

Eco-Schools Inspiration

Energy



Teaching
Resource



KEEP
NORTHERN
IRELAND
BEAUTIFUL



ECO-SCHOOLS



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Pupils of Killicomaine JHS, Portadown enjoying the visit to SSE Airtricity's Slieve Kirk Wind Park.



“ THE RESPONSE FROM ECO-SCHOOLS PARTICIPATING IN OPERATION ENERGY, OUR ONLINE ENERGY EDUCATION PROGRAMME HAS BEEN TERRIFIC; IT’S GREAT TO SEE ECO-SCHOOLS ACROSS THE COUNTRY GETTING INVOLVED IN SUCH A WIDE VARIETY OF ENERGY SAVING ACTIVITIES . ”

JOSH BRADLEY, COMMUNICATIONS EXECUTIVE, SSE AIRTRICITY, PRINCIPAL SPONSOR

Introduction

The energy required for heating, lighting and powering equipment in an ordinary school classroom releases about 4,000 kg of CO₂ every year – enough to fill four hot-air balloons 10 metres in diameter. UK schools spend about £450m on energy each year, three times as much as they do on books, and about 3.5% of their budgets.

Some schools will spend four times more per pupil than similar schools in the same region. The difference is often to do with how effectively schools manage their energy use. Surveys show that, through simple low-cost and no-cost measures, schools can reduce their fuel bills by up to 10% while also reducing their CO₂ emissions.

Display Energy Certificate

Schools with buildings that have a floor area in excess of 500m² are required to have a Display Energy Certificate (DEC). This was effective from January 2013. DECs have been introduced to raise public awareness of the actual energy use and energy efficiency of the buildings they visit. A DEC certificate presents the actual energy use of a building on an A-G scale where A is the most energy efficient and G is the least. The certificate is similar to those that are required for fridges and other new white goods.

Getting started

In order to address how energy is used in the school and identify possible areas for saving energy, schools should conduct an Energy Audit. Guidance on how to complete this can be found in the [Environmental Review notes](#).

Following on from the review your school should have a good idea of where, how, and when energy is used in the school and areas where savings can be made. A good place to start is with awareness raising about the use of energy and what people can do to reduce the amount of energy used in school and at home.

Analysing energy bills will also give great information on where energy savings can be made and put a value on any savings made.

To keep track of energy usage and the impact of the actions taken, make use of our [data collection form](#).

Operation Energy

Operation Energy is an exciting new education programme from SSE Airtricity, Principal Sponsors of Eco-Schools, which is aimed at inspiring teachers, children and parents to become advocates for energy-use reduction, awareness and efficiency.

The Operation Energy programme is a free online resource for children and teachers, packed with over 40 hours of activities, campaigns, games, lesson plans, videos and competitions to help schools on their Green Flag journey.

The resource also includes a specially-dedicated zone for parents so that everyone in the family can help play their part in the ongoing quest to reduce energy use. The resource, including all downloads, lesson plans and games, is [available online](#).

Schools must register on the Operation Energy website to access the materials.





Case Study

School: <i>Hollybush Primary</i>	Teacher: <i>Feargal Friel/Claire Grant</i>
No. of pupils: <i>422</i>	Eco-School status: <i>Green Flag</i>

Background Information

Q: Why did you choose Energy as an Eco-Schools topic? What was your Action Plan?

A: The Hollybush Eco Action Plan includes Energy as a topic and the action to cut down the use of electricity in the school was a priority in the School Development Plan.

In 2008 senior staff and governors were becoming increasingly concerned about rising energy costs, in particular the increase in the price of oil used for heating and hot water.

The biggest impact on reducing carbon emissions and cost savings made by the school was the installation of a 99kW Austrian KWB wood pellet burning boiler in March 2011 to replace the increasingly expensive oil-fired heating system and two classrooms heated by gas. In addition to replacing the oil-fired boiler, the biomass system heats a classroom that was previously heated electrically. Two energy efficient oil fired boilers provide back-up when required.

To compliment the biomass installation a range of basic energy efficiency measures have been implemented.

- Light monitors and 'Eco police' to monitor electricity saving behaviours within school.
- Signs to remind people to turn off lights when not in use.
- Use of energy saving light bulbs.
- Notices placed on PCs to 'Switch me off' when not in use.
- Teachers encouraged to switch off radiators if rooms become too warm.

