

New Zealand schools – warm to pool solar heating

Brrr! Many of us have unpleasant memories of shivering our way through swimming lessons held in chilly school pools. But for a new generation of fortunate schoolchildren, their swim class recollections will be of pleasantly warm pool water and a long swimming season, thanks to the solar heating systems installed by their schools.

This case study looks at the experience of five New Zealand schools which recently made the move to heat their pools using solar energy: Coroglen School (Thames-Coromandel); Glamorgan School (Auckland); Matawai School (East Cape); Sefton School (Canterbury); and Whau Valley School (Northland).

Coming in out of the cold

Many schools wish to make the most of their pool – but all too often it is unused for most of the year, the water being too cold for swimming except in summer which is mostly during the school holidays. Yet with water safety so critical, schools are keen to ensure their pupils can survive, and thrive, in the water. Their approach? To make the pool warm enough to extend the school's swimming season for as long as possible, as inexpensively as possible – by harnessing the power of the sun.

Pool solar heating: an overview

Although swimming pools vary widely, they work on the same basic principle: pool water is circulated through a filtration unit to remove dirt and particles. Solar heating simply adds a step to this continuous cycle by diverting the filtered water to flow through 'solar collectors' – a system of special panels or tubes positioned in full view of the sun on a nearby north-facing roof or on a tilted frame. The water heats up during its journey through the solar collectors, and warmed water flows back into the pool.

The size of the solar collector area needs to be at least 50% of the size of the pool area. General information on solar water collectors for heating swimming pools in New Zealand can be found in 'Guidelines on the Performance of Solar Water Heating Collectors to heat swimming pools' available on www.eeca.govt.nz/swimming-pools

A temperature sensor monitors whether the water needs additional heat. On sunny days when the pool water reaches a set temperature, a valve automatically shuts off the water from passing through the solar collector until the water temperature drops again.

To make the most of the sun-warmed water, it is important to use an insulated pool cover when the pool is not in use – this helps retain the heat. A cover also helps to keep debris out of the pool, reducing the strain on the pool's filtration system.

Implementation

Installing a solar heating system for the swimming pool is a major project, which must be budgeted and planned for. The schools we reviewed tended to combine it with other upgrades to pool infrastructure, such as the filtration system or changing sheds.

The schools' solar heating systems were installed between 2009 and 2010. The systems ranged in size from 36 square metres to 148 square metres, and ranged in price from around \$10,000 to \$27,000. In the case of these schools, grants available from EECA at the time helped offset some of the cost of the outlay.

In addition to engaging a firm with experience in supplying and installing pool solar heating systems, check with your local council before the work is started, as council consent and sign-off may be required.



Sefton school's pool in Canterbury, alongside the solar heating system sits above the changing sheds.



Pupils enjoy a warmer swim at Coroglen's school pool thanks to their solar heating system. Photo courtesy of Peninsula Post.

✓ Key features

- Using solar energy to heat school pools
- Unglazed collectors are a cheaper option suitable for most locations

✓ Key benefits

- An extended swimming season
- Swimming lessons become more enjoyable
- Children make faster progress learning to swim

✓ Sector relevance

- Schools
- Community groups

Benefits

The schools reported the following benefits:

- The pool water is now much warmer, and therefore more comfortable for the children to swim in. Swimming has consequently become a much more popular activity, with more children taking part in swim classes, and classes being able to go for a longer duration.
- The schools' swimming season now tends to be several months longer, as the pool stays warm beyond the mid-summer months.
- The combined effect of the above is to make students much more likely to be able to swim competently, because they have far more opportunity (and willingness) to practise.
- One spin-off observed is that the pool starts to be used by the wider community outside of school hours, e.g. by local swim clubs as a venue for swimming lessons.
- Demonstrates that the school is serious about water safety, healthy lifestyles, energy efficiency and the environment, and upgrading their facilities.

Issues encountered

The five schools had few or no problems installing their new solar heating systems. Sefton School (Canterbury) noted its problem was connecting the new solar heating system into an old pool structure: "Finding leaks was quite an issue and discovering underground pipes that had been cut while the new changing sheds were being built added to delays in getting the system up and running. Our installer was brilliant at resolving the issues."

And Glamorgan School wisely noted that: "The only issue is that solar heating requires sunshine and this cannot be controlled!"

Lessons learned

The schools had the following advice for other schools thinking of installing solar pool heating:

- Bear in mind the effect of new structures that could block sunlight from falling on the pool's solar heating tubing. After installing their solar heating system, one school later built a pool canopy nearby – then found it shaded the solar collector for around two hours each morning.
- If the solar collector is on a fairly accessible rooftop, consider installing fencing around it to minimise the risk of students treading on the tubing/panels, e.g. while retrieving lost balls. This will also help keep out vandals. Remember, though, to allow access for maintenance or repairs.
- Remember that warm pool water needs more frequent water-quality monitoring, and more chlorine, than cold water does.
- The most common form of solar collector used for pool heating is the unglazed collector, which typically consists of either a rubberised or plastic mat of thin tubes, through which the water flows. These are the cheapest form of solar collector per square metre, though greater surface area is generally required to reach the same efficiency as a glazed solar collector. In windy locations, or towards the lower South Island, schools may find that glazed collectors are a more suitable option.

The schools' perspectives

Robyn van der Sande, Chairperson – Board of Trustees of Glamorgan School (Auckland):
 "In previous years, our children have not lasted long before having to terminate their lesson because of the cold – when they started to turn purple, was a good indication! To be able to use the pool effectively for the entire day has been a real bonus. The benefit to the children's progress in their swimming abilities has definitely been noticed."

Nik House, Principal of Matawai School (East Cape):
 "The obvious benefits are a much-extended swimming season for our students, a more efficient heating system that can be heated quickly after refilling the pool, and that our pool has received a much needed upgrade. Also, due to increased swimming time, our students' overall swimming ability has greatly increased. We now have a facility that is modernised, tidy, safe, and will provide students with the opportunity to learn to swim for many years to come."

Robert Clarke, principal of Whau Valley School (Northland):
 "We can only rave about our system. We view the initial cost of the system as short-term pain for very long gain. Too many people are entering the water ill-prepared to swim as compared to previous generations. In addition we see the free energy available from the sun as good for the environment and a seed planted in the minds of the next generation."

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