Department of Energy & Climate Change

UK Greenhouse Gas Emissions – 2nd Quarter 2014 Provisional Figures

Statistical Release: Official statistics

9 October 2014

© Crown copyright 2014

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 Kate Johnson.

Contact telephone: 0300 068 8187

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

Contents

Executive summary

Headline results for the year to quarter 2 2014

- DECC today publishes provisional estimates of UK greenhouse gas emissions for the year to the second quarter of 2014.
- Total greenhouse gas emissions have been provisionally estimated at 538.0 million tonnes carbon dioxide equivalent ($MtCO_2e$) over the four quarters to Q2 2014, a decrease of 15.1 $MtCO_2e$ (2.7 per cent) compared to the year up to quarter 1 2014, when emissions were estimated to be 553.0 $MtCO_2e$.
- On a temperature adjusted basis, greenhouse gas emissions for the year to Q2 2014 have been provisionally estimated at 552.8 $MtCO_2e$. This is around 1.7 per cent lower than in the four quarters to Q1 2014, when emissions were estimated to be 562.5 $MtCO_2e$. Emissions measured on a temperature adjusted basis were higher than actual emissions. This reflects the fact that, on the whole, temperatures over the last four quarters were higher than the long term average, in particular during the first two quarters of 2014, where monthly temperatures were consistently warmer than the long term mean.
- Actual and temperature adjusted emissions are both lower than in the year up to Q1 2014. This was due to a decrease in the amount of coal used for electricity generation, as electricity generation overall was low, coupled with lower coal fired generation, compared to Q2 2013. There is also a decrease in emissions due to a reduction in the use of gas for space heating due to the fact that Q2 2014 was warmer than Q2 2013 by around 1.9 degrees Celsius. This only impacts the actual (non-adjusted) emissions, which explains the smaller fall in emissions seen in the temperature adjusted series.

Introduction

These estimates are “Official Statistics”, and have been rebadged from “Experimental Statistics” following a review of the underlying methodology. More information about the review, and the underlying methodology, can be found at the end of this publication and in the accompanying methodology document. The review established that there was demand among users to continue publishing the statistics.

These statistics provide users with a first estimate of how emissions are changing in 2014, ahead of the annual provisional emissions statistics for 2014, which will be published on 26th March 2015. The final inventory figures for 2014 will be published in February 2016. This publication also provides an estimate of temperature adjusted emissions, which give an idea of overall trend 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, as well as others interested in greenhouse gas emissions in the UK. 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 CO_2 emissions (around 80% of all greenhouse gas emissions), 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 Final UK Greenhouse Gas inventory.

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 2, 2014, represent an annual total comprising Quarter 2 2014, and the preceding 3 quarters, quarters 3 to 4, 2013 and Quarter 1, 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 (see page 9 for more on methodology). Data on emissions in individual quarters are available in the data tables published alongside this publication.

Results

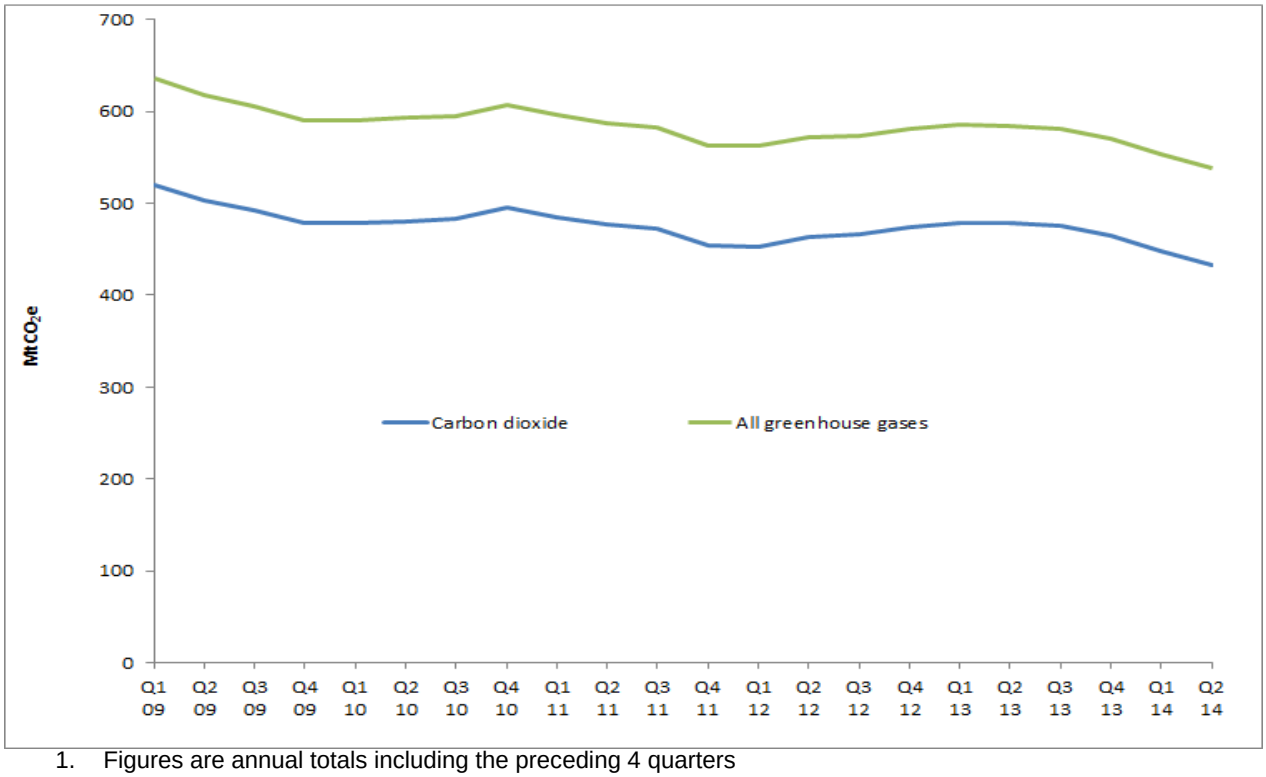
2nd quarter 2014 greenhouse gas emissions estimates

