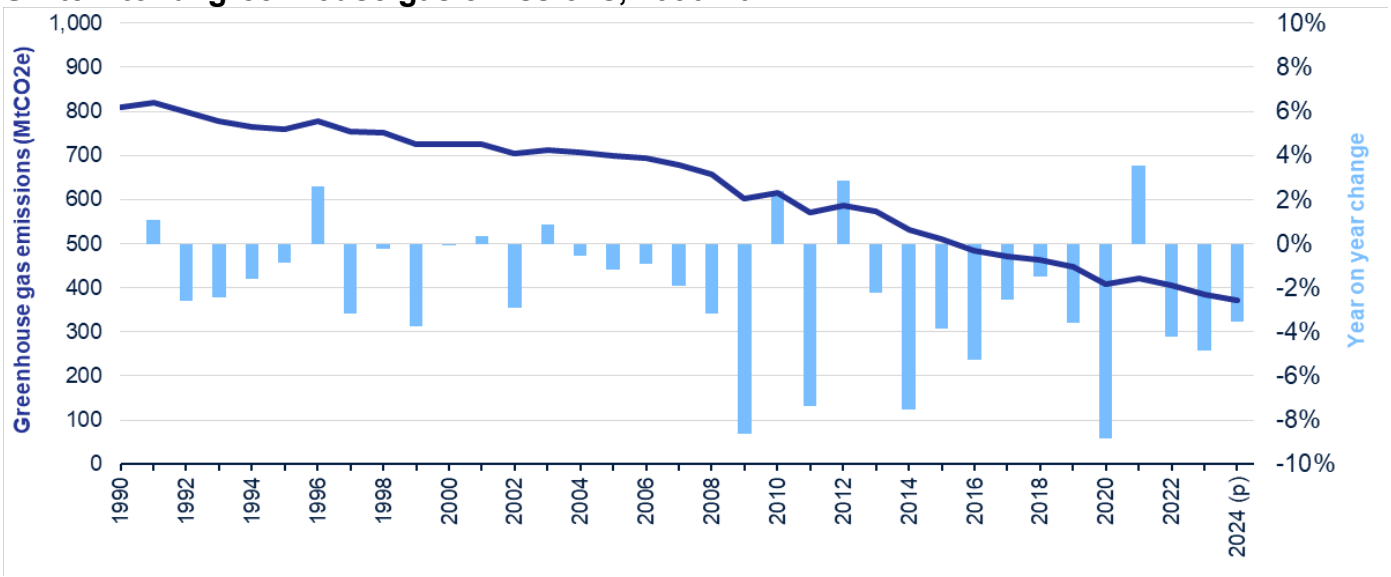
Department for Energy Security & Net Zero

2024 UK Greenhouse Gas Emissions, Provisional Figures

27 March 2025 **Accredited Official Statistics**

In 2024, total UK net territorial greenhouse gas emissions are provisionally estimated to have been 371 million tonnes of carbon dioxide equivalent (MtCO2e), a decrease of 4% from the 2023 estimate of 385 MtCO2e. Emissions were 54% lower than they were in 1990. Carbon dioxide made up around 78% of the 2024 total.

UK territorial greenhouse gas emissions, 1990-2024



- Decreased gas and coal use in the electricity supply and industry sectors caused the largest emissions reductions in 2024. Electricity supply sector emissions fell by 15% (6 MtCO2e), largely as a result of higher electricity imports, greater renewable generation, and the closure of the UK's last coal powered station in September 2024. Industry sector emissions fell by 9% (5 MtCO2e), largely due to blast furnace closures in the iron and steel industry and lower coal use across the sector.
- Domestic transport sector emissions fell by 2% (2 MtCO2e), largely due to a reduction in road vehicle diesel use that outweighed increased road vehicle petrol use. The domestic transport sector remains the largest emitting sector, accounting for 30% of all emissions.
- Buildings and product uses sector emissions increased by 2% (1 MtCO2e), due to higher gas use likely driven by an easing of energy and other cost pressures.

What you need to know about these statistics:
This publication provides provisional estimates of 2024 UK territorial greenhouse gas emissions, meaning emissions that occur within UK borders. Emissions are presented in carbon dioxide equivalent units (CO2e) throughout this statistical release.

These estimates give an early indication of emissions in 2024 and are subject to revision when final estimates are published in February 2026. They also include estimates of quarterly emissions, impacts of external temperature changes, and UK-based international aviation and shipping emissions.

Responsible statistician: William Hayes **Email: GreenhouseGas.Statistics@energysecurity.gov.uk**
Media enquiries: 020 7215 1000 **Public enquiries: 07743 194032**
Next publication: March 2026

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Introduction

This publication provides provisional annual and quarterly estimates of UK territorial greenhouse gas emissions for 2024, including estimates of carbon dioxide and total emissions by source sector. It also provides estimates of temperature adjusted emissions, which give an idea of overall trends in emissions without fluctuations due to changes in external temperature, and UK-based international aviation and shipping emissions. More information about the underlying methodology for the provisional emissions statistics can be found in the methodology summary published alongside this statistical release.

Data for 1990-2023 are consistent with the annual emissions presented in the 2023 final UK greenhouse gas emissions statistics publication. Data for 2024 emissions are provisional and do not follow the full methodology used for 1990-2023. Energy use accounts for a large majority of UK emissions. Most of these emissions are estimated based on provisional energy statistics published at the same time as this statistical release by the Department for Energy Security and Net Zero (DESNZ) in the quarterly Energy Trends publication. A small proportion of emissions related to energy use are assumed to remain the same as in 2023 as data from which to produce estimates for them is not available at the time of publication.

Most non-energy use emissions are based on a simple approach which assumes that the changes in emissions for each gas in each category between 2023 and 2024 were in line with the corresponding percentage change in emissions from 2023 to 2024 in the Energy and Emissions Projections: 2023 to 2050 published by DESNZ. Like the energy use emissions, a small number of non-energy use emissions are held constant from the previous year in the provisional estimates. This is because these emissions are not separated from energy use emissions in the proxy projections.

Energy use emissions are allocated to individual quarters within each year in proportion to the quarterly energy statistics. Otherwise, emissions are assumed to be spread evenly over the year.

There are uncertainties associated with all estimates of emissions. Although for any given year considerable uncertainties may surround the emissions estimates for a gas, trends over time are likely to be much more reliable. For more information on uncertainties in emissions estimates, see Annex 1 published alongside the 2023 final UK greenhouse gas emissions statistics.

The estimates present emissions on a “territorial” basis, so only include emissions which occur within UK borders. They therefore exclude emissions from UK businesses and residents that occur abroad, including from international aviation and shipping (although these are reported separately), and any emissions embedded within the supply chain of manufactured goods and services imported into the UK (while including emissions that occur in the UK resulting from exported goods and services). When emissions are measured on this basis, UK emissions account for around 1% of the global total, based on a range of estimates produced by the UN, the International Energy Agency and the World Resources Institute amongst others.

Two additional approaches to estimating UK emissions are also published and the Office for National Statistics (ONS) has published an article that compares these different measures of UK emissions in more detail. The alternative measures are:

- ONS publishes emissions on a “residence” basis in the UK Environmental Accounts. These statistics cover emissions caused by UK residents and businesses whether in the UK or abroad, but exclude emissions within the UK which can be attributed to overseas residents and businesses.

- The Department for Environment, Food and Rural Affairs (Defra) publishes the UK carbon footprint. These statistics present emissions on a “consumption” basis, covering emissions associated with the consumption of goods and services by households in the UK. They include estimates of emissions associated with each stage of the supply chain for those goods and services, regardless of where they occur, while excluding emissions occurring in the UK that are associated with the consumption of goods and services by households outside the UK.

These estimates cover seven gases: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). The last four gases are collectively referred to as fluorinated gases or F gases. In accordance with international reporting and carbon trading protocols, emissions from each of the gases is weighted by its global warming potential (GWP)[1], so that total emissions can be reported on a consistent basis. The GWP for each gas is defined as its warming influence relation to that of carbon dioxide over a 100-year period. Emissions are then presented in carbon dioxide equivalent units (CO2e).

Carbon dioxide is reported in terms of net emissions, which means total emissions minus total removals of carbon dioxide from the atmosphere by carbon sinks. Carbon sinks are defined by the United Nations Framework Convention on Climate Change (UNFCCC) as “any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere”[2].

The sector breakdowns in this publication and accompanying tables are based on Territorial Emissions Statistics (TES) sectors and present emissions by source, where emissions and removals are typically allocated to the sector in which they are emitted or removed from the atmosphere. Full TES sector descriptions can be found in the Technical Information section of this statistical release.

These statistics give policy makers and other users an initial steer as to the trend in emissions between 2023 and 2024, helping to form an initial assessment of the extent to which the UK is on track to meet targets. For information on UK emissions targets and progress towards them, see the 2023 final UK greenhouse gas emissions statistics.

[1] The global warming potentials (GWPs) used are from table 8.A.1 (without climate-carbon feedback) of Working Group 1 of the IPCC Fifth Assessment Report: Climate Change 2013 and summarised in Table 6.4 in the Excel tables in the 2023 final UK greenhouse gas emissions statistics

[2] United Nations Framework Convention on Climate Change: https://unfccc.int/process-and-meetings/what-is-the-united-nations-framework-convention-on-climate-change

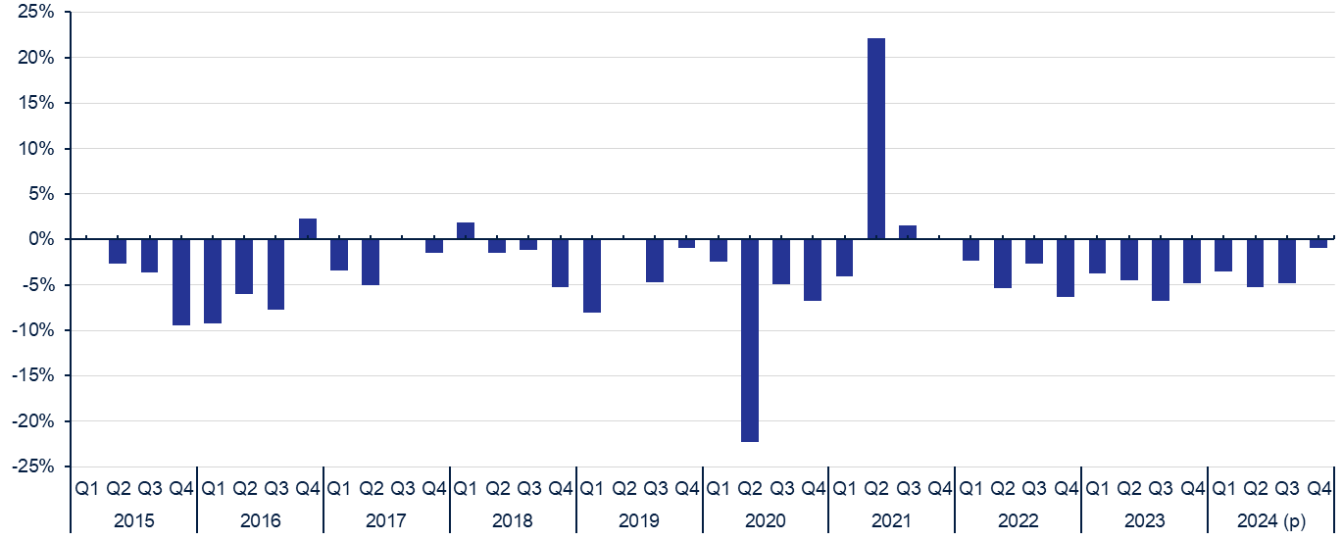
2024 provisional greenhouse gas emissions

In the data tables accompanying this publication, Table 1a shows annual greenhouse gas emissions by source sector and Table 1b shows annual CO2 emissions by source sector. Tables 2a and 2b show greenhouse gas and CO2 emissions totals respectively for individual quarters, and tables 3a and 3b the moving annual totals. Temperature adjusted totals are also shown in each table.

