



# The Zero Carbon Task Force

a progress report

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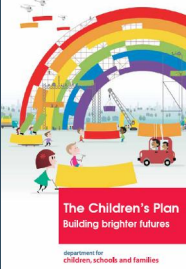

## Agenda

- Background
- Context
- The Task Force
  - Membership and Aims
  - Progress to date
  - Next steps




background

## The Children's Plan



- ~ Sets an ambition for all new school buildings to be zero carbon by 2016.+
- ~ We know that with the technologies currently available, the zero carbon ambition cannot be achieved on many school sites.+
- ~ We are appointing a taskforce to advise on how to achieve zero carbon schools, whether the timescale is realistic and how to reduce carbon emissions in the intervening period+.

(December 2007)



background

## Ambition

This will be the most ambitious design and building initiative the school system has ever faced. This expert task force drawn from the construction, sustainability and education sectors will help us overcome the technical, design and construction challenges over the next eight years. %

Ed Balls,  
Secretary of State  
Dept for Children Schools and Families




background

## Carbon Emissions




**Rules of thumb**

- ~ one unit of electricity releases 0.6kg CO<sub>2</sub> at power stations
- ~ ~£150 spent on energy corresponds to one tonne of CO<sub>2</sub>



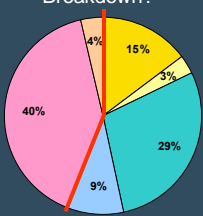

context

## Carbon Emissions from Energy Use

Fuel type	CO <sub>2</sub> emissions
Electricity	0.57 kg
Gas	0.19 kg
Oil	0.27 kg
Coal	0.29 kg
Biomass (wood)	0.03 kg
Secondary School	510 tonnes p.a.
Primary School	70-140 tonnes p.a.

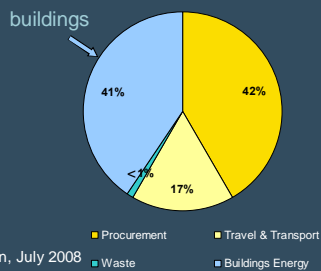
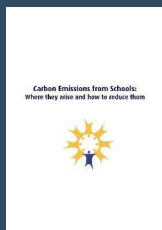
Sources: 2006 Building Regulations/  
DCSF energy & water benchmarks

Breakdown?

context

## Total Carbon Emissions



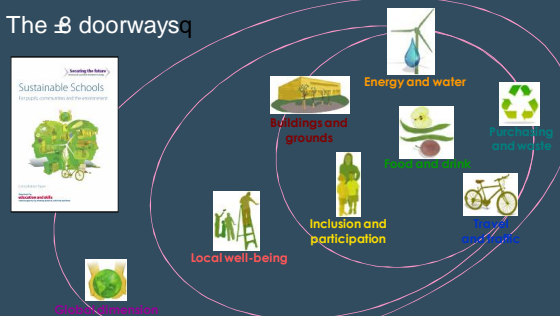
Sustainable Development Commission, July 2008



context

## Sustainable Development Action Plan

The £ doorways



## Recent Developments

- ~2003: (10%) Renewables required by planning authorities
- ~2006: One School Pathfinder sustainability demonstration projects (20% renewables)
- ~2008: 60% carbon reduction for new schools
- ~2016: zero carbon new school buildings



context

## Sustainable Schools – Case Studies



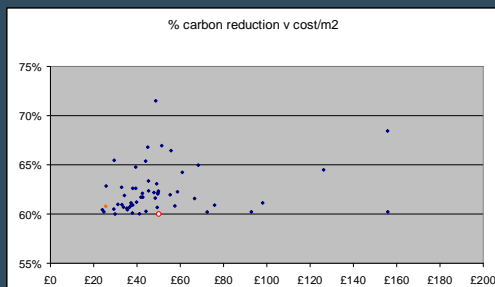
Published 2006

- ~ 12 case studies of new and existing primary and secondary schools (including one academy)
- ~ Occupant satisfaction surveys of five schools
- ~ Measured energy consumption against DCSF benchmarks and design targets (where available)



context

## 60% Carbon Reduction



context

## The Task Force

- ~ Established April 2008
- ~ Chaired by Robin Nicholson
- ~ Expert membership drawn from various sectors:
  - 6 designers
  - 1 contractor
  - 4 researchers
  - 7 Government officials (from central & local government and NDPBs)
  - Ellen MacArthur



the task force

## Terms of Reference

- ~ Develop a **roadmap** to zero carbon for all schools by 2016 with clear targets and milestones along the way
- ~ Recommend the best way of **implementing** this through BSF, Academies and non-BSF schools
- ~ Identify where zero carbon **cannot** be achieved
- ~ Commission **exemplary** developments and explore their potential for roll out
- ~ Scope the potential for **refurbishment** projects



the task force

## We will **not** consider

- ~ carbon emissions beyond those attributable to the energy used in the buildings
- ~ consider broader sustainable schools issues, not related to reducing carbon emissions
- ~ carbon offsetting schemes



the task force

## Call for Evidence

July-Oct 2008  
106 responses (>50% from professionals)



### Headline issues:

- ~ confirmation of correct focus of TF
- ~ the need for proper funding
- ~ the lack of knowledge all round.

