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INTERVIEW/ PIC OPP: 11 AM WEDNESDAY DECEMBER 3

GREEN TEA AND EGGS AT THE BIKE SHED CAFÉ - WHO PAYS?

It isn't every day you see an electricity meter running backwards, but La Trobe University has one, right next to the students' bike shed (official name: the *Cycle Smart Centre*). On top of the shed are 30 solar panels that generate the power that's pushing it: the University's own grid-connected solar power station.

The meter's disc runs forwards like most meters at night, but backwards during the day when the solar power station is exporting power.

On a bright cloudless day the photovoltaic array on top of the bike shed generates up to 4.8 Kilowatts of electricity - less than 0.1 per cent of the University's (Bundoora campus) total power consumption, but enough to boil two kettles and/or cook an egg. It adds up to more than five MWh of electricity a year without generating any carbon dioxide.

That's a good enough excuse for a tea party if you ask Andrew Mackie, the PhD electronics engineering student who designed the power station. Good enough too for Vice Chancellor Paul Johnson to get on his bike to see for himself - and launch this latest proclamation of his University's green energy credentials.

By the time he'd parked his bike at *Cycle Smart* at 11.00 am tomorrow (December 3), the students will have the kettle on the hob to welcome him with a hot cup of tea. If he's peckish, they'll even fry him an egg - cheered on by officials from Sustainability Victoria and the Australian Government Department of the Environment Heritage Water and the Arts, which co-funded the venture with La Trobe, and contributing staff and students from the University's Department of Electronic Engineering and Buildings and Grounds Division.

Depending which way the meter runs the Vice Chancellor will know who's hosting his brunch - the Bike Shed or the Big House (La Trobe). (If the disc spins backwards, the solar system is exporting power, so Bike Shed "pays"; if it spins forwards they are cooking on imported power from the University's main grid, so Big House "pays".)

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Either way it's green power, but the bike shed's top-up solar power is free. La Trobe (Bundoora) already generates most of its own electricity from a natural gas-powered co-generator, selling excess back to the public grid; the new photovoltaic station also feeds surplus to the University grid, so also bolsters the exports.

Mature age student and career-qualified electronics engineer Andrew Mackie got interested in developing the power station as an adjunct project during his final year PhD studies researching the capacity of powerlines to simultaneously deliver electricity and transmit digital signals the other way (making it possible to read smart electricity meters and/or gas and water meters on the half-hour.)

The projects are not directly related but the bike shed station successfully exploits this two-way concept to carry power and information in two directions. (A similar version of this novel technology will also be used to read electricity meters remotely in the pending rollout of 2.4 million new smart electricity meters throughout Victoria.)

“The idea behind communication over the mains is to try to level off demand, so if we use meters that are read remotely 48 times a day instead of once every three months we can charge people different amounts depending on when they use the electricity; we can incentivise them to switch off during critical periods, say, when everybody has their air conditioners on,” says Mr Mackie.

He says this concept is one of two ways of levelling off demand. The other is to localise power generation, especially during sunny periods: augmenting supplies during times of critical demand with guilt-free solar power. The Bike Shed project – in conjunction with the University's co-generator – demonstrates how both concepts can work: showcasing the way forward for robust electricity supplies of the future.

While its output is small and mainly symbolic, the new solar station will offer cutting edge learning challenges for students and researchers studying solar power in the University's new Green Stream electronics engineering unit *ELE 3SPG Sustainable Power Generation*.

With data signals regularly transmitted from metering equipment at the Bike Shed station, then down the powerlines to the Electronics Engineering Department, they will be able to monitor power usage in real time on a computer screen in their own building – to know at a glance how much electricity the University is generating from the sun and what CO₂ emissions they're saving. So, too, will members of the public – from a solar generator web page on the University's website. (<http://www.latrobe.edu.au/ee/solar/index.html>)

Electronics Engineering Laboratory Manager Peter Stewart said Mr Mackie's findings on powerline communications are in a field of inquiry of major commercial interest globally, initially for remotely reading electricity meters but with many other applications.

(The Bike Shed Solar Power station cost \$49,000 and came in under budget. Sustainability Victoria contributed \$14,000, the Federal Government \$12,000, La Trobe University Buildings and Grounds Division \$13,000 and La Trobe University Department of Electronic Engineering \$10,000.)

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PIC OPP:

Vice Chancellor Paul Johnson will arrive at the Bike Shed, Physical Sciences 4, Science Drive, Bundoora, to launch the solar power station at 11 am tomorrow (Dec 3). Andrew Mackie and Peter Stewart will boil the billy, make the tea, and fry an egg on solar power before the launch.

Launch will take place at 11.30 am.

Julie Harris, from Sustainability Victoria, will also talk about Sustainability Victoria's Solar in Schools Scheme.

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Weblinks:

Solar station: <http://www.latrobe.edu.au/ee/solar/index.html>

New courses: <http://www.latrobe.edu.au/ee/spg/index.html>