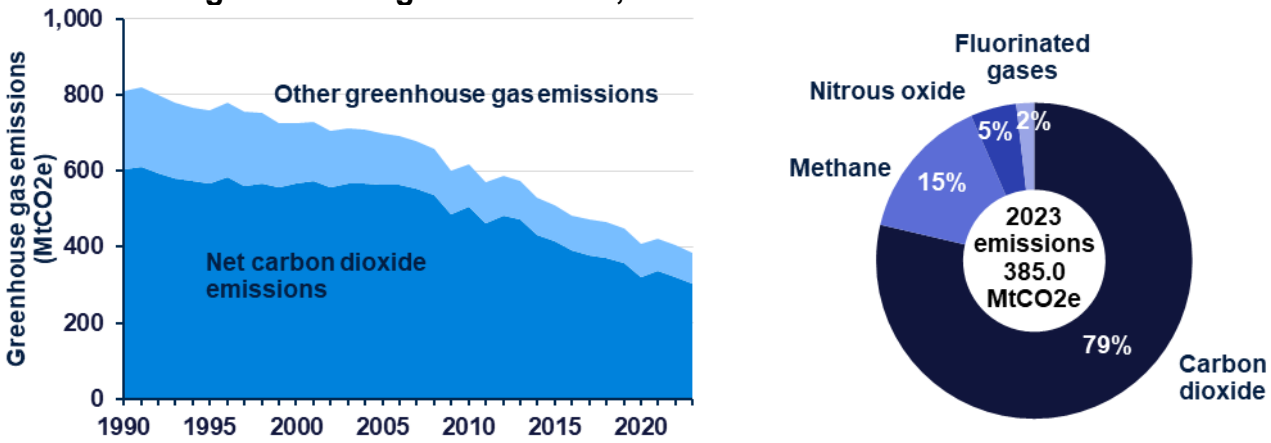
Department for Energy Security & Net Zero

2023 UK Greenhouse Gas Emissions, Final Figures

6 February 2025 **Accredited Official Statistics**

In 2023, total UK net territorial greenhouse gas emissions were estimated to be 385 million tonnes carbon dioxide equivalent (MtCO2e), a decrease of 5% from the 2022 estimate of 405 MtCO2e. Total greenhouse gas emissions were 53% lower than they were in 1990. Carbon dioxide made up around 79% of the 2023 total.

UK territorial greenhouse gas emissions, 1990-2023



- Decreased gas use in the electricity supply sector made the largest contribution to the total reduction in 2023. Electricity supply emissions fell by 11 MtCO2e (20%), reflecting higher electricity imports from France, unlike 2022 when the UK had higher than usual exports, a continued decrease in UK electricity demand, and an increased share of renewables to meet remaining demand. This meant that there was less gas use in UK power stations.
- Emissions from buildings and product uses fell by 5 MtCO2e (6%), largely due to lower gas use in residential buildings. High energy and other costs are likely to have been a factor in reduced gas use for heating buildings.
- Domestic transport emissions fell by 1 MtCO2e (1%). Compared to 2019, the most recent pre-pandemic year, domestic transport emissions were down 13 MtCO2e (10%). Domestic transport remains the largest emitting sector, responsible for 29% of all UK emissions in 2023.

What you need to know about these statistics:

This publication provides the latest estimates of 1990-2023 UK territorial greenhouse gas emissions, meaning emissions occurring within the UK borders. Figures for all years since 1990 have been revised since the last publication to incorporate methodological improvements and new data, so the estimates presented here supersede previous estimates.

Greenhouse gas emissions are presented in carbon dioxide equivalent units (CO2e) throughout this statistical release and cover seven greenhouse gases: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3).

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

Contents

Introduction

This publication provides the latest annual estimates of UK territorial greenhouse gas emissions from 1990-2023. The geographic coverage of this report is UK only unless stated otherwise. The figures in this statistical release are used as the basis for reporting against UK greenhouse gas emissions reduction targets and provide information for users 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 UK submissions to the United Nations Framework Convention on Climate Change (UNFCCC) each year.

The estimates present emissions on a "territorial" basis, so include emissions which occur within UK borders, including offshore areas over which the UK has jurisdiction. They therefore exclude emissions from UK businesses and residents that occur abroad, including from international aviation and shipping, and any emissions embedded within the supply chain of manufactured goods and services imported into the UK (while including emissions that occur in the UK resulting from exported goods and services).

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

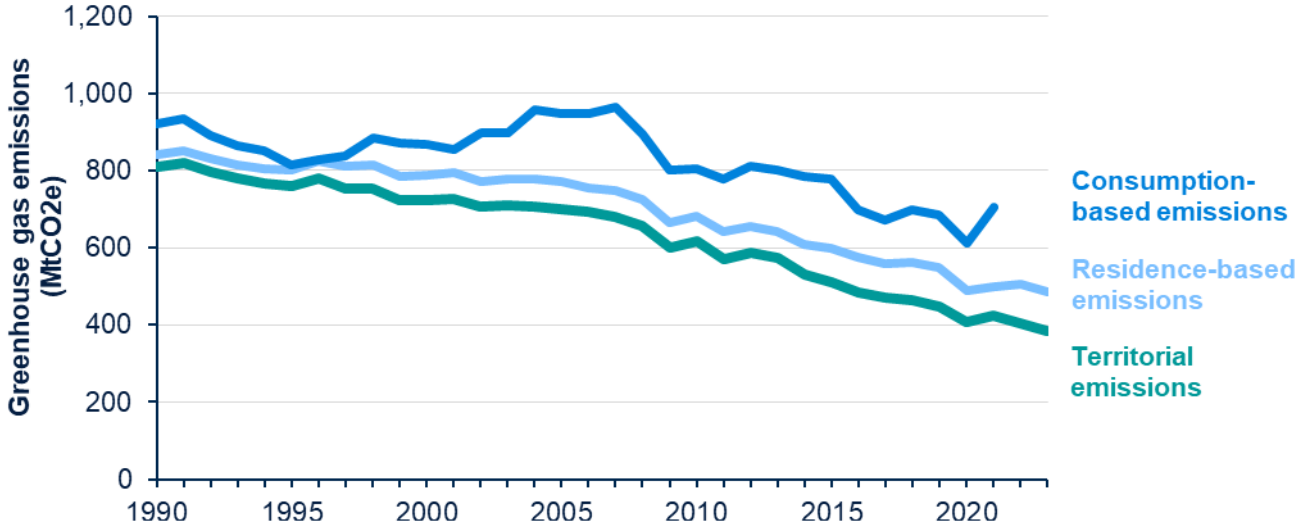
- ONS publishes emissions on a "residence" basis in the UK Environmental Accounts. The figures represent emissions caused by UK residents and businesses whether in the UK or abroad but exclude emissions within the UK which can be attributed to overseas residents and businesses.

- The Department for Environment, Food and Rural Affairs (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.

Figure 1 shows how the estimates of UK territorial emissions in this publication compare to the most recent estimates of UK emissions on a residence and a consumption basis. The estimates are not directly comparable as there are differences in definitions and methodologies and both the consumption-based 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 its territorial emissions and have followed a different trend over this period, 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

Figure 1: UK territorial, residence-based and consumption-based greenhouse gas emissions, 1990-2023 (MtCO2e)



Sources: Table 1.1, Final UK greenhouse gas emissions statistics 1990-2023 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

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 emissions presented on an end-user basis will be published as an annex to this publication on Thursday 27 March 2025[2].

These estimates cover seven gases: carbon dioxide (CO2), methane (CH_4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF6) and nitrogen trifluoride (NF3). The last four gases are collectively referred to as fluorinated gases or F gases. In accordance with international reporting protocols, emissions of each gas are weighted by its global warming potential (GWPs)[3], 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).

Carbon dioxide is reported in terms of net emissions, which means total emissions minus total removals of carbon dioxide from the atmosphere by carbon sinks. Carbon sinks are defined by the 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 1990-2022 emissions figures have been revised since the previous publication in February 2024 to incorporate methodological improvements, such as modelling of methane emissions from landfill, and new data. The 2023 figures have been revised from the provisional estimates published in March 2024. Details of these revisions can be found later in this statistical release.

[2] The Annex for 1990-2022 UK greenhouse gas emissions final figures by end-user published in March 2024 can be found here: https://www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2022

[3] The global warming potentials (GWPs) used are from Working Group 1 of the IPCC Fifth Assessment Report: Climate Change 2014 and 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/what-is-the-united-nations-framework-convention-on-climate-change

References to the 'UK Greenhouse Gas Inventory' refer to the consistent time series of emissions from 1990 to the most recent year which is updated annually and reported to the UNFCCC. The figures in these statistics are consistent with the UK Greenhouse Gas Inventory for 1990-2023, although 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.

Greenhouse gas emissions are allocated into sectors known as Territorial Emissions Statistics (TES) sectors, which are as follows:

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

2023 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.

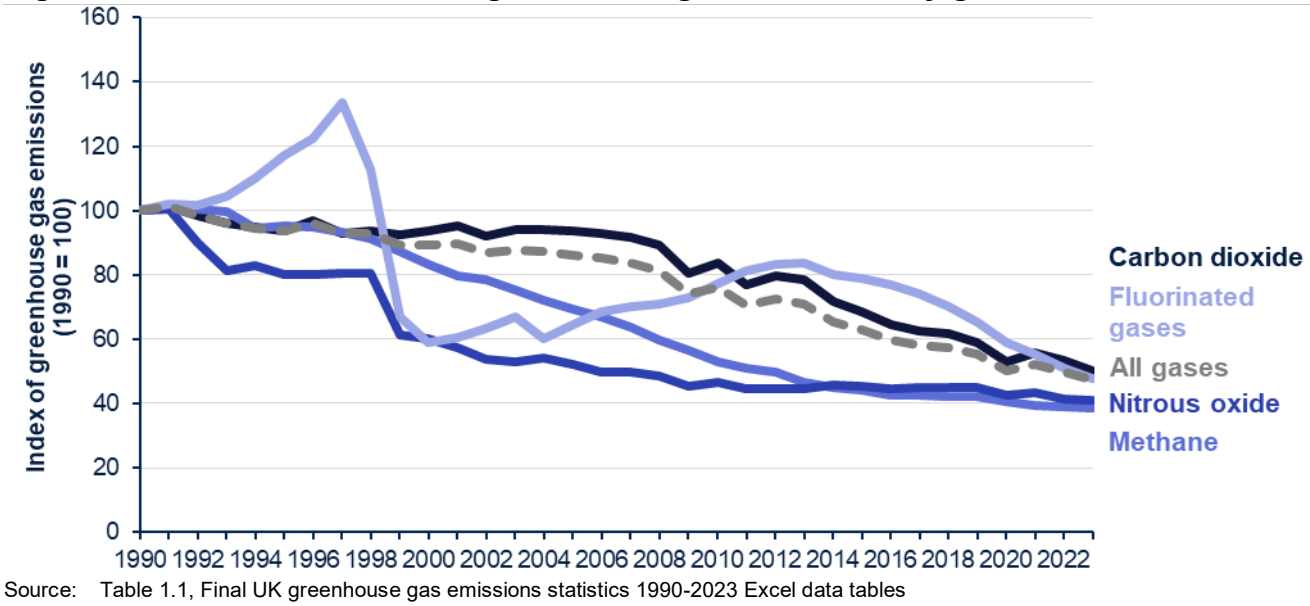
In 2023, total greenhouse gas emissions were estimated to be 385 MtCO2e, a decrease of 20 MtCO2e (5%) from the 2022 estimate of 405 MtCO2e. Greenhouse gas emissions in 2023 are 53% lower than they were in 1990.

