

29<sup>th</sup> March 2012



## STATISTICAL RELEASE

### 2011 UK GREENHOUSE GAS EMISSIONS, PROVISIONAL FIGURES AND 2010 UK GREENHOUSE GAS EMISSIONS, FINAL FIGURES BY FUEL TYPE AND END-USER

DECC today publishes provisional 2011 estimates of UK greenhouse gas emissions, together with final estimates of 2010 UK greenhouse gas emissions by fuel type and end-user.

#### Greenhouse gas emissions – 2011 headline results

- In 2011, UK emissions of the basket of six greenhouse gases covered by the Kyoto Protocol were provisionally estimated to be 549.3 million tonnes carbon dioxide equivalent. This was 7.0 per cent lower than the 2010 figure of 590.4 million tonnes.
- Carbon dioxide (CO<sub>2</sub>) is the main greenhouse gas, accounting for about 84 per cent of total UK greenhouse gas emissions in 2010, the latest year for which final results are available. In 2011, UK net emissions of carbon dioxide were provisionally estimated to be 456.3 million tonnes (Mt). This was 8.0 per cent lower than the 2010 figure of 495.8 Mt.
- Between 2010 and 2011, there were decreases in CO<sub>2</sub> emissions from most of the main sectors. The provisional estimates show decreases in emissions of 22.0 per cent (19.1 Mt) from the residential sector, 6.1 per cent (11.8 Mt) from the energy supply sector, and 8.0 per cent (6.0 Mt) from the business sector. Emissions from the transport sector were down by 1.4 per cent (1.7 Mt) since 2010. All these sectoral breakdowns are based on the source of the emissions, as opposed to where the end-user activity occurred. 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.
- The decrease in CO<sub>2</sub> emissions between 2010 and 2011 resulted primarily from a decrease in residential gas use, combined with a reduction in demand for electricity accompanied by lower use of gas and greater use of nuclear power for electricity generation.

These results are shown in Table 1 and Figure 1 below. The time series since 1990 is shown in Table 7 towards the end of this statistical release.

**Table 1: Emissions of greenhouse gases (MtCO<sub>2</sub>e)**

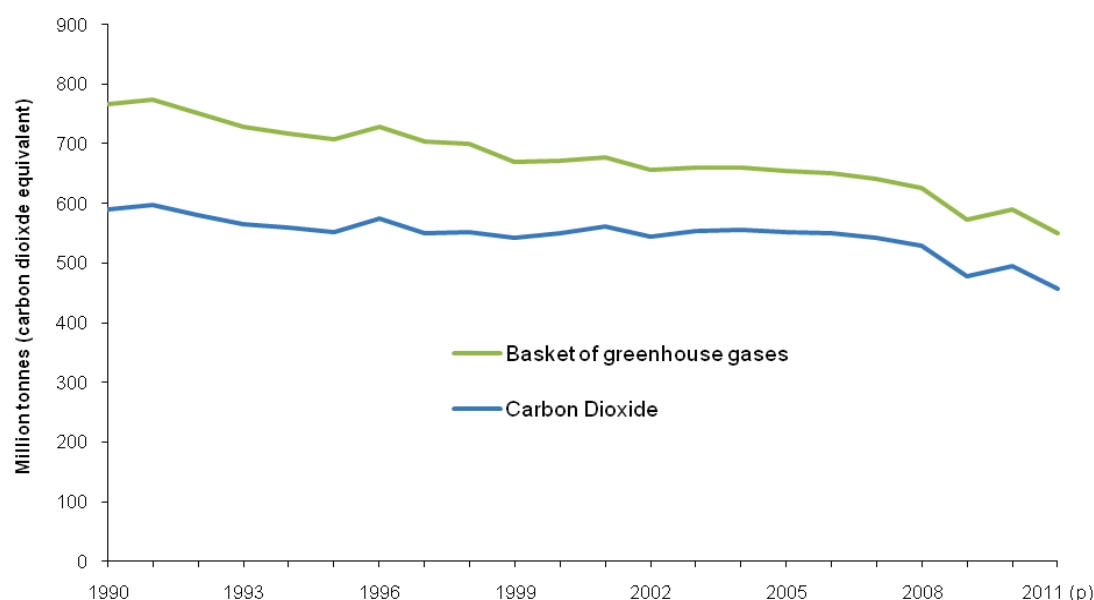
|                                | 2010  | 2011(p) | Change |
|--------------------------------|-------|---------|--------|
| Total greenhouse gas emissions | 590.4 | 549.3   | -7.0%  |
| Net carbon dioxide emissions   | 495.8 | 456.3   | -8.0%  |

(p) 2011 estimates are provisional

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

Carbon dioxide emissions are reported as net emissions, to include removals from the atmosphere by carbon sinks.

**Figure 1: Emissions of greenhouse gases, 1990-2011 (provisional)**



Source: AEA, DECC

## Coverage of emissions reporting

The basket of greenhouse gases covered by the Kyoto Protocol consists of six gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. 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 is reported in terms of *net* emissions, which means total emissions minus total removals of CO<sub>2</sub> 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 within the UK and its Crown Dependencies (Jersey, Guernsey, and the Isle of Man).

Reporting of greenhouse gas emissions under the Kyoto Protocol is based on emissions in the UK, its Crown Dependencies, and those Overseas Territories (Bermuda, Cayman Islands, Falkland Islands, Gibraltar and Montserrat) that are party to the UK ratification of the Kyoto Protocol. The Kyoto Protocol also uses a narrower definition of carbon sinks than that applied for domestic UK CO<sub>2</sub> reporting, which therefore results in a slightly different total. These adjustments mean that the greenhouse gas basket reported for Kyoto differs slightly from the sum of the individual gases as shown.

### **Basis of the provisional 2011 estimates**

Provisional estimates of carbon dioxide emissions are produced by DECC, based on provisional inland energy consumption statistics which are being published today in DECC's quarterly [Energy Trends](#) publication. Details of the provisional energy consumption statistics which have been used to estimate emissions can be found in *Energy Trends*.

Carbon dioxide accounts for the majority of the basket of UK greenhouse gas emissions (84 per cent in 2010). However, in order to give an indication of what the latest provisional carbon dioxide emissions estimates imply for the basket total, we need to also produce an estimate of emissions of the remaining gases in the basket. This estimate is based on a simple approach which assumes that the trend for these gases will be half way between 'no change' on 2010 and a repeat of the trend indicated by the last 11 years' data (2000-2010).

Finally, in order to establish an estimate of total emissions which is consistent with the Kyoto Protocol definition for the basket as a whole, a further adjustment is made in respect of emissions from Overseas Territories and the narrower definition of carbon sinks used by the Protocol.

These provisional emissions estimates will be subject to revision when the final estimates are published in early 2013; however, they provide an early indication of emissions in the most recent full calendar year. The majority of provisional estimates are within 1.5 per cent of the final figures.

To ensure consistency with other National Statistics publications on UK greenhouse gas emissions, the sectoral breakdowns in this statistical release are based on National Communication sectors.

### **2011 carbon dioxide emissions by source sector**

Carbon dioxide (CO<sub>2</sub>) accounted for about 84 per cent of the UK's man-made greenhouse gas emissions in 2010.

In 2011, an estimated 40 per cent of carbon dioxide emissions were from the energy supply sector, 26 per cent from transport, and 15 per cent from each of the business and residential sectors.

Between 2010 and 2011, provisional estimates indicate that CO<sub>2</sub> emissions decreased in the residential sector by 22 per cent (19 Mt), 6 per cent (12 Mt) from the energy supply sector, 8 per cent (6 Mt) from the business sector, and 1 per cent (2 Mt) in the transport sector.

