



BCA AWARDS 2017

Recognising Excellence in the Built Environment



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BCA Green Mark

CHAMPION AWARD

The **BCA Green Mark Champion Award** was launched at BCA Awards 2008. This award recognises developers with strong commitment towards corporate social responsibility and outstanding achievements in environmental sustainability. It is given to developers who achieve a substantial number of Green Mark buildings at Gold level and higher.

In 2016, BCA introduced a new sub-category called BCA Green Mark Platinum^{STAR} Champion in recognition of the efforts of those who have achieved 50 or more building projects with Green Mark Platinum rating.

There are two categories for this award:

- BCA Green Mark Champion
- BCA Green Mark Platinum Champion
 - BCA Green Mark Platinum^{STAR} Champion
 - BCA Green Mark Platinum Champion

Besides demonstrating a strong commitment towards corporate social responsibility and environmental sustainability, developers must meet these criteria to qualify:

Total no. of buildings rated	BCA Green Mark Champion	BCA Green Mark Platinum Champion	
		Platinum Champion	Platinum ^{STAR} Champion
Green Mark Gold & above	At least 10	At least 50	-
Green Mark Gold ^{PLUS} & above	At least 6	At least 30	-
Green Mark Platinum	At least 3	At least 15	At least 50

BCA GREEN MARK CHAMPION AWARD



Defence Science and Technology Agency

The Defence Science and Technology Agency (DSTA) is responsible for the planning and design of building and infrastructure facilities in support of the Ministry of Defence (MINDEF) and the Singapore Armed Forces (SAF). Environmental Sustainability is a key part of DSTA's design philosophy, and is strongly ingrained in our design and planning processes through the DSTA environmental sustainability framework.

New facilities are designed by DSTA to meet MINDEF's operational requirements, while being liveable for servicemen, energy efficient, and maintainable. While many facilities delivered by DSTA are not showcased due to security reasons, DSTA's commitment to sustainability can be seen in Green Mark Platinum-awarded projects such as the DSTA Integrated Complex (DIC). In line with our philosophy, DSTA emphasizes on passive designs and adopts best practices using mature energy efficient systems such as building automation, LED lighting and chilled beam air-conditioning in the DIC, while at the same time testing innovative technologies and designs that could contribute to green and sustainable outcome such as the adoption of mass engineered timber. Existing MINDEF buildings are also constantly being retrofitted and improved by DSTA to be more sustainable, as evidenced in the upcoming replacement of all lighting in MINDEF facilities to energy efficient LEDs.

DSTA is honoured to be recognised with the Green Mark Champion Award, which is a validation that our design criteria are in line with the national practice. We will continue our strong commitment to shaping a green and sustainable built environment in all existing and future MINDEF facilities.



DSTA Integrated Complex

BCA GREEN MARK CHAMPION AWARD

People's Association

One of the People's Association (PA) strategic thrusts is to transform community infrastructure into lifestyle & bonding destinations to meet the changing needs and aspirations of residents. The focus is to create conducive community space that bring residents together to meet, interact, bond and build social capital. PA is committed to see that its buildings and facilities are also environmentally-friendly.

PA has embarked on green and sustainable efforts in transforming its community infrastructures since 1990s. To date, 13 of its facilities are green mark gold rating and above. Its Headquarters at King George's Avenue was one of the very few buildings that have achieved Green Mark Gold^{PLUS} rating in 2007. The design is inspired by the idea of a "rain tree with outreach foliage" and lauded for its innovation in environmentally-sustainable design which includes a naturally-ventilated central atrium, a "breathing wall" and a lightweight secondary roof with building integrated photovoltaic skylights.

PAssionWaVe@Marina Bay is PA's first Green Mark Platinum building built in 2014. Located within the Bay East Gardens, the design is based on a series of large tropical leaf shape that reflect its tropical and garden-like setting. The design also captures the essence of a waterfront park ambience and other sustainable design features includes an airy circulation spine with ample daylighting and natural ventilation, integration of landscape roof deck and efficient building orientation.

Ci Yuan Community Club (CC) is the first Green Mark Platinum CC built in 2015. It integrated with a hawker centre that installed food waste digester. The CC also has auto drip irrigation system with extensive use of green materials and landscapes on every level.

Our Tampines Hub (OTH), Heartbeat @ Bedok and Wisma Geylang Serai (WGS) are other integrated community and lifestyle hubs that are Green Mark Platinum award winners that bring together multiple agencies to offer a wide range of services, programmes and facilities to residents in the Heartland. These projects represent the whole of government resident-centric model for development of community building through meaningful engagement at all levels. The eco-sustainability efforts include an efficient food waste management system at OTH that converts all food waste from the supermarket, hawker centre and F & B outlets into useful by-products. At Heartbeat @ Bedok, the main theme is greenery which helps to cool the building and save energy. WGS adopted a passive design to achieve a high ratio of natural ventilated community spaces and the reuse of former Malay Village's architectural elements in some of architectural design within its building.

The most recent Green Mark Gold^{PLUS} award winner for an existing building is Bukit Panjang CC. This is the first Eco-CC project with strong collaboration from PA, Community Development Council and grassroots organisations. The CC is installed with solar panels as a renewable energy source, sensors for monitoring use of power and water. The CC has also set up monthly waste monitoring systems, education corners, recycling box for electronic products and organising green activities to promote environmental sustainability among the residents.



People's Association Headquarters



Ci Yuan Community Club



Heartbeat @ Bedok



Wisma Geylang Serai

BCA Green Mark

PEARL AWARD

The **BCA Green Mark (GM) Pearl Award** is a prestigious award that recognises the strong commitment of developers/ building owners/ landlords and tenants of the same project/ building working in tandem to achieve greater environmental sustainability for their project/ building. The Award is given to developers/ building owners/ landlords who have a substantial number of tenants who are GM certified under the GM occupant-centric schemes within a base building which is GM Gold^{PLUS} or higher.

There will be two tiers of the Award:

Green Mark Pearl Award and **Green Mark Pearl Prestige Award**.

The Awards will be given out for the following three building types:

1. Commercial Offices
2. Retail Malls
3. Business Park Developments

BCA GREEN MARK PEARL PRESTIGE AWARD



Fuji Xerox Towers

Since 1995, leading eco-developer City Developments Limited (CDL) has embraced its ethos to 'Conserve as it Constructs', integrating sustainability in its business and operations. CDL adopts a triple bottom line strategy focused on financial, environmental, and social performance. Beyond developing green buildings, CDL has encourages and enables its commercial tenants to play a more proactive role in Singapore's green building agenda, through the CDL Green Lease Partnership programme.

Developed and managed by CDL, Fuji Xerox Towers, a Green Mark Platinum building, is a recipient of the Green Mark Pearl Prestige Award. Located at Anson Road in Singapore's Central Business District, the 48,688 sqm 38-storey office building was completed in 1987. Its green features include heat recovery pre-cooled air-handling units, natural lighting and ventilation at the atrium, extensive greenery and rooftop garden, bicycle bays and showers facilities.

Under CDL's recycling programme, Fuji Xerox Towers has been tracking the paper recycling rate amongst its tenants since 2009. It also recycles lamp tubes, which resulted in over 350 kilograms (kg) of lamp tubes being diverted from landfills. In addition, water-efficient fittings have been installed at all toilets and pantries to conserve water.

CDL also encourages its tenants of Fuji Xerox Towers to implement green practices at their workplace. One such example is Fuji Xerox Singapore, which has adopted the use of energy-efficient office equipment, natural daylighting, Forest Stewardship Council (FSC)-certified paper materials, Singapore Green Building Product carpets and Singapore Green Labelling Scheme-certified stationeries. This enabled Fuji Xerox Singapore to achieve Green Mark Office Interior (GMOI) Gold^{PLUS} award.

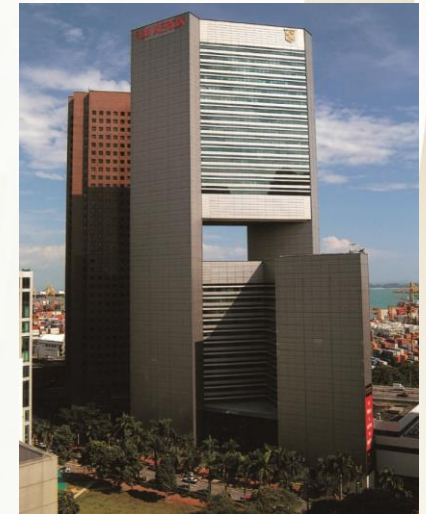
As an incentive to encourage greater energy conservation amongst tenants, CDL also introduced a 1% electricity rebate for those who attain 2% savings over the previous quarter's bill.

Two of its tenants, Prudential and Conergy, which leveraged on the support of CDL Lease Partnership programme to green fit their premises, attained the GMOI Gold award.

Landlord/Owner:



**CITY
DEVELOPMENTS
LIMITED**



BCA GREEN MARK PEARL AWARD



King's Centre

Developed and managed by CDL, King's Centre, a recipient of this year's Green Mark Pearl Award, was recertified Green Mark Platinum in 2016. Completed in 1999, the 11,047 sqm integrated waterfront development comprises an eight-storey office-cum-retail building and the 30-storey Grand Copthorne Waterfront Hotel Singapore.

Its prominent green features include: a series of 6.3 kilowatt-peak rooftop solar photovoltaic panels; carbon emission monitoring and control system at the basement carpark; motion sensors for lighting at common areas and staircases; the use of NEWater instead of potable water for cooling tower; and green roofs at the fifth and sixth floors.

Under the CDL's recycling programme, King's Centre has been tracking the paper recycling rate amongst its tenants since 2009. Water-efficient fittings have been installed at all toilets and pantries to conserve water.

As at 1 January 2017, under CDL's Green Lease Partnership programme, 100% of the existing tenants at King's Centre have committed to adopting green practices within their premises. One such example is Murdoch University, which has adopted the use of energy-efficient office equipment, FSC-certified paper towels, and extensive daylight provision achieved through an open-office concept.

As an incentive to encourage greater energy conservation amongst tenants, CDL also introduced a 1% electricity rebate for those who attain 2% savings over the previous quarter's bill.

Murdoch University, along with Grand Shanghai and Pentair, has achieved GMOI certification.

Landlord/Owner:



**CITY
DEVELOPMENTS
LIMITED**



BCA GREEN MARK PEARL AWARD



City Square Mall

Developed and managed by CDL, City Square Mall, the first mall to receive Green Mark Pearl Award, is Singapore's first Eco-Mall. Completed in 2009, it is also the first mall in Singapore to achieve the highest honour of Green Mark Platinum Award in 2007 (recertified in 2015).

Located at the junction of Serangoon Road and Kitchener Road, City Square Mall is a 65,032 sqm 11-storey development comprising about 200 tenants.

Its prominent green features include: light motion sensor at the carpark, energy-efficient light-emitting diode and T5 lights; daylighting provisions; designated recycling corners; recycling programme for electronic waste products; food waste EcoDigester for its F&B tenants; and eco-messages at various parts of the mall.

Under CDL's recycling programme, City Square Mall has been tracking the paper recycling rate amongst its tenants since 2009. It also recycles lamp tubes, which resulted in over 740 kg of lamp tubes being diverted from landfills. In addition, water-efficient fittings have been installed at all toilets and pantries to conserve water, enabling City Square Mall to become a Public Utilities Board Water Efficient Building.

As at 1 January 2017, under CDL's Green Lease Partnership programme, 100% of the mall's existing tenants have committed to adopting green practices within their premises. One such example is SSTC Institute, which has adopted extensive use of second-hand and collapsible furniture; extensive daylight provision in meeting rooms; paperless attendance tracking system; and segregation of recyclables within office premises. As an incentive to encourage greater energy conservation amongst tenants, CDL also introduced a 1% electricity rebate for those who attain 2% savings over the previous quarter's bill.

Of its 36 tenants that attained GMI certification, Capitol Optical, Decathlon, Singapore Post and SSTC Institute achieved Platinum ranking this year.

Landlord/Owner:



**CITY
DEVELOPMENTS
LIMITED**



BCA Green Mark

FOR BUILDINGS

The BCA Green Mark scheme was launched in 2005 as a key strategic programme to raise the awareness of sustainable and environmentally friendly buildings. It evaluates buildings for their environmental impact and performance. The benefits of Green Mark Buildings include cost savings resulting from efficient use of key resources such as energy and water, leading to lower operational and maintenance costs. Other less tangible benefits include enhanced occupant productivity and health due to good indoor environmental quality.

Buildings are assessed under the following criteria:

- Energy Efficiency
- Water Efficiency
- Environment Protection
- Indoor Environment Quality
- Other Green Features

The Awards will be given out for the following building types:

- i. Non-Residential Buildings (New & Existing)
- ii. Residential Buildings (New & Existing)
- iii. Schools
- iv. Landed Houses
- v. Healthcare Facilities

47 Jalan Buroh

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	CWT Limited
Architect:	Ace Architects & Associates
Structural Engineer:	Aston Consulting Engineers
M&E Coordinator:	Precise Projects Pte Ltd
Main Contractor:	Precise Development Pte Ltd & HPC Builders Pte Ltd
ESD Consultant:	IGnesis Engineering Pte Ltd

- Estimated energy savings: 8,821,273kWh/yr; Estimated water savings: 28,046.6m³; ETTV: 29.96W/m²
- Energy efficient chilled water plant – 0.61kW/RT
- VFD for Pumps & Cooling tower fans
- Energy efficient LED lighting system
- CO sensors for regulating the Car Park MV fans
- Solar PV of 539kWp that offsets 5% of the annual energy consumption
- Extensive use of Green Concrete with recycled aggregates (RCA & WCS)

Assisi Hospice

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Developer/Landowner:	Assisi Hospice
Project Manager:	Assisi Hospice
Architect:	New Space Architects Pte Ltd
M&E Engineer:	Meinhardt (Singapore) Pte Ltd
Contractor:	Soil-Build Pte Ltd
Landscape Architect:	Site Concepts International Pte Ltd
Quantity Surveyor:	Langdon and Seah (Singapore) Pte Ltd
ESD Consultant:	Meinhardt Façade Technology (S) Pte Ltd
Acoustics Consultant:	Acvicon Acoustics Consultants Pte Ltd

- Estimated energy savings: 1,169,305.49kWh/yr; Estimated water savings: 10,163.79m³; ETTV: 35.3W/m²
- Use of energy efficient low-E double glazing
- Use of extensive external shading devices, achieving overall ETTV of 35.3W/m²
- Use of NEWater for cooling tower make up water tank
- Twin compressor chillers with very high part-load efficiency of 0.45kW/RT @ 30%
- Use of sun pipes and motion sensors for energy efficient features
- Designed high delta-T chilled water plant (8°C)

Beach Centre

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: Asiawide Development Pte Ltd
Architect: DDA Resources Architects
M&E Engineer: K G Goh Consultants Pte Ltd
Structural Engineer: KTP Consultants Pte Ltd
Main Contractor: Hong Shin Builders Pte Ltd
ESD Consultant: Building System & Diagnostics Pte Ltd

- Estimated energy savings: 724,206kWh/yr; Estimated water savings: 757m³; ETTV: 31.58W/m²
- Façade with high performance DGU glazing
- Energy efficient centralized water cooled chilled water system
- Use of energy efficiency LED lights for entire building
- Solar panels of 100 kWp to harness and generate clean energy
- Use of water efficient water fitting
- Extensive use of locally certified environmentally friendly products for the building

Canberra Plaza

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Housing & Development Board
Architect:	SAA Architects Pte Ltd
M&E Engineer:	Bescon Consulting Engineers Pte
Structural Engineer:	KTP Consultants Pte Ltd
Quantity Surveyor:	Langdon and Seah (Singapore) Pte Ltd
Main Contractor:	Nanjing Dadi Construction (Group) Co., Ltd (Singapore Branch)
Landscape Consultant:	Tulin Designs Pte Ltd

- Estimated energy savings: 1,861,038kWh/yr; Estimated water savings: 2,128m³; ETTV: 29.38W/m²
- Façade with high performance DGU glazing
- Energy efficient centralized water cooled chilled water system
- Extensive use of energy efficiency LED lights
- Use of DC/EC fan coil units
- Use of water efficient water fitting
- Extensive use of locally certified environmentally friendly products for the building

Development of Camp Facilities at Kranji Camp III for OETI

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: Defence Science & Technology Agency (DSTA)
Architect: ID Architects Pte Ltd
M&E Engineer: PDC Consultant Engineers
Structural Engineer: E2000 Pte Ltd
Main Contractor: Quek Hock Seng Construction Pte Ltd
ESD Consultant: GreenA Consultants Pte Ltd

- Estimated energy savings: 112,784.33kWh/yr; Estimated water savings: 4,496.54m³; ETTV: 28.42W/m²
- Use of energy efficiency air-conditioning system with design system efficient of 0.68 kW/RT
- Efficient Lighting with use of LED
- All water fittings are rated excellent under WELS
- Extensive usage of sustainable products and low VOC paints
- Use of lifts with variable voltage variable frequency motor drive and sleep mode features
- CFD simulations are conducted to ensure good ventilation

Frasers Tower

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	FC Commercial Trustee Pte Ltd
Architect:	DP Architects Pte Ltd
M&E Engineer:	Squire Mech Pte Ltd
Structural Engineer:	Meinhardt (Singapore) Pte Ltd
Quantity Surveyor:	Rider Levett Bucknall LLP
Main Contractor:	Hyundai Engineering & Construction Co Ltd
Landscape Consultant:	Ong & Ong Pte Ltd

- Estimated energy savings: 5,119,761kWh/yr; Estimated water savings: 102,379.36m³; ETTV: 35.72W/m²
- Chiller plant efficiency of 0.562 kW/RT
- CO2 sensors for regulating the pre-cooled air supply to AHUs
- Motion sensors to control lighting at staircase, toilets and carpark
- Photocell sensors to control lighting in the Office area
- Regenerative power for lifts serving the offices
- Ductless fan for basement carpark ventilation

Grand Park City Hall

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Grand Park Property Pte. Ltd.
Architect:	RSP Architects Planners & Engineers (Pte) Ltd
M&E Engineer:	J Roger Preston (S) Pte Ltd
Structural Engineer:	RSP Architects Planners & Engineers (Pte) Ltd
Quantity Surveyor:	Barton Bruce Shaw Pte Ltd
Main Contractor:	Gennal Industries Pte Ltd
Landscape Consultant:	Coen Design International Pte Ltd
ESD Consultant:	Building System & Diagnostics Pte Ltd

- Façade with high performance DGU glazing
- Energy efficient centralized water cooled chilled water system of 0.556kW/RT
- Extensive use of energy efficiency LED lights
- Installation of photovoltaic cells at rooftop to harness solar energy
- Use of water efficient water fitting
- Rainwater harvesting for irrigation
- Heat pumps to provide hot water for guestrooms

JTC Chemicals Hub @ Tuas South

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: JTC Corporation
Architect: AWP Pte Ltd
M&E Engineer: Arup Singapore Pte Ltd
Structural Engineer: Beca Carter Hollings & Ferner (SE Asia) Pte Ltd
Quantity Surveyor: WT Partnership (S) Pte Ltd
Main Contractor: Tat Hin Builders Pte Ltd
ESD Consultant: Arup Singapore Pte Ltd

- Estimated energy savings: 959,902kWh/yr; Estimated water savings: 9,170m³; ETTV: 33.82W/m²
- Buildings are facing north and south, minimizing the solar heat gain
- Light Industrial Spaces designed for natural ventilation, with flexibility to be fitted out as air-conditioned and provided with chilled water connection
- Chilled water plant efficiency of 0.59kW/RT
- Use of high energy efficiency LED lightings
- Recycling rainwater for irrigation and toilet flushing purposes
- Use of Green Cement to replace Ordinary Portland Cement and Recycled Concrete Aggregate (RCA) and Washed Copper Slag (WCS) to replace natural coarse and fine aggregates in concrete

JTC Furniture Hub @ Sungei Kadut

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	JTC Corporation
Architect:	ID Architects Pte Ltd
M&E Engineer:	Arup Singapore Pte Ltd
Structural Engineer:	Arup Singapore Pte Ltd
Quantity Surveyor:	Langdon & Seah Singapore Pte Ltd
Main Contractor:	Straits Construction Pte Ltd
Landscape Consultant:	Martin Lee Designs
ESD Consultant:	Arup Singapore Pte Ltd

- Estimated energy savings: 4,140,185kWh/yr; Estimated water savings: 3,014m³; ETTV: 37.2W/m²
- Building is designed to promote natural ventilation into factory units
- Majority of west facing facade is well shaded from direct solar radiation
- Central chilled water plant with design efficiency of 0.596kW/RT
- Use of energy efficient LED fittings for common areas
- Use of sustainable construction materials such as green cement and recycled concrete aggregates to reduce building's embodied energy
- JTC is committed on Green Lease to engage tenants on delivering sustainable building outcomes

JTC nanospace @ Tampines

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: Jurong Town Corporation
Architect: JGP Architecture (S) Pte Ltd
M&E Engineer: CPG Consultants Pte Ltd
Structural Engineer: Tham & Wong LLP
Main Contractor: Kienta Engineering Construction Pte Ltd
ESD Consultant: Kaer Pte Ltd

- Estimated energy savings: 18,057,671.44kWh/yr; Estimated water savings: 2,192m³; ETTV: 35.55W/m²
- High efficient Chiller Plant of 0.57kW/RT
- Excellent water efficient fittings
- Extensive use of RCA and WCS
- High performance façade with ETTV of 35.55W/sqm
- Non-potable water for landscape irrigation
- Lighting savings of 38.6%

JTC Space @ Tuas

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	JTC Corporation
Architect:	SAA Architects Pte Ltd
M&E Engineer:	Aecom Singapore Pte Ltd
Structural Engineer:	Aecom Singapore Pte Ltd
Quantity Surveyor:	Langdon & Seah Singapore Pte Ltd
Main Contractor:	Tiong Seng Contractors Pte Ltd
Landscape Consultant:	Coen Design International Pte Ltd

