



## Annex 2: 2020 UK Greenhouse Gas Emissions, by Standard Industrial Classification

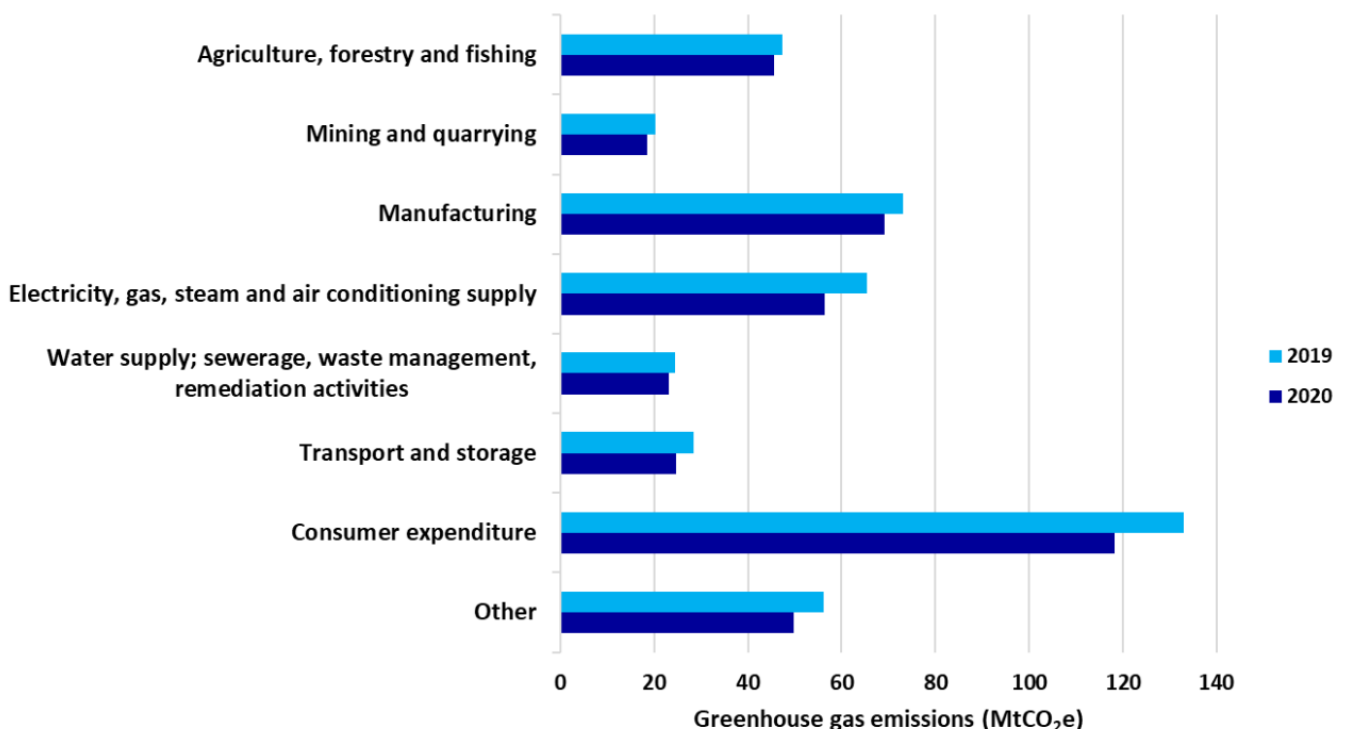
30 June 2022

National Statistics

This publication is an extension of the final UK territorial greenhouse gas emission estimates by source for 1990-2020 published in February 2022. It provides the latest estimates of 1990-2020 greenhouse gas emissions in the UK by Standard Industrial Classification (SIC).

- Manufacturing was the largest emitting SIC section at an estimated 69.2 million tonnes of carbon dioxide equivalent (MtCO<sub>2e</sub>) in 2020, followed by 'electricity, gas, steam and air conditioning supply' with 56.4 MtCO<sub>2e</sub>, equating to 17.1% and 13.9% respectively of all UK 2020 emissions.
- Greenhouse gas emissions fell 9.5% from 2019 to 2020, almost three times the fall from 2018 to 2019, this would have been significantly impacted by the coronavirus (COVID-19) pandemic and resulting restrictions brought in across the UK. Between 2019 and 2020, the SIC section with the largest proportional fall in total emissions was 'activities of households as employers; undifferentiated goods and services-producing activities of households for own use', which fell 31.3% (0.01 MtCO<sub>2e</sub>). Whereas electricity, gas, steam and air conditioning supply had the largest absolute decrease in total emissions from 2019 to 2020, decreasing by 8.9 MtCO<sub>2e</sub> (13.7%).
- 29.1% of 2020 emissions (118.2 MtCO<sub>2e</sub>) are captured by 'consumer expenditure', a non-SIC section which captures emissions associated with households and personal travel, as opposed to business activity.

