

Guidance

Energy efficiency: guidance for the school and further education college estate

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Applies to England

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This guidance sets out how schools and colleges can reduce their:

- energy demand and consumption
- energy costs
- carbon emissions

It focuses on how to reduce energy use for:

- heating
- hot water

- lighting
- technology
- equipment

It includes a range of advice from everyday behavioural changes to more complex interventions that will need investment and planning.

Each organisation's circumstances will be different. You may have already implemented some of the measures in this guidance and some might not be suitable for your organisation. You should consider which measures might be most effective based on your organisation's individual needs, building condition and available resources.

When carrying out any works, you should comply with the relevant regulations and follow [health and safety guidance](#).

If you carry out condition works, you should also consider sustainable building practices.

The top 3 actions that schools and colleges can take to reduce energy costs are:

- understand energy usage and conduct an energy audit, so you can target where to save energy
- develop a plan using your energy audit to encourage good practices, behaviours and further interventions
- implement and manage the proposed interventions to reduce energy consumption

Good estate management for schools

You should read this guidance alongside 2 parts of good estate management for schools:

- [information about managing energy and water use](#)
- [tips for reducing use](#)

Understanding your energy use

If you know how much energy you use and what influences it, you can plan to target and prioritise the best ways to reduce energy consumption, and evaluate their effectiveness.

You should make sure you have access to data on your energy usage from meter readings and understand how you're being charged.

Factors influencing energy use

Several factors can affect how much energy your building uses, including, but not limited to:

- the condition of the building (this is not always determined by age)
- how well the building and systems have been managed and maintained
- the type of setting – for example, different operational requirements for primary, secondary, further education and special educational needs and disabilities
- user behaviours
- the energy efficiency of ICT and education equipment
- the catering requirements of the building's users and the efficiency of existing equipment
- environmental factors, such as heatwaves or extreme cold weather

Understanding metering

Monitoring your energy use through regular meter readings will:

- help you understand how much you use

- allow you to monitor use over time
- help you evaluate the impacts of any changes you make

Smart meters provide regular, automated information about your gas and electricity usage. You can set them up to provide data at specified time intervals.

Half-hourly readings give the most detailed information. They'll allow you to see patterns and how much energy is being used when your building is unoccupied.

For more information on how to get a smart meter, read [an introductory guide to smart meters for the public sector](#).

If you have sub-meters installed, monitoring them can help you identify where energy is being used and target areas with the highest electrical use. If you have a building management system (BMS), you can use it to monitor your sub-meters.

You might find it useful to compare your energy usage to other schools. You can use [Energy Sparks](#) to analyse your smart meter data to help reduce your electricity and gas usage.

Understanding your energy bills

Energy bills include several costs, which are typically charged through energy unit rates (dependent on the time period) and standing charges. For details of the varying elements that are charged for, read [Ofgem's Your energy bill explained](#).

Understanding your energy consumption and projected usage can help you budget and compare tariffs more accurately. For more information about comparing tariffs and other ways to save money, read [what you can do about rising energy prices](#).

Finding information about your energy usage

You can find out how and where energy is consumed in your building by referring to the utility bills or display energy certificate (DEC).

Most schools and colleges should have one in place. If you need a copy of your DEC, go to [find an energy certificate](#).

Voluntary-aided, voluntary-controlled and foundation schools

If your school is voluntary-aided, voluntary-controlled or foundation, it has charitable status and you should not normally be charged 20% VAT and Climate Change Levy (CCL) on your energy supplies.

If your school is being charged, contact your supplier and notify them of your VAT status, using the supplier's VAT declaration. This will reduce the VAT level to 5% and remove the CCL charge.

For more information, read the [VAT education manual](#).

Energy audit

An energy audit is an assessment of the energy needs and efficiency of your buildings and site.

An energy audit can:

- help you to understand and prioritise energy efficiency works
- highlight areas where you can make improvements

A suitable person should carry out the energy audit. This could be the person who manages your estate, such as the premises manager, or the senior leadership team. If you do not have enough expertise in-house, you might need to ask for professional advice.

The audit should consider what actions, practices and interventions you can take to reduce energy consumption. For advice and examples, see the section on [implementing behavioural change](#).

Your energy audit could include:

- walking around the site with a relevant senior leader
- developing an action plan
- agreeing the next steps

You should also review the current heating system's annual maintenance contract.

You should incorporate energy efficiency plans into your [estate strategy and asset management plan](#). This will help you plan works within your maintenance priorities.

