



BCA AWARDS 2016

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BCA Green Mark CHAMPION AWARD

The **BCA Green Mark Champion Award** was launched at BCA Awards 2008. This award recognizes 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.

There are two main categories for the award:

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

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

Total no. of building rated	BCA Green Mark Champion	BCA Green Mark Platinum Champion	BCA Green Mark 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

GREEN MARK PLATINUM^{STAR} CHAMPION AWARD



National Technological University (NTU)

Sustainability is one of National Technological University (NTU)'s Peaks of Excellence. NTU aims to achieve a bold 35 percent reduction in its energy consumption by 2020 from the baseline in 2011. NTU will be a leading example of high impact energy efficiency and sustainability accentuating innovation, it ramping up its efforts to transform into one of the most environmentally friendly university campuses in the world. That is why NTU is leading the EcoCampus initiative.

NTU has saved significantly energy to date since 2011 by systematically managing and upgrading the air-conditioning system – such as increasing the temperature set point, regulating fresh air, replacing with electrostatic air filter, upgrading chiller plants etc.

NTU is currently in the process of adopting and implementing the features related to energy efficiency in both existing and new buildings. NTU will be progressively upgrading the water-cooled chilled water plants within the campus by 2020. In 2013, NTU became the Solar Pioneer for embarking a 5MWp Photovoltaic system project for the entire campus which was completed in 2015. Innovations contributing to significant energy savings are Passive Displacement Cooling (PDV), Demand Control Ventilation (DCV) for laboratories, Auto-sash for fume cupboard etc.

Existing fluorescent light fittings are being replaced with energy efficient LED lightings. Task lighting will be adopted at work areas. The newly implemented in-line pumping for domestic water transportation eliminates the need for transfer tanks and reduces the transfer pump size by 80% for all buildings in NTU campus.

The projects which are currently under construction used steel and engineered wood which uses much less grey energy, shortens the construction time and improves productivity. NTU's new sports building is the first building in the region with a large-span Cross Laminated Timber roof structure that will help to provide heat insulation five times better than concrete. The Prefabricated Prefinished Volumetric Construction (PPVC) first adopted into NTU student hostel is principally a steel structure which besides improving productivity reduces noise and dust at the construction sites.

Key Achievements:

NTU has won 51 Green Mark Platinum awards, among which a Prototype Platinum Award and 2 new buildings have energy savings exceeding 40%.



Demand Control Ventilation



Photovoltaic Cell



PPVC



Cross Laminated Timber

GREEN MARK CHAMPION AWARD

Genting Singapore PLC

As Asia's leading integrated resort developer, Genting Singapore is committed to being a responsible corporate citizen by giving back and investing in the communities and environment in which we operate. We aim to develop world-class integrated resorts that transform destinations, create jobs and reinvest in local economies through sustainable practices and development. We promote environmental conservation through investments in technologies, implementing green designs in infrastructure and promoting green programmes across our development projects. To enhance our accountability towards sustainability efforts, we became one of the first few local companies to document our efforts in accordance with the "G4-Core" standards of the Global Reporting Initiative.

In recognition of our efforts, Genting Singapore is awarded 3 Green Mark Platinum and 8 Green Mark Gold Plus by the Building and Construction Authority for its award-winning flagship property in Singapore, Resorts World Sentosa ("RWS"), one of Southeast Asia's largest fully integrated destination resorts. In addition to being the recipient of the Solar Pioneer Award by the Economic Development Board and the Energy Market Authority in 2010, RWS has also been certified as one of the pioneering green data centres in Singapore by the Infocomm Development Authority.



Genting Hotel Jurong



Resorts World Sentosa



Hard Rock Hotel



SEA Aquarium

GREEN MARK CHAMPION AWARD

Ministry of Education, Singapore

From educating our children on the importance of environment conservation to building sustainable schools, the Ministry of education (MOE) recognises the importance of environmental sustainability. It starts from designing schools with green features, to educating students and involving them in environmental programs and to attaining BCA Green Mark for schools. MOE's commitment is our continuous journey towards creating an eco-friendly environment for our younger generation.

An example is Alexandra Primary School which has been awarded the Green Mark Platinum in 2012. It is designed with a central void and makes use of the north south building orientation to reduce solar heat gain and optimise on natural ventilation. Its green roof, green wall and solar panels with interactive panels also provide an authentic and interactive experience for students to learn about the environment and nature.

Through the judicious use of resources and better building performance, West Spring Primary school has also achieved the Green Mark Platinum in 2012. The strategies employed in the design include enhanced ETTV, efficient aircon system, maximum daylight, sustainable construction method, green wall and composting bins. The building and landscape serve as education tools for students to acquire a greater understanding on environmental sustainability.

Beatty Secondary is yet another example as it has attained Green Mark Gold Plus recently. The school uses effective sun shading devices, solar hot water system and energy efficient equipment to reduce energy consumption. The school also appoints an environment monitor in each class to promote green movement and cultivate leadership skills.

MOE recognises that schools have a crucial role to play in preparing our students to take their place as informed, responsible, and empowered citizens who will be pivotal in shaping the future of our nation and the global environment. Under the Public Sector to Take the Lead in Environmental Sustainability initiative, MOE seeks to increase the environmental awareness for staff and students, and achieve a minimum BCA Green Mark Gold for all mainstream schools.

Key Achievements:

20 schools with Green Mark which includes 4 Platinum, 2 Gold plus, 8 Gold and 6 certified level.



Alexandra Primary School



Beatty Secondary School

GREEN MARK CHAMPION AWARD



Ministry of Health, Singapore

The Healthcare Infrastructure Projects Division (HIPD) in MOH Holdings Pte Ltd (MOHH) supports the Ministry of Health (MOH) in the development of public healthcare infrastructure projects to meet the growing healthcare demand of Singapore. The type of development undertaken by HIPD include general hospitals, community hospitals, specialist centres, polyclinics, nursing homes, and senior care centres.

A Sustainability for Healthcare Infrastructure strategy roadmap was developed to guide design and construction, and through to operations and maintenance. Our general approach in environmental sustainability are in the design considerations responding to the site environment; creating indoor and outdoor healing environment; space design for efficient workflow; and, the adoption of energy conservation designs for building services taking in accounts energy savings and cost considerations for building life cycle.

MOH/MOHH continue our strong commitment in shaping a green and sustainable built environment for public healthcare infrastructures in Singapore.



Changi General Hospital



Ng Teng Fong General Hospital



National Centre for Infectious Diseases

GREEN MARK CHAMPION AWARD



National Parks Board

As the National Parks Board (NParks) continues to design and develop more parks, enrich our streetscapes and make greenery more pervasive in Singapore, it is also imperative that we ensure that urban landscapes are sustainable. The adoption of best practices in landscape design, construction, management and maintenance is essential for environmental and economic sustainability. NParks adopts Green Mark as one of the standards to bring about sustainable planning, design, development and management of parks and landscapes. Green Mark is also a good avenue to share best practices and innovative approaches with practitioners from the landscape, horticulture and related industries.

NParks was involved in the planning, design and developments of the following Platinum projects:

- Gardens by the Bay (Bay South)
- Gardens By The Bay (*Special Project)
- CDL Green Gallery @ SBG Heritage Museum
- Coney Island Park
- Kranji Marshes

About NParks

National Parks Board (NParks) is responsible for providing and enhancing the greenery of our City in a Garden. Beyond building green infrastructure, NParks is actively engaging the community to enhance the quality of our living environment. NParks manages over 350 parks and 4 nature reserves. Adding to this is the extensive streetscape, or roadside greenery, that forms the backbone of our City in a Garden. An island-wide Park Connector Network is also being developed to link major parks, nature areas and residential estates.

As the lead agency on biodiversity conservation, NParks has developed an urban biodiversity conservation model, which aims to conserve representative eco-systems in land-scarce Singapore. NParks also monitors and coordinates measures to enhance the presence of biodiversity in our urban landscape. NParks is working closely with partners in the landscape and horticulture industry to increase productivity, and provide training for all levels of the workforce. Enhancing competencies of the industry will support Singapore's vision of being a City in a Garden.



Dragonfly Lake at Gardens by the Bay



Coney Island Park



Kranji Marshes

BCA Green Mark

PEARL AWARD

The **BCA Green Mark (GM) Pearl Award** is a prestigious award that recognises the strong commitment of 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 building owners/ landlords who have a substantial number of tenants/ occupants 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

GREEN MARK PEARL PRESTIGE AWARD



7 & 9 Tampines Grande

As Asia's leading eco-developer, CDL has embraced its ethos to 'Conserve as we Construct' since 1995, remodelling its operations around a triple bottom line strategy focused on financial, environmental, and social performance. From design, construction, procurement, maintenance and even stakeholder engagement, the entire life cycle of its buildings are aligned with environmental sustainability.

Beyond implementing infrastructural enhancements at its buildings, CDL has also focused on the 'software' in greening its portfolio. Through the CDL Green Lease Partnership programme, CDL has encouraged and enabled its commercial tenants to play a more proactive role in Singapore's sustainable development agenda.

Developed and managed by CDL, 7 & 9 Tampines Grande is a Green Mark Platinum office building and a recipient of the inaugural Green Mark Pearl Award in 2015. This year, the building has received the higher tier Green Mark Pearl Prestige Award, reflecting its success in engaging its building users to adopt eco-friendly practices within their work spaces.

Designed as a new-generation green office complex, 7 & 9 Tampines Grande features the extensive use of solar technology (one of the largest in a Singapore commercial property), photocell sensors for perimeter lights, hybrid car park lots and water efficient shower facilities, waterless urinals as well as extensive greenery and a rooftop garden.

To enable its tenants to monitor and manage their energy consumption, tenants are provided access to a digital monitoring portal that provides real-time half hourly updates of energy consumption, with rebates offered as an incentive to achieve significant energy savings. Two tenants, NCR Asia Pacific and Aldwych International, also leveraged CDL's support to green fit their premises and attained the Green Mark for Office Interior certification this year.



GREEN MARK PEARL AWARD



11 Tampines Concourse

As Asia's leading eco-developer, CDL has embraced its ethos to 'Conserve as we Construct' since 1995, remodelling its operations around a triple bottom line strategy focused on financial, environmental, and social performance. From design, construction, procurement, maintenance and even stakeholder engagement, the entire life cycle of its buildings are aligned with environmental sustainability.

Beyond implementing infrastructural enhancements at its buildings, CDL has also focused on the 'software' in greening its portfolio. Through the CDL Green Lease Partnership programme, CDL has encouraged and enabled its commercial tenants to play a more proactive role in Singapore's sustainable development agenda.

Developed and managed by CDL, 11 Tampines Concourse is a Green Mark Gold^{Plus} building, and a recipient of the Green Mark Pearl Award. Completed in 2009, the 108,000 sq ft three-storey office building is also the first CarbonNeutral[®] development in Singapore and Asia Pacific.

Designed and built with environmental sustainability in mind, 11 Tampines Concourse is equipped with green features such as an innovative indoor non-compressor fresh air cooling system, natural day-lighting systems, photocell sensors, water-efficient fittings, waterless urinals, and use of low VOC paints for internal painting.

Aside from carbon neutralising the construction phase of 11 Tampines Concourse, CDL also offsets the carbon emissions from the building's ongoing annual operations, including tenants' emissions. To enable its tenants to monitor and manage their energy consumption, tenants are provided access to a digital monitoring portal that provides real-time half hourly updates of energy consumption, with rebates offered as an incentive to achieve significant energy savings. This year, four of the building's tenants – Future Electronics Inc., British Council, Singex Exhibitions and ATPI – obtained the Green Mark for Office Interior certification.



GREEN MARK PEARL AWARD



Central Mall Office Tower

As Asia's leading eco-developer, CDL has embraced its ethos to 'Conserve as we Construct' since 1995, remodelling its operations around a triple bottom line strategy focused on financial, environmental, and social performance. From design, construction, procurement, maintenance and even stakeholder engagement, the entire life cycle of its buildings are aligned with environmental sustainability.

Beyond implementing infrastructural enhancements at its buildings, CDL has also focused on the 'software' in greening its portfolio. Through the CDL Green Lease Partnership programme, CDL has encouraged and enabled its commercial tenants to play a more proactive role in Singapore's sustainable development agenda.

Developed and managed by CDL, Central Mall (Office Tower) is a Green Mark Platinum building, and a recipient of the Green Mark Pearl Award. Located along Magazine Road, the seven-storey office block comprises office with retail units.

Some of the building's green features include high-efficiency chiller plant system, variable speed drives (VSDs) installed for air-handling units (AHUs), efficient light fittings at common areas, CO₂ sensors for the carpark, bicycle bays, motion sensors for stairwells and toilets, and a green roof. In addition, Central Mall (Office Tower) is also a Public Utilities Board (PUB) Water Efficient Building.

To monitor and manage their energy consumption, tenants have access to a digital monitoring portal that provides real-time half hourly updates of energy consumption, with rebates offered as an incentive to achieve significant energy savings. CDL also encourages its tenants to implement green practices at the workplace. One such example is Grey Group, which has adopted usage of standing fans after working hours, green stationery, monitoring of water usage. Grey Group, along with F H Bertling, has successfully attained the Green Mark for Office Interior certification this year.



GREEN MARK PEARL AWARD



JEM Office Tower

Jem is the first mixed-use retail and office development to awarded the BCA Green Mark Platinum 4.0 award, the highest standard for sustainability locally, from the Singapore Building and Construction Authority (BCA) in 2012. Jem also won the Gold Award in the 'Best Innovative Green Building' for sustainability category in MIPIM Asia Awards 2012.

Jem's commitment to sustainability was put forth through various design features in building. Jem is the first development to use an innovative chilled water configuration delivering industry leading energy reduction for air conditioning. Extensive landscaping is incorporated to reduce the impact of the afternoon sun on the building while the building design also allows for natural lighting to reduce energy usage. For water efficiency, besides using efficient water fittings, rainwater is harvested for irrigation and recycled water will be used where possible. During construction, extensive measures were taken to reduce usage of cement and to include use of sustainable materials.

Tenants at Jem are required to commit to sustainability by signing the Green Lease. Green Lease is a tool used by Lendlease to encourage tenants to embrace Lendlease's sustainability objectives and incorporate these elements into their design and operation. Tenants are required to comply with Lendlease's minimum Sustainability Standards which includes features to ensure energy savings, reduce water consumption and proper disposal of waste. The occupiers in the Jem office tower has also be certified under Green Mark occupant-centric schemes.

The Lendlease integrated model enables Jem to influence sustainability through the entire property chain from investment management, building and construction, mall management to getting tenants to embark on committing to sustainability for a truly sustainable outcome.



GREEN MARK PEARL AWARD



Ocean Financial Centre

Ocean Financial Centre is a landmark premium Grade A office building, strategically located in the heart of Singapore's financial district. Developed by Keppel Land and owned by Keppel REIT, Ocean Financial Centre offers approximately 900,000sf of Grade A office space. Setting new benchmarks for eco-friendly commercial developments, the 43-storey office tower was the first office building in Singapore to achieve the Green Mark Platinum award by the Building and Construction Authority of Singapore (BCA); and the first high-rise office development in Southeast Asia to be conferred the prestigious Platinum LEED certification from the US Green Building Council.

The building features state-of-the-art energy-efficient and environmentally-friendly technologies, including one of Singapore's largest assembly of solar panels, an energy-efficient hybrid chilled water system and a central paper recycling facility. Ocean Financial Centre also stands out with its green wall, which achieved the Guinness World Record for the Largest Vertical Garden in September 2013. Comprising close to 57,000 pots of plants, the green wall not only helps to reduce the surface temperature of the building's carpark located behind the wall, it also acts as a green lung in filtering out vehicular emissions and provides visual relief from the dense concrete landscape of the city centre.

Ocean Financial Centre continues to lead in architectural and building excellence, having been conferred numerous awards including the Best Innovation Green Building by MIPIM Asia. It was named winner in the Large Green Building category at the ASEAN Energy Awards 2015 and was awarded the Water Efficient Building (Gold) certification by the PUB.

In 2016, Ocean Financial Centre was re-certified with the highest Green Mark Platinum award and has clinched the Green Mark Pearl Award conferred by the BCA. These awards attest to Keppel's strong commitment towards environmental protection in creating a sustainable future.



