



Department for  
Business, Energy  
& Industrial Strategy

# UK GREENHOUSE GAS EMISSIONS – 2<sup>ND</sup> QUARTER 2016 PROVISIONAL FIGURES

Statistical Release: Official Statistics



29 September 2016

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# UK GREENHOUSE GAS EMISSIONS – 2ND QUARTER 2016 PROVISIONAL FIGURES

## Statistical Release: Official Statistics

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Any enquiries regarding this publication should be sent to us at [ClimateChange.Statistics@beis.gov.uk](mailto:ClimateChange.Statistics@beis.gov.uk).

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This publication is available for download at <https://www.gov.uk/government/collections/uk-greenhouse-gas-emissions-quarterly-official-statistics>.

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# Executive Summary

## Headline results for the year to Q2 2016

- Total greenhouse gas emissions have been provisionally estimated at 476.3 million tonnes carbon dioxide equivalent (MtCO<sub>2</sub>e) for the twelve months leading to Q2 2016, a decrease of 34.7 MtCO<sub>2</sub>e (6.8 per cent) compared to the same period in 2015, when emissions were estimated to be 511.0 MtCO<sub>2</sub>e.
- Total greenhouse gas emissions on a temperature adjusted basis for the year leading up to Q2 2016 were 13.8 MtCO<sub>2</sub>e (2.9 per cent) higher than actual emissions. This reflects the fact that temperatures in the quarters up to Q2 2016 were slightly higher than the long term average.
- Looking at the quarterly emissions time series, actual emissions are lower in the year up to Q2 2016 compared to the year up to Q1 2016 (6.3 MtCO<sub>2</sub>e or 1.3 per cent decrease). This is due to a large switch from coal to gas for electricity generation in Q2 2016.

## User consultation results

The Department for Business, Energy and Industrial Strategy (BEIS) ran a user consultation in the Q1 2016 quarterly greenhouse gas emissions statistics release published on 30<sup>th</sup> June 2016, proposing to cease publication of the quarterly greenhouse gas emissions statistics.

The user consultation set out three options:

- 1) To cease the quarterly emissions statistics in their entirety.
- 2) To cease the quarterly emissions statistics, but continue to include a quarterly emissions time series within the annual provisional annual statistics publication each March.
- 3) To continue the publication of quarterly emissions statistics.

In total we received ten responses to the consultation. The results of the consultation are summarised below:

- None of the respondents cited the quarterly emissions statistics as being critical to their work.
- Two respondents suggested that continuing to produce the quarterly time series on an annual basis would be useful, as we did in March 2016.

- One respondent suggested that a 'half year review' in Energy Trends would be useful.

Following these responses to the user consultation, our proposed action is to cease the quarterly publication of these statistics, but continue to include the time series within our annual provisional greenhouse gas emissions statistics publication, as we did in March 2016: <https://www.gov.uk/government/statistics/provisional-uk-greenhouse-gas-emissions-national-statistics-2015>.

Therefore, this will be the final release of the quarterly greenhouse gas emission statistics, with the next quarterly time series being published on 30 March 2017 in the next annual UK provisional greenhouse gas emissions national statistics publication.

If you have any queries regarding the results of the consultation please email [ClimateChange.Statistics@beis.gov.uk](mailto:ClimateChange.Statistics@beis.gov.uk).

## Introduction

These statistics provide users with a first estimate of how emissions are changing on a quarter by quarter basis ahead of provisional annual emissions figures for 2016 which will be published in March 2017. 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 82 per cent of all greenhouse gas emissions in 2014), 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 [2014 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 2 2016, represent an annual total comprising of quarter 2 2016 and the preceding 3 quarters, quarters 3 and 4 of 2015 and quarter 1 of 2016. 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 2009-2014 are consistent with the annual emissions presented in the National Statistics publication 'Final UK Greenhouse Gas Emissions'. Data for 2015 and 2016 emissions are provisional and are calculated based on UK energy statistics. Data for 2015 emissions are calculated on the same basis as in the 2015 provisional greenhouse emissions statistics published on March 31<sup>st</sup> 2016, however, there have been some minor revisions to the 2015 figures as the result of revisions to underlying energy data. Emissions for 2015 are now estimated to be 495.2 MtCO<sub>2</sub>e, compared to the estimate published in March of 497.2 MtCO<sub>2</sub>e.

