



Provisional estimates of UK Greenhouse Gas emissions for 2015, including quarterly emissions for 4th quarter 2015

Statistical release

31st March 2016

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This document is also available from our website at:

<https://www.gov.uk/government/collections/provisional-uk-greenhouse-gas-emissions-national-statistics>

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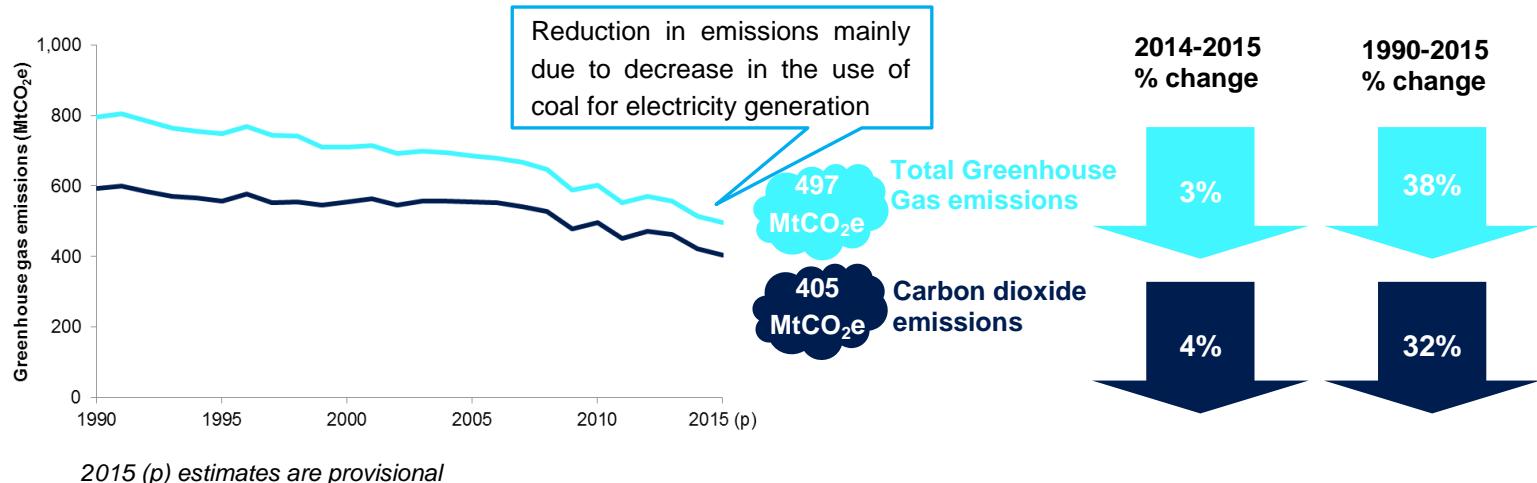
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Executive summary

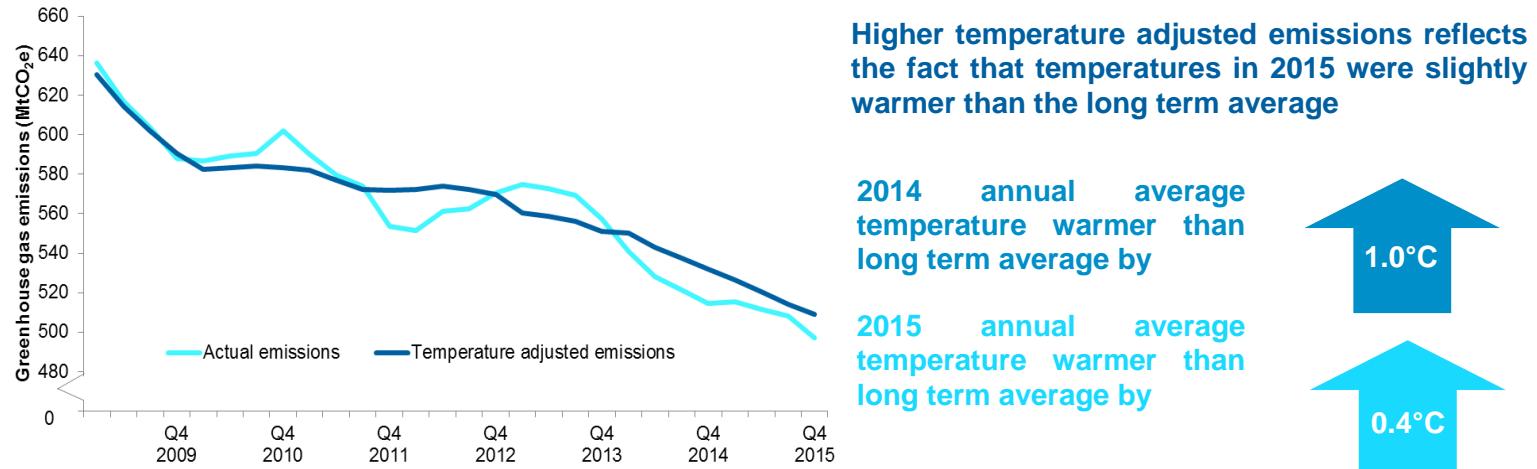
- This publication provides provisional annual and quarterly estimates of 2015 UK greenhouse gas emissions by source.
- In 2015, UK emissions of the basket of seven greenhouse gases covered by the Kyoto Protocol were provisionally estimated to be 497.2 million tonnes carbon dioxide equivalent (MtCO₂e). This was 3.4 percent lower than the 2014 figure of 514.4 MtCO₂e.
- The provisional emissions figures rely on estimates of carbon dioxide emissions based on UK energy statistics. In 2015, UK net emissions of carbon dioxide were provisionally estimated to be 404.7 million tonnes (Mt), 4.1 percent lower than the 2014 figure of 422.0 Mt. Carbon dioxide (CO₂) is the main greenhouse gas, accounting for over 80 percent of total UK greenhouse gas emissions.
- The largest decrease between 2014 CO₂ emissions and provisional 2015 CO₂ emissions was a 13 percent (19.6 Mt) decrease in the energy supply sector, largely due to a change in the fuel mix for electricity generation, with less use of coal than there was in 2014. The next largest decrease was in the business sector.
- Total greenhouse gas emissions on a temperature adjusted basis for 2015 were 12.1 MtCO₂e (2.4 percent) higher than actual emissions. This reflects the fact that temperatures in 2015 were slightly higher than the long term average.
- The sectoral breakdowns for provisional emissions are based on the source of the emissions. Emissions related to electricity generation are therefore attributed to power stations, the source of these emissions, rather than homes and businesses where electricity is used.

