Sustainable Energy in the Life of a Primary School

Introduction

Eastchurch CEP on the Isle of Sheppey in Kent is a first school serving the village of Eastchurch and the two coastal settlements of Leysdown and Warden Bay, both six miles away.

In July 2005 it became one of the first Kent schools to have 18 photovoltaic modules installed in the roof of a single-storey classroom. The project (match-funded by Kent County Council and the DTI PV Major Demonstration Programme) was designed to demonstrate educational, environmental and financial benefits.

Context

There are 273 pupils aged between five and nine years old in the mainstream school but the recent construction of a new purpose-built nursery on the same campus in March 2006 has increased the total roll to more than 300 pupils.

The school is a single-storey construction. The original Victorian build has been extended twice; once in the 1970s and again in the 1990s.

Ethos

The school has put a high level of importance on environmental matters for many years. It was the first Kent school to gain Eco-School Green Flag status in 1998 and has had a key role in encouraging other schools throughout Kent to register. Pupils have spoken to neighbouring schools and staff to other teachers, sharing best practice.

Community engagement has been fostered through environmental "Action Days". In recent years these have taken place during school time to ensure maximum participation in the activities which focus on improving the school environment.

"Every Child Matters"

Pupil participation is highly valued. All classes from Reception to Year 4 are represented on the School Council. This is the school's Action Team and a separate E-Team of Year 4 pupils ensures that energy is not wasted and data is collected from the photovoltaic panel every day. In addition, the E-Team and Caretaker take weekly electricity, gas and water meter readings. The E-Team awards certificates to classes or individuals in Friday's assembly, rewarding those who work hard to reduce electricity consumption. Each class has a recycling, energy and water monitor system and two members of Year 4 are the Chief Recycling Officers for the school.

The staff have worked hard to ensure that the curriculum is relevant to the pupils. It puts a high score on making links to the environment by using a combination of school lessons and practical experiences which includes out-of-school visits and working with guest speakers and organisations on specific areas.

The Qualifications and Curriculum Authority (QCA) have recognised their achievements and included the school's Education for Sustainable Development Policy on the School Management pages of their web site at www.nc.uk.net/esd/school_management/examples.htm.

The school is working with QCA on a project to assess progress in Geography and Environmental Education. It has provided material for the Innovation web site and highlighted Geography in Action in the National Curriculum. The school was involved in an Ofsted working party on fieldwork for this year's HMI subject report for Geography exemplifying good practice and is a pilot school for the Primary Geography Quality Mark.

The school is engaged in re-applying for Healthy School Status, which complements the Eco-Schools programme in many ways. Just over half of the pupils come to school by new yellow buses that are fuel-efficient and meet new emission requirements whilst local pupils are encouraged to walk. The school has produced a School Travel Plan, promoting safe, healthy and environmentally responsible ways to travel to school.

Eco-School and Energy-Producing School

A key aim of the school over many years since gaining Green Eco-Schools Flag status had been to generate their own energy and reduce carbon emissions. A renewable energy feasibility study was undertaken and identified good potential for a range of technologies including solar photovoltaics.

Once the feasibility study was completed the school was chosen to be a demonstration project and relevant permission was gained to install the photovoltaic modules on the classroom roof.

The work took place over three days in July 2005, within school time, with little disruption. An independent surveyor from Creative Environmental Networks (CEN) checked the photovoltaic modules and installation. The total life of the modules, which are virtually maintenance-free, is estimated to be 25 years with an expected carbon saving of 26 tonnes.

Specifications

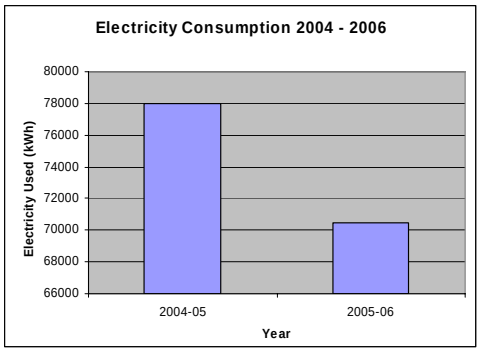
- 2 strings of 9 modules with a system rating of 3kWp.
- Electrical equipment and switch gear are fitted on the wall in the nearby boiler room.
- A monitoring panel, which the E-Team read, is prominently situated outside the school dining room and visible to pupils, staff and visitors.

Energy Facts and Figures

The school uses gas for heating and cooking and electricity for lighting and equipment.

Annual electricity consumption – from weekly meter readings:

May 2004 – April 2005 = 77992kWh
May 2005 – April 2006 = 70465kWh
A reduction of 7527kWh



Carbon emissions as a result of electricity consumed:

May 2004 – April 2005 = 33537 kg CO_2
May 2005 – April 2006 = 30300 kg CO_2
A reduction of 3237 kg CO_2

Photovoltaic modules – from readings taken daily:

Electricity generated: July 2005 – May 2006 = 2173kWh
Carbon emissions saved: July 2005 – May 2006 =1521kg CO_2

The photovoltaic modules are able to generate approximately 4-5% of the main school's electricity requirements.

Surplus electricity generation is expected to be in the region of £30-£40 a year. This will be paid to the school through the Seeboard (EDF Energy) Un-metered option.

Financial Benefits

The financial considerations alone would suggest that this project was not economically viable based on the cost of installation and current electricity prices.

The electricity generated by the photovoltaic modules has been estimated to meet 4-5% of the electricity requirements of the main school. This means that payback would not be possible within the 25-year life expectancy of the panels.

The context of increasing electricity prices does, however, provide another perspective. Electricity unit prices are set to rise in the short term by 40%, which could see the school paying an additional £2000 a year for their electricity if consumption remains constant.

The experience of the last year has shown that Eastchurch CEP has reduced their electricity consumption by almost 10%. This could be due to electricity generation, increased awareness and energy efficiency.

The £18,090 cost of the photovoltaic modules was met by Kent County Council and grant funding from the DTI.

In the longer term the solar photovoltaic installations are likely to become far more viable as the technology matures and becomes more efficient and the cost of the modules comes down.

Environmental Benefits

One tonne of CO_2 would fill 6 double-decker buses.

Electricity generation by the panel at Eastchurch CEP has saved the equivalent of over 9 double-decker buses of CO_2 being emitted into the atmosphere in the last year.

Educational Benefits

The presence of a solar photovoltaic system has helped to increase awareness of energy issues within the school and the need to reduce electricity consumption. The system and its monitoring panel presents a visual educational tool, which can inspire pupils and the wider community to learn about energy use and its impact on the environment.

The E-Team's daily recording of data illustrates this by providing opportunities to understand the Earth's relationship with the Sun and how the seasons effect the amount of energy produced. Skills of recording data, producing tables and other graphical representation can be applied to a practical task and the topic of climate change can be introduced.

Further funding from sources such as Learning through Landscape's "Fit and Healthy" programme, has led to greater recognition in the wider community. An Eco-School with an "Outstanding Environmental Management System", Eastchurch CEP were joint-first winners in the School's Category of the Environment Awards for Kent Business 2005, encouraging more Kent schools to enter the awards.

Becoming the joint winner of the Ashden Sustainable Energy in Schools Award has been an unexpected and very welcome development, which will inspire pupils, staff and community in Eastchurch and Kent to make changes and bring about further improvements to their environment.

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