



## Annex 2: 2022 UK Greenhouse Gas Emissions, by Standard Industrial Classification

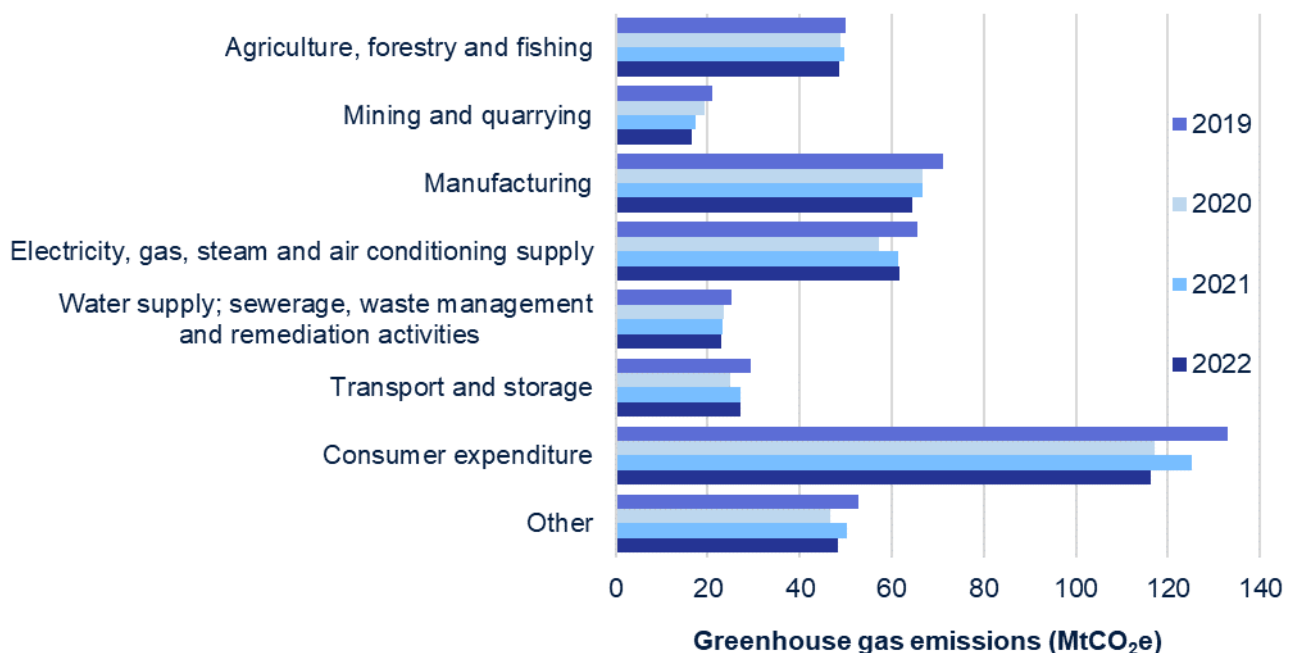
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Accredited Official Statistics

This publication is an extension of the final UK territorial greenhouse gas emission estimates by source for 1990-2022 published in February 2024. It provides the latest estimates of 1990-2022 greenhouse gas emissions in the UK by Standard Industrial Classification (SIC).

- Manufacturing was the largest emitting SIC section at an estimated 64.4 million tonnes of carbon dioxide equivalent (MtCO<sub>2e</sub>) in 2022, followed by 'electricity, gas, steam and air conditioning supply' with 61.7 MtCO<sub>2e</sub>, equating to 15.9% and 15.2% of all UK emissions in 2022 respectively.
- Despite rises in some SIC sections as the UK continued to recover from the coronavirus (COVID-19) pandemic, 2022 saw a decrease in emissions from most SIC sections as warmer weather and higher energy costs reduced fuel consumption. The SIC section with the largest absolute decrease in total emissions was manufacturing, which decreased by 2.3 MtCO<sub>2e</sub> (3.4%). This was largely due to reduced emissions from the manufacture of basic iron and steel.
- Three SIC sections saw an increase in emissions in 2022, with 'transport and storage' and 'electricity, gas, steam and air conditioning supply' seeing the largest absolute increases of 0.2 MtCO<sub>2e</sub> (0.6%) and 0.2 MtCO<sub>2e</sub> (0.3%) respectively.
- 28.6% of 2022 emissions (116.4 MtCO<sub>2e</sub>) are captured by 'consumer expenditure', a non-SIC section which includes emissions associated with households and personal travel, as opposed to business activity. Emissions from consumer expenditure decreased by 7.0% (8.8 MtCO<sub>2e</sub>) in 2022.