Developer



Owner



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:

1. Non-Residential Buildings (New & Existing)
2. Residential Buildings (New & Existing)
3. Schools
4. Landed Houses
5. Healthcare Facilities

Academic Block North

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Nanyang Technological University (NTU)
Project Manager:	Office of Development and Facilities Management, NTU
Architect:	ADDP Architects LLP
ESD/Green Consultant:	Energy Research Institute @ NTU (ERI@N)
Structural Engineer:	AECOM Singapore Pte Ltd
Quantity Surveyor:	Faithful + Gould Pte Ltd
Main Contractor:	Hytech Builders Pte Ltd
Landscape Consultant:	O2x Studio Pte Ltd
M&E Engineer:	Squire Mech Pte Ltd

- Estimated energy savings: 3,118,303 kWh/yr; Estimated water savings: 12,699 m³/yr; ETTV: 18.33 W/m²
- Naturally ventilated common spaces & use of cool paints to reduce thermal heat gain through façade
- Good daylighting design for common areas including use of sun-pipes integrated with LED & sensors
- Chiller plant system efficiency of 0.598 kW/RT
- Dedicated Outdoor Air System (DOAS) with heat pipes for energy efficient humidity control of fresh air
- Passive Displacement Cooling (PDC) (i.e.) fan-less cooling in offices for energy savings
- Use of motion sensors and photocell sensors with highly energy efficient LED & T5 lighting
- Ecosash system for fume hoods and Demand Control Ventilation (DCV) in labs for energy saving in ventilation

Bedok Integrated Complex

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	People's Association
Project Manager:	ARCADIS Project Management Pte Ltd
Architect:	ONG&ONG Pte Ltd
Structural Engineer:	KTP Consultants Pte Ltd
Quantity Surveyor:	Davis Langdon KPK (S) Pte Ltd
Main Contractor:	Kim Seng Heng Engineering Construction Pte Ltd
Landscape Consultant:	ONG&ONG Pte Ltd
M&E Engineer:	Rankine & Hill (S) Pte Ltd

- Estimated energy savings: 4,072,384 kWh/yr; Estimated water savings: 11,221 m³/yr; ETTV: 39.33 W/m²
- Extensive passive design: Atrium design optimizes natural ventilation, tapered façade design reduces solar heat gain
- Efficient chilled water plant with design system efficiency of 0.6 kW/RT
- Use of energy efficient LED and T5 lighting
- Water fittings are rated WELS “Very Good” and “Excellent”
- Extensive greenery with Green Plot Ratio of 4.56
- Provision of covered walkway and bicycle lots to enhance connectivity to public transport and encourage walking and cycling

DSTA Annex

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Defence Science & Technology Agency (DSTA)
Architect:	HCF & Associates
Structural Engineer:	Tham & Wong LLP
Main Contractor:	Deenn Engineering Pte Ltd
Landscape Consultant:	ISS Hydroculture Pte Ltd
M&E Engineer:	Rankine & Hill (S) Pte Ltd
Energy Modeling Consultant:	Building System & Diagnostics Pte Ltd

- Estimated energy savings: 3,152,083 kWh/yr; Estimated water savings: 30,047.59 m³/yr; ETTV: 36.35 W/m².
- Chiller plant system with efficiency of 0.578 kW/RT
- Permanent measurement and verification instrumentation for the monitoring of chilled water plant efficiency and heat balancing are available
- Active chilled beam system for the office
- Energy efficient LED for offices, meeting room and canteen
- Dedicated outdoor air system for air-to-air energy recovery to the office
- Displacement ventilation for the lobby
- Solar photovoltaic panels of 30 kWp to reduce building energy consumption

Hotel Boss

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Forward Land Pte Ltd
Architect:	Arkiwave Architects
ESD/Green Consultant:	G-Energy Global Pte Ltd
Structural Engineer:	KH Consultants
Quantity Surveyor:	1MH & Associates
Main Contractor:	Changhua Construction Pte Ltd
Landscape Consultant:	Nyee Phoe Flower Garden Pte Ltd
M&E Engineer:	CMP Consulting Engineers

- Estimated energy savings: 4,343,693 kWh/yr; Estimated water savings: 50,244 m³/yr; ETTV: 35.96 W/m²
- Highly efficient chiller plant system with efficiency of 0.578 kW/RT
- VSD, permanent measurement and verification instrumentation for the monitoring of chilled-water plant efficiency and heat balancing are available
- Use of energy efficient lights and motion sensors
- Use of energy efficient DC-Fan coil units for increased energy savings
- Heat pumps to provide hot water for guestrooms
- Use of automatic irrigation system coupled with rain sensors
- Installation of photovoltaic cells at rooftop to harness solar energy

JTC Food Hub @ Senoko

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	JTC Corporation
Architect:	Surbana International Consultants Pte Ltd
Structural Engineer:	Surbana International Consultants Pte Ltd
Quantity Surveyor:	Surbana International Consultants Pte Ltd
Main Contractor:	Yongnam – Jiang Huang JV
M&E Engineer:	Surbana International Consultants Pte Ltd

- Estimated energy savings: 9,745,407 kWh/yr;
Estimated water savings: 27,736 m³/yr; ETTV: 34.90 W/m²
- Chilled water plant efficiency of 0.6 kW/RT
- LED lightings in all common areas
- Solar leasing
- Photocell sensor for common area lighting control
- Efficient mechanical ventilation system
- CO sensor to regulate MV fans in the driveway
- Green Lease agreement with tenants

Kuehne + Nagel

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Kuehne + Nagel Real Estate Pte Ltd
Project Manager:	CBRE Pte Ltd
Architect:	HA Architects Pte Ltd
ESD/Green Consultant:	Ignesis Consultants Pte Ltd
Structural Engineer:	BC KOH & Partners LLP
Electrical Contractor:	Nylect Engineering Pte Ltd
Main Contractor:	Boustead Projects Pte Ltd
ACMV Contractor:	A One Air Conditioning Pte Ltd
Fire Safety Engineer:	Ignesis Consultants Pte Ltd

- Estimated energy savings: 2,638,857 kWh/yr; Estimated water savings: 13,322 m³/yr; ETTV: 31.29 W/m²; RETV: 10.2 W/m²
- VRF air-conditioning system with design system efficiency of 0.71 kW/RT
- Double glazed Low-E glass with U-value of 1.64 W/m²K and Shading Coefficient (SC) of 0.26
- Insulated panel walls and precast panel wall system
- Highly efficient LED lighting system – 67% better than SS 530 standards.
- Extensive use of green cement and recycled aggregates (RCA & washed copper slag)
- Water efficient fittings with WELS rating of “Excellent” & “Very Good”
- Low VOC & SGLS certified paints and adhesives

Lee Kong Chian School of Medicine, NTU (Novena Campus)

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Lee Kong Chian School of Medicine, Nanyang Technological University
Project Manager:	PM Link Pte Ltd
Architect:	DP Architects Pte Ltd
ESD/Green Consultant:	DP Sustainable Design Pte Ltd
Structural Engineer:	Beca Carter Hollings & Ferner (SE Asia) Pte Ltd
Quantity Surveyor:	Davis Langdon KPK (Singapore) Pte Ltd
Main Contractor:	Greatearth Construction Pte Ltd
Landscape Consultant:	DP Green Pte Ltd
M&E Engineer:	Meinhardt (Singapore) Pte Ltd

- Estimated energy savings: 6,587,961 kWh/yr;
Estimated water savings: 2,058.60 m³/yr; ETTV: 31.85 W/m²
- Passive building design to reduce solar heat gain
- Energy efficient air-conditioning system
- Minimizing use of single pass AHUs in lab air distribution system
- Heat recovery using round-around coil
- Under-floor air distribution system in auditorium and learning studio
- Energy efficient lighting
- Use of green concrete

MSC Building

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	M7 Corporation Holding Pte Ltd
Architect:	RSP Architects, Planners & Engineers (Pte) Ltd
Structural Engineer:	RSP Architects, Planners & Engineers (Pte) Ltd
Quantity Surveyor:	Rider Levett Bucknall LLP
Main Contractor:	M7 Corporation Pte Ltd
M&E Engineer:	Vincent, Han & Associates

- Estimated energy savings: 1,661,806.04 kWh/yr;
Estimated water savings: 926.88 m³/yr; ETTV:
33.92 W/m²
- Green wall
- Green roof
- Solar panels
- Motion sensors for staircases
- “Excellent” WELS rated water fittings
- VVVF Lift system
- Ductless fan for basement ventilation

New Community Club @ Keat Hong

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	People's Association (PA)
Project Manager:	SIPM Consultants Pte Ltd (SIPM)
Architect:	3HP Architect Pte Ltd (in association with 23.5 Degree G-Architects Pte Ltd)
ESD/Green Consultant:	Kaer Pte Ltd
Structural Engineer:	KCL Consultants Pte Ltd
Main Contractor:	Tat Hin Builders Pte Ltd
Landscape Consultant:	APEX G-A 1981 Pte Ltd
M&E Engineer:	GIMS & Associates Pte Ltd (in association with KJ Group Consult)

- Estimated energy savings: 869,101.77 kWh/yr; Estimated water savings: 1,110 m³/yr; ETTV: 39.81 W/m²
- Chiller plant system with design system efficiency of 0.536 kW/RT
- Permanent measurement and verification instrumentation for the monitoring of chilled-water plant efficiency and heat balancing are available
- Use of energy efficient lighting system
- High performance façade
- Implementation of green lease on all tenants
- Naturally ventilated corridors and lift lobbies
- Use of green cement and washed copper slag in construction

Our Tampines Hub

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	People's Association (PA)
Project Manager:	ARCADIS Project Management Pte Ltd
Architect:	DP Architects Pte Ltd
ESD/Green Consultant:	Meinhardt (Singapore) Pte Ltd
Structural Engineer:	T.Y. Lin International Pte Ltd
Quantity Surveyor:	Davis Langdon KPK (Singapore) Pte Ltd
Main Contractor:	Hexacon Construction Pte Ltd
Landscape Consultant:	DP Architects Pte Ltd
M&E Engineer:	AECOM Singapore Pte Ltd

- Estimated energy savings: 8,715,330 kWh/yr;
Estimated water savings: 357,193 m³/yr; ETTV: 38.43 W/m²
- Reuse of concrete waste from demolished building on site
- Highly insulated façade with double glazed Low-E glass
- Green Leasing is adopted to increase tenants' awareness to go green and protect the environment
- Excellent chiller plant with design system efficiency below 0.60kW/RT
- Naturally ventilated concourse and food court
- Extensive use of LED lights and energy efficient lighting system

Project Hamptons

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	DBS Trustee Limited as Trustee of Mapletree Industrial Trust
Architect:	P&T Consultants Pte Ltd
ESD/Green Consultant:	GreenA Consultants Pte Ltd
Structural Engineer:	LSW Consulting Engineers Pte Ltd
Quantity Surveyor:	WT Partnership (S) Pte Ltd
Main Contractor:	Tiong Seng Contractors Pte Ltd
Landscape Consultant:	Earthscape Concepts Pte Ltd
M&E Engineer:	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 12,688,483.62 kWh/yr;
Estimated water savings: 67,796.92 m³/yr; ETTV: 32.7 W/m²
- Water-cooled chilled water plant with efficiency of 0.59 kW/ton
- Heat balancing and VSD for chiller plant equipments
- NEWater for landscape irrigation, toilet flush, cooling tower and carpark washing
- Low CUI and use of Cobiax
- Sustainable products usage
- Conservation of trees and high GnPR
- Effective IAQ management plan per SMACNA guideline and demolition protocol

Resorts World Sentosa – Maritime Experiential Museum

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Resorts World at Sentosa Pte Ltd
Architect:	DP Architects Pte Ltd
ESD/Green Consultant:	G-Energy Global Pte Ltd
Structural Engineer:	AECOM Singapore Pte Ltd
Quantity Surveyor:	Langdon & Seah Singapore Pte Ltd
Main Contractor:	Sunray Woodcraft Construction Pte Ltd
Landscape Consultant:	Light Cibles Pte Ltd
M&E Engineer:	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 1,274,444.48 kWh/yr; Estimated water savings: 10,564 m³/yr; ETTV: 39.86 W/m²
- Low ETTV of 39.86 W/m² with extensive use of double glazed low-emissivity glass
- Use of energy efficient fixtures such as LED and T5 fluorescent lighting for the museum and back of house areas
- Sanitary fittings are mostly rated WELS “Excellent”
- Extensive use of daylighting in the building
- Pilot installation of an electric car charging station in Resorts World Sentosa.
- Creative use of products with recycled content, e.g. boat exhibit.
- Good “green” management in place to recycle materials such as used lamps and cooking oil

STT Defu

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner:	STT Singapore DC Pte Ltd
Managing Agent/ Maintenance Contractor:	Acme Associates Pte Ltd
DC Infrastructure Consultant:	HurleyPalmerFlatt
Architect:	BK Consulting Engineers Pte Ltd
ESD/Green Consultant:	Building System & Diagnostics Pte Ltd
Structural Engineer:	BK Consulting Engineers Pte Ltd
Main Contractor:	Acme Associates Pte Ltd
M&E Engineer:	Plan One Engineering Services

- Estimated energy savings: 37,721,809 kWh/yr; Estimated water savings: 3,195 m³/yr; ETTV: 6.93 W/m²
- Designed to minimize East-West orientated façades to reduce direct heat gain
- Energy efficient chilled water plant is designed and installed with an average system efficiency of 0.48 kW/RT
- All internal areas are fitted with energy efficient LED lightings, and occupancy sensors are installed to control the data centre halls, toilets and staircases lightings when they are not in use
- Energy performance of all M&E systems are monitored continuously through the Customized Data Centre Infrastructure Management System (DCIM)
- Water is conserved through the use of PUB WELS water efficient fittings
- Extensive use of environmentally friendly construction materials such as green concrete, Recycled Concrete Aggregates (RCA), Washed Copper Slag (WCS)
- Extensive use of environmentally friendly architectural products

Supply Chain City

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Supply Chain City Pte Ltd
Architect:	ID Architect Pte Ltd
ESD/Green Consultant:	IGnesis Engineering Pte Ltd
Structural Engineer:	Sterling C&S Consulting Engineer
Main Contractor:	HPC Builders Pte Ltd
Landscape Consultant:	Prince's Landscape (1988) Pte Ltd
M&E Engineer:	IGnesis Engineering Pte Ltd
Fire Safety Engineer:	IGnesis Engineering Pte Ltd

- Estimated energy savings: 8,463,058.90 kWh/yr;
Estimated water savings: 28,046.6 m³/yr; ETTV: 38.75 W/m²
- Efficient chiller plant system of 0.65 kW/RT
- Well insulated roofing system and high performance curtain wall glazing system
- Condensate recovery from AHU
- NEWater for cooling tower makeup and irrigation
- ASRS cranes with regenerative drives
- Use of green concrete and certified (SGBC/SGLS) materials
- Efficient lighting system – LED & T5 with occupancy sensor

Temasek Polytechnic East Wing

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Temasek Polytechnic
Project Manager:	Arcadis Project Management Pte Ltd
Architect:	Forum Architect Pte Ltd
ESD/Green Consultant:	ZEB-Technology Pte Ltd
Structural Engineer:	RSP Architects Planners & Engineers
Quantity Surveyor:	Faithful + Gould Pte Ltd
Main Contractor:	Koon Seng Construction Pte Ltd
M&E Engineer:	T.Y. Lin International Pte Ltd

- Estimated energy savings: 2,681,278 kWh/yr; Estimated water savings: 508,490.67 m³/yr; ETTV: 34.35 W/m²
- Chiller plant system with high targeted efficiency of 0.592 kW/ton
- Use of energy efficient T5 lighting resulting in 40.78% improvement over code lighting power budget.
- CUI of 0.44 m³/m²
- Provision of energy efficient features such as motion sensors for staircases and toilet, photo sensors for lift lobby, pre-function area and study areas
- Louvers for efficient natural ventilation of atriums, lift lobbies and corridors
- Extensive usage of sustainable products in construction

Administration Building

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 85,437 kWh/yr
- Efficient water-cooled chiller plant
- Extensive use of LED lighting
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Motion sensors at all toilets and staircases
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

Fusionopolis One

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: JTC Corporation
Facility Management: DTZ Facilities & Engineering (S) Ltd
ESCO: DTZ Facilities & Engineering (S) Ltd
ESD/Green Consultant: DTZ Facilities & Engineering (S) Ltd

- Estimated energy savings: 131,010 kWh/yr
- Fusionopolis One uses District Cooling System (DCS)
- Building Automation System (BAS) is available to facilitate monitoring and trend logging of chilled water secondary pumping system efficiency and air side temperature
- Automatic control devices are used to regulate outdoor air flow rate to maintain the concentration of Carbon Dioxide (CO₂)
- 34% improvement in air distribution system efficiency
- Use of energy-saving lamps at landlord common areas and tenanted areas (e.g. LED, PLC lamps, T5 fluorescent lamps)
- Carbon Monoxide (CO) monitoring system for control of car park mechanical ventilation fans
- Occupancy sensors are installed in all toilets and sky bridges to reduce energy consumption usage

Gardens by the Bay (Bay South)

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Gardens by the Bay
Facility Management: CBM Pte Ltd
ESCO: Trane Distribution Pte Ltd
ESD/Green Consultant: Surbana Jurong Pte Ltd

