



Department
of Energy &
Climate Change

UK GREENHOUSE GAS EMISSIONS – 1ST QUARTER 2016 PROVISIONAL FIGURES

Statistical Release: Official Statistics



30 June 2016

© Crown copyright 2016

You may re-use this information (not including logos) free of charge in any format or medium, under the terms of the Open Government Licence.

To view this licence, visit www.nationalarchives.gov.uk/doc/open-government-licence/ or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or email: psi@nationalarchives.gsi.gov.uk.

Any enquiries regarding this publication should be sent to us at ClimateChange.Statistics@decc.gsi.gov.uk.

The responsible statistician for this publication is Georgina Eaton.

Contact telephone: 0300 068 5455.

This document is also available at our website at <https://www.gov.uk/government/collections/uk-greenhouse-gas-emissions-quarterly-official-statistics>.

Contents

Executive Summary _____	3
Headline results for the year to quarter 1 2016 _____	3
User consultation _____	3
Introduction _____	4
Results _____	5
1 st quarter 2016 greenhouse gas emissions estimates _____	5
Carbon dioxide emissions by source sector – actual emissions _____	9
Carbon dioxide emissions by source sector – temperature adjusted emissions _____	9
Additional information _____	13
Basis of the provisional quarterly emissions estimates _____	13
Quarterly totals _____	13
Quarterly emissions estimates – temperature adjustment _____	13
Revisions to the quarterly provisional emissions estimates _____	14
Future updates to quarterly provisional emissions estimates _____	14
Further information and feedback _____	14
Notes for Editors _____	16

Executive Summary

Headline results for the year to quarter 1 2016

- Total greenhouse gas emissions have been provisionally estimated at 483.0 million tonnes carbon dioxide equivalent (MtCO₂e) for the twelve months leading to Q1 2016, a decrease of 32.1 MtCO₂e (6.2 percent) compared to the same period in 2015, when emissions were estimated to be 515.1 MtCO₂e.
- Total greenhouse gas emissions on a temperature adjusted basis for the year leading up to Q1 2016 were 14.5 MtCO₂e (3.0 percent) higher than actual emissions. This reflects the fact that temperatures in the quarters up to Q1 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 Q1 2016 compared to the year up to Q4 2015 (12.2 MtCO₂e or 2.5 percent decrease). This is due to a reduction in the use of coal for electricity generation in Q1 2016.

User consultation

DECC has produced estimates of quarterly emissions statistics since March 2006. We are keen to streamline our statistical publications where possible. Analysis of the use of our publications on gov.uk would suggest that there are far fewer users of our quarterly emissions statistics relative to our annual publications. As such, we are proposing to cease publication of our quarterly statistics. In particular for this publication we are inviting comments and feedback from users, further details can be found [at the end](#) of this publication.

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 CO₂ emissions (around 82 percent 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 1 2016, represent an annual total comprising quarter 1 2016 and the preceding 3 quarters, quarters 2, 3 and 4 of 2015. 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 31st 2016, however, in Q1 2016 there were 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 MtCO₂e, compared to the estimate published in March of 497.2 MtCO₂e.

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

Results

1st quarter 2016 greenhouse gas emissions estimates

A temperature adjustment has been applied to the quarterly CO₂ 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 Q1 2015 – Year to Q1 2016

