



## Energy: a 'how to' guide

A resource for improving energy efficiency in Victorian schools



**ResourceSmart  
Schools**

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## Introduction

Building sustainability into every aspect of school life not only benefits our environment, it also helps schools reduce their costs and communities increase their quality of life.

This 'how-to' guide to energy efficiency in Victorian schools has been developed by Sustainability Victoria and the Department of Education and Training (DET) for schools and organisations that work with schools. The guide outlines key energy saving opportunities that can be adopted by schools and demonstrates how simple actions can result in significant costs savings.

In addition to saving money, there are many social and environmental advantages to reducing energy consumption, such as minimising our impact on the environment. This is increasingly important for the reputation of schools as students, teachers and parents become aware of climate change and other environmental issues facing our communities.

The actions to improve energy efficiency also provide an excellent opportunity for practical, on-the-ground learning for students. This guide highlights activities that can be undertaken by students and offers practical opportunities for bringing sustainability into the classroom.

**References to relevant Department of Education and Training policies have been included throughout this guide for Victorian government schools.**

Valuable assistance in developing this guide has been provided by The Carbon Trust and Planet Savers Australia.



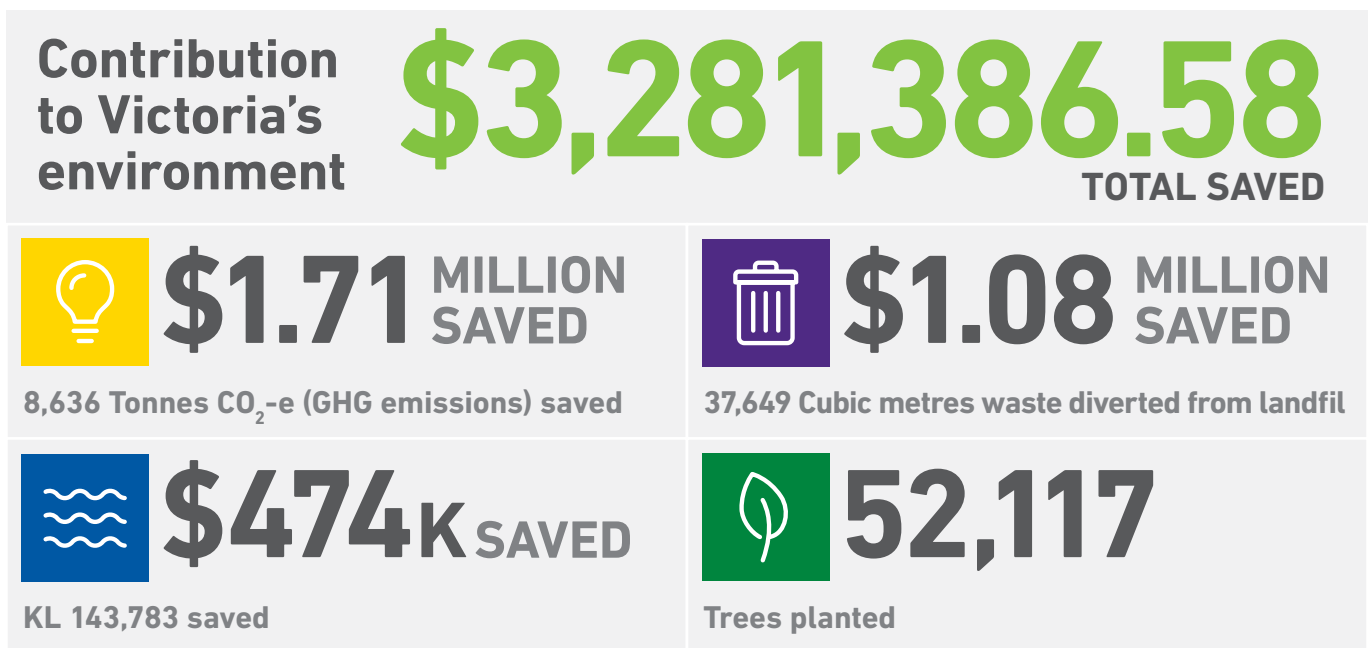
# ResourceSmart Schools – a whole of school approach

A Victorian government program managed by Sustainability Victoria helping schools benefit from embedding sustainability in everything they do.

ResourceSmart Schools provides a framework that helps schools embed sustainability across all learning areas, assisting schools to address the cross-curriculum priority of sustainability outlined in the Australian Curriculum. The initiative also provides practical support to schools through a network of sustainability experts to help schools reduce their use of energy, water and waste and improve biodiversity.

Schools seeking to improve their energy efficiency are encouraged to take a whole of school approach to sustainability. In Victoria, this is available to all schools through ResourceSmart Schools.

ResourceSmart Schools is a Victorian Government initiative that helps schools reduce costs while giving students the opportunity to learn about sustainability in real-world environment.



