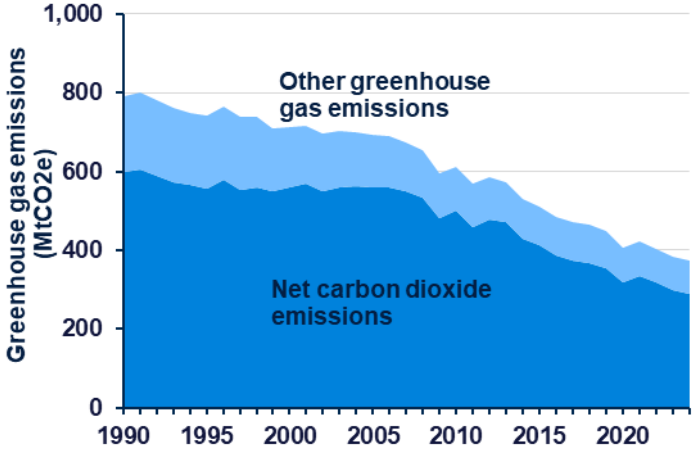
UK Government

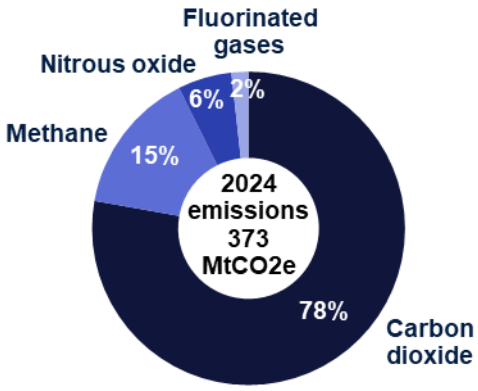
2024 UK Greenhouse Gas Emissions, Final Figures

5 February 2026 **Accredited Official Statistics**

In 2024, total UK net territorial greenhouse gas emissions were estimated to be 373 million tonnes carbon dioxide equivalent (MtCO2e), a decrease of 3% (11 MtCO2e) from 2023 and 53% (417 MtCO2e) from 1990. Carbon dioxide made up around 78% of the 2024 total.

UK territorial greenhouse gas emissions, 1990-2024





- Lower gaseous fuel and coal use in the electricity supply and industry sectors caused the largest emissions reductions in 2024. Electricity supply emissions fell by 16% (7 MtCO2e), largely due to higher net electricity imports, greater renewable generation, and the closure of the UK's last coal-fired power station in September 2024. Industrial emissions fell by 7% (4 MtCO2e), largely due to blast furnace closures in the iron and steel industry and lower coal use across the sector.

- Emissions from buildings and product uses rose by 4% (3 MtCO2e), due to higher gas use likely driven by an easing of energy cost pressures. Domestic transport emissions remained at a similar level to 2023 and this remains the largest emitting sector, responsible for 30% of all UK emissions in 2024.

What you need to know about these statistics:

This publication provides the latest estimates of 1990-2024 UK territorial greenhouse gas emissions, meaning emissions occurring within the UK's borders. Figures for all years since 1990 have been revised since the last publication to incorporate method improvements and new data, so the estimates presented here supersede previous ones.

This statistical release presents seven greenhouse gases: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3) in carbon dioxide equivalent units (CO2e). The last four gases are collectively referred to as fluorinated gases or F-gases.

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Contents

Introduction

This publication provides the latest annual estimates of UK territorial greenhouse gas emissions from 1990-2024. The estimates in this statistical release are drawn from the UK Greenhouse Gas Inventory, a consistent time series of emissions estimates from 1990 to the most recent year that is updated and reported annually. It is used as the basis for reporting against UK greenhouse gas emissions reduction targets and to provide information on the drivers of emissions trends since 1990. Emissions are estimated following the guidance set out by the Intergovernmental Panel on Climate Change (IPCC)[1] as required for annual reporting under the UK's obligations under the United Nations Framework Convention on Climate Change (UNFCCC) and Paris Agreement[2].

This statistical release shows emissions on a "territorial" basis. It covers emissions that occur within the UK's borders, including offshore areas within UK jurisdiction. It therefore excludes emissions from UK businesses and residents that occur outside the UK, including from international aviation and shipping, and emissions in the supply chains of manufactured goods and services imported into the UK (while including emissions that occur in the UK resulting from exported goods and services), except where stated otherwise.

Two additional approaches to estimating UK emissions are published by the Office for National Statistics (ONS) and the Department for Environment, Food and Rural Affairs (Defra). ONS has published an article that compares these in more detail. These approaches are:

- The "residence" basis, covering emissions from UK residents and businesses whether in the UK or abroad but excluding emissions within the UK which can be attributed to overseas residents and businesses. Estimates following this approach are published by the ONS in the UK Environmental Accounts.

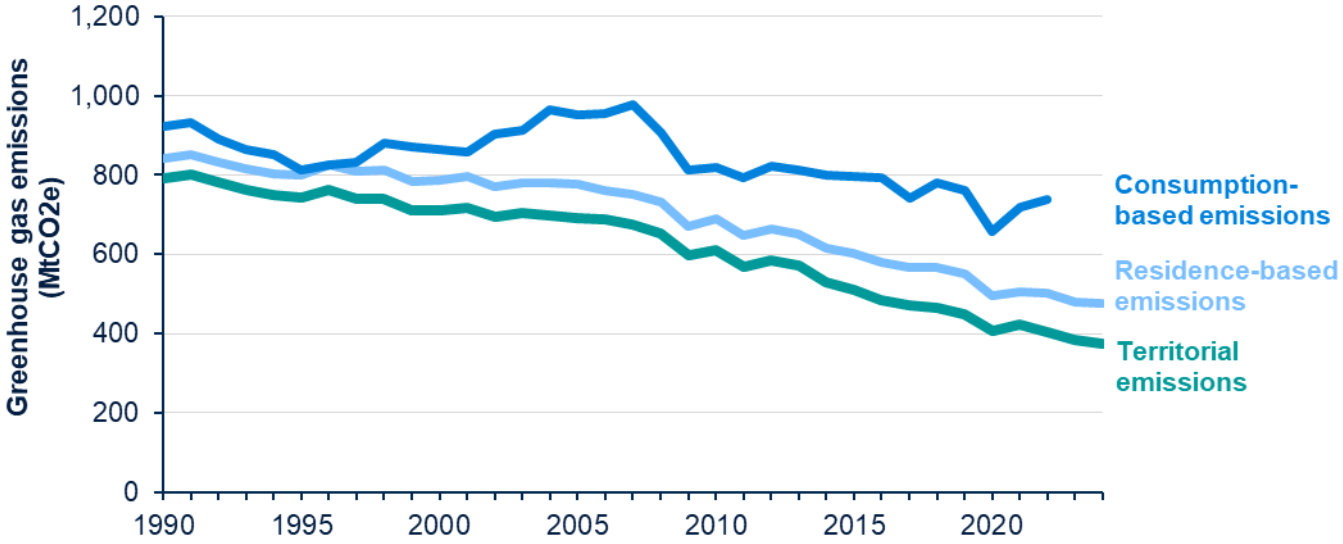
- The "consumption" basis, covering emissions associated with the consumption of goods and services by households in the UK regardless of where they occur, but excluding emissions occurring in the UK that are associated with the consumption of goods and services by households outside the UK. Estimates following this approach are published by Defra as the UK carbon footprint.

Figure 1 compares the UK territorial emissions estimates in this publication to the most recent residence and consumption-based estimates. The estimates are not directly comparable as there are differences in definitions and methods. In addition, both the consumption and residence-based estimates do not incorporate the latest methodology changes made to the territorial estimates. However, this does give a good indication of the relative sizes and trends in each of these estimates, for example, UK consumption-based emissions are considerably higher than UK territorial emissions and have followed a different trend over the time series, peaking in 2007 and not falling as far as the territorial and residence-based estimates have since 1990.

[1] 2006 IPCC Guidelines for National Greenhouse Gas Inventories: https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html; 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement): https://www.ipcc-nggip.iges.or.jp/public/wetlands/index.html; 2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol (KP Supplement): https://www.ipcc-nggip.iges.or.jp/public/kpsg/index.html; 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html

[2] Paris Agreement reporting guidance: https://unfccc.int/process-and-meetings/transparency-and-reporting/preparing-for-the-ETF

Figure 1: UK territorial, residence, and consumption-based greenhouse gas emissions, 1990-2024 (MtCO2e)



Sources: Table 1.1, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables
Atmospheric emissions: greenhouse gases by industry and gas, ONS: https://www.ons.gov.uk/economy/environmentalaccounts/datasets/ukenvironmentalaccountsatmosphericemissionsgreenhousegasemissionsbyeconomicsectorandgasunitedkingdom
UK carbon footprint, Defra: https://www.gov.uk/government/statistics/uks-carbon-footprint

In this publication, emissions of each greenhouse gas are weighted by its global warming potential (GWP), so that total greenhouse gas emissions can be reported on a consistent basis. The GWP for each gas is defined as its warming influence in relation to that of CO2 over a 100-year period. Emissions are then presented in carbon dioxide equivalent units (CO2e). The GWPs used are from Working Group 1 of the IPCC's Fifth Assessment Report, which are the latest values ratified for use for reporting under the Paris Agreement and UNFCCC from 2024[3].

These statistics report net emissions, which means total emissions of a gas minus total removals of that gas from the atmosphere by emission sinks. Emission sinks are defined by the UNFCCC as "any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere"[4].

Note that as part of this release the 1990-2023 emissions figures have been revised since the previous publication in February 2025 to incorporate methodological improvements, such as modelling of methane emissions from landfill, and new data. The 2024 figures have been revised from the provisional estimates published in March 2025. Details of these revisions can be found later in this statistical release.

The figures in these statistics are consistent with the UK Greenhouse Gas Inventory for 1990-2024, with the one difference that the inventory reported to the UNFCCC includes emissions from UK Crown Dependencies and certain Overseas Territories which are excluded from these statistics except where specifically stated.

The estimates in this publication are based on the source of the emissions rather than where the end-user activity occurred. For example, emissions related to electricity generation are attributed to power stations, where the emissions occur, rather than homes and businesses where the electricity is used. A breakdown of UK territorial emissions with energy supply

[3] GWPs from the IPCC's AR5 are summarised in Table 6.4 in the data tables accompanying this publication.
[4] United Nations Framework Convention on Climate Change: https://unfccc.int/process-and-meetings/united-nations-framework-convention-on-climate-change

emissions presented on an end-user basis will be published as an annex to this publication on 31 March 2026[5].

Territorial emissions are allocated to Territorial Emissions Statistics (TES) sectors. The TES sectors are electricity supply, fuel supply, domestic transport, buildings and product uses, industry, agriculture, waste, and land use, land use change and forestry (LULUCF).

Electricity supply	Emissions from power stations, 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, such as 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 (such as 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 included 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 (excluding 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 (such as from burning biomass for energy) are excluded from other sectors to avoid double counting of emissions.

2024 total greenhouse gas emissions

In the data tables accompanying this publication, Table 1.1 shows UK greenhouse gas emissions since 1990 by gas and Table 1.7 shows emissions by fuel type.

In 2024, total greenhouse gas emissions were estimated to be 373 MtCO2e, a decrease of 11 MtCO2e (3%) from the 2023 estimate of 384 MtCO2e. In 2024 they were 53% lower than they were in 1990.

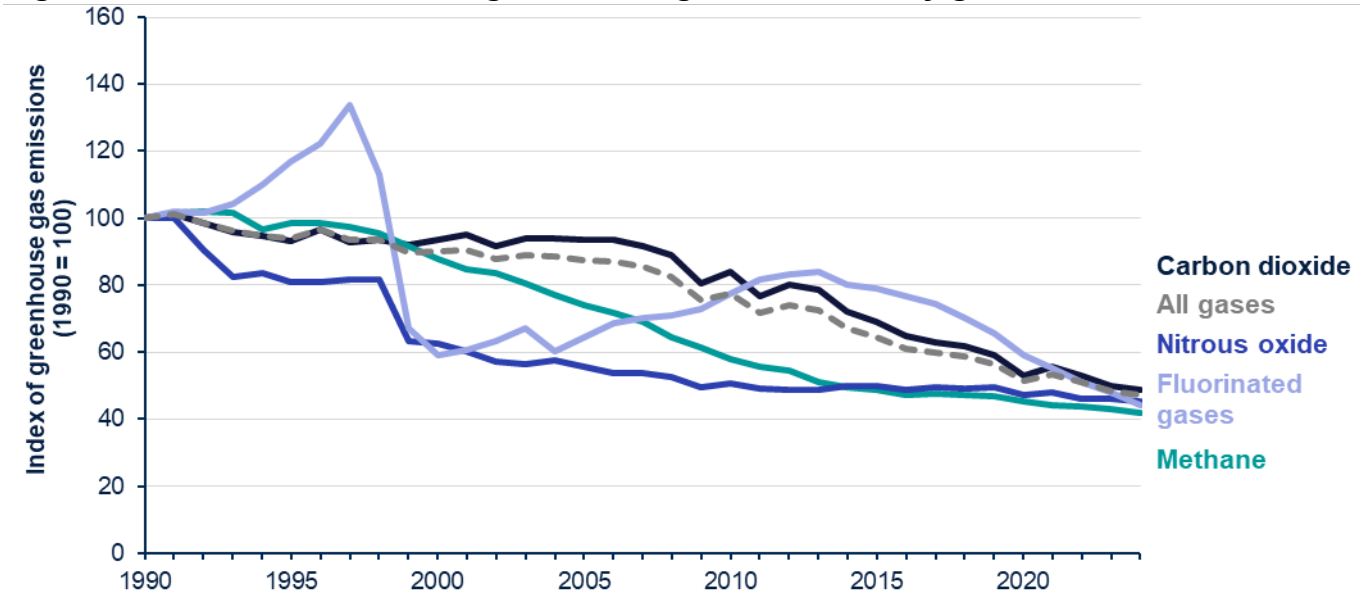
The fall in emissions in 2024 is largely due to reduced gas and coal use in the electricity supply and industry sectors. Electricity supply sector emissions fell by 16% (7 MtCO2e), owing to lower gas use driven by record high net imports of electricity and increased domestic generation from renewable sources, which also reached a record high[6]. Coal use for electricity generation also fell due to the closure of the UK's last coal-fired power station in September 2024. Industry sector emissions fell by 7% (4 MtCO2e), largely due to blast furnace closures in the iron and steel industry and lower coal use across the sector. Meanwhile, buildings and product uses sector emissions rose by 4% (3 MtCO2e), as result of higher gas use in buildings, likely driven by an easing of energy cost pressures.

When broken down by gas, UK emissions are dominated by carbon dioxide, which is estimated to have accounted for around 78% of UK emissions in 2024 on a carbon dioxide equivalent basis. When weighted by their global warming potentials, methane accounted for 15% of UK emissions in the UK in 2024; nitrous oxide contributed around 6%, and F-gases accounted for the remaining emissions, at around 2%.

Carbon dioxide has, for all recorded years, been the dominant greenhouse gas emitted in the UK. Between 1990 and 2024, carbon dioxide emissions fell by 51% (307 MtCO2e). The majority of this decrease is from lower coal use in power stations. Emissions of methane and nitrous oxide have seen larger proportional falls since 1990, at 58% (77 MtCO2e) and 55% (25 MtCO2e) respectively. F-gas emissions are estimated to be 56% (8 MtCO2e) lower now than they were in 1990, with hydrofluorocarbons being the dominant F-gas throughout this period.

[6] Further information on UK electricity generation in 2024 can be found in DUKES 2025 Chapter 5: Electricity.

