

Carbon Emissions from Schools: Where they arise and how to reduce them



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Executive summary

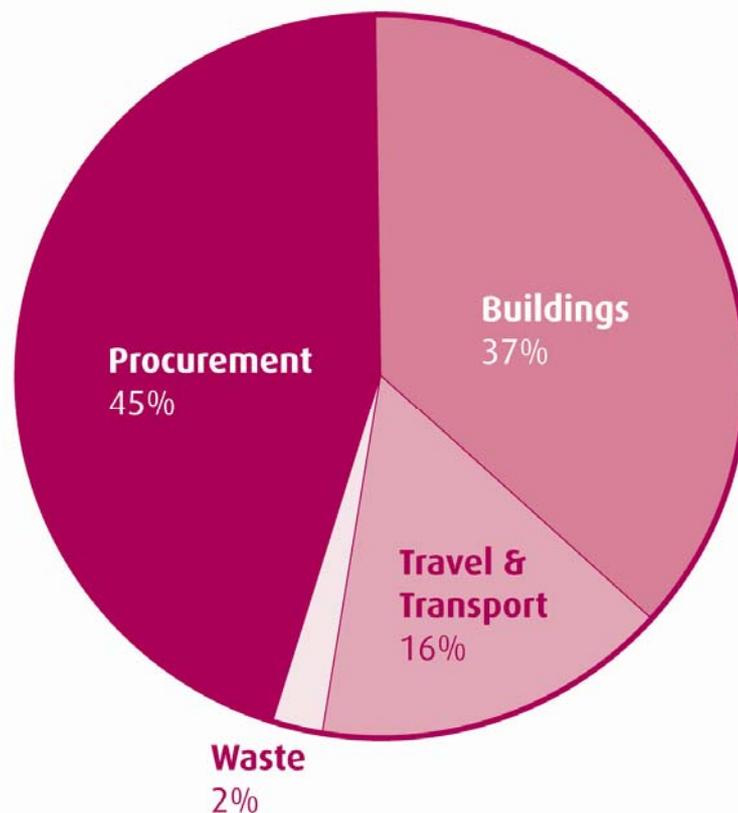
The Sustainable Development Commission has worked with the Department for Children, Schools and Families to understand the carbon emissions associated with the English schools estate. Our analysis looks at schools' current contribution to greenhouse gas emissions and emissions scenarios in the future to 2050.

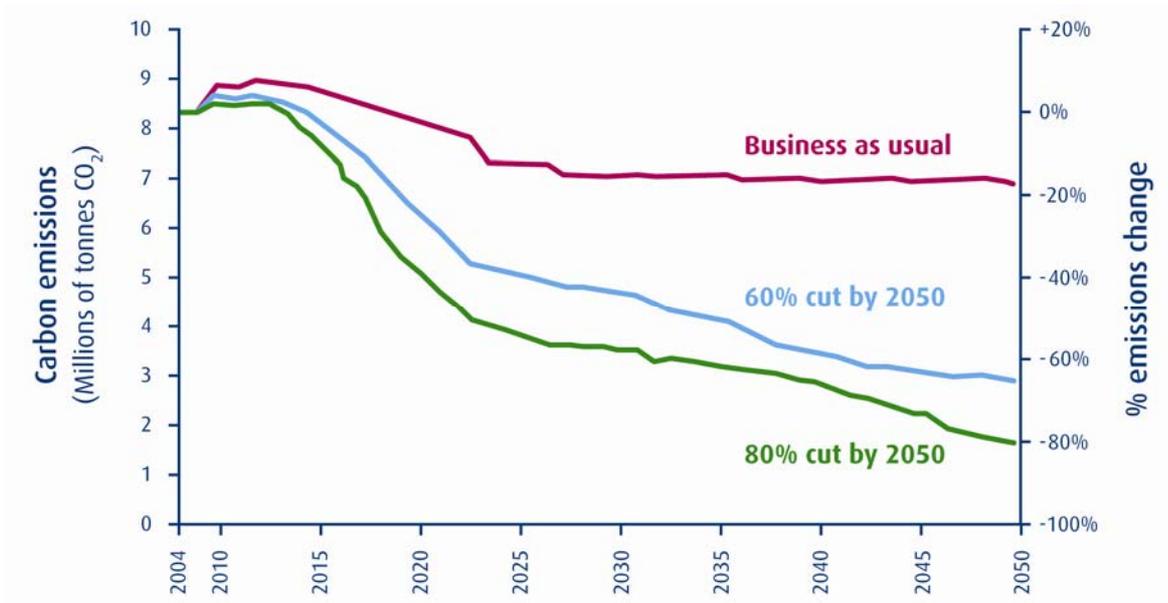
The analysis shows that carbon emissions are currently estimated at 8.5 million tonnes of carbon dioxide per year, and greenhouse gases at 9.4 million tonnes of carbon dioxide equivalent per year. The analysis looks at the breakdown of emissions from energy use in buildings, travel and transport, procurement and waste.

These emissions are projected to reduce by less than 20 per cent over the period to 2050, which is insufficient to play a leading role in reducing schools' impact on dangerous climate change. The UK government is currently committed to a national carbon emissions reduction of 60 per cent by 2050 and the SDC believes that schools should be exceeding this target.

The analysis presented in this report shows that emissions from the English schools system can be reduced by 80 per cent by 2050 with vital early action bringing deep cuts by 2020. We present scenarios for how these emissions reductions could be achieved, and our recommendations to the DCSF to lead by example in reducing emissions to mitigate climate change.

Graph: Greenhouse Gas emissions from the English schools estate for 2004





Above: Summary graph of carbon emissions scenarios from the SDC analysis: 'Business As Usual' scenario, '60 per cent cut by 2050' scenario and '80 per cent cut by 2050' scenario.

About the Sustainable Development Commission

The Sustainable Development Commission (SDC) is the Government's independent adviser on sustainable development. It supports

practice across a range of policy areas including climate change, health, economics, education and young people, buildings and transport.

Energy Busters and Energy Futures: programmes for change in Norfolk schools



Over the last three years the Environmental and Outdoor Learning Team at Norfolk County Council, in partnership with the National Trust, have been running a scheme to raise awareness about energy and climate change in both primary (Energy Busters) and secondary schools (Energy Futures).

Photo caption: Young people share tactics with each other at a conference at Ecotech (Archant Photography Ltd)

This scheme connects with key elements of the National Curriculum and applies energy management concepts in the real world of the school environment. The aim is to engage the whole school community in thinking about energy and climate change through the process.

The scheme has demonstrated extensive cost savings in the 50+ schools that have already been engaged, reducing their average energy costs by 20 per cent, and helping to save money that can be reinvested within the school. Some schools were able to save over 30 per cent of their energy use simply through behavioural and no-cost measures.

The value of this scheme was spotted by Norfolk County Council (NCC) when it embarked on the Local Authority Carbon Management Scheme (a partnership venture with the Carbon Trust) from May 2007 until March 2008. The ensuing baseline work energy use in the authority's buildings not only revealed how extensive NCC's emissions were, but showed that 71 per cent of the overall footprint could be attributed to schools. To put this in cost terms, a recent projection suggests that of a total buildings energy bill of £8.6m per year, around £6m is down to Norfolk's 441 schools.

If the Energy Busters scheme expanded to cover all schools in Norfolk, it may be possible to achieve a reduction of 9,000 tonnes CO₂ per year, with a cost saving in excess of £1m per year. The 'Invest to Save' argument is clear, and a case is currently being made to expand the scheme in this way, linked to an allocation from Norfolk Children's Services capital budget.

Future work will focus on enabling schools to engage with their wider communities - to which they are central. For example, among the performance indicators included within Norfolk's Local Area Agreement is an area-based climate change reduction target (NI 186 within the National Indicator Set). Having schools showcase good practice on energy management, and wider action on carbon emissions, can help to build, inspire and motivate action in communities. Norfolk sees this as a critical factor in supporting community action on climate change, and a great way to tap into the interests of young people who are justifiably concerned about their future lives.

1. Introduction

This report was commissioned by The Department for Children, Schools and Families (DCSF) – the department with overall responsibility for schools in England. We believe that it is the first strategic, holistic appraisal ever of the options available to a UK Government department for the long-term reduction of carbon emissions with a large public sector estate. The report is born out of DCSF's concern about the impacts of climate change on young people and schools, and the known contribution that schools can make to modelling good practices for communities. Helping schools to proactively lead by example on tackling climate change is a key objective of this report.

Aims

The study has four main aims:

- To identify and understand the magnitude of carbon dioxide (CO₂) emissions associated with England's schools
- To explore the changes required to reduce the carbon footprint by developing scenarios for 2020 and 2050
- To suggest the level of ambition to which the schools sector could aspire
- To recommend actions and policy interventions for the DCSF and others to implement or influence in order to deliver each of the scenarios

The report does not prescribe one particular set of actions for the DCSF, local authorities or schools to undertake. It presents scenarios to show how different policies and combinations of policies can lead to different degrees of emissions reductions. It is important to note that the report does not give practical guidance on how to reduce carbon emissions from schools.

This report focuses on state-funded primary and secondary schools in England, although many of its findings and lessons could be applied to

other types of school. It covers both existing schools and schools being constructed and refurbished through the DCSF's extensive capital investment programmes.

Carbon dioxide emissions are divided into four main sources:

- The use of energy in school buildings
- Pupil and staff travel, and school transport
- Supply chain activities of companies producing goods and services procured by schools
- Waste management and minimisation by schools

This report does not cover adaptation to climate change, which is outside the scope of this study.

