Integrated Smart Green Technologies for Improving Human Health, Wellbeing and Productivity

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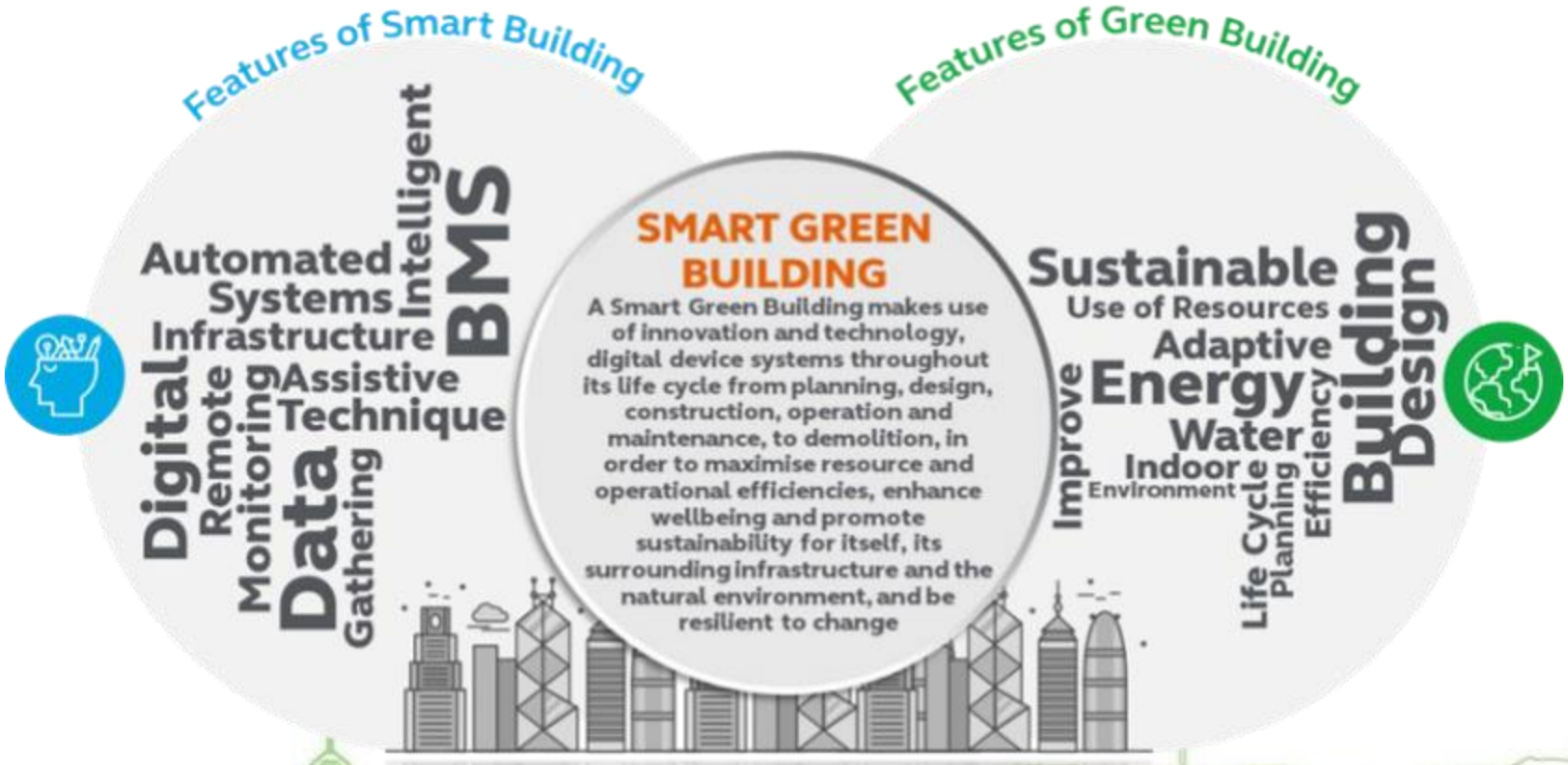
Hong Kong Green Building Council

Presentation Outline

1. Integration of Smart Green Building Technology
2. Principal Strategies for Smart Green Buildings
3. Overseas Case Studies
4. Local Case Studies
5. Way Forward

