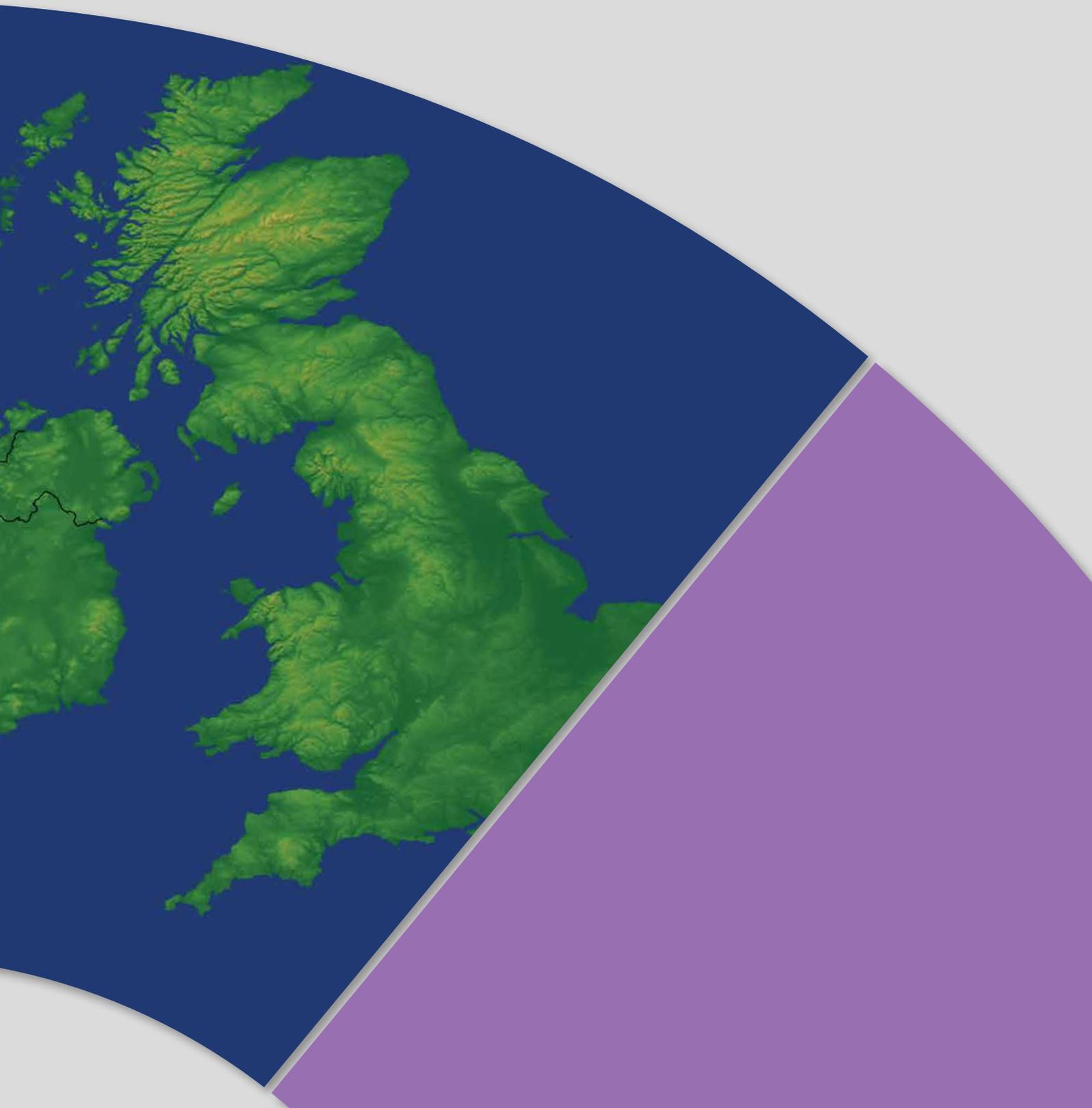


## Introduction and key messages

1. Economy-wide emissions trends and drivers
2. Non-traded sector emissions
3. Traded sector emissions
4. Government policy and strategy
5. Devolved administrations



---

# Chapter 1: Overview

## Introduction and key messages

In our previous progress reports, we showed that UK greenhouse gas emissions rose by 3% in 2010 as cold winter temperatures drove up energy demand, and then fell by 7% in 2011, in the context of warmer winter temperatures, low economic growth and rising fuel prices.

In this chapter we provide a high-level overview of emissions trends in 2012; we adjust emissions figures to allow for colder winter temperatures; we consider whether underlying progress is sufficient to meet carbon budgets; and we summarise key challenges in developing and implementing new policies. We first present analysis for the economy as a whole, then disaggregate to non-traded and traded sector emissions, and within this to specific sectors. Our key messages are:

- **Economy-wide emissions** increased by 3.5% to 570 MtCO<sub>2</sub>e in 2012, in the context of low economic growth and high oil and gas prices, but also cold winter temperatures and a gas-to-coal switch in the power sector driven by low coal prices. Without the cold winter temperatures the increase in greenhouse gas emissions would have been around 2%, and without the gas-to-coal switch greenhouse gas emissions would have decreased by 1-1.5%. Despite 2012 emissions remaining below the level of the first carbon budget (which was set before the full impact of the recession had occurred), such a rate of underlying progress would be insufficient to meet the third and fourth carbon budgets, which will require annual emissions reductions of around 3%.
- **Non-traded sector emissions** rose by 2.7% in 2012 to 339 MtCO<sub>2</sub>e. Without the temporary impacts of the cold winter temperatures, emissions would have been broadly flat. Against a relatively low level of ambition, progress in delivering measures to reduce emissions was mixed, with good progress in insulation of lofts and cavity walls, and emissions intensity of new cars, but very limited progress in solid wall insulation, low-carbon heat and energy efficiency improvement in commercial and industrial sectors.
- **Traded sector emissions** increased 5% to 231 MtCO<sub>2</sub>e, driven mainly by an increase in emissions from power, but remained 47 MtCO<sub>2</sub>e below the traded sector cap across the budget period. Emissions intensity of generation rose by 10% due to increased use of coal-fired generation in place of gas. The increase in emissions intensity of generation was partly mitigated by an increased share of renewable generation, from 9% in 2011 to 11% in 2012, reflecting good progress in adding new wind capacity. Without the gas-to-coal switch, emissions intensity would have fallen 2% due to the increased renewable generation.
- **Policy challenges.** There are major challenges relating to design and implementation of the Electricity Market Reform and the Green Deal. New policies are required to support uptake of low-carbon heat in the residential sector. Stronger incentives are required for uptake of measures in the commercial and industrial sectors.

- **Banking outperformance.** Given the importance of delivering measures to meet future carbon budgets, outperformance of the current budget due to the recession should not be carried forward to future budgets.

We set out our analysis in five sections:

1. Economy-wide emissions trends and drivers
2. Non-traded sector emissions
3. Traded sector emissions
4. Government policy and strategy
5. Devolved administrations

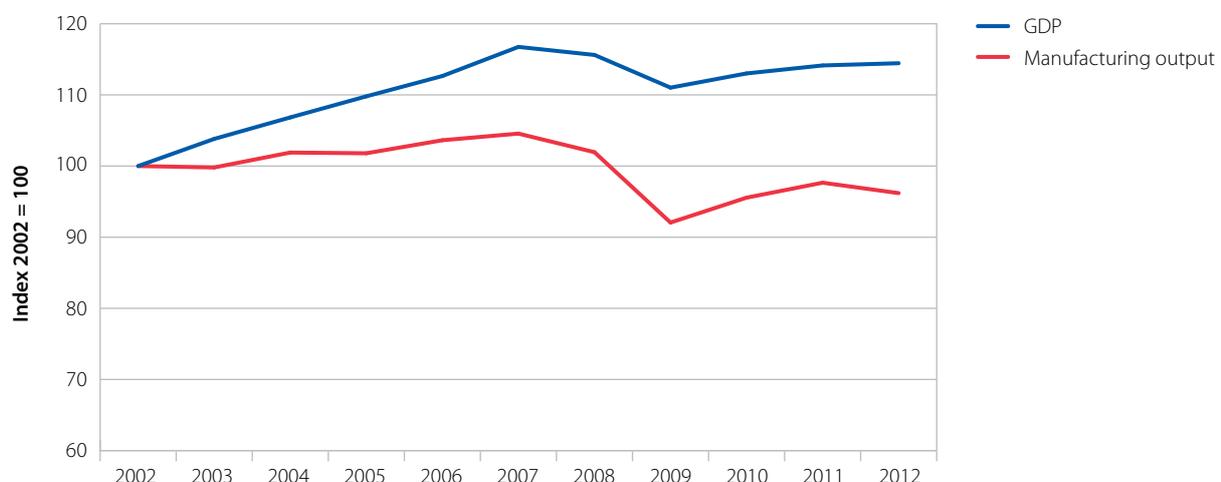
## 1. Economy-wide emissions trends and drivers

Our focus in this chapter is on emissions currently covered by carbon budgets. These are UK emissions of the six greenhouse gases in the Kyoto basket from all sectors of the economy except international aviation and shipping. Although not currently included in carbon budgets, international aviation and shipping emissions are important, and we consider them in Chapter 5.