## Key features

Support	Sustainability experts support the school on their sustainability journey and schools track and measure their progress using the online system.
Recognition	Sustainability Certification and the ResourceSmart Schools Awards recognise and reward school activity.
Savings	Save on energy, water and waste bills – and greenhouse gas emissions.
Adaptable	Schools create a unique environmental management system and can work with any sustainability program or organisation to progress through framework.
Learning	Students learn take-home lessons about sustainable actions as required by the Australian Curriculum.
Sustainable schools	Schools learn to operate more sustainably, reducing costs and minimising their impact on the environment through efficient resource use.
Community	Practical support for schools and communities to live and work more sustainably and to support other schools and environmental partners along the way.

# Energy consumption in schools

Energy consumption is Victorian schools' greatest impact on the environment. Reducing energy consumption is the simplest way to reduce your school's environmental impact.

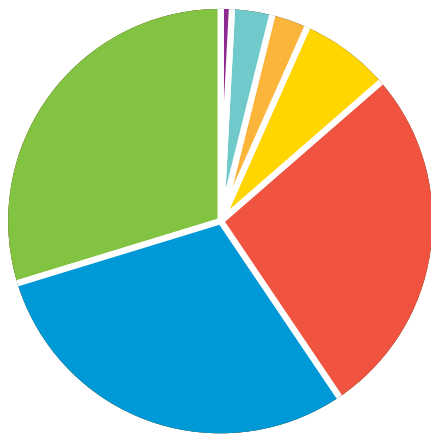
Schools, depending on their size, can be significant users of energy.

Analysis by DET has identified that the main areas of energy consumption in schools are:

- > Lighting
- > Heating and cooling
- > Computers.

## Breakdown of energy costs in a typical school

FIGURE 1 A TYPICAL SCHOOL'S ENERGY CONSUMPTION



- Hot water
- Office equipment
- Fridges & kitchen equipment
- Computers & servers
- Heating & cooling
- Lighting
- School equipment

## Understanding your energy bills

Electricity and gas bills provide a variety of information that can assist schools to understand their energy usage.

Information from energy bills can assist schools to calculate electricity and gas benchmarks and evaluate the effectiveness of their energy efficiency programs.

### TIP

#### Use RSS online to track your sustainability.

The ResourceSmart Schools provides participating schools with access to ResourceSmart Online, an online system that allows schools to manage and analyse their billing data.

Students are encouraged to use ResourceSmart Online to collect and store data and track changes over time. This data can also be used to raise awareness and create change within the school.

## Daily electricity monitoring

Another great way for schools to understand their energy usage is to use an online system or device to monitor daily electricity consumption.

These systems take electricity data at regular intervals from your school's smart meter or switchboard and display the data via an online portal or display device.

Daily monitoring allows schools to immediately measure the results of energy efficiency programs without having to wait for their electricity bill. Daily monitoring also allows schools to identify any unexpected increases in electricity use.

Many electricity retailers now provide an online system for customers to monitor their electricity usage. Schools should contact their retailer to see if they provide this service.

Schools can also access daily electricity data by joining the Schools Water Efficiency Program (SWEP). The SWEP website has been recently expanded to allow participating schools to access daily electricity data alongside their daily water consumption data.

For further information on the Schools Water Efficiency Program, see the section: **Energy efficiency programs.**

### TIP

#### Energy monitoring can save energy

Actions taken as a result of good energy metering and monitoring can save 5-10% of a site's energy use.

## Opportunities for saving energy

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There are many low and no-cost solutions you can use to reduce consumption in your school's main areas of energy use.

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### Where to start?

Each school's energy usage is different so the best place to start is with an energy audit. An energy audit is a process that will identify the most effective activities and strategies for your school to reduce its energy use.

### Energy audits

Energy audits can identify both practice or behaviour improvements and infrastructure and equipment upgrades. They can be conducted by schools themselves or by a professional energy auditor. An audit should identify:

- › where energy is being used
- › wasteful practices
- › opportunities to save money
- › maintenance work that could improve energy efficiency
- › if capital investment would improve energy efficiency.

The resources provided through the ResourceSmart Schools Energy Module assist schools to conduct an energy audit. Schools may also find the resources available from Cool Australia useful. See **Further information** (page 16).

A professional energy audit will assist all schools to save energy but is particularly beneficial for schools seeking technical advice on equipment and infrastructure upgrades.

### Finding an energy auditor

Many Victorian schools have engaged energy auditors to help them save energy. If you decide to use a professional energy auditor, ask schools in your area to recommend a provider. If you are a ResourceSmart School, your ResourceSmart Facilitator can help you find a local provider.

#### TIP

#### **Engage your students in energy audits**

If you choose to engage an energy auditor, involving students in the audit process is a great way of creating whole-school engagement in the project and improve learning outcomes.

## Types of energy audits

There are three levels of energy audits as defined in Australian Standard AS3598:2000. Level 1 and Level 2 audits are relevant to schools. The features of these are outlined below.

