

Roof tiles go solar

A short-listed entry in this year's *Australian Design Award*[®]-*Dyson Student Award* has the potential to revolutionise adoption of solar power in Australian suburbs, transforming the humble concrete roof tile into a technical package delivering both solar power and solar hot water to grid-connected homes.



Sebastian Braat's 'keep it simple' approach to urban roofing shows that energy solutions that make economic sense are often already before our eyes. Jacqui Knox, Blue Mountains Gazette

Sebastian Braat, a design student at the University of Western Sydney, calls his invention the KISSTile (Keep It Simple Solar Tile) and was inspired to develop it by the many hectares of tiled roofs in our towns and cities.

'In housing estates, the "McMansion syndrome" is alive and well with poor thermal design often leading to a big power drain on the electricity grid,' Braat said. 'Looking to reduce power usage, it seemed to me that solar power was the obvious way to go, but conventional solar panels tend to look less than aesthetically pleasing and are quite complicated to fit, whereas if the roof tiles themselves could act as solar collectors, this would be an elegant solution.'

The upshot is the KISSTile, which Braat describes as a 'roof-integrated modular solar tile' designed specifically for Australian concrete tile roofs. The tile is essentially a mini photovoltaic panel and



KISSTiles in place on the northern roof of a suburban home. Courtesy of Australian Design Awards

solar heat exchanger in one, and most homes have room for an array of 200–500 of these on the north-facing aspect of the roof. Each tile produces 4 watts of power, so 250 tiles provide a kilowatt – enough to reduce the power demand of the average home by 50 per cent. More energy efficient homes could actually produce a power surplus by the end of the year.

Braat developed a clear polycarbonate chassis into which he fitted a technical package that consists of solar cells, a heat exchanger and associated electrical and water connectors. The chassis can be injection moulded to match the profile of each of the common roof tiles in use in Australia and homeowners could fit the KISSTiles and make the tile-to-tile connections themselves, with a tradesman required only for the service connections.

'My research indicated that a roof-integrated solution, with the tile serving as

roof cladding on a conventional roof structure, is the most appropriate in terms of aesthetics, professionalism and adding value to the house for the owner,' he says. 'People want their houses to look good and to me, conventional solar panels look like awkward add-ons.'

Cost-wise, the solar tile design should have an edge if a commercial partner can be found to manufacture and market the product. Sebastian's research showed that a major barrier to widespread adoption of solar power in urban Australia is the initial set-up cost.

By using amorphous photovoltaic film rather than more costly alternatives, recycled polyethylene for the backing plate and the heat exchanger vessel and by avoiding the use of glass and aluminium components, together with reduced labour during installation, he has achieved cost savings of 30 per cent on conventional solar systems.

'This provides incentive to adoption and, furthermore, the KISSTile design is the only product offering both solar power and hot water in the one unit,' Braat says. He told *Ecos* that he has approached a major petroleum company with a view to commercialisation, but has not come to any agreement.

He points to steady growth in the grid-connected photovoltaics (solar cells) market and new sustainability requirements in the housing industry and hopes that the publicity generated by reaching the finals of the *Australian Design Award*[®]-*Dyson Student Award* might generate more industry interest in the product.

As Stephanie Watson, Standards Australia Manager of the Australian Design Awards, says, 'The *Dyson Student Award* puts student talent in the spotlight and provides a bridge from academia to industry.'

The *Australian Design Award*[®]-*Dyson Student Award* consists of Gold, Silver and Bronze winners sharing prize money of \$10 000, with the Gold winner being automatically entered into the prestigious *International James Dyson Award*. The Australian Design Award Presentation was held at Sydney's Darling Harbour on 19 May.

● Steve Davidson

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