For complex systems or sites, a more detailed energy audit may be suitable. This could include:

- analysing energy data
- predicting energy use
- assessing how different ways to improve your building's energy efficiency affect usage

The premises manager or the senior leadership team should decide if you need external assistance. To find a supplier, use [request help and support for your procurement](#).

If you need support with your energy audit, contact your local authority.

Implementing behavioural change

Behavioural changes within school or colleges can often help you reduce your energy use.

Ways to encourage behavioural change include:

- spot checks by the site premises manager or the senior leadership team, headteacher or eco club to encourage key user actions, such as switching off lights and equipment in empty rooms
- prompts, such as posters, to remind staff and learners to turn off equipment or systems
- discussing energy efficiency in staff meetings, assemblies and lessons

You should include good practice energy efficiency behaviours in your sustainability policy to show that senior leaders are committed – for example, staff needing to switch off devices and equipment such as audiovisual, laptops, computers and peripherals when not in use.

For more information on energy efficiency and practical examples, see the section on [implementing behavioural change](#).

Some of the key members in your community who affect energy usage in the building will be:

- catering staff – kitchens typically have high energy usage
- site staff – they control the heating and hot water settings
- cleaners – they play a key role in turning off items at the end of the day

You can reduce the overall energy demand and use of your buildings in a number of ways.

Heating

Key user actions and behaviours

Adjust temperature settings and consider reducing the temperature in some areas. You should make sure you maintain suitable minimum temperatures, which are:

- 18°C for parts of the building where there is a normal level of activity, such as classrooms and offices
- 21°C for areas where the occupants are inactive or sick
- 15°C for other teaching accommodation, washrooms, sleeping accommodation and circulation areas

A 20°C internal set point for a school is typically the ideal level.

Many heating control systems review the outside temperature and have set points at which the system will automatically switch off when it is warm enough outside. This is often called the 'eco summer hold-off' or similar. If this is available, you should set the outside temperature to between 15°C and 17°C to prevent the heating operating on warmer days and open the windows to cool the building down.

Most systems have frost settings to protect the building and the system itself from damage through freezing. This will turn on parts of the system regardless of the time settings. Check that the set points are appropriate for your building.

Many systems have an 'optimised start' function, which will automatically bring on the heating earlier than the start of the school or college day. Check if your system has this feature and it does not start heating too early.

You can often switch off the heating slightly earlier than the last usage, as there will be latent heat within the building and the system itself. For example, if the school is in use until 6pm, you could turn the heating off at 5pm.

Reducing temperature

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

Provide advice and training for staff on how to adjust and maintain a suitable temperature in their teaching space. Training should consider factors such as when to open and close windows.

Use temperature monitors to inform heating needs (or cooling needs in the server room). Standard issue carbon dioxide (CO₂) monitors can double up as temperature monitors, which you may already have in place.

Good practice

Set heating controls to match the needs of your building, in line with your class timetables. Make sure the controls are working as intended.

Install thermostatic radiator valves (TRVs), which maintain the room at a set temperature and allow local control of heating. TRVs are a simple retrofit solution that you can fix to all existing radiators.

Where safe to do so, insulate pipes (focusing on pipework and fittings in boiler rooms) to reduce heat loss.

Insulating pipes

Insulating bare heating pipes will reduce heat loss by between 50% and 70%.

If your school or college has a swimming pool, use a cover to retain the heat.

Interventions

Install central heating controls to set automated temperatures based on your daily or weekly needs. Remember to take account of holiday periods. Assign a responsible and competent individual to make sure the systems are running optimally. Make sure handover plans are available for any staff changes.

Significant heat can be lost through leaks and unwanted openings. You should fill and seal these internally and externally. Reduce cold air leaks by filling or draught proofing small gaps around pipework, windows and doors.

Over time, systems stop operating as they were originally intended. Appointing a specialist to recommission the heating system can bring the system back to optimum operating conditions.

Domestic hot and cold water

Key user actions and behaviours

Turn off running water when it is not needed.

Good practice

Where safe to do so, insulate pipes to reduce heat loss.

Turn off water heaters at the mains during evenings, weekends and holidays. You do not need to run hot water 24 hours a day, 7 days a week for legionella protection. You can switch off systems overnight and at weekends and should switch them on again in time to heat the water sufficiently before use. For more information on managing legionella risk, read the Health and Safety Executive (HSE) guidance [Legionnaires' disease: hot and cold water systems](#).