Figure 2: Index of territorial UK greenhouse gas emissions by gas, 1990-2024

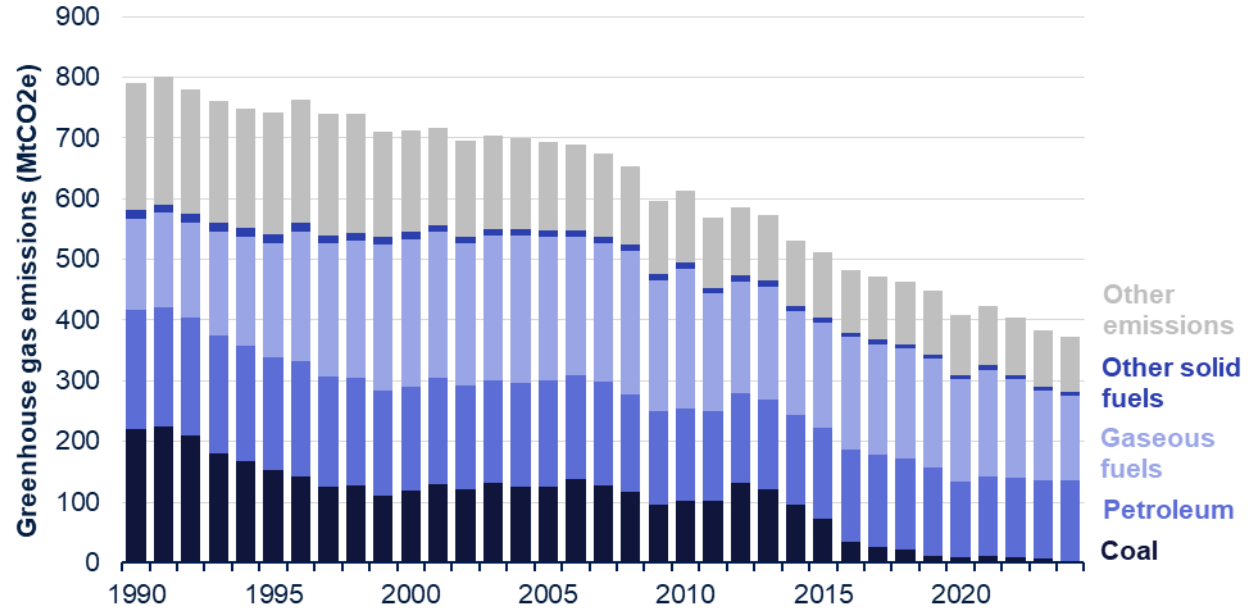


Source: Table 1.1, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

In 2024, 75% of emissions in the UK came from fuel combustion. Between 2023 and 2024, emissions from fuel combustion fell by 3%. Fuel combustion emissions were 51% lower in 2024 than they were in 1990. Combustion of gaseous fuels and petroleum accounted for 38% and 35% of all UK 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 in the UK in 2024. Between 1990 and 2024, emissions from coal use fell by 98%. In 1990, coal use was responsible for 28% of UK emissions as it was the main fuel used for electricity generation at the time.

Figure 3: Territorial UK greenhouse gas emissions by fuel type, 1990-2024 (MtCO2e)



Source: Table 1.7, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

UK performance against emissions reduction targets

In the data tables accompanying this publication, Table 2.1 shows the progress against UK domestic emissions reduction targets under the Climate Change Act 2008 and Table 2.2 shows UK progress against international emissions reduction targets under the Paris Agreement.

Domestic Targets

The Climate Change Act 2008

The UK has domestic targets for reducing greenhouse gas emissions under the Climate Change Act 2008 (CCA)[7]. The CCA has established a long-term legally binding framework to reduce UK net greenhouse gas emissions by at least 100% below 1990 levels by 2050 (i.e. Net Zero). The CCA also introduced carbon budgets. These are legally binding limits on the total amount of greenhouse gas emissions the UK can emit over five-year periods and are required to be set 12 years in advance of the start of each period[8].

Compliance with carbon budgets is not assessed by directly comparing the budget level against total UK net greenhouse gas emissions. Instead, the budget level is compared to the Net UK Carbon Account, which can also take account of international emissions trading and is defined for each period in carbon accounting regulations[9]. Up until 2020, the Net UK Carbon Account included adjustments for net trading of emissions allowances from UK operators participating in the EU Emissions Trading System (EU ETS)[10]. The UK left the EU ETS in 2020, and so adjustments for trading are not applicable from 2021. Further information on EU ETS adjustments can be found in Annual Statement of Emissions publications[11].

The first carbon budget ran from 2008-12. In 2014, it was confirmed the UK had met the budget with the Net UK Carbon Account 37 MtCO2e (1%) below the limit of 3,018 MtCO2e[12]. The second carbon budget ran from 2013-17. In 2019, it was confirmed the UK had met the budget with the Net UK Carbon Account 384 MtCO2e (14%) below the limit of 2,782 MtCO2e[13]. The third carbon budget ran from 2018-22. In 2024, it was confirmed the UK had met the budget with the Net UK Carbon Account 391 MtCO2e (15%) below the limit of 2,544 MtCO2e[14]

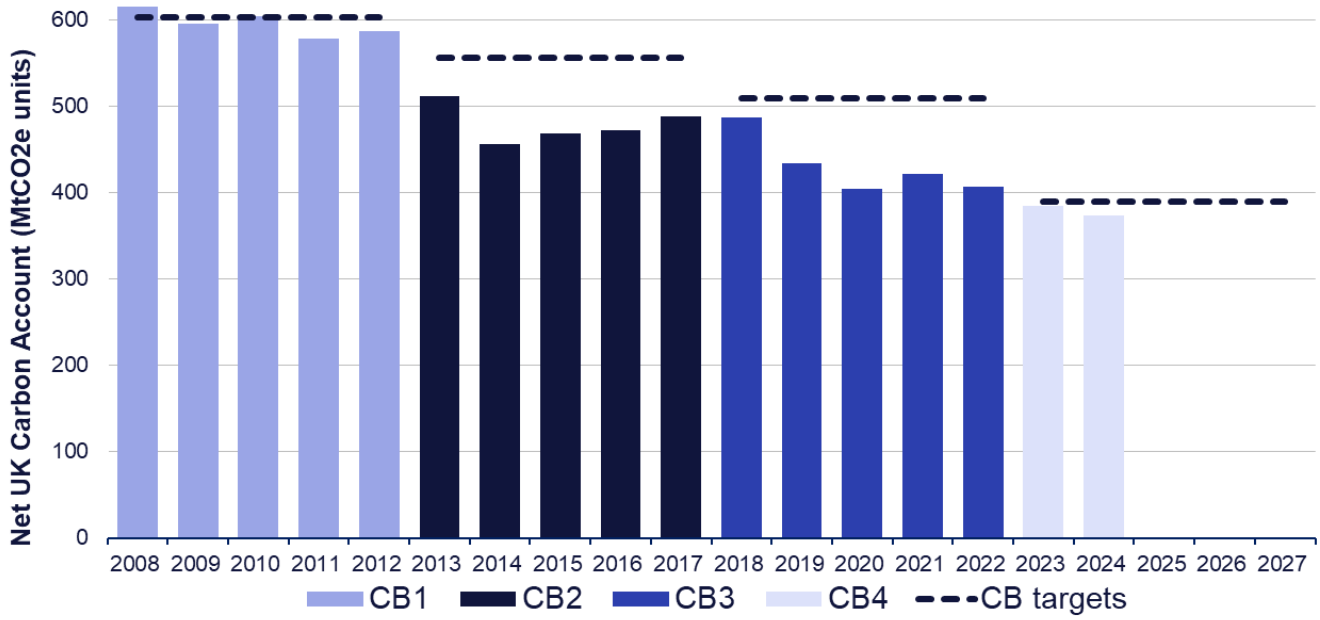
2024 represents the second year of the fourth carbon budget. The latest figures show the Net UK Carbon Account was 384 MtCO2e in 2023 and 373 MtCO2e in 2024. The Net UK Carbon

[7] Climate Change Act 2008: http://www.legislation.gov.uk/ukpga/2008/27/contents
[8] Carbon budgets: https://www.gov.uk/guidance/carbon-budgets
[9] Carbon Accounting Regulations: https://www.legislation.gov.uk/uksi/2009/1257/contents/made
[10] The EU Emissions Trading System (EU ETS): https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en
[11] Annual Statement of Emissions: https://www.gov.uk/government/collections/annual-statements-of-emissions
[12] Final statement for the first carbon budget period: https://www.gov.uk/government/statistics/final-statement-for-the-first-carbon-budget-period
[13] Final statement for the second carbon budget period: https://www.gov.uk/government/statistics/final-statement-for-the-second-carbon-budget-period
[14] Final statement for the third carbon budget period: https://www.gov.uk/government/statistics/final-statement-for-the-third-carbon-budget-period

Account must be on average lower than 390 MtCO2e each year for the UK to meet the fourth carbon budget.

Projected performance against current and future carbon budgets can be found in UK energy and emissions projections[15].

Figure 4: Progress towards UK Carbon Budget (CB) targets (MtCO2e units)



Source: Table 2.1, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

Note: Up until 2020, UK net greenhouse gas emissions were adjusted for net trading of emissions allowances from UK operators participating in the EU ETS.

International Targets

The Kyoto Protocol

Up until 2020, the UK had emissions reduction targets under the Kyoto Protocol to the UNFCCC[16]. The UK, collectively with the EU, met its emissions reduction targets under the First Commitment Period (2008-12) and Second Commitment Period (2013-20). For further information on the UK's achievement of its targets under the Kyoto Protocol, see the International Targets section and Table 2.2 from Final UK greenhouse gas emissions statistics 1990-2022.

The Paris Agreement

The UK has set two emissions reduction targets under the Paris Agreement[17] to the UNFCCC, known as Nationally Determined Contributions (NDCs). The UK's 2030 NDC sets a target of at least 68% reduction in total net greenhouse gas emissions compared to the UK's base year[18].The UK's 2035 NDC sets a target of at least 81% reduction in total net greenhouse gas

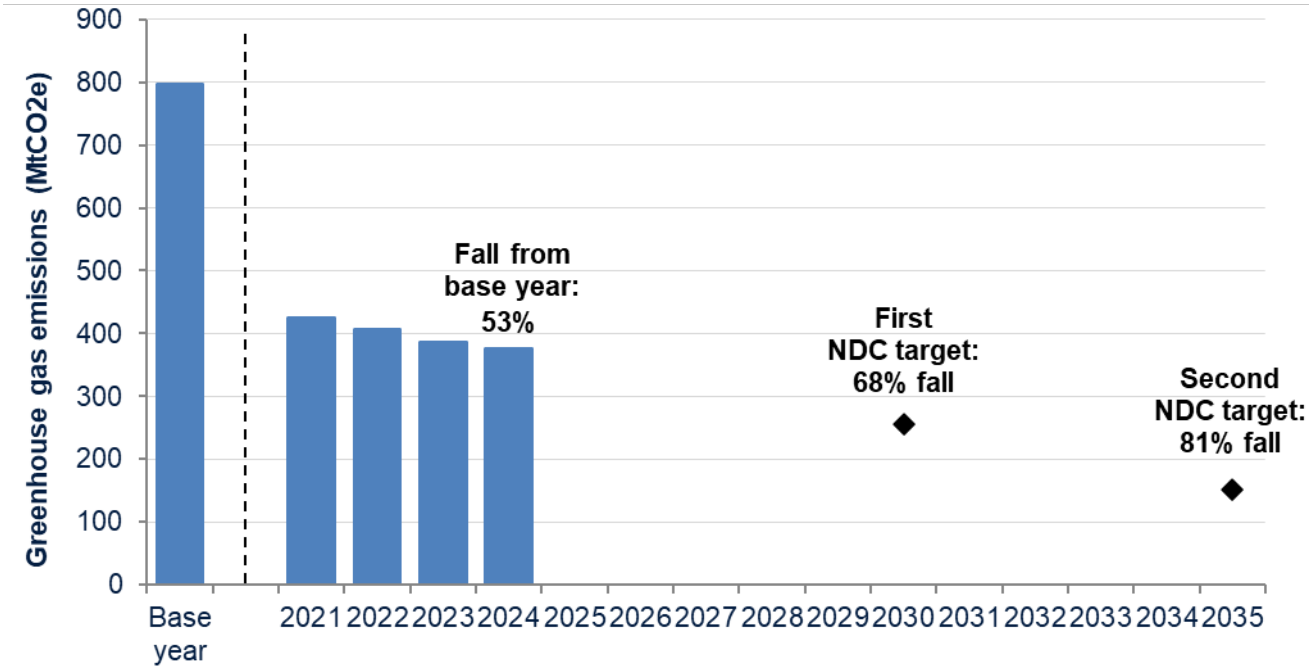
[15] Energy and emissions projections: https://www.gov.uk/government/collections/energy-and-emissions-projections
[17] The Paris Agreement: https://unfccc.int/process-and-meetings/the-paris-agreement
[17] The Paris Agreement: https://unfccc.int/process-and-meetings/the-paris-agreement
[18] UK's first NDC: https://www.gov.uk/government/publications/the-uks-nationally-determined-contribution-communication-to-the-unfccc

emissions compared to its base year[19]. The base year for the UK's NDCs is 1990 for CO2, CH4 and N2O, and 1995 for F-gases.

The NDC targets include the UK and Crown Dependencies and UK Overseas Territories which the UK's ratification of the Paris Agreement has been extended to. To date, these are the Crown Dependencies of Jersey, Guernsey and the Isle of Man, and the Overseas Territory of Gibraltar.

Figure 5 shows the UK's progress towards its NDC targets. In 2024, emissions were 53% lower than in the base year. The most recent projected performance against these targets can be found in the government's Carbon Budget and Growth Delivery Plan[20].

Figure 5: Progress towards UK Paris Agreement targets



Source: Table 2.2, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

Note: The base year for the UK's NDCs is 1990 for CO2, CH4 and N2O, and 1995 for F-gases

[19] UK's second NDC: https://www.gov.uk/government/publications/uks-2035-nationally-determined-contribution-ndc-emissions-reduction-target-under-the-paris-agreement

[20] Carbon Budget and Growth Delivery Plan (2025): https://www.gov.uk/government/publications/carbon-budget-and-growth-delivery-plan

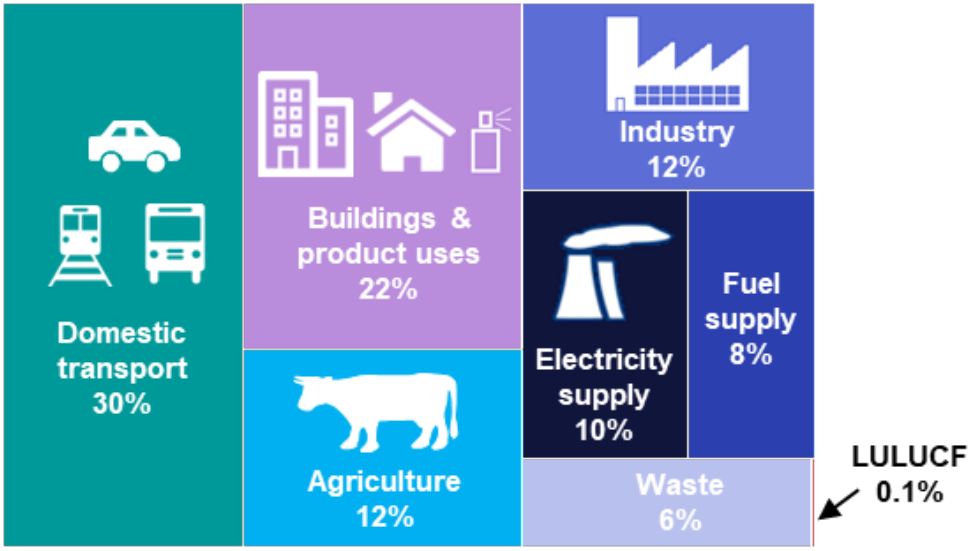
Emissions by sector

In the data tables accompanying this publication, Table 1.2 shows overall UK greenhouse gas emissions since 1990 by sector and source, while tables 1.3 to 1.6 show this breakdown for each individual gas.

The sector breakdowns in this publication and accompanying tables are based on 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.

In 2024, 30% of net greenhouse gas emissions in the UK were from domestic transport, 22% from buildings and product uses, 12% from agriculture, 12% from industry, 10% from electricity supply, 8% from fuel supply, 6% from waste and 0.1% from LULUCF. The LULUCF sector includes both net sinks and net sources of emissions.

