

## Sustainable design on show

The Deep Creek Reserve multipurpose building, now home to Deep Creek Golf Club and Cardinia Environment Coalition, has been designed to exceed Council's sustainable design matrix requirements.

The building has been designed to achieve a significant reduction in energy and water requirements, an increased level of indoor environmental quality and utilised sustainable materials for its construction.

The building has been developed to provide education on sustainability to the broader community and its built form demonstrates sustainable design.

An accredited green star sustainable design consultant was engaged to support the design of the building and ensure a high level of sustainable design was achieved. The green star framework was used to provide a reference point for the design.

## Key design features

- A **40kW solar electricity system** will support energy requirements across the entire Deep Creek site. This includes the use of highly efficient 111 Sunpower Maxeon panels. These advanced panels utilise back-contact conductivity removing gridlines from their surface and enabling them to absorb more sunlight. The panels have a solid metal backing that adds strength to each cell increasing durability. The solar energy system will reduce emissions by approximately 54 tonnes of CO<sub>2</sub>e per annum (equivalent to emissions of 13 average cars). It has been estimated to reduce energy costs by \$13,000 per annum.
- A **thermally reflective roof** reduces heat gain and maximises the efficiency of the solar PV system. A cooler roof, leads to cooler solar panels that operate more efficiently. Space has been allocated for the addition of a battery storage system for the solar array, should it become more cost effective to install in the future.
- The building features **double glazing** and high levels of **insulation** to improve thermal performance.
- The **building orientation** minimises unwanted east/west solar gains and captures beneficial northern winter sun.
- A **building management system** monitors all key plant and equipment and energy consumption data from sub-metering of different devices in the facility. A weather station informs the building management system and outdoor conditions are used to determine the most efficient way to operate heating and cooling equipment.



*Photo: Solar electricity system and thermally reflective roof*

- Efficient heating and cooling equipment includes an economy cycle and night purge, with operable windows acting as a spill air path.
- **Energy efficient LED lighting** is used throughout the facility, and motion sensors have been installed to ensure lights are only used as spaces are occupied.
- The buildings slab is constructed with concrete that uses 50 per cent recycled or reclaimed water, uses industrial waste products as aggregate and has a reduction in Portland cement of 35 percent when compared to standard concrete. Industrial waste products are used to substitute the Portland cement reducing the embodied emissions of the concrete.
- Thousands of **recycled bricks** have been used for the building. Using recycled bricks reduces waste to landfill and carbon emissions, as the need to use energy to produce new bricks is avoided
- **Low volatile organic compound (VOC) paints**, sealants and adhesives were specified to optimise indoor air quality. Products with high VOCs emit more of these chemicals into the air, negatively impacting health.
- **Water efficient fittings and fixtures** have been used throughout the facility such as taps and toilets.
- A **rainwater storage** system with a capacity of 20,000 litres will provide a significant percentage of the water requirements for the facilities toilets.
- **Independent solar powered lighting** has been used for the carpark. This lighting contains a battery and solar panel and does not require any use of grid energy to operate.
- **Vegetated swale drains** are used in the carpark to treat stormwater, removing pollutants, before flowing into the demonstration wetlands and Pakenham Creek.

These features reduce the facilities environmental impacts and operational costs and ensure it showcases sustainable design for the community.



Photos: (L-R) Weather station. Car park with vegetated swale drains and independent solar lighting