
Executive Summary

This is our fifth statutory report to Parliament on progress towards meeting carbon budgets. In it we consider the latest data on emissions and their drivers, and we assess progress in development and implementation of new policies which are required in order to reduce emissions. The report includes assessment at a range of levels: the whole economy; the non-traded and traded sectors; the key emitting sectors; and the devolved administrations.

We conclude that there has been good progress in the implementation of some measures, notably loft and cavity wall insulation, boiler replacement, new car efficiency, investment in renewable power generation, and waste emissions reduction.

In order to ensure continued progress, incentives for uptake of insulation measures under the Green Deal should be strengthened. In the area of low-carbon power generation it is necessary to provide more confidence to investors that the Government is committed to sector decarbonisation.

Progress has been very limited in implementing other measures including solid wall insulation, low-carbon heat and energy efficiency improvement in non-residential and commercial sectors. New approaches are required in order to ensure increased uptake in these areas.

The UK has met the first carbon budget and our assessment is that we are likely to meet the second carbon budget. However, we are not currently on track to meet the third and fourth carbon budgets. Without a significant increase in the pace of emissions reduction, starting very soon, the costs and risks of moving to a low-carbon economy in the 2020s and beyond will be increased. To meet its statutory commitments, it will be necessary for the Government to develop and implement further policy measures over the next two years.

Our main conclusions, which lead us to specific recommendations summarised in Box 1, are:

- **Economy-wide emissions of greenhouse gases.** These increased by 3.5% in 2012 due to relatively cold winter months compared to 2011 and switching from gas to coal in power generation. After allowing for these temporary effects, emissions would have decreased by 1-1.5%. This highlights the significant challenge in meeting future carbon budgets, which will require annual emissions reductions of 3%. The challenge is more pronounced given that there was very limited GDP growth in 2012 and real increases in energy and fuel prices. The risk is that emissions may increase when the economy returns to higher growth, particularly if energy and fuel prices do not continue to increase at the rates in 2012.

-
- **Low-carbon investments and behaviour.** There was good progress in 2012 on adding new wind generation capacity to the system, insulating lofts and cavity walls in residential buildings, and improving the efficiency of new cars. However, there is a risk that progress will not be sustained, particularly as regards wind generation capacity and insulation. Progress was very limited in other areas, notably low-carbon heat, and energy efficiency improvement in commercial and industrial sectors.
 - **Power sector.** Record levels of wind generation capacity (both onshore and offshore) were added to the system in 2012. However, the slow movement of offshore wind projects into construction suggests that investments are now being delayed until implementing arrangements for the Electricity Market Reform are finalised. Challenges remain in moving forward with demonstrations of Carbon Capture and Storage (CCS) and investments in nuclear new build, and putting in place arrangements to support ongoing investment programmes for each of the low-carbon technologies.
 - **Buildings.** Loft and cavity wall insulation rates increased in 2012 as energy companies aimed to meet their targets in the final year of the supplier obligation schemes (CERT and CESP). There is a significant risk around future delivery of these measures given weaker incentives under the new Green Deal and Energy Company Obligation. Solid wall insulation rates increased but remained low. While central Government made good progress to meet emissions reduction targets for its own estate, there was very limited improvement in commercial sector energy efficiency. Low-carbon heat deployment remained very low, with inadequate levels of investment in heat pumps, which are an important option for meeting carbon budgets.
 - **Industry.** There was limited evidence of energy efficiency improvement in industry in 2012, and significant potential remains in this area. This should be addressed to reduce industry costs and emissions. An approach to developing industrial CCS compatible with deployment in the 2020s is also required.
 - **Transport.** Emissions of new cars and vans continued to improve, and are on track to meet EU targets for 2020. Take-up of electric vehicles is slow but the market is developing as new models become available. A stable framework of support must remain in place in this nascent market to boost consumer and producer confidence. The Local Sustainable Travel Fund is now fully committed and could reduce transport emissions through Smarter Choices programmes aimed at rationalising car travel. Further funding to support national roll-out should be provided if projects are successful in delivering emissions reductions at low cost. Uptake of eco-driving training remains very low; eco-driving should be actively encouraged through a combination of inclusion in the driving test, driver training, awareness raising and in-car information on fuel efficiency.
 - **Agriculture.** The evidence base on agriculture is highly uncertain. While estimated emissions were broadly flat, it is unclear what changes are occurring in farming practice and what impact these are having. In order to understand progress and develop policies accordingly, the evidence base needs to be improved through introduction of a smart emissions inventory, and systematic gathering and publication of information on farming practice.

-
- **Waste emissions.** These emissions have been falling and are on track with our modelled trajectories to meet carbon budgets. However, further consideration should be given to banning specific types of biodegradable wastes, such as food waste, from landfill.
 - **F-gas emissions.** Emissions of F-gases arise primarily from leakage during their use as coolants in air conditioning and refrigeration, though they are also used in some industrial processes and other applications. Commercial companies are increasingly deploying low-carbon alternatives. Given significant scope for reduction of F-gas emissions, the Government should at a minimum fully support proposals from the EU to reduce emissions of F-gases by 70% in 2030, but should also consider pushing for a more ambitious agreement, with more rapid phase out of some uses of these gases.
 - **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.
 - **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 2014/15-18/19, 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 mainly 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 strengthened financial/fiscal incentives for uptake should be 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 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.
 - **Devolved administrations.** Similar emissions changes have occurred in the devolved administrations as in the UK overall. In some areas of policy and delivery the devolved administrations are leading within the UK, but significant challenges remain in the transition to low-carbon economies.
 - **Emissions.** Emissions in the devolved administrations have broadly followed the whole UK trend, with a decrease in emissions during the economic downturn, and year-on-year fluctuations largely due to variations in temperature. In 2011 (the latest year for which data is available), Scottish emissions fell faster than the UK average (by 10% compared to 7%), while emissions in Wales and Northern Ireland fell by 5%.
 - **Progress.** The devolved administrations continue to lead the UK in some areas. For example Scotland is making very good progress in increasing its renewable energy capacity, while both Scotland and Wales have more ambitious waste targets than required under the EU Landfill Directive. All three devolved administrations have additional, government-funded fuel poverty reduction programmes, focusing on energy efficiency.
 - **Challenges.** Significant challenges remain, and will need to be addressed, such as increasing the rate of renewable power capacity deployment (especially in Wales), increasing low-carbon heat penetration, increasing rates of woodland planting (especially in Wales and Northern Ireland), encouraging more uptake of electric vehicles, as well as reducing the very high rates of fuel poverty found in the devolved administrations.

Box 1: Summary of recommendations in 2013 progress report

Power

- Set out in the Delivery Plan for the Electricity Market Reform (EMR) the quantity of capacity to be contracted during the period 2014/15 to 2018/19, and the intended prices for wind generation.
- Resolve detailed implementing issues for EMR relating to contract design and payment mechanism as the Energy Bill is finalised, ready to sign contracts in 2014.
- Clarify that the funding under the levy control framework will be calculated relative to the cost of building and running a new unabated gas-fired plant rather than the wholesale electricity price and increase funding if contract lengths are shorter than expected project lifetimes.
- Agree the contract for the first new nuclear project.
- Provide clarity on power sector development through the 2020s: legislate a target for carbon intensity of power generation in 2030; set out commercialisation strategies for carbon capture and storage (CCS) and offshore wind; extend the levy control framework to 2030.
- Ensure the two selected CCS projects move forward such that contracts can be signed by early 2015, enabling plant to become operational by 2018/19. Set out the timing of further projects and approaches to de-risking and CO₂ infrastructure development.
- Set stretching sustainability standards for the use of biomass, and require that forest biomass comes from sustainably managed forests.

Buildings

- Carry out an early review of the Green Deal and ECO and consider further incentives to encourage uptake of measures (especially lofts and cavity wall insulation).
- Tighten building regulations in line with the previously announced schedule towards all new homes being zero carbon from 2016.
- Ensure measures are in place to adequately support fuel poor electrically heated households, either within the Energy Company Obligation, or otherwise. Ensure that the Energy Company Obligation continues to the point where all fuel poor households have benefitted from it, and address very high rates of fuel poverty found in the devolved administrations.
- Set ambitious minimum standards for energy efficiency in the residential and non-residential sector, as envisaged under the 2011 Energy Act. These standards should be announced now with a lead time so that landlords can optimise the timing of implementation, for example, as tenancy agreements come to an end.
- Make a comprehensive assessment of non-residential low-carbon policies to ensure they work effectively.
- Extend the Renewable Heat Incentive to the residential sector and ensure funding beyond 2015, allow Green Deal finance to cover the up-front cost of purchasing heat pumps, and consider options to address non-financial barriers.

Industry

- Include the full range of cost-effective abatement options in the industry sector roadmaps and align financial incentives for low-cost abatement.
- Set out an approach to demonstration and commercialisation of industry CCS compatible with deployment in the 2020s.
- Introduce a detailed implementing package for commitments to mitigate competitiveness risks for UK firms from low-carbon policies (e.g. the £250 million compensation package and exemptions from costs under EMR).

Box 1: Summary of recommendations in 2013 progress report

Transport

- Support the setting of challenging longer-term new Car and Van CO₂ intensity targets at EU level as soon as possible (e.g. following the Commission's proposed review to be completed by the end of 2014).
- Push for rapid progress in developing an EU framework for HGV emissions.
- Ensure a stable framework of support for electric vehicles (commit to continuation of funding of Plug-in Car and Van Grants beyond 2015 and reinstate tax incentives for company cars).
- Push for robust sustainability criteria for biofuels to be agreed at the EU level as soon as possible.
- Actively promote uptake of eco-driving through a combination of inclusion as a key element in the practical driving test, driver training, awareness raising and in-car information on fuel efficiency.

Agriculture

- Set targets in their roadmaps as to how the cereals and oil seeds sectors will contribute to emission reductions.
- Set out approach to assessing the effectiveness of the voluntary approach in the GHG Industry Action Plan.
- Any review on progress towards reducing emissions from agriculture should also consider a range of policy options, including policies that would provide stronger incentives for farmers.

Waste and other non-CO₂

- Consider stronger levers to reduce the amount of biodegradable waste that is sent to landfill, including further provision by local authorities for separate collection of food waste, and review landfill bans on major sources of biodegradable waste on a case-by-case basis.
- Support EC proposal to update the F-gas regulation and consider going further given the existence of cost-effective alternatives.

Actions for specific and national authorities

- **DECC** is the key department in ensuring that actions are taken in power, buildings and industry sectors.
- **CLG** has an important role to play ensuring that building regulations for new homes are tightened, minimum energy efficiency standards for non-residential buildings are set, and transport emissions fully accounted for as part of the planning process.
- **DfT** is responsible for actions to reduce surface transport emissions.
- **Defra** is responsible for actions to reduce agriculture and other non-CO₂ emissions, including our specific recommendations on waste and F-gases.
- **HM Treasury** is responsible for ensuring that there is sufficient funding, for example, in the levy control framework, the Renewable Heat Incentive, and to support Electric Vehicle Market Development; and to ensure that fiscal levers such as Vehicle Excise Duty and the tax regime for ultra low-carbon vehicles are designed to ensure carbon efficient choice and investments.
- **Devolved Administrations.** It is essential that national authorities take action across the range of measures in order to ensure that national and UK emissions targets are achieved, with a particularly important role supporting energy efficiency improvement, investment in renewable power generation and renewable heat, programmes to reduce car travel, and approaches to reduce emissions from agriculture and land use.

We set out the analysis that underpins these conclusions in ten parts:

1. Economy-wide emissions
2. Non-traded sector emissions
3. Traded sector emissions
4. Power sector emissions
5. Emissions from buildings
6. Emissions from industry
7. Emissions from surface transport
8. Agriculture
9. Waste and other non-CO₂ emissions
10. Emissions in the devolved administrations

1. Economy-wide emissions

The context for our assessment in this report is one of limited GDP growth in 2012, increased energy prices and colder winter months than 2011:

- GDP grew by 0.3% (in real terms) in 2012, following growth in 2011 of 0.7% (Figure 1). Within this, manufacturing output fell by 1.5%.
- Wholesale gas price increases in 2012 resulted in a 10% real terms increase in residential gas prices, and a 4% real terms increase in residential electricity prices (Figure 2).
- In the transport sector, petrol prices rose by 0.2% in real terms¹ and diesel prices rose by 0.8% in real terms (Figure 3).
- The winter months in 2012 (i.e. January, February and December) were around 0.5°C colder than in the previous year (though close to the long term average) and there were 20% more heating degree days (HDD)² over the year (Figure 4).

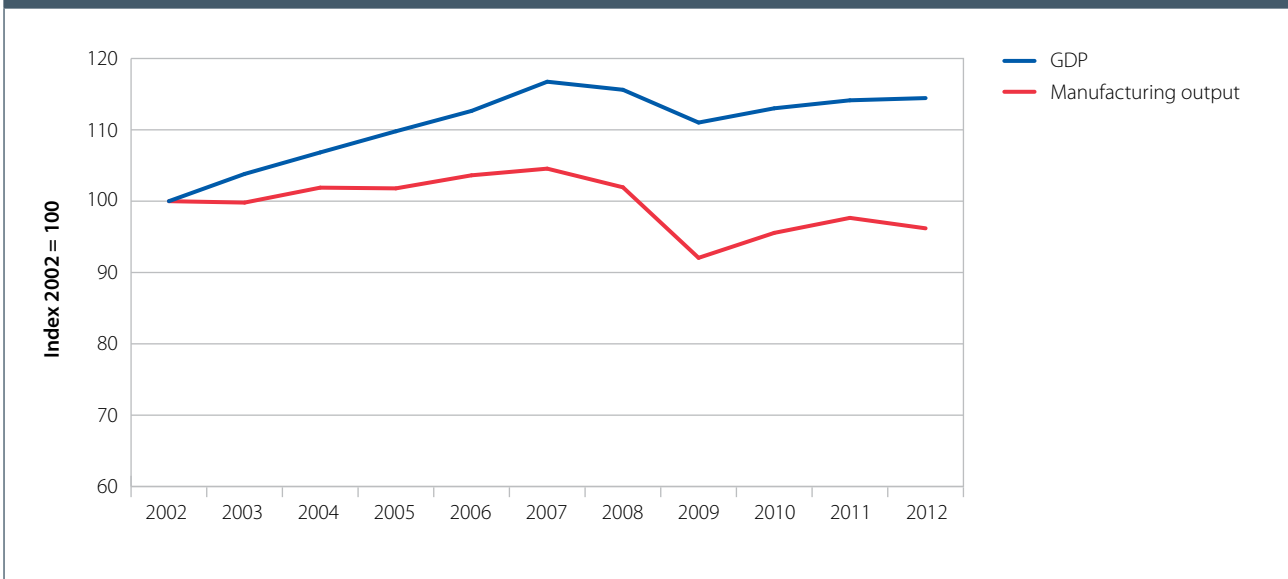
Economy-wide greenhouse gas emissions increased by 3.5% in 2012 (Figure 5). This reflected a 4.5% increase in CO₂ emissions, which account for 84% of total greenhouse gas emissions; and a 1.5% reduction in non-CO₂ emissions, which account for 16% of total greenhouse gas emissions.