The context for 2012 emissions is one of limited GDP growth, increasing energy prices, and colder winter months than 2011.

- **GDP.** Growth remained below the long-term trend at 0.3% (in real terms) in 2012, following growth in 2011 of 0.7% (Figure 1.1); within this, manufacturing output fell by 1.5%.

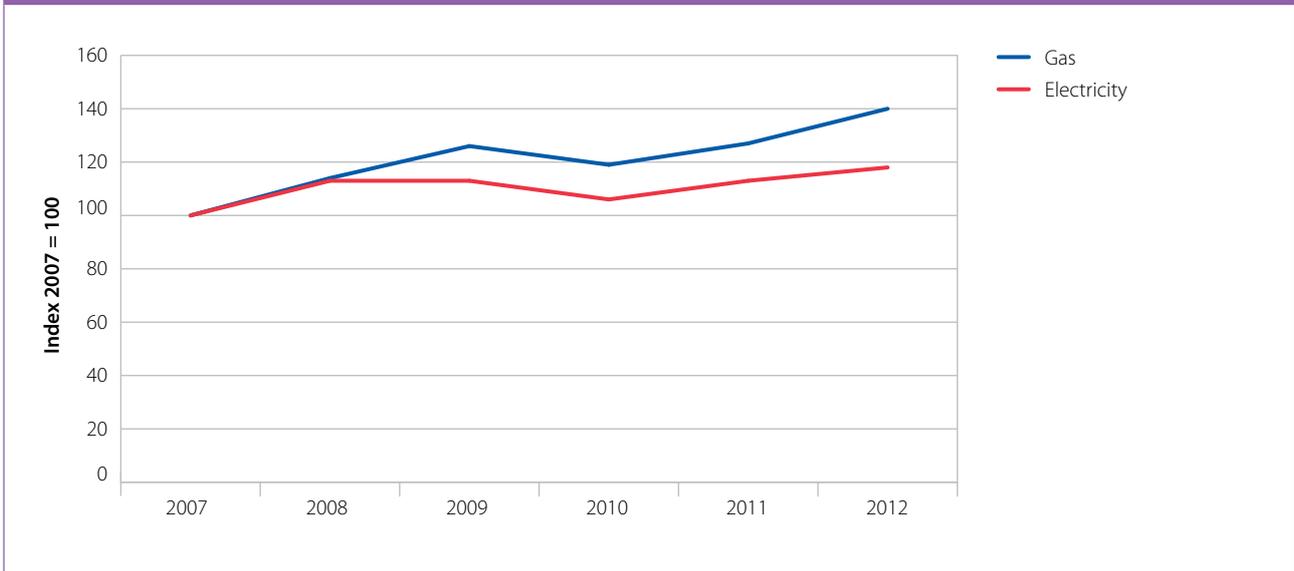
Figure 1.1: UK economic indicators (2002-2012)



Source: ONS (March 2013) *Quarterly National Accounts*.

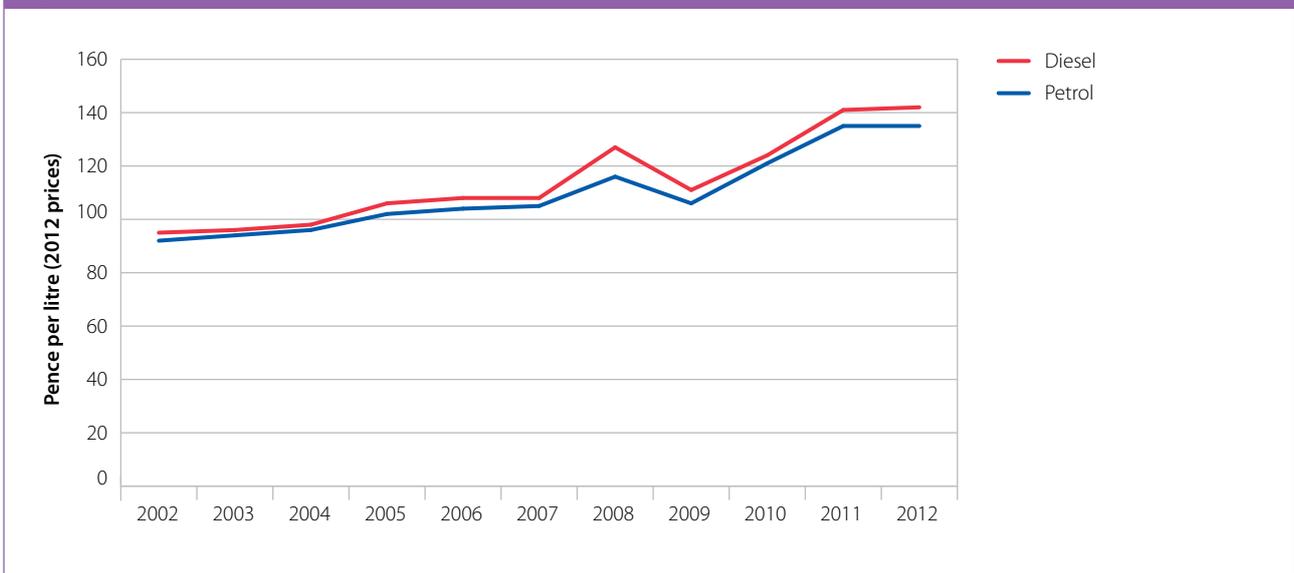
- **Prices.** Wholesale gas price increases in 2012 resulted in a 10% increase in residential gas prices, and a 4% increase in residential electricity prices, in real terms (Figure 1.2). In the transport sector, petrol prices rose by 0.2% and diesel prices rose by 0.8%, in real terms – see Figure 1.3<sup>1</sup>.

**Figure 1.2: Residential fuel prices in the UK (2007-2012)**



Source: DECC (March 2013) *Quarterly Energy Trends*.

**Figure 1.3: Road fuel prices in the UK (2002-2012)**

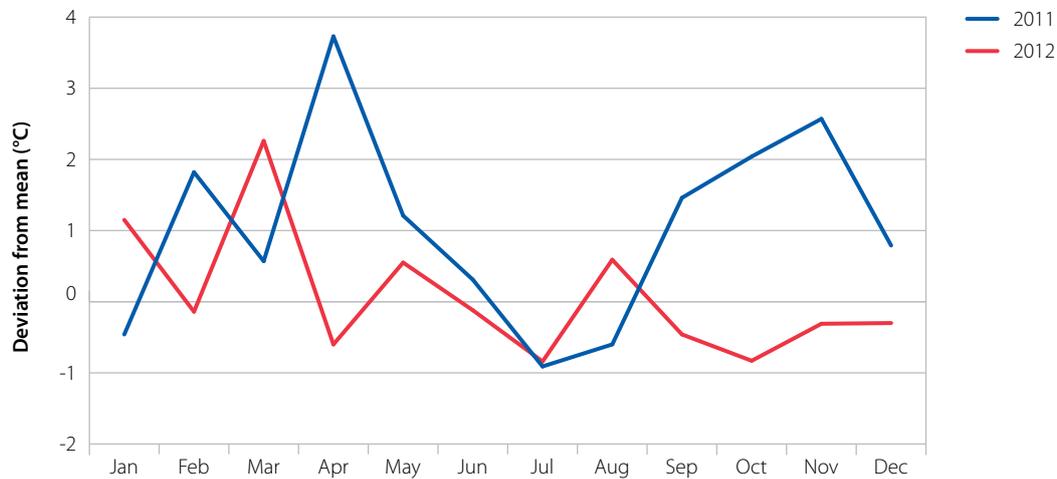


Source: DECC (March 2013) *Quarterly Energy Trends*.