- Estimated energy savings: 16,475,150 kWh/yr;
Estimated water savings: 599,370 m³/yr
- Spectrally selected glass with motorized shading system
- Biomass cogeneration system with absorption chiller
- Thermal stratification + displacement ventilation + slab cooling
- Provision of photovoltaic system at the Supertree top
- Provision of green roof and vertical greenery
- Provision of light shelves and skylights for Gardens Staff Office
- Natural water filtration using lake

Grand Copthorne Waterfront Hotel Singapore

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Republic Hotels & Resorts Limited

ESD/Green Consultant: Kaer Pte Ltd

- Estimated energy savings: 1,856,762 kWh/yr;
Estimated water savings: 152 m³/yr
- Chiller plant was replaced and the new system efficiency achieved is 0.626 kW/RT
- Use of energy efficient heat pump for generation of hot water
- Use of efficient T5 fluorescent and LED lighting for common corridors and lobbies
- Use of Eco-digester to convert food waste to water
- Achieved Gold for Water Efficient Building
Certificate from PUB for being in top 10% on water efficiency performance

JCube

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: HSBC Institutional Trust Services (Singapore) Pte Ltd as Trustee of CapitaLand Mall Trust – JCube

Facility Management: CapitaLand Retail Management Pte Ltd

ESD/Green Consultant: Johnson Controls (S) Pte Ltd

- Photovoltaic panels on rooftop with system capacity of about 50 kWp to harness solar energy for production of electricity
- Recycling of waste heat and AHU condensate
- Use of UV-C emitters in AHUs
- Provision of education corners on green features
- Implementation of green lease for tenants
- Air-conditioning system with an efficiency of 0.64 kW/RT

Marina Bay Financial Centre Tower 3

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Central Boulevard Development Pte Ltd
Facility Management: Raffles Quay Asset Management Pte Ltd
ESD/Green Consultant: DTZ Facilities & Engineering (S) Ltd

- Estimated energy savings: 8,394,100 kWh/yr;
Estimated water savings: 6,384 m³/yr
- Low-E coating for glass façade
- Efficient air distribution system with VSDs and VAV boxes
- Extensive use of LED lightings with motion sensors and photocell sensors
- Heat recovery wheel
- Lifts with regenerative drive system
- Greenery provision at Level 1 and 5
- High efficiency filters for AHU

MOM Services Centre

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Ministry of Manpower
Facility Management: ST Synthesis Pte Ltd
ESD/Green Consultant: Johnson Controls (S) Pte Ltd

- Energy efficient chiller plant system (0.650 kW/RT) with thermal energy storage
- LED lightings for most functional spaces
- AC VVVF lifts and escalators with sleep mode
- Motion sensors at staircases, toilets and corridors
- Solar photovoltaic system (35 kWp) at rooftop, and extensive greenery
- Priority parking lots for electric vehicles, complete with charging station
- Underfloor air-conditioning system and passive displacement ventilation system

Nanyang Academy of Fine Arts Campus 3

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Academy of Fine Arts
Facility Management: Nanyang Academy of Fine Arts Estate Management Office
ESCO: Kaer Pte Ltd / Takasago Singapore Pte Ltd
ESD/Green Consultant: CNA Development Pte Ltd

- Estimated energy savings: 754,958 kWh/yr
- New efficient chiller plant with efficiency of 0.63 kW/RT
- UVC emitters at AHUs for improved energy efficiency, reduced maintenance, reduced water usage, pandemic protection and IAQ improvement
- Electronic air filtration system at AHUs to capture fine and ultra-fine particulates from outside air to 'haze-proof' NAFA 3 and enhance the indoor air quality.
- Rain sensor and weather programme to reduce cooling load demand on rainy days
- Treatment of toilets with titanium dioxide to improve toilet air quality and sanitation standard.
- Extensive use of green, sustainable building products.

Nanyang House

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 75,000 kWh/yr
- Passive design with naturally ventilated and naturally day-lit spaces
- Provision of motion sensors for artificial lighting control
- Extensive greenery using compost recycled from horticultural waste
- Provision of recycling bins and segregation of recyclables
- Sustainable operation with sustainable policies, green procurement policies, water improvement plans
- NTU has obtained a PUB Water Efficient Building Certificate

Nanyang Technological University – N1

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 418,545 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting, and use of renewable energy (solar PV)
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Motion sensors at all toilets and staircases
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

Nanyang Technological University – N1.1

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 88,202 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Motion sensors at all toilets and staircases
- Water sub-metering linked to BMS for leak detection system

Nanyang Technological University – N2

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 410,678 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting, and use of renewable energy (solar PV)
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Motion sensors at all toilets and staircases
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

Nanyang Technological University – N2.1

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 281,216 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Motion sensors at all toilets and staircases
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

Nanyang Technological University – N3

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 360,212 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting, and use of renewable energy (solar PV)
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Motion sensors at all toilets and staircases
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

Nanyang Technological University – N4

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 530,693 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting, and use of renewable energy (solar PV)
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Motion sensors at all toilets and staircases
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

National Design Centre

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



National Design Centre
(Photo: Aaron Pocock)

Building Owner: Ministry of Communications and Information
Facility Management: UEMS Solutions Pte Ltd
ESD/Green Consultant: Building System and Diagnostics Pte Ltd
IAQ Auditor: Nuevo Lab Pte Ltd

- Energy efficient Variable Refrigerant Volume (VRV) air-conditioning system
- Extensive use of energy efficient lightings achieving at least 40% energy savings as compared to the baseline
- Implementation of Energy, Green Procurement and Environmental Policies and Water Efficient Improvement Plans
- Conservation of more than 50% of building structure during major refurbishment works

National University of Singapore – Engineering Block E4

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: National University of Singapore
Facility Management: NUS, Office of Facilities Management
ESD/Green Consultant: CPG Consultants Pte Ltd

- Estimated energy savings: 1,091,622 kWh/yr; Estimated water savings: 9,033 m³/yr; ETTV: 34.72 W/m²
- New façade with ETTV of 34.72 W/m²
- Upgrade to LED light fittings for all user and common areas and T5 for mechanical rooms
- Motion sensor lighting for all toilets and staircases
- Replacement of all existing water fittings to WELS “Excellent” rated fittings
- Comprehensive campus wide recycling program and greenhouse gas inventory
- Extensive use of certified sustainable products including low VOC paints and finishes
- NEWater for cooling towers

North Spine

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 1,106,534 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting, and use of renewable energy (solar PV)
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Motion sensors at all toilets and staircases
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

Oasis @ Sakra

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner / Client: JTC Corporation

Project Management: WorleyParsons Pte Ltd

Architect: SQFT Architects Pte Ltd

ESD/Green Consultant: SQFT Architects Pte Ltd, TAN Consultants

Quantity Surveyor: OTN Building Cost Consultants Pte Ltd

Main Contractor: Hon Industries Pte Ltd

M&E Engineer: TAN Consultants

- Estimated energy savings: 710,681 kWh/yr; ETTV: 42.6 W/m²
- Achieved ETTV of 42.6 W/m² with Low-E glass (U-Value: 1.85, and Shading Coefficient (SC): 0.3) and overhangs
- Efficient VRF air-conditioning system with efficiency of 0.73 kW/RT
- T5 and LED luminaires give 59% improvement over baseline
- Cross-ventilation air flow in 8 levels of car parks
- All water fittings are with 3-tick WELS water efficiency label
- BMS tracking of water consumption & room temperature
- Management commitment in waste management and Post-occupancy evaluation

Ocean Financial Centre

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Keppel Land and Keppel REIT
Facility Management: Keppel REIT Property Management Pte Ltd
ESCO: G-Energy Global Pte Ltd
ESD/Green Consultant: G-Energy Global Pte Ltd

- Estimated energy savings: 10,499,363 kWh/yr; Estimated water savings: 4,839 m³/yr; ETTV: 43.55 W/m²
- ETTV of 43.55 W/m² with the use of triple-glazed low-emissivity glass
- Hybrid chilled water system
- One of the largest roof solar panel system as renewable energy source (75.04kWp)
- Efficient vertical system (Regenerative drive system coupled with VVVF feature elevators, escalator with motion sensors)
- Effective water conservation strategy (water efficient fittings, rain water harvesting, water usage & leak detection system and collection of condensate water)
- Extensive green wall and roof terraces
- Paper recycling chute system

Parkway Parade

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Management Corporation Strata Title No. 1008

Facility Management: Lend Lease Retail Pte Ltd

ESD/Green Consultant: DTZ Facilities & Engineering (S) Ltd

- Estimated energy savings: 1,953,617 kWh/yr;
Estimated water savings: 65,105 m³/yr
- Efficient chilled water system
- Use of LED lightings
- Use of motion sensors, photocell sensors and CO sensors
- Rainwater harvesting
- Greenlots charging station for electric vehicles
- Electrostatic air cleaner
- Carpark guidance system

School of Bioengineering (BioE)

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 765,700 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Extensive use of motion sensors at all toilets, staircases, corridors, lobbies and small offices
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

School of Biological Sciences

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 2,955,600 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting
- Certified PUB Water Efficient Building
- Extensive use of Motion sensors at all toilets, staircases, corridors, lobbies and small offices
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

School of Chemical and Biomedical Engineering

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 1,662,000 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Extensive use of motion sensors at all toilets, staircases, corridors, lobbies and small offices
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

School of Materials Science and Engineering (Block N4.1)

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 617,000 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting, and use of renewable energy (solar PV)
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Motion sensors at all toilets and staircases
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

School of Mechanical & Aerospace Engineering (Block N3.1)

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 680,400 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Motion sensors at all toilets and staircases
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

School of Mechanical & Aerospace Engineering (Block N3.2)

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 1,061,800 kWh/yr
- Efficient water cooled chiller plant
- Extensive use of LED lighting, and use of renewable energy (solar PV)
- Certified PUB Water Efficient Building
- Naturally ventilated car park
- Motion sensors at all toilets and staircases
- Water sub-metering linked to BMS for leak detection system
- Lifts with AC VVVF and sleep mode

Sheraton Towers Hotel Singapore

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Richvein Pte Ltd
Facility Management: Sheraton Towers Hotel Singapore
ESCO: LJ Energy Pte Ltd
ESD/Green Consultant: LJ Energy Pte Ltd

- Estimated energy savings: 5,303,230 kWh/yr
- Chiller plant system efficiency of 0.60 kW/RT
- Majority of lighting consists of LED-based luminaires
- Heat pump system to provide hot water for showering
- Pre-cooled air units include heat pipes for heat recovery
- Green education corner to raise awareness amongst guests and visitors

Student Services Centre

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 446,655 kWh/yr
- Energy efficient air conditioning system
- Provision of motion sensors for artificial lighting control
- Naturally ventilated common areas
- Use of compost recycled from horticultural waste
- NTU has obtained a PUB Water Efficient Building Certificate
- Sustainable operation with sustainable policies, green procurement policies, water improvement plans

Tiong Bahru Plaza & Central Plaza

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: ARMF (TBP) Pte Ltd
Architect: SAA Architects Pte Ltd
ESD/Green Consultant: Kaer Pte Ltd
M&E Engineer: Vincent Han & Associate

- Estimated energy savings: 3,423,173 kWh/yr; Estimated water savings: 7,156 m³/yr
- Chiller plant design system efficiency at 0.63 kW/RT
- Energy management system for control, and remote monitoring feature for the monitoring of the chiller plant
- Use of efficient LED lighting in the common areas, along with continuous improvements made to energy efficient lighting system
- All lifts within the development are modernized to have VVVF and sleep mode features
- Modernization of the carpark ventilation system to include CO sensors coupled to VFD fans to enhance energy savings through fan operation
- All the water fittings within the development are chosen to have WELS 3-ticks rating to enable substantial water consumption savings
- UV Lamps in all AHUs to improve Indoor Air Quality (IAQ) and energy savings by improved cooling coil surface heat transfer

Treetops Executive Residences

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: British Malayan Trustees Pte Ltd
Facility Management: DTZ Hospitality Management Services
ESCO: Comfort Management Pte Ltd
ESD/Green Consultant: Comfort Management Pte Ltd

- Estimated energy savings: 1,235,996 kWh/yr
- Use of tri-generation system that produces electricity, chilled water for air-conditioning, and domestic hot water
- Chiller plant design system efficiency of 0.50 kW/RT
- Extensive usage of fluorescent and LED lightings at common facilities and car parks
- Demand ventilation at car park using CO sensors & variable speed drives
- Awarded the PUB Water Efficient Building Certificate
- Extensive greenery within the premises
- UV system employed for cooling tower to reduce reliance on chemical treatment usage

United World College of South East Asia – Dover Campus

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: United World College of South East Asia

Facility Management: United World College of South East Asia

- Estimated energy savings: 1,841,812 kWh/yr; Estimated water savings: 9,860 m³/yr
- Highly efficient innovative air-conditioning system (operating at below 0.63 kW/ton and airside on average of < 0.2 kW/ton)
- Motion sensor lighting at all private lift lobbies, changing rooms and common staircases, and day-lighting sensors in classrooms
- Rooftop garden, and huge green walls incorporated on building façades to reduce the ambient temperature
- Use of “Excellent” water efficient fittings throughout
- Passive design and building layout to minimize heat gain and maximize natural ventilation
- One of the most energy efficient office setups in Singapore, through an innovative combination of air conditioning technologies

Universal Studios Singapore

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Resort World at Sentosa Pte Ltd
Facility Management: Resort World at Sentosa Pte Ltd
ESCO: G-Energy Global Pte Ltd
ESD/Green Consultant: G-Energy Global Pte Ltd

- Estimated energy savings: 200,000 kWh/yr; ETTV: 12.88 W/m²
- Extensive use of energy efficient LED lightings
- 500 kWp solar harvesting system
- Extensive use of water efficient sanitary fittings
- USS Lagoon for rainwater harvesting used for irrigation and water features
- Extensive Greenery (Green Roofs > 25%)
- Pneumatic Waste System / Carpark Guidance System / Recycling cooking oil

HDB Greenprint Pilot Neighbourhood at Yuhua

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner:	Housing & Development Board
Town Council:	Jurong Town Council
Managing Agent / Maintenance Contractor:	Cushman & Wakefield
Waste Contractor:	Colex (under purview & appointment by NEA)
Cleaning Contractor:	LS2 Services Pte Ltd
Landscape Consultant:	Yong Aik Construction Pte Ltd

- Estimated energy savings: 2,310,718 kWh/yr;
Estimated water savings: 1,700 m³/yr
- Solar photovoltaic system at rooftops of 29 blocks
- Outdoor LED street lightings at all 3 surface car parks
- Elevator energy regenerative system in lifts of 16 blocks
- Pneumatic waste conveyance system for all 38 blocks that comes with recycling bins at the ground floor
- Green roofs and vertical greenery
- Rainwater harvesting systems for 17 suitable blocks
- Secured bicycle parking facilities in the form of dual bicycle racks at the void decks of 28 suitable blocks

Nanyang Heights Faculty Housing

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 184,745 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, lift lobbies, corridors and staircases
- Use of motion sensors at half landings of staircases
- Use of in-line water transfer pumps
- Use of non-potable water for landscape irrigation
- Lifts incorporated with AC VVVF motors and sleep mode function

Nanyang Meadow Faculty Housing

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 125,479 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, lift lobbies, corridors and staircases
- Use of motion sensors at half landings of staircases
- Use of in-line water transfer pumps
- Use of non-potable water for landscape irrigation
- Lifts incorporated with AC VVVF motors and sleep mode function

Nanyang Technological University

Graduate Hall 1

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 63,250 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building
- Naturally ventilated car park, lift lobbies, corridors and staircases
- Use of motion sensors at half landings of staircases, common toilets and amenity rooms
- Lifts incorporated with AC VVVF motors and sleep mode function
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment with flow rate of less than 8.5 l/min

Nanyang Technological University

Graduate Hall 2

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 4,813 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building
- Naturally ventilated lift lobbies, corridors and staircases
- Use of motion sensors at half landings of staircases, common toilets and amenity rooms
- Lifts incorporated with AC VVVF motors and sleep mode function
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment with flow rate of less than 8.5 l/min

Nanyang Technological University

Hall of Residence 1

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 129,236 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Electrical sub-metering to monitor the common area energy usage
- Use of non-potable water for landscape irrigation.
- Provision of vertical green wall

Nanyang Technological University

Hall of Residence 2

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 139,316 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Electrical sub-metering to monitor the common area energy usage
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment with flow rate of less than 8.5 l/min

Nanyang Technological University

Hall of Residence 3

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 156,003 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Use of motion sensors at half landings, common toilets and staircases
- Provision of heat pumps to common toilets
- Use of non-potable water for landscape irrigation
- Gearless type lifts with AC VVVF and sleep mode features
- Implementation of 22 °C minimum limit on air-conditioning units in hostel rooms