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

# Results

## 2<sup>nd</sup> quarter 2016 quarterly 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 UK, Year to Q2 2015 – Year to Q2 2016**

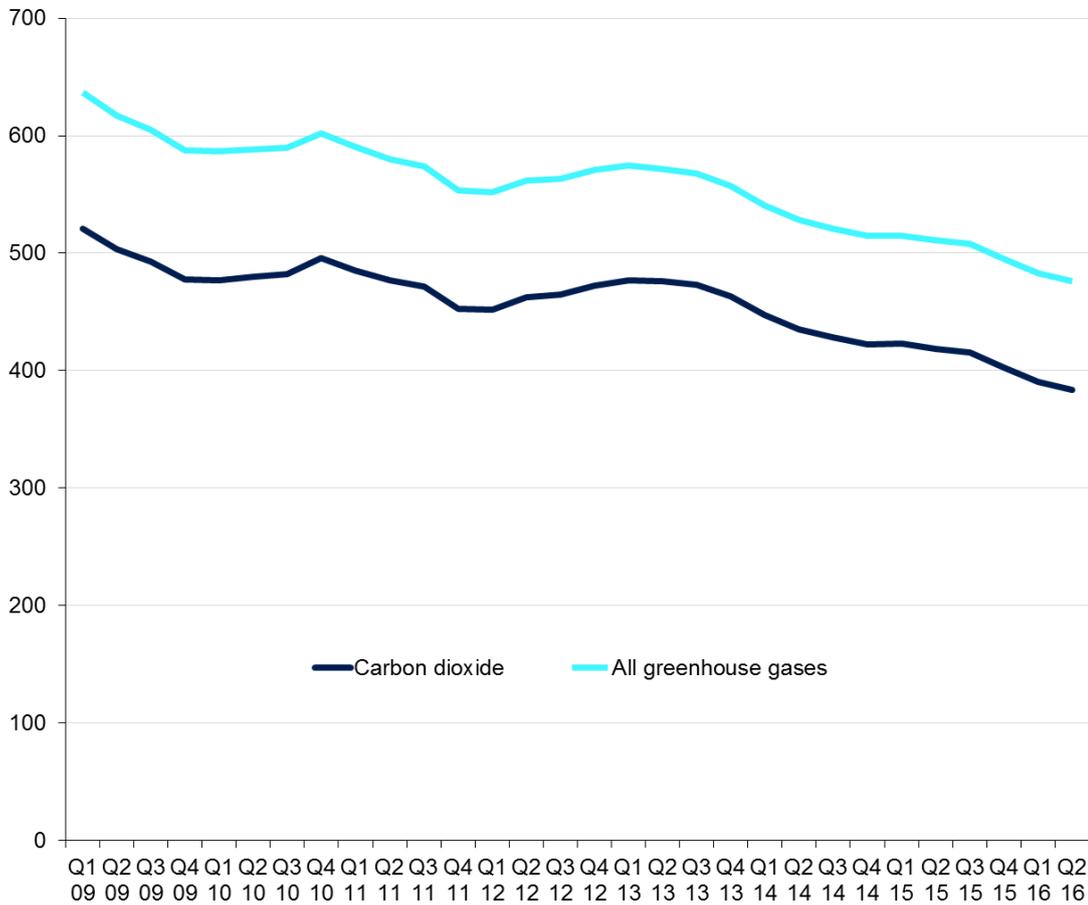
	<b>MtCO<sub>2</sub>e</b>		
	Year to Q2 2015	Year to Q2 2016	Difference (%)
Total GHG emissions	511.0	476.3	-6.8%
Temperature adjusted GHG emissions	520.3	490.1	-5.8%
Total CO <sub>2</sub> emissions	418.5	383.8	-8.3%
Temperature adjusted CO <sub>2</sub> emissions	427.8	397.6	-7.1%

Source: Tables 1 & 2, UK greenhouse gas emissions 2<sup>nd</sup> quarter 2016 provisional figures Excel data tables

**Footnotes:**

1. Non-CO<sub>2</sub> emissions have not been temperature adjusted.
2. Figures are annual totals including the preceding 4 quarters. For example, "Q2 2016" covers the four quarters from Q3 2015 to Q2 2016 inclusive.

