



# ASSET

## SUSTAINABILITY DEMANDS OF BUILDINGS IN 2020, A UK PERSPECTIVE

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Stewart has over twenty years business experience in general management and strategy including Managing Director roles in Corus, Rugby Cement and Serco. He was a founder member of the Corby Urban Regeneration Company and served as a Trustee of the BRE Trust (formerly called the Foundation for the Built Environment).

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# SUSTAINABILITY DEMANDS OF BUILDINGS IN 2020: A UK PERSPECTIVE

## INTRODUCTION

This is another challenging paper that will, hopefully, suggest that there is opportunity for you to be part of making a massive difference.

The Sustainable Development Commission (SDC), the independent advisor to both the UK and devolved administrations, is initially charged with developing and delivering a sustainable development strategy. Over the last 10 years there has been added a watchdog responsibility and capacity building. I am one of 15 part-time commissioners, with a secretariat of some dozens, who are developing policy work.

### The 5 principles of sustainable development

This is the definition of sustainable development from the Government's 2005 Sustainable Development Strategy. It is an excellent, concise but comprehensive definition. It is all about delivering the 2 outcomes shown. The first outcome is **Living within environmental limits**, remembering that at the end of the day we do only have one planet, and the second outcome is **Ensuring a strong healthy and just society**, because without that if

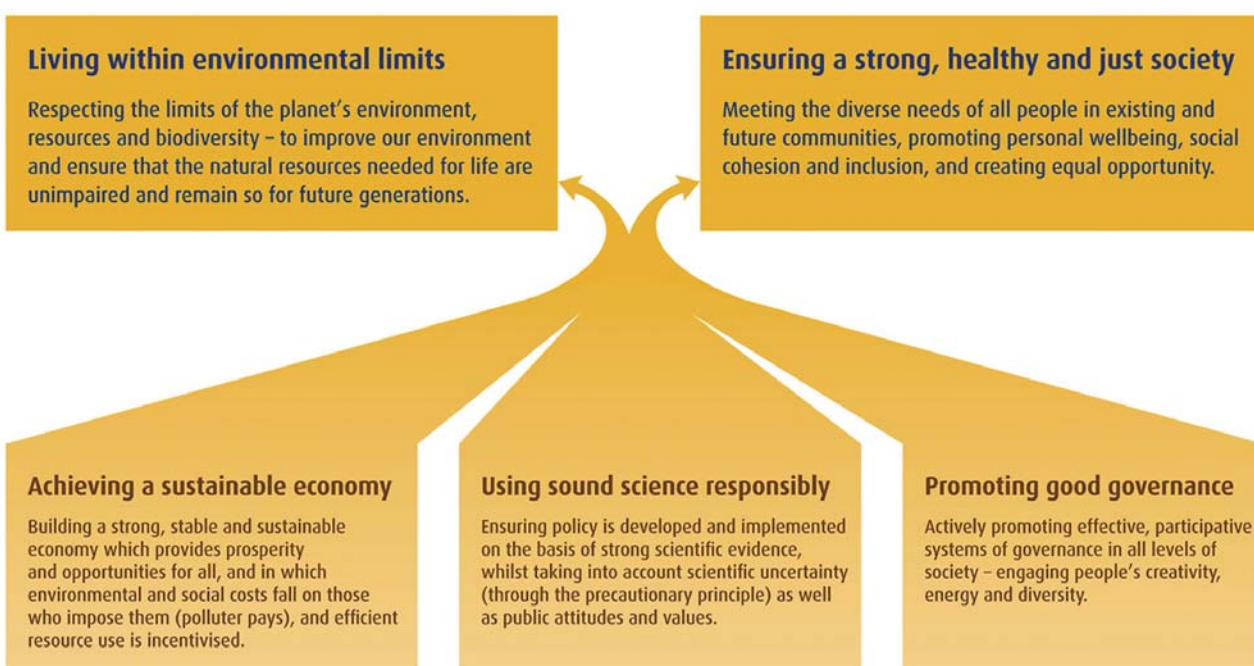
we go too far on the green side and destroy the strength, health and viability of society then we have got it wrong. The two outcomes, held in tension, are supported on the 3 pillars shown. These pillars are, **Achieving a sustainable economy, Using sound science responsibly and Promoting good governance.**

