Renewable Energy and Environmentally Sustainable Design

Case Studies

Ballarat University - BIPV

Award Winning Project:
This project won the 2007 BCSE* award for *Excellence in Designing and Installing a Grid-Connect Photovoltaic Energy System over 5kW.*

Site: Ballarat University, SMB Campus

Dates:
- Design Phase Commencement: July 2005
- System Commissioned: December 2006

Client: H.Troon (Builders) for Ballarat University

Project Goals:
Design and install of a vertical, north facing 8.4kWp Building Integrated Photovoltaic (BIPV) façade on a new educational building.

Project Features:
The largest vertical north-facing BIPV façade in Australia, covering 200m2. Schott Solar's ASI-glass product can be used in place of regular glazing and provides excellent thermal properties, being double glazed and thus reducing unwanted ambient heat gain and loss. The embedded silicon has the ability to help block solar radiation from entering the building. Consequently, a 40% reduction in air conditioning plant size was achieved by using ASI-glass, whilst also producing 7.3MWh of energy each year. The glass allows 10% of light to pass through, enabling excellent visibility and connection to the environment.

Vertical installation, whilst sub-optimal for solar production, only suffers 37% reduction in energy yield when compared to an optimally inclined system. However, a façade orientated at 30° from the horizontal would have been impractical. A vertical façade proved simpler and cheaper for building design and construction. The amorphous silicon technology used produces energy even from indirect light, making the panels more tolerant of vertical inclination than their crystalline silicone equivalents.

Avoiding and adapting to shade proved to be the greatest challenge in system design as a small amount of shade can cause a whole solar system to cease production. Great care was taken avoiding protrusion of the panels' frame, to ensure that the panels were not shaded when the sun was high in the sky. The effects upon system performance of unavoidable shade from trees, power poles, and the entrance canopy was minimised through system design and use of amorphous silicon technology, which produces energy even when partially shaded. A data monitoring system collects the performance data and transmits it to a custom-built interpretive display in the entrance foyer.

Building Exterior

Façade Integration

Visual Transmission

Inverter Bank

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Project Team:

- Warwick Johnston, Senior Project Engineer, Going Solar
- Bruno Imeneo, McIldowie Partners Architects
- Steve Cook, Accredited Installer
- Jo Bradley, Administration Manager, Going Solar
- Stephen Ingrouille, Principal, Going Solar

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Interpretive Display

Building Exterior

* BCSE = Australian Business Council for Sustainable Energy