## Which audit recommendations should our school adopt?

An energy audit should identify a number of recommendations for saving energy. Depending on the type of audit, it may also recommend equipment and systems for replacement. Which of these options a school adopts will depend on the resources available to the school, however many of the audit recommendations should be no or very low cost.

When an audit recommends equipment or infrastructure upgrades, a calculation of the payback period is a common way of comparing the value of different upgrade options. Payback period is the amount of time (months, years) it takes for the investment in an energy efficiency measure to be offset by the energy cost savings produced.

In some cases, energy efficiency measures may have longer payback periods but have greater impact on energy use. Make sure you consider the amount of energy saved through an energy efficiency measure as well as the payback period.

### TIP

#### Start by doing an energy audit

An energy audit should check that your school is on the correct tariff with your energy supplier. Past audits have identified cases of schools paying too much for energy because they were on the wrong tariff.

### ENERGY AUDIT TYPES

Energy audit type	Features
Level 1	<ul style="list-style-type: none"> <li>High level approach</li> <li>Energy bill analysis</li> <li>Identification of unusual seasonal usage patterns</li> <li>'Walk through' inspection of site</li> </ul>
Level 2	<ul style="list-style-type: none"> <li>Detailed approach</li> <li>Includes Level 1 features</li> <li>Detailed 'walk through' inspection of site</li> <li>Check of appliances for energy efficiency</li> <li>Identifies energy savings solutions with expected savings, costs and payback period</li> </ul>

### TIP

#### Calculate the payback period to understand the cost savings the measure will deliver

Payback period is calculated by dividing the cost of implementing an energy efficiency solution (such as a lighting upgrade) by the annual energy cost saving that measure will deliver.

For example, if a school wishes to calculate the payback period for upgrading to energy efficient lighting, it would need to calculate the annual energy consumption of the existing lighting and subtract the annual energy consumption of the replacement lighting. This will calculate the annual energy saving in kilowatt hours (Kwh) that the upgrade will produce. To calculate the annual energy cost saving, multiply the annual energy saving (Kwh) by the school's electricity tariff (\$/Kwh).

This figure is the annual energy cost saving the school would receive by installing energy efficient lighting. To calculate the payback period, divide the cost of installing the lighting (\$) by the annual energy cost saving (\$). This calculates the payback period (in years) i.e. the amount of time it takes for the investment in an energy efficiency measure to be offset by the energy cost savings it.

A Level 2 energy audit conducted by a professional energy auditor should include the payback period for each recommended saving solution.



## Energy use outside of school hours

Reducing energy waste and usage outside of school hours can be one of the cheapest and most effective energy efficiency strategies your school can adopt.

Analysis by DET has shown that half to two thirds of schools' total energy usage is consumed outside of school hours.

Some of this usage is required for equipment that needs to run 24 hours a day such as computer servers. However it is estimated that up to 40% of all energy going into schools is non-productive and could be saved.

Schools have many opportunities to reduce their after-hours energy usage such as:

- › turning off lights
- › turning off computers, printers, photocopiers and office equipment
- › turning off heating and cooling
- › implementing shut down procedures for weekends and school holiday periods.

The savings from improved shut down and switch-off behaviours can result in financial savings of up to 20% of a school's electricity costs.

An energy audit will identify your school's out-of-hours usage and recommend solutions for saving energy.

### Standby power

Standby power is the power used to keep an electrical device ready even when it is switched off. Where possible appliances should be switched off at the wall or unplugged to eliminate standby power usage.

### Energy awareness campaigns

Everyone in a school can contribute to energy saving, so it is important to raise awareness throughout the whole school and train everyone in what they can do.

Running a campaign for students, teachers, other staff and parents can help by encouraging everyone in the school to play their part. Schools can do this by communicating key messages to the whole school community (e.g. turn the lights off when not in use, along with energy consumption information and comparisons) via posters, newsletters and the school's website. Getting students involved and leading energy awareness campaigns can be a fun way to encourage student engagement in energy efficiency and enrich their studies.

#### TIP

Vending machines are significant users of electricity. Because they often run 24 hours a day, 365 days a year they can be responsible for a significant proportion of a school's out-of-hours energy usage.

If you have a vending machine, work out the running costs for a year and if there is value in having a vending machine on the school premises.

#### POLICY

Some ICT equipment in Victorian government schools must remain turned on at all times. For further information see section: **Computers, ICT and office equipment (page 11)**.

# Lighting

Well-lit spaces are essential for an effective teaching and learning environment. As a result, lighting is one of schools' largest areas of energy use.

## ENERGY MYTH 1

**If you leave the lights on you will use less energy than if you turn them off and then on again.**

### Fact

There may be a small surge of power that occurs if older types of globes are used, however it's a small amount of energy compared to the amount used when lights are switched on. Always turn lights off when not in use.

An analysis by DET has shown that up to one third of schools' total energy usage is attributed to lighting.