- Estimated energy savings: 12,453,590kWh/yr; Estimated water savings: 21,386.8m³; ETTV: 28.78W/m²
- Building Massing is designed to minimize East-West orientation to reduce direct heat gain
- Green Leasing is adopted to increase tenants' awareness to go green and protect the environment
- Highly efficient chilled water plants are installed in this building with an operating design system efficiency of 0.539 kW/RT
- All internal areas are fitted with energy efficient LED lightings. Occupancy sensors are installed to control the common areas such as restrooms and staircases lightings when they are not in used
- Water is conserved through the use of PUB WELS water efficient fittings
- Extensive used of environmentally- friendly construction materials such as Recycled Concrete Aggregates and Washed Copper Slag and architectural products

Keppel Data Centre Singapore 4

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: Keppel DC Singapore 4 Pte Ltd
Architect: AWP Pte Ltd
M&E Engineer: i3 Critical Facilities Pte Ltd
Structural Engineer: CPG Consultants Pte Ltd
Quantity Surveyor: Turner & Townsend Pte Ltd
Main Contractor: ACME Associates Pte Ltd

- Estimated energy savings: 33,975,635kWh/yr; ETTV: 38.63W/m²
- Chiller plant system with efficiency of 0.553 kW/RT
- Permanent measurement and verification instrumentation for the monitoring of chilled-water plant efficiency and heat balancing
- Auto-tube cleaning system for each chiller
- Combination of multi-compressor chillers and centrifugal chillers to optimise efficiency at different load conditions
- UPS Design for IT loads using DRUPS with Distributed Redundant configuration
- Design for modularity and scalability

Micron F10X

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: Micron Fab
Architect: ID Architects Pte Ltd
M&E Engineer: C2D Solutions Pte Ltd
Structural Engineer: Rankine and Hill (S) Pte Ltd
Main Contractor: M+W Singapore Pte Ltd
ESD Consultant: Kaer Pte Ltd

- Estimated energy savings: 117,244.09kWh/yr; Estimated water savings: 9,219m³; ETTV: 5.39W/m²
- All motors installed are IE3 rated
- Heatpumps being used as replacement for boilers
- Excellent water efficient fittings
- Internal shuttle bus to promote green transportation
- High performance façade with ETTV of 5.39W/sqm
- Heat Island Effect reduction by using roof with SRI of 99

Nanyang Technological University – Learning Hub North

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Nanyang Technological University
Architect:	DCA Architects Pte Ltd
M&E Engineer:	AECOM Singapore Pte Ltd
Structural Engineer:	KTP Consultants Pte Ltd
Quantity Surveyor:	WT Partnerships (S) Pte Ltd
Main Contractor:	Lian Ho Lee (Private) Ltd
Landscape Consultant:	Chig Landscape Architecture
ESD Consultant:	Building System & Diagnostics Pte Ltd,
Design Consultant:	Richard Kirk Architect

- Estimated energy savings: 2,225,222kWh/yr; Estimated water savings: 20,712.75m³; ETTV: 35.57W/m²
- Double-glazed laminated glass at façade and laminated low-e glass at tutorial room shopfront to improve the building thermal envelope
- Optimizing existing infrastructure with services redundancy: tapping-off chiller water plant from NSAB and water tank from Block N3
- Energy efficient air conditioning system (PDV) system at all tutorial rooms
- LED light fitting is used for all lighting (100%)
- Photo sensor is provided all tutorial rooms, informal learning spaces, and common areas
- Maximizing daylight and natural ventilation through glass façade and air-well design

National University Hospital Utility Block

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	National University Hospital (S) Pte Ltd
MOH's Agent:	MOHH Holdings Pte Ltd
Architect:	Architects 61 Pte Ltd
M&E Engineer:	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
Structural Engineer:	AECOM Singapore Pte Ltd
Project Manager:	Arcadis Project Management
Quantity Surveyor:	Rider Levett Bucknall LLP
Main Contractor:	Koon Seng Construction Pte Ltd
ESD Consultant:	Building System & Diagnostics Pte Ltd

- Estimated energy savings: 686,525kWh/yr; Estimated water savings: 4240.04m³; ETTV: 34.49W/m²
- Installation of highly efficient chilled water plant to reduce energy consumption
- Use of energy efficient T5 lightings which ensures the health and well-being of staff, patients and community
- Motion sensors are used for toilet and staircase to reduce energy consumption
- Use of energy efficient lift with VVVF and sleep mode
- Use of water efficient fittings in the development
- Extensive use of environmentally friendly construction materials such as Recycled Concrete Aggregates and Washed Copper Slag

Oasis Terraces

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Housing & Development Board
Architect:	Multiply Architects LLP
M&E Engineer:	Bescon Consulting Engineers Pte Ltd
Structural Engineer:	KTP Consultants Pte Ltd
Quantity Surveyor:	Northcroft Lim Consultants Pte Ltd
Main Contractor:	Rich Construction Company Pte Ltd
Landscape Consultant:	WNE Integrated Design Pte Ltd
ESD Consultant:	Afogreen Build Pte Ltd

- Estimated energy savings: 3,449,303.80kWh/yr; Estimated water savings: 934.04m³; ETTV: 37.82W/m²
- Chiller plant system with expected energy efficiency of 0.577kW/ton
- Extensive greenery with GnPR 7.76
- Use of automatic cleaning condenser tube
- Use of Shading Simulation to determine tree locations on thoroughfare
- Implementation of green lease on all tenants
- Use of siphonic rainwater discharge system

Paya Lebar Quarter

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: Roma Central Pte Ltd/Milano Central Pte Ltd
Architect: DP Architects Pte Ltd
M&E Engineer: Meinhardt Singapore Pte Ltd
Structural Engineer: Arup Singapore Pte Ltd
Quantity Surveyor: Lend Lease Singapore
Landscape Consultant: Grant Associates Singapore
Lighting Consultant: Arup Singapore Pte Ltd

- Estimated energy savings: 3,835,265kWh/yr; Estimated water savings: 30,145.5m³; ETTV: 34.49W/m²
- Water cooled chilled water plant with full load efficiency of 0.599kW/RT on average
- Use of LED lighting to achieve, on average, over 50% savings
- Building Energy Savings of 12,344,430kWh/year
- Integrated Storm water Management System
- Use of WELS 3 ticks water rated fittings, AHU condensate recovery and NEWater
- Biophillic design features include Banyan Play area, terraced rain gardens, green and blue cascaded landscapes

Research Support Building

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: Nanyang Technological University
Architect: Chung Architects Pte Ltd
M&E Engineer: Aurecon Singapore (Pte) Ltd
Structural Engineer: Fong Consult Pte Ltd
Quantity Surveyor: Sembcorp Architects & Engineers Pte Ltd
ESD Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
Lab Specialist Consultant: World BioHazTec Pte Ltd

- Estimated energy savings: 636,475kWh/yr; Estimated water savings: 807.84m³; ETTV: 35.85W/m²
- Energy Efficient Central Water Cooled Chiller Plant
- Heat Recovery From Lab Exhaust to AHU (Passive Heat Pipe)
- Passive Displacement Ventilation in Meeting Room & Offices
- Energy Efficient Lighting (LED Lighting)
- Use of Green Concrete & Cement, Conservation of Existing Building Structure & Reuse of Existing Piles
- High Plume Fan for Laboratory Exhaust with Variable Speed Drive

Singapore Chinese Cultural Centre

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Singapore Chinese Cultural Centre
Project Manager:	Arcadis Project Management Pte Ltd
Architect:	DP Architects Pte Ltd
M&E Engineer:	Meinhardt (Singapore) Pte Ltd
Structural Engineer:	Meinhardt (Singapore) Pte Ltd
Quantity Surveyor:	Langdon & Seah Singapore Pte Ltd
Main Contractor:	Kim Seng Heng Engineering Construction Pte Ltd
Landscape Consultant:	DP Green Pte Ltd
ESD Consultant:	Meinhardt Façade Technology (S) Pte Ltd

- Estimated energy savings: 1,177,438kWh/yr; Estimated water savings: 1,806.90m³; ETTV: 37.53W/m²
- Use of energy-efficient double glazing, with double low-E coatings
- Use of district cooling
- Use of LED for all light fittings
- Use of motion sensors in staircases and toilets
- Use of UVC-band emitters in all AHUs
- Highly sustainable and buildable construction

Singapore Sustainability Academy

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: City Developments Ltd
Architect: Ong & Ong Pte Ltd
M&E Engineer: Rankine & Hill (Singapore) Pte Ltd
Structural Engineer: Meinhardt (Singapore) Pte Ltd
Quantity Surveyor: Langdon & Seah Singapore Pte Ltd
Main Contractor: Woh Hup (Private) Limited
ESD Consultant: Building System & Diagnostics Pte Ltd

- Estimated energy savings: 23,326kWh/yr; ETTV: 33.63W/m²
- Zero energy building – 100% replacement of energy consumption achieved with solar photovoltaic (PV) system
- Use of Engineered Spruce and Thermowood for the building façade to reduce heat transfer into the building spaces
- Energy efficient VRV air-conditioning system with at least 0.78kW/RT
- Extensive use of LED lightings which helps to achieve 43% savings
- Use of environmentally friendly Cross Laminated Timber (CLT) as construction materials to achieve low CUI value
- Provision of energy dashboards to raise awareness of energy consumption for the building users

SP Group Building

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	SPL Property Pte Ltd
Architect:	DP Architects Pte Ltd
M&E Engineer:	DP Engineers Pte Ltd
Structural Engineer:	DP Engineers Pte Ltd
Quantity Surveyor:	Surbana Jurong Consultants Pte Ltd
Main Contractor:	Shanghai Chong Kee Furniture & Construction Pte Ltd
Landscape Consultant:	DP Green Pte Ltd
ESD Consultant:	DP Sustainable Design Pte Ltd

- Estimated energy savings: 6,155,550kWh/yr; Estimated water savings: 15,041m³; ETTV: 38.277W/m²
- High performance glass to achieve ETTV – 38.277W/m²
- High efficient water-cooled chiller plant system with system efficiency of 0.613kW/RT
- High efficiency air-distribution system to achieve 37.83% energy savings from baseline
- Large implementation of LED light fittings
- Use of daylighting for interior spaces to reduce artificial lighting energy consumption
- Rainwater harvesting for landscape irrigation

Tiong Seng Building

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Tiong Seng Contractors (Pte) Ltd
Project Manager:	Tiong Seng Properties (Pte) Ltd
Architect:	LAUD Architects Pte Ltd
M&E Engineer:	Rankine & Hill (Singapore) Pte Ltd
Structural Engineer:	LSW Consulting Engineers Pte Ltd
Quantity Surveyor:	Tiong Seng Contractors (Pte) Ltd
Main Contractor:	Tiong Seng Contractors (Pte) Ltd
ESD Consultant:	Afogreen Build Pte Ltd
Acoustic Consultant:	Prof Lee Siew Fang (NUS)

- Estimated energy savings: 695,286.40kWh/yr; Estimated water savings: 895.49m³; ETTV: 38.93W/m²
- Unique DFMA design strategy
- Unique façade design for maximizing natural ventilation within rooms
- All lightings are of LED fittings
- Motion and photo sensors installed in the building
- All lifts have regenerative drive & sleep mode
- All water fittings are PUB WELS excellent rated

Wisma Geylang Serai

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: People's Association
Architect: Design Environment Group Architects LLP
M&E Engineer: Rankine & Hill (Singapore) Pte Ltd
Structural Engineer: ECAS-EJ Consultants Pte Ltd
Quantity Surveyor: Franklin + Andrews Pte Ltd
Main Contractor: Ken-Pal (S) Pte Ltd
ESD Consultant: Building System and Diagnostics Pte Ltd

- Estimated energy savings: 1,218,697kWh/yr; Estimated water savings: 931.67m³; ETTV: 35.16W/m²
- Optimization of the thermal comfort performance using airflow simulation software for the Secondary Street
- Building Massing is designed to minimize East/West orientation to reduce direct heat gain
- Highly efficient chilled water plants are installed in this building with an operating design system efficiency of less than 0.6 kW/RT
- All internal areas are fitted with energy efficient T5 or LED lightings. Occupancy sensors are installed to control the common areas such as restrooms and staircases lightings when they are not in used
- Water is conserved through the use of PUB WELS water efficient fittings
- Extensive used of environmentally- friendly construction materials such as Recycled Concrete Aggregates and architectural products

1 Serangoon North

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: Singapore Telecommunications Limited
Facility Manager: SMM Pte Ltd
ESD/Green Consultant: Mark Chia

- Estimated energy savings: 807,411kWh/yr
- Efficient Chiller Plant Efficiency 0.65kW/RT
- Provision of LED lighting for offices and common areas
- CO Sensors in car parks
- Lifts equipped with VVVF drive and sleep mode features
- Provision of motion sensors in toilets and photocell sensors in car parks

313@somerset

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Lendlease Retail Investments 1 Pte Ltd
ESD/Green Consultant: Kaer Pte Ltd

- The air-conditioning system operates with a system efficiency of 0.621kW/RT
- Lifts and escalators are equipped with variable voltage variable frequency motor drive and sleep mode function
- Use of energy efficient motion sensors and photo sensor for common corridors
- Use of carpark guidance systems to divert traffic and avoid congestions of vehicles
- Achieved PUB Water Efficient Building Silver certification with water savings fitting installed and other water saving measures

Bugis+

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer/Building Owner: CapitaLand Mall Trust
ESD/Green Consultant: Kaer Pte Ltd

- The air-conditioning system operates with a system efficiency of 0.642kW/RT
- Lifts and escalators are equipped with variable voltage variable frequency motor drive
- Use of natural ventilation for all public toilets
- Use of carpark guidance systems to divert traffic and avoid congestions of vehicles
- Achieved PUB Water Efficient Building certification with water savings fitting installed with other water saving measures

Campus for Research Excellence and Technological Enterprise (CREATE)

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: National Research Foundation
Facility Management: Fonda Global Engineering Pte Ltd

- Estimated energy savings: 6,300,000kWh/yr; Estimated water savings: 66,000m³
- Heat recovery and efficiency laboratory ventilation system
- PV and BIPV panels (300kWp)
- Design for chilled beams and efficient ACMV systems
- Rainwater harvesting to supply 26,000 cubic metre of water per year
- Vertical greenery, rooftop greenery and sky gardens

Central Mall Office Tower

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Centro Property Holding Pte Ltd
Facility Management: CBM Pte Ltd
ESD/Green Consultant: CBM Solutions Pte Ltd

- Energy efficient light fittings such as LEDs and T5 lightings
- Carbon monoxide detection system for ventilation in carparks
- Motion sensors in toilets and staircases
- Water fittings complying to 'Excellent' WELS rating
- Green roof
- Use of low VOC paint and environmentally friendly adhesives
- Variable Speed Drives used for chiller system

Das Spektrum@CBP

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Rohde & Schwarz Property Singapore Pte Ltd
Facility Management: Cushman & Wakefield (DTZ Facilities & Engineering (S) Limited)
ESD/Green Consultant: Earth-In-Mind Private Limited

- Chemical-free anti-termite treatment system
- North-West facing façade canted to reduce solar heat gain
- Use of sustainable material terracotta for louvers as shading devices
- Extensive coverage of greenery within development to achieve Green Plot Ratio of 5.17
- Extensive use of sustainable products in interior finishing and furniture
- Recycling of at least 50% AHU condensate as non-potable water source for landscape irrigation

DNV GL Technology Centre

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: Det Norske Veritas Pte Ltd / Ascendas Land (S) Pte Ltd
Facility Manager: Det Norske Veritas Pte Ltd
ESD/Green Consultant: Ascendas Services Pte Ltd

- Estimated energy savings: 634,533kWh/yr; Estimated water savings: 6,315m³; ETTV: 40.09W/m²
- Chiller plant system with efficiency of less than 0.65kW/RT
- Permanent measurement and verification instrument for the monitoring of chilled-water plant efficiency and heat balancing
- Energy efficient lighting system
- Photo and motion sensors to control staircase, meeting room and office perimeter lighting
- Extensive greenery with green plot ratio of 5.53

Great World Serviced Apartments

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: GWC Serviced Apartments Pte Ltd
Facility Management: GWC Serviced Apartments Pte Ltd
ESD/Green Consultant: Johnson Controls (S) Pte Ltd

- Highly efficient chiller plant with the system efficiency of 0.612 kW/RT
- Energy efficient light fittings are used in common area, carpark and apartment units
- Motion sensor linked to lightings in staff and gym toilets. Photocell sensors linked to lightings in lift lobbies on select floors
- The Cooling Energy Data Collection System (CEDCS) is provided to allow the building management to obtain, store, view, manage, and export accurate and timely data of energy consumed (kWh) for the air-conditioning system in respective apartment units

HarbourFront Centre

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: HarbourFront Centre Pte Ltd
Facility Management: HarbourFront Centre Pte Ltd
ESD/Green Consultant: LJ Energy Pte Ltd

- Cooling tower uses NEWater
- All toilets changed to a more efficient water taps
- All toilets & lift lobbies changed to a more efficient lighting
- High efficient chiller plant with system efficiency at 0.646kW/RT
- CO₂ demand ventilation control

Health Promotion Board Building

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner:	Health Promotion Board
Facility Management:	Indeco Engineers Pte Ltd
Guaranteed Energy Savings Consultant:	Siemens Pte Ltd

- Estimated energy savings: 1,084,337kWh/yr; Estimated water savings: 16,725.6m³/yr
- High performance water cooled chillers using environmentally friendly refrigerant HFC 134A, with a rated efficiency of 0.589kW/RT and variable speed driver (VSDs) units installed to chilled water pumps, condenser pumps and cooling towers fan motors
- LED lamp tubes installed to basement carpark and part of level 6 office areas
- Use of motion sensors in all toilets facilities to control the lightings and mechanical ventilation fans
- Gas leak monitoring detection system installed in plant room, auto tube cleaning system installed to condenser circuits of chillers and carbon monoxide (CO) gas detectors and sensors installed in basement carpark
- Use of Water Efficiency Label (WEL) fittings in all toilets
- Provision of sheltered bicycle parking space and recycling bins

ITE College West

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Gammon Capital (West) Pte Ltd
Facility Management: Cushman & Wakefield Facilities & Engineering (S) Limited
ESD/Green Consultant: Cushman & Wakefield Facilities & Engineering (S) Limited

- Estimated energy savings: 38,858kWh/yr; Estimated water savings: 29,930m³; ETTV: 39W/m²
- Efficient chiller plant with an operating system efficiency of 0.647kW/RT
- Extensive use of energy saving T5 fluorescent lightings with high frequency ballasts and PLCs
- Energy efficient lifts with Variable Voltage Variable Frequency (VVVF) motor drives and sleep mode features
- Motion sensors are used to control toilet lightings. Operations of the escalators are also optimized with passenger movement sensors
- Certified PUB Water Efficient Building
- Use of sustainable products such as low VOC waterproofing membranes and paints, eco-concrete, recycled mineral fibre ceiling boards and partition boards

ITE Headquarters & ITE College Central

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Institute of Technical Education
Facility Management: Institute of Technical Education
ESD/Green Consultant: Johnson Controls (S) Pte Ltd

- Use of passive design strategies to minimize solar heat gain to building and to facilitate cross ventilation and thermal comfort in naturally ventilated spaces
- Provision of photovoltaic panels with system capacity of 200 kWp
- Provision of rainwater harvesting system to minimize potable water use for irrigation
- Extensive provision of green roof and vertical greenery on the west facing facades
- Provision of environmental canopy and daylight reflectors to maximize daylighting usage
- Real time energy display board to inculcate better environmental awareness of the energy consumption levels and patterns among users

Joo Chiat Complex

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Housing & Development Board
Facility Management: CPG Facilities Management Pte Ltd
ESD/Green Consultant: Johnson Controls (S) Pte Ltd

- Estimated energy savings: 1,451,266.33kWh/yr; Estimated water savings: 1,272.39m³
- High efficiency chiller plant system with efficiency of 0.62kW/RT
- Provision of permanent instrumentation to monitor the chiller plant system operating efficiency
- Awarded Water Efficient Building. Water fittings comply with PUB Water Efficiency Labelling and Standards (WELS)
- Green guides are disseminated amongst tenants to create environmental awareness as well as to promote & encourage waste minimization and recycling among occupants and tenants
- Energy efficient LED lighting fittings for common areas including car parks
- Lifts & Escalators are installed with variable voltage variable frequency motor drive, sleep mode features for lifts and motion sensors for escalator

Jurong Port Administration Building

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Jurong Port Pte Ltd
Facility Management: Jurong Port Pte Ltd
ESD/Green Consultant: Chloros Solutions Pte Ltd

- Estimated energy savings: 190,201kWh/yr; Estimated water savings: 150m³; ETTV: 38.1 W/m²
- Low ETTV value of 38.1W/m²: Extensive usage of double glazed low E glass which reduces the thermal transmission and heat gain within the building, thus contributing to a low ETTV of 38.10 W/m². The glass being used, is tinted grey, and has a SC value of 0.23 and U value of 1.75 and the development has a window-to-wall ratio of 50%
- Energy Efficient Chiller Plant System: Though the building has relatively low cooling load of 103 RT peak, the system is still able to achieve a good system efficiency of 0.547 kW/RT
- Permanent Measuring and Verification Instruments: Measuring instruments for monitoring chilled water plant efficiency and verification of chilled water plant instrumentation (heat balance substantiating test)
- Vertical Greenery: Vertical greenery is also provided on the main façade of the Administration and Annex Building which serves to beautify the external areas
- Auto Condenser Tube Cleaning System: It reduces the chance of corrosion due to chemicals in tubes, prolonging the life span of the chillers and maintain the chiller's efficiency to save energy
- Anti-Corrosion Coating: It is applied to the fins of the fan coils to prevent corrosion and further improve IAQ of occupied space

