

Annex A: Green Mark for Super Low Energy (SLE)

BCA introduced the BCA Green Mark for Super Low Energy (GM SLE) during International Green Building Conference 2018 (IGBC 2018) on 5 September 2018. This voluntary certification framework targets new and existing non-residential buildings such as offices, commercial/retail, industrial, institutions and schools, including demonstration projects from Research & Innovation efforts. The scheme aims to encourage industry to push boundaries on energy efficiency to achieve best-in-class building energy performance in a cost effective manner. It is applicable for new and existing non-residential buildings including commercial, industrial and institutional buildings as well as schools.

Under BCA Green Mark for SLE, there are two building categories: (a) Super Low Energy buildings and (b) Zero Energy Buildings (refer to Table 1)

Table 1. GM SLE Building Categories

SLE/ZE certification	Requirement
Super Low Energy	To achieve at least 60% energy savings through adopting energy efficient measures and onsite renewable energy based on 2005 building code level.
Zero Energy	Use of onsite and off-site renewable energy to generate more than 100% of energy needed for building operation including plug load.

Green Mark Gold rating is the minimum requirement for SLE and ZE buildings in order to meet the holistic environmental sustainability indicators, such as greenery, indoor environmental quality and other non-energy aspects. This ensures the overall environmental sustainability performance indicators are being looked at holistically, while pushing the boundaries in terms of building energy performance.

For more information, visit https://www.bca.gov.sg/GreenMark/GM_SLE.html

Green Mark SLE Awards Inaugural Recipients

A total of 17 projects will be the inaugural recipients of the Green Mark for Super Low Energy (GM SLE) Award this year. They are:

S/N	Building Name	Developer/ Building Owner	Award
1	Samwoh Smart Hub	Samwoh	Green Mark Platinum (Positive Energy)
2	Surbana Jurong Campus	Surbana Jurong	Green Mark Platinum (Super Low Energy)
3	Development of Camp Facilities at Kranji Camp III for OES	DSTA	Green Mark Platinum (Zero Energy)
4	Home Team Academy	HomeTeam Academy	Green Mark Platinum (Super Low Energy)
5	Block 1337 Seletar Camp	DSTA	Green Mark Gold ^{PLUS} (Zero Energy)
6	Nanyang Auditorium	NTU	Green Mark Platinum (Zero Energy)
7	Wee Kim Wee School of Communication and Information	NTU	Green Mark Platinum (Zero Energy)
8	School of Humanities and Social Sciences	NTU	Green Mark Platinum (Zero Energy)
9	Administration Building	NTU	Green Mark Platinum (Zero Energy)
10	Nanyang House	NTU	Green Mark Platinum (Zero Energy)
11	The Wave	NTU	Green Mark Platinum (Zero Energy)
12	Block N1.1	NTU	Green Mark Platinum (Zero Energy)
13	Block N3	NTU	Green Mark Platinum (Super Low Energy)
14	SDE4	NUS	Green Mark Platinum (Zero Energy)
15	SDE 1 & 3	NUS	Green Mark Platinum (Super Low Energy)
16	Block EA	NUS	Green Mark Platinum (Super Low Energy)
17	Tahir Foundation Connexion	SMU	Green Mark Platinum (Zero Energy)

For more information on other Green Mark Award winners, visit https://www.bca.gov.sg/GreenMark/green_mark_projects.html

GM SLE winner: NTU Singapore

Nanyang Technological University, Singapore (NTU Singapore), is dedicated in making its Smart Campus into one of the most eco-friendly and sustainable campuses in the world.

Frequently listed among the global Top 15 most beautiful university campuses, NTU has more than 57 Green Mark-certified building projects comprising over 230 buildings, of which 95% are certified Green Mark Platinum.

New and existing buildings come with a host of energy-efficient features, which are monitored and optimised using an intelligent energy management system, reducing overall energy consumption.

One example is the existing School of Humanities and Social Sciences which has been enhanced with efficient water-cooled air-conditioning systems, energy-efficient LED lights and motion sensors toilets and staircases that keep lighting usage flexible. Another upgraded facility is the Wee Kim Wee School of Communication and Information. It has been upgraded with variable speed drives for pumps and water leakage detection systems to avoid unnecessary waste.

In addition, most buildings on NTU's campus are also powered by solar photovoltaic panels, which offsets up to 100 per cent of building energy consumption.

NTU has pioneered a variety of green construction techniques and applications. For example, NTU's student hostels at North Hill and Nanyang Crescent are the first public high-rise buildings using Prefabricated Pre-finished Volumetric Construction (PPVC), that allows prefabricated individual rooms to be stacked on top of each other. This method saves up to 25 to 40 per cent in manpower and 15 to 20 per cent in construction time. It also reduces noise and dust pollution onsite as more activities are done off-site.

NTU is also home to Southeast Asia's first large-scale building that uses an innovative timber construction technology known as Mass Engineered Timber. It provides five times better heat insulation than concrete and comes with a host of eco-features such as a passive displacement cooling system that uses convection to chill the air.

As part of its continuous drive towards sustainability, last year, NTU launched the oneNTU initiative "ECHO" which stands for NTU's "Eco-friendly", "Connected", "Healthy" and "oneNTU" to enable the University meet its commitment to reduce energy, water and waste intensity by 35 per cent in 2021, and by 50 per cent by 2025, from the levels of 2011.



*Figure 3: School of Humanities and Social Sciences, NTU Singapore
Credit: NTU Singapore*

GM SLE winner: Samwoh Smart Hub



Samwoh Corporation Pte Ltd (Samwoh) is a market leader in civil and infrastructure construction as well as an integrated provider of a full suite of engineering services which include the supply of building materials, supply and lay of asphalt premix, supply of ready-mixed and green concrete, recycling of construction and industrial wastes, research & development, pavement evaluation and consultancy services.

The company is a registered A1 civil engineering contractor with BCA under the civil engineering workhead. Innovation and sustainability has been the key drivers of growth for Samwoh. Strong focus on research & development also helps to bring value back to the core business of providing innovative and sustainable construction.

One of the most notable research achievements is the construction of Samwoh's Eco-Green Building, the first landmark building in the region to be constructed using up to a 100% recycle concrete aggregate (RCA). RCA is processed from the construction and demolition (C&D) waste to eliminate the needs for disposal and to enhance our resource resilience.

Samwoh is taking its 'green' journey' to another level with the construction of its new headquarters, Samwoh Smart Hub – the first positive energy industrial building in Singapore. The company aspires for this building to serve as an impetus for the built environment community to push the boundary of innovations for greater sustainability. The design for the Samwoh Smart Hub began in 2017, and when completed in 2020, will allow the company to consolidate all its six current premises into a single location to support its long-term growth plan.



Figure 4: Samwoh Smart Hub main view
Credit: Samwoh Corporation