

25<sup>th</sup> October 2012

**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.**

## **UK GREENHOUSE GAS EMISSIONS – QUARTERLY STATISTICS: 2<sup>nd</sup> QUARTER 2012 PROVISIONAL FIGURES**

DECC today publishes provisional estimates of UK greenhouse gas emissions for the 2<sup>nd</sup> quarter of 2012.

We will be reporting 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 fluctuations and highlight long-term trends. Each new publication will therefore provide an indication of the current trend in emissions without the effect of seasonality.

### **Headline results**

- For the year to quarter 2 2012, total greenhouse gas (GHG) emissions have been provisionally estimated at 559.4 million tonnes carbon dioxide equivalent (MtCO<sub>2</sub>e). This was an increase of almost 2 per cent on the previous quarter, when emissions were estimated to be 548.8 MtCO<sub>2</sub>e.
- For the year to quarter 2 2012, total carbon dioxide (CO<sub>2</sub>) emissions have been provisionally estimated at 466.4 Mt. This was an increase of just over 2 per cent on the previous quarter, when emissions were estimated to be 455.8 Mt.
- On a temperature adjusted basis, greenhouse gas emissions in the year to quarter 2 2012 were provisionally estimated at 571.4 MtCO<sub>2</sub>e, representing an increase of around 0.5 per cent on the previous quarter. Emissions measured on a temperature adjusted basis were therefore higher than actual emissions, reflecting the fact that three of the last four quarters have seen above average temperatures.
- The increasing trend in actual emissions this quarter is largely due to the combined effect of temperature differentials and fossil fuel prices. In the latter case, high gas prices have caused fuel switching from gas to coal for electricity generation during 2012.

These results are shown in Table 1 and Figure 1.

**Table 1: Emissions of all greenhouse gases and carbon dioxide only, expressed as a Moving Annual Total (MtCO<sub>2</sub>e)**

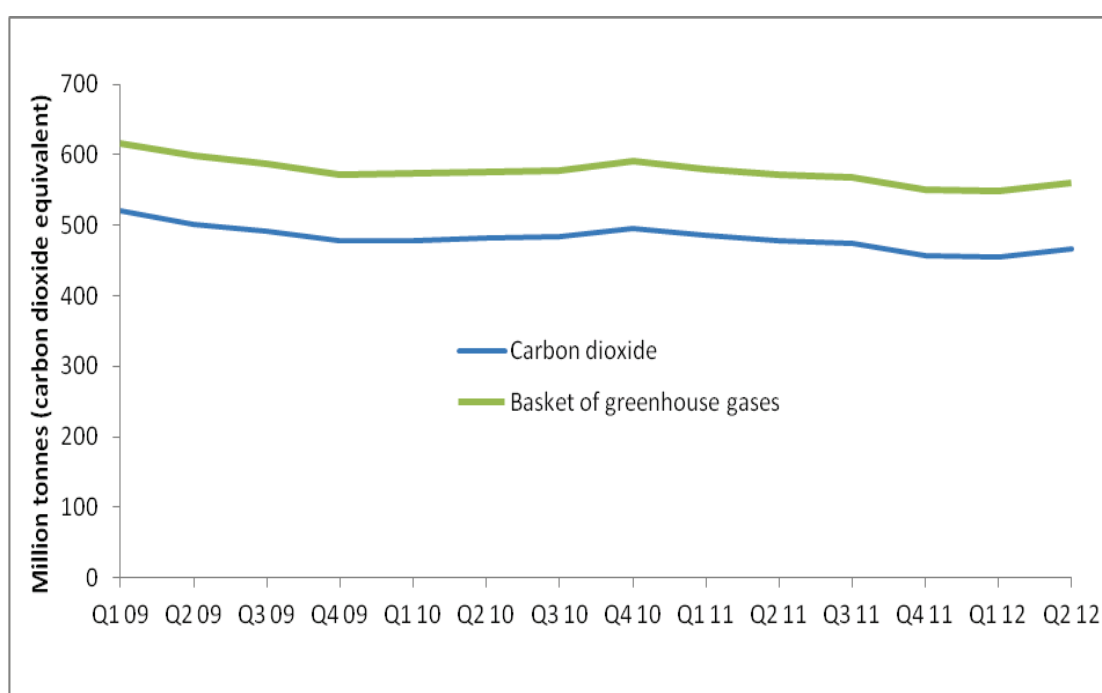
	Q1 2012	Q2 2012	Change
Total GHG emissions	548.8	559.4	+1.9%
Temperature adjusted GHG emissions	568.4	571.4	+0.5%
Total CO <sub>2</sub> emissions	455.8	466.4	+2.3%
Temperature adjusted CO <sub>2</sub> emissions	475.4	478.4	+0.6%

CO<sub>2</sub> emissions figures are for the UK and Crown Dependencies; Greenhouse gas emissions figures also include some Overseas Territories.