**Figure 1: Territorial greenhouse gas emissions by Standard Industrial Classification section, UK 2019 and 2020**



## Introduction

This publication is an extension of the final UK territorial greenhouse gas emission estimates by source for 1990-2020 published in February 2022. It provides the latest estimates of 1990-2020 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>) is 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. Due to the COVID-19 pandemic and the subsequent restrictions that were introduced in 2020 across the UK there were major impacts on various aspects of society and the economy, which lead to a significant impact on greenhouse gas emissions in the UK.

The Standard Industrial Classification is used to classify business 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 National Communication sector](#) that were published in February 2022. 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 National Communication sectors. All of the figures in this report and in tables 8.1-8.9 present estimates of the different greenhouse gases using the global warming potentials from Working Group 1 of the IPCC Fourth Assessment Report.

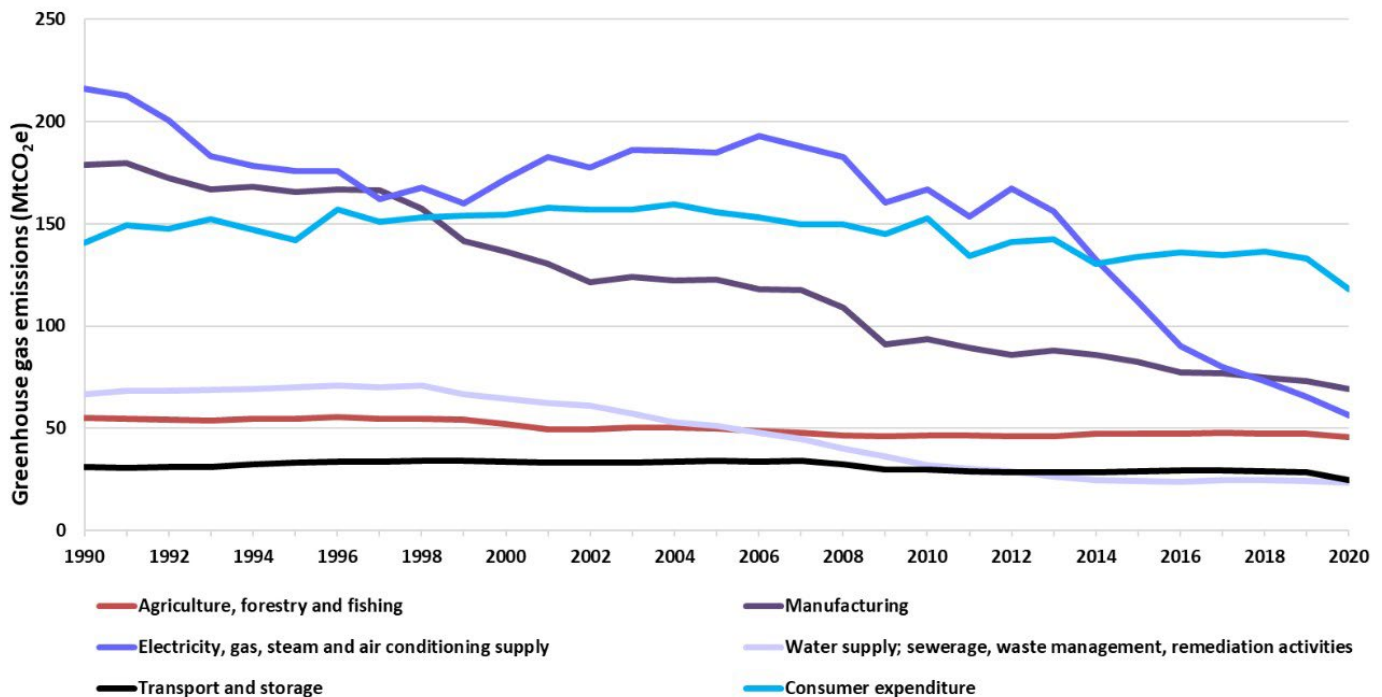
## 1990-2020 greenhouse gas emissions by SIC section

The overall reductions in territorial greenhouse gas emissions in the UK from 1990 to 2020 was 49.7% (400.7 MtCO<sub>2e</sub>), with the largest contributor being a 73.9% (159.7 MtCO<sub>2e</sub>) fall in emissions from the 'electricity, gas, steam and air conditioning supply' section, due largely to a switch from the use of coal in electricity production to other more efficient fuels such as natural gas and more recently renewable sources.