Decreased gas use in the electricity supply sector made the largest contribution to the total reduction in 2023. Electricity supply emissions fell by 11 MtCO2e (20%), reflecting higher electricity imports from France, unlike 2022 when the UK had higher than usual exports, a continued decrease in UK electricity demand, and an increased share of renewables to meet remaining demand. This meant that there was less gas use in UK power stations. Additionally, greenhouse gas emissions from the buildings and product uses sector fell by 5 MtCO2e (6%), largely as a result reduced demand for heating due to high energy and other costs.

When broken down by gas, UK emissions are dominated by carbon dioxide, which is estimated to have accounted for around 79% of greenhouse gas emissions in the UK in 2023. When weighted by their global warming potentials, methane accounted for 15% of greenhouse gas emissions in the UK in 2023; nitrous oxide contributed around 5%, and F gases accounted for the remaining emissions, at around 2%.

Carbon dioxide has always been the dominant greenhouse gas emitted in the UK. Emissions of carbon dioxide have reduced by 50% (301 MtCO2e) since 1990 to 303 MtCO2e in 2023, largely as a result of lower coal use in power stations. Emissions of methane and nitrous oxide have seen larger proportional falls since 1990, at 62% and 59% respectively. F gas emissions are estimated to be 52% lower now than they were in 1990, with hydrofluorocarbons being the dominant F gas throughout this period.

Figure 2: Index of territorial UK greenhouse gas emissions by gas, 1990-2023



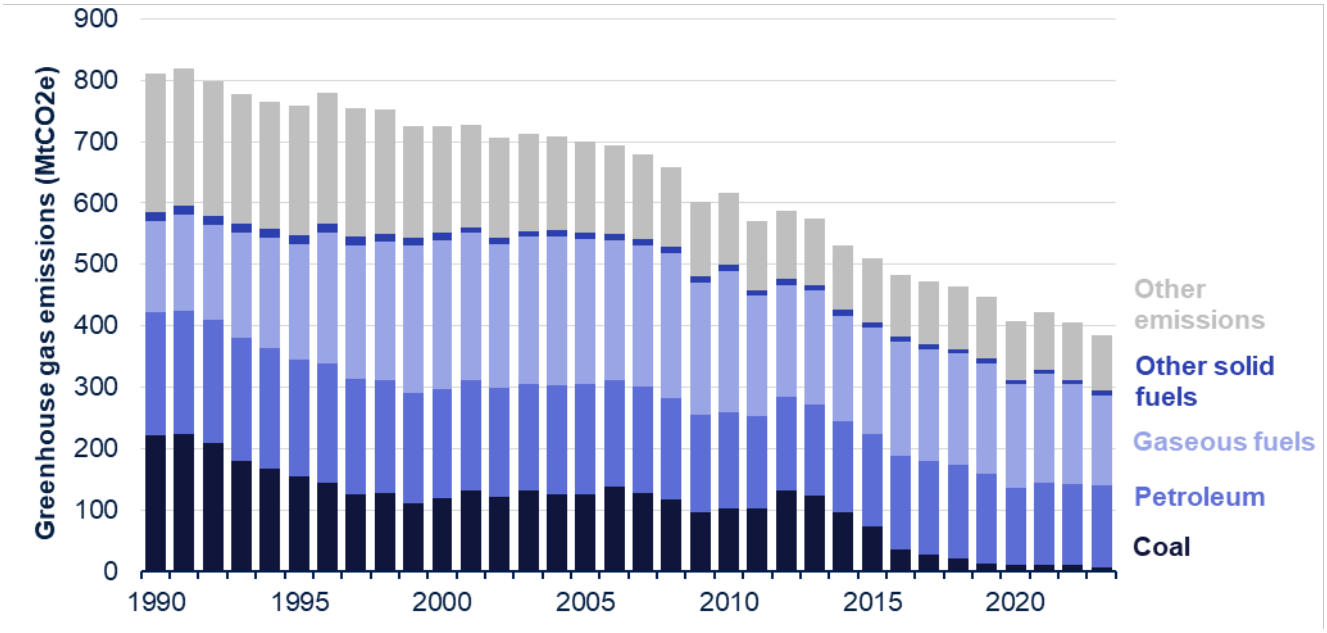
Source: Table 1.1, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables

In 2023, 76% of greenhouse gas emissions in the UK came from the use of fossil fuels. Emissions from fossil fuels decreased by 6% compared to 2022 and are 50% lower than in

1990. Use of gaseous fuels and petroleum accounted for 38% and 34% 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 2% of emissions in the UK in 2023. Emissions from coal use have fallen by 97% since 1990, at which point they were responsible for 27% of UK emissions as coal was the main fuel used for electricity generation at that time.

Figure 3: Territorial UK greenhouse gas emissions by fuel type, 1990-2023 (MtCO2e)



Source: Table 1.7, Final UK greenhouse gas emissions statistics 1990-2023 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. In previous publications, Table 2.2 showed UK progress against international emissions reduction targets under the Kyoto Protocol.

Domestic Targets

The Climate Change Act 2008

The UK has domestic targets for reducing greenhouse gas emissions under the Climate Change Act 2008 (CCA)[5]. 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[6].

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[7]. 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)[8]. 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[9].

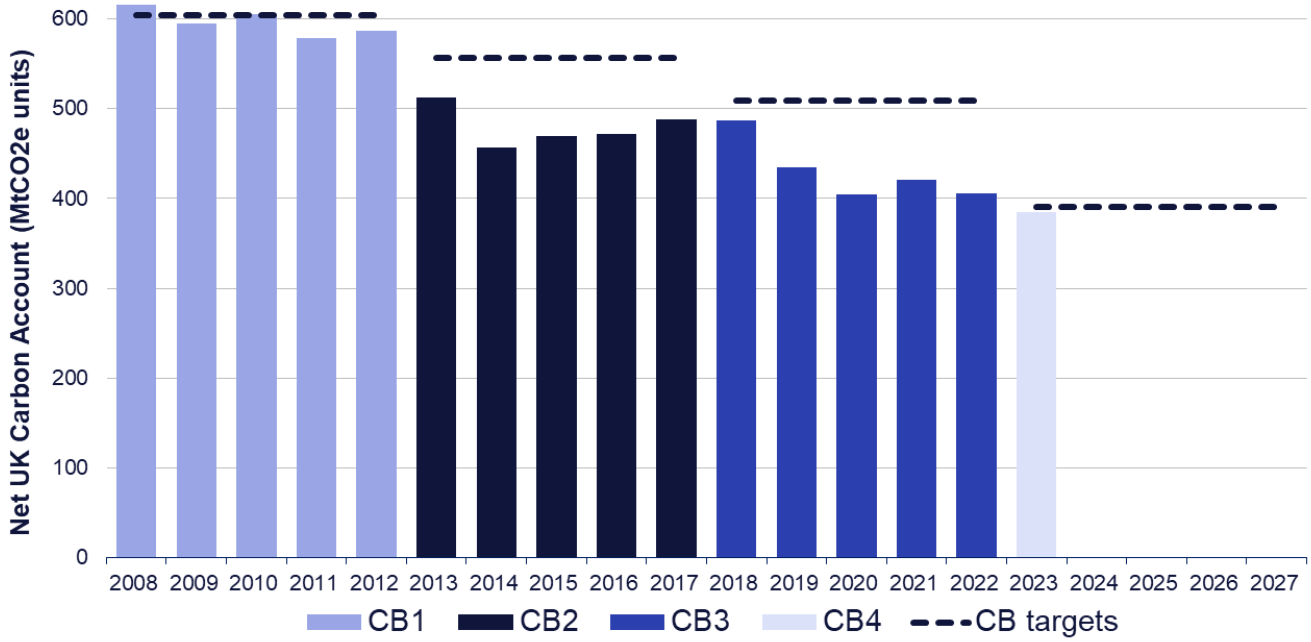
The first carbon budget ran from 2008-12. In 2014, it was confirmed the UK had met the budget with the Net UK Carbon Account 37 MtCO2e (1%) below the limit of 3,018 MtCO2e[10]. The second carbon budget ran from 2013-17. In 2019, it was confirmed the UK had met the budget with the Net UK Carbon Account 384 MtCO2e (14%) below the limit of 2,782 MtCO2e[11]. 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[12]

The latest figures show the 2023 Net UK Carbon Account was 385 MtCO2e. 2023 represents the first year of the fourth carbon budget. The Net UK Carbon Account must be on average lower than 390 MtCO2e each year for the UK to meet the fourth carbon budget.

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

Projected performance against current and future carbon budgets can be found in UK energy and emissions projections[13].

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



Source: Table 2.1, Final UK greenhouse gas emissions statistics 1990-2023 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[14]. 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

From 2021, the UK has emissions reduction targets under the Paris Agreement[15] to the UNFCCC, known as Nationally Determined Contributions (NDCs). For its First NDC, the UK has committed to reduce total net greenhouse gas emissions by at least 68% in 2030, compared to 1990 levels[16]. For its Second NDC, the UK has committed to reduce total net greenhouse gas emissions by at least 81% in 2035, compared to 1990 levels[17].

[13] Energy and emissions projections: https://www.gov.uk/government/collections/energy-and-emissions-projections
[14] The Kyoto Protocol: https://unfccc.int/kyoto_protocol
[15] The Paris Agreement: https://unfccc.int/process-and-meetings/the-paris-agreement
[16] UK's first NDC: https://www.gov.uk/government/publications/the-uks-nationally-determined-contribution-communication-to-the-unfccc
[17] UK's second NDC: https://www.gov.uk/government/publications/uks-2035-nationally-determined-contribution-ndc-emissions-reduction-target-under-the-paris-agreement

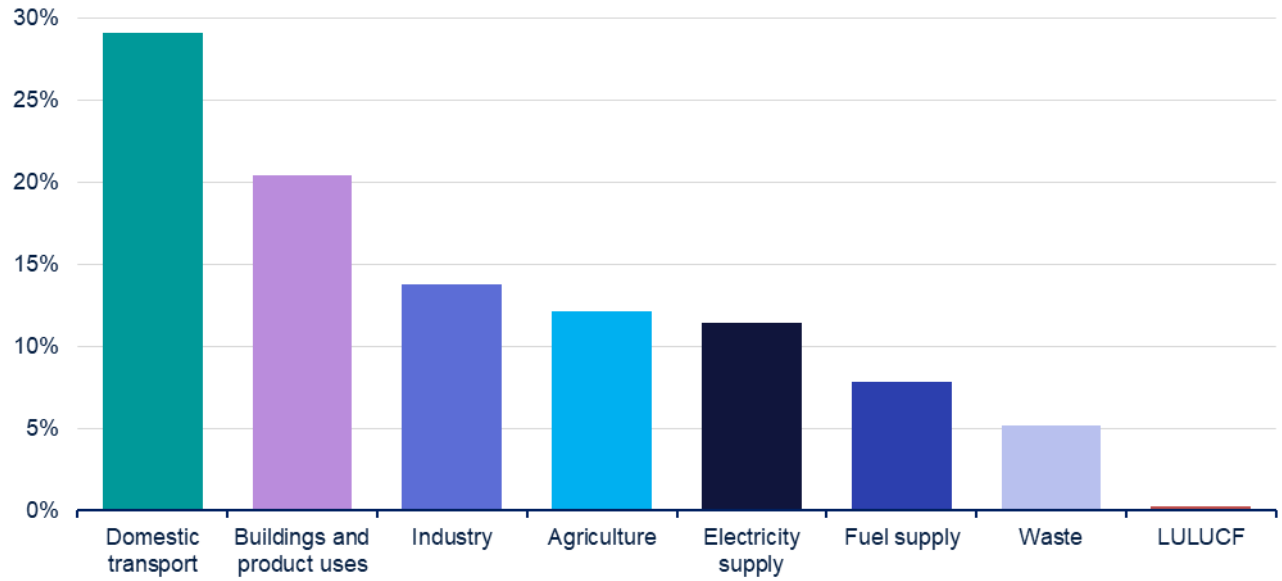
Emissions by sector

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 2023, 29% of net greenhouse gas emissions in the UK were estimated to be from the domestic transport sector, 20% from buildings and product uses, 14% from industry, 12% from agriculture, and 11% from electricity supply. The other 13% was attributable to the remaining sectors: fuel supply, waste, and the LULUCF sector. The LULUCF sector includes both sinks and sources of emissions.

