



# UK greenhouse gas emissions: 4th quarter 2014 provisional figures

Statistical Release: Official statistics

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This document is also available from our website at  
<https://www.gov.uk/government/publications/quarterly-uk-emissions-estimates>

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# Executive summary

## Headline results for the year to quarter 4 2014

- Total greenhouse gas emissions have been provisionally estimated at 520.5 million tonnes carbon dioxide equivalent (MtCO<sub>2</sub>e) for 2014, a decrease of 47.9 MtCO<sub>2</sub>e (8.4 percent) compared to 2013, when emissions were estimated to be 568.3 MtCO<sub>2</sub>e.
- Around half of this decrease is due to temperature differences between 2013 and 2014. When measured on a temperature adjusted basis, total greenhouse gas emissions for 2014 have been provisionally estimated at 538.6 MtCO<sub>2</sub>e. This is a decrease of 23.6 MtCO<sub>2</sub>e (4.2 percent) compared to 2013, when temperature adjusted emissions were estimated to be 562.2 MtCO<sub>2</sub>e.
- Total greenhouse gas emissions on a temperature adjusted basis for 2014 were 18.1 MtCO<sub>2</sub>e (3.5 percent) higher than actual emissions. This reflects the fact that temperatures in 2014 were 1 degree Celsius higher than the long term average.
- Looking at the quarterly emissions time series, actual and temperature adjusted emissions for 2014 are both lower than in the year up to Q3 2014. This was due to a decrease in the amount of coal used for electricity generation. This decrease was mainly driven by the closure of some coal generation plants. Some of this reduction can also be attributed to increased generation from renewable sources, and a reduction in overall electricity demand when comparing Q4 2014 with Q4 2013.

# Introduction

These statistics provide users with a first estimate of how emissions are changing on a quarter by quarter basis ahead of final emissions figures for 2014 which will be published in February 2016. This publication also provides an estimate of temperature adjusted emissions, which give an idea of overall trends in emissions without fluctuations due to changes in external temperature.

This publication will be of interest to those wanting an early indication of the broad trend of emissions. They give an early indication of emissions trends to those interested in whether we are on track to meet future targets. The statistics are estimates based on provisional inland energy consumption statistics for CO<sub>2</sub> emissions (around 80% of all greenhouse gas emissions), with other greenhouse gas emissions remaining constant for each quarter, reflecting the absence of quarterly data. As such they are not used directly to monitor progress against UK emissions targets. For information on UK emissions targets and progress towards them, see the [2013 Final UK Greenhouse Gas Emissions statistics](#). Quarterly emissions estimates are presented for the latest twelve month period ending at the end of the stated quarter. For example, emissions for the year to Quarter 4, 2014, represent an annual total comprising Quarter 4 2014, and the preceding 3 quarters, Quarters 1, 2 and 3 of 2014. Presenting the data in this way has some advantages over presenting data for single quarters, since seasonal fluctuations are smoothed out and long term trends highlighted. Data on emissions in individual quarters are available in the Excel spreadsheet data tables published alongside this publication.

Data for 2009-2013 are consistent with the annual emissions presented in the National Statistics publication 'Final UK Greenhouse Gas Emissions'. The data for 2013 emissions in previous publications was provisional and will be different to those published here as it has now been updated to include finalised estimates of emissions. Data for 2014 emissions are provisional and are calculated based on UK energy statistics on the same basis as the 2014 provisional greenhouse emissions published on March 26<sup>th</sup> 2015.

More information about the underlying methodology can be found in the accompanying [methodology document](#).

# Results

## 4th quarter 2014 greenhouse gas emissions estimates

A temperature adjustment has been applied to the quarterly CO<sub>2</sub> emissions, in order to estimate what the overall trend of emissions would have been without the impact of external temperatures.