Jurong Town Hall

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: JTC Corporation
Facility Management: JTC Corporation
Architect: Parsons Brinckerhoff Pte Ltd
ESD/Green Consultant: Parsons Brinckerhoff Pte Ltd
M&E Consultant: Parsons Brinckerhoff Pte Ltd

- Replace existing unitary system with efficient water-cooled chiller plant
- Provision of energy efficient air distribution system
- Extensive use of T5 lighting with high frequency ballast and LED lights
- Use of double glazed glass to improve thermal performance of facade
- Extensive use of sustainable materials certified by local certification body
- Install MERV 13 filter for all PAUs
- Set relevant environmental policies to improve energy efficiency & water efficiency of the building and recycle & minimize wastes

King's Centre

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: City Developments Ltd
Facility Manager: CBM Pte Ltd
ESD/Green Consultant: CBM Solutions Pte Ltd

- Use of solar photovoltaic to harvest renewable energy
- Use of energy efficient lifts with VVVF and sleep mode features
- Use of 'Very Good' and 'Excellent' WELS rating tap fittings
- Use of motion sensors and motion sensors with dimmer at staircases, toilets and car park
- Use of energy efficient T5 and LED lightings
- Green Roof
- Use of SGBC certified products

Manulife Centre

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Victorian Property Holding Pte Ltd
Facility Management: Victorian Property Holding Pte Ltd
ESD/Green Consultant: CBM Solutions Pte Ltd

- Use of VSD Screw Chiller
- Use of CO sensors for carpark mechanical ventilation system
- Use of motion sensors at toilets, staircases and pantry areas
- Use of tap and sink fittings complying to WELS 'Excellent' rating
- Provision of rooftop greenery with use of drought tolerant plants
- Use of CO₂ sensors to regulate fresh air intake at AHUs
- Engagement in Global Lamp Recycling Programme

Mapletree Anson

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: DBS Trustee Limited as Trustee of Mapletree Commercial Trust
Facility Management: Mapletree Commercial Property Management Pte Ltd
ESD/Green Consultant: Building System & Diagnostics Pte Ltd
IAQ Auditor: TUV SUD PSB Pte Ltd

- High efficiency central cooling plant – VSD screw chillers, VSD for chilled water and condenser water pump, VSD for cooling tower fan
- Incorporated Heat Pipes technologies at the pre-cooled AHU to pre-cool the outdoor fresh air through cooled toilet exhaust air
- Extensive use of energy efficiency T5 fluorescent lights with electronic ballast for office space
- CO₂ sensors integrated demand control ventilation for office AHU to reduce fresh air intake when human occupancy is low hence reduce cooling load demand
- CO sensor integrated with ductless MV jet fan for carpark - to activate the MV fans when the CO level is above the unacceptable limits hence reducing the electricity consumption
- Motion detectors integrated with lighting control for all toilets
- Indoor air quality (IAQ) audit conducted to ensure a good indoor air quality in office premises

Mapletree Business City

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Mapletree Business City Pte Ltd
Facility Management: Mapletree Business City Pte Ltd
ESD/Green Consultant: Building System & Diagnostics Pte Ltd
IAQ Auditor: TUV SUD PSB Pte Ltd

- High efficiency district cooling plant – super efficient centrifugal chillers, VSD for chilled water and condenser water pump, VSD for cooling tower fan. Optimized chilled water plant with system efficiency lower than 0.60kW/RT at operating load condition
- Extensive use of energy efficiency T5 fluorescent and LED lights for offices and common areas. Intelligent BMS control to turn off lighting at common areas when not in use
- Implementation of Energy, Green Procurement and Environmental Policies and Water Efficient Improvement Plan
- Incorporated waste heat recovery system to produce hot water for F&B and amenities usage
- CO₂ sensors integrated demand control ventilation for all office AHUs to reduce fresh air intake when human occupancy is low hence reduce cooling load demand
- Rainwater is harvested for non-potable uses, reducing the consumption of water
- Indoor air quality (IAQ) audit conducted to ensure good indoor air quality in office premises

Marina Bay Financial Centre (Phase 1)

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: BFC Development LLP
Facility Management: Raffles Quay Asset Management Pte Ltd
ESD/Green Consultant: Cushman & Wakefield F&E (S) Ltd

- Estimated energy savings: 2,159,028kWh/yr
- Use of energy efficient lifts system (Regenerative Drive System) – 31% of the energy used by a lift can be recovered by the Regenerative Converter
- Lift Destination Control System in place that direct passengers to the specific elevator with min. no. of intermediate stops thus consumes less energy
- Car Parking Guidance System (CPGS) in place to lead drivers to available lot by the shortest possible route, reduces the amount of exhaust gasses
- In addition, recycling of used light tubes and electronic waste are also in place to reduce carbon footprint and mercury emission
- Documented records of basic recyclables (such as carton, paper, can, plastic, glass in place on a monthly basis
- Use of energy saving lightings (T5 & LED come with motion sensors) in place serving landlord and tenanted spaces

National University of Singapore Centre for Life Sciences (CeLS)

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: National University of Singapore
Facility Manager: NUS Office of Facilities Management
ESD/Green Consultant: Cushman & Wakefield Facilities & Engineering (S) Ltd

- Energy-efficient chiller plant with committed system efficiency of 0.60kW/RT
- High efficiency air distribution system achieving 50% improvement over the baseline
- PUB Water Efficient Building (WEB) certification has been achieved
- Environmentally-sustainable practices are encouraged among building occupants & visitors via online portal and posters / notices
- Secondary air filters for all AHUs are of high efficiency “MERV13” rating to maintain good indoor air quality

Old Hill Street Police Station

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: Ministry of Communications and Information
Facility Manager: One Marina Property Services Pte Ltd
ESD/Green Consultant: Building System & Diagnostics Pte Ltd
ESCO: Measurement & Verification Pte Ltd

- Estimated energy savings: 2,083,634kWh/yr; Estimated water savings: 145m³/yr
- GESP for AC System (5 years): 0.62kW/RT (Rooftop Plant)
- 57% improvement from baseline through the extensive use of VSDs for Air Distribution system
- Extensive use of energy efficient lighting to achieve 33.5% energy savings as compared to the baseline
- Harnessing of renewable solar energy allows an energy replacement rate of 2.59% (Baseline: 2016 total building consumption)
- PUB certified water efficient building which signifies the installation of efficient water fitting
- Use of NEWater as cooling tower make-up water, reducing the use of potable PUB water for operational needs

One Raffles Place Tower 2

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: OUB Centre Limited
ESD/Green Consultant: Kaer Pte Ltd

- Efficiency of air-conditioning systems targets to achieve 0.65kW/RT
- All lifts are equipped with variable voltage variable frequency motor drive and sleep mode function
- Use of energy efficient motion sensors for toilets and staircases
- Extensive rainwater harvesting to replace potable water needs for toilet flushing
- Achieved PUB Water Efficient Building certification with water savings fitting installed throughout the building

One Raffles Quay

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: One Raffles Quay Pte Ltd
Facility Management: Raffles Quay Asset Management Pte Ltd
ESD/Green Consultant: Cushman & Wakefield F&E (S) Ltd

- Estimated energy savings: 1,948,335kWh/yr
- Use of energy efficient lifts system – 45% of the energy used by a lift can be recovered by the Regenerative Converter
- Siphonic rainwater discharge system to prevent entrance of air into the downpipe
- Car Park Guidance System (CPGS) in place to reduce amount of exhaust gases
- Collection of AHUs condensate water for car park washing in place
- Documented records of recyclables (paper, plastics, glass) and recycling of used light bulbs in place to reduce carbon footprint and mercury emission
- Use of energy saving lightings (T5 & LED come with motion sensors) in place serving landlord and tenanted spaces

Prototype Glass House Complex at Horticulture Park

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:

Facility Manager:

ESCO:

ESD/Green Consultant/Project
Manager:

Gardens by the Bay

ST Synthesis Pte Ltd

Trane Distribution Pte Ltd

Surbana Jurong Consultants Pte Ltd

- Estimated energy savings: 692,368kWh/yr; Estimated water savings: 51.6m³/yr
- Chiller system retrofit from air-cooled to water-cooled (0.68 kW/RT) type
- Air distribution and AHU retrofit to achieve 0.41W/CMH
- Lighting retrofit to all LEDs
- Water fitting retrofit to all WELS excellent rating
- Digital water sub-meters
- Extensive greenery provision

Quayside Isle

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Cityview Place Holdings Pte Ltd

Facility Management: Cityview Place Holdings Pte Ltd

- LED lights used for common areas
- Use of ductless ventilation system with CO sensors
- Use of motion sensors at toilets and staircases
- Use of energy efficient air-conditioning
- Use of tap and sink fitting complying to “Excellent” WELS rating
- Rain water harvested for irrigation
- Provision of solar panels on roof

Resorts World Convention Centre

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Resorts World at Sentosa Pte Ltd
Facility Management: Resorts World at Sentosa Pte Ltd
ESD/Green Consultant: Cushman & Wakefield Facilities & Engineering (S) Ltd

- Estimated energy savings: 14,585kWh/yr; Estimated water savings: 1,232m³/yr
- Low ETTV of building façade to minimise building heat gain
- High efficiency air distribution system
- Use of variable speed drives for heat exchanger chilled water pumps
- Use of energy-saving LEDs throughout the building premises
- Use of energy-efficient escalators and lifts with VVVF drive and sleep mode
- Certified PUB Water Efficient Building

Smart Nation Research Cluster

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: National University of Singapore
Facility Manager: National University of Singapore
ESD/Green Consultant: Earth-In-Mind Private Limited
M&E Consultant: Aurecon Singapore (Pte) Ltd

- Estimated energy savings: 656,360kWh/yr; Estimated water savings: 9,430m³
- Energy efficient chiller equipment (Chiller, CHWP, VSD)
- Energy Building Monitoring Dashboard
- Energy efficient LED lighting
- VVVF and sleep mode lifts
- Major use of WELS “Excellent” Water Fittings
- Extensive use of sustainable products with SGBC/SGLS certificate

Standard Chartered Bank @ Changi Business Park

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Standard Chartered Bank, Singapore
Facility Management: CBRE GWS Holding (S) Pte Ltd
ESD/Green Consultant: G-Energy Global Pte Ltd

- Estimated energy savings: 137,847kWh/yr; Estimated water savings: 15,516m³; ETTV: 39.3w/m²
- Low ETTV value of 39.3W/m² and using double glazed low emission glass
- Use of energy efficient T5 fluorescent tubes with motion sensors for office areas
- Provision of 96kWp solar panel to harvest renewable energy
- Integrated grey water, condensate water and rain water harvesting system for toilets flushing
- Extensive drought tolerant greenery
- Green Educational Wall

The Adelphi

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: The Management Corporation Strata Title Plan No. 1614
Facility Manager: Propmag Management Services
ESCO: Comfort Management Pte Ltd
ESD/Green Consultant: Building System & Diagnostics Pte Ltd

- Estimated energy savings: 2,558,394kWh/yr; Estimated water savings: 3,199m³
- GESP for 30% reduction (approximate) in Building Energy Consumption (Landlord) for 8 years (Baseline: 2016)
- 31% improvement from baseline through the extensive use of VSDs for Air Distribution system
- Extensive use of energy efficient lightings to achieve a 42% energy savings as compared to the baseline
- PUB certified water efficient building which signifies the installation of efficient water fitting
- Extensive waste recycling and quantification of papers, plastics, glass and light tubes

The Treasury

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Ministry of Finance
Facility Management: UEMS Solutions Pte Ltd
ESD/Green Consultant: Cushman & Wakefield Facilities & Engineering (S) Ltd

- Estimated energy savings: 660.992kWh/yr; Estimated water savings: 16,869m³
- Energy-efficient chiller plant system with committed efficiency of 0.633kW/RT
- High efficiency air distribution system, with pre-cooled coil installed for all AHUs
- Lighting systems in offices are equipped with high frequency ballasts & dimming feature
- The Treasury is participating in the SolarNova program, with solar photovoltaic (PV) panels planned to be installed on the roof of the building; 73kWp of solar capacity has been identified

Woh Hup Building

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Woh Hup Holdings Pte Ltd

ESD/Green Consultant: Kaer Pte Ltd

- Efficiency of air conditioning system targets to achieve 0.753kW/RT
- Advanced energy management system which monitors energy & water consumption, solar and rainwater harvesting
- All lifts are equipped with variable voltage variable frequency motor drive and sleep mode function
- Use of energy efficient motion sensors and photo sensor for common corridors
- PUB Water Efficient Building with water savings fittings installed throughout the building

Park Place Residences at PLQ

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Verona Central Pte Ltd
Architect:	DP Architects Pte Ltd
M&E Engineer:	Meinhardt Singapore Pte Ltd
Structural Engineer:	Arup Singapore Pte Ltd
Quantity Surveyor:	Lendlease Singapore Pte Ltd
Main Contractor:	Lendlease Singapore Pte Ltd
Landscape Consultant:	Grant Associates Singapore
Lighting Consultant:	Arup Singapore Pte Ltd

- Estimated energy savings: 1,103,428.66kWh/yr; Estimated water savings: 17,095.69m³; RETV: 14.31W/m²
- Good natural ventilation design features to dwelling units and common corridors
- Use of energy efficient split units in all dwelling units
- Use of LED lighting to achieve 53% savings
- Building Energy Savings of 1,103,428.66kWh/year
- Use of pneumatic waste system
- Use of WELS water rated fittings and NEWater

Nanyang Technological University Hall of Residence 4

Existing Residential Building

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: GreenA Consultants Pte Ltd

- Estimated energy savings: 105,801.91kWh/yr
- Use of solar thermal air-con with COP higher than 6
- LED lighting for common area with motion and photo sensor controls
- Common area such as corridors, staircases and lobbies are naturally ventilated
- Use of non-potable water for irrigation
- Use of sustainable products for renovation works
- Key card control of air-con units in student rooms

Ministry of Health Proposed Development of Ang Mo Kio Polyclinic and Senior Care Centre

Healthcare Facilities

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer: Ministry of Health Singapore
Architect: Surbana Jurong Pte Ltd
M&E Engineer: Surbana Jurong Pte Ltd
Structural Engineer: Surbana Jurong Pte Ltd
Quantity Surveyor: Mott MacDonald Singapore Pte Ltd
Landscape Consultant: Surbana Jurong Pte Ltd

- Estimated energy savings: 808,483kWh/yr; Estimated water savings: 8,628m³; ETTV: 35.07W/m²
- Energy efficient chiller systems with efficiency of 0.503kW/RT
- Usage of motion sensors for common lighting areas
- Lifts with VVVF sleep mode and regenerative drive
- Usage of highly energy efficient LED lightings
- Water fittings are WELS “Very Good” and “Excellent” rated
- Low VOC and SGLS certified paints and adhesives
- Social communal green spaces for community integration

Pioneer Family Healthcare Centre

Healthcare Facilities

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Ministry of Health Singapore
Project Manager:	Surbana Jurong Consultants Pte Ltd
Architect:	JGP Architecture (S) Pte Ltd
M&E Engineer:	Mott MacDonald Singapore Pte Ltd
Structural Engineer:	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
Quantity Surveyor:	CPG Consultants Pte Ltd
Main Contractor:	CMC Construction Pte Ltd
Landscape Consultant:	COEN Design International Pte Ltd
ESD Consultant:	G-Energy Global Pte Ltd

- Estimated energy savings: 461,920.47kWh/yr; Estimated water savings: 8,130m³; ETTV: 35.66W/m²
- Low ETTV of 35.66W/m² through passive design of building envelope and orientation
- Chiller plant system with efficiency of 0.57kW/RT
- Use of energy efficient LED and T5 fluorescent lights for both internal and external lighting
- All sanitary water fittings are WELS Excellent '3 ticks' rating
- Extensive use of Green Label products for both interior fit-out works and external works
- Provision of sensory plants that account for green plot ratio of 3.45

Raffles Hospital Extension

Healthcare Facilities

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Raffles Hospital Properties Pte Ltd
Architect:	Swan & Maclaren Pte Ltd
M&E Engineer:	J Roger Preston (S) Pte Ltd
Structural Engineer:	Surbana International Consultants Pte Ltd
Quantity Surveyor:	Rider Levett Bucknall
Main Contractor:	Keong Hong Construction Pte Ltd
Landscape Consultant:	Swan & Maclaren Pte Ltd
Façade Specialist:	Aurecon Singapore Pte Ltd
ESD Consultant:	Aurecon Singapore Pte Ltd

- An overall energy saving of 31% is demonstrated with an energy model with an expected EEI of 223 kWh/m²/yr
- Excellent ETTV of 37.4W/m², due to a NE orientation and horizontal and vertical fins for sun-shading
- The cooling system efficiency is 0.59 kW/RT, operating at high leaving temperature of 8.5°C and return of 14°C
- Lighting is largely with T5 and LED; and major uses and areas are sub-metered
- Water-efficient fittings are used, most of Excellent rating
- Extensive greenery – sky terrace, courtyard, vertical green wall, roof top gardens

Yishun Polyclinic and Senior Care Centre

Healthcare Facilities

GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Ministry of Health, Singapore
Project Manager:	Davis Langdon KPK (Singapore) Pte Ltd
Architect:	RDC Architects Pte Ltd
M&E Engineer:	Meinhardt (Singapore) Pte Ltd
Structural Engineer:	Meinhardt (Singapore) Pte Ltd
Quantity Surveyor:	CPG Consultants Pte Ltd
Main Contractor:	Hytech Builders Pte Ltd
Landscape Consultant:	Greenology Pte Ltd
ESD Consultant:	Parsons Brinckerhoff Pte Ltd

- Estimated energy savings: 926,968kWh/yr; Estimated water savings: 1,492m³; ETTV: 36.42W/m²
- Energy efficient chiller plant system with 0.589kW/RT Design System Efficiency
- Minimize heat gain from façade through good orientation of building and use of high performance glass; ETTV: 36.42W/m²
- Concrete usage minimized via efficient structure design
- Extensive use of sustainable product with ratings under Singapore Green Building Council (SGBC) and Singapore Green Labelling Scheme (SGLS)
- Energy efficient LED lighting; use of motion sensors in toilets
- Use of WELS excellent water fittings

Development of Camp Facilities at Kranji Camp for SAFDB

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: DSTA
Architect: ID ARCHITECTS PTE LTD
M&E Engineer: PDC Consulting Engineers
Structural Engineer: E2000 Pte Ltd
Main Contractor: Quek Hong Seng Construction Pte Ltd
ESD Consultant: GreenA Consultants Pte Ltd

- Estimated energy savings: 856,752.41kWh/yr; Estimated water savings: 6,008.08m³; ETTV: 28.71W/m²
- Use of energy efficiency air-conditioning system with design system efficient of 0.73kW/RT
- Efficient Lighting with use of LED
- All water fittings mostly rated 3 ticks and 2 ticks under WELS
- Extensive usage of sustainable products and low VOC paints

Farrer Square

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	RB Capital Farrer Hotel Pte Ltd
Architect:	RSP Architects Planners & Engineers (Pte) Ltd
M&E Engineer:	J Roger Preston (S) Pte Ltd
Structural Engineer:	RSP Architects Planners & Engineers (Pte) Ltd
Quantity Surveyor:	Rider Levett Bucknall LLP
Main Contractor:	Yau Lee Construction (S) Pte Ltd
Landscape Consultant:	Ong & Ong Pte Ltd
ESD Consultant:	Building System & Diagnostics Pte Ltd

- Estimated energy savings: 1,656,307kWh/yr; Estimated water savings: 2,705m³; ETTV: 41.99W/m²
- Façade with high performance DGU glazing
- Energy efficient centralized water cooled chilled water system of 0.575kW/RT
- Extensive use of energy efficient LED lightings
- Extensive greenery provision, with rooftop garden

German European School Singapore

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	German European School Singapore
Architect:	P&T Consultants Pte Ltd
M&E Engineer:	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
Structural Engineer:	P&T Consultants Pte Ltd
Quantity Surveyor:	Davis Langdon KPK Pte Ltd
Main Contractor:	Tiong Aik Construction Pte Ltd
Landscape Consultant:	Martin Lee Design
ESD Consultant:	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 1,601,995kWh/yr; Estimated water savings: 6,000m³; ETTV: 36.5W/m²
- Energy efficient water-cooled chiller plant
- Use of energy efficient light fittings such as LEDs and T5s
- Use of motion sensors and photocell sensors
- Displacement ventilation at auditorium

GREYFORM Building

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Straits Construction Singapore Pte Ltd
Project Manager:	Straits Construction Singapore Pte Ltd
Architect:	Ong & Ong Pte Ltd
M&E Engineer:	Rankine & Hill (S) Pte Ltd
Structural Engineer:	BC Koh & Partners LLP
Quantity Surveyor:	Straits Construction Singapore Pte Ltd
Main Contractor:	Straits Construction Singapore Pte Ltd

- Estimated energy savings: 807,642kWh/yr; Estimated water savings: 36,750m³; ETTV: 37.52W/m²
- No West facing façade
- Use of Green Concrete and low CUI
- Recycling of cement water and steel scrap
- Use of prefabricated components for façade walls and structure

Hankyu Hanshin Logistics Centre

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: Hankyu Hanshin Properties Singapore Pte Ltd
Architect: 3HPARCHITECTS Pte Ltd
M&E Engineer: Plan One Engineering Services
Structural Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
Quantity Surveyor: Langdon & Seah Singapore Pte Ltd
Main Contractor: Figtree Projects Pte Ltd

- Estimated energy savings: 1,571,125kWh/yr; Estimated water savings: 391.61m³; ETTV: 33.19W/m²
- VRF system with operating efficiency of 0.66kW/RT
- High Efficient LED lighting for warehouse
- Extensive use of environmentally friendly products