Installing energy efficient lighting is a simple way for schools to reduce their energy consumption. A Level 1 energy audit will identify if lighting upgrades are suitable for your school. A Level 2 energy audit can identify if the lighting in areas such as gyms, theatres or outdoors are suitable to replace with LED or energy-efficient fluorescent tube lighting.

ALL electrical work in schools including the installation of light fittings must be performed by a registered electrical contractor. After the works are completed, the electrical contractor must provide a Certificate of Electrical Safety (CES).

For further information visit:  
[www.esv.vic.gov.au/For-Consumers/Choosing-and-using-a-tradesperson](http://www.esv.vic.gov.au/For-Consumers/Choosing-and-using-a-tradesperson)

## Fluorescent tube lighting

Fluorescent tube lighting is commonly found in classrooms, administration areas, corridors and common areas. Replacing outdated T8 and T12 fittings with T5 or LED fittings can reduce energy consumption by 50% or more.

## Gym lighting

Mercury Vapor or Metal Halide (collectively referred to as HID) type lighting is commonly found in school gyms. Replacement with LED or fluorescent tube lighting will typically reduce energy consumption by 50%.

A Level 2 energy audit will identify if the gym lighting in your school is suitable for replacement with LED or fluorescent tube lighting.

## Movement and daylight sensors

By installing movement and daylight sensors you can significantly reduce energy use. Occupancy sensors automatically turn off lights in a space after that space has been unoccupied for a period of time. Daylight sensors dim lights when sufficient daylight is present in the space. A Level 2 energy audit will identify opportunities for lighting sensors in your school.

### TIP

#### Increasing the amount of daylight has benefits

Making good use of daylight in a classroom can reduce lighting costs by 20% and improve student learning outcomes.

## POLICY

Lighting in schools must comply with the illumination and glare index levels described in Australian Standard AS 1680.2.3:2008.

DET prohibits the use of T5 retrofits for existing fluorescent tube lighting in Victorian government schools due to the potential for safety and maintenance issues.

The use of linear LED replacement tubes in existing fluorescent tube fittings is not recommended. It is recommended that existing T8 and T12 fluorescent tube type fittings are replaced with new energy-efficient T5 fluorescent tube or LED fittings when schools undertake energy-efficient lighting upgrades.

# Heating and cooling

Heating and cooling are typically the biggest users of energy in schools.

## ENERGY MYTH 2

### Setting a higher temperature will heat your room faster

#### Fact

Heating and cooling systems work at a fixed rate. Setting higher or lower temperatures than required will not heat or cool your room faster; it will just consume more energy.

Heating and cooling are usually the largest and most expensive energy users in a school. Savings made in heating and cooling can have a positive impact on energy bills with even simple, low-cost measures making a difference.

Only heat or cool rooms you are using. When using heating or cooling, close all windows and doors whenever possible to prevent cool or warm air from escaping. Don't overheat or overcool. In winter, set your school's thermostat to 18°C–20°C and in summer set it to 24°C–27°C.

## Heat only when needed

Temperature needs can vary during the day so check the system operating hours match the times when heating is most needed. Review the setting every month to ensure they are correct.

## Check thermostats regularly

Settings should reflect the activity taking place within the space. Ensure thermostats are not influenced by draughts, sunlight, heaters or ICT equipment.

## Keep systems clear and un-obstructed

Ensure that heaters and vents are not obstructed by any equipment and that filters are kept clean and free of dust. This will mean better circulation of heat in the space and will reduce the energy required to meet the heating demand.

## Upgrade controls

Heating and cooling system control can be an issue with old, inefficient time controls. Upgrades are worthwhile as the payback period can be short which equates to energy and cost savings.

## Ceiling fans

Ceiling fans are a great alternative to air conditioning. They are much cheaper to install, operate and maintain. Reversible ceiling fans can be set to 'winter-mode' allowing warm air that has collected near the ceiling to be pushed back down to ground level, keeping the air temperature in the room more even and requiring less energy to heat the space.

## Timers on air conditioners

Split system air conditioners are often left on outside of school hours and are often set as low as 17°C in summer and as high as 28°C in winter. To prevent over-heating and over-cooling, modern split systems can be re-programmed for temperature limits and to automatically turn off via the remote. This programming is best done by your local electrician or air conditioning mechanic. This action can provide the greatest resource savings and therefore reductions in your energy bill.

## TIP

### Top tips for heating and cooling

1. Schools have reduced their heating and cool costs by implementing "dress for the weather" policies.
2. Set your heater or thermostat to between 18 and 20 degrees, as every degree warmer can increase your running costs by up to 10%.
3. Encourage staff to report areas that are too hot, cold or draughty and investigate them promptly through maintenance measures.
4. Adjust timers so that the building reaches optimum temperature just as people arrive and begins to cool down as people leave. This is best done by gradually altering setting over a number of days and checking the response of the building occupants. If the school is occupied for different periods over the week, install seven-day timers to allow the systems to operate only when the building is occupied.

