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FACTSHEET

BCA GREEN MARK PLATINUM BUILDINGS (SINGAPORE)

Jem Retail Mall	
Developer	Lend Lease
Green award	BCA Green Mark Platinum Award (Awarded 2012)
Overview	<p>Located at the heart of the Jurong Gateway precinct, Jem is the first mixed use development in Singapore to achieve BCA's Green Mark Platinum Version 4.0 award, the highest certification for sustainable buildings.</p> <p>Jem is expected to cut down on energy consumption the equivalent to that generated by about 2,400 public housing apartments annually. Sustainable features include comprehensive building modelling for differing climate conditions throughout the year; a highly efficient air-conditioning system; regenerative lifts; the extensive use of LED lighting; passive design features such as extensive greenery with 112 percent green replacement; a cascading sky park spread across three levels of the building; and large floor plate design for the commercial tower.</p> <p>In addition to Lend Lease's efforts on managing the mall sustainably, all retailers at Jem operate under Green Lease which encourages retailers to make use of highly efficient lighting systems and adopt recycling strategies, hence reducing overall tenancy waste.</p>
Green features	<ul style="list-style-type: none"> ▪ Extensive greenery ▪ Over 100 percent green replacement ▪ Envelope Thermal Transfer Value (ETTV) of 38.96 W/m² ▪ High efficiency multi-tiered chilled water plant ▪ High efficiency air-conditioning system with innovative inductive air diffusers and demand controls ▪ Innovative two-stage fresh air treatment and infiltration controls ▪ Intelligent lighting controls ▪ Re-generative lifts ▪ Fibre optics for escalator and traveller safety ▪ Rainwater harvesting system ▪ Condensate water collection ▪ Green Lease
Energy efficiency savings	Estimated energy savings of 13,016,670 kWh/year; estimated water savings of 265,160 m ³ /year

PARKROYAL on Pickering	
Developer	Pan Pacific Hotels Group Limited
Green award	<ul style="list-style-type: none"> ▪ BCA Green Mark Platinum Award (Awarded 2012) ▪ Solar Pioneer Award (Awarded 2011)
Overview	<p>Located in Chinatown at the gateway to Singapore's Central Business District, PARKROYAL on Pickering adopts a hotel-in-a-garden concept and incorporates energy-saving features throughout the property. Sky gardens and lush landscaping constitute more than 200 percent of the total land area. Green Lease practices are implemented within the hotel and extend to its tenants as well.</p> <p>For its sustainable design, the hotel has been awarded the BCA Green Mark Platinum award, the highest rating for green buildings in Singapore. It is also the recipient of the Solar Pioneer Award as one of the first in the hospitality sector to introduce solar-powered sky-gardens with solar cells that power landscape lighting.</p>
Green features	<ul style="list-style-type: none"> ▪ High efficiency air-conditioning system ▪ Extensive/vertical greenery ▪ Rainwater harvesting and use of NEWater ▪ Extensive use of natural light ▪ Use of natural ventilation in spaces such as external hotel corridors ▪ Use of energy efficient LED and T5 type fluorescent lamps ▪ Renewable energy ▪ Dual refuse chutes separating recyclable from non-recyclable waste ▪ Water efficient fittings ▪ Automatic sensors to regulate energy and water usage ▪ Green Leases for both office tenants and hotel operators
Energy efficiency savings	Estimated cost savings of 3,117,212 kWh/year; estimated water savings of 6,900 m ³ /year; Envelope Thermal Transfer Value (ETTV) of 39.49 W/m ²