Why is carbon reduction a relevant issue for schools?

Global perspective

Climate change due to human activities is one of the most serious problems facing the world in the 21st century. There should be no doubt over the science – the continued release of greenhouse gas emissions from the burning of fossil fuels, deforestation, and industrial and agricultural processes will lead to severe and potentially catastrophic changes in the earth's climate, some of which will be irreversible.

The government is committed to leading by example in reducing carbon emissions and tackling climate change.

¹Public services have a role in showcasing sustainable development within the communities they serve. As schools often lie at the centre of local communities, they can raise awareness of low-carbon practices and technologies with pupils and to the wider community of parents and carers, community groups and businesses.

The Stern Review² highlighted the need for strong, early action to reduce the emissions of carbon dioxide that contribute to global warming, and identifies four key action areas:

- Reducing demand for emissions-intensive goods and services
- Increased efficiency, which can save both money and emissions
- Action on non-energy emissions, such as avoiding deforestation
- Switching to lower-carbon technologies for power, heat and transport.

National policy

In its 2007 Energy White Paper, Government reaffirmed its commitment to place the UK on a path to reducing its carbon dioxide emissions by 60 per cent by 2050, with real progress by 2020. In the light of rapidly moving scientific evidence, the Government has committed to ask the independent Committee on Climate Change to consider whether the 2050 target should be tightened up to 80 per cent.

There is currently no direct translation of national policy targets into sector-specific targets for schools.

Local policy

At the local level, Government is proposing two new local government performance indicators to encourage carbon emissions reductions:

- Percentage CO₂ emission reductions from the local authority's estate/operations
- Percentage reduction in per capita CO₂ emissions across the authority's area

Schools emissions form a large proportion of emissions from the local government estate, suggesting that progress with the first indicator may require action in schools as a priority.

Progress with the second indicator will also benefit directly from action in schools, and indirectly through their wider community role.

The role of schools

"Educating people from an early age about how our actions influence the environment is a vital element in promoting responsible behaviour.

*Creative and practical ways can be found to help pupils translate the study of climate change into actions in their everyday lives."*³

As the SDC's 2007 report *Every Child's Future Matters*⁴ showed, climate change is not only of manifest concern to children and young people, it has the potential to undermine their future prosperity and life chances. Reducing school carbon emissions now, enabling schools to prepare themselves for future climate change impacts, and preparing young people to take action in their personal and professional lives, are all critical goals for schools to consider.

This work supports the DCSF programme of work to promote sustainable development in schools. Schools have the potential to become beacons of good practice for their communities and replicators of positive sustainable behaviours, not just through their teaching but through also their management and their engagement with local communities. There are a number of stunning examples of sustainable schools, which have set out to address serious local problems around health, crime and the environment.

The Government's strategy *Sustainable Schools for Pupils, Communities and the Environment*⁵ was launched in 2006, following a successful consultation with schools, local authorities and others. The programme is a means of aligning school improvement with the vision of a sustainable community and making sure that children are empowered and educated to build a sustainable future. At the heart of the vision is a commitment to care: *for oneself, for each other and for the environment.*

The National Framework for Sustainable Schools⁶ comprises eight doorways, many of which relate to carbon emissions, such as "energy and water", "travel and traffic" and "food and drink". It stresses the need to tackle these in a coherent way across curriculum, school management (campus) and community.

Schools can act as hubs for learning and change towards sustainability in their communities – for example, as the focal point of community-based energy systems or as demonstration centres for recycling. Being seen to lead by

example among the wider community is a means of building confidence in sustainable development, showcasing what can be achieved.

Alongside the goal of tackling climate change, a number of other benefits arise from reducing carbon emissions in schools. For example:

- Lower emissions from building energy use mean lower utilisation of energy and lower bills
- Lower emissions from school travel means more pupils walking, cycling or taking public transport to schools, with improvements to health and modal shift away from cars
- Lower emissions from school waste means less waste, more recycling and more composting, with less demand for landfill or waste disposal (and potentially lower costs)
- Lower emissions from school procurement means greater use of suppliers who are equally committed to tackling climate change, helping to stimulate and expand the market for low-carbon goods and services.

Further, schools have a particularly strong profile in the construction sector at present, with many billions of pounds being spent annually on school building projects. If implemented, this strategy would build capacity in the sustainable construction and renewable energy sectors, bringing substantial benefits to other sectors in the UK, and strengthening the UK's export potential.

A 2008 survey⁷ of young people's attitudes to climate change by the Department for Environment, Food and Rural Affairs (Defra) found that 97 per cent of young people are aware of climate change, and 60 per cent are worried about its impacts on their lives. 92 per cent of pupils believe that their school could play a part in addressing climate change. This evidence adds to the imperative to tackle carbon emissions from schools and ensure that they are playing their full part in reducing emissions – with and on behalf of children.

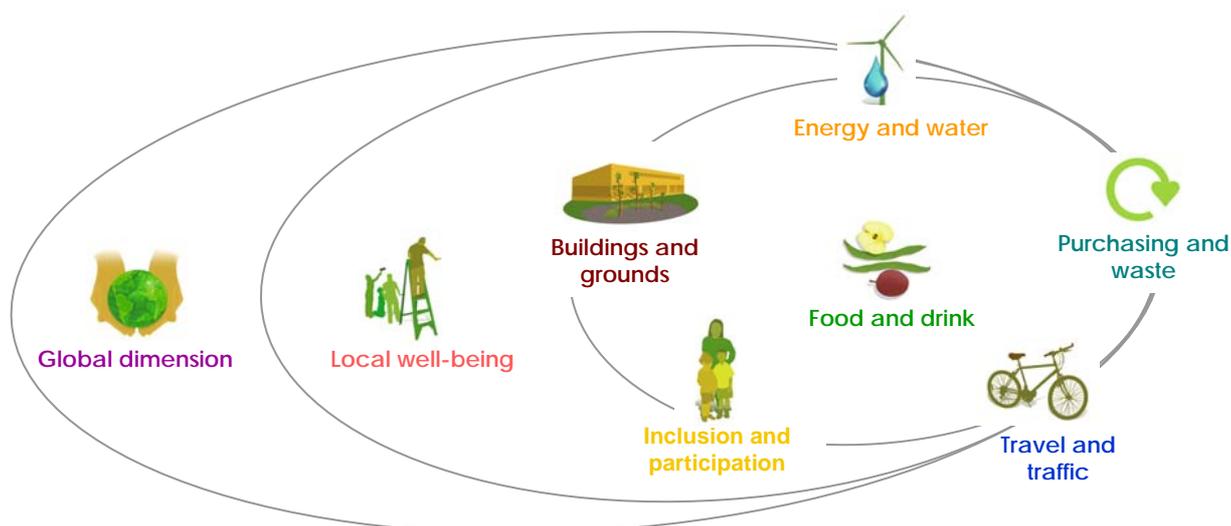
Methodology

The carbon model

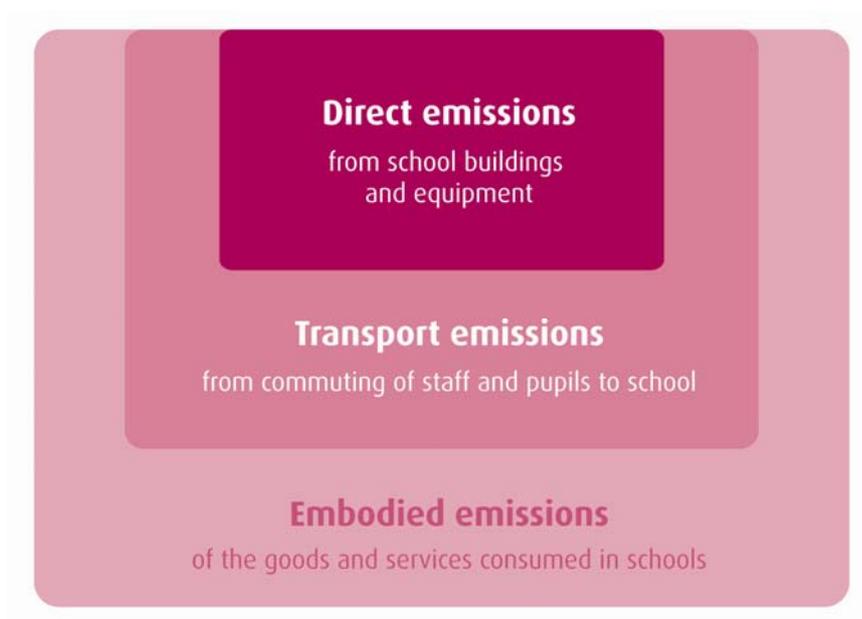
The scenarios in this report were developed using a schools carbon model created by the Stockholm Environment Institute (SEI) at the University of York. The model includes:

- Direct emissions from school buildings and energy-using equipment in buildings
- All travel emissions from commuting of pupils and staff to and from schools, and school transport
- All embodied (lifecycle) emissions of the goods and services procured by schools
- Emissions associated with the management, disposal and recycling of waste.

Diagram: The 'doorways' or sustainability themes of the National Framework for Sustainable Schools



The SEI carbon model for schools



The model uses data from the national economic accounts published by the Office of National Statistics. SEI has developed a methodology to translate financial expenditure into carbon or greenhouse gas impact across multiple sub-sectors of the economy. The model therefore tracks all expenditure by the education sector on each sub-sector of the economy and allows calculation of the carbon and greenhouse gas footprints.