That is the broad context of sustainability and we are all becoming increasingly obsessed with one aspect which is climate change and properly so. I am a scientist by training and in my SDC role I have been able to sit with some of the scientists on international sustainability bodies advising governments internationally on climate change. They make clear logical points which are reflected in media reporting, what you do not see, and I have had the chance to feel, is their increasing sense of desperation, because they have done their science and demonstrated that change is needed but they are desperate to see their conclusions enacted in real changes that will have an impact on carbon levels.

### Carbon: where we need to be

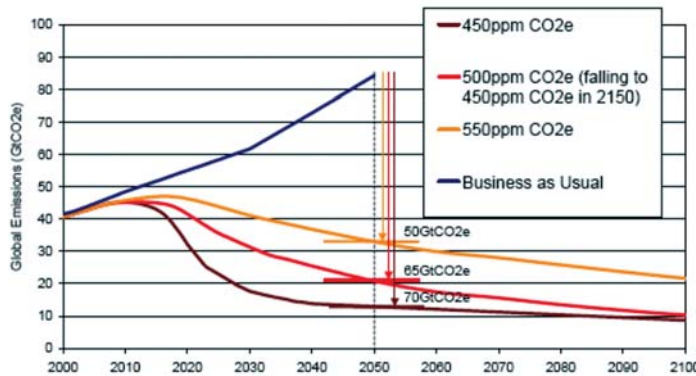
Global emissions are shown on the left hand axis with time from 2000 to 2100 along the horizontal line. At the moment we are on the top blue line and the different coloured curves represent the degree of temperature change expected at different carbon limits. The view currently, and this came out of a Stern Review, is that we have to get down to the red line or below, and indeed Lord Stern's view is that we need to do better than that. The challenge is therefore 80% carbon cuts by 2050. In 2006 Lord Stern demonstrated the business case for doing this in that "The costs of stabilising the climate are significant but manageable; delay would be dangerous and much more costly," so it makes economic sense.

## The five principles of sustainable development



## Carbon : where we need to be...

**"The costs of stabilising the climate are significant but manageable; delay would be dangerous and much more costly."**  
(Stern, 2006)



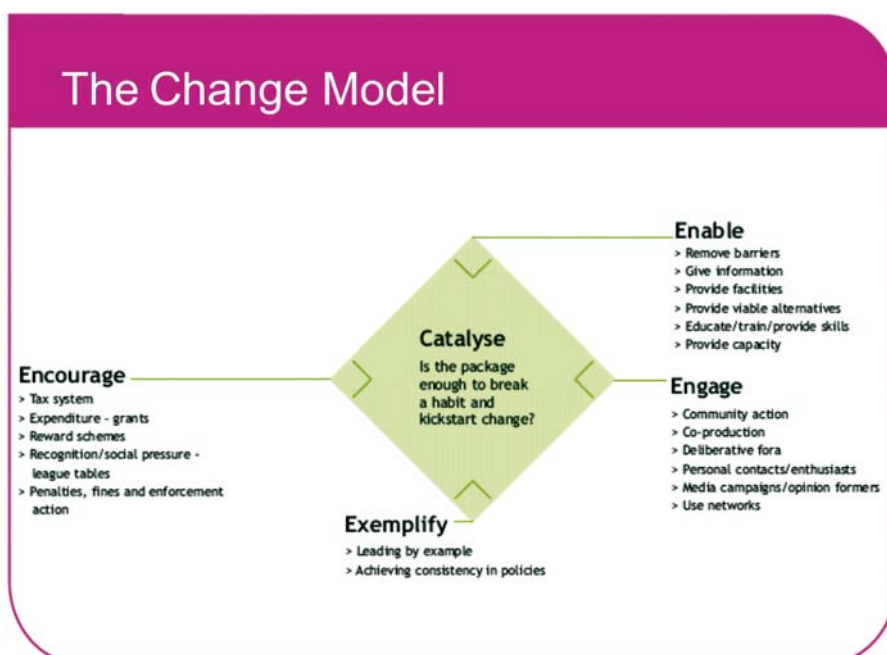
### Climate Change: the Act

The UK Government has taken an internationally leading position in making a commitment to achieving those sorts of cuts through the Climate Change Act. This act is a long term legally binding framework, the first in the world. Its targets are

