Zero Carbon School Buildings

Consultation Response Form

The closing date for this consultation is: 6 October 2008
Your comments must reach us by that date.

department for
children, schools and families

THIS FORM IS NOT INTERACTIVE. If you wish to respond electronically please use the online or offline response facility available on the Department for Children, Schools and Families e-consultation website (http://www.dcsf.gov.uk/consultations).

The information you provide in your response will be subject to the Freedom of Information Act 2000 and Environmental Information Regulations, which allow public access to information held by the Department. This does not necessarily mean that your response can be made available to the public as there are exemptions relating to information provided in confidence and information to which the Data Protection Act 1998 applies. You may request confidentiality by ticking the box provided, but you should note that neither this, nor an automatically-generated e-mail confidentiality statement, will necessarily exclude the public right of access.

Please tick if you want us to keep your response confidential.

Name	Jon Bootland/ Bruno Reddy
Organisation (if applicable)	Sustainable Development Foundation (SDF)
	Additional input from:
	Martin Hunt, Forum for the Future
	Craig White, White Design
	Steven Morrisson, Kingsdale School
	Paul Smith, Studio E Architects
	Saud Muhsonovic, Fulcrum Engineering
Address:	The Hub, 5 Torrens Street, London EC1V 1NQ

If your enquiry is related to the policy content of this call for evidence then please contact the DCSF National Enquiry Line on:

Telephone: 0870 000 2288

e-mail: info@dcsf.gsi.gov.uk

If you have a query relating to the consultation process you can contact the Consultation Unit on:

Telephone: 01928 794888

Fax: 01928 794113

e-mail: consultation.unit@dcsf.gsi.gov.uk

We would like to understand a bit about respondents.

Which of the following best describes your role?

☐ Construction/building professional	☐ Local Authority	☐ School
☐ Parent	☐ Governor	☐ Pupil/student
☐ Union/professional association	☐ Environmentalist	✓ Other (Please specify)

Please Specify:

The Sustainable Development Foundation (SDF) is a charitable organisation that promotes sustainability in the built environment, particularly to building clients and investors. The additional input came from a panel of advisors who are associated with SDF activities.

Reducing Energy Use In Schools

A key step towards zero carbon is to reduce energy use in schools. To make progress in this area, the Task Force believes that there needs to be better management of schools' facilities and equipment. It would also like to hear any suggestions that may allow education to be delivered in ways that reduce carbon emissions (e.g. are there different, less energy intensive ways of using school spaces to provide education?).

There are several issues that may need to be addressed: new ways of gathering data on school's energy use; new approaches to energy management; refining aspects of school buildings that have inherently low demand for energy (e.g. design features which support passive heating or cooling or make use of natural light).

Evidence suggests that even when buildings are designed to be energy efficient, they often do not perform as intended or predicted. Indeed, in some cases energy use actually increases because of the combined effect of extra equipment/facilities within schools and their poor management/operation. For example, the Task Force is aware that some schools leave the lighting on 24hrs/day for security reasons, and that few of the power saving features of ICT equipment are used, with computers often being left on overnight and even during the school holidays.

In order to drive behavioural change, there will be a requirement from October 2008 for many schools to display details of their energy performance. But other measures, such as 'smart metering', may be required to enable performance of schools to be better managed.

1 Has the Task Force identified the right issues that will need to be addressed to reduce schools' energy use?

| ✓ Yes | ☐ No | ☐ Don't Know |

Comments:
We welcome the Task Force's recognition that there needs to be better management of schools' facilities and management, that there needs to be new ways of gathering data on energy use and that aspects of low carbon design need to be refined.

We believe that building management and design should be prioritised over the adoption of low carbon technologies. In particular, we feel that culture-change needs to be given a high priority in any action plan or strategy, in addition to the technical focus already addressed in this call for evidence.

We would add that there are also key issues surrounding
- The definition of a zero carbon school (Does this cover just the building? Does it cover extended use? What about community carbon reductions?)
- Potential conflicts with the Extended Schools agenda – does this lead to greater energy use?
- Timely and fit-for-purpose information that defines zero carbon schools, explains how they can be achieved and describes the benefits of doing this for different stakeholder groups (pupils, teachers, Governors, other users)
- Procurement approaches that support zero carbon refurbishment of new build

2 Do schools/local authorities have access to the right data and guidance to enable them to reduce energy use in schools?

[ ] Yes   ✔ No   [ ] Don't Know

Comments:
In short we do not feel that schools or local authorities have access to the right data or guidance.

Ideally, the control of and information about energy usage should be held locally i.e. by the school itself, so that they will become more aware of their energy consumption and be able to make the changes necessary to reduce it.

