

# 'SMART' BUILDING FOR WELLINGTON WATERFRONT

Wellington's waterfront will soon have New Zealand's first Greenstar building, with plenty of 'wow' factor for its occupants.

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An impression of the completed building. (By [www.stantialstudio.com](http://www.stantialstudio.com).)

**T**he building is the first to be constructed on the waterfront for over 10 years and will house Meridian Energy Ltd's new corporate offices along with retail space on the ground floor. It aims to set new benchmarks for energy efficiency and water conservation, while providing an invigorating, healthy and productive work environment for occupants. Both Wellington Waterfront Ltd, which initiated the project, and Dominion Funds Ltd, which owns the building and anchor tenant Meridian Energy Ltd, are committed to the benefits of an Ecologically Sustainable Design (ESD) approach.

## Building design

The design brief for the site stipulated a building which: is sympathetic to, and related to, existing heritage buildings; contributes to the recreational potential, shelter, comfort and social inclusiveness of the waterfront; and incorporates as many environmentally friendly construction and design principles as possible.

As part of adopting an ESD approach, a number of computer models were developed by Beca to inform the design and specifications. These included 3D dynamic

thermal simulation, energy consumption benchmarking, thermal comfort modelling, water use analysis, daylight availability and Greenstar pre-assessments using the Australian and pilot New Zealand rating tools.

Studio Pacific Architecture's concept for the 4-storey office building comprises three distinct architectural elements – the main pavilion, the annex adjacent to heritage sheds 11 and 13, and the link. To take advantage of the exceptional site and waterfront views the architectural design features highly transparent façades. The environmental performance of each façade has been



The southern face has vertical slot windows on levels 1 and 2.

designed to acknowledge the building's orientation, and these façade treatments are also used to help define the differing forms making up the building.

### Double skin façades

The design of the building envelope is a key element in achieving the project objectives and aims to deliver the visual 'wow' factor for the occupants.

Extensive glazing is used on all façades, with the exception of the south faces of levels 1 and 2 of the pavilion, which use vertical slot windows. 3D computer simulation analysis was used to develop the transparent façade concept, façade performance being one of the most important elements in

the ESD approach. The building envelope incorporates sun shading blinds/louvres and windows that open for natural ventilation, and is automatically controlled to adapt to the prevailing weather conditions.

The east and west sides of the pavilion building incorporate a ventilated 'double skin' façade. The outer skin protects the blinds from high winds, while an automatic solar sensor controls the motorised Venetian blinds. These blinds are retractable to maximise the harbour view. The double skin is controlled to assist with project environmental performance (see Figure 1), and has three operating modes.

1. Winter – the cavity of the double façade is sealed to capture solar gains and limit heat loss. →



The extensive glazing is obvious during construction in April 2007.

1. Mid-season – the cavity is ventilated, and the operable windows to the offices are opened to provide natural ventilation.
  2. Summer – the façade cavity is ventilated to reduce heat build-up.
- The north façades and the annex building incorporate motorised sun louvres, automatically controlled by sensors to control solar heat gain.

### 5-star performance

The building aims to be New Zealand's first 5-star green rated building. In many areas the design exceeds Greenstar benchmarks through the use of environmentally preferable materials and practices. Fletcher Construction's recycling of construction waste is being used as a case study by the Ministry for the Environment. It is hoped that the results will encourage further uptake in the Wellington region.

### Air, heat, light, water

For improved indoor air quality the building HVAC system uses 100% outdoor air with an energy recovery wheel to reduce heating and cooling energy. The ventilation system supplies filtered primary air to the ceiling-mounted active chilled beam terminal units.

Heat entering through the fabric of the building and generated by occupants, office equipment and lights is absorbed into the exposed building structure around the perimeter. An air-cooled chiller supplies chilled water to the beams at 15°C. The façade performance and ventilation heat recovery reduce heating requirements – a reverse-cycle heat pump provides the remaining heating needs.

Night purging adds to the overall cooling system for the building. Windows automatically open at night to allow cool air in, flushing warm air out and cooling the exposed structural soffits.