- 80% reduction by 2050 (against 1990) and
- 34% reduction by 2020 (against 1990)

The latter is about 25% from where we are now. These are really massive changes to be delivered in the next 10 years or so. Government is also committed to five-year carbon budgets and the first two of those were published in the budget last month. There will be independent scrutiny through the Committee on Climate Change.

### The Change Model



As Government has committed to legally binding targets it therefore also committed itself to catalysing and driving the required changes.

This is a great model of what Government can do in driving change and the key words are Encourage, Enable, Engage and Exemplify. The challenge has to be accepted by all industry sectors, including the construction sector, through the development of sustainable strategies, and by the public sector through its procurement role. The annual £175 billion spend across the UK now needs to be aligned with those carbon targets. In addition to exemplifying the way the public sector procures there is a need to introduce sustainable estate

targets, green taxes (another way of encouraging us to change behaviour) and changes to the way public sector accounting works so such things as whole life costing can be considered.

### Climate Change Act

The next steps are

- 1 June 2009: deadline for Government to set the first three carbon budgets through secondary legislation agreed by both Houses of Parliament
- Mid 2009: Government will publish policies and proposals to meet the first three carbon budgets

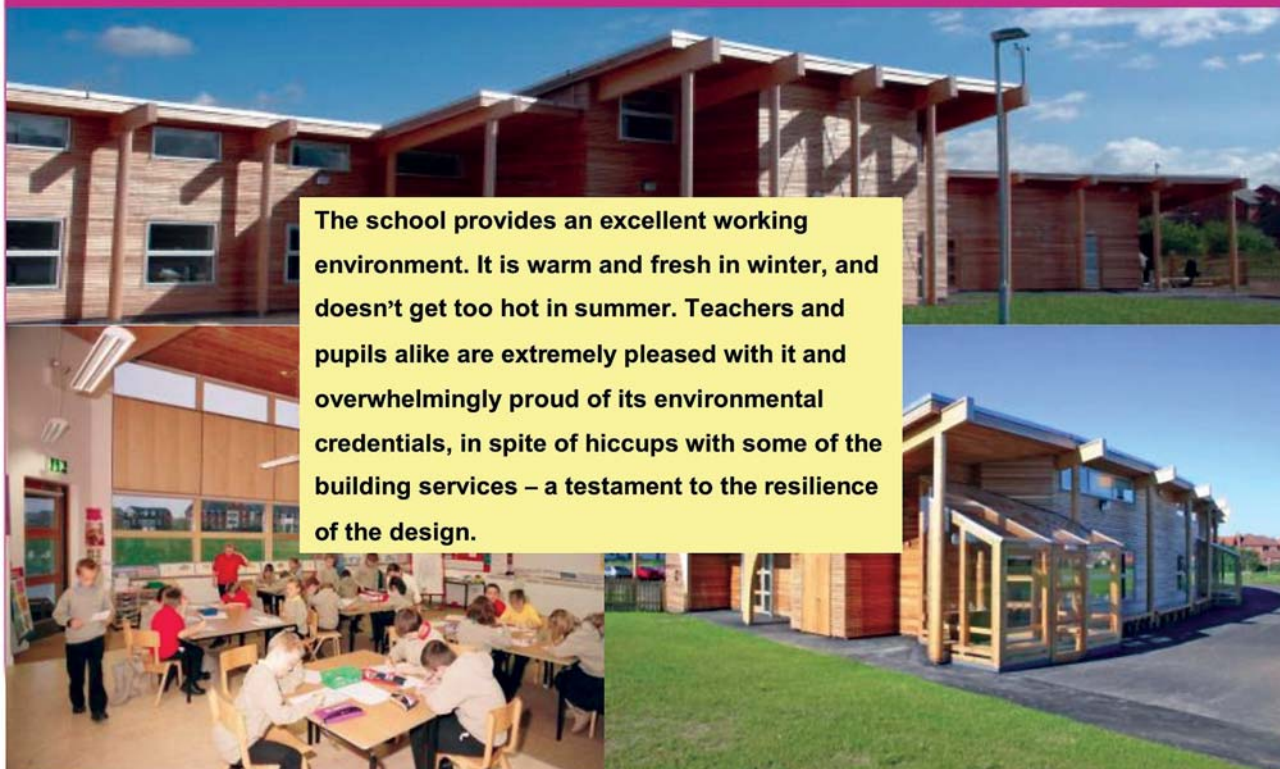
### Buildings

Some of the Government's new policies will have an impact on buildings and property and public sector estate managers. In summary these are as follows.

- UK Wide
  - Heat and Energy Saving Strategy
  - Community Energy Saving Programme
- England
  - Code for Sustainable Homes
  - Energy Performance Certificates
  - Display Energy Certificates
  - Zero Carbon Homes 2016
  - Zero Carbon non-Domestic, 2019?
  - Building Regulations Reviews (Part L: Energy)

In response to this drive towards sustainable construction the construction industry stepping up and saying if public procurement

# Buildings: Design....



demands of us higher standards we will deliver them. Now some of the scepticism and cynicism that was around 5 years ago is evaporating in this new light and there is a growing industry commitment to deliver against those standards.