In 2024, total UK net territorial greenhouse gas emissions are provisionally estimated to have been 371 MtCO2e, a decrease of 4% from the 2023 estimate of 385 MtCO2e. Total emissions were 54% lower than they were in 1990. Carbon dioxide made up around 78% of the 2024 total. Where they relate to energy use, the provisional emissions estimates are mostly based on provisional UK energy statistics. Meanwhile, provisional estimates of other emissions are largely based on projections. The rest of this section is focused on trends for the source sectors where energy use accounts for the majority of their emissions.

The fall in emissions in 2024 is largely due to reduced gas and coal use in the electricity supply and industry sectors. Electricity supply sector emissions are estimated to have fallen by 15% (6 MtCO2e), owing to lower gas use driven by record high net imports of electricity and increased domestic generation from renewable sources. Coal use for electricity generation also fell due to the closure of the last coal powered station in September 2024. Industry sector emissions are estimated to have fallen by 9% (5 MtCO2e), largely due to blast furnace closures in the iron and steel industry and lower coal use across the sector. In addition, domestic transport sector emissions are estimated to have fallen by 2% (2 MtCO2e), largely due to a reduction in road vehicle diesel use that outweighed increased road vehicle petrol use. Meanwhile, buildings and product uses sector emissions are estimated to have increased by 2% (1 MtCO2e), as result of higher gas use in residential buildings likely driven by an easing of energy and other cost pressures.

Figure 1: Percentage change in quarterly greenhouse gas emissions from previous year, UK, Q1 2015-Q4 2024

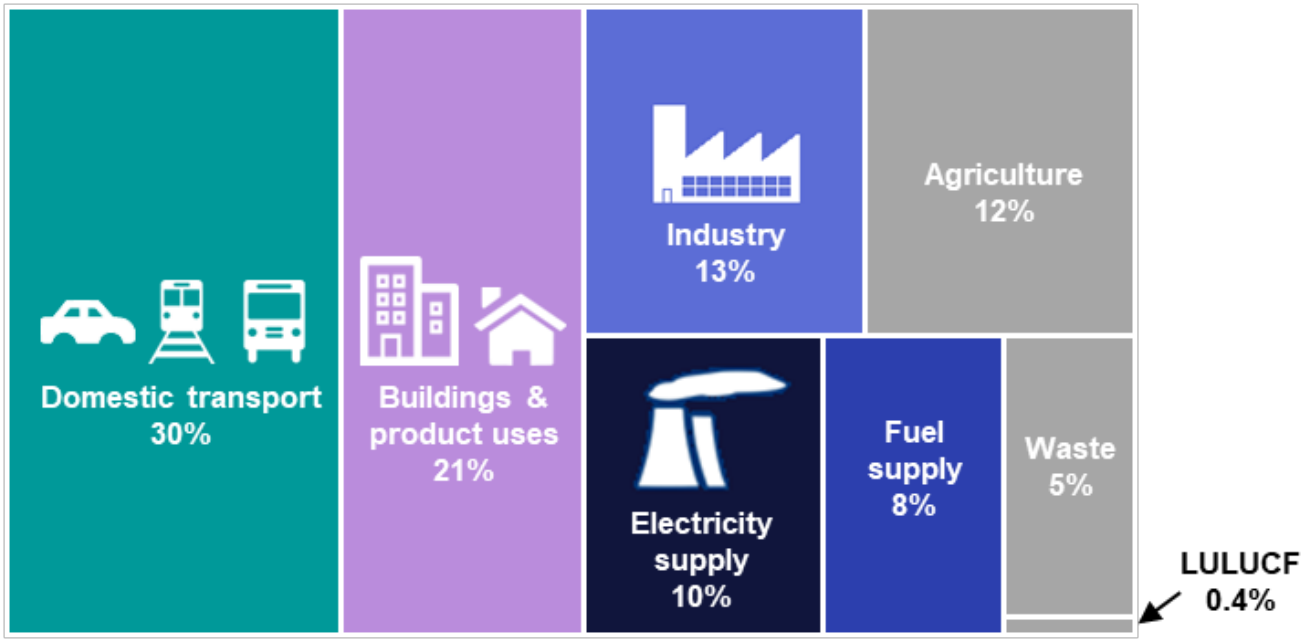


Source: Table 2a, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Note: 2024 estimates are provisional.

Emissions fell in every quarter of 2024 when compared to the year before, however the drivers of these reductions varied throughout the year. There was a 4% (4 MtCO2e) fall in emissions in first quarter of 2024 when compared to the same period in 2023. This was primarily driven by a 12% (1 MtCO2e) decrease in the fuel supply sector, as well as a 6% (1 MtCO2e) decrease in the industry sector and a 3% (1 MtCO2e) decrease in the domestic transport sector. The second and third quarters of 2024 both saw a 5% fall when compared to the same periods in 2023, falling by 5 and 4 MtCO2e respectively. For both quarters, the decrease was driven largely by a 27% (3 MtCO2e) fall in electricity supply sector emissions when compared to the same periods in 2023. Lower electricity supply sector emissions outweighed a 10% (1 MtCO2e) increase in buildings and product uses sector emissions in the third quarter when compared to the same period in 2023. Despite a further 4% (1 MtCO2e) increase in buildings and product uses sector emissions, and a 6% (0.4 MtCO2e) increase in fuel supply sector emissions, there was a 1% (1 MtCO2e) fall in total emissions in the fourth quarter of 2024 when compared to the same period of 2023, as increases in these sectors were offset by a 14% (2 MtCO2e) decrease in industry sector emissions.

The domestic transport sector remains the largest emitting sector, accounting for 30% of all emissions in 2024. In comparison, 21% of emissions were from the buildings and product uses sector, 13% from the industry sector, 12% from the agriculture sector, and 10% from electricity supply sector. The remaining 13% is attributed to the fuel supply, waste and LULUCF sectors.

Figure 2: Greenhouse gas emissions by TES sector, UK, 2024 (%)

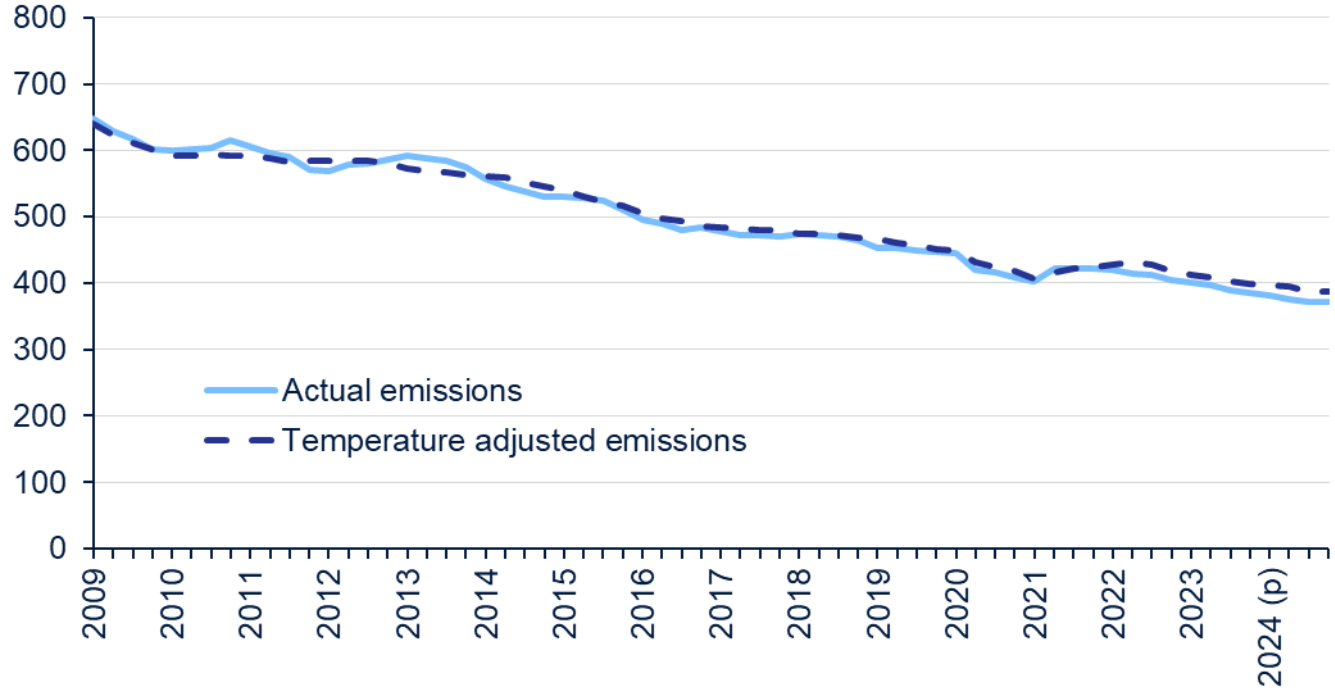


Source: Tables 1a, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Notes: 1. LULUCF is land use land use change and forestry
2. Estimates of agriculture, waste, and LULUCF sector emissions for 2024 are largely derived from projections.

Between 1990 and 2024, emissions decreased by 54%. The largest factor behind this long-term decrease was the change in the mix of fuels being used for electricity generation, with a shift away first from coal to gas in the 1990s, and more recently to renewable energy sources. This was combined with lower electricity demand, owing to greater efficiency resulting from improvements in technology and a decline in the relative importance of energy intensive industries. Overall inland energy consumption is provisionally estimated to have decreased by

24% since 1990, and if this figure is adjusted to allow for the effect of temperature, there was a 25% decrease over this period[3,4].

Figure 3: Actual and temperature adjusted greenhouse gas emissions, UK, year ending Q1 2009-year ending Q4 2024 (MtCO2e)



Source: Tables 3a, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Note: 2024 estimates are provisional.

As shown in Figure 2, temperature adjusted emissions show a similar overall trend to actual emissions. Over the most recent ten-year period, temperature adjusted emissions decreased by 29%, similar to the 30% fall in actual emissions over this period. Temperature adjusted emissions fell by 3% in 2024 when compared to 2023, slightly lower than 4% fall in actual emissions over the same period.

