Tips to reduce energy and water use in schools

Energy and water are major non-staff costs in schools and a major part of a schools' environmental impact. Some schools will have greater scope for savings than others.

The Carbon Trust estimates that most business can cut energy spend by at least 10% by taking some simple efficiency measures, and often by 20%, by simple actions that produce quick returns on investment.

These tips will help you to:

- Save money, year on year
- Create a healthier and more comfortable school environment
- Reduce demand on finite resources
- Have a positive impact on climate change by reducing emissions of carbon

There are many simple and straightforward ways that you can save money and become more sustainable. Some of these will be through changing behaviors and culture, but equally importantly can be through more active management of buildings, plant and equipment along with strategic planning.

Behaviours and culture

The global focus on environmental issues has generated a lot of interest and support within schools to change behaviours. Many schools have active pupil and staff engagement which allows them to translate general concerns about the environment into practical action within their schools.

This section is aimed particularly at head teachers, school business professionals and school staff.

1. **Develop a green policy**

Developing a green policy will help to show commitment to energy efficiency and empower staff and pupils to make changes with support from senior leaders.

Your green policy should include:

- mission statement
- objectives and targets
- roles and responsibilities
- a framework for action planning
- milestones to review progress
- resources, which are widely available from the Carbon Trust

2. Share energy information with pupils and school staff

Encourage shared ownership of the issues by involving staff and pupils. To identify where energy savings can be achieved, it is best to start by looking at how energy is currently being used.

Make staff and pupils aware of the energy they are using, and what it is costing in both monetary and environmental terms.

Help them understand how their habits have an impact on energy use and how changing them can have a positive effect.

Encourage and reward ideas and activities that will reduce energy use. Many school energy schemes have been created and are managed by pupils, making the most of their enthusiasm and creativity.

Teachers can bring energy information into lesson plans, most obviously within science or maths lessons. Engaging pupils with meter readings, energy management statistics and comparisons of numerical data helps them to:

- improve numeracy skills
- develop their own understanding of energy and how it is used

This can influence longer-term behaviour both at school and in the home.

There are additional resources for pupils and staff available at Eco Schools and National Energy Foundation Energy Envoys.

3. Encourage small changes

Start with the basics, such as switching off lights and electrical equipment when not in use. Labelling light switches is a simple way to help ensure only required lights are turned on.

Remove obstructions from windows and radiators to make best use of daylight and make sure heating systems are operating efficiently.

Encourage pupils and staff to keep doors closed wherever possible to stop warm or cool air from escaping. Adjust temperature controls to cool rooms if the heating is on before opening windows.

Many schools have groups of 'eco-champions' or 'power rangers' who check at the end of each day for equipment or lights that have been left on, switch them off and inform the staff responsible.

Others create some healthy competition, for example by using graphs to compare energy use in different sites or buildings.

Set targets and recognise success. Where monitoring shows that a difference has been made, celebrate and help to maintain enthusiasm for going further.

There are a number of housekeeping measures and management procedures that could be put into place which don't have a cost attached to them. A few examples of no cost measures could be:

Active management

Understanding how buildings, equipment and building systems work and how much energy they use will help you use them more efficiently.

This section is aimed particularly at school business professionals, estates staff and site operatives.

4. Use the building and building systems as intended

Using existing heating or lighting controls effectively can reduce energy wastage, save money and reduce emissions by up to 40%.

If the boiler is poorly operated or maintained, heating costs can increase by 30% or more. Make sure it is serviced at least annually and adjusted for optimum efficiency.

Heating costs increase by around 8% for every 1°C increase (Carbon Trust). Make sure temperature controls are set and adjusted to reflect different uses and activities in different areas or rooms. Check timers so they reflect actual hours of use and are set to the right date and time (particularly after the clocks go forward or back).

You may want to limit the ability for individuals to change the heating controls, or only enable very small adjustments.

Up to 30% of heating costs can be saved by preventing cold air entering the building (Carbon Trust). Make sure all sources of draughts are identified and appropriate draught proofing is fitted. If the room is too warm and the heating is on, adjust the temperature control rather than opening windows.

Overheating in the summer can be a problem in some areas. Either open windows or use air-conditioning, never both.

Poor control of a space can lead to discomfort, so it is important that staff understand know how to adjust the temperature, ventilation and lighting in their spaces so that conditions can be adjusted to achieve the desired comfort levels.