<sup>1</sup> Prices are expressed in real terms. DECC convert nominal gas and electricity prices to real prices using the Treasury's GDP deflator series. In order to maintain consistency with DECC's approach, we convert nominal petrol and diesel prices to real prices using the same GDP deflator. However, we note that for 2012, the GDP deflator implies an inflation rate of 1.4%, considerably below the rates of around 3% implied by the consumer price index (CPI) and retail price index (RPI).

- Temperature.** The winter months in 2012 (i.e. January, February and December) were around 0.5°C colder than those in the previous year and there were 20% more heating degree days (HDDs)<sup>2</sup> over the year (Figure 1.4), leading to increased heating demand.

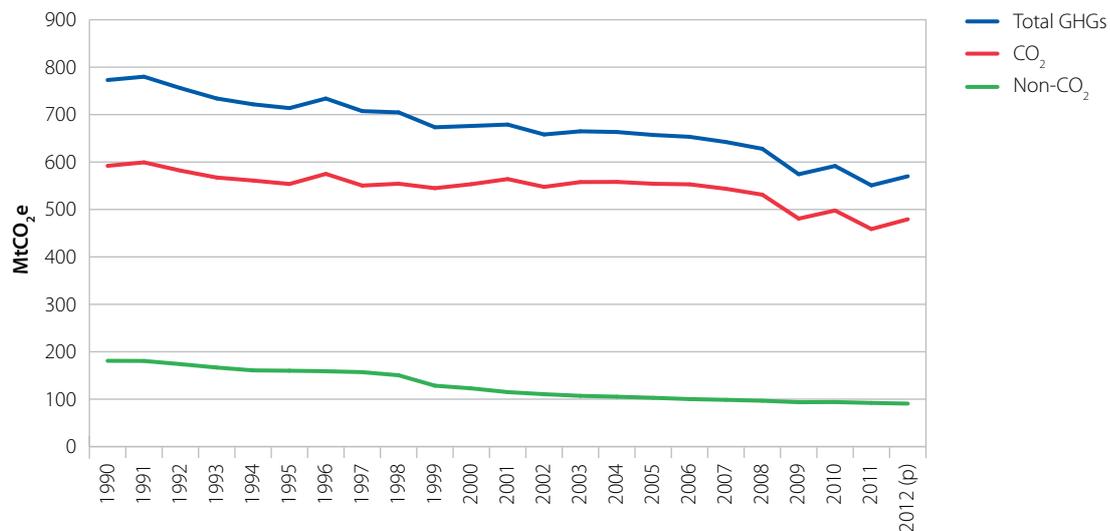
**Figure 1.4: Average temperature deviation from the long term mean (2011-2012)**



Source: DECC (March 2013) *Energy Trends*.

Within this context, UK greenhouse gas emissions rose from 551 MtCO<sub>2</sub>e in 2011 to 570 MtCO<sub>2</sub>e in 2012, a 3.5% increase (Figure 1.5). This reflected increased CO<sub>2</sub> emissions in all sectors, particularly in the residential sector (due to increased heating) and power sector (due to fuel switching).

**Figure 1.5: UK greenhouse gas emissions (1990-2012)**

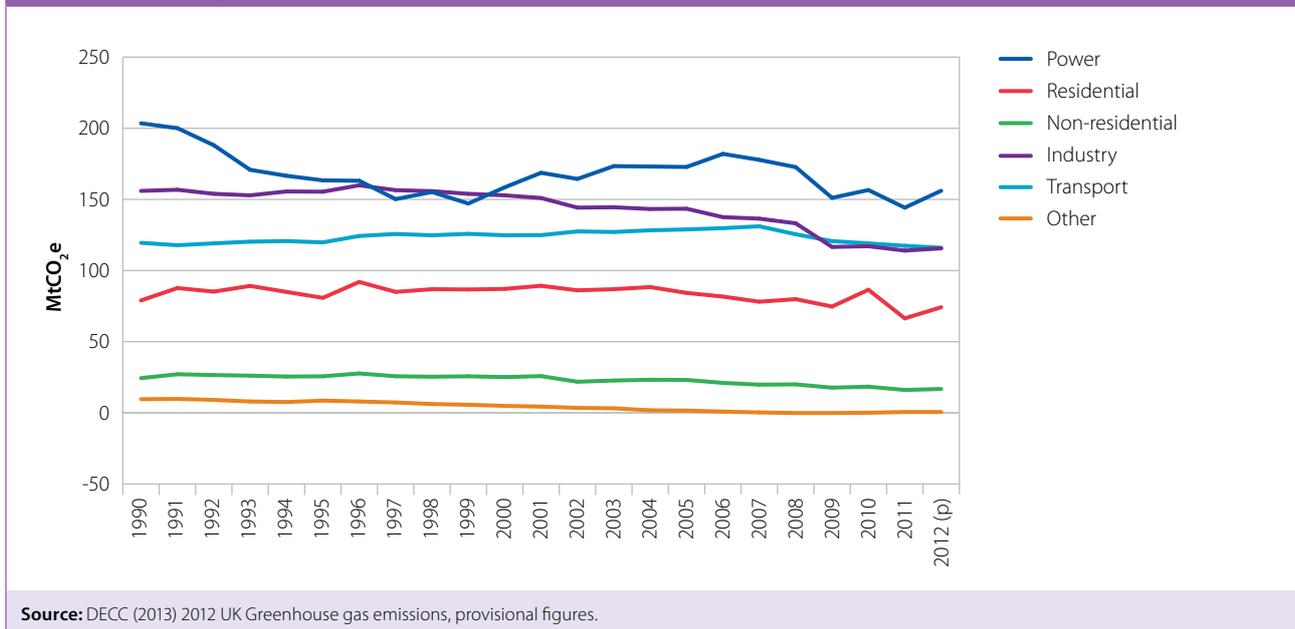


Source: DECC (2013) 2012 UK Greenhouse gas emissions, provisional figures.

<sup>2</sup> A Heating Degree Day (HDD) is defined as a decrease of one degree centigrade in the average temperature, below a baseline temperature of 15.5°C (below which a building typically needs heating) on a given day. For example, an average outside temperature of 10.5°C over two days would result in 10 HDDs.

- CO<sub>2</sub> emissions accounted for 84% of total UK greenhouse gas emissions in 2012. They increased by 4.5% in 2012 to 479 MtCO<sub>2</sub>, reflecting increased emissions from power generation, buildings and industry (Figure 1.6):

Figure 1.6: UK CO<sub>2</sub> emissions by sector (1990-2012)

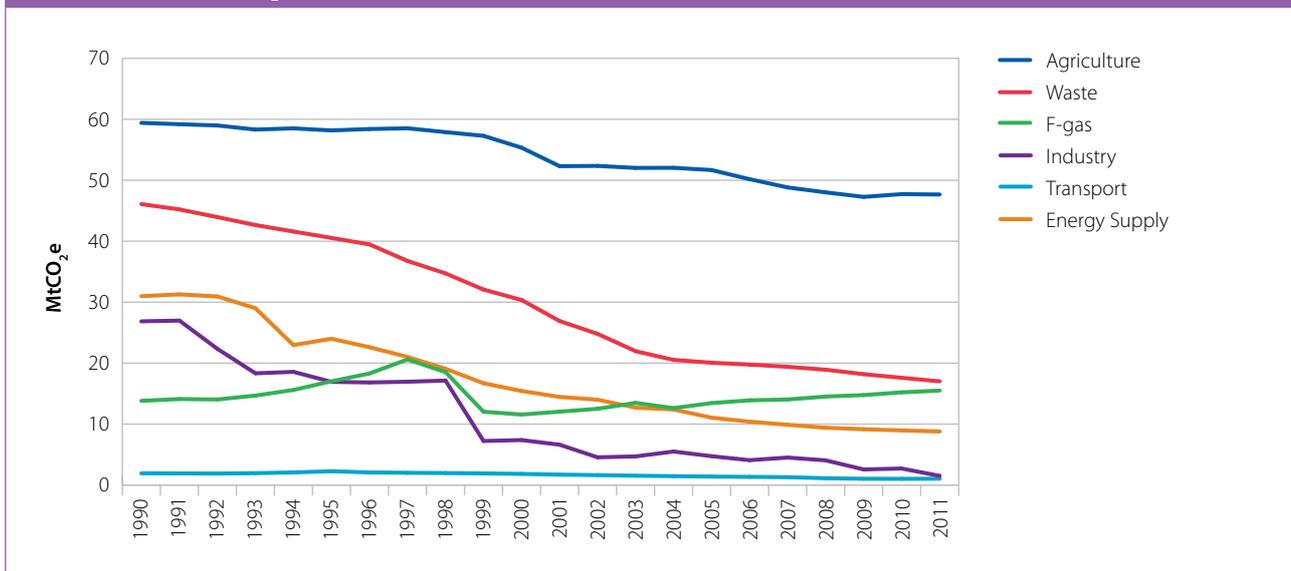


Source: DECC (2013) 2012 UK Greenhouse gas emissions, provisional figures.