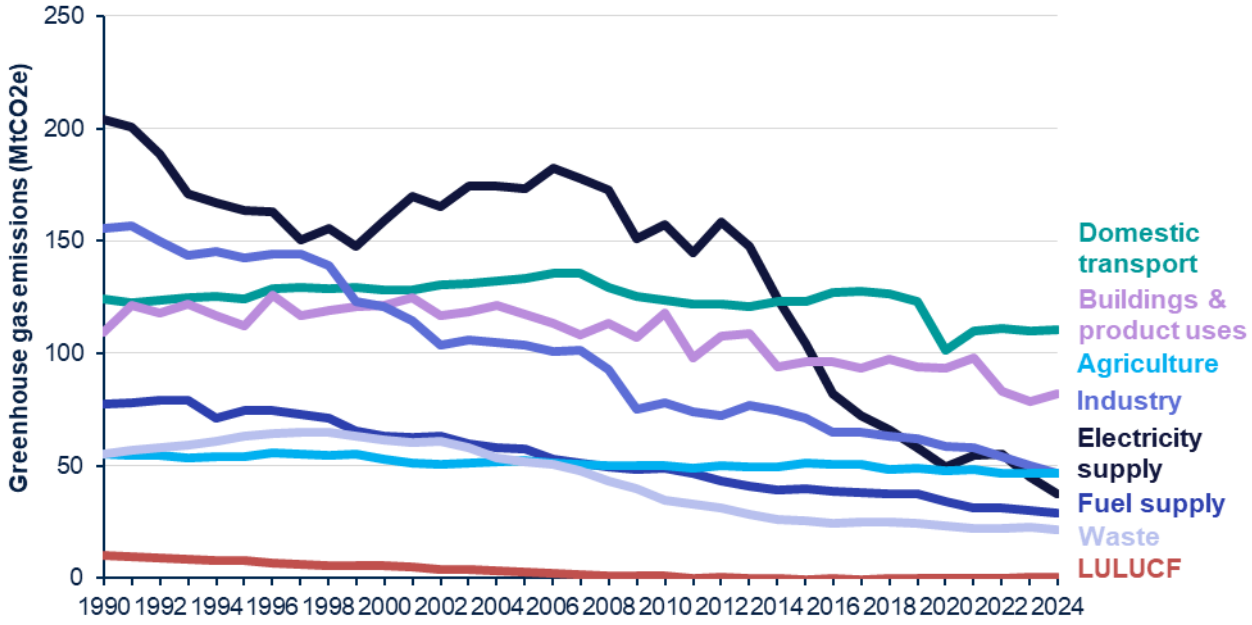
Figure 6: Territorial UK greenhouse gas emissions by TES sector, 2024 (%)



Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables
Note: LULUCF is land use, land use change and forestry.

Historically, electricity supply had the highest greenhouse gas emissions of any sector. However, large reductions in emissions from power stations now make it the sector with the fifth highest emissions. Since 2015, domestic transport has had the highest emissions of any sector. In 2024, emissions from the agriculture sector were higher than those from the industry sector for the first time in the time series.

Figure 7: Territorial UK greenhouse gas emissions by TES sector, 1990-2024 (MtCO2e)



Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

Note: LULUCF is land use, land use change and forestry.

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 UK greenhouse gas emissions in 2024, with carbon dioxide accounting for almost all emissions for this sector. In 2024, 75% of electricity supply emissions were from the combustion of gas and 19% from municipal solid waste. The rest were from a mixture of coal, petroleum and other fuels.

There was a 16% decrease in emissions from the electricity supply sector between 2023 and 2024, largely due to lower gas and coal use in UK power stations. The fall was largely due to a mixture of higher net electricity imports, greater renewable generation, and the closure of the UK's last coal-fired power station in September 2024. Gas use for electricity generation fell 13% in 2024 and coal use fell 53%[21].

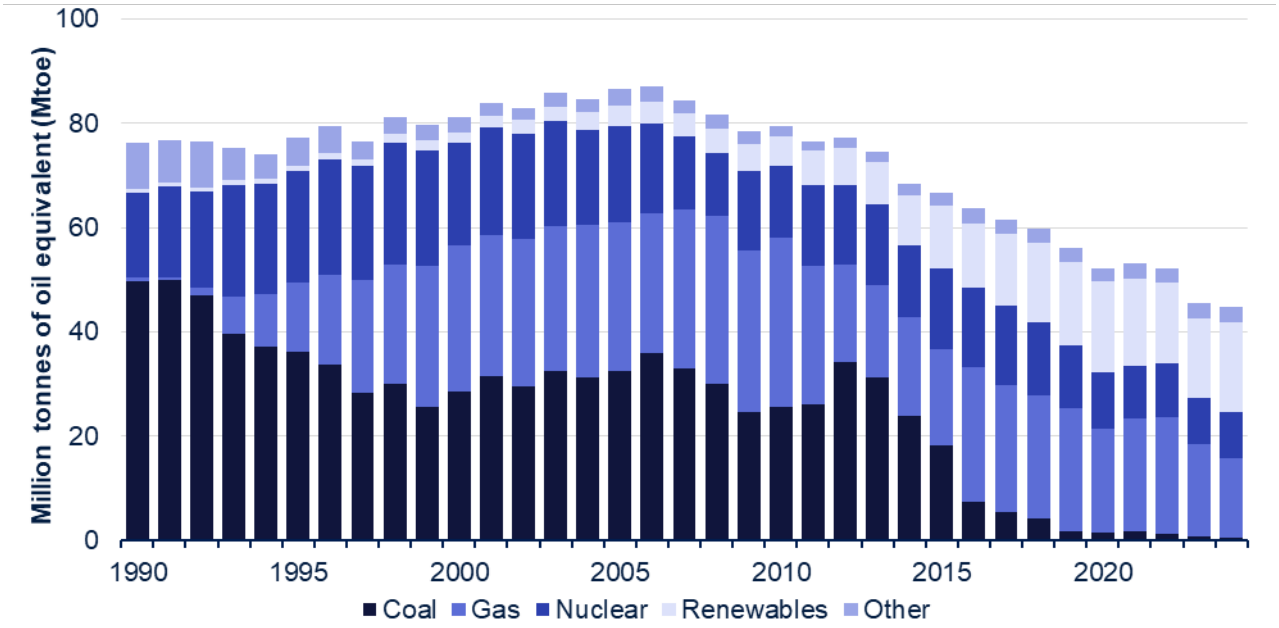
Between 1990 and 2024, electricity supply emissions have reduced by 82%. This decrease is mainly the result of changes to the mix of fuels used for electricity generation, including the growth of renewables; together with greater efficiency resulting from technological improvements. The electricity supply sector historically had the largest emissions of the sectors presented in these statistics. However, in 2015, domestic transport overtook electricity supply as the sector with the highest emissions, and there are now several sectors with higher emissions.

Since 1990, there has been a decline in the use of coal at power stations and an increase in the use of gas, which has a lower carbon content so results in fewer emissions. Coal use in generation reduced by 99% between 1990 and 2024, when it made up only 1% of the fuel used for UK electricity generation compared to 65% in 1990. Total electricity supplied was 9% lower in 2024 than in 1990, having grown to a peak in 2005 and decreased since then[22].

The government has set several targets as part of its Clean Power 2030 Action Plan for the electricity network in Great Britain. Progress towards these can be found in the Clean Power 2030 metrics publication[23].

[21] Table 5.1.1, Fuel input for electricity generation, Digest of UK Energy Statistics (DUKES) 2025
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904820/DUKES_5.1.1.xls
[22] Table 5.1.3, Electricity generated and supplied, Digest of UK Energy Statistics (DUKES) 2025
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904822/DUKES_5.1.3.xls
[23] Clean Power 2030 metrics: https://www.gov.uk/government/statistics/clean-power-2030-metrics

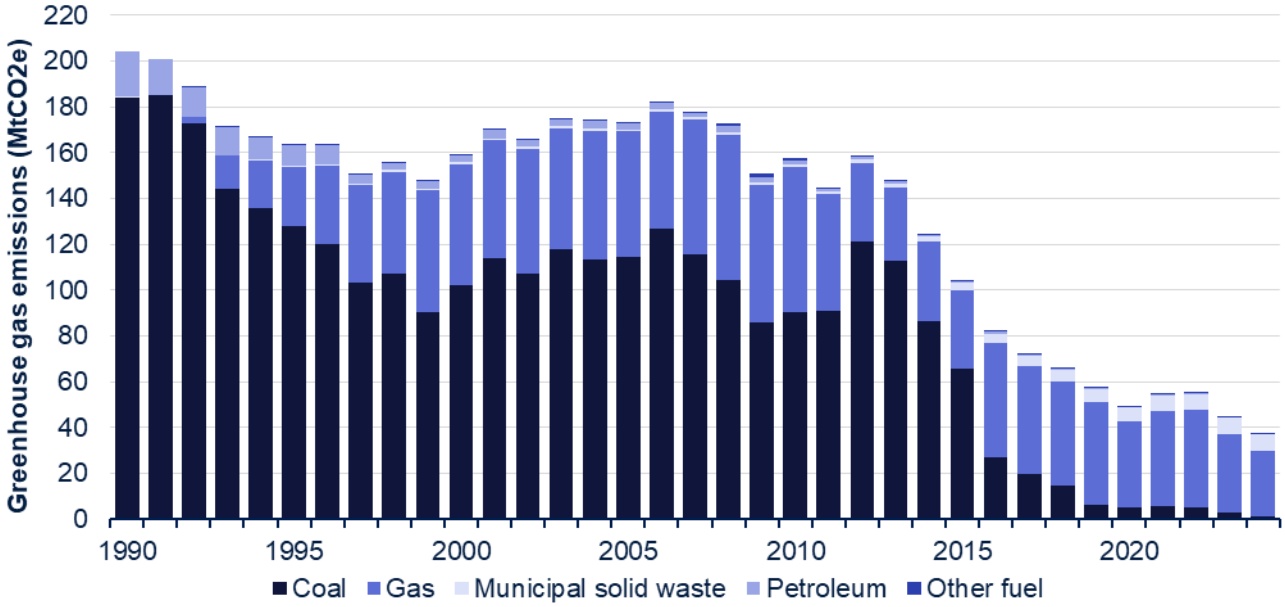
Figure 8: Fuel used for UK electricity generation, UK 1990-2024 (Million tonnes of oil equivalent (Mtoe))



Source: Table 5.1.1 and Table 5.3, Digest of UK Energy Statistics (DUKES) 2025 https://www.gov.uk/government/statistics/electricity-chapter-5-digest-of-united-kingdom-energy-statistics-dukes

Note: These totals include fuel used for electricity generation by organisations generating their own electricity (autogeneration), which are not included in the electricity supply emissions totals https://www.gov.uk/government/statistics/electricity-chapter-5-digest-of-united-kingdom-energy-statistics-dukes

Figure 9: Greenhouse gas emissions from electricity supply, 1990-2024 (MtCO2e)



Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

Note: Figures 8 and 9 show different fuel groupings as not all fuels produce direct emissions.
The use of municipal solid waste is included in the 'renewables' category and the use of petroleum in the 'other' category in Figure 8.

Fuel supply

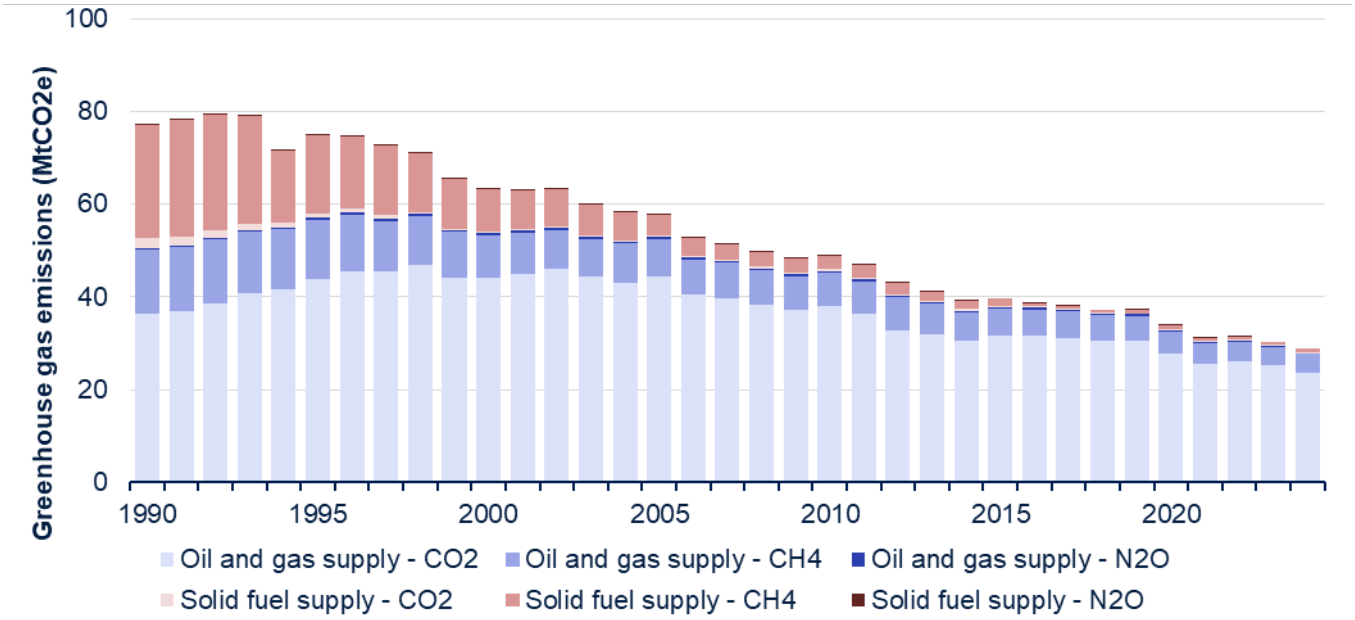
The fuel supply sector consists of emissions that arise during the production and supply of fuels, for example from the combustion of fuels in oil refineries and at oil and gas platforms, the flaring and venting of gas from oil and gas facilities, leakages from the gas network and

methane emissions from coal mining. Fuel supply accounted for 8% of greenhouse gas emissions in the UK in 2024, 97% of which were from oil and gas supply.

Between 2023 and 2024, fuel supply emissions fell by 5%. This was largely due to reduced combustion emissions from 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 largely been the result of lower UK production of coal. Deep mined coal production has declined steadily over the period, with the last large deep mines all closing in 2015. Emissions from coal mining and handling have fallen from 26 MtCO2e in 1990 to only 1 MtCO2e in 2024. Oil and gas supply emissions rose to a peak in 1996 at 58 MtCO2e, but have since fallen by 52%.

Figure 10: Greenhouse gas emissions from fuel supply, UK 1990-2024 (MtCO2e)



Source: Tables 1.3 to 1.5, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

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 around 30% of all territorial UK greenhouse gas emissions, almost entirely through carbon dioxide emissions. Road vehicles accounted for 90% of domestic transport emissions in 2024.

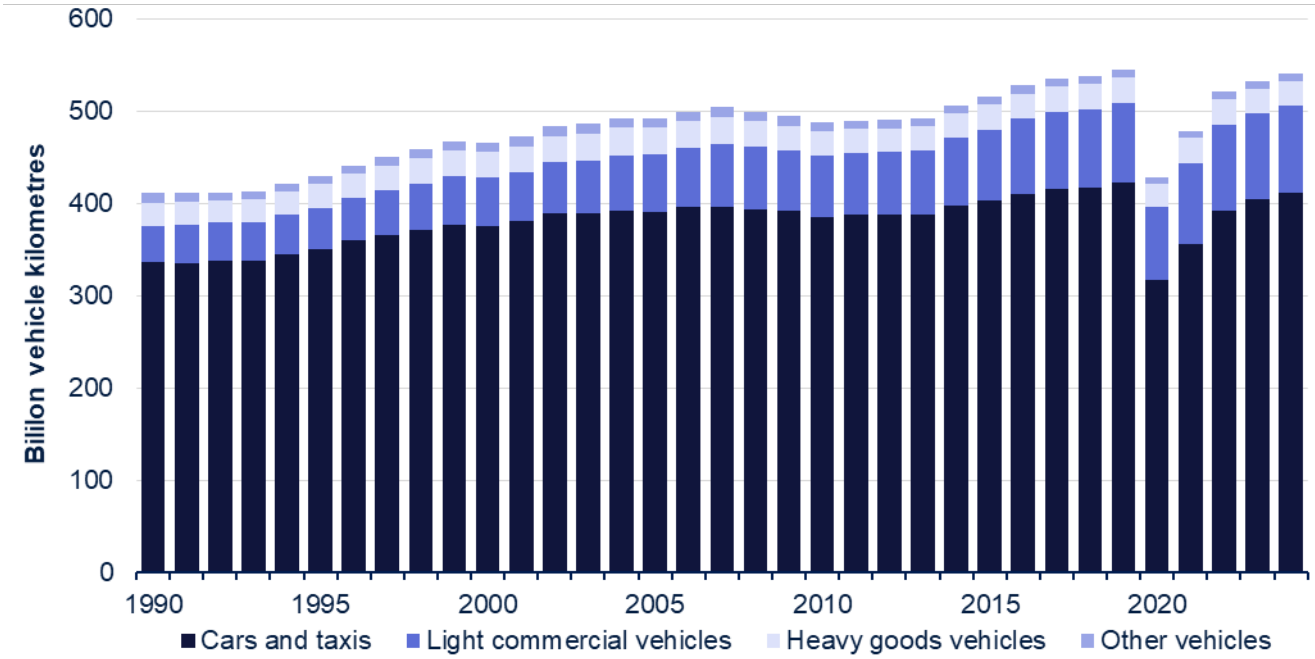
Domestic transport emissions remained at a similar level in 2024 to 2023, with a small 0.2% increase between the two years. Emissions from road transport increased by 0.3%, largely due to an increase in emissions from light duty vehicles. There were also increases of 5% in emissions from both waterborne travel and railways and of 4% from civil aviation, but large falls of 24% in military aviation emissions and 18% from military shipping. Emissions from domestic transport remained 10% lower than in 2019, the last year before the COVID-19 pandemic, with emissions from each of road, rail, aviation and waterborne transport all having remained lower in 2024 than they were in 2019.

