Renewable Energy and Environmentally Sustainable Design

Case Studies

PV Noise Barrier for the Tullamarine-Calder Interchange

Australia's First Solar Noise Barrier on a Freeway

Site: Tullamarine-Calder Interchange, adjacent to Essendon Airport, Melbourne

Dates:

- Initial Enquiry Received: January 2006
- Feasibility Study Provided: January 2006
- Tender Won: June 2006
- Installation Completed: June 2007

Client:
Tullamarine-Calder Interchange Alliance, a partnership between Parsons-Brinkerhoff, Baulderstone, and VicRoads.

Project Goals:
Design and installation of a freeway noise-wall (sound barrier) constructed of a 500m length of vertically-inclined PV panels, totalling 24kW of peak power output.

Project Features:
As visitors to Victoria drive to Bendigo or Melbourne's international airport, they are farewelled by the site of the first solar noise barrier in Australia. With 29+ years of experience in solar system design, Australian company Going Solar has put solar panels to their most innovative use atop a 500m length of noise-wall. Noise reduction is achieved by the BIPV glass' density acting to deflect sound from the neighbouring houses. The power produced feeds into the electrical grid, where it offsets energy used by the streetlights and CCTV.

Vertical inclination, whilst sub-optimal for solar production, suffers only 37% reduction in energy yield when compared to an optimally inclined system. However, vertical inclination achieved the noise-wall's height requirement with the least resources, and as such was the most cost-effective solution. A feasibility study found that as concrete would have otherwise been used, the additional money for the least-cost solar option would be paid back by the noise-wall's electricity production within 15 years. The support offered by Sustainability Victoria's Renewable Energy Support Fund made this project even more attractive.

Using shade-tolerant amorphous silicon is a critical requirement of this application. Although shading was minimised by the placement of light poles

Initial Concept

During Installation

Final Vision

Bicycle Path at Rear of Array

and gantry uprights behind the solar panels, the shadow cast by the way-finding sign was unavoidable. Fortunately, Schott Solar's ASI-glass product tolerates shade, and the impact of shade upon the system output was minimised by Going Solar's clever system design. Amorphous silicon also produces energy even from indirect light, making the panels more tolerant of vertical inclination than their crystalline silicone equivalents.

An integrated design process imposed larger upfront design effort and meeting attendance, in order to successfully achieve a smooth installation.

A data monitoring system collects the performance data and transmits it to VicRoad's control centre via GSM modem, and also to public display located 1km away via an optic fibre.

Project Team:

- Warwick Johnston, Senior Project Engineer, Going Solar
- Steve Cook, Accredited Installer
- Jo Bradley, Administration Manager

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