



30th April 2013

STATISTICAL RELEASE

UK GREENHOUSE GAS EMISSIONS – QUARTERLY STATISTICS: 4th QUARTER 2012 PROVISIONAL FIGURES

These estimates should be treated as “Experimental Official Statistics”. We would welcome any comments from users on either the estimates themselves or the underlying methodology.

DECC today publishes provisional estimates of UK greenhouse gas emissions for the 4th quarter of 2012.

We report quarterly emissions estimates in terms of the Moving Annual Total (MAT), which represents the sum of the most recent four quarters. Using a MAT serves 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.

Headline results

- For the year to quarter 4 2012, total greenhouse gas (GHG) emissions have been provisionally estimated at 571.7 million tonnes carbon dioxide equivalent (MtCO₂e). This was around 1.6 per cent higher than in the previous quarter, when emissions were estimated to be 562.7 MtCO₂e.
- For the year to quarter 4 2012, total carbon dioxide (CO₂) emissions have been provisionally estimated at 479.2 Mt. This was 2.0 per cent higher than in the previous quarter, when emissions were estimated to be 469.8 Mt.
- On a temperature adjusted basis, greenhouse gas emissions in the year to quarter 4 2012 were provisionally estimated at 569.6 MtCO₂e, which is slightly lower than the level of the previous quarter. Emissions measured on a temperature adjusted basis were similar to actual emissions. This reflects the fact that, on the whole, temperatures in the last year were close to the long-term average.
- The increasing trend in actual emissions was primarily due to lower temperatures in the final quarter of 2012 compared with the equivalent quarter in 2011, which led to an increase in demand for space heating. Emissions on a temperature adjusted basis, however, showed little change compared with the previous quarter.

These results are shown in Table 1 and Figure 1 below.

Table 1: Emissions of all greenhouse gases and carbon dioxide only, expressed as a Moving Annual Total (MtCO₂e)

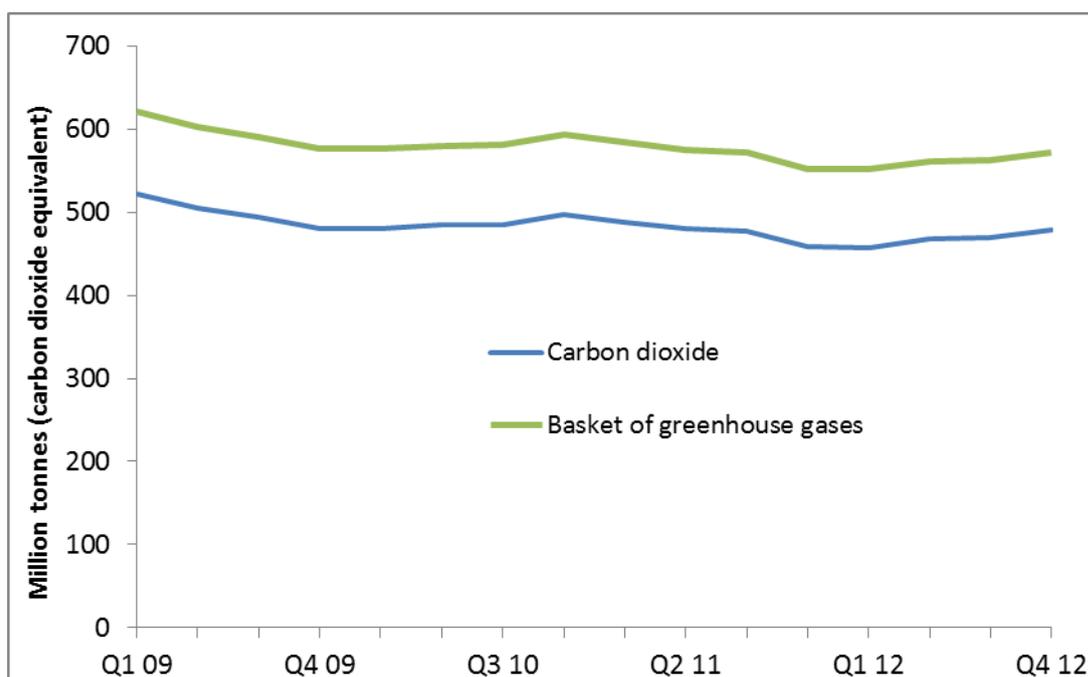
	Q3 2012	Q4 2012	Change
Total GHG emissions	562.7	571.7	+1.6%
Temperature adjusted GHG emissions	571.0	569.6	-0.2%
Total CO ₂ emissions	469.8	479.2	+2.0%
Temperature adjusted CO ₂ emissions	478.2	477.1	-0.2%

CO₂ emissions figures are for the UK and Crown Dependencies; Greenhouse gas emissions figures also include some Overseas Territories.

