

Annual Statement of Emissions for 2011

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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 fourth 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 2011. 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 sinks¹). 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 2011, net UK emissions were 549.2 million tonnes of carbon dioxide-equivalent (MtCO₂e). This is 41 MtCO₂e (or just under 7%) below net UK emissions in 2010. However, 24.9 MtCO₂e worth of carbon units were sold in 2011 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 2011 was around 573.9 MtCO₂e**. This is nearly 26% below base year emissions, which were 774.3 MtCO₂e. The net UK carbon account decreased by 4% between 2010 and 2011. This decrease in emissions between 2010 and 2011 resulted primarily from a decrease in residential gas use. Residential emissions are heavily influenced by external temperatures, and 2011 was a warmer than average year. However, a reduction in demand for electricity and greater use of nuclear power for electricity generation also contributed to the overall decrease in emissions. The technical problems observed at some nuclear power stations in 2010 were resolved in 2011 leading to greater nuclear capacity.

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 which is next year for the first carbon budget.

¹ 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.”

Introduction

1. The Climate Change Act 2008 introduced a legally binding target to reduce greenhouse gas emissions by at least 80% below the 1990 baseline² 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. The level of the fourth carbon budget was set in law, following approval by Parliament at the end of June 2011, as required under the Act. The level is set at 1,950 MtCO₂e, in line with the Committee on Climate Change’s recommendation.
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.
5. International aviation and shipping emissions are not currently included within the 2050 target as defined by the Act, or within the four carbon budgets that have been set. Existing carbon budgets out to 2027 have already been set to leave headroom for international aviation and shipping emissions, putting us on a trajectory which could be consistent with a 2050 target that includes a share of international aviation and shipping emissions and aligns with the UK’s share of the international goal of limiting global temperature rises due to climate change to 2°C. Therefore, international aviation and shipping emissions are not currently included within the “net UK carbon account”.

