

# **Annual statement of emissions for 2009**

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**Presented to Parliament pursuant to section 16  
of the Climate Change Act 2008**

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# Executive summary

This is the second annual statement of emissions required under section 16 of the Climate Change Act 2008. It sets out the steps taken to calculate the “net UK carbon account” in respect of 2009. The net UK carbon account is what we compare against the carbon budgets to determine whether they are being met, and must not exceed the level of the carbon budget at the end of each budgetary period.

The net UK carbon account is calculated by first taking net UK emissions (i.e. aggregate gross emissions from sources in the UK, adjusted to take into account removals of emissions from the atmosphere by UK carbon sinks). These are adjusted to account for any carbon units which have been brought in from overseas by Government and others to offset UK emissions, and UK carbon units which have been disposed of to a third party outside the UK. The detailed rules for these calculations are contained in the Carbon Accounting Regulations 2009.

This statement shows that, in 2009, net UK emissions were 561.8 million tonnes of carbon dioxide-equivalent (MtCO<sub>2</sub>e). This is 54.2 MtCO<sub>2</sub>e (8.8%) less than net UK emissions in 2008. However, 13.5 MtCO<sub>2</sub>e worth of carbon units were sold in 2009 by companies in the UK operating under the EU Emissions Trading System (EU ETS). Taking into account the use of these carbon units, this means **the net UK carbon account in 2009 was 575.3 MtCO<sub>2</sub>e**. This is 26.5% below base year emissions, which were 783.1 MtCO<sub>2</sub>e

Annual statements in future years must be produced by 31 March annually, and final statements for each budgetary period – which will combine the results of each annual statement for the budgetary period to determine whether the budget has been met – must be produced by 31 May in the second year following the end of the budgetary period.

# Introduction

1. The Climate Change Act 2008 introduced a legally binding target to reduce greenhouse gas emissions by at least 80% below the 1990 baseline<sup>1</sup> in 2050, with an interim target to reduce emissions by at least 34% in 2020. The Act also introduced ‘carbon budgets’, which set the trajectory to ensure the targets in the Act are met. These budgets represent legally-binding limits on the total amount of greenhouse gases that can be emitted in the UK for a given five-year period.
2. The first budgetary period runs from 2008 to 2012 and the next two budgets cover the periods 2013-2017 and 2018-2022. The level of these budgets, which took account of the advice of the independent Committee on Climate Change, were announced in April 2009 and subsequently approved by Parliament and entered into force in May 2009.
3. Under the Act, the Government must set budgets at least three periods in advance, and by 30 June 2011 we must set the level of the fourth budget (2023-2027). The Committee on Climate Change provided advice to Government on the level of this budget in December 2010.
4. In order to monitor progress towards the carbon budgets in each year, section 16 of the Climate Change Act requires that the Government lays before Parliament an annual statement of emissions. This must provide information on our progress towards meeting carbon budgets in a clear and transparent way. The statements must include information on both emissions of greenhouse gases in the UK and removals of greenhouse gas emissions from the atmosphere (e.g. from forestry activities), as well as the use of carbon units – where they have been brought into the UK from overseas to offset UK emissions, or sold to a third party outside the UK. This ensures that an amount for “the net UK carbon account” can be calculated in each year, in accordance with the requirements in the Act. This statement, which relates to 2009, is the second such statement under the Act. Subsequent statements must be produced by 31 March annually.

## Calculating the net UK carbon account

5. Section 27 of the Climate Change Act defines the “net UK carbon account”. This is what we compare against carbon budgets to determine whether we are meeting them. The net UK carbon account must not exceed the level of the carbon budget at the end of each budgetary period. The process for determining the net UK carbon account in each year is summarised in Figure 1.
6. The starting point is UK emissions for the year, using data from the annual statistical release of UK greenhouse gas emissions published as National Statistics in February annually.<sup>2</sup> These emissions comprise aggregate gross emissions from sources in the UK, including emissions from land use, land use change and forestry (LULUCF), which are