Figure 5: Territorial UK greenhouse gas emissions by TES sector, 2023 (%)

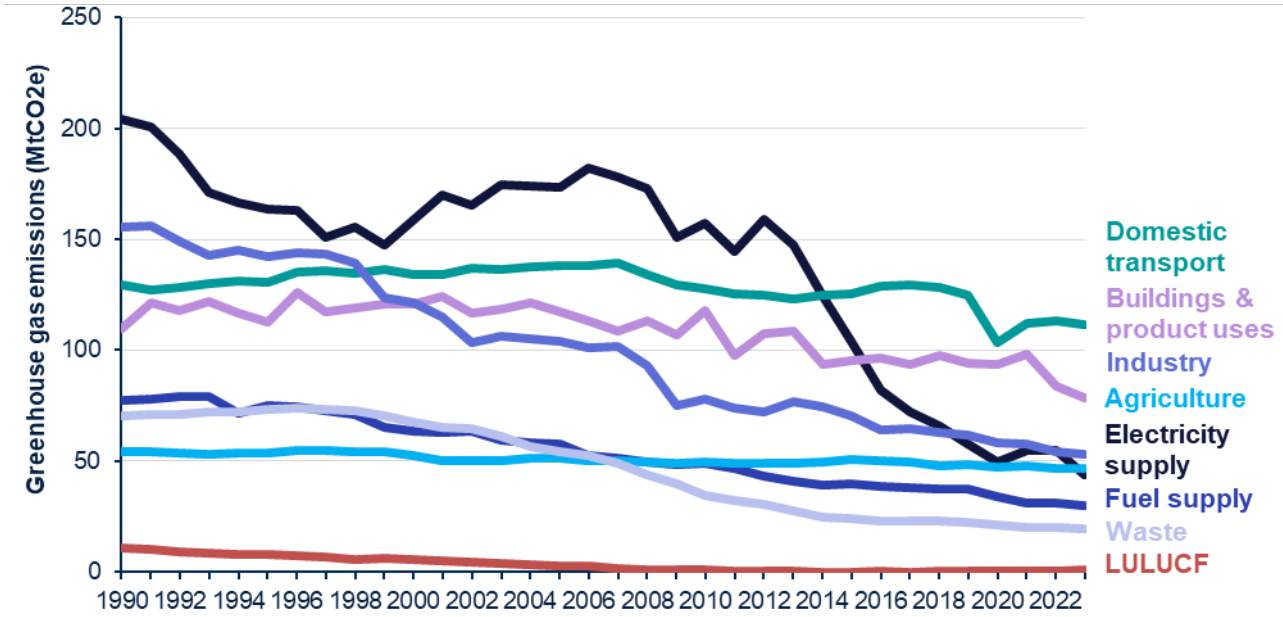


Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables

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

Historically, the electricity supply sector 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 2014 the domestic transport sector has had the highest emissions of any sector.

Figure 6: Territorial UK greenhouse gas emissions by TES sector, 1990-2023 (MtCO2e)



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

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

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 2023, domestic transport accounted for around 29% of all territorial UK greenhouse gas emissions, almost entirely through carbon dioxide emissions. The main source of emissions from this sector is the use of petrol and diesel in road vehicles.

Domestic transport emissions fell by 1% between 2022 and 2023, largely due to reductions in road vehicle diesel use, and despite a rise in emissions from road vehicle petrol use. This is the first-time domestic transport emissions have fallen since 2020 when travel was heavily restricted due to the COVID-19 pandemic. Emissions from domestic transport remain 10% lower than in 2019, the last pre-pandemic year.

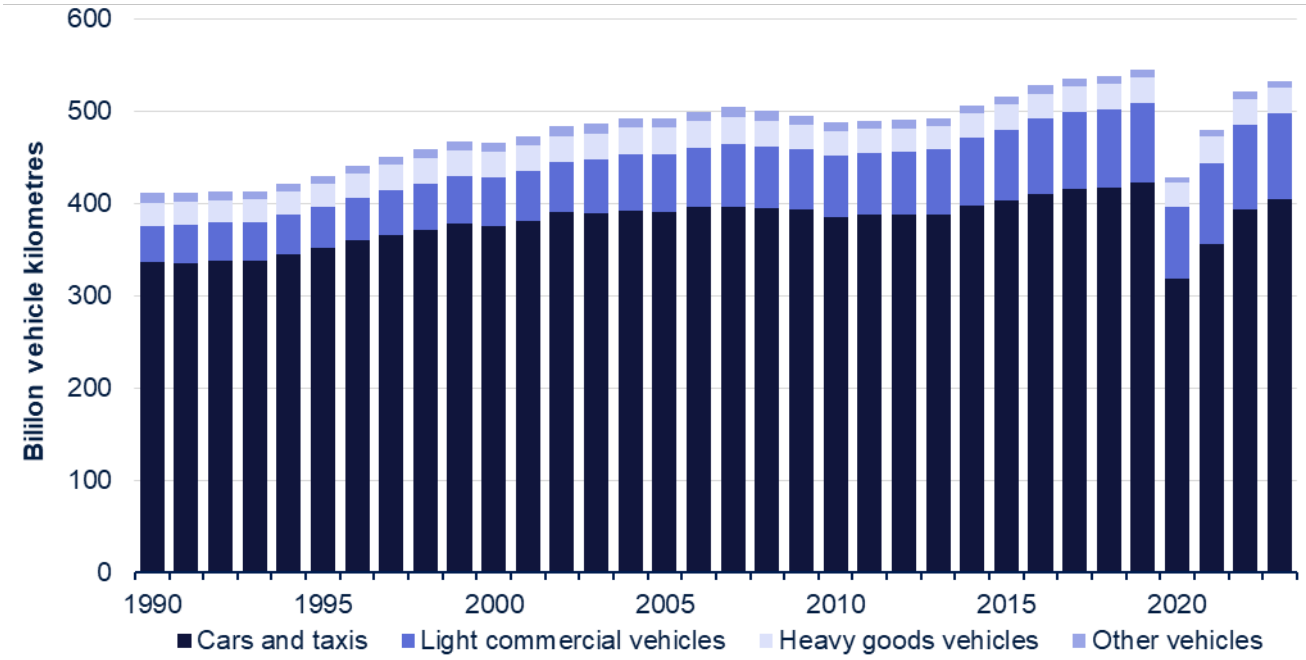
Before 2020 there had been relatively little overall change in the level of greenhouse gas emissions from domestic transport with emissions only 4% lower in 2019 than they were in 1990. Between 1990 and 2007, when domestic transport emissions peaked, there was a general increasing trend with some fluctuations year to year. After this peak, emissions declined most years apart from a period of increase between 2013 and 2017. Overall, emissions are estimated to have been around 13% lower in 2023 than 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 7 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 2023, increasing 2% when compared to 2022. Despite increased motor vehicle traffic in 2023, road transport emissions were 1% lower than in 2022, largely as a result of lower diesel use.

With lower petrol consumption outweighing an increase in diesel consumption[18] 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 commercial 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.

Civil aviation emissions continued to return towards pre-pandemic levels but remained 14% lower in 2023 when compared to 2019. Similarly, emissions from railways increased by 5% in 2023, but remained 13% lower than in 2019. Meanwhile, emissions from waterborne transport were 13% lower in 2023 than in 2019, and have continued to remain at similar level to the low in 2020.

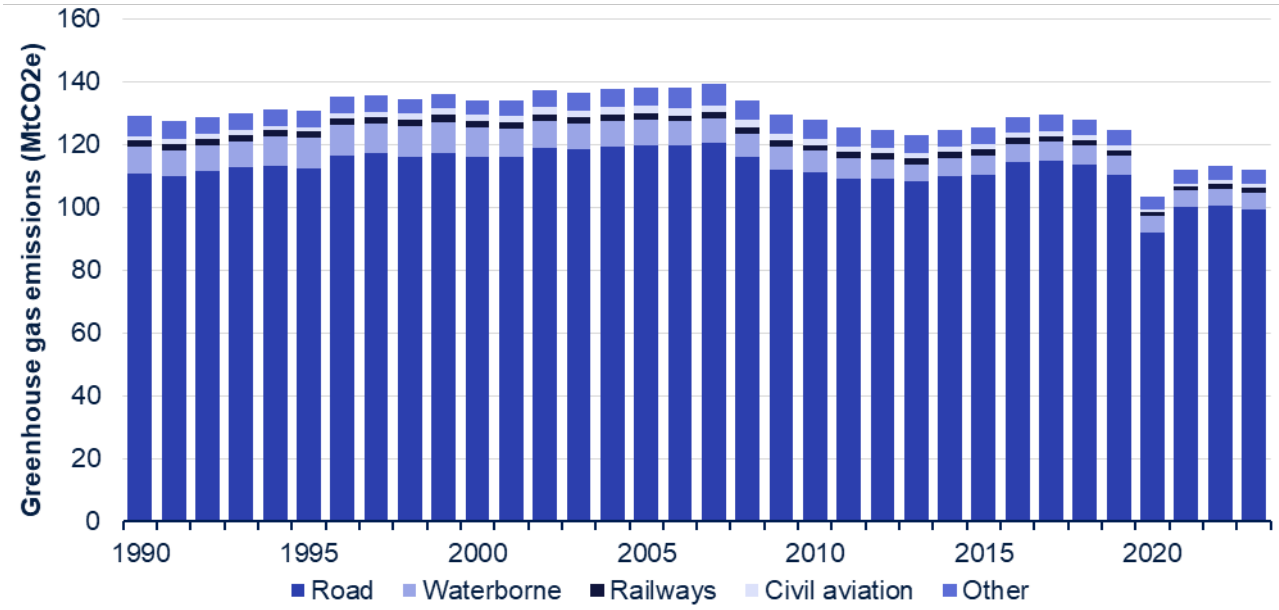
Figure 7: Motor vehicle traffic, Great Britain 1990-2023 (Billion vehicle kilometres)



Source: Table TSGB0702 (TRA0201), Transport Statistics Great Britain, Roads and traffic (TSGB07), annual from 1949: https://www.gov.uk/government/statistical-data-sets/tsgb07

[18] Table TSGB0301 (ENV0101), Petroleum consumption by transport mode and fuel type, Transport Statistics Great Britain, Energy and environment (TSGB03), UK from 2000: https://www.gov.uk/government/statistical-data-sets/tsgb03

Figure 8: Greenhouse gas emissions from domestic transport, UK 1990-2023 (MtCO2e)



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

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 11% of UK greenhouse gas emissions in 2023, with carbon dioxide accounting for almost all emissions for this sector.

There was a 20% decrease in emissions from the electricity supply sector between 2022 and 2023, largely due to lower gas use in UK power stations. Gas use for electricity generation fell 20% in 2023, reflecting higher electricity imports from France, unlike 2022 when the UK had higher than usual exports, a continued decrease in UK electricity demand, and an increased share of renewables to meet remaining demand. This meant that less gas was needed to meet the remaining demand for electricity.