Nanyang Technological University

Hall of Residence 6

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 172,888 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Provision of heat pumps to common toilets
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment with flow rate of less than 8.5 l/min

Nanyang Technological University

Hall of Residence 7

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 147,329 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Provision of heat pumps to common toilets
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment with flow rate of less than 8.5 l/min

Nanyang Technological University

Hall of Residence 8

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 150,171 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Provision of heat pumps to common toilets
- Use of non-potable water for landscape irrigation
- Provision of vertical green wall

Nanyang Technological University

Hall of Residence 9

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 144,441 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, lift lobbies, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Provision of heat pumps to common toilets
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment with flow rate of less than 8.5 l/min

Nanyang Technological University

Hall of Residence 10

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 144,679 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Provision of heat pumps to common toilets
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment with flow rate of less than 8.5 l/min

Nanyang Technological University

Hall of Residence 11

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 150,963 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, lift lobbies, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Provision of heat pumps to common toilets
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment with flow rate of less than 8.5 l/min

Nanyang Technological University

Hall of Residence 12

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 170,138 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Provision of heat pumps to common toilets
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment with flow rate of less than 8.5 l/min

Nanyang Technological University

Hall of Residence 13

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 210,903 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Provision of heat pumps to common toilets
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment with flow rate of less than 8.5 l/min

Nanyang Technological University

Hall of Residence 14

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 164,339 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Provision of heat pumps to common toilets
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment with flow rate of less than 8.5 l/min

Nanyang Technological University

Hall of Residence 15

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 172,276 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Provision of heat pumps to common toilets
- Use of non-potable water for landscape irrigation
- Use of water efficient cleaning equipment with flow rate of less than 8.5 l/min

Nanyang Technological University

Hall of Residence 16

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 148,366 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, lift lobbies, corridors and staircases
- Use of motion sensors at half landings, common toilets and staircases
- Provision of heat pumps to common toilets
- Gearless type lifts with AC VVVF and sleep mode features
- Implementation of 22 °C minimum limit on air-conditioning units in hostel rooms

Nanyang View Faculty Housing

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Building Owner: Nanyang Technological University
Facility Management: Nanyang Technological University
ESD/Green Consultant: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
M&E Engineer: Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

- Estimated energy savings: 62,715 kWh/yr
- Extensive use of LED lighting
- Certified PUB Water Efficient Building for all accommodation blocks
- Naturally ventilated car park, corridors and staircases
- Use of motion sensors at half landings of staircases
- Use of in-line water transfer pumps
- Use of non-potable water for landscape irrigation
- Use of compost recycled from horticulture waste

CGH Medical Centre

(Healthcare Facilities)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	Ministry of Health
Employer's Agent:	Changi General Hospital / MOH Holdings Pte Ltd
Architect:	RDC Architects Pte Ltd
ESD/Green Consultant:	Parsons Brinckerhoff Pte Ltd
Structural Engineer:	Parsons Brinckerhoff Pte Ltd
Quantity Surveyor:	Arcadis – Langdon & Seah Singapore Pte Ltd
Main Contractor:	Kimly-Shimizu Joint Venture
Landscape Consultant:	Mace Studio Pte Ltd
M&E Engineer:	Parsons Brinckerhoff Pte Ltd

- Estimated energy savings: 3,843,435 kWh/yr; Estimated water savings: 18,148 m³/yr; ETTV: 27.01 W/m²
- Energy efficient water-cooled chilled water plant with design system efficiency of 0.589 kW/RT
- Minimizes heat gain from façade through good building orientation, use of spandrel glass with rock wool insulation and provision of sun shading
- Extensive use of sustainable product with high ratings under Singapore Green Building Council (SGBC)
- Provision of heat pipe to recover energy from exhaust air to pre-cooled fresh air
- Regulates fresh air demand through CO₂ sensor for AHUs and CO sensor control for carpark mechanical ventilation system
- 100% replacement of potable water usage for landscape irrigation, cooling tower and toilet flushing
- Provision of efficient transformers

National Centre for Infectious Diseases and Centre for Healthcare Innovation

(Healthcare Facilities)



GREEN MARK AWARD FOR BUILDINGS

PLATINUM



Client/Developer:	MOH Holdings Pte Ltd
Project Manager:	PM Link Pte Ltd
Architect:	CPG Consultants Pte Ltd
ESD/Green Consultant:	Building System & Diagnostics Pte Ltd
Structural Engineer:	CPG Consultants Pte Ltd / Meinhardt (Singapore) Pte Ltd
Quantity Surveyor:	CPG Consultants Pte Ltd
Main Contractor:	Kajima Overseas Asia Pte Ltd
M&E Engineer:	CPG Consultants Pte Ltd

- Estimated energy savings: 16,413,608 kWh/yr; Estimated water savings: 181,325.60 m³/yr; ETTV: 36.38 W/m²
- Highly efficient chilled water plant with design system efficiency of 0.59 kW/RT
- Air distribution design for operation theatres, wards and critical areas optimizes cooling efficiency while preventing unwanted movement of contaminants between different zones
- Extensive use of flicker-free and mercury-free LED lightings which helps to ensure staff, patients and community health and well-being
- PUB WELs water efficient fittings, collection of AHU condensate for cooling tower make up and recycled rainwater for irrigation
- Lush greenery, green terraces and roof garden helps to reduce heat island impact and provide therapeutic green spaces which offer visual and physical relief to staff, patients and families
- Clinical areas with specialized ventilation systems are provided with HEPA filters, ultraviolet germicidal irradiation and self-cleaning titanium dioxide for infection control
- Adoption of universal design which improve user-friendly accessibility and connectivity within the healthcare facilities

Acacia Home

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Ministry of Social and Family Development
Architect:	CPG Consultants Pte Ltd
ESD/Green Consultant:	CPG Consultants Pte Ltd (CPGreen)
Structural Engineer:	CPG Consultants Pte Ltd
Quantity Surveyor:	CPG Consultants Pte Ltd
Main Contractor:	CMC Construction Pte Ltd
M&E Engineer:	CPG Consultants Pte Ltd

- Estimated energy savings: 168,279.14 kWh/yr;
Estimated water savings: 39,435.30 m³/yr; ETTV: 35.17 W/m²
- High efficiency VRV system
- Energy efficient T5 lighting with motion sensors
- Naturally ventilated dormitories and common areas
- Provision of recycling bins and recycling sorting facilities
- Extensive use of certified sustainable materials and products

Construction of Aircraft Hangar Complex and Workshop Building

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Defence Science & Technology Agency (DSTA)
Project Manager:	Defence Science & Technology Agency (DSTA)
Architect:	DDA Resources Architects
Structural Engineer:	Mtech Consultants
Main Contractor:	Thong Huat Builders Pte Ltd
M&E Engineer:	WN Consultants Pte Ltd / HY M&E Consultancy Services Pte Ltd

- Estimated energy savings: 132,004 kWh/yr;
Estimated water savings: 3771.42 m³/yr; ETTV: 33.29 W/m²
- Sunpipe to enhance daylight
- Roof-mounted turbine ventilators
- Greencast ecowall
- Natural ventilation using simulation software

Jewel Changi Airport

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Jewel Changi Airport Trustee Pte Ltd
Architect:	Safdie Architects Asia LLC (Designer) / RSP Architects Planners & Engineers (Pte) Ltd
ESD/Green Consultant:	Atelier Ten Ltd / G-Energy Global Pte Ltd
Structural Engineer:	RSP Architects Planners & Engineers (Pte) Ltd
Quantity Surveyor:	Langdon & Seah Singapore Ltd
Main Contractor:	Woh Hup – Obayashi Joint Venture (Project Jewel)
Landscape Consultant:	Peter Walker & Partners Landscape Architecture, Inc. (Designer) / ICN Design Int'l Pte Ltd
M&E Engineer:	Mott MacDonald Singapore Pte Ltd

- Estimated energy savings: 18,254,739.70 kWh/yr;
Estimated water savings: 58,300 m³/yr; ETTV: 39 W/m²
- State-of-the-art highly energy efficient chiller plant system
- Innovative and efficient air-conditioning using radiant chilled slab, integrated dehumidification AHUs and dynamic balancing control systems for targeted cooling of human-occupied zones
- Efficient lighting used throughout the building, including 100% LED lighting for front of house
- Harness renewable energy through solar panels which are expected to offset an estimate of 430MWh of energy consumption per year
- Extensive greenery which improves indoor air quality and achieves high green provision

JTC Space @ Gul

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	JTC Corporation
Architect:	ID Architects Pte Ltd
Structural Engineer:	Aurecon Singapore Pte Ltd
Quantity Surveyor:	WT Partnership (S) Pte Ltd
Main Contractor:	LBD Engineering Pte Ltd
M&E Engineer:	Mott MacDonald Singapore Pte Ltd

- Estimated energy savings: 309,869.00 kWh/yr
- Provision of good natural ventilation
- Use of LED lighting fittings throughout the entire development
- Use of Solar PV panel system to replace landlord's energy consumption
- All water fittings rated WELS "Excellent"
- Use of Pre-Fabricated Bathroom Unit (PBU) for all toilets throughout the entire development

JTC Space @ Tampines North

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	JTC Corporation
Project Manager:	JTC Corporation
Architect:	SAA Architects Pte Ltd
ESD/Green Consultant:	Building System & Diagnostics Pte Ltd
Structural Engineer:	Aecom Singapore Pte Ltd
Quantity Surveyor:	Davis Langdon KPK (Singapore) Pte Ltd
Main Contractor:	Sanchoon Builders Pte Ltd
M&E Engineer:	Aecom Singapore Pte Ltd

- Estimated energy savings: 1,909,495 kWh/yr;
Estimated water savings: 12,440.30 m³/yr
- Green Leasing is adopted to increase tenants' awareness of green fit out works and protect the environment
- All factories have large window openings facing the north and south to facilitate cross ventilation
- CFD simulation to optimize natural ventilation through the factories units
- Extensive usage of LED lightings which helps to achieve at least 40% energy savings for lightings
- Water is conserved through the use of PUB WELS "Excellent" water efficient fittings

Lian Soon Industrial Building

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Greenleaf Engineering Pte Ltd
Architect:	Point Architects Pte Ltd
ESD/Green Consultant:	Aurecon Singapore Pte Ltd
Structural Engineer:	Mtech Consultants Pte Ltd
Main Contractor:	Greenleaf Industries Pte Ltd
M&E Engineer:	William Ng Consultants Pte Ltd

- Estimated energy savings: 382,071 kWh/yr; ETTV: 37.64 W/m²
- Use of LED and T5 lighting with high frequency ballast, and lifts with VVVF motor drive and sleep mode features
- Naturally ventilated staircase, lift lobby and car park
- Majority of water fittings with “Excellent” WELS rating
- Use of VRV system with fresh air duct
- Conservation of 33% of existing structure

National University of Singapore – Frontier

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	National University of Singapore
Architect:	AR43 Architects Pte Ltd
ESD/Green Consultant:	CPG Consultants Pte Ltd (CPGreen)
Structural Engineer:	Hainal-Konyi Pte Ltd
Quantity Surveyor:	Rider Levett Bucknall LLP
Main Contractor:	Lian Soon Construction Pte Ltd
M&E Engineer:	Parsons Brinckerhoff Pte Ltd

- Estimated energy savings: 169,705.26 kWh/yr;
Estimated water savings: 9,179.21 m³/yr; ETTV: 38.66 W/m²
- Naturally ventilated canteen dining area
- Energy efficient LED lighting for all areas except mechanical spaces which use T5 lighting achieving over 56% in savings over the SS 553 baseline
- Exclusive use of WELS “Excellent” products for all water fittings
- Widespread use of SGLS and SGBC certified green products
- Extensive use of green concrete including recycled concrete aggregates and washed copper slag

Ngee Ann Polytechnic Blocks 34, 37, 46, 47 & 50

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLDPLUS



Client/Developer:	Ngee Ann Polytechnic
Architect:	RSP Architects Planners & Engineers (Pte) Ltd
Structural Engineer:	RSP Architects Planners & Engineers (Pte) Ltd
Quantity Surveyor:	Langdon & Seah Singapore Pte Ltd
Main Contractor:	Vigcon Construction Pte Ltd
Landscape Consultant:	Coen Design International Pte Ltd
M&E Engineer:	Squire Mech Pte Ltd

- Estimated energy savings: 763,381 kWh/yr;
Estimated water savings: 19,985.60 m³/yr; ETTV: 36.79 W/m²
- Replacement of chiller system
- Extensive usage of LED lighting at classrooms, offices, labs, lift lobbies and toilets
- Replacement of sanitary fittings to water saving fittings
- Introducing daylight to spaces to reduce reliance of artificial lighting, along with façade replacement with low-E DGU to achieve ETTV of 36.79 W/m²
- Provision of green wall to reduce cooling load

V Hotel Bencoolen

(New Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Lotus Capital Pte Ltd
Architect:	Arkiwave Architects
ESD/Green Consultant:	G-Energy Global Pte Ltd
Structural Engineer:	KH Consultants Pte Ltd
Quantity Surveyor:	1MH & Associates
Main Contractor:	V3 Construction Pte Ltd
Landscape Consultant:	Nyee Phoe Flower Garden Pte Ltd
M&E Engineer:	CMP Consulting Engineers

- Estimated energy savings: 778,182 kWh/yr;
Estimated water savings: 27,879 m³/yr; ETTV: 40.78 W/m²
- Highly efficient chiller plant system with efficiency of 0.673 kW/RT; VSD, permanent measurement and verification instrumentation for the monitoring of chilled-water plant efficiency and heat balancing are available
- Use of energy efficient lights and motion sensors
- Heat pumps to provide hot water for guestrooms
- Use of automatic irrigation system
- Remote monitoring of the chiller plant system

Biopolis One

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: JTC Corporation
Facility Management: DTZ Facilities & Engineering Limited
ESCO: DTZ Facilities & Engineering Limited
ESD/Green Consultant: DTZ Facilities & Engineering Limited

- Estimated energy savings: 3,519,936 kWh/yr; Estimated water savings: 8,280 m³/yr
- Biopolis One uses District Cooling System (DCS); Building Automation System (BAS) is available to facilitate monitoring and trend logging of chilled water secondary pumping system efficiency and air side temperature; Provision of variable speed controls for all secondary chilled water pumps are available
- Automatic control devices are used to regulate outdoor air flow rate to maintain the concentration of carbon dioxide
- Total of 29% improvement in air distribution system efficiency
- Use of energy-saving lamps at landlord common areas and tenanted areas (e.g. LED, PLC lamps T5 fluorescent lamps)
- Carbon Monoxide (CO) monitoring system that is linked to the BAS system for monitoring to optimize ventilation requirements of the car park, hence eliminating unnecessary operation of the mechanical ventilation fans

Capital Square

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Capital Square Pte Ltd
Facility Management: CBRE Pte Ltd
ESCO: Comfort Management Pte Ltd
ESD/Green Consultant: Comfort Management Pte Ltd

- Estimated energy savings: 533,780 kWh/yr
- Replacement of existing chillers with high efficiency chillers, chiller plant efficiency of 0.68 kW/RT
- 45% improvement in lighting power budget including tenants
- Demand ventilation using CO sensors for car park
- PUB Water Efficient Building Certificate
- Extensive greenery and use of compost recycled from horticulture waste

National University of Singapore – Yong Loo Lin School of Medicine Block MD3

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: National University of Singapore (NUS)

Facility Management: Office of Facilities Management, NUS

ESD/Green Consultant: CPG Consultants Pte Ltd

- Estimated energy savings: 181,210 kWh/yr; Estimated water savings: 932 m³/yr
- Replacement of existing light fittings with energy efficient LED and T5 light fittings
- Use of motion sensors for lighting at all toilets and staircases, selected laboratories and corridors
- Use of WELS 'Excellent' rated water fittings and water sub-meters at every floor to monitor major usage, as well as use of NEWater for cooling towers
- Extensive use of certified sustainable products including low VOC paints and finishes
- Comprehensive campus-wide recycling programme, and greenhouse gas inventory and emissions reduction programme

National University of Singapore – Yong Loo Lin School of Medicine Block MD10

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: National University of Singapore (NUS)

Facility Management: Office of Facilities Management, NUS

ESD/Green Consultant: CPG Consultants Pte Ltd

- Estimated energy savings: 189,990 kWh/yr; Estimated water savings: 1,868 m³/yr
- Replacement of existing light fittings with energy efficient LED and T5 light fittings
- Use of motion sensors for lighting at all toilets and staircases, selected laboratories and corridors
- Use of WELS 'Excellent' rated water fittings and water sub-meters at every floor to monitor major usage, as well as use of NEWater for cooling towers
- Extensive use of certified sustainable products including low VOC paints and finishes
- Comprehensive campus-wide recycling programme, and greenhouse gas inventory and emissions reduction programme

