

# Building beautifully

Environmentally efficient buildings can be conventional-looking inspirations.

One of the funny things about energy and resource-efficient architecture is how we, as a society, expect it to look. In April this year, Toyota Motor Sales USA, Inc., showed the world just how mainstream a 'green' building's design could appear when the firm opened its award-winning Torrance, California, sales headquarters.

The facility is one of the largest 'green' building complexes in the world and boasts five three-storey buildings (totalling 58 000m<sup>2</sup>), a 2800m<sup>2</sup> cafeteria, two central plants and a two-storey glass atrium connecting the buildings – all are located on a 15.4 hectare site.

The US\$87 million facility has achieved a gold 'LEED' (Leadership in Energy and Environmental Design) standard under the US Green Building Council's rating system. Gold is the second-highest rating a building can receive and the Toyota facility is the largest complex to ever receive such a rating. Yet, it looks like a 'plain vanilla' office building, as one reporter wrote.

'Office buildings have a significant impact on the environment, using about 65 per cent of the electricity and 12 per cent of the drinking water in the United States,' said Christine Ervin, President and CEO of the Green Building Council. 'Fortunately, there are ways to reduce the environmental impact buildings have, while also enhancing the overall work environment. This complex demonstrates what can be accomplished when concern for the environment plays a role in every aspect of the design and building process.'

The gold rating recognised several progressive steps in design and construction. First, the facility is built with at least



Toyota Motor Sales U.S.A., Inc.

The design team for Toyota's sales headquarters in California wanted to show that 'green' could be done mainstream' and still look beautiful.

95 per cent recycled materials. According to solarbuzz.com, a leading solar energy research website, there are more than 250 miles of reinforced-steel beams in the complex, which were made mostly from recycled cars. Even material left over from the construction process was also 96 per cent recycled – casting moulds, for example, were turned into pavers.

The facility also houses one of the largest commercial solar electric systems in North America, enabling it to supply 20 per cent of its own needs. Nearly every one of the building's 2500 staff will work under natural daylight, and motion sensors throughout the facility will make sure dark areas are not unnecessarily lit when unoccupied.

Closer to home, an Australian project by Pavilion Architects, a joint venture consortium of DesignInc, Scott Carver, and Timothy Court & Co has incorporated aesthetic innovations in environmentally sustainable design into the vast new \$67 million Royal Agricultural Showground pavilions project at Homebush Bay, in Sydney.

The facility is a multi-purpose exhibition precinct designed for fit-out for the annual Royal Sydney Easter Show, the largest agricultural show in the world,

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involving 1000 horses, 800 cattle, sheep, pigs, alpacas, poultry etc.

According to Timothy Court & Co the buildings rely heavily on passive solar design to ensure acceptable temperature and light levels are maintained. With each animal producing heat equal to a small bar heater, this is no mean feat. A line of skylight ventilators was designed in black polycarbonate to induce airflow through the sides of the building and out through high-level ventilators. This solution produces up to 15 air changes per hour, well above the standard office air conditioning rate of six air changes per hour.

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Timothy Court and Company

The Homebush pavilion's central skylight ventilators are also very efficient heat funnels.