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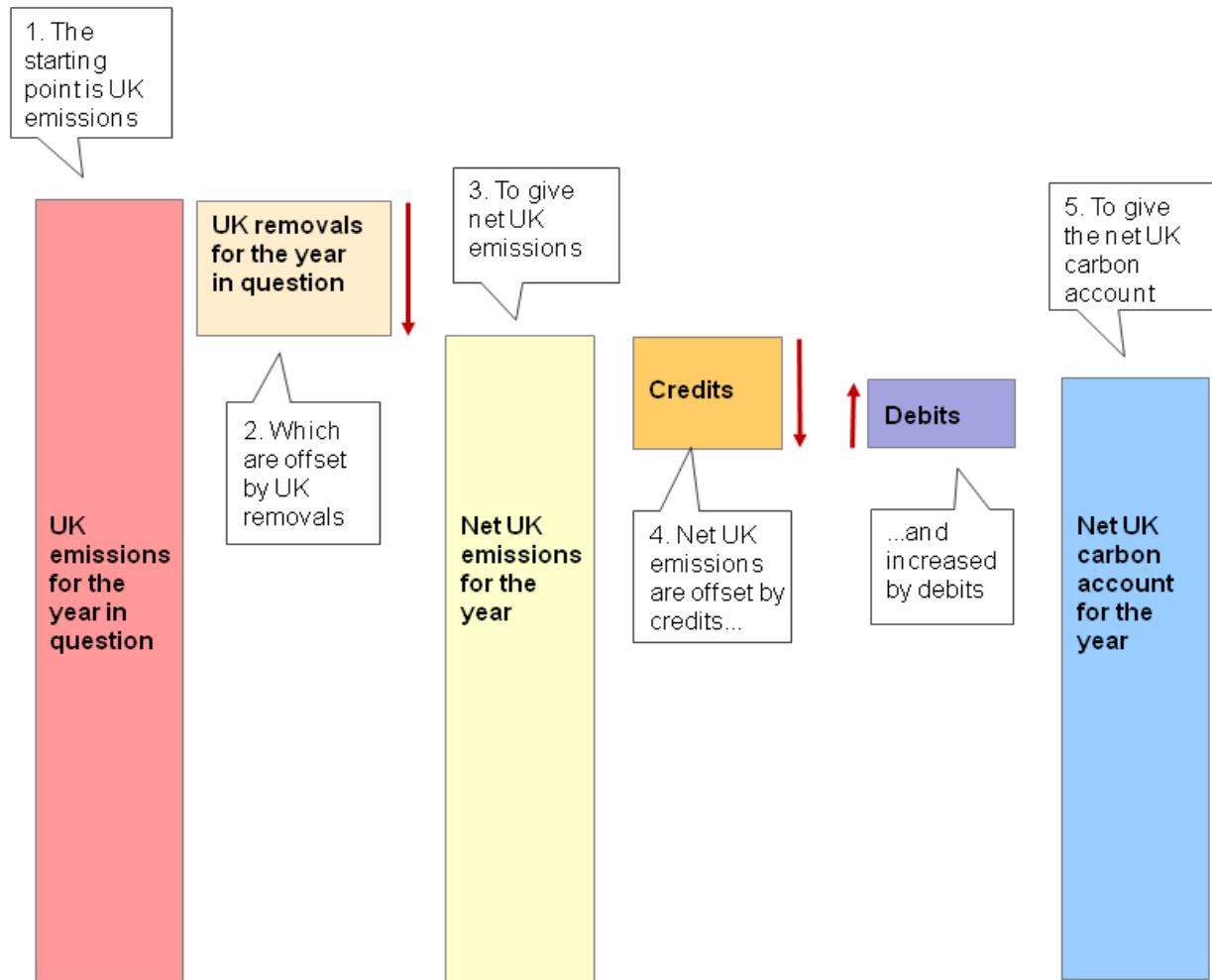
<sup>1</sup> ‘The 1990 baseline’ is defined in the Climate Change Act 2008 as 1990 emissions of carbon dioxide, methane and nitrous oxide and 1995 emissions for the fluorinated gases.

<sup>2</sup> The final 2009 estimates of UK greenhouse gas emissions were published on 1 February 2011. See: [http://www.decc.gov.uk/en/content/cms/statistics/climate\\_change/gg\\_emissions/uk\\_emissions/2009\\_final/2009\\_final.aspx](http://www.decc.gov.uk/en/content/cms/statistics/climate_change/gg_emissions/uk_emissions/2009_final/2009_final.aspx)

then adjusted to take into account removals of emissions from the atmosphere by carbon sinks associated with LULUCF activity.<sup>3</sup>

7. This gives net UK emissions, which are adjusted to account for:
  - a. carbon units which have been brought in from overseas by Government and others to offset UK emissions (“credits”), thereby reducing the net UK carbon account, and
  - b. UK carbon units which have been sold to a third party outside the UK or otherwise disposed of (“debits”), which increase the net UK carbon account as the recipient can use these units to offset their own emissions and it would lead to double counting if they were also used to offset UK emissions.

**Figure 1: Calculating the net UK carbon account**



<sup>3</sup> The UNFCCC defines a carbon sink as “any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere.”

## **Structure of the report**

8. This report contains two sections:

- **Part 1** provides UK greenhouse gas emissions statistics for 2009, covering emissions, removals and net emissions of each of the six greenhouse gases covered by carbon budgets, individually and collectively.
- **Part 2** sets out the amount of units which were credited to and debited from the net UK carbon account in 2009. The calculations in this part of the report are based on the methodologies established by the Carbon Accounting Regulations 2009 and the Carbon Accounting (Amendment) Regulations 2009.<sup>4</sup>

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<sup>4</sup> SI 2009 No. 1257 and SI 2009 No. 3146, respectively, available from:  
[www.opsi.gov.uk/si/si2009/uksi\\_20091257\\_en\\_1](http://www.opsi.gov.uk/si/si2009/uksi_20091257_en_1) and [www.opsi.gov.uk/si/si2009/uksi\\_20093146\\_en\\_1](http://www.opsi.gov.uk/si/si2009/uksi_20093146_en_1)

# Part 1 – UK greenhouse gas emissions

9. The information contained in this part of the statement is derived from the UK greenhouse gas emissions statistics for 2009, which were published on 1 February 2011.<sup>5</sup> Emissions coverage under the Climate Change Act 2008 comprises UK territory only (i.e. England, Wales, Scotland and Northern Ireland).<sup>6</sup>
10. Unless otherwise stated, all figures in this section are stated in tonnes of carbon dioxide-equivalent (tCO<sub>2</sub>e). This is the usual way of reporting greenhouse gases to account for the different global warming potentials of each gas. The global warming potential (GWP) of a gas is a measure of its impact on global warming relative to carbon dioxide, and is agreed at international level. Carbon dioxide-equivalent figures are therefore produced by multiplying the emissions of a greenhouse gas by its GWP. This means the emissions and removals figures for different greenhouse gases in this part of the report are directly comparable.