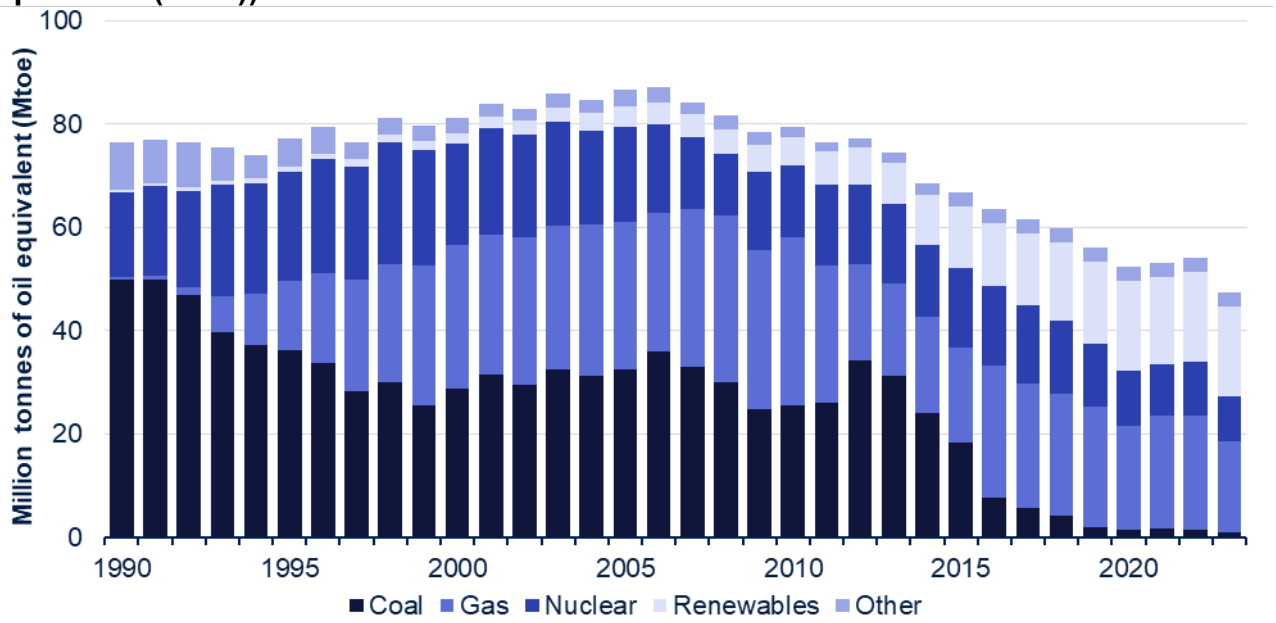
Between 1990 and 2023, electricity supply emissions have reduced by 78%. This decrease is mainly the result of changes to the mix of fuels used for electricity generation, including the growth of renewables; together with greater efficiency resulting from technological improvements. The electricity supply sector historically had the largest emissions of the sectors presented in these statistics. However, in 2014, 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 98% between 1990 and 2023, and now makes up only 2% of the fuel used for UK electricity generation compared to 65% in 1990[19]. Total electricity supplied was 6% lower in 2023 than in 1990, having grown to a peak in 2005 and decreased since then[20].

[19] Table 5.1.1, Fuel input for electricity generation, Digest of UK Energy Statistics (DUKES) 2024
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904820/DUKES_5.1.1.xls
[20] Table 5.1.3, Electricity generated and supplied, Digest of UK Energy Statistics (DUKES) 2024
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/904822/DUKES_5.1.3.xls

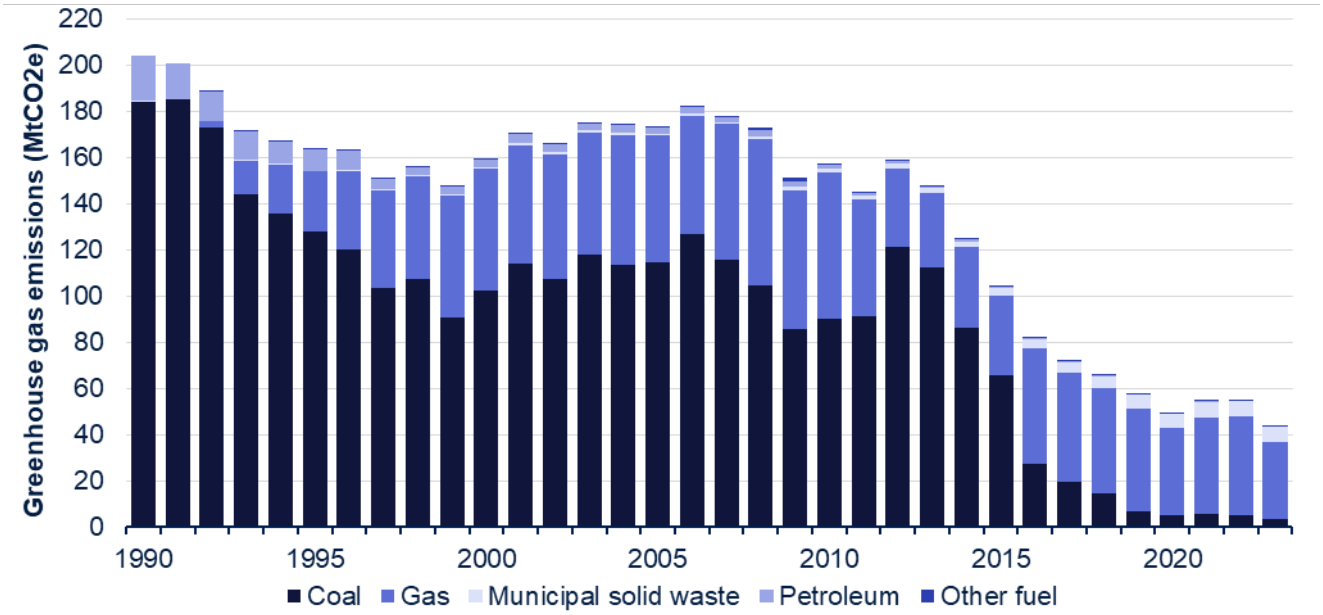
In 2023, the use of coal for electricity generation decreased 35% when compared to 2022, whereas nuclear and renewable inputs fell by 15% and 1% respectively.

Figure 9: Fuel used for UK electricity generation, UK 1990-2023 (Million tonnes of oil equivalent (Mtoe))



Source: Table 5.1.1 and Table 5.3, Digest of UK Energy Statistics (DUKES) 2024
https://www.gov.uk/government/statistics/electricity-chapter-5-digest-of-united-kingdom-energy-statistics-dukes

Figure 10: Greenhouse gas emissions from electricity supply, 1990-2023 (MtCO2e)



Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables
Note: Figures 9 and 10 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 9.

Fuel supply

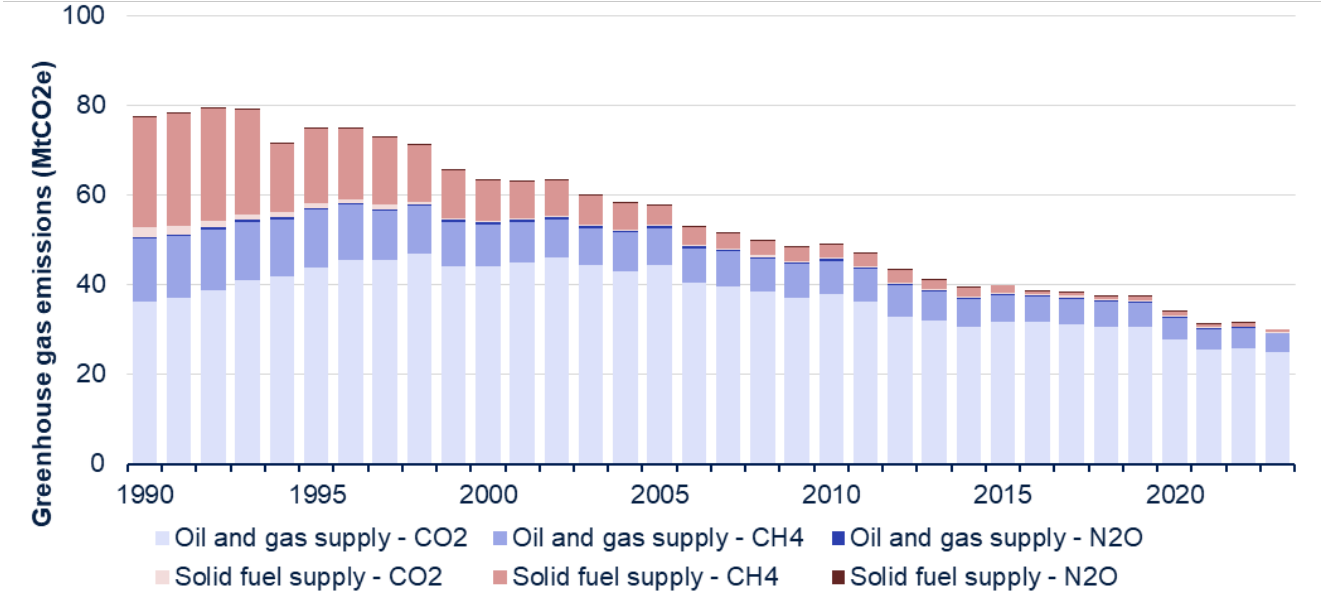
The fuel supply sector consists of emissions that arise during the production and supply of fuels, for example from the combustion of fuels in oil refineries and at oil and gas platforms, the flaring and venting of gas from oil and gas facilities, leakages from the gas network and

methane emissions from coal mining. Fuel supply accounted for 8% of greenhouse gas emissions in the UK in 2023, 97% of which were from oil and gas supply.

Fuel supply emissions fell by 4% between 2022 and 2023, largely due to reduced combustion emissions from oil and gas production. Since 1990 fuel supply emissions have fallen by 61%.

The long-term decline in emissions from the fuel supply sector has 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 2023. Oil and gas supply emissions rose to a peak in 1996 at 58 MtCO2e, but since fallen by 50%.

Figure 11: Greenhouse gas emissions from fuel supply, UK 1990-2023 (MtCO2e)



Source: Tables 1.3 to 1.5, Final UK greenhouse gas emissions statistics 1990-2023 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 2023, it is estimated to have been responsible for 20% of greenhouse gas emissions in the UK. Of these emissions, 65% were from fuel combustion in residential buildings, 17% in commercial buildings, 11% in public sector buildings and 7% were other buildings and product use emissions.

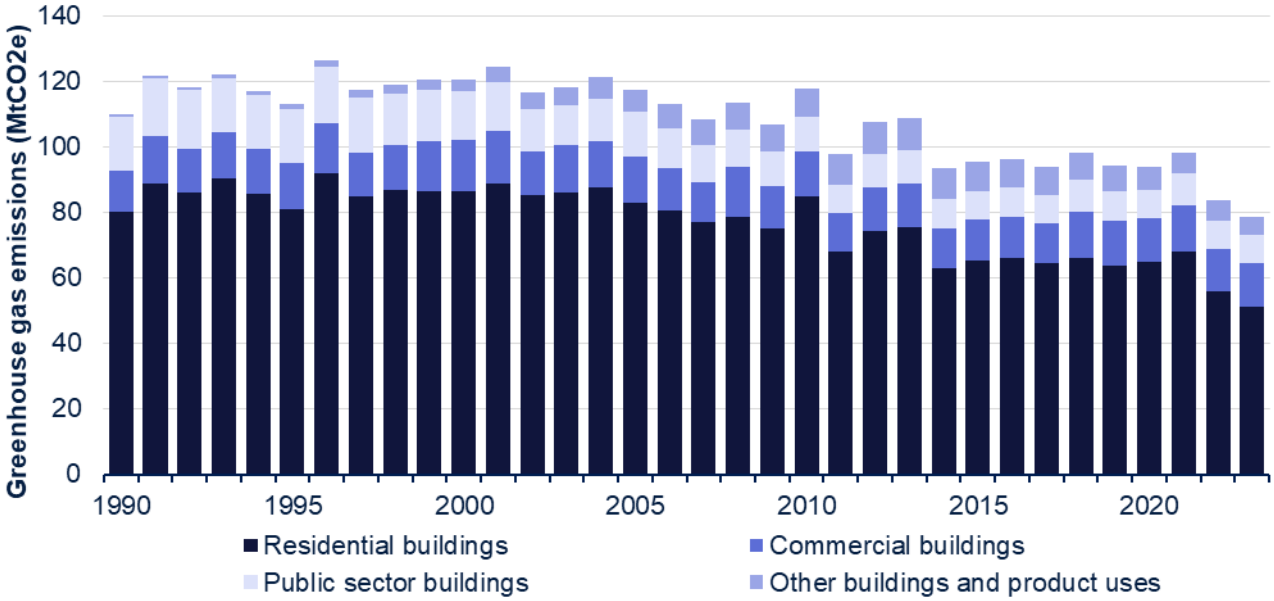
It should be noted that since these figures are estimates of emissions by source, emissions related to electricity use in buildings, including electricity use for heating, are attributed to power stations and are therefore included in the electricity supply sector rather than the buildings and product uses sector.