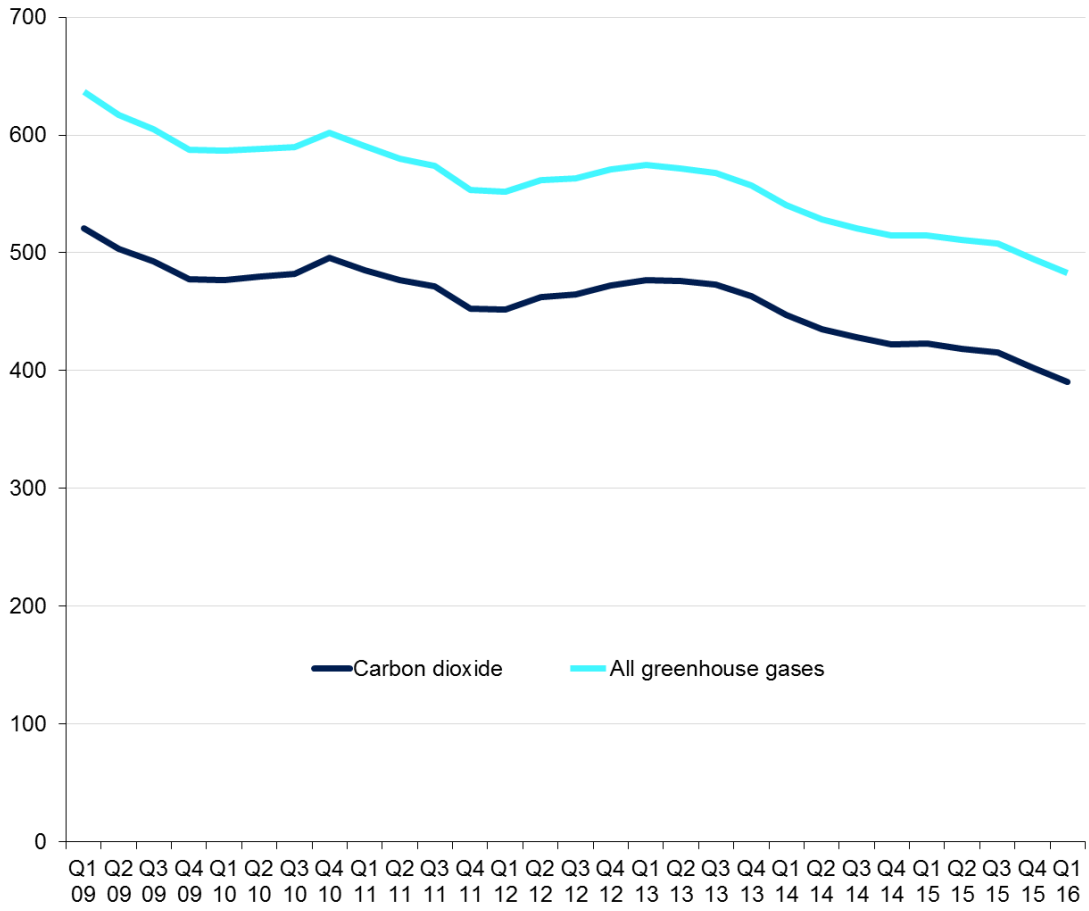
	Year to Q1 2015	Year to Q1 2016	Difference (%)
Total GHG emissions	515.1	483.0	-6.2%
Temperature adjusted GHG emissions	526.4	497.5	-5.5%
Total CO ₂ emissions	422.7	390.5	-7.6%
Temperature adjusted CO ₂ emissions	433.9	405.0	-6.7%

Source: Tables 1 & 2, UK greenhouse gas emissions quarterly statistics June 2016 Excel data tables

Footnotes:

1. Non-CO₂ emissions have not been temperature adjusted.
2. Figures are annual totals including the preceding 4 quarters. For example, "Q1 2016" covers the four quarters from Q2 2015 to Q1 2016 inclusive.

Figure 1: Actual emissions of all greenhouse gases and carbon dioxide UK, Year to Q1 2009 - Year to Q1 2016 (MtCO₂e)