All SIC sections saw emissions reductions between 2019 and 2020, with the largest reduction in emissions, excluding 'consumer expenditure', coming from electricity, gas, steam and air conditioning supply, reducing by 8.9 MtCO<sub>2e</sub> (13.7%). From 2009 to 2019, emissions from 'transport and storage' have been relatively stable, fluctuating between 28.3 and 29.9 MtCO<sub>2e</sub> from year to year. Comparatively, between 2019 and 2020, transport and storage emissions fell 13.1% (3.7MtCO<sub>2e</sub>) from 28.3 to 24.6 MtCO<sub>2e</sub>, which can be attributable to the impact of the COVID-19 pandemic as people were instructed to stay at home as much as possible for large periods of 2020 and many businesses reduced their activities.

In 2020, 17.1% of the UK's territorial greenhouse gas emissions were from the manufacturing industry, with emissions of 69.2 MtCO<sub>2</sub>e. This was the largest of any of the industry sections presented in these statistics. The electricity, gas, steam and air conditioning supply section had emissions of 56.4 MtCO<sub>2</sub>e (13.9% of the UK total) and the 'agriculture, forestry and fishing' section 45.6 MtCO<sub>2</sub>e (11.3%).

**Figure 2: Territorial greenhouse gas emissions for selected industries by Standard Industrial Classification section, UK 1990 to 2020**

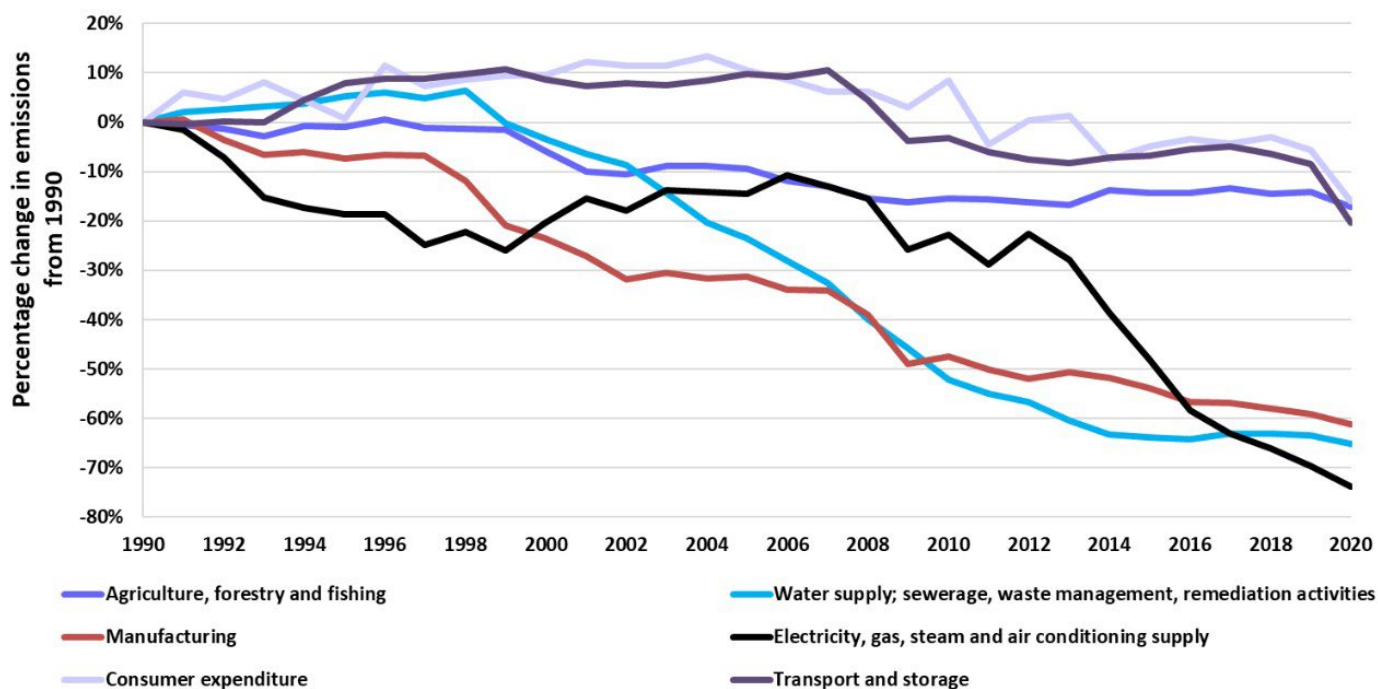


Emissions from the manufacturing section fell by 109.5 MtCO<sub>2</sub>e (61.3%) between 1990 and 2020. The most significant reduction in manufacturing was a 40.9 MtCO<sub>2</sub>e (87.6%) fall in the manufacture of petrochemicals, followed by a fall of 13.8 MtCO<sub>2</sub>e (55.9%) in emissions from the manufacture of basic iron & steel.

