



Department
of Energy &
Climate Change

UK Greenhouse Gas Emissions – 3rd Quarter 2015 Provisional Figures

Statistical Release: Official statistics

22nd December 2015

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This document is also available from our website 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 quarter 3 2015

- Total greenhouse gas emissions have been provisionally estimated at 516.6 million tonnes carbon dioxide equivalent (MtCO₂e) for the twelve months leading to Q3 2015, a decrease of 13.2 MtCO₂e (2.5 percent) compared to the same period in 2014, when emissions were estimated to be 529.9 MtCO₂e.
- Total greenhouse gas emissions on a temperature adjusted basis for the year leading up to Q3 2015 were 5.9 MtCO₂e (1.1 percent) higher than actual emissions. This reflects the fact that temperatures in the quarters up to Q3 2015 were slightly higher than the long term average.
- Looking at the quarterly emissions time series, actual emissions are slightly lower in the year up to Q3 2015 compared to the year up to Q2 2015 (3.2 MtCO₂e or 0.6 percent decrease). This is due to a reduction in the use of coal and gas for electricity generation in Q3 2015.

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 2015 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 CO₂ emissions (around 80 percent of all greenhouse gas emissions in 2013), 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 3, 2015, represent an annual total comprising quarter 3 2015 and the preceding 3 quarters, quarters 1 and 2 of 2015 and quarter and 4 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'. Data for 2014 and 2015 emissions are provisional and are calculated based on UK energy statistics. Data for 2014 emissions are calculated on the same basis as in the 2014 provisional greenhouse emissions statistics published on March 26th 2015, however, in Q2 2015 there were some minor revisions to the 2014 figures as the result of revisions to underlying energy data. Emissions for 2014 are now estimated to be 522.4 MtCO₂e, compared to the estimate published in March of 520.5 MtCO₂e.

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

Results

3rd quarter 2015 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

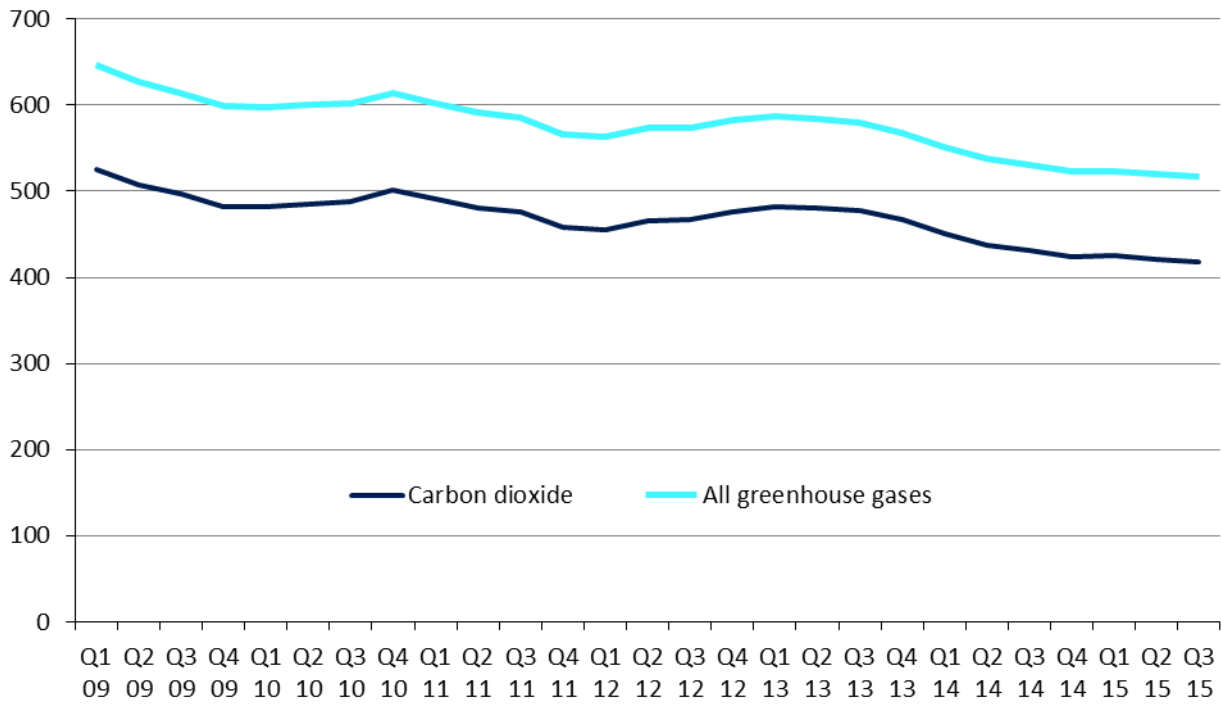
UK and Crown Dependencies, Year to Q3 2014 – Year to Q3 2015

	Year to Q3 2014	Year to Q3 2015	Difference (%)
Total GHG emissions	529.9	516.6	-2.5%
Temperature adjusted GHG emissions	546.1	522.5	-4.3%
Total CO ₂ emissions	430.8	418.2	-2.9%
Temperature adjusted CO ₂ emissions	447.0	424.0	-5.1%

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

Note: 1. Non-CO₂ emissions have not been temperature adjusted.
2. Figures are annual totals including the preceding 4 quarters. For example, "Q3 2015" covers the four quarters from Q4 2014 to Q3 2015 inclusive.