**Figure 1: Actual emissions of all greenhouse gases and carbon dioxide UK, Year to Q1 2009 - Year to Q2 2016 (MtCO<sub>2</sub>e)**



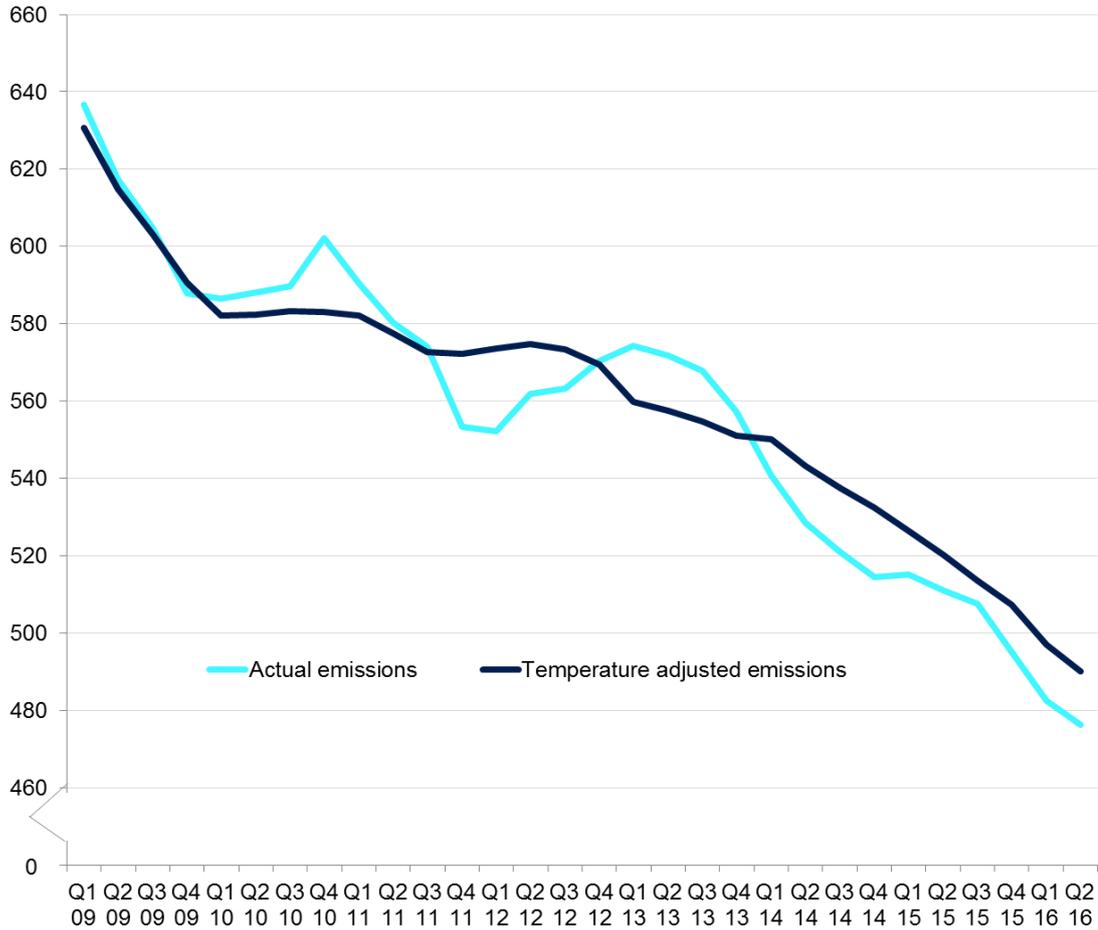
Source: Table 1, UK greenhouse gas emissions 2<sup>nd</sup> quarter 2016 provisional figures Excel data tables

**Footnotes:**

- 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, Year to Q1 2009 - Year to Q1 2016 (MtCO<sub>2</sub>e)**



Source: Tables 1 & 2, UK greenhouse gas emissions 2<sup>nd</sup> quarter 2016 provisional figures Excel data tables

**Footnotes:**

- 1. Figures are annual totals of the preceding 4 quarters.
- 2. From 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 25.2 per cent and temperature adjusted emissions by 22.3 per cent in the year to Q2 2016, compared to the year to Q1 2009.

On a temperature adjusted basis, emissions remained relatively flat during the period between early 2010 and 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 (Celsius) lower than the long term average, while temperatures in Q4 2012 and Q1 2013 were 0.5 and 1.8 degrees (Celsius) lower than the long term average.

During 2013, 2014, 2015 and the first two quarters of 2016, both temperature adjusted and non-adjusted emissions have generally fallen.