The temperature of hot water in hand basins should be 43°C or lower to prevent scalding. If it is too hot, reduce the outlet temperature using a thermostatic mixing valve. The HSE legionella guidance says that large tanks of hot water need to be stored at 60°C and reach 50°C at the outlet (before the thermostatic mixing valve) within one minute.

Check your water meter regularly. If you suspect a leak, take a meter reading last thing in the evening and first thing in the morning. If the reading has changed, indicating consumption, this is likely to be a leak. Ask your water provider about their free leak detection service.

For more advice about legionella, read [good estate management for schools](#).

Interventions

Install point of use water heaters in areas where long pipe runs are needed to connect to the central hot water supply. This can help reduce heat loss through the pipework.

You should run electric point of use water heaters with low storage volumes (15 litres or less) at 50°C, not the 60°C needed for legionella protection in larger storage tanks.

Install timer-controlled electric switches on point of use water heaters to automatically turn them off.

Insulate pipes and calorifiers in the main plant room, distribution routes and where pipework runs close to drinking water taps.

Appointing a specialist to recommission your water system can bring it back to optimum operating conditions.

Install water-saving devices such as cistern dams, urinal controllers, flow restrictors and self-closing taps. These can often reduce water usage while having no effect on function or user experience.

Lighting

Key user actions and behaviours

Assign responsibility to individuals to make sure lights are switched off when rooms are not in use and at the end of the day.

Maximise the use of natural daylight to reduce the need for lighting by:

- drawing blinds up
- removing window obstructions

- regularly cleaning all windows, skylights, transparent doors and lights

Good practice

Set timers, sensors and controls to suit your operational needs, including adjustments required for the varying seasons. This is especially important for security lighting, which can be energy intensive.

Label large banks of light switches so users know what each switch controls.

Interventions

Install time switches centrally to make sure external lights are used only when needed. Time switches also reduce the reliance on user actions, helping to maximise energy savings.

If you already control your lighting through a BMS, check the timings are set appropriately. You should not usually leave external lighting on permanently overnight for security reasons. Instead, install motion sensors on the external lighting to alert others in the area of movement around the school overnight.

Install movement sensors to make sure lights are switched on only when the area is in use. Ensure that the 'lag times' (the time from the last movement being detected to the lights going off) are appropriate for the area. Common lag times are:

- 15 minutes lag for classrooms
- 5 minutes or less for corridors and toilets

Install daylight sensors to maximise the use of natural daylight and reduce unnecessary use of energy intensive artificial lighting. Many motion sensors have daylight sensors as part of the unit. You can set

the light level at which the lights will not come on by adjusting the dials on the sensors.

Install energy efficient light fittings. Replacing fluorescent lamps with LED lighting can enable significant energy savings. Replacements should comply with the building regulations and meet the requirements set out in DfE's output specification.

Replacing lighting

Replacing inefficient lights, such as fluorescent lights, with LED lights, alongside movement and daylight sensors, can reduce your energy consumption from lighting by over 84%.

Technology and equipment

Key user actions and behaviours

Switch off electrical equipment when not in use. This could include computers, ICT devices and kitchen equipment, as long as continuous operation is not essential.

Where possible, set devices to automatically power down when not in use.

Do not enable automatic power-up settings, as this will turn on all computers, regardless of whether they're needed or not. The most efficient ICT power management strategy is to have automatic power-down and manual power-up.

Label kitchen equipment with the warm-up times. Many modern ovens and fryers will warm up in under 10 minutes. You should only turn them on at the start of the day if you're using them in the first 15 minutes.

Set air conditioning (typically used in server rooms, reprographic rooms and ICT classrooms) to be no cooler than necessary for the installed equipment or room temperature. Most server rooms need not run any lower than 21°C.

Minimise the demand on resources – for example, printing only when necessary or making sure kilns are full before using them.

Good practice

When buying or installing equipment, consider using management tools to centrally change settings across all devices to lower energy use.

Develop a sustainable technology strategy and policy for staff and learners.

When buying new equipment, factor in energy efficiency as part of your decisions. Consider whether increased costs upfront will be offset by savings over time with more energy efficient equipment.

Undertake a technical audit of your ICT assets to identify opportunities to transition to more energy efficient cloud-based services. For more information, read [digital and technology standards for schools](#).

Replacing technology

Replacing desktop computers with laptops or tablets that use less energy could typically reduce energy consumption from the equipment by up to 80%.