JTC Launchpad @ one-north Phase 2

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Developer:	JTC Corporation
Architect:	Parsons Brinckerhoff Pte Ltd
M&E Engineer:	Parsons Brinckerhoff Pte Ltd
Structural Engineer:	Parsons Brinckerhoff Pte Ltd
Quantity Surveyor:	TJ Chiam Surveyors Pte Ltd
Main Contractor:	Lian Ho Lee Construction Pte Ltd
ESD Consultant:	Parsons Brinckerhoff Pte Ltd

- Estimated energy savings: 843,658kWh/yr; Estimated water savings: 2,445m³; ETTV: 36.08W/m²
- Energy efficient VRF system, 0.62kW/RT Design System Efficiency
- Minimize heat gain from façade through good orientation of building and use of high performance glass
- Minimize concrete usage by using Cross Laminated Timber (CLT)/Glued Laminated Timber (Glulam) for building structures
- Extensive use of sustainable product with high ratings under Singapore Green Building Council (SGBC)
- Use of motion and daylight sensors in offices and common areas

National University of Singapore – Ridge View Annex

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	National University of Singapore
Architect:	AWP Pte Ltd
M&E Engineer:	AUP Consultants Pte Ltd
Structural Engineer:	DE Consultants (S) Pte Ltd
Quantity Surveyor:	Rider Levett Bucknall LLP
Main Contractor:	Lian Soon Construction Pte Ltd
Landscape Consultant:	Stephen Caffyn Landscape Design (SCLD)
ESD Consultant:	CPG Consultants Pte Ltd (CPGreen)

- Estimated energy savings: 190,473.34kWh/yr; Estimated water savings: 1,511.74m³; ETTV: 33.98W/m²
- Energy efficient chiller plant system
- Natural ventilation in common areas – staircases, corridors, atrium, lift lobbies and toilets
- Energy efficient lighting for all areas except mechanical spaces which use T5 lighting
- Energy efficient lifts with AC VVVF motor drive and sleep mode features

Pasir Ris Central Hawker Centre

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	National Environment Agency
Architect:	CPG Consultants Pte Ltd
M&E Engineer:	CPG Consultants Pte Ltd
Structural Engineer:	CPG Consultants Pte Ltd
Quantity Surveyor:	CPG Consultants Pte Ltd
Main Contractor:	LBD Engineering Pte Ltd
Landscape Consultant:	Plantwerkz Pte Ltd / LBD Engineering Pte Ltd
Green Mark Consultant:	Progressive Engineering & Management
Site Supervisory & Design for Safety:	Construction Professionals Pte Ltd

- Estimated energy savings: 248,120.79kWh/yr; Estimated water savings: 28,090.4m³
- Natural ventilated hawker centre with average wind velocity of more than 0.6m/s at 1.2m above floor level for all prevailing wind directions
- Provisions of HVLS fans that achieved a good ventilation of 0.8m/s
- Extensive usage of LED & T5 result in 64.73% savings over base case where toilets and staircases equipped with motion sensors
- WELS excellent water fittings for all bib taps and sink taps contributing 58% of water saving

Robinson Tower Redevelopment

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Superluck Properties Pte Ltd
Design Architect:	Kohn Pederson Fox Associates
Architect:	Architects 61 Pte Ltd
M&E Engineer:	T.Y Lin International Pte Ltd
Structural Engineer:	KTP Consultants Pte Ltd
Quantity Surveyor:	Langdon & Seah Singapore Pte Ltd
Main Contractor:	Woh Hup (Private) Limited
Landscape Consultant:	Grant Associates Singapore Pte Ltd
ESD Consultant:	Building System & Diagnostics Pte Ltd

- Estimated energy savings: 2,359,318kWh/yr; Estimated water savings: 9,715.09m³; ETTV: 41.55W/m²
- Installation of highly efficient chilled water plant to reduce energy consumption
- Use of PUB WELS water efficient fittings in the development to achieve water conservation
- Use of efficient LED lighting completed with motion sensors in staircases and toilets contributing up to 40% energy savings
- Aesthetically pleasing and extensive greenery provision of a GNPR of up to 8.23 to promote nature connectivity

Sungei Tengah Lodge

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: HI-TEK Construction/Right Construction JV Pte Ltd
Architect: 3P Ecotecture Pte Ltd
M&E Engineer: Gims & Associates Pte Ltd
Structural Engineer: Teamwork Consultants
Main Contractor: HTC Construction Pte Ltd

- Good building orientation
- Good passive design with rooms having natural cross-ventilation
- Use of energy-saving LED lightings
- Use of water efficient fittings
- Use of highest grade leader interior paints for better Internal Air Quality

Toll Logistics Warehouse

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: Toll Logistics (Asia) Ltd
Project Manager: LMO Associates Pte Ltd
Architect: RSP Architects Planners & Engineers (Pte) Ltd
M&E Engineer: Aurecon Singapore (Pte.) Ltd
Structural Engineer: RSP Architects Planners & Engineers (Pte) Ltd
Quantity Surveyor: WT Partnership
Main Contractor: Precise Development Pte Ltd

- Energy efficient centralized water-cooled chilled water system with average efficiency of 0.580kW/RT
- Installation of permanent measurement and verification instrumentation to monitor chilled-water plant efficiency
- Extensive usage of energy efficient LED lights and high performance fluorescent lights
- Use of water-efficient water fittings
- Provision of bicycle lots and shower facilities to encourage use of alternative transportation

Vision Exchange

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: Sim Lian JV(Vision) Pte Ltd
Architect: DesignLink Architects Pte Ltd
M&E Engineer: Kunda Consulting Engineers
Structural Engineer: OCC Consultants Pte Ltd
Main Contractor: Sim Lian Construction Co (Pte) Ltd
Landscape Consultant: DesignLink Architects Pte Ltd

- Estimated energy savings: 3,968,625kWh/yr; Estimated water savings: 37,570.20m³; ETTV: 37.25W/m²
- Use of better energy efficient air-conditioned equipments and energy management to minimize energy consumption
- Good accessibility to public transport (eg bus stop & Jurong MRT)
- Use of energy efficient equipment such as energy efficient lightings, VVVF lifts, energy efficient escalators, motion sensors in staircases
- Use of water efficient irrigation system and non-potable water for landscaping

Bedok Campus

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: Land Transport Authority
Facility Manager: Land Transport Authority
ESD/Green Consultant: BELMACS Pte Ltd

- Estimated energy savings: 1,969,436kWh/yr; Estimated water savings: 1,842m³
- This project achieves an air-conditioning plant efficiency of 0.7 using air-cooled VRV system
- Air distribution system comprising fan coil units achieves 80% improvement in efficiency over the baseline target
- Lifts with AC Variable Voltage Variable Frequency drives & sleep mode features
- For artificial lighting to the inner habitable space, it employs energy efficient LED luminaires

Bukit Panjang Community Club

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: People's Association
Facility Management: SMM Jurong Pte Ltd
ESD/Green Consultant: Dr. John Min

- Estimated energy savings: 6,000kWh/yr; Estimated water savings: 1,000m³
- Photovoltaic system
- Green wall
- Energy efficient air-conditioning
- Energy efficient lighting

Bukit Panjang Plaza

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer/Building Owner:	CapitaLand Mall Trust
Facility Manager:	CapitaLand
ESCO:	Measurement & Verification Pte Ltd
ESD/Green Consultant:	Building System & Diagnostics Pte Ltd

- Energy Efficient Water-Cooled Chilled-Water Plant with overall Chiller Plant System Efficiency of 0.652kW/RT
- Extensive use of Energy Efficiency LED Lightings for common areas
- Skyroof day lighting design located at the central of the building

Choa Chu Kang Centre

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Housing & Development Board
Facility Management: UEMS Solutions Pte Ltd
ESD/Green Consultant: Cushman & Wakefield Facilities & Engineering (S) Limited

- Use of LED lightings in common areas e.g. lobbies and carpark
- Use of natural ventilation design for common areas e.g. staircases and carpark
- Use of private meters for major usage
- PUB Water Efficient Building certified
- Provision of recycling bins at every floors

DSM Dyneema APAC Technical Center

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	DSM Dyneema APAC
Architect:	CWM Consulting Engineers
M&E Engineer:	William Ng Consulting Engineers
Structural Engineer:	CWM Consulting Engineers
Main Contractor:	Malany Daching Company
ESD Consultant:	GreenA Consultants Pte Ltd

- Estimated energy savings: 60,051kWh/yr; Estimated water savings: 4,467.6m³; ETTV: 37.78W/m²
- Energy efficient VRV air-con
- Energy efficient T5 Lighting c/w HF ballast
- N/V @ workshop, toilets & staircases
- Use of sustainable products

Health Sciences Authority

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Health Sciences Authority
Facility Management: Indeco Engineers Pte Ltd
ESCO: DTZ Facilities & Engineering (S) Limited

- Estimated energy savings: 219,065.88kWh/yr; Estimated water savings: 1,259.25m³
- Efficient chiller plant system operating at 0.634kW/RT
- T8 LED lighting for all common areas in HSA Building
- Basement carpark lighting controlled by photo cell sensor and some common areas
- Motion sensors for pantries, toilets, staircases and corridors

IBM Place I & II

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: JTC Corporation
Facility Management: JTC Corporation
ESD/Green Consultant: GreenA Consultants Pte Ltd

- Estimated energy savings: 190,520.07kWh/yr; Estimated water savings: 6,725.68m³
- Replacement of all CHWP and AHU general purpose motors with inverter duty motors for improved energy savings during low load conditions
- Replacement of all AHU instrumentation, including Power Meters and Air Flow sensors to provide an indication of kW/RT for air side at BMS
- Installation of new BMS system for both buildings
- Replacement of existing lighting fittings with LED and motion sensors at staircases

IMM Building

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer/Building Owner: CapitaLand Mall Trust
Facility Management: CapitaLand
ESD/Green Consultant: LJ Energy Pte Ltd

- IMM is using central water-cooled chiller plant system to monitor performance and optimize operations of the chiller plant system (average 0.66kW /RT)
- Use of variable speed drives (VSDs) for all pumps and cooling tower
- Naturally ventilated multi-storey carpark with parking guidance systems
- The lift system is incorporated with sleep mode feature that cut off ventilation fan and light under no traffic condition. The escalators and moving walks are also equipped with variable speed drive that is able to slow down when there are no passengers
- IMM is connected via “J-Walk” from level 2 that connects several buildings in its vicinity to Jurong East MRT station and adjacent bus terminal. Free shuttle bus service is also provided to Westgate and J-Cube. A parking lot is designated for hybrid vehicle parking

Income @ Tampines Junction

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: NTUC Income Insurance Co-operative Limited
Facility Management: One Marina Property Services Pte Ltd
ESD/Green Consultant: LJ Energy Pte Ltd

- Estimated energy savings: 1,681,642kWh/yr; Estimated water savings: 504m³/yr
- Highly efficient chiller plant system with a committed total system efficiency of 0.65kW/RT
- Use of variable speed drives for condenser and chilled water pumps, as well as cooling tower fans
- Highly efficient air distribution system, with 41.9% improvement from baseline
- Certified PUB Water Efficient Building, with use of WELS 'Excellent' rated water fittings for all toilets and pantries

International Plaza

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Management Corporation Strata Title No. 461
Facility Management: MCST No. 461
ESD/Green Consultant: Cushman & Wakefield Facilities & Engineering (S) Ltd

- Estimated water savings: 699m³/yr
- Efficient chilled water air-con system
- Use of LED lightings for common areas
- Use of motion sensors for lighting and CO sensors for car park MV fans control
- Green Education Corner

JTC Launchpad @ one-north (Blk 79)

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: JTC Corporation
Architect: Tan + Tsakonas Architects
M&E Engineer: Unipac Consulting Engineers LLP
Structural Engineer: Harvest Consulting Engineers LLP
Quantity Surveyor: PQS Consultants Pte Ltd
Main Contractor: QXY Resources Pte Ltd

- Estimated energy savings: 616,636.80kWh/yr; Estimated water savings: 3,185m³
- Energy efficient air-conditioning system
- Additional sunshading, drywall and roof insulation to reduce solar heat gain into the existing building
- Energy efficient light fittings
- Water efficient fittings

Raffles City Singapore

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer/Building Owner: CapitaLand
Facility Management: CapitaLand
ESCO: Siemens Pte Ltd

- Achieved PUB water efficient building award
- Monitoring of carbon dioxide and monoxide in office and carpark to maintain air quality
- Motion sensors for office toilets and staircases
- Photocell sensors to control lighting at atrium
- Biodiesel plant installed for processing of tenants' collected used oil

Regent Singapore, A Four Seasons Hotel

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Pontiac Land Group C/O Regent Singapore
Facility Management: Regent Singapore
ESD/Green Consultant: Siemens Pte Ltd

- Estimated energy savings: 1,358,051kWh/yr; Estimated water savings: 1,149m³/yr
- Use of energy-saving LEDs for spiral staircases in the lobby, fountain lights, and decorative chandelier
- Use of photocell sensor to monitor luminance level at the guest room corridor of Level 12, which is directly under the skylight
- Extensive recycling programmes in place for waste generated by the hotel operations e.g. tin cans, plastic bottles, glass bottles, paper, waste oil from kitchens and food waste
- Use of rain sensor for the irrigation system, as well as NEWater for cooling towers, irrigation and water features

Singapore Pools Building

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Singapore Pools (Private) Limited
Facility Management: E M Services Private Limited
ESD/Green Consultant: LJ Energy Pte Ltd

- Chiller plant system efficiency 0.662kW/RT
- Majority of lighting consists of T5 luminaires
- VSDs for all chilled water and condenser water pumps
- NEWater for cooling towers

Winsland House 1

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Winsland Investment Pte Ltd
Facility Manager: Wing Tai Investment Management Pte Ltd
ESD/Green Consultant: G-Energy Global Pte Ltd

- Estimated energy savings: 511,199.4kWh/yr
- Chiller Plant System Efficiency of 0.62kW/RT
- AHUs equipped with CO₂ sensors and UVC emitters
- Lifts are equipped with variable voltage variable frequency (VVVF) drive and sleep mode features

Young Man's Christian Association of Singapore

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: YMCA
Facility Management: YMCA
ESD/Green Consultant: EMSI Singapore Pte Ltd

- Chiller plant system with the efficiency $< 0.70\text{kW/RT}$
- 15 kWp PV renewable energy system
- Extensive LED lights installed in all areas
- Naturally ventilated carpark and staircases
- Environmental friendly interior paints

Choa Chu Kang N8C2

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Housing & Development Board
Architect:	Surbana Jurong Consultants Pte Ltd
M&E Engineer:	Surbana Jurong Consultants Pte Ltd
Structural Engineer:	Surbana Jurong Consultants Pte Ltd
Quantity Surveyor:	Surbana Jurong Consultants Pte Ltd
Main Contractor:	Chiu Teng Construction CO Pte Ltd
Landscape Consultant:	Surbana Jurong Consultants Pte Ltd

- Estimated energy savings: 1,882,013.37kWh/yr; Estimated water savings: 98,112.24m³; RETV: 16.23W/m²
- Provision of water efficient fittings to all residential units
- Use of low VOC paint for internal to all blocks
- Provision of internal and external clothes drying racks
- Using Ferrolite wall for internal partition in the residential units

Matilda Court

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Housing & Development Board
Project Manager:	SIPM Consultants Pte Ltd
Architect:	Surbana International Consultants Pte Ltd
M&E Engineer:	Surbana International Consultants Pte Ltd
Structural Engineer:	Surbana International Consultants Pte Ltd
Quantity Surveyor:	Surbana International Consultants Pte Ltd
Main Contractor:	Wee Hur Construction Pte Ltd
Landscape Consultant:	Surbana International Consultants Pte Ltd

- Estimated energy savings: 1,536,424kWh/yr; Estimated water savings: 4,308.17m³; RETV: 15.12W/m²
- Rainwater collection system is provided to collect and store rainwater for common corridor washing
- The common corridors, staircases and deck are provided with LED lighting. The staircase mid-landings and refuse chute area are provided with motion sensors to reduce energy consumption
- Energy efficient lifts with regenerative features save energy and converting it into electricity
- Provision of rain garden at precinct landscape helps to clean storm water before discharge to public drain

Matilda Edge

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Housing & Development Board
Project Manager:	SIPM Consultants Pte Ltd
Architect:	Surbana International Consultants Pte Ltd
M&E Engineer:	Surbana International Consultants Pte Ltd
Structural Engineer:	Surbana International Consultants Pte Ltd
Quantity Surveyor:	Surbana International Consultants Pte Ltd
Main Contractor:	Hi-Tek Construction Pte Ltd
Landscape Consultant:	Surbana International Consultants Pte Ltd

- Estimated energy savings: 1,607,133.51kWh/yr; Estimated water savings: 6,797.45m³; RETV: 16.13W/m²
- Sun breakers at strategic locations to keep out direct sunlight
- Sustainable construction with low concrete usage index
- Provision of sheltered bicycle parking lots
- Provision of double refuse chutes to separate recyclable from non-recyclable waste

Matilda Portico

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Housing & Development Board
Project Manager:	Ong & Ong Pte Ltd
Architect:	Ong & Ong Pte Ltd
M&E Engineer:	Rankine & Hill (Singapore) Pte Ltd
Structural Engineer:	Rankine & Hill (Singapore) Pte Ltd
Quantity Surveyor:	Davis Langdon KPK (Singapore) Pte Ltd
Main Contractor:	Ningbo Construction Group Co., Ltd (Singapore Brach)
Landscape Consultant:	Ong & Ong Pte Ltd

- Estimated energy savings: 918,563.87kWh/yr; Estimated water savings: 9,035m³; RETV: 16.13W/m²
- All residential units with North and South facing windows
- Double refuse chutes for recyclable and non-recyclable wastes
- Use of LED light fittings in all common areas
- Harvested rainwater use for common area cleaning

Punggol Bayview

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Housing & Development Board
Architect:	Surbana Jurong Consultants Pte Ltd
M&E Engineer:	Surbana Jurong Consultants Pte Ltd
Structural Engineer:	Surbana Jurong Consultants Pte Ltd
Quantity Surveyor:	Surbana Jurong Consultants Pte Ltd
Main Contractor:	Qingjian International (South Pacific) Group Development Co., Pte Ltd
Landscape Consultant:	Surbana Jurong Consultants Pte Ltd

- Estimated energy savings: 211,081.69kWh/yr; RETV: 20.57W/m²
- Provision of percolation tank for storm water run-off treatment with approx. 22% of the site/paved area
- Provision of green roof and roof top garden of at least 25% of all the roof areas with automatic water efficient irrigation system with rain sensor
- Rain water harvesting for staircase washing for all residential blocks

Punggol Vue

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Housing & Development Board
Architect:	Surbana Jurong Consultants Pte Ltd
M&E Engineer:	Surbana Jurong Consultants Pte Ltd
Structural Engineer:	Surbana Jurong Consultants Pte Ltd
Quantity Surveyor:	Surbana Jurong Consultants Pte Ltd
Main Contractor:	Ho Lee Construction Pte Ltd
Landscape Consultant:	Surbana Jurong Consultants Pte Ltd
CFD Consultant:	Numerical Innovation Group (NING) Research

- Estimated energy savings: 803,455.23kWh/yr; Estimated water savings: 146,708.64m³; RETV: 17.09W/m²
- Relative Good Thermal Performance of Building Envelop with RETV of 17.09W/m²
- Natural Ventilation & Day Lighting for all Residential Units and Common Areas with Cross Ventilation
- Use of Water Conserving Fittings with good WELS Rating & Rainwater Harvesting Tanks for Rain Water Recycling to Wash Common Areas & Irrigate Plants
- Implementing Precast Construction for Sustainable Construction Method to Reduce Materials Wastage

Sims Urban Oasis

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: Sims Urban Oasis Pte Ltd
Architect: ADDP Architects LLP
M&E Engineer: United Project Consultants Pte Ltd
Structural Engineer: TEP Consultants Pte Ltd
Quantity Surveyor: David Langdon KPK (Singapore) Pte Ltd
Main Contractor: Woh Hup (Private) Limited
Landscape Consultant: COEN Design International Pte Ltd

- Estimated energy savings: 1,460,913.3kWh/yr; Estimated water savings: 220,144.64m³; RETV: 19.85W/m²
- Use full laminated glass for East-West facing towers to achieve the required performance
- Use rainwater for irrigation with 100% automatic water efficient irrigation system and rain sensor
- Motion sensor lights are provided to all staircases
- Water efficient washing machine with WELS Excellent rating are provided to all units

Tampines Greenridges

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: Housing & Development Board
Architect: LAUD Architects Pte. Ltd.
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte. Ltd.
Structural Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte. Ltd.
Quantity Surveyor: Langdon & Seah Singapore Pte. Ltd.
Main Contractor: Chip Eng Seng Contractors (1988) Pte. Ltd.
Landscape Consultant: ICN Design International Pte. Ltd.