Figure 1: Summary of key findings

2015 UK greenhouse gas emissions provisionally estimated to decrease from 2014



2015 temperature adjusted greenhouse gas emissions were higher than actual emissions

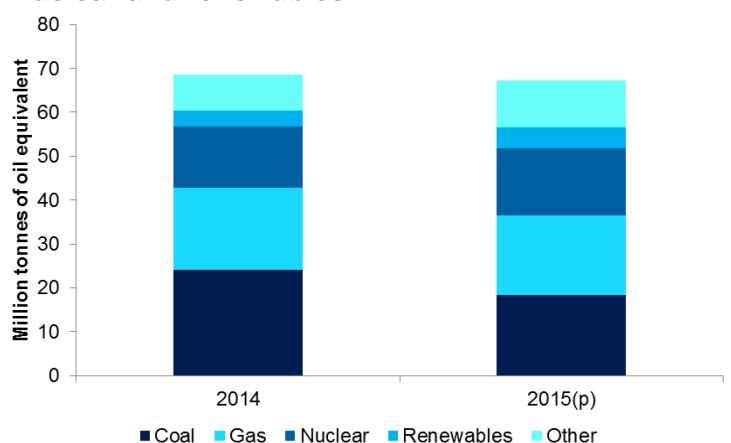


Temperature adjusted emissions estimates remove the effect of external temperatures
Figures are annual totals including the preceding 4 quarters.

The energy supply sector experienced the largest reduction in CO₂ emissions from 2014 to 2015

	2014-2015 % change	1990-2015 % change
Energy supply	13%	44%
Industrial process	5%	40%
Business	3%	38%
Transport	1%	1%
Residential	5%	18%
Public	6%	36%

Reduction in energy supply CO₂ emissions driven by change in fuel mix for electricity generation in 2015, with less use of coal and more use of nuclear and renewables



Introduction

This publication provides provisional annual and quarterly estimates of UK greenhouse gas emissions by source sector for 2015. 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.

Data for 1990-2014 are consistent with the annual emissions presented in the National Statistics publication '[2014 Final UK Greenhouse Gas Emissions statistics](#)'. Data for 2014 emissions in previous quarterly publications were provisional and will be different to those published here as our estimates have now been updated to include finalised estimates of annual emissions. Data for 2015 emissions are provisional and are calculated based on UK energy statistics.

The provisional estimates of carbon dioxide emissions are based on provisional inland energy consumption statistics, which are being published at the same time in DECC's quarterly [Energy Trends](#) publication. Estimates of non-CO₂ gases are based on a simple approach which assumes that emissions of non-CO₂ gases in 2015 will be the same as emissions in 2014, and that these emissions will be spread evenly over the year.

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 4, 2015, represent an annual total comprising quarter 4 2015 and the preceding 3 quarters, quarters 1, 2 and 3 of 2015. 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.

The geographical coverage of this report has changed from UK and Crown Dependencies to UK only from this year. This change has been made to better align with the needs of users of the statistics, and with the geographical coverage of the UK's domestic carbon budget targets.

The structure of this statistical release report has changed from last year. Previously this report contained an annex detailing final end-user greenhouse gas emissions estimates and uncertainty estimates. This year the annex is now published alongside the 2014 Final UK Greenhouse Gas Emissions statistics. Additionally, the quarterly statistics for the year up to Q4 2015 are included within this statistical release as both are based on inland energy consumption statistics and cover similar time periods. In previous years, the quarterly statistics were published separately to the provisional annual emissions.

There are uncertainties associated with all estimates of greenhouse gas emissions. Although for any given year considerable uncertainties may surround the emissions estimates for a pollutant, it is important to note that trends over time are likely to be much more reliable. It is also important to note that the provisional 2015 estimates are subject to a greater range of uncertainty than the final figures for earlier years. For more information on uncertainties see the annex published alongside the 2014 Final UK Greenhouse Gas Emissions statistics.

For the purposes of reporting, greenhouse gas emissions are allocated into sectors as follows:

- Energy supply
- Business
- Transport
- Public
- Residential
- Agriculture
- Industrial process
- Land use land use change and forestry (LULUCF)
- Waste management

These high-level sectors are made up of a number of more detailed sectors, which follow the definitions set out by the Intergovernmental Panel on Climate Change (IPCC), and which are used in international reporting tables which are submitted to the United Nations Framework Convention on Climate Change (UNFCCC) every year.

The provisional estimates are not used for any formal reporting of how the UK is performing against its emissions reduction targets, as this requires final estimates based on the UK's greenhouse gas inventory. However, these statistics give policy makers and other users an initial steer as to the trend in emissions between 2014 and 2015, which helps them to form an initial assessment of the extent to which the UK is on track to meet targets. For information on UK emissions targets and progress towards them, see the [2014 Final UK Greenhouse Gas Emissions statistics](#).

More information about the underlying methodology for the quarterly emissions statistics can be found in the accompanying [methodology document](#).

Note that all 2015 greenhouse gas emissions and energy statistics figures in this statistics release are provisional and subject to change. The annual provisional emissions estimates will be subject to revision when the final estimates are published in February 2017; however, they provide an early indication of emissions in the most recent full calendar year. The majority of provisional estimates in the past have been within 2 percent of the final figures.

2015 annual provisional emissions results

In 2015, an estimated 34 percent of carbon dioxide emissions were from the energy supply sector, 29 percent from transport, 17 percent from business and 16 percent from the residential sector.

Between 2014 and 2015, provisional estimates indicate that carbon dioxide emissions decreased by 4.1 percent (17.2 million tonnes (Mt)). Emissions in the energy supply sector decreased by 12.6 percent (19.6 Mt) driven by a change in the fuel mix for electricity generation, with less use of coal (as a result of a unit at the Drax plant switching to biomass from coal and of the temporary closure of some plants), and more use of nuclear and renewables. Business sector emissions decreased by 3.1 percent (2.2 Mt) due to a reduction in the use of blast furnace gas for iron and steel industrial combustion (driven by the SSI steelworks at Redcar ceasing production in mid-September 2015). Emissions increased by 4.9 percent (3.0 Mt) in the residential sector due to an increase in the use of natural gas for space heating, and there was also a small increase of 1.4 percent in emissions from the transport sector.

Since 1990, UK carbon dioxide emissions have decreased by 32 percent. This decrease has resulted mainly from changes in the mix of fuels being used for electricity generation, including the growth of renewables, together with greater efficiency resulting from improvements in technology and a decline in the relative importance of energy intensive industries. Overall energy consumption is provisionally estimated to have decreased by around 10 percent since 1990 (although it increased up to 2001 and has decreased since then). If this figure is adjusted to allow for the effect of temperature, energy consumption has fallen by around 11 percent between 1990 and 2015.