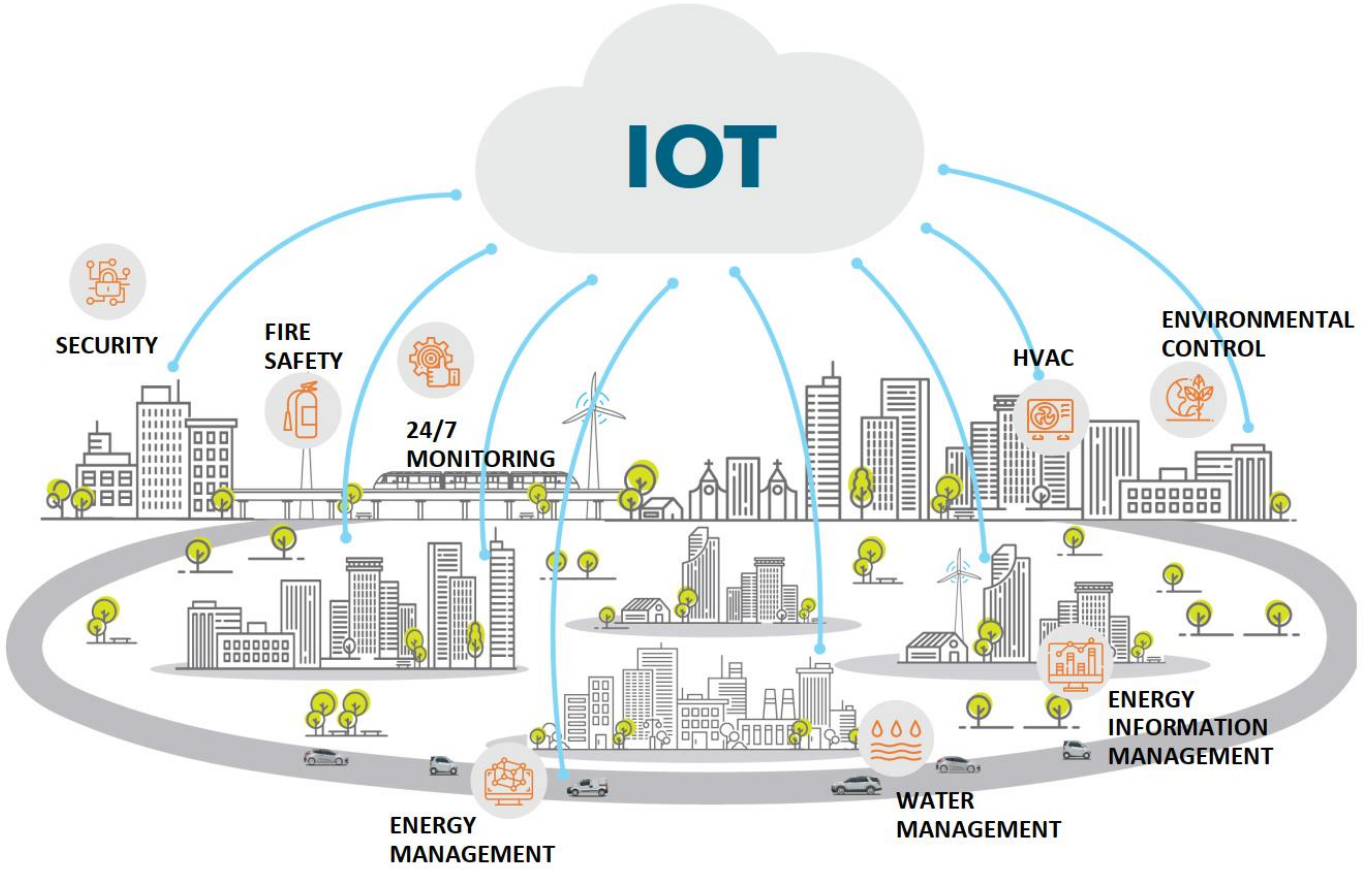
Integration of Smart Green Building Technology

- The Interface between the Smart and Green Buildings



Integration of Smart Green Building Technology

- The Internet of Thing (IOT) is the "Backbone" to Smart Green Buildings



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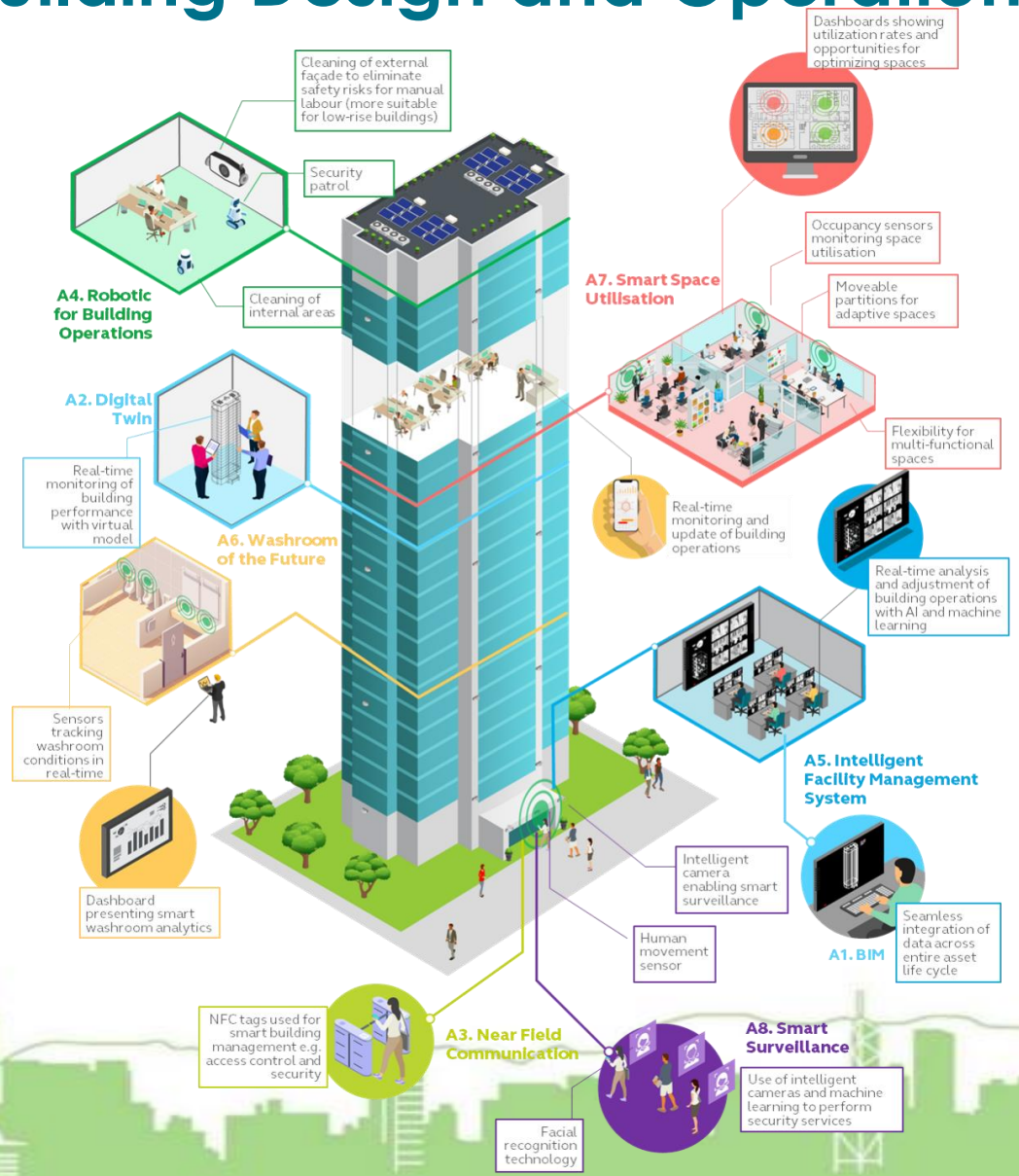
Principal Strategies for Smart Green Buildings