Domestic transport emissions were 11% lower in 2024 than in 1990. Before 2020 there had been relatively little overall change in the level of greenhouse gas emissions from domestic transport with emissions only 1% lower in 2019 than they were in 1990.

Road vehicles are the most significant source of emissions in this sector, in particular passenger cars, and the changes which have been seen over the period were heavily influenced by this category. Figure 11 shows how the volume of traffic on the roads has changed over time in Great Britain, which reflects the trend seen for the UK as a whole. Motor vehicle traffic volumes have generally increased throughout this period, other than a 3% fall seen between 2007 and 2010 following a recession, and a large 21% fall between 2019 and 2020 as a result of the COVID-19 pandemic. Motor vehicle traffic continued to recover in 2024, increasing 2% when compared to 2023.

With lower petrol consumption outweighing an increase in diesel consumption[24] and improvements in fuel efficiency of both petrol and diesel cars, the volume of emissions from passenger cars has generally been in decline since 2005. Although decreases were partially offset by an increase in emissions from light duty vehicles prior to the COVID-19 pandemic. Emissions of carbon dioxide are closely related to the amount of fuel used, whilst nitrous oxide and methane emissions are influenced more by the vehicle type and age.

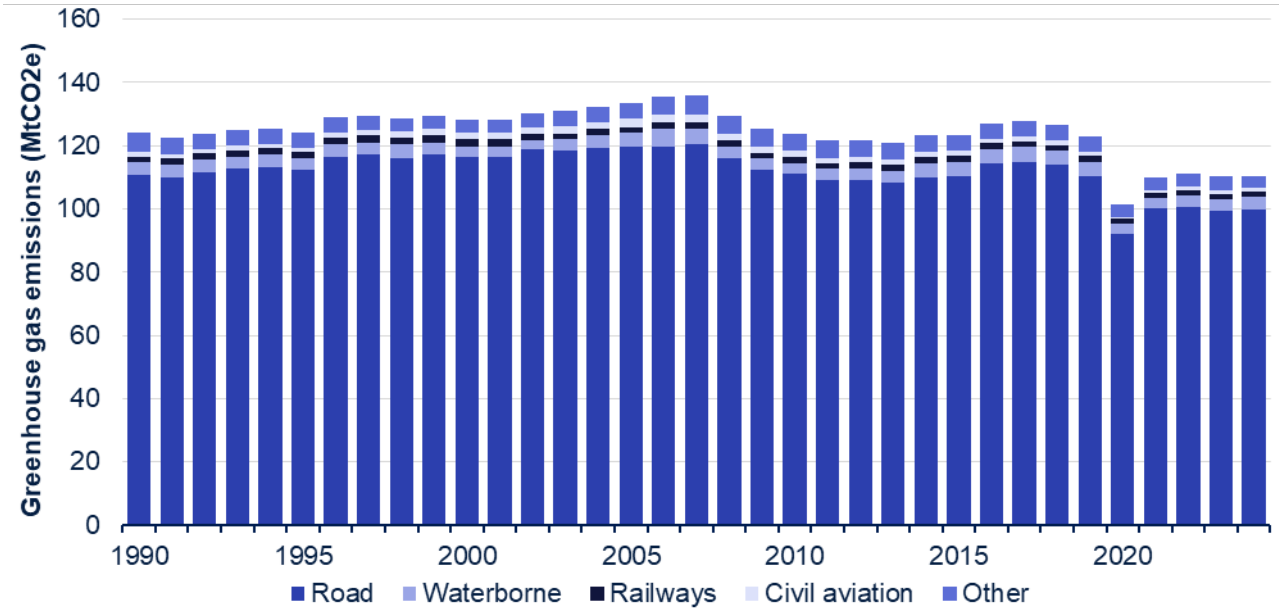
Figure 11: Motor vehicle traffic, Great Britain 1990-2024 (Billion vehicle kilometres)



Source: Table TRA0201: Road traffic (vehicle kilometres) by vehicle type in Great Britain, annual from 1949: https://www.gov.uk/government/statistical-data-sets/tsgb07

[24] Energy Consumption in the UK 2025, Table C8: Road transport energy use by vehicle type, split by white diesel and petrol 1970-2023: https://www.gov.uk/government/statistics/energy-consumption-in-the-uk-2025

Figure 12: Greenhouse gas emissions from domestic transport, UK 1990-2024 (MtCO2e)



Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

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 22% of greenhouse gas emissions in the UK. Of these emissions, 66% were from fuel combustion in residential buildings, 16% in commercial buildings, 11% in public sector buildings and 6% were other buildings and product use emissions.

It should be noted that since these figures are estimates of emissions by source, 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.

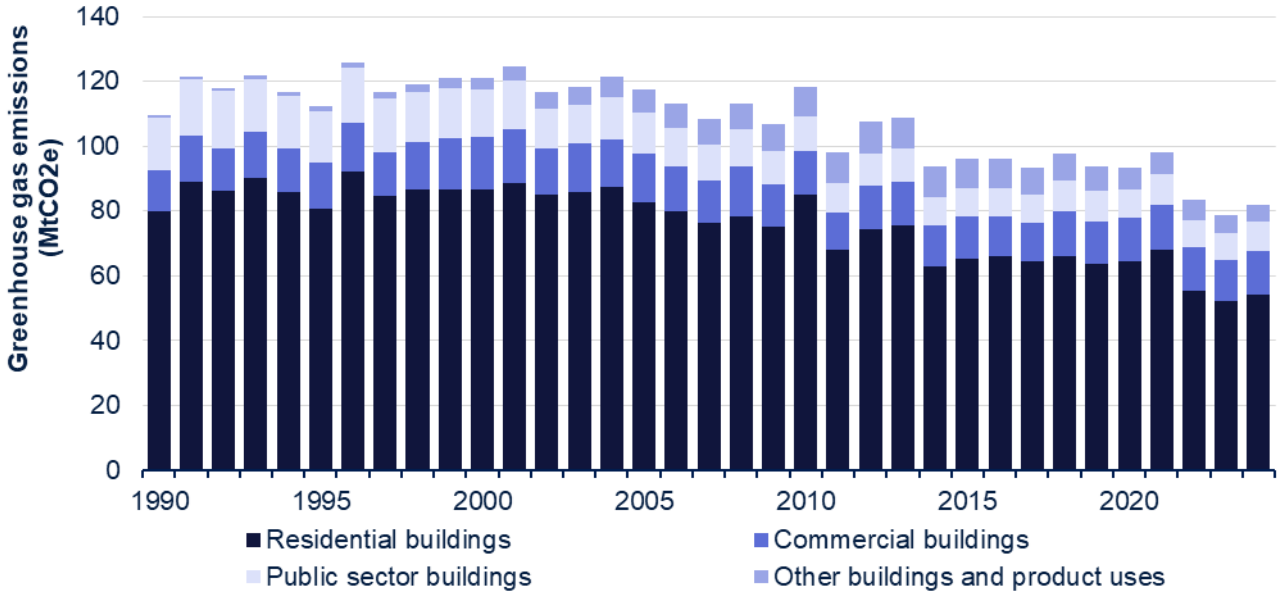
There was a 4% increase in emissions from buildings and product uses between 2023 and 2024 due to higher gas use, likely driven by an easing of energy cost pressures. Emissions from buildings are also influenced by external temperatures, with colder temperatures driving higher emissions due to increased use of heating. Between 1990 and 2024 there has been considerable variation in emissions from year to year as a result. Importantly, continued warmer weather has also kept emissions down relative to earlier years. Average temperatures across 2023 and 2024 were 0.8°C and 0.6°C higher than the 30-year long-term average respectively[25]. Further information on the impact of external temperatures on emissions can be found later in this statistical release.

Since emissions from buildings and product uses largely relate to fuel combustion, carbon dioxide is the most prominent gas in the sector, accounting for 93% of emissions in 2024. F-gases made up 5% of buildings and product uses emissions. Emissions from F-gases

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

increased significantly up until their peak in 2012, mainly due to an increase in emissions from refrigeration and air-conditioning as HFCs replaced ozone depleting substances that were previously used as refrigerants. This increasing trend has reversed in recent years following the introduction of the HFC phase down as part of the EU 2014 F-Gas Regulation[26]. Between 2012 and 2024, F-gas emissions in the buildings and product uses sector fell by 53%.

Figure 13: Greenhouse gas emissions from the buildings and product uses sector, UK 1990-2024 (MtCO2e)



Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

In 2024, emissions from residential buildings increased by 4% when compared to 2023. Changes in emissions from residential buildings from year to year are heavily influenced by external temperatures but there has been a reduction over the long term. Between 1990 and 2024, emissions from residential buildings fell by 32%. This is despite a rise in the UK population and household numbers over this period[27,28]. The fall is partly related to a large fall in use of coal and other solid fuels for heating homes, which have a higher carbon content than the other fuels commonly used. Since 1990, there has been a general downward trend in greenhouse gas emissions from public sector buildings such as schools, hospitals and offices, which fell by 44%. Emissions from commercial buildings on the other hand have remained at a similar level and were 7% higher in 2024 when compared to 1990. But in both cases there has been a change in the fuel mix used for heating, with less use of coal and oil, and more use of natural gas. Between 2023 and 2024, public sector buildings emissions increased by 8% and commercial buildings emissions increased by 5%.

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

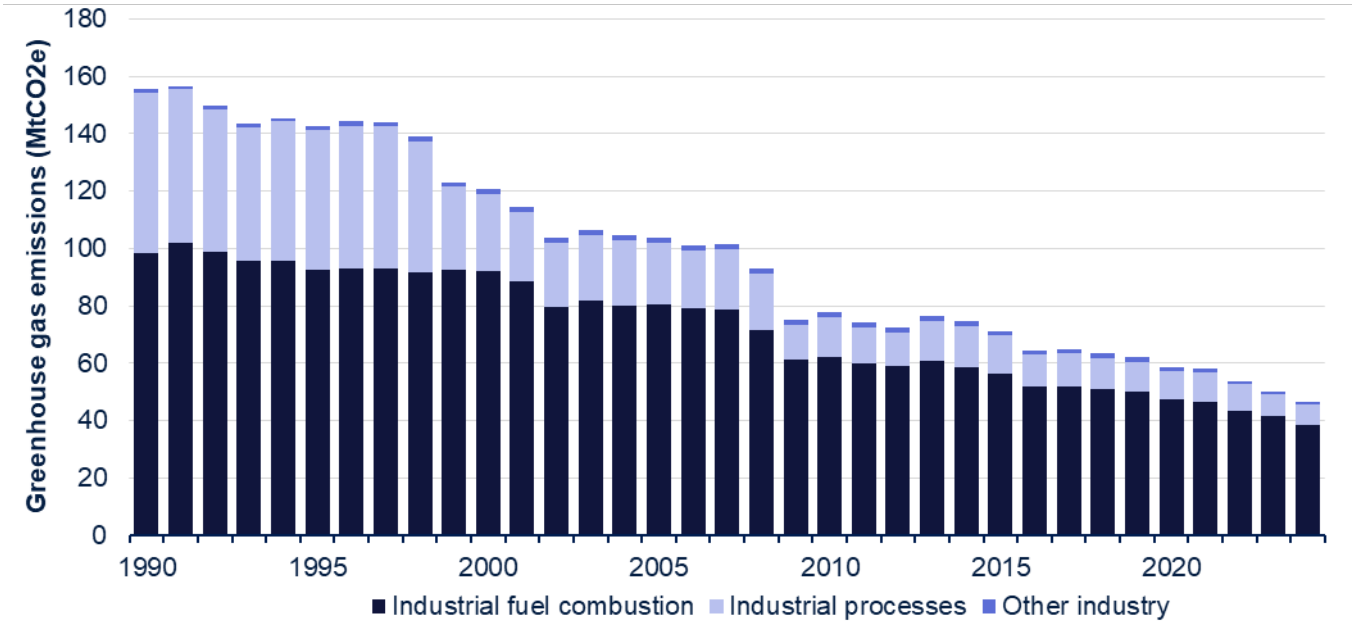
[26] EU 2014 F-Gas Regulation: https://www.eea.europa.eu/ds_resolveuid/b471e1af4e06431c8048970f6c992099
[27] Office for National Statistics, Population estimates time series dataset: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatestimeseriesdataset
[28] Office for National Statistics, Families and households dataset: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/datasets/familiesandhouseholdsfamiliesandhouseholds

have been responsible for 12% of greenhouse gas emissions in the UK in 2024, with carbon dioxide emissions accounting for 97% of these emissions.

Between 2023 and 2024, there was a 7% decrease in greenhouse gas emissions from industry, largely due to blast furnace closures in the iron and steel industry and lower coal use across the sector. In 2024, greenhouse gas emissions from industry were 70% lower than in 1990. Over this period, industrial process emissions fell by 88%, whilst industrial fuel combustion emissions fell by 61%. Emissions reductions were largest between 1999 and 2009, with a significant drop in 2009 likely driven by economic factors. Since then, industry sector emissions have continued to gradually decrease.

The fall in industrial process emissions is largely the result of plant closures and installation of abatement equipment. Most notably, nitrous oxide emissions from adipic acid production fell up until the closure of the only UK production facility in 2009, whilst HFC emissions from halocarbon production have reduced significantly following the introduction of abatement at production facilities in 1999. In 2024, the largest source of industrial process emissions was cement production, with other processes such as lime, sinter, and iron and steel production also significant contributors.