The CO₂ emissions increase on 2011 was primarily due to an increase in heating demand due to lower winter temperatures and an increase in the share of coal use in power generation.

¹ DECC publish gas and electricity prices in real terms 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. For 2012, the GDP deflator implies an inflation rate of 1.4%, considerably below the rates implied by the consumer price index (CPI) and retail price index (RPI) of over 4%.

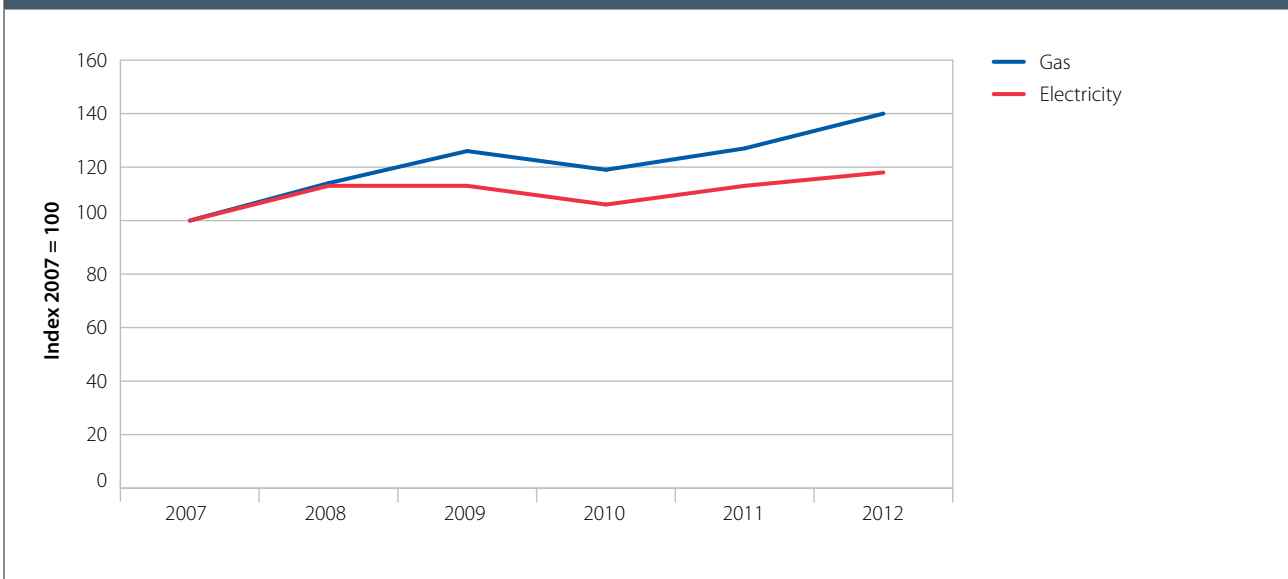
² A Heating Degree Day (HDD) is defined as a decrease of one degree centigrade in the average temperature, below a baseline temperature of 15.5°C (below which a building typically needs heating) on a given day. For example, an average outside temperature of 10.5°C over two days would result in 10 HDDs.

Figure 1: UK economic indicators (2002-2012)



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

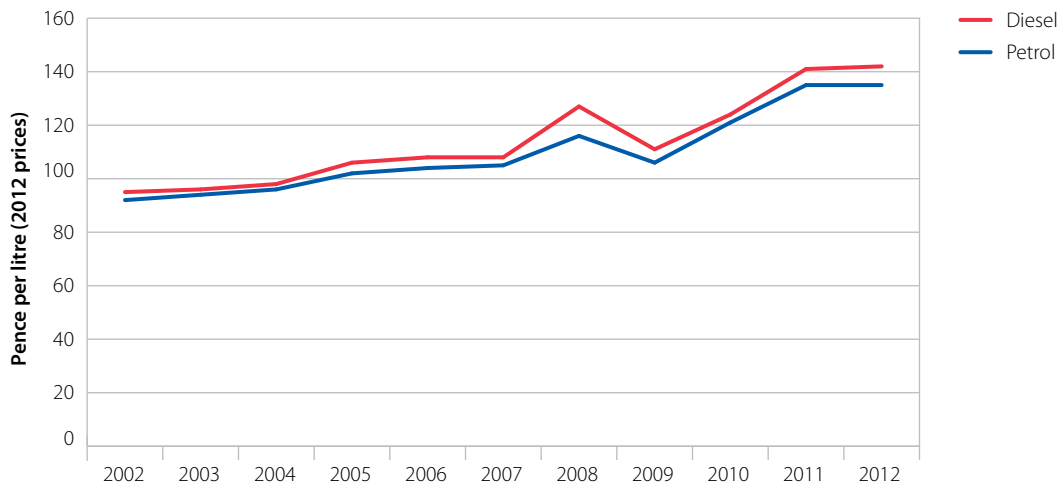
Figure 2: Residential fuel prices in the UK (2007-2012)



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

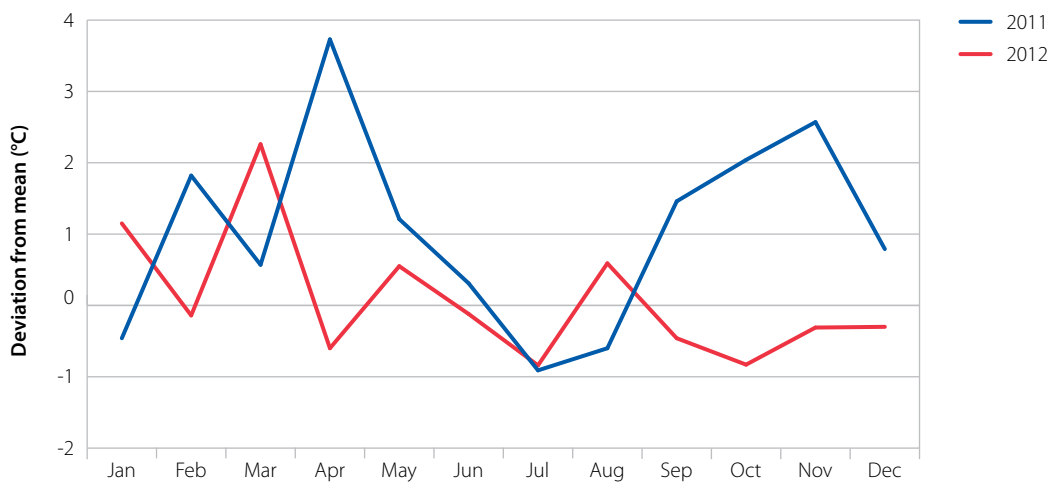
- Lower winter temperatures caused an increase in heating demand. This was met largely through burning of fossil fuels which resulted in increased direct emissions from buildings; these account for around a fifth of total CO₂ emissions, and increased by 10% in 2012. The majority of direct emissions from buildings come from the residential sector, where direct emissions increased by 12% in 2012.
- Emissions from power generation, which account for a third of CO₂ emissions, increased by 8% in 2012. The share of coal use in power generation increased from 30% of generation in 2011 to 39% in 2012, while the share of natural gas decreased from 40% in 2011 to 27% in 2012.

Figure 3: Road fuel prices in the UK (2002-2012)



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

Figure 4: Average temperature deviation from the long term mean (2011-2012)



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

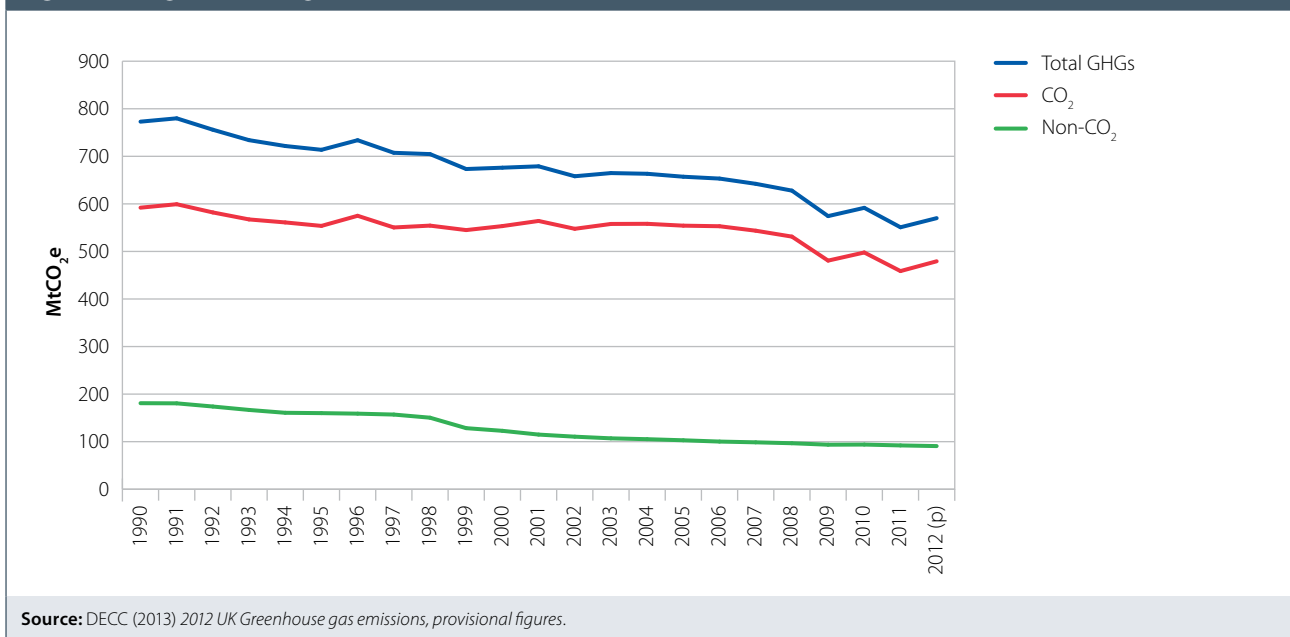
Note: The long term mean temperature is calculated for the years 1971-2000.

Adjusting for the impact of colder temperatures and also for the switch from gas to coal in power generation, both of which are transitory³, greenhouse gas emissions fell by 1-1.5% in 2012. This compares with an annual emissions reduction of 3% required to meet the fourth carbon budget.

This limited reduction in the adjusted figures in 2012, a year characterised by low GDP growth and increases in energy and fuel prices, suggests it will be a major challenge to achieve a 3% a year reduction as the economy recovers, particularly if increases in energy and fuel prices were

³ We do not expect the gas to coal switch to continue in future as the majority of coal plant is set to retire driven by a combination of end-of-life closures, new EU legislation and coal becoming un-economic due to the rising carbon price floor (section 4).

Figure 5: UK greenhouse gas emissions (1990-2012)



to moderate. There is a risk that emissions increase as the economy returns to trend growth unless there is an increase in the pace of progress implementing measures to reduce emissions.

2. Non-traded sector emissions

Non-traded sector emissions are those not covered by the EU Emissions Trading Scheme (ETS). They include emissions due to burning of fossil fuels for heat in buildings, non-energy-intensive industry, surface transport, as well as almost all non-CO₂ emissions (e.g. from agriculture and waste). They account for 59% of economy-wide greenhouse gas emissions.

Non-traded sector emissions rose by 3.1% in 2012 (Figure 6). This increase was driven by an increase in emissions from buildings, which, as discussed above, was due to increased heating demand in response to colder winter temperatures. Without this impact, non-traded sector emissions would have increased by only 0.2%.

Our assessment of progress in implementing measures to reduce emissions shows that there was good progress on boiler replacement, loft and cavity wall insulation, and new car emissions. However, there was limited progress on solid wall insulation, low-carbon heat, non-residential and industrial energy efficiency improvement, electric vehicle market development and transport consumer behaviour change (see sections 5-7 below).

The first carbon budget was met, largely due to the impact of the recession, which would also allow achievement of the second budget with limited effort. However, if there were no improvement in the rate of progress achieved in 2012, the third and fourth carbon budgets would not be achieved (Figure 7).