Table 1: UK Annual Greenhouse Gas Emissions 1990-2015, headline results

UK, 1990-2015

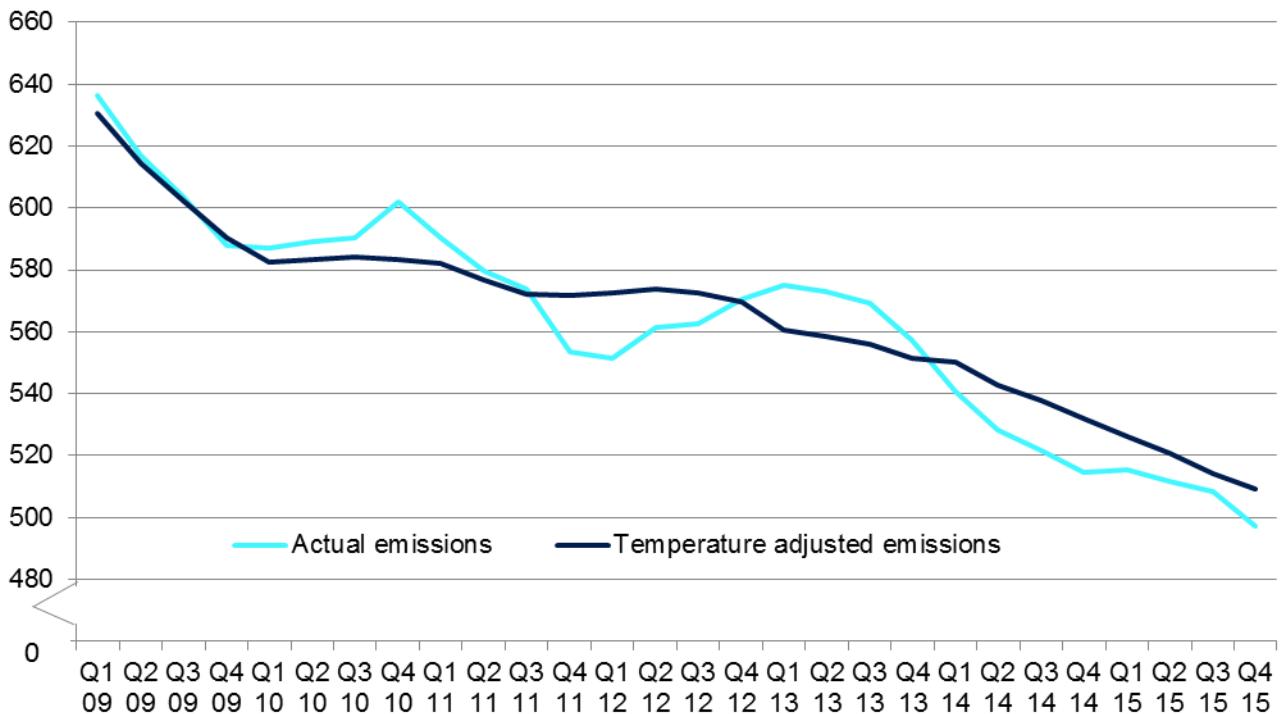
	1990	1995	2000	2005	2010	2014	MtCO ₂ e 2015 (p)
Energy supply	242.1	210.2	203.3	218.6	196.7	155.6	136.0
from power stations	202.9	162.7	158.0	172.6	156.9	122.9	101.5
other Energy supply	39.2	47.4	45.3	46.0	39.8	32.7	34.5
Business	112.7	109.9	109.4	97.0	78.4	72.4	70.1
Transport	119.2	119.4	124.5	128.8	119.0	116.6	118.3
Public	13.4	13.2	12.0	11.1	9.7	8.1	8.6
Residential	78.4	79.7	85.6	82.5	84.5	61.1	64.0
Agriculture	7.0	7.1	5.7	5.6	5.2	5.3	5.3
Industrial process	19.6	17.8	17.1	16.4	10.6	12.3	11.7
Waste management	1.3	0.9	0.5	0.4	0.3	0.3	0.3
LULUCF	-0.8	-1.2	-4.0	-6.4	-8.6	-9.7	-9.7
Total CO ₂	592.8	557.1	554.3	554.1	495.8	422.0	404.7
Other greenhouse gases	203.8	191.4	156.3	132.2	106.3	92.5	92.5
Total greenhouse gases	796.6	748.5	710.6	686.3	602.1	514.4	497.2

Source: Table 1, Provisional UK greenhouse gas emissions national statistics 1990-2015 Excel data tables

Notes:

1. (p) 2015 estimates are provisional.
2. Provisional 2015 CO₂ emissions for the agriculture, waste and LULUCF sectors are assumed to be the same as 2014 estimates as unlike other CO₂ estimates these cannot be estimated from energy statistics.
3. The entire time series is revised each year to take account of methodological improvements in the UK emissions inventory.
4. Emissions are presented as carbon dioxide equivalent in line with international reporting and carbon trading. To convert carbon dioxide into carbon equivalents, divide figures by 44/12.
5. Figures shown do not include any adjustment for the effect of the EU Emissions Trading System (EU ETS), which was introduced in 2005.
6. Totals for CO₂ emissions, energy supply and total greenhouse gases may not sum due to rounding.

Figure 2: Actual and temperature adjusted greenhouse gas emissions, UK, Year to Q1 2009 - Year to Q4 2015 (MtCO₂e)



Source: Tables 3 & 4, Provisional UK greenhouse gas emissions national statistics 1990-2015 Excel data tables

Note:

- 1. Figures are annual totals including the preceding 4 quarters.
- 2. From year to Q1 2015 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 21.9 percent and temperature adjusted emissions by 19.2 percent in the year to Q4 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.

Energy supply

The energy supply sector was the largest contributor to the decrease in carbon dioxide emissions between 2014 and 2015. Carbon dioxide emissions from this sector were provisionally estimated to be 136.0 Mt in 2015, a decrease of 13 percent (19.6 Mt) compared to 2014.

Since 2014 emissions from power stations have decreased by 17 percent, largely due to changes to the fuel mix used at power stations for electricity generation. In particular there was a 24 percent decrease in coal use for generation, resulting from the conversion of a unit at the Drax plant from coal to biomass and the temporary closure of some plants due to market conditions, in addition to an increase in the carbon price floor from April 2015. There was increased use of nuclear and renewables for electricity generation (10 percent and 29 percent increases respectively).