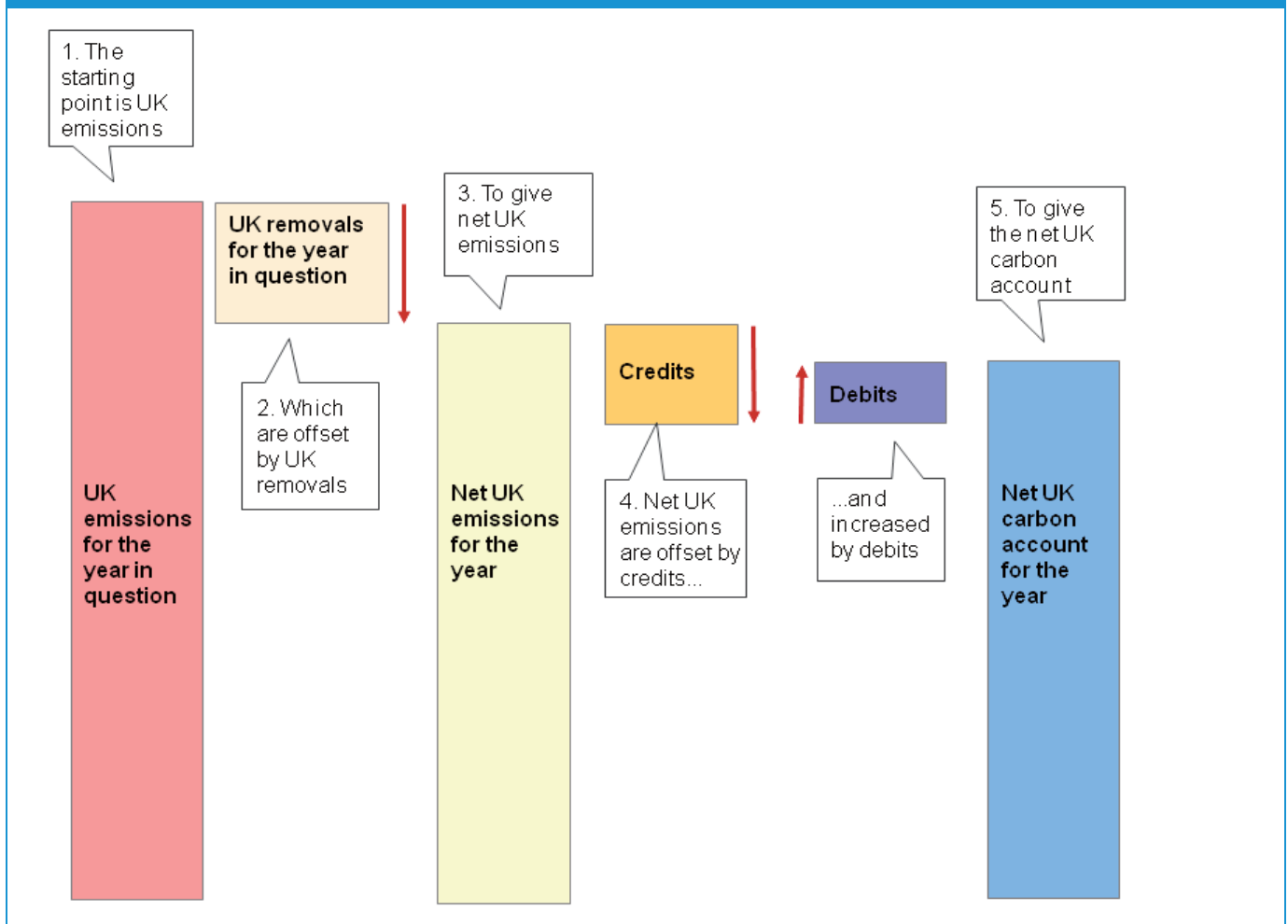
Calculating the net UK carbon account

6. 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.

² ‘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.

7. 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 annually³. These emissions comprise aggregate gross emissions from sources in the UK, including emissions from land use, land use change and forestry (LULUCF), which are then adjusted to take into account removals of emissions from the atmosphere by carbon sinks associated with LULUCF activity.
8. 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



³ The final 2011 estimates of UK greenhouse gas emissions were published on 5 February 2013. See: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/73148/050213_Ghg_National_Statistics_release__2011_final_results_.pdf

Structure of the report

9. This report contains two sections:

- **Part 1** provides UK greenhouse gas emissions statistics for 2011, 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 2011. 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 2009⁴.

⁴ SI 2009 No. 1257 and SI 2009 No. 3146, respectively, available from:
www.opsi.gov.uk/si/si2009/uksi_20091257_en_1 and www.opsi.gov.uk/si/si2009/uksi_20093146_en_1

Part 1 – UK greenhouse gas emissions

1. The information contained in this part of the statement is derived from the UK greenhouse gas emissions statistics for 2011, which were published on 5 February 2013. Emissions coverage under the Climate Change Act 2008 comprises UK territory only (i.e. England, Wales, Scotland and Northern Ireland)⁵.
2. Unless otherwise stated, all figures in this section are stated in tonnes of carbon dioxide-equivalent (tCO₂e). 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

3. 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 1990-2011 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.
4. It should be noted that the base year figures differ from those in the Annual Statement of Emissions for 2010. This is owing to changes in the historical time series of emissions data back to 1990 in the most recent inventory report (February 2013). See section 1.4 for more details.

⁵ 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, tCO₂e

Greenhouse gas	Base year	Net base year emissions
Carbon dioxide CO ₂	1990	590,522,357
Methane CH ₄		98,619,573
Nitrous oxide N ₂ O		68,164,665
Hydrofluorocarbons HFCs	1995	15,316,751
Perfluorocarbons PFCs		461,669
Sulphur hexafluoride SF ₆		1,239,300
TOTAL ⁶		774,324,315

1.2 2011 emissions by gas

Section 16(2) of the Climate Change Act

5. 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 2011 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.
6. It should be noted that the emissions estimates for 2010 reported in this statement differ from last year's statement owing to changes in the historical time series of emissions data back to 1990 in the most recent inventory report (published in February 2013). See section 1.4 for more details.
7. Section 16 also requires that the annual statement includes details of the methods used to measure or calculate those amounts, and this is set out in paragraph 14.