5. Take advice

If you are not sure how to use your systems and equipment effectively, you can get advice from:

- the installer of the building management system - contact details can usually be found on the main system plant, such as the boiler and heating control panel.
- the company that installed your heating or lighting system
- your local authority or a local controls expert who will be able share simple building management techniques
- your building user guide

You can also find advice in your Display Energy Certificate (DEC) advisory report to help improve your energy management, reduce consumption and CO2 emissions. The report contains:

- recommendations for improving the energy performance of your buildings
- a range of possible improvements, including cost effective measures that may improve the energy performance of the property
- zero and low-cost operational and management improvements
- possible upgrades to the buildings or services
- opportunities for the installation of low and zero carbon technologies

The report categorises recommendations, by payback period:

- short term payback (up to 3 years), for example building energy management measures
- medium term payback (3 to 7 years), for example upgrading building services
- long term payback (more than 7 years), for example low and zero carbon technologies

Each category includes the energy assessor's selection of the most suitable improvement measures for the building, generally between 5 and 10 measures.

You may be able to get funding to help you carry out works. For example, interest free loans for energy efficiency work are available through the Salix Energy Efficiency Loan Scheme.

You could get an energy management survey carried out an external consultant. This could help you prioritise and set targets to improve energy efficiency. You should look for a CIBSE accredited low carbon consultant.

6. Use your meters for energy monitoring and benchmarking

Monitoring meter readings regularly is a low or no cost measure that enables you to monitor energy uses and patterns.

Fluctuations in energy use patterns may have many possible explanations such as seasonal variations. But you may find a change that can't be explained, or no reduction when you would expect to see one (such as heating or equipment being left on in school holiday periods).

Many schools have sub-meters installed. Since the 1990s, building regulations have required sub-meters to be installed to monitor at least 90% of the loads in a school.

There are options of how to use your existing sub-meters to monitor different energy end uses, including:

- manually reading the meters
- connecting to the existing building management system
- using the inbuilt transmission capabilities of meters
- using computer software to optimise control

Automated meter readings can take place at specified time intervals, providing information on patterns of use and levels of demand when buildings are unoccupied.

The data meter readings provide can also be used for teaching and learning.

Many schools have recently had smart meters installed on their main incoming gas, electric and water supplies. These provide information about how much energy is used and when. This will help you to understand your energy use and how it can be reduced. If you have a smart meter learn how to use it.

You can compare your school performance to ESFA benchmarks across the main energy end uses of:

- lighting
- small power
- heating gas
- kitchen gas

There are tools to help you.

[Annex 2H Energy of the Generic Design Brief](#) provides good practice benchmarks for energy end use and guidance on the best way to monitor your energy end uses.

It describes:

- how new schools are required to describe themselves using the iSERV methodology
- the benefits of monthly energy management reports

You can use these to target energy saving measures in areas where there is most energy wasted and are likely to be most cost effective.

iSERV is also suitable for existing schools.

Read further information on the [K2n National Database and iSERV continuous monitoring and benchmarking](#).

[The Chartered Institution of Building Services Engineers (CIBSE)](#) provides an energy benchmarking tool for all building users.

It will take performance data from a number of sources and:

- provide benchmark figures for a variety of building types
- enable building owners and designers to compare their consumption

Future developments will include an interface to view an individual owner's portfolio of buildings and how they perform compared to similar local buildings. Data updates will be anonymous and made via the web interface.

Find out more about measuring the performance of your estate and benchmarking.

7. Understand and check your bills and tariff

Energy use in school buildings is very much under the control of the individual school. You should know how much electricity you use, alongside other fuels for heating and hot water. You should also know how much water you use.

Understanding and analysing your bills will help you:

- check they're accurate and based on actual meter readings so you only pay for what you use
- understand if energy usage is up or down compared to previous years
- identify unexpectedly high or unusual patterns of energy use so that quick action can be taken
- minimise energy wastage

You could make a simple graph of energy use over time to help you see trends.

You will also be able to use your Display Energy Certificate, produced annually, to:

- compare your energy use to national averages
- see how energy use has changed from the previous year

Check your energy consumption to see if it seems reasonable for the:

- time of year
- severity of the weather

Check your water consumption to see if it seems reasonable for the number of people

When you receive a bill, check it to make sure that it reflects the correct tariff.

The amount you pay for electricity may depend on when you use it. Using off peak (night time) electricity through timers and reducing peak demand can save significant amounts of money.

You may also be able to get a cheaper tariff by changing supplier.

[School Switch](#) is a new service delivered by the Crown Commercial Service to help schools and academies achieve greater value for money when buying their energy and to switch their energy supplier. It also provides a simple route to renewable energy options from a range of suppliers.

8. Use water conservation devices and check for water leaks

Introduce ways to reduce the amount of water used. Water conservation devices are simple to apply and economical and may reduce water consumption by half. Installations such as cistern dams, urinal controllers, flow restrictors and self-closing taps save water and money.