Pasir Ris Sports Centre

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Singapore Sports Council

Facility Management: Singapore Sports Council

ESD/Green Consultant: CPG Consultants Pte Ltd

- Estimated energy savings: 565,070 kWh/yr
- Energy efficient T5 & LED lightings are installed for lobby and general areas
- 170 kWp solar photovoltaic is installed to harness clean and renewable energy
- Rainwater harvesting system for irrigation and landscaping
- Public display system to show the building consumption and solar PV generation
- Green provision and vertical greenery

Prison Link Centre (Changi)

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Singapore Prison Service
Facility Management: CBM Pte Ltd
ESCO: DTZ Facilities & Engineering (S) Limited
ESD/Green Consultant: DTZ Facilities & Engineering (S) Limited

- Estimated energy savings: 170,963 kWh/yr;
Estimated water savings: 1,143 m³/yr
- High efficiency unitary air-conditioners and air distribution system
- Use of natural ventilation design for car park
- Use of energy efficient LEDs
- Private water-meters to monitor usage
- Use of water efficient fittings

SEAMEO Regional Language Centre

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Ministry of Education

ESCO: Kaer Pte Ltd

ESD/Green Consultant: Kaer Pte Ltd

- Estimated energy savings: 394,232 kWh/yr;
Estimated water savings: 1,111 m³/yr
- Centralized chilled water plant designed to achieve system efficiency of 0.65 kW/RT and equipped with permanent measurement instrumentation
- Energy efficient lightings installed in all areas such as common corridors, offices and guestrooms
- Use of motion sensors for lighting control in washrooms, common corridors and all staircases
- Provision of recycling waste facilities with monthly monitoring of recyclable waste collected
- Use of water efficient fittings; certified as PUB Water Efficient Building

Siglap Centre

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: Tian Hock Properties Pte Ltd

ESCO: G-Energy Global Pte Ltd

ESD/Green Consultant: G-Energy Global Pte Ltd

- Estimated energy savings: 353,518 kWh/yr;
Estimated water savings: 96 m³/yr
- Highly efficient chiller plant targeted to have efficiency of 0.65 kW/RT
- Provision of automatic tube cleaning system
- LED Lights in all the landlord common areas
- Recycling practices and green display to share on green features and green knowledge
- Use of SGLS certified toilet rolls, hand soaps, floor detergent

University Hall, National University of Singapore

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner: National University of Singapore
Facility Management: National University of Singapore
ESD/Green Consultant: CPG Consultants Pte Ltd

- Chiller plant room system efficiency of 0.73 kW/RT
- All fluorescent lightings come with high frequency ballast
- Extensive skylight to reduce light fittings needed
- Three sky gardens
- PUB certified Water Efficient Building

UOB Plaza 2

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner:	United Overseas Bank Group
Facility Management:	UOB Facilities Management
ESCO:	G-Energy Global Pte Ltd
ESD/Green Consultant:	G-Energy Global Pte Ltd
M&E Engineer:	Belmacs Pte Ltd

- Estimated energy savings: 2,032,680 kWh/yr
- Use of energy-efficient lightings (LED and PLC)
- CO2 sensors at all Air Handling Units (AHUs) to regulate fresh air intake
- Energy monitoring system to monitor across current UOB buildings
- MERV 14 filters for better indoor air quality.
- Chiller plant efficiency of 0.634 kW/RT (office hours).

Botanique @ Bartley

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	UOL Development (Bartley) Pte Ltd
Architect:	ADDP Architects LLP
Structural Engineer:	TEP Consultants Pte Ltd
Quantity Surveyor:	Rider Levett Bucknall
Main Contractor:	China Construction Realty Co Pte Ltd
Landscape Consultant:	Ecoplan Asia Pte Ltd
M&E Engineer:	Alpha Consulting Engineers Pte Ltd

- Estimated energy savings: 9,682,954.12 kWh/yr; Estimated water savings: 38,256 m³/yr; RETV: 20.43 W/m²
- Inverter and environmentally friendly air conditioner split units with 4 NEA 'ticks' green label are used in all units & common areas
- VVVF drive and gearless lifts with lights and fans in the lift cars switched off when there is no hall call after a predetermined time delay
- Extensive use of energy efficient LED and T5 lamps throughout the development; T5 with integrated motion sensor are used at staircases
- Basement car-parks are provided with 2.5% openings for natural intake and CO sensors to control ductless exhaust system
- Automatic flushing cistern for the handicapped toilet; Dual flush cistern for WC and all basin, sink & shower mixer taps in apartment unit toilets and clubhouse changing rooms/toilets are either "Very Good" or "Excellent" WELS certified

J Gateway

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	MCL Land (Gateway) Pte Ltd
Architect:	AGA Architect Pte Ltd
Structural Engineer:	KCL Consultants Pte Ltd
Quantity Surveyor:	KPK Quantity Surveyors (Singapore) Pte Ltd
Main Contractor:	Keong Hong Construction Pte Ltd
Landscape Consultant:	Salad Dressing
M&E Engineer:	Rankine & Hill (Singapore) Pte Ltd

- Estimated energy savings: 7,393,818 kWh/yr;
Estimated water savings: 71,022 m³/yr; RETV: 19.95 W/m²
- Extensive green area integrated at landscape deck, sky links and sky terraces
- Naturally ventilated and day-lit common areas
- Installation of green transport amenities such as electric vehicle charging station, bike racks as well as convenient access to public transport
- Extensive use of sustainable and environmentally friendly products
- Incorporation of pneumatic waste system

Kampung Admiralty (Residential)

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLDPLUS



Client/Developer:	Housing & Development Board
Architect:	WOHA Architects Pte Ltd
ESD/Green Consultant:	AECOM Singapore Pte Ltd
Structural Engineer:	Ronnie & Koh Consultants Pte Ltd
Quantity Surveyor:	Davis Langdon KPK (Singapore) Pte Ltd
Main Contractor:	Lum Chang Building Contractors Pte Ltd
Landscape Consultant:	Ramboll Studio Dreiseitl
M&E Engineer:	AECOM Singapore Pte Ltd
Fire Safety Engineer:	AECOM Singapore Pte Ltd

- Estimated energy savings: 55,730 kWh/yr; Estimated water savings: 1,148 m³/yr; RETV: 18.79 W/m²
- Extensive use of LED lighting throughout the entire development
- Photovoltaic PV panels on roof for energy generation
- Harvested rainwater for irrigation
- Extensive greenery with community farming garden and green roof
- Pneumatic waste collection system with dual refuse collection separating recyclable and non-recyclable waste

North Park Residences

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Frasers Centrepoint Limited
Architect:	SAA Architects Pte Ltd / ADDP Architects LLP
ESD/Green Consultant:	Building System & Diagnostics Pte Ltd
Structural Engineer:	Aecom Singapore Pte Ltd
Quantity Surveyor:	Arcadis Project Management
Main Contractor:	Lum Chang Building Contractors Pte Ltd
Landscape Consultant:	COEN Design International Pte Ltd
M&E Engineer:	Aecom Singapore Pte Ltd

- Estimated energy savings: 4,127,485.31 kWh/yr;
Estimated water savings: 243,175.41 m³/yr; RETV:
21.97 W/m²
- Minimize east-west facing façade and achieve good thermal performance of building envelope.
- Dwelling units with good natural ventilation
- Naturally-ventilated and day-lit common areas
- Use of water efficient fittings and washing machines that are certified under the Water Efficiency Labeling Scheme (WELS)
- Use of efficient irrigation system with rain sensor for landscape areas

Principal Garden

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Secure Venture Development (Alexandra) Pte Ltd
Project Manager:	UOL Project Management Services Pte Ltd
Architect:	Architects 61 Pte Ltd
Structural Engineer:	TEP Consultants Pte Ltd
Quantity Surveyor:	Langdon & Seah Singapore Pte Ltd
Main Contractor:	Unison Construction Pte Ltd
Landscape Consultant:	Sitetectonix Pte Ltd
M&E Engineer:	Alpha Consulting Engineers Pte Ltd

- Estimated energy savings: 6,031,356.24 kWh/yr; Estimated water savings: 31,824 m³/yr; RETV: 20.27 W/m²
- Buildings layout facing north-south orientation with extensive provision of balconies, overhang ledges and cool paint to east-west gable end wall to minimize heat gain
- Extensive use of high efficiency energy saving lightings (T5 / LED) with alternate circuiting, timer controls and energy monitoring device to manage / minimize energy consumption
- Energy efficient air-conditioning system with 4 “ticks” equivalent COP and lift system with re-generative drivers
- Extensive use of environmental friendly products certified under SGLS and provision of extensive greenery, PBU and pneumatic waste collection system
- Extensive use of water efficiency fittings

Punggol Opal

(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
Structural Engineer:	Surbana International Consultants Pte Ltd
Quantity Surveyor:	Surbana International Consultants Pte Ltd
Main Contractor:	Thong Huat Brothers Pte Ltd
Landscape Consultant:	Surbana International Consultants Pte Ltd
M&E Engineer:	Surbana International Consultants Pte Ltd

- Estimated water savings: 57,621.35 m³/yr; RETV: 19.72 W/m²
- Improvement in lighting power budget in common areas due to high usage of LED lightings
- Rainwater harvesting tanks in all Residential Blocks
- High Green Plot Ratio
- Dedicated dual chute – recycled refuse chute in all residential blocks
- North-south building orientation optimisation to achieve better thermal performance of building envelope (RETV)

St George's Towers

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Housing & Development Board
Architect:	Look Architects Pte Ltd
ESD/Green Consultant:	Building System and Diagnostics Pte Ltd
Structural Engineer:	KTP Consultants Pte Ltd
Quantity Surveyor:	Langdon & Seah Singapore Pte Ltd
Main Contractor:	Chang Hua Construction Pte Ltd
Landscape Consultant:	Land Design One Pte Ltd
M&E Engineer:	Gims & Associates Pte Ltd

- Estimated energy savings: 1,319,644.99 kWh/yr;
Estimated water savings: 73,250.94 m³/yr; RETV: 17.31 W/m²
- Abundant greenery provision at rooftop of multi-storey car park and sky terraces
- Dwelling units with good natural ventilation
- Naturally-ventilated and day-lit common areas
- Provision of centralized dual refuse chutes to separate recyclable from non-recyclable waste
- Use of integrated cistern pedestal system for all residential units

The Vales

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Anchorvale Residences Pte Ltd
Architect:	AGA Architects Pte Ltd
Structural Engineer:	Surbana International Consultants Pte Ltd
Quantity Surveyor:	Langdon & Seah Singapore Pte Ltd
Main Contractor:	China Construction (SP) Development Co Pte Ltd
Landscape Consultant:	Coen Design International Pte Ltd
M&E Engineer:	Surbana International Consultants Pte Ltd

- Estimated energy savings: 3,321,500.69 kWh/yr;
Estimated water savings: 7,421.276 m³/yr; RETV: 21.28 W/m²
- Optimised building envelope with the use of glass with good solar coefficient to minimize heat gain to building
- Design optimizing thermal comfort, daylight and wind, all at the same time
- Use of cool paints, eco-friendly construction materials and products
- Use of WELS-certified water fittings
- Motion sensors for common staircase and common toilets

The Verandah @ Matilda

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Housing & Development Board
Project Manager:	LBW Consultants LLP
Architect:	Housing & Development Board
Structural Engineer:	Housing & Development Board
Quantity Surveyor:	Langdon & Seah Singapore Pte Ltd
Main Contractor:	Teambuild Engineering & Construction Pte Ltd
Landscape Consultant:	Housing & Development Board
M&E Engineer:	Housing & Development Board

- Estimated energy savings: 1,144,000 kWh/yr;
Estimated water savings: 18,000 m³/yr; RETV: 20.29 W/m²
- Provision of solar photovoltaic system to generate power for common services of residential blocks
- Centralised chutes for recyclables
- Rainwater harvesting system to collect rain water for plant irrigation and common area washing
- Provision of regenerative lifts
- Use of LED light fittings for common area and LED light fittings with motion sensor at staircase half landings

Waterwoods

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLDPLUS



Client/Developer:	Coral Edge Development Pte Ltd
Architect:	Design Link Architects Pte Ltd
Structural Engineer:	P&T Consultants Pte Ltd
Quantity Surveyor:	Langdon & Seah Singapore Pte Ltd
Main Contractor:	Greatearth Corporation Pte Ltd
Landscape Consultant:	Design Link Architects Pte Ltd
M&E Engineer:	Bescon Consulting Engineers Pte Ltd

- Estimated energy savings: 751,181.6 kWh/yr; Estimated water savings: 54,440.70 m³/yr; RETV: 21.41 W/m²
- Energy efficient inverter air-conditioning system for individual residential units helps to substantially reduce the amount of energy used and increases cost savings for consumers
- Use of energy efficient lightings in common areas, such as the e-deck & landscape areas, helps to minimize energy consumption from lighting usage substantially in common areas
- Extensive use of natural landscaping throughout the site encourages greenery usage to reduce heat island effect
- Extensive use of sustainable / recycled products within the development helps to promote sustainability and stay environmentally friendly
- Use of water efficient fittings for common areas and residential units ensures minimal wastage of water and higher cost savings

Blk 161A-B, 162A-B, 163A-B, 162(MSCP), 160A-B, 165A-B, 166A-B, 166(MSCP) Punggol Central (Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner:	Housing & Development Board
Town Council:	Pasir Ris-Punggol Town Council
Managing Agent / Maintenance Contractor:	EM Services Pte Ltd
Facility Management:	EM Services Pte Ltd
Waste Contractor:	SembCorp Pte Ltd
Cleaning Contractor:	Titan Facilities Management Pte Ltd
Landscape Consultant:	BSG Landscape & Construction Pte Ltd

- Estimated energy savings: 133,832 kWh/yr
- T5 lightings for residential blocks, LED Lightings for MSCPs
- VVVF lift system and regenerative lift component
- Auto On/Off switch for high jet water spray
- Recycling bins at every block, collected every alternate day
- Solar photovoltaic system installed at rooftop of selected blocks

Blk 171A-C, 171(MSCP), 172A-C, 172(MSCP) Edgedale Plains

(Existing Residential Building)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Building Owner:	Housing & Development Board
Town Council:	Pasir Ris-Punggol Town Council
Managing Agent / Maintenance Contractor:	EM Services Pte Ltd
Facility Management:	EM Services Pte Ltd
Waste Contractor:	SembCorp Pte Ltd
Cleaning Contractor:	Titan Facilities Management Pte Ltd
Landscape Consultant:	BSG Landscape & Construction Pte Ltd

- Estimated energy savings: 82,975 kWh/yr
- T5 lightings for residential blocks, LED Lightings for MSCPs
- VVVF lift system and regenerative lift component
Auto On/Off switch for high jet water spray
- Recycling bins at every block, collected every alternate day
- Solar photovoltaic system installed at rooftop of selected blocks

Beatty Secondary 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: Diploma in Integrated Facility Management,
Temasek Polytechnic

- Estimated energy savings: 105,893.762 kWh/yr
- T5 lighting at some common areas (Foyer, staff room corridor)
- Controlled air conditioning for hall, textile room and classroom
- Recycling bins at every level
- Motion sensor for toilets
- Solar water heater

33 Olive Road

(New Landed Houses)



GREEN MARK AWARD FOR BUILDINGS

GOLD^{PLUS}



Client/Developer:	Lim Hock Chee
Architect:	Red Bean Architect
ESD/Green Consultant:	Afogreen Build Pte Ltd
Structural Engineer:	CPLim & Partners LLP
Main Contractor:	Holden Tiling & Construction Pte Ltd
Landscape Consultant:	Earthscape Concepts Pte Ltd
M&E Engineer:	PTA Consultants Pte Ltd
Lighting Designer:	Limelight Atelier Pte Ltd

- Estimated energy savings: 190,960.323 kWh/yr;
Estimated water savings: 1,688.0434 m³/yr
- Efficient Air-conditioning and lighting (LED)
- Smart building system with remote monitoring and controlling
- Efficient water fitting
- Rainwater collection system
- Reuse of reclaimed timber

GREEN MARK FOR BUILDINGS AWARDS

GOLD

Project Name

Downtown Gallery
Gain City Megastore @ Sungei Kadut
General Industrial Factory Building
Mapletree Logistics Hub – Toh Guan

P+F GDC Building
PSA Maintenance Base
Rigel Innovation Centre
Schlumberger
Sin Ming Autocity
Singapore Telecommunications –
Yio Chu Kang Exchange
158 Cecil Street
71 Robinson Road
All Saints Home (Yishun)

Category

New Non-Residential Building
New Non-Residential Building
New Non-Residential Building
New Non-Residential Building

New Non-Residential Building
New Non-Residential Building
New Non-Residential Building
New Non-Residential Building
New Non-Residential Building
New Non-Residential Building

Existing Non-Residential Building
Existing Non-Residential Building
Existing Non-Residential Building