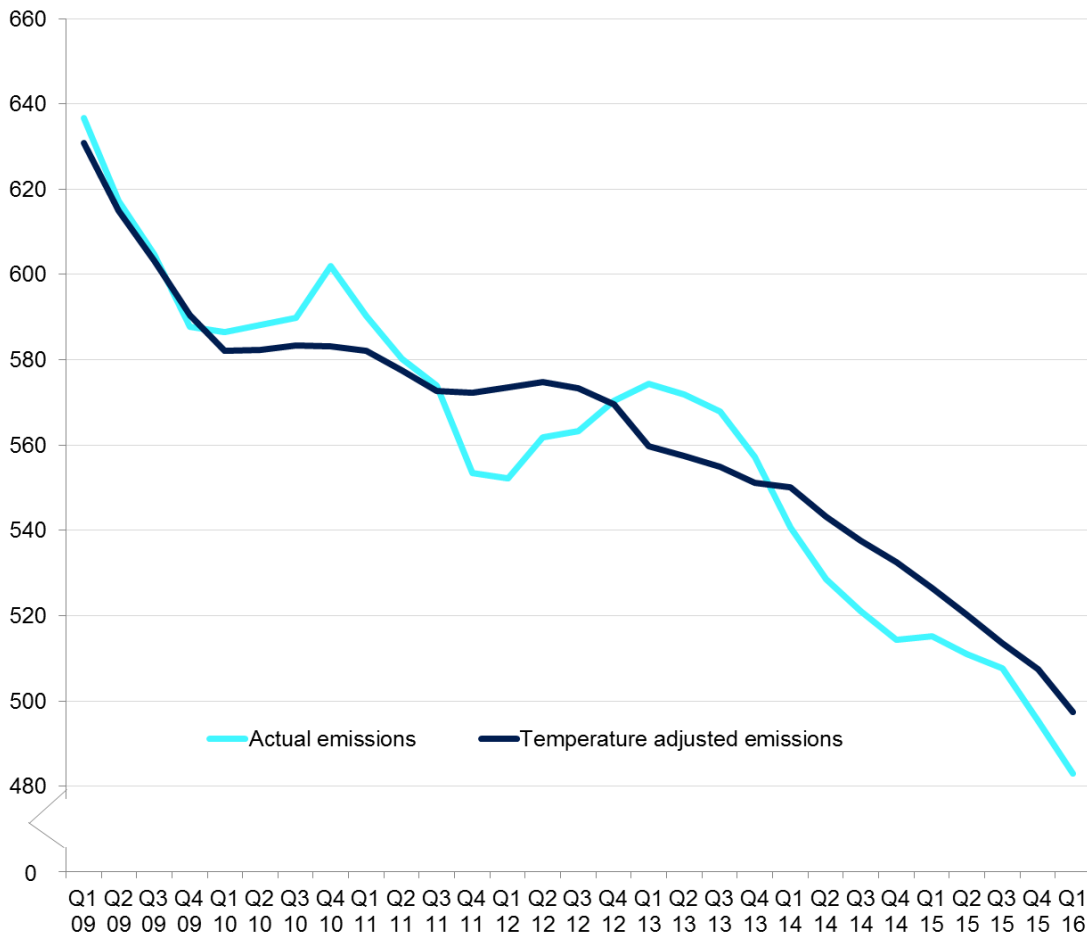
Source: Table 1, UK greenhouse gas emissions 1st quarter 2016 provisional figures Excel data tables

Footnotes:

- 1. Figures are annual totals of the preceding 4 quarters.
- 2. From Q1 2015 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 (MtCO₂e)



Source: Tables 1 & 2, UK greenhouse gas emissions 1st quarter 2016 provisional figures Excel data tables

Footnotes:

- 1. Figures are annual totals of the preceding 4 quarters.
- 2. From Q1 2015 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 24.1 percent and temperature adjusted emissions by 21.1 percent in the year to Q1 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 Q1 2016 both temperature adjusted and non-adjusted emissions have generally fallen.

Results

Table 2: Actual and temperature adjusted greenhouse gas emissions UK, Year to Q4 2015 – Year to Q1 2016

	Year to	Year to	Difference	Difference
	Q4 2015	Q1 2016	(MtCO ₂ e)	(%)
Total GHG emissions	495.2	483.0	-12.2	-2.5%
Temperature adjusted GHG emissions	507.3	497.5	-9.9	-1.9%
Total CO ₂ emissions	402.8	390.5	-12.2	-3.0%
Temperature adjusted CO ₂ emissions	414.9	405.0	-9.9	-2.4%

Source: Tables 1 & 2, UK greenhouse gas emissions 1st quarter 2016 provisional figures Excel data tables

Footnotes:

1. Non-CO₂ emissions have not been temperature adjusted.
2. Figures are annual totals including the preceding 4 quarters. For example, "Q1 2016" covers the four quarters from Q2 2015 to Q1 2016 inclusive.