1) Building Design and Operations

- A1. **BIM**
- A2. **Digital Twin**
- A3. Near Field Communications **(NFC)**
- A4. **Robotics** for Building Operations
- A5. Intelligent Facility Management **(iFM)** System

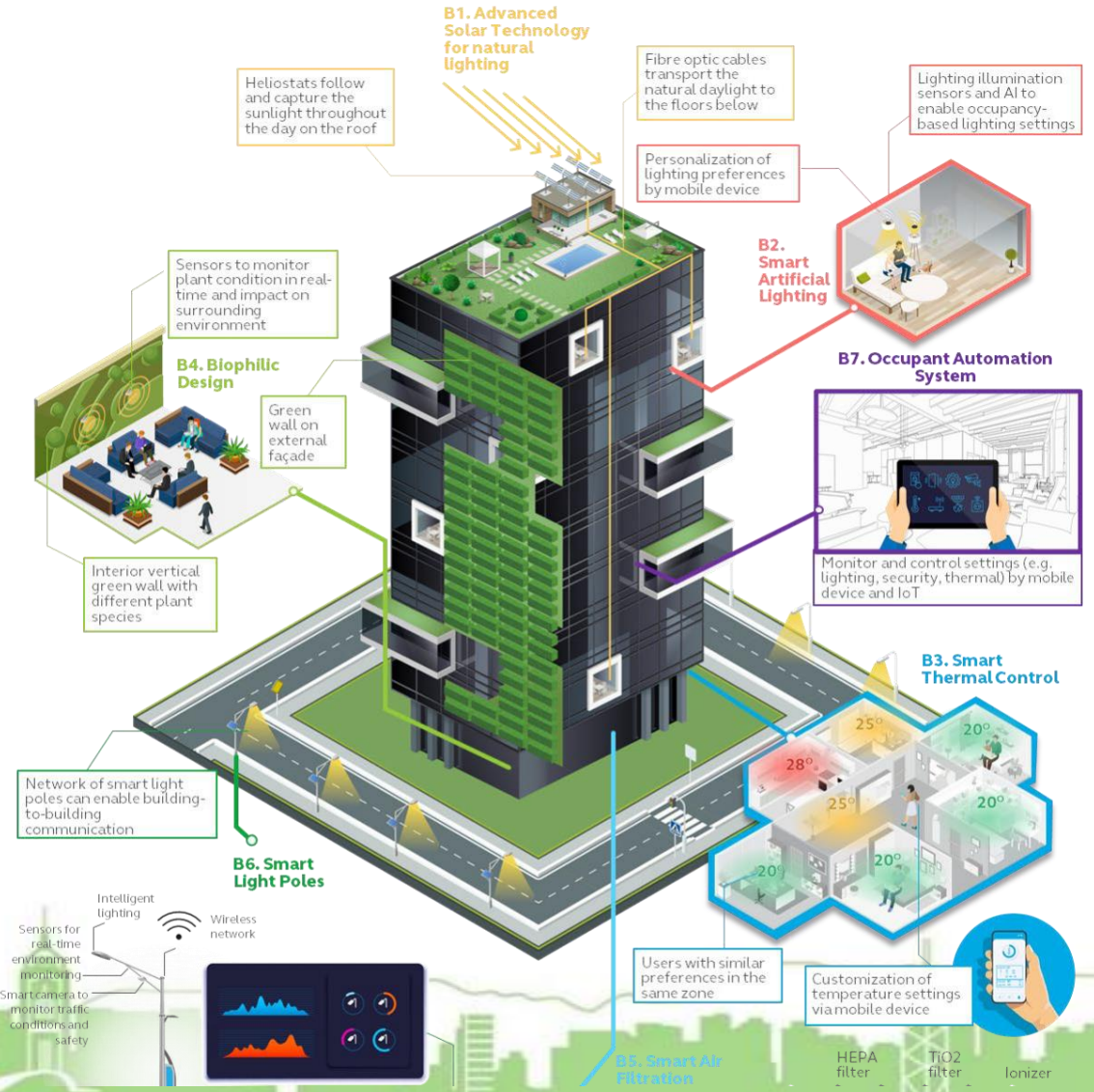


- A6. **Washroom** of the Future
- A7. Smart **Space Utilisation**
- A8. Smart Surveillance

Principal Strategies for Smart Green Buildings

2) Health and Wellbeing

- B1. Advanced **Solar Technologies** for Natural Lighting
- B2. **Smart Artificial Lighting**
- B3. **Smart Thermal Control**
- B4. **Biophilic Design**