W Singapore – Sentosa Cove & Quayside Isle		
Developer	City Developments Limited (CDL)	
Green award	BCA Green Mark Platinum Award (Awarded 2010)	
Overview	<p>W Singapore – Sentosa Cove is the first new hotel in Singapore to attain BCA's Green Mark Platinum status, and together with The Residences at W Singapore – Sentosa Cove, Quayside Isle, and The Oceanfront @ Sentosa – are the only BCA Green Mark Platinum developments on Sentosa Cove.</p> <p>W Singapore – Sentosa Cove Around 3.5 percent of the total construction cost of W Singapore – Sentosa Cove was invested on the development of the hotel's green features. The hotel incorporates both active and passive design elements for energy and water efficiency. Daylighting of corridors, thick external walls for temperature control, naturally ventilated and sky-lit poolside bathrooms, and sustainably sourced materials (such as the timber used for the pool deck) also count among the hotel's sustainable hardware features. The sustainability-oriented operational features include recycling, the provision of rental bicycles, and a low-impact approach to hospitality.</p> <p>Quayside Isle The Quayside Isle is the only specialty F&B/retail development located within the exclusive gated community at Sentosa Cove. Approximately 4.7 percent of its total construction cost was invested on the development's numerous green innovations. It is also CDL's second zero-carbon development where CDL successfully offset the carbon generated during the construction phase.</p>	
Green features	W Singapore – Sentosa Cove	Quayside Isle
	<ul style="list-style-type: none"> ▪ High efficiency air-conditioning system ▪ Daylight design and orientation for passive design ▪ Extensive use of LED lighting ▪ Water efficient fittings ▪ Rainwater harvesting system to collect rainwater for irrigation and non-potable use ▪ Condensate water collection ▪ Large greenery landscape and roof top greenery 	<ul style="list-style-type: none"> ▪ Extensive use of LED lighting ▪ Water efficient fittings ▪ Rainwater harvesting system to collect rainwater for irrigation and non-potable use ▪ Extensive use of Solar Photovoltaic Panels as part of the architectural roof design ▪ Installation of heat recovery system to provide hot water to large restaurant kitchens ▪ Multiple dual-chute pneumatic waste collection points (one in each F&B unit)
Energy efficiency savings	Expected energy savings of over 3,300,000 kWh/year, amounting to about S\$930,000; annual water savings of 22,200 m ³ amounting to about S\$26,000.	Expected energy savings of almost 1,400,000 kWh/year, amounting to over S\$270,000; annual water savings of almost 11,000 m ³ .

Treetops Executive Residences	
Owner	Project by British and Malayan Trustees Ltd (Trustee of Sallim Talib Family Settlement); managed by DTZ Hospitality Management Services
Green award	BCA Green Mark Platinum Award (Awarded 2012)
Overview	<p>Premier serviced apartment Treetops Executive Residences has undergone green retrofitting to enhance the living experience of guests through eco-friendly initiatives, at the same time achieving 50 percent in energy savings and winning the BCA Green Mark Platinum Award.</p> <p>It has installed a tri-generation plant, the first to be installed in a serviced residence in Singapore, to supply power to the building and produce chilled water for the air-conditioning system and hot water for domestic use.</p> <p>Other retrofits include the installation of a pre-cooled air handling unit, kitchen fan optimisation, use of an ultraviolet and water membrane filter system for water efficiency, the use of energy saving light bulbs as well as use of natural light.</p>
Green features	<ul style="list-style-type: none"> ▪ Daylight design ▪ Tri-generation plant ▪ Wind turbine for cooling tower ▪ Optimised kitchen ventilation and fresh air optimisation ▪ Electronic air filters to improve indoor air quality ▪ Replacement of light fittings with energy saving light bulbs ▪ Extensive greenery ▪ Long-term energy performance contract with energy consultant to monitor energy usage and system efficiency
Energy efficiency savings	Total energy savings of 2,752,981 kWh (for both Phase I and Phase II energy conservation, which translates to approximately 50 percent reduction in energy consumption.

JCube	
Owner	CapitaMall Trust
Green award	BCA Green Mark Platinum Award (Awarded 2011)
Overview	<p>Located in the heart of the up-and-coming Jurong Lake District, JCube is an ultra-hip mall that houses Singapore's only Olympic-size ice rink and first IMAX cinema in the suburbs. The eco-friendly mall is fitted with green features such as a grey-water recycling system for its ice rink and a rainwater harvesting tank. Waste heat from the ice rink chiller is recycled to heat the water at the rink's shower rooms and the ice re-surfacing machines.</p> <p>In addition, the mall uses natural daylight and solar energy to further reduce its reliance on grid power. The rooftop terrace-cum-event space located on Level 5 features a landscaped garden to add greenery to the mall. To maximise the mall's green performance, JCube implements a Green Lease model to engage tenants in sustainable practices and operations.</p>
Green features	<ul style="list-style-type: none"> ▪ Air-conditioning system with an efficiency of 0.66 kW/ton ▪ Permanent measurement and verification instrumentation for the monitoring of chilled-water plant efficiency ▪ Use of energy efficient lighting ▪ Photovoltaic panels on rooftop with system capacity of about 50 kWp to harvest solar energy for production of electricity ▪ Rainwater harvesting system for landscape irrigation ▪ Recycling of waste heat and AHU condensates ▪ Green demolition ▪ Green Leases for tenants
Energy efficiency savings	Estimated energy savings of 8,793,984 kWh/year; estimated water savings of 3,419 m ³ /year; Envelope Thermal Transfer Value (ETTV) of 38.06W/m ²