Figure 14: Greenhouse gas emissions from industry by subsector, UK 1990-2024 (MtCO2e)



Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

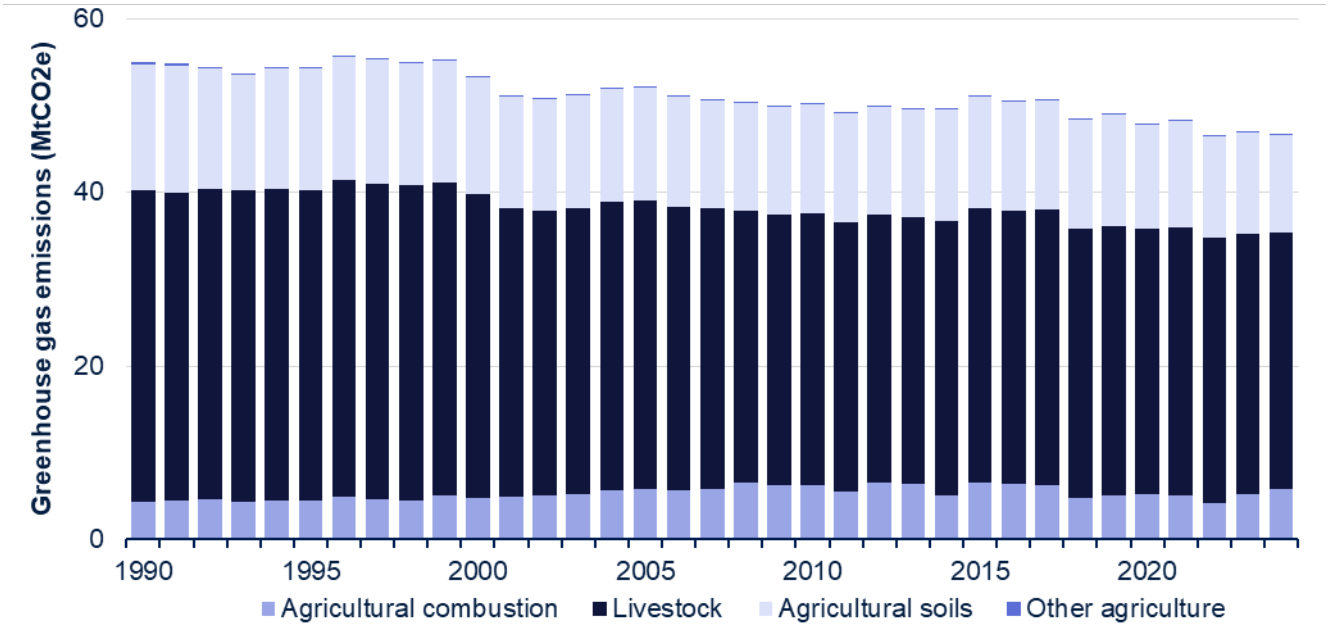
Agriculture

The agriculture sector consists of emissions from livestock, agricultural soils, stationary combustion sources and off-road machinery. It is estimated to have been responsible for 12% of greenhouse gas emissions in the UK in 2024. Emissions of methane (58%) and nitrous oxide (26%) dominate this sector. The most significant sources are emissions of methane due to enteric fermentation (digestion processes) from livestock, particularly cattle, and nitrous oxide emissions related to the use of fertilisers on agricultural soils.

Between 2023 and 2024 there was a 1% decrease in emissions from the agriculture sector, due to a reduction in emissions from livestock and agricultural soils, and despite increased

emissions from agricultural machinery. In 2024, greenhouse gas emissions from the agriculture sector were 15% lower than in 1990, largely driven by a fall in animal numbers and synthetic fertiliser use.

Figure 15: Greenhouse gas emissions from agriculture by subsector, UK 1990-2024 (MtCO2e)



Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

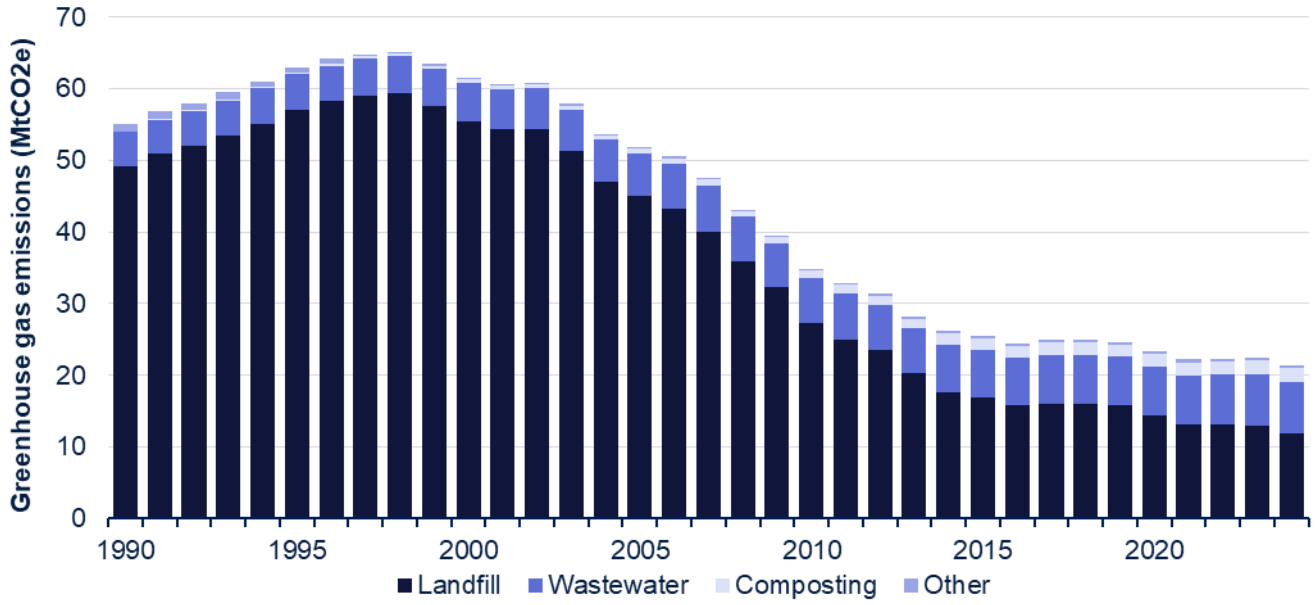
Waste

The waste sector consists of emissions from the treatment and disposal of solid and liquid waste, including from waste disposed at landfill sites, composting, waste incineration (except when energy is recovered), and the treatment of wastewater. It is estimated to have been responsible for around 6% of greenhouse gas emissions in the UK in 2024, with methane emissions accounting for 77% of all waste sector emissions. Landfill accounted for 55% of total waste emissions in 2024 and wastewater 34%.

Between 2023 and 2024 there was a 4% fall in emissions from the waste sector, largely due to an 8% fall in emissions from landfill sites. In 2024, greenhouse gas emissions from the waste sector were 61% lower than in 1990. This decrease is the result of a combination of factors, including improvements in the standards of landfilling, changes to the types of waste going to landfill (such as reducing the amount of biodegradable waste), and an increase in the amount of landfill gas being used for energy.

Note that this year there have been two notable revisions to the waste estimates due to methodology changes compared to the 1990-2023 figures published a year ago. There has been a large increase in the wastewater emission estimates in all years throughout the time series, while landfill emissions have been revised down, with particularly large decreases for the estimates in the 1990s. See the methodology changes section on page 31 for more information about these revisions.

Figure 16: Greenhouse gas emissions from waste, UK 1990-2024 (MtCO2e)



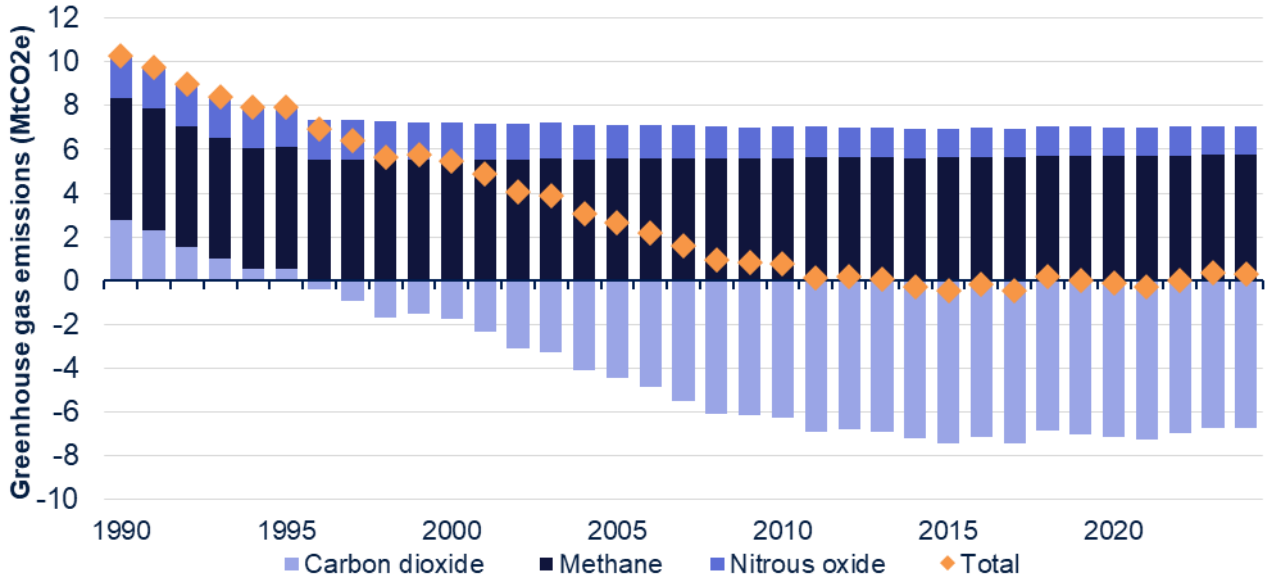
Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

Land use, land use change and forestry (LULUCF)

The LULUCF sector consists of emissions and removals from forests, cropland, grassland, peatland, and settlements. The sector as a whole is estimated to be a net source of greenhouse gas emissions across almost all years since 1990. In general, peatland is the largest source of greenhouse gas emissions, while forestry is the dominant sink. Grassland mineral soils changes are estimated to be an emissions sink throughout the data series, while cropland mineral soils changes and settlements are estimated to have been net sources of emissions.

The LULUCF sector is estimated to have had net emissions of 0.3 MtCO2e in 2024. This was similar to the 2023 total, with a reduction in the emissions sinks from forest land largely offset by reduced emissions from wildfires and peatland. Between 1990 and 2024, LULUCF net emissions fell by 10.0 MtCO2e. The largest factor in this long-term fall has been a reduction in emissions from peatlands associated with management practices such as re-wetting. There has also been a reduction in net emissions from settlements and cropland mineral soils changes, and an increase in the net sink from grassland mineral soils changes and forestry.

Figure 17: Greenhouse gas emissions from the LULUCF sector, UK 1990-2024 (MtCO2e)



Sources: Tables 1.2 to 1.6, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

International comparison

UK territorial greenhouse gas emissions account for less than 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. Under the UNFCCC, the UK and several other countries (known as the Annex I Parties to the Convention[29]) report their territorial emissions each year, while other countries report theirs every few years. Estimates are made using consistent approaches in line with the guidance from the IPCC, allowing for comparisons to be made between different countries' emissions estimates[30].

Figure 18 shows the most recent territorial greenhouse gas emissions estimates for the UK and other members of the G20. Emissions estimates are derived from individual countries' reports submitted to the UNFCCC, apart from for the African Union for which there is limited data coverage within the UNFCCC reports for several of its members. Instead, an aggregate total for the African Union has been compiled using World Resources Institute emissions estimates[31]. To be consistent with other countries, the UK emissions shown are the 2023 estimates submitted to the UNFCCC last year, so do not include the revisions to the estimates shown elsewhere in this publication.

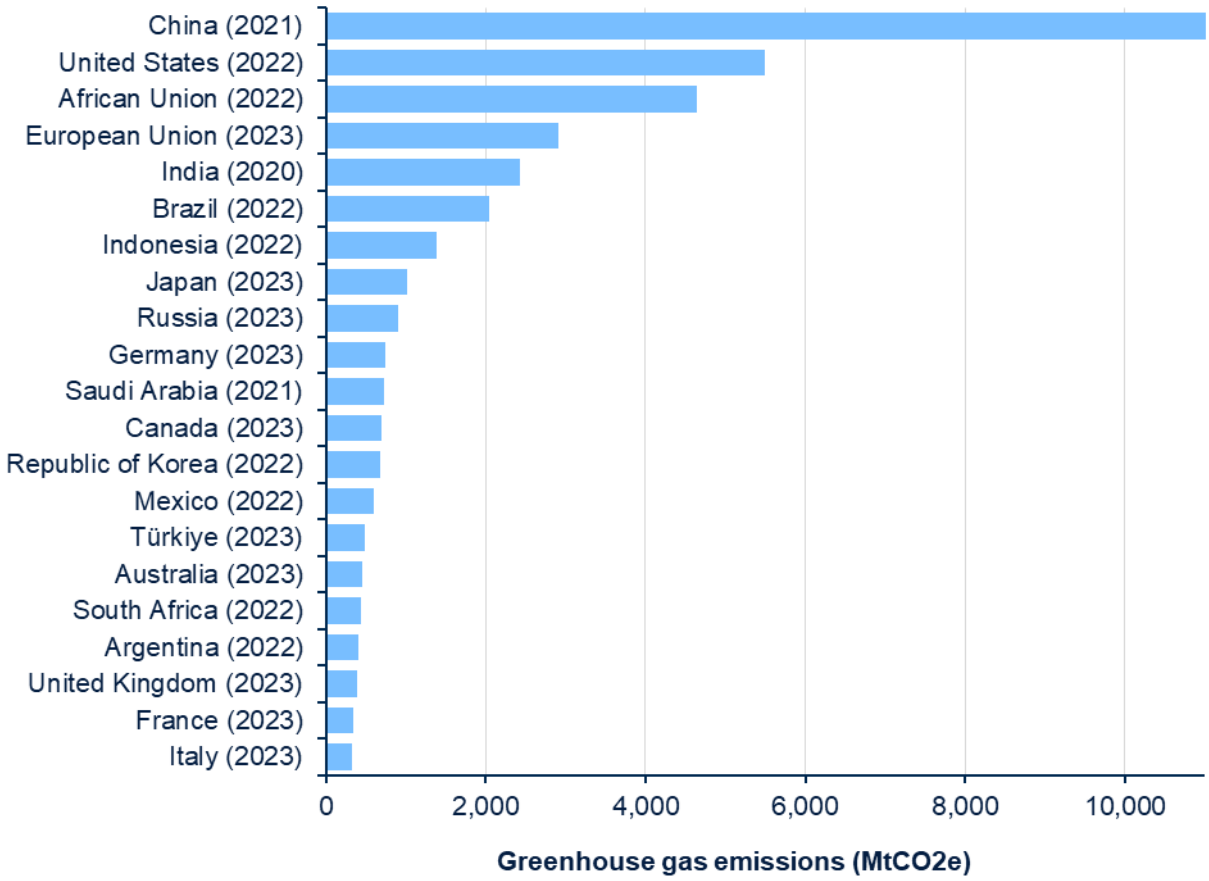
The year the data relates to for each country is shown in the chart, for most Annex I countries this is 2023. As these are territorial emissions, they only include emissions within a country's borders, so do not reflect any emissions resulting from the production of goods imported into a country or any international travel by its residents. The estimates shown include the LULUCF sector.

[29] Annex I Parties' submissions in 2025 showing greenhouse gas emissions in 2023 are available here: https://unfccc.int/ghg-inventories-annex-i-parties/2025
[30] 2006 IPCC Guidelines for National Greenhouse Gas Inventories: https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html
[31] A description of the method used by Climate Watch and a comparison with the UNFCCC data are available here: https://www.climatewatchdata.org/about/faq/ghg

Countries' emissions are affected by many things. Higher emission rates can be associated with several factors such as higher populations, significant heavy industry, a large manufacturing sector, or the use of more carbon intensive fuels such as coal for electricity generation. China is the country with the highest greenhouse gas emissions, of around 13,000 MtCO2e in 2021 (the latest year of data available), followed by the United States, which had emissions of around 5,500 MtCO2e in 2022. The African Union had emissions of around 4,600 MtCO2e in 2022, whilst the European Union had emissions of around 2,900 MtCO2e in 2023.

Emissions per person for each G20 member are not shown in this publication as population data with a consistent geographical scope to the emissions estimates is not readily available for all G20 members.

Figure 18: Most recently reported annual territorial greenhouse gas emissions, G20 members (MtCO2e)



Sources: Countries' submissions to the UNFCCC
Climate Watch Global Historical Emissions for the African Union

Notes:

1. The year the data relates to for each country is shown next to their name in the chart.
2. All emissions totals include emissions and removals from the LULUCF sector.
3. The UK figures include Crown Dependencies and certain Overseas Territories in line with its international reporting requirements, although they only make up around 1% of the UK emissions total.
4. The UK figures are from the 2023 emissions estimates submitted to the UNFCCC in 2025 so do not incorporate the data updates and methodology changes made to the 2023 estimates in this publication.
5. The EU total includes France, Germany, and Italy despite them also being shown separately.

Emissions outside the scope of the UK total

There are several sources of emissions relating to UK activities relevant to climate change which are excluded from the national total, consistent with international greenhouse gas inventory reporting requirements. We produce estimates for some of these emissions and this publication includes estimates of emissions arising from the use of fuels from UK international aviation and shipping bunkers. Further details about these and other emissions outside the scope of the UK total are included in section 1.7.4 of the UK National Inventory Document (NID) covering 1990-2023 emissions[32].