- Emissions from power generation, which account for 33% of CO<sub>2</sub> emissions, increased by 8% to 156 MtCO<sub>2</sub>. This was due to an increase in coal use in power generation, from 30% of generation in 2011 to 39% in 2012, and a decrease in natural gas use, from 40% of generation in 2011 to 27% in 2012. The increase in emissions would have been even larger without the increased share of renewable generation, which rose from 9% in 2011 to 11% in 2012.
- Direct emissions in buildings (e.g. from burning of fossil fuels for heat), which account for 19% of total CO<sub>2</sub> emissions, rose by 10% in 2012 to 91 MtCO<sub>2</sub>. In particular, direct emissions from residential buildings rose by 12% to 74 MtCO<sub>2</sub>, largely driven by an increase in heating demand due to lower winter temperatures. This reflected a 14% rise in average gas demand per household, such that residential gas bills rose by 26%, while residential electricity bills were 5% higher (Box 1.1).
- Direct emissions from industry, which account for 24% of total CO<sub>2</sub> emissions, rose by around 1.4% in 2012 to 116 MtCO<sub>2</sub>. Although total output fell in 2012, the impact of this in reducing emissions was more than offset by the reopening of the carbon-intensive Teesside plant in the iron and steel sector, and increasing gas consumption possibly related to lower temperatures.
- Transport emissions, which account for 24% of total CO<sub>2</sub> emissions, fell by 1.2% in 2012 to 116 MtCO<sub>2</sub>. Data on surface transport, and on the individual road transport modes, will not be released until early 2014.

- Non-CO<sub>2</sub> emissions account for 16% of total UK greenhouse gas emissions and largely comprise emissions from agriculture and waste. Provisional emissions statistics for 2012 assume non-CO<sub>2</sub> emissions continue long-term trends and decrease 1.5% to 91 MtCO<sub>2</sub>e (Figure 1.7). Actual estimates for 2012 non-CO<sub>2</sub> emissions will not be available until February 2014.

**Figure 1.7: UK non-CO<sub>2</sub> emissions by sector (1990-2011)**



Source: NAEI (2013) *Final emissions estimates*

### Box 1.1: Fuel bills in 2012

2012 saw rising energy prices and a particularly cold winter, increasing demand for gas in the residential sector:

- **Prices.** In 2012 average domestic gas and electricity prices increased by 11% and 6% respectively (not adjusting for general inflation)<sup>3</sup>. Both these price rises were driven by:
  - an increase in the wholesale price of gas (which increased from 56 p/therm in 2011 to 60 p/therm in 2012)<sup>4</sup>; and
  - a small increase in support for development of low-carbon technologies and other energy policies<sup>5</sup>.
- **Consumption.** At the same time, gas consumption increased by 14% and electricity consumption remained broadly constant.

As a result, the average annual gas bill increased by 26% to £637 and the electricity bill for those on standard tariff<sup>6</sup> increased by 5% to £422<sup>7</sup>. This compares to general inflation of around 3%<sup>8</sup>.

Adjusting for the impact of the colder temperatures in the winter months (Box 1.2), the increase in greenhouse gas emissions would have been around 2%. Adjusting again for the impact of the temporary switch from gas to coal in the power sector, greenhouse gas emissions would have decreased by 1-1.5%.

This limited underlying reduction in 2012, a year characterised by low GDP growth and high energy prices, suggests it will be a major challenge to achieve the 3% reduction in GHG emissions per year required to meet the third and fourth carbon budgets, particularly as the economy recovers and if fuel prices do not continue to increase at the rates in 2012. We consider in more detail whether the UK is on track to meet future carbon budgets, and highlight specific challenges that may arise, with a detailed assessment of underlying progress in the rest of this chapter and throughout this report.

**Box 1.2: The impact of temperature on energy demand and the Committee's approach to temperature adjusting**

As noted in our previous progress reports, temperature can have a significant impact on energy consumption and therefore emissions. Winter temperatures in particular can affect demand for heating fuels (summer temperatures currently have a much smaller effect given that energy demand for cooling remains significantly lower than demand for heating in the UK).

The winter months of 2012 (January, February and December) were colder than those of 2011, resulting in higher emissions, particularly in the residential sector. We have used DECC estimates of the 'temperature-adjusted' change in energy consumption from 2011 to 2012, which can be interpreted as how energy consumption would have changed without the decrease in winter temperatures. We have then applied our own estimates of emissions intensity in 2012 to calculate the effect on emissions. This allows us better to assess underlying progress, abstracting from year-to-year variations in temperatures, which is useful in assessing future prospects for emissions.

Total CO<sub>2</sub> emissions in 2012 rose by 4.5%, but adjusting for temperature they would have risen 2.4%. The adjustment is primarily in energy use for heating buildings, with the largest impact in the residential sector.

DECC release their own estimates of temperature-adjusted emissions which suggest a larger impact, such that after adjusting for temperature total emissions in 2012 would have remained flat. DECC's methodology adjusts emissions directly (as opposed to energy consumption) and as such, may capture second-order impacts such as fuel switching. Our approach is to identify the impact of fuel switching separately and we therefore continue to temperature-adjust energy consumption rather than emissions.

## 2. Non-traded sector emissions

Non-traded sector emissions are those outside of the European Union Emissions Trading System (EU ETS) and include direct emissions from use of fossil fuels in buildings, non-energy intensive industry (primarily for heat) and transport, as well as almost all non-CO<sub>2</sub> emissions (e.g. from agriculture and waste). Non-traded sector emissions accounted for 59% of total UK greenhouse gas emissions in 2012.

Non-traded sector emissions rose by 2.7% in 2012 to 339 MtCO<sub>2</sub>e. This increase was driven by an increase in emissions from buildings, due to increased heating demand in response to colder winter temperatures. Without the temporary impacts of the cold winter temperatures, emissions would have risen only 0.2%.

The slight increase in temperature-adjusted emissions in 2012 – particularly in the context of limited GDP growth and high energy and fuel prices – suggests there has been little, if any, underlying progress in the implementation of measures to reduce emissions (i.e. investments in energy-saving technologies, increased use of low-carbon technologies, etc). We now consider this further.

---

## Underlying progress in the non-traded sectors

Our indicator framework for monitoring progress against carbon budgets includes not only emissions, but also implementation of measures to reduce emissions. In doing so, it provides an early signal of future emissions, to enable appropriate policy responses. The framework sets out trajectories for delivery based on our 'Extended Ambition' scenario, which is set out in our first (October 2009) progress report to Parliament and which we previously have shown to be broadly consistent with Government ambition.

Against this framework, there has been progress in some areas but with other areas falling behind:

- **Buildings.** In buildings, there was continued progress on boiler replacement with mixed progress on insulation measures.
  - Boiler replacement continued at a steady pace, with 1.3 million efficient boilers installed in 2012, up 2% from 2011 levels.
  - Uptake of loft insulation was above our indicator trajectory in 2012 when including DIY figures, reflecting the success of the CERT (Carbon Emissions Reduction Target) policy. However, it will be difficult to maintain these rates in future under the Green Deal and Energy Company Obligation (ECO) – see section 4.
  - Uptake of cavity wall insulation remained below our indicator trajectory in 2012.
  - Levels of solid wall insulation continued to be well below our indicator trajectory, despite increased rates of uptake in 2012 compared to 2011.
- **Heat.** Uptake of low-carbon heat across the range of technologies was very low, albeit broadly in line with expectations in 2010 and 2011.
- **Transport.** In road transport, emissions intensity of new cars outperformed our indicator for a fourth year, with some progress achieved in laying the foundations for electric vehicle market development, but limited progress on measures to encourage travel behaviour change.
  - New car emissions intensity fell by 3.6% in 2012, to 133 gCO<sub>2</sub>/km – well ahead of our trajectory level of 146 gCO<sub>2</sub>/km.
  - Following the launch of new electric car models and the plug-in car grant in 2011, around 2,250 electric cars were registered in 2012, more than double the volume in 2011. Although below levels assumed in our indicator trajectory, this is important progress in early market development.
  - Biofuels penetration decreased from 3.5% (by volume) in 2011 to 3.1% in 2012, as the Renewable Transport Fuel Obligation (RTFO) was amended to reduce the share of biofuels required by allowing biofuels produced from wastes, non-agricultural residues and second generation biofuels to be counted twice in meeting the RTFO target.