## Seal doors

Door seals are a cheap and effective way to reduce heating and cooling costs and improve the thermal comfort of classrooms and office areas by reducing drafts. Door seals should be a priority for older buildings that have large gaps under doors.

## Install automatic door closers

Doors that are left open cause a significant loss of heat in winter and cool air in the summer, wasting the energy that was used to heat or cool the air. Automatic door closers are a great way of reducing this loss from classrooms and office areas.

## Improve glazing

Different types of glass and coating will have an impact on the light of the room and its insulation. Opt for double glazing as a minimum requirement for all new windows for comfort and energy saving. This is especially important for north-facing or exposed windows. Window tinting films can provide similar results at a reduced cost.

## Hot water heating

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**Simple solutions can be implemented by schools to save energy heating water.**

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Schools have many opportunities to reduce their energy consumption by targeting water heating as hot water uses a large amount of energy to heat it.

Monitor taps and service any taps that are dripping in your school. Only use dishwashers when they are completely full to save energy and water.

## New hot water systems

If your school uses a significant amount of hot water from an electric hot water unit it may be worthwhile upgrading to a natural gas system or LPG hot water service if you don't have natural gas available.

A Level 2 energy audit will identify if the installation of new hot water systems is an effective energy saving strategy for your school.

In some cases, it may be beneficial to install energy efficient electric instantaneous hot water heaters.

Choose a hot water system that suits your usage. Larger systems will waste money by heating water that isn't required.

### TIP

#### **Power point timers are cheap and effective**

Install a power point timer on your boiling hot water unit to automatically turn the unit off when hot water is not in use this will ensure it's not running 24 hour a day, seven days per week. If you don't have an automatic timer fitted to your hot water unit, turn the system off at the wall during school holidays to prevent it from continuing to use electricity maintaining the water at boiling.

A Level 2 energy audit will recommend the appropriate timers for your hot water system.

### POLICY

DET provides air conditioning to schools identified with the highest needs based on location within the Nationwide House Energy Rating Scheme (NatHERS) climate zones developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

The eligible zones are located predominantly in Northern Victoria. Use of the NatHERS climate zones is considered to be the most fair and equitable method to provide air conditioning to the schools of greatest need.

Schools located outside the entitled zones need to consider additional energy costs before installing split system air conditioning units. The energy costs associated with split system air conditioning units can be substantial. Supplementary funding for non-entitled air conditioning systems is not available through the Student Resource Package Utilities Allocation.

# Computers, ICT and office equipment

Computers, ICT and office equipment can account for a third of a school's total energy consumption.

## ENERGY MYTH 3

**When equipment is on standby, it's off.**

### Fact

Many people assume electrical products are off when they are on standby. Be especially wary of equipment that has a remote control – this is a sign that the equipment is likely to be left on standby while waiting for the 'on' signal from the remote. A red or green LED light is another sign.

The increased use of electrical equipment and information communications technology in schools is having an effect on electricity bills.

ICT and audio-visual equipment are the major energy users however, equipment such as vending machines and water coolers also has an impact. This means there are good opportunities for cutting costs and making energy savings across the board.

ICT equipment is one of the largest single users of electricity in many schools. Here are ways in which you can reduce consumption:

- › shut down computers and switch off monitors when not in use (e.g. at the end of the school day)
- › electronic whiteboards, printers, photocopiers and other stand-by appliances should be turned off at the wall at the end of each day
- › screensavers are energy intensive so set your screen to 'none' or 'blank'
- › recharge tablets and other devices during off-peak times to reduce costs (check your energy bill to find out what times are off-peak for your school)
- › purchase and/or lease energy efficient ICT devices/equipment where possible.

## POLICY

Use the Department's eduSTAR standard operating environment power management settings (on by default) to ensure computers and monitors reduce energy consumption during the day when they are in an idle state.

Core information and communications technology (ICT) equipment must be left powered on at all times of the day and night, including weekends, and school and public holidays. This includes the VicSmart router, the eduSTAR wireless LAN controller and core switch, and the CASES and eduSTAR servers. Timers must not be fitted to core ICT infrastructure.

For further information on the core ICT equipment to be left turned on at all times, see: <http://www.education.vic.gov.au/school/principals/infrastructure/Pages/sustainabilityenergy.aspx>

## In-built power management settings

Schools should utilise the in-built power management capability of IT networks and devices. Speak to your school's IT technician about configuring in-built power management setting to maximise energy efficiency of computers and other ICT equipment. This should be able to automatically turn off network connected equipment such as PCs, printers, electronic whiteboards and fax machines.

## Install timers

These are low cost (you can get them from most DIY stores) and reduce the likelihood of equipment being left on outside of hours. They are best fitted to communal equipment such as photocopiers, printers and vending machines that can be switched off when not in use. Timers MUST NOT be placed on core ICT equipment.