Solaris	
Owner	SB (Solaire) Investment Pte Ltd
Green award	BCA Green Mark Platinum Award (Awarded 2010)
Overview	<p>Located in the research and business park in central Singapore's one-north community, Solaris is a two-tower building designed to house MNCs from the info-communications, media, science and engineering R&D industries.</p> <p>A vast business space complex that is fully sustainable, Solaris incorporates a range of innovative features, including a continuous spiral landscaped terrace that winds its way up to roof gardens, a green corridor with central courtyards, and a unique solar shaft that helps create a daylight, naturally ventilated atrium. The 15-storey multi-tenanted facility is also fitted with sun shading devices to reduce solar heat gain and rainwater harvesters to minimise water consumption.</p>
Green features	<ul style="list-style-type: none"> ▪ Actuated skylight louvres for natural stack effect ventilation during hot days ▪ Solar shaft to enhance penetration of natural daylight to the building ▪ Eco-cell and rainwater harvesting via a network of siphonic drainage systems ▪ Extensive roof gardens and continuous vertical landscaping acts as a thermal buffer ▪ Climatic-responsive facade system maximizes natural daylighting and ▪ Network of light sensors installed along the perimeter of all tenancy units reduce energy use by automatically turning off lights when adequate daylighting is available ▪ Vegetation which exceeds the area of the building's original site, replacing the site's original green footprint by 113 percent
Energy efficiency savings	The building's overall energy consumption represents a reduction of over 36 percent compared to local precedents; low overall External Thermal Transfer Value (ETTV) of less than 40 W/m ²

JTC CleanTech One - Central Green Core	
Owner	JTC Corporation
Green award	BCA Green Mark Platinum Award (New Parks) (Awarded 2011)
Overview	<p>Developed as the green lung of JTC's CleanTech Park (CTP), Singapore's first eco-business park, the Central Green Core harmonises future urban development with the existing green elements within the site. Its design enhances the existing biodiversity with carefully selected plant species to recreate the natural habitats lost during development. Wildlife crossings are designed to connect the Central Green Core to the larger green network of secondary rainforest to promote the biodiversity within the business park.</p> <p>CTP's Central Green Core is the first development in Singapore to receive the BCA-Npark Green Mark for New Parks (Platinum). Besides using energy efficient fittings such as LED lightings and energy monitoring systems, the Central Green Core houses a stormwater management system.</p> <p>When CTP is fully developed, over 64 percent of the estate stormwater will be channelled into the Central Green Core where it will be cleansed via bioswales and cleansing biotopes. The cleansed water is retained within a central freshwater wetland for irrigation and other non-potable water uses within the estate.</p> <p>As part of JTC's sustainability efforts, the Central Green Core was also developed using recycled materials. For example, rocks excavated from JTC's Jurong Rock Caverns were processed and used as building materials for the bioswales as well as for architectural finishes within the Central Green Core.</p>
Green features	<ul style="list-style-type: none"> ▪ Provision of wildlife corridor which allows animals to inhabit and travel between the site and the larger surrounding green environment ▪ Re-creation of freshwater swamp forest to restore the site's historical eco-habitat as well as to conserve the site's unique ecological values ▪ Creation of swales for conveyance and slowing down of stormwater on site ▪ Cleansing biotopes for on-site treatment of stormwater to be recycled to flush toilets and irrigate green roof ▪ Retention ponds for permanent/temporary retention of stormwater to slow down the rainwater flow in an event of heavy rainfall ▪ Use of energy efficient LED outdoor lights. ▪ Design of sheltered structures with the integration of passive energy systems ▪ Use of environmentally friendly products and recycled materials

BCA GREEN MARK BUILDINGS (OVERSEAS)

CHINA

Shimao Eco-Exhibition Centre	
Developer	Tianjin Eco-city Shimao New Century Investment and Development Co. Ltd.
Green award	BCA Green Mark Gold – Overseas (Awarded 2011)
Overview	With a goal to save and use energy more effectively and reduce carbon emission, the Sino-Singapore Tianjin Eco-City Shimao Eco-Exhibition Centre harnesses renewable energy while adopting energy conservation and environmental protection technology measures throughout the 2-storey centre.
Green features	<ul style="list-style-type: none"> ▪ Use of Low Emissivity (Low-E) double glazed with argon gas ▪ Provision of ground source heat pump for cooling and heating ▪ Extensive use of energy efficiency features such as, light pipes (to light up the corridors of the first and second floor), radiant floor heating, solar water heaters, solar bollard lights, fibre optic lighting, solar-wind powered street lights ▪ Provision of renewable energy, solar photovoltaic panel, to replace 7.6 percent of the total building energy consumption
Energy efficiency savings	Estimated energy savings of 294,000 kWh /year; estimated water savings of 703 m ³ /year.

