

2009 Schools Ashden Awards case study

Currie Community High School

Location: Edinburgh, Scotland
School details: Secondary; 11-18 years; 900 pupils, 75 teachers, 33 other staff. Budget £4m/year (2008/09)

Summary

Currie Community High School is situated in a suburban area south west of the city of Edinburgh. The school benefits from a sports hall and swimming pool which, along with other school buildings, are used extensively by the community out of school hours. Currie has a long-term commitment to conservation and the environment. Over the past ten years, sustainable energy has been emphasised throughout the work of the school. Currie was awarded an Eco Schools Green Flag in 2004 and 2007.

- Pupil-led Energy group monitored lighting use, and reduced lighting wastage.
- Electricity monitoring meters are used by pupils to measure the consumption of different appliances and determine the most cost effective way to use them.
- During an energy saving week staff and pupils made energy saving pledges and notices on energy saving activity were read out in all classes at the start of each day.
- Lighting has gradually been upgraded, with high efficiency lamps and occupancy sensors, saving an estimated 48 MWh/year electricity.
- Walls and windows sealed, doors replaced, and management of heating improved to reduce heat loss, saving an estimated 102 MWh/year gas.
- Swimming pool cover saves an estimated 110 MWh/year gas.
- Feasibility study for renewable energy made in 2004. Steering group including school pupils and staff from Heriot-Watt University managed the renewable energy project.
- 30 kW of solar thermal panels installed in April 2008 to pre-heat hot water for the school's swimming pool, saved 8.2 MWh in gas in its first year of operation.
- 11kW Gaia two bladed wind turbine commissioned in May 2008, chosen for low noise production, generated 16.5 MWh electricity in its first year of operation.
- Overall savings from energy efficiency and renewable energy are about £12,500/year and 69 tonnes/year CO₂.
- Excellent integration of sustainable energy throughout the curriculum, used as an exemplar of best practice by Eco-Schools in Scotland. Currie High shares its sustainable energy activities with Chogoria High School in Kenya, enabling comparisons of the opportunities for renewable energy in the two countries.
- An electronic information system is being installed to display data from the two renewable energy systems and to provide network access to data for pupils.

Currie Community High School

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The school

Currie Community High School is situated in a suburban area south west of Edinburgh. It has 900 pupils aged 12 to 18 years, with about 7% from black and minority ethnic groups, and 7% receiving free school meals. The school employs 75 teachers and 33 other staff. The school moved to its present site in 1966 and was refurbished during the late 1990s.

The school benefits from a range of sports facilities which are shared with the local community, including a swimming pool, and a new sports hall built in 2008. Together with a broad community education programme for adults and children this means that the school facilities are used extensively in the evenings, at weekends and during holiday periods.

Currie High has a long history of commitment to environmental education and now to education for sustainable development. It values the importance of both teaching about sustainability issues and providing opportunities for pupils to take action to reduce the environmental impact of the school. The school achieved an Eco-Schools Green Flag in 2004 and 2007.

Behavioural activities to promote sustainable energy use

The school's Eco Committee has an Energy Sub-Group. One of the key tasks which the Group has initiated is checking unoccupied rooms during lunchtimes and after school to see whether lights have been left on. In October 2008 pupil members of the Group carried out an initial survey which showed that 25% of rooms had lights left on unnecessarily, and also found that computers were left running even though monitors were switched off. As a result the pupils and school business manager launched a switch-off campaign which included regular reminders in classroom bulletins. In January 2009 the survey was repeated and only 20% of unoccupied rooms had lights left on. Pupils calculated that over a 12 month period their actions would save the school £265. They are continuing with their campaign and aim to repeat the survey on a quarterly basis to reduce wastage as much as possible. Support staff and catering contractors are also trained to check that equipment is switched off when it is not in use.

During an energy saving week members of the Eco Committee introduced an energy pledge scheme for staff and pupils. Some of the pupil pledges were placed on the Eco-Schools notice board. Notices on energy activity were read out in all classes at the start of each day. This was to keep staff and pupils informed of progress and to encourage a sustained commitment to energy efficiency.