Table 1: Emissions of all greenhouse gases and carbon dioxide only ($MtCO_2e$)

	Year to Q1 2014	Year to Q2 2014	Change
Total GHG emissions	553.0	538.0	-2.7%
Temperature adjusted GHG emissions	562.5	552.8	-1.7%
Total CO_2 emissions	447.4	432.4	-3.4%
Temperature adjusted CO_2 emissions	456.9	447.2	-2.1%

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 "Q2 2014" cover the four quarters from Q3 2013 to Q2 2014 inclusive.

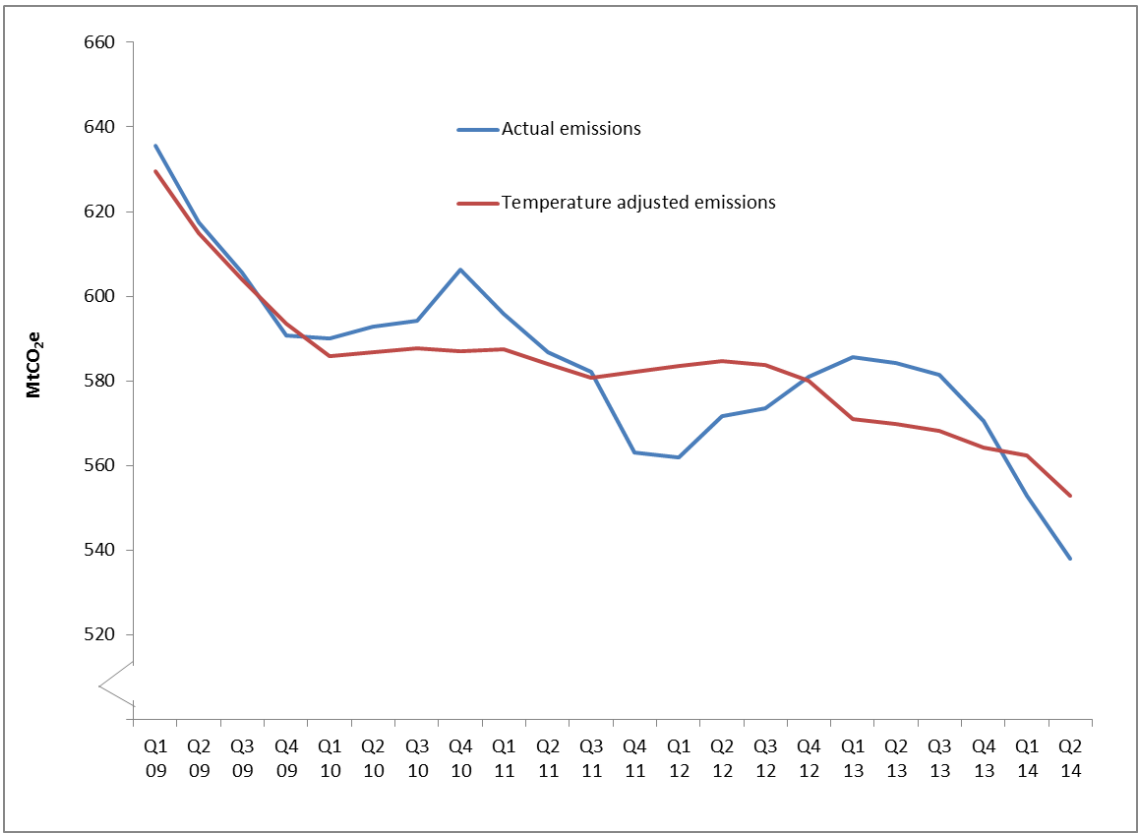
Figure 1: Actual emissions of all greenhouse gases and carbon dioxide, Year to Q1 2009 – Year to Q2 2014 (Mt CO_2e)