**Figure 1: Territorial greenhouse gas emissions by Standard Industrial Classification section, UK 2019 to 2022**



Source: Table 8.1, Final UK greenhouse gas emissions national statistics 1990-2022 Excel data tables

# Introduction

This publication is an extension of the final UK territorial greenhouse gas emission estimates by source for 1990-2022 published in February 2024. It provides the latest estimates of 1990-2022 greenhouse gas emissions in the UK by Standard Industrial Classification (SIC), which are presented in carbon dioxide equivalent units throughout this statistical release. Million tonnes of carbon dioxide equivalent (MtCO<sub>2e</sub>) are used within this report to provide consistency and comparability with the report from the main part of this publication, whilst figures are presented in thousand tonnes of carbon dioxide equivalent (ktCO<sub>2e</sub>) in the accompanying data tables so that smaller figures can more easily be distinguished from zeros.

The SIC is used to classify businesses and activities to the relevant industries and includes a hierarchy of SIC codes to represent subsections of various industries. Using this system allows this publication to report greenhouse gas emissions against their relevant industry rather than their whole-economy sector, as is seen in the [estimates by Territorial Emissions Statistics \(TES\) sector](#) that were published in February 2024. Emissions from a particular industry can vary over time due to a number of factors, including expansions and contractions in that industry as well as changes in practices. The total emissions presented here are consistent with the data published in February by source sector.

In the data tables accompanying this report, tables 8.1 to 8.8 present emissions by SIC section and group overall and for each gas, while table 8.9 shows how the emissions in each SIC group break down into TES sectors. All the figures in this report and in tables 8.1 to 8.9 present estimates of the different greenhouse gases using the global warming potentials from Working Group 1 of the IPCC Fifth Assessment Report: Climate Change 2013.

Note that as part of this release, the 1990-2021 emissions figures have been revised since the previous publication of territorial emissions by SIC in June 2023 to incorporate methodological improvements and new data. Therefore, the estimates presented here supersede previous ones.

## 2022 greenhouse gas emissions by SIC section

In 2022, 15.9% of the UK's territorial greenhouse gas emissions were from the 'manufacturing' section, with emissions of 64.4 MtCO<sub>2e</sub>. This was the largest of any of the industry sections presented in these statistics and has been since 2019. The electricity, gas, steam and air conditioning supply section had emissions of 61.7 MtCO<sub>2e</sub> (15.2% of the UK total) and the 'agriculture, forestry and fishing' section 48.5 MtCO<sub>2e</sub> (12.0%).

Net territorial greenhouse gas emissions in the UK decreased 3.5% in 2022, and are estimated to be 9.3% lower than in 2019, the most recent pre-pandemic year. The COVID-19 pandemic and the subsequent restrictions that were in place in 2020 and 2021 across the UK had a significant impact on greenhouse gas emissions in the UK, affecting different industries in different ways. The last of these restrictions were lifted in the UK during 2022, leading the industry sections most affected by the pandemic to see proportional increases in emissions

when compared to 2021, namely ‘activities of households as employers; undifferentiated goods and services-producing activities of households for own use’, and ‘transport and storage’.

However, 2022 was also a much warmer year than 2021, by 0.8 degrees Celsius on average across the year. These warmer temperatures led to a large drop in emissions from heating buildings and were the main factor driving the fall in overall UK emissions. Higher energy and other costs may have also been a factor in reducing demand for fuels, particularly towards the end of the year.

Consequently, all but three SIC sections saw emissions decrease between 2021 and 2022. Similarly, all but two SIC sections saw emissions remain below 2019 levels, the most recent pre-pandemic year. The largest absolute fall in emissions in 2022, excluding ‘consumer expenditure’, was from ‘manufacturing’, falling 2.3 MtCO<sub>2e</sub> (3.4%). This fall in emissions in the ‘manufacturing’ section is largely the result of lower activity in the iron and steel industry.