Client/Developer/Building Owner

Alkas Realty Pte Ltd
Gain City Best-Electric Pte Ltd
Kong Hwee Iron Works & Construction Pte Ltd
HSBC Institutional Trust Services (Singapore)
Limited as Trustee of Mapletree Logistics Trust
Pepperl+Fuchs (Mfg) Pte Ltd
PSA Corporation Limited
Rigel Technology (S) Pte Ltd
Schlumberger Oilfield (S) Pte Ltd
Housing & Development Board
Singapore Telecommunications Ltd

East Coast (Cecil) Investment Pte Ltd
CR-71 Robinson Road Singapore Pte Ltd
Ministry of Health

GREEN MARK FOR BUILDINGS AWARDS

GOLD

Project Name

BNP PARIBAS Campus Asia Pacific

Bukit Timah Plaza

Campus Clubhouse

Carrier Singapore

Cassia @ Penjuru

Changi Prison Complex Main Entrance

Depot Heights Shopping Centre

Fortune Centre (MCST 1001)

Goodwood Park Hotel

Greenridge Shopping Centre

Hotel Royal Queens, Singapore

Jurong Point 1

Category

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Client/Developer/Building Owner

BNP PARIBAS

Management Corporation Strata Title Plan
No. 568

Nanyang Technological University

Carrier Singapore Pte Ltd

Marine Housing Services Pte Ltd

Singapore Prison Service

Housing & Development Board

Management Corporation Strata Title Plan
No. 1001

Goodwood Park Hotel

Housing & Development Board

Hotel Royal Queens Singapore

The Management Corporation Strata Title
Plan No. 2693

GREEN MARK FOR BUILDINGS AWARDS

GOLD

Project Name

Jurong Point 2

LASALLE College of the Arts

Lot One Shoppers' Mall

OCBC Centre

Orchard Hotel Singapore

OUE Bayfront, OUE Link, OUE Tower

Plaza Singapura

PSA Brani Terminal Building

Sembawang Shopping Centre

Singapore American School

Category

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Client/Developer/Building Owner

Subsidiary Management Corporation No. 1 -
Strata Title Plan No. 3586

LASALLE College of the Arts Limited

HSBC Institutional Trust Services (Singapore)
Pte Ltd As Trustee of CapitaLand
Mall Trust – Lot One

OCBC Square Pte Ltd

City Hotels Pte Ltd

DBS Trustee Limited as Trustee of OUE
Commercial Real Estate Investment Trust

HSBC Institutional Trust Services (Singapore)
Limited as Trustee of CapitaLand Mall Trust

PSA Corporation Limited

HSBC Institutional Trust Services (Singapore)
Limited as Trustee of CapitaLand Mall Trust

Singapore American School Limited

GREEN MARK FOR BUILDINGS AWARDS

GOLD

Project Name

Singapore Changi Airport Terminal 3

StarHub Green

Sunshine Place

Suntec City Mall

Suntec Singapore Convention & Exhibition Centre

Tata Communications Exchange

The Atrium @ Orchard

The Star

Valley Point

Woodlands North Plaza

Commonwealth Tower

Trivelis

Category

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

New Residential Building

New Residential Building

Client/Developer/Building Owner

Changi Airport Group (Singapore) Pte Ltd

Ubitech Hub Pte Ltd

Housing & Development Board

Suntec REIT

Suntec Singapore Convention & Exhibition Centre

Mapletree Industrial Trust Management Ltd

HSBC Institutional Trust Services (Singapore) Limited as Trustee of CapitaLand Mall Trust

Rock Productions Pte Ltd

River Valley Tower Pte Ltd & River Valley Shopping Centre Pte Ltd

Housing & Development Board

Wealthall Development Pte Ltd

EL Development (Clementi) Pte Ltd

GREEN MARK FOR BUILDINGS AWARDS

GOLD

Project Name

Blk 167A-D, 168A-B, 170D(BCP), 168C-D,
169A-C, 170A-C, 169(MSCP)

Blk 201A-D, 201(MSCP), 202A-B, 203A-B,
204A-D, 204(MSCP), 205A Punggol Field

Blk 293-299, 292(MSCP) Punggol Central

Blk 301A-C, 303A-C, 301(MSCP) Punggol
Central

Blk 301D, 302A-D, 303D, 302(MSCP)
Punggol Place

Nassim Woods

Admiralty Secondary School

Peicai Secondary School

West Point Hospital

Category

Existing Residential Building

Existing Residential Building

Existing Residential Building

Existing Residential Building

Existing Residential Building

Existing Residential Building

Existing School

Existing School

Healthcare Facilities

Client/Developer/Building Owner

Housing & Development Board

Housing & Development Board

Housing & Development Board

Housing & Development Board

Housing & Development Board

Nassim Woods MCST 2758

Ministry of Education

Ministry of Education

West Point Hospital Pte Ltd

GREEN MARK FOR BUILDINGS AWARDS

CERTIFIED

Project Name

21B Senoko Loop

Jalan Terusan Recreation Centre

Tuas South Recreation Centre

AMK AutoPoint

Ang Mo Kio TechLink

Orchard Towers

21 Sunset Place

SingHealth Polyclinic at Marine Parade
Central

Category

New Non-Residential Building

New Non-Residential Building

New Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

Existing Non-Residential Building

New Landed Houses

Healthcare Facilities

Client/Developer/Building Owner

Cambridge Industrial Trust

JTC Corporation

JTC Corporation

Housing & Development Board

Housing & Development Board

The Management Corporation Strata Title
No. 664

Tan Suan Hoe

SingHealth Polyclinics

BCA Green Mark

FOR OCCUPANT-CENTRIC SCHEMES

The **BCA Green Mark Award 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:

- BCA Green Mark Award for Office Interiors
- BCA Green Mark Award for Supermarket
- BCA Green Mark Award for Retail
- BCA-IDA Green Mark Award for Data Centres

BCA Green Mark FOR OFFICE INTERIORS

The **BCA Green Mark for Office Interior** is BCA's initiative to promote and recognize 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 five criteria:

1. Energy Efficiency
2. Water Efficiency
3. Sustainable Management and Operation
4. Indoor Environmental Quality
5. Other Green Features

BCA Academy, Academic Tower (Level 9 and 10 Offices)

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner:

BCA Academy

Architect:

RSP Architects Planners & Engineers (Pte) Ltd

- Use of sun pipes to brighten up the level 10 office
- Solar panels as alternative renewable source of energy for offices and building
- Dimmable task lightings for office staff
- Office cubicle system with ease of assembly and dismantling
- Hot desking for transient staff
- Internal circulation staircase between offices
- Use of environmental products – carpet, false ceiling, green screed, water proofing etc

CapitaLand Limited

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner:	CapitaLand Limited
Facility Manager Company:	CapitaLand Limited
ESD/Green Consultant:	ZEB-Technology Pte Ltd
Renovation Consultant:	Geyer Environments Pte Ltd (Interior Design) New Art Interior Pte Ltd (Contractor)
M&E Engineer:	J Roger Preston (S) Pte Ltd

- Integrating daylight and presence sensors to energy efficient LED fittings
- Efficient open office design concept to maximize daylight
- Extensive indoor greenery to create conducive office environment and enhanced indoor air quality
- Provision of water efficient water fittings and direct water dispensing facilities to reduce wastage of resources
- Use of follow me printing and FSC certified paper as part of office sustainable and responsible practice
- Enhanced fire staircase to encourage staff to walk between floors, reducing usage of lifts and promoting a healthier lifestyle
- Sustainable office practices by adopting recycling and green product procurement

DSM Singapore Industrial Pte Ltd

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner: DSM Singapore Industrial Pte Ltd
ESD/Green Consultant: Building System & Diagnostics Pte Ltd
Renovation Consultant: SCA Design Pte Ltd / Facility Link Pte Ltd
Electrical Contractor: JAG Engineering Pte Ltd
ACMV Contractor: Elite Air Conditioning & Engineering Pte Ltd

- Use of more than 90% IT Equipment that is energy efficient or rated with Energy Star Label
- Extensive use of T5 fluorescent lighting and LED lighting in order to achieve lighting power budget of 8.20 W/m², which corresponds to 45% savings compared to the code
- Extensive use of motion sensor to control corridor lighting and lighting for enclosed rooms
- Energy efficient air-conditioning system with zoning and scheduling
- Provision of indoor plants for more than 2% of the office GFA.
- Extensive use of sustainable materials that have green label for office fit-out renovation and office operation
- Implementation of digital expense claim process and secure printing setting in order to reduce paper wastage

Keppel Land & Keppel REIT

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner:

Keppel Land and Keppel REIT

- EEI of 58.5 kWh/m²/yr
- Extensive use of LED lights
- Extensive use of energy star office equipment
- Comprehensive waste recycling program including recycling of paper, toner cartridges and light tubes
- Electronic air filters for better IAQ
- SEC Eco-office certified since 2008
- Voluntary green lease

Ministry of National Development / Building and Construction Authority / Agri-Food & Veterinary Authority (Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner:	Ministry of National Development, Building and Construction Authority, Agri-Food & Veterinary Authority of Singapore
Facility Manager Company:	DTZ Debenham Tie Leung Property Management Services Pte Ltd
ESD/Green Consultant:	Building System & Diagnostics Pte Ltd
Renovation Consultant:	Sunray Woodcraft Construction Pte Ltd
Project Manager:	Lend Lease Singapore Pte Ltd
M&E Engineer:	Bescon Consulting Engineers Pte Ltd

- Achieved 53% energy savings with lighting power density of 6.92 W/m²
- Use of all 'Excellent' WELS rating in office
- 39% of existing finishing are conserved in office
- Extensive use of environmentally friendly materials for fit-out works
- Implement landlord-tenant green lease initiatives
- Energy efficient smart plug and task lighting for all office workstations
- Urban farming initiative

Tenant Service Centre @ CapitaGreen

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner:	Market Street Office Trust Pte Ltd. (in its capacity as trustee-manager of MSO Trust)
Facility Manager Company:	CapitaLand Commercial Management Pte Ltd
Renovation Consultant:	D'perception Singapore Pte Ltd

- Use of energy efficient LED and T5 light fittings for the entire office space, with manual switches for zonal controls to minimize energy wastage
- Open office concept and full height glass windows to encourage the influx of natural daylight and reduce the lighting intensity required
- Photocells to control the office perimeter lighting intensity
- More than 97% of the office equipment is Energy Star certified
- Use of SGBC and SGLS certified carpet, ceiling boards and paint for the fit-out
- Green walls and indoor plants are used to create a conducive work environment and improve the indoor air quality
- Placement of recycling bins at strategic locations within the office to encourage the separation of waste before disposal

Tenant Service Centre @ Six Battery Road

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner: HSBC Institutional Trust Services (Singapore) Limited as Trustee of CapitaLand Commercial Trust

Facility Manager Company: CapitaLand Commercial Management Pte Ltd

- 100% usage of energy efficient light fittings and LED in meeting rooms, office areas, pantry and reception counter area; Zoning of lightings circuitries with switches for rooms and office areas to minimize wastage of energy
- Usage of chilled water from the building central plant for fan coil units with individual thermostat controls at respective rooms to minimize wastage of energy and installation of non-efficient outdoor split units
- Close to 100% of the office equipment are Energy Star certified
- Use of PUB WELS rating water fittings at pantry and restrooms to minimize water wastage
- Installation of water sub-meters and constant tracking of water usage and minimize wastage
- Open office concept with limited personal offices for better collaborative spaces to encourage flexibility and maximize space usage
- Internal plants to create a more conducive office environment with enhanced indoor air quality

Twitter Asia Pacific Pte Ltd

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

PLATINUM



Tenant/Owner:	Twitter Asia Pacific Pte Ltd
Facility Manager Company:	Cushman and Wakefield
ESD/Green Consultant:	Aurecon Singapore Pte Ltd
Renovation Consultant:	SIREN Design Group
Managing Agent/ Maintenance Contractor:	Jones Lang LaSalle Property Consultants Pte Ltd
M&E Engineer:	Bescon Consulting Engineers Pte Ltd

- Strong commitment to improve energy, water and waste reduction through policies and monitoring of consumption
- Intelligent energy efficient lighting system with motion sensor, daylighting sensors integration
- Spacious office design including the nursing room, gaming room and adjustable furniture to ensure the comfort and well-being of employees
- Sustainable and environmentally friendly procurement and purchasing policies
- Use of energy efficient office equipment to save energy
- Waste reduction through recycling facilities, waste improvement plan and monitoring
- Design incorporates a greater use of greenery to create a more conducive office environment

AGC Asia Pacific Pte Ltd

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

GOLDPLUS



Tenant/Owner: AGC Asia Pacific Pte Ltd

ESD/Green Consultant: Building System & Diagnostics Pte Ltd

Renovation Consultant: De Max Design Pte Ltd

- Use of more than 90% IT Equipment that is rated with Energy Star label
- Extensive use of LED lighting to achieve lighting power budget of 8.80 W/m², which corresponds to more than 40% savings compared to the code
- Extensive use of motion sensor to control lighting in all enclosed rooms
- Extensive use of sustainable materials that have green label for office fit-out renovation and office operation
- Formation of green committee in office in order to encourage active involvement of employees in sustainability practices

Anglo American Marketing Limited Singapore Branch

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner: Anglo American Marketing Limited Singapore Branch

- Achieve EEI of 67.8 kWh/m²/yr, which is 16% better than Gold^{PLUS} rating
- Use of Lutron System for dimming lightings
- Implement green procurement and purchasing policy with extensive use of sustainable office stationery and cleaning products
- Secure printing setting to reduce printing waste
- Voluntary green lease

Bugis Junction MCST Office

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

GOLDPLUS



Tenant/Owner: Bugis Junction Management Corporation

- Extensive use of energy efficient LED lightings and motion sensors, resulting in a 53% improvement in lighting power budget from code
- Achieved EEI of 56 kWh/m²/yr (excluding air-conditioning and after-hours usage)
- Adopt comprehensive waste recycling program , which includes recycling of toner cartridges and light fittings
- Use of Energy Star office equipment
- Implement green procurement and purchasing policy with extensive use of sustainable office stationery and cleaning products

CBRE Pte. Ltd.

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

GOLDPLUS



Tenant/Owner: CBRE Pte Ltd

Renovation Consultant: MMoser Associates (S) Pte Ltd

- Extensive use of energy efficient office equipment and Singapore Green Label Scheme (SGLS) certified sustainable material
- Extensive greenery
- Good natural daylight
- Efficient lighting design by use of LED and T5, and provision of motion sensor for enclosed room
- Recycling bin provided at strategic locations

Gazprom Marketing & Trading Singapore

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner: Gazprom Marketing & Trading Singapore

- Extensive use of LED and T5 tubes, lighting toggle switches and motion sensors lead to 46% improvement in lighting power budget from code
Achieved EEI of 55 kWh/m²/yr, which is 21% better than Platinum rating
- Landscaped garden with area of 14% of total leased area
- Adopt comprehensive waste recycling program, which includes recycling of toner cartridges and light tubes
- Use of Energy Star office equipment

Harley-Davidson Asia Pacific Pte Ltd

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner: Harley-Davidson Asia Pacific Pte Ltd
ESD/Green Consultant: Building System & Diagnostics Pte Ltd
Renovation Consultant: YDL Construction Pte Ltd
Project Manager: Cushman & Wakefield
M&E Engineer: THK Engineering

- Office EEI average of 61 kWh/m²/yr
- Efficient lighting fittings and extensive motion sensors used to reduce office consumption
- Use of 97% IT Equipment that is energy efficient or rated with Energy Star label
- Lush extensive greeneries in office and roof garden
- Extensive reuse of office furniture and green fit-out products

Johnson Controls (S) Pte Ltd

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

GOLDPLUS



Tenant/Owner:	Johnson Controls (S) Pte Ltd
Facility Manager Company:	United Engineers Developments Pte Ltd
ESD/Green Consultant:	Johnson Controls (S) Pte Ltd
Renovation Consultant:	Ai Associates Pte Ltd
Main Contractor:	Crown Construction Pte Ltd
M&E Engineer:	JAG Engineering (S) Pte Ltd
ACMV Contractor:	Wong Huat Engineering Pte Ltd

- Energy efficient lighting with Lighting Power Budget of 9.32 W/m²
- Intelligent lighting controls via in-house BMS
- Motion sensors and photo sensors installed at strategic areas
- Use of eco-friendly carpet flooring, ceiling panels, partition and interior paint finishes
- Terrace garden at Level 6, accessible to all staff

Ocean Financial Centre Management Office

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

GOLDPLUS



Tenant/Owner: Keppel REIT

- Extensive use of energy efficient T5 and LED lightings with motion sensors, resulting in a 52% improvement in lighting power budget from code
- Achieved EEI of 56 kWh/m²/yr (excluding air-conditioning and after-hours usage)
- Adopt comprehensive waste recycling program, which includes recycling of toner cartridges and light fittings
- Use of Energy Star office equipment
- Implement green procurement and purchasing policy with extensive use of sustainable office stationery and cleaning products