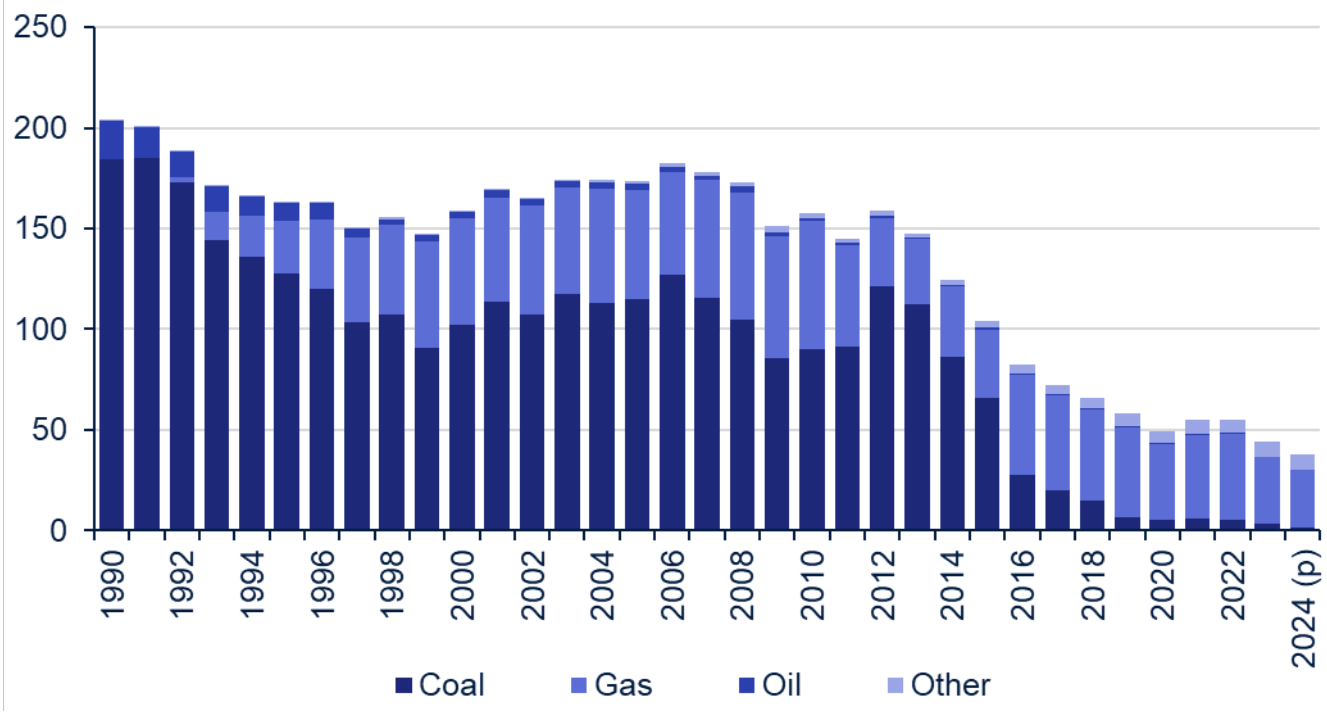
[3] Digest of UK Energy Statistics (DUKES), Table 1.1.2 Availability and consumption of primary fuels and equivalents (energy supplied basis), 1970 to 2023, DESNZ: https://www.gov.uk/government/statistics/energy-chapter-1-digest-of-united-kingdom-energy-statistics-dukes
[4] Energy Trends, Table 1.2 UK total energy, Inland energy consumption: primary fuel input basis, DESNZ: https://www.gov.uk/government/statistics/total-energy-section-1-energy-trends

Electricity supply

The electricity supply sector consists of emissions from the combustion of fuels in electricity generation from power stations. It is estimated to have been responsible for 10% of emissions in 2024, with carbon dioxide accounting for 98% of emissions for this sector.

There was a 15% decrease in emissions from the electricity supply sector between 2023 and 2024, largely due to lower gas and coal use in power stations. Despite a slight increase in total demand for electricity in 2024, domestic generation fell by 3%. This occurred as more electricity demand was met by imports, with net imports reaching a record high. Simultaneously, renewable generation rose by 7% in 2024, reaching a record share of 51% of total domestic generation[5]. Overall, electricity supply sector emissions from gas use fell by 14% in 2024 when compared to 2023. Emissions from coal use in the electricity supply sector also saw a sharp 55% fall in 2024 when compared to 2023, with the closure of the UK's last coal powered station in September 2024 also contributing to this fall.

Figure 4: Greenhouse gas emissions from electricity supply, UK, 1990-2024 (MtCO2e)

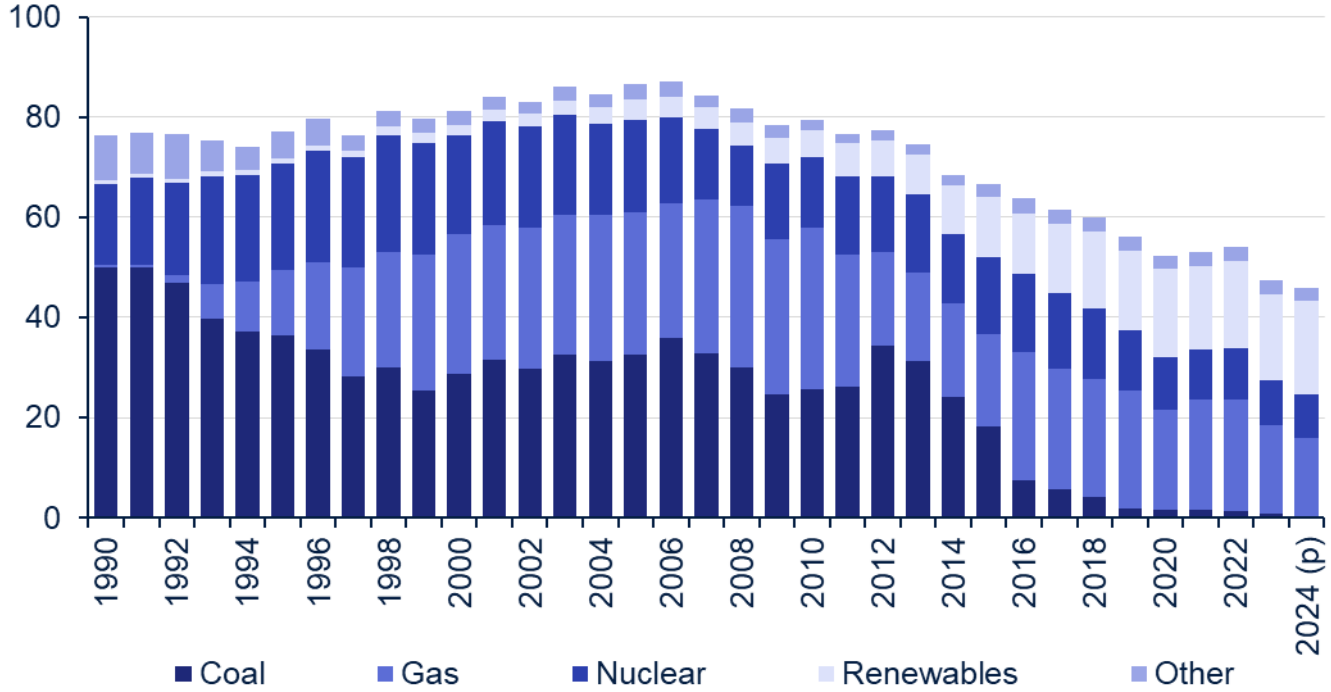


Source: Table 4a, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Note: 2024 estimates are provisional.

Between 1990 and 2024, electricity supply sector emissions have reduced by 82%. The long-term decrease in electricity supply sector emissions has mainly resulted from changes in the mix of fuels being used for electricity generation with a switch from coal to natural gas and growth in the use of renewable energy sources, combined with greater efficiency resulting from improvements in technology and a decline in the relative importance of energy intensive industries. In 2024, coal made up 1% of fuel used for electricity generation, compared to 65% in 1990. Nuclear and renewables, which are low carbon energy sources, accounted for 60% of fuel used for electricity generation in 2024, up from 22% in 1990.

[5] Energy Trends, Table 5.1 Fuel used in electricity generation and electricity supplied, DESNZ: https://www.gov.uk/government/statistics/electricity-section-5-energy-trends

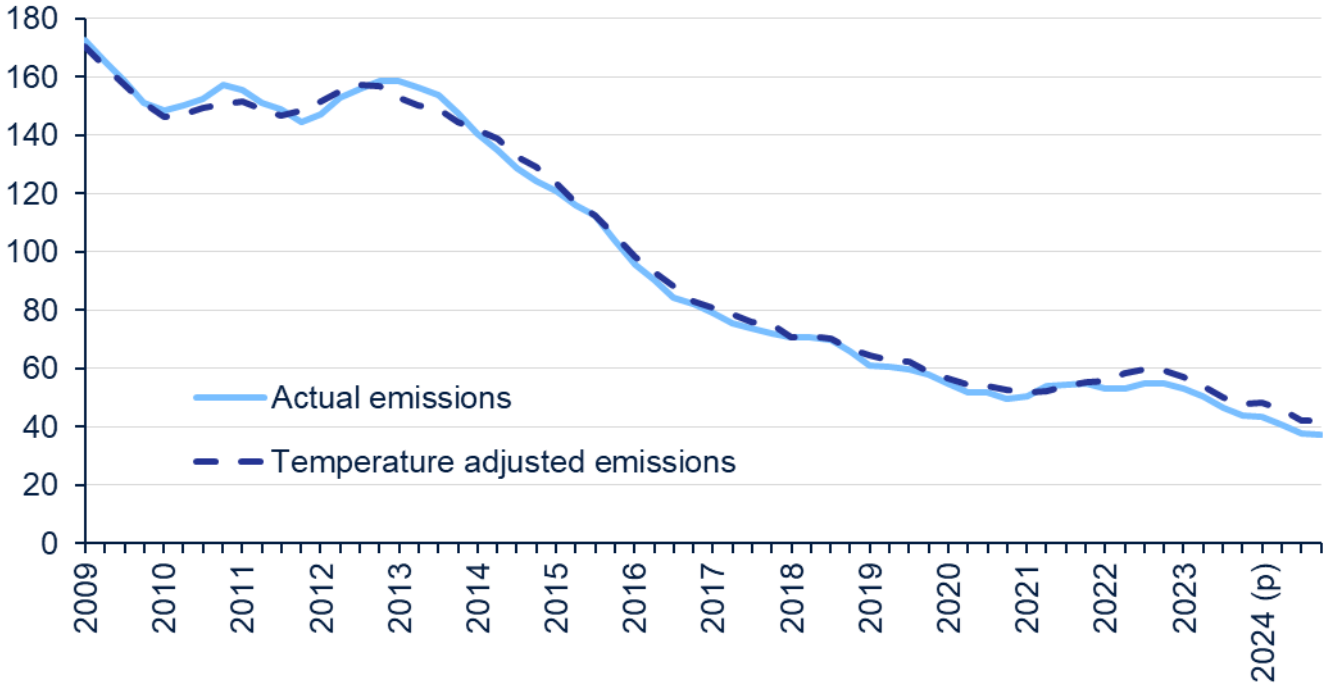
Figure 5: Fuel used for electricity generation, UK, 1990-2024 (Million tonnes of oil equivalent (Mtoe))



Source: Table 5.1.1, Digest of UK Energy Statistics (DUKES) 2024 and Table 5.1, Energy Trends March 2025 Excel data tables
Notes: 1. Figure 5 shows different fuel groupings to Figure 4 as not all fuels produce direct emissions
2. 2024 estimates are provisional.

