



Green Design Award
WINNER

DP ARCHITECTS PTE LTD
SINGAPORE
Republic Polytechnic

GREEN FEATURES



SITE PLAN
REPUBLIC POLYTECHNIC



The Architects have combined social, economic and environmental considerations to ensure a high standard of building performance for present and future occupants. Sustainability was considered for the whole life cost of the project, ensuring a pleasant environment for occupants. An appreciable reduction in the cost of sustainable construction has been felt by the sector of sustainable materials, materials, minimizing mineral extraction, ozone depletion and pollution. Secondly, features such as reflective film, thermal coating scheme create a better environment for the previously challenged, namely, Energy Modelling Management aims to reduce the building's operational energy demand and daylighting. Next is the through ventilation between the tower and Agave. In addition, the design of the tower tower, reduces the heat, maintaining the integrity of the existing topography. Finally, a pneumatic waste system facilitates energy efficient waste management.

embodied 612 primary energy 43.6%

1 SUSTAINABLE DESIGN INTENT



Adhering to the Government's objective for a 'Garden City', as well as to become a sustainable development, Republic Polytechnic was designed as a 'campus in the park', with the careful planning of landscaping to blend the entire campus into the existing surrounding greenery. The campus was also planned into existing the campus for further integration with nature. Public spaces are placed around natural elements to enhance the campus's aesthetic appeal and improve the quality of life. The relatively high density of the entire requirements leads to the subsequent incorporation of nature. The tower was designed to effectively replace it.

integrated 119678 total 83404m³

2 SITE ECOLOGY RESPONSE



The campus has optimized exposure to the north and south to allow more diffuse light that is suitable for daylighting. Through shading devices, a combination of perforated aluminium sun-shades, overcast shading and protruding concrete panels on East-West facades help to reduce solar radiation, yet retaining views, maintaining optimum indoor temperatures. Shading devices on the Agave tower, that facade reduce glare and protect light to the dining, by 'pushing' daylight deeper into the floor space. Similarly, to minimize heat transfer to facades below, the air-conditioned spaces of the tower as well as to reduce the urban heat island effect, the Agave tower is further and kept air covered for shade. Ultra-thin solar air ducts, which circulate with the surrounding landscaping, lower the surrounding ambient temperature.

EMV 42.80W/m² EUE 169.31kW/hr/m²/yr

6 BIO-CLIMATIC RESPONSE

3 ENERGY EFFICIENCY & FLOW

Energy saving 176660 kW/yr
primary energy saving 11594 kW/yr



Much emphasis is placed on energy efficiency, with the implementation of more innovative systems. The use of a thermal energy storage (TES) system for air-conditioning, amongst the first few in the region, enables the office to operate more efficiently at night and store the chilled water for use during the day; this optimising air-conditioning energy consumption. Energy efficient LED lighting, escalators, the use of photovoltaic solar panels to partially provide for general lighting and power requirements, and centrally-controlled switches for external lighting, motion detectors, in lieu of motion lighting switches for lighting, and energy saving, energy efficient light fittings are also used throughout the campus. Most importantly, all these systems are coordinated with the Building Management System which monitors usage and ensures optimisation of energy consumption.

4 WATER EFFICIENCY & CYCLE

collected water 67% recycled water 47%



The campus uses 100% of a high efficiency cooling tower. As However, has a lower mineral content, the make-up/condensate concentration is different. It increased, leading to increased scaling of condenser water. The system allows condenser coils to operate at higher mineral concentrations for delivering performance water treatment, or increased TDS levels. By capturing the condensate about 100% concentration, more 100% concentration. More 1,000,000, water savings can be achieved through increasing the make-up/condensate water consumption. Another innovation is the use of differential pressure system for the water supply system. It is designed for having both low and high-pressure circuits. This allows the self-purging systems to operate more efficiently.

5 MATERIALS & CONSTRUCTION



most buildings are painted white or silver. These paints contain low volatile organic compounds, which are environmentally friendly as they do not contribute to ozone layer depletion. A large portion of the building products used in the project contain recycled materials, such as copper tiles from recycled tyres, steel bolts and hardware from demolition debris and precasted housing from tyres. These building materials were manufactured and processed from recycled products, thus ensuring the sustainability of scarce building resources. Prefabrication, involving many of the production of building components off-site, is also adopted in many parts of the campus, such as the roof of the tower and the external facades of the park at the tower. This process increases productivity, sustainability, quality and reduces cost.

7 DAYLIGHT & AIR QUALITY ENHANCEMENT

daylight 36% primary energy saving 6279 kW/yr



An effective cooling system is essential to optimize the use of both daylighting and electric lighting for energy savings and occupant satisfaction. From careful studies of daylighting were carried out. Many innovative features also help to create a healthy indoor environment, including an air purging system in the building ventilation system for improved indoor air quality. Other special features include the multiple ventilation stacks in the green hall, allowing the system from incorporating to mechanical ventilation or natural ventilation. The hall are closely naturally ventilated by opening all the perimeter windows. Air conditioning and mechanical ventilation modes are activated only occasionally. A series of sunken courtyards with key circulation routes to create internal microclimate spaces, architectural details designed to provide natural lighting to the Agave atrium as well as increase the landscaped ones.

CONSUMPTION

WELLBEING