South32 Marketing Pte Ltd

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD^{PLUS}



Tenant/Owner:	South32 Marketing Pte Ltd
Facility Manager Company:	Colliers International Consultancy & Valuation (Singapore) Pte Ltd
ESD/Green Consultant:	ZEB-Technology Pte Ltd
Renovation Consultant:	Merx Construction Management Pte Ltd
Managing Agent/ Maintenance Contractor:	Colliers International Consultancy & Valuation (Singapore) Pte Ltd
Main Contractor:	Ngai Chin Construction Pte Ltd
M&E Engineer:	HurleyPalmerFlatt Pte Ltd
MEP Contractor:	DLE M&E Pte Ltd

- Overall Lighting Power Budget of 7.89 W/m² achieved through use of energy efficient LED and T5 fluorescent light fittings with motion and timer control
- Use of Energy Star certified office equipment
- Open and flexible office layout that facilitates office mobility
- Fitted with water efficient fittings and environmentally friendly finishes
- Sustainable procurement policy with extensive use of environmentally friendly office products

GREEN MARK AWARD FOR OFFICE INTERIOR

GOLD

Project Name

Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd

BNP Paribas

BNP Paribas Wealth Management

DP Architects Pte Ltd

DTZ Facilities & Engineering (S) Ltd

Estee Lauder Cosmetics Pte Ltd

F. H. Bertling Pte Ltd

Future Electronics Inc (DIST) Pte Ltd

Grey Group Pte Ltd

Lloyds Banking Group Singapore

NCR Asia Pacific Pte Ltd

SGX Office at SGX Centre

Swiss Reinsurance Company Ltd

UBS AG

Client/Developer/Building Owner

Beca Carter Hollings & Ferner (S.E. Asia)
Pte Ltd

BNP Paribas

BNP Paribas Wealth Management

DP Architects Pte Ltd

DTZ Facilities & Engineering (S) Ltd

Estee Lauder Companies Pte Ltd

F. H. Bertling Pte Ltd

Future Electronics Inc (Distribution) Pte Ltd

Grey Group Pte Ltd

Lloyds Banking Group Singapore

NCR Asia Pacific Pte Ltd

Singapore Exchange Limited

Swiss Reinsurance Company Ltd

UBS AG

GREEN MARK AWARD FOR OFFICE INTERIOR

CERTIFIED

Project Name

Aldwych International Pte Ltd

Atos Information Technology (S) Pte Ltd

ATPI Singapore Pte Ltd

British Council (Singapore) Limited

GAC (Singapore) Pte Ltd

Gaffney Cline & Associates (Consultants) Pte Ltd

Hong Leong Properties Pte Ltd

Kerry Ingredients (S) Pte Ltd

Lufthansa Cargo Aktiengesellschaft

Lufthansa Group

Occulus Pte Ltd

Shaw Industries Asia Pte Ltd

SingEx Exhibitions Pte Ltd

Tan Tock Seng Hospital Annex 1 Office

Client/Developer/Building Owner

Aldwych International Pte Ltd

Atos Information Technology (S) Pte Ltd

ATPI Singapore Pte Ltd

British Council (Singapore) Limited

GAC (Singapore) Pte Ltd

Gaffney Cline & Associates (Consultants) Pte Ltd

Hong Leong Properties Pte Ltd

Kerry Ingredients (S) Pte Ltd

Lufthansa Cargo AG

Lufthansa German Airlines

Occulus Pte Ltd

Shaw Industries Asia Pte Ltd

SingEx Exhibitions Pte Ltd

Tan Tock Seng Hospital Pte Ltd

GREEN MARK AWARD FOR OFFICE INTERIOR

CERTIFIED

Project Name

Tan Tock Seng Hospital Annex 2 Office

Transoceanic Development (Singapore) Pte Ltd

Walton International Group (S) Pte Ltd

Client/Developer/Building Owner

Tan Tock Seng Hospital Pte Ltd

Transoceanic Development (Singapore) Pte Ltd

Walton International Group (S) Pte Ltd

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.

Within commercial buildings, tenants – including supermarket operators – have a significant impact on the total building energy consumption. 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%. The BCA Green Mark for Supermarkets 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. 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:

1. Energy Efficiency
2. Water Efficiency
3. Environmental Protection
4. Indoor Environmental Quality
5. Other Green Features

Cold Storage Sime Darby

(Supermarket)



GREEN MARK FOR SUPERMARKET

PLATINUM



Tenant/Owner: Cold Storage Singapore (1983) Pte Ltd
ESD/Green Consultant: Green & Global Consulting Pte Ltd
M&E Engineer: VSD Engineering Enterprises Pte Ltd (Refrigeration)
Prolific Pte Ltd (ACMV)
Kim Yew Electrical & Sanitary Pte Ltd (Electrical)

- Energy efficient refrigeration system fitted with variable speed drives (VSD) for compressors, electronic expansion valves (EEV) and electronically commutated (EC) fans
- More than 90% refrigerated cabinets cooled by central refrigeration plant and more than 75% refrigerated cabinets fitted with doors
- 100% use of energy efficient LED lightings in retail space and remote refrigerated display cabinets
- Energy management system to monitor major energy consumption and drive Energy Efficiency Index (EEI) target
- Energy dashboard and 'Green' check out lane to promote green awareness
- All water efficient fittings rated 'Excellent' under WELS; Private water meter installed to monitor consumption and detect leakages
- Environmentally sustainable products used in interior fit-out in order to reduce indoor air pollutants

FairPrice Warehouse Club at FairPrice Hub

(Supermarket)

GREEN MARK FOR SUPERMARKET



GOLD^{PLUS}



Client/Developer:

NTUC FairPrice Co-operative Ltd

M&E Engineer:

United Project Consultants Pte Ltd /
Viplas Engineering Pte Ltd

Refrigeration Contractor:

TempCool Engineering (S) Pte Ltd

- Energy efficient LED lighting installed to minimize lighting energy consumption; Auto zonal lighting controls to conserve energy
- Energy efficient refrigeration system using electronically commutated (EC) fans for condensers, transducers and energy savings system
- Sinks and basins are fitted with water-efficient taps to minimize water usage
- Collection of cardboards, paper, plastic and metal cans for recycling
- In-store green wobblers to aid consumers to identify green products

GREEN MARK AWARD FOR SUPERMARKET

GOLD

Project Name	Category	Client/Developer/Building Owner
Cold Storage Guthrie House	Supermarket	Cold Storage Singapore (1983) Pte Ltd
FairPrice Finest Supermarket at Amara	Supermarket	NTUC FairPrice Co-operative Ltd
FairPrice Finest Supermarket at Bedok Mall	Supermarket	NTUC FairPrice Co-operative Ltd
FairPrice Finest Supermarket at Katong V	Supermarket	NTUC FairPrice Co-operative Ltd
FairPrice Finest Supermarket at The Seletar Mall	Supermarket	NTUC FairPrice Co-operative Ltd
FairPrice Supermarket at Bukit Batok Home Team	Supermarket	NTUC FairPrice Co-operative Ltd
FairPrice Supermarket at Bukit Merah	Supermarket	NTUC FairPrice Co-operative Ltd
FairPrice Supermarket at Chinatown Point	Supermarket	NTUC FairPrice Co-operative Ltd
FairPrice Supermarket at Eastpoint Mall	Supermarket	NTUC FairPrice Co-operative Ltd
FairPrice Supermarket at Jurong East	Supermarket	NTUC FairPrice Co-operative Ltd
FairPrice Supermarket at Potong Pasir Community Centre	Supermarket	NTUC FairPrice Co-operative Ltd
FairPrice Supermarket at Sun Plaza	Supermarket	NTUC FairPrice Co-operative Ltd

GREEN MARK AWARD FOR SUPERMARKET

GOLD

Project Name

FairPrice Xtra at Changi Business Park

FairPrice Xtra Hypermarket at JEM

Category

Supermarket

Supermarket

Client/Developer/Building Owner

NTUC FairPrice Co-operative Ltd

NTUC FairPrice Co-operative Ltd

GREEN MARK AWARD FOR SUPERMARKET

CERTIFIED

Project Name

Cold Storage Aperia

FairPrice Finest Supermarket at Clementi Mall

FairPrice Finest Supermarket at Junction 8

FairPrice Finest Supermarket at Woodgrove

FairPrice Supermarket at City Square Mall

FairPrice Supermarket at PSA

Category

Supermarket

Supermarket

Supermarket

Supermarket

Supermarket

Supermarket

Client/Developer/Building Owner

Cold Storage Singapore (1983) Pte Ltd

NTUC FairPrice Co-operative Ltd

NTUC FairPrice Co-operative Ltd

NTUC FairPrice Co-operative Ltd

NTUC FairPrice Co-operative Ltd

NTUC FairPrice Co-operative 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:

1. Energy Efficiency
2. Water Efficiency
3. Sustainable Awareness and Operation
4. Indoor Environmental Quality
5. Other Green Features

DBS Westgate Branch

(Retail)



GREEN MARK AWARD FOR RETAIL

GOLD^{PLUS}



Tenant/Owner:	DBS Bank Ltd
Landlord (Retail Mall):	Westgate
Renovation Consultant:	Design Base Pte Ltd
Managing Agent/ Maintenance Contractor:	Jones Lang Lasalle Property Consultants Pte Ltd
M&E Engineer:	J Roger Preston (S) Pte Ltd

- High-efficiency lighting with 7.7 W/m² lighting power budget
- Multi-zoned lighting that enabled flexible and non-wasteful lighting operation
- Installed efficient water fittings, track and monitor branch water consumption
- Tapping into high efficiency central chilled water plan for air-conditioning
- Green branch operations guide and regular workshops to facilitate responsible operations and behaviors

Fitness First (Gravity) CapitaGreen

(Retail)



GREEN MARK AWARD FOR RETAIL

GOLD^{PLUS}



Tenant/Owner:	Fitness First Singapore Pte Ltd
Landlord (Retail Mall):	CapitaLand Commercial Limited, CapitaCommercial Trust and Mitsubishi Estate Asia Pte Ltd
Project Management:	EC Harris Singapore Pte Ltd
ESD/Green Consultant:	ZEB-Technology Pte Ltd
Renovation Consultant:	Hirsch/Bedner Associates Pte Ltd
Managing Agent/ Maintenance Contractor:	Fitness First
M&E Engineer:	Wistec Engineers & Associates Pte Ltd

- Energy Efficiency Index (EEI) of 206.43 kWh/m²/yr
- Energy efficient LED fittings are used throughout the entire gym, including pool side and landscape
- Use of Singapore Green Building products such as certified glass mirrors, laminates and tiles
- Close to 100% of the equipment used are Energy Star certified
- Air-conditioning and lightings are zoned in accordance to usage type

POSB White Sands Branch

(Retail)



GREEN MARK AWARD FOR RETAIL

GOLD^{PLUS}



Tenant/Owner:	DBS Bank Ltd
Landlord (Retail Mall):	White Sands
Renovation Consultant:	Design Base Pte Ltd
Managing Agent/ Maintenance Contractor:	Jones Lang Lasalle Property Consultants Pte Ltd
M&E Engineer:	CCA & Partners Pte Ltd

- High-efficiency lighting with 10.8 W/m² lighting power budget
- Multi-zoned lighting that enabled flexible and non-wasteful lighting operation
- Installed efficient water fittings, track and monitor branch water consumption
- Tapping into high efficiency central chilled water plan for air-conditioning
- Green branch operations guide and regular workshops to facilitate responsible operations and behaviors

GREEN MARK AWARD FOR RETAIL

GOLD

Project Name

DBS Aperia Branch

DBS ARC Branch

DBS Sports Hub Branch

DBS Treasures Parkway Parade Branch

Client/Developer/Building Owner

DBS Bank Ltd

DBS Bank Ltd

DBS Bank Ltd

DBS Bank Ltd

GREEN MARK AWARD FOR RETAIL

CERTIFIED

Project Name

DBS MBS Branch

DBS NUS Branch

DBS Raffles Place Service Centre

DBS Suntec City Branch

DBS Tai Seng Branch

DEL-Care Edu Centre Pte Ltd

POSB Canberra Branch

POSB ITE College Central Branch

POSB Jurong East Central Branch

POSB Kampong Ubi Branch

POSB Pasir Ris East Branch

POSB Potong Pasir Branch

POSB Seletar Mall Branch

POSB West Coast Branch

POSB Zhenghua Branch

Client/Developer/Building Owner

DBS Bank Ltd

DBS Bank Ltd

DBS Bank Ltd

DBS Bank Ltd

DBS Bank Ltd

DEL-Care Edu Centre Pte Ltd

DBS Bank Ltd

DBS Bank Ltd

DBS Bank Ltd

DBS Bank Ltd

DBS Bank Ltd

DBS Bank Ltd

DBS Bank Ltd

DBS Bank Ltd

DBS Bank Ltd

BCA Green Mark FOR DATA CENTRES

The **BCA-IDA Green Mark for Data Centres** was launched in 2012 as a joint collaboration between BCA and the Infocomm Development Authority of Singapore (IDA) 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 five criteria:

1. Energy Efficiency
2. Water Efficiency
3. Sustainable Construction / Operation and Management
4. Indoor Environmental Quality
5. Other Green Features

AVA JEM Data Centre

(Data Centre)



BCA-IDA GREEN MARK FOR DATA CENTRES

PLATINUM



Tenant/Owner:	Agri-Food & Veterinary Authority of Singapore
Facility Manager Company:	DTZ Debenham Tie Leung Property Management Services Pte Ltd
ESD/Green Consultant:	Kaer Pte Ltd
Main Contractor:	Schneider Electric IT Singapore Pte Ltd
Managing Agent/ Maintenance Contractor:	Schneider Electric IT Singapore Pte Ltd
M&E Engineer:	Bescon Consulting Engineers Pte Ltd

- In-row cooling for DC server racks
- Scalable modular high efficiency UPS system
- Blanking panels for efficient air distribution
- Power capping and software virtualization for IT equipment
- Over 90% of New IT equipment are Energy Star certified

BCA JEM Data Centre

(Data Centre)



BCA-IDA GREEN MARK FOR DATA CENTRES

PLATINUM



Tenant/Owner:	Building and Construction Authority
Facility Manager Company:	DTZ Debenham Tie Leung Property Management Services Pte Ltd
ESD/Green Consultant:	Kaer Pte Ltd
Main Contractor:	Schneider Electric IT Singapore Pte Ltd
Managing Agent/ Maintenance Contractor:	Schneider Electric IT Singapore Pte Ltd
M&E Engineer:	Bescon Consulting Engineers Pte Ltd

- In-row cooling for DC server racks
- Scalable modular high efficiency UPS system
- Blanking panels for efficient air distribution
- Power capping and software virtualization for IT equipment
- Over 90% of New IT equipment are Energy Star certified

Digital Realty – Loyang Way – SIN11

(Data Centre)



BCA-IDA GREEN MARK FOR DATA CENTRES

PLATINUM



Tenant/Owner:	Digital Singapore 1 Pte Ltd
Project Manager:	CBRE Pte Ltd
Architect:	Space Plans Pte Ltd and Greenbox
ESD/Green Consultant:	Afogreen Build Pte Ltd
Structural Engineer:	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd and TW Asia Consultants Pte Ltd
Quantity Surveyor:	ARCADIS Pte Ltd
Main Contractor:	RCS Engineering Pte Ltd
M&E Engineer:	DSCO Group Pte Ltd

- Chiller plant system with overall efficiency of 0.55kW/RT
- High chilled water supply temperatures maintained
- Desiccant coil DX systems; Munters PAUs
- Auto-cleaning system for condenser tube
- Regenerative lifts
- CO₂ VAV-valve controller for all occupied areas
- Designed with modular sizes for all equipment

STT Defu

(Data Centre)



BCA-IDA GREEN MARK FOR DATA CENTRES

PLATINUM



Building Owner:	STT Singapore DC Pte Ltd
Managing Agent/ Maintenance Contractor:	Acme Associates Pte Ltd
DC Infrastructure Consultant:	HurleyPalmerFlatt
Architect:	BK Consulting Engineers Pte Ltd
ESD/Green Consultant:	Building System & Diagnostics Pte Ltd
Main Contractor:	Acme Associates Pte Ltd
M&E Engineer:	Plan One Engineering Services

- Design PUE of 1.4 at 100% IT load
- Energy efficient chilled water plant is designed and installed with an average system efficiency of 0.48kW/RT
- All internal areas are fitted with energy efficient LED lightings. Occupancy sensors are installed to control the data centre halls, toilets and staircases lightings when they are not in used
- Hot and Cold aisle containments are installed for data centre halls to improve the air management by isolating the hot and cold airstreams
- Diesel Rotary UPS (DRUPS) system for Data Centre Directional perforated panels are installed to direct the cold supply air to the rack inlet areas
- Management commitment for SS 564 certification

STT MediaHub

(Data Centre)



BCA-IDA GREEN MARK FOR DATA CENTRES

PLATINUM



Tenant/Owner:	Shine Systems Assets Pte Ltd
Architect:	Surbana Jurong Pte Ltd
ESD/Green Consultant:	Surbana Jurong Pte Ltd
DC Infrastructure Consultant:	Surbana Jurong Pte Ltd
Main Contractor:	Sim Lian Construction Co. Pte Ltd
M&E Engineer:	DSCO Group Pte Ltd

- Room within a room concept with perforated aluminum 2nd Skin around the building maximizes the ETTV values of the building
- Variable speed drive controlled chilled water plant with an efficiency of 0.561 kW/RT, achieving a building PUE of 1.50
- Higher chilled water supply temperature set point than industrial average
- Adaptive wet bulb set point controls for the cooling towers
- Electronically commutated fans for CRAC units
- Motion sensor controlled lighting in all M&E, Data Centre and circulation spaces
- Thermal buffer tank

1-NET North Data Centre

(Data Centre)



BCA-IDA GREEN MARK FOR DATA CENTRES

GOLD^{PLUS}



Tenant/Owner:	1-Net Singapore Pte Ltd / DataCentre One Pte Ltd
Architect:	Space Plans Pte Ltd
ESD/Green Consultant:	DSCO Group Pte Ltd
Structural Engineer:	Beca Carter Hollings & Ferner (S.E. Asia) Pte Ltd
Consultant/Contractor:	DSCO Group Pte Ltd / Shimizu Corporation
M&E Engineer:	Wah Loon Engineering Pte Ltd

- 100% alternative water source usage on cooling system, 7 COC and WELS excellent fittings
- Chiller plant system with efficiency of 0.566 kW/RT; Permanent measurement and verification instrumentation for the monitoring of chilled water plant efficiency are available
- Design PUE < 1.5
- DRUPS system to provide continuous cooling
- Modularity design of M&E services to minimize system loss



BCA Green Mark FOR BEYOND BUILDINGS

The **BCA Green Mark Award 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 an all-rounded sustainable and high quality built environment.