⁶ Figures may not sum due to rounding.

Table 2: Carbon dioxide (CO₂) emissions, tCO₂e	
2011 UK CO₂ emissions (A)	461,039,674
2010 UK CO ₂ emissions (B)	500,638,156
Increase or decrease on previous year (A – B)	Decrease of 39,598,482 tCO ₂ e on previous year
2011 UK CO₂ removals⁷(C)	3,835,587
2010 UK CO ₂ removals ⁸ (D)	4,217,493
Increase or decrease on previous year (C – D)	Decrease of 381,906 tCO ₂ e on previous year
2011 net UK CO₂ emissions (E = A – C)	457,204,087
2010 net UK CO ₂ emissions (F = B – D)	496,420,663
Increase or decrease on previous year (E – F)	Decrease of 39,216,576 tCO ₂ e on previous year

Table 3: Methane (CH₄) emissions, tCO₂e	
2011 UK CH₄ emissions (A)	41,713,069
2010 UK CH ₄ emissions (B)	42,662,277
Increase or decrease on previous year (A – B)	Decrease of 949,208 tCO ₂ e on previous year
2011 UK CH₄ removals⁸ (C)	-28,498
2010 UK CH ₄ removals ⁸ (D)	-24,570
Increase or decrease on previous year (C – D)	Decrease of 3,927 tCO ₂ e on previous year
2011 net UK CH₄ emissions (E = A – C)	41,741,567
2010 net UK CH ₄ emissions (F = B – D)	42,686,847
Increase or decrease on previous year (E – F)	Decrease of 945,280 tCO ₂ e on previous year

⁷ 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 (N₂O) emissions, tCO₂e	
2011 UK N₂O emissions (A)	34,102,538
2010 UK N ₂ O emissions (B)	35,181,444
Increase or decrease on previous year (A – B)	Decrease of 1,078,906 tCO ₂ e on previous year
2011 UK N₂O removals⁸ (C)	-591,148
2010 UK N ₂ O removals ⁸ (D)	-617,026
Increase or decrease on previous year (C – D)	Increase of 25,878 tCO ₂ e on previous year
2011 net UK N₂O emissions (E = A – C)	34,693,686
2010 net UK N ₂ O emissions (F = B – D)	35,798,470
Increase or decrease on previous year (E – F)	Decrease of 1,104,784 tCO ₂ e on previous year

Table 5: Hydrofluorocarbon (HFC) emissions, tCO₂e	
2011 UK HFC emissions (A)	14,492,753
2010 UK HFC emissions (B)	14,228,381
Increase or decrease on previous year (A – B)	Increase of 264,373 tCO ₂ e on previous year
2011 UK HFC removals⁸ (C)	0
2010 UK HFC removals ⁹ (D)	0
Increase or decrease on previous year (C – D)	n/a
2011 net UK HFC emissions (E = A – C)	14,492,753
2010 net UK HFC emissions (F = B – D)	14,228,381
Increase or decrease on previous year (E – F)	Increase of 264,373 tCO ₂ e on previous year

⁸ Removals of greenhouse gas from the atmosphere do not apply to HFCs, PFCs or SF₆.