There was a 65.2% (43.5 MtCO<sub>2</sub>e) fall in emissions from the 'water supply; sewerage, waste management and remediation activities' industry section between 1990 and 2020. 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 2020 it was responsible for about 5.7% of UK emissions (23.2 MtCO<sub>2</sub>e).

Several industries have seen increases in greenhouse gas emissions since 1990. This includes emissions from the 'wholesale and retail trade (including the repair of motor vehicles and motorcycles)', which, despite a 12.3% (1.9 MtCO<sub>2</sub>e) decrease from 2019 to 2020, increased by 13.7% between 1990 and 2020 to 13.2 MtCO<sub>2</sub>e. This was due to an increase in emissions from the retail sector, driven by increased emissions from the use of refrigeration and air conditioning systems which use HFCs. Since 1990, there has also been a 16.1% increase in emissions from the construction industry to 10.9 MtCO<sub>2</sub>e in 2020.

**Figure 3: Percentage change in territorial greenhouse gas emissions for selected industries by Standard Industrial Classification section, UK 1990 to 2020**



In 2020, consumer expenditure emissions were down 14.8 MtCO<sub>2</sub>e (11.1%) to 118.2 MtCO<sub>2</sub>e, compared to 2019, representing 29.1% of the UK total. 51.0 MtCO<sub>2</sub>e (43.2%) of the 2020 consumer expenditure emissions were from private travel, largely road transport, with the rest almost entirely resulting from the combustion of fuels in homes, in particular from gas boilers used for heating (in 2020, 98.3% of non-travel consumer expenditure emissions were due to domestic combustion). The level of greenhouse gas emissions from non-travel increased by 0.8% from 2019 to 2020, likely due to the greater energy demand as people spent more time at home with restrictions in place due to the pandemic, but these emissions have fallen by 16.7% since 1990. Travel emissions had increased by 10.3% (6.2 MtCO<sub>2</sub>e) from 1990 to 2019, however, due to a 23.1% fall in 2020 they are now down 15.2% compared to 1990. This large reduction in travel related greenhouse gas emissions would have been impacted by travel restrictions in place due to the pandemic. 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, although in 2020 the increase in these emissions was despite the warmer weather that year.

When emissions are considered on a National Communication sector basis, the largest sector in recent years is transport, which was responsible for 24.4% of UK emissions in 2020 (98.8 MtCO<sub>2</sub>e). Around half (50.8%) of these transport emissions in 2020 were from households, predominantly from the private use of cars. The largest industry section was transport and storage (section H), which was responsible for 23.4% of UK transport emissions in 2020, with the remaining 25.8% of transport emissions split across other industry sections.

## 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 1990-2020
Table 8.2	Estimated territorial emissions of carbon dioxide (CO <sub>2</sub> ) by industry section and group, UK 1990-2020
Table 8.3	Estimated territorial emissions of methane (CH <sub>4</sub> ) by industry section and group, UK 1990-2020
Table 8.4	Estimated territorial emissions of nitrous oxide (N <sub>2</sub> O) by industry section and group, UK 1990-2020
Table 8.5	Estimated territorial emissions of hydrofluorocarbons (HFCs) by industry section and group, UK 1990-2020
Table 8.6	Estimated territorial emissions of perfluorocarbons (PFCs) by industry section and group, UK 1990-2020
Table 8.7	Estimated territorial emissions of sulphur hexafluoride (SF <sub>6</sub> ) by industry section and group, UK 1990-2020
Table 8.8	Estimated territorial emissions of nitrogen trifluoride (NF <sub>3</sub> ) by industry section and group, UK 1990-2020
Table 8.9	Estimated territorial greenhouse gas emissions by industry section, group and National Communication sector, UK 1990-2020

## Technical information

These estimates have been produced by Ricardo Energy and Environment based on the territorial greenhouse gas emission estimates in the National Atmospheric Emissions Inventory (NAEI), which is maintained by Ricardo Energy and Environment on behalf of the Department for Business, Energy and Industrial Strategy (BEIS). 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 "residency" 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 2020 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 "residency" basis by the Office for National Statistics, as part of the UK Environmental Accounts. These are known as the air emissions accounts. Emissions on a residency 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 residency 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 the ONS article '[Net Zero and the different official measures of the UK's greenhouse gas emissions](#)'.

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 BEIS 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 2020 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 2023 final 1990-2021 UK greenhouse gas emissions estimates will be published by source sector.

In March 2023 the 1990-2021 UK emissions estimates will be updated to include estimates by end user and uncertainty estimates, and provisional 2022 emissions estimates will be published.

In June 2023 the 1990-2021 UK emissions estimates will be updated to include estimates by Standard Industrial Classification (SIC). BEIS will also publish estimates of greenhouse gas emissions by local authority for 2021.

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