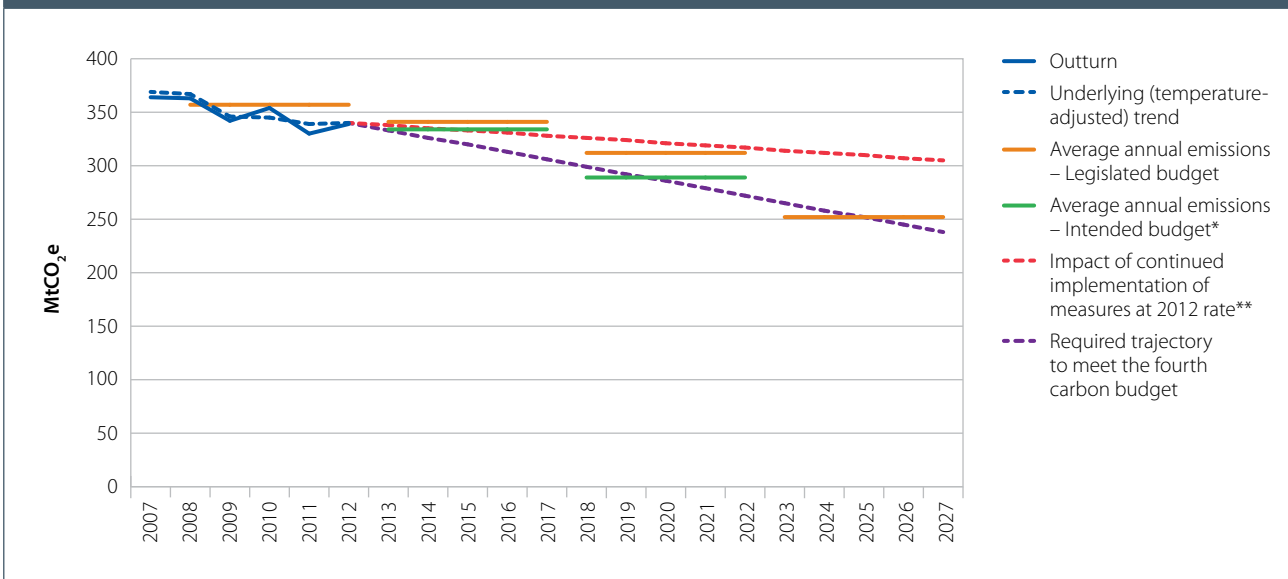
This highlights the need first to continue progress in areas where this has been achieved to date, including where this may be more challenging in future, such as loft and cavity wall insulation under the new Green Deal and Energy Company Obligation (see Section 5 below).

Figure 6: Non-traded sector emissions vs. Carbon budgets (2007-2027)



Source: DECC (2013) *2012 UK Greenhouse gas emissions, provisional figures*; DECC (March 2013) *Energy Trends*; 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.

Figure 7: Non-traded sector emissions based on continued implementation of measures in 2012 (2007-2027)



Source: NAEI (2013); DECC (2013) *2012 UK Greenhouse gas emissions, provisional figures*; European Commission (2 April 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.

In addition, it is necessary to accelerate the rate of progress in areas where this has been lacking to date, including low-carbon heat, non-residential and industrial energy efficiency improvement, new van emissions and electric vehicles. The need to accelerate progress is now urgent: lead times for policy development, and lags in market development, mean that action is required now if significant cuts are to be achieved by the time of the third and fourth carbon budgets.

3. Traded sector emissions

UK traded sector emissions

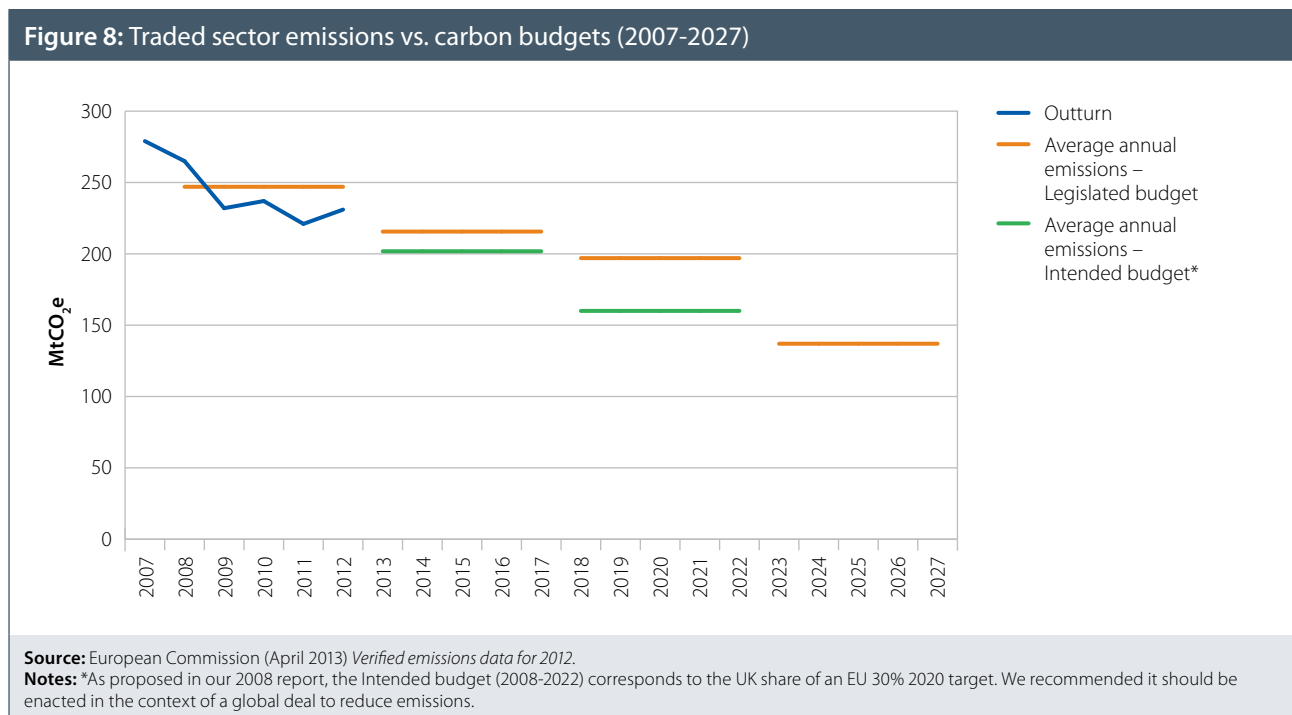
Traded sector emissions are those covered by the EU ETS. They comprise 67% emissions from the power sector and 33% emissions from energy-intensive sectors such as iron and steel and refining, and account for 41% of economy-wide emissions.

The carbon price underpin introduced in April 2013 applies to the power sector, but not to the rest of the traded sector; this started at a rate of £16/tCO₂ and will rise to £32/tCO₂ in 2020.

Given the accounting conventions under the Climate Change Act, the traded sector portion of the carbon budget will always be met. To the extent that gross emissions (i.e. actual emissions in the UK, before any trading of emissions allowances) in the traded sector are above budgeted levels, this will result in the purchase of allowances in the EU ETS, such that the budget is achieved on a net basis (i.e. after trading in emissions allowances).

However, it is important that gross emissions from the traded sector are reduced given the need to meet carbon budgets and targets further out in time largely through reductions in UK emissions.

Gross traded sector emissions rose by 5% in 2012, mainly as a result of increased emissions from power generation, but remained below the traded sector cap, mainly due to the ongoing impact of output reductions in 2009 (Figure 8).



- Power sector emissions rose by 8% in 2012 driven by increased emissions intensity of power generation.
- Industry traded sector emissions fell by 4% in 2012⁴.
- Traded sector emissions remained below the traded sector cap, reflecting the substantial decline in output in 2009 as a result of economic recession, which has not been made up since.

We consider whether there was progress implementing measures to reduce emissions in the power and energy-intensive sectors in sections 4 and 6 below.

EU traded sector emissions

EU traded sector emissions are important for the UK because the level of effort to reduce these emissions to the level of the cap determines the carbon price in the EU ETS. In turn, this is important because of the incentives it can provide to reduce emissions, and because a higher carbon price in the EU ETS would reduce electricity price differentials between the UK and other EU countries due to the carbon price underpin, therefore reducing competitiveness risks for electricity-intensive industries.

EU traded sector emissions fell 2% in 2012 and remained below the level of the EU ETS cap (Figure 9), resulting in a continued low carbon price (Figure 10).

- Emissions remained below the level of the EU ETS cap in 2012, largely reflecting the significant reduction in 2009 as a result of the EU and wider global economic downturn.
- Over Phase II as a whole (2008-12) emissions were around 10% below the level of the cap. The unused allowances from Phase II can be banked and will be available to meet the EU ETS cap in future years, putting a downward pressure on future as well as current carbon prices.
- The carbon price in 2012 averaged around €7/tCO₂ compared to €13/tCO₂ in 2011.

It is important to increase the carbon price, both to strengthen incentives for emissions reduction, and to improve credibility of one of the EU's key low-carbon policies.

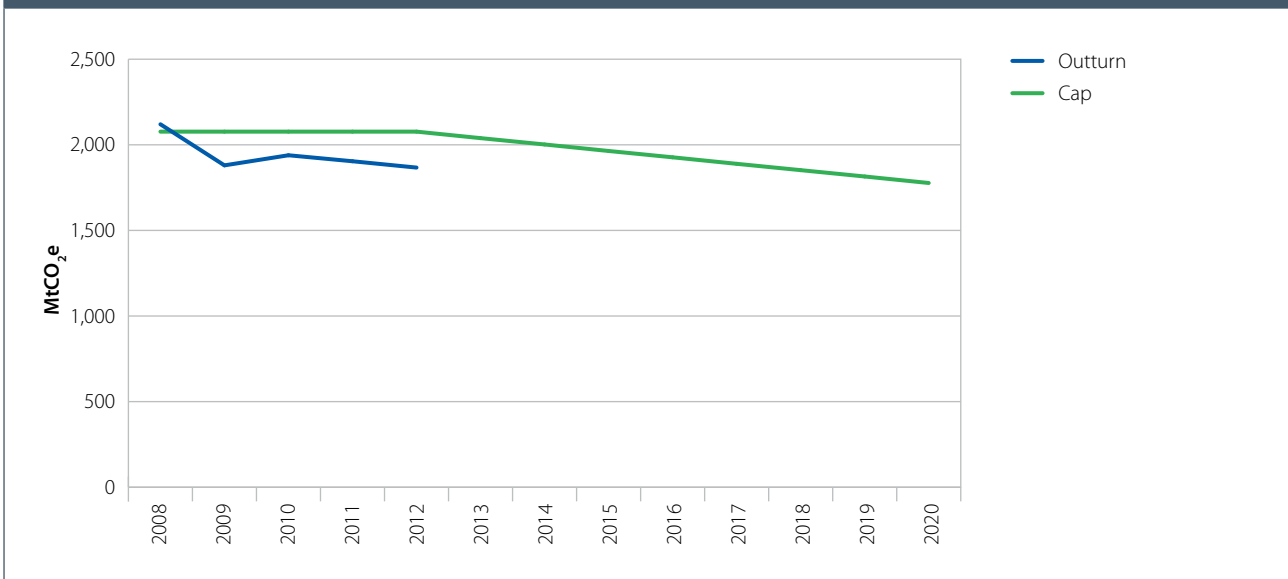
One option which could have increased the carbon price was to limit release of allowances to the market in the near term (called "back-loading"). However, this was voted against in the European Parliament in April 2013.

The European Commission (EC) is now considering proposals for structural reform of the EU ETS with a view to providing a more robust price signal, and which it will publish in 2014. The UK, alongside Energy and Environment Ministers from eight other member states, have called for substantive measures to strengthen the system.

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

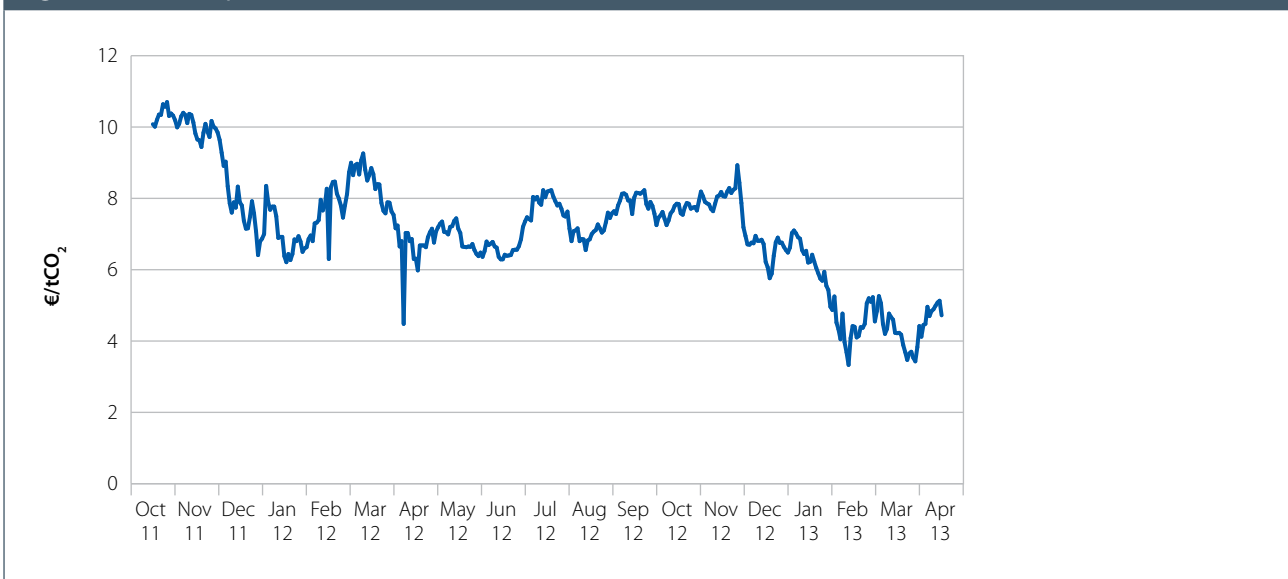
⁴ CITL data for 2011 and 2012.

Figure 9: Emissions within the EU ETS versus cap (2008-2020)



Source: European Commission (April 2013) *Verified emissions data for 2012*; European Commission (22 October 2010) *Commission Decision 2010/364/EU*.
Notes: Excludes International Aviation

Figure 10: Carbon price in the EU ETS



Source: Point Carbon.

by the end of 2013. The Green Paper, “A 2030 framework for climate and energy policies”, which launches 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. This Roadmap suggests a reduction in emissions of 40% on 1990 levels by 2030 on the path to an 80-95% reduction by 2050, reflecting the EC’s analysis of scope for cost-effective emissions reductions.

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% on 1990 levels, 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 very high-level analysis.