Non-CO₂ emissions have not been temperature adjusted.

The figures labelled as "Q4 2012" cover the four quarters from Q1 2012 to Q4 2012 inclusive.

Figure 1: Actual emissions of all greenhouse gases and carbon dioxide, as a Moving Annual Total; Q1 2009 – Q4 2012 (provisional)



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 (83 per cent in 2011). 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. 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 smoothes 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 32 year period 1980-2011). 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 report in a separate [note on the Gov.uk website](#).

4th quarter 2012 greenhouse gas emissions estimates

For the year to quarter 4 2012, total greenhouse gas emissions have been provisionally estimated at 571.7 million tonnes carbon dioxide equivalent (MtCO₂e). This represented an increase of 1.6 per cent (or 9.0 MtCO₂e) from the previous quarter (562.7 MtCO₂e).

On a temperature adjusted basis, greenhouse gas emissions in the year to quarter 4 2012 were provisionally estimated at 569.6 MtCO₂e. This was a decrease of 0.2 per cent (1.4 MtCO₂e) from the previous quarter (571.0 MtCO₂e).

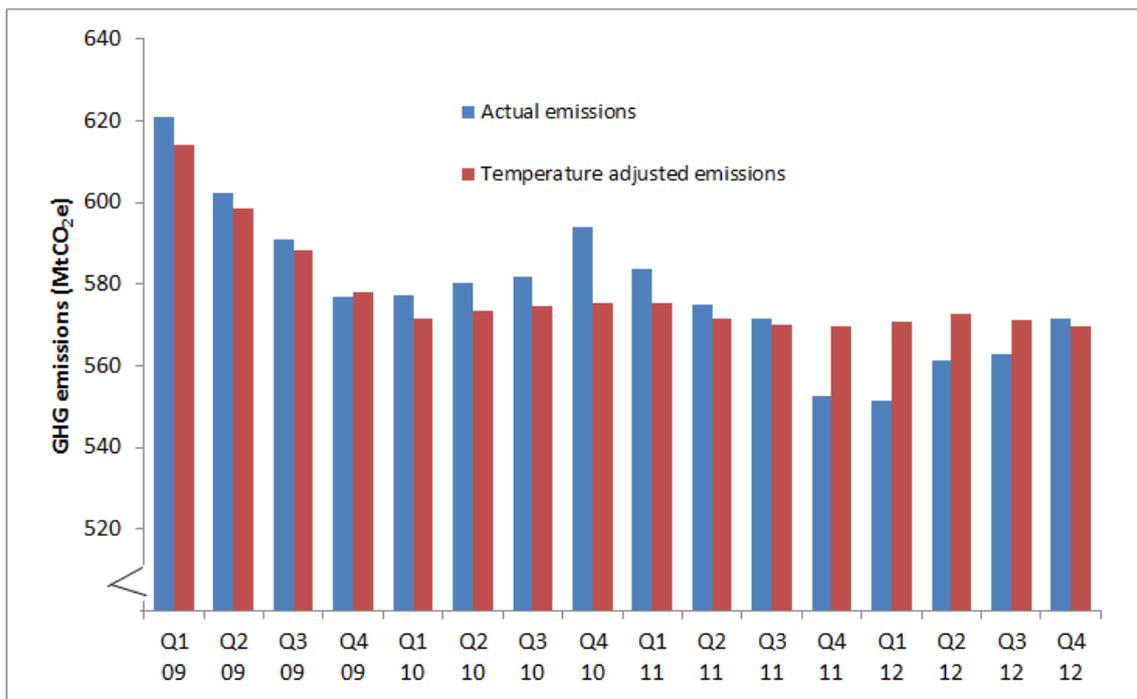
Emissions measured on a temperature adjusted basis were similar to actual emissions. This reflects the fact that, on the whole, temperatures in the last year were close to the long-term average.