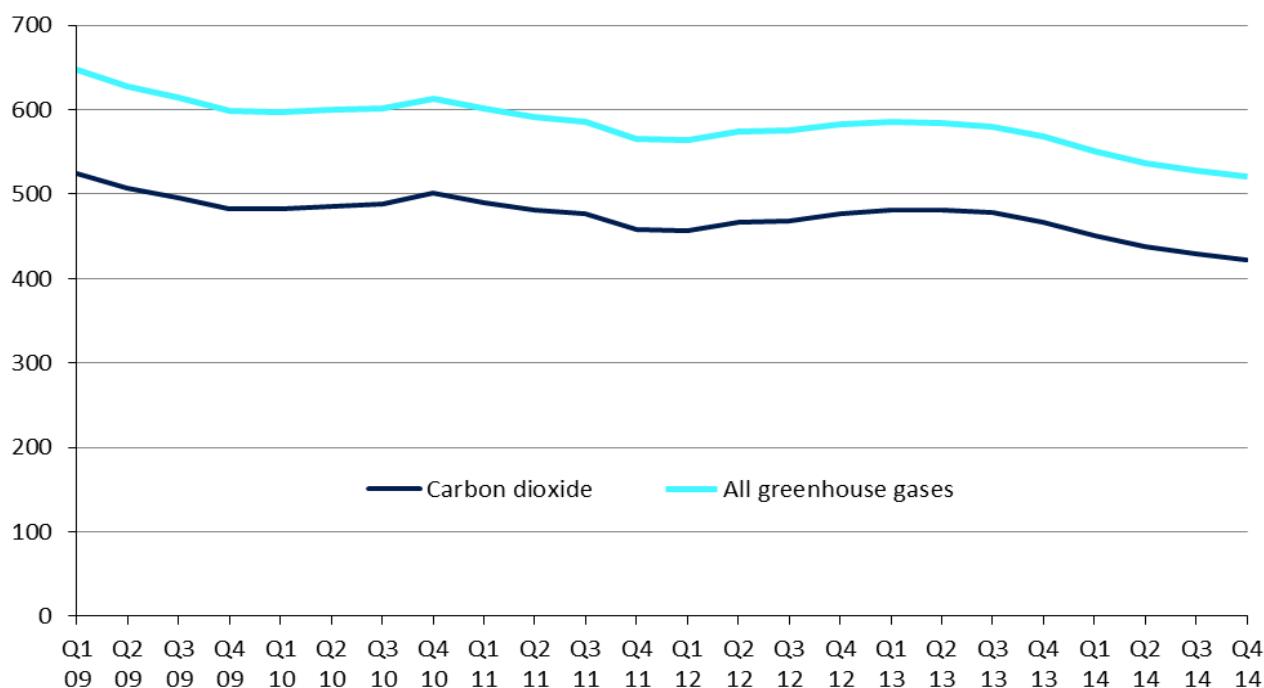
**Table 1: Actual and temperature adjusted greenhouse gas emissions, 2005 to 2014**

UK and Crown Dependencies

	2009	2010	2011	2012	2013	2014	MtCO <sub>2</sub> e Change 2013 to 2014
Actual Emissions	598.6	613.3	566.2	582.2	568.3	520.5	-8.4%
Temperature Adjusted emissions	601.2	594.0	585.0	581.4	562.2	538.6	-4.2%
Difference	2.7	-19.3	18.8	-0.8	-6.1	18.1	

Source: Tables 1 & 2, UK greenhouse gas emissions quarterly statistics April 2015 Excel data tables

**Figure 1: Actual emissions of all greenhouse gases and carbon dioxide, UK & Crown Dependencies, Year to Q1 2009 - Year to Q4 2014 (MtCO<sub>2</sub>e)**