## 1.1 Base year emissions by gas

*Section 16(8) of the Climate Change Act*

11. Table 1 sets out the base year figures – the emissions in the year against which progress is measured – for each greenhouse gas covered by the Act, on the basis of the methodology in the UK's 1990-2009 National Emissions Inventory. Under the Kyoto Protocol, the UK uses 1990 as the base year for carbon dioxide, methane and nitrous oxide emissions, and 1995 as the base year for the fluorinated gases (or F-gases: hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride). To ensure consistency with our international obligations, the same base year for each greenhouse gas is used under the Climate Change Act.
12. It should be noted that the base year figures differ from those in the Annual Statement of Emissions for 2008. This is due to changes in the historical time series of emissions data back to 1990 in the most recent inventory report (February 2011). See section 1.4 for more details.

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<sup>5</sup>[http://www.decc.gov.uk/en/content/cms/statistics/climate\\_change/gg\\_emissions/uk\\_emissions/2009\\_final/2009\\_fin.al.aspx](http://www.decc.gov.uk/en/content/cms/statistics/climate_change/gg_emissions/uk_emissions/2009_final/2009_fin.al.aspx)

<sup>6</sup> Section 89 of the Climate Change Act specifies that this includes UK coastal waters and the UK sector of the continental shelf.

**Table 1: Base year emissions for each greenhouse gas, tCO<sub>2</sub>e**

Greenhouse gas	Base year	Net base year emissions
<b>Carbon dioxide</b> CO <sub>2</sub>		588,136,074
<b>Methane</b> CH <sub>4</sub>	1990	110,125,095
<b>Nitrous oxide</b> N <sub>2</sub> O		67,700,997
<b>Hydrofluorocarbons</b> HFCs		15,446,714
<b>Perfluorocarbons</b> PFCs	1995	461,887
<b>Sulphur hexafluoride</b> SF <sub>6</sub>		1,239,300
	<b>TOTAL<sup>7</sup></b>	<b>783,110,066</b>

## 1.2 2009 emissions by gas

### Section 16(2) of the Climate Change Act

13. Tables 2 to 7 provide data for each of the six greenhouse gases covered by the Climate Change Act and carbon budgets framework. As required by the Act, this includes details of:

- The amount for 2009 of UK emissions, UK removals and net UK emissions of each gas; and
- Whether any of those amounts represent an increase or decrease compared to the equivalent amount for the previous year.

14. It should be noted that the figures for last year (2008) differ from the 2008 emissions figures in the Annual Statement of Emissions for 2008. This is due to changes in the historical time series of emissions data back to 1990 in the most recent inventory report (February 2011). See section 1.4 for more details.

15. Section 16 also requires that the annual statement of emissions includes details of the methods used to measure or calculate those amounts, and this is set out in paragraph 16.

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<sup>7</sup> Figures may not sum due to rounding.

**Table 2: Carbon dioxide (CO<sub>2</sub>) emissions, tCO<sub>2</sub>e**

<b>2009 UK CO<sub>2</sub> emissions (A)</b>	<b>476,950,462</b>
2008 UK CO <sub>2</sub> emissions (B)	528,286,682
Increase or decrease on previous year (A – B)	Decrease of 51,336,220 tCO <sub>2</sub> e on previous year
<b>2009 UK CO<sub>2</sub> removals<sup>8</sup>(C)</b>	<b>4,789,456</b>
2008 UK CO <sub>2</sub> removals <sup>8</sup> (D)	4,690,878
Increase or decrease on previous year (C – D)	Increase of 98,578 tCO <sub>2</sub> e on previous year
<b>2009 net UK CO<sub>2</sub> emissions (E = A – C)</b>	<b>472,161,006</b>
2008 net UK CO <sub>2</sub> emissions (F = B – D)	523,595,804
Increase or decrease on previous year (E – F)	Decrease of 51,434,798 tCO <sub>2</sub> e on previous year

**Table 3: Methane (CH<sub>4</sub>) emissions, tCO<sub>2</sub>e**

<b>2009 UK CH<sub>4</sub> emissions (A)</b>	<b>43,418,963</b>
2008 UK CH <sub>4</sub> emissions (B)	44,268,497
Increase or decrease on previous year (A – B)	Decrease of 849,534 tCO <sub>2</sub> e on previous year
<b>2009 UK CH<sub>4</sub> removals<sup>8</sup> (C)</b>	<b>-29,536</b>
2008 UK CH <sub>4</sub> removals <sup>8</sup> (D)	-35,121
Increase or decrease on previous year (C – D)	Increase of 5,585 tCO <sub>2</sub> e on previous year
<b>2009 net UK CH<sub>4</sub> emissions (E = A – C)</b>	<b>43,448,499</b>
2008 net UK CH <sub>4</sub> emissions (F = B – D)	44,303,618
Increase or decrease on previous year (E – F)	Decrease of 855,119 tCO <sub>2</sub> e on previous year

<sup>8</sup> A positive amount means the net effect is the removal of emissions from the atmosphere from these carbon sinks, while a negative figure means the net effect is emissions to the atmosphere from the carbon sink.

