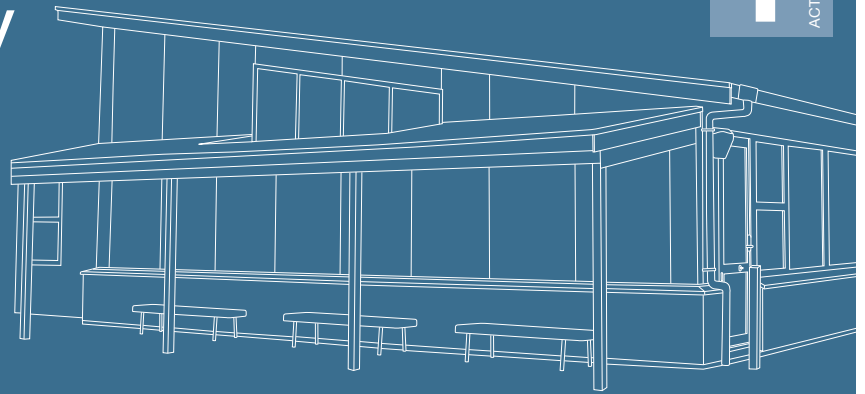


Saving energy in schools: new building projects



The best time to consider energy use is before you start building – as this is when you can achieve an energy efficient building at least cost and disruption. With the right planning and design, good energy performance can be achieved at little extra cost, and will provide significant savings over the long term.

General principles of energy efficient design

1. Reduce your energy needs (e.g. insulate, use daylight, good orientation and opening windows); then
2. Meet your needs with renewable energy wherever possible (such as wood-fired boilers or solar water heating); and
3. Use the most efficient systems available that suit your needs (e.g. T5 fluorescent lighting).

Before you start

It's important to choose architects, consultants and other suppliers who are experienced in creating energy efficient buildings and appreciate the unique needs of your school.

Once you've selected your design team, a good approach is to discuss and agree on a measurable energy density target. Ask your consultants for help to reach a figure that is realistic and achievable.

While you're still in the planning stages, it's worth finding out whether your school is eligible for any grants to help fund energy saving features. A good place to start is www.eecabusiness.govt.nz/services-and-funding



Tips for building an energy efficient school

- Orient buildings to face north where possible, with most windows facing north. However, use eaves or sun shades to prevent overheating from the midday sun (avoid direct sun light from the north in classrooms, however, as occupants will generally try to manage resulting glare with blinds, defeating the purpose of having windows).
- Consider planting deciduous trees which will provide shade over buildings in summer but allow sun through in the winter.

- Consider incorporating thermal mass such as concrete floors to store heat from the sun and release it when the temperature cools. This will help keep temperatures more even.
- Limit windows to around 30% of the total wall area to retain heat, with most of this concentrated on the north, or south side of each room to maximise daylight.
- Ensure windows (particularly those facing north) feature eaves or sunshades to reduce solar gains when the sun is at its most intense. Bounce, filter or redirect direct light from the north, using light shelves or roof monitors.
- Include opening windows to ensure adequate ventilation. If a building is designed to manage solar gains, occupants should be able to cool classrooms sufficiently by opening windows.
- Position windows high in the wall to allow the daylight to get to the deepest part of the room (ie above door height). Windows designed to optimise views may not provide a lot of the daylight needed.
- Insulate the roof and paint it a reflective colour to reduce overheating.
- Specify as much insulation as your budget will allow, especially if your school is in a cold area. This is particularly important for portable classrooms.
- Make sure interior finishes are highly reflective, eg paint walls and ceilings white.
- Design switching so that it's possible to turn off banks of lights (e.g. near windows) when they are not required.
- Install occupancy sensors to ensure that unused spaces are not being lit. Consider daylight sensors to reduce artificial lighting levels when there is sufficient daylight.
- Use a single photo sensor to control all your outdoor lights – this will be easier to keep clean, which is important to ensure it works effectively.
- Choose a renewable or efficient heating system – for example wood-fired boilers or heat pumps. For more information see the action sheet *Saving energy in schools – heating and cooling*.
- If you are planning to heat your school with hot water circulated from a centralised boiler, make sure that the radiators are fitted with thermostatic valves. This will ensure that the hot water supply is switched off when a room reaches the desired temperature.
- Make sure any thermostats controlling heating are not placed near a draft, or in a very sunny spot.
- Think about noise levels generated by your heating system early in the design process. Plant should be as far from classrooms as possible.
- When new boiler systems are installed, make sure that they are correctly tuned by a combustion specialist.
- Gas is considerably cheaper than electricity for heating. Small wall-hung condensing boilers are very efficient and can be used to heat a single block which means you don't have to heat up large boilers and a whole school network just for one or two classes used after hours.
- Ask the supplier to show key staff how to use system controls correctly. Make sure they also supply written instructions that can be used to train new staff.
- Hire an independent building services professional with experience in schools to check that the building is performing as it was designed. A fresh pair of eyes can pick up errors like heating controls set to turn on in the holidays, for example.

For more information:

Check out the BRANZ / Ministry of Education's Designing Quality Learning Spaces series at 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