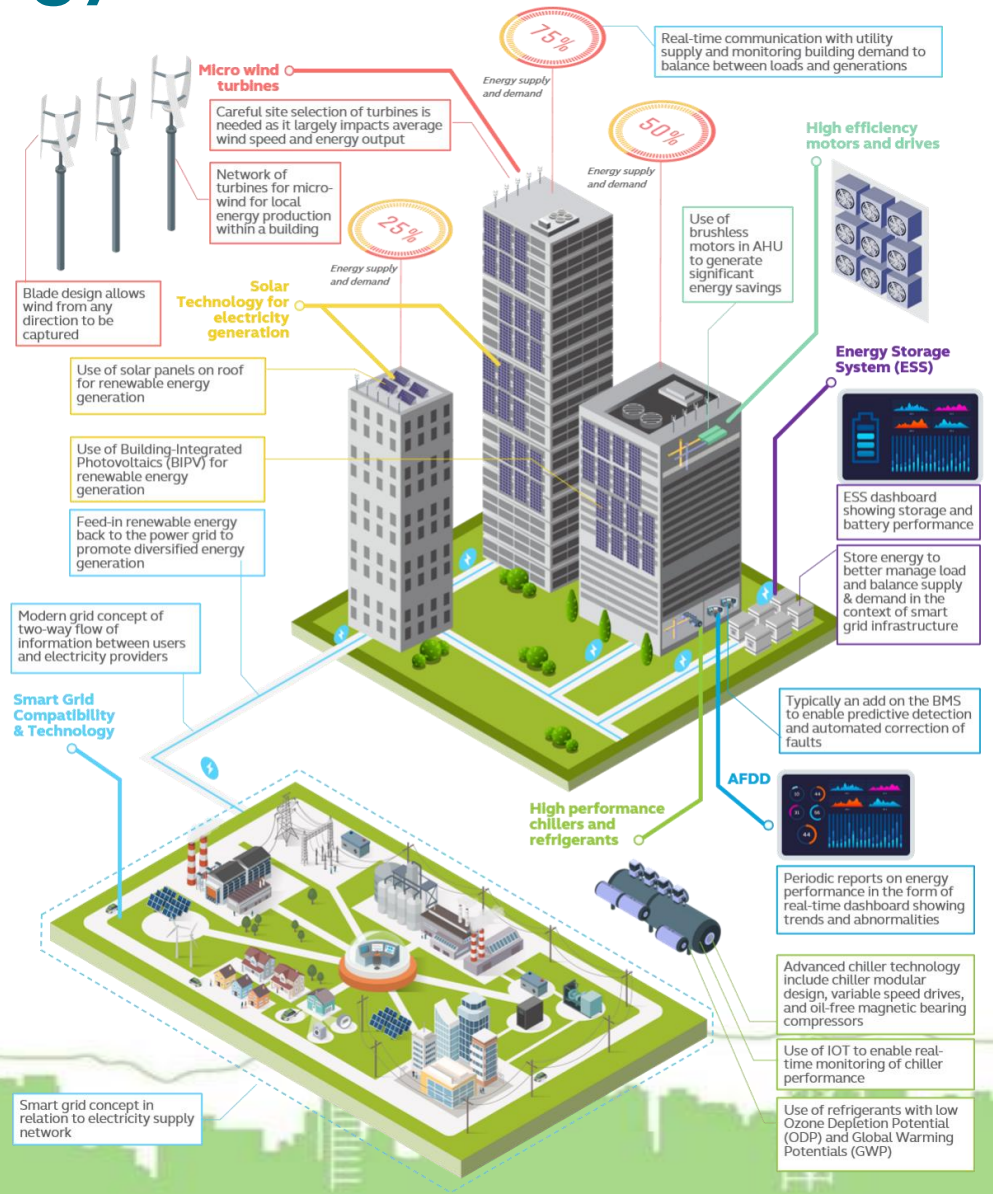


- B5. Smart **Air Filtration**
- B6. Smart Light Poles
- B7. **Occupant Automation System**

Principal Strategies for Smart Green Buildings

3) Energy Performance

- C1. AFDD (**Automatic Fault Detection and Diagnostics**)
- C2. **Smart Grid** Compatibility & Technology
- C3. **Energy Storage** System
- C4. **High Performance Chillers and Refrigerants**

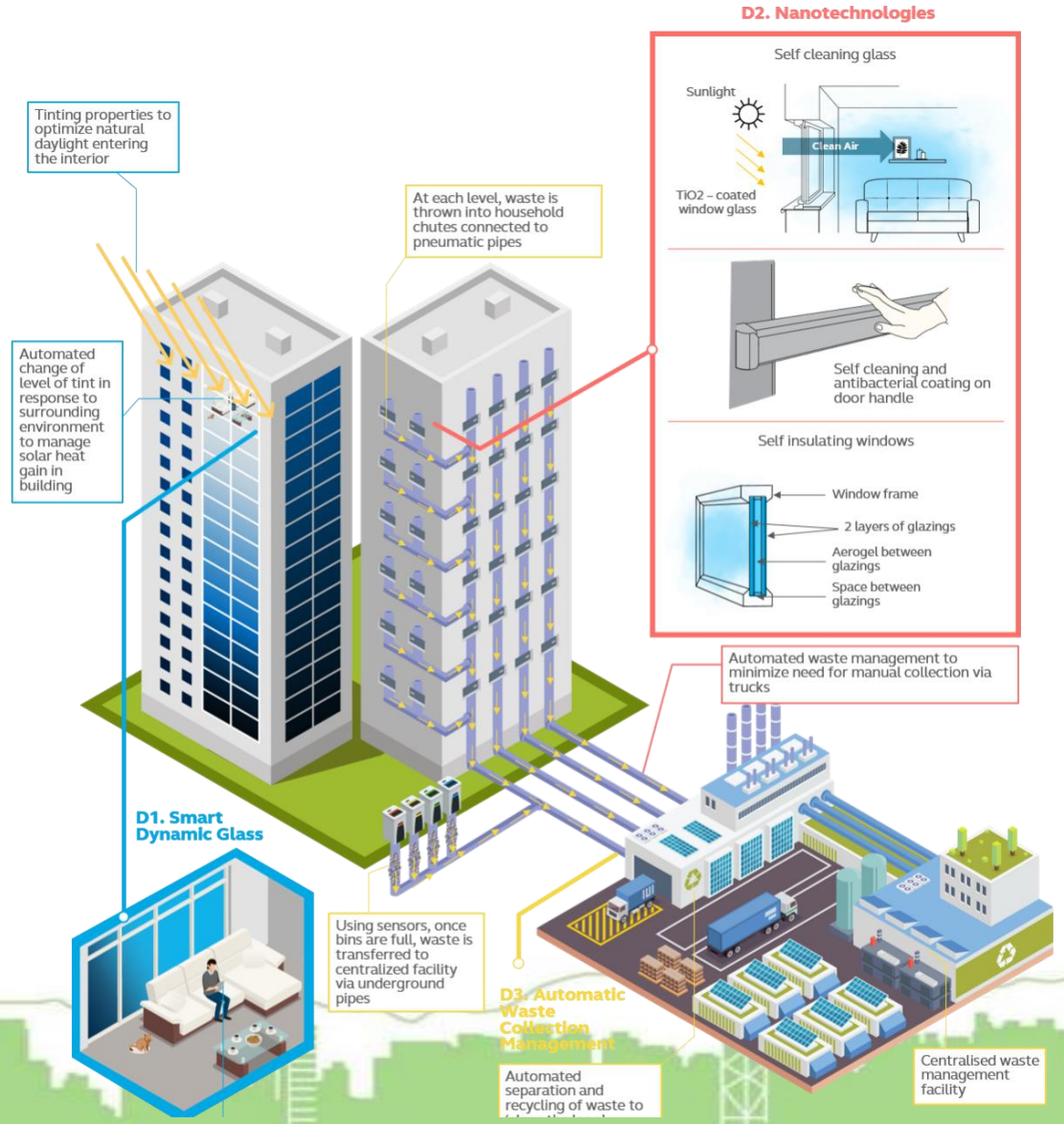


- C5. High Efficiency Motors and Drives
- C6. Solar Technology for **Electricity Generation**
- C7. **Micro Wind Turbines**