## Building: Design and Practice

This is a building in the middle of England built to very high sustainability standards. There is a lot of timber. The orientation relative to solar load is right, hence big north facing windows, with double height windows in classrooms. There is a great use of natural ventilation and natural lighting. It is a thermally efficient building. There are extra benefits above energy efficiency. Users of the building say it is a great place to work. Some of the energy efficiency measures have a fringe benefit as the insulation has deadened the sound, so it is easier to teach children in this environment. The thermal environment is more comfortable and natural lighting is more conducive to calm behaviour.

But we are on a steep learning curve and there have been some challenges. They showed a tremendous reduction in the energy footprint of this building but not, yet, in practice. There are some extremely ambitious targets here, particularly around renewables, biomass boiler, the energy efficiency features built in, solar water heating and photovoltaic panels but in operation it hasn't all gone to plan. For example the biomass boiler only ran for two weeks before it was realised that there was a mismatch between its output and the modest energy requirement of a highly insulated building. Power consumption went up and when you think of schools

today they are filled with computers each of which emits a 1/2 kilowatt of heat into the environment whilst also consuming that amount too, hence power consumption increased despite having the latest lighting and so on installed. The solar water heater works well but the gas boilers had to run even in summer and the photovoltaic panels only produced about half of the power required.

I am not emphasising these snags to be cynical but simply to remind us all that there is a huge learning curve to go up as we drive for energy efficiency improvements over the next decade. The good news is that at this particular project the partners involved in designing, constructing, commissioning and running that building came together and worked through the problems and resolved them.

## Buildings: Facilities Management

Facilities management has a key part to play and it is interesting to note some of the sustainable initiatives at the new NHS Norfolk and Norwich University Hospital; items relating to both energy use and the environmental impact of consumables used and the equipment installed.

- Real-Time Energy monitoring
- Introduction of LED lighting
- Micro fibre 'water-free' cleaning
- OTEX ozone disinfection laundering
- Harvesting waste water
- Mega Miser lighting in car parks
- Dishwasher replacement with sustainable solution

- Replacement of 900 PCs with energy saving units
- Water-based gloss paint used in wards and theatres
- CHP (Combined Heat and Power) centre generating 33% of energy needs

This quote from the Acting Chief Executive Anna Dugdale is relevant, "Partnership working is essential to tackling the sustainability agenda and we are in the fortunate position of having exceptional commitment and positive joint working from the site management team at the Norfolk and Norwich University Hospital."