## Match the equipment to the task

Set default printing to double-sided (duplex) where possible and try to print in batches to allow the machines to spend more on standby or off, than in idling mode. Reduce the print size of documents (print A4 books as A5 to reduce the pages by up to 50%).

## Relocate heat-emitting equipment

Place heat-emitting equipment such as printers and photocopiers in a separate, naturally-ventilated area with good airflow. This helps prevent overheating, removes potential emissions from the equipment and reduces the effect of noise.

## Science, technology and craft

Most schools use electrical equipment in science laboratories, arts and crafts studios and for audio-visual and food technologies. The energy used by these small items of apparatus can be significant when added together. Give careful thought to running costs and anticipated use when purchasing new or replacement equipment.

## Audio-visual (AV) and music equipment

Schools use a range of AV equipment to deliver education across most curriculum areas and TV/video sets are responsible for most of the energy consumption. Some equipment, such as musical keyboards, consumes energy when switched on even if not being operated. Separate wall power supply units should be switched off at the mains when the equipment is not in use.

## Vending machines and water coolers

Your schools might also make vending machines and water coolers available to staff and students. These tend to be left on out of school hours and energy can be saved by:

- › speaking to your supplier about turning water coolers and vending machines off at night and weekends. A simple seven-day timer can be fitted to automate switching off. Note: that timers should not be fitted to refrigerated food vending machines
- › remembering that, in some cases the energy used to run these items continuously is more than the revenue the school may be getting from the supplier.

## Renewable energy generation

### Using natural energy to generate renewable electricity.

Renewable energy technologies utilise natural and recurring energy sources to generate power. Installing renewable energy generation is a cost-effective strategy to reduce your school's energy costs. Renewable energy is suitable for most schools including those that are constructing new buildings, those that have completed energy efficiency upgrades and schools in north western Victoria with access to lots of sun!

### Solar Photovoltaic (PV) systems

Photovoltaic (PV) technology uses a semi-conducting material to convert sunlight into electricity. The cost of PV panels has reduced in recent years, making it a viable financial option for schools wanting to reduce their energy costs. Once fitted, they have no moving parts, produce no noise, are nearly invisible from the ground and are pollution free.

### What size system should my school install?

An energy audit will identify if solar is suitable for your school and if so, the optimum sized system to install.

### How much credit will my school receive for excess electricity feed into the grid?

The credit your school will receive for surplus power depends on your energy retailer, your annual electricity consumption, the size of your solar system and the date your solar system was installed.

Further information about Solar Feed-in Credits is available from the DET website:

[www.education.vic.gov.au/Documents/about/programs/infrastructure/solarfeedin.pdf](http://www.education.vic.gov.au/Documents/about/programs/infrastructure/solarfeedin.pdf)

#### TIP

#### Ensure your renewable energy systems are properly installed and connected

Renewable energy systems will save energy while demonstrating your school's commitment to the environment and providing practical teaching opportunities for students.

Before you receive the feed-in tariff from your energy retailer, your meter must be programmed to feed electricity into the grid. Your energy retailer will be able to confirm whether or not it has been programmed for this.

#### POLICY

Photovoltaic (PV) technology must comply with Australian standards and be installed by a Clean Energy Council accredited installer.

When considering installing solar panels, a school must check whether the roof to which the panels will be attached is under warranty. If so, the school must install the solar panels collaboratively with the roof provider, ensuring that the installation does not void the warranty, or alternatively ensure that the panels come with appropriate roof integrity warranties.

## Solar power monitoring

A solar power data monitoring system should be installed along with your PV system which will allow you to monitor your energy production and alert you if any issues arise.

The Schools Water Efficiency Program (SWEP) is being expanded to allow schools with certain types of solar panel systems to monitor and record daily solar power generation, along with water and electricity consumption.

For further information on the Schools Water Efficiency Program, see **Energy efficiency programs** (page 15).

## Wind turbines

Schools can also install wind turbines to generate renewable electricity and reduce their energy costs. Unlike solar panels, not all school sites are suitable for wind turbines. It is essential that a site has sufficiently strong and consistent winds at the turbine location and low turbulence in the wind.

Sites in rural or coastal locations are typically less sheltered and therefore more suited to wind turbines. An annual average wind speed of at least four meters per second is generally considered necessary to make a wind turbine viable.

Schools considering wind turbines should contact their local council to check if a building permit is required, and to ensure that the proposed wind turbine is consistent with the relevant planning scheme requirements.

### TIP

#### **Regular maintenance of solar panels is important**

Regular cleaning of solar panels will maximise their electricity generation. Solar panels should be cleaned by an appropriate contractor every twelve months.

### POLICY

**Schools must comply with DET purchasing policies when purchasing energy efficiency measures including renewable energy systems. For further information see the Finance Manual for Victorian Government Schools and the DET Renewable Energy in Schools Policy on eduGate.**

# Appliances

## Schools can make significant energy savings by choosing energy efficient appliances.

Schools should consider the energy efficiency of appliances when making purchase decisions. Purchasing energy-efficient appliances such as refrigerators, heaters, dishwashers and hot water systems will make a significant difference to your school's power bill. Purchasing the right sized appliance will also help to reduce energy costs.