As shown in Figure 6, the overall trend in temperature adjusted electricity supply sector emissions is similar to the actual trend for the electricity supply sector, as the majority of electricity generated is used for other purposes rather than heating.

Figure 6: Actual and temperature adjusted greenhouse gas emissions from electricity supply, UK, year ending Q1 2009-year ending Q4 2024 (MtCO2e)



Source: Table 3a, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Note: 2024 estimates are provisional.

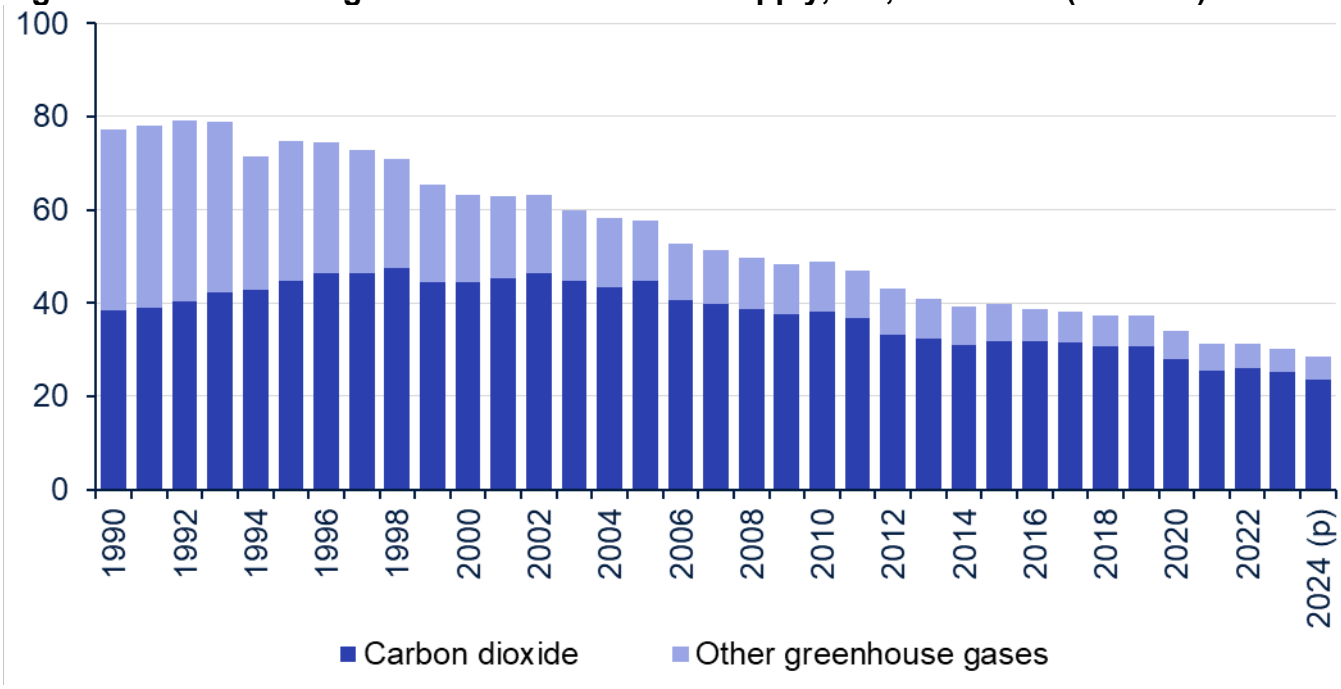
Fuel supply

The fuel supply sector consists of emissions that arise during the production and supply of fuels, for example from the combustion of fuels in oil refineries and at oil and gas platforms, the flaring and venting of gas from oil and gas facilities, leakages from the gas network and methane emissions from coal mining. Fuel supply accounted for 8% of emissions in 2024, most of which were from oil and gas supply. Carbon dioxide accounted for 83% of emissions for this sector.

Fuel supply sector emissions fell by 6% between 2023 and 2024, largely due to a reduction in combustion emissions during oil and gas production. Since 1990, fuel supply emissions have fallen by 63%.

The long-term decline in emissions from the fuel supply sector has been a result of lower domestic production of coal. Deep-mined coal production has declined steadily over the period, with the last large deep mines all closing in 2015.

Figure 7: Greenhouse gas emissions from fuel supply, UK, 1990-2024 (MtCO2e)



Source: Table 1a and Table 1b, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Note: 2024 estimates are provisional.

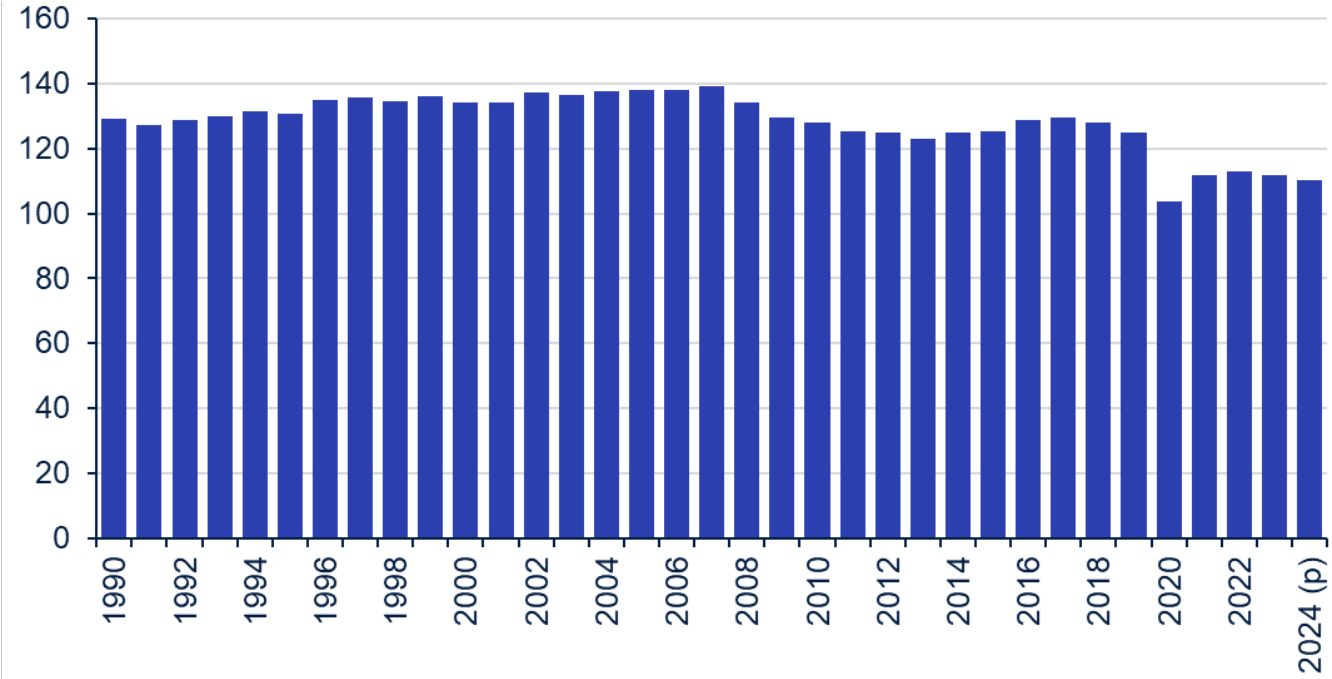
Domestic transport

The domestic transport sector consists of emissions from road vehicles, domestic aviation and shipping (including military), fishing vessels, and railways. It does not include emissions from international aviation or shipping. In 2024, domestic transport accounted for 30% of all emissions, with carbon dioxide accounting for 98% of emissions for this sector. The main source of emissions from this sector is the use of petrol and diesel in road vehicles.

Domestic transport sector emissions fell by 2% between 2023 and 2024, largely due to reductions in road vehicle diesel use, and despite a rise in emissions from road vehicle petrol use[6]. Domestic transport sector emissions continue to remain below levels seen prior to the COVID-19 pandemic. In 2024, domestic transport sector emissions are estimated be 12% lower than in 2019, the last pre-pandemic year.

Between 1990 and 2024, domestic transport sector emissions have reduced by 15%. Primarily as a result of a continual growth in vehicle kilometres travelled on roads[7], domestic transport emissions grew to a peak in 2007, 8% higher than in 1990. Since then, emissions from this sector had fallen to around 1990 levels up until 2019, driven mainly by improvements in new car fuel efficiency[8], as well lower traffic growth than in previous years as a result of a dip following the 2008/2009 recession.

Figure 8: Greenhouse gas emissions from domestic transport, UK, 1990-2024 (MtCO2e)



Source: Table 1a, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Note: 2024 estimates are provisional.