**Table 4: Nitrous oxide (N<sub>2</sub>O) emissions, tCO<sub>2</sub>e**

<b>2009 UK N<sub>2</sub>O emissions (A)</b>	<b>33,883,641</b>
2008 UK N <sub>2</sub> O emissions (B)	35,717,501
Increase or decrease on previous year (A – B)	Decrease of 1,833,860 tCO <sub>2</sub> e on previous year
<b>2009 UK N<sub>2</sub>O removals<sup>8</sup> (C)</b>	<b>-637,515</b>
2008 UK N <sub>2</sub> O removals <sup>8</sup> (D)	-650,437
Increase or decrease on previous year (C – D)	Increase of 12,922 tCO <sub>2</sub> e on previous year
<b>2009 net UK N<sub>2</sub>O emissions (E = A – C)</b>	<b>34,521,156</b>
2008 net UK N <sub>2</sub> O emissions (F = B – D)	36,367,938
Increase or decrease on previous year (E – F)	Decrease of 1,846,781 tCO <sub>2</sub> e on previous year

**Table 5: Hydrofluorocarbon (HFC) emissions, tCO<sub>2</sub>e**

<b>2009 UK HFC emissions (A)</b>	<b>10,846,283</b>
2008 UK HFC emissions (B)	10,772,262
Increase or decrease on previous year (A – B)	Increase of 74,021 tCO <sub>2</sub> e on previous year
<b>2009 UK HFC removals<sup>9</sup> (C)</b>	<b>0</b>
2008 UK HFC removals <sup>9</sup> (D)	0
Increase or decrease on previous year (C – D)	n/a
<b>2009 net UK HFC emissions (E = A – C)</b>	<b>10,846,283</b>
2008 net UK HFC emissions (F = B – D)	10,772,262
Increase or decrease on previous year (E – F)	Increase of 74,021 tCO <sub>2</sub> e on previous year

<sup>9</sup> Removals of greenhouse gas from the atmosphere do not apply to HFCs, PFCs or SF<sub>6</sub>.

**Table 6: Perfluorocarbon (PFC) emissions, tCO<sub>2</sub>e**

<b>2009 UK PFC emissions (A)</b>	<b>147,073</b>
2008 UK PFC emissions (B)	208,491
Increase or decrease on previous year (A – B)	Decrease of 61,418 tCO <sub>2</sub> e on previous year
<b>2009 UK PFC removals<sup>9</sup> (C)</b>	<b>0</b>
2008 UK PFC removals <sup>9</sup> (D)	0
Increase or decrease on previous year (C – D)	n/a
<b>2009 net UK PFC emissions (E = A – C)</b>	<b>147,073</b>
2008 net UK PFC emissions (F = B – D)	208,491
Increase or decrease on previous year (E – F)	Decrease of 61,418 tCO <sub>2</sub> e on previous year

**Table 7: Sulphur hexafluoride (SF<sub>6</sub>) emissions, tCO<sub>2</sub>e**

<b>2009 UK SF<sub>6</sub> emissions (A)</b>	<b>661,165</b>
2008 UK SF <sub>6</sub> emissions (B)	711,122
Increase or decrease on previous year (A – B)	Decrease of 49,958 tCO <sub>2</sub> e on previous year
<b>2009 UK SF<sub>6</sub> removals<sup>9</sup> (B)</b>	<b>0</b>
2008 UK SF <sub>6</sub> removals <sup>9</sup> (D)	0
Increase or decrease on previous year (C – D)	n/a
<b>2009 net UK SF<sub>6</sub> emissions (C = A – B)</b>	<b>661,165</b>
2008 net UK SF <sub>6</sub> emissions (F = B – D)	711,122
Increase or decrease on previous year (E – F)	Decrease of 49,958 tCO <sub>2</sub> e on previous year

16. The emissions and removals data included in tables 2 to 7 are taken from the greenhouse gas emissions data published on 1 February 2011, derived from the UK's 1990-2009 national emissions inventory. The methodologies used to calculate and compile these data is in line with UNFCCC reporting guidelines on annual inventories. These methods include emissions factors (country specific, plant specific and the default emissions

factors used under the international framework), as well as emissions and production data reported by operators and regulators, and modelling.<sup>10</sup>

### 1.3 UK emissions totals

#### *Section 16(3) of the Climate Change Act*

17. Table 8 sets out the aggregate amount of UK emissions, UK removals and net UK emissions for each gas in 2009, taken from the tables above.

**Table 8: Aggregate 2009 UK greenhouse gas emissions, removals and net UK emissions, tCO<sub>2</sub>e**

	UK emissions (A)	UK removals (B) <sup>11</sup>	Net UK emissions (A – B)
<b>Carbon dioxide</b>	476,950,462	4,789,456	472,161,006
<b>Methane</b>	43,418,963	-29,536	43,448,499
<b>Nitrous oxide</b>	33,883,641	-637,515	34,521,156
<b>Hydrofluorocarbons</b>	10,846,283	0	10,846,283
<b>Perfluorocarbons</b>	147,073	0	147,073
<b>Sulphur hexafluoride</b>	661,165	0	661,165
<b>TOTAL<sup>12</sup></b>	<b>565,907,586</b>	<b>4,122,405</b>	<b>561,785,181</b>

### 1.4 Change of method

#### *Section 16(4) of the Climate Change Act*

18. The UK's greenhouse gas inventory is compiled in line with international guidance from the International Panel on Climate Change<sup>13</sup> (IPCC). Each year the inventory is updated to include the latest data available. Methodological changes are made to take account of

<sup>10</sup> Further details on the methods used in specific sectors are set out in table 12 of the data tables published alongside the final 2009 emissions data, available from:  
[http://www.decc.gov.uk/en/content/cms/statistics/climate\\_change/gg\\_emissions/uk\\_emissions/2009\\_final/2009\\_final.aspx](http://www.decc.gov.uk/en/content/cms/statistics/climate_change/gg_emissions/uk_emissions/2009_final/2009_final.aspx)

<sup>11</sup> A positive amount means the net effect is the removal of emissions from the atmosphere from these carbon sinks, while a negative figure means the net effect is emissions to the atmosphere from the carbon sink.