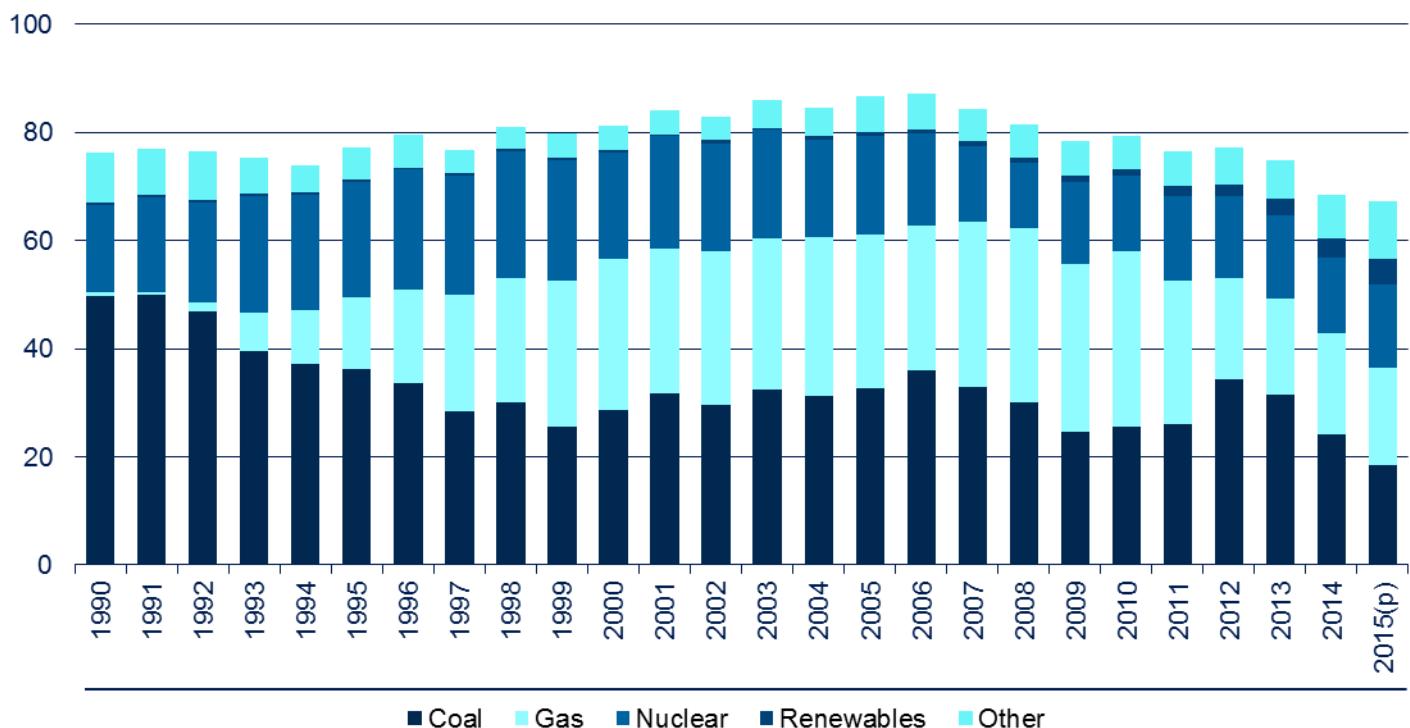
In 2015, carbon dioxide emissions from power stations, at 101.5 Mt, accounted for a quarter of all carbon dioxide emissions.

Looking at longer term trends, carbon dioxide emissions from the energy supply sector were estimated to be around 44 percent lower in 2015 than they were in 1990. This decrease has resulted mainly from changes in the mix of fuels being used for electricity generation, including fuel switching from coal to gas and the growth of renewables, together with greater efficiency resulting from improvements in technology.

There has been an overall decline in the use of coal at power stations over the period (particularly during the 1990s), accompanied by an overall increase in the use of gas, which has a lower carbon content. Coal use in generation is estimated to have reduced by 63 percent between 1990 and 2015.

Overall, emissions from electricity generation have decreased by 50 percent since 1990, despite final consumption of electricity being provisionally estimated to be around 10 percent higher in 2015 than in 1990 (although it peaked in 2005 and has decreased since then).

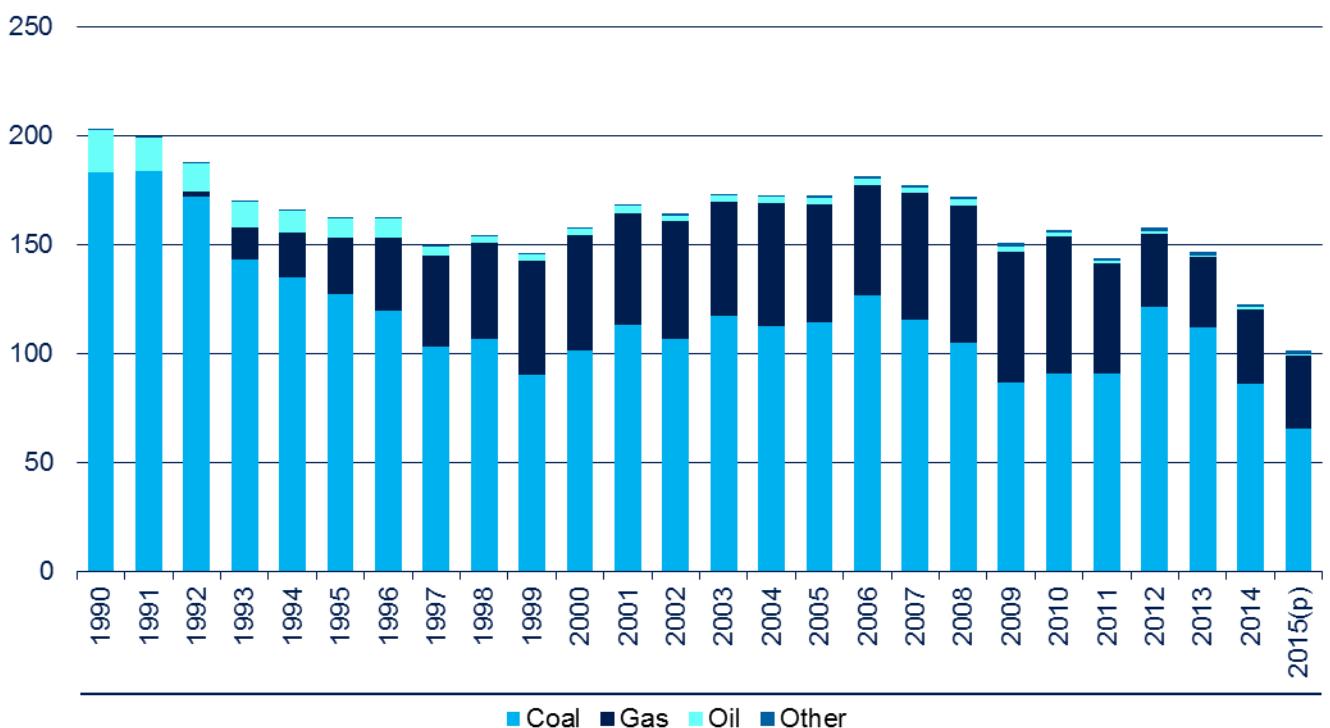
Figure 3: Fuel mix for UK electricity generation, UK, 1990-2015, (Million tonnes of oil equivalent)



Source: Table 5.1.1, Digest of UK Energy Statistics (DUKES) 1970-2014 and Table 5.1 Energy Trends: March 2016 Excel data tables

Note: (p) 2015 estimates are provisional.