Principal Strategies for Smart Green Buildings

4) Material and Waste Management

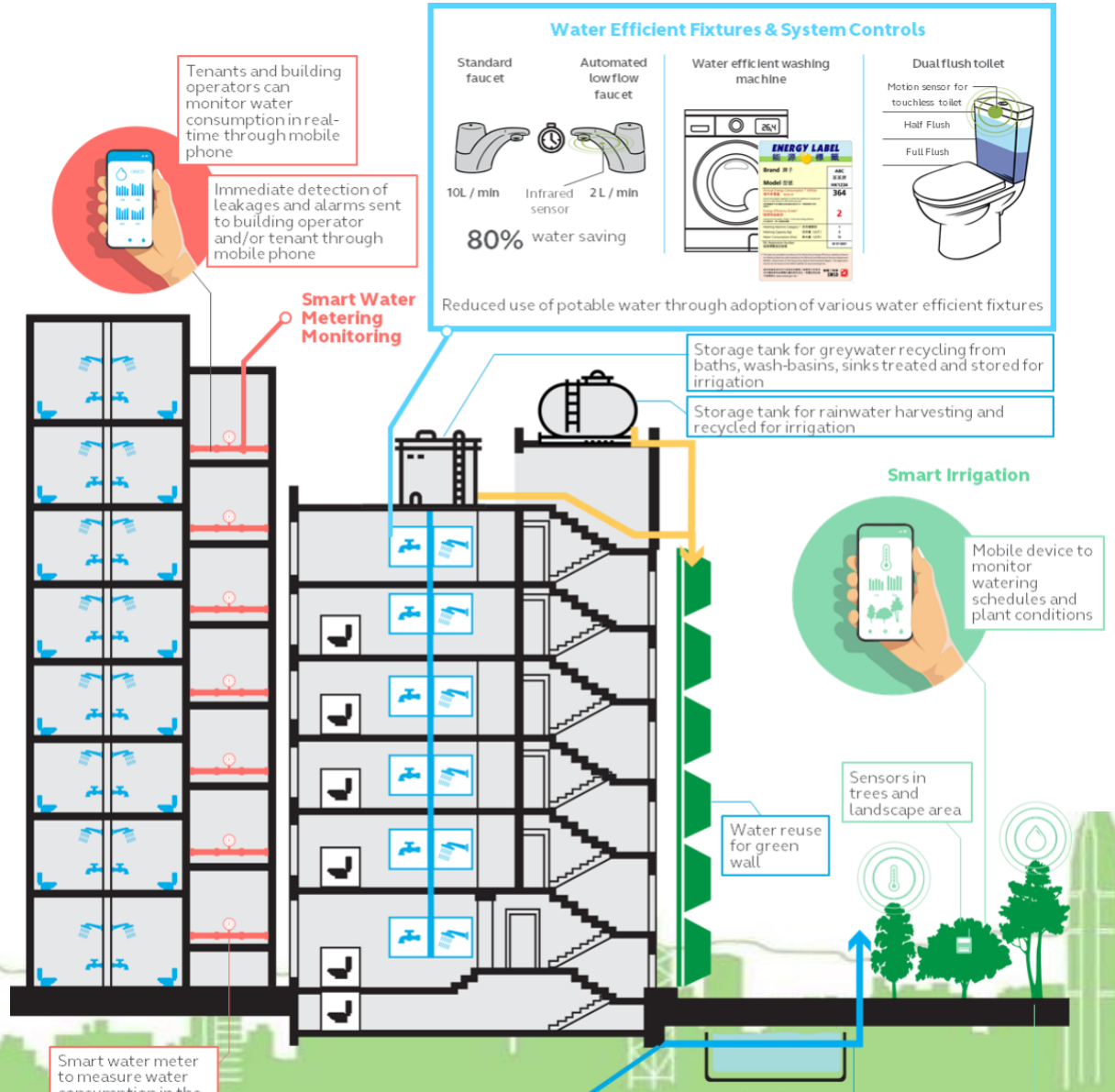
- D1. **Smart Dynamic Glass**
- D2. **Nanotechnologies**
- D3. **Automatic Waste Collection System**