Lakeside Ville (Phase III)	
Developer	Habitat Properties (Shanghai) Ltd
Green award	BCA Green Mark Gold – Overseas (Awarded 2011)
Overview	<p>Lakeside Ville is an upmarket residential development project located in Qingpu District, Shanghai. The development was recognised as one of the Top 10 best designed villas in Shanghai and was awarded the National Overall Gold Medal in the bungalow category by the Ministry of Construction, China. In 2008, it became the first residential development in China to be awarded the BCA Green Mark Gold Award.</p> <p>Lakeside Ville Phase III comprises 148 units of quality condominiums, 24 units of 3-storey townhouses and 8 units of commercial units. Phase III development was completed in June 2010. In 2011, Lakeside Ville Phase III was awarded the BCA Green Mark Gold Award.</p>
Green features	<ul style="list-style-type: none"> ▪ Energy efficient air-conditioners and refrigerators ▪ Design for effective natural ventilation and daylighting ▪ Energy efficient artificial lightings in common areas with sound and motion sensor control ▪ Gas heaters for all home units ▪ Under-floor heating system ▪ Ductless mechanical ventilation system ▪ Use of certified wood and provision of recycling bins

INDONESIA

BSD Green Office Park	
Developer	PT. Bumi Serpong Damai
Green award	BCA Green Mark Gold for Districts – Overseas (Awarded 2011)
Overview	Located in the heart of BSD City, an ambitious urban planning scheme in Indonesia combining housing, business and commercial properties, BSD Green Office Park is designed as a green district. It combines panoramic green landscaping, breathtaking views of the lakeside, state-of-the-art facilities and facilities, and environmentally sustainable features to provide the environmental qualities for a healthy and productive lifestyle.
Green features	<ul style="list-style-type: none"> ▪ 80 percent of the buildings with north-south orientation within 22.5 degrees of east/west axis and aerodynamically shaped to catch the prevailing west and south-west wind. ▪ Use of LED lights for street lighting ▪ Large green open landscaped spaces between buildings and green roofs on most buildings to reduce heat island effect ▪ Lake used for rainwater retention and irrigation
Energy efficiency savings	Estimated energy savings of 46,720 kWh/year; estimated water savings of 50,406,301 m ³ /year.

MALAYSIA

ST Diamond Building	
Developer	Energy Commission of Malaysia / Senandung Budiman Sdn. Bhd
Green award	BCA Green Mark Platinum – Overseas (Awarded 2011)
Overview	ST Diamond Building, the headquarters of the Energy Commission of Malaysia, is one of the lowest energy consumption buildings in Southeast Asia. A highly sustainable building that makes use of passive design, energy efficiency and renewable energy, it is the first building to obtain both Malaysia's highest Green Building Index (GBI) certification and Singapore's BCA Green Mark certification, both Platinum rated. The building has also won the Asean Energy Awards (AEA) 2012 and ASHRAE technology award 2013 (2nd place).
Green features	<ul style="list-style-type: none"> ▪ Good passive envelope design to minimize external heat gain to the building ▪ Slab cooling system (cooling the slab at night to absorb the heat during the day) ▪ Daylight design to minimize the use of artificial lighting ▪ Consideration of the glare issue in daylighting design ▪ 71.5 kWp photovoltaic (PV) system.
Energy efficiency savings	Estimated energy savings of 874,082 kWh/yr; estimated water savings of 3,552 m ³ /year; Envelope Thermal Transfer Value (ETTV) of 35.6 W/m ² .

Idea House	
Developer	Sime Darby Property Berhad
Green award	BCA Green Mark Platinum – Overseas (Awarded 2011)
Overview	A prototype developed by Sime Darby Property, Malaysia's largest land owner and leading property developer, Idea House is Southeast Asia's first carbon neutral home, featuring an array of innovative design elements that can be employed in future sustainable community developments in the region. Conceived as a test bed for new ideas, the house showcases the latest in sustainable architecture in Southeast Asia.
Green features	<ul style="list-style-type: none"> ▪ Various passive design strategies and environmental analysis to ensure better indoor thermal comfort and cross ventilation ▪ Use of low e-glass double glazing to enhance overall thermal comfort ▪ Energy efficient air-conditioning system and lighting ▪ Photovoltaic (PV) technologies with system capacity of 15.3 kWp ▪ Building Management System with effective monitoring of energy and water consumption ▪ Rainwater harvesting, grey water recycling and stormwater management systems ▪ Extensive greenery provision