School assessment with a difference

Local authorities can now obtain comprehensive information about the energy performance of their schools using the Advanced Students Schools Energy Savings Scheme (ASSESS) from the Energy Efficiency Best Practice programme (EEBPP).

With the increasing demands on estates departments within Local Authorities, it is often difficult to develop a detailed knowledge of the energy performance of their building stock. However, this sort of information is invaluable in

prioritising works and identifying where resources should be targeted. One particular field where this is relevant is schools.

The total annual energy cost of all schools in the UK is approximately £400m, one quarter of total public sector energy costs equivalent to 45 PJ of energy. The scope for



reducing this cost is estimated to be 20%, equivalent to £80 million per year.

The EEBPP assistance comes via local universities or colleges where students will be given comprehensive guidance on carrying out meaningful energy surveys of schools. A teaching pack, called ASSESS, has been developed to enable university students to undertake an energy survey, recognise opportunities for improving energy use and estimate the cost savings resulting from proposed energy efficiency investments. The results will be given to the schools and the Local Authority Energy Manager so that schools can be prioritised in order of energy performance and recommendations made can be followed up.

ASSESS has been approved by the government and has been thoroughly piloted by Coventry University working closely with Coventry City Council. The pilot proved to be a great success: Headmaster Mr Stoney of John Gulson School said: "We initially had some reservations about the interruptions it may cause. However these were soon allayed. The students made little demand on our time and carried out their survey discreetly, causing no disruption to lessons." In fact, every school reported that the students carried out their surveys with no disruption.

Coventry City Council already has a good database of school energy use but has found that the reports prepared by the students have added an extra dimension by increasing awareness within the schools and identifying specific areas where benefits can be achieved.

ASSESS is being made available to all universities and colleges which run appropriate courses and will be included within their timetable from the start of the forthcoming academic year.

Further information: BRECSU Enquiries Bureau, Tel. 01923 664258; e-mail: brecsuenq@bre.co.uk.

Designs on

Those of us young (or old) enough to have been at school in the 1960s will be all too familiar with poor building design: rooms too hot in the summer, cold in the winter and where one was often 'blinded by the light' quite literally, as a result of poor design rather than educational enlightenment!

A well designed, comfortable school is not only conducive to efficient learning but also provides the opportunity to reinforce the sustainability message, a message we must impress upon future generations in order to secure and protect the future of the planet. The question is, can the optimum energy efficient design be achieved within standard school building costs? The answer is certainly yes, as both Weobley Primary School in Leominster and Notley Green County Primary School in Essex have proved.

Weobley Primary, near Leominster in Hereford and Worcester, is the first school in the UK to be fuelled from burning locally produced wood chips. As well as heating the 180-pupil primary school and 30-pupil nursery school, the wood chips heat the older adjacent High School. The wood is produced from a local farm co-operative and is harvested from purpose-grown plantations of fast growing poplar and willows trees or managed established

woodlands. The environmental argument for wood, as a space heating fuel, is that it is CO_2 neutral. This means that the CO_2 released in combustion is only that which was absorbed during tree growth - the gas is simply recycled.

The architecture of Weobley is classic passive solar design using cross ventilation and optimising use of natural daylight. The building is cross ventilated through a series of openable windows. The distinctive waveform roof allows air to be drawn through the roof as illustrated in the figure. Natural daylight is exploited by optimising building orientation, good window design and light internal walls.

A central courtyard reduces the overall width of

the building from around 12m to further assist daylighting and natural ventilation. A combination of roof overhang, plant covered pergola and a line of deciduous trees on the south side has been adopted to minimise summertime heat gain.

The building is constructed using a 'breathing wall' system. This technique omits the use of a vapour barrier, and allows moisture to pass through the building's fabric. This provides a much healthier and more comfortable working environment for the occupants. The building is insulated to a U-value of between 0.2W/m²K and 0.25W/m²K, which is twice the level recommended by the DfEE. The wall insulation uses a material made from recycled newsprint (Warmcel). The concrete blockwork of the inside walls is designed to act as a heat sink, storing heat and releasing it gradually within the space.