Table 6: Perfluorocarbon (PFC) emissions, tCO₂e	
2011 UK PFC emissions (A)	325,308
2010 UK PFC emissions (B)	220,622
Increase or decrease on previous year (A – B)	Increase of 104,686 tCO ₂ e on previous year
2011 UK PFC removals⁹ (C)	0
2010 UK PFC removals ⁹ (D)	0
Increase or decrease on previous year (C – D)	n/a
2011 net UK PFC emissions (E = A – C)	325,308
2010 net UK PFC emissions (F = B – D)	220,622
Increase or decrease on previous year (E – F)	Increase of 104,686 tCO ₂ e on previous year

Table 7: Sulphur hexafluoride (SF₆) emissions, tCO₂e	
2011 UK SF₆ emissions (A)	607,243
2010 UK SF ₆ emissions (B)	689,349
Increase or decrease on previous year (A – B)	Decrease of 82,107 tCO ₂ e on previous year
2011 UK SF₆ removals⁹ (C)	0
2010 UK SF ₆ removals ⁹ (D)	0
Increase or decrease on previous year (C – D)	n/a
2011 net UK SF₆ emissions (E = A – C)	607,243
2010 net UK SF ₆ emissions (F = B – D)	689,349
Increase or decrease on previous year (E – F)	Decrease of 82,107 tCO ₂ e on previous year

8. The emissions and removals data included in tables 2 to 7 are taken from the greenhouse gas emissions data published on 5 February 2013, derived from the UK's 1990-2011 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 modelling⁹.

1.3 UK emissions totals

Section 16(3) of the Climate Change Act

9. Table 8 sets out the aggregate amount of UK emissions, UK removals and net UK emissions for each gas in 2011, taken from the tables above.

Table 8: Aggregate 2011 UK greenhouse gas emissions, removals and net UK emissions, tCO₂e			
	UK emissions (A)	UK removals (B)¹⁰	Net UK emissions (A – B)
Carbon dioxide	461,039,674	3,835,587	457,204,087
Methane	41,713,069	-28,498	41,741,567
Nitrous oxide	34,102,538	-591,148	34,693,686
Hydrofluorocarbons	14,492,753	0	14,492,753
Perfluorocarbons	325,308	0	325,308
Sulphur hexafluoride	607,243	0	607,243
TOTAL¹¹	552,280,586	3,215,942	549,064,644

1.4 Change of method

Section 16(4) of the Climate Change Act

10. The UK's greenhouse gas inventory is compiled in line with international guidance from the International Panel on Climate Change¹² (IPCC). Each year the inventory is updated to include the latest data available. Methodological changes are made to take account of

⁹ Further details on the methods used in specific sectors are set out in table 12 of the data tables published alongside the final 2011 emissions data, available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/73148/050213_Ghg_National_Statistical_Release_2011_Final_Results.pdf

¹⁰ 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.

¹¹ Figures may not sum due to rounding.

¹² Further details on IPCC guidance is available from: www.ipcc-nggip.iges.or.jp

new data sources, or new guidance from the IPCC, relevant work by CORINAIR¹³, 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 Report¹⁴ (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.

11. 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 factors¹⁵, both of which are subject to uncertainty. The UK Greenhouse Gas Inventory assesses uncertainties according to internationally agreed good practice guidance¹⁶, 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 greenhouse gases have declined since 1990. The uncertainty associated with estimates of emissions of carbon dioxide (CO₂) is small, at approximately 2%, based on 2010 emissions data. The uncertainty associated with the emissions of the other five Kyoto gases is higher, and so uncertainty for the basket of Kyoto gases is roughly 16%¹⁷.
12. 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.
13. In preparing the 2011 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. It should also be noted that the UNFCCC reviewed the UK inventory in 2012 and this led to a number of changes to the emissions estimates.
14. The tables below provide details of the most significant of these revisions, together with a summary of the overall impact of all revisions on the 2010 and base-year figures:

¹³ 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>

¹⁴ Further details on how the UK's greenhouse gas inventory is compiled can be accessed from: www.gov.uk/government/organisations/department-of-energy-climate-change/series/uk-greenhouse-gas-emissions

¹⁵ 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.

