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SCALE UP, THEN POWER UP

Max Pichon reports on two on-site energy projects that will set new benchmarks for scale in Australia.

The University of Queensland has switched on what it says is Australia's largest solar photovoltaic installation, a 1.2MW system that spans 11 rooftops at the St Lucia campus.

The UQ Solar Array, which effectively coats four buildings with more than 5,000 polycrystalline silicon solar panels, will generate about 1,850MWh a year.

"During the day, the system will provide up to six per cent of the university's power requirements, reducing greenhouse gas emissions by approximately 1,650 tonnes of CO₂-e per annum," said Rodger Whitby, the GM of generation for renewables company Ingenero.

It also underpins a number of cutting-edge research projects in diverse fields, according to Professor Paul Meredith, who oversaw the design and installation of the solar array.

"A major objective of our array research program is to provide a clearer understanding of how to integrate megawatt-scale renewable energy sources into an urban grid," said Professor Meredith, of the School of Mathematics and Physics and Global Change Institute.

"Mid-size, commercial-scale renewable power generating systems like UQ's will become increasingly common in urban and remote areas. Addressing the engineering issues around how these systems can feed into and integrate with the grid is essential so that people can really understand and calculate their value as we transition to lower-emission forms of energy."

Electricity retailer Energen contributed \$90,000 to the research project through state-of-the-art equipment to allow high-quality monitoring and analysis of the power feed.

Another key research project addresses one of the most common criticisms of solar



The 1.2MW solar array spans 11 rooftops at the university.

power: that it cannot replace baseload grid power. Through a partnership with Brisbane electricity storage technology company RedFlow, a 200kW battery bank will be connected to a 339kW section of the solar array.

"The RedFlow system uses next-generation zinc bromine batteries," Professor Meredith said. "These are more efficient than the lead-acid batteries that have been more common to date, and being filled with water rather than acid, they are much, much more environmentally friendly."

Ingenero also donated a concentrated photovoltaic (CPV) array, which concentrates the sun's rays 650 times using mirrors and optics.

Mackay's sweet deal

Mackay Sugar is edging closer to having Australia's biggest co-generation project, signing G&S Engineering to erect the plant and major machinery at its Racecourse Mill in Queensland.

Mackay Sugar CEO Quinton Hildebrand said the \$120 million plant will be able to provide up to one-third of Mackay's electricity needs by making use of bagasse, a

fibre waste left over from crushing cane.

"By using this by-product for electricity production, Mackay Sugar will help reduce our region's greenhouse gas emissions by 200,000 tonnes equivalent carbon dioxide each year, as well as add more value to the crops grown by our local farmers," he said.

"Mackay Sugar will store bagasse on site to ensure the plant will operate year-round, supplying energy to the community and the Mackay Refinery even during the non-crush period."

The project will surpass the \$45 million, 21 MW co-generation plant plastics maker Qenos is building at its Melbourne facility (more in WME, 05/11).

Preliminary site works were completed in May, including a new control system for Racecourse Mill's Boiler No. 3 and the demolition of Boiler No. 1.

The next stage of the project will commence in August, with G&S Engineering installing a high pressure boiler capable of powering a 37.25 MW turbine, along with all related piping and auxiliary equipment. Commissioning is due to start by the end of 2012.

The co-generation plant is part of Mackay Sugar's 20-year Diversification Plan, which outlines various projects based around its existing infrastructure and renewable energy goals.

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