With the support of teachers and pupils, average temperatures in classrooms have gradually been reduced by up to three degrees centigrade and lighting is predominantly energy efficient.

The caretaker is responsible for overseeing the school's energy systems, reading the meters and keeping weekly records.

Other energy saving measures include reducing the number of photocopiers to one, turning off alternate radiators in the school hall, replacing all kettles with a single water heater and installing a warm air curtain over the front door of the school. All radiators have been turned off in the school kitchen as it was greatly over-heated.

Parents are invited to participate in the sustainable energy activities at Hollybush and some are members of the school's Eco-Committee. All parents are encouraged to apply the school's energy efficiency practices at home and parents of older pupils are invited to monitor their carbon footprint. As far as is possible the sustainable energy work at the school is carried out by local contractors. Small businesses and community groups are encouraged to visit the school to see the energy practices first hand with the biomass system a major attraction. The WELB highlights Hollybush as a centre of excellence for sustainable energy best practice.





Case Study

Q: How do you integrate Energy into the curriculum?

A: We have a range of curriculum materials, including Operation Energy, to be used during Energy Topic lessons. Six weekly environmental topics take place throughout the school, some involving energy. For example all 10 and 11 year olds calculate their personal and family carbon footprint using online carbon calculators. This exercise is repeated a year later; the most significant reductions have been due to a reduction in flying.

Each year the school holds a science fair which includes a range of energy activities and there are regular displays of pupils' energy projects throughout the school.

Occasionally pupils assist the caretaker in reading the meters and display the data on the school's Eco-Committee notice board as well as using it in curriculum activities.

Q: How do you co-ordinate with other teachers to ensure a whole school approach?

A: Everyone has a role to play. The Principal and Deputy Principal and I, as Eco-Coordinator, promote energy saving amongst staff and all teachers take responsibility for using energy appropriately in their classrooms.

Q: How did you encourage pupil participation? How did they have ownership of the project?

A: Pupil energy monitors are responsible for ensuring lights are switched off when not required, windows are closed and taps are not left dripping. At the end of each school day a 'shut down' check is carried out to ensure all internal lights and appliances are switched off.



“EVERYBODY IN OUR SCHOOL THINKS THEY ARE CONTRIBUTING TO SAVING ENERGY AND WHEN THEY GROW UP THEY WILL BE A GOOD EXAMPLE FOR OTHERS.”

ECO TEAM PUPIL MEMBER



Eco-Committee members are responsible for making sure lights are switched off when not needed
Left





Case Study

During Implementation of Eco-Schools Inspiration case study

**Q: How did you encourage pupil participation?
How did they have ownership of the project?**

- Eco-Committee
- Eco-Police
- Awareness raising activities
- Operation Energy Workshop
- Wall displays
- Posters

Q: How will pupils/whole school benefit from the Eco-Schools Inspirations project?

- Greater awareness of energy usage
- Less energy usage
- Cost savings

Q: What is your overall aim and what actions are you going to take?

- To raise awareness of the benefits of saving energy
- Improve pupil understanding of energy issues
- Continue monitoring initiatives implemented to date including; turning off lights, appliances and computers, wood chip boiler and photovoltaic panels



Q: How are you going to spend the £500 funding?

- Purchase Energy Topic resources for use in the classroom

Q: Are you going to receive any support or resources from parents, staff or outside agencies?

- Western Education and Library Board Energy Officer
- SSE Airtricity Operation Energy Workshop
- Keep Northern Ireland Beautiful Visit





Case Study

Reporting on impact of action(s)

Q: Did you encounter any problems and, if so, how did you overcome them?

A: No we did not encounter any problems.

Q: Is there any advice you could offer to schools undertaking the Energy topic? Do you have any useful suggestions for other teachers embarking on the topic?

A: You cannot work in isolation. Every member of the school community needs to get on board in order to make a difference. We were very fortunate in our school that all the pupils, parents and members of staff including cleaners, cooks etc. made a great effort to implement the ideas introduced to reduce our energy consumption.

Q: Has doing this topic driven other Eco-Schools ideas? What are your future plans regarding Eco-Schools?