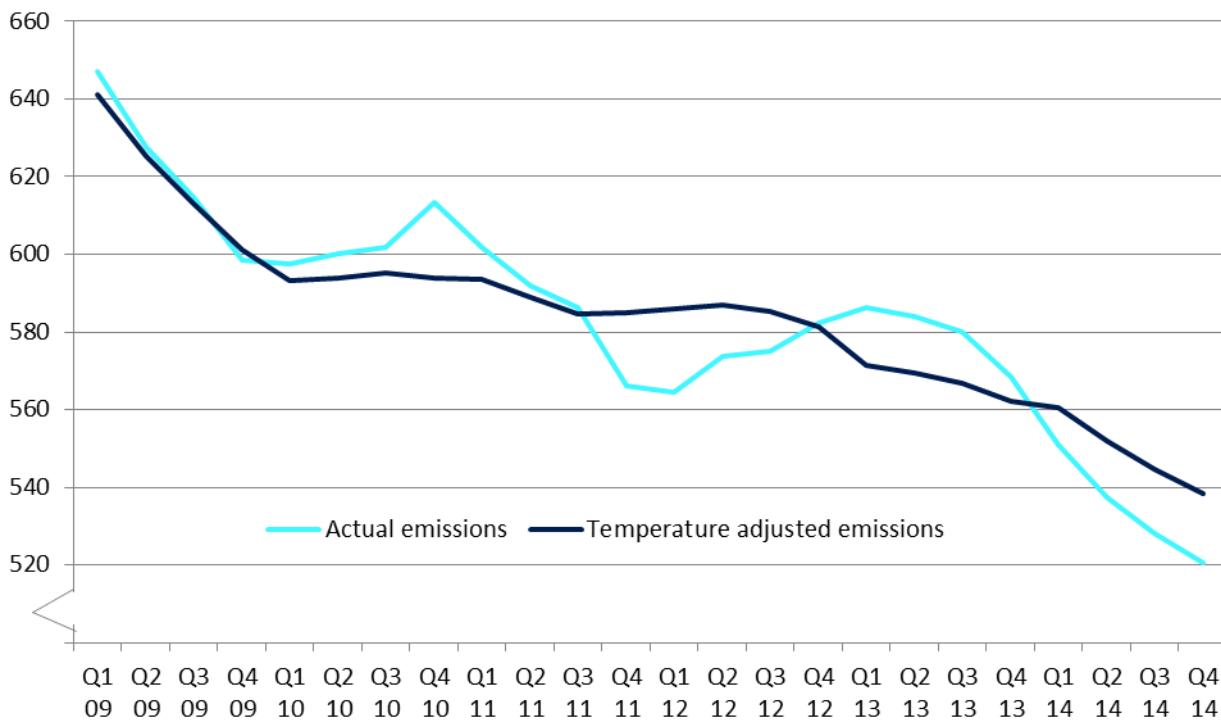


Source: Table 1, UK greenhouse gas emissions quarterly statistics April 2015 Excel data tables

- Note:
1. Figures are annual totals of the preceding 4 quarters
  2. From Q1 2014 onwards, figures include provisional data

Figure 2 compares the total GHG emissions time series from Figure 1 above with the temperature adjusted time series. The y-axis scale is different than in Figure 1, to make it easier to compare the two series.

**Figure 2: Actual and temperature adjusted GHG emissions, UK & Crown Dependencies, Year to Q1 2009 - Year to Q4 2014 (MtCO<sub>2</sub>e)**



Source: Tables 1 & 2, UK greenhouse gas emissions quarterly statistics April 2015 Excel data tables

Note: 1. Figures are annual totals including the preceding 4 quarters  
2. From year to Q1 2014 onwards, figures include provisional data

Both the non-adjusted and the temperature corrected series show a general decreasing trend since 2009, with non-adjusted emissions having decreased by 20 percent and temperature adjusted emissions by 16 percent in the year to Q4 2014, compared to the year to Q1 2009.

On a temperature adjusted basis, emissions remained relatively flat during the period between early 2010 and early 2012, while non-adjusted emissions were much more variable during this period, showing that much of the fluctuation in the non-adjusted series can be attributed to changes in energy use due to varying external temperatures. In particular, Q4 2010 was 2.4 degrees lower than the long term average, while temperatures in Q4 2012 and Q1 2013 were 1.7 and 0.9 degrees higher than the long term average.

Both temperature adjusted and non-adjusted emissions have been falling during 2013 and 2014. However, the decrease between 2013 and 2014 emissions for the temperature adjusted series (23.6 MtCO<sub>2</sub>e) was less than the decrease for the non-adjusted series (47.9 MtCO<sub>2</sub>e). This reflects the fact that temperatures in 2014 were 1.0 degrees Celsius warmer than the long term average, and means that around half of the decrease in emissions between 2013 and 2014 can be attributed to temperature differences.