Figure 1: Actual emissions of all greenhouse gases and carbon dioxide, UK & Crown Dependencies, Year to Q1 2009 - Year to Q3 2015 (MtCO₂e)

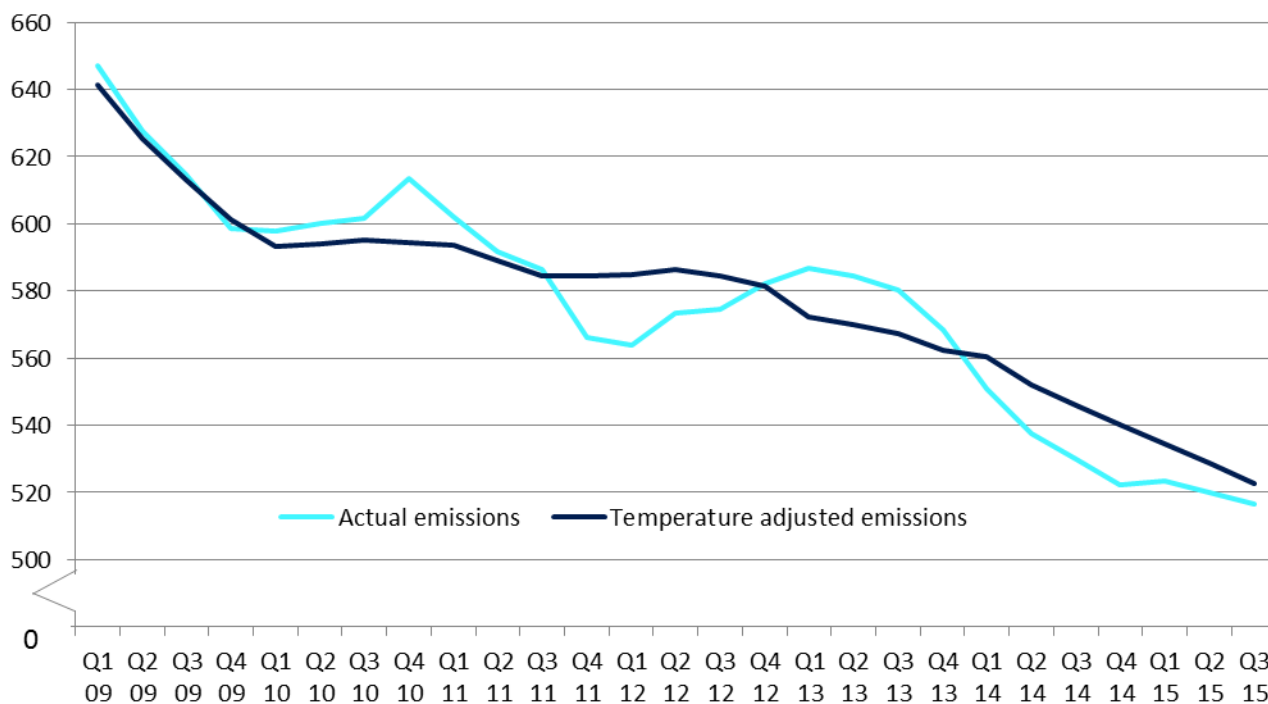


Source: Table 1, UK greenhouse gas emissions quarterly statistics December 2015 Excel data tables

- 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 Q3 2015 (MtCO₂e)



Source: Tables 1 & 2, UK greenhouse gas emissions quarterly statistics December 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 19 percent in the year to Q3 2015, 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 and 2015 both temperature adjusted and non-adjusted emissions have fallen.

Table 2: Actual and temperature adjusted greenhouse gas emissions

UK and Crown Dependencies, Year to Q2 2015 – Year to Q3 2015

	MtCO₂e			
	Year to Q2 2015	Year to Q3 2015	Difference (MtCO ₂ e)	Difference (%)
Total GHG emissions	519.8	516.6	-3.2	-0.6%
Temperature adjusted GHG emissions	528.9	522.5	-6.4	-1.2%
Total CO ₂ emissions	421.3	418.2	-3.2	-0.8%
Temperature adjusted CO ₂ emissions	430.4	424.0	-6.4	-1.5%

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

- Note:
1. Non-CO₂ emissions have not been temperature adjusted.
 2. Figures are annual totals including the preceding 4 quarters. For example, "Q3 2015" covers the four quarters from Q4 2014 to Q3 2015 inclusive.