1. Figures are annual totals including the preceding 4 quarters
2. From Q1 2013 onwards, figures include provisional data

A temperature adjustment has been applied to the quarterly CO_2 emissions, in order to estimate what the overall trend of emissions would have been without the impact of external temperatures. Both the non-adjusted and the temperature adjusted emissions are shown in Figure 2 below.

Figure 2: Actual and temperature adjusted GHG emissions; Year to Q1 2009 Year to Q1 2014 (Mt CO_2e)



1. Figures are annual totals including the preceding 4 quarters
2. From year to Q1 2013 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 15 per cent and temperature adjusted emissions by 12 per cent in the year to Q2 2014, compared to the year to Q1 2009.

On a temperature adjusted basis, emissions remained relatively flat during the period between late 2010 and early 2012, while non-adjusted emissions were much more variable during this period, showing that much of the fluctuation can be attributed to change in energy use due to varying external temperatures. In particular, the 4th quarter of 2010 was 2.4 degrees lower than the long term average, while temperatures in Q4 2012 and Q1 2013 were 1.7 and 0.9 degrees higher. Both temperature adjusted and non-adjusted emissions have been falling during 2013 and early 2014.

More information regarding the long term trends in emissions in each sector can be found in the Final UK Greenhouse Gas Inventory release.

Comparing the year up to quarter 2 of 2014 with the year up to quarter 1 of 2014, actual and temperature adjusted emissions are both lower. The decrease comes largely from the energy supply sector, in which emissions decreased by 7.9 Mt (4.6 per cent). This was due to a decrease in the amount of coal used for electricity generation, due to a decrease in electricity generation overall, coupled with a decrease in the proportion of coal fired generation, which fell

from 34.5 per cent of generation in Q2 2013 to 28.2 per cent in Q2 2014[1]. See Energy Trends for further information about changes in the energy sector overall.

For the actual emissions, the residential sector also contributed substantially to the overall decrease (by 3.8 Mt or 5.6 per cent). This decrease was due to a reduction in the use of gas for space heating due to the fact that Q2 2014 was warmer than Q2 2013 by around 1.9 degrees Celsius. In particular, the month of April 2014, where differences in temperature are more likely to impact the use of space heating than in May or June, was 2.7 degrees Celsius higher than April 2013[2]. On a temperature adjusted basis, the reduction in emissions in the residential sector is much smaller (1.1 Mt or 1.5 per cent).

Carbon dioxide emissions by source sector – actual emissions

Table 2 below shows a summary of quarterly emissions by source sector, and the changes between the year to Q1 2014 and the year to Q2 2014.

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

	Year to Q1 2014	Year to Q2 2014	Change (Mt)	Change (%)
Energy Supply	170.5	162.6	-7.9	-4.6%
Business	75.6	73.2	-2.4	-3.2%
Transport	116.8	116.4	-0.3	-0.3%
Public	9.9	9.5	-0.4	-4.1%
Residential	68.2	64.3	-3.8	-5.6%
Other	6.5	6.3	-0.2	-2.4%
Total CO_2	447.4	432.4	-15.1	-3.4%

1. The figures labelled as "Q2 2014" cover the four quarters from Q3 2013 to Q2 2014 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 in all sectors, with the largest decrease in absolute terms in the energy supply sector (7.9 Mt or 4.6 per cent). Emissions in the residential sector showed the next largest decrease (3.8 Mt or 5.6 per cent). Whilst emissions decreased in all sectors, the reduction in the transport sector was the least both in absolute and percentage terms (0.3Mt and 0.3 per cent).