### Refrigerators

Refrigerators and freezers consume significant amounts of energy as they are on 24 hours a day, seven days a week. Regular maintenance checks are important to monitor consumption. Take the following actions to make sure refrigerators are efficient as possible:

- › position fridges and freezers away from heat sources
- › set the fridge thermostat at the right level for the contents. Freezers operate more efficiently when full. Settings need adjusting when the fridge is empty.
- › check the seals are intact and cold air is not escaping
- › ensure the doors are not be left open or opened unnecessarily
- › defrost regularly
- › turn off fridges during holiday periods and when appropriate. If it is not possible to turn off all fridges, consolidate the contents of fridges so that some can be turned off.

### Catering and food technology equipment

School kitchens and canteens are a major energy consumption area. Saving money in these areas does not have to compromise working conditions or the service offered – it can even improve both.

The following actions can help save energy and money:

- › do not switch on too soon – most modern catering equipment reaches optimum temperature quickly
- › switch off ovens, grills and fryers immediately after use and ensure appliances are not on standby i.e. microwaves, kettles, toasters
- › avoid overfilling saucepans and kettles, use lids where possible; select the right size of saucepan to avoid under-filling
- › keep fridge and freezer doors closed and defrost regularly to save energy and prolong the life of the equipment
- › switch off equipment, lights and extraction fans when not in use
- › reduce drying times on dishwashers and allow residual heat to finish the drying process.

## Understanding energy rating labels



Energy rating labels display a rating from 1 to 6 stars. The more stars, the more energy efficient the appliance will be, and the lower the running costs.

Super-efficient models can receive 7 to 10 stars, with the additional stars displayed as a crown on top of the label.

When purchasing appliances always choose the most energy efficient model within your price range and ensure you speak with the sales assistant as they can often offer you advice and information that is not available at the point of sale.

You can compare the energy efficiency of different models using the star rating system, and use the numbers in the energy consumption box to review the model's annual energy consumption. If you know your electricity tariff, you can then estimate what your annual running costs will be.

You can also visit the Energy Rating website [www.energyrating.gov.au](http://www.energyrating.gov.au) to search for and compare the energy efficiency of different appliances.

#### TIP

### Turn off appliances during school holidays

Encourage teachers, students and canteen staff to turn off appliances at the wall in the canteen, classrooms and staff room when they are not in use. Ensure all appliances are turned off over the school holidays.

As a minimum fridges and freezers should be cleaned out and turned off over the summer school holidays. Replacing faulty refrigerator and freezer door seals will make a significant difference particularly over the summer months. Regular cleaning and maintenance of refrigerators and freezers will reduce running costs.



# Energy efficiency programs

## Where can schools find further assistance?

There are various energy efficiency programs and schemes that can be accessed by schools.



### Schools Water Efficiency Program

The Schools Water Efficiency Program (SWEP) is a Victorian Government initiative that helps schools save water by monitoring usage using water meter data logger technology. The program has now been expanded to include electricity monitoring. Victorian schools can now monitor and record their daily electricity consumption through the SWEP website. In addition, the program is being extended to include certain types of solar panel systems so a limited number of schools will be able to monitor and record daily solar power generation on the SWEP website. Daily monitoring of electricity and solar power will allow schools to:

- › immediately measure the results of energy efficiency programs
- › identify unexpected electricity usage
- › identify electricity usage from the hiring of school facilities
- › record solar power generated
- › identify issues with solar panels i.e. not working or generating to capacity.

The SWEP electricity program will also come with a curriculum resource with modules for use in the classroom focusing on energy. This complements the existing curriculum resource based on school water consumption. For further details, and to see if your school is eligible to access electricity and solar power monitoring visit the SWEP website.

For more information and to register online, visit:  
[www.myswep.com.au](http://www.myswep.com.au)



### Smarter Choice

The Smarter Choice Retail Program assists consumers to make better choices when buying new appliances, hardware and lighting.

The program, managed by Sustainability Victoria has information available in over 400 partnering stores to help you compare the running costs and environmental performance of the products you're looking to buy.

For further information about the Smarter Choice Retail Program visit:  
[www.sustainability.vic.gov.au/smarterchoice](http://www.sustainability.vic.gov.au/smarterchoice)



### Victorian Energy Efficiency Target Scheme

Under the Victorian Energy Efficiency Target (VEET) scheme, accredited businesses can offer discounts and special offers on selected energy saving products and appliances installed at homes, businesses or other non-residential premises. The bigger the greenhouse gas reduction, the bigger the potential saving.

When you are obtaining a quote from your electrician/provider enquire about Victorian Energy Efficiency Certificates and products that are eligible for a discount under the VEET scheme.