**Table 2: Actual and temperature adjusted greenhouse gas emissions UK, Year to Q1 2016 – Year to Q2 2016**

	<b>MtCO<sub>2</sub>e</b>			
	Year to Q1 2016	Year to Q2 2016	Difference (MtCO <sub>2</sub> e)	Difference (%)
Total GHG emissions	482.6	476.3	-6.3	-1.3%
Temperature adjusted GHG emissions	497.1	490.1	-7.0	-1.4%
Total CO <sub>2</sub> emissions	390.1	383.8	-6.3	-1.6%
Temperature adjusted CO <sub>2</sub> emissions	404.6	397.6	-7.0	-1.7%

Source: Tables 1 & 2, UK greenhouse gas emissions 2<sup>nd</sup> quarter 2016 provisional figures Excel data tables

**Footnotes:**

1. Non-CO<sub>2</sub> emissions have not been temperature adjusted.
2. Figures are annual totals including the preceding 4 quarters. For example, "Q2 2016" covers the four quarters from Q3 2015 to Q2 2016 inclusive.

Table 2 shows the change in emissions since the last quarterly statistics publication. This is essentially comparing Q2 2015 with Q2 2016, as these are the only quarters that are different within the two time periods being compared. The decrease in actual and temperature adjusted emissions is due to a large switch from coal to gas for electricity generation.

More information regarding the long term trends in emissions in each sector can be found in the [2014 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  
UK, Year to Q1 2016 - Year to Q2 2016**

	Year to Q1 2016	Year to Q2 2016	Difference (MtCO <sub>2</sub> )	Difference (%)
Energy Supply	127.2	121.6	-5.6	-4.4%
Business	65.6	64.4	-1.3	-1.9%
Transport	119.4	120.0	0.6	0.5%
Public	8.1	8.3	0.1	1.5%
Residential	62.8	63.1	0.3	0.5%
Other	6.9	6.5	-0.4	-6.3%
<b>Total CO<sub>2</sub></b>	<b>390.1</b>	<b>383.8</b>	<b>-6.3</b>	<b>-1.6%</b>

Source: Table 1, UK greenhouse gas emissions 2<sup>nd</sup> quarter 2016 provisional figures Excel data tables

**Footnotes:**

1. Figures are annual totals including the preceding 4 quarters. For example, "Q2 2016" covers the four quarters from Q3 2015 to Q2 2016 inclusive.
2. Figures for "Total CO<sub>2</sub>" and "Difference" 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 UK, Year to Q1 2016 - Year to Q2 2016**

	Year to Q1 2016	Year to Q2 2016	Difference (MtCO <sub>2</sub> )	Difference (%)
Energy Supply	131.7	125.8	-5.9	-4.5%
Business	67.8	66.4	-1.4	-2.0%
Transport	119.4	120.0	0.6	0.5%
Public	8.7	8.8	0.1	1.1%
Residential	70.1	70.1	-0.0	-0.0%
Other	6.9	6.5	-0.4	-6.3%
<b>Total CO<sub>2</sub></b>	<b>404.6</b>	<b>397.6</b>	<b>-7.0</b>	<b>-1.7%</b>

Source: Table 2, UK greenhouse gas emissions 2<sup>nd</sup> quarter 2016 provisional figures Excel data tables

### Footnotes:

1. Figures are annual totals including the preceding 4 quarters. For example, "Q2 2016" covers the four quarters from Q3 2016 to Q2 2016 inclusive.
2. Figures for "Total CO<sub>2</sub>" and "Difference" 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.

**Table 5: Temperature adjusted and non-adjusted Carbon dioxide emissions by sector UK, Year to Q2 2016**

	<b>MtCO<sub>2</sub></b>			
	Total CO <sub>2</sub> emissions	Temperature adjusted CO <sub>2</sub> emissions	Difference (MtCO <sub>2</sub> )	Difference (%)
Energy Supply	121.6	125.8	4.2	3.5%
Business	64.4	66.4	2.0	3.1%
Transport	120.0	120.0	0.0	0.0%
Public	8.3	8.8	0.5	6.7%
Residential	63.1	70.1	7.0	11.1%
Other	6.5	6.5	0.0	0.0%
<b>Total CO<sub>2</sub></b>	<b>383.8</b>	<b>397.6</b>	<b>13.8</b>	<b>3.6%</b>

Source: Tables 1 & 2, UK greenhouse gas emissions 2<sup>nd</sup> quarter 2016 provisional figures Excel data tables