Associated with the model is a Schools Carbon Reduction Scenario Tool. This has allowed us to examine the effect of different policy options on school carbon dioxide and greenhouse gas emissions from the baseline year of 2004 until 2050. Data from a range of sources are entered for the key categories (Building energy use, Transport, Procurement and Waste), and are subsequently converted into a time-series. These are aggregated to produce a comprehensive and coherent picture of emissions across the schools sector.

Stakeholder consultation

The SDC undertook an extensive stakeholder consultation during the preparation of this report, in order to gauge aspirations from local authorities, schools, NGOs and government itself on how far and how quickly the schools

sector should proceed with carbon emissions reductions. In brief, the consultation suggested a strong level of readiness to tackle carbon reduction in schools, not only to mitigate climate change, but to reduce costs, enhance education and model good practices for communities.

The stakeholder consultation helped to inform the future vision of the schools sector outlined below.

The school of 2020 vision

Consultation with stakeholders provided the following views on how carbon emissions might be regarded and treated within schools in 2020:

- School leaders, staff, pupils and managers are aware of their carbon emissions and monitor them year by year
- Schools have taken direct action to reduce their carbon emissions and have achieved a 30 per cent-50 per cent reduction from 2004 levels (as outlined in the carbon footprint)

- School buildings are energy efficient with visual displays of energy consumption. Most schools have low or zero carbon energy generation technologies, at the scale of the individual building, a cluster of buildings, or the community scale. School staff, pupils and the wider community have an understanding of the school's energy performance and how it is being improved.
- Pupils and staff choose to walk, cycle or use public transport to travel to and from school. Car use is minimal.
- Sustainable procurement has become the norm; the price of sustainably sourced goods is equal to – or less than – that of non-sustainable alternatives. Schools find it easy to make procurement decisions as they can access useful information about sustainability, and costing takes into account all the impacts of a product.
- Schools recycle or compost a wide range of their waste, and act as hubs for community recycling schemes. Smarter procurement has significantly reduced the amount of waste generated, so that only a fraction of today's amount is sent to landfill.
- Schools are supported in their activities to reduce carbon emissions by local, regional and central government, professional development and training bodies, local partners such as charities and businesses and by the local community.
- Schools support their wider community to reduce carbon emissions through showcasing best practice and developing awareness, skills and knowledge.

Carbon management in Kirklees schools



Kirklees' 198 school buildings emit about 19,000 tonnes of CO₂ per year – about half of the authority's estates estimated total of 37,000 tonnes. An innovative scheme introduced by Kirklees Council is enabling it to invest in energy and water efficiency measures in its estate and to attract external funding for energy projects. The scheme is known as the Energy and Water Conservation Fund.

Photo Caption: Pupil-led wind turbine project at Spen Valley Sports College

Any council building (including schools) can request an energy survey containing costed recommendations on investments to save energy and water and reduce bills. Building managers can then apply for a loan from the fund to carry out the work on the assumption that it will be repaid from the savings arising from lower energy and water bills. Annual repayments are set at half the value of the savings so that even during the repayment period the recipient of the loan saves money. Payments continue until the grant has been repaid, and then for a further two years as a contribution towards the fund's administrative costs. For small projects under £1,000, half of the cost of the project is given as a grant.

Before work begins, applicants supply details about their current energy and water consumption, floor area, hours and times of use, number of occupants and any additional information about activities with energy and water implications (e.g. swimming pool). These are then re-measured after the relevant investments have been made to ensure the impact of the work is properly assessed.

Energy and water consumption reports are also produced each year for council buildings, comparing the previous year's usage with a three-year average and national benchmarks. The aim is to enable staff to regularly take stock of their energy usage and carbon emissions in order to plan for further reductions.

To date, 60 per cent of applications to the fund have been from schools. The authority believes that energy efficiency education is crucial and recognises that the 65,000 pupils in Kirklees schools are the energy managers of its future low-carbon economy. Each year, around 10 -15 local schools are selected to take part in a Climate Champions project. Schools are chosen to reflect different age groups, different areas of Kirklees, different socio-economic backgrounds, and where there are recognised issues with energy usage.

2. Carbon footprint of schools

In 2006, the SDC was commissioned by DCSF (then the Department for Education and Skills) to assess the carbon footprint of the UK schools estate. The 2006 study⁸ estimated that the UK schools estate is responsible for 10.4MtCO₂ (million tonnes of carbon dioxide) from direct and indirect sources per year. These emissions represent less than two per cent of UK carbon emissions, but almost 15 per cent of carbon emissions attributable to the public sector.⁹

During the current study, SDC has recalculated the carbon footprint of the schools estate using the most recent data (for 2004), and a more detailed data classification, and limiting the study to the footprint of the schools estate in England (rather than the whole UK). The current 2008 footprint study estimates that the English schools estate emits **8.5 million tonnes of carbon dioxide each year**.

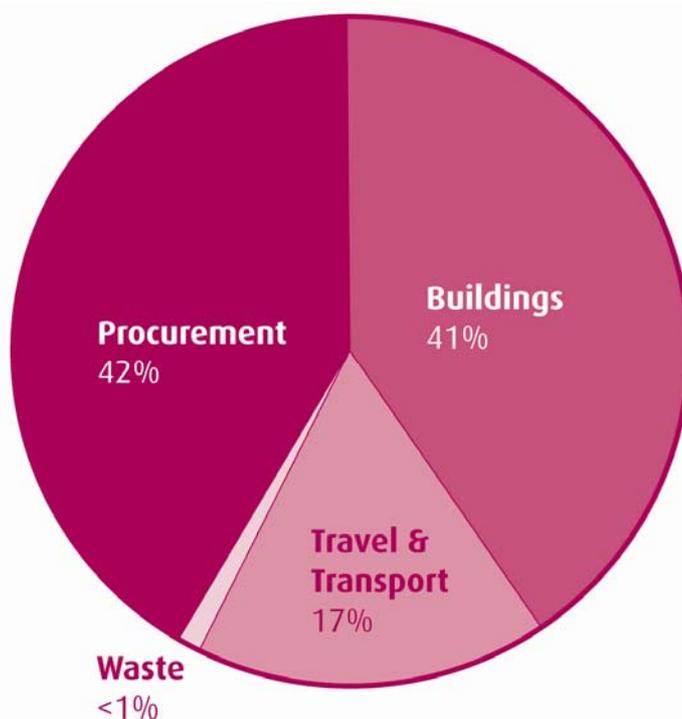
Sources of school carbon emissions

Our research looked holistically at the current situation regarding carbon emissions from the English schools estate. Emissions from four main sources have been examined:

- The use of energy (heat and power) in school buildings
- Pupil, staff and school travel and transport
- Supply chain activities of companies producing goods and services procured by schools
- Waste management and minimisation by schools

The 2008 analysis of the English schools estate carbon footprint estimates that 41 per cent of the national schools' carbon footprint is related to emissions from the use of heat and power in school buildings. 42 per cent is from emissions in the supply chain, including school food and construction activity, 17 per cent is from transport and less than one per cent from waste, as illustrated by the charts below. The footprint is a national picture, taking into account rebuilding programmes, not a footprint for an average school.

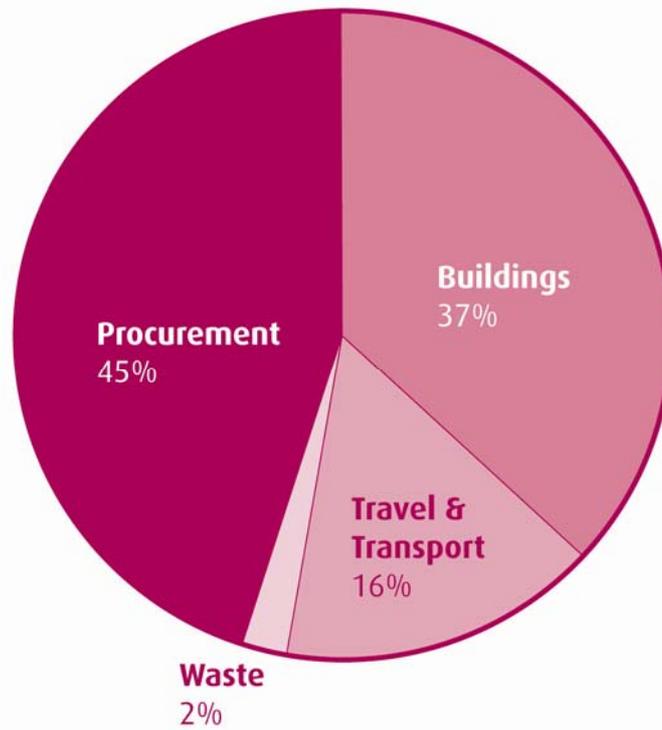
Pie chart: Schools carbon footprint for 2004



We have also analysed the footprint of all greenhouse gases¹⁰ for the English schools estate in order to better reflect the impact of waste on climate change (notably through emissions of methane). Our estimate of the greenhouse gas footprint for the English schools estate is **9.4 million tonnes of carbon dioxide**

equivalent, made up of 37 per cent from building energy use, 16 per cent from transport, 45 per cent from procurement and two per cent from waste. Clearly, waste is not a big player in comparison to procurement or transport, but it does play an important role in relation to sustainable behaviour.