[6] Energy Trends, Table 3.4 Supply and use of petroleum products, DESNZ: https://www.gov.uk/government/statistics/oil-and-oil-products-section-3-energy-trends
[7] Transport Statistics Great Britain, Roads and traffic (TSGB07), Table TSGB0702 (TRA0201) Road traffic (vehicle kilometres) by vehicle type in Great Britain, annual from 1949, Department for Transport: https://www.gov.uk/government/statistical-data-sets/tsgb07
[8] Transport Statistics Great Britain, Energy and environment (TSGB03), Table TSGB0303 (ENV0103) Average new car fuel consumption, in Great Britain, annual from 1997, Department for Transport: https://www.gov.uk/government/statistical-data-sets/tsgb03

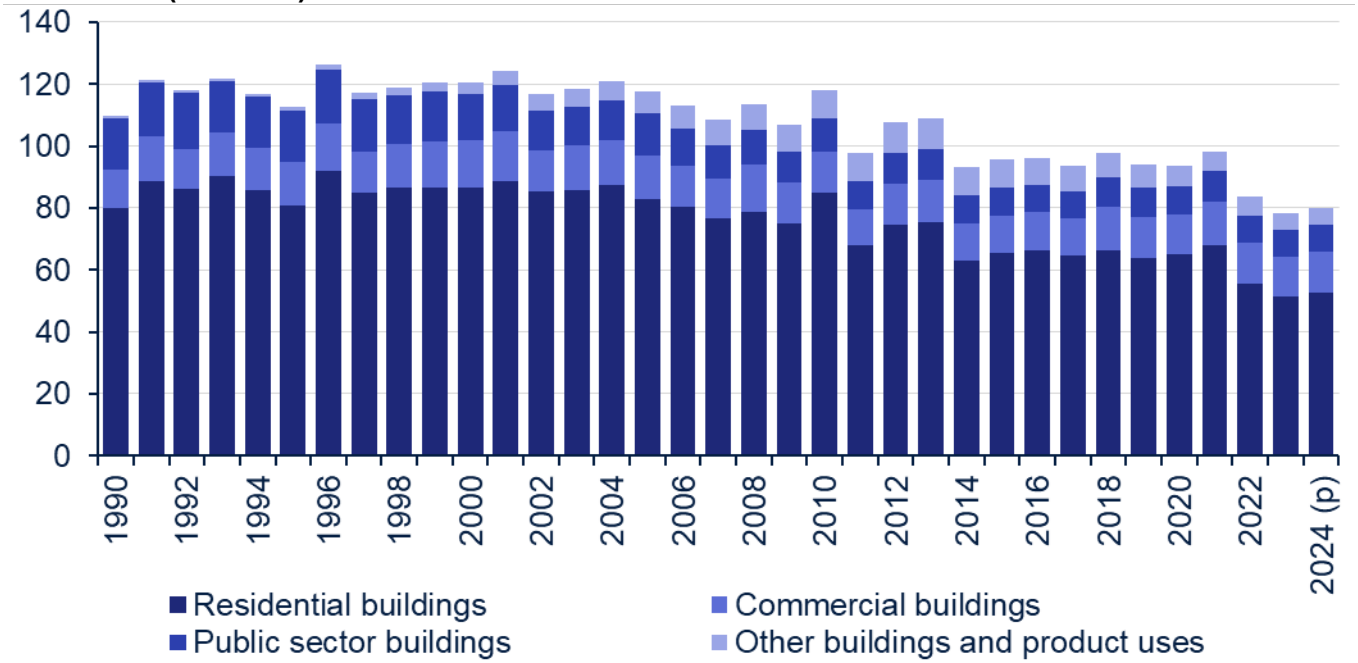
Buildings and product uses

The buildings and product uses sector consists primarily of emissions from fuel combustion in buildings, largely from the use of natural gas and other fuels for heating and cooking. It also includes emissions that directly arise from the use of products such as refrigeration and air conditioning, garden machinery, anaesthetics, metered dose inhalers and aerosols. In 2024, it is estimated to have been responsible for 21% of emissions. Of these emissions, 66% were from fuel combustion in residential buildings, 16% in commercial buildings, 11% in public sector buildings, with the remaining 7% from other buildings and product uses. Carbon dioxide accounted for 93% of emissions from the buildings and product uses sector.

It should be noted that the sector breakdowns in these estimates present emissions by source, whereby emissions and removals are typically allocated to the sector in which they are emitted or removed from the atmosphere. Therefore, emissions related to electricity use in buildings, including electricity use for heating, are attributed to power stations and are therefore included in the electricity supply sector rather than the buildings and product uses sector.

There was a 2% increase in emissions from the buildings and product uses sector between 2023 and 2024. An easing of energy and other cost pressures are likely to be a main driver of the increase in 2024. Between 1990 and 2024, buildings and product uses sector emissions have reduced by 27%. Emissions from buildings are influenced by external temperatures, with colder temperatures driving higher emissions due to increased use of heating. Variations in temperature were not a significant factor driving the trend in buildings emissions from 2023 to 2024. Whilst daily average temperatures were marginally cooler in 2024 when compared to 2023, the average number of heating degree days was about the same across the two years. However, temperatures in 2024 remained 0.6 degrees Celsius higher than the 30-year long term mean, keeping buildings emissions down relative to earlier years[9].

Figure 9: Territorial greenhouse gas emissions from buildings and product uses, UK, 1990-2024 (MtCO2e)



Source: Table 1a, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Note: 2024 estimates are provisional.

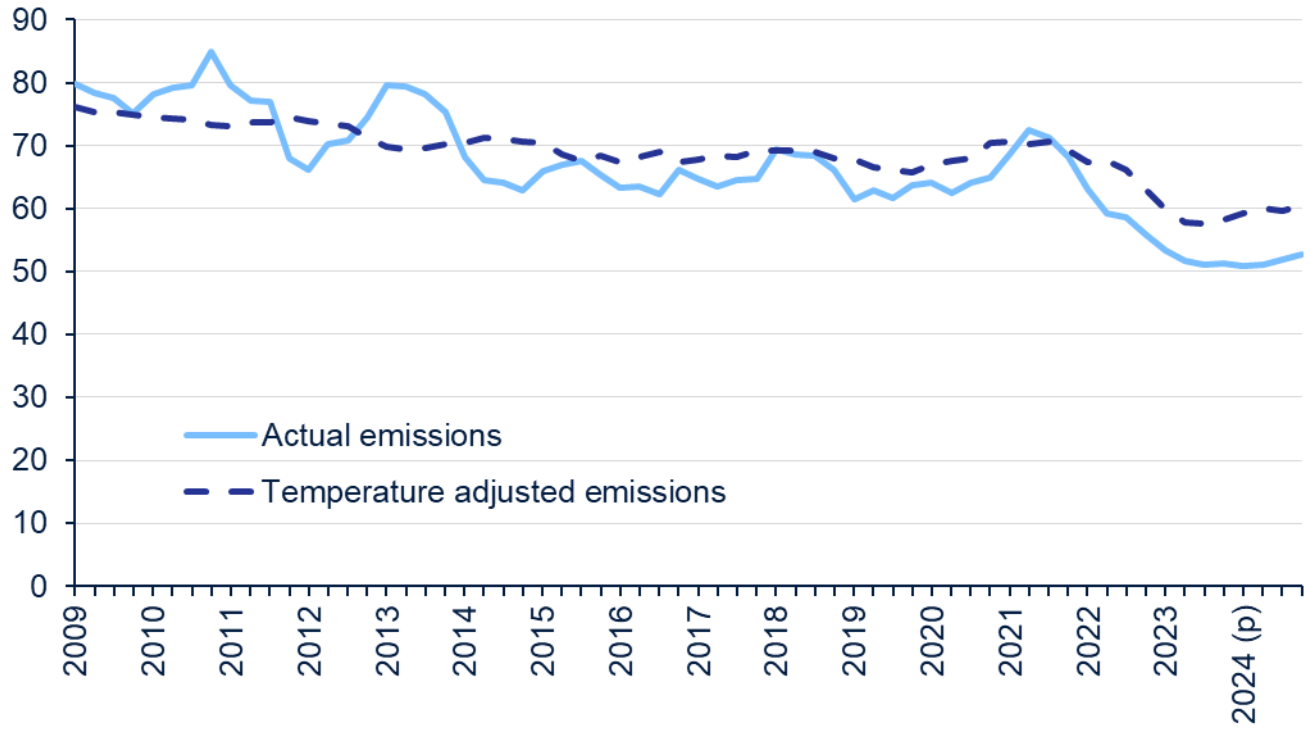
[9] Energy Trends, Table 7.1 Average temperatures and heating degree days and deviations from the long term mean, DESNZ: https://www.gov.uk/government/statistics/energy-trends-section-7-weather

Residential buildings

The main source of emissions from residential buildings is the use of gas for heating and cooking. Emissions from residential buildings are provisionally estimated to have increased by 3% in 2024 when compared to 2023. Since 1990, emissions from residential buildings have fallen by 34%.

As shown in Figure 10, emissions from residential buildings fluctuate owing to year-on-year variation in weather conditions. Above average temperatures and fewer heating degree days since 2022 has kept residential buildings emissions down relative to earlier years. However, heating degree days were similar across 2023 and 2024, indicating that variations in weather were not a significant driver of the trend between 2023 and 2024. If weather conditions for both 2023 and 2024 had followed long-term trends, there would have been a 4% increase in residential buildings emissions estimates.

Figure 10: Actual and temperature adjusted greenhouse gas emissions from residential buildings, UK, year ending Q1 2009-year ending to Q4 2024 (MtCO2e)

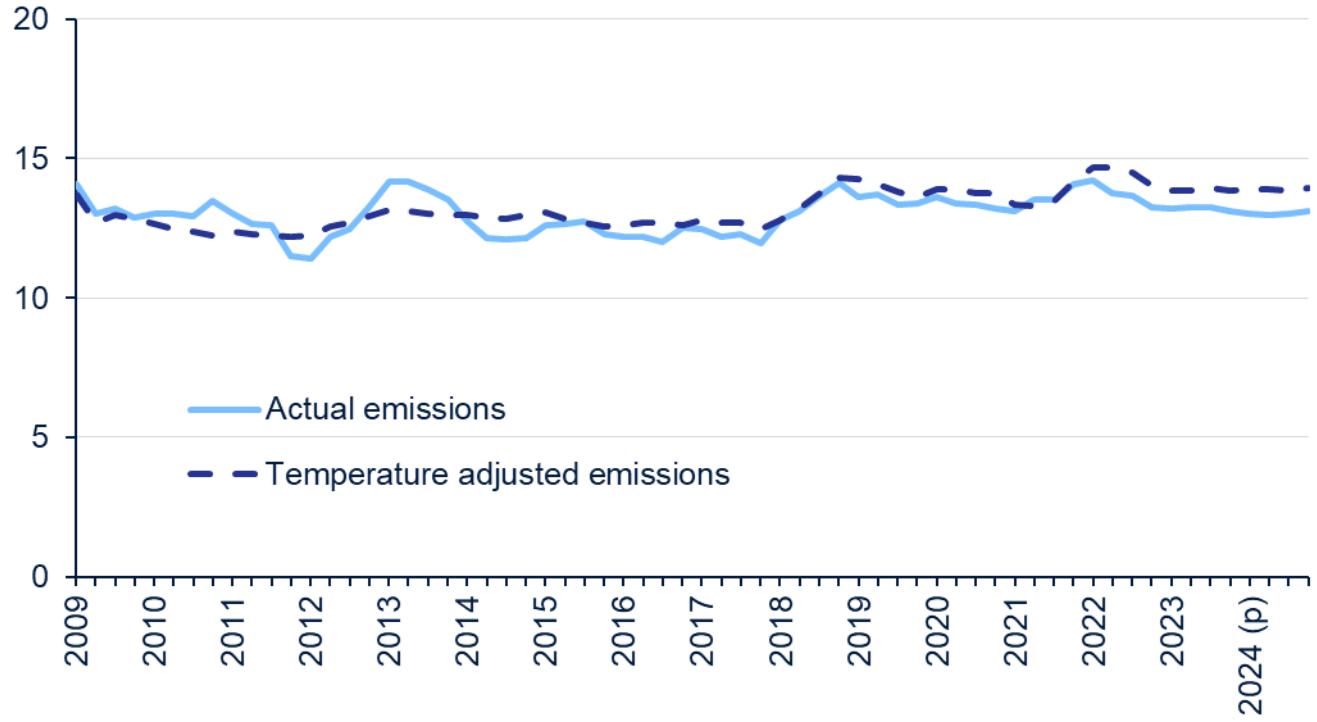


Source: Table 3a, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Note: 2024 estimates are provisional.

