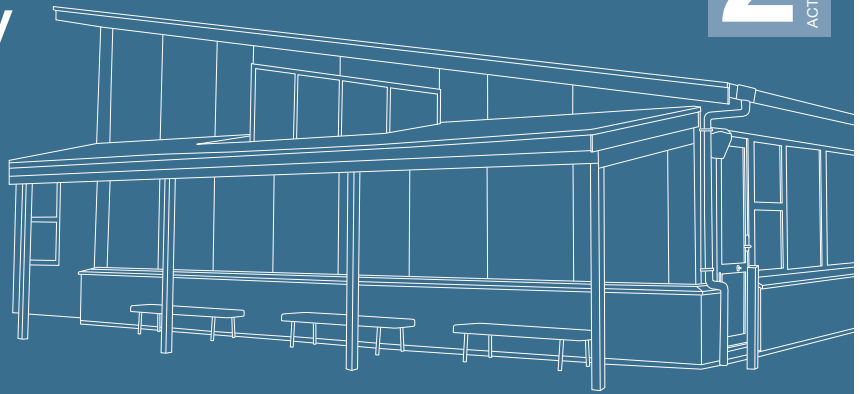


# Saving energy in schools: heating and cooling



For students to be at their best, it's important that learning environments are a comfortable temperature with adequate ventilation. Ministry of Education guidelines suggest 18 - 20 °C is the optimum range for student comfort (depending on activity levels).

## Insulate first

In existing buildings, adequate insulation is one of the best ways to help to maintain a comfortable and healthy temperature year round - reducing heat losses in winter and heat gains in summer.

## Choosing a heating and cooling system

Heating typically accounts for around half a school's energy use<sup>1</sup>. Because classroom temperatures can vary considerably, it's important that heating systems are flexible enough to give teachers control over individual room temperatures. By choosing efficient flexible heating and cooling systems and using renewable energy where possible, you can significantly reduce your school's energy costs and environmental impact.

## Central heating options

In general, central heating is more economical than local heating. However, it's important that central systems are zoned correctly to allow heat to be turned off in spaces that don't need it.

### Wood energy

Modern wood fired boilers can provide heat at a fraction of the price of other clean heat options such as gas boilers (though the initial outlay is more than for a gas or oil-fired boiler). It is also an environmentally-friendly choice as wood is renewable energy, virtually carbon neutral, and has low particulate emissions.

Your existing oil or coal-fired boiler may be able to be converted to run on wood chips or pellets. For further information see [www.bkc.co.nz](http://www.bkc.co.nz)

### Gas boilers

Modern condensing LPG and natural gas boilers are efficient, user-friendly and clean burning. They offer relatively low up-front capital costs although ongoing energy costs are usually higher than those for wood-fired boilers.

Installing a single wall-hung condensing boiler in each block (rather than a central gas boiler) can help save energy by preventing heat loss through long pipe runs. This also means that when only one block is required for after hours use, it can be heated individually.

## Local heating options

### Electric heating

Electric bar and fan heaters are cheap to buy but relatively inefficient so will cost more to run. Radiant electric heaters are more efficient and particularly suitable for halls, gymnasiums and larger spaces where they can provide an immediately available source of heat. Radiant heaters are not suitable for pre-heating an area as they heat the occupants rather than the space.

### Heat pumps

Because heat pumps extract 'free' heat from the outside air, they are very energy efficient and produce 200-400%

<sup>1</sup> Based on analysis of energy audits at 20 secondary schools throughout New Zealand.

as much heat as the energy they use. It is important to select a heat pump that is properly sized for the area it is to heat, so look for an accredited installer who can give good advice. Water source or ground source heat pumps are even more efficient but have a higher installation cost, which is often unable to be justified economically.

Avoid using the heat pump cooling function, as your summer electricity bill can rise substantially.

Ceiling sweep fans can be used year round to reduce energy use. In winter, when ceiling temperatures can be 3-5° C warmer than at floor level, fans can help heat to circulate around a room. In summer, ceiling fans help occupants to feel cool by moving the air around.



### Action checklist

	Keep your heating system simple and make sure staff know how to use it.
	For heating systems that are manually controlled, agree with staff on a process and responsibilities for turning off heating in unoccupied spaces, after hours and over holidays.
	Limit the amount of electrical equipment in each classroom to prevent overheating. For example, supply computer monitors to each classroom but store all the CPU functions in one central location where the heat load can be managed.
	Consider installing controls that automatically shut down heating after hours and between classes, but let teachers manually turn on heating when needed.
	Consider a centralised control system which can control lighting, heating and hot water from a central PC. Remote access is also possible.
	Consider upgrading to a zoned heating system which allows you to selectively heat only the parts of the building complex that need it (e.g. west-facing rooms in the morning).
	Schedule regular maintenance, filter changes and cleaning for boilers and other heating systems – at least once a year to ensure best performance.
	Check insulation regularly as it can deteriorate over time. Pay particular attention to ceiling cavities.
	Install automatic door closers to prevent heat loss, particularly on exterior doors.
	Where sun through a window is regularly causing overheating in a classroom, consider retrofitting solar glass, sunshades or adjustable blinds.

#### For more information:

Check out the Ministry of Education’s property management guidelines on heating and insulation and the BRANZ / Ministry of Education’s Designing Quality Learning Spaces series at [www.minedu.govt.nz](http://www.minedu.govt.nz)

To find out more about saving energy at school, check out the other action sheets in this series or visit [www.eecabusiness.govt.nz/how-to-be-energy-efficient/schools](http://www.eecabusiness.govt.nz/how-to-be-energy-efficient/schools)