### Other issues:

- ~ confusing amount of data
- ~ wide range of barriers and few financial incentives
- ~ strong support for energy networks



progress to date

## School Visits

- ~ Oakgrove, Milton Keynes
- ~ Howe Dell, Hatfield
- ~ Aufkirchen, Munich
- ~ Herbert Strutt, Derby
- ~ Cardinal Wiseman
- ~ Everest Community College
- ~ Knowsley BSF
- ~ Whitecross
- ~ North Solihull
- ~ 0



progress to date

## School Visits

Oakgrove Secondary, Milton Keynes

- ~ Off-site pre-fabrication for quick construction (~12 months)
- ~ Airtightness
- ~ Recycled newsprint insulation
- ~ Ground source heating
- ~ Energy use: actual = twice estimated
- ~ Smart meters retrofitted



progress to date

## School Visits

Howe Dell Primary School, Hatfield

Demonstration Project:

- ~ Orientation to catch maximum light
- ~ Superinsulation + airtightness + heat recovery
- ~ Several renewables: wind turbine, PV, solar thermal, ground source heat pump
- ~ Inter-seasonal Heat Store
- ~ Eco-curriculum



"Howe Dell is almost an experiment in how green and sustainable a building can be".

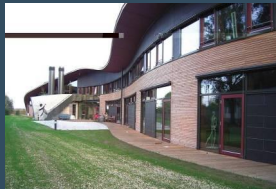


progress to date

## School Visits

Aufkirchen, Montessori Volksschule, Munich

- ~ Superinsulation + airtightness + heat recovery
- ~ Heating demand <5% of typical
- ~ No renewables
- ~ Limited use of ICT (one PC per class and shared projector)
- ~ Occupants would not change anything



progress to date

## School Visits

Herbert Strutt Primary, Derbyshire



- ~ Use of renewables (PV) in curriculum
- ~ Ground source heating (boreholes)
- ~ Planning issues re large wind turbines (bats!)
- ~ Smart metering to be installed by county



progress to date

## Interim report

Currently with Ministers

24 recommendations

6 workstreams:

- ~ manage energy (in **all** schools)
- ~ reduce energy use of **ICT**
- ~ information on **energy performance**
- ~ low energy **design & construction**
- ~ neighbourhood **energy supplies**
- ~ **transform education**



progress to date

## The Carbon 'Hierarchy'

REDUCE energy demand	Passive features (insulation, daylight, solar gain/shading, thermal mass, etc.)	<b>MONITOR</b> • Agree (prior to) measures • Evaluate impacts
	Encourage energy conscious behaviours	
	Implement energy efficiency measures	
EFFICIENCY of equipment and energy sources	Use energy efficient equipment	
	Provide simple and effective controls	
	Recover useful heat	
DECARBONISE energy supplies	Use clean fossil fuel technology	
	On-site or near-site renewable energy sources, including community schemes	
NEUTRALISE energy supplies	Off-site renewable energy	
	Procure other green electricity supplies	
	Distribute surplus heat and energy through a neighbourhood network	
	Consider responsible carbon offsetting schemes	



progress to date

## Exemplar Projects (15 projects, ~£10million)

Zero carbon schools / blocks	Devon, Peterborough, Gloucester, Islington, Northumberland, Wakefield
Ambitious low carbon refurbishment	Barnsley, Derby, Hackney, Leicester, Southend
Specific measures	Coventry: low energy school with co-located services Sefton: all recommendations accompanying school; Display Energy Certificate Suffolk: Large scale wood fuel boilers serving neighbourhood Sunderland: large wind turbine serving two schools



next steps

## Task Force Focus for 2009

- ~ Investigate neighbourhood energy schemes
- ~ Develop better ways of assessing energy/carbon performance of new schools
- ~ Collate guidance and develop briefs for ZC schools
- ~ Influence and engage suppliers and manufacturers
- ~ Identify skills required by construction industry
- ~ Ensure low carbon from school design to its operation



next steps

## Immediate Next Steps

- ~ Investigate impact of school ICT and how it can be minimised
- ~ Task Force visits to low energy / low carbon schools in the UK & overseas
- ~ Advanced energy metering to all schools
- ~ Exemplar projects to test new low and zero carbon solutions
- ~ Scope the potential to reduce energy / carbon during school refurbishments



next steps

## Action for others

- ~ Raising awareness of good energy efficiency behaviours, including training and local technical support
- ~ Exploring funding options for investment in energy efficiency
- ~ Address carbon emissions attributable to school activities other than energy used in the buildings
- ~ Broader sustainable schools issues, not related to reducing carbon emissions



next steps

## Questions?

