

## Sustainability by the Bay

Dex Chen

Gardens by the Bay, 18 Marina Gardens Drive, Singapore 018953

dex.chen@gardensbythebay.com.sg

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### INTRODUCTION

Underlying the concept of Gardens by the Bay are the principles of environmental sustainability. For Bay South, the first phase of the Gardens' development, a concerted effort was made to plan and design for sustainable cycles in energy and water.

#### Cooled Conservatories

Comprising two glass biomes, the cooled conservatories – Flower Dome and Cloud Forest - replicate the cool-dry climate of the Mediterranean and semi-arid sub-tropical regions and the cool-moist climate of the Tropical Montane region respectively. They house a diverse collection of plants that are not commonly seen in this part of the world.

The energy used for powering the chillers is produced by a biomass furnace that burns horticultural waste collected from parks and gardens island wide.

The cooled conservatories are a statement in sustainable engineering and apply a suite of cutting-edge technologies that provide energy-efficient solutions in cooling:

The two structures are fitted with a glass material that allows optimal light in but cuts out a substantial amount of heat.

They also apply the strategy of cooling only the occupied zones, thus reducing the volume of air to be cooled.

The air in the conservatories is first de-humidified by liquid desiccant, which reduces the moisture content of the air. This cuts down the amount of energy required in the cooling process.

This suite of technologies can help to reduce energy consumption, compared to conventional cooling technologies.

#### Supertrees

The Supertrees reflect the form and function of mature trees to illustrate the emergent giants of the rainforest.

Ranging in height from 25 to 50 metres, the 18 tree-like structures serve as unique vertical gardens showcasing a diverse variety of bromeliads, ferns, orchids and tropical flowering climbers, on a scale never before presented in a garden.

Eleven of the Supertrees are embedded with environmentally sustainable features. Some have photovoltaic cells on their canopies to harvest solar energy to offset the energy for lighting up the Supertrees at night. Others are integrated with the de-humification process and serve as ventilation that expels hot, moist air.

### **Lake System**

The Gardens' lake system acts as a catchment and supplies all the water required for irrigating the outdoor gardens. In addition, it also functions as a living system, providing aquatic habitats for biodiversity such as fishes and dragonflies.

Encompassing two main lakes – the Dragonfly Lake and Kingfisher Lake, the lake system is designed to be an extension of the Marina Reservoir. Water run-off from

within the Gardens is captured by the lake system and channelled through filter beds, comprising aquatic reeds, and wetlands, before being discharged into the reservoir.

The lake system exemplifies the role and importance of plants in the healthy functioning of our ecosystem. It raises awareness of the value that aquatic plants play in nature and highlights the significance of water in sustaining biodiversity.

### **The Journey Continues**

Moving forward, the Gardens will go beyond current sustainability practices and venture into new, sustainable ways to optimise operational efficiency. We are exploring long-term approaches in charting the sustainability journey, particularly in our efforts to protect the environment, a duty that is expected of a world-class garden attraction.