There was a 6% decrease in emissions from buildings and product uses between 2022 and 2023. High energy and other costs are likely to be the main factor in the fall in the latest year, having reduced demand for gas for heating. Emissions from buildings are also influenced by external temperatures, with colder temperatures driving higher emissions due to increased use

of heating. Between 1990 and 2023 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 2022 and 2023 were 0.9 and 0.8 degrees Celsius higher than the 30-year long-term average respectively[21]. 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 92% of emissions in 2023. F gases made up 6% of buildings and product uses emissions. Emissions from F gases 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[22]. Between 2012 and 2023, F gas emissions in the buildings and product uses sector fell by 49%.

Figure 12: Greenhouse gas emissions from the buildings and product uses sector, UK 1990-2023 (MtCO2e)



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

In 2023, emissions from residential buildings fell by 8% when compared to 2022. 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 2023, emissions from residential buildings fell by 36%. This is despite the UK population rising over this period[23] and a rise in the number of households in the UK[24]. This 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 48%. Emissions from commercial buildings on the other hand have

[21] 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
[22] EU 2014 F-Gas Regulation: https://www.eea.europa.eu/ds_resolveuid/b471e1af4e06431c8048970f6c992099
[23] Office for National Statistics, Population estimates time series dataset: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatestimeseriesdataset
[24] Office for National Statistics, Families and households dataset: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/families/datasets/familiesandhouseholdsfamiliesandhouseholds

remained at a similar level and were 5% higher in 2023 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. Both public sector and commercial buildings saw a 1% fall in greenhouse gas emissions between 2022 and 2023.

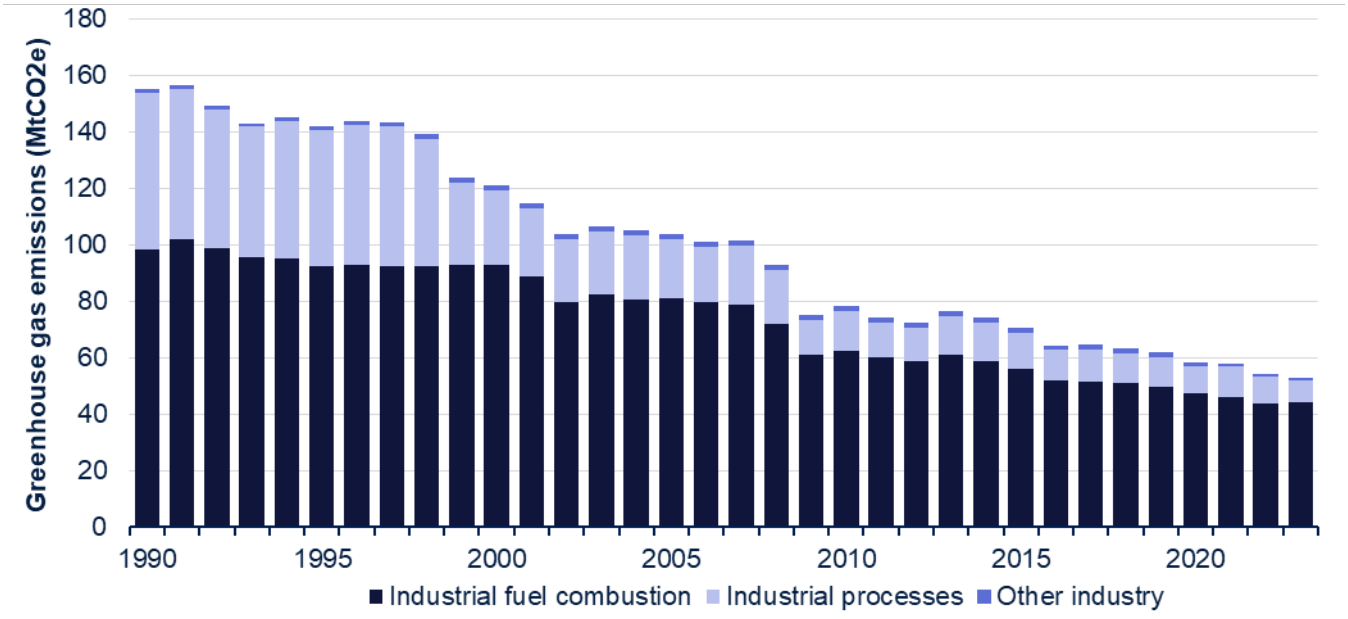
Industry

The industry sector includes emissions from fuel combustion at industrial sites and in industrial machinery. It also includes emissions resulting from industrial processes and emissions of F gases from industrial uses such as in refrigeration systems. The industry sector is estimated to have been responsible for 14% of greenhouse gas emissions in the UK in 2023, with carbon dioxide emissions accounting for 97% of these emissions.

Between 2022 and 2023, there was a 2% decrease in greenhouse gas emissions from industry, largely due to reductions in emissions from industrial processes and industrial combustion that outweigh increases in iron and steel production and industrial off-road mobile machinery emissions. In 2023, greenhouse gas emissions from industry were 66% lower than in 1990. Over this period, industrial process emissions fell by 86%, whilst industrial fuel combustion emissions fell by 55%. 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 product 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 2023, the largest source of industrial process emissions was cement production, with other processes such as sinter, lime, iron and steel, and ammonia production also significant contributors.

Figure 13: Greenhouse gas emissions from industry by subsector, UK 1990-2023 (MtCO2e)



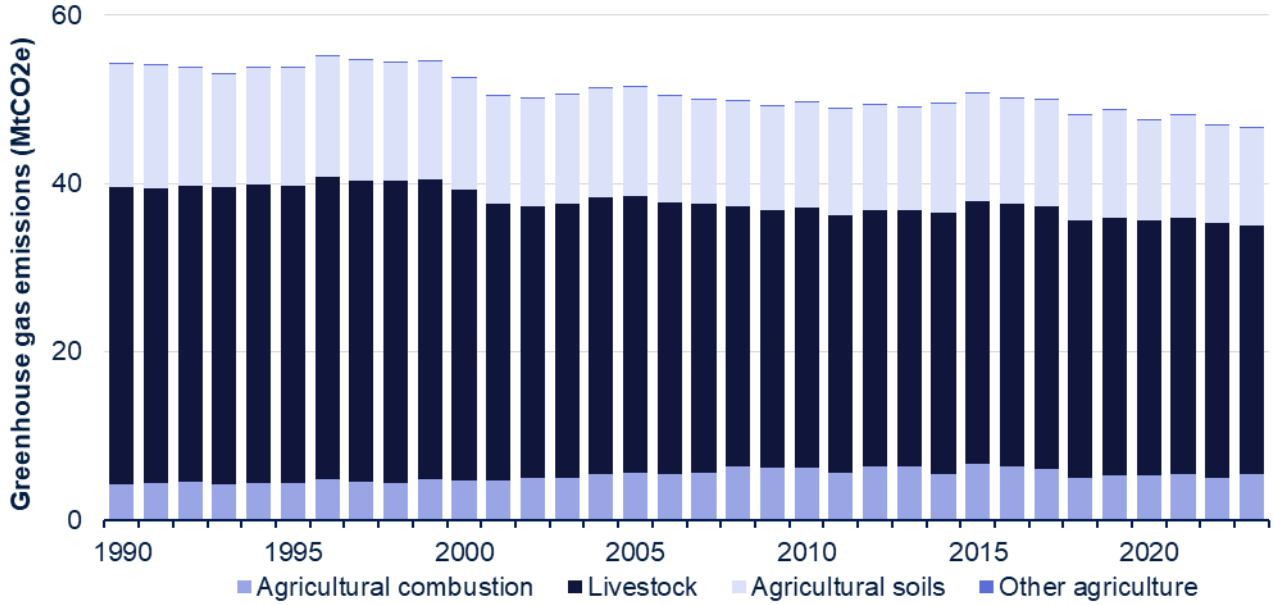
Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables

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 2023. Emissions of methane (58%) and nitrous oxide (27%) 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 2022 and 2023 there was a 1% decrease in emissions from the agriculture sector, largely due to a reduction in livestock emissions, and despite increased emissions from agricultural machinery. In 2023, greenhouse gas emissions from the agriculture sector were 14% lower than in 1990, largely driven by a fall in animal numbers and synthetic fertiliser use.

Figure 14: Greenhouse gas emissions from agriculture by subsector, UK 1990-2023 (MtCO2e)



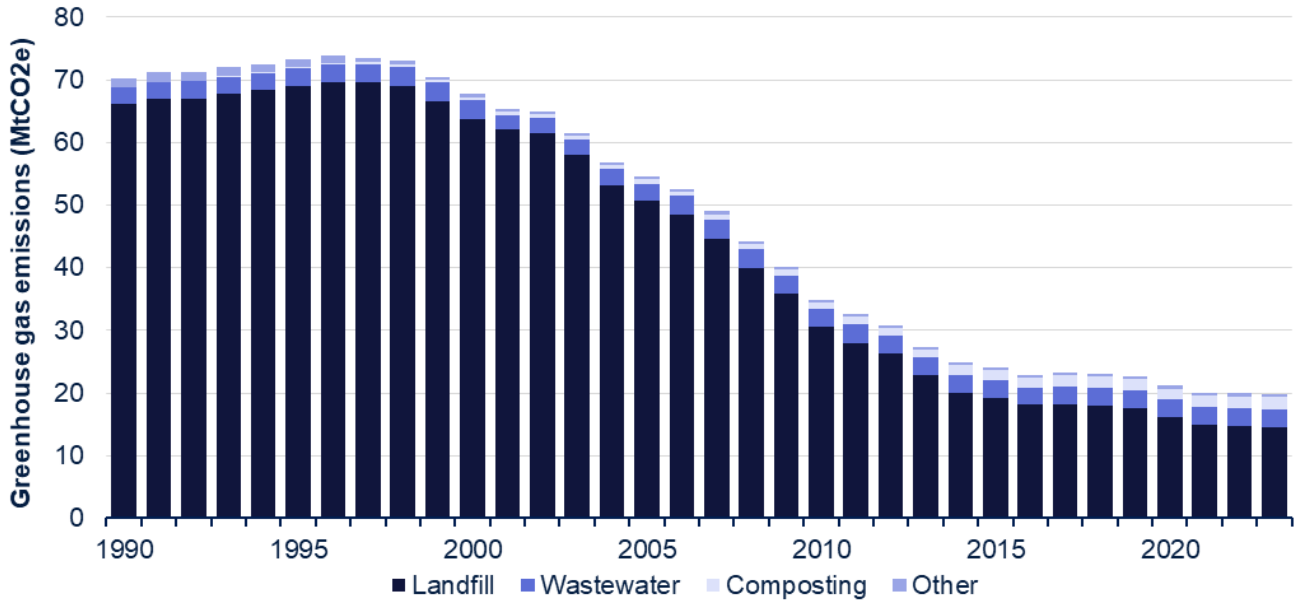
Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables

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 5% of greenhouse gas emissions in the UK in 2023, with methane emissions accounting for 91% of all waste sector emissions. Most waste sector emissions are from landfill sites.