Principal Strategies for Smart Green Buildings

5) Water Performance

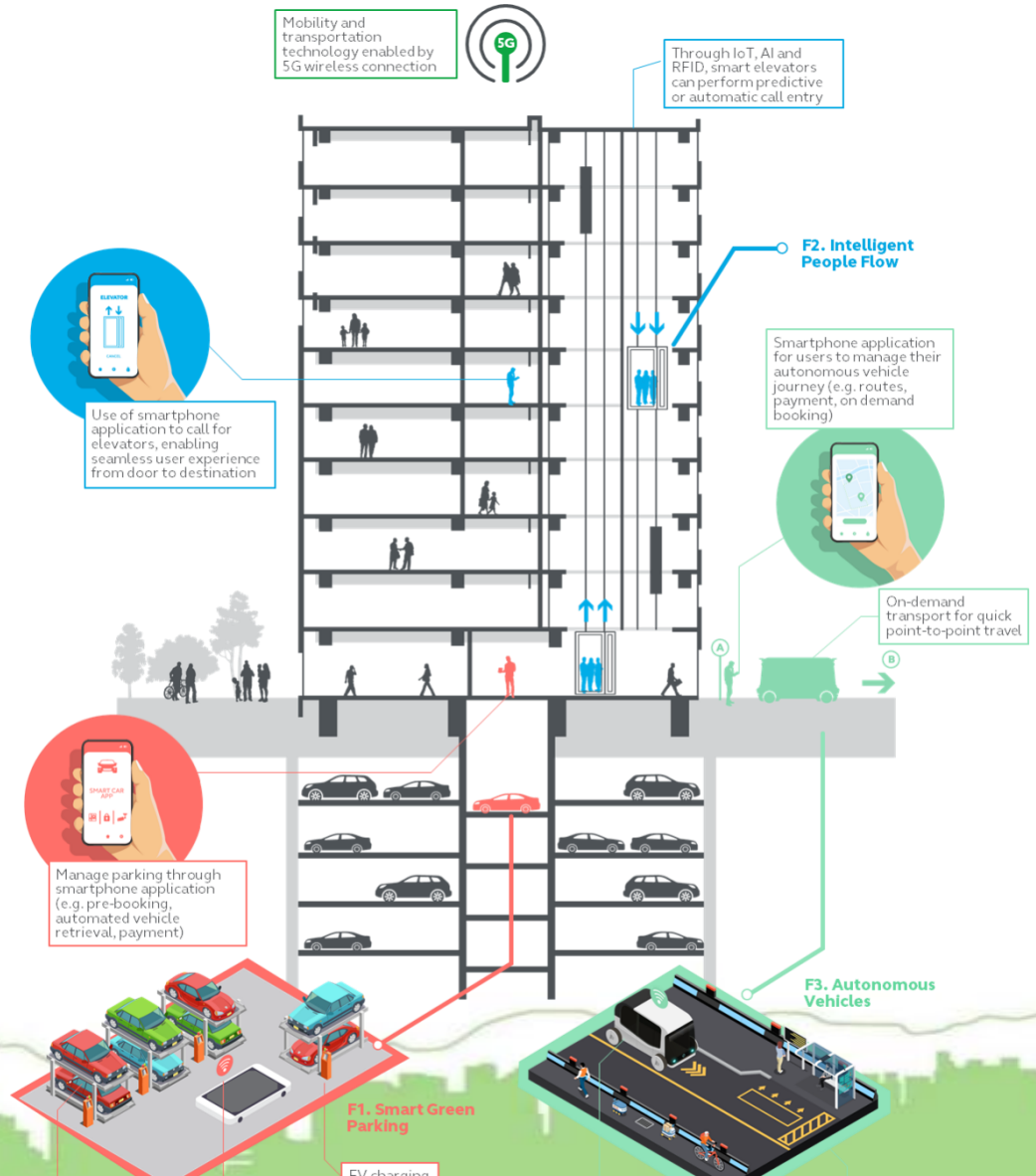
- E1. **Smart Water Metering and Monitoring**
- E2. **Water Efficient Fixtures and System Controls**
- E3. **Grey Water Reuse & Harvesting Rainwater**
- E4. **Smart Irrigation**



Principal Strategies for Smart Green Buildings

6) Mobility and Transportation

- F1. **Smart Green Parking**
- F2. **Intelligent People Flow**
- F3. **Autonomous Pods**



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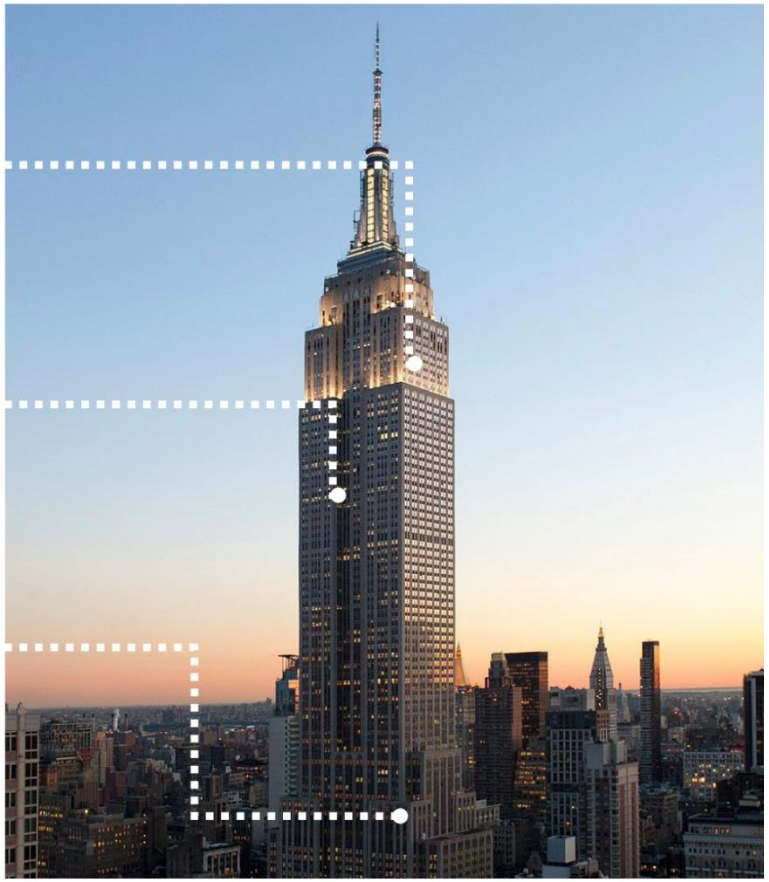
Overseas Case Studies

EMPIRE STATE BUILDING

Use of high-recycled content construction materials

Efficient direct digital controls (DDC) system

Chiller plant retrofit



High-efficiency triple-glazed window replacement for all 6,500 windows

Enhanced thermal comfort from better windows

Over 6,000 radiators retrofitted to reduce heat loss

Modernised elevators with regenerative technology reducing energy usage by 50% to 75%