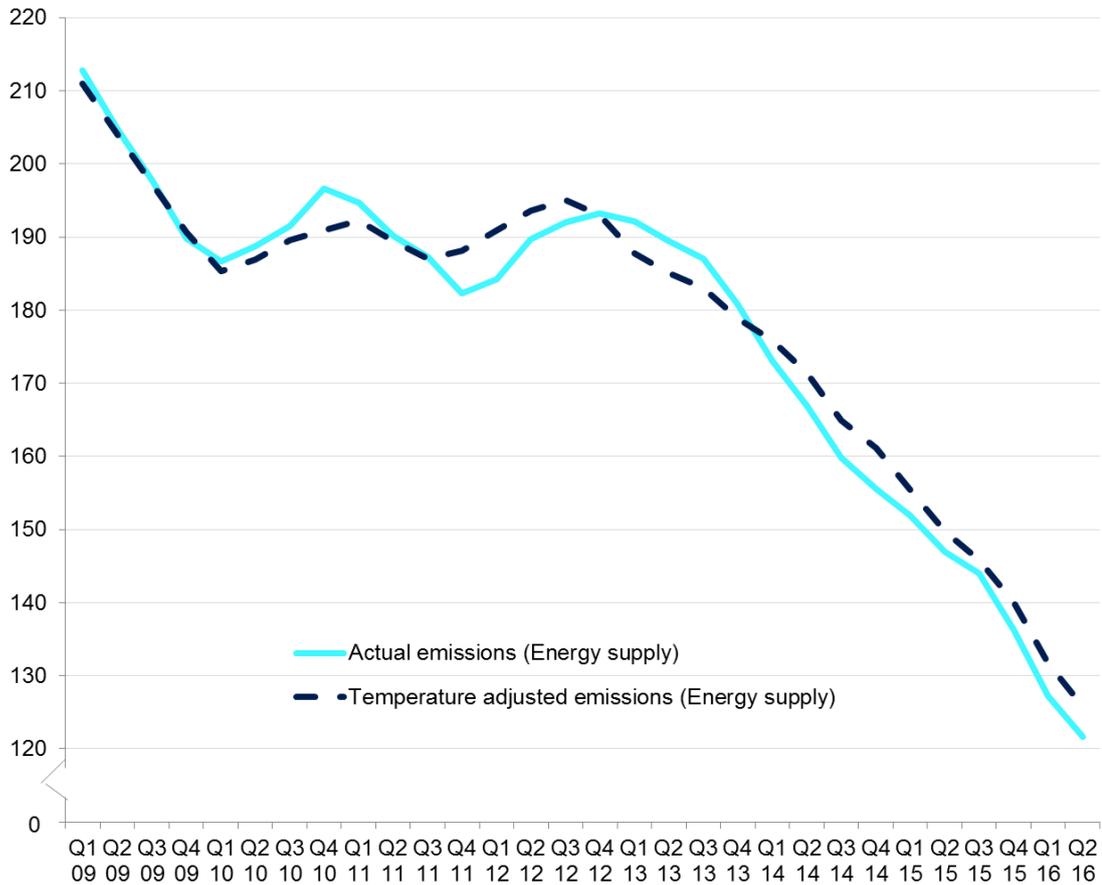
**Footnotes:**

1. Figures are annual totals including the preceding 4 quarters. For example, "Q2 2016" covers the four quarters from Q3 2016 to Q2 2016 inclusive.
2. Figures for "Total CO<sub>2</sub>" and "Difference" 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.

Figures 3 and 4 below show the trend for these two sectors. 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 40 per cent compared to the year to Q1 2009, while non-adjusted emissions have decreased by around 43 per cent over the same period.

**Figure 3: Actual and temperature adjusted energy supply emissions UK, Year to Q1 2009 - Year to Q2 2016 (MtCO<sub>2</sub>)**