Leaking underground pipes can result in a huge loss of water, which will cost your school money. Check your water meter regularly and use the readings to help you see trends, changes or differences between buildings.

If you suspect a leak, take a meter reading last thing at night when everyone has gone home and first thing in the morning before everyone arrives. If the reading has changed, indicating consumption, this is likely to be a leak.

Ask your local water company about their free leak detection service.

Find out more about [energy and water management](#).

Strategic planning

Investment in new technology, equipment and energy sources can deliver savings over a short payback period.

This section is aimed particularly at head teachers, finance directors, school business professionals and estates staff.

9. Upgrade heating controls

Modern heating controls are accurate, tamperproof and have the facility for 7 day programming. Heating can be set to operate at different times of the day or week to suit the occupation pattern, and take account of holiday periods.

Heating controls should:

- be working properly

- provide a comfortable environment for teaching, learning and other activities
- match actual occupation times

Reducing the temperature in a building by 1°C will save 5% to 10% of the heating bill. Operating the heating systems for an hour less each day will save a similar amount.

Ensure thermostats are appropriately positioned, particularly where there have been changes to building layout. Thermostats placed in an area that is exposed to draughts will increase heating costs.

See Annex 2I Controls of the Generic Design Brief for a summary of suggested controls for primary and secondary schools.

See Annex 2F: Mechanical services and public health engineering Section 10.2 for recommended heating set points for primary and secondary schools.

10. Install energy efficient lighting and controls

Lighting accounts for around half of the electricity used in a typical school. You could reduce your consumption by:

- installing lighting controls
- using occupancy lighting sensors in areas that are infrequently used
- replacing failed lamps with more energy efficient ones, which last longer

In many cases, older 38mm diameter fluorescent tubes (T12 now discontinued) can be replaced directly with 26mm versions (T8) which use 8% to 10% less electricity.

Where whole light fittings are being replaced consider using 16mm fluorescent tubes (T5), compact fluorescent lamps (CFL) or light-emitting diode (LED) types. LED lights use up to 90% less energy than traditional lamps but need careful specification. They can also last up to three times longer than compact fluorescent lamps (CFL) saving maintenance and downtime costs. Use the Annex 2E Daylight Electric Lighting of the ESFA Generic Design Brief to ensure that any new lighting will provide a quality lit environment and save energy over the long term.

Daylight and occupancy linked lighting controls per luminaire can save significant amounts of lighting energy in reasonably day lit rooms (up to 80%) but cost benefit calculations need to be done to ensure capital costs can be justified.

11. Manage information and communications technology (ICT) loads

The use of ICT in schools is growing rapidly. ICT equipment not only uses electricity directly, but often places further demands on electricity needed for lighting and cooling.

The electricity used by ICT can be significantly reduced by selecting energy efficient equipment and enabling power management features.

Rooms with interactive white boards should be set up to allow users to quickly and conveniently manage blinds and lighting.

Energy use can be reduced by using free ventilation cooling rather than relying on air conditioning at times of the year when it is cool enough outside. Payback on free cooling can be less than 2 years.

Appliances should be switched off at the wall where possible to conserve energy. Where this is not possible an automated system shut-down could be developed out of school hours to ensure any ICT equipment left on at the end of the day is not wasting energy when out of use.

For further information read the [energy efficiency of ICT equipment](#).

12. Improve insulation

Use draught strips on windows and doors. This is one of the most effective ways to save money and improve comfort. Depending on the time of year, the gap between a door or window and its frame can vary by 3mm. On a standard door this is a hole equivalent to a house brick. Using draught strips can solve this problem. You should consider replacing single glazed windows and doors.

Insulate hot and cold water pipes, keep runs of pipe work short, and lag pipes properly. Lagging pipes saves energy and reduces the risk of pipes freezing in the cold months.

Ventilation ducts should be properly sealed to avoid unnecessary draughts.

It is also possible to obtain more environmentally friendly insulation. Speak to your local authority or purchasing consortia for advice.

13. Consider renewable energy

Small-scale renewable energy systems are can help to reduce carbon emissions. They can also generate interest in energy efficiency amongst pupils and provide a valuable teaching resource.

Renewable energy systems that can be appropriate for schools include:

- solar panels
- heat pumps
- solar thermal collectors
- biomass
- wind turbines

You may need approvals, such as planning, to install equipment on the land and buildings. Different tenures or controlling interests can affect how you can use the land and buildings. You should also consider potential liabilities associated with leasing out part of the premises or structure. Find out more about land and building tenures.