**Table 2: Emissions of all greenhouse gases and carbon dioxide only**

UK and Crown Dependencies

	Year to Q3 2014	Year to Q4 2014	MtCO <sub>2</sub> e Change
Total GHG emissions	528.1	520.5	-1.5%
Temperature adjusted GHG emissions	544.7	538.6	-1.1%
Total CO <sub>2</sub> emissions	429.1	422.0	-1.6%
Temperature adjusted CO <sub>2</sub> emissions	445.6	440.1	-1.2%

Source: Tables 1 &amp; 2, UK greenhouse gas emissions quarterly statistics April 2015 Excel data tables

- Note:
1. Non-CO<sub>2</sub> emissions have not been temperature adjusted.
  2. The figures labelled as "Q4 2014" cover the four quarters from Q1 2014 to Q4 2014 inclusive.

Comparing the year up to Q4 2014 with the year up to Q3 2014, actual and temperature adjusted emissions are both lower. This was mainly due to a decrease in the amount of coal used for electricity generation. The decrease in coal was driven by the closure of some coal generation plants. Some of this reduction can also be attributed to increased generation from renewable sources, and a reduction in overall electricity demand when comparing Q4 2014 with Q4 2013.

More information regarding the long term trends in emissions in each sector can be found in the [2013 Final UK Greenhouse Gas Emissions statistics](#). See [Energy Trends](#) for further information about overall changes in the energy sector.

## Carbon dioxide emissions by source sector – actual emissions

**Table 3: Actual carbon dioxide emissions by sector Year to Q3 2014 - Year to Q4 2014**

UK and Crown Dependencies

	Year to Q3 2014	Year to Q4 2014	Change	Change (%)
Energy Supply	157.7	153.1	-4.5	-2.9%
Business	71.6	70.0	-1.7	-2.3%
Transport	116.5	116.9	0.4	0.3%
Public	8.3	8.4	0.1	1.2%
Residential	63.4	62.3	-1.1	-1.7%
Other	11.5	11.2	-0.3	-2.2%
<b>Total CO<sub>2</sub></b>	<b>429.1</b>	<b>422.0</b>	<b>-7.1</b>	<b>-1.6%</b>

Source: Table 1, UK greenhouse gas emissions quarterly statistics April 2015 Excel data tables

- Note:
1. The figures labelled as "Q4 2014" cover the four quarters from Q1 2014 to Q4 2014 inclusive.
  2. Figures for "Total CO<sub>2</sub>" and "Change" may be different to the sum of those presented in the table due to rounding.

## Carbon dioxide emissions by source sector – temperature adjusted emissions

**Table 4: Temperature adjusted Carbon dioxide emissions by sector Year to Q3 2014 - Year to Q4 2014**  
 UK and Crown Dependencies

	Year to Q3 2014	Year to Q4 2014	Change	MtCO <sub>2</sub> Change (%)
Energy Supply	162.8	158.7	-4.1	-2.5%
Business	74.1	72.7	-1.4	-1.9%
Transport	116.5	116.9	0.4	0.3%
Public	9.0	9.1	0.2	1.8%
Residential	71.7	71.4	-0.3	-0.4%
Other	11.5	11.2	-0.3	-2.2%
<b>Total CO<sub>2</sub></b>	<b>445.6</b>	<b>440.1</b>	<b>-5.5</b>	<b>-1.2%</b>

Source: Table 2, UK greenhouse gas emissions quarterly statistics April 2015 Excel data tables

Note:

