Bright white rooms key to energy savings

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Rooms with high light reflectivity are thought to need less wattage to light and less artificial lighting time overall. Credit: Jack Amick

Trials testing the effect of interior paints containing titanium dioxide on the energy required to light a room have reconfirmed the naturally occurring oxide's ability to reduce energy consumption and counteract global warming.

The technical paper was published by Cristal Global—a South West company producing titanium dioxide pigment for use in paints and other products.

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The ability for TiO_2 to off-set its carbon charge when used in interior

decorative paints was tested in two exercises.

In a theoretical test, the energy consumption required to light a 4x5x3m office to a standard luminescence when using paint containing 3kgs of titanium oxide, providing 80 per cent reflectivity, was found to be half of the energy required to light the same room when the paint contained 1kg of titanium oxide and provided 40 per cent reflectivity.

The energy saved by the 2kg difference would off-set the energy used to develop the TiO_2 within a month and provide energy savings for more than a decade.

The second test, a practical exercise, involved a 1msq box with inter-changeable walls of various shades, containing different concentrations of TiO_2, to test reflectivity.

Only 40 extra grams of TiO_2 in the wall paint was required to increase the reflectivity of the walls from 40 to 80 per cent.

They found carbon dioxide emission from producing the TiO_2 was off-set in energy savings as a result of reflectivity in three days.

Study author and Cristal Global Asia Pacific technical service manager Billy Golder says TiO_2 is the only commercially significant white pigment on the market.

"[It] is used extensively by all paint manufacturers in Australia. A typical four litre can of decorative white paint would use about 1–1.5kg of titanium dioxide," Mr Golder says.

The study also expanded on other uses of TiO_2 – including as an infra-red reflector through painting roofs white – which can result in the reduction of energy consumption to cool buildings and counter the

Urban Heat Island Effect (UHI) in Australian cities.

Mr Golder says UHI is quantified by the temperature differences between a city and the surrounding country areas in a 24-hour period.

"Many cities have an inability to cool sufficiently through the night due to the heat mass stores," he says.

"The adverse effects are on the health of the inhabitants from heat stress and elevated photochemical smog and all the associated cost to health services—mitigating the UHI is crucial to health and environment."

The study was completed to argue the importance of titanium dioxide in sustainable living as the industry faced burdens resulting from Clean Energy legislation introduced in 2012.

More information: www.bemax.com.au/EnviroImpact.asp

Provided by Science Network WA

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