¹⁶ Intergovernmental Panel on Climate Change guidelines, as adopted by the UNFCCC.

¹⁷ Uncertainties relate to emissions for 2010 – uncertainties based on 2011 data are expected to be available towards the end of March 2013. For further information, see annex 7: http://cdr.eionet.europa.eu/gb/eu/ghgmm/envtx_tmq/ukghgi-90-09_Annexes_issue1.docx/manage_document

- Estimates of carbon dioxide emissions from industrial combustion, within the business sector, were revised in respect of the use other petroleum gas at UK petrochemical plants. The 2012 UNFCCC review of the UK inventory concluded that the emissions estimates in the chemical category were underestimated across the whole time series from 1990 onwards, due to emissions estimates having only been included for some, but not all, UK petrochemical plants. These emissions estimates are now higher than previously estimated across the entire time series.
- Estimates of carbon dioxide emissions from road transport have been revised to reflect new data now available for vehicle kilometres travelled on minor roads, together with other changes to the underlying petrol and diesel consumption data from the Digest of UK Energy Statistics (DUKES). These emissions are now lower than previously estimated for all years from 2000 onwards.
- Finally, there were revisions to the estimates of methane emissions from industrial waste-water handling, within the waste management sector. The 2012 UNFCCC review of the UK inventory concluded that our emissions estimates in this category were underestimated across the whole time series from 1990 onwards, due to a lack of transparency around whether emissions had been adequately reported. Our emissions estimates for this source have now been revised upwards across the entire time series.

Sector	2010 emissions as reported in the 2010 inventory (tCO ₂ e)	2010 emissions as reported in the 2011 inventory (tCO ₂ e)	Change in emissions reported for 2010 (tCO ₂ e)
Other industrial combustion (not including iron and steel)	53,615,396	57,133,149	3,517,754
Passenger cars	111,572,725	109,893,088	-1,679,637
Waste-water handling	1,481,516	2,827,718	1,346,202
Lime production	233,705	1,134,921	901,216
Other sectors	419,349,670	419,055,454	-294,215
Total emissions	586,253,012	590,044,332	3,791,320
Sector	Base year emissions as reported in the 2010 inventory (tCO ₂ e)	Base year emissions as reported in the 2011 inventory (tCO ₂ e)	Change in emissions reported for the base year (tCO ₂ e)
Other industrial combustion	79,228,260	81,328,634	2,100,374
Passenger cars	109,659,556	109,659,485	-71
Waste-water handling	1,436,587	2,834,859	1,398,272
Lime production	1,206,414	1,435,952	229,538
Other sectors	576,060,869	575,864,618	-196,251
Total emissions	767,591,686	771,123,549	3,531,863

15. 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, 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.

16. For the sake of transparency, the table below shows a revised level of the net UK carbon account for 2010, in comparison to the figure published in the Annual Statement of Emissions for 2010. 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 2010 (and subsequent years) will be made in the final statement for the period, to be published in 2014.

	2010 (tCO ₂ e)
2010 net UK carbon account as reported in 2010 Annual Statement	593,806,166
2010 net UK carbon account based on the 2011 Emissions Inventory	597,597,486
Change	3,791,320

1.5 International aviation and shipping

Section 16(5) of the Climate Change Act

17. International aviation and shipping emissions are not currently included within the “net UK carbon account”. This is because international aviation and shipping emissions are not currently included within the 2050 target as defined by the Act, or within the four carbon budgets that have been set. Existing carbon budgets out to 2027 have already been set to leave headroom for international aviation and shipping emissions, putting us on a trajectory which could be consistent with a 2050 target that includes a share of international aviation and shipping emissions and aligns with the UK’s share of the international goal of limiting global temperature rises due to climate change to 2°C.
18. The Government laid, on 19 December 2012, a report in Parliament announcing that it has deferred making a decision on whether to include emissions from international aviation and shipping within the 2050 target and carbon budgets¹⁸.
19. Emissions from international aviation and international shipping¹⁹ 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 2011.

