEIS to emphasise the importance of local and regional decision making for energy policy in delivering a number of national energy policy objectives.
www.gov.uk/government/organisations/department-for-business-energy-and-industrial-strategy/about/statistics

BEIS 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 BEIS 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.
www.gov.uk/government/collections/national-energy-efficiency-data-need-framework

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