Facilities managers (FMs) rarely have energy usage data from which to make decisions about reducing heat and power. Different schools have access to differing amounts and quality of data. Data-poor schools find out about their energy usage when they get their quarterly utility bill (in some cases they never get it because the bill goes straight to the local authority (LA)). Some are given

guidance on how to access their energy consumption data from their energy company – the more immediate the figures (e.g. energy consumption in the last 5 minutes) the better but it's not always available. Even if it *is* available, FMs may not know how to respond or worse still, be disempowered from being able to do anything. They may be too busy to view the data on a regular basis or it may take too long or be too awkward to access it.

In order to develop an efficient heating regime FMs need instruction, and possibly ongoing assistance from the designers, on how their building was designed to perform. They need real-time and cumulative data and assistance in how to use the data. They need pragmatic guidance that makes it clear how their efficient operation of the building can and will save energy (and money). Designers could extend their professional services to help occupants tune and operate the building, i.e. moving beyond design and completion stages into operation.

An intelligent Building Management System (BMS) that takes into account weather information, historic usage patterns and occupant needs would support the FM in this endeavour.

Pupils, teachers and other school staff, essential parts of the 'building system', are, in all but a few instances, kept in the dark about energy consumption. We would argue that the ownership of the zero carbon agenda should be shared amongst these groups (and other users if appropriate) to ensure that all have a stake in reducing demand. They need to know how much energy the school is using or, better still, how much their classroom is using broken down into heating, lighting and small power.

Headteachers and school bursars/business development managers need to know how much they are spending on energy and the scale of opportunity for making savings (i.e. design performance vs actual performance). They need additional guidance and support on how to achieve those savings.

Local Authorities
Local authorities need guidance on how to support their schools in making energy consumption reductions, from support in getting hold of real-time energy data to support in how to use the real-time data. Schools don't know which sources of information to trust – at the very least the LA needs to point schools in the right direction.

In fact, the issue of LA control has other connotations. More schools are gaining independence from their Local Education Authority. In LB Southwark and LB Westminster, for example, there are no remaining community secondary schools. They are all Academies, Foundation Schools, faith schools or schools that otherwise have control over most aspects of the running of the school. In these circumstances, whose responsibility is it to provide the schools with

support and guidance they need for energy reduction?

Our response to this section has concentrated on reducing energy during operation of a school. There is more to be said about the information and guidance required for schools and LAs to *procure* a school building that is low-energy. Please refer to our response to question 11.

3 What are the barriers to reducing energy use in schools?

Comments:

Existing school buildings have often been constructed to poor performance specifications (poor air tightness, high heat loss parameters, inefficient boilers, etc) that make them high energy consumers, irrespective of good management. This may apply just as much to recently-built schools – including ones that have been through BSF, Academies or Primary Capital – as much as Victorian schools. For example, there are cases where the heating is turned on over the weekend in order that the building will be warm for Monday. Retrofitting low-carbon approaches often requires a technological fix, which is prohibitively expensive and puts zero carbon performance further out of reach (until the National Grid is 100% renewable energy, that is). Procuring zero carbon refurbishment services is even more difficult than new building procurement, and therefore introduces all the complexities associated with procurement discussed in section 11.

School leadership
During operation, neither the headteacher nor the senior leadership team is accountable for energy usage. The absence of anyone holding them account for the school's energy use is a significant barrier to any attempts to reduce it on the school's part. If the school leader isn't made responsible there can be no cascading responsibility amongst the rest of the building occupants. Achieving such commitment and responsibility is a key part of the culture-change required to deliver zero-carbon schools

Another barrier for senior leadership teams is that they have no training of how to lead a sustainable school nor the means, the time, nor willingness to find out. Subsequently they are not in a position to empower the rest of the school to make energy-reducing behaviour changes. Given that a fundamental element of what motivates most people to make a change in their behaviour is a respected and trusted authority, making it easy for the school leaders to lead on energy reductions is vital.

Teachers
There are numerous barriers for teachers, which are common to all programmes that are trying to drive a change in culture. Examples include: absence of accountability, lack of feedback on performance, lack of information about what they can do (and the spare planning time to find out), lack of a sense of ownership over the building, distance between their actions and the consequences, invisibility of cumulative energy consumption, apathy towards the 'cause', a feeling that other things need to take priority, absence of good role models, feeling that "no one else is in the country is, so why should I?", habit, lack of a whole-school approach, lack of messaging coming from the school leadership, lack of demand from parents and pupils, lack of understanding regarding how the building heating system works, lack of control over the heating (and the lighting in some areas of the school), a feeling that this belongs in the domain of science or geography teachers (or simply someone else)……………………… Organising the necessary culture change, and planning to ensure that it happens, will need to address all these points and more – a culture change management plan is needed!