Between 2022 and 2023 there was a 1% fall in emissions from the waste sector, largely due to a continuation of gradual decreases in emissions from landfill sites. In 2023, greenhouse gas emissions from the waste sector were 72% 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.

Figure 15: Greenhouse gas emissions from waste, UK 1990-2023 (MtCO2e)



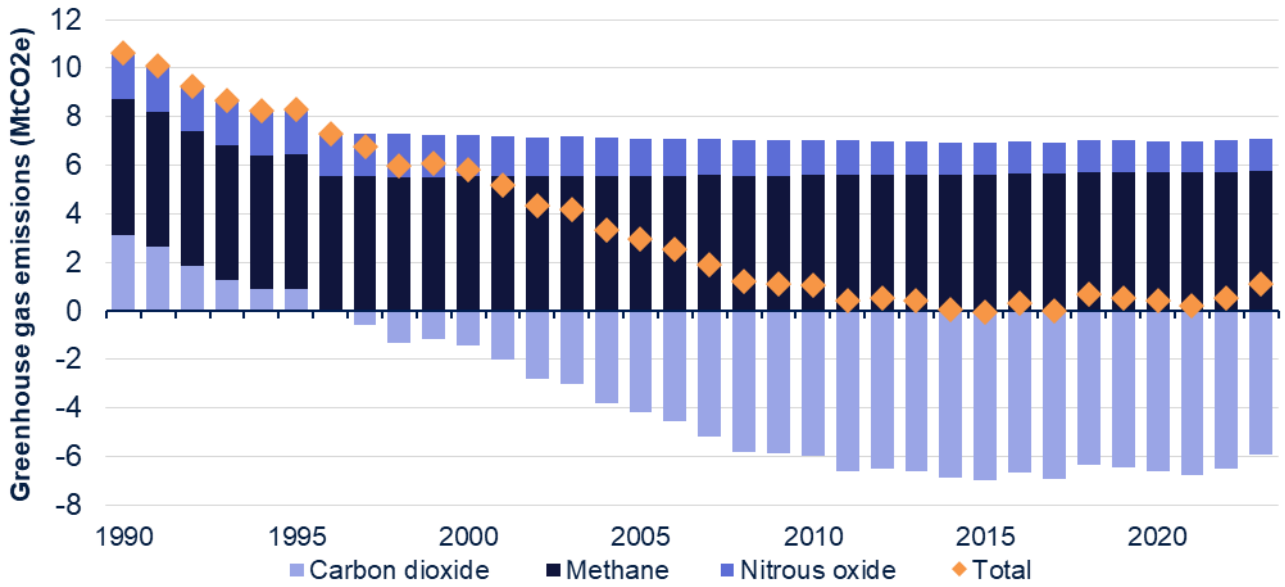
Source: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables

Land use, land use change and forestry (LULUCF)

The LULUCF sector consists of emissions and removals from forests, cropland, grassland, peatland, and settlements. Whilst LULUCF includes emissions and removals, 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 1.1 MtCO2e in 2023. This is an increase from 0.5 MtCO2e in 2022, largely due to lower emissions sinks from forest land. Between 1990 and 2023, LULUCF net emissions fell by 9.5 MtCO2e. The largest factor in this long-term fall has been a reduction in emissions from peatlands associated with ongoing 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 16: Greenhouse gas emissions from the LULUCF sector, UK 1990-2023 (MtCO2e)



Sources: Tables 1.2 to 1.6, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables

International comparison

UK territorial greenhouse gas emissions account for around 1% of the global total, based on a range of estimates produced by the UN, the International Energy Agency, and the World Resources Institute amongst others. Under the UNFCCC, the UK and a number of other countries (known as the Annex I Parties to the Convention[25]) 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 set out by the Intergovernmental Panel on Climate Change (IPCC), allowing for comparisons to be made between different countries' emission estimates[26].

Figure 17 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[27]. To be consistent with other countries the UK emissions shown are the 2022 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 charts, for Annex I countries this is 2022. 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 emissions and removals from the LULUCF sector.

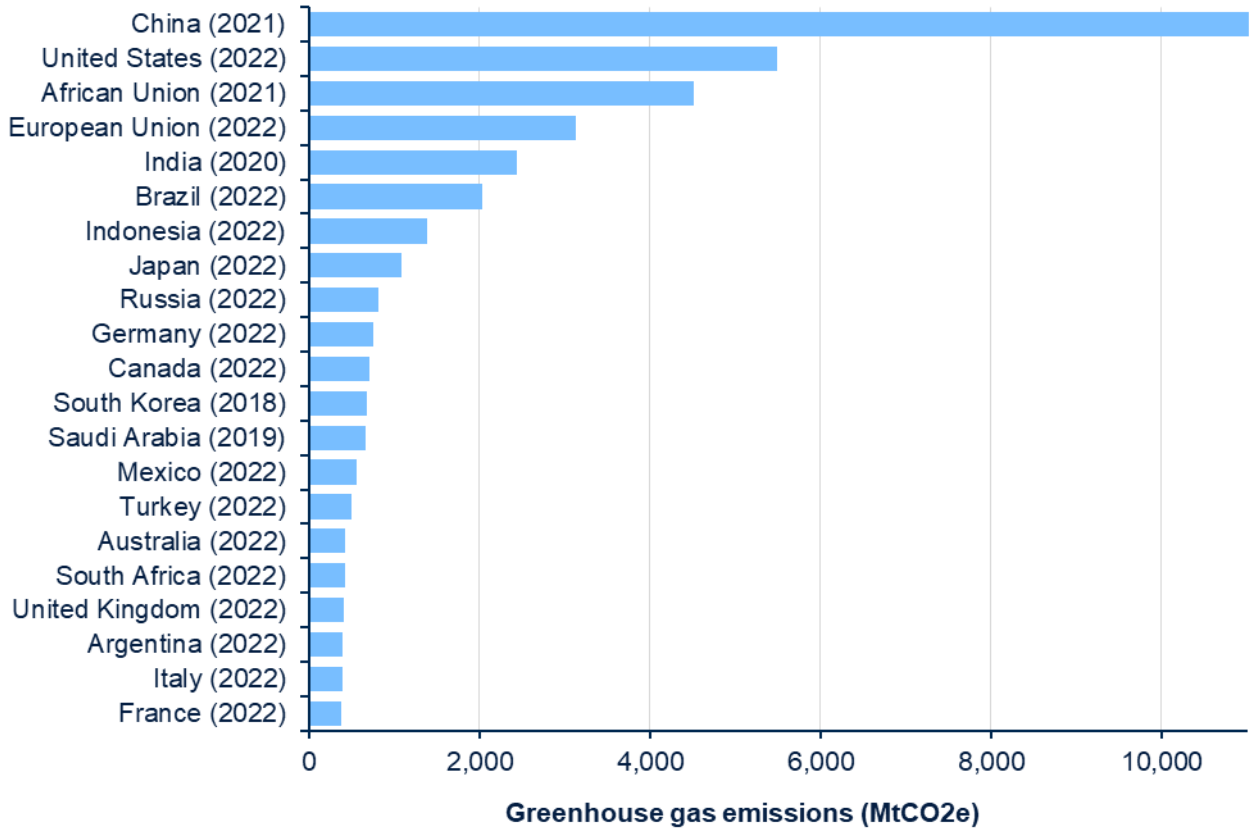
Countries' emissions tend to reflect their size, with the highest emissions coming from the countries with the largest populations and land areas. China is the country with the highest greenhouse gas emissions, of around 13,000 MtCO2e in 2021 (the latest year of data available), followed by the United States, which had emissions of around 5,500 MtCO2e in 2022. The African Union had emissions of around 4,500 MtCO2e in 2021, whilst the European Union had emissions of 3,100 MtCO2e in 2022.

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 due to a delay in UNFCCC submissions for the first year of Paris Agreement reporting.

Higher emission rates can be associated with several factors, such as significant heavy industry, a large manufacturing sector, or the use of more carbon intensive fuels such as coal for electricity generation.

[25] Annex I Parties' submissions in 2024 showing greenhouse gas emissions in 2022 are available here: https://unfccc.int/ghg-inventories-annex-i-parties/2024
[26] 2006 IPCC Guidelines for National Greenhouse Gas Inventories: https://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html
[27] A description of the methodology used by Climate Watch and a comparison with the UNFCCC data are available here: https://www.climatewatchdata.org/about/faq/ghg

Figure 17: Most recent 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 charts.
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 2022 emissions estimates submitted to the UNFCCC in 2024 so do not incorporate the data updates and methodology changes made to the 2022 estimates in this publication.
5. The EU total includes France, Germany, and Italy despite them also being shown separately.
6. In its last submission, Saudi Arabia reported its emissions for each gas separately in absolute terms. These figures have been converted to CO2e using the same Global Warming Potentials as used for the UK figure to produce a combined total for this comparison.

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 greenhouse gas 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 1990-2022 emissions[28].

International aviation and shipping

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

Emissions from international aviation and shipping can be estimated from refuelling from bunkers[29] 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[30,31].

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 2023, emissions from international aviation fuel use from UK bunkers were estimated to be 33 MtCO2e, an increase of 17% from 2022. However, international flight numbers have not returned to pre-pandemic levels, and emissions from UK international aviation fuel use remain 8% lower than in 2019. 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.

[28] UK 2024 National Inventory Document (1990-2022): https://unfccc.int/documents/645088
[29] A large container or compartment that stores fuel for ships or aircraft
[30] ICAO strategies for reducing international aviation emissions: https://www.icao.int/environmental-protection/Pages/default.aspx
[31] 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

High altitude aviation has a greater greenhouse effect due to the formation of persistent condensation trails (contrails) over and above that of carbon dioxide emissions from fuel alone, but this is not reflected in these estimates.

Emissions from UK international shipping bunkers were estimated to be 6 MtCO2e in 2023, a decrease of 1% from 2022, and 15% lower than in 2019. UK international shipping fuel use emissions did not see as pronounced a fall in 2020 when compared to aviation but also remain at a lower level than before the COVID-10 pandemic following the fall in shipping traffic that has occurred since. Between 1990 and 2023, emissions from UK shipping bunkers have fluctuated; they had been around their 1990 level pre-pandemic.

Figure 19: Greenhouse gas emissions from UK-based international aviation and shipping bunkers, 1990-2023 (MtCO2e)

Source: Table 5.1, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables

Revisions from provisional estimates of greenhouse gas emissions

Provisional estimates of 2023 UK greenhouse gas emissions were published in March 2024, based on early estimates of energy consumption 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 2023 for the UK would be 384 MtCO2e, representing a 5.4% decrease on 2022 emissions. The final estimates show that 2023 emissions were 385 MtCO2e, a 4.9% decrease on 2022 emissions. Therefore, the provisional greenhouse gas emissions estimates underestimated total greenhouse gas emissions in 2023 (by 0.2%) and overestimated the percentage decrease in emissions from 2022 to 2023 (by 0.5 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 2023 provisional and final greenhouse gas emissions estimates, by sector

UK, 2022-2023 MtCO2e

	2023 Provisional emissions	2023 Final emissions	Difference between final and provisional	Provisional 2022 to 2023 % change	Final 2022 to 2023 % change
Electricity supply	44.1	43.9	-0.2	-19.6%	-20.2%
Fuel supply	31.1	30.1	-1.0	1.0%	-3.9%
Domestic transport	111.6	111.8	0.2	-1.4%	-1.1%
Buildings and product uses	77.6	78.5	0.8	-6.2%	-6.0%
Industry	52.8	53.1	0.3	-8.0%	-2.4%
Agriculture	47.8	46.6	-1.2	0.2%	-0.5%
Waste	18.3	19.9	1.6	-2.4%	-0.5%
LULUCF	0.8	1.1	0.3	6.2%	106.7%
Total	**384.2**	**385.0**	**0.8**	**-5.4%**	**-4.9%**

Sources: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables
Table 1a, Provisional UK greenhouse gas emissions national statistics 2023 Excel data tables

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

The provisional estimates are focused on carbon dioxide emissions from the energy sector, and only provide a simplistic estimate of non-CO2 gases which assumed that the 2023 emissions for non-CO2 gases changed from their 2022 levels in line with the percentage difference between the estimates for 2022 and 2023 of non-CO2 emissions in the 2022-2040 Energy and Emissions Projections[32] published by DESNZ. Focusing on carbon dioxide emissions, it was provisionally estimated that net UK carbon dioxide emissions in 2023 were 302.8 million tonnes, the same as estimated in the final figures. The 2023 provisional estimate for emissions of non-CO2 gases was 81 MtCO2e and the final estimate is 82 MtCO2e, meaning these emissions were underestimated by 0.9% 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 methodological 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 2025[33].

