



Is Net Zero Possible for Singapore's Buildings?

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Net Usable Area for PV Deployment in Singapore

Deployment Type	Total Net Usable Area (km ²)
Roof top (all building types)	13.2
Facades (retrofit + new buildings)	9.8
Land-based/ Temporary PV	5.0
Floating PV	4.6
Infrastructure PV	4.2
TOTAL	36.8 km²

~ technical potential yield of 8.6 GWp of solar power

Deployment Scenarios & Impact on PV Power Generation

Scenarios		Installed PV Capacity (GWp)	Estimated Annual Electricity Supplied (TWh)	As Percentage of Total Demand
2030	Baseline	1.0	1.28	1.8%
	Accelerated	2.5	3.16	4.5%
2050	Baseline	2.5	3.09	3.4%
	Accelerated	5.0	6.64	7.4%

Built Environment Sector

Efforts towards Net Zero



Singapore Green Building Masterplan: Build our green future together

The SGBMP aims to deliver 3 key outcomes: ‘80-80-80 in 2030’

VISION

“A leading green
Built Environment
sector mitigating
climate change and
providing a healthy,
liveable and
sustainable Built-
Environment for all”



80% of buildings to be green by 2030:

- *Step up the pace* of greening our buildings
- *Raise the sustainability standards* of our buildings



80% of new developments to be SLE from 2030:

- *Mainstream Super Low Energy (SLE) performance of new buildings* so that from 2030, large majority of new development would be achieving today's SLE energy performance standards



80% EE improvement (from 2005 levels) by 2030:

- *Push boundaries in energy efficiency for best in class green buildings* through research, innovation and implementation

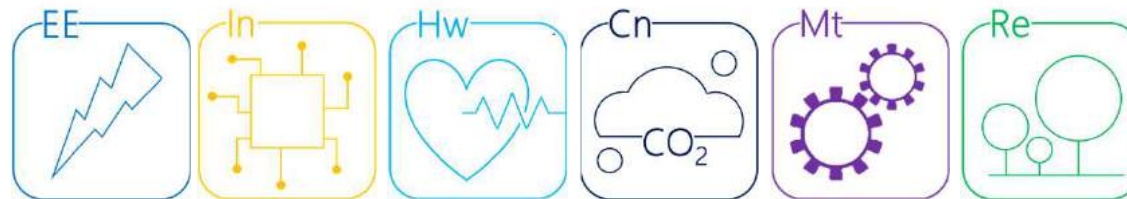


80% buildings (by GFA) to be green: Sustainability standards will be raised with Green Mark scheme revision

Green Mark 2021 is a key lever that facilitates high performance and climate action in buildings

- Higher energy performance requirements and longer term sustainability outcomes
- It is aligned to the wider Green Plan, SGBMP's '80-80-80 in 2030' and a driver of the Construction ITM (Smart, Productive and Green)
- It supports and prepares the value chain for the future green economy - towards climate resilience, carbon neutrality and transition plans, whilst championing SLE, DfM, Smart FM, IDD, DfMA & SC, Healthy buildings.

GREEN MARK 2021



GM: 2021 criteria is ready for piloting!

For more info, please visit <https://go.gov.sg/qm2021>



Business Case for SLE buildings: With net positive savings over the lifecycle, widespread adoption of SLE will help reduce energy use and carbon emissions in the built environment sector.

- Green Mark buildings reap net positive savings over their lifecycle*, with energy savings outweighing the upfront investment cost.

Green Mark Rating	Green Cost Premium	Simple Pay Back (yrs)	NPV Savings per GFA (median \$/GFA)
SLE# (>60% EE improvement over 2005 levels)	1.00% - 4.60%	2.11–5.77	250
Platinum (>50% EE improvement over 2005 levels)	1.00% - 4.40%	2.30-5.80	225
Gold^{Plus}	0.70% - 1.87%	1.89-3.56	117
Gold	0.12% - 1.80%	0.81-2.45	48

* LCC analysis is based on an independent consultancy study on BCA Green Mark Schemes. Building lifecycle is assumed as 30 years, with CAPEX, OPEX, maintenance and replacement cost factored in the assumption. For more info, please visit <https://go.gov.sg/gmcoststudy>

#BCA has separately conducted an LCC analysis on 6 new non-residential SLE building projects for comparison.

- *Strong business case to strive for higher standards and go beyond GM Platinum rating.*



80% buildings (by GFA) to be green: To step up the pace of greening buildings in Singapore, building energy performance data will be made public, starting with commercial buildings in 2H 2021.

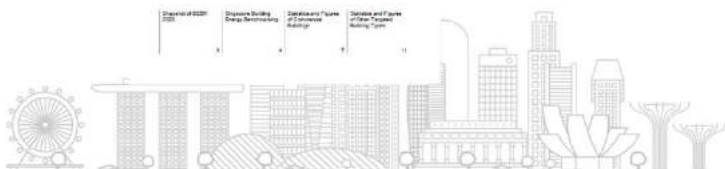
- **BCA has taken gradual steps to increase the transparency of building energy performance to the public, enabling building owners to benchmark the performance of their buildings.**

2013	2017	2020	2021
<ul style="list-style-type: none"> • All building owners are required to submit their building energy performance data 	<ul style="list-style-type: none"> • Building Energy Benchmarking Report published yearly 	<ul style="list-style-type: none"> • Building owners could opt to voluntarily have their building's energy data disclosed to the public 	<ul style="list-style-type: none"> • Circular to give notice that data submitted from 2020 onwards would be published in the following year
			<ul style="list-style-type: none"> • Identify all buildings in the data that is published, beginning with commercial buildings



- **Commercial buildings include offices, hotels, retail and mixed developments**

- The publication of building energy performance will be on data.gov.sg and on the Building Energy Submission System (BESS) portal





The Commitment

The Net Zero Carbon Buildings Commitment (the Commitment) challenges business, organisations, cities, states and regions to reach net zero carbon in operation for all assets under their direct control by 2030, and to advocate for all buildings to be net zero carbon in operation by 2050.





CapitaLand unveils S\$50 million innovation fund and crowns winners of first CapitaLand Sustainability X Challenge

SGX  **TEMASEK**



Trusted carbon credits. Real impact.

Climate Impact X is a global exchange and marketplace
for high-quality carbon credits.



Advancing Net Zero

A World Green Building Council global project



WorldGBC definition:

A net zero carbon building is highly energy efficient with all remaining energy from on-site and/or off-site renewable sources

100% of buildings must operate at net zero carbon

2050

2030

All new buildings must operate at net zero carbon

GOVERNMENT
ENGAGEMENT

TRAINING &
EDUCATION

CORPORATE
ENGAGEMENT

CERTIFICATION

Key Principles

1. Measure and disclose carbon

Carbon is the ultimate metric to track, and buildings must achieve an annual operational net zero carbon emissions balance based on metered data



2. Reduce energy demand

Prioritise energy efficiency to ensure that buildings are performing as efficiently as possible, and not wasting energy



3. Generate balance from renewables

Supply remaining demand from renewable energy sources, preferably on-site followed by off-site, or from offsets



4. Improve verification and rigour

Over time, progress to include embodied carbon and other impact areas such as zero water and zero waste





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Thank you

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