Figure 2 below shows actual and temperature adjusted greenhouse gas emissions since the first quarter of 2009. Since the first quarter of 2010, temperature adjusted emissions have gone from being slightly lower than actual emissions (reflecting the cold 2010) to being noticeably higher than actual emissions (reflecting the above average temperatures in 2011 and most of 2012). The fourth quarter of 2012 saw the situation reverse for the first time since the third quarter of 2011. The 9.0 MtCO₂e increase in actual emissions represents the third successive quarterly increase. There was, however, a decrease (of 1.4 MtCO₂e) in temperature adjusted emissions; in each the last six quarters though, emissions on this basis have not changed from the previous quarter by more than +/-0.4 per cent.

The increase in actual emissions from the previous quarter largely reflects the fact that temperatures were lower in the final quarter of 2012 compared with the equivalent quarter in 2011, by around 2.3 degrees Celsius on average. The residential and business sectors, two sectors known to be affected by external temperatures, saw increases in emissions of 6.5 per cent (4.5 Mt) and 3.8 per cent (2.9 Mt) respectively. Emissions from the energy supply sector also increased, by 0.6 per cent (1.1 Mt). In addition to the temperature effect, the quarter also saw a continuation of the fuel switching at power stations from gas to coal seen throughout 2012, which has resulted from high wholesale gas prices. Since coal is a more carbon intensive fuel than gas, this has led to an increase in emissions for this sector compared with the previous quarter.

On a temperature adjusted basis, there was very little change in emissions from the previous quarter. This reflects the fact that emissions on this basis in the fourth quarter of 2012 were similar to those in the equivalent quarter in 2011.

Figure 2: Actual and temperature adjusted GHG emissions, expressed as Moving Annual Total; Q1 2009 – Q4 2012 (provisional)



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 two most recent quarters.

Table 2: Sources of carbon dioxide (CO₂) emissions, provisional sectoral breakdown – MAT, actual data (Mt)

	Q3 2012	Q4 2012	Change (Mt)	Change (%)
Energy Supply	191.3	192.5	1.1	0.6%
Business	76.0	78.9	2.9	3.8%
Transport	115.7	116.0	0.4	0.3%
Public	7.2	7.4	0.2	2.7%
Residential	69.6	74.2	4.5	6.5%
Other	10.0	10.3	0.3	2.8%
Total CO₂	469.8	479.2	9.4	2.0%

Note: the figures labelled as “Q4 2012” cover the four quarters from Q1 2012 to Q4 2012 inclusive.

Carbon dioxide emissions increased most, in absolute and percentage terms, in the residential sector (by 4.5 Mt or 6.5 per cent). Emissions in the business and energy supply sectors increased by 2.9 Mt (3.8 per cent) and 1.1 Mt (0.6 per cent) respectively. Emissions in the remaining sectors also increased, but by no more than 0.4 Mt.

Carbon dioxide emissions by source sector – temperature adjusted emissions

Table 3 below shows a summary of CO₂ emissions by source sector, on a temperature adjusted basis and as a Moving Annual Total, and the changes between the two most recent quarters.

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

	Q3 2012	Q4 2012	Change (Mt)	Change (%)
Energy Supply	193.8	191.9	-1.9	-1.0%
Business	77.4	78.5	1.1	1.5%
Transport	115.7	116.0	0.4	0.3%
Public	7.5	7.3	-0.2	-3.1%
Residential	73.8	73.1	-0.7	-1.0%
Other	10.0	10.3	0.3	2.8%
Total CO₂	478.2	477.1	-1.1	-0.2%

Note: the figures labelled as “Q4 2012” cover the four quarters from Q1 2012 to Q4 2012 inclusive.

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.