Pie Chart: Schools greenhouse gas footprint for 2004

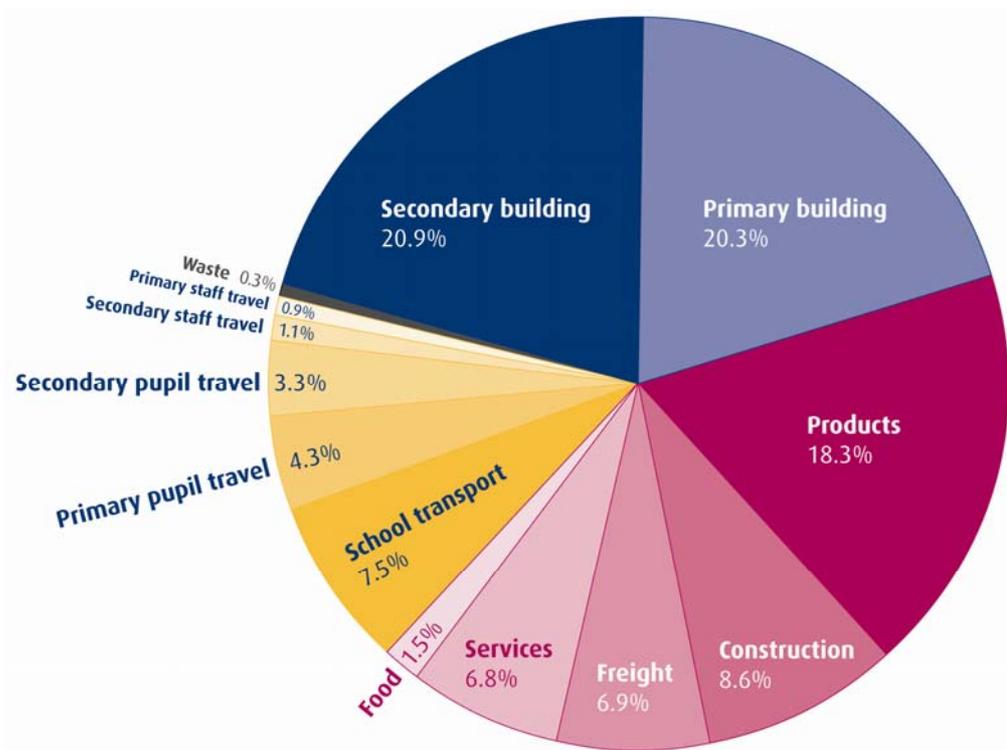


Sector	CO ₂ emissions		GHG (CO ₂ e) emissions	
	MtCO ₂	% of total	MtCO ₂ e	% of total
Building energy use	3.51	41%	3.51	37%
Travel and transport	1.45	17%	1.51	16%
Procurement	3.53	42%	4.14	45%
Waste	0.024	<1%	0.2	2%
Total	8.5	100%	9.4	100%

The rest of this report focuses on carbon dioxide emissions, but also refers to greenhouse gases where the impacts of gases other than CO₂ are significant.

The following chart shows the schools carbon footprint broken down into the major sub-sector sources of emissions:

Pie chart: Schools carbon footprint with breakdown of major sectors



The following tables summarise the main sectors of the schools carbon footprint, identifying where emissions arise and the key drivers that may be affecting each sector over time.

Energy use in school buildings

	41%
Key components	Buildings – existing and new Energy use for building services Electricity use for ICT
Drivers	Major new build and refurbishment programmes Multi-purpose buildings with longer operating hours Buildings not performing as predicted Stable/falling fossil fuel use Rapid growth in electricity use Carbon neutral, low-carbon and zero-carbon school buildings

School travel and transport

Proportion of carbon footprint	17%
Key components	Pupil and staff travel to/from school International trips
Drivers	Longer journeys to school Health and well-being agenda School Travel Plans Multi-site education

School procurement

Proportion of carbon footprint	42%
Key components	Furniture Materials and equipment Stationery ICT and Electrical equipment Food
Drivers	Budget/real or perceived cost differential Sustainable procurement Demand for construction materials Access to alternatives (eg, to plastic) Health and well-being agenda (food procurement)

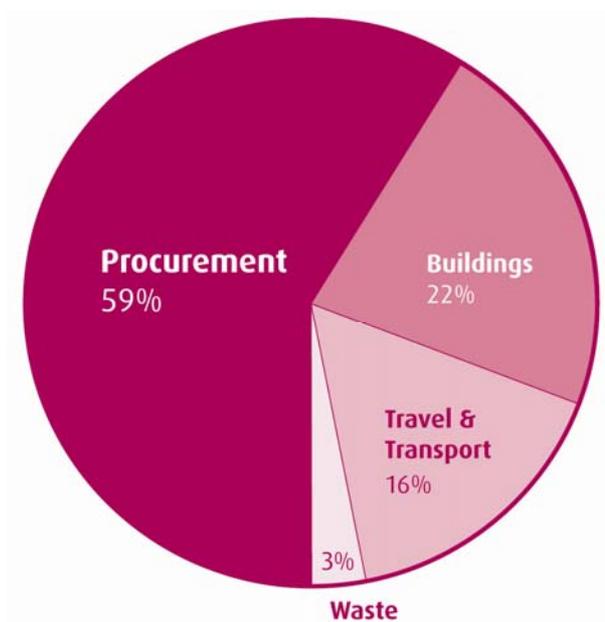
Schools waste

Proportion of carbon footprint	0.3%
Proportion of greenhouse gas footprint	2.1%
Key components	Paper waste Food waste
Drivers	Awareness/take up of recycling schemes Consistency of local authority approaches Increase in food waste

Health

The SDC has also been working with the NHS to quantify the carbon footprint of the NHS in England.¹¹ The results can be contrasted easily with the estimate for schools provided in this report as a similar methodology has been applied. Overall, the NHS footprint is approximately twice as large as the footprint for schools, i.e. 30 per cent of public sector emissions.

Looking at greenhouse gas emissions, the NHS England footprint breaks down as follows: building energy use at 22 per cent, travel comprising 16 per cent, waste at 3 per cent and procurement making up 59 per cent. Some interesting comparisons can be made. For example, the building energy use of NHS England is only 20 per cent larger than that of the schools estate. However, since the floor area of the schools is around double that of the health estate, this suggests that the latter is much more intensive in its use of energy which may be explained by longer opening hours (24 hours for acute hospitals) and energy intensive processes. Emissions from procurement of goods and services in the NHS England are more than double those from procurement in England's schools, and dominate the NHS carbon and greenhouse gas footprints. NHS England procurement emissions include major sub-sectors of pharmaceuticals and medical equipment which hardly exist within schools' procurement.



Above: Graph showing NHS England carbon footprint.

Below: Table showing NHS England carbon and greenhouse gas footprint data.

NHS Sector	CO ₂ emissions		GHG (CO ₂ e) emissions	
	MtCO ₂	% of total	MtCO ₂ e	% of total
Building energy use	4.14	22%	4.59	22%
Travel	3.41	18%	3.45	16%
Procurement	10.97	59%	12.59	59%
Waste	0.10	1%	0.65	3%
Total	18.61	100%	21.28	100%

Learning for sustainability in Worcestershire schools



Worcestershire County Council (WCC) sees educating the next generation about sustainable development as a crucial role for schools, and has run an internationally respected Education for Sustainable Development (ESD) service for many years.

Photo caption: Red Hill Primary School's climate-proofed building

Over the last two years, the ESD Team have coordinated a County Learning for Sustainability Forum which brings together officers from County Council Directorates, District Councils, local NGOs and others supporting schools with their work to become sustainable schools. The Forum recently had its *Learning for Sustainability Strategy* approved by the Worcestershire Partnership (a local strategic partnership), and this endorsement strengthens the Forum's role in building partnerships for action on sustainable schools. Climate change is a named key theme running through the Strategy.

Over the past three years, the authority has worked with Warwickshire County Council and Coventry City Council on a *Switch it Off* campaign that is linked to its work on climate change with schools. The campaign is delivered through a two-week programme. The first week involves 'under-cover' audits and checks by a pupil-led eco team, leading to a general awareness raising about the issues and possible solutions. The second week is 'Switch it Off Week', with a focus on actively reducing energy use. Schools have reported varying degrees of success, with some cutting electricity consumption by a third and one school by 50 per cent. The campaign is a part of a joined-up approach to encouraging schools to focus on energy across curriculum, campus and community, not just as a one off, but as an ongoing theme and tied in with monitoring and evaluation as part of Eco-Schools. It has led to much greater awareness of the benefits of monitoring and reducing energy use in schools, including the potential cost savings.

The ESD service is active in thinking through how climate change can be addressed through the design and construction of school buildings. Its strong links with the Council's architecture unit have influenced the design of schools in the county, a good example of which is Red Hill first school in Worcester.

Designed as a 'climate change ready' school, Red Hill was one of the first in the UK to use the UKCIP climate change adaptation framework to inform the design process, leading to a low-profile roofline with wide guttering, shade-giving overhangs, a sustainable drainage scheme (SUDS) and solar-powered ventilation stacks. It was opened by the minister for climate change on 18th June 2007 and acts as a test bed for technologies to be used elsewhere in the County.

The building has a variety of features that reduce its carbon footprint and enhance the overall environment of the site. It is the first school in the County with ground source heating and hot water systems. It harvests rainwater for flushing toilets and has a mechanical extract ventilation system powered by small photovoltaic panels. The ICT suite is cooled in summer using the ground source heat pump in reverse mode, while the sustainable drainage system provides includes a rich wildlife habitat and recreation/learning area based on swales and ponds. Much of the original building was crushed on site to create hardcore for the new foundations, and extensive use was made of recycled content materials in the construction.