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 methodological change to the historical series since the 1990-2022 Greenhouse Gas Inventory was published is the introduction of a delay to the start of methane generation once waste is deposited at a landfill site. While there is no impact on total landfill methane emissions that are estimated to have occurred over the whole time series, there are significant reallocations of landfill emissions between years. In addition, revisions to DUKES energy balance data for gas oil, burning oil, and natural gas have impacted industry, buildings and product uses, and agriculture emissions over recent years. Gas oil sectoral consumption data has been revised to account for the removal of the entitlement to use rebated red diesel

[32] Energy and emissions projections: https://www.gov.uk/government/collections/energy-and-emissions-projections
[33] The NID covering 1990-2023 emissions will be submitted to the UNFCCC by 15 April 2025. The previous 2024 NID covering 1990-2022 emissions can be found here: https://unfccc.int/documents/645088

for most sectors in April 2022. Meanwhile, improved information from suppliers has led to revisions to burning oil and natural consumption data.

Impacts of the changes made to estimates of 1990 and 2022 emissions are given in Table 3. Revisions to other years of the time series are generally of a similar scale.

Table 3: Revisions in the 1990-2023 Greenhouse Gas Inventory, by sector

UK, 1990 and 2022 MtCO2e

	1990 emissions			2022 emissions		
	1990-2022 inventory	1990-2023 inventory	Change	1990-2022 inventory	1990-2023 inventory	Change
Electricity supply	204.0	204.0	0.0	54.9	55.0	0.2
Fuel supply	77.2	77.2	~0.0	30.8	31.3	0.5
Domestic transport	129.3	129.3	0.0	113.2	113.1	-0.1
Buildings and product uses	108.4	109.8	1.3	82.8	83.5	0.7
Industry	156.4	155.2	-1.2	57.4	54.5	-3.0
Agriculture	54.1	54.4	0.3	47.7	46.9	-0.8
Waste	72.3	70.3	-2.0	18.8	20.0	1.2
LULUCF	10.7	10.6	-0.1	0.8	0.5	-0.2
Total	**812.4**	**810.7**	**-1.7**	**406.2**	**404.7**	**-1.5**

Sources: Table 1.2, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables
Table 1.2, Final UK greenhouse gas emissions national statistics 1990-2022 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.

Transition from IPCC to CRT categories in the dataset of emissions by source

Due to a change in reporting requirements under the Paris Agreement, UK greenhouse gas inventory emissions estimates are now submitted to the UNFCCC in Common Reporting Tables (CRT). Therefore, emissions are now allocated CRT categories in the dataset of emissions by source where they were previously allocated IPCC codes. To help users understand how emissions map between IPCC codes and CRT categories, the dataset of emissions by source also includes a legacy IPCC code column.

Methodology changes

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

Landfill

There has been an update to the delay between waste deposition and the start of methane generation assumed in the landfill model, in response to a review indicating an inaccuracy in the previously assumed delay.

Organic material in solid waste degrades over time, with methane emissions from anaerobic decomposition occurring over multiple years after waste is deposited at a solid waste disposal

site. A review of the waste sector identified that the previously assumed delay to the start of the waste degradation of zero was inconsistent with the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National Greenhouse Gas Inventories[34]. Therefore, the landfill model has been updated to incorporate the IPCC default delay time of 6 months.

Whilst there is no impact on total landfill CH4 emissions that are estimated to have occurred, the implementation of a 6-month delay has a significant impact on the distribution of emissions between years.

Wastewater

Sewage sludge disposed to sea is now assumed to be settled, and therefore have zero emissions when disposed to sea.

Previously, the IPCC default emission factor for untreated sewage disposal had been used to calculate CH4 emissions from the release of sewage sludge disposal to sea. However, the IPCC default factor is deemed to be more representative of disposal to warm, organically loaded and stagnant water, and therefore overestimates emissions from releases of sewage sludge to the colder, clear, and free flowing water more typical for the UK. Sea disposal of sewage sludge was phased out by 1998. Therefore, this change leads to a reduction in emissions from wastewater in the earlier portion of the timeseries.

Bioenergy

Individual bioenergy models have been consolidated into a new aggregate bioenergy model. Importantly, the new model preserves a higher level of granularity of calculated emissions estimates. Improved granularity allows for more detailed breakdowns of emissions estimates from bioenergy use, as well as better allocation of emissions across sectors. Key improvements include:

- Additional breakdown of emissions from the full range of biofuels used in road transport.
- Disaggregation of industrial wood use across sectors.
- Disaggregation of municipal solid waste (MSW) incineration emissions to include separate estimates for fossil-based residual wastes and biogenic wastes.
- Categorisation of biomass into plant or animal biomass.

In addition, consolidation of models has removed some minor instances of double counting of emissions.

Biodiesel

Motor and heating fuels are liable to fuel duty. Historically, gas oil (diesel) intended for use in road vehicles, otherwise known as ‘white diesel’, has been subject to a higher tax rate than ‘red diesel’ intended for use in settings outside of road transport.

However, from April 2022, the entitlement to use rebated red diesel was removed for most sectors. Correspondingly, the previous assumption that biodiesel, subject to the same tax rate as white diesel, was almost exclusively consumed by road users no longer applies. Instead, this biodiesel use is now distributed across users of gas oil on a pro-rata basis. This change

[34] 2006 IPCC Guidelines for National Greenhouse Gas Inventories: https://www.ipcc-nggip.iges.or.jp/public/2006gl/

leads to minor reallocations of biodiesel use emissions from road transport to the industry and agriculture sectors from 2022.

Active deep coal mines

Estimates of methane emissions from active coal mines have been updated to incorporate site-specific data for the Aberpergwn colliery, the largest UK coal mine currently in operation. Previous estimates derived by extrapolating production data from DUKES underestimated emissions as anthracite extracted at the Aberpergwn colliery is primarily sold for non-energy uses. Therefore, site-specific measurements are deemed to be more representative than the DUKES data focused on UK production for the energy sector. Overall, incorporation of this more accurate data results in a small increase in methane emissions from the fuel supply sector.

Autogeneration

The models used to estimate emissions from organisations generating their own electricity (autogeneration) have been updated to employ more granular data on oil use. Autogeneration from the use of fuel oil and gas oil has been separated from other industrial combustion for the first time.

This change has neither an impact on the overall estimate of UK territorial greenhouse gas emissions, nor the sectoral allocation of emissions. Instead, the improved method allows for a more detailed and transparent breakdown of industrial oil use emissions that is consistent with breakdowns currently provided for coal and natural gas use.

Burning oil

Burning oil use from 1990 to 1997 is now distributed across sectors through use of the average sectoral allocations from DUKES from 2016 to 2019. Previously, timeseries data for burning oil use contained large steps between 1997 and 1998 due to lack of sectoral consumption data in DUKES prior to 1998. Average sectoral allocations from 2016 to 2019 are employed in the absence of time-series consistent data for previous years.

This change results in minor reallocations of burning oil use emissions from the industry sector to the buildings and product uses and agriculture sectors.

Outdoor waste burning

The model used to estimate emissions from waste burning has been updated to incorporate data from Defra 2019 and 2022 Domestic Burning Surveys, and to enable a more detailed breakdown of small-scale waste burning emissions by waste type. In addition, minor issues with some nitrous oxide emissions factors and the dry matter content parameter have been corrected.

Domestic combustion

The model used to estimate emissions from domestic solid fuel combustion has been updated to include data from Defra 2019 and 2022 Domestic Burning Surveys. This allows for the inclusion of use of coffee logs for the first time. In addition, new DUKES data has been utilised to improve estimates of domestic wood use. Overall, these changes have minimal impacts on domestic combustion emissions.

Agriculture

There have been several methodological updates to estimates of emissions from the agriculture sector. These include:

- An update to the estimation of nitrous oxide emissions from storage of slurry from dairy cows to include an emissions factor for natural crust cover for the first time. The emission factor for natural crust cover employed is the default factor from the 2019 Refinement to the 2006 IPCC Guidelines for Greenhouse Gas Inventories and is applied to dairy cow slurry at storage only[35]. It has been assumed that 80% of non-covered tanks form a natural crust. As uptake of covers increases, the percentage of crusted stores will be adjusted downwards. Implementation of an emissions factor for natural crust cover has resulted in small increase in nitrous oxide emissions in the agriculture sector across the entire timeseries.

- Updated modelling assumptions for estimating emissions from landspreading of organic manure to account for regulatory changes. In Wales, a new policy was introduced in 2021 whereby application of organic manure (slurry, digestate, and poultry manure) to bare soil or stubble must be incorporated within 24 hours, unless low emissions slurry spreading equipment (LESSE) has been used[36]. In Scotland, a new policy was introduced in 2023 whereby all liquid digestate as well as slurry applied by contractors or on large cattle and pig farms should be applied using LESSE[37]. In addition, assumptions around uptake of LESSE in Northern Ireland have been revised on receipt of additional activity data.

- Updated modelling assumptions for estimating emissions from slurry storage in above ground tanks to account for regulatory changes in Northern Ireland requiring all new slurry stores to be covered[38]. Correspondingly, assumptions around uptake of covers as a mitigation measure have been revised.

Land use, land use change and forestry changes

There have been several methodological updates to estimates of emissions from the the LULUCF sector. These include:

- Updates to peatland restoration areas for Scotland and Northern Ireland. For Scotland, restoration area changes occur from 2013-2022 and are based on updated data from Peatland Action, whereas for Northern Ireland, changes occur from 2020-2023 and are based on data from the Northern Ireland Executive Department of Agriculture, Environment and Rural Affairs (DAERA). These changes impact the distribution of rewetting activities across the specified timeseries.

- Several updates to the forest carbon accounting model, including improved early growth estimates, incorporation of carbon from branches on dead trees into the soil, increases in the decay rate of dead branches from 4% to 14% based on a recent review performed by Forest Research, as well as updates to the calculation of the anaerobic conditions soil water availability modifier.

[35] 2019 Refinement to the 2006 Guidelines for National Greenhouse Gas Inventories: https://www.ipcc.ch/report/2019-refinement-to-the-2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/
[36] The Water Resources (Control of Agricultural Pollution) (Wales) Regulations 2021: https://www.gov.wales/water-resources-control-agricultural-pollution-wales-regulations-2021-guidance-farmers-and-land
[37] The Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2021: https://www.legislation.gov.uk/ssi/2021/412/body/made#regulation-3-4-j
[38] The Nutrient Action Programme Regulations (Northern Ireland) 2019: https://www.daera-ni.gov.uk/articles/silage-slurry-and-agricultural-fuel-oil-ssafo-storage

- Updates to deforestation areas. For Scotland, estimates of areas of rewetted forest for 2013-2023 have been updated based on data from Peatland Action. For Northern Ireland, estimates of areas of rewetted forest for 2020-2023 have been updated based on data from DAERA. This is the first time that forest to wetland data has been available for Northern Ireland. For England, 2022 deforestation areas are derived from the 2023-2024 Forestry Commission Key Performance Indicators[39]. The 2022 deforestation areas are carried forwards for 2023.