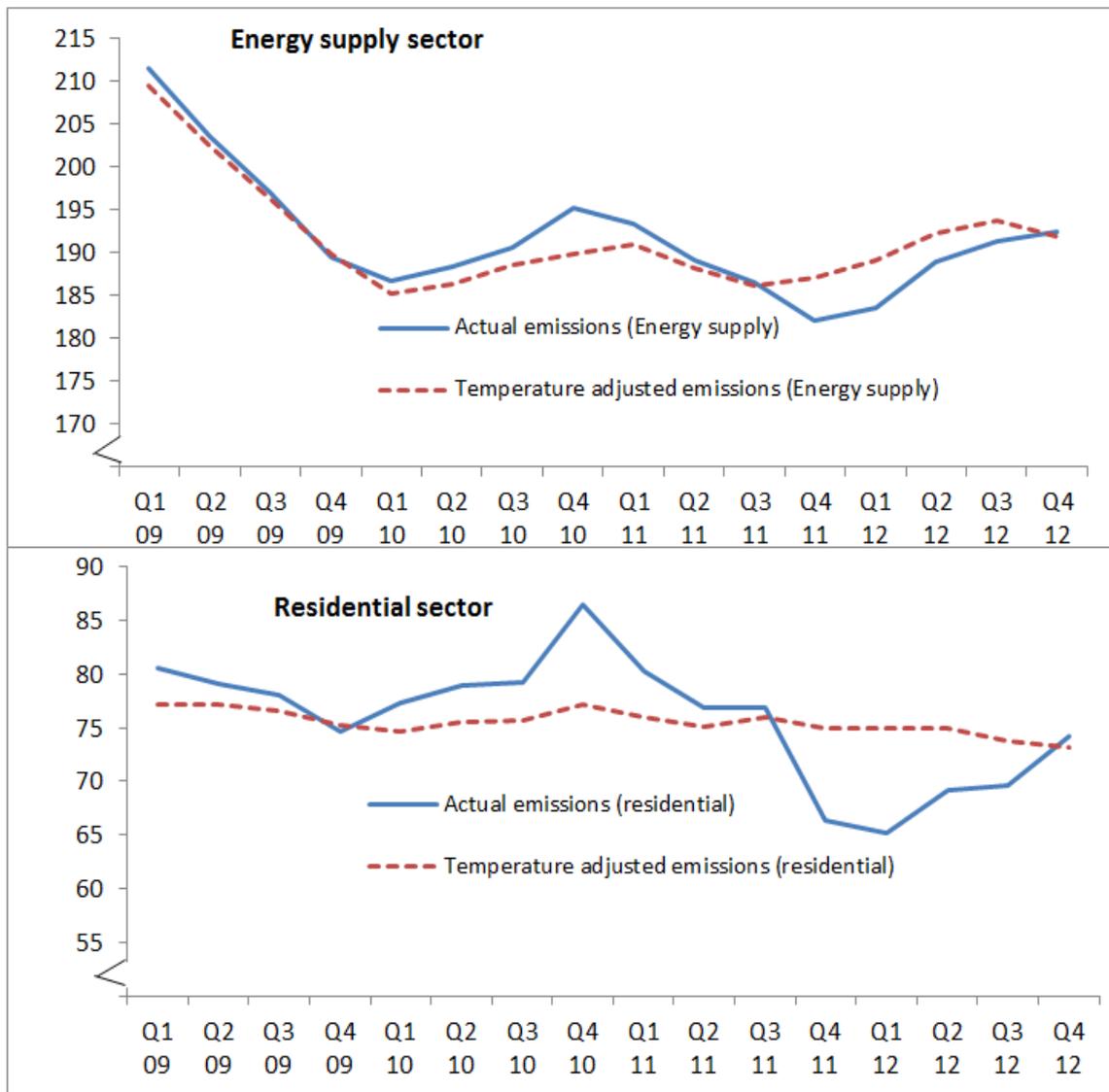
In quarter 4 2012, when comparing tables 2 and 3 above, adjusting emissions for temperature has led to a decrease in emissions from the residential sector of

1.0 Mt (from 74.2 to 73.1 Mt) and emissions from the energy supply sector of 0.6 Mt (from 192.5 to 191.9 Mt), allowing for rounding.

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 next four quarters, where temperature adjusted emissions were higher than actual emissions. In the most recent quarter, the situation has reversed again, and actual emissions are now very slightly higher than temperature adjusted emissions again.

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.

Figure 3: Energy supply and residential emissions – actual and temperature adjusted data, expressed as Moving Annual Total; Q1 2009 – Q4 2012 (Mt)



Revisions to the quarterly provisional emissions estimates

It should be noted that the quarterly emissions time series will be revised each quarter to reflect any revisions made to either the underlying energy data or to the UK greenhouse gas inventory.

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.

The next set of quarterly statistics will be published in July 2013 and will provide a first estimate of emissions for the first quarter of 2013.

Feedback and further information

These estimates should be treated as “Experimental Official Statistics”. We would welcome any comments from users on either the estimates themselves or the underlying methodology.

Any enquiries or comments should be sent to DECC’s UK Greenhouse Gas Emissions Statistics and Inventory Team at:

ClimateChange.Statistics@decc.gsi.gov.uk

Contact telephone: 0300 068 6563

The lead statistician for this publication is John Mackintosh.

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 2011 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.

ISSUED BY:

Department of Energy and Climate Change
3 Whitehall Place
London SW1A 2AW

TELEPHONE:

Press Enquiries:
0300 068 5219

General Enquiries:
0300 060 4000

Out of hours:
020 7215 3505