Table 2 shows the change in emissions since the last quarterly statistics publication. This is essentially comparing Q3 2014 with Q3 2015, as these are the only quarters that are different within the two time periods being compared.

The decrease in emissions is due to a reduction in coal and gas use for electricity generation. For the actual emissions, this is partially offset by increased emissions resulting from an increase in demand for gas in the domestic sector. The temperature adjusted emissions show a greater decrease in emissions as the impact of the increase in domestic gas use is reduced when taking into account temperature.

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

UK and Crown Dependencies, Year to Q2 2015 - Year to Q3 2015

	MtCO₂			
	Year to Q2 2015	Year to Q3 2015	Difference (MtCO ₂)	Difference (%)
Energy Supply	145.4	142.4	-2.9	-2.0%
Business	73.1	71.9	-1.1	-1.5%
Transport	117.4	118.0	0.6	0.5%
Public	8.4	8.5	0.1	1.4%
Residential	66.0	66.5	0.5	0.7%
Other	11.1	10.8	-0.3	-2.7%
Total CO₂	421.3	418.2	-3.2	-0.8%

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

Note: 1. Figures are annual totals including the preceding 4 quarters. For example, "Q3 2015" covers the four quarters from Q4 2014 to Q3 2015 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 and Crown Dependencies, Year to Q2 2015 - Year to Q3 2015

	MtCO₂			
	Year to Q2 2015	Year to Q3 2015	Difference (MtCO ₂)	Difference (%)
Energy Supply	148.2	144.2	-4.0	-2.7%
Business	74.4	72.8	-1.6	-2.1%
Transport	117.4	118.0	0.6	0.5%
Public	8.7	8.7	-0.0	-0.1%
Residential	70.6	69.5	-1.1	-1.5%
Other	11.1	10.8	-0.3	-2.7%
Total CO₂	430.4	424.0	-6.4	-1.5%

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

Note: 1. Figures are annual totals including the preceding 4 quarters. For example, "Q3 2015" covers the four quarters from Q4 2014 to Q3 2015 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 and Crown Dependencies, Year to Q3 2015

	MtCO₂			
	Total CO ₂ emissions	Temperature adjusted CO ₂ emissions	Difference (MtCO ₂)	Difference (%)
Energy Supply	142.4	144.2	1.7	1.2%
Business	71.9	72.8	0.9	1.2%
Transport	118.0	118.0	0.0	0.0%
Public	8.5	8.7	0.2	2.8%
Residential	66.5	69.5	3.0	4.6%
Other	10.8	10.8	0.0	0.0%
Total CO₂	418.2	424.0	5.9	1.4%

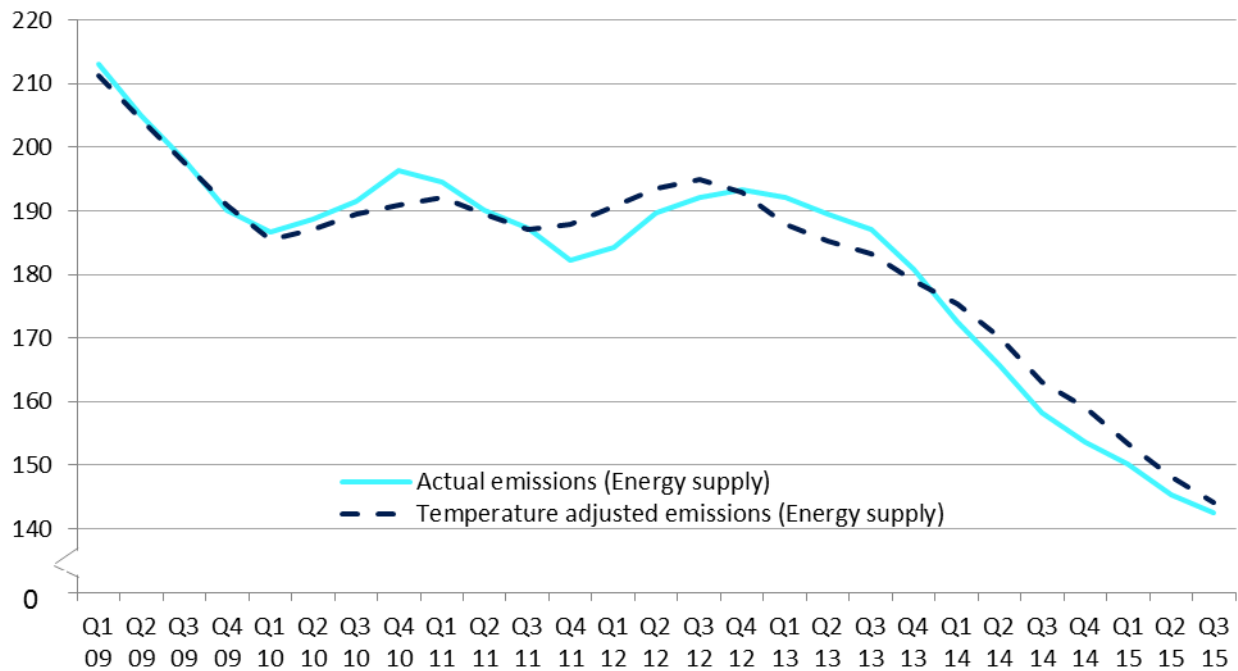
Source: Tables 1 & 2, UK greenhouse gas emissions quarterly statistics December 2015 Excel data tables