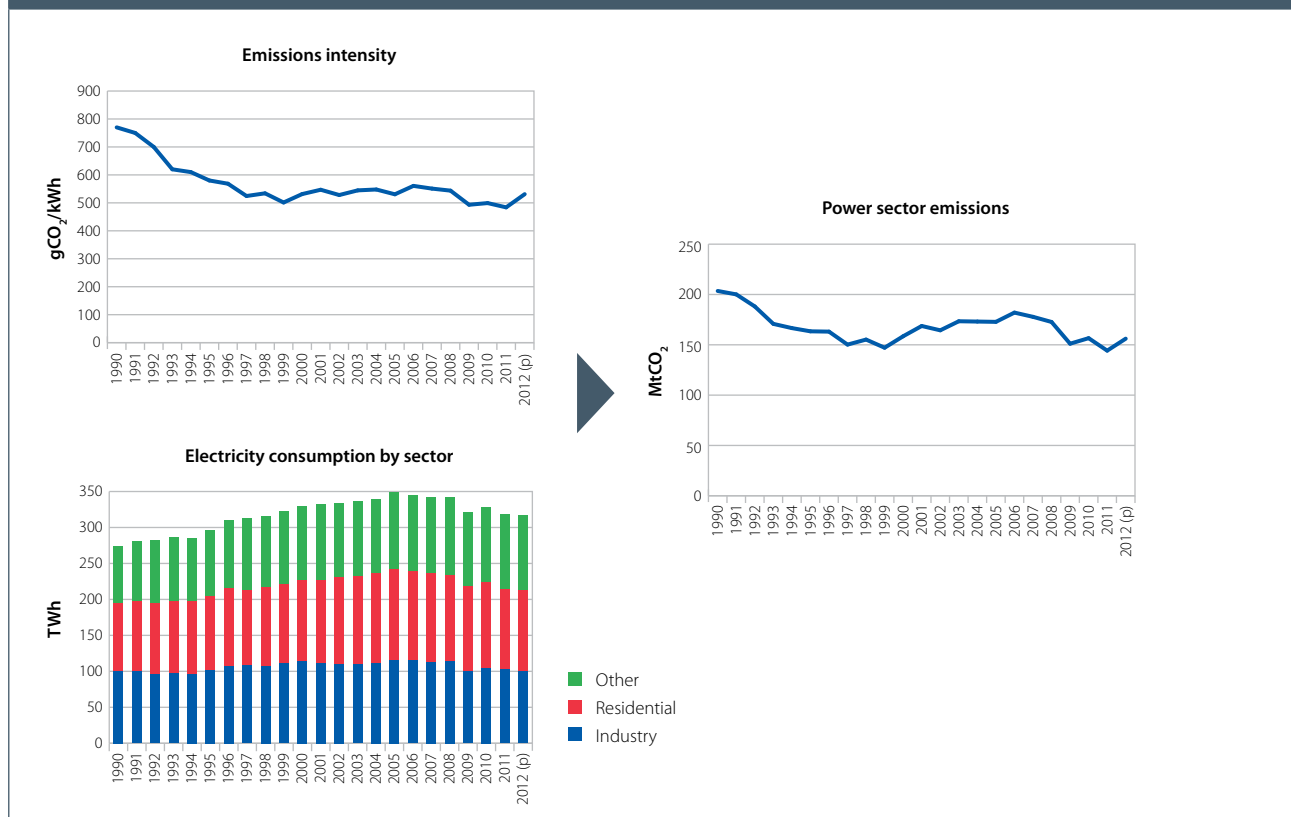
We therefore strongly support the UK Government position. We will consider consistency of UK carbon budgets with EU targets further in the context of the fourth carbon budget review.

4. Power sector emissions

Emission trends

Power sector emissions increased by 8% in 2012 due to increased carbon intensity of generation. This was the result of switching from gas to coal as the primary generation source. This more than offset the impact of increased renewable generation, while demand remained broadly constant (Figure 11).

Figure 11: Emissions intensity of electricity supply, electricity demand and CO₂ emissions from the power sector (1990-2012)



Source: DECC (March 2013) *Energy Trends*; DECC (2013) *UK Greenhouse Gas Emissions 1990-2012 (provisional)*, CCC calculations.
Notes: Emissions intensity is UK based useable generation, i.e. adjusted for losses. Electricity consumption includes imported power. 2012 data are provisional.

- **Carbon intensity.** In 2012, carbon intensity of generation increased by 10%, due to an increase of highly carbon-intensive coal-fired generation at the expense of gas-fired generation. This was driven by a low price of coal and a high price of gas in the global market and a low carbon price. The impact of increased coal generation on emissions was partially offset by the addition of renewable capacity to the system.
- **Consumption.** Total consumption remained broadly constant. A doubling of net imports of electricity led to a 4% reduction in the amount of electricity generated in the UK.

Achievable carbon intensity of power generation

While carbon intensity of generation increased by 10% to 531 gCO₂/kWh in 2012, achievable emissions intensity fell by 6% to 315 gCO₂/kWh. In other words, if plant on the system were dispatched so as to minimise emissions while still maintaining security of supply (i.e. if gas-fired plant were dispatched before coal-fired plant whenever technically possible), carbon intensity would fall by 41% from 531 to 315 gCO₂/kWh, at minimal additional cost to the consumer.

This can be compared with carbon intensity levels around 200 gCO₂/kWh in 2020 and 50 gCO₂/kWh in 2030 which we have identified as being on the cost-effective path to meeting the 2050 target set out in the Climate Change Act.

Over time we would expect actual carbon intensity to converge towards achievable intensity as coal plant currently on the system is retired in compliance with EU air quality legislation.

- **Age of coal plants.** The majority of coal plants in the UK were built in the 1960s and 1970s, and with a typical lifetime of 40-50 years, many of them are now nearing the end of their lifetime.
- **Environmental legislation.** European regulations relating to air quality will lead plants to retire or reduce their running hours earlier than suggested by expected retirement ages:
 - **Large Combustion Plant Directive (LCPD).** Around a quarter of UK coal-fired capacity (6 GW) face restricted running hours between now and end-2015 under the LCPD,⁵ and will have to close when these hours are used up. The favourable economic conditions for coal in 2012 brought forward generation that would likely have occurred at a later date, therefore, the cumulative output and emissions from these plants is likely to be unaffected.
 - **Industrial Emissions Directive (IED).** The remainder of UK coal plant could also face further restrictions from 2015 and be forced to close by end-2023 under the IED.⁶
- **Economics of coal plant.** Even though the cost of coal generation has fallen over 2012, the profitability of coal plant is likely to decline in the future due to the UK's carbon price floor.

In order that carbon intensity is significantly reduced beyond this, investment across the portfolio of low-carbon technologies is required.

⁵ The LCPD regulates sulphur oxides, nitrogen oxides and particulate matter emissions. Plants were given a choice to opt in or out. Plants opting out were allocated 20,000 hours to run 2008-2015. Plants opting in must comply with Emissions Limit Values for the three pollutants. This could involve undergoing full biomass conversion.

⁶ In 2010 the LCPD was combined with six other existing directives to form the IED. LCPD plants which opt in to the IED must agree to stricter emissions limits. Plants which opted in to the LCPD but not to the IED will have their hours capped at 17,500 for 2016-2023. Plants are required to give notice of intent to comply with IED at the end of 2013; the final decision has to be taken by the end of 2014.

Progress in low-carbon investment

Wind generation

A record level of onshore and offshore wind capacity was added to the system in 2012 (1.2 GW of each). If these deployment levels can be sustained this would be enough to meet our 2020 indicators for both onshore and offshore wind (i.e. 15 GW and 12 GW respectively) (Figure 12).

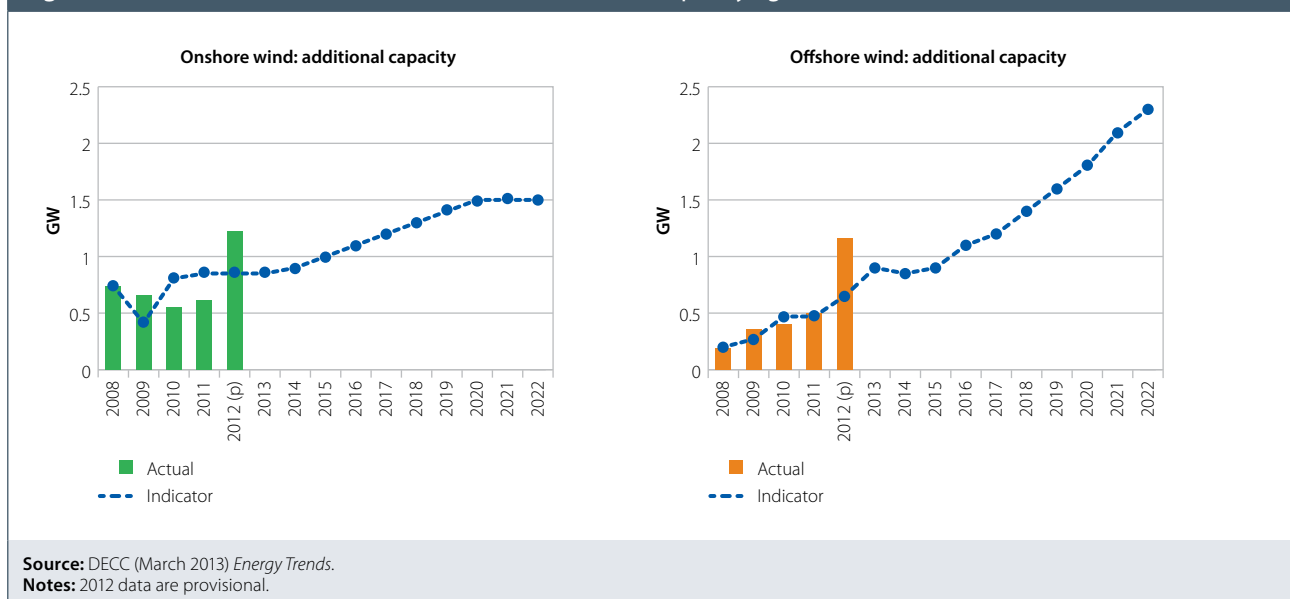
There is a healthy project pipeline to support further investment.

- 4.4 GW onshore wind and 2.3 GW offshore wind had planning approval and was awaiting construction at the end of 2012. If these projects move smoothly into construction and operation then this would be enough, along with those projects already under construction, to deliver required capacity additions for the next six years onshore and four years offshore.
- There was a substantial amount of new wind planning applications in 2012 (particularly offshore) and the number of determinations were in line with our indicators.

However, the rate at which projects are entering construction is slow, particularly for offshore wind, as investors wait for details on the design of the Electricity Market Reform before proceeding to the next stage of the project cycle.

- At the end of 2012, 1.9 GW of onshore wind and 1.3 GW of offshore wind were under construction (compared with 1.8 GW and 1.9 GW respectively at the end of 2011).
- During 2012, far less offshore capacity started construction than completed (0.6 GW compared with 1.2 GW), whilst a large amount of onshore capacity began construction (1.3 GW).

Figure 12: Onshore and offshore wind: annual additional capacity against our indicators (2008-2022)



Whether and how quickly projects move forward will therefore depend on the Electricity Market Reform, both in terms of enabling legislation and implementing arrangements (see below).

Biomass

In 2012, only 30 MW (0.03 GW) of solid biomass was added to the system, compared with 830 MW (0.83 GW) in 2011 (largely due to the conversion of Tilbury coal power station).

A further 0.5 GW of coal plant has converted to biomass so far in 2013 (Ironbridge) and another 5.5 GW is publicly investigating conversion.

It is important that safeguards are in place to ensure that the use of biomass results in genuine emission reductions. We therefore repeat our recommendation that the threshold for the use of biomass under the Renewables Obligation should be reduced to 200 gCO₂/kWh compared to the current threshold of 285 gCO₂/kWh, and progressively tightened further. In achieving this, it is important that forest biomass comes from sustainably managed forests, meaning carbon stocks should be maintained and possibly increased over time.

Solar

Solar installations continued at a high level in 2012 (0.7 GW installed) although this was slightly down on 2011. Of the added capacity, over half (0.4 GW) came on line after a second round of tariff cuts came into force in April 2012, suggesting that solar generation is still profitable at these lower tariffs.

Progress investing in nuclear new build

Two important milestones were passed in the last year with generic design approval of the Areva reactor design and planning permission granted for the Hinkley site. Negotiations to agree contract terms for the first plant are underway.

- **Approval of reactor designs.** The pressurised water reactor designed by Areva (which will be used by EDF) received generic design approval by the regulator in December 2012. Horizon's planned boiling water reactor design was submitted for approval in January 2013, with a final decision expected by 2017/18.
- **Planning.** The EDF project at Hinkley Point C was granted planning permission in March 2013, two years later than initially expected following delays caused by the 2011 incident at Fukushima.
- **Contracting.** The Government is currently negotiating with EDF over the level and terms of support for a new nuclear plant at Hinkley. Following agreement the project can reach final investment decision and potentially begin construction this year.

Agreement on the contract for the first project at Hinkley Point C would allow focus on other contracts to be signed under the first EMR Delivery Plan period, with scope to sign for up to around 6 GW by 2018-19, as part of a major nuclear programme through the 2020s, with significant economic benefits for the UK.

Progress demonstrating carbon capture and storage (CCS)

Following limited progress over the last few years, the CCS Commercialisation Programme moved forward with selection of preferred bidders to undertake front-end engineering and design (FEED) studies for two projects:

- From the four projects shortlisted, two preferred bidders were selected to negotiate FEED studies: a gas post-combustion project at Peterhead in Scotland and a coal oxy-fuel project at Drax in Yorkshire.
- DECC has stated that it expects these studies to take around 18 months, with final investment decisions for the plants to occur in early 2015.

It is important that these projects move forward such that FEED studies are completed and contracts signed in early 2015, if not earlier, allowing for plant to become operational by 2018/19.

It is also important to set out the next steps for commercialisation of CCS, to capitalise on current investor interest, and noting that further investment will be required to drive down costs such that CCS can compete in the market:

- The Government should consider options for a further two demonstration projects to come on line by the early 2020s, in line with commitments in the Coalition agreement. This should include approaches to funding FEED studies and signing contracts, and opportunities to leverage UK funding with that from the EU.
- Going beyond the four demonstration projects, the Government should set out a commercialisation strategy for CCS covering investments envisaged through the 2020s and associated conditions, for example, related to required cost reductions in order that support is continued. This should include an assessment of different CCS applications within and between coal, gas, biomass and industry. It should take account of international efforts to develop CCS technology, complementing rather than duplicating what is happening in other countries.