International aviation and shipping

In the data tables accompanying this publication, Table 5.1 shows greenhouse gas emissions arising from fuel use from UK international aviation and shipping bunkers since 1990.

Emissions from international aviation and shipping can be estimated from refuelling from bunkers[33] 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[34,35].

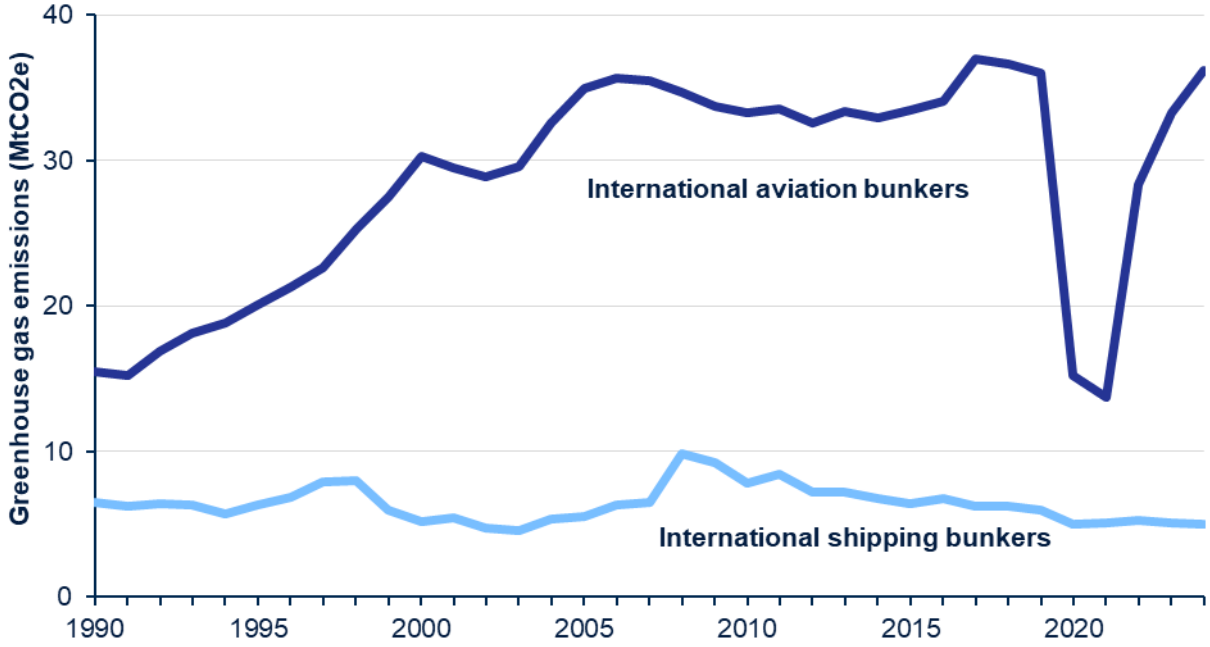
However, in 2021 the UK government set the Sixth Carbon Budget (covering 2033-37) to include the UK share of international aviation and shipping emissions, as recommended by the Climate Change Committee. This is the first time emissions from international aviation and shipping will be included in UK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

In 2024, emissions from international aviation fuel use from UK bunkers were 36 MtCO2e, an increase of 9% from 2023. This increase brings emissions from UK international aviation fuel to about the same level they were in 2019, the last year before the COVID-19 pandemic restrictions. Between 1990 and 2006, emissions from UK international aviation fuel use more than doubled from 16 MtCO2e to 36 MtCO2e. After 2006, emissions fell slightly and then increased again, reaching a peak of 37 MtCO2e in 2017.

[32] UK 2025 National Inventory Document (1990-2023): https://unfccc.int/documents/646505
[33] A large container or compartment that stores fuel for ships or aircraft
[34] ICAO strategies for reducing international aviation emissions: https://www.icao.int/environmental-protection/Pages/default.aspx
[35] 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

Emissions from UK international shipping bunkers were 5 MtCO2e in 2024, a decrease of 2% from 2023, and 16% lower than in 2019. UK international shipping emissions did not see as pronounced a fall in 2020 when compared to aviation but remain at a lower level than before the COVID-19 pandemic. Between 1990 and 2024 emissions from UK shipping bunkers have fluctuated, peaking in 2008 since when they have fallen by 49%.

Figure 19: Greenhouse gas emissions from UK-based international aviation and shipping bunkers, 1990-2024 (MtCO2e)



Source: Table 5.1, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

Uncertainties around the 2024 estimates

In the data tables accompanying this publication, Table 4.1 shows the uncertainty in the 2024 UK greenhouse gas emissions estimates by gas and Table 4.2 shows it by TES sector. Table 4.3 shows revisions to the time series of estimates over time.

This section sets out the uncertainty ranges associated with the final 2024 emissions estimates. Estimates of uncertainty are broken down by sector and gas. Estimates of uncertainty give users an idea of how reliable emissions estimates are and which estimates have greater relative uncertainty. They also inform annual improvements to the emissions estimates, which aim to reduce uncertainty, particularly for key categories.

The geographic coverage of the uncertainty estimates includes the UK, its Crown Dependencies and those Overseas Territories that are included in the UK's reporting to the United Nations Framework Convention on Climate Change (i.e. the Cayman Islands, Bermuda, the Falkland Islands and Gibraltar). Uncertainties are not calculated for different geographical coverages, but uncertainty estimates for the UK only would be expected to be very similar.

The uncertainty analysis accounts for known sources of uncertainty associated with the underlying emission factors, activity data and other model variables and assumptions used to estimate each source of emissions. For example, the statistical difference[36] between energy supply and demand reported in the Digest of UK Energy Statistics. The uncertainty estimates are produced using a Monte Carlo simulation. The uncertainty is estimated for each data source in the emissions estimates and entered into a model which uses these ranges of possible values to produce a large number of emissions estimates. The range of the resulting emissions estimates is then used to derive the overall uncertainty.

The uncertainties presented describe a 95% confidence interval. This means that in the uncertainty model 95% of the simulated values fell between the intervals shown. They are summarised by a single percentage value, which is calculated as 0.5*R/E where R is the difference between the 2.5 and 97.5 percentiles of simulated estimates and E is the mean. Further details of the uncertainty estimates and the statistical approaches used to produce them are presented in the UK's National Inventory Document (NID) which is due to be published by 15 April 2026[37].

The overall uncertainty around the greenhouse gas emissions total for 2024 is estimated to be 2.6%. This is based on the 95% confidence interval, which ranges from 2.5% below to 2.8% above the total. The uncertainty in the trend in total emissions reductions between 1990 and 2024 is estimated to be a percentage reduction of between 50% and 55%.

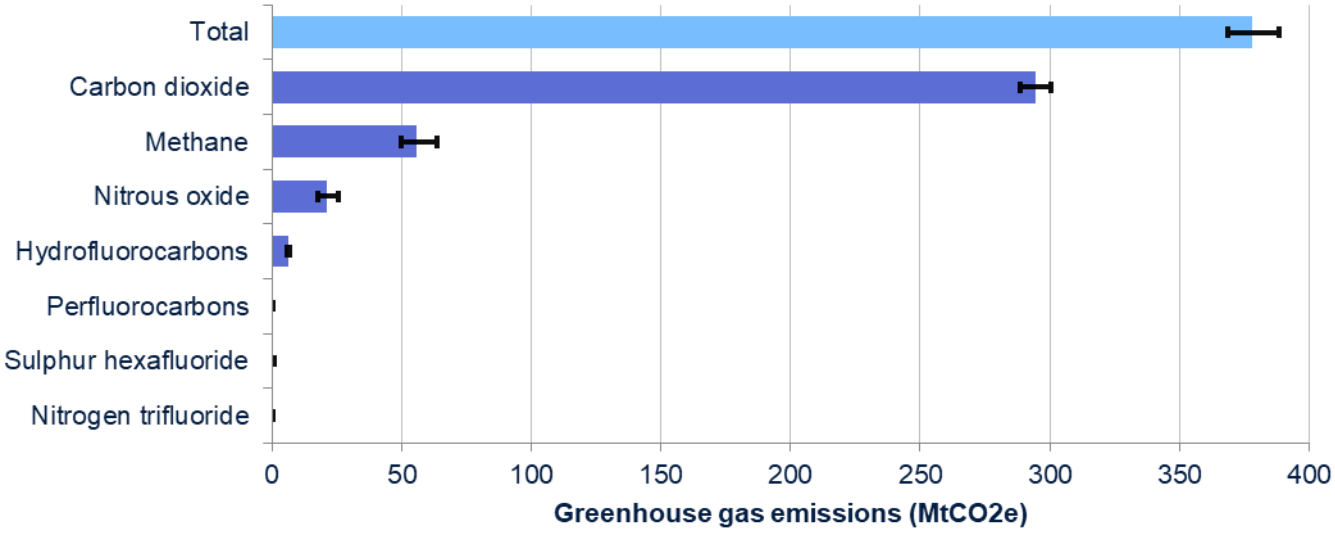
Estimated uncertainty varies between different sectors and gases. Among the different greenhouse gases, carbon dioxide estimates have the lowest uncertainty associated with them while nitrogen trifluoride, perfluorocarbons and nitrous oxide estimates are the most uncertain (Figure 20). At sector level, the LULUCF and waste sectors are the most uncertain, as shown in Figure 21. However, these gases and sectors make up small proportions of total emissions so overall uncertainty in total emissions remains low.

[36] Statistical difference is explained on page 5 of the Energy Balance: Methodology note: https://www.gov.uk/government/publications/energy-balance-methodology-note

[37] Found in Annex 2 of the previous UK National Inventory Report: https://naei.energysecurity.gov.uk/reports/uk-greenhouse-gas-inventory-1990-2023-annual-report-submission-under-framework-convention

Figure 20: Illustration of uncertainty in estimates of UK greenhouse gas emissions by gas

UK, Crown Dependencies and Overseas Territories, 2024 (MtCO2e)

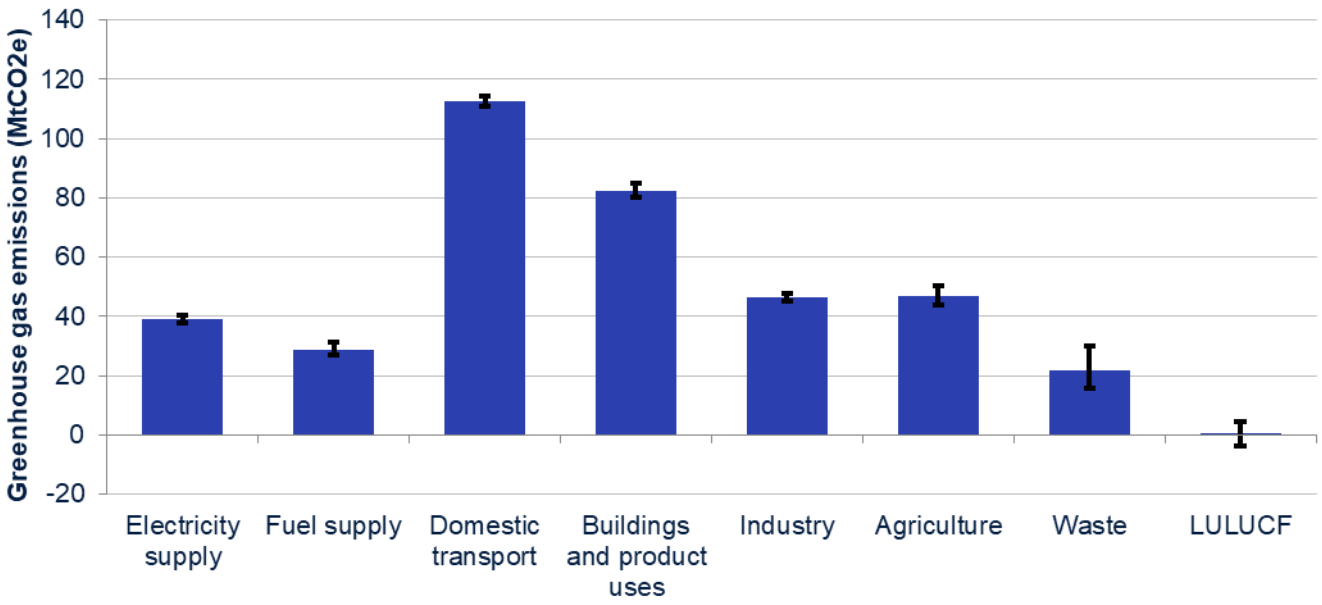


Source: Table 4.1, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

Note: The error bars on the chart represent the uncertainty ranges (the 95% confidence interval) around the 2024 total greenhouse gas emissions central estimates for total emissions and for each gas.

Figure 21: Illustration of uncertainty in estimates of UK greenhouse gas emissions by TES sector

UK, Crown Dependencies and Overseas Territories, 2024 (MtCO2e)



Source: Table 4.2, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

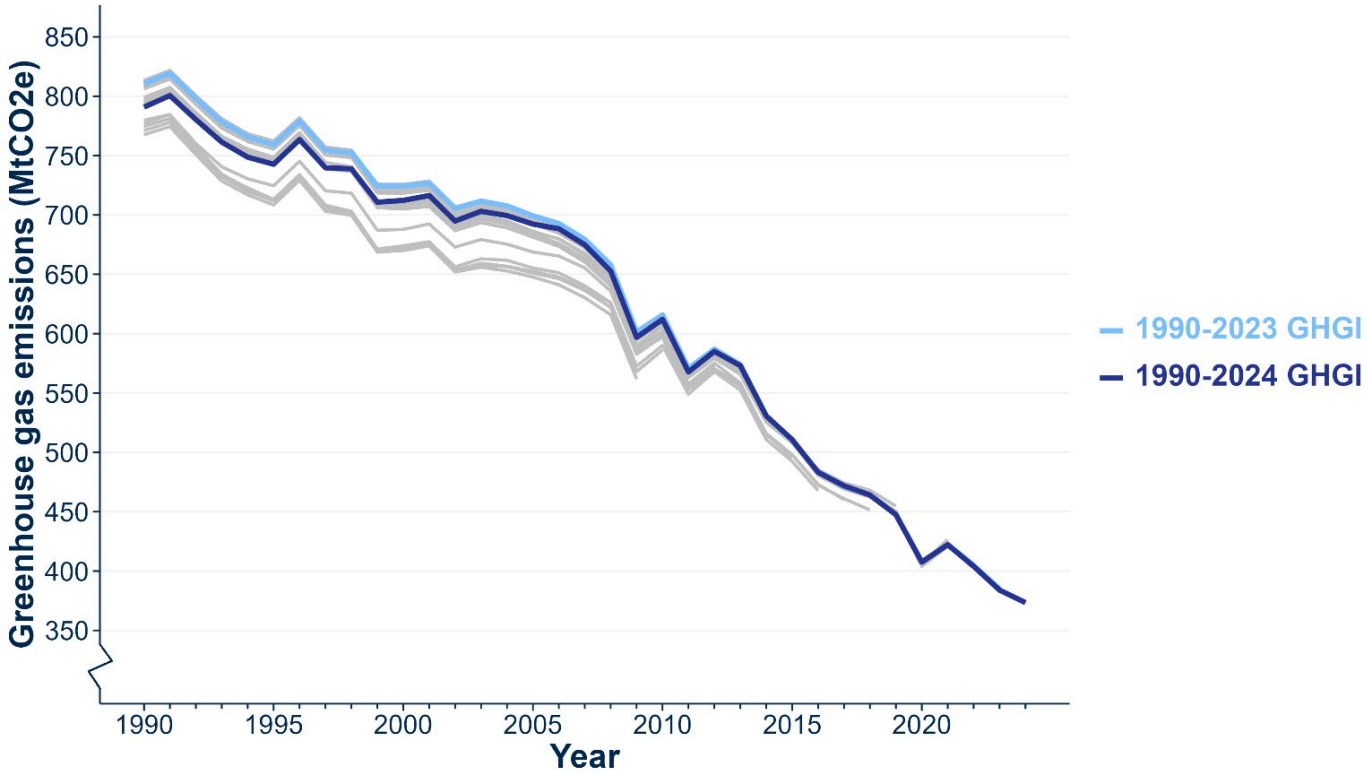
Note: The error bars on the chart represent the uncertainty ranges (the 95% confidence interval) around the 2024 total greenhouse gas emissions central estimates for each sector.