- Updates to assumptions for harvested wood products based on additional information from Forest Research. Overall, estimates of sawmill input have been improved, leading to minor changes across the entire timeseries.

- Minor updates to estimates of harvest intensity for private forest in Northern Ireland. This leads to minor changes in estimates for forest land carbon stock change and harvested wood products.

- Updates to soil carbon stock change areas to ensure consistency with the areas used to calculate biomass losses and burning emissions.

- A minor update to include Welsh wildfire data for 2022.

- A minor update to include new bioenergy crop areas for England for 2021 and 2022. Previously, the 2020 crop areas were held constant for these years.

- An update to report indirect nitrous oxide emissions within their corresponding direct emissions categories. Previously, these emissions were reported under a separate category within the LULUCF sector.

- An update to disaggregate rewetted fen areas into separate grassland and wetland areas to ensure that emissions are allocated to the correct categories within the LULUCF sector after 20 years.

- Additional minor corrections to area estimates for Bermuda and the Cayman Islands, and corrections to estimates for the Cayman Islands to ensure correct implementation of the carbon fraction of land to settlement biomass losses. As these changes are exclusive to Overseas Territories, their impacts are excluded from UK LULUCF totals.

[39] Forestry Commission Key Performance Indicators: https://www.gov.uk/government/collections/forestry-commission-corporate-plan-performance-indicators

Accompanying tables

The following tables are available in Excel and ODS 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 1990-2023
Table 1.2	Territorial greenhouse gas emissions by source category, UK 1990-2023
Table 1.3	Territorial emissions of carbon dioxide (CO2) by source category, UK 1990-2023
Table 1.4	Territorial emissions of methane (CH4) by source category, UK 1990-2023
Table 1.5	Territorial emissions of nitrous oxide (N2O) by source category, UK 1990-2023
Table 1.6	Territorial emissions of fluorinated gases (F gases) by source category, UK 1990-2023
Table 1.7	Territorial greenhouse gas emissions by type of fuel, UK 1990-2023
Table 1.8	Territorial emissions of carbon dioxide (CO2) by source category, UK 1970-1990 (no longer published)

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 (no longer published)

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

Table 3.1	Territorial greenhouse gas emissions by geographical coverage and gas, UK, Crown Dependencies & Overseas Territories, 1990-2023
Table 3.2	Territorial greenhouse gas emissions for the UK, Crown Dependencies and Overseas Territories by source category, 1990-2023
Table 3.3	Territorial greenhouse gas emissions in the UK, Crown Dependencies & Overseas Territories, and totals reported to the UNFCCC and under the Paris Agreement, 1990-2023
Table 3.4	Territorial greenhouse gas emissions for the UK, Crown Dependencies and Overseas Territories by type of fuel, 1990-2023

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: 1990/2022 *(will be updated on 27 March 2025 with 2023 estimates)*
Table 4.2	Uncertainty in estimates of territorial greenhouse gas emissions by source sector, UK, Crown Dependencies and Overseas Territories: 1990/2022 *(will be updated on 27 March 2025 with 2023 estimates)*
Table 4.3	UK territorial greenhouse gas emissions: changes over successive Greenhouse Gas Inventories from 1990-2008 to 1990-2023

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, 1990-2023

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 27 March 2025)*

Table 7.1	Territorial greenhouse gas emissions by end user category, UK 1990-2023
Table 7.2	Territorial emissions of carbon dioxide (CO2) by end user category, UK 1990-2023
Table 7.3	Territorial emissions of methane (CH4) by end user category, UK 1990-2023
Table 7.4	Territorial emissions of nitrous oxide (N2O) by end user category, UK 1990-2023
Table 7.5	Territorial emissions of fluorinated gases (F gases) by end user category, UK 1990-2023
Table 7.6	Territorial emissions of carbon dioxide (CO2) by end user category, UK 1970-1990

UK territorial emissions by Standard Industrial Classification (SIC) *(will be added in a separate file on 26 June 2025*)

Table 8.1	Territorial greenhouse gas emissions by industry section and group, UK 1990-2023
Table 8.2	Territorial emissions of carbon dioxide (CO2) by industry section and group, UK 1990-2023
Table 8.3	Territorial emissions of methane (CH4) by industry section and group, UK 1990-2023
Table 8.4	Territorial emissions of nitrous oxide (N2O) by industry section and group, UK 1990-2023
Table 8.5	Territorial emissions of hydrofluorocarbons (HFCs) by industry section and group, UK 1990-2023
Table 8.6	Territorial emissions of perfluorocarbons (PFCs) by industry section and group, UK 1990-2023
Table 8.7	Territorial emissions of sulphur hexafluoride (SF6) by industry section and group, UK 1990-2023
Table 8.8	Territorial emissions of nitrogen trifluoride (NF3) by industry section and group, UK 1990-2023
Table 8.9	Territorial greenhouse gas emissions by industry section, group and Territorial Emissions Statistics sector, UK 1990-2023

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[40]. 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

[40] 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

can be dependent on a range of parameters, such as feed characteristics for livestock or the 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 CO2 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 1990-2023 inventory will be published in April 2025, so the NID for the 1990-2022 inventory is the most recent methodology report at the time of this publication[41].

DESNZ also runs a programme to monitor atmospheric concentrations of greenhouse gases, which is used to verify the emission estimates made in the Greenhouse Gas Inventory[42].

Estimating emissions on a temperature adjusted basis

In our provisional 2023 UK greenhouse gas emission statistics[43] 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 2022 and 2023 were provisionally estimated to be 421 MtCO2e and 398 MtCO2e respectively. Therefore, the decrease in emissions between 2022 and 2023 in the temperature adjusted figures was 23 MtCO2e, closely aligned with the 22 MtCO2e decrease seen in the provisional non-temperature adjusted figures. This suggests that variations in temperature were not a significant factor driving the trends in emissions from 2022 to 2023. Critically, average temperature in 2023 and 2022 were similarly higher than the average over the 30-year period from 1991-2020 by 0.8°C and 0.9°C respectively[44].

[41] UK 2024 National Inventory Document (1990-2022): https://naei.energysecurity.gov.uk/reports/uk-greenhouse-gas-inventory-1990-2022-annual-report-submission-under-framework-convention
[42] 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
[43] Provisional 2023 UK greenhouse gas emissions: https://www.gov.uk/government/statistics/provisional-uk-greenhouse-gas-emissions-national-statistics-2023
[44] 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 4: Comparison of unadjusted and temperature adjusted greenhouse gas emissions estimates, 2022-2023

UK, 2022-2023 MtCO2e

	2022 emissions	2023 emissions	Absolute change	Percentage change
Final estimates ➢ unadjusted emissions	404.7	385.0	-19.7	-4.9%
Provisional estimates ➢ unadjusted emissions	406.2	384.2	-22.0	-5.4%
Provisional estimates ➢ Temperature adjusted emissions	420.6	398.1	-22.6	-5.4%

Source: Table 1.1, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables
Table 1a, Provisional UK greenhouse gas emissions national statistics 2023 Excel data tables
Note: The provisional emissions estimates differ from the emissions estimates shown elsewhere in this publication because they were published before the 2023 figures presented were finalised.

Uncertainties

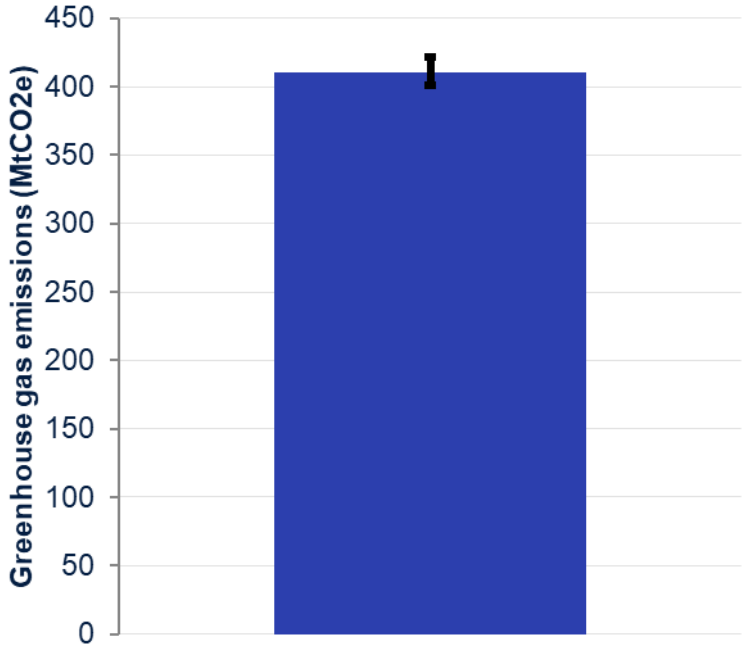
In the data tables accompanying this publication, Table 4.1 shows the uncertainty in the 2022 UK greenhouse gas emissions estimates by gas and Table 4.2 shows it by sector. These will be updated to show the equivalent 2023 estimates on 27 March 2025.

Estimates of greenhouse gas emissions have an inherent uncertainty due to uncertainty in the underlying data used to calculate the emissions, and due to uncertainty in the applicability, completeness, and application of that data. Uncertainty analysis is conducted by modelling the uncertainty in the underlying emission factors, activity data and other variables within models, or in the overall model output. The uncertainties are expressed as a 95% confidence interval. This means that in the uncertainty model 95% of the simulated values fell between the intervals shown. They are expressed as 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 and E is the mean.

The overall uncertainty around total greenhouse gas emissions for 2022 is estimated to be around 3%, as shown in Figure 21 (which is based on uncertainty analysis of 2022 emissions, as published in 2024). The geographic coverage of the uncertainty estimates includes the UK, Crown Dependencies and Overseas Territories, but uncertainty estimates for the UK only would be expected to be very similar. Estimates of 2023 uncertainties will be published on 27 March 2025.

The uncertainty of greenhouse gas emissions estimates varies considerably by sector. LULUCF emissions estimates are the most uncertain, followed by waste and agriculture. Among the different greenhouse gases, carbon dioxide estimates have the lowest uncertainty associated with them while nitrogen trifluoride and perfluorocarbons estimates are the most uncertain.

Figure 21: Illustration of uncertainty in UK greenhouse gas emissions, UK, Crown Dependencies and Overseas Territories, 2022 (MtCO2e)



The error bar on this chart represents the uncertainty range (in this case, the 95% confidence interval) around the 2022 total greenhouse gas emissions central estimate.

Source: Table 4.1, Final UK greenhouse gas emissions statistics 1990-2023 Excel data tables

Further information

Future updates to these statistics

On Thursday 27 March 2025 DESNZ will publish a breakdown of 1990-2023 UK territorial emissions with energy supply emissions on an end-user basis to supplement the source sector breakdown included in this publication and estimates of the uncertainty in the 2023 emission estimates.

On Thursday 27 March 2025 DESNZ will also publish provisional estimates of UK greenhouse gas emissions for 2024. This will coincide with the publication of Energy Trends statistics, which will include estimates of 2024 UK energy consumption.

On Thursday 26 June 2025 DESNZ will publish estimates of 1990-2023 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 2024 will be published in February 2026, with a summary of any planned methodology changes published in advance of that in January 2026.

Related publications

- This statistical release and the related data tables are the first release of data from the National Atmospheric Emissions Inventory (NAEI) for 1990-2023, produced for DESNZ and the Devolved Administrations by Ricardo. Additional results will be released as they become available. For further information, see the NAEI website.

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

- 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 2023 must be laid before Parliament and published no later than 31 March 2025. This will give details of the Net UK Carbon Account for 2023, 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 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.

Contact

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

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

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