Commercial buildings

The main source of emissions from commercial buildings is the use of gas for heating. Emissions from commercial buildings are provisionally estimated to have increased by 0.1% in 2024 when compared to 2023. Since 1990, emissions from commercial buildings have risen by 5%. As shown in Figure 11, emissions from commercial buildings see some fluctuations due to year-on-year variation in weather conditions, but these are less pronounced than fluctuations for residential buildings.

Figure 11: Actual and temperature adjusted greenhouse gas emissions from commercial buildings, UK, year ending Q1 2009-year ending Q4 2024 (MtCO2e)

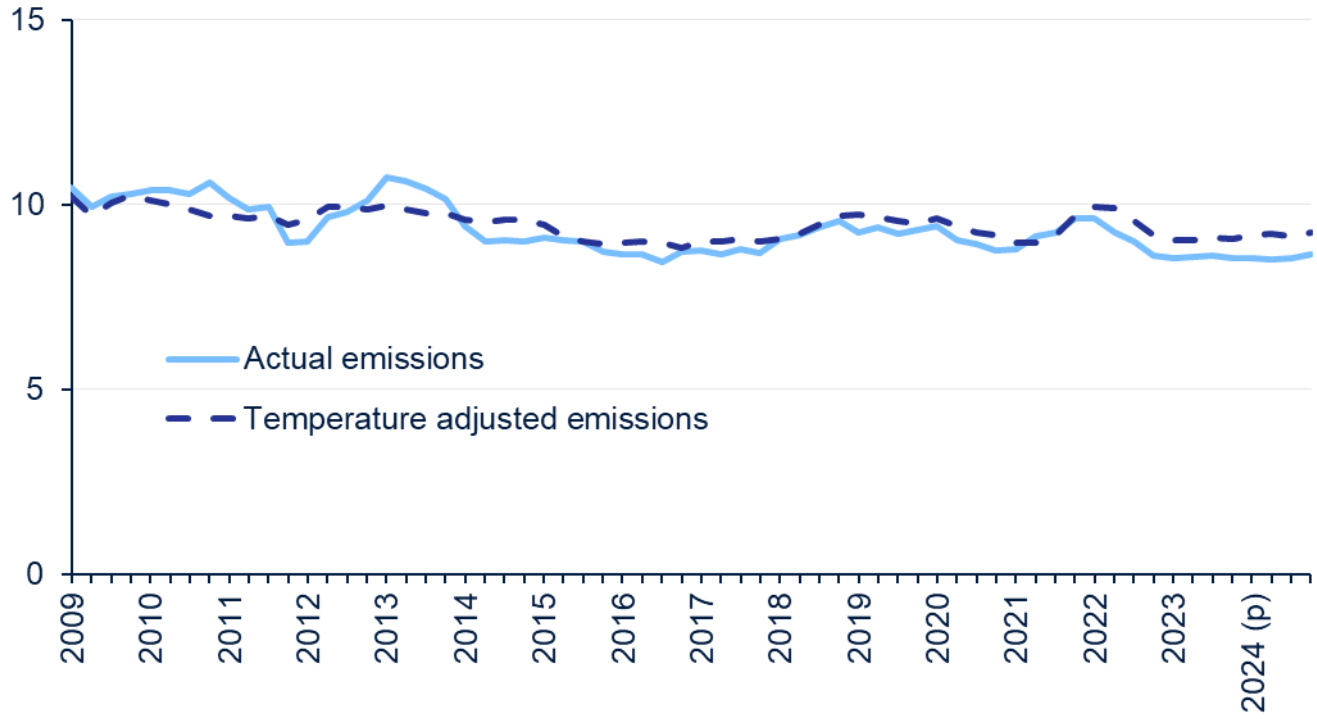


Source: Table 3a, Provisional UK territorial greenhouse gas emissions statistics 1990-2024 Excel data tables
Note: 2024 estimates are provisional.

Public sector buildings

The main source of emissions from public sector buildings is the use of gas for heating. Emissions from public sector buildings are provisionally estimated to have increased by 1% in 2024 when compared to 2023. Since 1990, emissions from public sector buildings have fallen by 47%. As shown in Figure 12, emissions from public sector buildings see some fluctuations due to year-on-year variation in weather conditions, but these are less pronounced than fluctuations for residential buildings.

Figure 12: Actual and temperature adjusted greenhouse gas emissions from public sector buildings, UK, year ending Q1 2009-year ending Q4 2024 (MtCO2e)



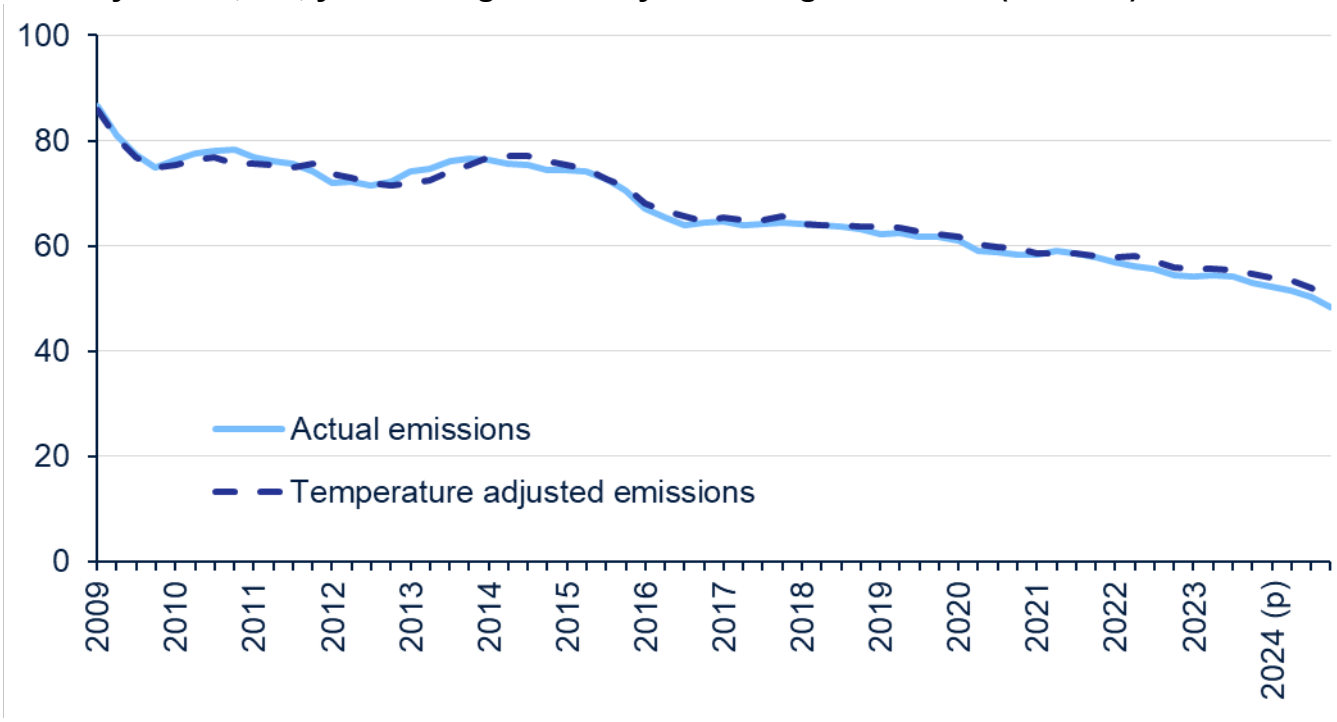
Source: Table 3a, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Note: 2024 estimates are provisional.

Industry

The industry sector includes emissions from fuel combustion at industrial sites and in industrial machinery. It also includes emissions resulting from industrial processes and emissions of F gases from industrial uses such as in refrigeration systems. The industry sector is estimated to have been responsible for 13% of emissions in 2024, with carbon dioxide emissions accounting for 97% of these emissions.

Between 2023 and 2024, there was a 9% decrease in emissions from the industry sector, largely due to blast furnace closures in the iron and steel industry and reduced coal use across the sector. Since 1990, emissions from the industry sector have decreased by 69%. As shown in Figure 13, the overall trend in temperature adjusted industry sector emissions is similar to the actual trend for the industry sector, as the majority of fuel use in this sector is used for purposes other than heating.

Figure 13: Actual and temperature adjusted greenhouse gas emissions from the industry sector, UK, year ending Q1 2009-year ending to Q4 2024 (MtCO2e)



Source: Table 3a, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Note: 2024 estimates are provisional.

Other sectors

Most emissions from the agriculture, waste and LULUCF sectors, as well as for the other buildings and product uses subsector are not related to energy use. Therefore, provisional estimates for the majority of emissions from these sectors cannot be derived from provisional energy statistics. Instead, non-energy use emissions are largely assumed to have changed in line with latest projections[10].

[10] Energy and Emissions Projections: 2023 to 2050, DESNZ: https://www.gov.uk/government/publications/energy-and-emissions-projections-2023-to-2050

2024 provisional greenhouse gas emissions by fuel type

In the data tables accompanying this publication, Table 4a shows annual greenhouse gas emissions by sector and fuel type and Table 4b shows annual CO2 emissions by sector and fuel type.

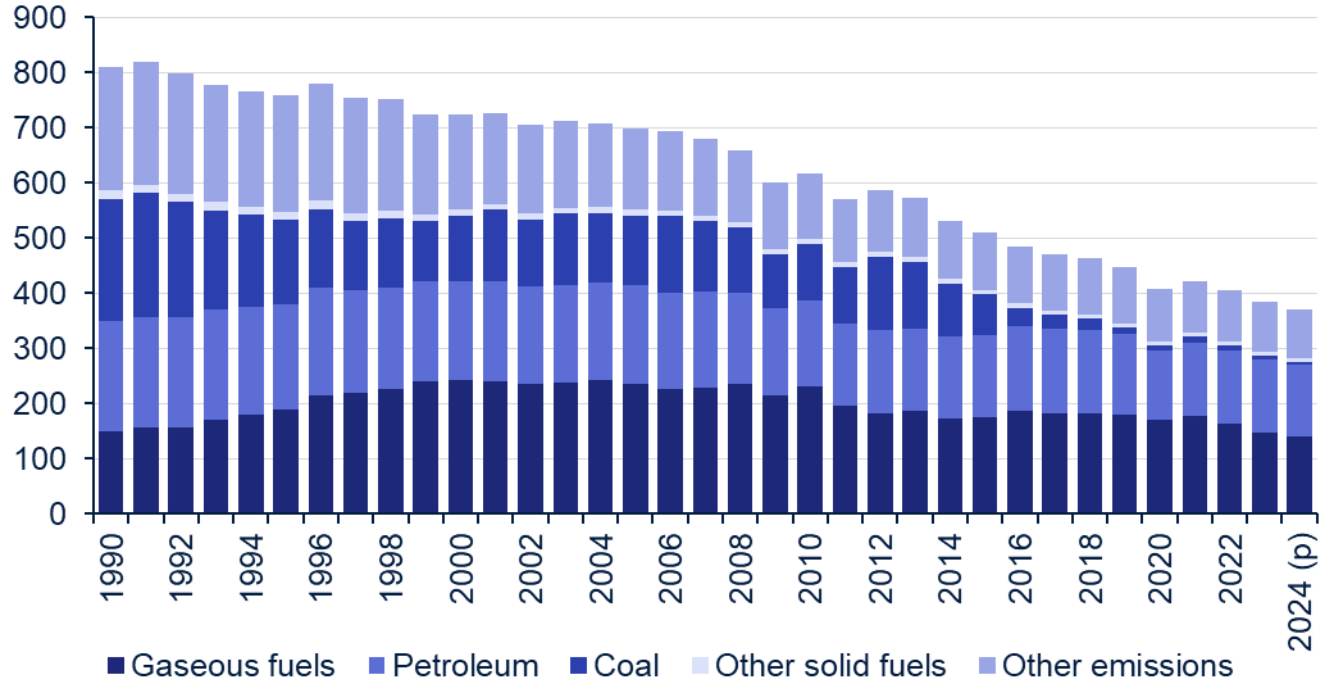
The combustion of fuel releases both energy and emissions. Emissions released by the production of one unit of power depends on the type of fuel that is burned. For example, since coal has a higher carbon content than gas, more carbon dioxide emissions result from burning one tonne of coal to generate a unit of power than from one tonne of gas.