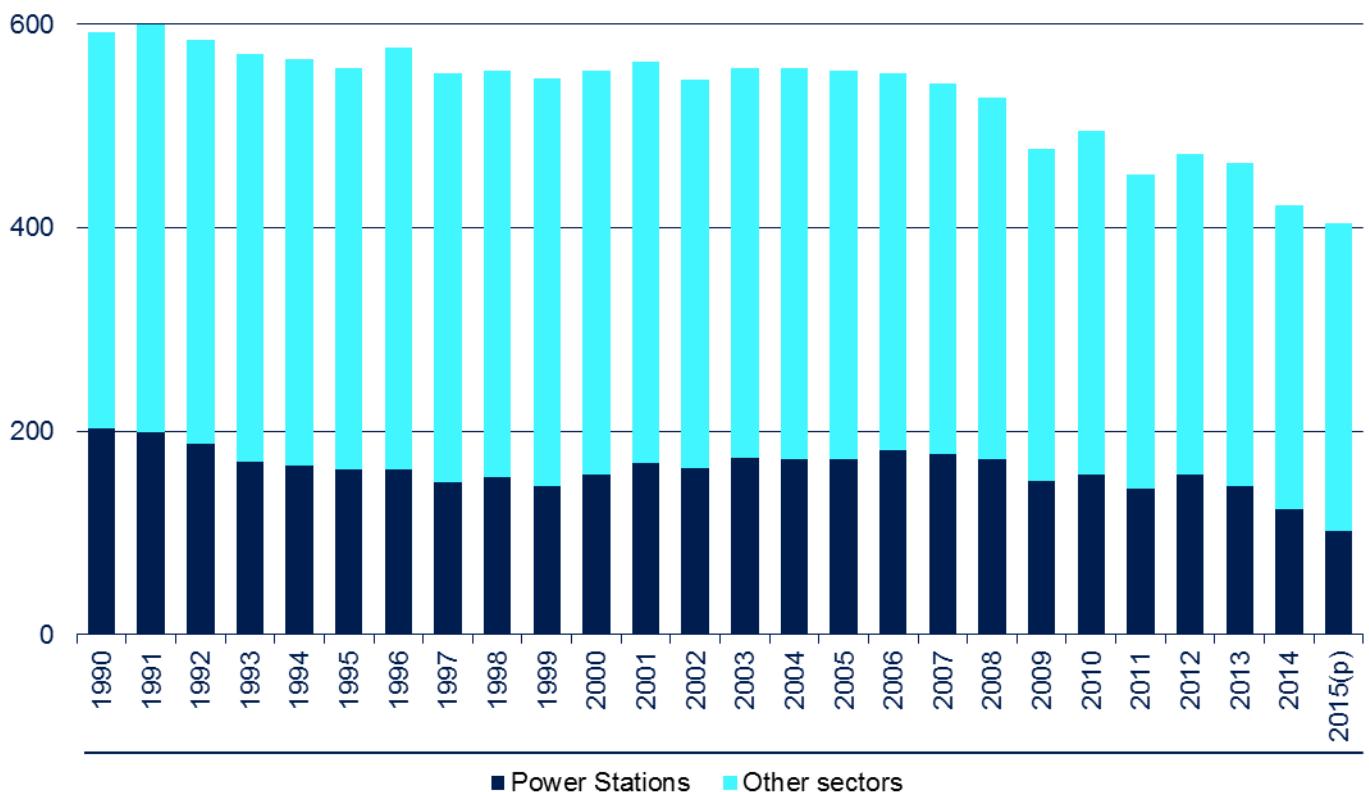
Figure 4: Carbon dioxide emissions from electricity generation, UK, 1990-2015, (MtCO₂)



Source: Tables 1 & 2, Provisional UK greenhouse gas emissions national statistics 1990-2015 Excel data tables

Note: (p) 2015 estimates are provisional.

Figure 5: Carbon dioxide emissions from power stations as a proportion of total carbon dioxide emissions, UK, 1990-2015, (MtCO₂)



Source: Table 1, Provisional UK greenhouse gas emissions national statistics 1990-2015 Excel data tables

Note: (p) 2015 estimates are provisional.

Residential

In 2015, the residential sector, with emissions of 64.0 Mt, accounted for 16 percent of all carbon dioxide emissions. Between 2014 and 2015 there was a 4.9 percent (3.0 Mt) increase in emissions from this sector due to 2015 being a cooler year than 2014.

2015 was 0.6 degrees Celsius cooler on average than 2014, despite average temperatures in the fourth quarter of 2015 being the warmest for the fourth quarter since 1970¹. In particular the first quarter of 2015 was on average 1.3 degrees cooler than the first quarter of 2014, which has contributed to an increase in the use of natural gas for space heating.

The main source of emissions from this sector is the use of natural gas for heating and cooking. Since 2004 there has been a general downward trend in emissions, although 2010 and 2012 were exceptions to this, due to the particularly cold weather experienced in 2010 and warm weather in 2011. In 2015, emissions from this sector were 18 percent lower than in 1990.

It should be noted that emissions from this sector do not include those related to domestic electricity consumption, as these emissions are included in the energy supply sector.

¹ Energy trends section 7: weather
<https://www.gov.uk/government/statistics/energy-trends-section-7-weather>

Transport

In 2015, carbon dioxide emissions from the transport sector, at 118.3 Mt, accounted for 29 percent of all carbon dioxide emissions. Between 2014 and 2015, transport emissions increased by 1.4 percent (1.7 Mt). Provisional motor vehicle traffic estimates show that vehicle kilometres travelled increased in 2015² resulting in a higher use of fuel.

Emissions from this sector are similar to 1990 levels. Road transport is the most significant source of emissions in this sector, in particular passenger cars. Emissions from passenger cars have decreased since the early 2000s due to lower petrol consumption outweighing an increase in diesel consumption³ and more recently, improvements in fuel efficiency of both petrol and diesel cars⁴. However, this decrease has been partially offset by an increase in emissions from light goods vehicles.

It should be noted that these estimates do not include emissions from international aviation and shipping; domestic aviation and shipping, however, are included.

Business

Carbon dioxide emissions from the business sector, at 70.1 Mt, accounted for around 17 percent of all carbon dioxide emissions in 2015. This was 3.1 percent (2.2 Mt) lower than in 2014, largely due to a reduction in the use of blast furnace gas for iron and steel industrial combustion as the SSI steelworks at Redcar ceased production in mid-September 2015.