As we go along this very challenging journey to deliver low environmental impact buildings it is worth remembering that it is all about partnership with everyone involved in the design and operation of the building.

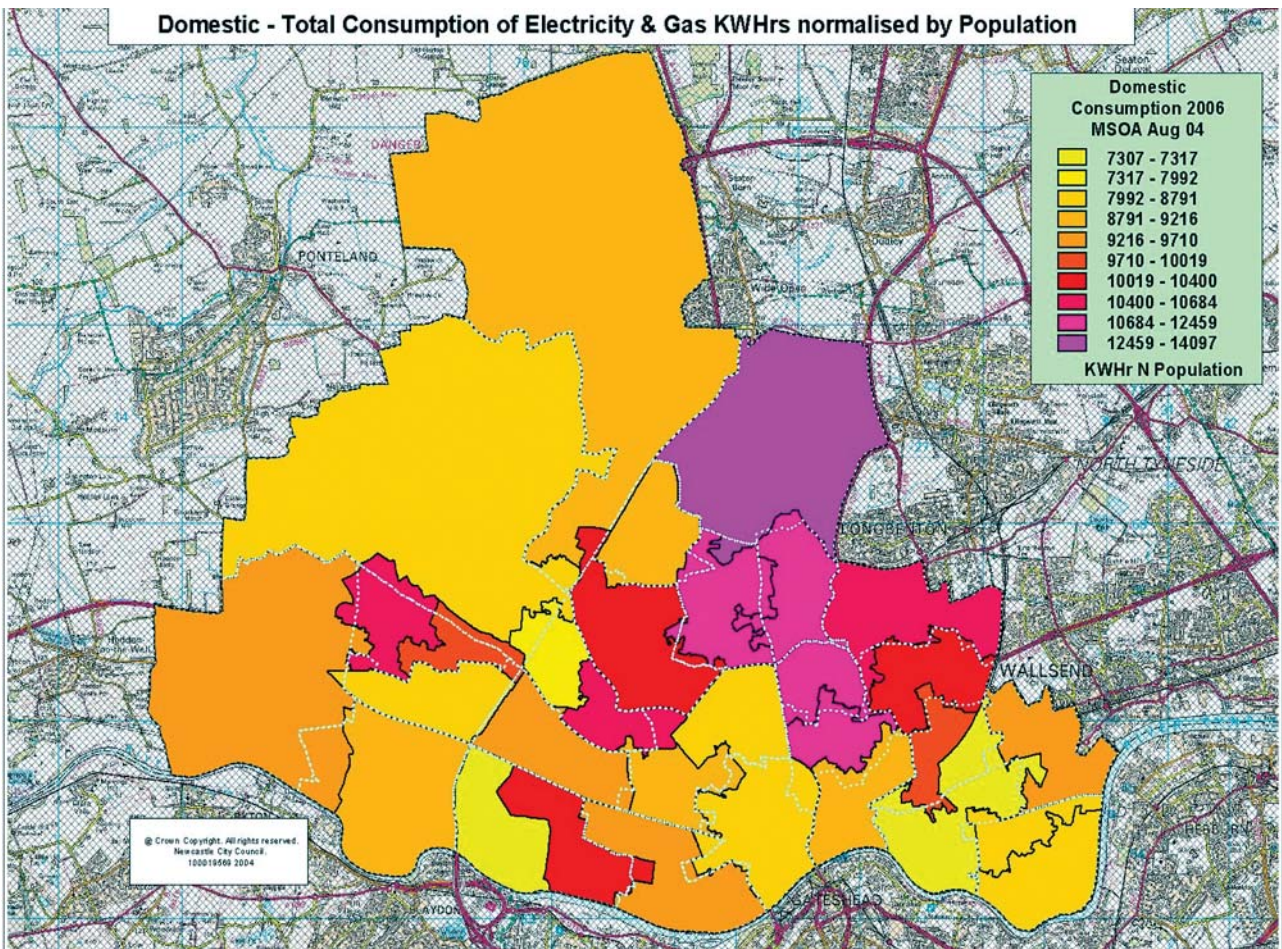
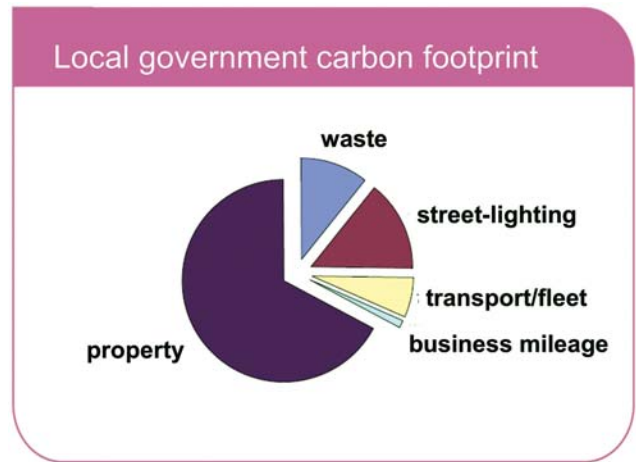
### Local Government Footprint

