



Implementation of SDG Goals by Architects in Singapore practices

15th and 16th January 2025

Colombo, Sri Lanka



Sustainable Development Goals (SDGs)



Image Credit: United Nations

SDGs Most Relevant to Singapore



Creating environments that support health, wellness, & social equity



Integrating renewable energy solutions into architecture



Using smart tech, green construction methods, & innovation

SDGs Most Relevant to Singapore



Creating eco-friendly, resilient urban spaces



Incorporating sustainable materials & reducing construction waste



Designing for climate resilience, energy efficiency, & low-carbon buildings

Sustainability in Singapore's Architectural Landscape

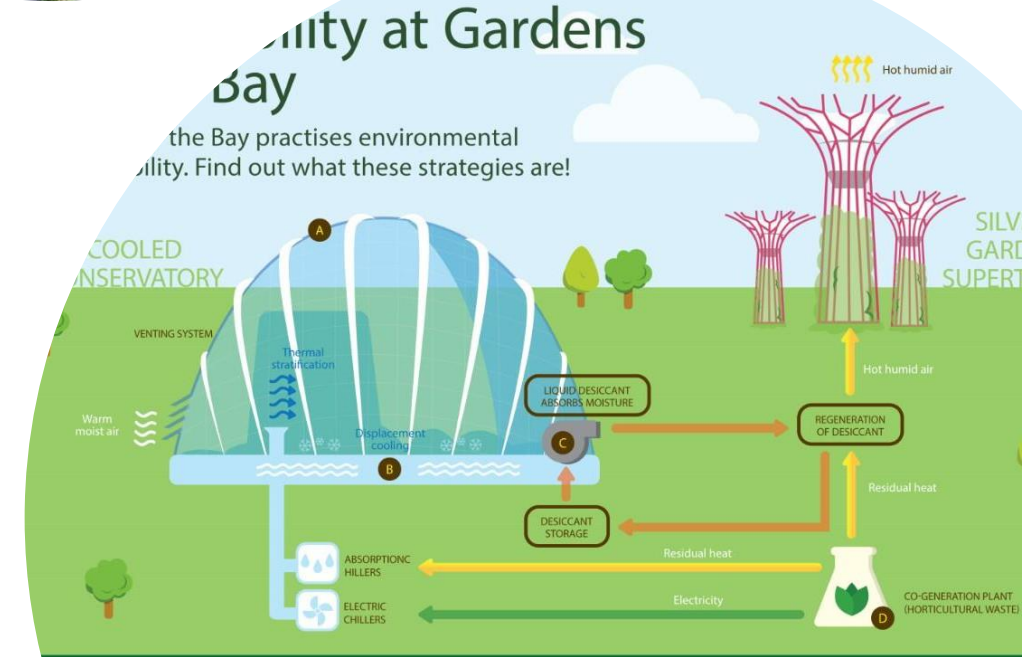
- Govt Policies & Initiatives
 - Green Building Masterplan
 - Target 80% of SG's building to be green by 2030
 - Sustainable Singapore Blueprint
 - Strategic direction for a green, livable and sustainable SG
 - BCA Green Mark Scheme
 - Benchmark for green building performance





Case Study: Marina Bay Sands & Gardens by the Bay

- Marina Bay Sands
 - Integration of energy-efficient systems (solar panels, passive design).
- Gardens by the Bay
 - Solar Panels on Supertrees, Spectrally Selected Glass Panels for Conservatories, Water management systems e.g. rainwater harvesting.



Cooled Conservatories

- A. Spectrally selected glass panels:
 - minimise solar heating of the conservatories, and maximise light for the plants.
- B. Water pipes in the ground:
 - ground, enabling cold air to settle at the cooled areas.

- C. Air in domes is de-humidified:
 - to reduce the amount of energy required in the cooling process.
- D. Horticultural waste:
 - fuels our biomass-powered plant to generate heat and electricity for the chillers.

Supertrees

- Solar panels on their canopies:
 - capture and convert solar energy to electricity for lighting up the Supertree

Implementing SGDs in Architectural Practice



Design for Climate Resilience: CapitaSpring

- Vertical Greenery: over 80,000 plants to combat urban heat island effect and improve air quality.
- Passive Design Strategy: max natural ventilation and daylighting, reduce reliance on artificial cooling systems
- Rainwater Harvesting: collects rainwater for irrigation
- Resilient Material Selection: durable & weather-resistant material to withstand SG's tropical climate (high humidity + heavy rainfall)
- Energy Efficiency: include smart sensors for lighting and cooling, helping to reduce carbon footprint



Implementing SGDs in Architectural Practice



Smart Design & Technologies: Marina One

- BIM: BIM used throughout Marina One's design & construction processes to enhance precision in resource mgt, optimize building performance & reduce construction waste.
- Solar Energy Systems: Solar panels to harness renewable energy, contributing to building's energy efficiency & reducing reliance on non-renewable resources
- Green Heart Design: the centrepiece is a biodiverse sanctuary with over 350 species of trees & plants. This vertical garden promotes natural cooling, reduces urban heat island effect, & enhances air quality
- Eco-Friendly Materials: Sustainable & recyclable materials used extensively, ensuring lower environmental impact during construction & operation
- Energy Efficient Systems: motion-sensor lighting and energy efficient HVAC system, reducing energy consumption
- Rainwater Harvesting
- Smart Cooling Technologies: uses district cooling systems to regulate indoor temperatures, reducing overall energy consumption compared to conventional cooling methods



Implementing SGDs in Architectural Practice

Circular Economy in Construction: Kampung Admiralty

- Reuse & Recycling Materials: Construction utilized recycled concrete aggregates (RCA) & eco-concrete made from industrial-by products. Reused of timber & other materials during demolition of previous structures
- Adaptable & Modular Design: allow for flexible repurposing of spaces as community needs evolve over-time. Spaces within are designed to be multi-functional
- Life Cycle Approach: Material with lower embodied carbon & longer lifespans were prioritized, ensuring building remains functional and sustainable over its lifecycle
- Integrated Sustainability: Green roofs & extensive landscape improve insulation & biodiversity. Rainwater harvesting & energy efficient systems enhance building's environment performance.
- Community-Centric Designs: shared facilities reduce need for redundant construction, promoting a communal approach to reduce usage





Challenges & Opportunities for SG Architects

- **Challenges**
 - **Cost:** Green materials and technologies may have a higher initial cost.
 - **Knowledge Gaps:** Limited expertise in emerging sustainable practices.
 - **Regulations:** Navigating complex regulations in building codes and sustainability standards.
- **Opportunities**
 - **Government Support:** Access to incentives, grants, and sustainability frameworks (e.g., Green Mark certification).
 - **Collaboration:** Opportunities for interdisciplinary partnerships (urban planners, engineers, policy makers).
 - **Innovation and Market Demand:** Growing demand for sustainable, eco-friendly spaces in the region.



Thank you.