Non-CO<sub>2</sub> emissions have not been temperature adjusted.

The figures labelled as "Q2 2012" cover the four quarters from Q3 2011 to Q2 2012 inclusive.

**Figure 1: Actual emissions of all greenhouse gases and carbon dioxide, as Moving Annual Total; Q1 2009 – Q2 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 greenhouse gas emissions (84 per cent in 2010). 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. 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 adjustment 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). Without any temperature correction, emissions during very cold winters will be reported at an artificially high level. The temperature adjustment to emissions has been applied for the period from September to April inclusive in every year.

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 DECC website](#).

## **2<sup>nd</sup> quarter 2012 greenhouse gas emissions estimates**

For the year to quarter 2 2012, total greenhouse gas emissions have been provisionally estimated at 559.4 million tonnes carbon dioxide equivalent (MtCO<sub>2</sub>e). This represented an increase of 1.9 per cent (or 10.7 MtCO<sub>2</sub>e) from the previous quarter (548.8 MtCO<sub>2</sub>e).

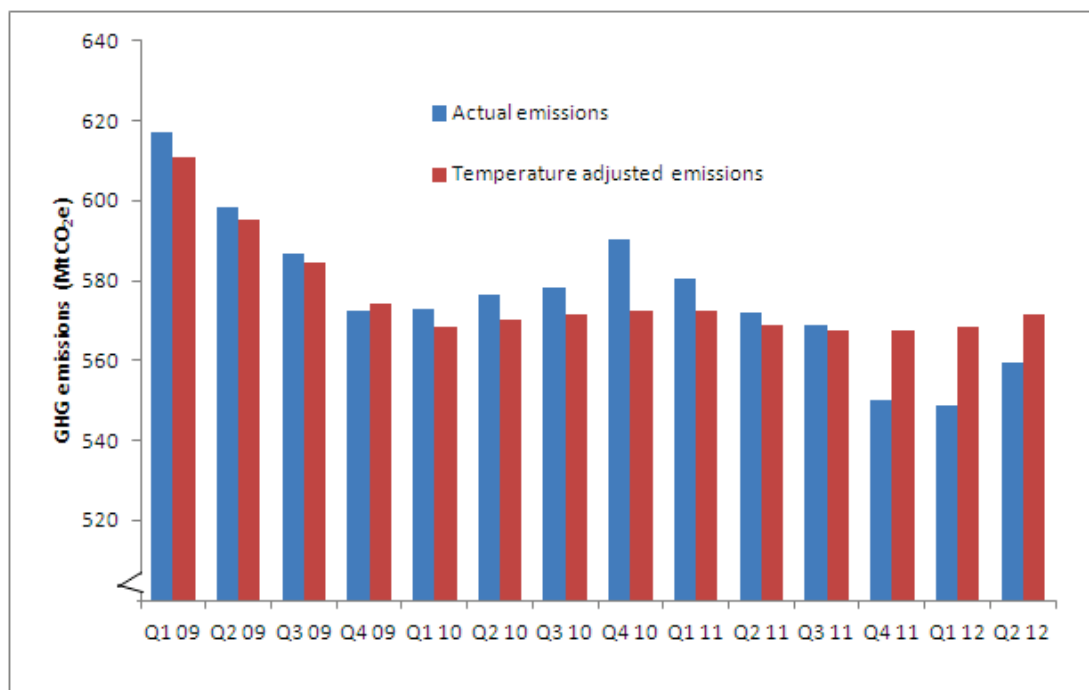
On a temperature adjusted basis, greenhouse gas emissions in the year to quarter 2 2012 were provisionally estimated at 571.4 MtCO<sub>2</sub>e. This was an increase of 3.0 MtCO<sub>2</sub>e from the level in the previous quarter (568.4 MtCO<sub>2</sub>e).

