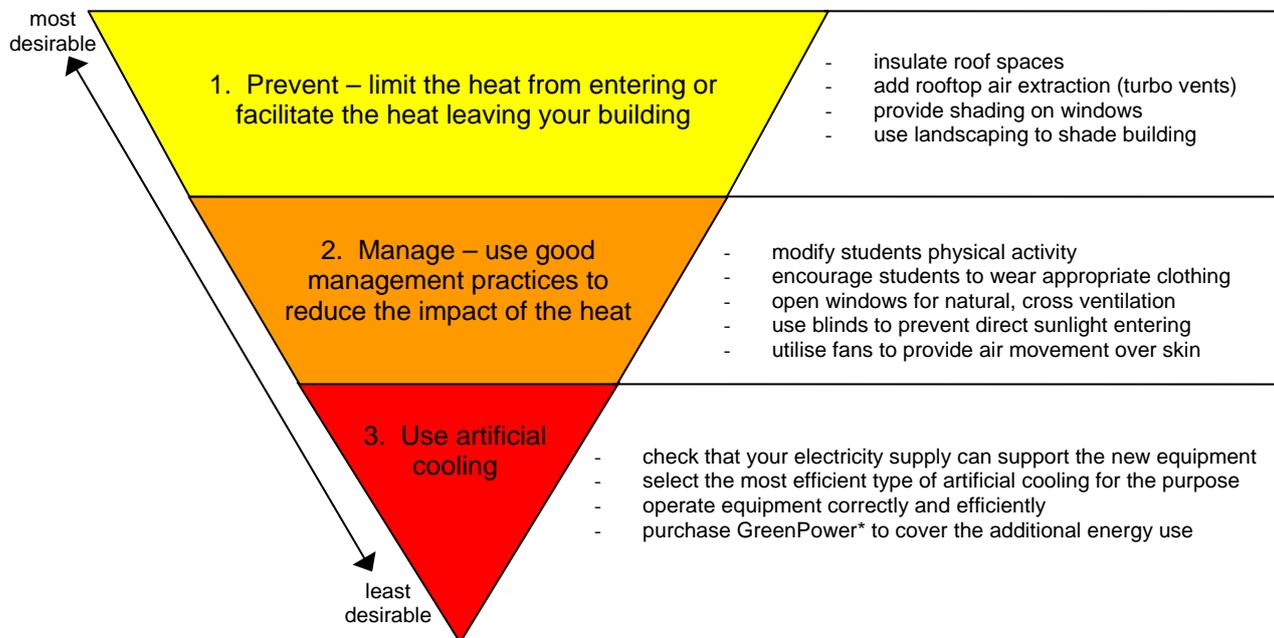


Selecting an Appropriate Air Cooling System for your School

The NSW Government has a commitment to reduce greenhouse gas emissions. What can your school do to assist in reducing greenhouse gas emissions?



Green Power - All air cooling systems can use Green Power – electricity generated from clean, renewable energy sources. Has your school considered increasing the supply of GreenPower to cover the energy used by this new equipment?

➤ Evaporative Cooling

If passive measures can't achieve the desired thermal comfort, evaporative cooling can work well in locations where humidity is low when temperatures are high.

- This generally means areas away from the coast, but suitable conditions can be met even in Sydney's western suburbs in February.
- Evaporative coolers are more energy efficient than refrigerated air conditioners and with lower running cost.
- They can however use 25 litres of water per hour and raise humidity levels but this impact can be minimised through the installation of rainwater tanks for the water supply.

➤ Air-Conditioners

The term 'Air-conditioner' generally refers to a system that uses an air-to-air heat exchanger and compressor in a similar way to a refrigerator, to provide cooling. The same unit can also be designed to provide a heating system. These heating and cooling units are called 'reverse cycle' and are the most commonly used system.

NOTE: Air-conditioners consume more energy and create more greenhouse gas emissions than fans and evaporative coolers.

- Correct sizing of the unit is essential to ensure the unit meets the required cooling and heating load. See www.choice.com.au/calculators/quizcoolingcalc.asp
- The system must accommodate the appropriate ratio of air change (fresh air drawn in) required for the facility. This is determined by the Australian Standards.
- Power loads need to be assessed - the school mains power supply may have to be increased. Alternatively, green power eg solar panels, can be used to supplement the existing power supply.

NOTE: Only systems with a high-energy efficiency rating should be used. Preference should be given to systems with a 5 or 6 Star Energy Rating. Go to – www.commerce.nsw.gov.au – then follow the links to procurement / Goods & Services Contracts / Contract information and user guides / hardware & electrical products / Air Conditioning units.

➤ **Types of Air-conditioners** are available as portable, wall, window, split and ducted systems.

- **Through wall/window units** placed in an existing window or external wall are generally less efficient than fixed split systems and suitable for single rooms up to about 50m². Smaller units can use standard power outlets, but larger ones need three-phase power.
- **Fixed split systems** allow the indoor wall, ceiling or floor-mounted unit to be up to 15 metres from the outdoor compressor. The outdoor compressor should be shaded.
- **Multi-split systems** allow more than one indoor unit to run off the outdoor compressor.
- **Ducted units** for larger areas are often less efficient than split systems due to losses in the ducts. The ducts need insulation and sealing to prevent condensation and leakage.

➤ **New Technologies**

- **Inverter technology:** With conventional air-conditioners, the compressor is either on at 100% capacity or off. Invertors can vary the compressor speed and more efficiently maintain the set temperature within a narrow range.
- **Thermal Energy Storage Technology** can shift up to 69% of power consumption for air-cooling to off peak periods. Either coolant filled balls or water are frozen and stored at night to supplement the air-conditioning system during the day.

NOTE: Systems that utilise Inverter and Thermal Energy Storage technology are currently preferred as they reduce energy consumption (greenhouse gas emissions) and running cost.

➤ **Operating tips to improve efficiency**

- Incorporate passive measures such as insulation and shading where possible.
- Close windows and doors when system is operating.
- Adjust thermostats according to the outside temperature. Set thermostats at 26 to 28°C on 35°C + days and progressively lower on cooler days.
- Do not set thermostats to below 22°C as each degree the thermostat is lowered can increase running costs by up to 15%.
- Use programmable timers with manual override to ensure systems turn off outside of regular operating hours.
- Adjustable and rotating louvres help direct air movement more evenly around the room.
- Service all coolers and heaters according to manufacturer's instructions. As a minimum, clean air filters and drains at the end of each school term.

➤ **Asset Management Directorate assistance**

- For further advice on passive ventilation and air cooling system installation procedures, contact your local Asset Management Unit by phone on 132 779.

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