Other Staff including security, canteen, facilities, grounds, technicians, admin and cleaning
The barriers for these members of staff are largely the same as those for teachers. Auxiliary staff such as cleaning and security, feel an even greater disconnect between their actions (e.g. turning on all lights and leaving them on) and the outcomes. Communication/contracts between the school and the employers of auxiliary staff do not emphasise or stipulate good energy practice. Again, the need for a culture change, contractual conditions and programmes to drive that, are clear.

Pupils
For pupils, whose options are to turn lights off in unoccupied rooms, switch appliances off at the end of the day, not run hot water excessively ect, the barriers are lack of examples from peers, parents and teachers, shortage of messaging from school leadership, lack of feeling of ownership over the building or classroom, lack of feedback on performance, habit, perception that it is an adult's domain, not being given the responsibility to reduce energy consumption, not knowing what good practice is, and not practising good practice at home.

Technology
Technology itself is also a barrier for two reasons. First the inefficiencies of old technologies (boilers, lamp fittings, radiators, fridges, etc) mean that energy is wasted as soon as they are switched on. Secondly, the controls may be inadequate in a number of ways: lack of thermostat functionality in classrooms, AC that comes on at the same time as heating, lack of light switches in communal areas, no controls on radiators to be able to turn them on or off etc. Investment programmes to support upgrading of existing systems may be

needed to support change in the existing building stock.

4 What incentives or disincentives are needed to ensure that schools reduce their energy use?

Comments:

There are a few generic points to be made about incentives and disincentives (and this applies to responses to questions 8, 12 and 16 also). First, a range of incentives are required – not everyone will respond to the same incentives. Secondly, a joined up approach is essential – interventions across the *whole* system is the only way to reach a timely and successful outcome.

The incentives are as follows:

Financial – to reduce the costs of better controls, extra design time, training for headteachers and staff. This could be in the form of Enhanced Capital Allowances, shared ownership schemes, tax breaks and easy-access grants.
Accountability & culture change– a mechanism is needed to make every stakeholder in the chain feel responsible for how much energy is being used. For example, local authority and Building Control inspections, a watchdog or a regulatory body would begin to make schools feel answerable. A league table would currently not work because parents don't choose their child's school based on energy performance. However, if a school were made to report to its existing client base (parent and pupils) regarding its energy consumption there would likely be a reduction over time. Display Energy Certificates may, in the future, make a small impact initially but owing to the infrequency of their renewal, they are unlikely to make a real difference.
Role models – role models are an effective means to motivate people to change their behaviour and required at all levels from designers and school clients to canteen staff and pupils.
Leadership – many people will respond to instructions from a trusted leader. The headteacher and senior leadership team need to be aware of their responsibilities, how to empower the building occupants and what good/bad practice looks like.
Information – to take reasoned actions people need to be informed, whether it's today's energy consumption or how something works. Performance feedback is a particularly powerful enabler for changing behaviour so energy data needs to be collected over short time intervals and accessible.
Consensus – people need to feel that they're not alone in making energy reductions. Messaging needs to make it clear that other designers, manufacturers, suppliers, other headteachers, teachers, staff, pupils, parents, etc are also making meaningful energy reductions.

Sharing Energy Supplies

Schools must use energy to function, and can therefore only become zero carbon if low carbon sources of energy can be supplied to schools. These sources include solar, wind and biomass.

Individual school sites may not be well suited to take the greatest advantage of renewable energy sources: schools do not have a year round or round the clock demand for heat and power; and environmental conditions may not support renewable energy systems such as solar or wind power.

More may be achieved by looking at planning and integrating energy supply systems across local communities, and by investing in renewable energy and shared heat supplies in suitable locations other than within school grounds. The Task Force is aware of schools that are served by community heating schemes - shared energy systems can be extremely carbon efficient, particularly where they are considered in the context of major local development, re-development or regeneration.

Where community based energy schemes and unsuitable and renewable energy systems are not viable on school sites, investment off-site may be an option.

5 Do you agree that integrated low carbon energy networks will be required for all new schools to achieve the zero carbon goal?

✓ Yes	✓ No	☐ No view

Comments:
We have indicated yes and no due to the ambiguity of the question, which needs defining: what are the bounds of a low carbon energy network? What does the word 'integrated' mean in this instance? Does zero carbon allow for near- and off-site renewables? Does a refurb or remodel count as a *new* school? Even zero carbon itself is confusing to many people (see question 1 and need for definitions) so clear guidance and terminology is needed here.

