

SOLAR PROGRESS

RENEWABLE ENERGY FOR AUSTRALASIA

A Permanent Home for CASE

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Visitors to the new CASE headquarters in Western Australia will be able to see a functional demonstration of low energy building technology and design that incorporates renewable energy power generation systems. The building will be a showcase for Australian technology.

In conjunction with the WA chapter of the Royal Australian Institute of Architects, CASE held a competition early this year for architects to compete for the project, worth some A\$1.35 million. The building brief included a requirement to reflect the state of the art in both technology and architecture in the applications of passive and active forms of renewable energy. Another objective of the design was to embody the concepts and practise of sustainable development.

The building will be a dynamic experiment, demonstrating that it is possible through energy collection and storage systems for a commercial office complex (housing up to 50 people) to operate independently of the electricity and gas grids. It will also be self contained from a waste disposal aspect using on-site sewage treatment and methane generation.

The brief also specified that the building should have an educational function. Visitors will be able to observe energy generation and building systems and as well, scientific observations may be made of the building performance.

The competition, run anonymously, was timed to coincide with Architecture Week, and the winning entry was part of a public display. The winner of the competition, Garry Baverstock of Baverstock and Associates, has been a prominent member of ANZSES for many years and has two earlier low energy buildings to his credit. The better known of these is the Solar Energy Information Centre building in Perth, and the most recent is a 1900m² amenities building and workshops at the Perth Zoo.

The CASE building will be a single storey with the south side bermed to reduce heat losses in

winter, also affording access to plant and a site for grey water disposal. The western side of the building is oriented north and the office wing to the east faces 20° to the east. This arrangement will permit the offices to gain early morning winter heat through windows and solar air collectors thus providing heat start-up, normally a major problem for office buildings.

Construction will be tilt up concrete with a special insulating skin at the outside of the internal walls. The Cement and Concrete Association will be undertaking some development work with Baverstock and Associates to determine the exact technique to be used. The roofs will be lined with integrated polystyrene panels with a parasol skin externally. The need for change in building function with time will be accommodated by using "styrocon" or plaster block modular panels as internal walls.

The focus of the building is the central atrium. The atrium serves several functions, including a source

of daylight, a return air shaft, and a thermal shaft of phase change chemicals to enhance the thermal inertia of the building. It is both the reception area and a distribution point. The building is single storey, and the staircase in the atrium permits viewing of roof mounted systems. Extending from the thermal shaft is an energy tower housing a wind turbine, satellite dishes and solar hot water collector panels.

Cooling will be provided by hybrid dry evaporative cooling systems used in series with direct evaporative cooling. Occasional peak occupancy loads for auditorium cooling will be provided by a refrigerative system. Night free energy cooling and economy cycle are designed for minimum fan energy consumption and the free cooling effect is stored in the building mass.

Heating will be optimised by direct solar gain, and high efficiency solar air collectors. Stored heat energy in phase change systems (organic eutectic salts) will assist winter morning heating.

The building will make use of natural light as well as dimmer controlled compact fluorescent and halogen lights. Electrical power will be supplied by photovoltaic arrays, and a wind turbine. High efficiency DC motors will be used wherever possible. The building's functions will be computer controlled, the system also permitting monitoring. It is expected that the total energy demand for the building will be 120MJ/m²/year, compared with 600 to 700MJ/m²/year BOMA targets. The peak level load demand will be approx 14kW.

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