

Too cool for school: Britain's most eco-friendly building

By Esther Walker
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The loos flush using rainwater, roofs are covered with sedum plants, the building is heated using the playground and the desks are made from drainpipes. In the "living" classroom, wearing jerseys bearing the school's part-flower, part-windmill logo, a group of nine to 11-year-olds demonstrate their field skills by looking for creepy-crawlies with magnifying glasses. Imogen, a bright-eyed nine year-old, talks to me about carpets. "They're made up of tiles," she tells me authoritively. "So that when it wears out, they can replace one or two rather than the whole carpet."

Welcome to Howe Dell primary school, Hatfield, the most eco-friendly building in the country.

Commissioned by Hertfordshire County Council, one of Britain's more environmentally conscientious local authorities, Howe Dell is almost an experiment in how green and sustainable a building can be.

The pièce de résistance of the building was the construction of the world's first IHT system underneath the playground. IHT, which stands for Interseasonal Heat Transfer, takes heat from the sunshine that falls on the tarmac playground, then stores it and releases it in the winter to heat the school. IHT was invented and then developed by the London-based company Icac (Interseasonal Collection and Exchange).

Until now, if you wanted to use the heat generated by summer sunshine to warm something at a different time of year, you could not do so without converting it, inefficiently, into another form of energy, such as electricity. There hasn't been an effective way of storing the energy directly in the form of heat and releasing it later, when it is needed.

Mark Hewitt, an architect with Icac, developed a network of water pipes, which were laid under Howe Dell's playground. As the tarmac heats up when the sun shines on it, the heat in the water is pumped away and stored in computer-controlled thermal banks in the ground under the school. The banks are so well insulated that the heat only moves through them very slowly. The stored heat is then released into the school when it is needed – sometimes months later.

The principles of IHT were first demonstrated on the M1 in a project for the Highways Agency at Toddington service station. Heat collected from roads in summer was used to de-ice the same roads in winter.

The same technology can use the cold of winter air and ice to cool the building in the summer. It's the computer technology, explains Hewitt, which now makes this sort of heat storage possible. "With computers, you can predict very complex movements of energy," he says.

Another factor that made the school possible was the will of the council and its provision of funds to this ambitious project. A building this advanced doesn't come cheap: the contract to build the school was put out to tender and the council hired a company to take on the project for £8.7m. Unfortunately, the company went into administration after six months, having not paid any of the subcontractors. So the project had to begin again and the final bill, part-funded by the sale of Howe Dell's former site and by money from the Carbon Trust, came to £10.4m.

It took eight years to plan and build the school and, while it was being constructed, Howe Dell stayed on its former site: a rectory attached to Hatfield House, a mile and a half away from the new site. When Ofsted inspectors visited, they deemed the rectory not fit for purpose. The threat of closure loomed over the school until the council decided this was the perfect opportunity to move the school to a new site.

For the pupils and head teacher, Debra Massey, the school is more than just a new building, it's an educational resource. The school has an eight-pupil-strong "Eco-Squad" (members change every term), all wearing smart green "Eco-Squad" badges, whose job it is to promote ideas of sustainability. Environmental concerns are second nature to the pupils, who talk me through how they are developing fingerprint technology to replace the old library card system to save on paper.

The school's curriculum also incorporates sustainable education principles and it won the Eco-Schools Green Flag award for the environmentally aware additions to classes. The green section of the curriculum aims to teach pupils the interdependence of peoples and countries, the need to promote sustainable development and an awareness of their personal responsibility for the environment.

The school's sustainability features don't stop at the underground pipes. "The council was presented with a list of green features," says Edward Thompson of Icac. "There were about 10 or so on the list and the council said, 'We'll have the lot.'"

The range of sustainability features incorporated into the building by Capita Architecture is impressive. Solar heating panels warm up water for kitchens and washing. Photovoltaic panels supply some electricity. The architects also designed the school with skylights that flood the classrooms and corridors with daylight, cutting lighting bills,

and specified super-thick exterior walls and thick window glass to reduce heat loss.

Classroom sink-tops and splashbacks are made from recycled plastic yoghurt pots while desks are made from recycled drainpipes. And, as Imogen explained earlier, carpet tiles mean that when the carpet wears out only some tiles need to be replaced. A wind turbine is planned for the school's wetland area to contribute electricity.

The sedum roof acts as further insulation, as a habitat for creepy crawlies and serves as a living classroom, where pupils can study biodiversity. Rainwater is collected and used for flushing loos. The school also has boilers, which top up the green heat if needed.

"When I arrived at Howe Dell, work on the building hadn't started," explains Massey. "At times, the project was very vulnerable, so to be here is fantastic. Everyone believes in the same dream – that children need to be educated in green issues."

"At the moment," adds Hewitt, "it is expensive to build something like this. As a society, we need the nerves and the will to invest in buildings such as these."

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