Despite the ambiguity we make the following observations:
- We would like to see the task force adopt and focus on the energy hierarchy – avoid, reduce, substitute (renewables) & offset (as a last resort) – so that the sourcing from low and zero carbon technologies is not the first option.
- District heating and private wire networks are, from some viewpoints, carbon-efficient ways of delivering low and zero carbon energy.
- Not all new schools will be able to connect to district heating or private wire networks due to proximity to such a scheme, cost (capital costs for the developer, transactional costs for an ESCo), or because it is

constructed in too early a development phase.
- The most straight-forward way to get a community energy scheme (for heat or power or both) is to incorporate it early on in the plans for a major local development, re-development or regeneration. This cannot be led at the level of an individual project i.e. the task force should consider how it can influence local authorities and planning departments in including community zero carbon supplies in the preparation of their development plans (LDFs/ LEPs etc). Alternatively, addressing the inclusion of community zero carbon approaches in Local Strategic Partnerships, and their assessment criteria (which are yet to be finalised) might be another appropriate route.
- The definition of zero carbon should allow for near- and off-site renewable energy.
- The National Grid needs decarbonising substantially – 40-60% renewables – since schools will need to connect to the Grid for back-up during times of high demand.

6 Do local authorities and their designers/advisors have access to information about the availability or potential availability of low carbon energy sources?

| ☐ Yes | ✓ No | ☐ No view |

Comments:
Local Authorities
Low carbon technologies – LAs have or can gain a high level understanding of technologies (wind, solar, biomass, etc). However, it would be useful to have a single, independent, comprehensive source of information who the major manufacturers are, their products, the turn-key costs and what the lead time is. They need to understand the latest planning regulations concerning the technologies and the grants available, how the technologies form part of an energy strategy, operational implications for each technology and examples of successful installations.

Community scale energy – LAs have less information at their disposal regarding community scale energy schemes. They need to know how to integrate a community energy scheme into a development plan, examples (and site visits) of where this has been done before, the associated costs and timeframes for procuring district heating or electricity network, how to engage an ESCo (Energy Services Company) partner, possible ownership arrangements for the technology, and who the key players are who can deliver a community energy scheme (ESCos, consultants, lawyers, suppliers, etc). Again this information is best coming from a single, trusted source.

Designers/advisors
Designers have more information available to them but it's not complete. Useful additional information would include efficiencies of products, operation and maintenance schedules for each technology, planning regulations, carbon payback calculations and the legal costs of planning, installing and operating the technology, particularly in relation to community-scale solutions.

7 What are the barriers to accessing low carbon energy supplies?

Comments:

Barrier number one is shortage of accessible, reliable information from a single trusted source.

The perception that renewable technologies present an added risk is also a common barrier for LAs and design teams. The risk factor is usually a combination of technology maturity, feared scarcity of maintenance engineers, feared susceptibility of supply, concern as to how to run the plant, who will own it, how and when ownership might be transferred, and replacing it.

A third barrier is the cost: the cost of extra design time, the planning lag, capital costs of the plant, transactional costs of selling the heat and electricity, and training costs for facilities managers.

Fourth, school developers have little incentive to pay for low-carbon technology when they are not paying for operation of the building. Most developers currently will opt out because it's not in their interest, because it takes more time, because the financial and legal complexities are off-putting. Schemes to share lifetime cost savings (such as the pain-share-gain-share mechanism used in health PFI) would help in this respect.

Finally, there's often no time in the timeframe to bring community energy schemes (and other energy reduction measures) into new or refurbishment projects.

8 What incentives or disincentives are needed to enable schools to access low carbon sources of energy?

Comments:

- A trusted, central source of fit-for-purpose information. A proactive body/organisation that promotes the possibilities of low carbon technology and shares high quality information would be a valuable incentive. For more detail of the information required, please see our response to question 6.

- Means to reduce costs, e.g. a framework of installers and maintenance engineers, readily accessible grants, tax breaks, harnessing the buying power of the Local Authority or several Authorities.

- A partnering contract in the form of a pain/gain share model between the Local Authority and the developer incentivises the whole project team with shared savings.

- The technology market needs a catalyst, such as a market transformation programme (MTP) similar to the Government's current MTP for energy-using products. At the moment, the cost of an immature market prohibits the purchase of renewable energy technology. There needs to be a financial incentive to support buyers during a market transformation – typically buyers have to bear the cost of higher production, distribution and installation costs. When things go wrong the maintenance costs are usually higher too.

- Training for FMs to raise their confidence with operating renewable energy plant.

Designing Low Energy School Buildings

Energy demand in schools can be significantly reduced by improving insulation, improving air-tightness, making best use of natural light, use of efficient equipment (such as high efficiency lighting, low flow taps, etc.) and making sure things are (or can be) switched off when not needed.

As buildings and equipment become more sophisticated, there is a risk that more energy is used and that their operation becomes more complicated. The Task Force believes that the most effective buildings are those which are robust and require little effort to run.

