

Statistical bulletin

# Greenhouse gas emissions intensity, UK: 2020 provisional estimates

Measuring the contribution of the environment to the economy, the impact of economic activity on the environment, and society's response to environmental issues.



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# 1 . Main points

- Greenhouse gas (GHG) emissions fell by approximately 13% between 2019 and 2020, to just over 480 million tonnes of CO<sub>2</sub> equivalent ([these estimates are compiled on a residence basis](#)).
- Coronavirus (COVID-19) restrictions implemented in the UK in Quarter 1 (Jan to Mar) 2020 are likely to be the main driver of the declines in GHG emissions.
- The transport sector was the biggest contributor to the decline, with GHG emissions falling by 40% between 2019 and 2020.
- Consumer expenditure still accounts for the most emissions; it was responsible for almost 28% of all greenhouse emissions in the UK in 2020.
- Emissions of acid rain precursor fell by 12% between 2019 and 2020.
- The total GHG intensity for the UK dropped by approximately 5% for the year 2020.

## 2 . Greenhouse gas emissions and emissions intensity

Estimates in this bulletin are on a [residence basis](#) and all sectors and industries mentioned relate to those defined under the UK Standard Industrial Classification (SIC) 2007.

The total greenhouse gas (GHG) emissions for 2020 were over 480 million tonnes of carbon dioxide equivalent (Mt Co<sub>2</sub>e) ([estimates are compiled on a residence basis](#)). This is a 13% decline from 2019 and is the biggest single year drop since these statistics began in 1990.

The four sectors contributing the most GHG to UK emissions are the same ones as in previous years: consumer expenditure, energy, manufacturing and transport. These four collectively contribute over 70% of total UK GHG emissions.

Transport recorded the biggest fall in greenhouse emissions, dropping by just over 40% from 2019 to 2020. Previously this sector had seen annual emissions fall by between 1% and 2%. This transport emissions reduction is much greater than in any other sector, and much greater than the overall 13% reduction. The next largest sectoral emissions reduction was 14% for mining and quarrying.

Households, who are accountable for emissions related to consumer expenditure, were the largest contributors to UK emissions when compared to industry sectors. This has been the case for the last number of years. Emissions fell less for households than for some other sectors. Emissions related to consumer expenditure in particular were down over 10% from the previous year, to 133 million tonnes (Mt Co<sub>2</sub>e) in 2020, which is one of the biggest annual reductions in this sector since 1990. Consumer expenditure emissions are primarily from the heating of homes and travelling (including commuting, social, domestic or leisure travelling).

In 2020, GHG emissions intensity for the UK dropped to 0.20 thousand tonnes of Co<sub>2</sub>e per £ million of gross value added (GVA). This is a drop of 5% from the previous year, which is slightly over the average year on year reduction of intensity of 4% since 1990. The sector with the largest fall was transport, which dropped by 29%. Usually, a reduction in overall UK greenhouse gas emissions intensity would indicate that the UK is moving towards a greener and more sustainable economy. However, for 2020, we have to note that restrictions relating to the coronavirus (COVID-19) pandemic will have impacted the economic output of most industries and activity more broadly.

## Acid rain precursor emissions and other pollutants

Acid rain has steadily reduced over the last decade. Industries have reduced acid rain precursor emissions, by an average 6% year-on-year since 1990. There was a 11% reduction in acid rain precursor emissions in 2020, a level of annual reduction recorded five times since 1990. The 2020 drop can be almost entirely attributed to the travel sector, which saw a fall of 24% between 2019 and 2020, equivalent to 66 thousand tonnes of sulphur dioxide equivalent. Other sectors recorded record falls but, on average, by only 7% over the same period.

Particulates and other pollutants were also down in 2020: PM2.5 down 7%, as PM10 (8%), carbon monoxide (6%) and benzene (6%).

## 3 . Environmental accounts data

[Atmospheric Emissions: greenhouse gases by industry and gas](#)

Dataset | Released 21 September 2021

Data on the emissions of carbon dioxide, methane, nitrous oxide, hydro-fluorocarbons, perfluorocarbons, sulphur hexafluoride, nitrogen trifluoride and total greenhouse gas emissions, UK, 1990 to 2019 and (provisional) 2020.

## 4 . Measuring the data

The 2020 data in this release is provisional. To produce provisional 2020 air emissions data, the 2019 data on activities occurring that could result in emissions are updated using information on production activities for 2020 (where available, or using appropriate proxy information if necessary). Emission factors from 2019 that estimate the mass of emissions associated with those activities (by type of gas or pollutant) are then applied.

The UK Environmental Accounts are "satellite accounts" to the main UK National Accounts. They are compiled in accordance with the [System of Environmental Economic Accounting \(SEEA\)](#), which closely follows the UN System of National Accounts (SNA).

### Air emissions and energy use

The air and energy accounts in the UK Environmental Accounts are compiled by Ricardo Energy and Environment on behalf of the Office for National Statistics (ONS).

The main source of information for this reporting is the National Atmospheric Emissions Inventory (NAEI). This provides air emissions data, calculated from activity data and emission factors, for all relevant sources in the UK as a starting point for generating the air emissions accounts. The residence principle is then applied to these datasets, thereby apportioning the emissions to an industrial classification based on [Standard Industrial Classification: SIC 2007](#).

## 5 . Strengths and limitations

More quality and methodology information on strengths, limitations, appropriate uses, and how the data were created is available in the [Environmental accounts air emissions Quality and Methodology Information \(QMI\)](#).

## 6 . Glossary

## Greenhouse gas

The greenhouse gases included in the atmospheric emissions accounts are those covered by the Kyoto Protocol: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF<sub>6</sub>) and nitrogen trifluoride (NF<sub>3</sub>). These gases are widely believed to contribute to global warming and climate change. The potential of each greenhouse gas to cause global warming is assessed in relation to a given weight of CO<sub>2</sub> so all greenhouse gas emissions are measured as carbon dioxide equivalents (CO<sub>2</sub>e).

## Residence basis

Estimates compiled on a residence basis include data relating to UK residents and UK-registered businesses, regardless of whether they are in the UK or overseas. Data relating to foreign visitors and foreign businesses in the UK are excluded.

## Territory basis

Estimates of greenhouse gas emissions compiled on a territory basis include emissions within UK borders. [UK air emissions statistics on a territory basis](#) are published by the Department for Business, Energy and Industrial Strategy.

## 7 . Related links

### [UK Environmental Accounts: 2021](#)

Bulletin | Released 3 June 2021

Measuring the contribution of the environment to the economy, the impact of economic activity on the environment, and society's response to environmental issues.

### [UK natural capital accounts: 2020](#)

Bulletin | Released 19 November 2020

Estimates of the financial and societal value of natural resources to people in the UK.

### [The challenges of defining a "green job"](#)

Article | Revised 7 April 2021

Reviews the options available to define "green jobs" and explores the challenges in doing so. The Office for National Statistics (ONS) contributions to defining and measuring "green jobs" are explained, together with alternatives from the relevant literature.

### [Material footprint in the UK: 2018](#)

Article | Released 10 May 2021

The UK's material footprint captures domestic and foreign extraction of materials needed to produce products used in the UK. This article presents updated estimates.

### [Low carbon and renewable energy economy, UK: 2019](#)

Bulletin | Released 29 March 2021

Estimates of the size of the UK's green economy from the Low Carbon and Renewable Energy Economy Survey, including turnover, employment, investment and trade.