In 2024, use of gaseous fuels and petroleum accounted for 38% and 35% of all greenhouse gas emissions respectively. Natural gas is the most prominent gaseous fuel used in the UK; it is used for heat and electricity generation. Meanwhile, most petroleum use occurs in road vehicles. Coal use accounted for 1% of emissions, whereas other solid fuel use accounted for 2%. Other emissions not related to fuel use accounted for the remaining 24% of emissions.

The largest absolute change in emissions in 2024 was from the use of gas, down 5% (7 MtCO2e) when compared to 2023, largely as a result of decreased gas use for electricity generation and in industry that outweighed an increase in gas use for heating buildings. However, the largest percentage change in emissions in 2024 came from coal use, down 47% (3 MtCO2e) when compared to 2024. Similarly to gas use emissions, the reduction in coal use emissions is largely the result of reduced use in the electricity supply and industry sectors. Petroleum use emissions fell by 1% (2 MtCO2e) in 2024 when compared to 2023, largely as a result of lower road vehicle diesel use that outweighed an increase in road vehicle petrol use. Other solid fuel use emissions fell by 4% (0.3 MtCO2e) in 2024 when compared to 2023.

Between 1990 and 2024, emissions decreased by 54%. The largest factor behind this long-term decrease was the change in the mix of fuels being used for electricity generation, with a shift away first from coal to gas in the 1990s, and more recently to renewable energy sources. Since 1990, emissions from coal use have decreased by 98%. Over the same period, gas and petroleum use emissions have decreased by 5% and 35% respectively, but have increased as a share of UK emissions since emissions from other sources have fallen more quickly.

Figure 14: Greenhouse gas emissions by type of fuel, 1990-2024 (MtCO2e)



Source: Table 4a, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Note: 2024 estimates are provisional.

2024 temperature adjusted greenhouse gas emissions

In the data tables accompanying this publication, tables 1a and 1b show temperature adjusted annual greenhouse gas and CO2 emissions respectively. Quarterly temperature adjusted totals are shown in tables 2a and 2b. Temperature adjusted moving annual totals are shown tables 3a and 3b.

A temperature adjustment has been applied to the quarterly energy use emissions to estimate what the trend in emissions would have been without the impact of differences in external temperatures. When temperatures are lower there is greater use of natural gas and electricity for heating buildings, so the buildings and product uses sector typically sees the largest deviations between actual and temperature adjusted emissions. Despite a similar year-on-year trend between actual and temperature adjusted emissions when compared to 2023, actual emissions in 2024 are estimated to be 4% (15 MtCO2e) lower than if temperatures had been in line with the long-term average.

Table 1 compares actual and temperature adjusted emissions by sector in 2023 and 2024. The adjustments are based on the estimated historical impacts of temperatures on emissions. Average temperatures and heating degree days in 2024 were similar to in 2023, remaining above the 30-year long-term averages. Therefore, variations in temperature were not a significant factor driving the trends in emissions between 2023 and 2024.

Table 1: Actual and temperature adjusted greenhouse gas emissions by sector

UK, 2023-2024 MtCO2e

	Temperature adjusted emissions			Actual emissions		
	2023	2024	**2023-2024 Percentage change**	2023	2024	**2023-2024 Percentage change**
Electricity supply	48.1	42.1	**-12.4%**	43.9	37.5	**-14.6%**
Fuel supply	30.1	28.4	**-5.6%**	30.1	28.4	**-5.6%**
Domestic transport	111.8	110.1	**-1.5%**	111.8	110.1	**-1.5%**
Buildings and product uses	86.7	89.0	**2.6%**	78.5	79.8	**1.7%**
Industry	54.6	50.1	**-8.3%**	53.1	48.3	**-8.9%**
Other	67.6	67.2	**-0.6%**	67.6	67.2	**-0.6%**
Total	**398.9**	**386.9**	**-3.0%**	**385.0**	**371.4**	**-3.5%**

Source: Table 1a, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables

2024 provisional greenhouse gas emissions from international aviation and shipping

In the data tables accompanying this publication, Table 5 shows greenhouse gas emissions arising from use of fuels from UK international aviation and shipping bunkers.

Emissions from international aviation and shipping can be estimated from refuelling from bunkers[11] at UK airports and ports, whether by UK or non-UK operators. Under the reporting guidelines agreed by the UNFCCC, these emissions are not included in the UK emissions total that is submitted to the UNFCCC but are reported as "memo" items in national greenhouse gas inventories. However, it is important to note that whether emissions from refuelling at UK-based international aviation and shipping can be used as an accurate estimate of UK international aviation and shipping emissions will depend on what assumptions are being made about how to allocate international aviation and shipping emissions to different countries.

In line with international reporting requirements, the UK 2030 and 2035 emissions reduction targets under the Paris Agreement (known as the UK's Nationally Determined Contribution) do not include emissions from international aviation and shipping. Instead, Parties to the UNFCCC are required to act to limit or reduce emissions from international services working through the International Civil Aviation Organization (ICAO) and International Maritime Organization (IMO), the international organisations responsible for formulating policies and setting targets for reducing emissions from international aviation and shipping respectively[12,13].

However, in 2021 the UK government set the Sixth Carbon Budget (covering 2033-37) to include the UK share of international aviation and shipping emissions, as recommended by the Climate Change Committee. This is the first time emissions from international aviation and shipping will be included in UK domestic carbon budget targets.

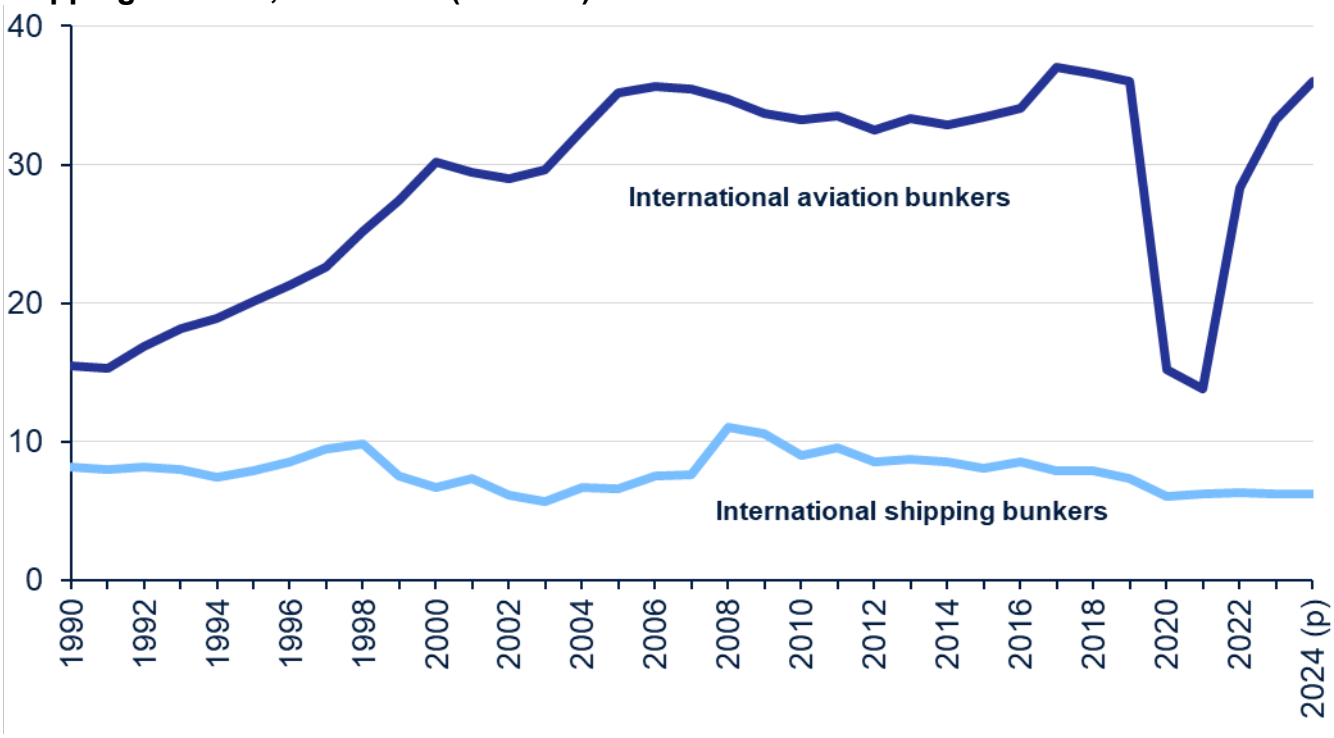
International aviation bunker emissions increased by 9% (3 MtCO2e) between 2023 and 2024, and were 0.1% higher than in 2019, the most recent pre-pandemic year. Emissions from international aviation bunkers have more than doubled since 2021 due to a recovery in air traffic following the COVID-19 pandemic. Between 1990 and 2006, emissions from UK international aviation fuel use more than doubled. After 2006, emissions fell slightly and then increased again, reaching a peak in 2017. High altitude aviation has a greater greenhouse effect due to the formation of persistent condensation trails (contrails) over and above that of carbon dioxide emissions from fuel alone, but this is not reflected in these estimates.