Interventions

Migrate to cloud-based alternatives to replace energy intensive computing equipment, such as servers – for example, management

information systems (MIS) or file storage. For guidance, read [support schools when choosing a MIS](#).

Replace ICT equipment that is at the end of its life with energy efficient alternatives (new or remanufactured). The types of ICT equipment that typically use the most energy are:

- desktop computers
- audiovisual devices such as projectors, digital screens, large video displays, stage lighting and control systems, and interactive whiteboards
- network equipment, such as wifi and switching

Where appropriate, use cloud-based laptops, tablets or 'mini' desktops with wifi capability, as they typically use less energy than standard desktop computers.

Renewable energy technologies

This guidance provides simple steps and interventions you can use to reduce your energy usage.

If you're interested in generating your own renewable energy on site, you should ask for expert guidance about the following technologies and considerations.

Solar panels

Solar panels, also known as photovoltaic panels (PVs), capture the sun's energy and convert it into electricity. You can then use the electricity in your building, store it or send it to the grid. If you use these, you can make annual savings on your building's electricity bills.

Key considerations

You should appoint a specialist to assess the existing roof space in terms of space available and structural integrity. The existing roof may be unable to accommodate the load.

The electricity produced will be direct current (DC). Your building needs alternating current (AC) electricity, so you'll need an inverter to convert it. You'll need to check if the internal space is big enough for the inverter.

If you want to export electricity to the grid, you'll need to appoint a specialist. Depending on grid stability, your application may not be accepted and you may have to pay additional costs.

Solar thermal panels

Solar thermal panels capture the sun's energy and use it to directly heat water. This water is then stored in a hot water cylinder for use within the building.

Key considerations

You'll need a dedicated solar hot water cylinder. You should appoint a specialist to assess the existing roof space in terms of space available and structural integrity. The existing roof may be unable to accommodate the load.

You'll need to arrange an assessment of the existing heating and hot water system. For example, if you have a combination boiler and no hot water tank, a solar water system may not be compatible.

Wind turbines

Wind turbines use wind to generate electricity. When the wind blows, the blades rotate, which drives a turbine that generates electricity.

Key considerations

You'll need a wind speed of at least 5 meters per second and an outside space free from obstacles such as buildings or trees.

Turbines typically need a maintenance check every 2 years. You should consider if the ongoing maintenance is affordable.

Managing ventilation

Good ventilation is necessary to provide healthy and productive indoor environments throughout the year. This includes lower CO₂ levels, which are linked to cognitive performance, reducing the risk of airborne diseases (such as COVID-19 and influenza) and overheating during the summer season.

During winter, you can use CO₂ monitors to help balance good ventilation while keeping rooms warm.

You do not have to fully open windows or keep ventilation systems on to achieve good ventilation. CO₂ monitors measure and display the CO₂ levels of the space. A higher CO₂ level means you need to increase the ventilation.

If your CO₂ monitor is showing levels under 800ppm (green light), you can consider fully or partially closing the windows. Do so gradually and in stages.

If your CO₂ monitor is showing levels over 800ppm (amber light), consider opening the windows and doors. Open the higher windows first, then the lower windows and doors, if necessary.

If your CO₂ monitor is showing over 1500ppm (red light), your ventilation is poor. Open the windows and doors until the reading lowers.

Continue to monitor the CO₂ level and use the readings to change the ventilation flexibly.

For more guidance, go to [CoSchools](#).

Department for Education frameworks and standards

If you need specialist services to help you buy goods or services, read [find a DfE-approved framework for your school](#).

The frameworks recommended by the DfE will give you:

- value for money
- compliance with the relevant procurement regulations

If you plan to add or replace systems or building elements, read the DfE guidance on [school and further education college design and construction](#).

Buying your energy

There's a lot to consider when procuring your energy. For guidance, read [buying for schools: energy](#).

To find out what to do at the end of your contract, read [buying for schools: energy procurement - minimum standard questions](#).

External guidance

There are many tools and resources available to help you to improve the energy efficiency of your school or college, including:

- [Energy Sparks](#)

- [Less CO₂](#)
- [National Governance Association's Greener Governance campaign](#)
- [Carbon Trust](#)
- [Energy Saving Trust's Energy Saving Schools Challenge](#)
- [Eco-Schools](#)
- [Centre for Sustainable Energy's Energy in Schools](#)
- [National Energy Action's schools and education resources](#)
- [The Trust Network](#)
- [Green Schools Project](#)