- Estimated energy savings: 3,504,719.16kWh/yr; Estimated water savings: 67,375.19m³; RETV: 15.09W/m²
- Energy efficient lighting
- VVVF with regenerative lift system
- Pneumatic waste collection system
- Integrated basin/cistern pedestal system

The Brownstone

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: Canvey Developments Pte Ltd
Architect: ADDP Architects LLP
M&E Engineer: United Project Consultants Pte Ltd
Structural Engineer: P&T Consultants Pte Ltd
Quantity Surveyor: Langdon & Seah Singapore Pte Ltd
Main Contractor: Teambuild Engineering & Construction Pte Ltd
Landscape Consultant: COEN Design International Pte Ltd

- Estimated energy savings: 1,963,992.78kWh/yr; Estimated water savings: 142,618.9m³; RETV: 19.04W/m²
- 65% Prefabricated Prefinished Volumetric Construction (PPVC)
- Use of energy efficient features such as motion sensors, gas heaters, energy efficient lift and ventilation systems etc
- Use of water fittings that are certified under WELS
- Extensive use of sustainable and environmental friendly products by Singapore Green Label Scheme

The Criterion

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: City Developments Ltd/TID Pte Ltd
Architect: Consortium 168 Architects Pte Ltd
M&E Engineer: United Project Consultants Pte Ltd
Structural Engineer: KTP Consultants Pte Ltd
Quantity Surveyor: Davis Langdon KPK (Singapore) Pte Ltd
Main Contractor: Nakano Singapore (Pte Ltd)
Landscape Consultant: Tinderbox Pte Ltd

- Estimated energy savings: 2,205,130.03kWh/yr; Estimated water savings: 49,137,359m³; RETV: 19.78W/m²
- Passive design with majority of the blocks oriented along North-South direction
- Use of Low-E glass to increase thermal insulation at all windows and sliding doors
- Energy efficient air conditioning system with Nanoe-G air purifying function
- Use of non-portable water including rainwater for landscape irrigation

Toa Payoh Apex

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Housing & Development Board
Architect:	ONG & ONG PTE LTD
M&E Engineer:	Rankine & Hill (S) Pte Ltd
Structural Engineer:	SCE Consultants (Pte) Ltd
Quantity Surveyor:	WT Partnership (S) Pte Ltd
Main Contractor:	KUAN AIK HONG CONSTRUCTION PTE LTD
Landscape Consultant:	ONG & ONG PTE LTD
ESD Consultant:	ONG & ONG PTE LTD

- Estimated energy savings: 3,604,422kWh/yr; Estimated water savings: 21,652m³; RETV: 12.92W/m²
- All residential units with North and South facing windows
- Roof garden on multi storey car park and commercial blocks
- Use of Integrated Basin / Pedestal system.

Waterway Sunray

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: Housing & Development Board
Architect: ADDP Architects LLP
M&E Engineer: United Project Consultants Pte Ltd
Structural Engineer: KTP Consultants Pte Ltd
Quantity Surveyor: Langdon & Seah Singapore Pte Ltd, and Arcadis Company
Main Contractor: Kay Lim Construction & Trading Pte Ltd
Landscape Consultant: Earthscape Concepts Pte Ltd

- Estimated energy savings: 32,846.35kWh/yr; Estimated water savings: 26,705.91m³; RETV: 18.95W/m²
- Rainwater collection system is provided to collect and store rainwater for common corridor washing
- The common corridors, staircases and deck are provided with LED lighting. The staircase mid-landings and refuse chute area are provided with motion sensors to reduce energy consumption
- Energy efficient lifts with regenerative features save energy and reduce carbon footprint by recovering braking energy and converting it into electricity
- Provision of bio-swale features at precinct landscape helps to clean storm water before discharge to public drain

Waterway View

New Residential Building

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer: Housing & Development Board
Project Manager: ADDP Architects LLP
Architect: ADDP Architects LLP
M&E Engineer: United Project Consultants Pte Ltd
Structural Engineer: KTP Consultants Pte Ltd
Quantity Surveyor: WT Partnership
Main Contractor: Yau Lee Construction (Singapore) Pte Ltd
Landscape Consultant: Earthscape Concepts Pte Ltd

- Estimated energy savings: 75,995.73kWh/yr; Estimated water savings: 18,312.05m³; RETV: 20.03W/m²
- Good North South orientation of the units within the precinct to reduce thermal transfer to internal spaces
- Provision of rainwater collection system for every block, with stored rainwater used for washing and irrigation of plants at roof terraces where applicable
- Provision of LED lighting to common areas, reducing energy consumption. Staircases mid-landings LED lights come with motion sensors, to reduce wastage of electricity
- Separate centralized refuse chutes at every block and every level for recyclables only, to make it easy and convenient for residents to sort their waste and recycle suitable waste

Bendemeer Primary School

Existing School

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Ministry of Education
Facility Management: CPG Facilities Management Pte Ltd

- The school is built with minimal west and east facing facades and adequate provision of effective sun shading devices on the aforementioned facades to minimize heat gain within the building
- Energy and water usage are monitored and documented with reasons for higher and lower consumption. These information on trends of energy and water utilisation are communicated to both staff and students to encourage them to reduce consumption if necessary
- Green Ambassadors are appointed to ensure that green practices are carried out in the school and to influence their peers to adopt environmentally friendly habits
- Provision of Rooftop Learning Hub (Green Corner) equipped with adequate learning materials on environmental sustainability for both students and staff
- Provision of recycling bins at strategic locations within the school (eg. Canteen) and posters recycling Do's and Don'ts posters to educate users to recycle correctly

Da Qiao Primary School

Existing School

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Ministry of Education
Facility Management: CPG Facilities Management Pte Ltd
ESD/Green Consultant: Tng Jie Min (Back to School Programme)

- Built with minimal west and east facing facades
- Adequate provision of effective sun shading devices on the-facades to minimize heat gain within the building
- Energy and water usage are monitored and documented. These are communicated to both staff and students to encourage them to reduce consumption if necessary
- VIA Champions are appointed to ensure that green practices are carried out in the school and to influence their peers to adopt environmentally friendly habits
- Provision of an educational, fun and engaging green corner, equipped with adequate learning materials on environmental sustainability for both students and staff. The school updates the learning material regularly and displays up-to-date information
- Provision of recycling posters and bins at strategic locations within the school

Hong Wen School

Existing School

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Ministry of Education
Facility Management: CPG Facilities Management Pte Ltd
ESD/Green Consultant: Zoe Cheng (Back to School Programme)

- Energy and water usage are monitored and documented. These information are communicated to both staff and students to encourage them to reduce consumption if necessary
- Environment advocates are appointed to ensure that green practices are carried out in the school and to influence their peers to adopt environmentally friendly habits
- Provision of a green corner (Eco-Cove) equipped with adequate learning materials on environmental sustainability for both students and staff. Eco-cove is regularly updated with the latest Green activities and information
- Provision of recycling posters and bins at strategic locations within the school
- No east-west façade to minimize heat gain and solar glare

Woodgrove Secondary School

Existing School

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Ministry of Education
Facility Management: Guthrie FMC Pte Ltd
Green Consultant: ES Management Pte Ltd

- When the school was designed, the east-west façade was taken into consideration, thus the heat gain and solar glare was highly minimized
- Energy and water usage are monitored and documented with reasons for higher and lower consumption. These information on trends of energy and water utilisation are communicated to both staff and students to encourage them to reduce consumption if necessary
- Environmental Ambassadors are appointed to ensure that green practices are carried out in the school and to influence their peers to adopt environmentally friendly habits. They also work hand in hand with the school's environmental policy
- Provision of a green corner equipped with adequate learning materials on environmental sustainability for both students and staff. They carry out activities and regularly update the green corner with the latest update on green activities and information
- Provision of recycling bins at strategic locations within the school (e.g. staff room, canteen) and posters recycling Do's and Don'ts posters to educate users to recycle correctly

Watercove

Landed Houses

GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Sembawang Estates Pte Ltd
Project Manager:	Mr McDonald Low
Architect:	P&T Consultants Pte Ltd
M&E Engineer:	Rankine & Hill (S) Pte Ltd
Structural Engineer:	Ronnie & Koh Consultants Pte Ltd
Quantity Surveyor:	Langdon & Seah Singapore Pte Ltd
Main Contractor:	V3 Construction Pte Ltd
Landscape Consultant:	Site Concept International Pte Ltd

- Estimated energy savings: 427,909.17kWh/yr; Estimated water savings: 11,775.81m³; RETV: 20.15W/m²
- Heat recovery system for Hot Water
- LED lighting for Landscape/Common Areas
- Motion sensors in escape stairs and private car parks
- High efficient Air Conditioning with filtration systems

GREEN MARK AWARD FOR BUILDINGS

GOLD

Project Name	Category	Client/Developer/Building Owner
Project Link	New Non-Residential Building	Pacific Refreshments Pte Ltd
ASM Technology Singapore @ Tech Park Building 2	New Non-Residential Building	ASM Technology Singapore Pte Ltd
Block O, Goodman Arts Centre	New Non-Residential Building	National Arts Council
Hillview Community Club	New Non-Residential Building	People's Association
HS Bldg @ 3 Pioneer Sector Lane	New Non-Residential Building	Hua Siah Construction Pte Ltd
Lower Seletar Waterworks (Membrane Filtration Building)	New Non-Residential Building	Public Utilities Board
Loyang Point	New Non-Residential Building	Housing & Development Board
Mapletree 18	New Non-Residential Building	Mapletree Trustee Pte Ltd (As Trustee-manager Of Marina Trust)
Markono Group M-Cube Building	New Non-Residential Building	Markono Print Media Pte Ltd
OUE Downtown Serviced Apartment	New Non-Residential Building	Alkas Realty Pte Ltd

GREEN MARK AWARD FOR BUILDINGS

GOLD

Project Name	Category	Client/Developer/Building Owner
Proposed Development of Facilities and Infrastructure at Seletar	New Non-Residential Building	Defense Science & Technology Agency
Sapphire Large Batch Plant and Creative Centre	New Non-Residential Building	Givaudan Singapore Pte Ltd
Select Group Building	New Non-Residential Building	SELECT GROUP LTD.
Symrise R&D Rejuvenate Phase 1	New Non-Residential Building	Symrise Asia Pacific Pte Ltd
Tanglin Trust School Nixon Building	New Non-Residential Building	Tanglin Trust School
Temasek Polytechnic - Centre for Aquaculture & Veterinary Science (Blk 8A)	New Non-Residential Building	Temasek Polytechnic, Estates & Facilities Management Office
Tiong Bahru Community Centre	New Non-Residential Building	People's Association
YOTEL Singapore (Orchard Road)	New Non-Residential Building	Yat Yuen Hong Company Limited
30 Hill Street	Existing Non-Residential Building	Sembcorp Investment Pte Ltd
55 Market Street	Existing Non-Residential Building	BMT Limited as Trustee of Frasers Commercial Trust

GREEN MARK AWARD FOR BUILDINGS

GOLD

Project Name	Category	Client/Developer/Building Owner
978 & 988 Toa Payoh North	Existing Non-Residential Building	DBS Trustee Limited As Trustee of Mapletree Industrial Trust
Block 15 At Woodlands Loop	Existing Non-Residential Building	JTC Corporation
Block 22 at Woodlands Link	Existing Non-Residential Building	JTC Corporation
Century Square	Existing Non-Residential Building	The MCST Plan No. 2193
China Square Central	Existing Non-Residential Building	BMT Limited as Trustee for Fraser's Commercial Trust
Compass One	Existing Non-Residential Building	North 1 Pte Ltd
Diabetes and Metabolism Centre	Existing Non-Residential Building	Singapore General Hospital Pte Ltd
Disco Hi-Tec (Singapore)	Existing Non-Residential Building	Disco Hi-Tec (Singapore) Pte Ltd
Goldbell Towers	Existing Non-Residential Building	Chua Chuan Leong Contractors Pte Ltd
Grand Mercure Singapore Roxy	Existing Non-Residential Building	Grand Mercure Singapore Roxy

GREEN MARK AWARD FOR BUILDINGS

GOLD

Project Name	Category	Client/Developer/Building Owner
HarbourFront Tower One and HarbourFront Tower Two	Existing Non-Residential Building	HarbourFront Two Pte Ltd
Income at Prinsep	Existing Non-Residential Building	NTUC Income Insurance Co-Operative Ltd
ION Orchard	Existing Non-Residential Building	Orchard Turn Developments Pte Ltd
K&S Corporate Headquarters	Existing Non-Residential Building	DBS Trustee Limited As Trustee Of Mapletree Industrial Trust
Multi-Mission Range Complex	Existing Non-Residential Building	Mindef
Northpoint Shopping Centre	Existing Non-Residential Building	HSBC Institutional Trust Services (Singapore) Limited as Trustee of Fraser's Centrepoint Trust
OCBC Centre East	Existing Non-Residential Building	OCBC Square Private Limited
OCBC Centre South	Existing Non-Residential Building	OCBC Square Private Limited
One Raffles Place Tower 1	Existing Non-Residential Building	OUB Centre Ltd
Raffles City Convention Centre	Existing Non-Residential Building	RC Hotels Pte Ltd

GREEN MARK AWARD FOR BUILDINGS

GOLD

Project Name	Category	Client/Developer/Building Owner
Rex House	Existing Non-Residential Building	Management Corporation Strata Title No. 1583
Sim Lim Square	Existing Non-Residential Building	The Management Corporation - Strata Plan Title No. 1440
Singapore Shopping Centre	Existing Non-Residential Building	The Management Corporation Strata Title Plan No.645
Standard Chartered Bank at Changi Business Park Phase 2	Existing Non-Residential Building	Standard Chartered Bank
Straits Trading Building	Existing Non-Residential Building	Nine Battery Pte Ltd
The Ritz-Carlton Millenia Singapore	Existing Non-Residential Building	RCMS Properties Pte Ltd
The Signature	Existing Non-Residential Building	DBS Trustee Limited as Trustee of Mapletree Industrial Trust
Tuas View Fire Station	Existing Non-Residential Building	Singapore Civil Defence Force (SCDF)
Upper Serangoon Shopping Centre	Existing Non-Residential Building	MCST 1479
VivoCity	Existing Non-Residential Building	DBS Trustee Limited as Trustee of Mapletree Commercial Trust

GREEN MARK AWARD FOR BUILDINGS

GOLD

Project Name	Category	Client/Developer/Building Owner
Wilkie Edge	Existing Non-Residential Building	CapitaLand Commercial Trust
York Hotel	Existing Non-Residential Building	York Hotel Pte Ltd
EastLink I @ Canberra	New Residential Building	Housing & Development Board
EastLink II @ Canberra	New Residential Building	Housing & Development Board
HDB Hougang N9 C18	New Residential Building	Housing & Development Board
HDB Jurong West N9 C18	New Residential Building	Housing & Development Board
Park Grove @ Yishun	New Residential Building	Housing & Development Board
The Creek @ Bukit	New Residential Building	Housing & Development Board
West Valley @ Bukit Batok	New Residential Building	Housing & Development Board
Whampoa Dew	New Residential Building	Housing & Development Board

GREEN MARK AWARD FOR BUILDINGS

GOLD

Project Name	Category	Client/Developer/Building Owner
Woodlands Glen	New Residential Building	Housing & Development Board
Blk 195A-E, 194(MSCP) Punggol Road	Existing Residential Building	Housing & Development Board
Blk 601A-D, 602(MSCP), 602A-C, 603(MSCP), 603A-C, 604A-C Punggol Central / Punggol Road	Existing Residential Building	Housing & Development Board
Blk 612A-D, 612(MSCP), 613A-D Punggol Drive	Existing Residential Building	Housing & Development Board
Blk 614A-B, 614(MSCP), 615A-C Edgefield Plains	Existing Residential Building	Housing & Development Board
Blk 632A-C, 633(MSCP), 633A-B, 635A-C, 636A-B Punggol Drive	Existing Residential Building	Housing & Development Board
Ang Mo Kio Secondary School	Existing School	Ang Mo Kio Secondary School
Chung Cheng High School (Main)	Existing School	Chung Cheng High School (Main)
Commonwealth Secondary School	Existing School	Ministry of Education
Punggol Primary School	Existing School	Ministry of Education

GREEN MARK AWARD FOR BUILDINGS

GOLD

Project Name	Category	Client/Developer/Building Owner
Punggol Secondary School	Existing School	Ministry of Education
Serangoon Garden Secondary School	Existing School	Serangoon Garden Secondary School
Serangoon Secondary School	Existing School	Serangoon Secondary School
Woodlands Secondary School	Existing School	Ministry of Education
Xinghua Primary School	Existing School	Xinghua Primary School
Xingnan Primary School	Existing School	Ministry of Education

GREEN MARK AWARD FOR BUILDINGS

CERTIFIED

Project Name	Category	Client/Developer/Building Owner
Nexus	New Non-Residential Building	Shell Chemicals Seraya Pte Ltd
Second Changi NEWater Plant (Area 2 – Control Building)	New Non-Residential Building	BEWGI-UE NEWATER PTE LTD
30 Toh Guan Road (Annexed Warehouse)	Existing Non-Residential Building	RBC Investor Services Trust Singapore Limited (As Trustee of Cambridge Industrial Trust)
86 International Road	Existing Non-Residential Building	RBC Investor Services Trust Singapore Limited (As Trustee of Cambridge Industrial Trust)
AIA Tower	Existing Non-Residential Building	AIA Singapore Pte Ltd
AMK Tech II	Existing Non-Residential Building	Housing & Development Board
Duke-NUS Medical School	Existing Non-Residential Building	Duke-NUS Medical School
EASTech	Existing Non-Residential Building	Housing & Development Board
EASTLink	Existing Non-Residential Building	Housing & Development Board

Project Name	Category	Client/Developer/Building Owner
Mandarin Orchard Singapore	Existing Non-Residential Building	OUE Limited
Pan Pacific Hotel Singapore	New Non-Residential Building	Hotel Marina City Pte Ltd
PSA Vista	New Non-Residential Building	Vista Real Estate Investments Pte Ltd
Sophia Hills	New Residential Building	Hoi Hup Sunway Mount Sophia Pte Ltd

BCA Green Mark

OCCUPANT-CENTRIC SCHEMES

The **BCA Green Mark for Occupant-Centric Schemes** is catered for the multi-tenanted and multi-functional aspect of the diverse buildings which make up the built environment. A single building may be occupied by different tenants, who each have different operational functions. The various schemes under the BCA Green Mark Occupant-Centric schemes allow appropriate sustainability benchmarks and criteria to be tailored for the various core operations of tenants within buildings.

This year, the BCA Green Mark Award winners for Occupant-Centric schemes are grouped into the following categories:

- i. BCA Green Mark Award for Office Interiors
- ii. BCA Green Mark Award for Supermarkets
- iii. BCA Green Mark Award for Retail
- iv. BCA-IMDA Green Mark Award for Data Centres
- v. BCA Green Mark Award for Laboratories
- vi. BCA Green Mark Award for Restaurants

BCA Green Mark

FOR OFFICE INTERIOR

The **BCA Green Mark for Office Interior** is BCA's initiative to promote and recognise environmentally-friendly and sustainable practices of office tenants. Office buildings make up a significant percentage of the building stock in Singapore. Such buildings may be multi-tenanted, hence the way individual tenanted spaces are operated and maintained may not always be under the control of the building owner. The BCA Green Mark for Office Interior complements the BCA Green Mark for Buildings by encouraging individual office tenants within buildings to be sustainable. The scheme is applicable to both existing and new offices that have or have not undergone renovation.

The scheme, launched in 2009, has since been gaining momentum with the industry, with its take-up rate being on the rise each year.