For further information about the VEET scheme visit:  
[www.veet.vic.gov.au](http://www.veet.vic.gov.au)

### Energy Rating Calculator

Energy Rating calculator helps you choose products that provide the best value for money. This handy tool can save you hundreds of dollars on your power and water bills, and is an easy way to participate in conserving our natural resources.

For further information about the energy rating calculator visit:  
[www.sustainability.vic.gov.au/services-and-advice/households/energy-efficiency/smarter-choice/energy-rating-calculator](http://www.sustainability.vic.gov.au/services-and-advice/households/energy-efficiency/smarter-choice/energy-rating-calculator)

The true cost of an appliance must include the total running costs over its lifetime, which can often amount to more than the purchase price.

The Energy Rating mobile app is available for free to download via the Apple App Store and Google Play for Android.

# Roles and responsibilities

Actions are divided into 'essential' and 'desirable'. A tick means the person in a particular job function is likely to be well suited to the task. For some tasks a number of different people could be involved

(e.g. energy walk-rounds). Other tasks are of a more specialist nature (e.g. energy purchasing). A tick with a grey background indicates the person who is likely to be the best choice for the task.

## Who can do what?

	Principal	Teacher	Parent	Student	Bursar/ Administrator	Maintenance officer	Energy/ Sustainability Co-ordinator
<b>Actions</b>							
<b>Essential</b>							
Policy and planning	✓	✓	✓		✓		✓
Identify responsibilities/ energy team	✓						
Leading role in Whole School Approach	✓	✓					
Identify curriculum opportunities		✓					✓
Raise awareness of staff and pupils	✓	✓		✓	✓	✓	✓
Active participation in no cost measures		✓		✓	✓	✓	✓
Read meters regularly						✓	✓
Record/ analyse/monitor energy consumption				✓	✓		✓
Identify areas of avoidable waste		✓		✓	✓	✓	✓
Review progress towards targets and benchmarks	✓		✓		✓	✓	✓
<b>Desirable</b>							
Conduct energy walk-rounds	✓	✓		✓	✓	✓	✓
Advise on technical measures						✓	✓
Advise on energy purchasing							
Contribute to curriculum issues	✓	✓		✓			✓
Identify all energy using systems/ equipment				✓		✓	✓
Identify controls, timers, set points						✓	✓
Maintenance of energy using equipment						✓	
Sanction appropriate investment	✓		✓		✓		
Apply for relevant grants	✓				✓		✓
Provide regular progress reports					✓		✓

Best suited for task

✓ Could do the task

## Glossary

### **Gigawatt (GW)**

Gigawatt or a thousand million watts (a watt is a unit that measures the rate of energy conversion).

### **Gigawatt hours (GWh)**

Gigawatt hours: a measure of energy (energy is also measured using joules)

### **Megawatt (MW)**

Megawatt or a million watts (a watt is a unit that measures the rate of energy conversion).

### **Megawatt hours (MWh)**

Megawatt hours: a measure of energy (energy is also measured using joules).

### **Photovoltaic (PV) systems**

An energy technology that uses semiconductors to produce an electric current when exposed to sunlight – often called solar cells or solar panels.

## Further information

ResourceSmart Schools

[www.resourcesmartschools.vic.gov.au](http://www.resourcesmartschools.vic.gov.au)

Sustainability Victoria

[www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au)

Department of Education and Training (DET) Tools and Resources

[www.education.vic.gov.au/school/principals/infrastructure/pages/sustainabilitytools.aspx](http://www.education.vic.gov.au/school/principals/infrastructure/pages/sustainabilitytools.aspx)

Department of Environment, Land, Water & Planning

[www.delwp.vic.gov.au](http://www.delwp.vic.gov.au)

Schools Water Efficiency Program

[www.myswep.com.au](http://www.myswep.com.au)

Cool Australia

[www.coolaustralia.org](http://www.coolaustralia.org)

CERES

[www.ceres.org.au](http://www.ceres.org.au)

DEDJTR Tools and Resources for Principals

[www.energyandresources.vic.gov.au/energy/education-and-training](http://www.energyandresources.vic.gov.au/energy/education-and-training)

Carbon Trust (United Kingdom)

[www.carbontrust.com/resources/guides/sector-based-advice/schools](http://www.carbontrust.com/resources/guides/sector-based-advice/schools)

Energy literacy in schools (USA)

[www.energy.gov/eere/education/energy-literacy-essential-principles-and-fundamental-concepts-energy-education](http://www.energy.gov/eere/education/energy-literacy-essential-principles-and-fundamental-concepts-energy-education)

School of the future (Europe)

[www.school-of-the-future.eu/index.php/database-about-energy-efficiency-and-indoor-environment-quality/publications-about-energy-efficiency-and-indoor-environment](http://www.school-of-the-future.eu/index.php/database-about-energy-efficiency-and-indoor-environment-quality/publications-about-energy-efficiency-and-indoor-environment)

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