Local authorities are a major sector of the economy and have a major role to play in delivering sustainable development.

- 2.1 million employees
- Around 10% of Gross Domestic Product
- Procurement spend of £50 billion in 2005/06
- Capital spend £17 billion of which £4.5 billion on housing and £3.5 billion on transport in 2005/06
- Total operational assets £216 billion of which £107 billion council dwellings (at 31 March 2005)
- Larger Authorities' energy bills £>10 million pa

Local authorities have a direct influence through the many levers available to them through their own operations. Similarly Government has direct influence over local authorities through funding and also policy. Accordingly local authorities have a major part to play in leading this change to a sustainable economy. One aspect of sustainability is climate change and here is one view of the carbon footprint of local government.

About two-thirds of the local authority footprint is estimated to be the use of energy in property. Asset managers therefore have an important involvement in delivering the climate change challenge across the UK, a major challenge and a major opportunity for improvement.



### Local Government Indicators

Local government has picked up 4 main National Indicators and these are

- NI 185 Authority CO2
- NI 186 Area CO2
- NI 187 Fuel Poverty
- NI 188 Adaptation

Intriguingly many authorities have actually elected to go for the more ambitious indicator of saying “we want to be responsible for reducing the carbon in our area, not just in our own operations, but in our geographic area, in our economic area.” When local authorities take on the responsibility for carbon reduction in their areas, they also become involved in building a sustainable industrial strategy and have to respond to the challenge of creating jobs in a low carbon environment.

### BERR MLSOA Energy Statistics

Here is another challenge. This is a map of a local authority area (Newcastle Upon Tyne) showing energy consumption in domestic properties across the area. If the authority is taking on the responsibility for indicator 186, what does that lead you to do beyond the bounds of the Council's own asset management responsibility in terms of influencing the community on heat saving projects, community energy saving projects and so on. The purple areas are the highest emitters so tackling community energy schemes will be an important element of local authorities demonstrating leadership. A more comprehensive list of initiatives affecting local authorities is