Since 1990, there has been a decrease in UK carbon dioxide emissions of around 23 per cent. This fall in emissions has been accompanied by a decrease in overall energy consumption over the period, of around 5 per cent. On a temperature corrected basis, energy consumption has fallen by around 6 per cent between 1990 and 2011. A number of factors explain this effect, such as changes in the efficiency in electricity generation and switching from coal to less carbon intensive fuels such as gas.

Table 2 and Figure 2 below show the breakdown of carbon dioxide emissions into the main source sectors.

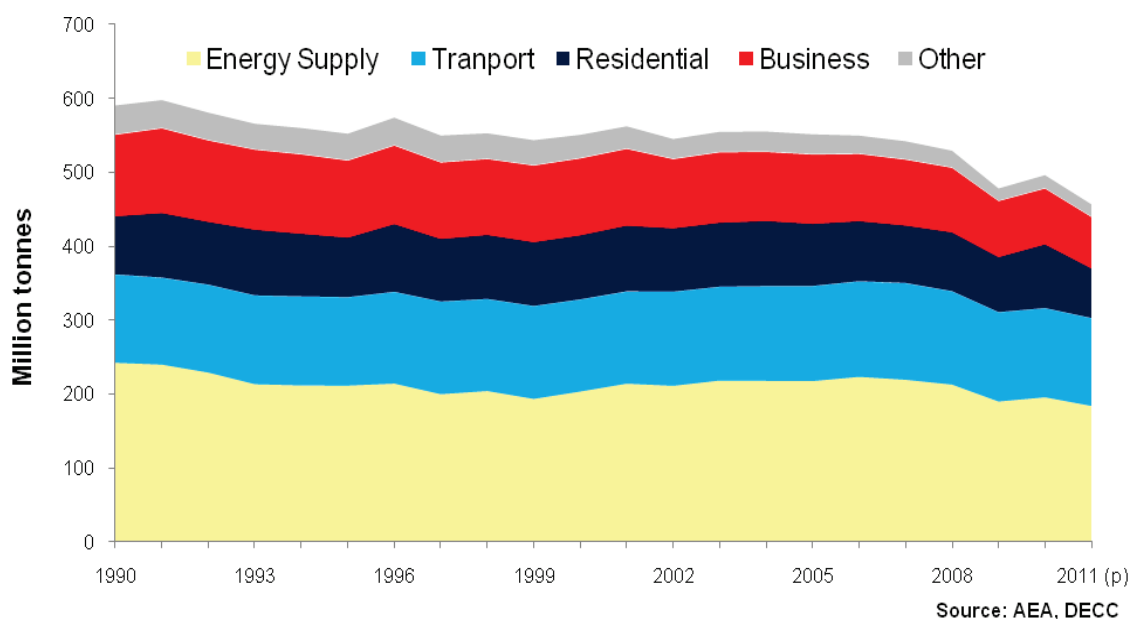
**Table 2: Sources of carbon dioxide emissions, 1990-2011 (provisional) (Mt)**

|               | 1990 | 1995 | 2000 | 2005 | 2007 | 2008 | 2009 | 2010 | 2011 (p) |
|---------------|------|------|------|------|------|------|------|------|----------|
| Energy Supply | 242  | 211  | 203  | 218  | 219  | 213  | 190  | 196  | 184      |
| Transport     | 119  | 120  | 125  | 129  | 131  | 126  | 121  | 121  | 119      |
| Business      | 111  | 104  | 104  | 94   | 89   | 87   | 76   | 76   | 70       |
| Residential   | 79   | 81   | 87   | 84   | 78   | 80   | 75   | 87   | 67       |
| Other         | 39   | 36   | 31   | 27   | 24   | 22   | 16   | 17   | 16       |
| Total         | 590  | 552  | 550  | 551  | 542  | 529  | 478  | 496  | 456      |

(p) 2011 estimates are provisional.

All figures are for the UK and Crown Dependencies only, and exclude Overseas Territories.

**Figure 2: Carbon dioxide emissions by source, 1990-2011 (provisional)**



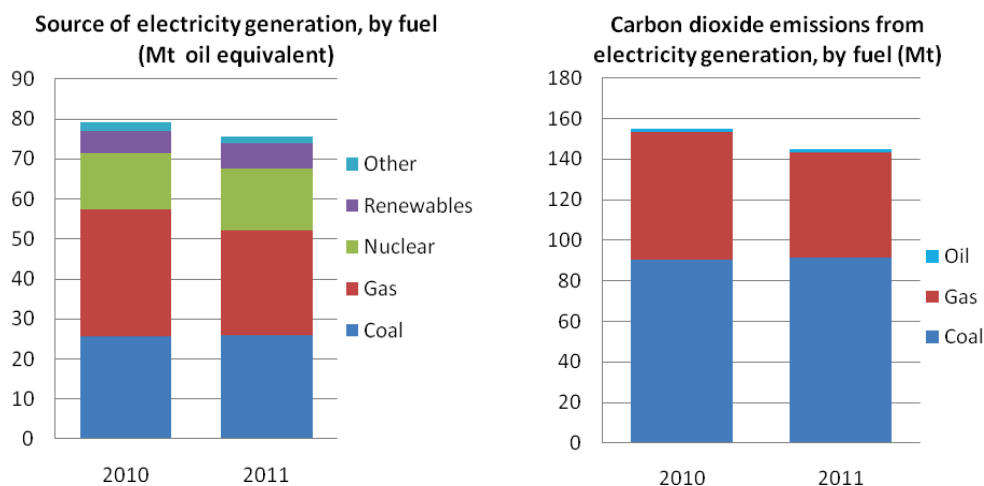
## Energy supply

The energy supply sector was the second biggest contributor to the decrease in CO<sub>2</sub> emissions between 2010 and 2011. Emissions from this sector were provisionally estimated to be 183.8 Mt in 2011, a decrease of around 6 per cent compared to 2010.

The decrease in emissions from this sector since 2010 can almost entirely be attributed to power stations. Demand for electricity was 3 per cent lower in 2011 than in 2010, and there was also a change in the fuel mix used at power stations for electricity generation. The technical problems which had been experienced at some nuclear power stations in 2010 were resolved, and there was therefore more nuclear power available for electricity generation in 2011. Consequently, there was a 17 per cent decrease in gas use for generation, alongside an 11 per cent increase in the use of nuclear power. Together, these changes resulted in a decrease of around 7 per cent in emissions from electricity generation. In 2011, CO<sub>2</sub> emissions from power stations, at 146.0 Mt, accounted for just under a third of all CO<sub>2</sub> emissions.

Figure 3 below shows the impact on emissions of the change in the fuel mix for electricity generation between 2010 and 2011.