3. Scenarios for future carbon emissions

This study has defined and developed a Business as Usual Scenario and two scenarios of interventions to reduce carbon/GHG emissions over the study period to achieve differing levels of carbon reduction. The interventions include a mix of technological change, use of regulatory standards, and behavioural change, driven by new policies.

The Business as Usual (BAU) scenario includes current and expected/ predicted near-future social, demographic and technological trends, as collated by the SDC through desk research and engaging with stakeholders.

The intervention scenarios show how carbon emissions can be reduced over the period to 2050, with the main focus on the period to 2020. Each scenario shows just one way in which interventions can be used to reduce emissions by a target amount, and are not designed to be a prediction of the future nor a prescription for the policies the Department should adopt. The policies have not been costed and are chosen to be feasible on the basis of the SDC project team's judgement, working with the Project Advisory Group and stakeholders.

The SDC's carbon reduction intervention scenarios are designed to reduce emissions by a target date of 2050, but with an important milestone of 2020. Aiming for long term emissions reductions by 2050 is in line with Government's long term policy.¹² However, emissions reduction targets focused on 2050 are not sufficient to encourage early action, and risk high cumulative emissions. Greater certainty of technologies and policies may be achieved with a focus on 2020, which brings a focus on early action to reduce emissions.

This study has developed three scenarios: a Business as Usual trend and two carbon reduction intervention scenarios to illustrate progressively more demanding and challenging interventions to increasingly reduce carbon emissions. In summary, the three interventions are:

- **Scenario 1: Business as Usual:** includes current and expected/ predicted near-future social, demographic and technological trends
- **Scenario 2: 30 per cent emissions reduction by 2020, 60 per cent emissions reduction by 2050:** This scenario is in line with current government commitments for the UK. It assumes smaller interventions introduced over longer periods and development of more easily implemented policies/measures to engineer change in behaviour
- **Scenario 3: 50 per cent emissions reduction by 2020, 80 per cent emissions reduction by 2050:** This scenario is more demanding, with potentially more rigorous policies/measures and technological changes and includes some 'blue sky' thinking, especially in the longer term.

Emission reduction interventions have been used progressively and cumulatively. This means that the modelling assumes that all scenario interventions across each of the sectors are implemented before the next policies are factored in. Hence Scenario 2 is built onto the BAU scenario, and Scenario 3 includes the policies of Scenario 2.

The details of the intervention and reduction scenarios per performance sector are summarised in this report.

Scenario 1: 'Business as Usual'

The report addresses the future direction of schools carbon emissions in the light of known policies and trends within the schools sector.

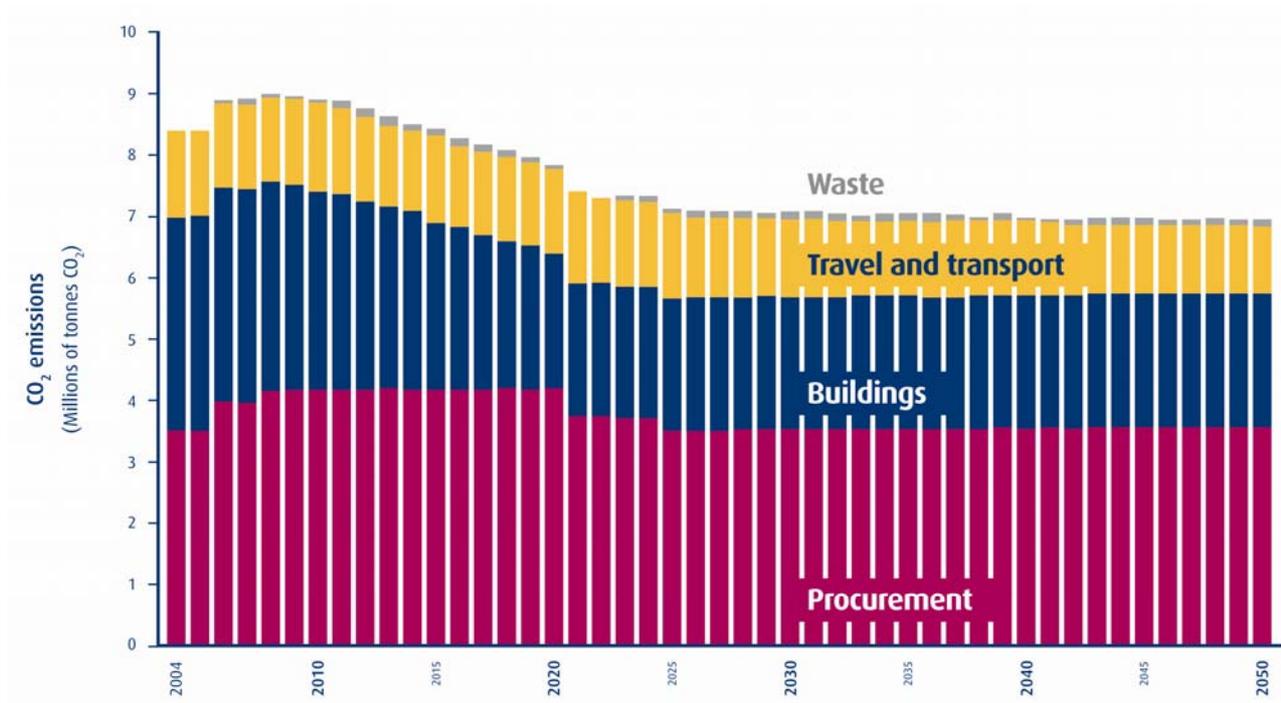
Our carbon model has been used to generate an initial projection of emissions from the English schools estate under a 'business as usual' (BAU) scenario. This uses a combination of known policies and continuation of current observed trends to generate emissions from each sector for each year from 2004-2050. There are trends and policies that increase emissions and decrease emissions and the BAU scenario shows the estimated overall effect on emissions from the schools estate. The BAU trajectory suggests that emissions from the English schools estate initially rise then fall by less than ten per cent by 2020 and less than 20 per cent by 2050.

Although the BAU trajectory does not suggest a strong growth in emissions, it is a concern to see that emissions appear not to be on a path to reduce by at least 60 per cent by 2050.

The growth in emissions up to 2010 is largely driven by the increased expenditure on construction during the major capital investment programmes (Building Schools for the Future (BSF), Primary Capital Programme, Academies). The schools carbon trajectory does not currently demonstrate strong early reductions in emissions as recommended by the Stern Review.¹³

The multiple drivers affecting emissions from each sector suggest that powerful intervention will need to be taken to reduce greenhouse gas emissions in all areas across the footprint to ensure that reductions in one area are not negated by growth in another.

CO₂ emissions projected under a Business As Usual scenario to 2050



Targeted carbon management in Calderdale schools

In 2005, Calderdale Council was selected to participate in the third phase of the Carbon Trust's Local Authority Carbon Management programme. Through this process it was found that the largest proportion of carbon emissions arising from the Council's activities (excluding procurement of goods and services) was from energy use (46.4 per cent), and that the highest energy users are schools (58 per cent of total energy use).

The current school energy bill is in excess of £2.1m and, in the light of this, the Council has recruited a Carbon Management Officer to work directly with schools to save money and reduce environmental impact. It is hoped that savings of greater than £200,000 per year will be possible to achieve through relatively simple measures such as heating system upgrades, modernisation of light fixtures, insulation and lagging, refurbishments and awareness-raising schemes.



The Officer is delivering training sessions for head teachers and premises managers across the authority's 104 schools. They have engaged the Carbon Trust to perform energy surveys at five of Calderdale's secondary schools, and joined forces with the Alternative Technology Centre in Hebden Bridge to deliver the SUSSED energy and water reduction project to primary schools in the area. The Eco-Schools scheme is promoted to schools as a means of reducing carbon emissions while also getting pupils and staff engaged in a whole-school approach. Energy projects such as biomass boilers are also being investigated and delivered via an inter-departmental approach within the authority.

Photo caption: Children at Riverside School where heating costs has been reduced dramatically

The work contributes directly to the objectives of the Council's Local Area Agreement 2007 – 2010, which covers six themes taken from the community strategy for the authority – the Calderdale Futures Plan 2006-2016. One of the themes is the Environment, which includes an outcome to “tackle climate change through reduced greenhouse gas emissions.” To deliver this outcome a target has been set to “achieve enhanced carbon emissions reductions from the Council's operational buildings, fleets, street lighting and schools.” If the target is attained, the Council will be rewarded with a significant sum of money that will enable further measures to be implemented in schools.

Scenario 2: 30 per cent reduction by 2020

Overview of scenario

This scenario identifies one way in which the English schools estate could achieve a 30 per cent reduction in carbon emissions by 2020, placing it on a path to a 60 per cent reduction by 2050. It is not a prescription of how the DCSF should design policy to reduce emissions, but a possible approach.

This scenario is based on proven technologies, and in the period to 2020 assumes extensions to and adjustment of existing initiatives and policies. It focuses on actions which can be

undertaken or significantly influenced by DCSF, local authorities and schools themselves.