A: We will continue to raise awareness throughout the school of the importance of saving energy.





Case Study

Hollybush PS Energy Usage 2011-2012

Type – complete for each type used in your school	Start date for period over which energy consumption was calculated	Finish date for period over which energy consumption was calculated	No. of school days in this period	Amount of energy used in kWh/Litres, etc.	Average amount of energy used per person per day *	Cost (£)	How did you measure your energy consumption?
Previous Year							
Electricity	September 2010	February 2011	105	40305KWh	(40305KWh/422 pupils/ 105 days)= 0.91 kWh/pupil/ day	40305KWh x £0.15/KWh= £6045 £14.32/Pupil £0.13/Pupil/ Day	Electricity meter readings on a weekly basis by Eco-Committee and Caretaker
Oil	September 2010	February 2011	105	13,878 litres (13,878litres x 10 kWh/ltr) = 138,780 kWh	138,780KWh/422 pupils/ 105 days)= 3.13 kWh/pupil/ day	138,780KWh x £0.058/kWh = £8,049 £19.07/Pupil £0.18/Pupil/ Day	Oil Gauge in Boiler House
Other Biomass – wood pellets	September 2010	February 2011	105	0	0	0	Wood Pellet Boiler Installed in March 2011
Current Year							
Electricity	September 2011	February 2012	105	32430KWh	(32,430/422 pupils/ 105 days)= 0.73 kWh/pupil/ day	32430KWh x £0.15/KWh= £4,864 £11.52/Pupil £0.11/Pupil/ Day	Electricity meter readings on a weekly basis by Eco-Committee and Caretaker
Oil	September 2011	February 2012	105	0	0	0	Oil Gauge in Boiler House NB: back up to wood pellet system
Other Biomass – wood pellets	September 2011	February 2012	105	118798KWh	(118,798/422pupils/105days)= 2.68 kWh/pupil/ day	118,798KWh x £0.036/KWh= £4,232 £10.03/Pupil £0.10/Pupil/ Day	Read Out from Boiler

Click here to view the Eco-Schools Data Collection Form template





Curriculum Links and Skills

The Energy topic allows you to incorporate and promote **Thinking Skills & Personal Capabilities** and **Cross-Curricular Skills** into your lessons.

Lesson Suggested Learning Intentions

(taken from W.A.U. strands on Northern Ireland Curriculum website)

Strand 1: Interdependence

'About the effects that people's actions have on the natural environment (S&T) (G); that some waste materials can be recycled and that this can be of benefit to the environment (S&T); to be aware of how modern technology has influenced design and production of everyday objects (S&T).'

Strand 2: Movement and Energy

'How the lack of basic resources impacts on the lives of people in different countries (G); that the journey of a product can affect the environment both locally and globally (G).'

Strand 3: Place

'How the use of materials relates to their properties (S&T); about the impact of different people over time on places (H); how human activities create a variety of waste products (S&T); about the importance of recycling and its benefits (S&T); that some materials decay naturally while others do not (S&T).'

Strand 4: Change Over Time

'About the environmental benefits of reducing, reusing and recycling (S&T); about how materials are changed to make new materials (S&T); about the depletion of the world's resources and how this has occurred (G); that there are things we can do to prevent pollution and the production of waste (G); about desirable and undesirable change at home and in the environment (S&T).'

Managing Information

Example: Find out how energy is made. Compile a project on renewable and non-renewable energy sources. Make a display on the forms of energy for the Eco-Schools Noticeboard.

Thinking, Problem-Solving and Decision-Making

Example: Investigate how the school uses energy and ways that energy use at school could be reduced/made more sustainable. Design a campaign to reduce energy use in the school and what pupils can do at home to reduce energy use.

Using ICT

Example: Produce posters encouraging people to save energy using publishing software. Put information from bills into tables and make graphs of energy use at your school.

Being Creative

Example: Try to make up 'saving energy' slogans for use in the school. Make up an energy awareness raising play, poem, song, or rap.

Communication

Example: Produce an energy saving tips factsheet for parents. Hold an energy action day, such as a power down day.

Using Mathematics

Example: Make graphs on energy use at your school. Calculate any savings made by analysing energy bills from the school.

Self-Management

Example: Investigate how personal behaviour can make a difference on how much energy we use.