**Figure 3: Carbon dioxide emissions from electricity generation, 2010-2011 (provisional)**

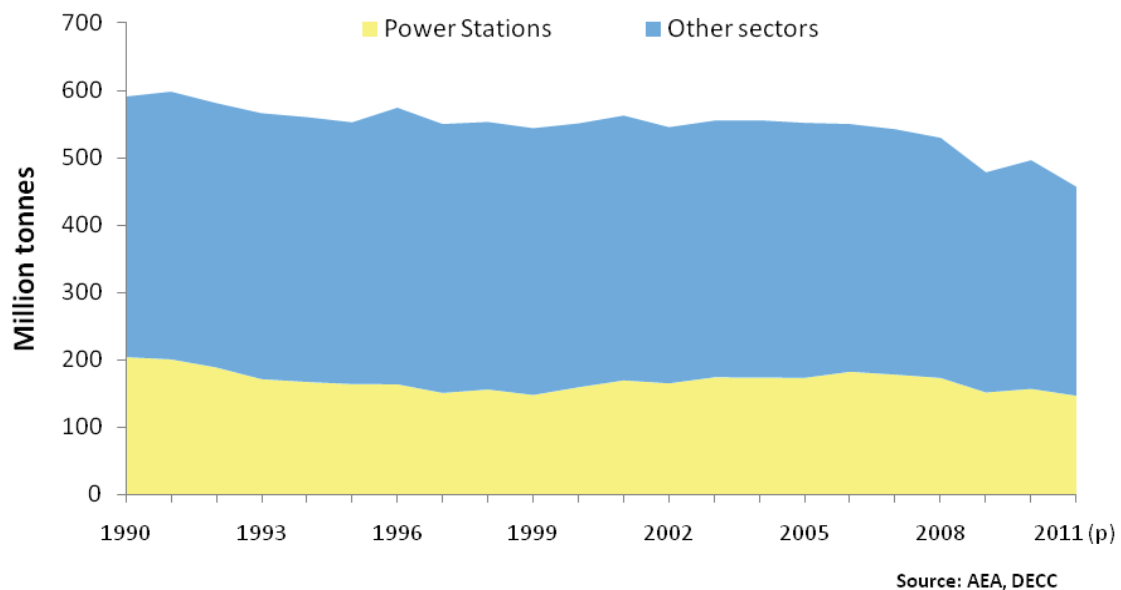


Emissions from the energy supply sector were estimated to be around 24 per cent lower in 2011 than they were in 1990. Between 1990 and 2011, final consumption of electricity increased by around 15 per cent; domestic electricity consumption in particular was just over 20 per cent higher in 2011 than in 1990. However, emissions from electricity generation have decreased by 28 per cent over the same period. Since 1990, there has been an upward trend throughout the period to 2010 in gas usage for electricity generation. However the sharp decrease observed in 2011 puts gas usage at power stations at its lowest level since 1998. Coal use in generation has roughly halved since 1990.

Figure 4 below shows the actual level of CO<sub>2</sub> emissions from electricity generation at power stations, together with the relative impact on total CO<sub>2</sub> emissions. The decrease in emissions from power stations since 1990 has

resulted from a combination of changes in the fuel mix over the period together with greater efficiency due to improvements in technology. It is difficult to assess the relative impacts of the two, but it is likely that the majority of the saving since 1990 will have been due to fuel switching from coal to gas.

**Figure 4: Carbon dioxide emissions from electricity generated at power stations, 1990-2011 (provisional)**



### *Transport*

In 2011, CO<sub>2</sub> emissions from the transport sector, at 119 Mt, accounted for just over a quarter of all CO<sub>2</sub> emissions. Between 2010 and 2011, transport emissions decreased by 1.4 per cent (1.7 Mt); lower petrol consumption outweighed the small increase in diesel consumption.

Emissions from this sector are roughly unchanged from 1990 levels (down 0.4 per cent, or 0.5 Mt). There has been a general increase in these emissions throughout the period up to 2007, but they are now at their lowest since 1992.

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

### *Residential*

In 2011, the residential sector, with emissions of 67 Mt, accounted for around 15 per cent of all CO<sub>2</sub> emissions. Between 2010 and 2011 there was a 22 per cent decrease in emissions from this sector, the highest decrease for any single sector, resulting from a decrease in the use of all fossil fuels, gas in particular.

Residential emissions are heavily influenced by external temperatures, and 2011 was a warmer than average year; in particular, it was significantly warmer than 2010. In the first and last quarters, 2011 was warmer than 2010 by 2.2 and 4.1 degrees Celsius respectively. This heavily contributed to the significant reduction (of 23 per cent) in the use of natural gas for space heating, which was therefore reflected by a similar fall in emissions.

In 2011, emissions from this sector were estimated to be around 15 per cent lower than in 1990. This is only the third year in which emissions from this sector are below 1990 levels.

It should be noted that emissions from this sector do not include emissions from power stations related to domestic electricity consumption.

### *Business*

Carbon dioxide emissions from the business sector, at 70 Mt, accounted for around 15 per cent of all CO<sub>2</sub> emissions in 2011. This was 8 per cent (6 Mt) lower than in 2010. Emissions from this sector were provisionally estimated to be 37 per cent below 1990 levels in 2011.

### *Industrial process*

In 2011, CO<sub>2</sub> emissions from the industrial process sector were estimated to be 9 Mt, a reduction of around 4 per cent compared with 2010. Between 1990 and 2011, emissions from this sector are provisionally estimated to have decreased by around 47 per cent.

### *Public sector*

Carbon dioxide emissions from the public sector, at 8 Mt, decreased by around 6 per cent between 2010 and 2011. It has been provisionally estimated that there has been an overall reduction of 39 per cent in emissions from this sector between 1990 and 2011.

### *Agriculture, waste management and land use, land use change and forestry*

Emissions estimates for these sectors are not yet available for 2011, so the 2010 estimate has been used for this component of total UK CO<sub>2</sub> emissions in 2011.

On this basis, 2011 emissions from the agriculture sector, at 4 Mt, are estimated to have been 21 per cent (1 Mt) lower than in 1990. Emissions from waste management were estimated to be 0.3 Mt in 2011, while in 1990 they were estimated to be 1.2 Mt. Net land use, land use change and forestry emissions have changed from emissions of 3 Mt in 1990 to removals of 5 Mt in 2011.

## **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, more CO<sub>2</sub> 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 582 tonnes of carbon dioxide per GWh in 2011 overall; within this, emissions from electricity generated from coal (887 tonnes of carbon dioxide per GWh electricity supplied) were over two times higher than for electricity supplied by gas (363 tonnes of carbon dioxide per GWh). For all sources of electricity, (including nuclear, renewables and autogeneration) the average amount of carbon dioxide emitted in 2011

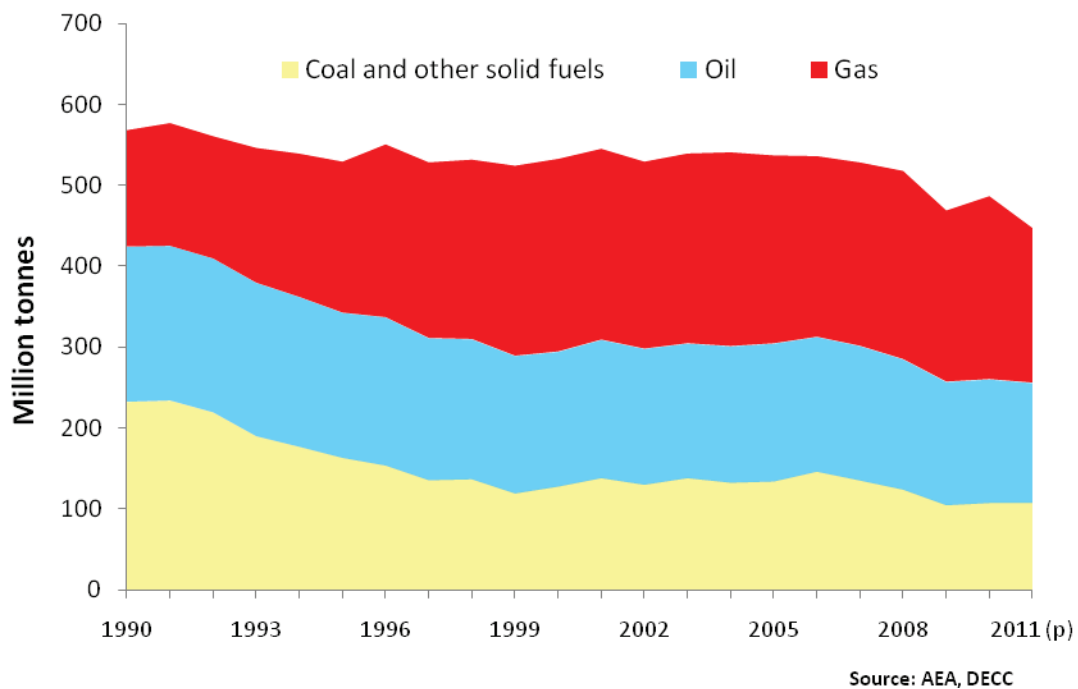
amounted to 428 tonnes per GWh of electricity supplied, compared to 425 tonnes per GWh in 2010.

