Department of Energy & Climate Change

UK Greenhouse Gas Emissions – 4th Quarter 2013 Provisional Figures

Statistical Release: Experimental statistics

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

Executive summary

Introduction

DECC today publishes provisional estimates of UK greenhouse gas emissions for the year to the 4th quarter of 2013.

These estimates are “Experimental Statistics”. We would welcome any comments from users on either the estimates themselves or the underlying methodology.

Quarterly emissions estimates are presented as Moving Annual Total (MAT), covering the most recent four quarters. MAT aims to smooth out short-term seasonal fluctuations and highlight long term trends. Each new publication therefore provides an indication of the current trend in emissions without the effect of seasonality (see page 9 for more on methodology).

Headline results for the year to quarter 4 2013

- Total greenhouse gas emissions (GHG) decreased by 11.4 $MtCO_2e$ (2.0%) compared to the year up to quarter 3 2013. The decrease in emissions on a temperature adjusted basis was less, at 5.0 $MtCO_2e$ (0.9%).
- Total greenhouse gas emissions have been provisionally estimated at 569.9 million tonnes carbon dioxide equivalent ($MtCO_2e$) over the four quarters to Q4 2013. This is around 2.0 per cent lower than in the four quarters to Q3 2013, when emissions were estimated to be 581.3 $MtCO_2e$.
- On a temperature adjusted basis, greenhouse gas emissions have been provisionally estimated at 563.9$MtCO_2e$. This is around 0.9 per cent lower than in the four quarters to Q3 2013, when emissions were estimated to be 568.9 $MtCO_2e$. Emissions measured on a temperature adjusted basis were therefore lower than actual emissions. This reflects the fact that, on the whole, temperatures over the last four quarters were lower than the long term average.
- Actual and temperature adjusted emissions are lower than in the year up to Q3 2013, due to lower use of coal and gas in electricity generation. There is also a decrease in emissions from a reduction in the use of gas for space heating due to the fact that Q4 2013 was warmer than Q4 2012 by around 1.4 degrees Celsius.

Results

4th quarter 2013 greenhouse gas emissions estimates

Table 1: Emissions of all greenhouse gases and carbon dioxide only, expressed as a Moving Annual Total ($MtCO_2e$)

	Year to Q3 2013	Year to Q4 2013	Change
Total GHG emissions	581.3	569.9	-2.0%
Temperature adjusted GHG emissions	568.9	563.9	-0.9%
Total CO_2 emissions	475.3	464.3	-2.3%
Temperature adjusted CO_2 emissions	462.9	458.3	-1.0%

1. CO_2 emissions figures are for the UK and Crown Dependencies; Greenhouse gas emissions figures also include some Overseas Territories.
2. Non-CO_2 emissions have not been temperature adjusted.
3. The figures labelled as "Q4 2013" cover the four quarters from Q1 2013 to Q4 2013 inclusive.

Figure 1: Actual emissions of all greenhouse gases and carbon dioxide, as a Moving Annual Total; Q1 2009 – Q4 2013 (Mt CO_2e)