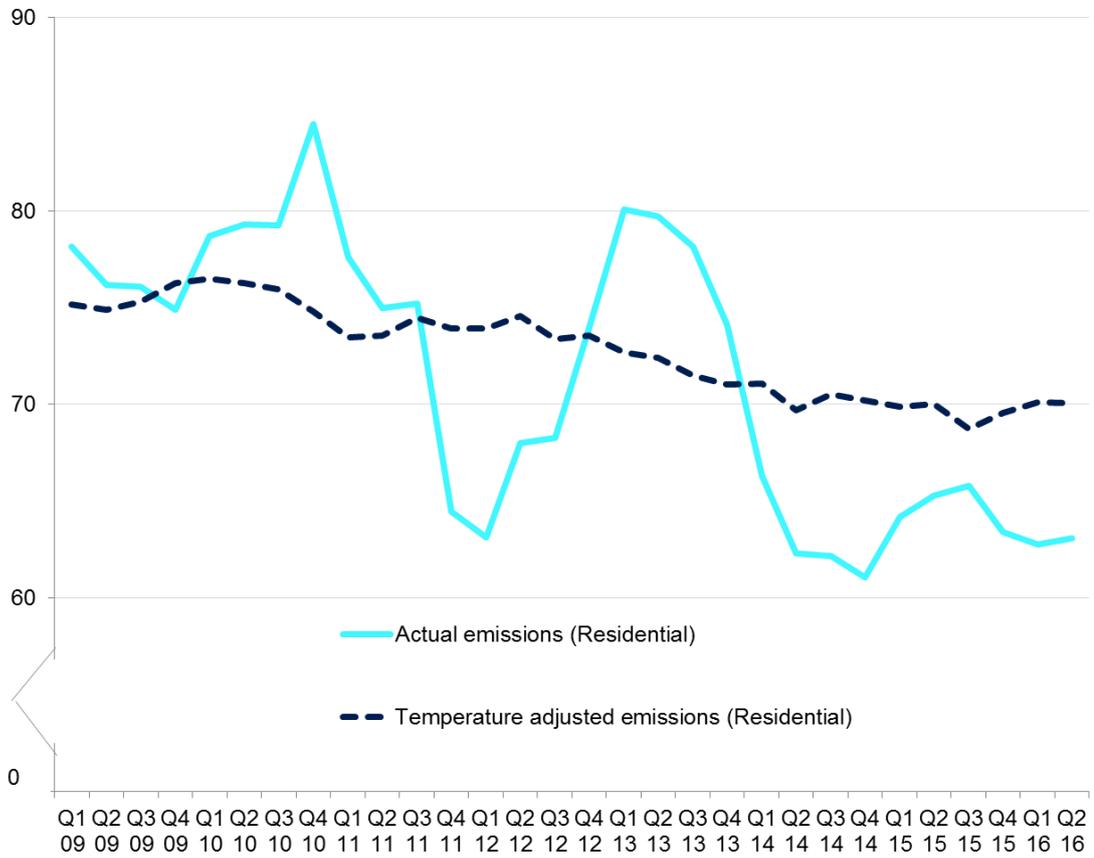
Source: Tables 1 & 2, UK greenhouse gas emissions 2<sup>nd</sup> quarter 2016 provisional figures Excel data tables

**Footnotes:**

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

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 Q2 2016, while the trend for non-adjusted emissions is much more variable over the same time period. Temperature adjusted emissions in the residential sector have decreased by around 7 per cent compared to the year to Q1 2009, while non-adjusted emissions have decreased by around 19 per cent over the same period.

**Figure 4: Actual and temperature adjusted residential emissions UK, Year to Q1 2009 - Year to Q2 2016 (MtCO<sub>2</sub>)**



Source: Tables 1 & 2, UK greenhouse gas emissions 2<sup>nd</sup> quarter 2016 provisional figures Excel data tables

**Footnotes:**

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

## 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 the BEIS quarterly Energy Trends publication.

Carbon dioxide accounts for the majority of UK greenhouse gas emissions (82 per cent in 2014). 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 serves to smooth 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. As provisional annual statistics are calculated on the same basis as quarterly statistics, this means that the latest quarterly publication may update figures previously released as part of the annual publication. Emissions from 2009-2014 are consistent with final UK greenhouse gas emissions statistics from 1990-2014. Emissions estimates for 2015 and 2016 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 sectoral breakdown is given mainly for information, and is included in the publication for completeness, but sectoral estimates are more uncertain than the total.

Following the results of the user consultation this will be the final release of these statistics, however a quarterly time series will be included within the annual provisional emissions statistics publication, the next edition of which will be released on 30 March 2017.

## 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>

The latest UK energy statistics, including revisions to earlier years' data, can be found in the [Energy Trends](#) quarterly bulletin produced by BEIS. Any enquiries about the Energy Trends report should be sent to [energy.stats@beis.gov.uk](mailto:energy.stats@beis.gov.uk).

For any queries or feedback on this publication please email:  
[ClimateChange.Statistics@beis.gov.uk](mailto:ClimateChange.Statistics@beis.gov.uk).

## Notes for editors

1. The annual figures for 1990 to 2014 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@beis.gov.uk](mailto:energy.stats@beis.gov.uk).
6. Figures up to and including the year to Quarter 4 2014 are based on final UK greenhouse gas emissions statistics. Figures from the year to Quarter 1 2015 onwards include provisional estimates.