Offices are evaluated under the following criteria:

- i. Energy Efficiency
- ii. Water Efficiency
- iii. Sustainable Management and Operation
- iv. Indoor Environmental Quality
- v. Other Green Features

Ascendas-Singbridge Pte Ltd

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM

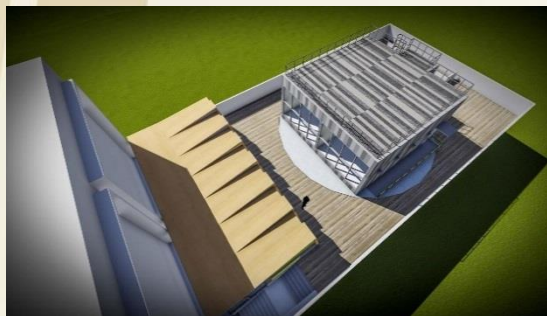


Tenant/Owner:	Ascendas-Singbridge Pte Ltd
Renovation Consultant/Contractor:	New Art Interior Pte Ltd
Facility Manager Company:	Ascendas-Singbridge Pte Ltd
M&E Consultant:	Mott Macdonald Singapore Pte Ltd
ESD Consultant:	Cundall Singapore Pte Ltd

- Energy efficient air conditioning and lighting system with zoning and control
- Provision of energy efficient IT equipment
- Flexible open office design with provision of hot desks
- Extensive use of environmentally friendly products and recycling facilities with good waste management
- Indoor planting and access to a roof top garden area
- Development of new policies and approaches to actively management monitor the environmental performance of the office, inclusive of a Green Team
- Water efficient fittings with operational water efficiency management plans

GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner:	BCA Academy
M&E Consultant:	Surbana Jurong Consultants Pte Ltd
Main Contractor:	Sanyo Engineering & Construction Inc
Building Management & Data Acquisition Contractor:	Quantum Automation Pte Ltd
Rotating Platform Contractor:	BHL Construction Pte Ltd
ESD Consultant:	Kaer Pte Ltd

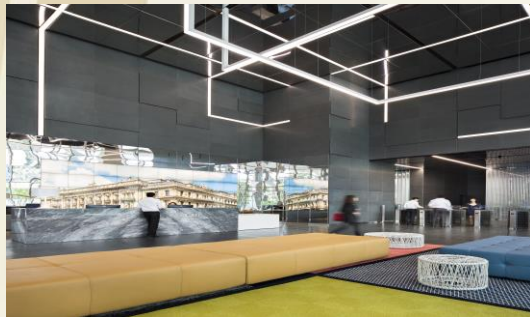
- Asia's first rotatable test facility for building energy efficiency
- Cross Laminated Timber (CLT) for the standalone lounge which improves the construction productivity and minimizes the usage of the materials for interior fit-out
- Comprehensive "Plug and Play" testing capabilities, flexible framing system for easy configuration of lighting, air-conditioning and façade system
- Dimming control for the indoor lighting
- All lighting individually circuited and separately programmable
- Conduct tour programme for education and demonstration the performance of technologies tested
- Advanced control system and data acquisition system

Credit Suisse AG

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner: Credit Suisse AG
Architect: Hassell Design
Facility Manager Company: Jones Lang LaSelle, IP, Inc
M&E Consultant: BESCON Consulting Engineers Pte
ESD Consultant: Kaer Pte Ltd

- Zoning of AC and lighting and 100% flexible smart working electronic desk search system and the use of thin clients result in significant (after-hours) energy savings and $EEI < 60 \text{ kWh/m}^2/\text{year}$
- Energy Efficient Lighting –Implementation of LED lighting throughout the office results in a LPD of 7.2 W/m^2 and $> 50\%$ savings, where motion sensors are applied throughout the office at $> 90\%$ of the GFA to eliminate unnecessary energy consumption and task lighting allows for individual lighting levels control
- More than 99% of equipment are Energy Star labelled, 4 tick fridges, AAA dishwasher and sleep mode features are applied to $> 90\%$ of all equipment
- Real time monitoring and live display of energy & water consumption is available for individual user download for tracking purposes, with green tips and user guides
- Tenant water fittings with WELS excellent rating, remote SMS message for leak detection, drought tolerant plants, and NEWater provision reduce potable water consumption
- Extensive use of environmental friendly and reused products, finishes and furniture
- Open stairs increase inter level interaction and reduce burden on lifts

DBS Bank Ltd

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner:	DBS Bank Ltd
Renovation Consultant/Main Contractor:	SHIMIZU Corporation
Project Management:	Sweett (Singapore) Pte Ltd
M&E Consultant:	J Roger Preston (S) Pte Ltd
Facility Manager Company:	Jones Lang LaSelle Property Consultants Pte Ltd
ESD Consultant:	Kaer Pte Ltd

- Schedule control for AC System and localized timer control for lighting
- Extensive use of T5 with high frequency ballast with LED light fittings arranged in proper zoning and sufficient controls
- All water fittings are WELS 'Excellent' Rating for minimizing water consumption
- Water leak detection system to minimize water wastage
- Open office plan that widely uses environmentally sustainable materials for office operation
- Video conference room for carbon footprint reduction
- Green corner and washable cups for visitors

Dimension Data Asia Pacific Pte Ltd

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner:	Dimension Data Asia Pacific Pte Ltd
Renovation	Merge O+R Pte Ltd
Consultant/Contractor:	Merge O+R Pte Ltd
Facility Manager Company:	Dimension Data Asia Pacific Pte Ltd
Managing Agent/Maintenance Contractor:	Savills Singapore Pte Ltd
ESD Consultant:	Kaer Pte Ltd

- Zoning of lighting and use of motion sensor in frequent used meeting rooms
- More than 80% office equipment is energy star labelled
- Zoning of AC and use of auxiliary AC after working hours
- Provision of green corner with display of energy and water consumption and other sustainable material for access to occupants
- Interior staircases to increase inter level interaction and reduce burden on lifts
- Use of video conferencing system to reduce

Ministry of Communications and Information (MCI)

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner:	Ministry of Communications and Information (MCI)
Renovation	Aspacio Design Associates Pte Ltd /
Consultant/Contractor:	Perform Industries Pte Ltd
Facility Manager Company:	One Marina Property Services Pte Ltd
Project Manager:	One Marina Property Services Pte Ltd
ESD Consultant:	Building System & Diagnostics Pte Ltd

- Control of auxiliary air-conditioning units using combination of toggle switches and Building Management System
- Extensive lighting control using dimmers, motion sensors, photocell sensors and timers for lightings
- Use of >98% IT Equipments with Energy Star Label
- Implementation of sustainable purchasing policy
- Integrated CO₂ monitoring to automatically regulate fresh air intake
- Use of renewable Solar energy with replacement rate of more than 2.5%
- All water fittings are certified WELS 3-Ticks

Sunhuan Construction Pte Ltd

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner:	Sunhuan Construction Pte Ltd
Renovation	Sunhuan Construction Pte Ltd
Consultant/Contractor:	Sunhuan Construction Pte Ltd
Architect:	ACE Architects & Associates
M&E Consultant:	HPX Consulting Engineers
ESD Consultant:	Building System & Diagnostics Pte Ltd

- Use of energy efficient lighting fittings with a Lighting Power Budget of 6.44W/m², achieving 57% energy saving
- Most of sanitary fittings are 'Excellent' WELS certified
- Provision of roof garden and indoor plants for employees
- Achieve good IAQ in the office
- Usage of sustainable products for office operation
- Implementation of shuttle bus transportation system for employees
- Provision of smart control system in office spaces
- .

City Developments Limited (City House Level 2)

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner:

City Developments Limited

- Extensive use of energy efficient lights
- Extensive recycling facilities and waste management
- Setting of ISO 14001 Targets and Environmental Programs
- Setting green procurement guidelines
- Introduction of document management system and electronic forms to reduce paper usage

City Developments Limited (City House Level 5)

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner:

City Developments Limited

- Extensive use of energy efficient lights
- Extensive recycling facilities and waste management
- Setting of ISO 14001 Targets and Environmental Programs
- Setting green procurement guidelines
- Introduction of document management system and electronic forms to reduce paper usage

FCL Offices at Alexandra Point

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner: FCL Management Services Pte Ltd
Facility Manager Company: FCL Management Services Pte Ltd
ESD Consultant: Kaer Pte Ltd

- Use of video conferencing system to reduce travelling and carbon emission
- More than 80% office equipment is Energy Star labelled
- Use of efficient lighting system with an overall lighting power density of 10W/m²
- Zoning of lighting and use of motion sensor in pantries
- Provision of recycling facilities and monitoring of recyclable waste

Financial Industry Disputes Resolution Centre Ltd

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner: Financial Industry Disputes Resolution Centre Ltd
Renovation Consultant/Contractor: H*id private limited

- T5 lights for entire office space
- Installed solar film to reduce glare
- Carpets, system furniture and laminates used are Eco certified
- Energy Star rated office equipment
- Environmental Policy endorsed by top management

Fuji Xerox Singapore Pte Ltd

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner:

Fuji Xerox Singapore Pte Ltd

- T5 lights for entire office space.
- Recycling bins provided at prominent locations for easy access.
- Tele-conferencing equipment
- Password access for using photocopier
- Use of non-disposable cups for meetings and staff

HarbourFront One Pte Ltd

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner:

HarbourFront One Pte Ltd

Managing Agent/Maintenance Contractor: Keppel Land International Ltd

- Achieve EEI of 66.1kWh/m²/yr
- Use of energy efficient LED lightings and natural lighting, achieving 17% better than Gold^{PLUS} requirement
- Extensive use of Energy Star office equipment
- Promote recycling by adopting recycling facilities and recycling points within the office
- Implement green procurement and purchasing policy with extensive use of sustainable office stationery and cleaning products

Institute of Bioengineering and Nanotechnology

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner: Institute of Bioengineering and Nanotechnology

ESD Consultant: TUV SUD PSB Pte Ltd

- Maximized the usage of LED lighting
- Installation of CO₂ sensors
- Implementation of UVC Emitter
- Usage of in-house Building Management System
- Appointment of Green Mark Facility Manager

Ogilvy & Mather (S) Pte Ltd

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner:	Ogilvy & Mather (S) Pte Ltd
Renovation Consultant:	Geyer
Facility Manager Company:	Ogilvy & Mather (S) Pte Ltd
Managing Agent:	Ogilvy & Mather (S) Pte Ltd
ESD Consultant:	Kaer Pte Ltd

- Use of video conferencing system to reduce travelling and carbon emission
- More than 80% office equipment is energy star labeled
- Provision of internal staircases to increase inter level interaction and reduce burden on lifts
- EEI of 65 kWh/sqm/yr
- Average LPD of 9.75W/m² with the overall savings of 33.63%

Singapore Cancer Society

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner: Singapore Cancer Society
Renovation: FARM (ID Consultant) Sunray Woodcraft
Consultant/Contractor: Construction Pte Ltd (Main contractor)
M&E Consultant: Bescon Consulting Engineers Pte Ltd
ESD Consultant: Building System & Diagnostics Pte Ltd

- Design of lighting power density to be 5.98W/m² in order to achieve 60.13% energy saving
- Use of all 'Excellent' WELS rating in office
- Extensive use of environmental friendly materials for fitout works
- Implement landlord-tenant green lease initiatives
- Provide task lighting for each staffs to optimize the lux level

Visa Worldwide Pte Limited

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner:	Visa Worldwide Pte Ltd
Renovation Consultant:	AD Incorporation Pte Ltd
Project Manager Company:	CBRE Pte Ltd
M&E Consultant:	J Roger Preston (S) Pte Ltd
Renovation Consultant:	Facility Link Pte Ltd
ESD Consultant:	Faithful+Gould Pte. Limited

- Motion sensors throughout the office to minimize energy usage
- High efficient lighting design giving low lighting power budget of 8.64W/m²
- Office desk equipped with height adjustable feature to provide people oriented work environment
- Auxiliary air-con provided to open plan office and meeting rooms for after office usage with timer set for 2 hours usage
- Sustainable procurement policy in place with extensive use of environmentally friendly office products

Visa Worldwide Pte Ltd

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner: Visa Worldwide Pte Ltd
Renovation: SCA Design Pte Ltd / New Art Interior Pte Ltd / DLE
Consultant/Contractor: M&E Pte Ltd
M&E Consultant: J Roger Preston (S) Pte Ltd
Project Manager: CBRE Pte Ltd
ESD Consultant: Building System & Diagnostics Pte Ltd

- Control of auxiliary air-conditioning units using toggle switches
- Extensive lighting control using dimmers, motion sensors, photocell sensors and timers for all lighting within the project space
- Use of >90% IT Equipment with Energy Star Label
- Implementation of sustainable purchasing policy in order to “green” the procurement policy within the local office branches
- Integrated CO₂ monitoring to automatically regulate fresh air intake

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD

Project Name	Client/Developer/Building Owner
Abbvie Pte Ltd	Abbvie Pte Ltd
Akzo Nobel Paints (Singapore) Pte Ltd	Akzo Nobel Paints (Asia Pacific) Pte Ltd
AllianceBernstein (Singapore) Ltd	AllianceBernstein (S) Ltd
Central Provident Fund Board (Novena Square)	Central Provident Fund Board
Central Provident Fund Board (Jurong Service Centre)	Central Provident Fund Board
Centre for Liveable Cities	Centre for Liveable Cities Singapore (CLC)
CDL Office (City House Level 3)	City Developments Limited
CDL Office (City House Level 4)	City Developments Limited
CDL Office (City House Level 22)	City Developments Limited
CDL Office (Republic Plaza Level 36)	City Developments Limited

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD

Project Name

Civil Aviation Authority of Singapore

Conergy Asia & ME Asia Pte Ltd

DBS Bank Ltd

DP Architects Pte Ltd

Levi Strauss Asia Pacific Division Pte Ltd.

LSK Engineering (S) Pte Ltd

Ministry of Communications and Information

Ministry of Law

Panasonic Asia Pacific Pte Ltd

Pharmaceutical Research Associates Singapore Pte Ltd

Client/Developer/Building Owner

Civil Aviation Authority of Singapore

Conergy Asia & ME Asia Pte Ltd

DBS Bank Ltd

DP Architects Pte Ltd

Levi Strauss Asia Pacific Division Pte Ltd.

LSK Engineering (S) Pte Ltd

Ministry of Communications and Information (Cyber Security Agency)

Ministry of Law

Panasonic Asia Pacific Pte Ltd

Pharmaceutical Research Associates

Project Name

Prudential Assurance Company Singapore (Pte) Ltd

Schroder Investment Management (Singapore) Ltd

Wellington Management Singapore Pte Ltd

Client/Developer/Building Owner

Prudential Assurance Company Singapore Pte Ltd

Schroder Investment Management (Singapore) Limited

Wellington Management Singapore Pte Ltd

Project Name	Client/Developer/Building Owner
ACA Investments Pte Ltd	ACA Investments Pte Ltd
Farrer Park Hospital Pte. Ltd.	Farrer Park Hospital Pte Ltd
HL Suntek Insurance Brokers Pte Ltd	HL Suntek Insurance Brokers Pte Ltd
Hoffman Schroff Pte Ltd	Hoffman Schroff Pte Ltd
Hovono Holdings Pte. Ltd.	Hovono Holdings Pte Ltd
Jones Lang Lasalle Technology Services Pte Ltd	Jones Lang LaSalle Technology Services Pte Ltd
Knowledge International Strategy Systems Pte Ltd	Knowledge International Strategy Systems Pte Ltd
M&C REIT Management Limited	M&C REIT Management Limited
Millennium and Copthorne International Limited	Millennium & Copthorne International Limited
Mitsubishi Estate Asia Pte Ltd	Mitsubishi Estate Asia Pte Ltd

Project Name

Murdoch Singapore Pte Ltd

SAP Asia Pte Ltd

The Association of Banks in Singapore

Client/Developer/Building Owner

Murdoch Singapore Pte Ltd

Office Tenants SAP Asia Pte Ltd

The Association of Banks in Singapore

BCA Green Mark

FOR SUPERMARKETS

The **BCA Green Mark for Supermarkets**, launched in 2012, is an initiative by BCA to promote and recognize environmentally friendly as well as sustainable practices and features in supermarket outlets. It aims to encourage supermarket operators to adopt energy efficient design, equipment and green practices at their outlets. Such measures can help supermarket operators reduce their energy consumption and utilities costs.

There are about 300 supermarkets in Singapore, and each outlet's floor area can range from 90 m² to 4,500 m². Refrigeration, required to keep the goods and produce fresh, accounts for up to 50% of the total supermarket energy consumption. The rest of the energy is consumed by lighting, plug loads and air-conditioning. By incorporating green features, supermarkets can reduce the total energy consumed by as much as 10%. Thus, supermarket operators have a significant impact on the total building energy consumption. Green supermarkets also have the power to educate and motivate supermarket patrons to be environmentally responsible.

The scheme assesses supermarkets based on the following five criteria:

- i. Energy Efficiency
- ii. Water Efficiency
- iii. Environmental Protection
- iv. Indoor Environmental Quality
- v. Other Green Features

FairPrice Finest Supermarket at JCUBE

Supermarkets

GREEN MARK AWARD FOR SUPERMARKETS

PLATINUM



Tenant/Owner: NTUC Fairprice Co-operative Ltd
M&E Consultant: CCA & Partners Pte Ltd
M&E Contractor: Viplas Engineering Pte Ltd
Refrigeration Contractor: Carrier Singapore (Pte) Ltd

- Centrally-controlled energy-efficient refrigeration system with display showcases fitted with doors, electronic expansion valves, anti-sweat control, & electronically commutated (EC) fans for the condensers & evaporators
- 100% LED lighting, inclusive of refrigerated display showcases, with zonal control & occupancy sensors to conserve energy
- Energy Management System with remote monitoring capability to track energy consumption
- Sinks & basins are fitted with water-efficient taps. Private water meters are installed to track consumption of various usage & for leak detection
- Collection of cardboards, paper, plastic & metal cans for recycling. Contribution to Food Donations
- Numerous sustainable SGBC Green Building products used for fit-out eg. Laminates, low VOC paints, plaster board, etc
- Eco-trail highlighting green features with display panel showing accumulated numbers of plastic bags saved via our incentive scheme

GREEN MARK AWARD FOR SUPERMARKETS

GOLD

Project Name	Client/Developer/Building Owner
Cold Storage Eastwood	Cold Storage Singapore (1983) Pte Ltd
Cold Storage Parkway Parade	Cold Storage Singapore (1983) Pte Ltd
FairPrice Supermarket at Coronation Plaza	NTUC FairPrice Co-operative Limited
FairPrice Supermarket at Redhill	NTUC FairPrice Co-operative Limited
FairPrice Supermarket at Upper Serangoon View	NTUC FairPrice Co-operative Limited
Giant Supermarket Loyang Point	Cold Storage Singapore (1983) Pte Ltd
Giant Supermarket Paya Lebar Square	Cold Storage Singapore (1983) Pte Ltd

BCA Green Mark

FOR RETAIL

The **BCA Green Mark for Retail** was launched in 2012 to recognize the sustainable efforts of individual retail tenants. It provides recognition of retailers' commitment to reduce their environmental impact.

The retail sector is one of the highest consumers of energy per floor area. Data collected from retail buildings assessed under the Green Mark for Buildings showed that approximately 50% of the total building energy is consumed by the retail tenants. The tenant loads within such buildings also lead to high air-conditioning load within the retail mall.

As the Green Mark for Buildings is catered for building owners, it may not directly address the way building tenants consume energy. Hence, the BCA Green Mark for Retail complements the Green Mark for Buildings scheme by addressing specific areas within the tenant space such as the sustainable fit-out and operation, with a strong focus on assessing efficiency of installed light fittings and plug load energy consumption – both which are within the control of the tenant. These criteria are developed to guide and encourage tenants to fit-out their shops in a sustainable manner that reduces the operating costs, energy consumption and cooling load while maintaining the required aesthetic.

The scheme assesses retail tenants under the following five criteria:

- i. Energy Efficiency
- ii. Water Efficiency
- iii. Sustainable Awareness and Operation
- iv. Indoor Environmental Quality
- v. Other Green Features

Capitol Optical (City Square Mall)

Retail

GREEN MARK AWARD FOR RETAIL

PLATINUM



Tenant/Owner:	Capitol Optical Company Pte Ltd
Landlord (Retail Mall):	City Developments Limited (City Square Mall)
Renovation	
Consultant/Contractor:	RECT General Contractor
M&E Consultant:	Long Way Electrical Contract
Other specialist	
consultant/Contractor:	CE Consulting Engineers
Managing Agent/Maintenance Contractor:	RECT General Contractor

- Use of energy efficient LED lights
- Use of energy-efficient office equipment
- Environmental policy and sustainable operations manual in place
- Use of environmentally-friendly cleaning products
- Use of low VOC paints and adhesives
- Use of environmentally-friendly printing paper

Decathlon (City Square Mall)

Retail

GREEN MARK AWARD FOR RETAIL

PLATINUM



Tenant/Owner: Decathlon Singapore Pte Ltd
Landlord (Retail Mall): City Developments Limited (City Square Mall)
Renovation
Consultant/Contractor: 8Build Pte Ltd
M&E Consultant: Parsons Brinckerhoff Pte Ltd

- T5 lights for entire premises, light motion sensor for low-occupancy store area
- No plastic bags provided; sale of reusable bags
- Energy-efficient office equipment
- Environmentally-friendly renovation materials including low-VOC paint and adhesives
- Environmental policy and sustainable operations manual in place
- Sustainable operations
- Global Sustainability Report

Singapore Post (City Square Mall)

Retail

GREEN MARK AWARD FOR RETAIL

PLATINUM



Tenant/Owner:	Singapore Post Limited
Landlord (Retail Mall):	City Developments Limited (City Square Mall)
Renovation	Kingsmen Design Pte Ltd/Megabuilders &
Consultant/Contractor:	Development Pte Ltd
M&E Consultant:	CCA & Partners Pte Ltd
Managing Agent/Maintenance Contractor:	CBRE

- Use of energy-efficient T5 and LED lights
- Green Urban Logistics – Installation of POPStations which reduce delivery trips; vPost's sea freight option vs air freight for lower emissions and fuel usage per product
- Paperless system – Automating of paper based internal service requests into a digital system
- Usage of low VOC paints and adhesives
- Green Fleet Programme – Replacement of delivery scooters with larger carrying capacity three-wheelers that reduced delivery trips and emissions

SSTC Institute (City Square Mall)

Retail

GREEN MARK AWARD FOR RETAIL

PLATINUM



Tenant/Owner:

SSTC Institute Pte. Ltd.