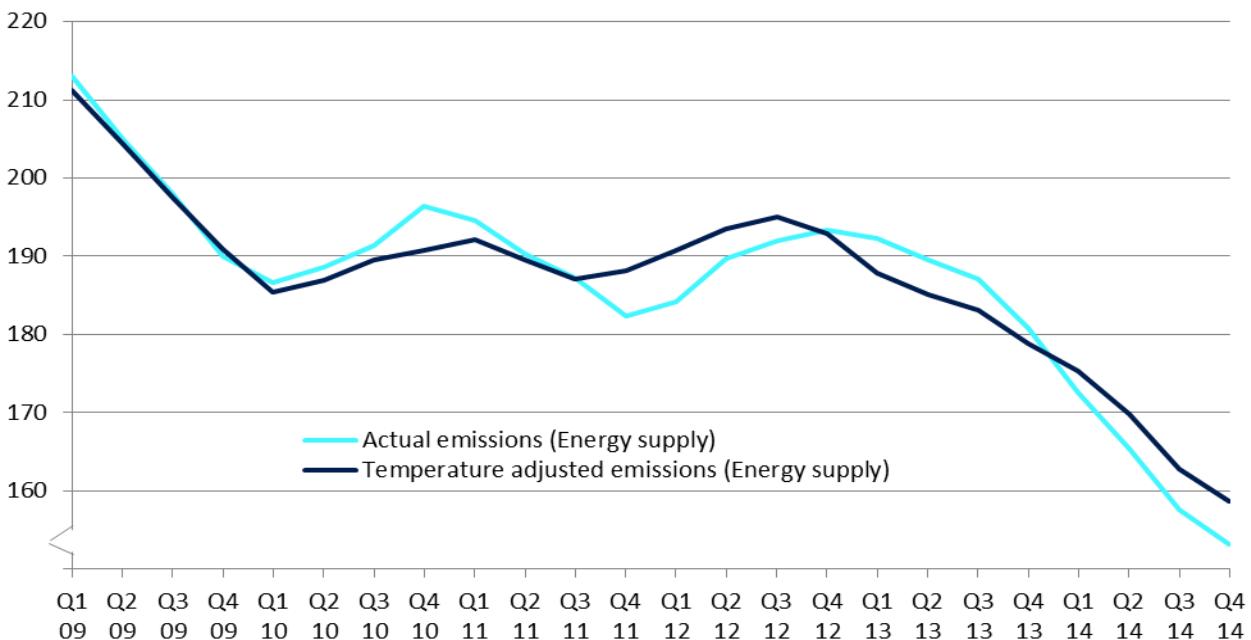
1. The figures labelled as "Q4 2014" cover the four quarters from Q1 2014 to Q4 2014 inclusive.
2. Figures for "Total CO<sub>2</sub>" and "Change" may be different to those presented in the table due to rounding.
3. Energy Supply, Business, Public and Residential are the only sectors that are temperature adjusted.

The sectors most influenced by temperature are residential and energy supply. With respect to the residential sector in particular, if temperatures increase there is a decrease in demand for space heating, resulting in a decrease in emissions. The reverse is true if temperatures decrease.

In the year to Q4 2014, when comparing Tables 3 and 4 above, adjusting emissions for temperature increases emissions from the energy supply sector by 5.6 Mt (from 153.1 to 158.7 Mt), and from the residential sector by 9.1 Mt (from 62.3 to 71.4 Mt). This reflects the fact that temperatures over the last four quarters were higher than the long term average by 1.0 degrees Celsius. For the year to Q4 2014 and the year to Q3 2014, when comparing table 3 and 4 above there is relatively little change in the absolute differences for these sectors as temperatures during the year to Q3 2014 also deviated from the long term mean by a similar amount.

Figures 3 and 4 below show the trend for these two sectors. As can be seen in the chart, temperature adjusted emissions from the energy supply sector show a similar trend to non-adjusted emissions. Temperature adjusted emissions in the energy supply sector have decreased by around 25 percent compared to the year to Q1 2009, while non-adjusted emissions have decreased by around 28 percent in the same period.