In 2011, carbon dioxide emissions from the use of fossil fuels, including fuel used for generating electricity, were estimated at 447 Mt. This was 8 per cent lower than the 2010 figure of 486 Mt. The biggest decrease was in emissions from the use of gas, down 16 per cent (35 Mt) from 226 Mt in 2010 to 191 Mt in 2011. This largely resulted from reduced use of gas for both domestic combustion and for electricity generation at power stations.

Over the period 1990 to 2011, CO<sub>2</sub> emissions from fossil fuels decreased by 21 per cent. Over the same period, overall primary consumption of fossil fuels was broadly unchanged. The relatively higher decrease in emissions has been due to an increase in the use of gas accompanied by a decrease in the use of coal and other solid fuels; gas consumption as a proportion of all fossil fuels has increased from 26 per cent in 1990 to 42 per cent in 2011, whilst the proportion used of coal and other solid fuels has decreased from 34 per cent to 16 per cent over the same period. Oil use, as a proportion of all fossil fuels, has remained relatively stable over the period; this accounted for almost 40 per cent of all fossil fuels used in 1990 and 45 per cent in 2011.

Figure 5 below shows CO<sub>2</sub> emissions by fossil fuel between 1990 and 2011. The time series since 1990 is shown in Table 8 towards the end of this statistical release.

**Figure 5: Carbon dioxide emissions by fossil fuels: 1990-2011 (provisional)**



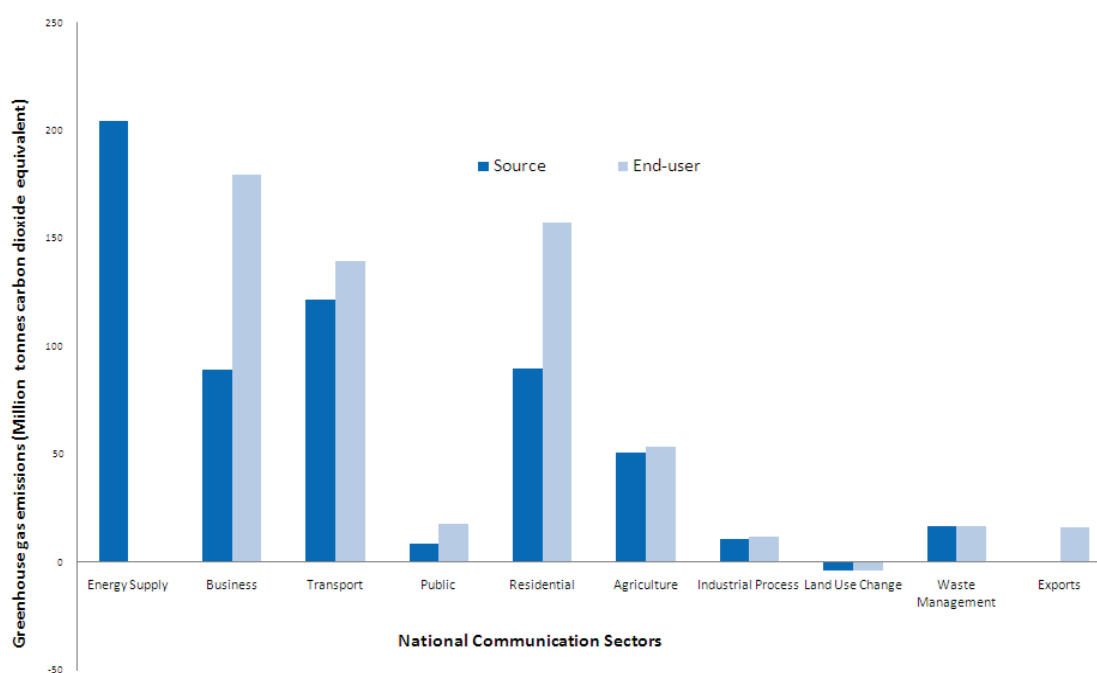


## Other results published today: 2010 greenhouse gas emissions by end-user sector

Also published today is the breakdown of 2010 greenhouse gas emissions by end-user. These results are based on, and consistent with, the breakdown of 2010 emissions by source which was published on 7<sup>th</sup> February 2012. The end-user breakdown reallocates the emissions by source in accordance with where the end-use occurred. The results shown in this breakdown are based on a number of assumptions, and we would therefore expect them to be subject to a wider margin of error than the breakdown by source.

The affect across all sectors of reallocating 2010 greenhouse gas emissions from source to end-user is shown in Figure 6 below.

**Figure 6: Allocation of 2010 greenhouse gas emissions from source sectors to end-user sectors**



A summary of the changes in the end-user breakdown for each gas between 2009 and 2010 can be found in Table 9 towards the end of this statistical release. This also shows a comparable summary of the breakdown of emissions by source, which was published in February.

The full end-user breakdown by National Communications category, from 1990 to 2010, can be found on the [Climate Change Statistics section of the DECC website](#).

## Emissions by gas and end-user sector

### Total greenhouse gases

In 2010, three main sectors accounted for 81 per cent of all end-user greenhouse gas emissions; the business sector (31 per cent), the residential sector (27 per cent), and the transport sector (24 per cent). The largest

increases in end-user emissions between 2009 and 2010 were found in the residential sector, followed by the business sector (up 9 and 2 per cent respectively). Emissions from all the other sectors were relatively unchanged compared to 2009 levels, with the exception of the waste management sector which experienced the biggest decrease of around 3 per cent.

Since 1990, emissions from all the main sectors have decreased; business by 27 per cent, residential by 7 per cent and agriculture by 20 per cent. Emissions from the transport sector have remained at the same level as they were in 1990.

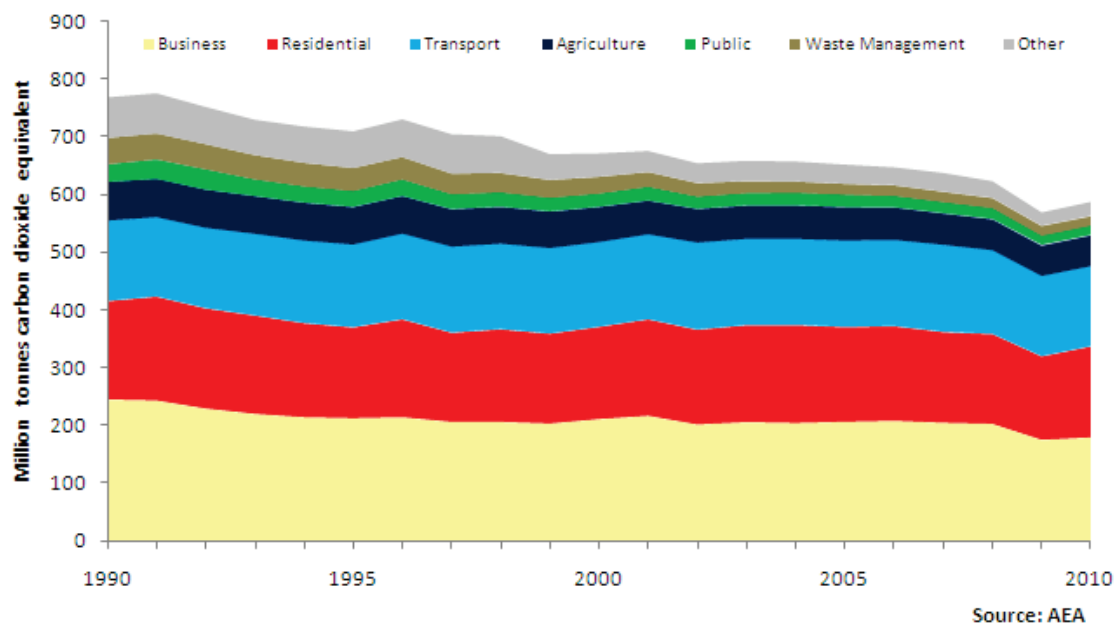
Table 3 and Figure 7 below show the breakdown of greenhouse gas emissions into the main source sectors.