Landlord (Retail Mall):

City Developments Limited (City Square Mall)

- Incorporate daylight into design
- Use of T5 and LED lights throughout premises
- Zoning of lights for different usage and location
- Energy-efficient office equipment and electronic attendance tracker
- Environmentally-friendly renovation materials including low-VOC paint and adhesives
- Use of recycled classroom and reception area furniture
- Flexible space design with classroom divider and collapsible furniture for easy reconfiguration

ELO Lab (City Square Mall)

Retail

GREEN MARK AWARD FOR RETAIL

GOLD^{PLUS}



Tenant/Owner: Elo Water Pte Ltd
Landlord (Retail Mall): City Developments Limited (City Square Mall)
Renovation
Consultant/Contractor: Caught-In-Space

- Use of energy-efficient LED lights
- Use of energy-efficient office equipment
- Use of environmentally-friendly renovation materials including low VOC paints and adhesives
- Environmental policy in place
- Use of environmentally-friendly printing paper

Emtech Wellness International (City Square Mall)

Retail

GREEN MARK AWARD FOR RETAIL

GOLD^{PLUS}



Tenant/Owner: Emtech Wellness International Pte. Ltd.
Landlord (Retail Mall): City Developments Limited (City Square Mall)
Renovation
Consultant/Contractor: Jerry Tan (Ally Wong Interior Pte Ltd)

- Use of energy-efficient LED lights
- Use of environmentally-friendly renovation materials including paints and laminates
- Environmental policy in place
- Recycling paper for double-sided use
- Encourage staff and customer to use reuseable bottles

Genius R Us (City Square Mall)

Retail

GREEN MARK AWARD FOR RETAIL

GOLD^{PLUS}



Tenant/Owner: Genius R Us (City Square) LLP
Landlord (Retail Mall): City Developments Limited (City Square Mall)

- Use of energy-efficient LED lights
- Zoning of lighting for different areas
- Use of environmentally-friendly printing paper
- Use of energy-efficient office equipment
- Environmental policy and green guide in place

Golden Village Multiplex (City Square Mall)

Retail

GREEN MARK AWARD FOR RETAIL

GOLD^{PLUS}



Tenant/Owner: Golden Village Multiplex Pte Ltd
Landlord (Retail Mall): City Developments Limited (City Square Mall)
Renovation
Consultant/Contractor: TKC Builders Pte Ltd
M&E Consultant: Icon Engineers LLP (Azuri Engineers Pte Ltd)

- Use of energy-efficient LED lights
- Environmental policy and sustainable operations manual in place
- Use of environmentally-friendly renovation materials including low-VOC paint
- Sustainable operations manual in place
- Use of paperless access card system
- Implementing Quicktix™ paperless ticketing system

LEAP SchoolHouse @ City Square Mall

Retail

GREEN MARK AWARD FOR RETAIL

GOLD^{PLUS}



Tenant/Owner: LEAP SchoolHouse @ City Square Mall Pte Ltd

Landlord (Retail Mall): City Developments Limited (City Square Mall)

- Extensive zoning of lighting for different areas
- Use of environmentally-friendly renovation materials including low-VOC paint, adhesives and vinyl flooring
- Use of sustainable consumable materials including environmentally-friendly dishwashing liquid, printing paper and non-disposable crockery
- Retain and reuse of existing furniture
- Sustainability messages and activities incorporated in school curriculum

Skinlab The Medical Spa (Junction 8)

Retail

GREEN MARK AWARD FOR RETAIL

GOLD^{PLUS}



Tenant/Owner: Skinlab The Medical Spa Pte Ltd
Renovation Consultant: CK Builder & Consultancy Pte Ltd
M&E Consultant: CK Builder & Consultancy Pte Ltd
ESD Consultant: ZEB-Technology Pte Ltd

- Energy efficient LED lightings are used throughout the entire retail space, including treatment rooms
- Use of Singapore Green Building Products such as certified Gypsum Board, Laminate, Rockwool and Solid Surface
- Aircon and lightings are zoned in accordance to usage type
- All products packing are returned back to the supplier for recycling
- Separate lighting circuitry for shopfront to allow for flexibility in lighting controls

Skinlab The Medical Spa (Westgate)

Retail

GREEN MARK AWARD FOR RETAIL

GOLD^{PLUS}



Tenant/Owner: Skinlab The Medical Spa Pte Ltd
Renovation Consultant: CK Builder & Consultancy Pte Ltd
M&E Consultant: CK Builder & Consultancy Pte Ltd
ESD Consultant: ZEB-Technology Pte Ltd

- Energy efficient LED fittings are used throughout the entire retail space, including treatment rooms
- Use of Singapore Green Building Products such as certified Gypsum Board, Laminate, Rockwool and Solid Surface
- Aircon and lightings are zoned in accordance to usage type
- All products packing are returned back to the supplier for recycling
- Separate lighting circuitry for shopfront to allow for flexibility in lighting controls

The Music Lab (City Square Mall)

Retail

GREEN MARK AWARD FOR RETAIL

GOLD^{PLUS}



Tenant/Owner: The Music Lab Academy Pte Ltd
Landlord (Retail Mall): City Developments Limited (City Square Mall)

- Use of energy-efficient LED lights
- Zoning of lighting for different areas
- Environmental policy and sustainable operations manual in place
- Use of environmentally-friendly printing paper
- Use of environmentally-friendly renovation materials including low-VOC paint

Project Name

Celebrity Fitness (City Square Mall)

Daiso (City Square Mall)

Picket & Rail (City Square Mall)

Client/Developer/Building Owner

Celebrity Fitness

Daiso Industries Co.

Picket & Rail Holdings Pte Ltd

Project Name	Client/Developer/Building Owner
Challenger (City Square Mall)	Challenger Technologies
Gaming Defines Life (PLAYe) (City Square Mall)	PLAYe
Heguru Singapore (City Square Mall)	Heguru Centre
MindChamps PreSchool @ City Square Mall	MindChamps PreSchool @ City Square Mall Pte Ltd
Spectacle Hut (City Square Mall)	Spectacle Hut
Stepping Out Studios (City Square Mall)	Stepping Out Studios
Toys 'R' Us (Singapore) (City Square Mall)	Toys 'R' Us

BCA Green Mark

FOR DATA CENTRES

The **BCA-IDA Green Mark for Data Centres**, launched in 2012, is a joint collaboration between BCA and the Infocomm Development Authority of Singapore (IMDA) to drive data centres in Singapore to be more energy efficient.

In this technological era, the growth of cloud-based services, online media and transactions is fuelling a rapid increase in global demand for data centres. This is resulting in a growing energy footprint for data centres as they are prodigious consumers of energy. According to IDA, it is estimated that in Singapore, the 10 largest data centres consume energy equivalent to that produced by 130,000 households. The local commercial data centre operational capacity is projected to increase by 50% from 2010 to 2015 with a corresponding increase in energy consumption.

The scheme covers both new and existing data centres. It is also applicable to both buildings specifically built for data centres as well as data centres within office buildings.

The scheme assesses data centres on the following criteria:

- i. Energy Efficiency
- ii. Water Efficiency
- iii. Sustainable Construction/ Operation and Management
- iv. Indoor Environmental Quality
- v. Other Green Features

70 LD

Data Centre

BCA-IMDA GREEN MARK FOR DATA CENTRES

PLATINUM



Tenant/Owner:	Church Street Properties Pte Ltd
Consultant/Contractor:	Obayashi Singapore Pte Ltd
M&E Consultant:	DSCO Group Pte Ltd
Managing Agent/Maintenance Contractor:	Pro-Matrix Pte Ltd
GM Consultant:	Kaer Pte Ltd

- Design PUE of 1.41
- DRUPS for Electrical, IT and Cooling
- ETTV – 32.83W/m² with Naturally Ventilated Transformer Rooms at each level
- Cold Aisle Containment at Level 4 Data Halls
- Extensive implementation of IT Virtualization and Power Capping.
- NEWater for Cooling Tower and Domestic Usage
- LED lighting with Motion Sensors for DC Spaces

Equinix Singapore SG2 Data Centre

Data Centre

BCA-IMDA GREEN MARK FOR DATA CENTRES

PLATINUM



Tenant/Owner: Equinix Pte Ltd
Consultant/Contractor: Wah Loon Engineering Pte Ltd
M&E Consultant: DSCO Singapore Pte Ltd
ESD Consultant: Trane Distribution Pte Ltd
Maartje van Roosmalen

- PUE 1.487, with M&V, SynapSense Active Control, cell-phone PUE/plant efficiency alerts, policies, SS564 and energy audit for operational performance
- Modular VSD 0.657kW/RT plant accommodating load changes, SGBC tube cleaning, preventive maintenance and failure control maintain resiliency and efficiency
- Plant optimization, VSD cooling towers, proportional integrative loop control for VSD pumps and elevated temperatures improved performance by 21%
- 0.187W/CMH, top-down VAV, floor-mounted booster fans, desiccant dehumidification, containment leakage prevention for evenly distributed ASHRAE compliant temperature/humidity, RTI>93%, RCI>98
- Near cable-landing stations, with SG1/SG3 back-up, IT-efficiency >81%, branch circuit power monitoring, motion-activated LED and high voltage static switches
- >99% of water consumption using NEWater, >10.9 COC, PUB WEMP and water efficient building reduce potable water consumption
- Novec fire suppression, refrigerant leak detection, MERV13 double filtration, CO2 monitoring, and real-time energy display educate and maintain comfort

Keppel Data Centre Singapore 4

Data Centre

BCA-IMDA GREEN MARK FOR DATA CENTRES

PLATINUM



Tenant/Owner: Keppel DC Singapore 4 Pte Ltd
Consultant/Contractor: ACME Associates Pte Ltd
M&E Consultant: I3 Critical Facilities Pte Ltd
Energy Modelling Specialist: Building System & Diagnostics Pte Ltd

- Chiller plant system with expected energy efficiency of 0.553kW/RT.
- Permanent measurement and verification instrumentation for the monitoring of chilled-water plant efficiency and heat balancing.
- Auto-tube cleaning system for each chiller
- Combination of multi-compressor chillers and centrifugal chillers to optimise efficiency at different load conditions
- UPS Design for IT loads using DRUPS with Distributed Redundant configuration
- Design for modularity and scalability
- Green Education Corner to promote awareness of sustainable DC design and operation

Singtel DC West

Data Centre

BCA-IMDA GREEN MARK FOR DATA CENTRES

PLATINUM



Tenant/Owner:	Singapore Telecommunication Limited
Renovation	Aplusi Asia Pte Ltd/Kienta Engineering Construction
Consultant/Contractor:	Pte Ltd
M&E Consultant:	DSCO Group Pte Ltd
Architect:	XCUBE Architects
Structural Engineer:	Joseph & Ang Engineers
ESD Consultant:	DSCO Group Pte Ltd

- Chiller plant system with efficiency of 0.562kW/RT
- Permanent measurement and verification instrumentation for the monitoring of chilled water plant efficiency
- Modularity design of M&E services to minimize system loss
- 100% alternate water source usage on cooling system, 7 COC and WELS excellent fittings
- Management commitment for SS564 certification
- High efficiency UPS, transformer and CRAH
- Management commitment for SS564 certification

SP Group Building, Data Centre

Data Centre

BCA-IMDA GREEN MARK FOR DATA CENTRES

PLATINUM



Tenant/Owner: SP Services Ltd
Consultant/Contractor: RCS Engineering Pte Ltd
Facility Manager Company: RCS Engineering Pte Ltd
M&E Consultant: Surbana Jurong Consultants Pte Ltd
ESD Consultant: RCS Engineering Pte Ltd
Tenant/Owner: SP Services Ltd

- The Data Centre is surrounded by the service corridors (Room within a room concept) to cut down the Solar gain and external conduction gain.
- Highly efficient chiller plant (0.531kW/RT), which is 41% efficient compared to baseline efficiency
- Lower IT power chain losses <11% at 100% load
- Efficient Air Distribution system. All FCU/CRAC units are served by EC motor
- CRAC unit's air distribution efficiency is around 0.117 W/CMH, which is 53% efficient compared to Green Mark baseline efficiency requirements
- Energy Efficient chiller, use of Magnetic bearing chiller with dual compressor
- 100% artificial lighting is served by LED

Telin 3

Data Centre

BCA-IMDA GREEN MARK FOR DATA CENTRES

PLATINUM



Owner: Telekomunikasi Indonesia International Pte Ltd
Main Contractor: Sato Kogyo (S) Pte Ltd
Facility Manager Company: Telekomunikasi Indonesia International Pte Ltd
M&E Consultant: Meinhardt (Singapore) Pte Ltd
Project Manager: Turner & Townsend Pte Ltd
Architect: AWP Pte Ltd
ESD Consultant: Kaer Pte Ltd

- Design PUE of <1.5 at 100% IT load
- Energy efficient chilled water plant designed with system efficiency of 0.60kW/RT
- Use of energy efficient LED lightings
- Use of efficient DRUPS system for continuous power supply
- Use of new ASHRAE Class A1 Refrigerant R-1233z(E)
- At least 99% potable water savings with NEWater and over 7 COC for cooling tower
- Use of WELS "Excellent" water fitting

Project Name

Kim Chuan Telecommunication Complex 2

Client/Developer/Building Owner

Singapore Telecommunications Limited

Project Name

M1 Annex Building Level 4 Data Centre

Client/Developer/Building Owner

M1 Limited

BCA Green Mark

FOR LABORATORIES

The new **BCA Green Mark for Laboratories** recognises the sustainable efforts and commitment of laboratory owners and operators to reduce the environmental impact of laboratory operations.

Laboratories are characterised by having high receptacle load due to the specialised need, the need for fresh air dilution to meet safety requirements, and long operating hours. These result in laboratories being highly energy-intensive, typically consuming about 3 to 5 times more energy than a typical office space.

The BCA Green Mark for Laboratories complement the Green Mark for Buildings scheme by encouraging laboratory operators to adopt best practices, optimise the operations of laboratory equipment and systems, while addressing the safety requirements for laboratories.

The scheme assesses laboratories under the following five criteria:

- i. Sustainable Design
- ii. Laboratory Energy Performance
- iii. Resource Stewardship
- iv. Smart and Healthy Laboratory
- v. Advanced Green Efforts

Cambridge Centre for Advanced Research and Education in Singapore, a NRF-CREATE Programme Laboratories

GREEN MARK AWARD FOR LABORATORIES

PLATINUM



Tenant/Owner: Tenant: Cambridge Centre for Advanced Research and Education in Singapore Ltd. (CARES)
Owner: NRF
Managing Agent/Maintenance Fonda Global Engineering Pte Ltd
Contractor:
M&E Consultant: Sembcorp Architects & Engineers

- Optimised lab layout to deliver functionality, safety and visual aesthetics
- Ample daylights to most areas with sunshades and photocell operated blinds to control perimeter lighting intensity
- Efficient LED lighting design with optimal lighting quality
- Lighting control system with auto switch off sequence and user override function
- Optimised ventilation while satisfying authorities' requirements for labs
- Thorough evaluation and selection of local extract ventilation equipment to improve fume capture efficiency at reduced airflow
- Strong user engagement to promote safety and energy awareness

NUS Faculty of Science, Chemistry Lab, Tahir Foundation Building (MD1 Level 14)

Laboratories

GREEN MARK AWARD FOR LABORATORIES

PLATINUM



Tenant/Owner: National University of Singapore
Facility Manager Company: Office of Facilities Management, NUS
M&E Consultant: CPG Consultants Pte Ltd

- Autosash controls installed for all fumehoods
- Energy efficient LED and T5 lighting
- Energy efficient chilled water supply
- Energy efficient air distribution system
- Segregation of areas with different ACH design
- Motion detectors for lighting control in toilets and staircases
- Extensive use of SGBC/SGLS products

IBN Chemistry Lab (#06-60)

Laboratories

GREEN MARK AWARD FOR LABORATORIES

GOLD



Tenant/Owner: Institute of Bioengineering and Nanotechnology

- Maximised the usage of LED lighting
- Installation of VEV smart system
- Implementation of UVC Emitter
- Usage of in-house Building Management System
- Appointment of Green Mark Facility Manager

BCA Green Mark

FOR RESTAURANTS

As restaurants utilise high levels of energy and water resources on a daily basis, this provided a good opportunity to introduce the Green Mark for Restaurants in 2011, specially tailored for restaurants to promote corporate responsibility as well as to recognise environmentally friendly and sustainable practices in restaurants, taking sustainability beyond commercial and residential infrastructure.

Restaurants are evaluated under the following criteria:

- i. Energy Efficiency
- ii. Water Efficiency
- iii. Sustainable Management and Operation
- iv. Indoor Environment Quality
- v. Other Green Features

McDonald's Marine Cove (MRC)

Restaurants

GREEN MARK AWARD FOR RESTAURANTS

PLATINUM



Tenant/Owner: HanBaoBao PTE LTD
Architect: Archideas Design Inc.
Main Contractor: Megabuilders & Development Pte Ltd
M&E Consultant: Alpha Consulting Engineers Pte Ltd
Interior Designer: Myth Design
ESD Consultant: Metropolitan Green Design & Technology

- The Low Oil Volume Fryer (LOV) utilises an innovative design, they allow restaurants to cook the same amount of product while using approximately 40% less oil using approximately 4% less energy than standard fryers
- Halton Hood technology providing innovative and highly efficient heat load, cooking fumes and odour extraction in the kitchen whilst reducing annual energy consumption by more than 6%
- High efficient hand dryer operates at 1.2kW load achieving savings of approximately 0.75% over the annual energy consumption
- Utilises almost 100% LED lighting achieving a lighting budget of 8.2W/m², and improvement of 45.3% over 15W/m² as stipulated in SS530. Zoning of lighting for different usages/location; Scheduling control to switch on and/or off the lightings where lighting is not needed beyond the scheduled period; Colour coded lighting switches enable flexibility for staff to manage the lighting zones to the needs of the store
- The restaurant is also designed with large floor to ceiling glazed windows with low-e value allowing natural daylight harvesting throughout the day. The glass properties reduce solar radiation thereby reducing the heat load for the air-conditioning system
- Recycling for used shortening which are collected and converted to soap.
- The restaurant is designed with Positive pressurization of the dining areas to reduce the ingress of heat, outdoor particulates, dust, insects and odour while the kitchen has Negative Pressurization with high extraction rates for kitchen odours, hot exhaust air and cooking fumes

Din Tai Fung @ City Square Mall

Restaurants

GREEN MARK AWARD FOR RESTAURANTS

GOLD^{PLUS}



Tenant/Owner:	Taster Food Pte Ltd
Renovation Consultant/Contractor:	Tate Projects Pte Ltd
Facility Manager Company:	Taster Food Pte Ltd
M&E Consultant:	Parsons Brinckerhoff
Managing Agent/Maintenance Contractor:	Taster Food Pte Ltd

- Effective planning on lighting placement and usage of LED lights to achieve 36.76% savings
- Prudent evaluation process on kitchen equipment to ensure efficiency
- Adopt 3Rs strategies in daily operation resulting in lower usage of water
- Consumable materials prudently applied equipped with environment-friendly procurement policy
- Implementation of effective food ordering and wastage monitoring system

McDonald's Bedok Mall (BDML)

Restaurants

GREEN MARK AWARD FOR RESTAURANTS

GOLD^{PLUS}



Tenant/Owner: HanBaoBao PTE LTD
Architect: Archideas Design Inc.
Main Contractor: Megabuilders & Development Pte Ltd
M&E Consultant: Alpha Consulting Engineers Pte Ltd
Interior Designer: Suites Interior Design Pte Ltd
ESD Consultant: Metropolitan Green Design & Technology

- The Low Oil Volume Fryer (LOV) utilizes an innovative design, they allow restaurants to cook the same amount of product while using approximately 40% less oil using approximately 4% less energy than standard types
- Halton Hood technology providing innovative and highly efficient heat load, cooking fumes and odour extraction in the kitchen while reducing annual energy consumption by more than 6%
- The restaurant utilizes 100% LED lighting achieving a lighting budget of 8.58W/m², an improvement of 42.8% over 15W/m² as stipulated in SS530. Zoning of lighting for different usage/location; Scheduling control to switch on and/or off the lightings is not needed beyond the scheduled period; Colour coded lighting switches enable flexibility for staff to manage the lighting zones to the needs of the store
- The restaurant is also designed with large floor to ceiling glazed windows with low-e value allowing natural daylight harvesting throughout the day. The glass properties reduce solar radiation thereby reducing the heat load for the air-conditioning system
- The restaurant is designed with Positive pressurization of the dining areas to reduce the ingress of heat, outdoor particulates dust, insects and odour while the kitchen has Negative pressurization with high extraction rates for kitchen odour, hot exhaust air and cooking fumes

McDonald's Pasir Ris Central (PRC2)

Restaurants

GREEN MARK AWARD FOR RESTAURANTS

GOLD^{PLUS}



Tenant/Owner: HanBaoBao PTE LTD
Architect: Archideas Design Inc.
Main Contractor: Megabuilders & Development Pte Ltd
M&E Consultant: Alpha Consulting Engineers Pte Ltd
Interior Designer: Myth Design
ESD Consultant: Metropolitan Green Design & Technology

- The Low Oil Volume Fryer (LOV) utilizes an innovative design, they allow restaurants to cook the same amount of product while using approximately 40% less oil using approximately 4% less energy than standard types
- Halton Hood technology providing innovative and highly efficient heat load, cooking fumes and odour extraction in the kitchen while reducing annual energy consumption by more than 6%
- The restaurant utilizes 100% LED lighting achieving a lighting budget of 12.17W/m², an improvement of 19% over 15W/m² as stipulated in SS530. Zoning of lighting for different usage/location; Scheduling control to switch on and/or off the lightings is not needed beyond the scheduled period; Colour coded lighting switches enable flexibility for staff to manage the lighting zones to the needs of the store
- The restaurant is designed with Positive pressurization of the dining areas to reduce the ingress of heat, outdoor particulates dust, insects and odour while the kitchen has Negative pressurization with high extraction rates for kitchen odour, hot exhaust air and cooking fumes

McDonald's Suntec City 2 (STC2)

Restaurants

GREEN MARK AWARD FOR RESTAURANTS

GOLD^{PLUS}



Tenant/Owner: HanBaoBao PTE LTD
Architect: Archideas Design Inc.
Main Contractor: Megabuilders & Development Pte Ltd
M&E Consultant: Alpha Consulting Engineers Pte Ltd
Interior Designer: Myth Design
ESD Consultant: Metropolitan Green Design & Technology

- The Low Oil Volume Fryer (LOV) utilizes an innovative design, they allow restaurants to cook the same amount of product while using approximately 40% less oil using approximately 4% less energy than standard types
- Halton Hood technology providing innovative and highly efficient heat load, cooking fumes and odour extraction in the kitchen while reducing annual energy consumption by more than 6%
- Utilizes a mixture of LED and energy efficient lighting achieving a lighting budget of 7.34W/m², an improvement of 51.1% over 15W/m² as stipulated in SS530. Zoning of lighting for different usage/location; Scheduling control to switch on and/or off the lightings is not needed beyond the scheduled period; Colour coded lighting switches enable flexibility for staff to manage the lighting zones to the needs of the store
- The restaurant is also designed with large floor to ceiling glazed windows with low-e value allowing natural daylight harvesting throughout the day. The glass properties reduce solar radiation thereby reducing the heat load for the air-conditioning system
- The restaurant is designed with Positive pressurization of the dining areas to reduce the ingress of heat, outdoor particulates dust, insects and odour while the kitchen has Negative pressurization with high extraction rates for kitchen odour, hot exhaust air and cooking fumes

GREEN MARK AWARD FOR RESTAURANTS

GOLD

Project Name	Client/Developer/Building Owner
McDonald's Bedok Reservoir Park (BRP)	McDonald's Restaurants Pte Ltd
McDonald's East Point Mall (EPM)	McDonald's Restaurants Pte Ltd
McDonald's Paya Lebar Square (PLSQ)	McDonald's Restaurants Pte Ltd
McDonald's Punggol Safra (PGS)	McDonald's Restaurants Pte Ltd
McDonald's Seletar Mall (SLM)	McDonald's Restaurants Pte Ltd
McDonald's Toa Payoh Safra (TPS)	McDonald's Restaurants Pte Ltd
McDonald's Water Way Point (WWP)	McDonald's Restaurants Pte Ltd

GREEN MARK AWARD FOR RESTAURANTS

CERTIFIED

Project Name	Client/Developer/Building Owner
Artemis Grill Pte Ltd	Artemis Grill Pte Ltd
BreadTalk and Toast Box	Breadtalk Pte Ltd (Toastbox)
Food Republic	Food Republic Pte Ltd
Grand Shanghai	Grand Shanghai
Kelvin & Lee Food Pte Ltd (Swensen's)	Kelvin & Lee Food Pte Ltd
Kentucky Fried Chicken	Kentucky Fried Chicken Management Pte Ltd
Oldtown White Coffee	OldTown Singapore Pte Ltd
Pizza Hut	Pizza Hut Singapore Pte Ltd
Saizeriya	Singapore Saizeriya Pte. Ltd
The Coffee Bean and Tea Leaf	The Coffee Bean and Tea Leaf (S) Pte Ltd

Project Name

The Manhattan Fish Market

Wok Master

Client/Developer/Building Owner

MFM Restaurants Pte Ltd

Wokmaster Pte Ltd

BCA Green Mark

BEYOND BUILDINGS

The **BCA Green Mark for Beyond Buildings**, an extension of the BCA Green Mark Award for Buildings – aims to recognize good practices in the built environment beyond the building level, in order to ensure all-rounded sustainable and high quality built environment.