- Funding for the Local Sustainable Transport Fund was increased from £560 million to £600 million in 2012. The Fund is now fully committed, supporting 96 projects in 77 Local Authorities across England between 2011-2015. With local authority match funding, over £1 billion is now being invested in local sustainable travel. Almost all successful projects include Smarter Choices measures (workplace and school travel plans, public transport information and marketing, etc.).
- The number of car drivers trained in eco-driving fell from around 8,000 in 2011 to around 7,000 in 2012, well below the 300,000 assumed in our indicator trajectory.

The UK has met the first carbon budget and it is likely that we will meet the second. However, we are not currently on track to meet the third and fourth carbon budgets, for which a significant increase in the pace of emissions reduction is required (Figure 1.8). Achieving this will be challenging. Whilst there was good progress in 2012 in insulating lofts and cavity walls in residential buildings, and improving the efficiency of new cars, there are risks to sustaining that progress, particularly for insulation measures. In other areas, notably low-carbon heat, solid walls and energy efficiency improvement in commercial and industrial sectors, the challenge will be to ramp up progress. Development and implementation of new policies will be required to drive this acceleration; this is discussed in more detail in Chapters 2-7.

Despite the slow rate of implementation of measures in 2012, emissions in the first carbon budget period (2008-2012) were lower than the level of the budget; we now turn to the issue of outperformance.

**Figure 1.8:** Non-traded sector emissions based on continued implementation of measures at 2012 rate (2007-2027)



**Source:** NAEI (2013); DECC (2013) *2012 UK Greenhouse gas emissions, provisional figures*; European Commission (2013) *Verified Emissions for 2008-2009-2010-2011-2012 and allocations 2008-2009-2010-2011-2012*; DECC (2012) *Updated Emissions Projections*; CCC calculations.  
**Notes:** \*As proposed in our 2008 report, the Intended budget (2008-2022) corresponds to the UK share of an EU 30% 2020 target. We recommended it should be enacted in the context of a global deal to reduce emissions. \*\*Based on the Baseline scenario from DECC (2012) UEP, net of estimated savings ensuing from continued uptake of measures at the rates seen in 2012, until 2027 or until full potential is realised (e.g. all lofts have been insulated), whichever is sooner. Trajectory has been smoothed.

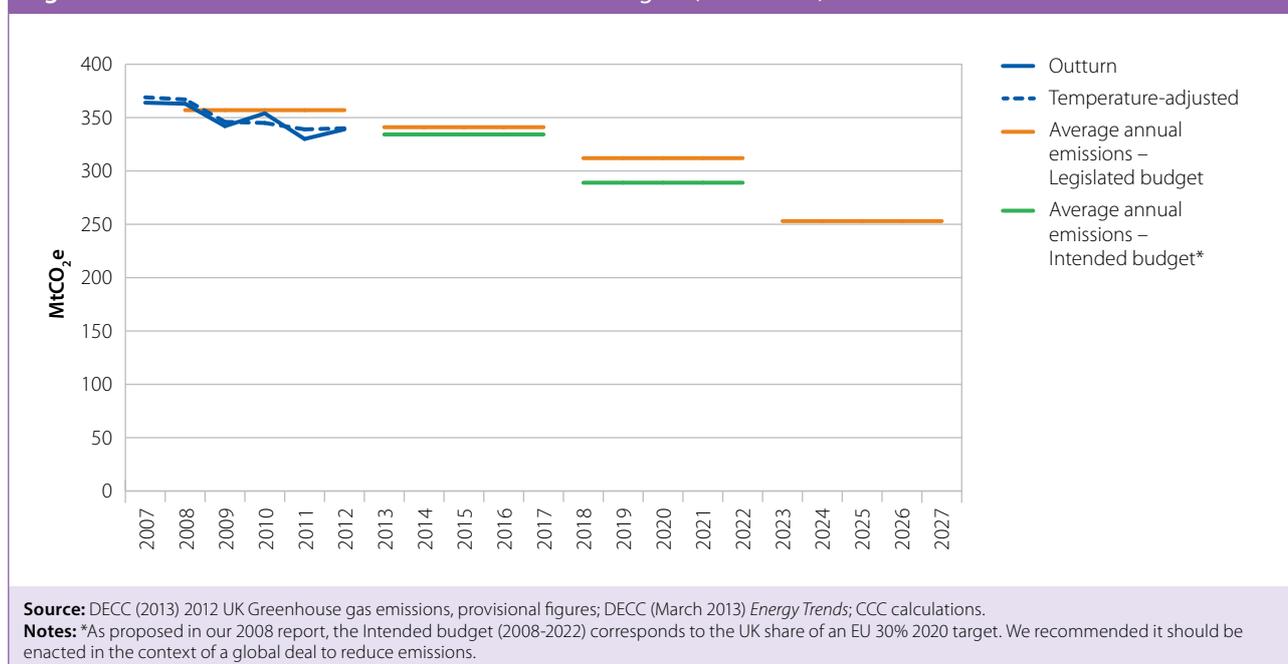
## Outperformance of the first carbon budget

Total non-traded sector emissions were around 1,728 MtCO<sub>2</sub>e across the first carbon budget period (2008-2012). Net traded sector emissions (i.e. the UK's share of the EU ETS cap) were 1,233 Mt across the first carbon budget period. The UK net carbon account was therefore 2,961 Mt, indicating that the UK outperformed the first carbon budget (total 3,018 Mt) by around 57 Mt (2% of the total carbon budget, and 3% of the non-traded sector's share of the carbon budget) (Figure 1.9).

The Climate Change Act allows the UK to carry forward outperformance of a carbon budget to the next budgetary period, subject to advice from the Committee. There is a question over whether this outperformance should be carried forward to the next budgetary period. We have previously argued that outperformance should only be carried forward where it is due to implementation of policy to reduce GHG emissions.

Our analysis of underlying progress in the non-traded sectors does not suggest that this outperformance is due to implementation of policy to reduce GHG emissions. This outperformance should be seen in the context of the 9% reduction in GHG emissions during the recession in 2009. Therefore, there is no rationale to carry this outperformance forward to the next budgetary period, and to do so would risk reducing incentives to reduce emissions in future carbon budget periods. We will issue formal advice on carrying forward outperformance in early 2014 when final emissions statistics for 2012 are released.<sup>3</sup>

Figure 1.9: Non-traded sector emissions vs. carbon budgets (2007-2027)



<sup>3</sup> 2012 emissions data discussed in this report are provisional.

---

### 3. Traded sector emissions

#### Traded sector emissions in the UK

Our focus in this section is on emissions covered by both the EU ETS and carbon budgets. These include emissions from power generation and energy-intensive industries (e.g. refineries, production of cement, iron and steel), emissions from domestic aviation (but currently not international aviation) and non-CO<sub>2</sub> emissions from nitric and adipic acid and aluminium production. Traded sector emissions accounted for 41% of total UK greenhouse gas emissions in 2012.

Under the Climate Change Act, traded sector emissions are accounted for on a net basis (i.e. net of sales/purchases of allowances in the EU ETS or offset credits). Therefore, the net carbon account and the level of compliance with the carbon budget is not affected by the level of gross traded sector emissions (i.e. actual emissions, before any trading of allowances/credits).

However, the importance of power sector decarbonisation for the economy-wide decarbonisation strategy means it is important to reduce gross (rather than only net) traded sector emissions. For example, in our previous work (e.g. our recent advice, *Next steps on Electricity Market Reform*) and again in this report (Chapter 2), we have suggested that an appropriate aim is largely to decarbonise the UK power sector over the next two decades (e.g. to around 50 gCO<sub>2</sub>/kWh in 2030).