The Task Force also believes that building professionals should, as a priority, focus on designing for manageability, providing controls that are simple to understand and use. There is also a need to develop skills within the design and construction industries to ensure that schools are built to the necessary quality standards.

9 Has the Task Force identified the right issues that need to be addressed to procure, design, construct and operate zero carbon schools?

☐ Yes	✓ No	☐ Don't Know

Comments:
We are pleased with the Task Force's approach to designing a zero carbon school, i.e. through passive design, demand reduction, manageability and good controls.

However, question 9 mentions procurement and construction as well – both of these merit consideration beyond what is implied in the preamble above. We would particularly welcome more emphasis placed on <u>procurement</u> from the school client's perspective and how they will be supported in getting a zero carbon school. The SDF has carried out a study, with Forum for the Future and others, on behalf of NCSL, which found that procuring a sustainable building is a genuine challenge for school clients – please refer to question 11 for detail.

Furthermore, there are very real and distinct challenges associated with the <u>construction</u> of low and zero carbon buildings in reality. The SDFoundation is part of the LowCarb4Real initiative, through its role in the Good Homes Alliance (GHA), which provides guidance on the practical challenges of delivering zero carbon for housing and highlights the difference between design targets and as-built performance. These challenges have been reinforced by examples of best practice design and construction methods from sites by GHA developers such as Kingerlee Homes and Ecos Homes.
LowCarb4Real material can be made available to the task force on request.

The LowCarb4Real programme is also developing a roadmap to define practical actions required to achieve zero carbon homes by 2016; this may also be useful information for the task force to consider.

10 Does the data and information available allow the construction industry to design and deliver zero carbon schools?

☐ Yes   ✓ No   ☐ Don't Know

Comments:

Information and guidance for schools – there is not sufficient information in the right format and in the right place to help school head teachers and other school leaders deliver zero carbon schools. School leaders need case studies, a chance to meet others who have been through the process, cost-benefit information, details of what works and what doesn't etc. And ideally this information should be available through trusted existing sources.

Information and guidance for the industry – it seems that the industry has sufficient guidance and information about how to design and deliver zero carbon schools in theory. Furthermore, guidance can be conflicting as in the plausible situation where two design teams will diverge on how they meet interpret Building Regulations and Building Bulletins. Approaching the same set of issues could produce 2 very different responses by following the guidance. Furthermore, it is unclear whether these theoretical designs will actually achieve very low or zero carbon performance in reality, as there is very limited data and evidence.

Data and evidence – there are real concerns about the availability and quality of existing data. It seems that there are at least 2 energy benchmark datasets but they are out of date or incomplete. For example, the 2002 dataset doesn't take into account energy usage associated with ICT, and the demands of extended schools mean that actual energy usage can vary widely from that predicted. Furthermore, there is very little understanding about what usage patterns might be for schools that act as community hubs, and how that affects the energy usage or carbon footprint of the community as a whole. The task force could usefully influence research providers to fund research into these and related subjects.

Please refer to our answer to question 6 for more detail.

11 What are the barriers to procuring, designing, constructing and operating zero carbon schools?

Procurement:

In our response we would like to draw on evidence from a recent study we have conducted in partnership with Forum for the Future and others on behalf of NCSL and also on our collective professional experience not captured in the study.

Study
Leading sustainable school building projects – A research project for NCSL
364 school leaders responded to the survey, a further 11 were interviewed and an additional 100 attended a series of focus group sessions.

The study found that the barriers to procuring a sustainable school building are:
- There is a need for leaders to understand the interconnectedness of sustainability. What does a sustainable school look like, what are the essential and desirable features?
- School leaders need some very specific skills in order to procure and manage a complex building project including project management and interpretation of architect's drawings, for example. Leaders may have the core leadership skills and indeed knowledge about sustainability but more input is needed in building competence and confidence.
- It is crucial that knowledge is captured and shared from post-occupancy evaluations for new schools to learn from.
- School leaders would like to find information on methods of instilling a sense of pride in pupils so that they look after the building.
- Prior to negotiations with bidders, Local Authorities fail to provide adequate support to schools on matters of sustainability.
- Building Bulleting 87 which sets a standard for energy use in schools, is badly out of date and needs updating.
- The time taken for school leaders to research, consult on, develop and firm up their vision and make the business case for sustainability is crucial. Those leaders going through BSF now report feeling pressured to deliver "something" in a relatively short period of time. It is our understanding that Local Authorities in turn feel that they have to spend the budget quickly since it may not be available to them later. This pressure means that the time taken to research, develop and cost visions incorporating sustainability is often squeezed.
- Cost is a major barrier. Rarely are budgets sufficient for many aspects of sustainability, not just renewable energy technology, to be included.
- Many leaders reported that the final say about who they work with resides elsewhere. Indeed, the role of the Local Authority architect was somewhat confused, and there are massive capacity issues.