This year, projects awarded under the BCA Green Mark for Beyond Buildings are classified under the following:

- i. BCA Green Mark Award for Districts
- ii. BCA-NParks Green Mark Award for New / Existing Parks

BCA Green Mark

FOR DISTRICTS

The **BCA Green Mark for Districts**, launched in 2009, is an initiative by BCA to promote and recognise environmentally-friendly and sustainable practices in the planning and implementation of district developments. The BCA Green Mark for Districts seeks to achieve a holistic and integrated approach in the planning and design of multiple buildings and infrastructure within the district from the initiation stage.

Districts are assessed under the following criteria:

- i. Energy Efficiency
- ii. Water Efficiency
- iii. Material and Waste Management
- iv. Environmental Planning
- v. Green Buildings and Green Transport
- vi. Community and Innovation

Green districts help individual buildings leverage on a more sustainable district platform, leading to better environmental performance and cost effectiveness.

By moving beyond buildings and implementing Green Mark at the district level, the scheme will allow larger scale contributions to the built environment in terms of reduction in waste, carbon emissions, energy and water consumption.

Singapore Science Park I

District

GREEN MARK AWARD FOR DISTRICT

PLATINUM



Client/Developer: Ascendas-Singbridge

ESD Consultant: Surbana Jurong Consultants

- Estimated energy savings: 80,429kWh/yr
- Compact, complete and connected green district
- Green transportation with introduction of EV, e-scooter, bicycle path etc
- Smart locations and linkages
- Walkable street with improved thermal comfort
- Community outreach and involvement
- Energy efficient district with >60% energy savings for infrastructure and public amenities

BCA Green Mark

FOR PARKS

The **BCA–NParks Green Mark Award for New Parks**, launched in 2010, is a joint initiative by the Building Construction Authority (BCA) and the National Parks Board (NParks). It aims to inspire and promote sustainable park design as well as to identify best practices in park design, construction, management and maintenance planning. The BCA–NParks Green Mark for New Parks is specifically developed for civic landscape areas, examining social and economic sustainability with a strong emphasis on environmental sustainability. This environmental assessment framework also complements the BCA–NParks Green Mark for Existing Parks.

Under a comprehensive assessment system, parks are evaluated based on seven criteria:

- i. Material Resources
- ii. Water Efficiency
- iii. Energy Efficiency
- iv. Greenery and Urban Ecology
- v. Design for Ease of Maintenance and Accessibility
- vi. Parks Development and Construction Management
- vii. Other Green Initiatives

All parks, including regional, neighbourhood, conservation, nature and public theme parks, can be assessed under this scheme.

Project Name

Zhenghua Nature Park

Client/Developer/Building Owner

National Parks Board

BCA Green Mark

OVERSEAS

BCA International Pte Ltd is a wholly-owned subsidiary of BCA. It provides a multitude of services to help develop excellent built environments worldwide. The Green Mark certification is among one of the most popular services offered by BCA International.

The Success Of Green Mark Overseas

As one of more than 20 Green Building rating systems recognised by the World Green Building Council (WGBC), Green Mark has gained popularity in the region as it is developed especially for the tropical climate. Green Mark can be customised to suit various countries' climatic conditions.

More developers are using Green Mark to provide meaningful differentiation of their buildings. Benefits of a Green Mark building include:

- Reduction in water and energy bills
- Improvement in indoor environmental quality
- Reduction in potential environment impact



World Bank Group Office Building, Laos

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

PLATINUM



Developer/Owner: The World Bank Corporate Real Estate
Architect: Sheladia Associates Inc.
M&E Engineer: Meinhardt (S) Pte Ltd
Structural Engineer: SK Consultants / Lao Consulting Group
Contractor: Hansol E&C Corporation
Landscape Architect: Sheladia Associates Inc.
ESD Consultant: Meinhardt (S) Pte Ltd

- An overall energy saving of 30% and excellent ETTV of 37.4W/m², due to a NS orientation and use of low-e DGU
- Lighting solutions with Motion sensors for all occupied spaces
- Thin film BIPV of 40.8 kWp generates 8.7% of proposed annual building energy consumption
- High COP air-cooled VRV Air-conditioning system
- Provision of vertical greenery and terrace garden
- Bio retention ponds and pervious paving for storm water management
- Rainwater harvesting system

Chongqing E-ling Residences, China

New Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

PLATINUM



Developer/Owner: Chongqing Goose Ridge Hill Real Estate Development Co. Ltd.
Architect: Zhong Mei Science and Industry Group Design & Research Institute Co. Ltd., Chongqing
M&E Engineer: Zhong Mei Science and Industry Group Design & Research Institute Co. Ltd., Chongqing
Structural Engineer: Zhong Mei Science and Industry Group Design & Research Institute Co. Ltd., Chongqing
Quantity Surveyor: Investment advisory Co., Ltd. Shanghai Shen Yuan
Main Contractor: Construction First Bureau (Group) Co. Ltd., China
Landscape Consultant: Future City (Suzhou Industrial Park) Planning and Architectural Design Firm
ESD Consultant: Chongqing University

- Estimated energy savings: 2,251,582kWh/yr; Estimated water savings: 19,847m³
- Split air conditionings of highest energy efficiency rating are installed in all the residential buildings
- Gas water heaters of highest energy efficiency are installed in all the residential buildings
- Solar water heaters are installed in residential building of B1, clubs and kindergartens. And solar photovoltaic power generation system is used to the outdoor landscape lighting
- The rainwater collection system is used for greening irrigation
- The sanitary wares of highest water-saving level are installed in all the residential buildings
- The development has good building orientation and layout to allow good natural ventilation in the dwelling units

Sedona Hotel Yangon (Inya Wing), Myanmar

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD^{PLUS}



Client/Developer:	Keppel Land International Limited (Straits Greenfield Limited)
Project Manager:	Keppel Land International Limited
Architect:	Forum Architects Pte Ltd
M&E Engineer:	Beca Carter Hollings & Ferner (S.E. ASIA) Pte Ltd
Structural Engineer:	Beca Carter Hollings & Ferner (S.E. ASIA) Pte Ltd
Quantity Surveyor:	Rider Levett Bucknall
Main Contractor:	Woh Hup International Pte Ltd
Landscape Consultant:	Belt Collins International Pte Ltd
ESD Consultant:	G-Energy Global Pte Ltd

- Estimated energy savings: 3,064,830kWh/yr; Estimated water savings: 15,202m³; ETTV: 41.31W/m²
- Low ETTV of 41.31W/m² with extensive use of double glazed low-emissivity glass
- Extensive use of daylighting in the hotel lift lobby
- Extensive use of energy efficient fixtures such as LED and T5 fluorescent lighting for the entire hotel, including the guestrooms
- Provision of autotube condenser cleaning system
- First Green Mark new building project in Yangon, Myanmar

Queensbay Mall, Malaysia

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD^{PLUS}



Client/Developer/Building CapitaLand and some strata owners

Owner:

Facility Management: Management Corporation of Queensbay Mall in collaboration with CapitaLand

- Estimated energy savings: 1,616,710kWh/yr; Estimated water savings: 12,157m³
- Rain water harvesting tank
- Replacement of conventional T8 Florescent to LED at multilevel and basement car park
- Parking Guidance System
- Electric car charging station

Kondominium Rimbun, Malaysia

New Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD^{PLUS}



Client/Developer: Amphil Corporation Sdn Bhd
Architect: GDP Architects Sdn Bhd
M&E Engineer: Jurutera Perunding Valdun
Structural Engineer: TYLin International Sdn Bhd
Quantity Surveyor: Yong & Mohamad Faiz
Landscape Consultant: Pentago Landscape Sdn Bhd
Sustainable Consultant: Building System and Diagnostics Pte Ltd

- Estimated energy savings: 580,791kWh/yr; Estimated water savings: 5,400m³; RETV less than 20W/m²
- 4 ticks air-conditioning for all air-conditioned spaces
- 25 kWp of PV panels installed
- Greenery covers more than 50% of site area (GnP 4.56)
- Extensive greenery coupled with cool pavements to mitigate and reduce UHI effect

CapitaMall Tianfu, China

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer/Building CapitaLand

Owner:

Project Manager: CapitaLand

Architect: WOHA Architects Pte Ltd

M&E Engineer: P&T Group

Structural Engineer: SiChuan Provincial Architectural Design Institute

Quantity Surveyor: Davis Langdon & Seah Consultancy Co. Ltd

Main Contractor: Beijing Urban Construction Group Co., Ltd

Landscape Consultant: WOHA Architects Pte Ltd

- Estimated energy savings: 5,030,094.88kWh/yr; Estimated water savings: 3,361.4m³
- Energy-efficient air-conditioning system
- Water-efficient sanitary wares
- Car park guidance system

I Apparel, Cambodia

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer: I Apparel International Group Pte Ltd
Project Manager: I Apparel International Group Pte Ltd
Architect: IX Architects Pte Ltd
M&E Engineer: NGE Energy Pte Ltd
Structural Engineer: BMB & A (Cambodia) JSC
Main Contractor: BMB & A (Cambodia) JSC
ESD Consultant: Building System & Diagnostics Pte Ltd

- Estimated energy savings: 168,835.56kWh/yr; Estimated water savings: 39.01m³
- Double brickwall with air cavity at West & East façade as a thermal insulation
- Porous façade design on the North, South façade & roof for to allow for natural ventilation to occupied spaces within
- Extensive window openings to bring in natural daylighting into the space
- 100% LED lighting with more than 60% energy improvement
- Low concrete usage – CUI of 0.16

Keppel Logistic (Tianjin Eco-City), China

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer: Keppel Logistics (Tianjin Eco-City) Limited
Project Manager: Sato Koygo (Xi'an) Co., Ltd
Architect: SAA Architects Pte Ltd
M&E Engineer: SAA Architects Pte Ltd
ESD Consultant: ZEB-Technology Pte Ltd

- Use of greywater for toilet flushing and irrigation
- Minimum window opening at East, West and North orientation
- Building envelope thermal performance of 55% better than baseline

Menara Bangkok Bank, Malaysia

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Developer/Owner: Berjaya Corporation Bhd.
Architect: A&A Architects Sdn. Bhd.
M&E Engineer: P.J Leong and Partners
Structural Engineer: TYLin International Sdn Bhd
Landscape Consultant: Malik Lip & Associates Sdn Bhd
Quantity Surveyor: Jurukur Bahan FPS Sdn. Bhd.
ESD Consultant: Arup Singapore Pte. Ltd.

- Estimated energy savings: 3,239,550.92kWh/yr; Estimated water savings: 9,077.79m³
- High performance façade design to achieve ETTV of 33.56W/m²
- Use of water cooled VRV system to replace air cooled VRV usage at corporate suites
- Rainwater harvesting for irrigation
- Motion sensors controlling lightings and fans at toilets and staircases

Raffles City Ningbo, China

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer/Building Owner: CapitaLand
Architect: SPARCH
M&E Engineer: Meinhardt
Structural Engineer: Ningbo Architecture Design Institute
Quantity Surveyor: DLS
Main Contractor: CSCEC No.8
Landscape Consultant: SPARCH

- Estimated energy savings: 971,427kWh/yr
- Ductless fan for basement carpark ventilation
- Swimming pool heat pump
- Efficient chiller and water pump
- Roof Garden (Retail) and sky garden (office)

World Trade Centre 2, Indonesia

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Building Owner: PT Jakarta Land
Facility Management: PT Jakarta Land
ESD/Green Consultant: G-Energy Global Pte Ltd

- Estimated energy savings: 492,024kWh/yr; Estimated water savings: 8,322.23m³
- Provision of green corner
- Provision of heat recovery wheel to conserve energy

XP Power (Vietnam) Co. Ltd.

New Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer:	XP Power (Vietnam) Co. Ltd.
Project Manager:	Boustead Projects Pte. Ltd.
Architect:	Coseyco Phuong Nam Construction Joint Stock Co.
M&E Engineer:	A.G. (Vietnam) Consult Co. Ltd.
Structural Engineer:	Coseyco Phuong Nam Construction Joint Stock Co.
Quantity Surveyor:	KPK Quantity Surveyors (Vietnam) Ltd.
Main Contractor:	Boustead Projects (Vietnam) Co. Ltd.
ESD Consultant:	DEG Builders Pte. Ltd.
Energy Modelling:	DEG Builders Pte. Ltd.

- Estimated energy savings: 594,116.6kWh/yr; Estimated water savings: 286m³; ETTV: 30.64W/m²
- Good envelope design with low Window to Wall ratio of 15%
- Use of solar photovoltaic of 40.32kWp
- Use of rainwater harvesting and AHU condensate collection
- Good Concrete Usage Index of 0.31 m³/m²

Sedona Hotel Yangon, Myanmar

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Building Owner:	Straits Greenfield Limited subsidiary of Keppel Land International Limited
Facility Management:	Sedona Hotel Yangon
ESD/Green Consultant:	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Consultant:	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
Landscape Consultant:	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
Lighting Consultant:	Prospective Solution Pty Ltd
Interior Designer:	David Grace Design International Pte Ltd

- Estimated energy savings: 5,379,089kWh/yr; Estimated water savings: 9,702m³
- Efficient Water Cooled Chiller Plant target average operating efficiency of 0.6138kW/RT
- Provision of energy efficient lighting such as T5 and LED
- Provision of sheltered bicycle lots with shower and changing facilities
- Use of low VOC paints for spaces undergoing retrofitting

Somerset Central TD Hai Phong City, Vietnam

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer/Building Owner: CapitaLand
ESD/Green Consultant: W2square Consultancy Pte Ltd

- Estimated energy savings: 216,477.68kWh/yr; Estimated water savings: 4,343.50m³
- Efficient Air-Conditioning System
- Use of water efficient fittings
- Use of energy efficient features
- Green corner for interaction and promoting recycling with the Residents

Sutera Mall, Malaysia

Existing Non-Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Building Owner: Tanah Sutera Development Sdn Bhd
Facility Management: Tanah Sutera Development Sdn Bhd
ESD/Green Consultant: Comfort Management Pte Ltd
Building System & Diagnostics Pte Ltd
IAQ Auditor: Astar Laboratory Sdn Bhd

- Efficient chiller plant with operating system efficiency at 0.692kW/RT
- Fully fitted with LED lightings for common areas
- Using Bio-mate technology on site to decompose food wastes to fertilizers
- Extensive use of micro-organism for cleaning purposes
- Energy efficient lifts with VVVF

Central Park City, China

New Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer:	Keppel Land China Ltd/CityOne Development (Wuxi) Co. Ltd.
Project Manager:	Keppel Land China Ltd.
Architect:	Surbana (Shanghai) Consultants. Ltd
M&E Engineer:	Surbana (Shanghai) Consultants. Ltd
Structural Engineer:	Surbana (Shanghai) Consultants. Ltd
Quantity Surveyor:	Surbana (Shanghai) Consultants. Ltd
Main Contractor:	Nantong Xinhua Construction Group Co. Ltd
Landscape Consultant:	Surbana (Shanghai) Consultants. Ltd
ESD/Green Consultant:	Earth-In-Mind Private Limited

- Estimated energy savings: 3,558,071kWh/yr; Estimated water savings: 45,306m³
- Use of Low-E double glazed glass windows for all dwelling units to reduce heat gain/loss through fenestration system
- Construction of light wells to reduce usage of artificial lighting in basement carpark
- Use of river canal as rainwater collection tank and thereby using non-potable water collected for irrigation
- Extensive use of construction materials such as fly ash hollow block, aerated concrete block and plasterboard, which are eco-labelled or contain substantial amount of recycled content

Seasons Park, China

New Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer:	Keppel Hong Da (Tianjin Eco-City) Property Development Co. Ltd
Architect:	P&T Consultants Pte Ltd
M&E Engineer:	P&T Consultants Pte Ltd
Structural Engineer:	P&T Consultants Pte Ltd
Quantity Surveyor:	Langdon & Seah (Beijing) Construction Consultants Co. Ltd. Tianjin Branch
Main Contractor:	中国建筑第八工程局有限公司
Landscape Consultant:	AECOM Ltd
ESD Consultant:	G-Energy Global Pte Ltd

- Estimated energy savings: 1,148,348.11kWh/yr; Estimated water savings: 22,368m³
- Provision of energy efficient air-conditioning system for all dwelling units
- Use of low temperature radiant floor heating system for all dwelling units
- Provision of gas water heater for all dwelling units
- Use of heat recovery system in clubhouse

Seasons Residence, China

New Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer:	Shanghai Jixiang Land Co., Ltd
Architect:	Palmer & Turner Consultants (Shanghai) Ltd
M&E Engineer:	Palmer & Turner Consultants (Shanghai) Ltd
Structural Engineer:	Shanghai Chenxiang Architectural Design Co., Ltd
Quantity Surveyor:	Sweett (Shanghai) Limited
Main Contractor:	Longxin Construction Group Co., Ltd
Landscape Consultant:	Xicheng (Shanghai) Landscape Design and Consulting Co., Ltd
ESD Consultant:	Earth-In-Mind Private Limited

- Estimated energy savings: 8,750,111.36kWh/yr; RETV: 11.87W/m²
- Use of Class 1 energy efficient split unit air-conditioners for all dwelling units
- Use of sound/light sensors for common areas
- Use of lifts with ACVVVF & sleep mode features
- Use of sustainable products for construction

Serenity Villa (Phase 1), China

New Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer:	Chengdu Sheng Shi Jing Wei Real Estate Co. Ltd.
Project Manager:	Luo Peng
Architect:	Dahlin Group/China Southwest Architectural Design And Research Institute Corp. Ltd
M&E Engineer:	China Southwest Architectural Design And Research Institute Corp. Ltd
Structural Engineer:	China Southwest Architectural Design And Research Institute Corp. Ltd
Quantity Surveyor:	Rider Levett Bucknall Limited
Main Contractor:	Sichuan No.6Construction Co. Ltd
Landscape Consultant:	Earthasia Design Group
ESD/Green Consultant:	Building System & Diagnostics Pte Ltd

- Estimated energy savings: 213,626.53kWh/yr; Estimated water savings: 1,461m³
- Use of local certified green items with recycled content
- Use of fresh air heat recovery system in the club house
- Use of energy efficient lighting
- Use of self cleaning façade paint

The Springdale Plot 4-1, China

New Residential Building

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer: Shanghai Hongda Property Development Co. Ltd
Architect: P&T Consultants Pte Ltd
M&E Engineer: SCADI
Structural Engineer: SCADI
Quantity Surveyor: Davis Langdon & Seah Consultancy Co. Ltd
Landscape Consultant: Site Concept International
ESD Consultant: Building System Diagnostics Pte Ltd

- Estimated energy savings: 28,022kWh/yr; Estimated water savings: 137m³
- All residential units are provided with pre laid solar heater pipelines and natural gas pipelines
- All residential units are passively designed for natural daylighting to maximum vision comfort and reduces energy consumption
- Extensive use of sustainable Green Product (with at least 30% recycled content)
- Extensive use of sustainable Green Product (Locally certified)

PT. GRAHANIAGA TATAUTAMA, Indonesia

Office Interior

GREEN MARK AWARD FOR OFFICE INTERIOR (OVERSEAS)

GOLD



Tenant/Owner: PT. Grahaniaga Tatautama
Renovation Q space/PT Prapanca Muchtar Design &
Consultant/Contractor: PT. Kreatama Konsep Selaras

- Achieving lighting power budget for power saving on 44% on the SS 530
- Achieved total power energy efficiency of 63% by procurement and usage of energy star labelled office equipment
- Composting for organic waste

GREEN MARK FOR OVERSEAS AWARDS

CERTIFIED

Project Name	Category	Client/Developer/Building Owner
CapitaMall 1818, China	New Non-Residential Building	CapitaLand
CapitaMall Fucheng Phase II, China	New Non-Residential Building	CapitaLand
Icon Residences, Mont' Kiara	New Non-Residential Building	Mah Sing Group Berhad
PT. WIK Far East Batam	New Non-Residential Building	PT. Wiki Far East Batam
Macau Olympic Sports Centre (Stadium, Hockey & Aquatic Centre)	Existing Non-Residential Building	Sports Bureau of Macao SAR Government
Dolce Vita (A/D/E/F Zone)	New Residential Building	CapitaLand
Imperial Bay	New Residential Building	CapitaLand
Tianfu Life	New Residential Building	CapitaLand
Eco Botanic Residences	Landed Houses	Casa Seroja Sdn Bhd