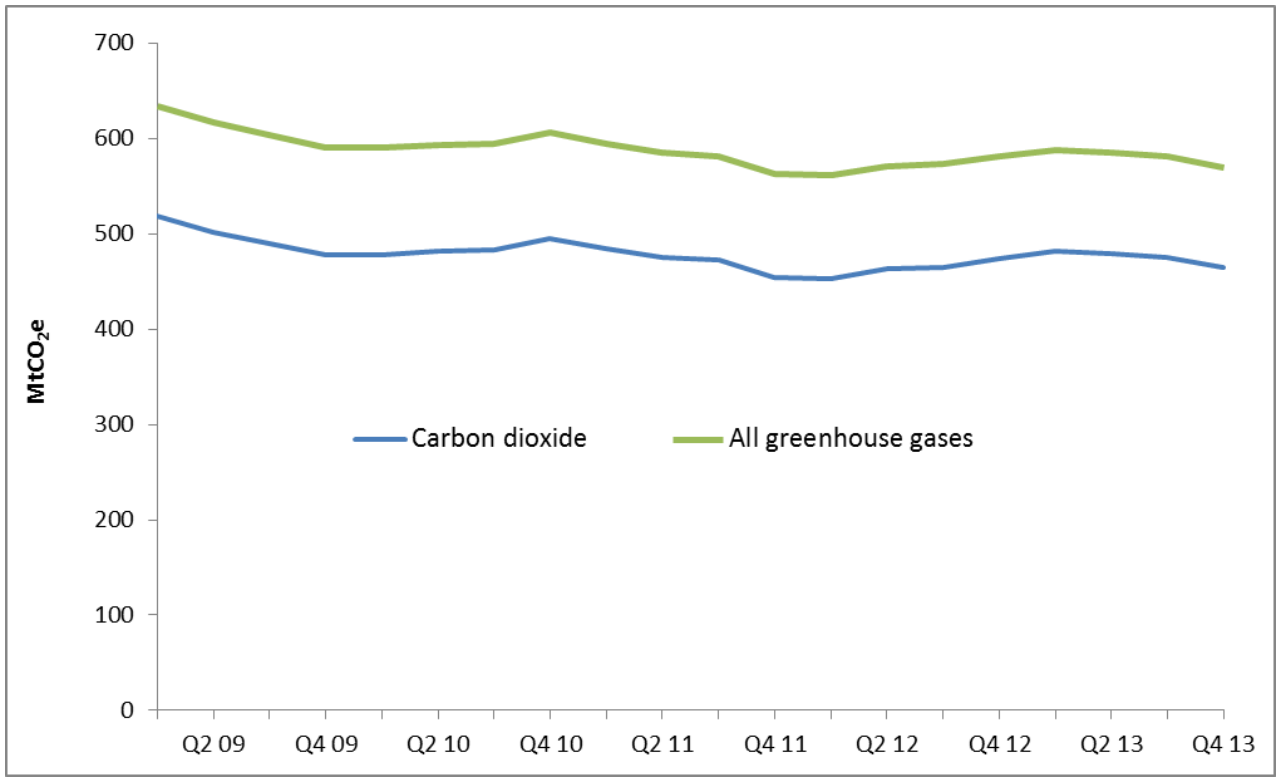
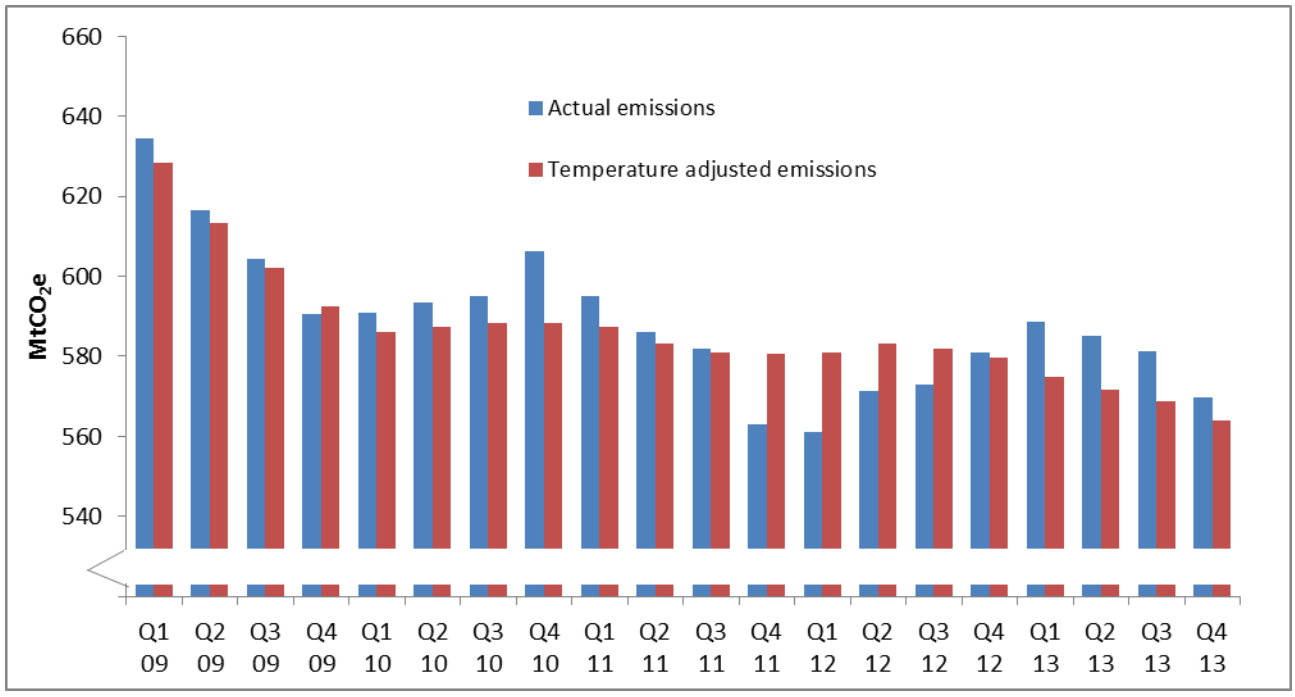