Temperatures have been higher than the long-term mean in three of the last four quarters. This will have resulted in energy consumption having been lower than if temperatures had been at average levels. As a result, greenhouse gas emissions were estimated to be higher on a temperature adjusted basis than actual emissions in this quarter.

Figure 2 below shows actual and temperature adjusted greenhouse gas emissions since the first quarter of 2009. Over the last two years, temperature adjusted emissions have been moving from being slightly lower than actual emissions (reflecting the cold 2010) to being noticeably higher than actual emissions (reflecting the warm 2011 and start of 2012). The 10.7 MtCO<sub>2</sub>e increase in actual emissions represents the second largest quarterly increase in emissions since the beginning of this series. There was a smaller increase (3.0 MtCO<sub>2</sub>e) in temperature corrected emissions, although on this basis this does, in fact, represent the largest increase in emissions since the series began.

The increasing trend in actual emissions this quarter is largely due to the combined effect of temperature differentials and fossil fuel prices. Average temperatures during the second quarter of 2012 were lower than the equivalent quarter of 2011; this has contributed to the increase in emissions between the two quarters which has in turn been reflected in an increasing MAT figure. The increasing trend in weather corrected emissions this quarter, which effectively removes the effect of temperature differentials, is primarily due to fuel switching at power stations for electricity generation. High gas prices during 2012 have led to power stations switching from gas to coal, a more carbon intensive fuel, for generation.

**Figure 2: Actual and temperature adjusted GHG emissions, expressed as Moving Annual Total; Q1 2009 – Q2 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 (CO<sub>2</sub>) emissions, provisional sectoral breakdown –MAT, actual data (Mt)**

	Q1 2012	Q2 2012	Change (Mt)	Change (%)
Energy Supply	184.3	189.7	5.4	2.9%
Business	70.1	72.2	2.1	3.0%
Transport	120.4	118.5	-1.9	-1.6%
Public	7.1	7.6	0.5	7.0%
Residential	65.3	69.6	4.3	6.6%
Other	8.6	8.8	0.2	2.3%
Total CO <sub>2</sub>	455.8	466.4	10.6	2.3%

Note: the figures labelled as "Q1 2012" cover the four quarters from Q2 2011 to Q1 2012 inclusive.

Compared to the previous quarter, emissions from all sectors – except the transport sector – increased.

Carbon dioxide emissions increased most, in absolute terms, in the energy supply sector (5.4 Mt or 2.9 per cent). In the residential and business sectors, emissions increased by 4.3 Mt (6.6 per cent) and 2.1 Mt (3.0 per cent) respectively. Emissions in the transport sector decreased by 1.9 Mt, (1.6 per cent).

### **Carbon dioxide emissions by source sector – temperature adjusted emissions**

Table 3 below shows a summary of CO<sub>2</sub> emissions by source sector, on a temperature adjusted basis, 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)**

	Q1 2012	Q2 2012	Change (Mt)	Change (%)
Energy Supply	189.8	193.1	3.3	1.7%
Business	73.4	74.2	0.8	1.1%
Transport	120.4	118.5	-1.9	-1.6%
Public	7.9	8.1	0.2	2.5%
Residential	75.2	75.7	0.5	0.7%
Other	8.6	8.8	0.2	2.3%
Total CO <sub>2</sub>	475.4	478.4	3.0	0.6%

Note: the figures labelled as "Q1 2012" cover the four quarters from Q2 2011 to Q1 2012 inclusive.