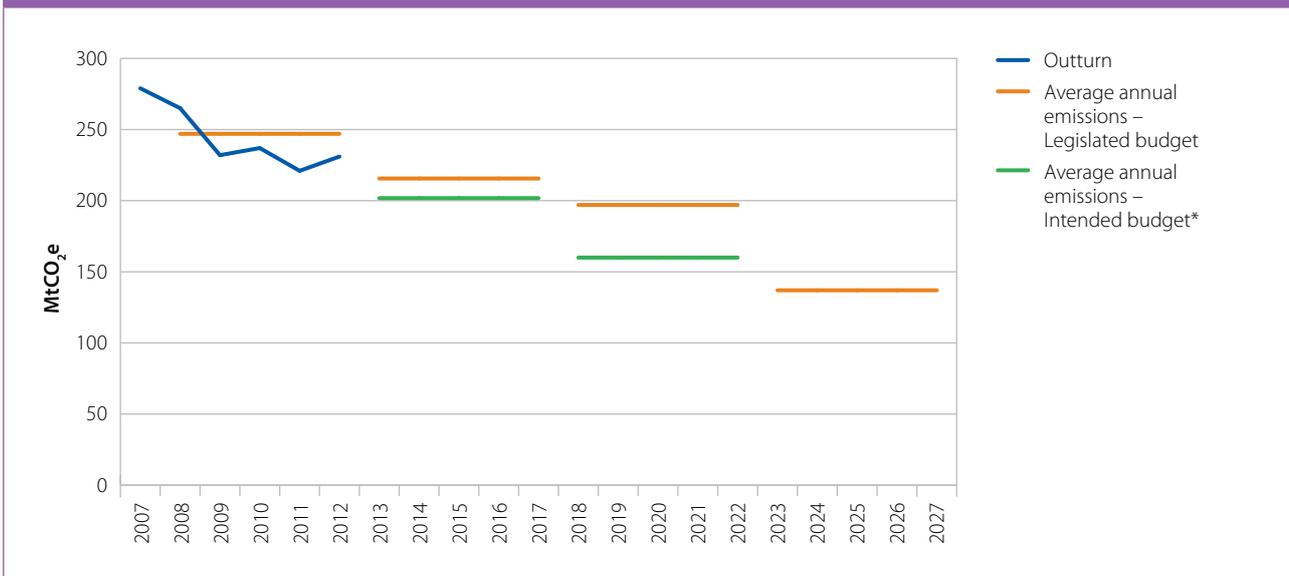
Gross traded sector emissions rose by 5% in 2012 to 231 MtCO<sub>2</sub>e, driven mainly by an increase in emissions from power generation, but remained below the traded sector cap (Figure 1.10).

- Power sector emissions rose by 8% to 156 MtCO<sub>2</sub> driven by increased emissions intensity of generation:
  - Emissions intensity of generation rose by 10%, to 531 gCO<sub>2</sub>/kWh, due to increased use of coal-fired generation in place of gas (because of low coal and carbon prices and high gas prices; see Chapter 2 for more details). Without the gas-to-coal switch, emissions intensity would have fallen 2% from 2011 to 472 gCO<sub>2</sub>/kWh due to increased renewable generation.
  - Power sector emissions are now above our indicator trajectory of 151 MtCO<sub>2</sub>, although without the coal to gas switch, emissions would have fallen 4% to 138 Mt and would therefore have been below the indicator trajectory.
  - The increase in emissions intensity of generation was mitigated by an increased share of renewable generation from 9% in 2011 to 11% in 2012, along with increased imports of electricity from 1.8% to 3.4% of total generation. Total electricity consumption was broadly unchanged in 2012, with increased use in buildings offset by a fall in use in industry.
- Industry traded sector emissions fell by 4% in 2012<sup>4</sup>.

---

<sup>4</sup> CITL data for 2011 and 2012.

**Figure 1.10: Traded sector emissions vs. carbon budgets (2007-2027)**



**Source:** European Commission (2013) Verified emissions data for 2012.

**Notes:** \*As proposed in our 2008 report, the Intended budget (2008-2022) corresponds to the UK share of an EU 30% 2020 target. We recommended it should be enacted in the context of a global deal to reduce emissions.

As discussed in Chapter 2, our assessment is that it is unlikely that the increase in coal burn will be sustained in the medium to long term, due to the age of existing plants, existing environmental legislation and the UK’s carbon price floor. Under current policy it is likely that these factors will drive a shift from coal to gas over the near-term, reducing power sector emissions at low cost.

Over the first carbon budget period, gross traded sector emissions were 1,186 MtCO<sub>2</sub>e, below the UK’s cumulative ETS cap of 1,233 Mt for the period 2008-2012. This implies that the UK’s ETS cap was loose over this period, so that the spare allowances to emit 47 MtCO<sub>2</sub>e could be either sold or used to meet the traded sector cap in future years. As for the non-traded sector, it is important to track not just current emissions but indicators of future emissions in the traded sector, particularly given long asset lifetimes. This is our focus in Chapter 2, where we consider progress in deploying new low-carbon capacity – renewables, nuclear and thermal plant fitted with carbon capture and storage technology (CCS).

## EU ETS emissions and carbon prices

### EU ETS emissions trends

UK traded sector emissions will in part be driven by the carbon price within the EU ETS. As the carbon price is determined by the level of effort required to limit gross EU traded sector emissions to the level of the EU ETS cap, these emissions are highly relevant for the UK.

Gross EU traded sector emissions fell by 2% in 2012, continuing long-term trends.

- Key drivers of this decrease were lower emissions from Finland, Belgium, Italy, France and Spain. These decreases occurred in countries which had flat or negative GDP growth, however there was also increased renewable generation and decreased fossil fuel combustion.
- Offsetting these decreases were increased emissions from Germany and the UK due to increased coal-fired generation. As in the UK, increased coal use in Germany reflects low coal and carbon prices, and high gas prices, as well as reduced nuclear power.

Emissions remained below the EU ETS cap in 2012, largely reflecting the significant fall in 2009 as a result of the global economic downturn. In total over the whole of Phase II (2008-12), EU traded sector emissions were around 500 MtCO<sub>2</sub>e below the level of the cap. The unused allowances can be banked and will be available to meet the ETS cap in future years.

Current emissions are below the level of the Phase III (2013-20) cap out to around 2017, with the prospect that outperformance of the cap in the early years could mean that the entire cap could be met without any further reduction in emissions (given scope to bank outperformance towards meeting the cap in future years) – see Figure 1.11.

**Figure 1.11: Emissions within the EU ETS versus cap (2008-2020)**

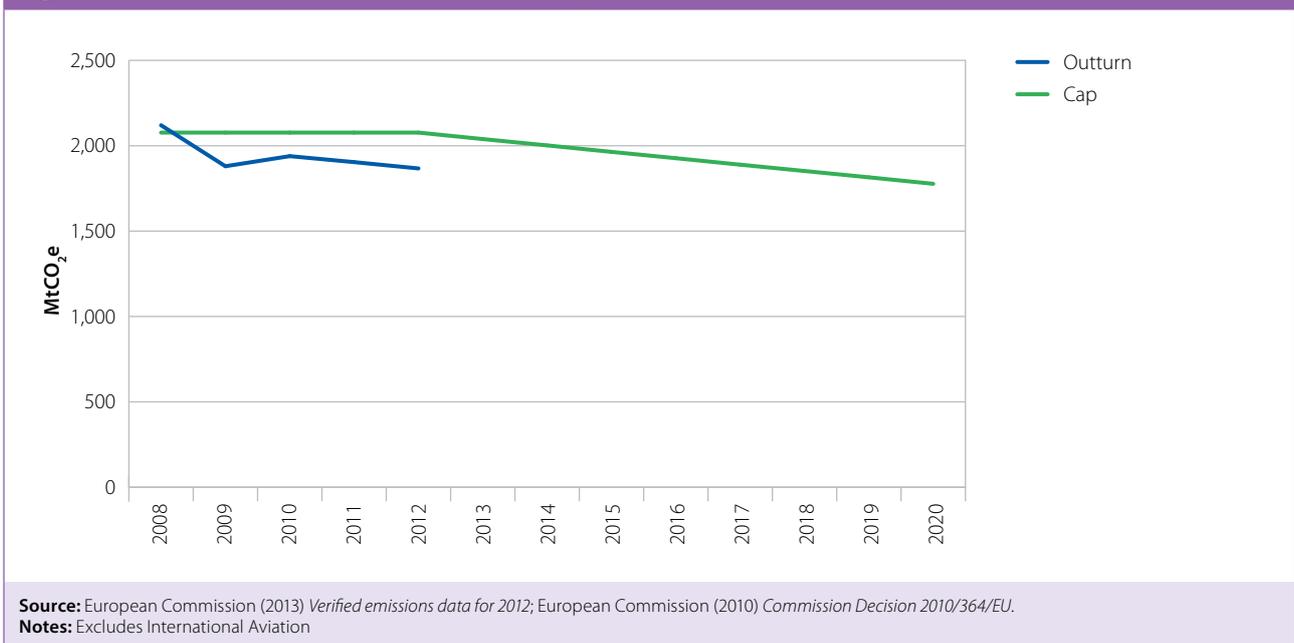


Figure 1.12: Carbon price in the EU ETS



Source: Point Carbon.