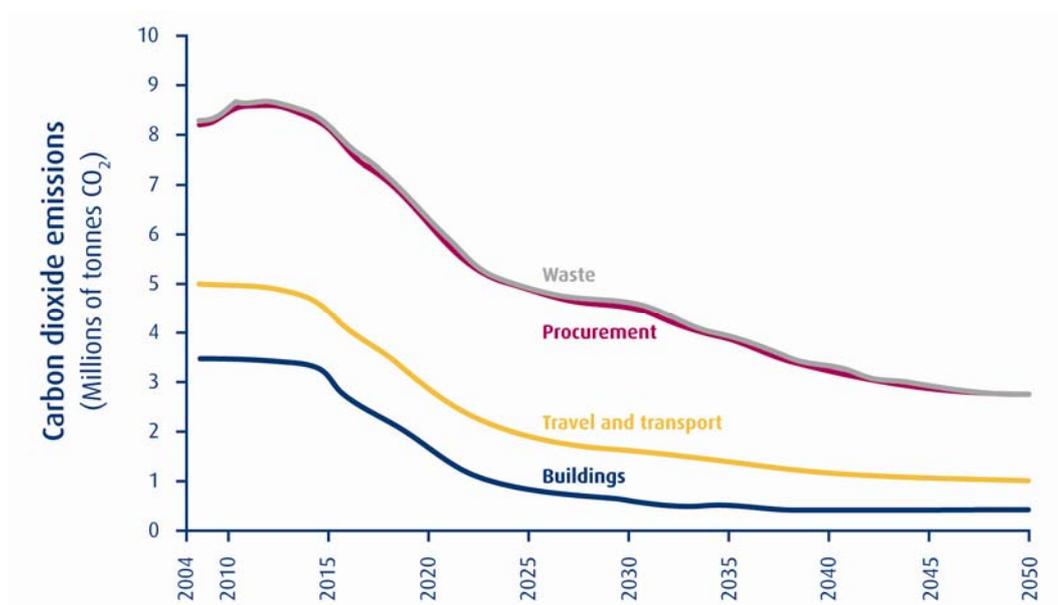
Emissions trajectory

The overall scenario is derived from action to reduce CO₂ emissions across four sectors: buildings, transport, procurement and waste.

Summary of scenario elements

The table below summarises the carbon reductions by policy area under our 30 per cent scenario. Percentage reductions are based on the 2004 baseline figure. In some instances (noted), the BAU trajectory sees an increase in the short-term, which is either reined in or counteracted by other actions in the model

Graph: Trajectory for carbon dioxide emissions reductions under 30 per cent scenario



Category	Policy areas	Reduction in CO ₂ emissions against original sector emission	Reduction in CO ₂ emissions against overall footprint
Buildings			
	Primary buildings	59.9%	12.2%
	Secondary buildings	79.9%	16.7%
Travel and transport			
	Primary pupil travel	17.4%	0.7%
	Secondary pupil travel	10.6%	0.4%
	Primary staff travel	5.1%	0.05%
	Secondary staff travel	4.8%	0.1%
	School transport	32.1%	2.4%
Procurement			
	Food	3.9%	0.1%
	Paper	53.5%	2.6%
	Furniture	6.9% (after initial increase)	0.1%
	Water	20%	0.1%
	Construction	7.1% (after initial increase)	0.6%
	Recycled products	97,000 tCO ₂ per year in 2020	1.1%
	Freight	7.4%	0.5%
Waste			
	Waste minimisation	37.6%	0.1%

The table shows that emissions reductions come from all sectors of the footprint, with greatest savings from buildings. The following interventions are required to deliver these emissions reductions:

Building energy use

- Improving the existing stock of school buildings – establish new energy performance standards for schools refurbished in capital programmes, extend primary capital programme to capture all primary stock. Introduce energy efficiency and introduce renewable energy retrofit programmes for the rest of the existing stock.
- New build schools to higher carbon standards leading towards zero carbon by 2016.
- Efficient ICT equipment and usage.
- Stimulate and sustain energy efficiency behaviour change in all schools.

Travel and transport

- Improved pupil access to walking and cycling to school

- Improved staff access to walking, cycling and public transport
- School transport to use fuel efficient vehicles.

Procurement

- Increase the uptake of “low-carbon food” by schools
- Reduce and reuse paper as well as procurement of recycled paper
- Reuse and repair of furniture, and procurement of more durable furniture
- Water efficiency measures introduced in school buildings
- Reduce emissions from construction procurement through increased recycled materials, and energy efficiency site measures.
- Increase recycled content in procured products.

Waste

- Reduce total waste generated
- Increase recycling and composting rate

Scenario 3: 50 per cent reduction by 2020

Overview of scenario

This scenario identifies one way in which the English schools estate could achieve a 50 per cent reduction in carbon emissions by 2020, placing it on a path to a 80 per cent reduction by 2050. This would put DCSF and the schools sector in the position of leading by example in setting and delivering bold carbon reduction targets. It is not a prescription of how the DCSF should design policy to reduce emissions, but a possible approach.

This scenario builds on the robust approaches to carbon reduction in Scenario 2, whilst also identifying more innovative areas for carbon emissions reduction intervention. It is again based as much as possible on the extension and adjustment of existing policies within the DCSF, local authorities and schools' sphere of influence. But it also includes more emphasis on DCSF, local authorities and schools' role in influencing actions

by others, for instance in the procurement supply chain. This scenario includes more innovative policy measures that have not previously been implemented for schools in England.

The SDC believes that the 50 per cent carbon reduction is achievable by 2020 with vision, concerted effort and action across sectors beyond schools.

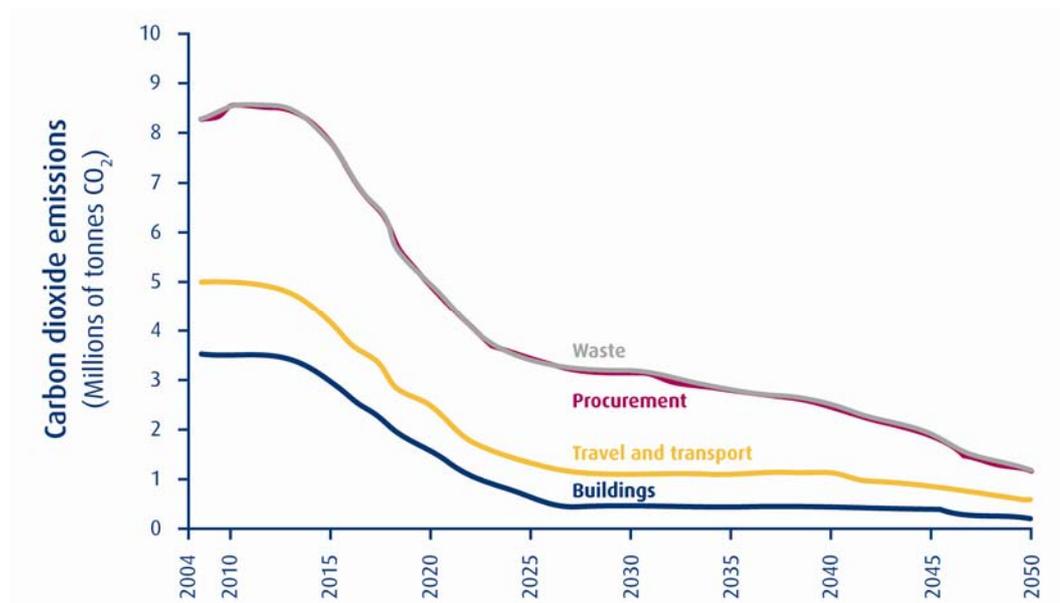
Emissions trajectory

The overall scenario is derived from action to reduce CO₂ and greenhouse gas emissions across four sectors: buildings, transport, procurement and waste.

Summary of scenario elements

The table below summarises the reductions in CO₂ emissions available by 2020 across each policy area as modelled in our 50 per cent scenario. Again, these are based on the 2004 baseline; some categories increase in the Business As Usual scenario, so percentage savings may reflect a reining-in of growth.

Graph: Trajectory for carbon dioxide emissions reductions under 50 per cent scenario



Category	Policy areas	Reduction in CO ₂ emissions against original sector emission	Reduction in CO ₂ emissions against overall footprint
Buildings			
	Primary buildings	58.5%	11.9%
	Secondary buildings	87.7%	18.3%
Travel and transport			
	Primary pupil travel	73%	3.1%
	Secondary pupil travel	58.8%	2.0%
	Primary staff travel	23.9%	0.2%
	Secondary staff travel	23.4%	0.2%
	School transport	42.4%	3.2%
Procurement			
	Food	41.2% (after initial increase)	0.6%
	Catering services	40%	0.3%
	Paper	65.8%	3.2%
	Furniture	23% (after initial increase)	0.3%
	Water	30%	0.2%
	Construction	29.4% (after initial increase)	2.5%
	Recycled products	172,000 tCO ₂ per year in 2020	2%
	Freight	24.2%	1.7%
	Hotels and accommodation	40%	0.1%
	ICT procurement	7.5%	0.2%
	Cleaning services	40%	0.9%
	Other products	35.9%	2.0%
Waste			
	Waste minimisation	62.6%	0.2%

The table shows that emissions reductions for this scenario that come from all sectors of the footprint, again with greatest savings from buildings. Greater savings are achieved from all sectors. The following new interventions are required to deliver these greater emissions reductions:

Building energy use

- Improving the existing stock of school buildings – establish higher energy performance standards for schools refurbished in capital programmes
- More extensive programme of renewable energy retrofit to school buildings
- More efficient ICT equipment
- More effective energy efficiency behaviour change in all schools.