Table 2 shows the change in emissions since the last quarterly statistics publication. This is essentially comparing Q1 2015 with Q1 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 reduction in coal use 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 Q4 2015 - Year to Q1 2016**

	MtCO₂			
	Year to Q4 2015	Year to Q1 2016	Difference (MtCO ₂)	Difference (%)
Energy Supply	136.2	127.0	-9.3	-6.8%
Business	68.6	65.6	-3.0	-4.4%
Transport	118.8	120.5	1.7	1.4%
Public	8.1	8.1	0.0	0.2%
Residential	63.4	62.3	-1.1	-1.7%
Other	7.6	7.0	-0.6	-7.9%
Total CO₂	402.8	390.5	-12.2	-3.0%

Source: Table 1, UK greenhouse gas emissions 1st quarter 2016 provisional figures Excel data tables

Footnotes:

1. Figures are annual totals including the preceding 4 quarters. For example, "Q1 2016" covers the four quarters from Q2 2015 to Q1 2016 inclusive.
2. Figures for "Total CO₂" 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 Q4 2015 - Year to Q1 2016**

	MtCO₂			
	Year to Q4 2015	Year to Q1 2016	Difference (MtCO ₂)	Difference (%)
Energy Supply	140.0	131.4	-8.5	-6.1%
Business	70.4	67.8	-2.7	-3.8%
Transport	118.8	120.5	1.7	1.4%
Public	8.6	8.7	0.1	1.3%
Residential	69.6	69.7	0.1	0.2%
Other	7.6	7.0	-0.6	-7.9%
Total CO₂	414.9	405.0	-9.9	-2.4%

Source: Table 1, UK greenhouse gas emissions 1st quarter 2016 provisional figures Excel data tables

Results

Footnotes:

1. Figures are annual totals including the preceding 4 quarters. For example, "Q1 2016" covers the four quarters from Q2 2015 to Q1 2016 inclusive.
2. Figures for "Total CO₂" 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 Q1 2016

	MtCO₂			
	Total CO ₂ emissions	Temperature adjusted CO ₂ emissions	Difference (MtCO ₂)	Difference (%)
Energy Supply	127.0	131.4	4.4	3.5%
Business	65.6	67.8	2.1	3.2%
Transport	120.5	120.5	0.0	0.0%
Public	8.1	8.7	0.6	7.1%
Residential	62.3	69.7	7.3	11.8%
Other	7.0	7.0	0.0	0.0%
Total CO₂	390.5	405.0	14.5	3.7%

Source: Tables 1 & 2, UK greenhouse gas emissions 1st quarter 2016 provisional figures Excel data tables

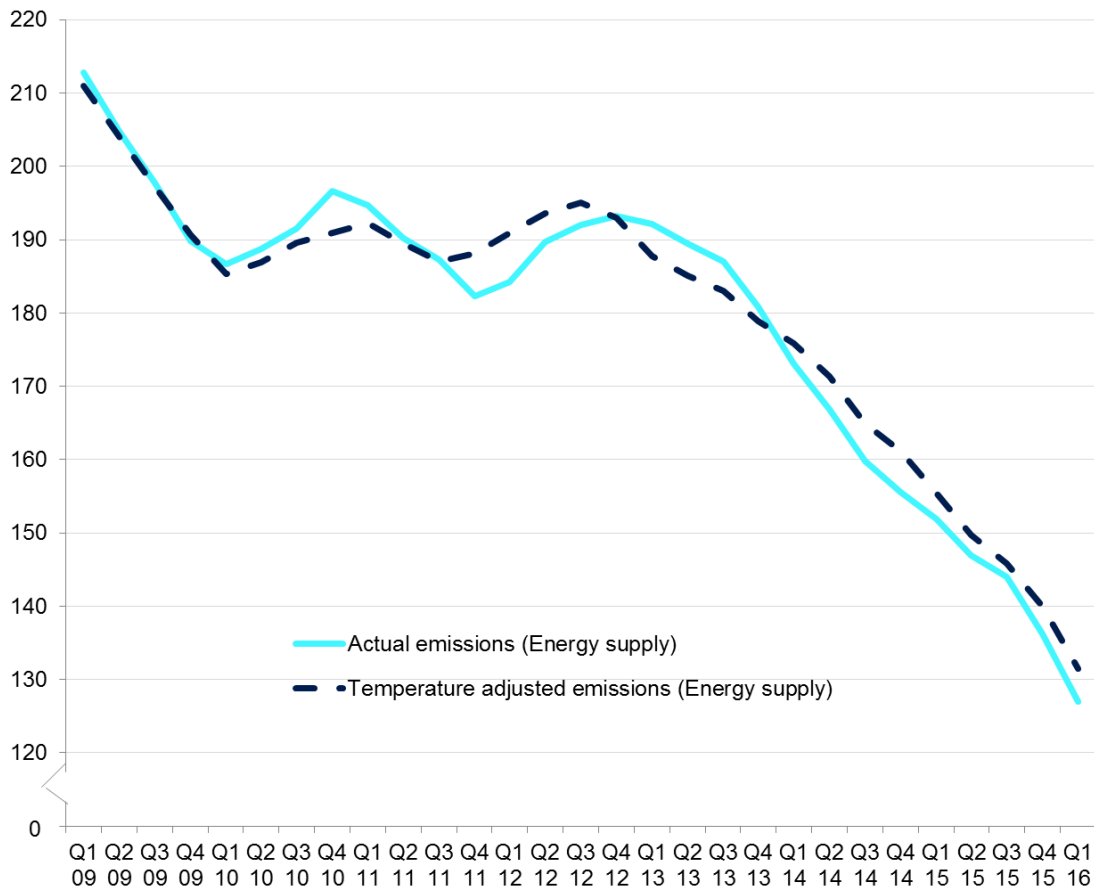
Footnotes:

1. Figures for "Total CO₂" and "Difference" may be different to the sum of those presented in the table due to rounding.

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 38 percent compared to the year to Q1 2009, while non-adjusted emissions have decreased by around 40 percent over the same period.

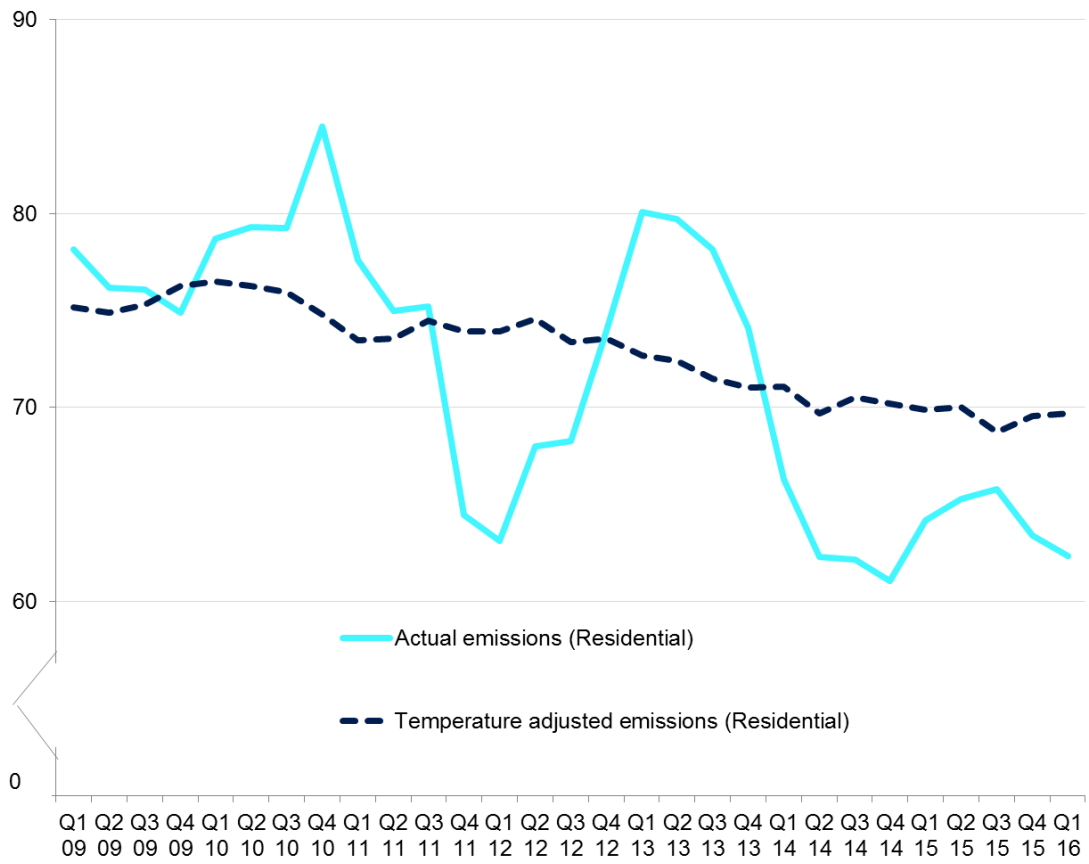
Figure 3: Actual and temperature adjusted energy supply emissions UK, Year to Q1 2009 - Year to Q1 2016 (MtCO₂)