There has been a 38 percent decrease in business sector emissions since 1990. Most of this decrease came between 2001 and 2009, with a significant drop in 2009 likely driven by economic factors. The main driver of the overall decrease in emissions since 1990 is a reduction in emissions from industrial combustion (including iron and steel).

Industrial process

In 2015, carbon dioxide emissions from the industrial process sector were estimated to be 11.7 Mt, a decrease of 5.0 percent (0.6 Mt) compared with 2014. Between 1990 and 2015, emissions from this sector are estimated to have decreased by around 40 percent driven by a reduction in emissions from cement production due to lower manufacturing output from this sector.

² Provisional Road Traffic estimates, Great Britain: January 2015 to December 2015

<https://www.gov.uk/government/statistics/provisional-road-traffic-estimates-great-britain-january-2015-to-december-2015>

³ Transport Statistics Great Britain, Energy and environment (TSGB03), Table TSGB0301 (ENV0101) Petroleum consumption by transport mode and fuel type: United Kingdom, 2000-2014

<https://www.gov.uk/government/statistical-data-sets/tsgb03>

⁴ Transport Statistics Great Britain, Energy and environment (TSGB03), Table TSGB0301 (ENV0103) Average new car fuel consumption: Great Britain 1997-2014

<https://www.gov.uk/government/statistical-data-sets/tsgb03>

Public sector

Carbon dioxide emissions from the public sector, at 8.6 Mt, were estimated to have increased by about 6.4 percent (0.5 Mt) from 2014 emissions. This has been largely driven by an increase in the use of gas for space heating as a result of 2015 being a cooler year than 2014. Between 1990 and 2015, emissions from this sector are estimated to have decreased by around 36 percent.

Agriculture; waste management; and land use, land use change and forestry

Updated emissions estimates for these sectors are not yet available for 2015, so for these statistics, emissions from these sectors are assumed to be the same as they were in 2014⁵.

Carbon dioxide emissions by fuel type

The amount of carbon dioxide released by the consumption of one unit of energy depends on the type of fuel consumed. For example, since coal has a higher carbon content than gas, more carbon dioxide emissions result from burning one unit of coal than from one unit of gas.

Emissions per unit of electricity supplied by major power producers from fossil fuels are estimated to have been around 560 tonnes of carbon dioxide per gigawatt hour (GWh) overall in 2015; within this, emissions from electricity generated from coal (860 tonnes of carbon dioxide per GWh electricity supplied) were over two times higher than for electricity supplied by gas (340 tonnes of carbon dioxide per GWh). For all sources of electricity (including nuclear, renewables and autogeneration), the average amount of carbon dioxide emitted in 2015 amounted to around 300 tonnes per GWh of electricity supplied.

In 2015, carbon dioxide emissions from the use of fossil fuels, including fuel used for generating electricity, were estimated at 398.7 Mt. This was 4 percent lower than the 2014 figure of 416.0 Mt. The biggest change in emissions was from the use of coal and other solid fuels, down 20.5 Mt (20 percent) from 103.1 Mt in 2014 to 82.5 Mt in 2015. This largely resulted from decreased fossil fuel use for electricity generation at power stations, in particular a decrease in the use of coal as a result of reduced capacity due to the conversion of a unit at the Drax plant from coal to biomass, and the temporary closure of some plants due to market conditions; in addition to an increase in the carbon price floor from April 2015.

Over the period 1990 to 2015, carbon dioxide emissions from fossil fuels decreased by 30 percent. Over the same period, overall primary consumption of fossil fuels has dropped by around 11 percent. The relatively higher decrease in emissions can be attributed to an increase in the use of gas accompanied by a decrease in the use of coal and other solid fuels; carbon dioxide emissions from gas as a proportion of all carbon dioxide emissions from fossil fuels has increased from 26 percent in 1990 to 43 percent in 2015, whilst emissions from coal and other solid fuels as a proportion of all fossil fuel carbon dioxide emissions has decreased from 41 percent to 21 percent over the same period. The proportion of carbon dioxide emissions from oil

⁵ Final UK greenhouse gas emissions national statistics
<https://www.gov.uk/government/collections/final-uk-greenhouse-gas-emissions-national-statistics>

has remained relatively stable over the period at around a third of emissions.

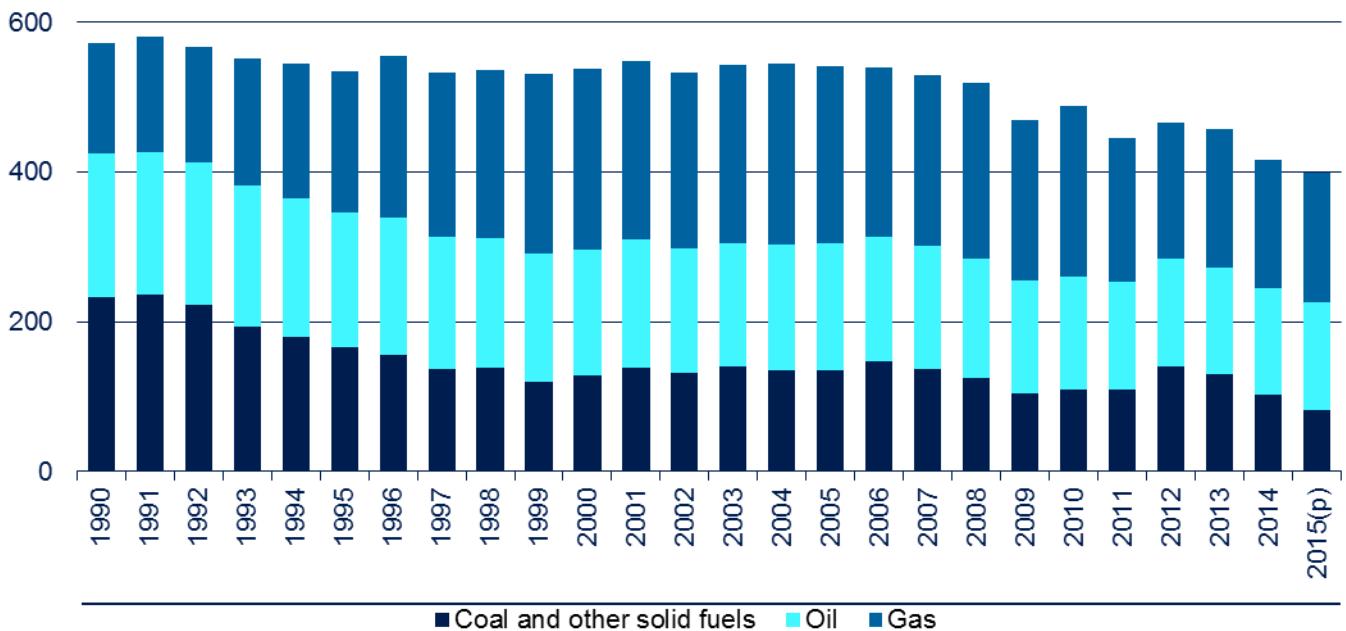
Table 2: UK Carbon dioxide emissions by fuel
UK, 1990-2015

	1990	1995	2000	2005	2010	2014	MtCO ₂ e 2015 (p)
Gas	146.6	189.4	241.9	235.5	228.5	170.4	172.0
Oil	191.7	179.7	168.2	170.2	150.8	142.5	144.2
Coal	219.7	152.6	117.2	124.9	100.9	94.9	74.5
Other solid fuels	14.1	13.3	11.5	10.2	8.9	8.1	8.0
Non-fuel	20.8	22.1	15.4	13.3	6.7	6.0	6.0
Total	592.8	557.1	554.3	554.1	495.8	422.0	404.7

Source: Table 2, Provisional UK greenhouse gas emissions national statistics 1990-2015 Excel data tables

Note: (p) 2015 estimates are provisional.