Other responses

Feedback from a series of new school projects is that the school client has very little dealing with the architect and even if they do, the architect is answerable to the Local Authority. So decisions are made that are not necessarily in the best interest of the school or zero carbon.

In addition, school clients report that Building Schools for the Future, Academies and the Primary Capital Programme are complex procurement processes that add confusion, tension, time & cost to non-expert building clients. The one-off nature of each project also allows for little transfer of learning from project to project.

Furthermore, clients feel ill-equipped to deal with sustainability within procurement. The mechanisms are not in place to ensure the school client has all the information, leadership, guidance and incentive they need to see low energy design solutions through to the end product.

Once within the process, time is a major barrier. More than half of a school's energy consumption can often be cut by improved performance of the building envelope – air tightness, insulation, etc. – and by passive design – solar shading, solar gain, etc. This may require increased design/installation/material costs so they are at risk of being 'value engineered' out during the procurement process.

As a specific detail, the school developer has little incentive to pay for energy-efficiency measures when they are not the one paying for energy costs of the building.

Finally, sustainability and zero carbon are emerging areas and as yet, expertise is inconsistent across the industry. Facilities managers, school leaders, contractors, engineers, architects, Local Authorities, lawyers, quantity surveyors, project managers, suppliers – indeed almost every stakeholder in the chain – may be learning on the job. Inevitably this is going to have consequences for procuring, designing, constructing and operating zero carbon schools.

12 What incentives or disincentives are needed to ensure that all schools are designed to be low/zero energy/carbon?

Comments:
We separate our response to this question, as above, into what was gleaned from an NCSL study (conducted by Forum for the Future and SD Foundation) and from our professional experience.

Study
Leading sustainable school building projects – A research project for NCSL

- Training for leaders: Headteachers would like to know more about the opportunities that a sustainable building offers and the link between sustainability and improved standards. The new sustainable development module for the revised National Professional Qualification for Headship (NPQH) presents an opportunity to address this [something similar could appear in Initial Teacher Training and all middle leader courses and should feature in the list of Standards for Qualified Teachers]. Also confidence and expertise is best acquired through actual experience. The next best thing would be to provide an ongoing support programme that incorporates case studies, simulations and role plays and involving peers who have been through the process – the SD Foundation is currently working with Forum for the Future and others to develop such a programme.
- Guidance on specific issues: For school remodels, how to retrofit listed buildings and circumvent the heritage planners strictures. Clarification on mandatory and optional standards, e.g. Building Bulletin 98, air infiltration rates, design temperatures, heat loss parameters, etc.
- BSF has appointed advisors for key aspects such as ICT. It is proposed that a similar position is created for sustainability. They would be able to have a directory of key professionals with experience in sustainability and advise on additional sources of funding and how best to influence the Local Authority and potential bidders.
- School clients need guidance on how to protect themselves against value engineering.
- Some schools benefited from devoted external contractor managers who had been made available to work on their behalf. The appointment of a Sustainability Advisor to Local Authorities would be an alternative solution.

Other
A number of points have been raised in response to previous questions, including:
- Strong leadership – school leaders need to be informed and supported but they also need to be committed to the goal of zero carbon and clear in their expectations of their designer and project manager and the building occupants.

- Accountability – no one is held to account for zero carbon schools currently. Years before 2016 (the target for all newly built schools to be zero carbon) stakeholders in the school building process need to have the onus placed on them to design, deliver and operate a zero carbon school. Contractors don't feel that Building Control will hold them to account for below-standard build quality.
- Financial incentives – covered previously.
- Culture change – to establish zero carbon as the 'done thing' – across the industry consensus needs to build rapidly that zero carbon is a worthy and realistic goal. Removing barriers, finding role models and repeated messaging will accelerate the uptake.
- Specifically tailored information and training from a single, trusted source – the industry needs architects who are happy to include zero carbon in their designs, engineers and quantity surveyors who can quickly assimilate it into their calculations, contractors who know what they're doing, project managers who are trained to deliver it, Local Authorities that can and school clients who know what to ask for.

Exploring Potential Technologies

If we are to deliver zero carbon schools by 2016, the Task Force believes that we will need to better understand how currently available technologies perform in practice; how they need to be developed in order to improve their effectiveness and/or reduce (capital and whole life) costs; and how untried potential solutions can be identified and developed.

There are several issues that may need to be addressed: new ways of gathering data on school's energy use; new approaches to energy management; refining aspects of school buildings that have inherently low demand for energy (e.g. design features which support passive heating or cooling or make use of natural light); refining existing and discovering new low carbon sources of heat and power.