<sup>12</sup> Figures may not sum due to rounding.

<sup>13</sup> Further details on IPCC guidance is available from: [www.ipcc-nngip.iges.or.jp](http://www.ipcc-nngip.iges.or.jp)

new data sources, or new guidance from the IPCC, relevant work by CORINAIR<sup>14</sup>, and new research, sponsored by DECC or otherwise. Improvements to the methodology are backdated as necessary to ensure a consistent time series. The United Kingdom's National Inventory Report<sup>15</sup> (NIR), which is submitted each year to the United Nations Framework Convention on Climate Change (UNFCCC), provides details of the methods used to estimate emissions.

19. Emission inventories will always have some uncertainty. It is not possible to measure directly all the emissions from a country, so inventories are largely based on statistical activity data as well as on emission factors<sup>16</sup>, both of which are subject to uncertainty. The UK GHG Inventory assesses uncertainties according to internationally agreed good practice guidance<sup>17</sup>, and this uncertainty information helps prioritise efforts to improve the accuracy of inventories in the future and guide decisions on methodological choice. The uncertainty analysis provides us with a high confidence that UK emissions of GHGs have declined since 1990. The uncertainty associated with current estimates of emissions of carbon dioxide (CO<sub>2</sub>) is small, at approximately 2%. The uncertainty associated with the emissions of the other five Kyoto gases is higher, and so uncertainty for the basket of Kyoto GHG's is roughly 17%<sup>18</sup>.
20. To ensure transparency and credibility in carbon budgets reporting, it is important that any methodological changes to greenhouse gas reporting – made in accordance with international practice - are clearly stated. Section 16(4) of the Climate Change Act requires that, where a change in methodology at the international level requires an adjustment in the emissions figures for an earlier year in the same budgetary period, the annual statement of emissions must specify the adjustment required and state the adjusted amount.
21. In preparing the 2009 emissions inventory, a number of revisions were made to the figures previously reported for earlier years, to take account of new methodologies which have been applied in respect of a number of specific sectors. These methodologies have been introduced in accordance with international reporting guidelines, and the revised figures will be included in our submission to the UNFCCC and the European Commission.
22. The tables below provides details of the most significant of these revisions, together with a summary of the overall impact of all revisions on the 2008 and base-year figures:
  - Estimates of methane emissions from the waste management sector were revised following a review of the data and assumptions used in the landfill methane emissions

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<sup>14</sup> The air pollutant emission inventory guidebook, which provides guidance on estimating emissions from both anthropogenic and natural emission sources, is available from: <http://www.eea.europa.eu/publications/emep-eea-emission-inventory-guidebook-2009>

<sup>15</sup> Further details on how the UK's greenhouse gas inventory is compiled can be accessed from: [http://decc.gov.uk/en/content/cms/statistics/climate\\_change/gg\\_emissions/intro/intro.aspx](http://decc.gov.uk/en/content/cms/statistics/climate_change/gg_emissions/intro/intro.aspx)

<sup>16</sup> The emission factor is the emissions per unit of activity. Emission factors are typically derived from measurements on a number of representative sources and the resulting factor applied to all similar sources in the UK.

<sup>17</sup> Intergovernmental Panel on Climate Change guidelines, as adopted by the UNFCCC.

<sup>18</sup> Uncertainties relate to emissions for 2009. For further information, see annex 7:

[http://cdr.eionet.europa.eu/gb/eu/ghgmm/envtx\\_tmq/ukghgi-90-09\\_Annexes\\_issue1.docx/manage\\_document](http://cdr.eionet.europa.eu/gb/eu/ghgmm/envtx_tmq/ukghgi-90-09_Annexes_issue1.docx/manage_document)

model, and these emissions are now lower than previously estimated for 2008 and higher for the base year.

- Estimates of emissions from domestic shipping have been revised following improvements to the methodology. The improved method now uses information on ship characteristics and ship movements within waters surrounding the UK to estimate fuel use and emissions for domestic shipping. This is deemed by sector experts to provide a more realistic estimate of domestic shipping emissions than the previous method. These emissions are now lower than previously estimated for 2008 and the base year.
- There has been a change in estimated removals of CO<sub>2</sub> from the atmosphere for the land use, land use change and forestry (LULUCF) sector, due to the use of new data from the 2007 Countryside Survey, which supersedes the previous Countryside Survey from 1998, and consequently net emissions from this sector are now lower than previously estimated for 2008 but higher for the base year.