[1] https://www.gov.uk/government/statistics/electricity-section-5-energy-trends

[2] https://www.gov.uk/government/statistics/energy-trends-section-7-weather

Carbon dioxide emissions by source sector – temperature adjusted emissions

Table 3 below shows a summary of CO_2 emissions by source sector, on a temperature adjusted basis, and the changes between the year to Q1 2014 and year to Q2 2014.

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

	Year to Q1 2014	Year to Q2 2014	Change (Mt)	Change (%)
Energy Supply	173.3	167.0	-6.4	-3.7%
Business	77.0	75.4	-1.6	-2.0%
Transport	116.8	116.4	-0.3	-0.3%
Public	10.3	10.1	-0.2	-1.7%
Residential	73.0	71.9	-1.1	-1.5%
Other	6.5	6.3	-0.2	-2.4%
Total CO_2	456.9	447.2	-9.7	-2.1%

1. The figures labelled as "Q2 2014" cover the four quarters from Q3 2013 to Q2 2014 inclusive.
2. Figures for "Total CO_2" and "Change" may be different to those presented in the table due to rounding.

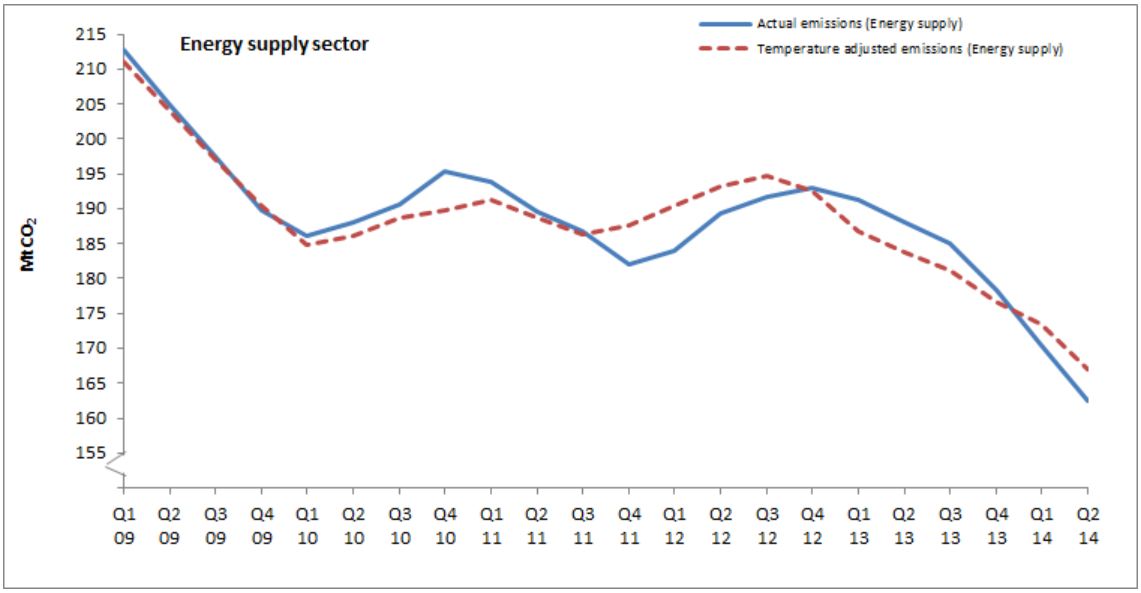
Carbon dioxide emissions decreased most, in the energy supply sector (6.4 Mt or 3.7 per cent). The next largest reduction, in absolute terms, was in the business sector, which reduced by 1.6 Mt (2.0 per cent).

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 2 2014, when comparing tables 2 and 3 above, adjusting emissions for temperature increases emissions from the energy supply sector by 4.4 Mt (from 162.6 to 167.0 Mt), and from the residential sector by 7.6 Mt (from 64.3 to 71.9 Mt).