Travel and transport

- Greater pupil access to walking and cycling to school and encouragement to use these modes
- Greater staff access to walking, cycling and public transport and encouragement to use these modes
- School transport to use more fuel efficient vehicles
- School trips using lower carbon transport.

Procurement

- Greater effort to increase uptake of “low-carbon food” by schools
- Further reduction and reuse of paper as well as procurement of recycled paper
- Greater water efficiency in school buildings
- Further reduction in emissions from construction procurement through increased recycled materials, and energy efficiency site measures

- Emissions reductions through procurement of lower impact cleaning, accommodation, ICT and freight services, and lower impact products.

Waste

- Further reduction in total waste generated
- Further increase in recycling and composting rate

Carbon offsetting

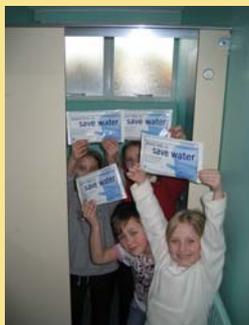
Carbon offsetting can be a useful tool: by making people think about the carbon impacts of their behaviours, it increases carbon literacy. It can also be a useful “action of last resort”, effectively a carbon accounting transaction for residual carbon which remains after (and only after) all possible/cost-effective reductions have been made.

However, the SDC does not support the inclusion of offsetting in the calculation of schools carbon emissions. We do not believe that offsetting will promote the path towards genuine emissions reduction and the associated transformation of behaviour. Rather, we need a suite of programmes and policies which will stimulate low-carbon behaviours and choices by schools and provide absolute clarity about the levels of carbon emissions from schools, without the risk of these being masked by offsetting.

A secondary, though important, concern is whether offsetting payments are the most appropriate use of school budgets.

EMAS (Eco Management Audit Scheme) in Leicester schools

Through Leicester's EMAS (Eco Management Audit Scheme) Education Programme, 72 schools in the city are now part of the City Council's corporate environmental management system. This has enabled the authority to put in place measures and support systems to encourage schools to set CO₂ targets and reduce their carbon emissions.



The commitment to include schools within the corporate EMAS system dates from 1999. From this point on, working in partnership with Groundwork Leicester and Leicestershire (GWLL), the authority has been developing targets for key environmental impacts which are common to the authority and schools alike. Currently no target has been established for reduction of school carbon emissions, but the feasibility of extending present city-wide and council-wide targets to schools is being actively explored.

Photo caption: Young EMAS participants at Rolleston Primary School

In the mean time the following measures have been put in place in schools:

- Intelligent metering for electricity, gas and water for 95 per cent of EMAS schools, allowing immediate monitoring of utility use, identification of leaks etc.
- School Travel Plans are a required aspect of Leicester's EMAS system for schools.
- EMAS schools have a target of increasing their energy supply from green energy tariffs.
- A Scrutiny Review Group is drawing lessons from Leicester's Building Schools for the Future (BSF) programme for application across its whole schools estate.

The programme is currently seeking to create a Carbon Neutrality post, with a remit to analyse school-based environmental data in more detail and produce league tables of school carbon emissions within the city, not just covering electricity, gas and water, but extending this to also look at emissions from transport, food and the supply chain.

One of the dilemmas faced in setting realistic targets on CO₂ emissions for schools is the need to take account of the increasing uptake of ICT equipment and other energy consuming teaching methods used in schools. Whilst this can lead to a variety of educational benefits it is vital that the associated electrical and cooling load of the technology is minimised in the overall architecture and choice of equipment.

Leicester City Council and GWLL are working with others on the development of a schools version of the Nottingham Declaration on climate change, with a particular view to ensuring that schools feel a sense of ownership of the Declaration. They are also addressing the challenge of making targets measurable and realistic, to ensure the Declaration's goals can be monitored effectively.

The authority's EMAS system is regularly reviewed and monitored, both internally and annually via an independent, external organisation. Progress, barriers and next steps are identified and as necessary actioned through the EMAS process, which involves all partners at each stage. The system is currently being reviewed to link the authority's CO₂ targets more intrinsically to its Climate Change Strategy, which emphasises engagement with targets and the power of individual action.

4. Recommendations

The SDC has identified a number of core principles to guide the development of our recommendations to the DCSF:

1. They should focus on areas with the most potential for emissions reduction

With this in mind, we encourage DCSF to take action to address emissions from across buildings, transport, procurement and waste, but specifically focus its efforts according to the carbon reductions that can be expected in return.

2. They should focus on areas within the Department's field of influence

We will identify priorities which can be delivered or significantly influenced by DCSF. For example, schools capital programmes are very much within departmental control; EU standards for the energy efficiency of products are not.

3. They should make use of existing DCSF policy and programmes as catalysts

We should focus on the opportunities for carbon reduction presented by existing programmes such as capital investment, nutritional standards and school travel planning.

To reflect the wider benefits of delivering real carbon emissions reductions in schools, we should also be mindful of two secondary principles:

a. The schools sector should demonstrate leadership

The public sector – including schools – has a vital role to play in leading and exemplifying best practice in carbon reduction. The strategy should be credible and effective, with interim milestones and a transparent reporting mechanism.

b. Policy recommendations should take into consideration wider positive impacts

Some policies may not lead to large-scale carbon emissions reductions in themselves; however, they may act as a catalyst for wider behaviour change, capacity building

or cultural change and should therefore be emphasised.

Key themes that emerge from our research and modelling of scenarios are that:

- All areas of emissions need to be tackled concurrently, but different levels of saving can be expected from each
- If one area is not amenable for any reason to substantial reduction, then other areas will need to make deeper reductions
- Overall, we are optimistic: with determination and a willingness to make bold policy decisions, both the 30 per cent and 50 per cent scenarios are achievable

General recommendations

This section includes recommendations for DCSF, other government departments, and regional and local government. We also cover aims and targets for carbon reduction, strategic frameworks, implementation mechanisms, funding, and governance and monitoring.

The role of DCSF

DCSF has a key role to play in leading the drive to reduce carbon dioxide emissions in England and, through its example, much further afield. Not only can the Department stimulate emissions reduction in its own operations and – as outlined here – in the schools estate, but in doing so it is uniquely placed to influence the energy users, transport passengers and product purchasers of the future through their experiences of school today.

We therefore believe that DCSF should seek to play a leading role in reducing carbon emissions – setting a clear direction for the education system and ultimately the general public to follow and communicating this widely amongst national and local stakeholders.

With a strategic framework for carbon emissions reduction in place within DCSF, meshing with the Sustainable Schools framework, schools can take action and act as examples to their communities, and as beacons for a lower carbon future.

We recommend that DCSF establish and commit to an aim for carbon reduction for the whole schools estate (as exists for carbon reductions from energy use in the NHS estate).¹⁴ The purpose of this aim would be to bring a sense of common purpose and urgency to the education sector's response to climate change, galvanising action across schools, local authorities and communities and giving carbon currency in education policy.

This aim could be phrased in terms of a minimum level of emissions reduction by a certain date. It is important to set a level which is realistic and achievable for the sector, but which also reflects the scale needed to meet national policy goals and the desire for the public sector to lead by example. In other words, the level should be aspirational but, with commitment, achievable.

We recommend that DCSF commits to an aim of 50 per cent reduction by 2020 leading to an 80 per cent reduction by 2050 (ie, in line with our Scenario 3). We recognise that this goes beyond the targets currently held by Government.

As a first step towards establishing this aim with schools, we recommend that DCSF adopts the same aim for its own operations. This would put DCSF in a leadership position with respect to the Framework for Sustainable Operations on the Government Estate (SOGE) which currently commits central government to a 30 per cent reduction by 2020, leading to a 60 per cent reduction by 2050.

We also recommend that DCSF take into consideration the carbon impact of future new

policies and initiatives with a view to minimising any increases and counteracting them through guaranteed reductions elsewhere in the system.

Other roles

Central government

The SDC believes that the overall role of government in reducing carbon emissions is to be the central facilitator of efforts to reduce emissions, taking long term action, and providing short term advice and encouragement, to help smooth the path of individuals and organisations operating within progressively tightening carbon limits.

We recommend that DCSF acts as a catalyst for carbon reductions by creating an enabling environment for school and local authority action. In its work with local authorities, DCSF should use appropriate policy levers and supportive guidance, but this should be coupled with allowing local flexibility of delivery, for example, clustered approaches by local authorities to a portfolio of schools.

Whilst DCSF will lead the agenda for carbon reduction in schools, other government departments will also have important roles to play in successful delivery, including:

- HM Treasury, in its allocation of funding for schools capital programmes and other activities
- Defra, in its design of information, funding and awareness programmes and specific areas of responsibility such as waste and agriculture

Aims and targets

An aim or target can help to provide a clear plan for schools to work within, offering a base for understanding what is expected of them. Pupils and the wider community can be engaged with the achievement of aims or targets, creating learning opportunities. Aims and targets shared across a cluster of schools can interlock with the delivery of multi-site education and the increasing trend towards partnership working in the sector.

Carbon reduction is not the core aim of a school. It is important therefore that any aim or target is introduced thoughtfully and with due consideration of its impact on schools. We suggest the language of aims rather than targets to reflect the need to take focused action without the additional burdens that targets often imply.