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

- BCA-NParks Green Mark Award for New / Existing Parks

BCA - NParks Green Mark Award FOR PARKS

The **BCA–NParks Green Mark Award for New Parks**, launched in 2010, is a joint initiative by the Building and 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:

1. Material Resources
2. Water Efficiency
3. Energy Efficiency
4. Greenery and Urban Ecology
5. Design for Ease of Maintenance and Accessibility
6. Parks Development and Construction Management
7. Other Green Initiatives

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

Coney Island Park

(New Parks)



GREEN MARK AWARD FOR PARKS

PLATINUM



Owner:	National Parks Board
Park Manager:	National Parks Board
Green Mark Team:	EnviroSpace Consultants Pte Ltd
Term Contractor:	National Parks Board
Landscape Consultant:	EnviroSpace Consultants Pte Ltd

- Currently there is no potable water line and electricity line into the island; Rainwater is harvested and solar energy is harnessed for toilet usage
- Extensive use of recycled materials on site – e.g. all signages, seats, benches, bike racks and boardwalk were made from casuarina timber from the trees that had to be felled for the construction of new paths and structures
- The design takes into consideration many maintenance issues such as vehicle access for maintenance of the vegetation in the entire park
- During the construction stage, many left over construction materials were reused (e.g. sand fill, timber, boulders, stones etc.)
- During construction, there was minimal intervention to prevent disturbance to the existing flora and fauna; No heavy machinery was allowed for the construction of the boardwalk so most works were carried out manually (e.g. cutting the planks to fit etc.)
- There are ongoing monitoring programs and newly proposed enrichment programs to enhance the two main habitats – mangrove & coastal forests
- Access paths made from previous concrete were created near each entrance to the island to allow wheelchair users to take a walk in the park

Kranji Marshes

(New Parks)



GREEN MARK AWARD FOR PARKS

PLATINUM



Master Planner & Developer:	Urban Redevelopment Authority
Owner:	National Parks Board
Landscape Architects:	Stephen Caffyn Landscape Design
Architects:	Metaphor Design + Architecture
Structural Engineers:	JS Tan & Associates
Environmental Engineers:	DHI Water & Environment (S) Pte Ltd
Quantity Surveyor:	CSN Consultants Pte Ltd
M&E Engineer:	Tham and Wong LLP
Main Contractor:	Landscape Engineering Pte Ltd

- Habitat requirements for wide variety of bird species researched and incorporated into the design
- Visitor facilities and activity areas are located away from sensitive marsh areas
- Set-back zones for visitor structures and trails to provide safe undisturbed, breeding/foraging areas
- Raptor Towers, Hides and Blinds all pre-fabricated off site and brought in and assembled to create minimum disturbance to wildlife
- Low impact visitor facilities – designed as energy and water efficient with natural light and ventilation. The main facilities have green roofs for habitat value and low environmental and visual impact
- Native plants selected and pre-grown according to habitat and ecological value
- Maintenance access, silt ponds, slipways and continuous access channels created to enable ease of future management and maintenance

Senja Parc View & N6 Neighbourhood Park

(New Parks)

GREEN MARK AWARD FOR PARKS



GOLD^{PLUS}



Owner:	Housing & Development Board
Park Manager:	Holland-Bukit Panjang Town Council
Architect:	3PA International
Structural Engineer:	DE Consultants (S) Pte Ltd
Quantity Surveyor:	WT Partnership (S) Pte Ltd
Main Contractor:	Vigcon Construction Pte Ltd
Landscape Consultant:	Evershine Projects Pte Ltd / Tulin Designs Pte Ltd
M&E Engineer:	Alpha Consulting Engineers Pte Ltd
BIA Consultant:	Strix Wildlife Consultancy
ISA Certified Arborist:	Urban Forester

- All garden taps for landscape irrigation are rated 3 ticks under the MWELS rating; sub-metering are provided for the park and outdoor areas to monitor water consumption
- The bio-retention rain garden is capable of treating more than 15% of storm water in the development before discharge; the development was awarded the ABC Waters Certification in 2011, with the implementation of ABC Waters features
- More than 70% of the existing trees in the neighbourhood park have been conserved and enhanced with new infill plants and trees to achieve an overall green plot ratio of more than 6.0
- The park is linked seamlessly by a network of covered linkways to the adjacent developments and bus-stop to facilitate use of public transport and connectivity
- To enhance the existing Greenery and Urban Ecology, a comprehensive Biodiversity Impact Assessment was commissioned prior to the start of the construction to document the biodiversity baseline, gauge the impact of the development and provide recommendations to mitigate potential impact to the environment

GREEN MARK AWARD FOR PARKS

GOLD

Project Name

Yishun Nature Park

Category

New Parks

Client/Developer/Building Owner

Housing & Development Board

GREEN MARK AWARD FOR PARKS

CERTIFIED

Project Name

One-North Parks (Parcel 3, 4, 6 & 7)

Category

New Parks

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 world wide. 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 recognized 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 customized 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 environmental impact



Exchange Tower, Thailand

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD^{PLUS}



Building Owner: City Developments Limited / Exchange Tower Limited
Facility Management: City Developments Limited
ESCO: CBM Solutions Pte Ltd

- Estimated energy savings: 1,230,412 kWh/yr
- Improved chiller plant system efficiency from 1.21 kW/RT to 0.74 kW/RT with M&V system and VSD for all pumps and cooling towers
- Motion detection for lightings at common toilets
- CO and CO₂ monitoring at basement car park and AHU rooms respectively
- Auto-tube cleaning (ball type) and refrigerant leak detection system
- Energy efficient LED Lightings at lift lobbies, corridors, toilets, pantry, common areas and car park to optimize energy consumption

Ferrenghi Residence, Malaysia

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLDPLUS



Client/Developer:	Uptrend Housing Development Sdn Bhd
Architect:	Atelier ADT Akitek (Asia) Sdn Bhd
ESD/Green Consultant:	Building System and Diagnostics Pte Ltd
Structural Engineer:	WEA Engineers & Associates Sdn Bhd
Quantity Surveyor:	Unitech QS Consultancy Sdn Bhd
Main Contractor:	Yoong Tsen Construction Sdn. Bhd. / TNH Construction Sdn. Bhd.
Landscape Consultant:	Praxcis Design Sdn Bhd
M&E Engineer:	I Consultancy

- Estimated energy savings: 3,135,241.29 kWh/yr;
Estimated water savings: 29,002.316 m³/yr; RETV: 18.80 W/m²
- All dwelling units with good true cross natural ventilation and the blocks enjoy optimal orientation to reduce absorption of excessive solar radiation
- Employed energy efficient luminaires such as LED, T5 coupled with high frequency ballast and 2 in 1 motion cum photocell sensors
- Use of low VOC paints for total internal walls and environmentally friendly adhesives of applicable areas
- Provision of water efficient fittings and washing machine
- Provision of ultra-energy efficient air conditioning system, refrigerator and clothes drying facilities

Ken Rimba Jimbaran, Malaysia

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD^{PLUS}



Client/Developer:	Ken Rimba Sdn Bhd
Project Manager:	Ken Rimba Sdn Bhd
Architect:	K. H. Tan Architects
ESD/Green Consultant:	BSD Consultancy Sdn Bhd
Structural Engineer:	JPS Consulting Engineers Sdn Bhd
Quantity Surveyor:	Ken Grouting Sdn Bhd
Main Contractor:	Ken Grouting Sdn Bhd
Landscape Consultant:	Landarc Associates
M&E Engineer:	LMC Consult Sdn Bhd

- Estimated energy savings: 9.97 kWh/yr; Estimated water savings: 20,579.91 m³/yr
- Solar water heater for every unit in the development
- Clothes drying facilities
- Rain water harvesting system for every unit in the development
- Bicycle lots and bicycle provision
- Breathable roof

Anggerek Desa Technology Park, Brunei

(New Non-Residential Building)

GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)



GOLD



Client/Developer:	The Brunei Economic Development Board (BEDB)
Project Manager:	Juruukur Bahan dan Pengurusan Utamacon
Architect:	P.A.Y Architects
ESD/Green Consultant:	ZEB-Technology Pte Ltd
Structural Engineer:	Seri Bumi Consultant
Quantity Surveyor:	Juruukur Bahan dan Pengurusan Utamacon
Main Contractor:	Haji Adinin and Sons (B) Sdn Bhd
Landscape Consultant:	P.A.Y Architects
M&E Engineer:	Regional Consultants

- Estimated energy savings: 343,750.78 kWh/yr;
Estimated water savings: 3,878.52 m³/yr; ETTV: 35.23 W/m²
- Extensive passive design features such as shading devices, naturally ventilated staircases, carparks, etc
- All regenerative lifts
- Photo sensors for the peripheral office spaces at all levels

Aspen House, Malaysia

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Building Owner: Aspen Vision Development Sdn Bhd

ESD/Green Consultant: BSD Consultancy Sdn Bhd

IAQ Auditor: AMCEN Lab Sdn Bhd

- Estimated energy savings: 76,220 kWh/yr
- Heritage building restoration project that uses more than 90% LED lighting for whole building
- High efficiency VRF multi split air-conditioning units, and inverter type unitary air conditioning units
- Lush green courtyard design, with 477 m² vertical greens

East Coast Mall, Malaysia

(Existing Non-Residential Building)



GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Building Owner: Am Trustee Berhad as Trustee of CapitaMalls Malaysia Trust – East Coast Mall

Facility Management: CapitaMalls Malaysia REIT Management Sdn Bhd

ESD/Green Consultant: CapitaMalls Malaysia REIT Management Sdn Bhd

Energy Audit Consultant: LJ Energy Sdn Bhd

- Estimated energy savings: 52,271 kWh/yr;
Estimated water savings: 18,715.32 m³/yr
- Carbon activated filters and ultra violet bacteria eradicating lights for exhaust system
- Rainwater harvesting system
- Grey Recycling System and Refuse recycling program

Hill Crest Villa (Phase 1-1), China

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer:	Keppel Land China Limited
Project Manager:	Chengdu Hilltop Development Co. Ltd
Architect:	China Southwest Architectural Design & Research Institute Co., Ltd
ESD/Green Consultant:	Building System & Diagnostics Pte Ltd
Structural Engineer:	China Southwest Architectural Design & Research Institute Co., Ltd
Quantity Surveyor:	WT Partnership
Main Contractor:	Chengdu Third Architectural Engineering Company
Landscape Consultant:	Site Concepts International Limited
M&E Engineer:	China Southwest Architectural Design & Research Institute Co., Ltd

- Estimated energy savings: 115,011 kWh/yr;
Estimated water savings: 2,183 m³/yr
- Energy efficient air-conditioner, energy efficient refrigerator and radiant floor heating system installed in the clubhouse
- Water efficient water fittings installed in the clubhouse and show units, drip irrigation for vertical greenery
- Extensive use of sustainable Green Product (with at least 30% recycled content and locally certified)

Serenity Cove Phase 3, China

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer: Tianjin Fushi Property Development Co., Ltd
Architect: ARTL Co. Ltd
ESD/Green Consultant: AECOM
Structural Engineer: FANTBUIL Associates Ltd.
Quantity Surveyor: Davis Langdon & Seah Consultancy Co., Ltd
Main Contractor: Nantong 3rd Construction Co., Ltd
Landscape Consultant: Boya Municipal Landscape Design Co., Ltd
M&E Engineer: FANTBUIL Associates Ltd.

- Estimated energy savings: 988.5 kWh/yr;
Estimated water savings: 38,426.4 m³/yr
- First class energy efficiency VRV air-conditioning used for multi-storey apartment
- Ground source heat pump used for all the bungalows and semi-D
- Solar photovoltaic panels of 60.8 kWp

Waterfront Residence, Nantong, China

(New Residential Building)



GREEN MARK AWARD FOR BUILDINGS (OVERSEAS)

GOLD



Client/Developer:	Keppel Lakefront (Nantong) Property Development Co., Ltd
Architect:	P & T Consultants Pte Ltd
ESD/Green Consultant:	Earth-In-Mind Private Limited
Structural Engineer:	Shanghai Dushi Architectural Design Institute
Quantity Surveyor:	Davis Langdon KPK (Hong Kong) Limited
Main Contractor:	Longxin Construction Group Co., Ltd
Landscape Consultant:	Site Concepts International Ltd
M&E Engineer:	Shanghai Dushi Architectural Design Institute
Interior Designer:	MCG Calibre Ltd

- Estimated energy savings: 95,475 kWh/yr;
Estimated water savings: 839 m³/yr
- Usage of CO sensors in basement car parks
- Energy efficient hot water system consists of gas water heater, plate-type heat exchanger, radiant floor heating used in basement clubhouse
Provision of green corner at sales gallery, as well as electric bike parking lots and charging stations

Sino-Singapore Tianjin Eco-City Investment and Development Co Ltd, China

(Office Interior)



GREEN MARK AWARD FOR OFFICE INTERIOR (OVERSEAS)

GOLD



Tenant/Owner: Sino-Singapore Tianjin Eco-City investment and Development Co Ltd

ESD/Green Consultant: Building System & Diagnostics Pte Ltd

- Efficient use of T5 lighting and LED to achieve more than 40% energy savings
- Efficient use of office equipments with 'Energy Star' label
- Extensive use of water efficient fittings with 'Water Efficiency Labeling Scheme (WELS)' label

GREEN MARK FOR OVERSEAS AWARDS

CERTIFIED

Project Name

Ascott Bonifacio Global City, Philippines

Atria Shopping Gallery, Malaysia

Bay Walk Mall @ Green Bay Pluit,
Indonesia

CapitaMall Jinniu Phase 2, China

CapitaMall Xuefu, Harbin, China

Citadines Salcedo Makati, Philippines

International School Brunei

Ascott Jakarta, Indonesia

8 Park Avenue (Blocks 7 to 10), China

Dolce Vita (C1~C8), China

Sunway Velocity Phase 1A, Malaysia

Kigamboni Housing Estate, Tanzania

Category

New Non-Residential Building

New Non-Residential Building

New Non-Residential Building

New Non-Residential Building

New Non-Residential Building

New Non-Residential Building

New Non-Residential Building

Existing Non-Residential Building

New Residential Building

New Residential Building

New Residential Building

New Landed Houses

Client/Developer/Building Owner

WJGlobal, Inc.

OSK Property Holdings Berhad

PT. Kencana Unggul Sukses

CapitaLand Mall Asia Limited

CapitaLand Mall Asia

Valero Prime Land Realty Development
Corporation

International School Brunei

PT Bumi Perkasa Andhika

Shanghai Pasir Panjang Land Co., Ltd
(Keppel Land China)

CapitaLand China

Sunway City Berhad

National Housing Corporation