Note: 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 32 percent compared to the year to Q1 2009, while non-adjusted emissions have decreased by around 33 percent over the same period.

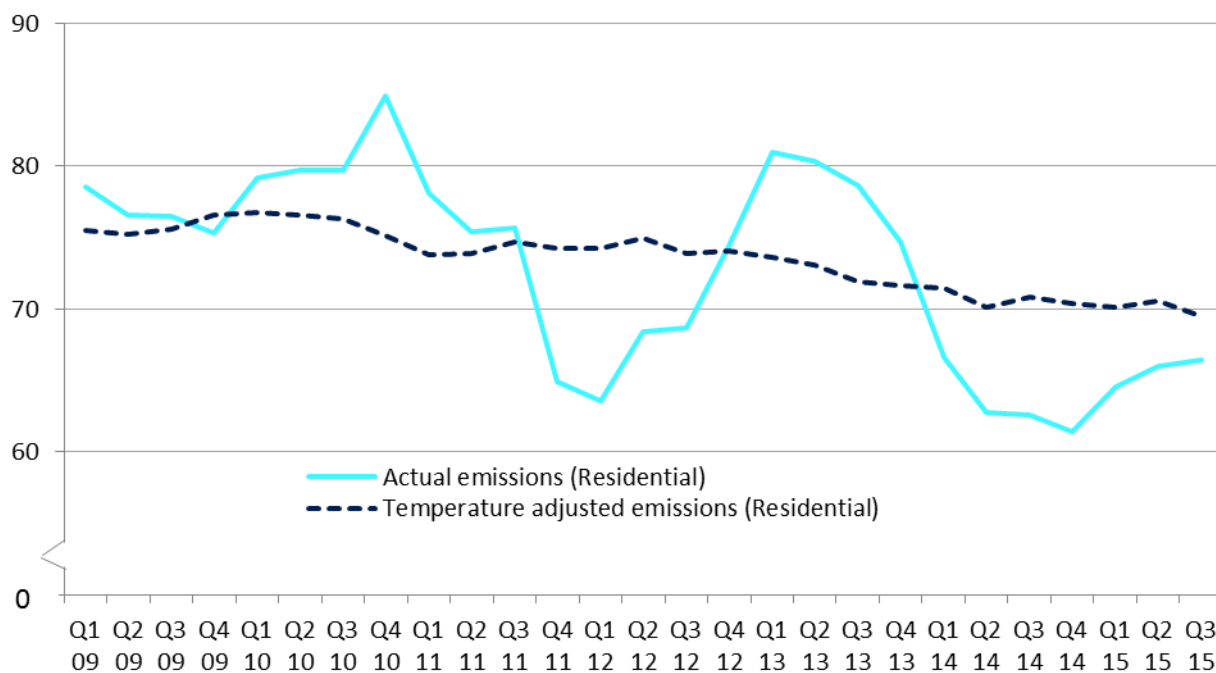
Figure 3: Actual and temperature adjusted energy supply emissions, UK and Crown Dependencies, Year to Q1 2009 - Year to Q3 2015 (MtCO₂)



Source: Tables 1 & 2, UK greenhouse gas emissions quarterly statistics December 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 Q3 2015, 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 8 percent compared to the year to Q1 2009, while non-adjusted emissions have decreased by around 15 percent over the same period.

Figure 4: Actual and temperature adjusted residential emissions, UK and Crown Dependencies, Year to Q1 2009 - Year to Q3 2015 (MtCO₂)



Source: Tables 1 & 2, UK greenhouse gas emissions quarterly statistics December 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-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 2009-2013 are consistent with final UK greenhouse gas emissions statistics from 1990-2013. Emissions estimates for 2014 and 2015 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.

The next quarterly statistics for the year up to Q4 2015 will be included within the 2015 UK Greenhouse Gas Emissions Provisional statistics that are scheduled to be published on Thursday 31st March 2016.

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.
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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