- DfT, in its activities supporting sustainable school travel and public transport provision
- CLG, in its coordination of local authorities and their performance frameworks, and in managing the planning framework for new school developments
- DIUS, in linking schools carbon reduction with HE/FE initiatives, and in its role as policy lead for international school travel grants
- BERR, in developing renewable energy capacity and delivering efficiencies in the construction industry

DCSF will need to engage closely with all of these departments (and potentially others) to ensure that opportunities for schools carbon reduction are identified and delivered. The greater the carbon reduction ambition, the more interaction with other departments will be required.

Regional government

Positive work is already under way at regional government level in facilitating and coordinating activity to promote Sustainable Schools. This role can be supported and enhanced to make carbon reduction a specific focus of regional activity. Regional government can work to develop, maintain and maximise support networks for local authorities and schools, and to collect and share good practice, both within and between regions.

Regional government can facilitate action between central and local government and also provide a negotiating space, for example, in the development of Local Area Agreements.

In addition, regional government has a significant part to play in the delivery of this strategy. Their oversight of transport and infrastructure issues, regional energy targets and their interest in the development of regional/local supply chains for economic development all link in to the work that this strategy aims to stimulate.

Local government

Many local authorities already play a pivotal role in initiatives to reduce carbon dioxide emissions in schools in their local areas. This activity directly supports progress with the two performance indicators in the new local

government performance framework which relate to carbon emissions. Moreover, action in schools offers a good way to stimulate action in the wider community.

Local government has multiple roles beyond this: supporters and facilitators of policy change, providers of financial and human resources, owners of expertise and coordinators of different strands of activity. This coordinating role is particularly important when considering the breadth and scope of the action needed to deliver carbon reductions of 30-50 per cent by 2020.

We see local authorities as the natural home for carbon reduction support services for schools, and for innovative methods of financing carbon reduction measures such as 'invest-to-save' schemes.

Local authorities can also directly deliver some of the carbon savings identified in this report, through their aggregated procurement role on behalf of schools, or through delivering community-scale and even authority-wide energy systems benefiting schools.

Schools

Schools are not only the beneficiaries of this strategy, but also key participants in its delivery. Almost every policy or initiative identified in our stakeholder consultation and scenario development requires someone at a school to decide to work differently.

It is vital that school leadership teams regard carbon reduction as a priority for their schools, as teachers, staff and pupils will need to adjust their behaviours, and purchasers will need to think again about how they select goods and services. DCSF needs to lead the system around schools in order to encourage these aspirations to take root.

Schools also have a role to play within their communities – reinforcing the community aspects of sustainable schools by exemplifying low-carbon approaches and behaviours. More and more members of the community will be making use of school facilities for different purposes, providing both the challenge of managing emissions from increased access and use, and the opportunity to use schools to demonstrate options for low-carbon living.

Recommendations for a DCSF Carbon Management Strategy

Strategic framework

- Make a clear statement of DCSF's priorities, objectives and approach to reducing carbon emissions from the schools estate
- Establish an aim/target for carbon reduction from the schools' estate of 50 per cent by 2020, leading to 80 per cent reductions by 2050
- Commit to taking action across the whole carbon footprint identified in this report
- Commit to seeking additional funding to implement carbon reduction policies, either through new money, revolving 'invest-to-save' funds or realignment of existing policy
- Commit to assessing the carbon impacts of all major DCSF policies to remain in line with the carbon reduction aim
- Clarify the treatment of schools within local authority CO₂ performance indicators
- Work with Defra to clarify how schools will be included in the Carbon Reduction Commitment.

Implementation

- Ensure regional government helps to coordinate local authority action on schools carbon reduction, and utilises its existing networks to share information and good practice
- Work with Defra and CLG to fund schools carbon reduction functions within local authorities, either through the appointment of designated officers or by bringing in third party organisations. Such support functions would help to:
 - Build capacity for carbon reduction within the local authority/area
 - Work with schools to develop and implement carbon reduction plans
 - Help local authorities to realise opportunities for CO₂ reductions from their schools estate, contributing to local authority performance indicators
 - Bring in additional expertise and resources to work with schools, and share experience and good practice within and between authorities
 - Support the DCSF's Sustainable Schools strategy to capture wider sustainability benefits for schools, pupils and communities.
- Provide more detailed technical support to local authorities and schools going through capital new build and refurbishment programmes
- Share DCSF school census data on pupil travel with local authorities to trigger action
- Ensure that guidance, information and campaigns mesh with the National Framework for Sustainable Schools to obtain consistency of message
- Support NCSL, teacher training colleges and others in their work to embed carbon reduction and sustainability into the management and operation of schools.

Funding

- Modify school funding arrangements to enable the linking of capital and revenue budgets, and ensure whole-life costing is central to decision-making in all major procurement
- Offer schools and local authorities immediate access to invest-to-save funding (including revolving funds)
- Include strong messages on carbon, if not actual conditions, within key funding streams
- Modify capital funding programmes to encourage carbon reductions
- Encourage schools to take up grants and alternative funding arrangements where appropriate
- Help schools and local authorities identify revenue-generation opportunities from carbon reduction, eg offering low-carbon school meals to the community, or selling heat and power from low-carbon onsite generation

- Encourage local authorities to explore new routes to financing and delivering community-scale and even authority-wide energy systems.

Governance and monitoring

- Establish a high-level group within DCSF to oversee progress on achieving carbon reductions
- Establish a carbon monitoring function within DCSF to gather relevant data, evaluate progress and report to the carbon reduction group
- Build carbon reduction objectives into departmental/team strategies and performance management systems
- Establish methodology for gathering school energy data from local authority performance indicators on CO₂
- Utilise Consistent Financial Reporting data to benchmark supply chain emissions
- Continue to use existing school census travel data and extend this (or find alternative data gathering routes) to cover all schools and incorporate staff and international travel
- Build on Ofsted's inclusion of sustainable development within its self-evaluation form for schools by ensuring sustainable development is fully embedded within the 2008-9 inspection reform process.

Wood heat in Nottinghamshire schools



Schools account for over 57 per cent of all carbon emissions from Nottinghamshire County Council's estate, with many using coal-fired heating systems – a legacy from the county's coal mining heritage. In 2003 the authority began replacing coal with wood-fuel by installing new boilers or converting existing coal-fired boilers to handle wood pellets. To date 30 boilers have been installed at 25 schools, at a cost of almost £1.4m. These, and a further 18 installations planned over the next year, will reduce CO₂ emissions by a total of 4,343 tonnes per year, which is almost 10 per cent of schools' emissions in the county.

Photo caption: Mornington Primary School boiler house

The results speak for themselves. West Bridgford School recently achieved an A grade rating on its Display Energy Certificate (DEC), where a rating for a building like this would normally range from D to E. In 2005 the school converted its old coal-fired boilers to run on 100 per cent renewable biomass as part of the Wood-heat initiative. The whole of the pool and theatre block, including the water for the swimming pool, hot water for showers and several other smaller buildings are now heated solely by biomass boilers. Since conversion over 2,000 tonnes of carbon emissions have been saved, and the student council is committed to achieving Eco-School status.

Nottinghamshire's wood-heat programme represents a clear commitment by the authority to tackling the causes of climate change, something enshrined in the Nottingham Declaration on Climate Change to which it is a signatory. It is a key component of the authority's carbon management plan, and positively supports progress with the two climate change indicators (NI185 and NI 186) featured in the new Local Government Performance Framework.

Schools and pupils are enthusiastic about the use of wood-fuel. They are keen on the environmental benefits and primary schools in particular are using their wood-fuel boilers to inspire learning about sustainability and climate change. The programme also builds confidence in wood-heat within the region and has led to a local wood-heat infrastructure developing; much of the wood is grown locally and two pellet mills have been built within the county providing the beginnings of a new industry for Nottinghamshire and a potential new revenue stream for local landowners. The clear lesson is that tackling climate change can provide important spin-off opportunities for local economic development and education.

Acknowledgements

We are grateful to the Department for Children, Schools and Families for supporting this work. For more information about the Department's strategy on sustainable development and sustainable schools please visit:

www.dcsf.gov.uk/aboutus/sd

www.teachernet.gov.uk/sustainableschools

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- SE² Ltd for facilitation of the stakeholder event

For further information on the technical work underlying the analyses presented in this report please contact jake.reynolds@sd-commission.gsi.gov.uk.

Endnotes

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- ¹ HM Government, 2006, *Climate Change Programme* (<http://www.defra.gov.uk/environment/climatechange/uk/ukccp/pdf/ukccp06-all.pdf>)
- ² HM Treasury, 2006, *Stern Review: The Economics of Climate Change* (http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm)
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- ⁴ SDC, 2007, *Every Child's Future Matters* (<http://www.sd-commission.org.uk/publications.php?id=578>)
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- ⁶ <http://www.teachernet.gov.uk/sustainableschools>
- ⁷ Defra, 2008, *Attitudes to climate change among young people - Wave 2: Key research findings*
- ⁸ SDC, 2006, *Schools Carbon Footprinting – Scoping Study – Final Report*
- ⁹ This assumes emissions are calculated using the same methodology.
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- ¹¹ SDC, 2008, *NHS England Carbon Emissions: Carbon footprinting report* (<http://www.sd-commission.org.uk/publications.php?id=733>)
- ¹² HM Government, 2007, *Energy White Paper*
- ¹³ HM Treasury, 2006, *Stern Review: The Economics of Climate Change*
- ¹⁴ See http://www.dh.gov.uk/en/Managingyourorganisation/Estatesandfacilitiesmanagement/Sustainabledevelopment/DH_411949
7. Whilst useful, this target is limited to emissions related to energy use in buildings, and does not cover the full carbon footprint as referred to in this report.