The Government should also set out a strategy for the development of CO₂ infrastructure. This would encompass not only DECC's storage strategy, currently under development, but also what to build, how this would be funded and implications for locating new fossil and biomass power plants.

The combination of demonstration projects together with commercialisation and infrastructure strategies will provide a good basis for development of CCS technology in the UK to complement efforts in other countries, such that this can make a potentially important contribution to reduction of emissions in power and energy-intensive sectors in the 2020s and beyond.

Electricity market reform

The Electricity Market Reform (EMR) is essential in supporting investment across the portfolio of low-carbon technologies. The EMR offers the opportunity to bring forward investment in low-carbon technologies which has potential to deliver significant benefits to consumers in the long run. Without it, we would expect such investments to be limited in scale and to be more expensive.

The enabling legislation for the EMR – the Energy Bill – entered Parliament in the last year, and has now gone through the House of Commons and into the Lords.

There remain a number of detailed technical issues relating to contract design and payment mechanism which must be addressed as a matter of urgency in order that investments currently held up can enter construction.

There are also important issues related to uncertainty around the future project pipeline which should be addressed through the implementing arrangements for the EMR, to support further project development and supply chain investment:

- There is uncertainty over what investments will be supported in the first years of the delivery plan. This relates in part to the levy control framework which, while set at broadly the appropriate level, requires further clarification and possible adjustment to avoid a funding shortfall.
- There is more uncertainty over investments to be supported after 2020, where the Government has set out a wide range of possible investment pathways for the 2020s, some of which include no further investment in low-carbon technologies.
- The consequence of this uncertainty is that incentives for project development and for supply chain investment are undermined.

In order to address these uncertainties the Government should:

- Set out in the EMR Delivery Plan the quantity of contracts it intends to award for each technology over the first EMR Delivery Plan period (2014-18), and publish prices for onshore and offshore wind contracts for this period.
- Clarify that the levy control framework will be calculated relative to the cost of new gas-fired generation rather than the wholesale market price.

-
- Ensure that funding under the levy control framework is sufficient given decisions on contract length. Our analysis of required funding has assumed that contract length is commensurate with asset life. The Government has proposed shorter contracts, which would increase funding requirements to 2020 and beyond, and would reduce funding requirements in the 2030s. The Government should only proceed with shorter contracts if it can demonstrate that this is likely to result in a clear economic benefit. In this event, the levy control framework limit would have to be increased to avoid a funding shortfall.
 - Provide more clarity for investors about the path for power sector development through the 2020s:
 - Commit in legislation to reduce the carbon intensity of power generation to 50 gCO₂/ kWh in 2030, with some flexibility to adjust this in the light of new information.
 - Publish commercialisation strategies for less mature technologies including offshore wind and CCS.
 - Extend funding under the levy control framework to 2030.

Noting that the current Government is not willing to commit to a carbon-intensity target, this will be a priority early in the next Parliament. For the interim period, the other measures above would help to improve the investment climate, and should be implemented in order to unlock the full economic benefit of the EMR.

5. Emissions from buildings

Emissions trends

Emissions from buildings account for 37% of total UK greenhouse gas emissions. They comprise 45% direct emissions due to the burning of fossil fuels for heat, and 55% indirect emissions related to electricity use. On a sector basis, residential emissions account for around 66% of total building emissions, commercial emissions for around 26% and public sector emissions for around 8%.

Buildings emissions increased by 10% in 2012. This was due to broadly similar increases across each of the residential, commercial and public sectors, mainly a result of an increase in indirect (electricity related) emissions due to higher electricity grid intensity, as well as a rise in direct emissions due to colder winter temperatures than in 2011.

- **Residential buildings.** Total residential CO₂ emissions increased by 12% in 2012, due in broadly equal part to the increase in winter temperatures and the increase in grid intensity due to the use of coal rather than gas in power generation.
- **Commercial buildings.** In 2012 total commercial emissions increased by 9%. This was largely due to the increase in grid intensity, given that the vast majority of commercial sector emissions are electricity-related.

-
- **Public buildings.** Public sector CO₂ emissions in 2012 increased by 8%. Part of this increase was weather related, but it largely reflects increased grid intensity, with most public sector emissions being electricity-related.

After allowing for the impact of the weather as compared with 2011 and the change in grid intensity, underlying emissions fell slightly in the residential sector, and were broadly flat in the non-residential sector. This conclusion is reinforced by the analysis summarised in the following sections, which also consider progress developing policies which will provide stronger incentives for energy efficiency improvements.

Progress against residential buildings indicators

There was a significant increase in loft and cavity wall insulation in 2012 as energy companies aimed to meet targets under the Carbon Emission Reduction Target (CERT) and the Community Energy Saving Programme (CESP), both of which were replaced with new policies at the beginning of 2013. Solid wall insulation was also increased, although from a very low base. The pace of boiler replacement was maintained, while progress on purchase of more efficient appliances is uncertain.

- **Loft insulation.** Professional installations increased by 50% in 2012 to almost 1.2 million, with DIY installations increasing by 35% to 0.4 million. Total installations were therefore 1.6 million, up from 1.1 million in 2011.
- **Cavity wall insulation.** Installations increased by 22% to over 0.6m.
- **Solid wall insulation.** Overall around 82,000 solid walls were insulated in 2012, up from around 19,000 in 2011.
- **Boiler replacement.** Installation of new boilers continued at a similar rate as in previous years. In 2012, 1.3m new efficient boilers were installed, up 2% from the level in 2011.
- **More efficient appliances.** As we reported in our 2012 progress report, the Government no longer monitors the sales of energy efficient appliances. We therefore have no new data to monitor progress. Considering the large savings expected from products policy, this is a gap which we recommend the Government should address promptly.

In future to meet carbon budgets, there is a need to maintain the pace of loft insulation and to increase the pace of cavity wall insulation, as well as significantly increase the rate of solid wall insulation.

However, there is a significant risk as to whether this is achievable under new policies, notably the Green Deal and the Energy Company Obligation, under which incentives for loft and cavity wall insulation are significantly weaker.

The Green Deal and the Energy Company Obligation

From early 2013, CERT and CESP have been replaced by the Green Deal and Energy Company Obligation (ECO):

- **Green Deal:** This is a new financing framework to facilitate energy efficiency improvements and low-carbon heat in homes and non-residential properties, funded by a charge on electricity bills that avoids the need for consumers to pay up-front costs.
- **ECO:** This creates a legal obligation on energy suppliers to improve the energy efficiency of households through the establishment of three distinct targets – the Carbon Emissions Reduction Obligation (20.9 million “lifetime” tonnes of CO₂), the Carbon Saving Community Obligation (6.8 million lifetime tonnes of CO₂) and the Home Heating Cost Reduction Obligation (£4.2 billion of lifetime cost savings).

Whereas loft and cavity wall insulation were a major focus of efforts to meet targets under the previous policy, this has now shifted to solid wall insulation and hard-to-treat cavity walls under the ECO. The result is a greater reliance on a market based approach and for most measures a switch from subsidy to households bearing full cost. Therefore incentives for loft and cavity wall insulation are significantly weaker. This is reflected in the Government’s own analysis, which projects that for example only around 10% of the remaining lofts will be insulated under the policies.

Data is available for accreditation of Green Deal Advisors and Green Deal Assessments that have been carried out in the first few months of the new policy.

- 152 Green Deal assessor organisations and the 1,274 Green Deal advisors they employ have been accredited
- 18,816 Green Deal assessments have been lodged
- £85.5 million of contracts have been let through the ECO brokerage system.

While official data on actual delivery of measures will not be available until after this report is published, there is evidence that this has slowed in early 2013. For example, registration figures for cavity wall and solid wall insulation under the official guarantee schemes suggest a drop of more than 60% compared to the same period in 2012.

This suggests the need for close monitoring, and consideration of ways to limit delivery risks including allowing the ECO to be met through loft and cavity wall insulation, and providing financial and fiscal incentives for uptake of these measures.

We will consider design and implementation of the Green Deal and the ECO in detail in our next progress report.

⁷ Savings during the lifetime of the measures installed.

Zero carbon homes

Our assessment above focuses on retrofit of measures to existing homes. It is also important to ensure that new homes are energy efficient and use electricity and heat generated from low-carbon sources.

The Government has previously committed to implementing a zero carbon homes policy in England by 2016. It is important that the Government should now tighten building regulations, as had been expected to be announced this May, in line with that commitment.

Fuel poverty

While low-carbon policies have to date had little effect on fuel bills and hence fuel poverty levels, by 2020 we expect average bills to rise by 10% compared to 2011 as a result of policies to support investment in low-carbon power generation technologies. Energy efficiency improvement is particularly important for addressing fuel poverty, to ensure price rises from low-carbon policies are offset.

In 2011 (the latest figures available), there were 4.5 million households in the UK in fuel poverty, down by 0.25 million from 2010:

- In England, there were 3.2 million fuel poor households, 0.3 million lower than in 2010.
- The devolved administrations had a much higher proportion of households in fuel poverty than England (15%) – in Northern Ireland fuel poverty levels reached 42% (mainly due to lower incomes and higher fuel prices, as most households rely on expensive heating oil). In Scotland fuel poverty stood at 25%, while fuel poverty levels in Wales were slightly higher at 29%.

It is unlikely that the fall in fuel poverty numbers in 2011 will have been maintained since then, due to fuel price rises and with fuel poverty policy (in particular in England) undergoing major changes. The main fuel poverty scheme for England (Warmfront) came to an end in early 2013 and the ECO is now the only scheme providing energy efficiency improvements in fuel poor households.

In future, the targeting of support under the ECO could offset the impact of rising electricity prices on the fuel poor as a group, although this should be closely monitored, and the level of targeting adjusted as required. In addition, ECO benefits will be unequally distributed, reaching only a proportion of fuel poor household over the next years. There are also particular issues for electrically heated households, where the impact of rising electricity prices will be felt disproportionately.

Therefore it will be necessary to put in place measures to support electrically heated homes, either within the ECO, or otherwise. Furthermore, it will be important to ensure that the ECO continues to the point where all fuel poor households have benefitted from it. In the meantime, there may be a need for other policies to support energy efficiency improvement, and possibly social tariffs or income transfers. All of these aspects should be considered in the Government's forthcoming fuel poverty strategy.

Emissions reduction in the non-residential sector

The CRC Energy Efficiency Scheme (formerly the Carbon Reduction Commitment) was simplified in 2013 through the abolition of the performance league table, the withdrawal of state funded schools from the scheme, and various administrative simplifications.

While simplification is generally to be welcomed, the abolition of the performance league table leaves incentives under the CRC much weakened. It is now little more than a (small) carbon tax and no longer tackles the non-price barriers it was originally set to address.

There are a number of retailers who have improved their energy efficiency significantly, for example through measures to improve the efficiency of heating, lighting and refrigeration.

However, for the non-residential sector as a whole there is limited evidence of energy efficiency improvement, as is manifest in emissions data, and there is a risk that significant energy efficiency potential is not addressed, for large and small energy users.

This risk could be limited through the setting of ambitious minimum standards for energy efficiency in the non-residential sector, as envisaged under the 2011 Energy Act. These standards should be announced now with a lead time so that landlords can optimise the timing of implementation, for example, as tenancy agreements come to an end.

In the public sector, there has been good performance against the 2014/15 target for the central Government to reduce emissions by 25%, with a 12% reduction achieved by the end of 2011/12. This highlights the effectiveness of setting targets for emissions reduction, reinforcing the experience under previous policies to improve energy efficiency in the residential sector. It suggests the potential benefits of setting targets in residential, non-residential and industrial sectors for energy efficiency improvement which would result in emissions reductions and cost savings.

Progress investing in low-carbon heat

Uptake of low-carbon heat in buildings remains very low, with 2% penetration in 2012 compared to 12% penetration envisaged by the Government in 2020 in its Renewable Energy Action Plan. Moreover, the vast majority of low-carbon heat in buildings is due to the use of biomass, with very limited investment in heat pumps. This is of concern, given the important role for heat pumps in meeting future carbon budgets.

The low level of heat pump penetration reflects limited incentives for a relatively unproven technology in the UK, particularly in the residential sector. Whereas policy should be aimed at addressing a range of financial and non-financial barriers, the current policy consists of small-scale programme of grants to households where uptake has been very low.

It is essential that the Renewable Heat Incentive is now extended to the residential sector, that this is funded beyond 2015, that Green Deal finance is allowed to cover the up-front cost of purchasing heat pumps, and that options to address non-financial barriers are considered. This set of measures together would provide more confidence that low-carbon heat markets will develop in a way that is consistent with the cost-effective path to meeting carbon budgets.

6. Emissions from industry

Industry emissions trends

Industry emissions account for a third of all greenhouse gas emissions in the UK. Around 80% of industry emissions are CO₂, of which 70% are direct due to the burning of fossil fuels and chemical processes, and 30% are indirect due to the use of electricity.

Industry CO₂ emissions increased by around 3% in 2012, reflecting increased carbon intensity of power generation, whilst electricity demand fell, and direct emissions were broadly flat.

- Indirect emissions increased by around 7%, as the 10% increase in the carbon intensity of the grid was partially offset by demand reduction of 2%.
- Direct emissions were broadly flat in a context where overall output fell, implying increased carbon-intensity of production. This can be largely explained through increased production in the iron and steel industry due to re-opening of the Teesside plant in 2012.

However, there is limited evidence of underlying reduction in industry emissions through energy efficiency improvement. In particular, energy intensity has not fallen in recent years. Furthermore, national accounts data shows low levels of investment in new plant and equipment required to unlock potential for energy efficiency improvement.

This should be addressed, given the significant opportunity to reduce industry emissions, which would reduce costs and contribute to meeting carbon budgets in a cost-effective way.

Policies to encourage energy efficiency improvement and low-carbon technology development

The key policy to encourage energy efficiency improvement is Climate Change Agreements (CCAs) for the energy-intensive industries. There has been mixed progress on CCAs, which have set ambitious targets to improve electricity related energy efficiency, but which no longer cover direct emissions. This is of concern because direct emissions comprise the majority of total industry emissions.

Going forward, it is very important to use the industry roadmaps proposed by the Government to set out milestones for energy efficiency improvement, and to ensure that policy incentives are aligned.