As well as the known sources of statistical uncertainty captured by this analysis, there are other sources of uncertainty which are harder to quantify. For example, methodological improvements, updated reporting guidelines and short-term shocks can cause estimates to change in ways that are difficult to predict. Each year, the whole historical time series of emissions estimates is revised where necessary to incorporate methodological improvements,

changes to international reporting guidelines as well as data revisions. The extent to which estimates have been revised over time gives a broader indication of potential uncertainty in the inventory, as shown in Figure 22.

There is an ongoing programme to reduce uncertainties in the inventory; the uncertainty estimates help guide decisions on improvements that are carried out for the inventory. Further details can be found in the UK NID.

Figure 22: Revisions to estimates of UK greenhouse gas emissions by inventory submission



Source: Table 4.3, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables

Note: The grey lines in the chart represent previous estimates of the total UK greenhouse gas emissions time series from each greenhouse gas inventory (GHGI) since 1990-2008. The 1990-2023 estimates are shown in light blue, and the 1990-2024 estimates in dark blue. The vertical axis begins at 350MtCO2e.

Independent monitoring programme

Reliability of these estimates is also further informed by DESNZ's programme to infer emission estimated from monitored atmospheric concentrations of non-CO2 greenhouse gases[38]. Independent emissions estimates modelled from atmospheric observations are consistent with the uncertainty ranges for 2012 onwards, providing further confidence in emissions estimates. Further details on this can be found in Annex 6 of the UK NID.

[38] United Kingdom's 2025 National Inventory Document Annex: https://unfccc.int/documents/646507

Revisions from provisional estimates of greenhouse gas emissions

Provisional estimates of 2024 UK greenhouse gas emissions were published in March 2025, largely based on early estimates of energy use for the year. Differences between the provisional and final estimates arise primarily due to revisions to other statistics on which these estimates were based, use of actual data to estimate emissions not related to energy use (which are only estimated in a simplistic way in the provisional estimates), and methodological changes to the way emissions are calculated.

Typically, the provisional estimates provide a better indication of emissions trends than of absolute emissions, as they do not include any methodological improvements that may be made to the way emissions are calculated, and which can lead to revisions to the whole emissions time series from 1990 onwards. More information on revisions to the time series can be found in the next section.

It was provisionally estimated that total greenhouse gas emissions in 2024 for the UK would be 371 MtCO2e, representing a 3.5% decrease on 2023 emissions. The final estimates show that 2024 emissions were 373 MtCO2e, a 2.7% decrease on 2023 emissions. Therefore, the provisional greenhouse gas emissions estimates underestimated total greenhouse gas emissions in 2024 (by 0.5%) and overestimated the percentage decrease in emissions from 2023 to 2024 (by 0.8 percentage points). The difference in the total is largely explained by methodology changes made this year and revisions to the energy data used in producing the estimates.

Table 1: Comparison of 2024 provisional and final greenhouse gas emissions estimates, by sector

UK, 2023-2024 MtCO2e

	2024 Provisional emissions	2024 Final emissions	Difference between final and provisional	Provisional 2023 to 2024 % change	Final 2023 to 2024 % change
Electricity supply	37.5	37.7	0.2	-14.6%	-16.1%
Fuel supply	28.4	28.8	0.4	-5.6%	-4.9%
Domestic transport	110.1	110.4	0.3	-1.5%	0.2%
Buildings and product uses	79.8	81.8	1.9	1.7%	4.0%
Industry	48.3	46.5	-1.8	-8.9%	-7.4%
Agriculture	46.4	46.5	0.1	-0.5%	-0.8%
Waste	19.5	21.4	2.0	-2.0%	-4.4%
LULUCF	1.4	0.3	-1.1	21.1%	-15.9%
Total	**371.4**	**373.4**	**2.0**	**-3.5%**	**-2.7%**

Sources: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables
Table 1a, Provisional UK greenhouse gas emissions statistics 2024 Excel data tables

Note: LULUCF is land use, land use change and forestry.

The provisional estimates are focused on emissions from energy use, and only provide a simplistic estimate of non-energy use emissions which assumed that 2024 emissions changed from 2023 levels in line with the percentage difference between the estimates for 2023 and 2024 in the 2023-2050 Energy and Emissions Projections[39] published by DESNZ. Focusing on carbon dioxide emissions, it was provisionally estimated that net UK carbon dioxide emissions in 2024 were 290 million tonnes, the same as in the final figures. The 2024 provisional estimate for emissions of non-CO2 gases was 81 MtCO2e and the final estimate is 83 MtCO2e, meaning these emissions were underestimated by 2.2% in the provisional estimates. The difference in the non-CO2 total is largely explained by methodology changes made this year.

Revisions to the UK Greenhouse Gas Inventory

In the data tables accompanying this publication, Table 4.3 shows how our estimates of greenhouse gas emissions in the UK since 1990 have been revised from year to year.

The UK Greenhouse Gas Inventory (the time series of emissions from 1990 onwards which is the basis for these statistics), is reviewed every year internally and externally (including a review by the UNFCCC), and the whole historical data series is revised where necessary to incorporate method improvements, changes to international reporting guidelines or new data. This includes revisions to the datasets which have been used in its compilation, most notably the UK energy statistics published in the Digest of UK Energy Statistics (DUKES). The methodological changes to the UK Greenhouse Gas Inventory can also impact future emissions projections. Full details of the methods used to produce the latest greenhouse gas emissions estimates will be available in the UK NID when it is submitted to the UNFCCC in April 2026[40].

These changes are applied back through the time series to 1990 to ensure that the trend in emissions from 1990 to the latest year is based on a consistent method. Therefore, it is not appropriate to compare the emissions time series from one year with that from another. However, the latest inventory represents a single consistent data series going back to 1990, and this therefore allows year-on-year comparisons to be made.

The most notable method change to the historic time series since the 1990-2023 Greenhouse Gas Inventory was published is the use of GDP data to estimate landfill emissions estimate where actual activity data is unavailable. In addition, wastewater emissions estimates have been updated to improve consistency with IPCC guidelines and capture UK-specific wastewater treatment practices. These changes are exclusive to the waste sector and lead to a large decrease in landfill emissions estimates over the early portion of the historic time series and an increase in wastewater emissions estimates across the historic time series. Overall, the 1990 estimate of landfill emissions has decreased by 17 MtCO2e while the 1990 and 2023 estimates of wastewater emissions have increased by 2 MtCO2e and 4 MtCO2e respectively.

Shipping emissions estimates have been updated to use global Automatic Identification System (AIS) data from 2019 and be normalised against DUKES data on fuel sales. These

[39] Energy and emissions projections: https://www.gov.uk/government/collections/energy-and-emissions-projections
[40] The NID covering 1990-2024 emissions will be submitted to the UNFCCC by 15 April 2025. The previous 2024 NID covering 1990-2023 emissions can be found here: https://unfccc.int/documents/646505

changes impact UK shipping, fishing, and seaport machinery emissions estimates and lead to an overall decrease of 5 MtCO2e in 1990 and 2 MtCO2e in 2023. Impacts to emissions estimates for Crown Dependencies and Overseas Territories as well as international aviation and shipping are shown in the Methodology changes section on pages 32-33.

Iron and steel emissions estimates for 2022 and 2023 have been updated to improve alignment to operator ETS data. This change is exclusive to the industry sector and leads to a decrease of 2 MtCO2e in 2023.

Impacts of the changes made to estimates of 1990 and 2023 emissions are given in Table 2. Revisions to other years of the time series are generally of a similar scale.

Table 2: Revisions in the 1990-2024 Greenhouse Gas Inventory, by sector

UK, 1990 and 2023 MtCO2e

	1990 emissions			2023 emissions		
	1990-2023 inventory	1990-2024 inventory	Change	1990-2023 inventory	1990-2024 inventory	Change
Electricity supply	204.0	204.0	~0.0	43.9	44.9	1.0
Fuel supply	77.2	77.2	~0.0	30.1	30.3	0.2
Domestic transport	129.3	124.2	-5.1	111.8	110.2	-1.7
Buildings and product uses	109.8	109.5	-0.3	78.5	78.6	0.2
Industry	155.2	155.7	0.5	53.1	50.2	-2.8
Agriculture	54.4	55.0	0.6	46.6	46.9	0.3
Waste	70.3	55.0	-15.2	19.9	22.4	2.6
LULUCF	10.6	10.3	-0.4	1.1	0.3	-0.8
Total	**810.7**	**790.8**	**-19.9**	**385.0**	**383.9**	**-1.0**

Sources: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables
Table 1.2, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables

Notes: ~0.0 indicates where a value is non-zero but is less than 0.05 MtCO2e in magnitude.
LULUCF is land use, land use change and forestry.

Methodology changes

Details of the methodological changes made to the emissions estimates this year are given below.

Solid waste

There has been an update to the landfill model to use gross GDP data to approximate solid waste disposal volumes where actual activity data is unavailable. Importantly, historic data on solid waste disposal at landfill sites is uncertain and unavailable before 1997. Previously, solid waste disposal volumes from 1990 to 1996 were extrapolated from 1997 data using household and employment statistics. However, an external review of this method highlighted that it is inconsistent with the Intergovernmental Panel on Climate Change (IPCC) Guidelines for

National Greenhouse Gas Inventories[41]. To improve consistency with IPCC guidelines, the landfill model has been updated to use GDP data as a proxy for solid waste disposal volumes.

This change is exclusive to the waste sector and leads to a large decrease in landfill emissions estimates over the early portion of the historic time series.

Domestic wastewater

There have been several changes to the domestic wastewater model to improve consistency with IPCC guidelines and capture UK-specific wastewater treatment practices. An external review of the model highlighted several inconsistencies with IPCC guidelines and recent improvements in the scientific understanding of wastewater treatment emissions. Therefore, the model has been updated to use the parameters and emissions factors from the 2019 Refinement to the 2006 IPCC Guidelines[42]. In addition, new UK-specific assumptions and academic literature are used to estimate processes that are not covered by IPCC guidelines.

This change is exclusive to the waste sector and increases emissions estimates across the historic time series, mainly from higher nitrous oxide (N2O) emissions.

Shipping

There has been an update to the model for estimating domestic shipping emissions. Ship movement estimates are now normalised against DUKES data on fuel sales. Previously, domestic shipping emissions were based on ship movements only. This meant that the emissions estimates were inconsistent with DUKES. Now, estimates derived from ship movements are adjusted so that they match the total amount of fuel use implied by sales data in DUKES. The normalisation process is also applied to modelled emissions estimates for inland waterways and port machinery, but not naval shipping that are based on fuel purchases by the Ministry of Defence (MoD).

In addition, the modelling and coverage of activities has been enhanced through incorporation of global Automatic Identification System (AIS) data from 2019. Previously, the model used UK AIS data from 2014. Overall, these changes decrease UK domestic shipping emissions estimates across the historic time series.

The model improvements also impact emissions estimates for Crown Dependencies and Overseas Territories. In particular, the incorporation of global AIS data allows for improved coverage of activities in Overseas Territories. Overall, the changes increase emissions estimates for domestic shipping in Crown Dependencies and Overseas Territories across the historic time series (an increase of around 1 MtCO2e in 1990 and 0.5 MtCO2e in 2023)[43].

The model has also been updated to remove double counting of at berth emissions. Previously, at berth emissions were reported against totals for both domestic and international shipping. However, IPCC guidelines require at berth emissions to be reported against domestic shipping. Now, all at berth emissions are included within the domestic shipping emissions

[41] Guidance from the IPCC Task Force on National Greenhouse Gas Inventories can be found here: https://www.ipcc-nggip.iges.or.jp/.

[42] The 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories can be found here: https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/.

[43] Revisions to emissions estimates for Crown Dependencies and Overseas Territories are excluded from the estimated impacts on UK totals shown in Table 2.

estimates only. This reduces UK-based international shipping emissions estimates across the time series (a decrease of around 2 MtCO2e in 1990 and 1 MtCO2e in 2023)[44].

Industrial wastewater

Estimates of emissions from the discharge of industrial wastewater have been added to the totals for the first time. Previously, they were excluded from totals due to a lack of guidance in the 2006 IPCC Guidelines. However, guidance was introduced in the 2019 Refinement to the IPCC 2006 Guidelines. Inclusion of this emissions source is now justified through its addition to the common reporting table (CRT) format used to comply with Paris Agreement reporting commitments.

This change is exclusive to the waste sector and results in a small increase in N2O and methane (CH4) emissions across the historic time series.

Biogas

Emissions from biogas and natural gas use from the gas distribution network have been separated for the first time. Previously, biogas in the distribution network was treated as a component of natural gas and wasn't distinguishable. However, an external review of the method highlighted the previous approach was not transparent to users. Therefore, DUKES data on biogas injection into the gas distribution network is used to produce separate estimates of fossil fuel and biofuel use emissions.

The impact of this change on UK emissions totals is minimal. Importantly however, almost all biogas and natural gas blending occurs in the gas distribution network. This means that consumers with a more direct supply of gas, such as large-scale consumers or upstream oil and gas sites, will use natural gas only. To account for these differences, the apportionment of gas use across the industry, fuel supply, electricity supply, domestic transport, buildings and product uses, and agriculture sectors has been revised.

Iron and steel

There has been an update to the method for estimating emissions from the iron and steel industry to apply a 5-year average to fuel data for 2022, 2023, and 2024. Previously, annual fuel data was used to estimate emissions from iron and steel production. However, coke oven closures in recent years mean that the existing method produces emissions estimates that are challenging to justify. Since the closures, the UK iron and steel industry has relied on imported coke. This means that use of UK coke oven coke data to track emissions from iron and steel production is no longer valid. Similarly, alignment to operator ETS data has deteriorated. To account for these discrepancies, a 5-year average is applied to the fuel data for 2022, 2023, and 2024.

This change improves the alignment to ETS data and is exclusive to the industry sector. It decreases emissions estimates for 2022 and 2023.

[44] International shipping emissions are excluded from the UK total in line with IPCC guidelines. Therefore, revisions to international shipping emissions estimates are excluded from the estimated impacts on UK totals shown in Table 2. However, they are included in the Carbon Budget 6 and reported in Table 5.1 of the data tables accompanying this publication as well as to the UNFCCC as a memorandum item each year.

Gas oil

Gas oil use emissions estimates have been revised to improve their time series consistency. DUKES is regularly updated with revisions back to 2009. Emissions estimates incorporate these revisions to maintain consistency with DUKES. However, these revisions also introduce time series inconsistencies between 2008 and 2009. In addition, there are further time series inconsistencies in the DUKES data from before 1997 that is not available electronically. To address these inconsistencies, several adjustments to the sector breakdown of gas oil use emissions have been made:

- For domestic, commercial, and agricultural use – 1998 to 2008 activity data is interpolated from the 1997 and 2009 DUKES data
- For the non-ferrous metal, chemical, paper and pulp, and minerals industries use – 1990 to 1997 activity data is extrapolated from the DUKES data from 1998 onwards
- For the food and drink, construction, and iron and steel industries well as unclassified use – 1990 to 2008 activity data is extrapolated from the DUKES data from 2009 onwards
- For forest machinery use, activity data is taken from forestry statistics in place of DUKES data.

Importantly, overall gas oil use emissions estimates remain consistent with the gas oil use totals reported in DUKES. Therefore, time series consistency improvements impact the apportionment of emissions estimates between the industry, agriculture, and buildings and product uses sectors only.

Peat

Peat fuel use emissions estimates have been updated to be more reflective of UK use cases. In response to recommendations from a review of the model for peat emissions, a higher calorific value for peat has been adopted in place of the default value in IPCC guidelines. At the same time, the carbon content in fuel peat extracted from Northern Ireland has been increased to align with UK Centre for Ecology & Hydrology (UKCEH) estimates.

This change is exclusive to the buildings and product uses sector and results in a small increase in emissions across the historic time series.

Fluoropolymer production

Hydrofluorocarbon (HFC) emissions from fluoropolymer production have been estimated and included in the totals for the first time. These estimates are derived from Pollution Inventory[45] and additional site-level data from the Environment Agency.

This change is exclusive to the industry sector and leads to a small increase in HFC emissions estimates, namely HFC-23, HFC-32, and HFC-125.

