

Cool paint job could blow away air con costs

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QUT's Professor John Bell and Dr Wendy Miller found "significant savings" in energy usage and electricity costs were possible with a special roof coating.

A cool discovery from QUT researchers has found that a special roof coating could bring Queenslanders relief from sweltering summers as well as lower electricity bills.

A two-year study focusing on a sample of houses, schools, offices and retail spaces in Brisbane and Townsville revealed roofs painted in a special reflective paint resulted in a 2 degrees Celsius reduction in inside temperature, in non-air conditioned internal spaces such as classrooms.

The discovery is good news for school pupils and homeowners looking

for respite from the Sunshine State's hottest months and could save businesses significant dollars in energy costs.

The specific white paint used in this research works by reflecting 88 per cent of the sun's energy, resulting in a cooler [roof](#) and hence cooler inside temperatures. This is compared with a standard light coloured roof that reflects less than 65 per cent of the sun's energy, or a dark coloured roof that reflects less than 25 per cent of the sun's energy.

Professor John Bell, head of QUT's School of Chemistry, Physics and Mechanical Engineering, who ran the project with QUT Senior Research Fellow Dr Wendy Miller, said the study had shown "significant savings" in energy usage and electricity costs were possible.

"We saw average energy savings of between 5 and 30 per cent across the range of buildings, with most buildings showing savings above 15 per cent," Professor Bell said.

"For an airconditioned block of two classrooms in Springfield to the west of Brisbane, for example, we reduced electricity use by 1,144 kilowatt hours per year, which is roughly 1 tonne of CO₂ per annum reduction for these two classrooms alone. Both electricity consumption and peak demand were significantly reduced, resulting in lower [electricity bills](#) for the school."

Professor Bell said the results indicated a cool roof could be a viable and far cheaper alternative to air conditioning classrooms.

"At Nundah we had a reduction of roof temperature of around 15 degrees during the hottest part of the day," he said.

"This resulted in a reduction of between one and three degrees in the internal temperature. That meant it rarely got above 27 degrees which is

arguably cool enough to eliminate the need for air conditioning, especially if ceiling fans are used.

"It really is an extraordinarily simple solution. Twenty years ago it was cheaper and easier to put in an air conditioner than to paint your roof, but not anymore.

"Unlike air conditioners this is a passive cooling solution that does not require ongoing investment in the electricity network or in housing. Because of this, it would be a worthy candidate for inclusion in the building regulations much as they have done in the California energy code since 2005."

The field test involved onsite measurements of temperature and electricity of 16 buildings across 10 sites in Brisbane and Townsville.

Measurements were taken before and after the application of a cool roof coating, with the research finding the coating resulted in temperature reductions on the roof surface, roof cavity and non-air-conditioned internal spaces.

Dr Miller said a combination of colour and chemistry made the roof coating effective. She said the trials showed the cool roof coatings reduced heat entering the building through the roof, leading to up to a 30 per cent reduction in air conditioning load.

"The trials indicate the economic benefits of cool roof coatings would be greatest for single storey buildings, buildings with aged, dark or medium coloured roofs, buildings with no or low levels of roof insulation, and buildings with high [air conditioning](#) use," she said.

"People are very interested in how to reduce their energy use and costs and the implications of this research are that there are simple ways of

reducing the costs of operating a business, or running a house or a school, because you are using less energy to maintain comfort for building occupants."

The project was run under the Guided Innovation Alliance, a collaboration between QUT, electricity distributor Ergon Energy and SmartGrid Partners. This alliance sees some of the world's latest innovations in [energy](#) saving technology tested at QUT and throughout Queensland.

Ergon Energy Manager Emerging Markets Glenn Walden said the research findings could benefit both the business and residential consumers.

"Ergon is committed to assisting customers with reducing their power bills," he said.

"Ergon could use these results on constrained parts of the network where businesses and residents paint their roofs with this reflective white paint and reduce peak demand.

"Coupled with other strategies, this can defer the need for expensive network augmentation that ultimately would be paid for by all customers."

Provided by Queensland University of Technology

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