**Table 3: Greenhouse gas emissions by end-user, 1990-2010 (MtCO<sub>2</sub>e)**

|                    | 1990  | 1995  | 2000  | 2006  | 2007  | 2008  | 2009  | 2010  |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Energy Supply      | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| Business           | 245.4 | 212.9 | 211.4 | 208.3 | 205.0 | 203.0 | 175.2 | 179.4 |
| Residential        | 169.8 | 156.8 | 159.2 | 163.6 | 156.7 | 155.1 | 144.1 | 157.2 |
| Transport          | 139.9 | 143.7 | 147.2 | 149.8 | 151.4 | 145.5 | 139.7 | 139.3 |
| Agriculture        | 66.9  | 65.0  | 60.7  | 56.0  | 54.3  | 53.6  | 52.6  | 53.2  |
| Public             | 30.9  | 28.3  | 23.7  | 20.7  | 20.2  | 20.0  | 17.9  | 17.8  |
| Waste Management   | 45.9  | 40.0  | 29.3  | 18.6  | 18.2  | 17.6  | 17.1  | 16.5  |
| Exports            | 9.5   | 13.9  | 13.6  | 16.6  | 17.1  | 15.6  | 16.0  | 16.3  |
| Industrial Process | 57.1  | 47.3  | 26.5  | 17.6  | 18.8  | 17.0  | 11.2  | 11.7  |
| LULUCF             | 3.9   | 2.5   | 0.4   | -3.1  | -3.5  | -3.9  | -4.2  | -3.8  |
| Total              | 769.4 | 710.4 | 672.0 | 647.9 | 638.1 | 623.6 | 569.6 | 587.8 |

All figures are for the UK and Crown Dependencies only, and exclude Overseas Territories.

**Figure 7: Greenhouse gas emissions by end-user, 1990-2010**



## Carbon dioxide

Total carbon dioxide (CO<sub>2</sub>) emissions in 2010 were 495.8 million tonnes, an increase of 4 per cent from 2009 (477.8 million tonnes). On an end-user basis, 91 per cent of this total was accounted for by three sectors: business, residential and transport, which represented 33 per cent, 30 per cent and 28 per cent of the total respectively.

Since 2009, there have been significant increases in emissions from the residential and business sectors (of 10 and 3 per cent respectively). Emissions from all the other sectors were estimated to be around the same level in 2010 as they were in 2009.

Since 1990, there have been notable reductions in emissions from both the business and residential sectors (down 29 and 4 per cent respectively). Emissions from transport were relatively unchanged between 1990 and 2010.

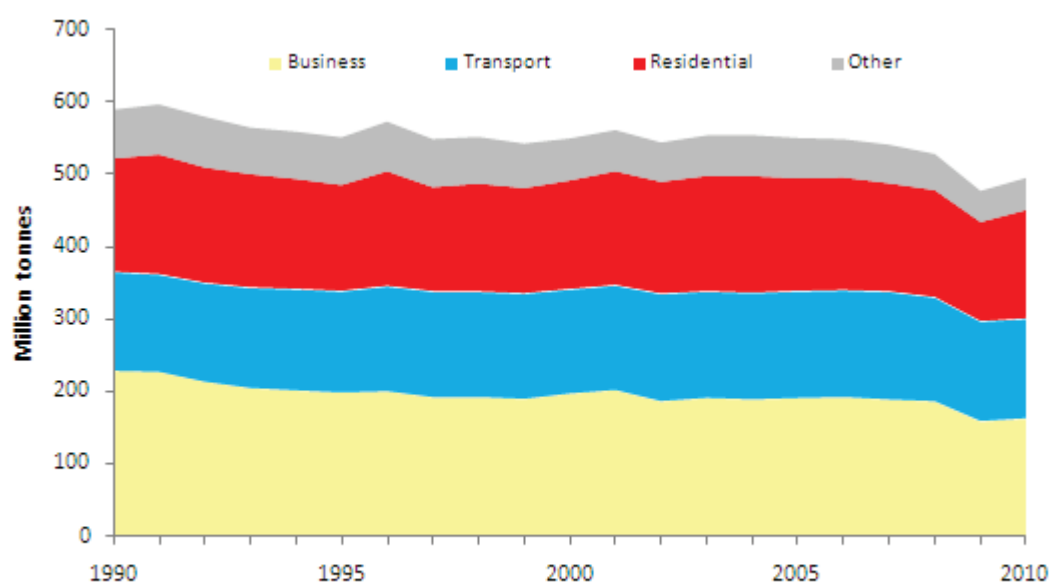
Table 4 and Figure 8 below show the breakdown of carbon dioxide emissions into the main end-user sectors.

**Table 8: Carbon dioxide emissions by end-user, 1990-2010 (Mt)**

|             | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|-------------|------|------|------|------|------|------|------|------|------|
| Business    | 229  | 199  | 197  | 191  | 192  | 189  | 186  | 159  | 163  |
| Residential | 157  | 147  | 150  | 156  | 156  | 150  | 148  | 137  | 151  |
| Transport   | 137  | 140  | 144  | 148  | 147  | 149  | 143  | 138  | 137  |
| Other       | 68   | 67   | 59   | 57   | 54   | 54   | 51   | 44   | 45   |
| Grand Total | 590  | 552  | 550  | 551  | 549  | 542  | 529  | 478  | 496  |

All figures are for the UK and Crown Dependencies only, and exclude Overseas Territories.

**Figure 8: Carbon dioxide emissions by end-user, 1990-2010**



Source: AEA

## Methane

Weighted by global warming potential, methane (CH<sub>4</sub>) emissions in 2010 totalled 41.3 Mt carbon dioxide equivalent (MtCO<sub>2</sub>e), a 2 per cent decrease from 2009 (42.0 MtCO<sub>2</sub>e). On an end-user basis, 44 per cent of these emissions were from agriculture and 36 per cent were from landfill waste. Of these two largest contributing sectors, emissions from agriculture were at the same level in 2010 as they were in 2009, while emissions from landfill waste decreased by 4 per cent over the same period.

Since 1990, emissions from landfill waste have reduced by 66 per cent and emissions from agriculture by 20 per cent.