Sector	2008 emissions as reported in the 2008 inventory (tCO <sub>2</sub> e)	2008 emissions as reported in the 2009 inventory (tCO <sub>2</sub> e)	Change in emissions reported for 2008 (tCO <sub>2</sub> e) <sup>B</sup>
Waste Management <sup>A</sup>	20,150,082	16,366,096	-3,783,987
Domestic shipping	5,394,809	1,610,587	-3,784,223
LULUCF	-1,941,918	-4,005,321	-2,063,403
Other sectors	602,438,325	601,987,873	-450,452
Total emissions	626,041,299	615,959,234	-10,082,064

A. Emissions relate only to landfill methane emissions from the Waste Management sector

B. The difference between emissions estimated from the 2008 and 2009 inventories may not equal the change in emissions reported column due to rounding.

Sector	Base year emissions as reported in the 2008 inventory (tCO <sub>2</sub> e)	Base year emissions as reported in the 2009 inventory (tCO <sub>2</sub> e)	Change in emissions reported for the base year (tCO <sub>2</sub> e) <sup>B</sup>
Waste Management <sup>A</sup>	49,625,408	56,002,143	6,376,734
Domestic shipping	4,144,662	1,763,887	-2,380,775
LULUCF	2,953,898	3,876,269	922,371
Other sectors	721,096,279	721,467,767	371,489
Total emissions	777,820,247	783,110,066	5,289,819

23. In the Government's response to the consultation on carbon units, the net UK carbon account and carbon accounting, which ran from October 2008 to January 2009,<sup>19</sup> we stated that any adjustment required would be made at the end of the budgetary period. The rationale here is to minimise any potential confusion caused by making retrospective adjustments to already published figures in respect of the net UK carbon account for an individual year, particularly as several changes could be required in the course of a budget period.

24. For the sake of transparency, the table below shows an revised level of the net UK carbon account for 2008, in comparison to the figure published in the Annual Statement of Emissions for 2008. However, any future changes in method in subsequent years of the first carbon budget period will require further adjustments to this figure, and it should be noted that final adjustments to the net UK carbon account for 2008 (and subsequent years) will be made in the final statement for the period, to be published in 2014.

	2008 (tCO <sub>2</sub> e)
2008 net UK carbon account as reported in 2008 Annual Statement	606,730,574
2008 net UK carbon account using 2009 inventory methodology	596,648,509
Change	-10,082,064

## 1.5 International aviation and shipping

### Section 16(5) of the Climate Change Act

25. Estimates of emissions from domestic shipping have been revised following improvements to the methodology. The improved method now uses information on ship characteristics and ship movements within waters surrounding the UK to estimate fuel use and emissions for domestic shipping. This is deemed by sector experts to provide a more realistic estimate of domestic shipping emissions than the previous method. These emissions are now lower than previously estimated for 2008 and the base year

26. Emissions from international aviation and international shipping can be estimated from refuelling from bunkers at UK airports and ports, whether by UK or non-UK operators. Under the reporting guidelines agreed by the UNFCCC, these emissions are not included in the UK's emissions total, but are reported as memo items in the national greenhouse gas inventory. Table 9 below shows greenhouse gas emissions from these sources in 2009. Since the methodology of calculating total UK shipping emissions remains unchanged, the impact of the change in methodology for domestic shipping, is that international shipping emissions have increased by the same amount that domestic shipping decreased by. For more information on the methodological change to domestic shipping, see paragraph 22. Emissions from international shipping, which are not included in the net UK carbon account, are now higher than previously estimated for 2008 and the base year due to changes in the inventory methodology.

**Table 9: Greenhouse gas emissions from UK-based<sup>20</sup> international aviation and shipping bunkers in 2009, tCO<sub>2</sub>e**

<b>International aviation total</b>	<b>33,230,057</b>
Carbon dioxide	32,904,195
Methane	2,021

<sup>20</sup> This differs slightly from the carbon budgets coverage as under the UNFCCC we report emissions from UK-based aviation and shipping bunkers in the UK, Jersey, Guernsey and the Isle of Man.

Nitrous oxide	323,842
<b>International shipping total</b>	<b>10,571,828</b>
Carbon dioxide	10,487,434
Methane	3,428
Nitrous oxide	80,966
<b>TOTAL</b>	<b>43,801,885</b>

# Part 2 – the net UK carbon account

27. This part sets out the amount of units which are to be credited to and debited from the net UK carbon account in 2009. The calculations in this part of the statement are based on the methodologies established by the Carbon Accounting Regulations 2009 and the Carbon Accounting (Amendment) Regulations 2009.<sup>21</sup>

## 2.1 Total amount of units credited to and debited from the net UK carbon account

*Section 16(6) of the Climate Change Act*

28. As described above, the net UK carbon account for a given year is calculated by taking net UK emissions for that year, with an adjustment made to reflect the amount of units to be credited to, and debited from, the net UK account for that year. Carbon units that are counted as credits reduce the level of the net UK carbon account, while carbon units that are counted as debits increase the level of the net UK carbon account.

29. The amounts of units to be counted as credits and debits in respect of 2009 are calculated based on the methodology set out in the Carbon Accounting Regulations 2009 and Carbon Accounting (Amendment) Regulations 2009. There are three elements to consider:

- The amount of units in the credit account which have been declared as credits to the net UK carbon account in respect of 2009 (*regulations 4 and 5*);
- The effect of the EU Emissions Trading System (EU ETS) (*regulation 6, as amended*); and
- Determining whether the Government disposed of any carbon units during the course of 2008 (*regulation 7*).