The glazing selection is designed to reduce glare, while allowing high levels of daylight into the offices. The lighting controls automatically reduce artificial lighting requirements when daylight is available. The automatic lighting control system is integrated with the HVAC and security systems to provide energy savings and flexibility.

Water efficiency measures include waterless urinals, sensor-controlled taps, timer-controlled showers, and a rainwater collection and recycling system for toilet flushing.

### Central intelligence

The 'brain' of the building is the Building Management System (BMS), which automatically controls the various systems to balance comfort and energy efficiency. A weather station is incorporated on the roof to help the BMS determine the prevailing weather conditions, and the BMS is able to adjust the systems to suit forecast weather. Integrated with both the security system and the lighting control system the BMS controls and monitors: solar blinds and sun louvres; windows for natural ventilation; Building Services plant and systems; and energy and water use metering.

*Beca is also doing the integrated fit-out design and Meridian Energy will move into the new building in late 2007.* ◀

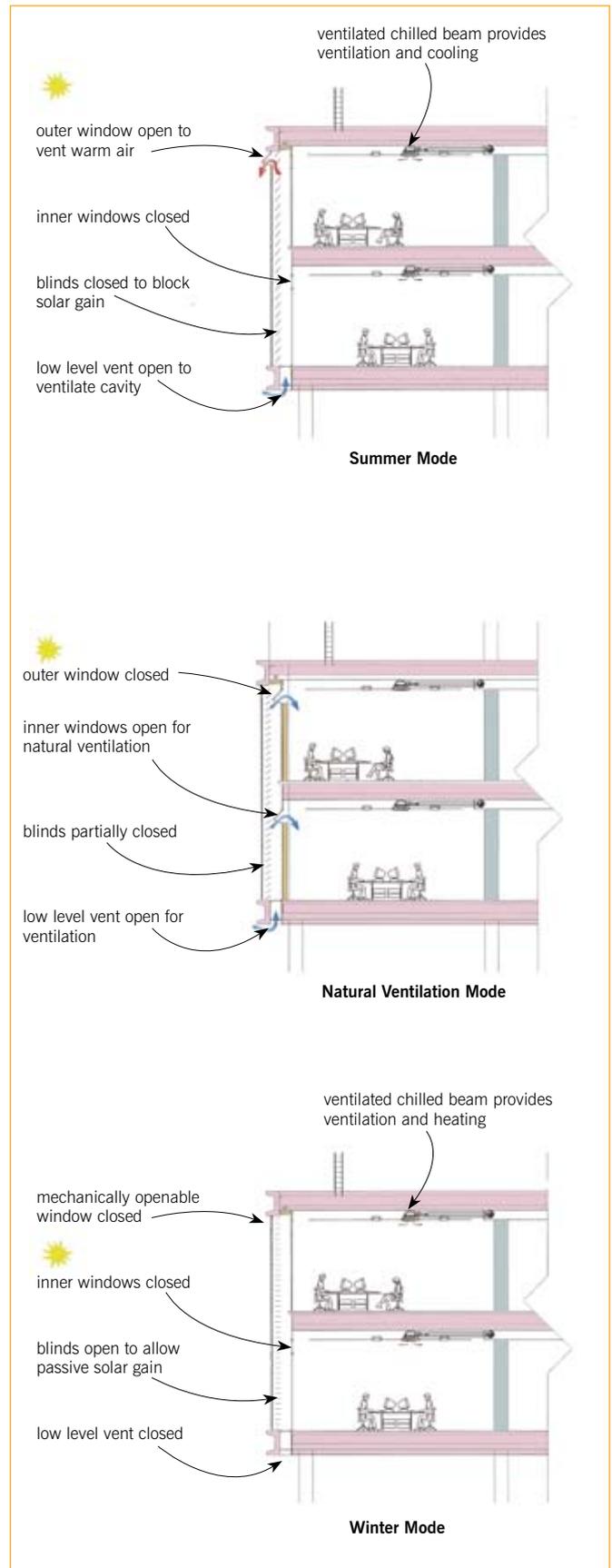


Figure 1: The double façade has three operating modes to assist environmental performance.