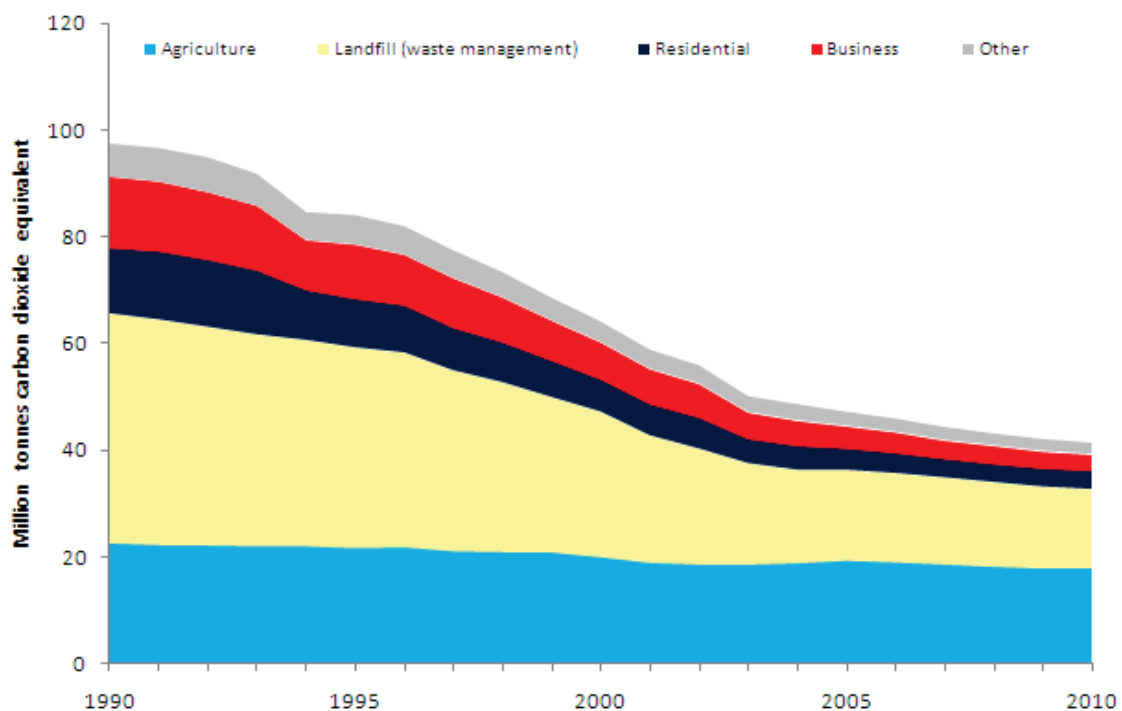
Table 5 and Figure 9 below show the breakdown of methane emissions into the main end-user sectors.

**Table 5: Methane emissions by end-user, 1990-2010 (MtCO<sub>2</sub>e)**

|             | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|-------------|------|------|------|------|------|------|------|------|------|
| Agriculture | 22.7 | 21.8 | 20.1 | 19.4 | 19.1 | 18.7 | 18.3 | 18.0 | 18.1 |
| Landfill    | 43.1 | 37.5 | 27.2 | 17.0 | 16.7 | 16.3 | 15.8 | 15.3 | 14.7 |
| Residential | 12.2 | 9.0  | 6.0  | 4.0  | 3.7  | 3.4  | 3.3  | 3.4  | 3.4  |
| Business    | 13.3 | 10.2 | 6.9  | 4.2  | 3.9  | 3.4  | 3.4  | 3.1  | 3.0  |
| Other       | 6.2  | 5.4  | 3.8  | 2.6  | 2.4  | 2.4  | 2.2  | 2.2  | 2.0  |
| Total       | 97.4 | 84.0 | 64.0 | 47.1 | 45.8 | 44.2 | 43.0 | 42.0 | 41.3 |

All figures are for the UK and Crown Dependencies only, and exclude Overseas Territories.

**Figure 9: Methane emissions by end-user, 1990-2010**



Source: AEA

## Nitrous oxide

Weighted by global warming potential, emissions of nitrous oxide (N<sub>2</sub>O) were 35.6 MtCO<sub>2</sub>e in 2010, a 1 per cent increase from 2009 (35.1 MtCO<sub>2</sub>e). On an end-user basis, emissions from agriculture, which accounted for 80 per cent of the total, increased slightly (by 1 per cent) compared with the previous year, although they were 20 per cent lower than in 1990.

In 2010, emissions from industrial process, which made up around 4 per cent of the total, were very similar to 2009 levels, but 95 per cent lower than in 1990. This reduction in the industrial process sector is largely due to the effect of adipic acid production, emissions from which fell by 95 per cent between 1998 and 1999 alone.

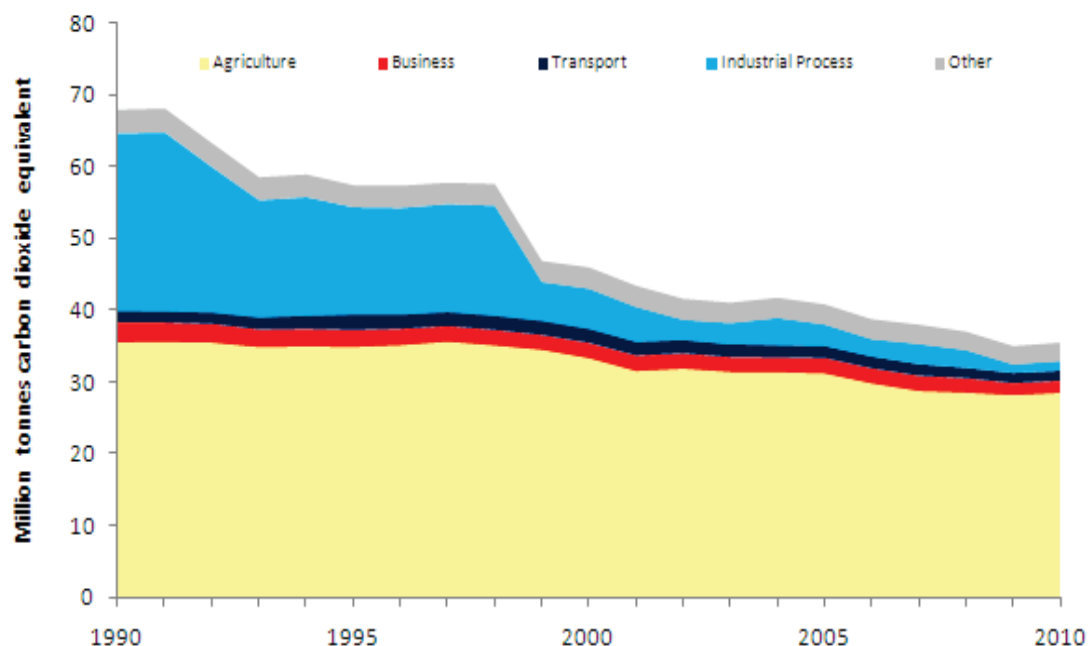
Table 6 and Figure 10 below show the breakdown of nitrous oxide emissions into the main source sectors.

**Table 6: Nitrous oxide emissions by end-user, 1990-2010 (MtCO<sub>2</sub>e)**

|                    | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|--------------------|------|------|------|------|------|------|------|------|------|
| Agriculture        | 35.5 | 34.9 | 33.3 | 31.2 | 29.9 | 28.8 | 28.6 | 28.3 | 28.6 |
| Business           | 2.7  | 2.3  | 2.1  | 2.1  | 2.0  | 2.0  | 1.9  | 1.6  | 1.6  |
| Transport          | 1.6  | 2.2  | 2.0  | 1.7  | 1.6  | 1.6  | 1.4  | 1.4  | 1.4  |
| Industrial Process | 24.7 | 14.9 | 5.6  | 3.0  | 2.4  | 2.8  | 2.5  | 1.2  | 1.4  |
| Other              | 3.2  | 3.1  | 3.0  | 2.8  | 2.8  | 2.8  | 2.6  | 2.6  | 2.6  |
| Total              | 67.8 | 57.4 | 46.0 | 40.9 | 38.8 | 38.1 | 37.1 | 35.1 | 35.6 |

All figures are for the UK and Crown Dependencies only, and exclude Overseas Territories.

