

Statistical bulletin

# Estimates of quarterly greenhouse gas emissions (residence basis), UK: Quarter 4 (October to December) 2023

Estimates of greenhouse gas emissions using the Chow-Lin regression-based temporal disaggregation method. These are official statistics in development.

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# 1 . Main points

- UK greenhouse gas (GHG) emissions on a residence basis were estimated to be 133 million tonnes of carbon dioxide equivalent (MtCO<sub>2</sub>e) in Quarter 4 (Oct to Dec) 2023, which was 1.8% lower than in Quarter 4 2022.
- The UK emitted 0.18 tonnes of CO<sub>2</sub>e per million pounds of economic activity (gross value added) in Quarter 4 2023, a level similar to that seen since Quarter 2 (Apr to June) 2021 and broadly in line with our final 2021 estimates.
- All emission estimates in this bulletin and accompanying data are produced using modelling techniques, with estimates for all quarters of 2023 subject to greater uncertainty, as provisional full-year emission data for that year will not be published until autumn 2024.
- These quarterly emissions estimates complement and draw on our annual residence-based emissions statistics, last published with provisional data for 2022 on 9 October 2023.
- The fall in GHG emissions in every quarter of 2023 compared with the same quarters in 2022 is also seen in provisional quarterly UK territorial emissions data.

We refer to residence-based (also known as production) emissions in this release. This is one of three [official measures of UK greenhouse gas emissions](#). Territorial emissions, published by the Department for Energy Security and Net Zero (DESNZ), is the measure generally used for greenhouse gas emissions targets. Footprint (or consumption) emissions, published by the Department for Environment, Food and Rural Affairs (Defra), account for emissions from trade.

Because of differences in how the annual and quarterly greenhouse gas emissions estimates are produced, quarterly emissions for 2023 should not be summed to provide a provisional full-year estimate. This estimate will be published in autumn 2024.

## 2 . Experimental estimates of quarterly greenhouse gas emissions (residence basis) data

[Estimates of quarterly greenhouse gas emission](#)

Dataset | Released 29 April 2024

Estimates of greenhouse gas emissions using the Chow-Lin regression-based temporal disaggregation method, quarterly data. These are official statistics in development.

## 3 . Measuring the data

All estimates presented in this bulletin and our accompanying dataset have been produced using temporal disaggregation and modelling techniques and are therefore subject to uncertainty. Please see the [Glossary section of our previous bulletin](#) for definitions of these terms.

The main source of information and predictor indicators for producing these official statistics in development are:

- the UK [annual estimates of greenhouse gas \(GHG\) emissions on a residence basis](#)
- the [Energy Trends publication from the Department for Energy Security and Net Zero \(DESNZ\)](#), which provides information on UK energy production, consumption, and trade for energy overall and specific fuels

All estimates of the annual GHG series and the latest quarter of the energy trends are provisional and subject to revisions. The whole data time series is updated for each iteration of this release, which means that the latest version supersedes any previous versions of the data.

This bulletin presents non-seasonally adjusted estimates. Estimates on both non-seasonally adjusted and seasonally adjusted bases are available in our [accompanying dataset](#).

## Official statistics in development

These statistics are labelled as “official statistics in development”. Until September 2023, these were called “experimental statistics”. Read more about the change in the [Guide to official statistics in development](#).

We are developing how we collect and produce the data to improve the quality of these statistics, such as refining and optimising the code used. Once the developments are complete, we will review the statistics with the Statistics Head of Profession. We will decide whether the statistics are of sufficient quality and value to be published as official statistics, or whether further development is needed. Production may be stopped if they are not of sufficient quality or value. Users will be informed of the outcome and any changes. We value your feedback on these statistics. Contact us at [environment.accounts@ons.gov.uk](mailto:environment.accounts@ons.gov.uk)

## Quality

More quality and methodology information on strengths, limitations, appropriate uses, and how these quarterly estimates were created is available in our [Experimental estimates of UK quarterly greenhouse gas emissions \(residence basis\), Quality and Methodology Information](#).

## 4 . Related links

### [UK Environmental Accounts: 2023](#)

Bulletin | Released 5 June 2023

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

### [Greenhouse gas emissions, UK: provisional estimates, 2022](#)

Headline bulletin | Released 9 October 2023

Measuring the air emissions generated by UK economic activities.

### [Provisional UK greenhouse gas emissions 2023](#)

Department for Energy Security and Net Zero publication

Released 28 March 2024

Provisional estimates of UK territorial greenhouse gas emissions for 2023, including quarterly emissions estimates.

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

Dataset | Released 9 October 2023

The emissions of carbon dioxide, methane, nitrous oxide, hydro-fluorocarbons, perfluorocarbons, sulphur hexafluoride, nitrogen trifluoride and total greenhouse gas emissions, by industry (SIC 2007 group – around 130 categories), UK, 1990 to 2021 and (provisional) 2022.

## 5 . Cite this statistical bulletin

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