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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Project Showcase

Gardens by the Bay – Waste to Energy
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
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
The Cool Conservatories and Supertrees, as an integrated system, showcases the application of sustainable energy solutions.

Source: Gardens by the Bay
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
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
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
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
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
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
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.designsingapore.org/pda/award-recipients/2013/gardens-by-the-bay-bay-south-garden
Thank You

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