Figure 6: Carbon dioxide emissions by fossil fuels, UK, 1990-2015, (MtCO₂)



Source: Table 2, Provisional UK greenhouse gas emissions national statistics 1990-2015 Excel data tables

Note: (p) 2015 estimates are provisional.

4th quarter 2015 greenhouse gas emissions results

This section discusses the quarterly time series of CO₂ emissions. In previous years, 4th quarter quarterly emissions statistics have been published separately to annual statistics, but this year they are combined into one publication.

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 4, 2015, represent an annual total comprising quarter 4 2015 and the preceding 3 quarters, quarters 1, 2 and 3 of 2015.

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. Tables 3 and 4 compare temperature adjusted and unadjusted quarterly greenhouse gas and CO₂ emissions.

Table 3: Actual and temperature adjusted greenhouse gas emissions
UK, Year to Q4 2014 – Year to Q4 2015

	Year to Q4 2014	Year to Q4 2015	MtCO ₂ e Difference (%)
Total GHG emissions	514.4	497.2	-3.4%
Temperature adjusted GHG emissions	532.1	509.2	-4.3%
Total CO ₂ emissions	422.0	404.7	-4.1%
Temperature adjusted CO ₂ emissions	439.7	416.8	-5.2%

Source: Tables 3 & 4, Provisional UK greenhouse gas emissions national statistics 1990-2015 Excel data tables

Notes:

1. Non-CO₂ emissions have not been temperature adjusted.
2. Figures are annual totals including the preceding 4 quarters. For example, “Q4 2015” covers the four quarters from Q1 2015 to Q4 2015 inclusive.

Table 4: Actual and temperature adjusted greenhouse gas emissions

UK, Year to Q3 2015 – Year to Q4 2015

	Year to Q3 2015	Year to Q4 2015	Difference (MtCO ₂ e)	MtCO ₂ e Difference (%)
Total GHG emissions	508.3	497.2	-11.2	-2.2%
Temperature adjusted GHG emissions	514.2	509.2	-5.0	-1.0%
Total CO ₂ emissions	415.9	404.7	-11.2	-2.7%
Temperature adjusted CO ₂ emissions	421.8	416.8	-5.0	-1.2%

Source: Tables 3 & 4, Provisional UK greenhouse gas emissions national statistics 1990-2015 Excel data tables

Notes: 1. Non-CO₂ emissions have not been temperature adjusted.

2. Figures are annual totals including the preceding 4 quarters. For example, “Q4 2015” covers the four quarters from Q1 2015 to Q4 2015 inclusive.

Table 4 shows the change in emissions since the last quarterly emissions statistics publication. This is essentially comparing Q4 2014 with Q4 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 use for electricity generation. For the actual emissions, there is also a small decrease in emissions in the residential sector due to decreased use of gas for space heating (as Q4 2015 was on average 1.2 degrees Celsius warmer than Q4 2014). In the temperature adjusted series, however, residential sector emissions are higher in Q4 2015 than Q4 2014 which means the overall decrease in emissions is smaller than in the non-adjusted series.

More information regarding the long term trends in emissions in each sector can be found in the [2014 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 and temperature adjusted emissions

Table 5: Actual and temperature adjusted Carbon dioxide emissions by sector

UK, Year to Q4 2015

	Total CO ₂ emissions	Temperature adjusted CO ₂ emissions	Difference (MtCO ₂)	MtCO ₂
Energy supply	136.0	139.6	3.5	2.6%
Business	70.1	71.9	1.8	2.6%
Transport	118.3	118.3	0.0	0.0%
Public	8.6	9.1	0.5	5.7%
Residential	64.0	70.3	6.2	9.7%
Other	7.6	7.6	0.0	0.0%
Total CO₂	404.7	416.8	12.1	3.0%

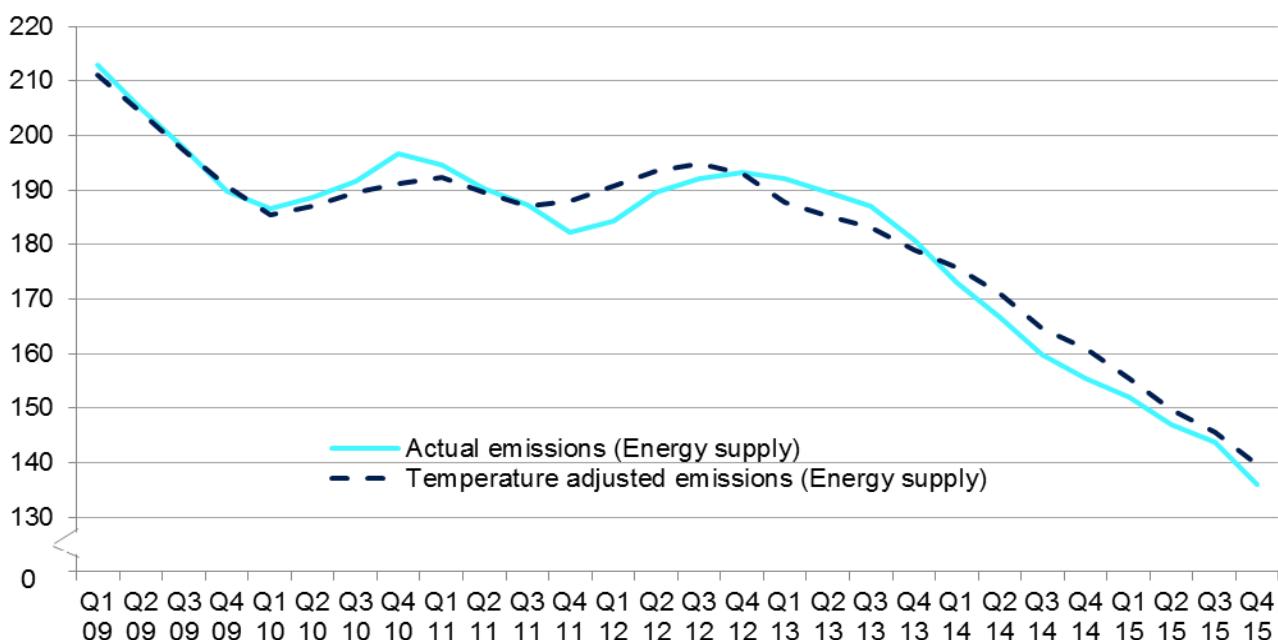
Source: Tables 3 & 4, Provisional UK greenhouse gas emissions national statistics 1990-2015 Excel data tables

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 7 and 8 below show the trend for these two sectors. Temperature adjusted emissions from the energy supply sector show a similar trend to non-adjusted emissions.