In addition, the road maps should set out an approach to the use of CCS in energy-intensive industries. This is a key abatement option for these industries, but at the moment the Government has not set out how it can be demonstrated and deployed, possibly in conjunction with programmes in other countries.

Limiting competitiveness risks for energy-intensive industries

We published a report in April 2013 which included an assessment of competitiveness risks for electricity-intensive industries. We concluded that these risks exist for electricity-intensive industries, but can be managed under current policies such as the proposed exemption for these industries from costs related to the Electricity Market Reform.

In designing and implementing this policy package, the relevant evidence to be considered includes:

- Electricity price increases for competitors to key UK electricity-intensive sectors
- Current and projected future industrial electricity UK consumption, at a detailed level (i.e. SIC 4)
- Scope passing through electricity price increases into higher product prices
- Materiality of electricity price impacts for firm location and investment decisions
- Whether surplus allowances have been generated for the sector under the EU ETS

The Government should now move from high level commitments to a detailed implementing package in order to provide clarity and support for electricity-intensive industries currently in the UK and those that might invest in the UK in future.

7. Emissions from surface transport

Emissions data for individual transport modes continue to be published with a time lag compared to UK-wide data, with the latest data currently available covering 2011. We report estimates of 2011 emissions by mode below; however we note that these should be treated with caution given uncertainties in the National Atmospheric Emissions Inventory (NAEI) methodology. We also make a provisional assessment for 2012 based on fuel sales, distance travelled, biofuel penetration and new vehicle efficiency.

Surface transport emissions account for around 20% of total UK greenhouse gas emissions, and fell by 1.3% in 2011. NAEI estimates suggest that within this, emissions from vans increased, while those from cars and HGVs fell. The 1.8% fall in emissions from cars was largely a result of improved fuel efficiency, which offset a slight increase in vehicle km. Van emissions rose by 1.6% as a result of both higher vehicle km and a worsening of the fuel efficiency of the fleet. HGV emissions fell by 0.8% as a fall in vehicle km and an increase in biofuels were partly offset by a worsening fleet efficiency.

A provisional assessment for 2012 suggests that CO₂ emissions may have fallen overall:

- Petrol sales fell by 4.8%, while diesel sales rose by 2.6% in 2012. Given the carbon intensity of petrol and diesel, this suggests road transport emissions may have fallen by 0.3%.

-
- Data on distance travelled, biofuels and new vehicle emissions suggest that within this, car and HGV emissions fell, while van emissions increased. Car travel fell by 0.2% in 2012 and new car CO₂ emissions improved by 3.6%, while biofuels penetration in cars remained constant. This suggests car emissions are likely to have decreased in 2012. Despite an improvement in efficiency of new vans of between 4.1 and 4.9%, van emissions are likely to have increased due to continued growth in vehicle km and a 1.1% fall in biofuel penetration. For HGVs, a continued decline in vehicle km is likely to offset the 1.2% fall in biofuel penetration suggesting emissions may have fallen last year.

Official estimates of emissions by mode in 2012 will be published early in 2014. We will report on these in our 2014 progress report.

Progress against indicators: new car and van emissions

Building on previous improvements, new car emissions continued to fall significantly in 2012, and outperform our indicator:

- Average new car CO₂ emissions fell from 138.1 gCO₂/km in 2011 to 133.1 gCO₂/km in 2012 – compared to our indicator of 145.8 gCO₂/km.
- New car emissions fell across all car classes in 2012. However, car purchase behaviour was more polarised than in 2011, with a smaller share of medium cars sold, but higher shares of both small and large cars (specifically dual-purpose vehicles)

Going forward, trends in purchase behaviour suggest there may be a need to reinforce EU standards with incentives for best-in-class purchase as well as switching between classes. Increased and further differentiated Vehicle Excise Duty may be required, with lower rates for more fuel efficient cars and without discontinuities such that there is a large change in VED for a small change in efficiency.

There was also good progress on new van emissions in 2012:

- Average new van CO₂ emissions fell by between 4.1 and 4.9%, to between 187 and 189 g/km in 2012 – compared to our indicator of 195.4 g/km
- However there was a continued trend towards purchase of heavier, higher-emitting vans (larger, heavier vans tend to offer greater flexibility of use and increased payload efficiency).

In future, if the trend towards heavier vans continues it will be important that purchasers choose best-in-class vehicles. The Government should consider scope for use of complementary policy levers to strengthen incentives for best-in-class purchase behaviour (e.g. fiscal levers).

We will continue to track the CO₂ intensity of new cars and vans and highlight appropriate actions to support continued progress.

The good progress on new car and van CO₂ intensity suggests that regulation is an effective means of achieving emissions reductions from vehicles. Given this, the Government should support the setting of longer term targets at EU level as soon as possible (e.g. following the

Commission's proposed review to completed by the end of 2014). These targets should be sufficiently challenging to have a strong effect on pulling new technology through into the market, with potential scope to go further than the indicative target ranges for 2025 proposed by the Commission (68-78 gCO₂/km for cars and 105-120 gCO₂/km for vans):

- Our scenario for meeting the fourth carbon budget envisaged 75 g/km in 2025 for cars and 112 g/km for vans⁸. New analysis on road transport technologies that we commissioned last year suggests g/km could be lower still e.g. through combined hybridisation and strong engine downsizing of non-EVs.
- Others have suggested that for cars a target of 60 g/km in 2025 would be achievable with an EV share of around 50% (of which half are pure battery electric) – and indeed required to accelerate the introduction of ultra-low emission vehicles⁹ – while less than 100 g/km could be achievable for vans.

The Government should also push for rapid progress in developing an EU framework for HGV emissions. There is currently no agreed test cycle for measurement of new HGV emissions, although the Commission have been conducting work in this area. They are expected to publish a strategy for reducing HGV emissions in the coming months.

Progress against indicators: electric vehicle market development

Sales of electric cars in 2012 were around 2250 vehicles, more than double the volume in 2011. Despite the increase in sales, volumes were low compared to our indicator of 11,750. Factors affecting uptake are likely to include availability of models on the market, the cost of the vehicles, availability of infrastructure, and consumer caution towards a new technology.

Model availability

There has been good progress in development of new electric vehicle models. As of June 2013, there are ten electric car models available on the UK market, including one plug-in hybrid and two range-extended model in the medium car segment (which accounted for around half of total sales in 2012). Moreover, a considerable range of models is under development and due to come to market in the near future. A number of electric van models also reached the UK market in 2012, with seven models currently eligible for the plug-in van grant and further models expected on the market soon.

Price support

The cost of electric vehicles (EVs) remains high relative to conventional alternatives. Reflecting this, the Government offers price support for EVs through the Plug-in Car and Van Grants, which provide consumers and businesses with up to £5,000 towards the purchase of an eligible electric car and up to £8,000 for each eligible electric van. However, this funding is

⁸ Given a roughly 30% share of electric vehicles. Excluding electric vehicles, the values are 95 g/km for cars and 137 g/km for vans.

⁹ RAC Foundation (2013) Powering Ahead: the future of low-carbon cars and fuels; Greenpeace and Transport & Environment (2013) The case for 2025 targets for CO₂ emissions from cars and vans.

committed for the life of the current parliament only. The Government should commit to continuation of funding beyond 2015.

There are also a number of other financial incentives for businesses to purchase electric vehicles, including preferential company car tax rates, and first year capital allowances.

However recent Budget announcements confirm these incentives will be weakened from 2015:

- **Company car tax.** In our 2012 progress report, we recommended that the announcement in Budget 2012 to withdraw company car tax exemption for electric vehicles from 2015/16 should be reversed, as this would undermine incentives in a market niche with a potentially high share of early electric vehicle adopters, while raising limited tax revenue. In Budget 2013, a preferential 5% rate of tax for ultra-low emissions vehicles was re-instated from April 2015. Nevertheless, this will still add around £500 to the cost of a pure electric vehicle compared to the current zero rate.
- **Capital allowances.** In general, electric vehicles are eligible for 100% first year capital allowances. However, in Budget 2012, confirmed in Budget 2013, it was announced that this was to be withdrawn for leasing firms. There is a potentially key role for leased business cars in driving electric vehicle uptake (reflecting both their share in total sales and the opportunity they present in allowing the public to gain experience of EVs).

We therefore recommend that in relation to company car tax the Government should reconsider reinstating the zero rate for zero-emission vehicles and that the decision on capital allowances be reversed.

Infrastructure investment

The Government has previously provided funding for electric vehicle charging infrastructure through the Plugged-in Places initiative, which provided match-funding for chargepoint installation in eight Plugged-in Places. As at end March 2013, this had delivered a total of 4,000 chargepoints. There was also significant investment in privately funded chargepoints, with a total of around 5,000 delivered by this time. However there have been issues with interoperability of existing chargepoints.

In February 2013, the Government announced a further £37 million funding package to support installation of chargepoints. The requirement for chargepoints funded through this new national offer to have pay as you go functionality is a step towards improved interoperability.

These measures to support the development of the EV market are necessary. It is important that a stable framework addressing financial and non-financial barriers remains in place. We will continue to monitor this closely and recommend further approaches that may be needed to ensure this nascent market continues to grow and uptake moves towards levels needed to meet carbon budgets.

Progress against indicators: biofuels

Biofuels penetration decreased from 3.5% in 2011 to 3.1% in 2012, as the Renewable Transport Fuel Obligation (RTFO) was amended to allow biofuels produced from wastes, non-agricultural residues and second generation biofuels to be counted twice in meeting the biofuels target. This level of biofuels is 1% short of our indicator.

The RTFO is flat-lined from 2013/14, pending a decision from the EU on how indirect land use change (ILUC) will be taken into account. While it is important that robust sustainability criteria taking account of ILUC impacts are implemented, the Government should push for these to be agreed as soon as possible to guard against an unnecessary investment hiatus in this sector or to allow additional action to meet carbon budgets to be put in place if required.

Progress against indicators: consumer behaviour change

Behaviour change offers around a third the total abatement potential reflected in our indicator for surface transport emissions in 2020.

In 2012 there has been some progress towards roll-out of Smarter Choices (i.e. encouraging people to switch to public transport and other means to reduce car journeys), with limited progress on eco-driving training and speed limiting, and some uncertainty in land use planning:

- **Smarter Choices.** Funding for the Local Sustainable Transport Fund was increased from £560 million to £600 in 2012. The Fund is now fully committed, supporting 96 projects in 77 Local Authorities across England between 2011/12 and 2014/15 – almost all of which included Smarter Choices measures in their bids. As the projects progress, monitoring and evaluation of outcomes should be encouraged, to ensure emission reduction impacts are achieved. If successful, the Government should make a commitment to further funding post-2015 and develop a plan for nationwide roll-out of Smarter Choices over the next decade.
- **Eco-driving training.** The level of eco-driving training remained low in 2012, with much greater use reported for drivers of trucks than other vehicles. Given the benefits to both cost reductions and carbon savings, the Government should actively promote the uptake of eco-driving training, through a combination of inclusion in the driving test, driver training, awareness raising and in-car information on fuel efficiency.
- **Speed limits and their enforcement.** Speed limits are exceeded by a high proportion of drivers on motorways (49%) and dual carriageways (41%). Given the significant decline in fuel efficiency as car speed increases from 70 to 80 mph, enforcing current speed limits presents an opportunity for reducing emissions. In-car information from fuel consumption meters would also encourage driving within the speed limit by emphasising the excessive fuel consumption associated with driving at 80 rather than 70 mph.

-
- **Land use planning.** The Government has set out proposals for changes in the way local authorities take account of transport issues in local plans. Given the potential for these to increase car use and emissions, it is important that transport emissions are factored into planning decisions alongside other costs and benefits. An Impact Assessment setting out the potential effect on travel demand and emissions should be published as soon as possible.

The challenges are therefore to implement and then extend the current programme of Smarter Choices, to increase levels of eco-driving, to consider better enforcing the current speed limit, and to ensure that transport emissions are factored into planning decisions alongside other costs and benefits.

8. Agriculture

Greenhouse gas emission data for agriculture continue to be published with a time lag compared to UK-wide data, with the latest data currently available covering 2011.

Agriculture emissions are estimated to account for around 9% of total UK greenhouse gas emissions.

However, we note that the current level of emissions is highly uncertain due to the method used in calculating the inventory. In particular, this applies standard emissions factors to standard farming practice, and therefore does not allow for variation in biological processes and different farming practices. Given the need to be able to measure agriculture emissions accurately, it is of crucial importance that Defra delivers the new Smart Inventory on schedule in 2015.

Over half of estimated emissions (53%) are due to agricultural soils, while enteric emissions – arising from the digestive process of cattle and sheep – account for another 30% of emissions. The remaining emissions are split between stationary and combustion emissions (9%) and manure management (8%). By gas, nitrous oxide (N₂O) accounts for 57% of emissions in the sector, with a further 35% coming from methane and the remaining 8% from carbon dioxide (CO₂).

Agricultural emissions remained unchanged from 2010 at 51.2 MtCO₂e. However, there were marginal changes in emissions across the range of sources and gases. Emissions from enteric fermentation, waste and manure management and methane declined slightly, while emissions from agricultural soils, stationary and mobile combustion, N₂O and CO₂ increased marginally.

An increase in livestock output combined with a decline in the emissions associated with rearing livestock imply an improvement in carbon intensity of production in 2011. Improved intensity was driven by a 10% decrease in the use of inorganic fertiliser on grasslands, a 2% decline in cattle numbers and increased yields of milk and meat, particularly sheep and lamb. However, it is unclear whether these increased yields ensued from more carbon intense farming practice, for example, relating to feeding of livestock.

For crops, there was a 3% increase in output and a 5% increase in crop-related emissions. The implied increase in the carbon intensity of arable farming reflected higher emissions from crop residues. This was partially offset by a reduction in carbon intensity associated with the application of inorganic fertiliser to soils. Whether this represents an increase in efficiency, or a rebound in output following poor harvests related to weather conditions in 2010, is unclear.

Although overall emissions have not fallen since 2009, emissions reductions achieved in previous years mean that the level of emissions is still consistent with our indicator trajectory.

Defra has now published an indicator framework to monitor progress in reducing emissions. This is an important part of the evidence base to understand whether farming practice is becoming more carbon efficient, more so because it is difficult to make inferences about farming practice from emissions and productivity data.