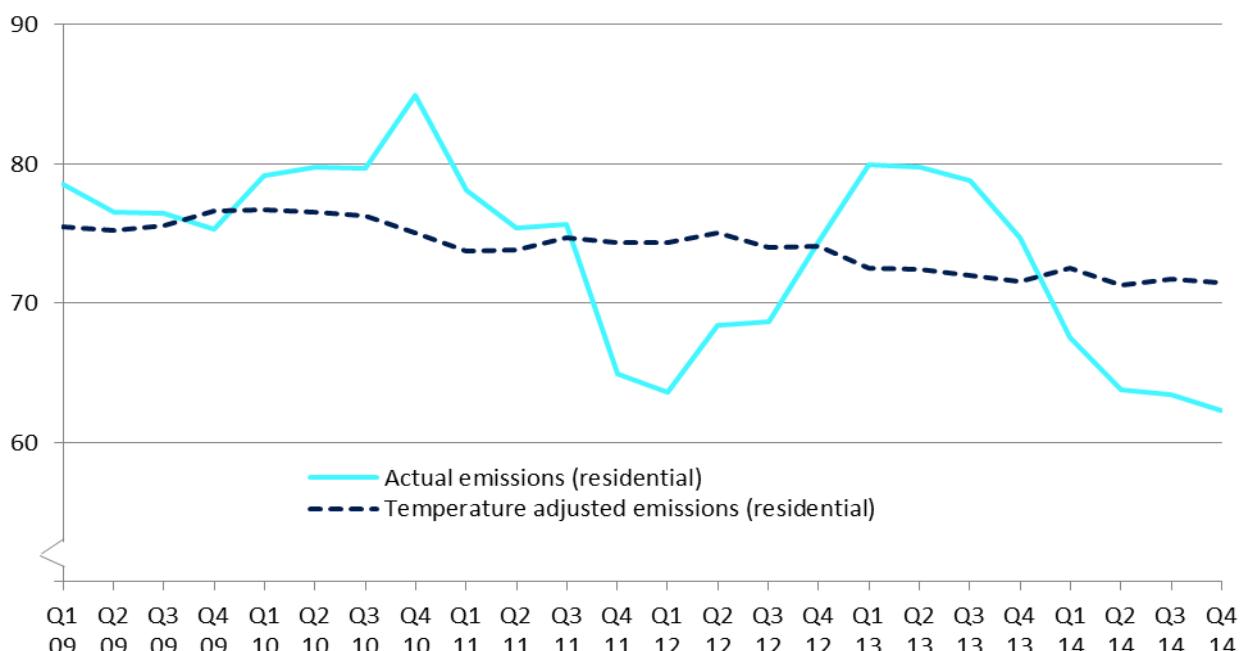
**Figure 3: Actual and temperature adjusted energy supply emissions, UK and Crown Dependencies, Year to Q1 2009 - Year to Q4 2014 (MtCO<sub>2</sub>)**



Source: Table 1, UK greenhouse gas emissions quarterly statistics April 2015 Excel data tables

In the residential sector, the difference between actual and temperature adjusted emissions is much more noticeable than in other sectors, reflecting the fact that this is the sector in which energy consumption and emissions are most sensitive to external temperatures. On a temperature adjusted basis, residential emissions have remained relatively flat between the year to Q1 2009 and the year to Q4 2014, while the trend for non-adjusted emissions is much more variable over the same time period.

**Figure 4: Actual and temperature adjusted residential emissions, UK and Crown Dependencies, Year to Q1 2009 - Year to Q4 2014 (MtCO<sub>2</sub>)**



Source: Table 2, UK greenhouse gas emissions quarterly statistics April 2015 Excel data tables

# Additional information

## Basis of the provisional quarterly emissions estimates

The estimates of carbon dioxide emissions have been produced based on provisional inland energy consumption statistics which are published in DECC's quarterly [Energy Trends](#) publication.

Carbon dioxide accounts for the majority of UK greenhouse gas emissions (82 percent in 2013). However, in order to give an indication of what the latest provisional quarterly carbon dioxide emissions estimates imply for the total, we need to also produce an estimate of emissions of the remaining non-CO<sub>2</sub> gases. Because of the lack of availability of underlying quarterly data sources for activities related to non-CO<sub>2</sub> gases, emissions from these gases are assumed to be the same during each quarter, based on the latest available published annual estimates. They have not been temperature adjusted, only carbon dioxide emissions have been adjusted for temperature.