30. The types of units which may be counted as credits or debits are listed in regulation 3 of the Carbon Accounting Regulations 2009.

### 2.1.1 Units in the credit account

31. Regulations 4 and 5 of the Carbon Accounting Regulations 2009 establish the mechanism by which units may be counted as credits towards carbon budgets.

32. Regulation 4 requires the Government to open a “credit account” in the UK Registry. The Registry is the system set up in the UK to administer the carbon accounting system under the existing EU and UN frameworks, recording the issuance, transfer, cancellation, retirement and banking of carbon units.

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<sup>21</sup> The Carbon Accounting Regulations 2009 (SI 2009 No. 1257) were amended in December 2009 by the Carbon Accounting (Amendment) Regulations 2009 (SI 2009 No. 3146) to correct a minor error regarding the total amount of allowances allocated to UK installations under the EU Emissions Trading System. The original and amended regulations are available from [www.opsi.gov.uk/si/si2009/uksi\\_20091257\\_en\\_1](http://www.opsi.gov.uk/si/si2009/uksi_20091257_en_1) and [www.opsi.gov.uk/si/si2009/uksi\\_20093146\\_en\\_1](http://www.opsi.gov.uk/si/si2009/uksi_20093146_en_1) respectively. Guidance for stakeholders on the carbon accounting rules is available on the DECC website: [www.decc.gov.uk/en/content/cms/what\\_we\\_do/lc\\_uk/carbon\\_budgets/carbon\\_budgets.aspx](http://www.decc.gov.uk/en/content/cms/what_we_do/lc_uk/carbon_budgets/carbon_budgets.aspx).

33. The credit account, which was created in the UK Registry in October 2009, is the dedicated route through which carbon units can be credited voluntarily to the net UK carbon account. Regulation 4 establishes a mechanism for returning carbon units which have been transferred into the credit account in error to the account from which they were originally transferred. Any other carbon units can only be removed from the credit account in order to be cancelled – this fulfils the requirement in Section 27(4) of the Act that units counted as credits cannot be used to offset any other emissions.
34. Regulation 5 sets out the process by which carbon units may be counted as credits. In short, any person may transfer carbon units to the credit account but they will only be counted as credits towards the net UK carbon account if a UK Minister makes a declaration to that effect. Where a declaration is not made in respect of a unit in the credit account, the unit may not be counted as a credit.
35. To date no units have been declared as credits towards the net UK carbon account, which means that, in respect of 2009, **0 units are to be credited to the net UK carbon account under this mechanism.**

### 2.1.2 Accounting for the EU Emissions Trading System (EU ETS)

36. The EU ETS operates as a cap and trade system, which means that operators of installations subject to the system are given an allocation of emissions allowances each year. The total amount of allowances issued caps the level of emissions allowed by installations across the EU. Each year, operators must surrender (i.e. give back) allowances equal to their emissions for that year. If their emissions are higher than their allocation for that year then they need to procure additional allowances to cover the higher emissions, either from other operators in the UK or EU who have a surplus of allowances, or by investing in projects which reduce emissions outside the EU under the Kyoto Protocol's Clean Development Mechanism (CDM) or Joint Implementation (JI).<sup>22</sup> If an operator's emissions are lower than their allocation for that year then they will be left with surplus allowances which they may sell to others or keep for use in future years.
37. Regulation 6, as amended by the Carbon Accounting (Amendment) Regulations 2009, establishes the mechanism to account for credits and debits as a result of the operation of the EU ETS during the first budgetary period (which coincides with the second phase of the EU ETS). Under this mechanism, at the end of the first budget, the contribution of the EU ETS towards the net UK carbon account will correspond to the level of the UK's cap under the system.
38. During the budgetary period, if operators of EU ETS installations in the UK collectively exceed the UK cap, the amount of emissions in excess of the cap must be considered as a credit, as operators must have bought units from overseas to cover these emissions. If on the other hand operators in the UK collectively reduce their emissions below the UK cap, then the difference between reported emissions from the EU ETS sector and the cap must be considered a debit, as operators must have either sold excess units or retained them for use in future periods.

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<sup>22</sup> Credits generated by CDM projects are known as Certified Emission Reductions (CERs), while those generated by JI projects are known as Emission Reduction Units (ERUs).

39. In order to determine whether units should be credited to or debited from the net UK carbon account in each year, the number of allowances surrendered is compared with “the annual allocation”.
40. The starting point for calculating the annual allocation is the total amount of allowances to be allocated by the UK in the period 2008-2012, whether for free, by auction/sale or via the new entrant reserve (a total of 1,228,109,497 allowances), less those allowances relating to installations in Gibraltar, which are not covered by the Act (941,956 allowances). This gives 1,227,167,541 allowances as the total UK allocation for the first budgetary period, which is then divided between the years of the period as set out in Table 10.