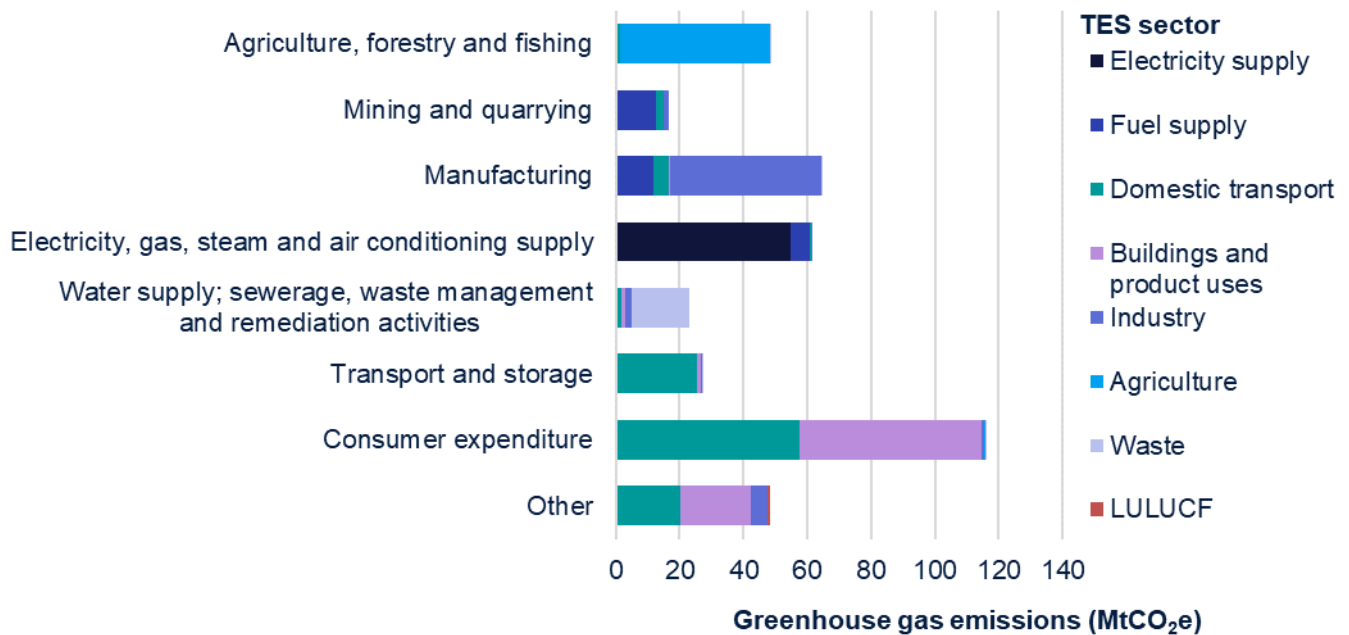
Meanwhile, emissions from ‘electricity, gas, steam and air conditioning supply’ increased by 0.2 MtCO<sub>2e</sub> (0.3%) as a result of higher gas use for UK electricity production. This was mainly driven by higher net exports of electricity to France. Emissions from the ‘transport and storage’ section also increased by 0.2 MtCO<sub>2e</sub> (0.6%), having been particularly impacted by the COVID-19 pandemic over recent years. Similarly, emissions from the ‘activities of households as employers; undifferentiated goods and services-producing activities of households for own use’ saw an increase in emissions of 0.01 MtCO<sub>2e</sub> (14.4%), returning close to its 2019 level.

In 2022, consumer expenditure emissions decreased 8.8 MtCO<sub>2e</sub> (7.0%) compared to 2021 to 116.4 MtCO<sub>2e</sub>, representing 28.6% of all greenhouse gas emissions in the UK. Private travel, largely road transport, accounted for 57.4 MtCO<sub>2e</sub> (49.3%) of the 2022 consumer expenditure emissions total, with the rest almost entirely resulting from the combustion of fuels in homes, in particular from gas boilers used for heating. Greenhouse gas emissions from private travel increased 2.7% in 2022 as travel continued to rebound towards pre-pandemic levels. However, emissions from private travel remain 13.0% lower than in 2019. In contrast, emissions from non-travel consumer expenditure decreased by 14.9% in 2022, with the warmer weather when compared to 2021 likely to be the main factor resulting in less energy being used to heat homes. Higher energy and other costs may have reduced consumer demand for heating, particularly towards the end of the year.