Overseas Case Studies

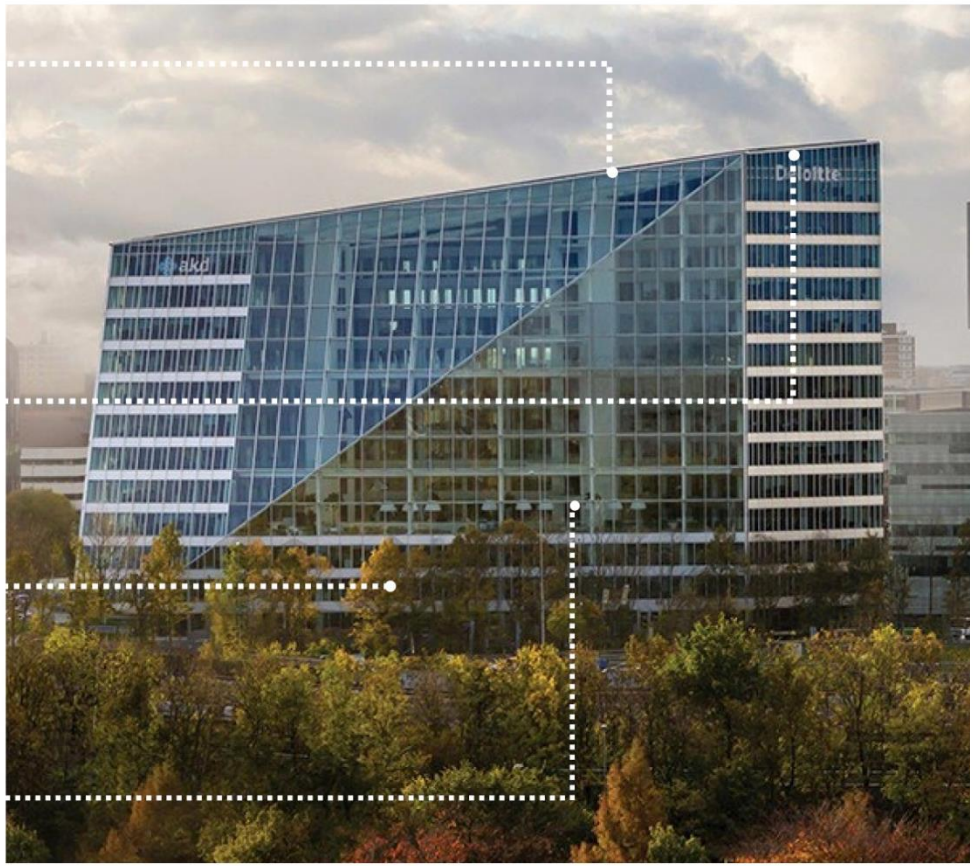
THE EDGE

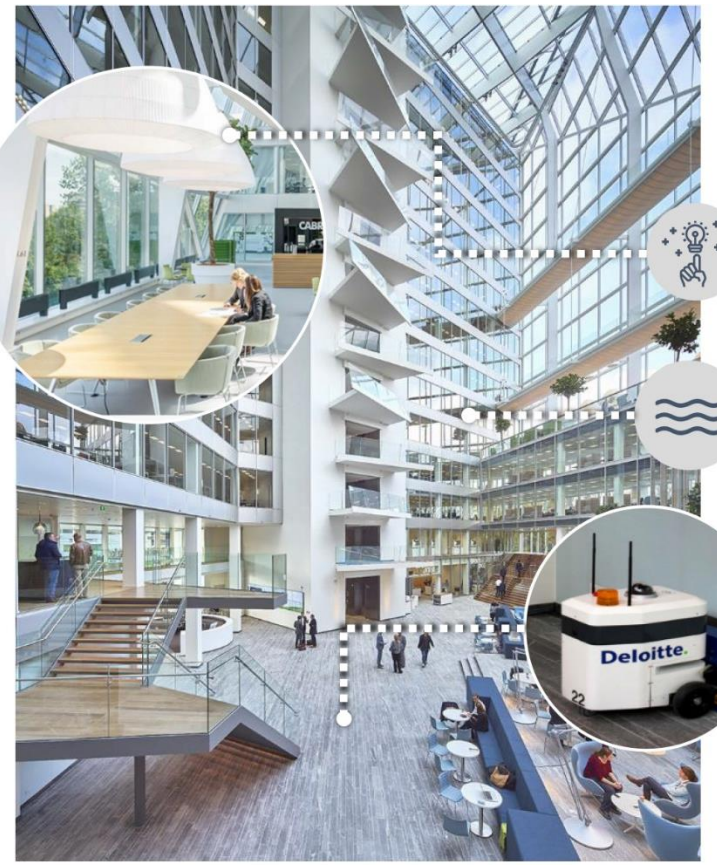
65,000 sq. ft of solar panels

Collection of rainwater on roof

Ecological Corridor

Smart building design and orientation





LED-lighting system powered by Ethernet and 100% IP based

Every workspace is within 7 metres of a window

Use of RoboCop for security and cleaning

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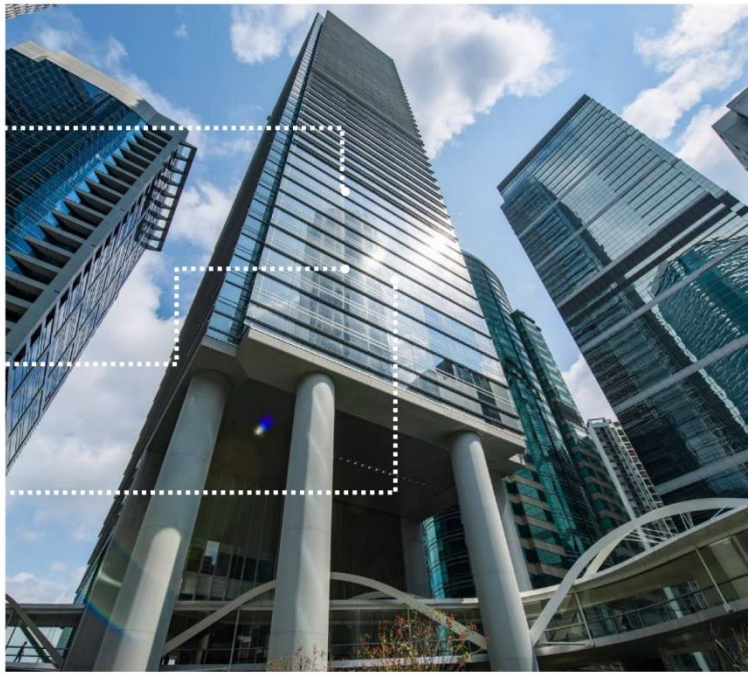
Local Case Studies

ONE TAIKOO PLACE



High performance façade

Curtain walls equipped with extra wide panels maximizing sunlight

Solar responsive façade

One Taikoo Place, completed in 2018, is part of a redevelopment project of Taikoo Place, featuring eight other properties to create one of Hong Kong's best-planned business hubs. The redevelopment is an ongoing milestone project to realise Swire Properties' long-term vision to creative planning and community building. Through collaboration with international designers, Taikoo Place has become a vibrant office space surrounded by landscaped gardens, water features, restaurants, and cafes.