¹⁸ www.gov.uk/government/publications/uk-carbon-budgets-and-the-2050-target-international-aviation-and-shipping-emissions.

¹⁹ The emissions inventory reports emissions from UK-based international aviation and shipping bunkers in the UK, Jersey, Guernsey and the Isle of Man. International Aviation and Shipping is not included in carbon budgets.

Table 9: Greenhouse gas emissions from UK-based international aviation and shipping bunkers in 2011, tCO₂e

International aviation total	33,203,452
Carbon dioxide	32,877,952
Methane	1,916
Nitrous oxide	323,584
International shipping total	9,659,338
Carbon dioxide	9,582,264
Methane	3,131
Nitrous oxide	73,944
TOTAL	42,862,791

Part 2 – the net UK carbon account

20. This part sets out the amount of units which are to be credited to and debited from the net UK carbon account in 2011. 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 2009.²⁰

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

Section 16(6) of the Climate Change Act

21. 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.

22. The amounts of units to be counted as credits and debits in respect of 2011 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 2011 (*regulations 4 and 5*);
- The effect of the EU ETS (*regulation 6, as amended*); and
- Determining whether the Government disposed of any carbon units during the course of 2011 (*regulation 7*).

23. 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

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

25. 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.

²⁰ 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 and 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: http://tools.decc.gov.uk/assets/decc/consultations/carbon%20accounting/1_20091211101501_e_@@_guidancecarbonaccounting.pdf

26. 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.
27. 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.
28. To date no units have been declared as credits towards the net UK carbon account, which means that, in respect of 2011, **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)

29. 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).²¹ 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.
30. 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.
31. 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.

²¹ 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).

32. 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”.
33. 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 ²²
2008	245,991,207
2009	245,294,083
2010	245,294,083
2011	245,294,084
2012	245,294,084
TOTAL	1,227,167,541

34. Table 11 sets out the effect of the EU ETS on the net UK carbon account in 2011.

Table 11: The effect of the EU ETS on the net UK carbon account in 2011

Total amount of units surrendered by UK operators (A) Comprised of:	220,438,968
EU allowances (EUAs)	204,468,020
Certified Emission Reductions (CERs)	14,631,731
Emission Reduction Units (ERUs)	1,339,217
UK's EU ETS annual allocation for 2011 (B)	245,294,084
Difference between 2011 annual allocation and amount of units surrendered (A – B)	-24,855,116

²² 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.

35. As the amount of units surrendered by UK operators was less than the annual allocation for 2011, a corresponding amount of units must be counted as debits. This means **24,855,116 units are to be debited to the net UK carbon account in 2011 as a result of the EU ETS**. This is made up of the following types of carbon units:
- 8,884,168 EUAs;
 - 14,631,731 CERs; and
 - 1,339,217 ERUs.

2.1.3 Disposal of units

36. 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.
37. 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.
38. “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.
39. 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”.
40. 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)²³, 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.
41. In 2011, 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.

²³ 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 2011

UK holding of carbon units on 31 December 2011	3,429,463,753
Comprised of:	
Units in issuance account	2,183,971,133
Units in surrender account	734,698,495
Total UK EU ETS allocation (less allowances that have been issued in previous years)	510,794,125
Relevant share of the UK assigned amount	3,395,954,499

42. As the UK holding of carbon units in 2011 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

43. 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.

44. The information in table 13 is taken from preceding tables in this report and provides an amount for the net UK carbon account in 2011.