Meanwhile, international shipping bunker emissions fell by 1% (0.1 MtCO2e) between 2023 and 2024, and remain 16% lower than in 2019, the most recent pre-pandemic year. UK international shipping fuel use emissions did not see as pronounced a fall in 2020 when compared to aviation but they remain at a lower level than before the COVID-19 pandemic following the fall in shipping traffic that has occurred since. Between 1990 and 2024, emissions

[11] A large container or compartment that stores fuel for ships or aircraft.
[12] More information on ICAO strategies for reducing international aviation emissions: https://www.icao.int/environmental-protection/Pages/default.aspx
[13] More information on IMO strategies for reducing international shipping emissions: https://www.imo.org/en/OurWork/Environment/Pages/2023-IMO-Strategy-on-Reduction-of-GHG-Emissions-from-Ships.aspx

from UK shipping bunkers have fluctuated and had been around their 1990 level pre-pandemic.

Figure 15: Greenhouse gas emissions from UK-based international aviation and shipping bunkers, 1990-2024 (MtCO2e)



Source: Table 5, Provisional UK territorial greenhouse gas emissions statistics 2024 Excel data tables
Note: 2024 estimates are provisional.

Accompanying tables

The following tables are available in Excel and ODS format on the UK territorial greenhouse gas emissions statistics collection page on GOV.UK:

Table 1a	UK annual territorial greenhouse gas emissions, including temperature adjusted greenhouse gas emissions and breakdowns by source sector
Table 1b	UK annual territorial carbon dioxide emissions, including temperature adjusted carbon dioxide emissions and breakdowns by source sector
Table 2a	UK territorial greenhouse gas emissions for individual quarters, including temperature adjusted greenhouse gas emissions and breakdowns by source sector
Table 2b	UK territorial carbon dioxide emissions for individual quarters, including temperature adjusted carbon dioxide emissions and breakdowns by source sector
Table 3a	UK territorial greenhouse gas emissions annual totals to the end of each quarter, including temperature adjusted greenhouse gas emissions and breakdowns by source sector
Table 3b	UK territorial carbon dioxide emissions annual totals to the end of each quarter, including temperature adjusted carbon dioxide emissions and breakdowns by source sector
Table 4a	UK territorial greenhouse gas emissions by source sector and fuel type
Table 4b	UK territorial carbon dioxide emissions by source sector and fuel type
Table 5	Estimated greenhouse gas emissions, arising from the use of fuels from UK international aviation and shipping bunkers

Technical information

Methodology for producing the provisional emissions estimates

Data for 1990-2023 are consistent with the annual emissions presented in the 2023 final UK greenhouse gas emissions statistics publication. Data for 2024 emissions are provisional and do not follow the full methodology used for 1990-2023. Energy use accounts for a large majority of UK emissions. Most of these emissions are estimated based on provisional energy statistics published at the same time as this statistical release by DESNZ in the quarterly Energy Trends publication. A small proportion of emissions related to energy use are assumed to remain the same as in 2023 as data from which to produce estimates for them is not available at the time of publication.

Most non-energy use emissions are based on a simple approach which assumes that the changes in emissions for each gas in each category between 2023 and 2024 were in line with the corresponding percentage change in emissions from 2023 to 2024 in the Energy and Emissions Projections: 2023 to 2050 published by DESNZ. Like the energy use emissions, a small number of non-energy use emissions are held constant from the previous year in the provisional estimates. This is because these emissions are not separated from energy use emissions in the proxy projections.

Energy use emissions are allocated to individual quarters within each year in proportion to the quarterly energy statistics. Otherwise, emissions are assumed to be spread evenly over the year.

Temperature adjustments are applied to certain activities and fuel types to remove the effect of external temperatures. The adjustments are determined by the relationships between emissions and the average number of heating degree days in each quarter and the deviations in heating degree days from the long-term average. More information on heating degree days and temperatures can be found in Energy Trends.

Further details of how these statistics have been estimated can be found alongside this statistical release in a separate methodology summary.

TES sectors

The TES sectors are defined as follows:

Electricity supply	Emissions from power stations for electricity generation, including incinerators generating energy from waste. Excludes emissions from organisations generating their own electricity (autogeneration) even when exported to the electricity grid. These emissions are instead included in the sector in which they occur.
Fuel supply	Emissions from the supply of fuels, e.g. oil, gas and coal. Includes activities such as extraction, production, venting, flaring, processing (e.g. oil refining) and distribution. Excludes emissions from coke production which are instead included in the industry sector as coke is primarily used in the iron and steel industry.
Domestic transport	Emissions from road vehicles, domestic aviation and shipping (including military), fishing vessels, and railways. Also includes emissions from transport related mobile machinery (e.g. at airports and ports) and F gases from mobile air conditioning and refrigeration. International aviation and shipping emissions are not included in the national total, though are reported separately.
Buildings and product uses	Emissions from fuel combustion in residential, public, and commercial buildings, largely for heating. Also includes emissions from house and garden mobile machinery, anaesthetics, F gases from air conditioning, refrigeration, heat pumps, aerosols as well as other product uses. Excludes emissions from industrial buildings which are instead included in the industry sector.
Industry	Emissions from fuel combustion in the manufacturing and construction industries, industrial processes, and F gases from industrial refrigeration. Emissions from coke production are included in this sector as coke is primarily used in the iron and steel industry. Includes emissions from organisations generating their own electricity and heat (autogeneration) even when exported to the electricity grid or used in heat networks.
Agriculture	Emissions from agricultural machinery and fuel combustion, livestock (enteric fermentation and manure management) and agricultural soils (excluding carbon stock changes which are included in the LULUCF sector).
Waste	Emissions from the treatment and disposal of waste, such as landfill, composting, incineration without energy recovery and wastewater handling. Excludes emissions from incinerators generating energy from waste as these are reported in the electricity supply sector.
Land use, land use change and forestry (LULUCF)	Net carbon dioxide emissions from carbon stock changes from forestland, cropland, grassland, wetlands, settlements and harvested wood products. Other greenhouse gas emissions from drainage (excl. croplands and intensive grasslands) and rewetting of soils, nitrogen mineralisation associated with loss and gain of soil organic matter, and fires. As carbon stock changes are included in this sector, carbon dioxide emissions of biogenic origin (e.g. burning biomass for energy) are excluded from other sectors to avoid double counting of emissions.

These high-level sectors are made up of several more detailed sectors, which largely follow the definitions set out by the Intergovernmental Panel on Climate Change (IPCC)[14] , and which are used in international reporting tables that are submitted to the UNFCCC every year. It is

[14] https://www.ipcc-nggip.iges.or.jp/

important to note that sectoral estimates presented in this statistical release are based on provisional energy data and are subject to change. The sectoral breakdown is given mainly for information, and is included in the publication for completeness, but sectoral estimates are more uncertain than the overall total.

Further information

Future updates to these statistics

On Thursday 26 June 2025 DESNZ will publish estimates of greenhouse gas emissions for UK local authorities and regions for 2023.

On Thursday 26 June 2025 DESNZ will also publish estimates of 1990-2023 UK territorial emissions by Standard Industrial Classification (SIC).

Final estimates of UK greenhouse gas emissions for 2024 will be published in February 2026, with a summary of any planned methodology changes published in advance of that in January 2026.

Provisional UK greenhouse gas emissions estimates for 2025 will be published in March 2026.

Related publications

- The UK National Inventory Document (NID) for 1990-2023 will be submitted to the United Nations Framework Convention on Climate Change (UNFCCC) by 15 April 2025. The report will contain national territorial greenhouse gas emissions estimates for 1990-2023 and descriptions of the methods used to produce the estimates. Previous UK submissions to the UNFCCC can be found on the National Atmospheric Emissions Inventory (NAEI) website.

- The background quality report provides a summary of quality issues relating to statistics on UK territorial greenhouse gas emissions.

- DESNZ also publishes UK territorial emissions projections based on assumptions of future emission reduction policies, economic growth, fossil fuel prices, electricity generation costs, UK population and other key variables.

- Further information about the Kyoto Protocol and the Paris Agreement can be found on the UNFCCC website.

- Estimates of territorial greenhouse gas emissions in the four countries of the UK are published on the NAEI website and for local authority areas on GOV.UK. In both cases estimates of emissions in 2023 will be published in June 2025.

- ONS publishes emissions on a “residence” basis in the UK Environmental Accounts. These statistics cover emissions caused by UK residents and businesses whether in the

UK or abroad, but exclude emissions within the UK which can be attributed to overseas residents and businesses.

- Defra publishes the UK carbon footprint. These statistics present emissions on a "consumption" basis, covering emissions associated with the consumption of goods and services by households in the UK. They include estimates of emissions associated with each stage of the supply chain for those goods and services, regardless of where they occur, while excluding emissions occurring in the UK that are associated with the consumption of goods and services by households outside the UK.

- The latest UK energy statistics, including revisions to earlier years' data, can be found in the Digest of UK Energy Statistics and the Energy Trends quarterly bulletin produced by the DESNZ. Any enquiries about the UK energy statistics should be sent to Energy.Stats@energysecurity.gov.uk.

- Detailed UK temperature data can be found on both the Met Office website and the weather statistics collection page on the GOV.UK website.

Revisions policy

The DESNZ statistical revisions policy sets out the revisions policy for these statistics, which has been developed in accordance with the UK Statistics Authority Code of Practice for Statistics.

Emissions estimates for 2024 are provisional and are based on provisional UK energy statistics as well as projections. They will be revised when the final 2024 estimates are published in February 2026. The full time series going back to 1990 will also be revised at this time in line with any methodology changes made to the UK Greenhouse Gas Inventory.

Uses of these statistics

The provisional estimates are not used for any formal reporting of performance against UK emissions reduction targets, as this requires final estimates based on the UK Greenhouse Gas Inventory. However, these statistics give policy makers and other users an initial steer as to the trend in emissions between 2023 and 2024, helping to form an initial assessment of the extent to which the UK is on track to meet targets. For information on UK emissions targets and progress towards them, see the 2023 final UK greenhouse gas emissions statistics.

User engagement

Users are encouraged to provide comments and feedback on how these statistics are used and how well they meet user needs. Comments on any issues relating to this statistical release are welcomed and should be sent to GreenhouseGas.Statistics@energysecurity.gov.uk

The DESNZ statement on statistical public engagement and data standards sets out the department's commitments on public engagement and data standards as outlined by the Code of Practice for Statistics.

Accredited Official Statistics designation

Accredited Official Statistics are called National Statistics in the Statistics and Registration Service Act 2007.

These Accredited Official Statistics were independently reviewed by the Office for Statistics Regulation (OSR) in June 2014 and had their accreditation reviewed in September 2018. They comply with the standards of trustworthiness, quality and value in the Code of Practice for Statistics and should be labelled 'Accredited Official Statistics'.

Our statistical practice is regulated by the OSR.

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 Greenhousegas.Statistics@energysecurity.gov.uk with any comments about how we meet these standards.

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

Pre-release access to statistics

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

Contact

- Responsible statistician: William Hayes
- Email: GreenhouseGas.Statistics@energysecurity.gov.uk
- Media enquiries: 020 7215 1000
- Public enquiries: 07743 194032

This publication is available from: https://www.gov.uk/government/collections/uk-territorial-greenhouse-gas-emissions-statistics

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