Figure 2 below shows actual and temperature adjusted greenhouse gas emissions, expressed as MAT. During 2010 and most of 2011 temperature adjusted emissions were consistently lower than actual emissions reflecting the fact that from the year to quarter 1 2010 up to the year to quarter 3 2011, temperature adjusted emissions were consistently lower than actual emissions for both sectors. However, this trend changed during the year to quarter 4 2011 up to the year to quarter 3 2012, where temperature adjusted emissions were higher than actual emissions. In the most recent five quarters up to the year to quarter 4 2013, the situation has reversed again as temperatures were, in general, below the long term average. As a result since the year up to the fourth quarter of 2012, actual emissions have been higher than temperature adjusted emissions.

Comparing the year up to quarter 4 of 2013 with the year up to quarter 3 of 2013, actual and temperature adjusted emissions are both lower. The decrease comes largely from the energy supply and the residential sector. The decrease in emissions from the energy supply sector (by 7.0 Mt or 3.8 per cent) was due to a decrease in coal and gas for electricity generation. The decrease from the residential sector (by 3.4 Mt or 4.2 per cent) was due to a reduction in the use of gas for space heating due to the fact that Q4 2013 was warmer than Q4 2012 by around 1.4 degrees Celsius.

Figure 2: Actual and temperature adjusted GHG emissions, expressed as Moving Annual Total; Q1 2009 – Q4 2013 (Mt CO_2e)



Carbon dioxide emissions by source sector – actual emissions

Table 2 below shows a summary of quarterly emissions by source sector, as a Moving Annual Total, and the changes between the year to Q3 2013 and the year to Q4 2013.

Table 2: Sources of carbon dioxide (CO_2) emissions, provisional sectoral breakdown – MAT, actual data ($MtCO_2$)

	Year to Q3 2013	Year to Q4 2013	Change (Mt)	Change (%)
Energy Supply	185.5	178.5	-7.0	-3.8%
Business	75.6	75.4	-0.2	-0.3%
Transport	116.9	116.7	-0.3	-0.2%
Public	10.6	10.4	-0.3	-2.7%
Residential	80.3	76.9	-3.4	-4.2%
Other	6.4	6.5	0.1	1.3%
Total CO_2	475.3	464.3	-11.1	-2.3%

1. The figures labelled as "Q4 2013" cover the four quarters from Q1 2013 to Q4 2013 inclusive.
2. Figures for "Total CO_2" and "Change" may be different to the sum of those presented in the table due to rounding.

Carbon dioxide emissions decreased most, in absolute terms, in the energy supply sector (by 7.0 Mt or 3.8 per cent). Emissions in the residential sector decreased by 3.4 Mt (4.2 per cent). Emissions in the remaining sectors showed little change from the previous quarter in absolute terms.

Carbon dioxide emissions by source sector – temperature adjusted emissions

Table 3 below shows a summary of CO_2 emissions by source sector, as a Moving Annual Total on a temperature adjusted basis, and the changes between the year to Q3 2013 and year to Q4 2013.