## Carbon price trends

The low level of emissions in the EU ETS has seen the carbon price fall to very low levels (Figure 1.12), further compounded in 2013 by lack of an EU agreement on a temporary strategy to reduce the supply of emissions permits:

- The carbon price during 2012 was, on average, around €7/tCO<sub>2</sub> compared to €13/tCO<sub>2</sub> in 2011, with a peak of €9/tCO<sub>2</sub> in February and a minimum price of €4.5/tCO<sub>2</sub> in March.
- In the early months of 2013 the European Parliament voted against 'backloading' 900 million emissions allowances (i.e. removing them from auctions over the first half of Phase III before re-introducing them in the second half). In response the carbon price has fallen further with lows around €3/tCO<sub>2</sub>.

Given the headroom in the cap, the carbon price is likely to remain low under the current scheme design, even if backloading were to go ahead. In fact, with projected emissions below the cap, it is likely that the price would be even lower (possibly zero) if there were not some uncertainty as to whether the cap might be tightened (either for the current Phase, or beyond 2020).

Only with structural reform of the EU ETS could we expect to see a significant increase in the price of EUAs. Structural reform is important to restore the credibility of the EU ETS, a key pillar of the current policy framework and a potentially important part of the 2030 package, to provide a clear signal for investment, and (from the UK perspective) to close the gap between the UK and EU electricity prices. It would also be desirable in emissions terms, given that fuel switching away from coal within existing capacity is a relatively low cost option for reducing emissions.

---

## Structural reform of the EU ETS and proposed 2030 package

The European Commission has moved forward in implementing structural reform for Phase III and is running a consultation on how it can best be achieved. The current discussion includes six options for reform:

1. Raising the 2020 emission target from 20% to 30% below 1990 levels;
2. Retiring a number of allowances permanently;
3. Revising the 1.74% annual reduction in allowances to 2020;
4. Bringing more sectors into the EU ETS;
5. Limiting access to international credits;
6. Introducing 'discretionary price management mechanisms' such as a price floor.

The EC is also currently consulting on a range of issues relating to development of climate and energy targets for 2030, and intends to develop more concrete proposals for a 2030 framework by the end of 2013. The March 2013 Green Paper, 'A 2030 framework for climate and energy policies', which launched this consultation, states that the 2030 framework should take into account the longer-term perspective laid out in the 2011 Roadmap for moving to a competitive low-carbon economy in 2050.

The Roadmap identifies a cost-effective reduction in gross EU-wide emissions of 40% on 1990 levels by 2030 (on the path to an 80-95% reduction by 2050).

A framework consistent with the ambition of the roadmap could strengthen the carbon price, put the EU on a cost-effective path to meeting its target to reduce emissions by at least 80% in 2050 on 1990 levels, and make a positive contribution towards agreement on a global deal to reduce emissions.

In May 2013 the UK Government announced that it will support a 2030 target to reduce EU emissions by 40%, rising to 50% through the purchase of credits in the context of a global deal, and depending on ambition committed by other countries.

This is broadly in line with the ambition (55% reduction including the purchase of credits) we suggested in our 2010 advice on the fourth carbon budget, based on a high-level analysis.

We therefore strongly support the UK Government position. We will consider consistency of UK carbon budgets with the EU targets further in the context of the Review of the Fourth Carbon Budget to be published later this year.

---

## 4. Government policy and strategy

### Recent policy developments

In order to achieve the significant ramp-up in ambition in our indicator framework over the second and third budget periods, and to prepare for meeting the fourth budget, new policies are required to overcome barriers and drive uptake.

Government has recently made a number of key policy announcements (on the Levy Control Framework, Carbon Capture and Storage commercialisation, the Green Deal and the Energy Company Obligation, and Climate Change Agreements).

- **Levy Control Framework.** The Levy Control Framework sets the total amount of subsidy that can be paid to new low-carbon generation, and provides a credible signal to investors by announcing in advance that the intention to sign contracts is underpinned by funding. In November 2012, the Government announced that it had agreed the level of support in 2020, at £7.6 billion (2012 prices), which is broadly comparable with our updated estimate of what is required to deliver a portfolio of low-carbon technologies, provided this is calculated appropriately (see Chapter 2).
- **Carbon Capture and Storage Commercialisation Programme.** DECC launched its Carbon Capture and Storage (CCS) Commercialisation Programme in Spring 2012. Under this programme, four (of eight) bids for support to develop a CCS installation were shortlisted: one gas post-combustion, one coal oxy-fuel and two pre-combustion coal projects, of which two (the 340 MW gas post-combustion project at Peterhead and the White Rose 304 MW oxy-fuel coal project at Drax) were selected as preferred bidders to negotiate front-end engineering and design (FEED) contracts, with a view to taking final investment decisions in early 2015. If these projects proceed as planned, they could be operational in 2018/19; however to deliver four CCS projects by 2020 (as set out in the Coalition Agreement in 2010) Government would need to proceed more quickly with other projects than currently planned.
- **Green Deal and Energy Company Obligation.** The Green Deal is a new financing framework, available from 2013, to facilitate energy efficiency improvements and low-carbon heat in homes and non-residential properties, funded by a charge on electricity bills. The Energy Company Obligation (ECO) creates a legal obligation on energy suppliers to improve the energy efficiency of households. In our 2012 progress report, we expressed concern that the estimated installation numbers under the Green Deal and ECO are substantially below our insulation indicator trajectories, which would have delivered a further reduction in emissions of at least 3 MtCO<sub>2</sub>. It is too early to assess how initial activities will translate into actual measures. Registration figures for cavity wall and solid wall insulation under the official guarantee schemes suggest that uptake has been very slow in the first few months of 2013. We will provide a more comprehensive assessment of the operation of the Green Deal and the ECO in our 2014 progress report.

- 
- **Climate Change Agreements.** In our 2012 progress report we noted that the scope of energy efficiency targets within Climate Change Agreements (CCAs) had been reduced substantially (by around 60%) to focus on only energy use not currently covered directly by the EU ETS (i.e. mostly electricity consumption), significantly weakening the incentives for reducing direct emissions. Energy efficiency targets have now been announced and are consistent with the level of ambition required for reductions in indirect emissions to 2020. The challenge remains to set out an approach that includes the full range of abatement options, including reduction of both direct and indirect emissions, and requires the implementation of options which are cost-effective compared with the carbon price.

However, a number of policy challenges remain:

- **Electricity Market Reform (EMR).** There are a number of detailed issues relating to contract design and payments mechanisms which should be resolved as the Energy Bill passes through Parliament. The EMR Delivery Plan should be designed to provide clarity for investors over the Government's intentions as market-maker. This should include setting out the quantity of capacity that the Government intends to contract over the period 2014-18, and the prices that it intends to pay for wind generation. Clarifications and possible adjustments on funding under the levy control framework to 2020 are required in order to ensure that this is sufficient to support ambition. Longer-term certainty should be provided through setting out commercialisation strategies for less mature technologies, setting a carbon-intensity target for 2030, and also extending funding under the levy control framework out to this date.
- **Green Deal/Energy Company Obligation.** Previously, energy companies had targets for insulation measures, and were subject to fines for under-delivery, resulting in subsidies being paid for loft and cavity wall insulation. Under the new Green Deal and Energy Company Obligation (ECO), incentives for delivery are weak, relying on a market based approach to address significant non-financial barriers to uptake, and requiring that most households bear the full cost of these measures. Support is still available for some measures under the ECO but, with the exception of low-income households, this excludes lofts and most cavity walls (i.e. except those that are hard-to-treat). These policies should be closely monitored and options to increase flexibility and strengthen financial/fiscal incentives for uptake should be further considered.
- **Low-carbon heat.** Very low uptake of low-carbon heat in the residential sector reflects significant financial and non-financial barriers, which are not adequately addressed by the small-scale grant programme currently in place. The Renewable Heat Incentive should be extended to cover the residential sector, funding should be committed beyond 2014/15, Green Deal finance allowed to pay for the up-front cost of low-carbon heat investment, and approaches to address non-financial barriers introduced.
- **Commercial and industrial sectors.** There is a need to rationalise the multiplicity of policies in these sectors and to strengthen incentives for uptake of measures. Proposed industry roadmaps are potentially important in increasing uptake of energy efficiency measures and new technologies in this sector.

---

## **Inclusion of international aviation and shipping emissions in carbon budgets**

In 2012 we recommended that international aviation and shipping emissions should be included in carbon budgets and the 2050 target. A failure to do so would represent a departure from the approach taken by the Government in its Carbon Plan, and could result either in increased costs of meeting carbon budgets, or in accepting higher risks of dangerous climate change.