Table 13: Summary of how the net UK carbon account for 2011 is calculated

2011 net UK emissions – see table 8 (A)	549,064,644
Amount of units to be credited (B)	0
Amount of units to be debited (C)	24,855,116
2011 Net UK carbon account, tCO₂e ((A – B) + C)	573,919,760

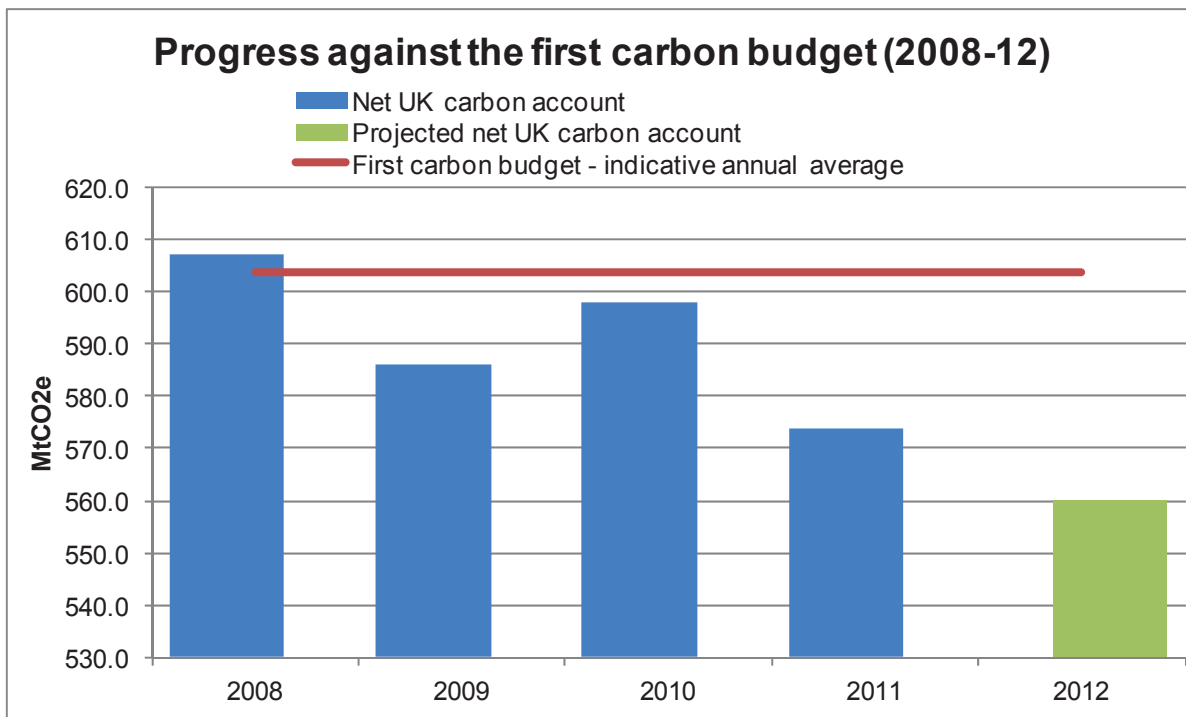
45. Under the Climate Change Act, the Government is required to meet the carbon budget over the five year period, and there is no requirement to meet specific emissions levels in a given year²⁴. This is to allow for unexpected changes in emissions due to reasons outside of Government control. However the Government is required, under section 12 of

²⁴ With the exception of 2020 and 2050.

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. The net UK carbon account for 2011 is above 561 MtCO₂e²⁵ which is the estimated figure for 2011, based on the October 2012 emissions projections.

2.3 Progress against the first carbon budget

44. The chart below summarises progress against the first carbon budget²⁶. The total net UK carbon account has so far reached 2,365 MtCO₂e over the first carbon budget which means emissions have to be below 653 MtCO₂e in 2012 if we are to meet the first carbon budget. The latest emissions projections suggest that we will be comfortably below this level (2012 = 560 MtCO₂e).



²⁵ This figure was published as part of the October 2012 emissions projections. See: <https://www.gov.uk/government/organisations/department-of-energy-climate-change/series/energy-and-emissions-projections>

²⁶ The first carbon budget covers the period 2008-12 and represents a cap on emissions of 3,018 MtCO₂e.



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