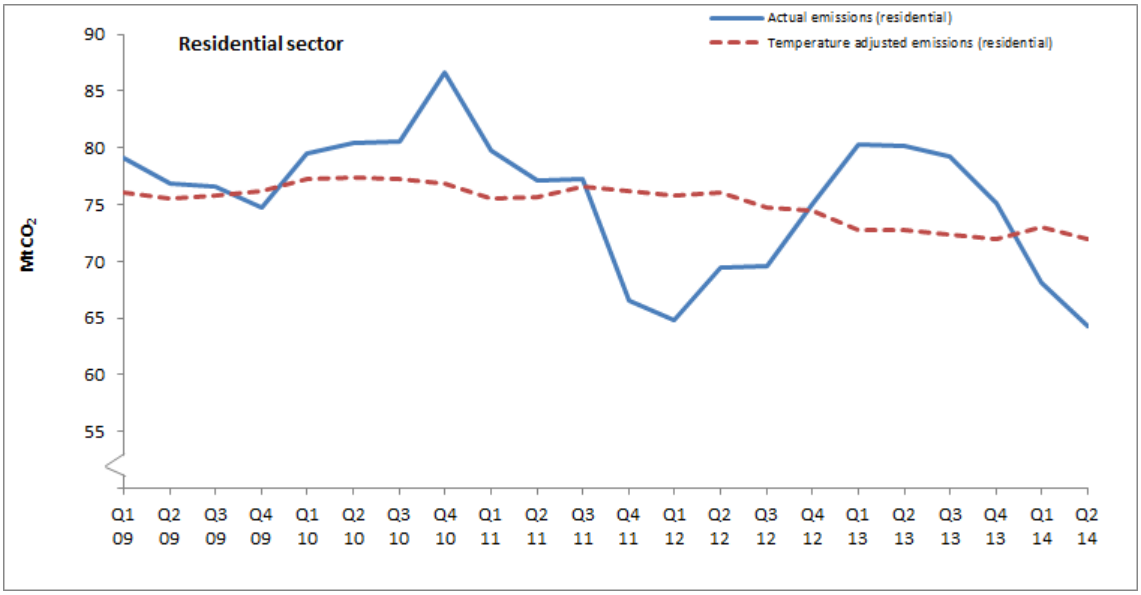
Figure 3 below shows the trend for these two sectors. As can be seen in the chart, temperature adjusted emissions from the energy supply sector show a similar trend to non-adjusted emissions. Temperature adjusted emissions in the energy supply sector have decreased by around 21 per cent compared to the year to Q1 2009, while non-adjusted emissions have decreased by around 24 per cent in the same period.

Figure 3: Energy supply emissions – actual and temperature adjusted data, Year to Q1 2009 – Year to Q2 2014 ($MtCO_2$)



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. Emissions from the residential sector change very little over the time period shown in the temperature adjusted series. On a temperature adjusted basis, residential emissions have remained relatively flat, having reduced by around 5 per cent between the year to Q1 2009 and the year to Q2 2014. The trend for non-adjusted emissions is much more variable over the same time period.

Figure 4: Residential emissions – actual and temperature adjusted data, Year to Q1 2009 – Year to Q2 2014 ($MtCO_2$)



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, as published in the Final UK Greenhouse Gas Inventory. 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 smooths 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 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. More information on the timing of revisions to the underlying data can be found in the Methodology summary.

Since the last publication, energy data on gas consumption has been revised throughout the time series. This has resulted in a change of approximately 4.1 Mt (or 0.8 per cent) in the estimate of emissions of the year to quarter 1 2014[3]. The largest absolute change due to energy data revisions can be seen in the energy supply sector, which is estimated to be 1.5 Mt higher (0.9 %) for the year to Q1 2014 than previously estimated as a result of revisions to energy data.

User consultation and methodology review

In the July 2014 publication, we requested feedback from the users of the publication regarding ways we could improve the publication. Alongside, we also conducted a review of the methodology.

As a result of this, we have made some changes to the publication. Some of the commentary has been redrafted, including some additional information regarding the impact of revisions, and individual quarterly values have been added to the data tables.

In terms of the underlying methodology, a small number of fuels have been reclassified in accordance with Energy Trends, and the temperature correction methodology has been changed to use heating degree days rather than degrees Celsius, which is consistent with the approach used for DECC's Energy data. The impact of the changes is relatively small, resulting in a 2.3 Mt CO_2 difference (0.4 per cent) for non-adjusted carbon dioxide emissions in the year to Q2 2014, and 0.2 Mt (0.03 per cent) on a temperature adjusted basis.

More information on the methodology can be found here.

As a result of changes to the methodology, the methodology used for this release is no longer entirely consistent with the methodology used for the provisional annual greenhouse gas emissions publication. The methodology for the provisional annual publication will be updated for the next publication in March 2015, at which time the methodology will once again be consistent between the two publications.

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.

---

[3] Comparison using previous estimates has been revised to reflect changes in the methodology made in this publication, allowing a direct comparison due to changes as a result of revisions to energy data

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 “Official Statistics”, having been rebadged from “Experimental Statistics” following the detailed review of the methodology.

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

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 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 SF_6.

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 2012 are based on final inventory data. Figures from the year to Quarter 1 2013 onwards include provisional estimates.

© Crown copyright 2014
Department of Energy & Climate Change
3 Whitehall Place
London SW1A 2AW
www.gov.uk/decc