As part of the redevelopment project, One Taikoo Place was designed to the highest standards of efficiency and sustainability, combining the latest and most advanced sustainable/green technologies. During development, over 78% of the demolition debris was recycled in compliance with BEAM Plus requirements, and 68% of the construction waste was also recycled. The building is committed to elevating human health and the wellbeing of its occupants through implementing WELL Certification, and other smart and sustainable endeavours.

2.5% renewable energy generated

33% energy reduction annually

Adoption of high efficiency chiller and AHU with EC plug fan

Adoption of Neuron, AI smart building console

69,000 sq. ft. of green space/ landscaped plazas

Rainwater collection

Local Case Studies

DOUBLE COVE

Adoption of rainwater recycling system

BIM to achieve better planning, design and quality of construction and minimize waste

Use of low-VOC materials for enhanced indoor air quality

Hybrid ventilat shopping arcac

Woodland and total landscape area is over 40% of total site area

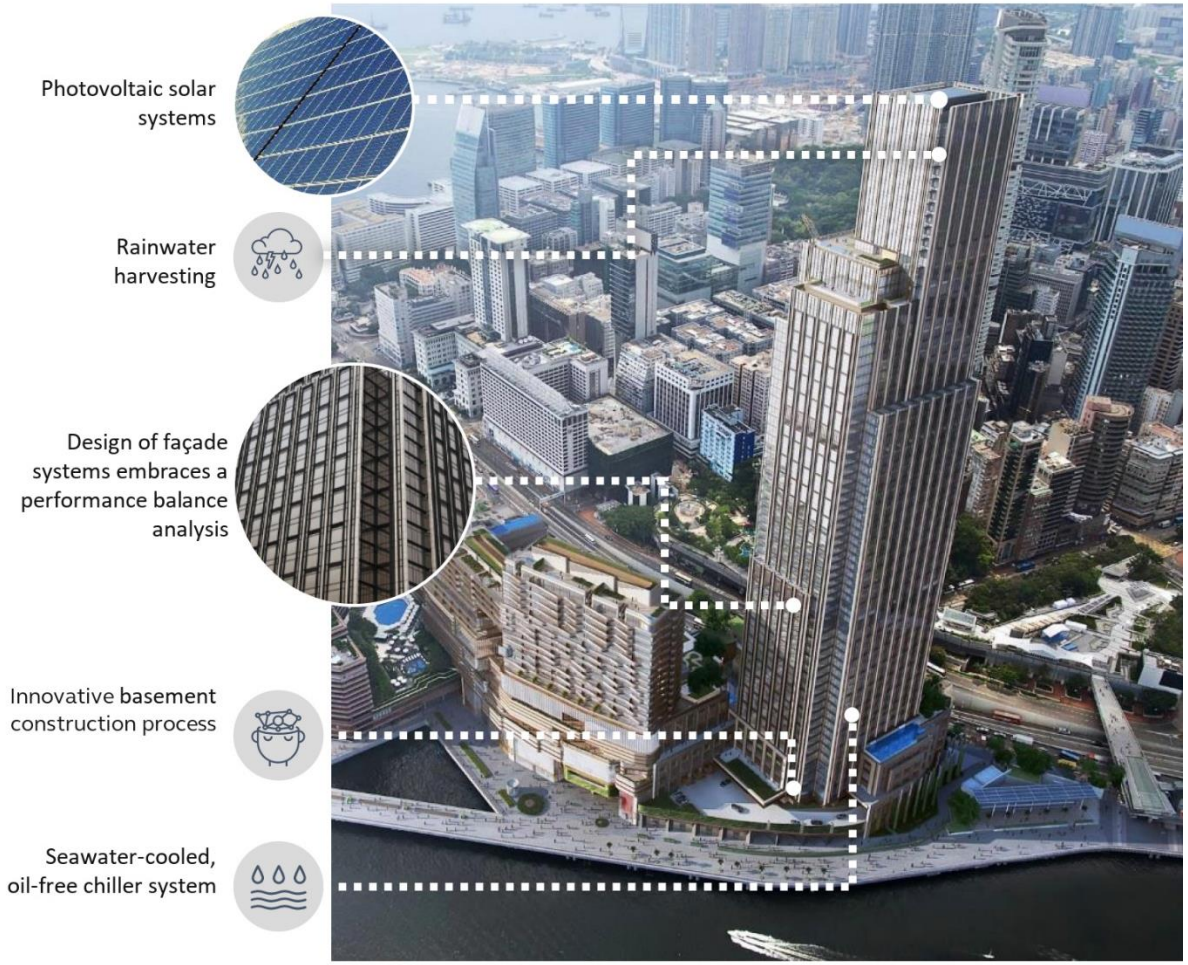
Communal bike rental services an over 80% EV char stations

Indoor air quality sensors and ventilation control

Home automation system accessed from smart devices

Local Case Studies

K11 (Victoria Dockside)



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Way Forward

1. Government Policy Support

Hong Kong is striving to become a smarter city, and to use innovation and technology to create a more sustainable environment. Over the past years, the Government has introduced the concept of Green Buildings, and how to incorporate the concept of sustainability into building design and management. For example,

1. HKGBC BEAM Plus for NB / EB / BI / ND
2. Green Contractor Award Scheme
3. Smart City Blueprint
4. The Office of the Government Chief Information Officer (OGCIO)
5. Public Sector Information (PSI) portal

Way Forward

2. Communication between the Government and industry

Developers often find it difficult to implement such strategies without the suitable knowledge or support. Therefore, to better support industry practitioners, the Government can continue to **release open data plans** to support the development of **smart green buildings.**

3. Public Awareness and Education

HKGBC is going to release the Smart and Green Guidebook for buildings. While past works have focused on either ‘smart’ or ‘green’ buildings, this Guidebook has been developed to try and redefine the interface between the two.

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