**Table 10: Annual allocation of EU ETS allowances, under section 6 of the Carbon Accounting (Amendment) Regulations 2009**

Year	Annual allocation <sup>23</sup>
2008	245,991,207
2009	245,294,083
2010	245,294,083
2011	245,294,084
2012	245,294,084
<b>TOTAL</b>	<b>1,227,167,541</b>

41. Table 11 sets out the effect of the EU ETS on the net UK carbon account in 2009.

**Table 11: The effect of the EU ETS on the net UK carbon account in 2009**

<b>Total amount of units surrendered by UK operators (A)</b> Comprised of: EU allowances (EUAs) Certified Emission Reductions (CERs) Emission Reduction Units (ERUs)	<b>231,799,466</b>  226,745,349 4,839,117 215,000
<b>UK's EU ETS annual allocation for 2009 (B)</b>	<b>245,294,083</b>
<b>Difference between 2009 annual allocation and amount of units surrendered (A – B)</b>	<b>- 13,494,617</b>

<sup>23</sup> The annual allocation for 2008 is the same as the incorrect number contained in the original regulations, and higher than in subsequent years, because the regulations could not be amended with retrospective effect. The allocations for 2009 and 2010, and 2011 and 2012, are different (by one unit) because allocations must be a whole number and the total allocation for 2009 to 2012 is not divisible by four.

42. As the amount of units surrendered by UK operators was less than the annual allocation for 2009, a corresponding amount of units must be counted as debits. This means **13,494,617 units are to be debited to the net UK carbon account in 2009 as a result of the EU ETS**. This is made up of the following types of carbon units:

- 4,839,117 CERs;
- 215,000 ERUs; and
- 8,440,500 EUAs.

### 2.1.3 Disposal of units

43. Regulation 7 of the Carbon Accounting Regulations 2009 establishes the mechanism for calculating whether an amount of units is to be debited in each year. Debits arise where Government disposes of carbon units, for example by selling them to another country or other third party. These units must be debited, and the net UK carbon account increased accordingly, as the recipient can use the units to offset their own emissions and it would lead to double counting if they were also available to offset UK emissions.

44. To ensure we are able to calculate in each year the amount of units which must be debited, regulation 7 requires that at the end of each year we compare “the UK holding of carbon units” in that year with what “the UK holding of carbon units” was in the previous year.

45. “The UK holding of carbon units” is defined as the amount of units held in the following UK Registry accounts:

- the Party Holding Account in the UK Registry where the UK’s Assigned Amount Units (AAUs) issued under the Kyoto Protocol were initially issued; and
- the UK’s national retirement account, where the UK retires AAUs annually in accordance with Kyoto Protocol obligations.

46. The holding is also deemed to include the total UK allocation under the EU ETS, regardless of where these are held at the time, as these units are simply UK AAUs which have been converted into EU allowances (EUAs), the EU ETS “currency”.

47. If the UK holding of carbon units is less than it was at the end of the previous year, and if it is also below the original allocation of units given to the UK under the Kyoto Protocol (less an amount representing the allocation to the UK’s Crown Dependencies and Overseas Territories, which are not covered by the Act),<sup>24</sup> this means we must have disposed of units in the meantime. The units will be debited from the net UK carbon account to reflect this.

48. In 2009, the UK’s holding of carbon units was greater than the relevant share of the UK assigned amount, which means there is no requirement to debit an amount of carbon units from the net UK carbon account. This calculation is set out in table 12.

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<sup>24</sup> The original allocation of units given to the UK under the Kyoto Protocol, less an amount representing the allocation to the UK’s Crown Dependencies and Overseas Territories, is defined as “the relevant share of the UK assigned amount”.

**Table 12: Calculation for determining whether an amount of units must be debited in respect of 2009**

<b>UK holding of carbon units on 31 December 2009</b>	<b>3,411,138,674</b>
Comprised of:	
Units in issuance account	2,183,971,133
Units in surrender account	0
Total UK EU ETS allocation	1,227,167,541
<b>Relevant share of the UK assigned amount</b>	<b>3,395,954,499</b>

49. As the UK holding of carbon units in 2009 is greater than the relevant share of the UK assigned amount, **0 units are to be debited from the net UK carbon account as a result of the disposal of carbon units.**

## 2.2 Net UK carbon account for the year

### *Section 16(7) of the Climate Change Act*

50. As described above, the net UK carbon account is calculated by taking net UK emissions, which are then adjusted to account for the amount of units to be debited from and credited to the net UK carbon account.

51. The information in table 13 is taken from preceding tables in this report and provides an amount for the net UK carbon account in 2009.

**Table 13: Summary of how the net UK carbon account for 2009 is calculated**

2009 net UK emissions – see table 8 (A)	561,785,181
Amount of units to be credited – see paragraph 35 (B)	0
Amount of units to be debited – see paragraphs 42 and 49 (C)	13,494,617
<b>2009 Net UK carbon account, tCO<sub>2</sub>e (A – B + C)</b>	<b>575,279,798</b>

52. Under the Climate Change Act, the Government is required to meet the carbon budget over the five year period, and there is no requirement to meet specific emissions levels in a given year.<sup>25</sup> This is to allow for unexpected changes in emissions due to reasons outside of Government control. However the Government is required, under section 12 of the Act, to publish indicative annual ranges showing where it expects the net UK carbon account to fall in each year of the budgetary period.

<sup>25</sup> With the exception of 2020 and 2050.

53. Indicative annual ranges for the first three carbon budgets were published in July 2009.<sup>26</sup> This showed the indicative annual range for the net UK carbon account in 2009 is 579 MtCO<sub>2</sub>e to 616 MtCO<sub>2</sub>e. The net UK carbon account for 2009 is therefore below the

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<sup>26</sup> See annex A at [www.decc.gov.uk/en/content/cms/publications/lc\\_trans\\_plan/lc\\_trans\\_plan.aspx](http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx)



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