Within the constraints of a low budget, the materials have been selected for their minimal impact on the environment, taking account of issues such as durability, embodied energy and opportunities for recycling and re-use. They include locally made bricks, locally produced timber and water-based paint.

As hot water use is low, the building relies on electrical point-of-use heaters. High-frequency up-lighting is controlled by passive infrared occupancy detectors, which switch the lights off when the last person leaves the room. The site was also designed to allow for future expansion.

Key to the overall success of the project is Hereford and Worcester County Council's commitment to promoting sustainable development and, in

Can the optimum energy efficient design be achieved within standard school building costs? The answer is certainly yes

AIVC #13044

learning

particular, wood fuel as a renewable energy resource. The other important element was the close liaison between members of the Council's technical team to ensure integration of the principle architectural features. Major decisions in relation to fuel storage, plant, heating, ventilation and daylight had a significant affect on the success of the final design which has been described by the Deputy Head as "absolutely wonderful to teach in."

Notley Green Primary School is built to high standards of sustainability, on a green field site in a new 'village' community at Great Notley. The school is a pathfinder project both for Essex County Council, which is using it to explore sustainable development, and the Design Council, which is using it as a 'live' model to produce a learning framework for other designers. It follows from early work carried out by Essex County Council in low-energy and passive solar design as well as multi-disciplinary working.

Rather than dictate specific aspects of sustainability, the client asked the design team to explore ideas which could be adapted on other projects while working within Essex Primary School Model Brief and the standard Essex budget for new school buildings.

Both Essex County Council and the Design Council are, however, interested in how sustainability extends beyond construction into the use and management of the building. An initial audit of sustainable materials was carried out with materials being selected using criteria of low embodied energy, renewable resources and recycling both in terms of recycled products and their capability of future recycling. The design team also tried to specify 'local' sustainable products wherever possible. Other sustainable features researched but not progressed due to excessive payback periods included biomass, wind power, solar heating and photovoltaics.

The triangular plan building sits on the north-eastern edge of the fanshaped site and is orientated so that six class bases face south-east. This position was optimised through extensive thermal modelling which also showed the plan shape to be very energy efficient as well as very compact in design with a reduced external wall area. It is anticipated that a subsequent phase to provide a further 180 places will be located to the west of the main building with the class bases

There's nothing like learning from example, and what better way to teach children about sustainability than for their own school building to be designed with these principles in mind, writes Sean Lockie

positioned along the same axis as the first to enable them also to face south-east.

The external timber framed 'breathing' wall uses recycled newspaper as insulation and is clad with cedar boarding. The 'green' roof will be covered with sedum, which is laid using pre-grown planted mats. Masonry internal walls will contribute to the thermal mass required to avoid summer overheating. Using a combination of perimeter windows and clerestory lights, the aim is to provide an average daylight factor of 4-5% in each class base in accordance with DfEE recommendations.

Rooflights will maximise daylight levels at the back of the class bases and a number of other areas including the deep plan triangular inner court in the centre of the building. The building is generally naturally ventilated and is heated by gas condensing boilers and a zoned underfloor heating system to maximise the flexible use of the building while minimising fuel use.

Both Weobley Primary and Notley Green County Primary have proved that school buildings can be successfully designed and built to be a pleasure to teach and learn in, to be environmentally friendly and to cost little or no more than a standard approach. By ensuring the architectural-related aspects such as orientation, thermal performance of the building fabric, effective use of daylight and natural ventilation work in harmony and are integrated with the building services aspects such as heating, lighting and ventilation, more schools like these could and should be developed.

As part of the Government's Energy Efficiency Best Practice programme, support is provided to local authorities and other organizations who want to run energy saving workshops for school heads, governors, teachers and caretakers. Expert speakers, information packs and workbooks can be provided free of charge. For further information on this or any other service please call the Environment and Energy Helpline on FREEPHONE 0800 585794.



willow plantation, similar to that used to Primary School.



Weobley school makes full use of the stack effect for ventilation and heating from passive solar sources