We can learn from other low carbon buildings or technologies in the UK and elsewhere in the world - many of these solutions are being developed for all building types, but it may be that some low carbon solutions are particularly appropriate for schools.

13 Has the Task Force identified the right issues surrounding the future technologies that will deliver low carbon schools?

✓ Yes ☐ No ☐ Don't Know

Comments:
We welcome the Task Force's support for passive solutions and endorse their view on monitoring and managing energy performance. Our view is that we support more intrinsic means of reducing carbon emissions, starting with the incentives mentioned in response to question 4. It will require a systemic change across the board (see answer to question 19) and we feel a strategy that does not depend on low carbon technology can achieve the majority of savings in a more robust way.

14 Are there low carbon technologies available to school buildings which are not being adopted?

✓ Yes ☐ No ☐ Don't Know

Comments:
We are aware of technologies that may be useful, including underground cooling, PV cladding and glazing, and tarmac heating systems in the playground.

However, more data is required on:
- the cost per unit of energy generated;
- the cost per tonne of CO_2 saved;
- the cost per tonne of embodied CO_2; and
- the payback period of the technology, both in cost and carbon terms.

15 What are the barriers to developing low carbon technologies appropriate to school buildings?

16 What incentives or disincentives are needed to ensure that potential low carbon technologies are developed?

Comments for 15 & 16:

No comment – see question 13

Teaching And Learning

The school curriculum should develop pupils' awareness and understanding of, and respect for, the environments in which they live, and secure their commitment to sustainable development at a personal, local, national and global level. DCSF's Sustainable Schools web-site sets out the opportunities for sustainable development across Key Stages 1 to 4 and within the 14-19 qualifications.

Low and zero carbon buildings present a range of opportunities for teaching and learning. We would like to understand how the sustainable features of a building can be made 'visible' to pupils, how systems can be monitored, and how they might support teaching and learning across all areas of the curriculum.

17 Is the information available to enable designers and builders to integrate sustainability features that can be used to support teaching and learning?

☐ Yes	☐ No	✔ Don't Know

Comments:
We agree with the Task Force's wish to make sustainability features more visible so that pupils (and staff) can learn about them.

There are two ways to answer this question:
1. **Learning environments that assist teaching and learning of sustainability concepts** – designers and builders do not have much information on this; they would need to rely on asking teachers and education professionals for advice. Both groups use different language, have different acronyms and are driven by different objectives. Creating or supporting a learning facility (e.g. BCSE) where they can learn to communicate across sectoral boundaries is essential.

2. **Sustainable environments that assist teaching and learning in general** – here designers should find it easy to access information regarding acoustics, indoor air quality, daylighting, natural ventilation, summer over-heating, passive solar gain. They should be made aware of examples where design has impacted negatively on the learning environment (see our response to question 20).

18 What are the barriers to using the features of low carbon school buildings for educational purposes?

Comments:

- A display card or notice, once read, no longer serves as a learning tool
- 'Windows' into the insulation layer of the school building add complexity to the construction and reduce thermal performance.
- There are a lot of parasitic costs associated with energy sub-metering including the software, data and power cabling, installation, the meters themselves, added running costs for maintenance and training.
- Teachers can't interpret the scale of energy consumption ("is that a lot of energy?") or don't understand the meaning of the units ("what is a kWh?")
- Not all staff will know what information is available.
- Display monitors tend to be:
    - in the reception area to which pupils have no access or are too small for 30 pupils to gather
    - too high for the pupils to read
    - a circulating powerpoint display which doesn't actually give much useful information or is hard to make sense of
- Staff don't have time or training to bring it into their lesson plan
- They are hesitant to teach about sustainable development for fear of lack of knowledge (they won't have had the formal training in it)
- (Facilities) staff feel that it's a(nother) teacher's job
- Staff feel that they're alone in trying to make a difference so end up doing nothing.

Other Issues

19 Are there any additional issues not identified above that need to be considered to achieve the zero carbon goal?

Comments:

Procurement
We would like to reiterate the importance of getting procurement right. A number of findings came out of our study for the NCSL[1] (please refer to responses to questions 11 and 12) and our work with healthcare clients (see www.shine-network.org.uk) that would usefully inform the Task Force.

Extended Schools
The school day is changing with more and more schools, especially new ones, becoming 'extended schools'. This is driven by shared, unwritten understanding that the more community involvement there is going on the more successful a school is said to be. So heat and power demand go up – the building is being used for longer hours by a spectrum of users with different patterns of usage. For example, in a school with a recently appointed fitness suite energy and water use are going up.