If these indicators suggest that there is insufficient progress being made in improving carbon efficiency of agriculture, this should trigger a policy review. While the Government has set a date of 2016 to review progress, an earlier review may be appropriate depending on the evidence. Any review should include a range of policy options, including continuing the current voluntary approach, but going beyond this to policies which would provide stronger incentives for farmers.

9. Waste and other non-CO₂ emissions

Waste and other non-CO₂ emissions account for around 8% of UK greenhouse gas emissions. Greenhouse gas emission data for Waste and other non-CO₂ emissions continue to be published with a time lag compared to UK-wide data, with the latest data currently available covering 2011.

Progress reducing waste emissions

Waste emissions, mostly methane, account for around 3% of UK greenhouse gas emissions. In 2011, waste emissions fell by 3%, continuing a longer-term trend where emissions have fallen 64% since 1990. This is largely due to reductions in the amount of biodegradable waste sent to landfill in response to the landfill tax to meet targets under the EU landfill directive. There has also been good progress to reduce waste generated by households and businesses and to divert waste from landfill, through voluntary responsibility deals such as the Courtauld Commitment (in the grocery sector) and information awareness campaigns.

Further reductions in waste emissions could be supported through introduction of stronger levers, particularly targeting food waste, which is likely to continue to be a major contributor to future waste emissions. For example, local authorities should consider options for increasing separate collection of food waste, which can then be used to produce energy through anaerobic digestion and pyrolysis.

There is also an outstanding question of whether certain categories of waste should be banned from landfill, which is the approach in some EU countries and in Scotland. The Government considered a ban on sending wood to landfill but concluded that this was not

a cost-effective measure and that current policies such as the landfill tax are sufficient drivers for reducing the landfilling of wood waste. It then inferred that bans for other materials could not be economically justified at present. This is not an evidence based approach, and there may be cost-effective opportunities for banning of other types of waste from landfill. These should be considered on a case-by-case basis.

Progress reducing other non-CO₂ emissions

Other non-CO₂ emissions in the UK comprise emissions of methane from energy supply, nitrous oxide (N₂O) from industry, and fluorinated gases (F-gases). They accounted for 5% of all UK greenhouse gas (GHG) emissions in 2011. Emissions fell 2% in 2011 continuing the long term trend that has seen emissions fall 64% since 1990, due to:

- Falling N₂O emissions from industry due to abatement equipment being installed at plants
- Falling methane emissions due to the decline in coal production in the UK and reduced leakage from the gas supply network.

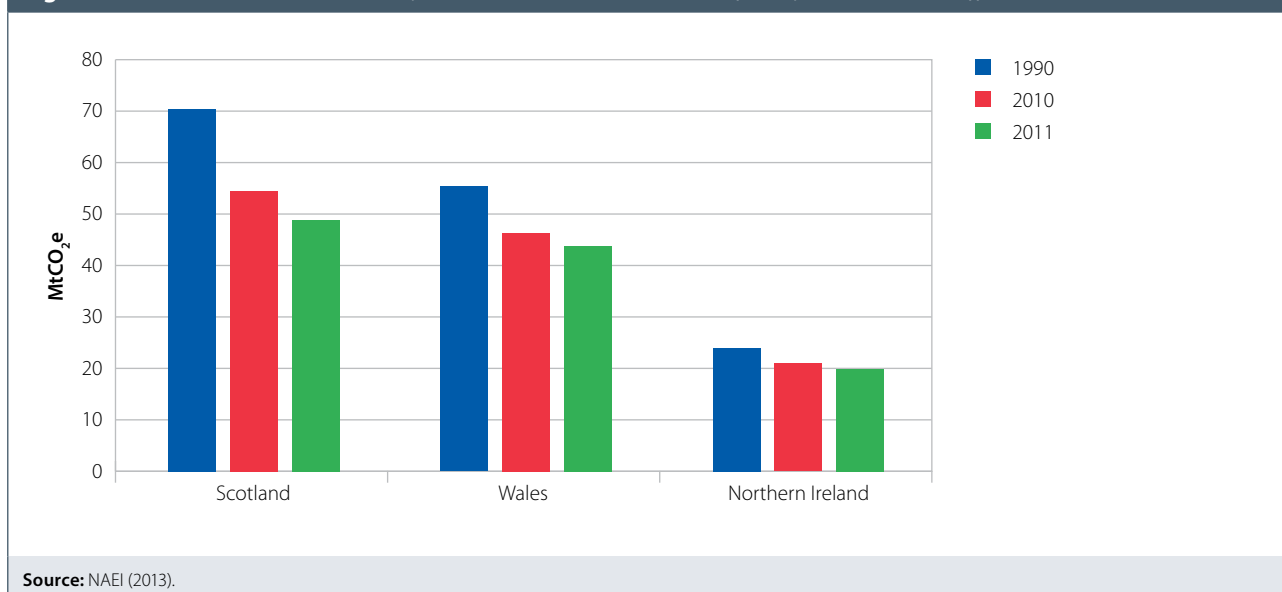
Emissions of these other non-CO₂ gases are projected to fall a further 50% by 2030 relative to 2011 levels. This primarily reflects expected reductions in energy supply and F-gas emissions, with emissions from industry expected to remain fairly flat:

- Energy supply emissions are projected to fall 45% due to further reductions in methane leakage and coal production
- Emissions of F-gases arise primarily from leakage during their use as coolants in air conditioning and refrigeration. Emissions are expected to fall 61% due to EC regulations that restrict their use in mobile air conditioning and other applications where low-GWP alternatives exist, and require reduced leakage rates across all uses.

In order to reduce F-gas emissions further the European Commission has proposed more stringent regulation which will phase down their supply to the market, with bans on their use in some applications. This proposal is expected to reduce F-gas emissions in the EU by around 70% in 2030 from today's levels.

However it should be noted that companies such as Coca-cola and Unilever have committed to the replacement of F-gases on a more ambitious timescale than the EC proposal (for example Coca-cola are committed to buying only HFC-free equipment by 2015). The US and China have also recently agreed a phase down in the use of HFCs. We therefore recommend that the Government should at a minimum fully support proposals from the EU to reduce emissions of F-gases by 70% in 2030, but should also consider pushing for a more ambitious agreement, for example, increasing the speed of phase out of some uses of these gases such that these emissions are zero or minimal by 2020.

Figure 13: GHG emissions Scotland, Wales and Northern Ireland (1990, 2010 and 2011)



10. Emissions in the devolved administrations

Greenhouse gas emission data for the devolved administrations continue to be published with a time lag compared to UK-wide data, with 2011 being the latest year for which data is currently available. In 2011, Scottish emissions fell faster than the UK average (by 9% compared to 7%), while emissions in Wales and Northern Ireland fell by 5% (Figure 13):

- 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 sector¹⁰ 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.
- 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, 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.

¹⁰ Around ¾ of emissions in energy supply are from the power sector.

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 in the UK in some areas, for example:

- Scotland had 40% of the UK's renewable installed 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 50gCO₂/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.
- Northern Ireland has sought views on the need for new climate change legislation, and recently introduced a charge on new plastic bags, which could have wider environmental benefits.

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, even though they have particularly good opportunities with a higher than average number of off-gas grid properties.
- 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 found in the devolved administrations and ensuring that low-carbon policies do not negatively impact on the most vulnerable households.

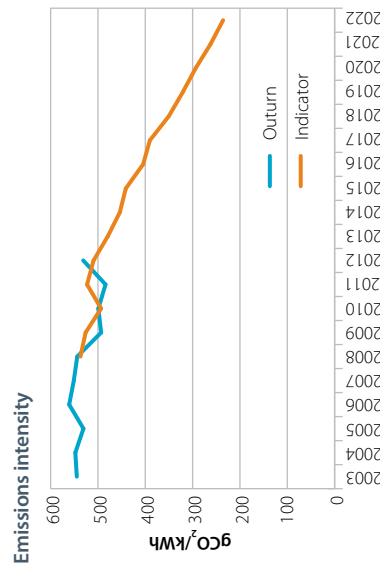
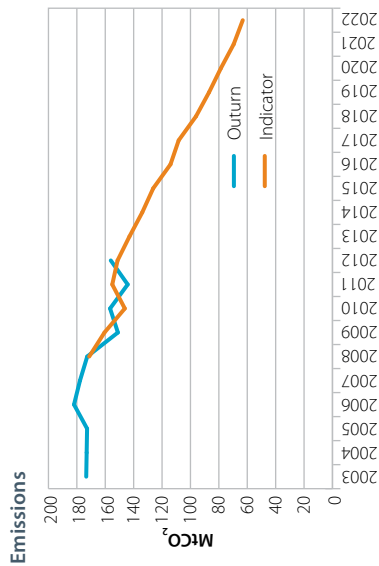
It is important to address these challenges so that the devolved administrations gain from the economic benefits, meet their own national emissions targets, and make an appropriate contribution to meeting the UK's carbon budgets.

Summary of progress against indicators and future challenges

Economy-wide

Increased emissions in 2012 largely reflect colder weather and a temporary switch from gas to coal in the power sector. Implementation of measures reduced emissions by around 1%. Implementation of measures was on track in some areas, however other areas continue to lag behind even the low ambition built into our indicators for the first budget period. Without a significant increase in the pace of emissions reduction, the costs and risks of moving to a low-carbon economy will be increased. There has been progress developing policies but a number of key policy challenges remain (e.g. around the design and implementation of flagship policies such as EMR and the Green Deal).

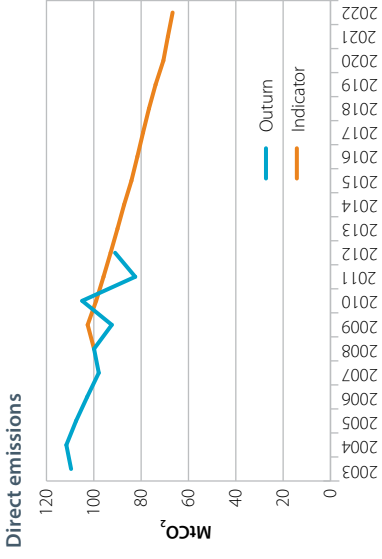
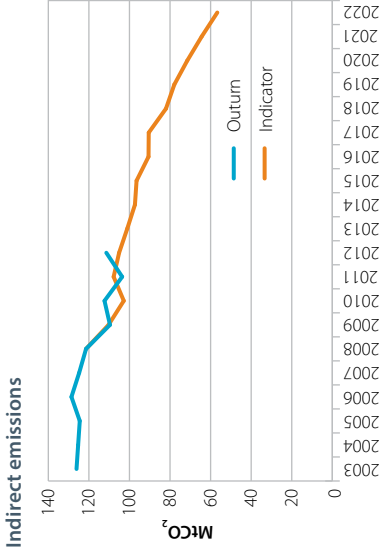
	Progress against indicators and milestones	Challenges
Power		
Market	Energy Bill introducing long-term contracts is progressing through Parliament.	Technical details need to be resolved and clarity needed for investors after 2020.
Transmission	Revenue controls under RII0 were finalised by Ofgem (Dec 2012). There has been progress gaining planning approval and entering construction for some key investments. The review of charging system for transmission network is now finalised.	Still need planning approvals for some infrastructure, especially in Wales and Northern Scotland. Enduring regime for offshore transmission lines needs to begin implementation.
Wind – planning	New planning applications continued onshore and reached record levels offshore. Average approval rate across the UK comparable to recent levels at 70% onshore, while offshore wind saw its first large-scale refusal. The average time taken for wind projects to be determined remains high (33 months), well above our indicator and guidance (12 months).	Slow determination rates could reduce competition for contracts under EMR and increase costs for consumers.
Wind – installed capacity	Record levels added in 2012 both onshore and offshore. However, possible bottleneck for capacity progressing into construction for offshore wind.	Resolution of financial and non-financial uncertainties required in order to translate the strong project pipeline into generation. In particular, need to provide clarity over details in EMR.
Nuclear	First reactor design (Areva's EPWR) received final approval under Generic Design Assessment (GDA) process (December 2012). Further design (Hitachi's ABWR) submitted for approval (January 2013). First new nuclear project (Hinkley C) received planning approval (March 2013) and entered negotiation for a contract under EMR.	Agreement of first contract will allow focus on other contracts to be signed under the first EMR Delivery Plan period.
CCS	Second commercialisation programme has selected two projects to enter Front-End Engineering Design studies.	Momentum must be maintained so these two projects can become operational by 2018/19. Approach should be set out for further demonstration projects and longer-term commercialisation strategy.



