

## Solaris



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### Facts

Official Name	Solaris
Structure Type	Building
Status	COM
Country	<a href="#">Singapore</a>
City	<a href="#">Singapore</a>
Street Address & Map	<a href="#">Phase 2B, Fusionopolis, One North Singapore</a>
Building Function	office
Structural Material	concrete
Proposed	2008
Construction Start	2008
Completion	2011

### Figures

Height: Architectural	79.2 m / 260 ft
Height: Occupied	65.4 m / 215 ft
Height: To Tip	79.2 m / 260 ft
Floors Above Ground	15
Floors Below Ground	3
# of Elevators	16
Top Elevator Speed	3.27 m/s
Tower GFA	32,119 m <sup>2</sup> / 345,726 ft <sup>2</sup>
# of Parking Spaces	302

### Companies Involved

Owner	JTC Corporation
Developer	SB (Solaris) Investment P/L
Architect	
• Design	TR Hamzah & Yeang
• Architect of Record	CPG Consultants
Structural Engineer	
• Design	<a href="#">Arup</a>
MEP Engineer	
• Design	CPG Consultants
Main Contractor	Soil Build Pte Ltd
Other Consultant	
• Stormwater Management	<a href="#">Fast Flow Systems Pte Ltd</a>

### About Solaris

The approach when designing the Solaris towers was to create a completely ecological site. Instead of replacing natural habitat with a built environment, the design sought to create a maximum amount of habitable green spaces in addition to a sustainable building. Two towers were designed to house research and development facilities, connected with a passively ventilated atrium.

The site is located at the edge of Singapore's Central Business District in the Fusionopolis development, an area dedicated to research and development in a variety of fields. The site was originally a military base, which meant that most of the original ecological system had been destroyed. The response to this issue was to highlight the existing landscape while contributing to it.

The building boasts a 36% reduction in overall energy consumption compared to relevant precedents, as well as a 108% ratio of landscape to site area. This was accomplished by integrating fully landscaped areas directly into the façade of the building. A linear "green ramp" was designed to connect the ground level with all areas of the building, wrapping around and winding its way up the towers while accessing terraces and gardens along the way. This landscaped element allows for the connection of ecosystems and the movement of species between them to improve biodiversity on the site.

Occupiable roof gardens and terraces offer spaces for the building users to enjoy during breaks, or to use for events. These areas not only contribute to the improvement of the user experience, but also create a distinct buffer between the building envelope and the elements, reducing solar gain and reflection. Along with this, planted areas and solar shades were incorporated with a double-glazed wall system to further decrease the effects of solar exposure. The ETTV (external thermal transfer value) of the full system is less than 39 watts per square meter.

An extensive rainwater harvesting system is employed throughout the building, using siphonic drainage to hold up to 700 cubic meters of water for irrigation of the green spaces. The system also ensures recycling of any water that goes through the full system.

The design of the building also responds directly to its environment and occupant needs. The atrium allows for daylighting of the internal

spaces in the building, and is fully passively cooled. A rain-check wall is employed at the perimeter to allow for ventilation during conditions of precipitation, and a vented roof takes advantage of the stack effect for cooling. Computational fluid dynamics was used to refine the design of the atrium to ensure optimal conditions. The louvers are controlled by climate-responsive sensors to adjust them when necessary. To cross between towers through the atrium, skybridges were added. Additionally, a light shaft was cut through the taller portion of the building to allow for greater daylight penetration. The internal spaces connected with the light shaft have automatic sensors to control lighting when daylight proves adequate.

Solaris received a 97.5 rating from Singapore's GreenMark program, denoting a Platinum certification. The building also came in at 6.3% below industry cost standards, while providing over 8,000 square meters of landscaped area.

## **Solaris**

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#### **Solaris Chosen as Featured Building**

Jan 2013 – Featured Tall Building

### **Research Papers**

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Sep 2014 – CTBUH Journal, 2014 Issue III

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