Table 3: Sources of carbon dioxide emissions, provisional sectoral breakdown – MAT, temperature adjusted data ($MtCO_2$)

	Year to Q3 2013	Year to Q4 2013	Change (Mt)	Change (%)
Energy Supply	181.9	176.7	-5.2	-2.8%
Business	73.7	74.5	0.8	1.0%
Transport	116.9	116.7	-0.3	-0.2%
Public	10.1	10.1	0.0	-0.2%
Residential	73.9	73.8	-0.1	-0.1%
Other	6.4	6.5	0.1	1.3%
Total CO_2	462.9	458.3	-4.7	-1.0%

1. The figures labelled as "Q4 2013" cover the four quarters from Q1 2013 to Q4 2013 inclusive.
2. Figures for "Total CO_2" and "Change" may be different to those presented in the table due to rounding.

Carbon dioxide emissions decreased most, in absolute and percentage terms, in the energy supply sector (by 5.2 Mt or 2.8 per cent). Emissions in the business sector decreased by 0.8 Mt (1.0 per cent). Emissions in the remaining sectors showed little change from the previous quarter in absolute terms.

The sectors most influenced by temperature in absolute terms 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.

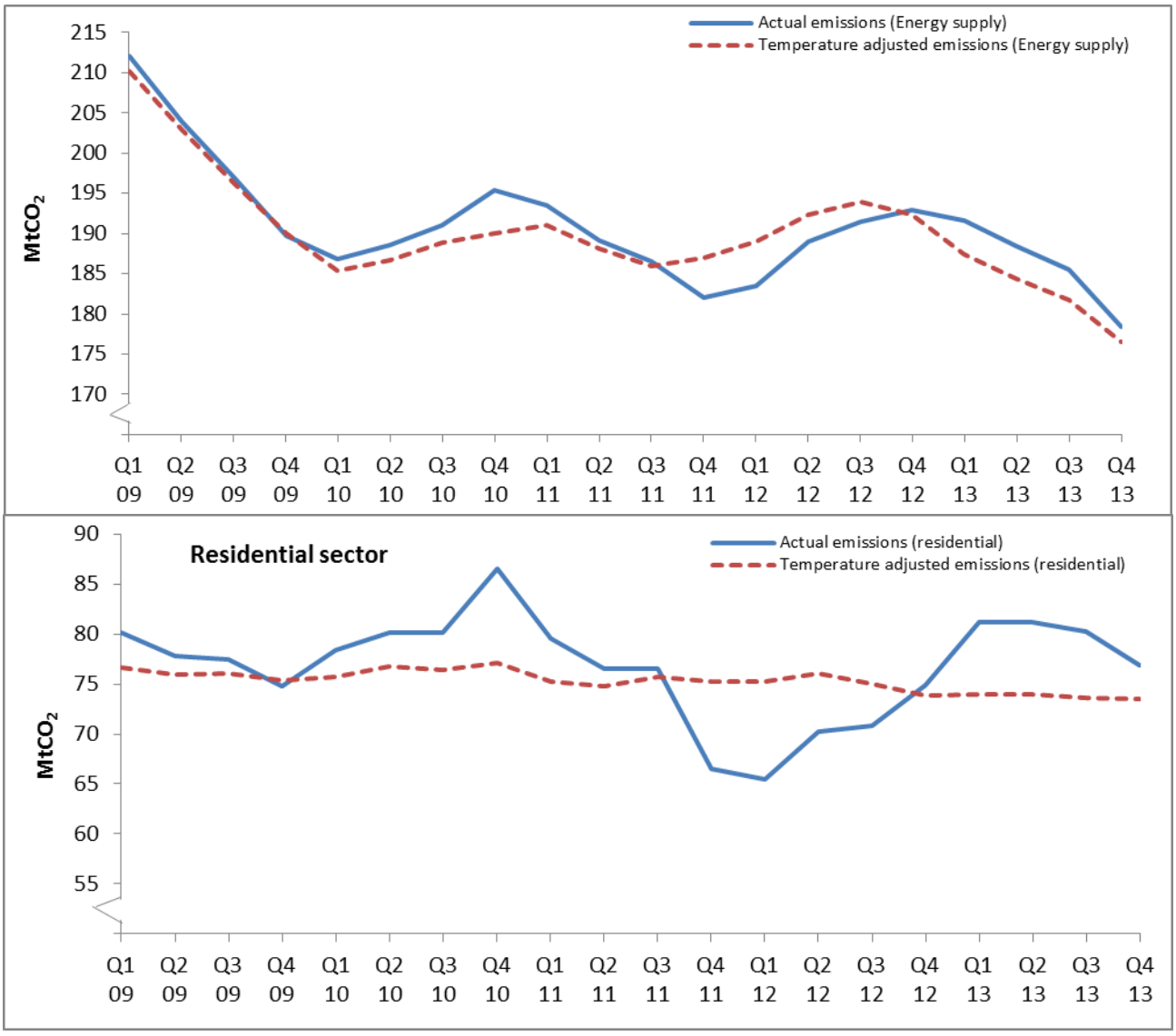
In the year to quarter 4 2013, when comparing tables 2 and 3 above, adjusting emissions for temperature decreases emissions from the energy supply sector by 1.7 Mt (from 178.5 to 176.7 Mt), and from the residential sector by 3.1 Mt (from 76.9 to 73.8 Mt)[1].