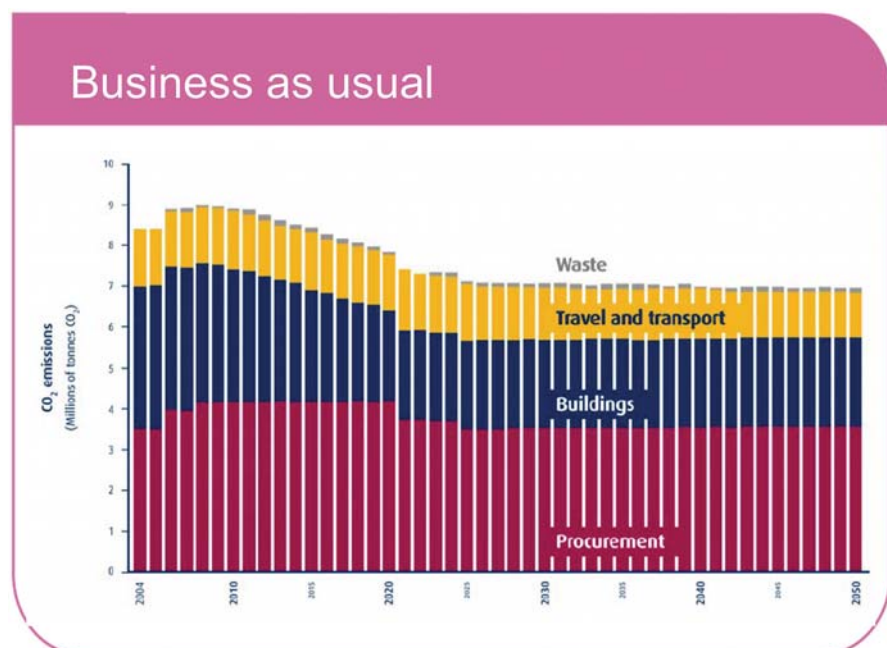
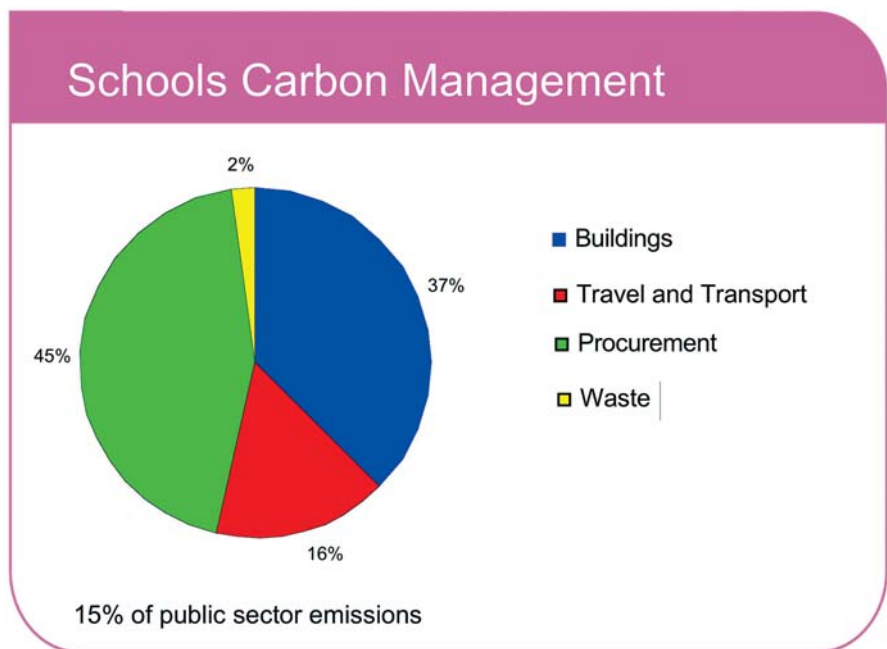
- National Indicators
- Carbon Reduction Commitment
- Spatial Planning: Planning Policy Statement on Climate Change
- Leading by example – the LA buildings, operations, vehicles, waste
- Transport Planning
- Promotion of renewable energy
- Community leadership

These are Government policies addressing climate change and the ambitious carbon reduction targets over the next decade. The energy use of buildings is going up the agenda.