Working with Others

Example: Invite energy organisations to the school to do a workshop on energy. Find out if the school can avail of energy saving funding such as grants. Take part in energy awareness raising competitions.



Primary Activity Ideas

Language & Literacy

Writing

- Write slogans for reducing energy use.
- Write a play on energy.

Talking & Listening

- Discuss video clips related to the energy topic.

Reading

- Gather articles about Energy use and put these in a display.

Mathematics & Numeracy

Number

- Calculate differences in energy bills and use.
- Investigate energy use at home and school. Make graphs on the numbers.

Measures

- Find graphs of relevant energy use around the world and use these to pose questions about global food, water and energy supplies.
- Monitor energy habits in school.

Shape & Space

- Investigate the different shape of water and wind turbines.
- Find out about where energy production sites, wind farms and powers stations are and ask why they are there?

Handling Data

- Apply findings from studies or research, such as a survey on energy, through graphs, diagrams, charts etc.
- Discuss, plan, collect, organise and represent data in response to a question or statement. Interpret information and evaluate the effectiveness of the process.
- Discuss examples of energy data represented in newspapers, magazines and multimedia sources.

Religious Education

- Explore the importance of plants, animals and rivers to human spirituality and wellbeing.
- Stewardship-Care for the planet, in particular the atmosphere.



Primary Activity Ideas

The World Around Us

Geography

- Find out about how energy is produced and used in different countries.
- Investigate different places that can be used for energy production.

History

- Find out about the history of electricity.
- How has energy usage changed over time?

Science & Technology

- Convert energy from one form to another, kinetic to light/heat.
- Find out about sustainable modes of transport and how energy is used.
- Make wind powered vehicles.
- Study how to make electricity from light.

The Arts

Art & Design

- Create energy awareness posters.
- Design a new wind turbine.

Music

- Compose a short piece of music using the voice, body and instruments about the energy topic.
- Perform a sound picture based on the energy topic.

Drama

- Use the Energy topic to develop a range of drama strategies including freeze frame, tableau, hot seating, thought tracking and conscience alley.

Personal Development & Mutual Understanding

- Understand health and safety on site. Especially with regards to electrical components and installations.
- Actively taking care of self and others.
- Apply findings to the wider community.
- Develop care for their local environment through playing an active and meaningful part in the life of the community e.g. litterpick or gardening in the local area.

Physical Education

- See if you can walk or cycle to school to save energy.
- Improve road and cycling safety so more people walk and cycle to school.



Post-Primary Activity Ideas

Environment & Society

Geography

- Obtaining non-renewable resources.
- Comparisons between cities/countries.
- How does quality of life differ between countries with different energy usage.
- Identify the most environmentally sound countries, identify key differences in practice.

History

- Examine how our energy usage has changed over time.
- What side effects have there been with changing energy sources e.g. London smog.

Language & Literacy

English/Irish Medium with Media Education

- Draft letters to council/government in improving energy usage.
- News reports on changing energy usage within school.

Modern Languages

- Links with partner schools/other Eco-Schools – compare energy saving strategies.

Physical Education

- Take part in responsible outdoor field work.
- Take part in responsible outdoor practical work.
- Carry out physical activity outside e.g. walk/jog around a nature trail.

Learning for Life & Work

Local & Global Citizenship

- Investigate help available within local council; different strategies in other areas/countries.

Education for Employability

- What companies are doing to reduce energy.

Personal Development

- What individuals can do – personal changes.

Home Economics

- Tips on how to conserve energy in the home.



Post-Primary Activity Ideas

The Arts

Art & Design

- Design posters to display around school encouraging energy saving.
- Designing wind turbines.

Drama

- Short plays/scenes showing how to conserve energy.

Music

- Compositions which reflect energy usage.

Mathematics

- Calculating energy used under different conditions.
- Compare energy usage over time.
- Calculate savings.

Science & Technology

- Calculating how much energy a school might use in a day (from computers/lights etc.)
- Methods of producing energy, renewable and non-renewable, and their impacts on the environment.
- Innovations in energy saving technology.

Religious Education

- Stewardship-Care for the planet, in particular the atmosphere.



Useful links

[Operation Energy](#)



[Eco-Schools delivery partners](#)



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