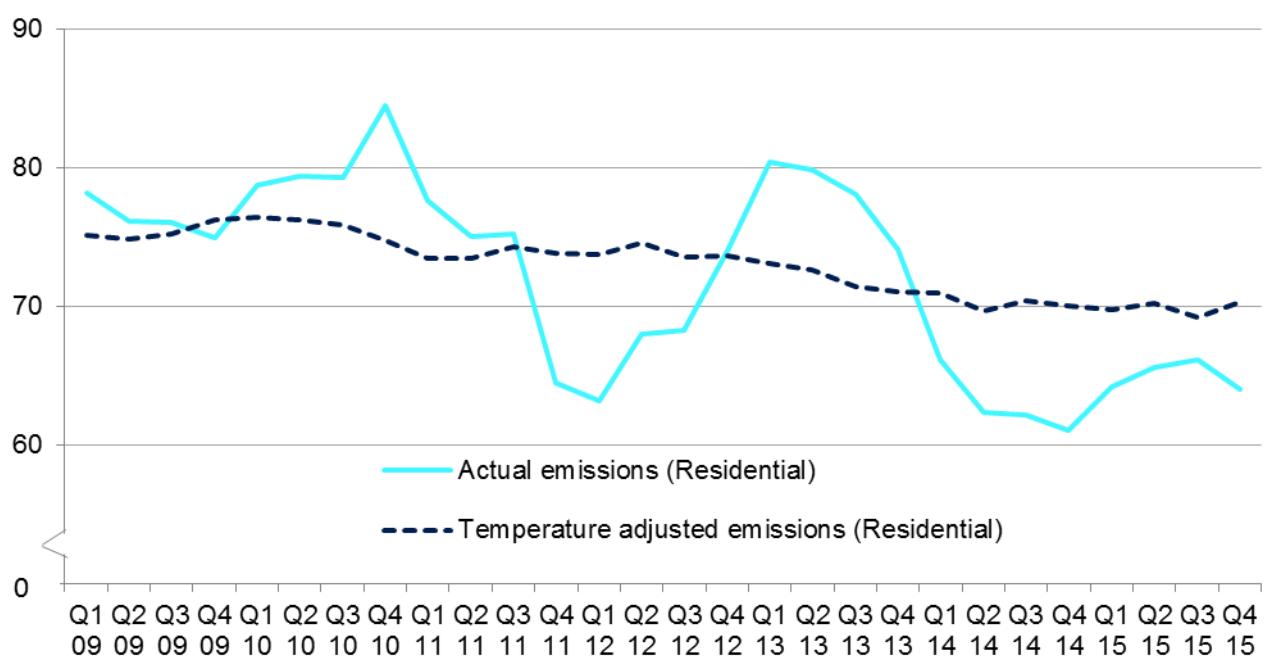
Figure 7: Actual and temperature adjusted energy supply CO₂ emissions, UK, Year to Q1 2009 - Year to Q4 2015 (MtCO₂)



Source: Tables 3 & 4, Provisional UK greenhouse gas emissions national statistics 1990-2015 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 since 2009, 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 6 percent compared to the year to Q1 2009, while non-adjusted emissions have decreased by around 18 percent over the same period.

Figure 8: Actual and temperature adjusted residential emissions, UK, Year to Q1 2009 - Year to Q4 2015 (MtCO₂)



Source: Tables 3 & 4, Provisional UK greenhouse gas emissions national statistics 1990-2015 Excel data tables

Additional information

Coverage of emissions reporting

The basket of greenhouse gases covered by these statistics is based on that covered by the Kyoto Protocol, and consists of seven gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride and nitrogen trifluoride. The last four gases are collectively referred to as fluorinated gases or F gases. In accordance with international reporting and carbon trading protocols, each of these gases is weighted by its global warming potential (GWP), so that total greenhouse gas emissions can be reported on a consistent basis. The GWP for each gas is defined as its warming influence relative to that of carbon dioxide. Greenhouse gas emissions are then presented in *carbon dioxide equivalent* units.

Carbon dioxide (CO_2) is reported in terms of *net* emissions, which means total emissions from burning fuel minus total removals of carbon dioxide from the atmosphere by *carbon sinks*. Carbon sinks are incorporated within the land use, land use change and forestry (LULUCF) sector, which covers afforestation, reforestation, deforestation and forest management. They are defined by the United Nations Framework Convention on Climate Change (UNFCCC) as “any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere”.

Unless otherwise stated, any figures included in this release represent emissions from within the UK and excludes its Crown Dependencies (Jersey, Guernsey, and the Isle of Man) and overseas territories. Figures are expressed in millions of tonnes of carbon dioxide equivalent (MtCO_2e).

Basis of the provisional 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 2014). However, in order to give an indication of what the latest provisional carbon dioxide emissions estimates imply for the total, we need to also produce an estimate of emissions of the remaining non- CO_2 gases. Estimates of non- CO_2 gases are based on a simple approach which assumes that emissions of non- CO_2 gases in 2015 will be the same as emissions in 2014, and that these emissions will be spread evenly over the year.

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.

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](#).

Rewvisions 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 future quarterly publications may update figures previously released as part of this publication. Emissions from 2009-2014 are consistent with final UK greenhouse gas emissions statistics from 1990-2014. Emissions estimates for 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 final emissions and quarterly provisional emissions estimates

Final estimates of UK greenhouse gas emissions for 2015 will be published as National Statistics on 7th February 2017. These estimates will be based on the UK's Greenhouse Gas Inventory for 2015.

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 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 quarterly statistics for the year up to Q1 2016 are scheduled to be published on Thursday 30th June 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/collections/uk-greenhouse-gas-emissions-statistics>

The latest UK energy statistics, including revisions to earlier years' data, can be found in the [Energy Trends](#) quarterly bulletin produced by DECC. Any enquiries about the Energy Trends report should be sent to energy.stats@decc.gsi.gov.uk.

For any queries or feedback on this publication please email:

ClimateChange.Statistics@decc.gsi.gov.uk

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