The question is not so much how to design for the extra demand but where to set the bounds of the concept of a school that is zero carbon. Is it restricted to a school's core working hours (how are these defined?) or should it be extended to include operational hours? If so, how do you get the community users to reduce energy consumption in the building when they have less feeling of ownership, less accountability and less access to energy performance data? What level of control does the school retain over the energy consumption of its after-hour users?

Furthermore, this requires schools and users to understand zero carbon within a broader sustainability context, which adds yet more complexity. For example Multi-use Games Areas (MUGAs) are being used regularly and for long hours, which requires more energy for lighting, but has a positive social impact. How should the two sustainability aspects be weighed up against each other?

Culture Change & Multiple Stakeholders

Throughout a school's lifecycle a multitude of stakeholders have invested in its success. The list includes designers, suppliers, quantity surveyors, contractors, fitters, energy providers, asset owners, local authority representatives, project managers, school leaders, staff, governors, and pupils.

---

[1] Conducted by Forum for the Future, the SD Foundation & others

To achieve zero carbon will require all of them to play their part and currently that is not the case – there is significant leakage and disengagement along the way. A systemic culture change is required involving a sophisticated suite of interventions for each stakeholder group delivered at the right time.

Schools as community zero carbon hubs

Finally, we think that the definition of a zero carbon school could extend to include its role in driving carbon reductions within its wider community. If we have to achieve 3% year on year CO2 emission reductions, as indicated in the Climate Change Bill, then each community will need to deliver significant change in infrastructure and behaviour. Schools are the ideal place for this to occur as they already have an active education role, can be used to demonstrate improvements and changes that can be made, and have a willing source of outreach ambassadors in their pupils. The task force could usefully explore how schools could be encouraged to adopt this wider role.

Good Practice Examples

20 Are you able to provide details of good practice examples of any of the
above?

Comments:

The NCSL study undertaken by the SD Foundation & partners (as noted
previously) contains 10 or 11 case studies:

Whitecross High School – notable for intelligent heating and lighting systems
that provide 'as needed' heat and light, for an onsite wind turbine (in planning)
and for an aspiration to be in the top 10% of school buildings in terms of energy
efficiency.
Bideford College – notable for a biomass boiler and for using systems (wind
turbine, rainwater harvesting) as learning tools.
Townley Grammar School for Girls – notable for its ground cooling system.
Larmenier and Sacred Heart Primary School – notable for innovative passive
design features and passionate headteacher and architect.
Bristol Brunel Academy – notable for cutting-edge design and BREEAM "very
good" standard
Old Warren House Pupil Referral Unit – notable for its use of renewable
energy on a small site
St Francis of Assisi Academy – notable for anti-overheating and daylighting
features and visible energy meters.
Kingsdale School – notable for the Head's high expectations and attention to
detail, which surprised the architects and ensured a successful outcome.
Queen Elizabeth School – notable for its ambition for a 95% reduction in
carbon emissions compared to average buildings and for plans to export heat to
other buildings nearby.
Kingsmead Primary School – notable for the headteacher's leadership of
sustainability despite coming into the post 6 months prior to building completion.

More details available on request (info@sdfoundation.org.uk)

Thank you for taking the time to let us have your views. We do not intend to acknowledge individual responses unless you place an 'X' in the box below.

Please acknowledge this reply ✓

Here at the Department for Children, Schools and Families we carry out our research on many different topics and consultations. As your views are valuable to us, would it be alright if we were to contact you again from time to time either for research or to send through consultation documents?

✓ Yes   ☐ No

All UK national public consultations are required to conform to the following standards:

1. Consult widely throughout the process, allowing a minimum of 12 weeks for written consultation at least once during the development of the policy.

2. Be clear about what your proposals are, who may be affected, what questions are being asked and the timescale for responses.

3. Ensure that your consultation is clear, concise and widely accessible.

4. Give feedback regarding the responses received and how the consultation process influenced the policy.

5. Monitor your department's effectiveness at consultation, including through the use of a designated consultation co-ordinator.

6. Ensure your consultation follows better regulation best practice, including carrying out a Regulatory Impact Assessment if appropriate.

Further information on the Code of Practice can be accessed through the Department for Business, Enterprise and Regulatory Reform Website: http://www.berr.gov.uk/files/file44364.pdf

Phil Turner - DCSF consultation Co-Ordinator 01928 794304

Thank you for taking time to respond to this consultation.

Completed questionnaires and other responses should be sent to the address shown below by 6 October 2008

Send by post to:

Consultation Unit
Ground Floor, Area B
Castle View House
East Lane
Runcorn
Cheshire WA7 2GJ

Send by e-mail to: ZeroCarbonSchools.CONSULTATION@dcsf.gsi.gov.uk