**Figure 10: Nitrous oxide emissions by end-user, 1990-2010**



Source: AEA

## **Revisions to the estimates of end-user emissions**

It should be noted that the historical time series of emissions by end-user is revised each year to reflect any revisions made to either the estimates of emissions by source or the other energy consumption data used in the end-user emissions calculation. In this publication, this has resulted in revisions to some end-user emissions figures for all years up to and including 2009. Further details of these revisions can be found in the [National Statistics release of 7<sup>th</sup> February 2012](#), which covered 2010 UK greenhouse gas emissions by source.

## **UK performance against emissions reduction targets**

The UK has a number of targets, both international and domestic, for reducing greenhouse gas emissions. These are essentially the Kyoto Protocol target and the Carbon Budgets set out under the UK Climate Change Act.

In reporting emissions reductions against these targets, the UK is required to take account of emissions trading through the various flexible mechanisms which have been established, including the European Union Emissions Trading System (EU ETS).

DECC reported on performance against these targets in detail in the [National Statistics release of 7<sup>th</sup> February 2012](#), which covered 2010 UK greenhouse gas emissions final figures. Performance was reported so as to take account of the latest available EU ETS results, also covering the 2010 calendar year. Since these are still the latest available results from the EU ETS, it is not possible to produce a further update showing performance against targets based on the provisional 2011 emissions estimates – we will not be able to do so until after the 2011 EU ETS results become available in May 2012.

## **Future updates to emissions estimates**

Final estimates of UK greenhouse gas emissions for 2011 will be published as National Statistics in early February 2013. These estimates will be based on the UK's National Atmospheric Emissions Inventory for 2011, to be produced for DECC and the Devolved Administrations by AEA.

## **Further information and feedback**

Any enquiries or comments in relation to this statistical release 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\\_change/climate\\_change.aspx](http://www.decc.gov.uk/en/content/cms/statistics/climate_change/climate_change.aspx)

## Notes for Editors

1. A full set of data tables can be accessed via the Climate Change Statistics pages of the DECC website.
2. The 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. Additional results will be released as they become available, including a full report to be published in April. For further information on the UK Greenhouse Gas Inventory, see the [NAEI web site](#).
3. 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 2011 estimates are subject to a greater range of uncertainty than the final figures for earlier years. For more information on these uncertainties see the [Climate Change Statistics section of the DECC website](#).
4. The headline measure included in this statistical release has previously been reported as one of the indicators supporting the UK Government's Sustainable Development Strategy. The full Sustainable Development indicator set was last updated in 2010, and a new set of indicators are currently under development to support the Government's approach to mainstreaming Sustainable Development, with reporting requirements to be confirmed in due course.
5. Further details of the European Union Emissions Trading System can be found at the [EU ETS section of the DECC website](#).
6. Detailed UK temperature data can be found on both the [Met Office website](#) and the [Energy Statistics section of the DECC website](#).

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**Table 7: UK Greenhouse Gas Emissions 1990-2011 (provisional), headline results**

**Greenhouse gas emissions: weighted by global warming potential (million tonnes carbon dioxide equivalent)**

| <b>Greenhouse gas emissions weighted by global warming potential (million tonnes carbon dioxide equivalent)</b> |                    |              |              |              |              |              |              |              |              |              |                 |
|-----------------------------------------------------------------------------------------------------------------|--------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-----------------|
|                                                                                                                 |                    | <b>1990</b>  | <b>1995</b>  | <b>2000</b>  | <b>2005</b>  | <b>2006</b>  | <b>2007</b>  | <b>2008</b>  | <b>2009</b>  | <b>2010</b>  | <b>2011 (p)</b> |
| Net CO <sub>2</sub> emissions<br>(emissions minus<br>removals)                                                  | Energy supply      | 242.5        | 211.5        | 203.4        | 217.6        | 223.4        | 219.3        | 212.8        | 189.8        | 195.7        | 183.8           |
|                                                                                                                 | Business           | 110.6        | 104.5        | 104.2        | 94.1         | 91.0         | 89.3         | 87.5         | 76.0         | 75.6         | 69.6            |
|                                                                                                                 | Transport          | 119.4        | 119.6        | 124.6        | 128.8        | 129.2        | 130.9        | 126.4        | 120.9        | 120.6        | 118.9           |
|                                                                                                                 | Public             | 13.0         | 12.7         | 11.5         | 11.0         | 10.0         | 9.3          | 9.3          | 8.2          | 8.4          | 7.9             |
|                                                                                                                 | Residential        | 79.0         | 80.8         | 87.1         | 84.3         | 81.7         | 78.1         | 79.9         | 74.7         | 86.5         | 67.5            |
|                                                                                                                 | Agriculture        | 5.2          | 5.3          | 4.8          | 4.6          | 4.3          | 4.1          | 4.1          | 4.1          | 4.1          | 4.1             |
|                                                                                                                 | Industrial process | 16.3         | 15.0         | 14.8         | 14.2         | 13.3         | 14.6         | 13.3         | 8.6          | 9.0          | 8.7             |
|                                                                                                                 | Waste Management   | 1.2          | 0.9          | 0.5          | 0.4          | 0.3          | 0.3          | 0.3          | 0.3          | 0.3          | 0.3             |
|                                                                                                                 | LULUCF             | 3.1          | 1.6          | -0.4         | -3.7         | -3.8         | -4.2         | -4.6         | -4.9         | -4.5         | -4.5            |
| Total CO <sub>2</sub>                                                                                           |                    | 590.3        | 552.0        | 550.5        | 551.2        | 549.4        | 541.8        | 529.0        | 477.8        | 495.8        | 456.3           |
| Other greenhouse gases                                                                                          |                    | 179.0        | 158.4        | 121.6        | 101.3        | 98.5         | 96.3         | 94.6         | 91.8         | 92.0         | 90.4            |
| <b>Kyoto greenhouse gas basket</b>                                                                              |                    | <b>766.4</b> | <b>708.4</b> | <b>671.5</b> | <b>654.7</b> | <b>650.3</b> | <b>640.9</b> | <b>626.7</b> | <b>572.5</b> | <b>590.4</b> | <b>549.3</b>    |

**Notes**

1. Figures shown for 2011 are provisional.
2. Provisional 2011 CO<sub>2</sub> emissions for the agriculture, waste and LULUCF sectors have not been estimated; 2010 estimates have been used for this component of the provisional estimates of total UK emissions.
3. Kyoto basket total differs slightly from sum of individual pollutants above as the basket uses a narrower definition for LULUCF, and includes emissions from UK Overseas Territories.
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. The entire time series is revised each year to take account of methodological improvements in the UK emissions inventory.
6. Figures shown do not include any adjustment for the effect of the EU Emissions Trading System (EUETS), which was introduced in 2005.