Figure 3 below shows the trend for these two sectors. As can be seen, starting from the year to quarter 1 2010 up to the year to quarter 3 2011, temperature adjusted emissions were consistently lower than actual emissions for both sectors, reflecting the fact that 2010 and the first half of 2011 were colder than average. However, this trend changed during the year to quarter 4 2011 up to the year to quarter 3 2012, where temperature adjusted emissions were higher than actual emissions. In the most recent five quarters up to the year to quarter 4 2013, the situation has reversed again as temperatures were, in general, below the long term average, and actual emissions are now higher than temperature adjusted emissions.

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.

[1] Figures may not sum when using the data presented in the table due to rounding.

Figure 3: Energy supply and residential emissions – actual and temperature adjusted data, expressed as Moving Annual Total; Q1 2009 – Q4 2013 ($MtCO_2$)



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 per cent in 2012). 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_2 gases. Due to the lack of availability of underlying quarterly data for the sources of emissions of these gases, they have been assumed to be the same each quarter, based on the latest full year of data. They have not been temperature adjusted; only carbon dioxide emissions have been adjusted for temperature.

Moving Annual Total

In order to remove the seasonality in the data so that a trend in emissions over time can be observed, quarterly emissions are reported in terms of the "Moving Annual Total" (MAT). The MAT is the sum of the emissions of the four most recent consecutive quarters. When data becomes available for each new quarter, the estimates for the latest quarter are added to the MAT, while at the same time the estimates for the same quarter from the previous year are removed from the series. This procedure will smooth out short-term fluctuations and highlights long term trends, and can be used to show the underlying trend each quarter.

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.

It is possible to adjust quarterly emissions estimates to 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 31 year period 1980-2010). Without any temperature adjustment, emissions during very cold winters will be reported at an artificially high level. 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.

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 note on the Gov.uk website.

Revisions to the quarterly provisional emissions estimates

It should be noted that the quarterly emissions time series is revised each quarter to reflect any revisions made to either the underlying energy data or to the UK greenhouse gas inventory. The estimates published here are therefore provisional estimates subject to future revision.

Future updates to quarterly provisional emissions estimates

Quarterly provisional estimates should 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.

These estimates are “Experimental Statistics”. We would welcome any comments from users on either the estimates themselves or the underlying methodology.

The next set of quarterly statistics will be published in July 2014 and will provide a first estimate of emissions for the first quarter of 2014. Provisional annual emissions for 2014 will be published on 26th March 2015.

Feedback and further information

Further information on climate change statistics, including Excel downloads of all the data used to compile this statistical release, 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 2012 in this statistics release are from the National Atmospheric Emissions Inventory (NAEI), produced for DECC and the Devolved Administrations by Ricardo-AEA. 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 on quarterly and temperature corrected emissions can be found on the DECC climate change statistics section of 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 three F-gases: HFCs, PFCs and SF6.

5. Any enquiries about the Energy Trends report should be sent to energy.stats@decc.gsi.gov.uk.

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