## Quarterly totals

In order to remove the seasonality in the data so that a trend in emissions over time can be observed, quarterly emissions are reported as annual totals, covering the stated quarter plus the preceding three quarters. When data becomes available for each new quarter, the estimates for the latest quarter are added to the total, while at the same time the estimates for the same quarter from the previous year are removed from the series. This procedure smooths out short-term fluctuations and highlights long term trends, and can be used to show the underlying trend each quarter.

Emissions estimates for each individual quarter are reported in the data tables accompanying this publication.

## Quarterly emissions estimates – temperature adjustment

Carbon dioxide emissions are indirectly influenced by external temperatures. During the winter months, emissions are generally higher than in summer months, due to higher demand for fuel for space heating. During a particularly cold winter for example, it is likely that more fuel will be burnt for domestic or commercial use than during an average winter, and therefore emissions will be higher due to the additional fuel consumption.

Temperature adjusted quarterly emissions estimates therefore remove the effect of external temperatures. In a particularly cold winter quarter, for example, this will result in temperature adjusted emissions being lower than actual emissions, reflecting the lower fuel consumption which would have occurred if temperatures had been at average levels (based on the 30 year period 1981-2010). The temperature adjustment to emissions has been applied for the months from September to April inclusive; in any given calendar year, it will therefore be applied in the period from January to April, and then again from September to December. Temperature adjustment is determined by the average number of heating degree days in each quarter. This information can be found in [Energy Trends](#).

Further details of how quarterly emissions have been estimated and of the methodology underlying the temperature adjusted estimates can be found alongside this statistical release in a separate [Methodology summary](#).

## **Revisions to the quarterly provisional emissions estimates**

It should be noted that the quarterly emissions time series may be revised each quarter to reflect any revisions made to either the underlying energy data or to the UK greenhouse gas inventory. Emissions from 2009-2013 are consistent with final UK greenhouse gas emissions statistics from 1990-2013. Emissions estimates for 2014 are provisional and are based on UK energy statistics. More information on the timing of revisions to the underlying data can be found in the [Methodology summary](#).

## **Future updates to quarterly provisional emissions estimates**

Quarterly provisional estimates help us to understand the latest trend in emissions, and will provide an early indication of this trend ahead of the final annual figures being available from our greenhouse gas emissions inventory. We recommend that users look at this trend rather than any absolute figures for any particular quarter.

It is important to note that these figures are based on provisional energy data and are subject to change. The sectorial breakdown is given mainly for information, and is included in the publication for completeness, but sectorial estimates are more uncertain than the total.

These estimates are Official Statistics, having been rebadged from Experimental Statistics in October 2014 following the detailed review of the methodology.

The next quarterly statistics for the year up to Q1 2015 will be published on Thursday 9<sup>th</sup> July 2015.

## **Further information and feedback**

Further information on UK greenhouse gas emissions statistics, including Excel tables with additional data on UK emissions, can be found on the Gov.uk website at:

<https://www.gov.uk/government/organisations/department-of-energy-climate-change/series/uk-greenhouse-gas-emissions>

## **Notes for Editors**

1. The annual figures for 1990 to 2013 in this statistics release are from the National Atmospheric Emissions Inventory (NAEI). For further information on the UK Greenhouse Gas Inventory, see the [NAEI web site](#).
2. Detailed UK temperature data can be found on both the [Met Office website](#) and the [Energy Statistics section of the Gov.uk website](#).
3. The complete [Methodology summary](#) on quarterly and temperature corrected emissions can be found on the Gov.uk website.
4. The basket of greenhouse gases we report for the purposes of the Kyoto Protocol consists of carbon dioxide, methane, nitrous oxide, and the fluorinated gases: hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride and nitrogen trifluoride.
5. Any enquiries about the Energy Trends report should be sent to [energy.stats@decc.gsi.gov.uk](mailto:energy.stats@decc.gsi.gov.uk).
6. Figures up to and including the year to Quarter 4 2013 are based on final UK greenhouse gas emissions statistics. Figures from the year to Quarter 1 2014 onwards include provisional estimates.

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