Electricity monitoring meters were purchased to enable pupils to record the power and energy used by various pieces of electrical equipment, especially computers and monitors. This enabled them to calculate the electricity used by the appliances when in use and when left on standby. The data is being used to encourage staff and pupils to shut down appliances when they are not in use. Pupils have also measured the power used by other equipment, including fridges, freezers, and washing machines and to investigate where savings could be made. In addition, pupils in the 'Support for Learning' department have monitored temperature in a sample of rooms, because some parts of the school have problems with occasional overheating and poor ventilation.

Some pupil members of the Eco Committee were keen to expand their energy and environmental work to involve the wider community. Funding has been obtained for a three-year community engagement project, in which pupils will seek to promote and support environmental activities in their local neighbourhood.

Sustainable energy technology

A range of electricity saving measures has gradually been installed around the school. Over 2,000 lamps and luminaries have been replaced with low energy designs, both internally and externally. Occupancy switches have been fitted to large areas such as the assembly hall and sports facilities, and photosensitive switching has been fitted to external security lighting.

Action has also been taken to reduce heat loss, mostly as part of upgrade, repair and maintenance programmes. In 2004 Currie High had a survey to establish the condition of its insulation, which found that no major improvement was required. In the following year the concrete panels and window frames on an exposed wall were sealed, and leaking windows were replaced. Several external doors have been fitted with draught excluders, and four door sets have been replaced to reduce heat loss. Various steps are taken to use the heating system effectively. Thermostatic radiator valves in classrooms are regularly maintained, and zone-temperature sensors have been relocated, to reduce variations in temperature around the school. All boilers, apart from those used for the swimming pool, are switched off from May to mid-September each year.

In 2004, the City of Edinburgh Council's Sustainable Development Unit funded a feasibility study to investigate suitable renewable energy technologies for Currie High. This led to the installation of solar water heating and a wind turbine. Senior pupils were involved in the steering group which managed the renewable energy projects.

An array of 30 kW of solar thermal panels was installed on the roof of the sports block and commissioned in April 2008. The panels pre-heat water for the swimming pool. Prior to this, an automatic swimming pool cover had been installed to reduce heat loss when the pool was not in use, and a high efficiency air-handling unit with heat recovery had been fitted.

In May 2008 Currie commissioned its 11 kW two-bladed Gaia wind turbine: it was the first school in Edinburgh to install a wind turbine. The model of turbine was chosen for its high reliability and also for low noise production, because the school is fairly close to housing. There has been no problem with noise, although a small number of homes experience flicker from the wind turbine blades. Trees have been planted to help screen the homes, and research is underway to try to reduce the flicker further.

Sustainable energy in the curriculum

Currie has been actively involved in conservation and tree planting for over 20 years, including management of an area of woodland adjacent to the school. The school now also has a very well structured energy education programme. Topics include renewable and non-renewable energy sources, and global warming and its consequences. Activities are embedded across different curriculum areas and year groups. For example, in Science the pupils investigate electricity generation and the advantages and disadvantages of different sources of energy. Even the Art and Design department gets involved. Pupils designed a mural showing wind turbines working in harmony with nature, which was the Scottish winner of a competition to design a mural to promote sustainable living. The mural was displayed at Edinburgh Waverley rail station, and at its launch, pupils took the opportunity to question travellers about the sustainability of their lifestyles.

Currie High has a partnership with Chogoria High School in Kenya, which includes sustainable energy. Pupils from Currie and Chogoria researched a variety of renewable energy technologies and assessed their suitability for providing energy in their home countries. Groups of pupils from each school then carried out a role play as employees of an energy company, and made presentations in which they proposed their own technology as

the most appropriate solution to their country's energy needs. Presentations were filmed and exchanged between the two schools. Pupils then discussed the findings of the partner school and whether the same solutions are appropriate for both countries. New joint projects on carbon foot-printing and food miles are planned for this year.

During a Sustainable Secondary Schools Project (2001-2005) the school's environment coordinator worked with a consultant from WWF and with support from some of her colleagues she wrote 'Tracks through Time'. This is a Sustainable Development Education course for the youngest pupils, which Currie has been teaching for the past four years.

Energy and carbon

Currie High keeps records of monthly and annual data on gas and electricity use. Annual use is quite high for a school of this size, because the buildings are used extensively by the community, out of school hours.

