Renewable Energy and Environmentally Sustainable Design

Case Studies

Bren's Pavilion

Site: Royal Park, Melbourne

Dates:
- Design Phase Commencement: March 2005
- System Commissioning:
  - Solar Hot Water & Rainwater November 2005

Client: City of Melbourne

Project Goals:
To minimise the use of mains water and energy supply for a council sports pavilion at Royal Park.

Project Features:
- Water and energy efficiency measures.
- Collection of rainwater for use in the showers, via a solar hot water system backed up by instantaneous gas boosting.
- Rainwater is also used to flush toilets.
- Customised solar air heating and extraction system for bar area.

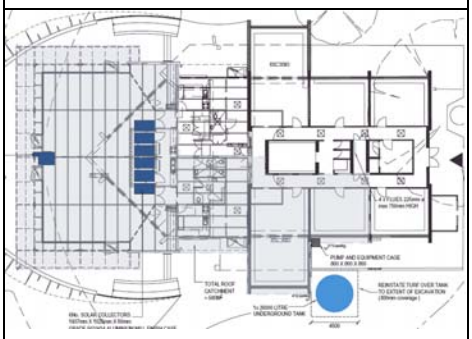
The process has involved considerable discussion between the Project Team and the City of Melbourne, City Projects, and Parks and Gardens departments to arrive at the best solution. The outcome is an important step towards water and energy independence, and was one of the first few installations of its type.

Six solar hot water panels on the roof feed three stainless steel storage tanks. When sufficient solar radiation is available, the hot water passes through the instantaneous gas boosting bank without using any natural gas. If the weather is inclement or there is a heavy demand on the system the instantaneous gas provides the balance of the required hot water.

The main demand for hot water will be for showers after sporting matches. As the demand is intermittent, the solar panels have plenty of time to heat the storage tanks for use when required.

The solar hot water panels are located on the north-facing sloping roof, placed in a position that minimised their visual impact. The storage tanks are located in the plant room in the centre of the building. The hot water is pumped from the panels to the storage tanks. Once the storage tanks reach their maximum temperature, the pump switches off and the panels re-radiate any unwanted heat. The pump is also activated on very cold nights to protect the solar collector panels from frost by circulating warm water though the system.

Bren's Pavilion – bar area



Bren's Pavilion – floor plan. The underground tank is located near the blue dot.

The solar hot water panels.

The pumps & storage tanks.

Case Studies

The number of solar panels had to be matched to the hot water storage capacity and the expected demand on the system. One constraining factor was the amount of space available for the storage tanks in the plant room. As a general rule, the more storage capacity available, the better.

Rainwater is harvested from most of the roof and collected in an underground storage tank after being filtered. Filtering consisted of leaf guards over the guttering, down-pipe filters and a 20 micron filter cartridge.

Water is then pumped via a Rainbank system to the existing header tank where it gravity feeds into hot water system. The temperature of the solar hot water and the gas boosting removes any health problems. Rainwater is used only in toilets and hot water services, ensuring that people will not drink it.

The system installation was smooth apart from indecision over the position of the rainwater storage tanks. Initially the tanks were to be aboveground to help display the project. Parks and Recreation decided that the tanks had to be underground and a concrete tank was selected. However as this did not provide a trafficable surface, the area above the tank had to be cordoned off and landscaped.

Project Team:

- Warwick Johnston, Project Engineer, Going Solar
- Lachlan Bateman, Project Engineer, Going Solar
- Stephen Ingrouille, Principal, Going Solar
- Brent Papadopoulos, Installer, Sustainable Plumbing Solutions

Further Information:

- steve@goingsolar.com.au
- www.goingsolar.com.au

The instantaneous gas boosting bank and existing header tank.

The rainwater control system and pump. Water is drawn from the underground tank or from the mains water supply.

The underground water storage tank being placed into position.

Ground above the installed water storage tank with stakes to restrict traffic.