Source: Tables 1 & 2, UK greenhouse gas emissions 1st quarter 2016 provisional figures 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 Q1 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 percent compared to the year to Q1 2009, while non-adjusted emissions have decreased by around 20 percent over the same period.

Figure 4: Actual and temperature adjusted residential emissions UK, Year to Q1 2009 - Year to Q1 2016 (MtCO₂)



Source: Tables 1 & 2, UK greenhouse gas emissions 1st quarter 2016 provisional figures 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 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-CO₂ gases. Because of the lack of availability of underlying quarterly data sources for activities related to non-CO₂ 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.

The next quarterly statistics for the year up to Q2 2016 are scheduled to be published on Thursday 29th September 2016.

Further information and feedback

DECC has produced estimates of quarterly emissions statistics since March 2006. We are keen to streamline our statistical publications where possible. Analysis of the use of our publications on gov.uk would suggest that there are far fewer users of our quarterly emissions statistics relative to our annual publications. As such, we are proposing to cease publication of our quarterly statistics.

We'd welcome comment on any aspect of the publication, but are particularly seeking feedback on the following areas:

About our users

We are interested to know more about the users of the publication, in order that we can better meet their needs.

1. Please tell us a little more about what kind of organisation you work for, and what you use this publication for.
2. How frequently do you access the publication e.g. each quarter, less often, only occasionally?
3. Do you depend on the information in this publication for any aspect of your work?

About the future of this publication

Tell us more about what you think about the proposal to cease this publication.

4. Would ceasing this quarterly publication series in its entirety create difficulties for you and/or your work? Please provide details.
5. One option upon ceasing the quarterly publication series would be to include a quarterly time series (temperature-adjusted and non-temperature-adjusted) within the annual provisional statistics release each March. Would this meet your needs as a user of these statistics?
6. Finally, please provide your preferred response to this consultation:
 - a) I am content for the publication of the quarterly emissions statistics to cease in their entirety
 - b) I am content for the frequency of the quarterly emissions statistics to cease, provided that a quarterly emissions series is included within the annual provisional annual statistics publication each March
 - c) I would like the publication of quarterly emissions statistics to continue
(If you have an alternative proposal for our consideration please provide this in your response)

About the publication content and format

Tell us more about what you think about the publication format:

7. Which element(s) of our statistical release do you find most useful?
 - The statistical report (this document), including:
 - Provisional **headline results** for the year to the latest available quarter
 - Provisional quarterly estimates of carbon dioxide **emissions by sector**
 - Provisional **temperature-adjusted** estimates of carbon dioxide emissions
 - Details of the **methodology** used to derive provisional emissions estimates
 - Quarterly data tables, including:
 - Table 1: UK greenhouse gas quarterly emissions annual totals
 - Table 2: UK greenhouse gas quarterly temperature adjusted emissions annual totals
 - Table 3: UK greenhouse gas emissions for individual quarters
 - Table 4: UK greenhouse gas temperature adjusted emissions for individual quarters
8. Do you find the commentary within the report useful? Is there anything you would like us to do differently?
9. Do you find the presentation of information clear? Are there improvements we could make?

How to respond

Consultation issued: 30th June 2016

Deadline for responses: 30th August 2016

Responses should be sent to:

Email: ClimateChange.Statistics@decc.gsi.gov.uk

Alternatively, you can write to us at the following address:

UK Greenhouse Gas Inventory and Statistics
Area 3B
3 Whitehall Place
London
SW1A 2AW

We would prefer responses to be sent in writing. However, if you have enquiries you are welcome to get in touch via telephone on 0300 068 8177.

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 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@decc.gsi.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.