Gas consumption has averaged 2.7 GWh/year over the past seven years, and has generally decreased, although there is considerable weather-related variation from year to year. The solar thermal array which started operating towards the end of the 2007/08 school year supplied 8.2 MWh during its first year of operation. It is estimated that the pool cover saves 108 MWh/year, and that the boiler efficiency and sealing measures introduced over the past few years save about 100 MWh/year. Combined, these represent a saving of about 216 MWh/year, equivalent to 41 tonnes/year CO₂ and £4,600/year savings on purchase of gas.

Electricity consumption averaged 620 MWh/year over the same period, with variations from year to year and a significant reduction during 2007/08. The wind turbine generated 16.5 MWh during its first year of operation. The improved lighting in the assembly hall saves an estimated 11 MWh/year, and the 'switch off' campaign saves about 0.48 MWh/year. Savings from the current programme of lighting upgrading are estimated to have saved 37 MWh during 2008/09. Combined, the measures for which estimates have been made represent a saving of about 65 MWh/year, equivalent to 28 tonnes/year CO₂ and £8,100/year savings on purchase of electricity.

Currie is intending to sell the Renewable Obligation Certificates (ROCs) for the electricity generated by the wind turbine, which will bring an income of about £850/year.

Potential for growth and replication

What more could Currie do?

An imminent task is the installation of a data display panel to provide information on the energy supplied by the two renewable systems. This will inform staff, pupils and visitors about the benefits of the wind turbine and solar thermal system, and will also provide data that pupils will investigate in Maths and Science activities.

There are plans to increase the size of the solar thermal system on the roof of the sports block. There is room for one more array of tubes which can connect with the existing system for heating the pool. It is estimated this would cost £14,000. There are also opportunities for further energy saving measures. Some external doors and windows still require draught-proofing and there is scope for additional intelligent lighting in the sports facilities and cafeteria.

However, in common with all Scottish state schools, the buildings of Currie school are owned and operated by the local Council. Any further investment in sustainable energy technology, will therefore be determined by the City of Edinburgh Council, which has to be seen to treat all schools equally.

What could other schools do?

Replication of the sustainable energy investments in other Scottish schools will also be determined by choices at Council level. The City of Edinburgh Council recognises the commitment of Currie's staff and pupils to reducing the school's carbon footprint and is keen to encourage other Edinburgh schools to follow its example, subject to funding. The energy and carbon data (above) shows the significant savings from energy efficiency measures. These could be incorporated in any school building during routine maintenance and building development.

However, what Currie has achieved is not just installation of technology, it also has the pupil-led encouragement of sustainable energy behaviour. The way that Currie has embedded energy education throughout its curriculum is one of its main strengths and can be shared with other schools. Eco-Schools in Scotland use Currie as an exemplar of best practice of sustainable development education. They also use the school as a venue for conferences and other events.

Management, finance and partnerships

Scottish schools do not have governing bodies, so the senior management team at Currie has sole responsibility for operating the school in association with the City of Edinburgh Council. The team is supported by a parent forum, and parent council with two teacher representatives.

To support the sustainable development activities, Currie High employs a part-time environmental coordinator, Alison Nind, who works very closely with Phill Pache, the school's business manager. The head teacher, Kate Paton, the deputy head teacher, Andrew Watson, and other members of staff fully support the sustainable development focus. Alison coordinates the pupil-focused activities both within the curriculum and the work of the Eco Committee. Phill deals with the technical and financial issues.

Investment in sustainable energy technologies at Currie High has been managed by the City of Edinburgh Council in partnership with the school. The Council has provided funding from its own budget and secured grants from the SCHRI for the wind turbine and solar thermal panels. In addition, it has negotiated green tariff electricity for the school through a Council-wide contract with Scottish and Southern Energy. The Council provides the school energy consumption data to Phill for monitoring, and the school's service support officers (janitors) are involved with monitoring the wind and solar systems.

Currie High is close to Heriot-Watt University and two staff members from the university have advised the school on sustainable energy, and on recording and display of data from renewable energy devices. They are involved in the Tarbase project (<http://www.energy.hw.ac.uk/projects/tarbase.cfm>) which looks at effective solutions for reducing CO₂ emissions from existing building stock. The proximity of the university to the school offers opportunities for comparing data and collaborative work in the future, including the involvement of pupils.

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This report is based on information provided to the Ashden Awards judges by Currie Community High School, and findings from a visit by two members of the judging team to see their work.

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