UNECE International PPP Forum (4th Edition)

The Last Mile: Promoting People-first PPPs for the UN 2030 Agenda for Sustainable Development

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MEINHARDT
Transforming Cities, Shaping the Future

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Project Showcase

Gardens by the Bay – Waste to Energy

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Gardens
by the Bay

Gardens by the Bay

- Singapore's Central Park
- Total area of 101 Hectares
- Singapore's Downtown District at Marina Bay
- Providing green space, recreation and edu-tainment to residents and visitors of all ages
- Venue for community-based activities

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Conservatories – Environmental Sustainability Design

- Designed for sustainable engineering to enable energy consumption savings of at least 30%
- Including:
  - Minimizing of Solar Heat Gain
  - Cooling only the occupied areas
  - Recycling of Bio-waste to create power
  - Water collected, treated and recycled for irrigation

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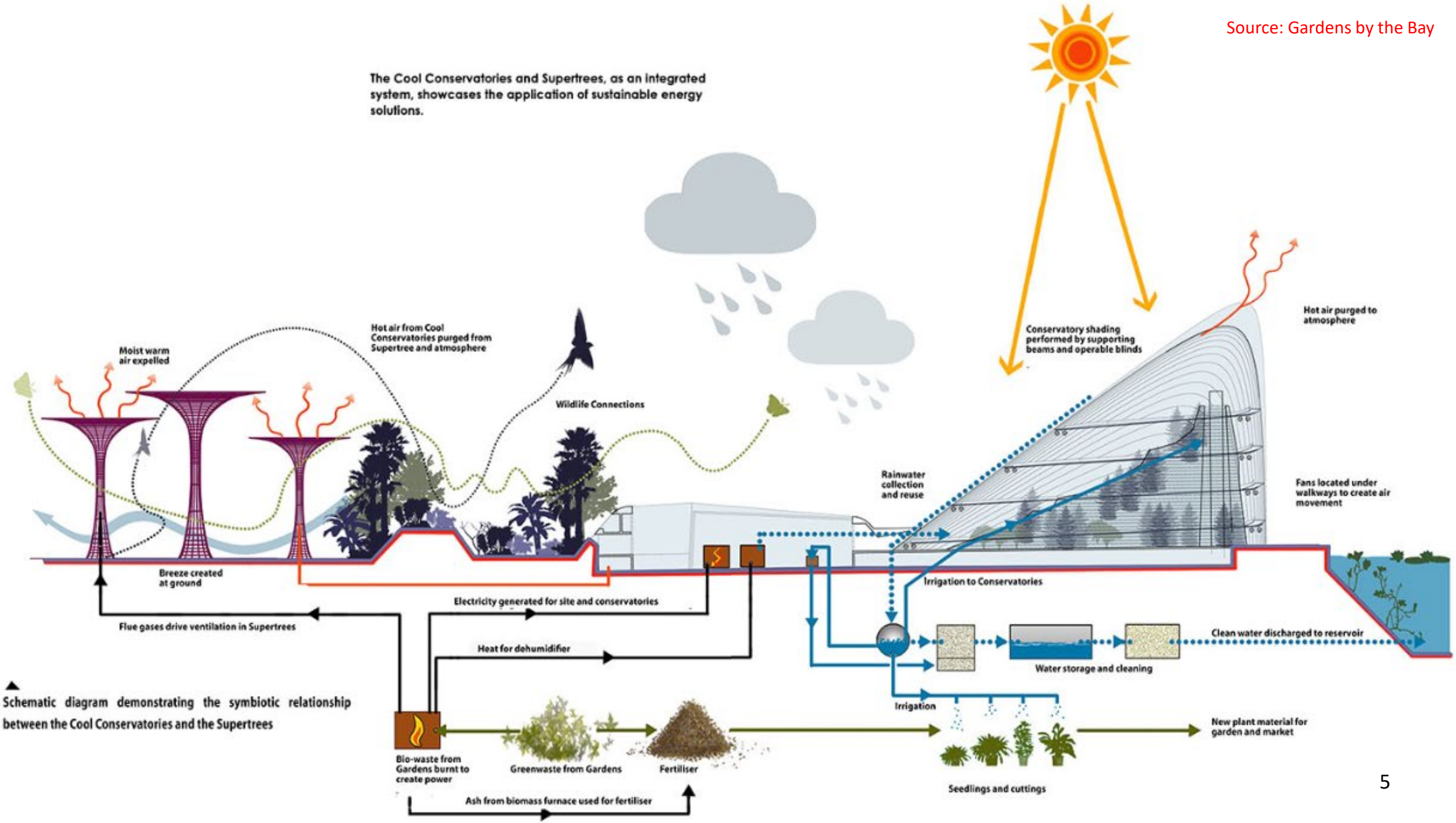
Source: Gardens by the Bay

The Cool Conservatories and Supertrees, as an integrated system, showcases the application of sustainable energy solutions.



Schematic diagram demonstrating the symbiotic relationship between the Cool Conservatories and the Supertrees

Gardens by the Bay, Singapore – Example of PPP Partnership (Public)

- Public consultation was done at the beginning of the design.
- Public consultation through focus group discussion, surveys, workshops and public showcases
- Public gave feedback on suggested masterplan.
- Thus design of Gardens captured ideas, aspirations and needs of the population

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Gardens by the Bay, Singapore – Example of PPP Partnership (Private)

- Private Company
- Year of Completion: 2011
- Type: Design-Build-Operate (DBO) Project with Gardens by the Bay
- Design, build, manage and operate biomass co-gen and tri-gen power plants.
- Concession Period: 15 years

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Energy Resource Centre @ Gardens by the Bay, Singapore

Factsheets

- Biomass fuel: horticultural & wood waste (crushed)
- Electrical power: 0.93 MW
- Heating power (steam): 5.4 MW
- Cooling load: 675 kW
- Steam production capacity: 9.5 t/hr
- CO2 reduction: 13,280 t/yr

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Energy Resource Centre @ Gardens by the Bay, Singapore

- Horticultural and other wood wastes are utilized as biomass fuel to provide the required energy for daily operations
- Tri-generation power plant: Generates electrical power, heating (steam) and cooling services
- Using highly efficient biomass furnace and boiler system
- Electrical power – produced through a steam turbine generator
  - Electricity is supplied back to GBB's power grid

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Energy Resource Centre @ Gardens by the Bay, Singapore

- Heat energy – derived from the steam generated in the boiler system
  - Used for regeneration of the liquid desiccant to create a dry atmosphere mimicking a temperate climate in the conservatories.
  - Used in the operation of absorption chillers
- Cooling load – generated through 2 units of absorption chillers
  - Purpose: On-demand Plant and Conservatories cooling

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Energy Resource Centre @ Gardens by the Bay, Singapore

- Flue gas post treatment systems, consisting of cyclones and electrostatic precipitators ensures 100% compliance to air pollution control standards set by local authorities
- By-products such as fly ashes and bottom ashes are repurposed as soil amendments as well as fertilizer

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ENVIRONMENTALLY SUSTAINABLE DESIGNS

Capabilities

1

Energy savings from green / renewable energy technologies

2

Lower long-term operational costs

3

Higher building performance

4

Improved occupant comfort

5

Healthier building environment

6

Responsible materials sourcing

7

Green mark managers & professionals

8

LEED BD&C Professionals

For more Information

- https://www.gardensbythebay.com.sg/en/the-gardens/sustainability-efforts.html
- https://www.designsingapore.org/pda/award-recipients/2013/gardens-by-the-bay-bay-south-garden

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Thank You

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