**Table 8: UK Carbon Dioxide Emissions by fuel, 1990-2011 (provisional)**

| Million tonnes carbon dioxide |             |             |             |             |             |             |             |             |             |             |             |             |             |                |
|-------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|----------------|
| <b>Fuel</b>                   | <b>1990</b> | <b>1995</b> | <b>2000</b> | <b>2001</b> | <b>2002</b> | <b>2003</b> | <b>2004</b> | <b>2005</b> | <b>2006</b> | <b>2007</b> | <b>2008</b> | <b>2009</b> | <b>2010</b> | <b>2011(p)</b> |
| Gas                           | 143.7       | 186.4       | 237.8       | 235.6       | 230.8       | 234.2       | 239.2       | 232.0       | 223.0       | 226.4       | 232.2       | 211.3       | 225.8       | 190.8          |
| Oil                           | 191.0       | 178.5       | 165.9       | 170.2       | 167.3       | 165.7       | 167.8       | 169.7       | 165.8       | 165.5       | 160.4       | 151.7       | 152.0       | 147.3          |
| Coal                          | 217.7       | 151.4       | 116.7       | 129.0       | 120.5       | 129.7       | 124.4       | 124.7       | 136.5       | 126.0       | 115.4       | 96.5        | 100.2       | 101.0          |
| Other solid fuels             | 15.2        | 12.4        | 11.7        | 9.8         | 10.1        | 9.1         | 8.8         | 10.0        | 10.2        | 9.8         | 9.2         | 8.9         | 8.0         | 7.5            |
| Non-fuel                      | 22.7        | 23.3        | 18.4        | 17.4        | 16.3        | 15.8        | 14.8        | 14.8        | 13.9        | 14.0        | 11.7        | 9.5         | 9.8         | 9.7            |
| Total                         | 590.3       | 552.0       | 550.5       | 562.1       | 544.9       | 554.6       | 555.0       | 551.2       | 549.4       | 541.8       | 529.0       | 477.8       | 495.8       | 456.3          |

**Notes**

1. Figures shown for 2011 are provisional.

**Table 9: UK emissions of all greenhouse gases, carbon dioxide, methane and nitrous oxide, 2009-10, by source and end-user, National Communication categories**

| Greenhouse Gas                                                  | NC Category        | Source        |               |             | End User      |               |             |
|-----------------------------------------------------------------|--------------------|---------------|---------------|-------------|---------------|---------------|-------------|
|                                                                 |                    | 2009          | 2010          | % change    | 2009          | 2010          | % change    |
| All Greenhouse gases (million tonnes carbon dioxide equivalent) | Energy Supply      | 198.7         | 204.3         | 2.8         | -             | -             | -           |
|                                                                 | Business           | 89.0          | 89.0          | 0.0         | 175.2         | 179.4         | 2.4         |
|                                                                 | Transport          | 122.2         | 121.9         | -0.2        | 139.7         | 139.3         | -0.3        |
|                                                                 | Public             | 8.3           | 8.5           | 2.4         | 17.9          | 17.8          | -0.1        |
|                                                                 | Residential        | 78.1          | 89.9          | 15.1        | 144.1         | 157.2         | 9.1         |
|                                                                 | Agriculture        | 50.2          | 50.7          | 0.9         | 52.6          | 53.2          | 1.2         |
|                                                                 | Industrial Process | 10.2          | 10.9          | 6.5         | 11.2          | 11.7          | 4.6         |
|                                                                 | Land Use Change    | -4.2          | -3.8          | -8.7        | -4.2          | -3.8          | -8.7        |
|                                                                 | Waste Management   | 17.1          | 16.5          | -3.4        | 17.1          | 16.5          | -3.4        |
|                                                                 | Exports            | -             | -             | -           | 16.0          | 16.3          | 2.1         |
|                                                                 | <b>Total</b>       | <b>569.6</b>  | <b>587.8</b>  | <b>3.2</b>  | <b>569.6</b>  | <b>587.8</b>  | <b>3.2</b>  |
| Carbon dioxide (million tonnes)                                 | Energy Supply      | 189.8         | 195.7         | 3.1         | -             | -             | -           |
|                                                                 | Business           | 76.0          | 75.6          | -0.5        | 158.7         | 162.7         | 2.5         |
|                                                                 | Transport          | 120.9         | 120.6         | -0.2        | 137.7         | 137.4         | -0.2        |
|                                                                 | Public             | 8.2           | 8.4           | 2.4         | 17.4          | 17.4          | 0.1         |
|                                                                 | Residential        | 74.7          | 86.5          | 15.8        | 137.5         | 150.5         | 9.5         |
|                                                                 | Agriculture        | 4.1           | 4.1           | 1.5         | 6.4           | 6.6           | 3.2         |
|                                                                 | Industrial Process | 8.6           | 9.0           | 4.8         | 9.4           | 9.7           | 3.0         |
|                                                                 | Land Use Change    | -4.9          | -4.5          | -7.6        | -4.9          | -4.5          | -7.6        |
|                                                                 | Waste Management   | 0.3           | 0.3           | 1.6         | 0.3           | 0.3           | 1.6         |
|                                                                 | Exports            | -             | -             | -           | 15.3          | 15.7          | 2.5         |
|                                                                 | <b>Total</b>       | <b>477.8</b>  | <b>495.8</b>  | <b>3.8</b>  | <b>477.8</b>  | <b>495.8</b>  | <b>3.8</b>  |
| Methane (thousand tonnes)                                       | Energy Supply      | 356.6         | 345.7         | -3.0        | -             | -             | -           |
|                                                                 | Business           | 10.5          | 10.6          | 0.5         | 149.9         | 143.2         | -4.5        |
|                                                                 | Transport          | 4.6           | 3.9           | -14.4       | 29.0          | 25.9          | -10.8       |
|                                                                 | Public             | 0.8           | 0.8           | 2.6         | 19.3          | 17.9          | -7.0        |
|                                                                 | Residential        | 21.6          | 23.7          | 9.5         | 159.6         | 163.8         | 2.6         |
|                                                                 | Agriculture        | 852.1         | 856.9         | 0.6         | 855.1         | 859.7         | 0.5         |
|                                                                 | Industrial Process | 5.0           | 4.9           | -1.6        | 15.7          | 14.6          | -6.5        |
|                                                                 | Land Use Change    | 1.1           | 1.4           | 19.0        | 1.1           | 1.4           | 19.0        |
|                                                                 | Waste Management   | 745.4         | 717.4         | -3.7        | 745.4         | 717.4         | -3.7        |
|                                                                 | Exports            | -             | -             | -           | 22.6          | 21.2          | -5.9        |
|                                                                 | <b>Total</b>       | <b>1997.7</b> | <b>1965.3</b> | <b>-1.6</b> | <b>1997.7</b> | <b>1965.3</b> | <b>-1.6</b> |
| Nitrous oxide (thousand tonnes)                                 | Energy Supply      | 4.5           | 4.6           | 1.3         | -             | -             | -           |
|                                                                 | Business           | 3.5           | 3.5           | -0.9        | 5.2           | 5.3           | 1.1         |
|                                                                 | Transport          | 3.8           | 3.8           | 0.7         | 4.5           | 4.4           | -0.3        |
|                                                                 | Public             | 0.0           | 0.0           | 1.9         | 0.2           | 0.2           | -0.8        |
|                                                                 | Residential        | 0.4           | 0.4           | 10.3        | 1.7           | 1.8           | 4.9         |
|                                                                 | Agriculture        | 91.1          | 92.1          | 1.1         | 91.2          | 92.2          | 1.1         |
|                                                                 | Industrial Process | 3.9           | 4.4           | 11.1        | 3.9           | 4.4           | 11.1        |
|                                                                 | Land Use Change    | 2.1           | 2.0           | -1.7        | 2.1           | 2.0           | -1.7        |
|                                                                 | Waste Management   | 3.9           | 3.9           | -0.4        | 3.9           | 3.9           | -0.4        |
|                                                                 | Exports            | -             | -             | -           | 0.6           | 0.6           | -5.5        |
|                                                                 | <b>Total</b>       | <b>113.2</b>  | <b>114.7</b>  | <b>1.3</b>  | <b>113.2</b>  | <b>114.7</b>  | <b>1.3</b>  |