Figure 2 shows which Territorial Emissions Statistics (TES) sectors the emissions in each SIC section fall into. The emissions from some TES sectors, such as agriculture, electricity supply, and waste, fall entirely or almost entirely within one SIC section, while emissions from others, such as domestic transport and buildings and product uses, are spread across a large range of SIC sections.

When emissions are considered on a TES sector basis, the largest sector in recent years is domestic transport, which was responsible for 27.9% of UK emissions in 2022 (113.2 MtCO<sub>2e</sub>). Around half (50.8%) of these transport emissions in 2022 were from households, predominantly from the private use of cars. The largest SIC industry section for domestic transport emissions is ‘transport and storage’, which was responsible for 22.3% of UK domestic transport emissions in 2022. The remaining 26.9% of domestic transport emissions are split across other industry sections.

**Figure 2: Territorial greenhouse gas emissions by Standard Industrial Classification section and TES sector, UK 2022**



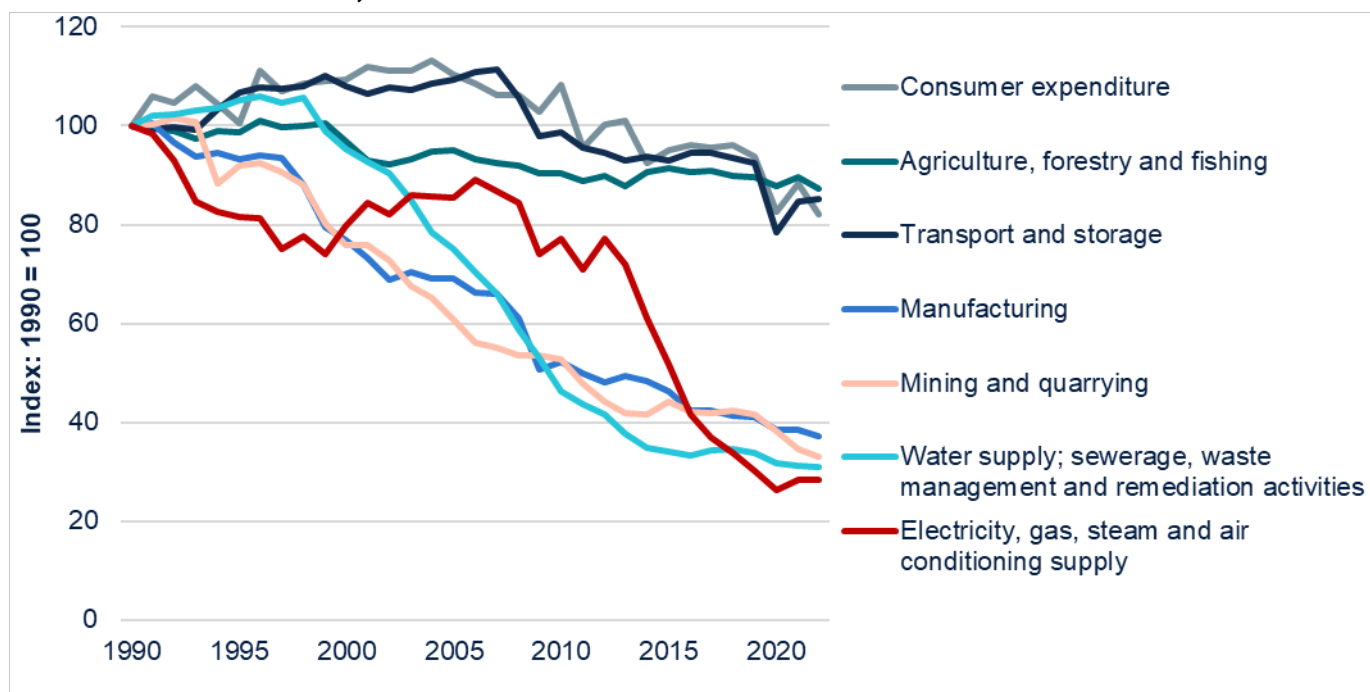
Source: Table 8.9, Final UK greenhouse gas emissions national statistics 1990-2022 Excel data tables

## 1990-2022 greenhouse gas emissions by SIC section

The overall reduction in territorial greenhouse gas emissions in the UK from 1990 to 2022 was 50.0% (406.2 MtCO<sub>2e</sub>), with the largest contributor being a 71.6% (155.4 MtCO<sub>2e</sub>) fall in emissions from the ‘electricity, gas, steam and air conditioning supply’ section, due mainly to a switch from the use of coal in electricity production to other lower emitting fuels such as natural gas and more recently renewable sources.