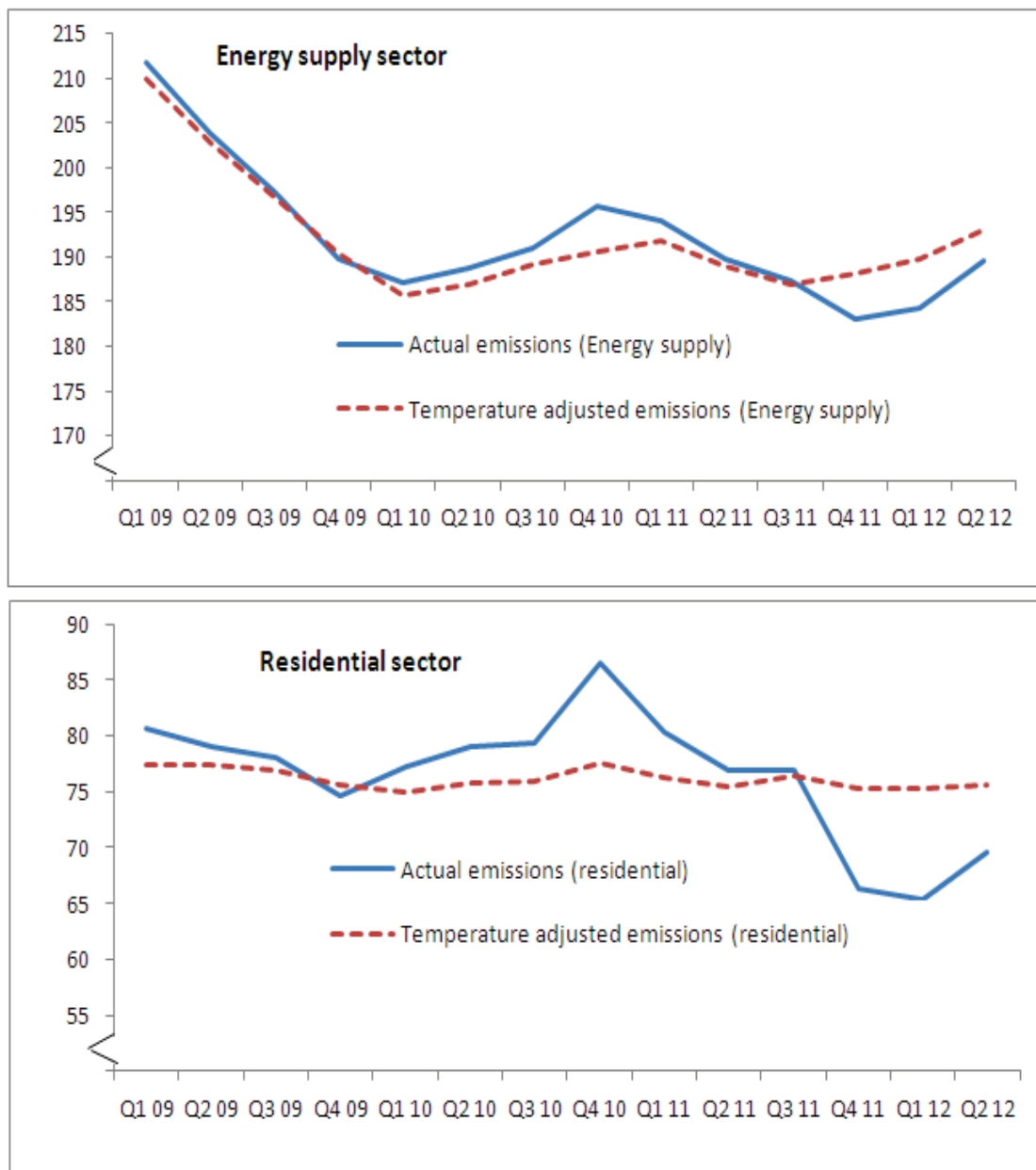
The sectors most influenced by temperature are residential and energy supply. With respect to the residential sector in particular, if temperatures decrease there is an increase in demand for space heating, resulting in an increase in emissions.

In quarter 2 2012, when comparing tables 2 and 3 above, adjusting emissions for temperature has led to an increase in emissions from the residential sector of 6 Mt (from 70 to 76 Mt) and emissions from the energy supply sector of 3 Mt (from 190 to 193 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 has changed during the last three quarters, where temperature adjusted emissions were higher than actual 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.

**Figure 3: Energy supply and residential emissions – actual and temperature adjusted data, expressed as Moving Annual Total; Q1 2009 – Q2 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 January 2013 and will provide a first estimate of emissions for the third quarter of 2012.

## **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](mailto: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 DECC website at:

[http://www.decc.gov.uk/en/content/cms/statistics/climate\\_stats/gg\\_emissions/uk\\_emissions/uk\\_emissions.aspx](http://www.decc.gov.uk/en/content/cms/statistics/climate_stats/gg_emissions/uk_emissions/uk_emissions.aspx)

## **Notes for Editors**

1. The annual figures for 1990 to 2010 in this statistics release are from the National Atmospheric Emissions Inventory (NAEI), produced for DECC and the Devolved Administrations by 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 DECC website](#).

3. The complete methodology on quarterly and temperature corrected emissions can be found in the climate change statistics section of the [DECC 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](mailto:energy.stats@decc.gsi.gov.uk).

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