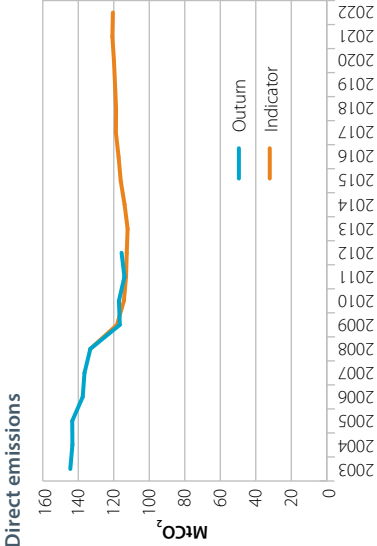
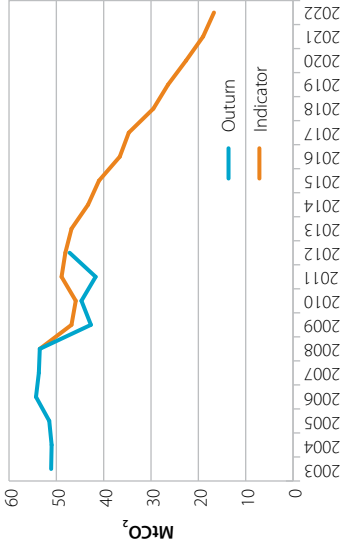
Summary of progress against indicators and future challenges

		Progress against indicators and milestones	Challenges																																																														
Road transport																																																																	
Direct emissions	<table border="1"> <caption>Direct emissions (MCO₂)</caption> <thead> <tr> <th>Year</th> <th>Outurn (MCO₂)</th> <th>Indicator (MCO₂)</th> </tr> </thead> <tbody> <tr><td>2003</td><td>120</td><td>120</td></tr> <tr><td>2004</td><td>115</td><td>115</td></tr> <tr><td>2005</td><td>110</td><td>110</td></tr> <tr><td>2006</td><td>105</td><td>105</td></tr> <tr><td>2007</td><td>100</td><td>100</td></tr> <tr><td>2008</td><td>95</td><td>95</td></tr> <tr><td>2009</td><td>90</td><td>90</td></tr> <tr><td>2010</td><td>85</td><td>85</td></tr> <tr><td>2011</td><td>80</td><td>80</td></tr> <tr><td>2012</td><td>75</td><td>75</td></tr> <tr><td>2013</td><td>70</td><td>70</td></tr> <tr><td>2014</td><td>65</td><td>65</td></tr> <tr><td>2015</td><td>60</td><td>60</td></tr> <tr><td>2016</td><td>55</td><td>55</td></tr> <tr><td>2017</td><td>50</td><td>50</td></tr> <tr><td>2018</td><td>45</td><td>45</td></tr> <tr><td>2019</td><td>40</td><td>40</td></tr> <tr><td>2020</td><td>35</td><td>35</td></tr> <tr><td>2021</td><td>30</td><td>30</td></tr> <tr><td>2022</td><td>25</td><td>25</td></tr> </tbody> </table>	Year	Outurn (MCO ₂)	Indicator (MCO ₂)	2003	120	120	2004	115	115	2005	110	110	2006	105	105	2007	100	100	2008	95	95	2009	90	90	2010	85	85	2011	80	80	2012	75	75	2013	70	70	2014	65	65	2015	60	60	2016	55	55	2017	50	50	2018	45	45	2019	40	40	2020	35	35	2021	30	30	2022	25	25	
Year	Outurn (MCO ₂)	Indicator (MCO ₂)																																																															
2003	120	120																																																															
2004	115	115																																																															
2005	110	110																																																															
2006	105	105																																																															
2007	100	100																																																															
2008	95	95																																																															
2009	90	90																																																															
2010	85	85																																																															
2011	80	80																																																															
2012	75	75																																																															
2013	70	70																																																															
2014	65	65																																																															
2015	60	60																																																															
2016	55	55																																																															
2017	50	50																																																															
2018	45	45																																																															
2019	40	40																																																															
2020	35	35																																																															
2021	30	30																																																															
2022	25	25																																																															
New car fuel efficiency	Continued improvement in new car gCO ₂ /km, but more polarised purchase behaviour (fewer medium cars, more small and large ones).	Agreement of challenging longer term targets at EU level needed to ensure continued progress, potentially reinforced with use of fiscal levers if required.																																																															
Reducing van emissions	Good progress on new van gCO ₂ /km, despite continued trend towards larger vans, as manufacturers respond to EU targets.	Agreement of challenging longer term targets at EU level needed to ensure continued progress, potentially reinforced with use of fiscal levers if required.																																																															
Development of electric car market	Doubling of electric car sales as plug-in hybrid models became available. 9000 chargepoints installed as at March 2013. New funding package for further chargepoints announced in February 2013.	Uptake still low relative to indicator, and changes to tax incentives for company cars threaten progress. Stable framework of support needed (commitment to continuation of funding of Plug-in Car and Van Grants beyond 2015 and reinstatement of tax incentives for company cars).																																																															
Increased use of biofuels	Fall in volumes supplied, due to amendments in the RTFO allowing double-counting of some feedstocks.	Agreement of robust EU framework for ILUC impacts needed as soon as possible.																																																															
Smarter Choices	Local Sustainable Transport Fund fully allocated, with most successful projects including Smarter Choices measures.	Further funding required to support nationwide roll out by 2020.																																																															
Eco-driving	Evidence of uptake in the freight sector but very low rates of training among car drivers.	Active promotion of eco-driving, through inclusion in the driving test, driver training, awareness raising and in-car information.																																																															
Speed limiting	Violation of the speed limits on motorways by almost 50% of car drivers, resulting in increased emissions.	Consultation on increasing single carriageway speed limit for HGVs. Emissions impacts should be properly reflected in the final decision																																																															
Land use/transport planning		Some elements of consultation on land use planning and the strategic road network could increase car trips and threaten carbon budgets.																																																															

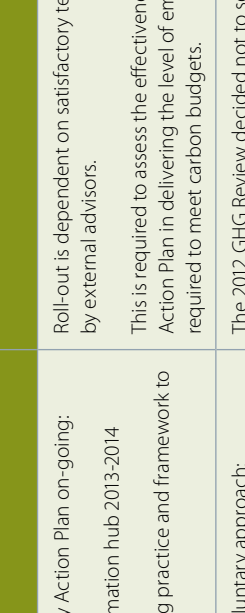
Summary of progress against indicators and future challenges

	Progress against indicators and milestones	Challenges
<p>Buildings</p> <p>Direct emissions</p>  <p>Indirect emissions</p> 	<p>Residential</p> <p>Delivery increased for cavity wall (+22%) and loft insulation (+45%) under the final year of CERT and CESP. Solid wall insulation rates increased fourfold but remains low (at 82,000).</p> <p>Currently on track for our indicator trajectories for loft insulation and boilers and off track for cavity wall and solid wall insulation.</p> <p>Minimum energy efficiency standards for private rented properties to be introduced in 2018.</p> <p>Green Deal for non-residential sector launched in 2013.</p> <p>CRC energy efficiency scheme weakened (e.g. by removing league table) further eroding the incentives to improve energy efficiency.</p> <p>Minimum standards for rented premises proposed from 2018.</p> <p>Public sector – good performance against the 2014-15 target for central Government to reduce emissions by 25%, with a 12% reduction in 2011/2.</p> <p>Low-carbon heat deployment remains very low (<2%) and offtrack to reach the target of 12% penetration by 2020.</p> <p>RHI started for the non-residential sector in November 2011. Residential sector RHI has been delayed a further year until 2014, and the RHPP small grant scheme extended in the interim.</p>	<p>Non-residential</p> <p>Standards need to be firming up soon to ensure that landlords make relevant appropriate investment decisions.</p> <p>A comprehensive assessment of non-residential low-carbon policies is required to ensure they work effectively.</p> <p>Standards need to be firming up soon to ensure that landlords make relevant appropriate investment decisions.</p> <p>RHI funding must 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.</p>
<p>Renewable heat</p>		

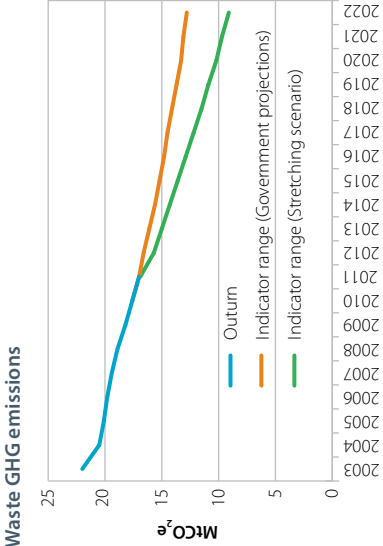
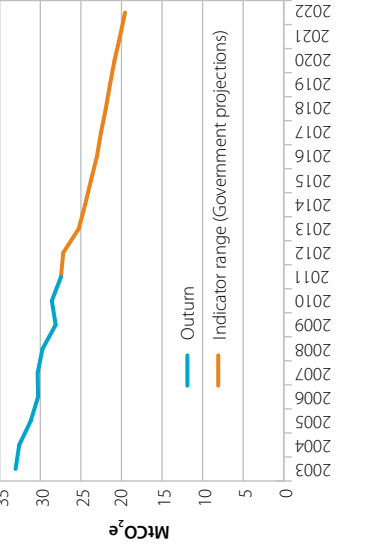
Summary of progress against indicators and future challenges

			Challenges
Industry			
<p>Energy intensity</p> 	<p>No improvement in energy intensity of direct fuels (e.g. non-electricity) since 2007. Energy-intensive industry slightly improved of 2%.</p>		<p>Significant barriers remain in industry, new policies are required to provide stronger incentives, particularly for investment in more expensive measures.</p> <p>Government should include the full range of cost-effective abatement options in the industry sector roadmaps currently being developed by DECC and BIS and align financial incentives for low-cost abatement</p>
<p>Renewable heat</p>	<p>Good progress, ahead of indicator trajectory.</p>		<p>Given that large biomass installations are likely to be a priority in future, Government should closely monitor uptake and set out an approach to large scale applications of biomass.</p>
<p>CCS</p>	<p>CCS in industry has not been funded under the current UK CCS competition and there has been a lack of progress internationally.</p>		<p>An approach to demonstration and commercialisation compatible with deployment in the 2020s is required.</p>
<p>Other milestones</p> 	<p>New design of CCAs announced which reduce the scope of coverage to non-EUETS emissions only, and does not address barriers to uptake.</p>		<p>The Governments forthcoming industry roadmaps provides an opportunity to set out how gaps in the current policy framework can be filled.</p>

Summary of progress against indicators and future challenges

	Progress against indicators and milestones	Challenges																																																															
<p>Agriculture</p> <p>GHG emissions</p>  <table border="1" data-bbox="252 698 686 1288"> <caption>Estimated GHG emissions (MtCO₂e) from 2003 to 2022</caption> <thead> <tr> <th>Year</th> <th>Output (MtCO₂e)</th> <th>LCIP ambition (UK) (MtCO₂e)</th> </tr> </thead> <tbody> <tr><td>2003</td><td>50</td><td>50</td></tr> <tr><td>2004</td><td>48</td><td>48</td></tr> <tr><td>2005</td><td>47</td><td>47</td></tr> <tr><td>2006</td><td>46</td><td>46</td></tr> <tr><td>2007</td><td>45</td><td>45</td></tr> <tr><td>2008</td><td>44</td><td>44</td></tr> <tr><td>2009</td><td>43</td><td>43</td></tr> <tr><td>2010</td><td>42</td><td>42</td></tr> <tr><td>2011</td><td>41</td><td>41</td></tr> <tr><td>2012</td><td>40</td><td>40</td></tr> <tr><td>2013</td><td>39</td><td>39</td></tr> <tr><td>2014</td><td>38</td><td>38</td></tr> <tr><td>2015</td><td>37</td><td>37</td></tr> <tr><td>2016</td><td>36</td><td>36</td></tr> <tr><td>2017</td><td>35</td><td>35</td></tr> <tr><td>2018</td><td>34</td><td>34</td></tr> <tr><td>2019</td><td>33</td><td>33</td></tr> <tr><td>2020</td><td>32</td><td>32</td></tr> <tr><td>2021</td><td>31</td><td>31</td></tr> <tr><td>2022</td><td>30</td><td>30</td></tr> </tbody> </table>	Year	Output (MtCO ₂ e)	LCIP ambition (UK) (MtCO ₂ e)	2003	50	50	2004	48	48	2005	47	47	2006	46	46	2007	45	45	2008	44	44	2009	43	43	2010	42	42	2011	41	41	2012	40	40	2013	39	39	2014	38	38	2015	37	37	2016	36	36	2017	35	35	2018	34	34	2019	33	33	2020	32	32	2021	31	31	2022	30	30	<p>Phase 2 of the GHG Industry Action Plan on-going:</p> <ul style="list-style-type: none"> • Roll-out of industry information hub 2013-2014 • Establish baseline farming practice and framework to monitor progress <p>On-going monitoring of voluntary approach:</p> <ul style="list-style-type: none"> • Bring forward 2016 Review if progress off-track • Review should consider policy options for intervention <p>Development of smart inventory</p>	<p>Roll-out is dependent on satisfactory testing of the Hub by external advisors.</p> <p>This is required to assess the effectiveness of the GHG Action Plan in delivering the level of emissions reduction required to meet carbon budgets.</p> <p>The 2012 GHG Review decided not to set triggers nor consider policy options. Therefore, we recommend that the scope of any future review should be widened to also consider a range of policy options, including continuing with the current voluntary approach and policies which would provide stronger incentives for farmers.</p> <p>Projects are on-going and the revised inventory is on schedule for roll-out in 2015</p>
Year	Output (MtCO ₂ e)	LCIP ambition (UK) (MtCO ₂ e)																																																															
2003	50	50																																																															
2004	48	48																																																															
2005	47	47																																																															
2006	46	46																																																															
2007	45	45																																																															
2008	44	44																																																															
2009	43	43																																																															
2010	42	42																																																															
2011	41	41																																																															
2012	40	40																																																															
2013	39	39																																																															
2014	38	38																																																															
2015	37	37																																																															
2016	36	36																																																															
2017	35	35																																																															
2018	34	34																																																															
2019	33	33																																																															
2020	32	32																																																															
2021	31	31																																																															
2022	30	30																																																															

Summary of progress against indicators and future challenges

			Challenges
<p>Waste and other non-CO₂</p>	<p>Waste</p> <p>Waste GHG emissions</p> 	<p>Emissions fell 3% in 2011 driven by historic reductions in the amount of biodegradable waste landfilled in line with our indicators.</p> <p>Key corporate voluntary responsibility deals to reduce waste/increase recycling were launched in 2012 (Courtauld Commitment Phase 3 and the Hospitality and Food Service Agreement); other existing deals continue to deliver against objectives.</p> <p>The number of AD plants handling municipal waste increased from 48 to 66, with an estimated capacity of handling 4 million tonnes.</p>	<p>Further reductions could be supported through stronger levers, particularly targeting household food waste; households can be further encouraged to reduce waste and increase recycling and local authorities can increase provision of separate food waste collection services, which can unlock potential for producing energy through anaerobic digestion.</p> <p>Landfill bans for specific waste materials should be considered on a case-by-case basis</p>
<p>Other non-CO₂</p>	<p>Other non-CO₂ GHG emissions</p> 	<p>The EC proposal to update the F-gas regulation by introducing a phase-down in F-gases represents a step forward in reducing future emissions of F-gases within the EU.</p>	<p>The proposed phase-down must be stretching enough to ensure that the chance to significantly reduce emissions of these gases, which have long atmospheric lifetimes and which already have market ready alternatives, is not missed.</p>