Emissions from the manufacturing section fell by 108.9 MtCO<sub>2e</sub> (62.8%) between 1990 and 2022. The most significant reduction in manufacturing was a 38.2 MtCO<sub>2e</sub> (90.3%) fall in the manufacture of petrochemicals, followed by a 14.9 MtCO<sub>2e</sub> (60.1%) fall in emissions from the manufacture of basic iron and steel.

There was a 51.3 MtCO<sub>2e</sub> (69.0%) fall in emissions from the ‘water supply; sewerage, waste management and remediation activities’ industry section between 1990 and 2022. This was due to 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. In 2022 it was responsible for about 5.7% of UK emissions (23.0 MtCO<sub>2e</sub>).

**Figure 3: Trend in territorial greenhouse gas emissions for selected Standard Industrial Classification sections, UK 1990 to 2022**

Source: Table 8.1, Final UK greenhouse gas emissions national statistics 1990-2022 Excel data tables

Seven of the twenty SIC sections have seen increases in greenhouse gas emissions since 1990. This includes construction, which saw emissions increase by 22.7% (1.9 MtCO<sub>2e</sub>) to 10.0 MtCO<sub>2e</sub> in 2022. Overall, real estate activities have seen the largest growth in emissions over this period, increasing by 41.6% (0.3 MtCO<sub>2e</sub>) since 1990. Emissions from 'accommodation and food services' increased by 33.9% (1.0 MtCO<sub>2e</sub>) between 1990 and 2022. Emissions from the 'wholesale and retail trade; repair of motor vehicles and motorcycles' increased by 8.8% (1.0 MtCO<sub>2e</sub>) between 1990 and 2022, largely driven by increased use of hydrofluorocarbons (HFCs) in refrigeration and air conditioning systems in the retail sector.

Consumer expenditure greenhouse gas emissions fell by 17.9% (25.4 MtCO<sub>2e</sub>) between 1990 and 2022. Within that, private travel emissions had increased by 9.3% (5.6 MtCO<sub>2e</sub>) from 1990 to 2019, however, following a large reduction due to the COVID-19 pandemic and resulting restrictions they were down 5.0% (3.0 MtCO<sub>2e</sub>) in 2022 compared to 1990. Non-travel emissions tend to fluctuate from year to year depending on the temperature, as households consume more or less energy depending on the weather. Nonetheless, non-travel consumer expenditure emissions have seen a gradual fall over time. In 2022, emissions from non-travel consumer expenditure fell by 14.9% (10.3 MtCO<sub>2e</sub>), making up almost half of the 27.6% (22.4 MtCO<sub>2e</sub>) emissions reduction in this section since 1990. Reduced emissions from non-travel consumer expenditure when compared to 2021 are largely the result of warmer weather, although higher energy and other costs may have also caused consumer to reduce their energy use.

# Accompanying tables

The following tables are available in Excel and ODS format on the department's [statistics website](#).

Table 8.1	Estimated territorial greenhouse gas emissions by industry section and group, UK 1990-2022
Table 8.2	Estimated territorial emissions of carbon dioxide (CO <sub>2</sub> ) by industry section and group, UK 1990-2022
Table 8.3	Estimated territorial emissions of methane (CH <sub>4</sub> ) by industry section and group, UK 1990-2022
Table 8.4	Estimated territorial emissions of nitrous oxide (N <sub>2</sub> O) by industry section and group, UK 1990-2022
Table 8.5	Estimated territorial emissions of hydrofluorocarbons (HFCs) by industry section and group, UK 1990-2022
Table 8.6	Estimated territorial emissions of perfluorocarbons (PFCs) by industry section and group, UK 1990-2022
Table 8.7	Estimated territorial emissions of sulphur hexafluoride (SF <sub>6</sub> ) by industry section and group, UK 1990-2022
Table 8.8	Estimated territorial emissions of nitrogen trifluoride (NF <sub>3</sub> ) by industry section and group, UK 1990-2022
Table 8.9	Estimated territorial greenhouse gas emissions by industry section, group, and Territorial Emissions Statistics sector, UK 1990-2022