Domestic combustion

Domestic wood combustion emissions estimates have been updated to use new DUKES data on changes in domestic wood use attributable to heating degree days (HDD) and stock impacts. Previously, changes in wood use attributable to HDD were estimated using adjusted

[45] Data from the Pollution Inventory can be found here: https://www.gov.uk/government/collections/pollution-inventory-reporting.

and unadjusted domestic gas use data from DUKES. This has been replaced with a direct breakdown of impacts on domestic wood use.

This change is exclusive to the buildings and product uses sector and results in a small decrease in emissions in 2023.

Agriculture changes

There have been several method changes to emissions estimates for the agriculture sector. These include:

- An update to the model for estimating emissions from dairy cattle livestock to use the latest slaughter-weight data to derive cattle weight. This change increases enteric CH4 emissions and causes a small increase in N2O emissions from dairy cattle.
- An update to the model for estimating emissions from slurry management to use country-specific data for low emissions slurry spreading equipment (LESSE) uptake for cattle and pig slurry in England. Meanwhile, data for Great Britain is used to estimate LESSE uptake in Wales, Scotland, and Northern Ireland. This change has a negligible impact on emissions estimates.
- An update to the model for estimating emissions from grassland to include new assumptions to reflect improvements to grass yield and nitrogen uptake from plant breeding. This change results in a negligible increase in N2O emissions from grass residue decomposition and a decrease in N2O emissions from the leaching of applied fertiliser, manures, and excreta.
- The introduction of a method to estimate ammonia emissions from the decomposition of plant residues on the soil surface. Importantly, ammonia is an air pollutant rather than a greenhouse gas. However, it is an indirect source of N2O emissions. This change results in a small increase in N2O emissions from deposition of ammonia from grassland.
- An update to the model for estimating emissions from sheep to use assumptions on the grass energy content that are more reflective of survey evidence. This results in an increase in grass intake to meet energy requirements that increases enteric CH4 emissions. The crude protein content of the grass was also adjusted in line with changed grassland assumptions, resulting in a steady reduction in the nitrogen content of grass over the time series. This change leads to a small increase in N2O emissions from sheep early in the time series, but a decrease in recent years.

LULUCF changes

There have been several method changes to UK emissions estimates for the LULUCF sector. These include:

- Updates to the forest carbon accounting model to better reflect the tree species and growth rates for afforestation from 2011, include deadwood from natural competition among young trees, improve the estimation of carbon transfer from branches on dead trees into the soil, and improve consistency with wood production estimates. In addition, new activity data for forest planting and wood production have been incorporated into the model. These changes lead to a reduction in net forestry and harvested wood products emissions across the time series.
- An update to the modelling of net emissions from peatland to incorporate evidence from Department for Environment, Food & Rural Affairs (Defra) funded field studies on the conditions of historic domestic peat extraction areas, Defra rewetting data for 2021 to

2024, and the Peatland ACTION programme for Scotland. These changes lead to a small reduction in net emissions across the time series.
- A small update to the modelling of net emissions from cropland and biomass carbon stock change to incorporate data from the 2024 Agricultural Census for England. This change leads to a small increase in net emissions across the time series

There have also been several method changes to LULUCF emissions estimates for the Crown Dependencies and Overseas Territories. These include:

- An update to the forest carbon accounting model to incorporate newly available forest planting for the Isle of Man. Data from the Isle of Man Government is used in place of modelled data from historic areas. This changes lead to a decrease in net removals from forest land in the Isle of Man.

- Incorporation of a new upland peatland map for the Isle of Man to estimate emissions from upland organic soils for the first time. This change leads to an increase in net emissions from grassland in the Isle of Man.

- An update to modelling across the LULUCF sector to replace emissions factors from the 2006 IPCC Guidelines with ones from the 2019 Refinement where appropriate. The new factors impact net emissions and removals estimates for all Crown Dependencies and Overseas Territories except the Falkland Islands. Most of the change occurs in forest carbon stock changes, with some minor changes to soil carbon stock change across other LULUCF subsectors.

Accompanying tables

The following tables are available in Excel format on the department's statistics website, alongside a dataset of UK territorial greenhouse gas emissions.

UK territorial emissions

Table 1.1	Territorial greenhouse gas emissions by gas, UK 1990-2024
Table 1.2	Territorial greenhouse gas emissions by source category, UK 1990-2024
Table 1.3	Territorial emissions of carbon dioxide (CO2) by source category, UK 1990-2024
Table 1.4	Territorial emissions of methane (CH4) by source category, UK 1990-2024
Table 1.5	Territorial emissions of nitrous oxide (N2O) by source category, UK 1990-2024
Table 1.6	Territorial emissions of fluorinated gases (F-gases) by source category, UK 1990-2024
Table 1.7	Territorial greenhouse gas emissions by type of fuel, UK 1990-2024

UK territorial emissions targets

Table 2.1	Progress against UK Carbon Budget targets
Table 2.2	Progress towards UK international greenhouse gas emissions reduction targets under the Paris Agreement

UK territorial emissions for international reporting, including Crown Dependencies and Overseas Territories

Table 3.1	Territorial greenhouse gas emissions by geographical coverage and gas, UK, Crown Dependencies and Overseas Territories, 1990-2024
Table 3.2	Territorial greenhouse gas emissions for the UK, Crown Dependencies and Overseas Territories by source category, 1990-2024
Table 3.3	Territorial greenhouse gas emissions in the UK, Crown Dependencies and Overseas Territories, and totals reported to the UNFCCC and under the Paris Agreement, 1990-2024
Table 3.4	Territorial greenhouse gas emissions for the UK, Crown Dependencies and Overseas Territories by type of fuel, 1990-2024

Uncertainty of territorial emission estimates and past revisions

Table 4.1	Uncertainty in estimates of territorial greenhouse gas emissions by gas, UK, Crown Dependencies and Overseas Territories: 1990/2024
Table 4.2	Uncertainty in estimates of territorial greenhouse gas emissions by TES sector, UK, Crown Dependencies and Overseas Territories: 1990/2024
Table 4.3	UK territorial greenhouse gas emissions: changes over successive Greenhouse Gas Inventories from 1990-2008 to 1990-2024

Emissions outside the scope of the UK total

Table 5.1	Greenhouse gas emissions arising from the use of fuels from UK international aviation and shipping bunkers, 1990-2024

Reference tables

Table 6.1	Sectoral definitions and inclusions: relationships between source categories as defined by the IPCC and the categories used in this publication
Table 6.2	Sectoral details, methodologies, and data sources
Table 6.3	Fuel categories used in greenhouse gas emissions statistics
Table 6.4	List of Global Warming Potentials (GWPs) of greenhouse gases used in UK emissions estimates

UK territorial emissions on an end-user basis *(will be added in a separate file on 31 March 2026)*

Table 7.1	Territorial greenhouse gas emissions by end user category, UK 1990-2024
Table 7.2	Territorial emissions of carbon dioxide (CO2) by end user category, UK 1990-2024
Table 7.3	Territorial emissions of methane (CH4) by end user category, UK 1990-2024
Table 7.4	Territorial emissions of nitrous oxide (N2O) by end user category, UK 1990-2024
Table 7.5	Territorial emissions of fluorinated gases (F-gases) by end user category, UK 1990-2024

UK territorial emissions by Standard Industrial Classification (SIC) *(will be added in a separate file on 25 June 2026*)

Table 8.1	Territorial greenhouse gas emissions by industry section and group, UK 1990-2024
Table 8.2	Territorial emissions of carbon dioxide (CO2) by industry section and group, UK 1990-2024
Table 8.3	Territorial emissions of methane (CH4) by industry section and group, UK 1990-2024
Table 8.4	Territorial emissions of nitrous oxide (N2O) by industry section and group, UK 1990-2024
Table 8.5	Territorial emissions of hydrofluorocarbons (HFCs) by industry section and group, UK 1990-2024
Table 8.6	Territorial emissions of perfluorocarbons (PFCs) by industry section and group, UK 1990-2024
Table 8.7	Territorial emissions of sulphur hexafluoride (SF6) by industry section and group, UK 1990-2024
Table 8.8	Territorial emissions of nitrogen trifluoride (NF3) by industry section and group, UK 1990-2024
Table 8.9	Territorial greenhouse gas emissions by industry section, group and Territorial Emissions Statistics sector, UK 1990-2024

Technical information

Methodology for producing greenhouse gas emissions estimates

It is impractical to directly measure emissions from every exhaust, chimney, and acre of land in the UK, so greenhouse gas emission estimates are based on a series of models that estimate emissions from different sources. The source data and methods used to derive UK greenhouse gas emission estimates have been developed to be consistent with methods defined within international guidance[46]. All countries that report to the UNFCCC are required to use these estimation methods to ensure that the emissions for each country are complete and comparable.

The basic equation for estimating most sources of emissions is:

$$Emission\ Factor\ \times Activity\ Data = Emission\ Estimate$$

For example, to estimate CO2 emissions from vehicles the activity data might be the total number of kilometres travelled by that type of vehicle and the emission factor the amount of CO2 emitted per kilometre.

The emission factor is the emission per unit of activity. Emission factors for energy sources are either dependent on the fuel characteristics (for emissions of CO2) or how the fuel is burned, for example the size and efficiency of equipment used. For other sources, the emission factor can be dependent on a range of parameters, such as feed characteristics for livestock or the

[46] 2006 IPCC Guidelines for National Greenhouse Gas Inventories: https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html
2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (Wetlands Supplement): https://www.ipcc-nggip.iges.or.jp/public/wetlands/index.html
2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol (KP Supplement): https://www.ipcc-nggip.iges.or.jp/public/kpsg/index.html

chemical reactions taking place for industrial process emissions. Emission factors are typically derived from measurements on a number of representative sources and the resulting factor applied to all similar sources in the UK.

The UK Greenhouse Gas Inventory uses the best available data from UK and international research for each emission source. The approach used is largely defined by the availability of data and the significance of the emission source in the overall UK inventory; more detailed methods are used for the high-emitting sources, whilst simpler methods can be used for minor sources, consistent with international guidance.

For some sources, the calculation of emissions is more complicated, and therefore a more complex model is used to estimate emissions. For example, emissions of methane from waste disposed to landfills are estimated using a model that reflects the fact that the emissions occur over a long timeframe from the initial disposal of the waste, and that emissions are affected by the level of capture and utilisation of the landfill methane produced. The carbon dioxide emissions and removals from land use, land use change and forestry are also modelled.

Table 6.2 in the data tables accompanying this publication summarises the methods and data sources used to estimate emissions from each source. More detailed methodology information for each source can be found in the NID submitted to the UNFCCC each year. The NID for the 1990-2024 inventory will be published in April 2026, so the NID for the 1990-2023 inventory is the most recent methodology report at the time of this publication[47].

DESNZ also runs a programme to monitor atmospheric concentrations of greenhouse gases, which is used to inform the emission estimates made in the Greenhouse Gas Inventory[48].

Estimating emissions on a temperature adjusted basis

In our provisional 2024 UK greenhouse gas emission statistics[49] we published estimates of temperature adjusted emissions, which give an indication of overall trends in emissions without fluctuations due to changes in external temperatures. The provisional emissions series is estimated based on UK provisional energy consumption data published by DESNZ and is not as accurate as the estimates in this statistical release, which are derived from the UK Greenhouse Gas Inventory.

On a temperature adjusted basis, greenhouse gas emissions in 2023 and 2024 were provisionally estimated to be 399 MtCO2e and 387 MtCO2e respectively. Therefore, the decrease in emissions between 2023 and 2024 in the temperature adjusted figures was 12 MtCO2e, slightly smaller than the 14 MtCO2e decrease seen in the provisional non-temperature adjusted figures. This suggests that variations in temperature were a small factor in the trend in emissions from 2023 to 2024. Average temperature in 2023 and 2024 were higher than the average over the 30-year period from 1991-2020, by 0.8°C and 0.6°C respectively[50].

[47] UK 2025 National Inventory Document (1990-2023): https://naei.energysecurity.gov.uk/reports/uk-greenhouse-gas-inventory-1990-2023-annual-report-submission-under-framework-convention
[48] Monitoring and verification of long term UK atmospheric measurement of greenhouse gas emissions: https://www.gov.uk/government/publications/uk-greenhouse-gas-emissions-monitoring-and-verification
[49] Provisional 2024 UK greenhouse gas emissions: https://www.gov.uk/government/statistics/provisional-uk-greenhouse-gas-emissions-statistics-2024
[50] Table 7.1, Average temperatures, heating degree days and deviations from the long-term mean, Energy Trends: https://www.gov.uk/government/statistics/energy-trends-section-7-weather

Table 3: Comparison of unadjusted and temperature adjusted greenhouse gas emissions estimates, 2023-2024

UK, 2023-2024 MtCO2e

	2023 emissions	2024 emissions	Absolute change	Percentage change
Final estimates ➢ unadjusted emissions	383.9	373.4	-10.5	-2.7%
Provisional estimates ➢ unadjusted emissions	385.0	371.4	-13.6	-3.5%
Provisional estimates ➢ Temperature adjusted emissions	398.9	386.9	-12.0	-3.0%

Source: Table 1.1, Final UK greenhouse gas emissions statistics 1990-2024 Excel data tables
Table 1a, Provisional UK greenhouse gas emissions statistics 2024 Excel data tables
Note: The provisional emissions estimates differ from the emissions estimates shown elsewhere in this publication because they were published before the 2024 figures presented were finalised.

Further information

Future updates to these statistics

On Tuesday 31 March 2026 DESNZ will publish a breakdown of 1990-2024 UK territorial emissions with energy supply emissions on an end-user basis to supplement the source sector breakdown included in this publication.

On Tuesday 31 March 2026 DESNZ will also publish provisional estimates of UK greenhouse gas emissions for 2025. This will coincide with the publication of Energy Trends statistics, which will include estimates of 2025 UK energy consumption.

On Thursday 25 June 2026 DESNZ will publish estimates of 1990-2024 UK territorial emissions by Standard Industrial Classification (SIC), to supplement the sector breakdown included in this publication.

Final estimates of UK greenhouse gas emissions for 2025 will be published in February 2027, with a summary of any planned methodology changes published in advance of that in January 2027.

Related publications

- This statistical release and the related data tables are the first release of data from the National Atmospheric Emissions Inventory (NAEI) for 1990-2024, produced for DESNZ and the Devolved Governments by the Inventory Agency. Additional results will be released as they become available. For further information, see the NAEI website.
- The UK National Inventory Document (NID) for 1990-2024 will be submitted to the United Nations Framework Convention on Climate Change (UNFCCC) by 15 April 2026. The report will contain national territorial greenhouse gas emissions estimates for 1990-2024 and descriptions of the methods used to produce the estimates. Previous UK submissions to the UNFCCC can be found on the NAEI website.
- The background quality report provides a summary of quality issues relating to statistics on UK territorial greenhouse gas emissions.
- 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 2024 will be published in June 2026.
- 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.
- Under the Climate Change Act, the Annual Statement of Emissions for 2024 must be laid before Parliament and published no later than 31 March 2026. This will give details of the

Net UK Carbon Account for 2024, which is used to determine compliance with the targets and carbon budgets under the Climate Change Act.

- ONS publishes emissions on a "residence" basis in the UK Environmental Accounts. The figures represent 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. This estimates emissions on a "consumption" basis, meaning it covers emissions associated with the consumption of goods and services by households in the UK. It includes 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.

- Detailed UK temperature data can be found on both the Met Office website and the Weather Statistics section of the gov.uk website.

- Similar results for non-greenhouse gas atmospheric pollutants are published by Defra in its statistics on Emissions of air pollutants in the UK.

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.

Uses of these statistics

UK territorial greenhouse gas emissions estimates are used by central government departments, devolved governments and local authorities to understand emissions in the areas they are responsible for, to develop policies to reduce emissions and to set targets. They are the basis for domestic and international emissions reduction targets and are required to be reported each year to the UNFCCC.

Outside government the statistics are used by the media and the public to understand the level of greenhouse gas emissions in the UK and trends over time. They provide detailed emissions data on gases, sectors and sub-sectors that may of interest to users (particularly academics) with a focus on a particular area of emissions. The data are also the basis of emission conversion factors that are used by companies and other organisations to report their greenhouse gas emissions.

Information about user needs for greenhouse gas emissions statistics is published in our background quality report.

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 pre-release 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.

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

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