In December 2012, following the EC's decision to suspend inclusion of international aviation emissions in the EU ETS, the Government decided to postpone formal inclusion of international aviation and shipping (IAS) emissions in carbon budgets. However, it confirmed the status quo that IAS emissions are included in the 2050 target and that carbon budgets are set on this basis.

## **5. Devolved administrations**

Data on greenhouse gas emissions in the devolved administrations are published with a time lag compared to UK-wide data, with the latest estimated emissions data currently available covering 2011<sup>5</sup>. Here we provide an overview of 2011 emissions trends in the three devolved administrations. For Scotland and Wales, our 2013 progress reports for the Scottish and Welsh governments provide a more detailed assessment and specific sector data.

At the UK level in 2011, emissions fell by 7% in the context of warm winter temperatures, slow economic growth and rising fuel prices.

GHG data for the devolved administrations (Figure 1.13) show that in 2011, Scottish emissions fell more than the UK average (10%), while Welsh and Northern Irish emissions fell slightly less (5%):

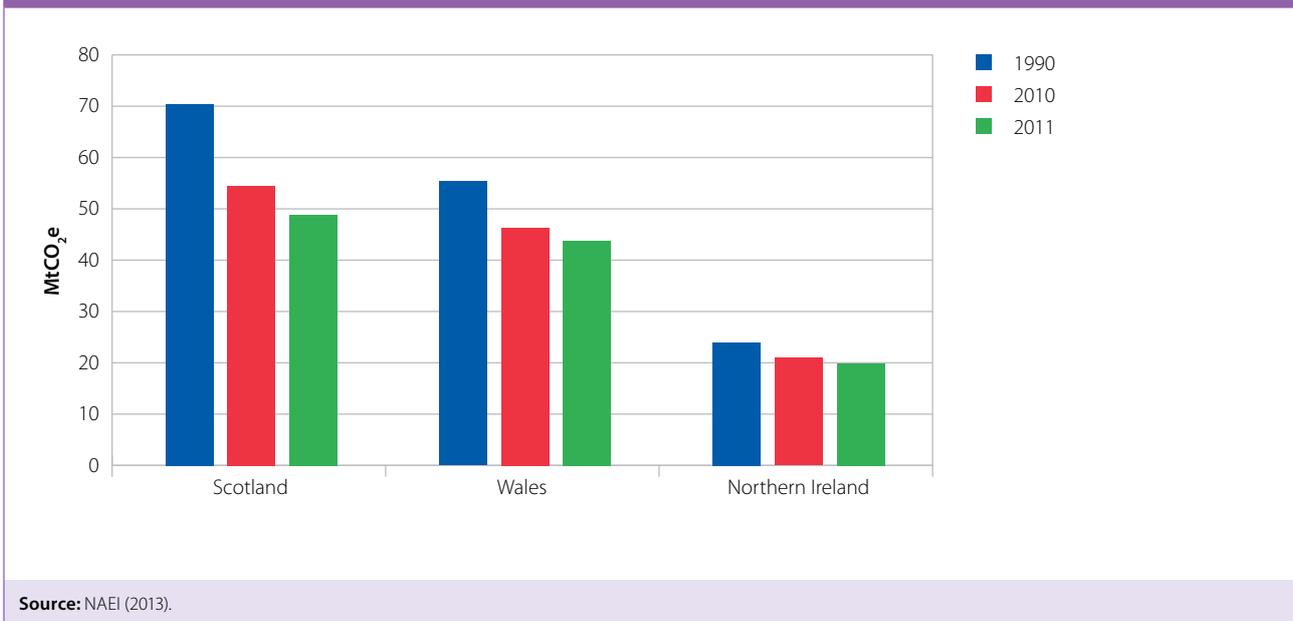
- Scottish emissions account for around 9% of the UK total. They fell by 10% in 2011, and were 31% lower than in 1990. The largest reduction in 2011 occurred in the energy supply sector<sup>6</sup> where emissions fell by 18% compared to 2010. This was due to a significant (27%) fall in coal-fired generation, combined with a large (43%) increase in renewable generation and a 10% increase in nuclear output. Residential sector emissions also fell by 21% in 2011. This can be attributed to the milder winter temperatures compared to 2010. Although Scotland missed its first annual emissions target and is likely to have missed its second target based on Scottish Government estimates, this is largely due to a combination of weather and revisions to the emissions inventory which have made achieving the targets more challenging. We note that Scottish emissions targets are more challenging than those of the UK to 2020, both because these have higher ambition, and because they include emissions from international aviation and shipping.

---

<sup>5</sup> Emissions data here are presented on a 'gross' basis – i.e. before trading in the EU ETS is accounted for.

<sup>6</sup> Around three quarters of emissions in energy supply are from the power sector.

Figure 1.13: GHG emissions in Scotland, Wales and Northern Ireland (1990, 2010 and 2011)



- Welsh emissions account for around 8% of the UK total. They were 5% lower in 2011 than 2010, and 21% lower than 1990. Emissions fell by 5% from 2010 to 2011 (compared to a 7% UK-wide reduction), due mainly to the reduced energy demand during the warmer winter months. Reflecting this, residential emissions fell by 22%.
- Emissions in Northern Ireland account for around 4% of the UK total. They were 5% lower in 2011 than 2010 and 17% lower than in 1990. Residential sector emissions fell by 18% – slightly less than in Scotland and Wales but still significant, again reflecting a milder winter.

As at the UK level, it is likely that emissions in the devolved administrations will have risen again in 2012 due to increased coal-fired generation and colder temperatures compared to 2011.

The devolved administrations continue to lead the UK in some areas, for example:

- Scotland had 40% of the UK's installed renewable capacity in 2011, as well as a significant pipeline of potential capacity. The Scottish government has set an emissions intensity target for the power sector of 50g CO<sub>2</sub>/kWh by 2030.
- All three devolved administrations have government-funded energy efficiency programmes targeted at fuel poor households, although fuel poverty levels remain high (particularly in Northern Ireland).
- Scotland and Wales have set themselves waste targets that go beyond the UK requirements under the EU Landfill Directive.

---

In terms of climate change strategy, the most important developments over the last year are:

- **Scotland** has published plans for meeting its future targets to 2027, setting out a range of policies and policy proposals. Significant revisions to both historical emissions data and projections suggest that there is a much greater challenge to meet emission targets than previously thought.
- **Wales** is currently considering the scope of an upcoming Environment Bill. This could be useful for providing a statutory underpinning to Wales' climate change targets, as well as considering longer-term targets (beyond 2020).
- **Northern Ireland** has run a pre-consultation seeking views on the need for a Northern Ireland Climate Change Bill. The aim of the proposed Bill would be to establish a long-term framework to drive greater efforts to reduce greenhouse gas emissions and to help ensure that Northern Ireland is better prepared to adapt to the impacts of unavoidable climate change.

We cover specific examples of policy developments in the devolved administrations in the sector chapters of this report. However, major challenges remain:

- Increasing the rate of renewable power capacity deployment, especially in Wales where deployment growth has been slower than in the rest of the UK.
- Increasing low-carbon heat penetration, which remains low across the devolved administrations.
- Encouraging a greater uptake of EVs, which currently have a low penetration across the whole of the UK.
- Increasing rates of woodland planting for which all three devolved administrations have ambitious targets but for which only Scotland is currently on-track.
- Reducing the very high rates of fuel poverty in the devolved administrations and ensuring that low-carbon policies do not negatively impact on the most vulnerable households.

It is important to address these challenges so that the devolved administrations gain from potential economic benefits, meet their own national emissions targets, and make an appropriate contribution to meeting the UK's carbon budgets.

---

## Key findings

- Economy-wide **emissions rose by 3.5%** in 2012.
- The **colder winter temperatures** in 2012 (relative to very mild winter temperatures in 2011) increased emissions by around 1.5%. Without a switch from gas to coal in power generation emissions would have fallen by 1-1.5%.
- There has been **progress** in the delivery of low-carbon measures in some areas, but with others **falling behind**.
- A significant **ramp-up in the pace of delivery** will be required urgently in order to meet the currently legislated third budget, particularly for more challenging measures such as low-carbon heat and electric vehicles. An even greater acceleration will be needed to meet the fourth carbon budget.
- There are **major challenges** relating to design and implementation of the Electricity Market Reform and the Green Deal. **New policies are required** to support uptake of low-carbon heat in the residential sector. Stronger incentives are required for uptake of measures in the commercial and industrial sectors.
- The devolved administrations continue to **lead the UK** in some areas; however **major challenges remain**.