## Technical information

These estimates have been produced by Ricardo based on the territorial greenhouse gas emission estimates in the National Atmospheric Emissions Inventory (NAEI), which is maintained by Ricardo on behalf of the Department for Energy Security & Net Zero (DESNZ). They are consistent with the estimates of emissions by Standard Industrial Classification (SIC) groups published by the Office for National Statistics (ONS) in the UK's Environmental Accounts, other than that the ONS estimates are presented on a "residence" basis whereas these statistics are on a "territorial" basis.

The greenhouse gas emission estimates in the NAEI are primarily calculated from a combination of activity data and emission factors. The methodology is outlined and explained in the final 2022 UK greenhouse gas emissions estimates statistical release that this annex accompanies.

These emissions have then been allocated to industry sectors based on the Standard Industrial Classification (SIC) 2007. A mapping procedure is required to make a link between the source categories in the NAEI and the SIC 2007 groups. The definitions are such that many of the NAEI sources can be mapped directly to a SIC 2007 group through many-to-one relationships, where one or more NAEI sources are judged as being equivalent to or contained within a single SIC 2007 group. In some other cases NAEI sources can be linked to several SIC 2007 codes through one-to-many relationships, and here the "activity" and consequent emissions from that source have to be split to each of the relevant SIC 2007 codes either directly according to their proportionate level of activity, or indirectly.

Further details can be found in the ONS Environmental Accounts quality and methodology information here:

<https://www.ons.gov.uk/economy/environmentalaccounts/methodologies/environmentalaccountsonairemissionsqmi>

These estimates are on a "territorial" basis, meaning they show emissions within the UK's borders. Similar estimates are also published on a "residence" basis by ONS as part of the UK Environmental Accounts. These are known as the air emissions accounts. Emissions on a residence basis include emissions that UK residents and UK-registered businesses are directly responsible for, whether in the UK or overseas, but exclude emissions from foreign visitors and businesses in the UK. The methodology used to allocate the territorial emissions to SIC (in this publication) and residence emissions are the same, although the scope will be different.

An explanation of the different measures of greenhouse gas emissions in the UK can be found in an article about '[Measuring UK greenhouse gas emissions](#)' published by ONS.

Bridging tables are available from ONS that clearly explain the differences between the reporting used for the ONS Environmental Accounts, used to fulfil the UK's UN System of Environmental-Economic Accounting (SEEA) reporting requirements for Eurostat, and the territorial estimates published by DESNZ and used to fulfil the UK's international UNFCCC reporting requirements:

<https://www.ons.gov.uk/economy/environmentalaccounts/datasets/ukenvironmentalaccountsatmosphericemissionsbridgingtables>

Estimates of emissions have an inherent uncertainty due to uncertainty in the underlying data used for the inventory and due to uncertainty in the applicability, completeness, and application of that data. Estimates of the uncertainty in the emissions estimates by gas and by sector are shown in tables 4.1 and 4.2 in the main set of Excel tables in the final 2022 UK greenhouse gas emissions statistics. In addition, there are further uncertainties in these estimates by SIC group due to the allocation of the emissions estimates to industry groups, which in some cases has needed to be modelled using other datasets. Further details are published by ONS in its methodology information:

<https://www.ons.gov.uk/economy/environmentalaccounts/methodologies/environmentalaccountsonairemissionsqmi#methods-used-to-produce-the-air-emissions-data>

## Further information

### Future updates to these statistics

In February 2025 final 1990-2023 UK greenhouse gas emissions estimates will be published by source sector.

In March 2025 the 1990-2023 UK emissions estimates will be updated to include estimates by end user and uncertainty estimates, and provisional 2024 emissions estimates will be published.

In June 2025 the 1990-2023 UK emissions estimates will be updated to include estimates by Standard Industrial Classification (SIC). We will also publish estimates of greenhouse gas emissions by local authority for 2023.

## Contact

- Responsible statistician: William Hayes
- Email: [GreenhouseGas.Statistics@energysecurity.gov.uk](mailto:GreenhouseGas.Statistics@energysecurity.gov.uk)
- Media enquiries: 020 7215 1000
- Public enquiries: 07824 416228





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