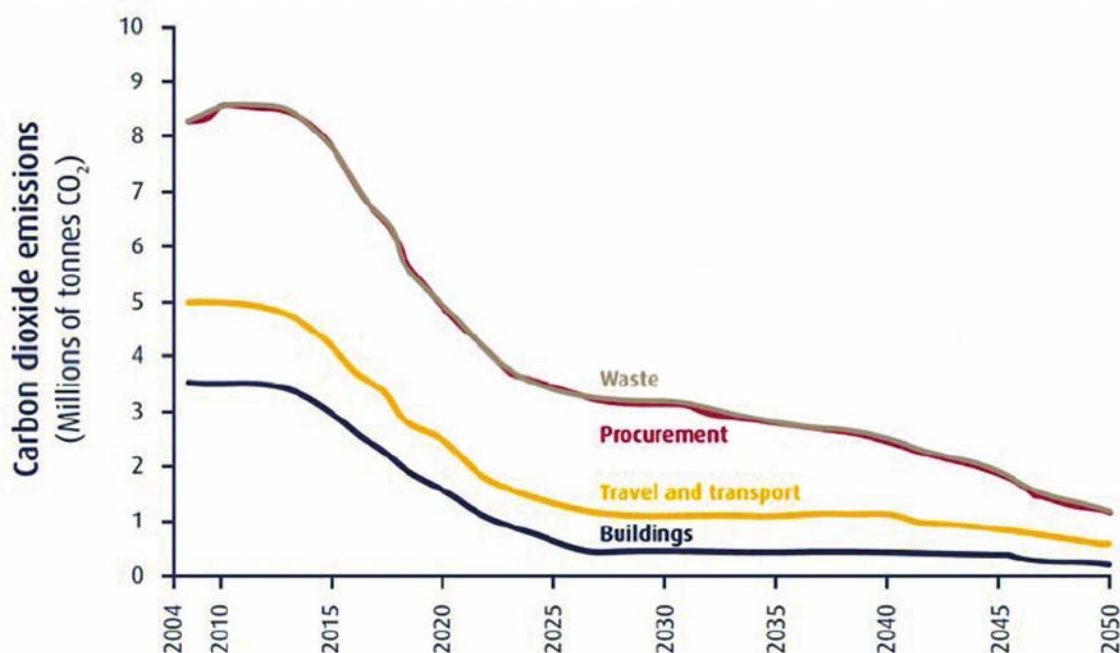
### Schools Carbon Management

The Sustainable Development Commission was asked by the Department of Children, Families and Schools to undertake an in-depth study of one area of local authority property, schools. The carbon footprint of schools accounts for about 15% of public sector emissions and is, on average, a bit less than other groups in the local authority sector. Government has a direct lever over schools and you can expect that to be driving the carbon footprint down hard.

This is our forecast based on business as usual of carbon emissions stacked here according to procurement, buildings, travel and transport, and waste, which is the very thin line at the top. The boost in procurement over the next 10 years or so is the Building Schools for the Future programme which is investing £10's of billions in



## 80% emissions reduction by 2050



new schools but then, fortunately, the energy use in schools comes down. Although sustainability is not a prime aim of that programme it is nonetheless now firmly on the agenda. Given Governments over-arching commitments what we did was to consider whether the schools estate could reduce its carbon to the level targeted and by putting in everything we can think of we have at least demonstrated, conceptionally, that there is potential in the buildings for the 80% emissions reduction.

Travel and transport and procurement are much harder. Whatever is being brought into schools such as supplies, food, paper, and books is the really tough one and more radical things need to happen up the supply chain.

### Recommendations

To achieve the required reductions these are our recommendations of matters to be tackled.

- Improve the existing stock of school buildings. Even in 2050 80% of school buildings will be the ones that we have got now.
- New build schools standards, zero carbon by 2016; it is important to adopt more ambitious standards than otherwise may be required.
- Renewable energy retrofit to all school buildings.
- Whole Life Costing, Opex savings to fund Capex.
- More energy efficient ICT equipment and usage; "thou shalt not install ITC equipment in public

buildings unless it confirms to an 80% carbon reduction."

- Use school buildings as learning tools to stimulate and sustain energy efficiency behaviour change.
- Understand the wider benefits (including financial) of sustainable schools
- Feed back actual performance of completed schools

We've talked about carbon footprint and the need to play an absolutely critical part in delivering the reductions by 2020, 35 percent on the 1990 levels. But perhaps just as important as footprint, is the role that local authorities have in changing the mind print. As citizens come in and out of local authority schools and other local authority buildings that you are managing, are they getting a vision for a low carbon future, for a sustainable future. So the mind print of what happens in the properties you manage is a really important part of this vision.

### Sustainable Property?

And finally to focus on the enabling role that local authorities properties can play consider shared services, for example community heat and power stations and what else can the properties that you are responsible for do to enable communities around them to achieve that low carbon, sustainable future.

Dr Stewart Davies