

FACTSHEETS

PUSH FOR GREENER BUILDINGS AND NEW SUPPORT SCHEME TO BOOST TRANSFORMATION EFFORTS THROUGH INDUSTRY ALLIANCES UNVEILED

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[Annex A – Factsheet on Singapore Green Building Masterplan \(SGBMP\)](#)

1. Buildings account for over 20% of Singapore's emissions. Greening our buildings is hence a key strategy to achieve our sustainability ambitions under the Singapore Green Plan 2030, and to fulfil our international commitments on climate change.¹

Singapore Green Building Masterplan (SGBMP)

2. The Singapore Green Building Masterplan (SGBMP) is an action plan that sets out Singapore's environmental sustainability ambitions for the Built Environment. It is part of the Singapore Green Plan 2030. Since January 2020, the Building and Construction Authority (BCA) and the Singapore Green Building Council (SGBC) have engaged over 5,000 stakeholders to co-create the next edition of the SGBMP. Titled "Build Our Green Future Together", the 4th edition of the SGBMP seeks to foster a leading green Built Environment sector which can lower its carbon footprint and provide a healthy, liveable and sustainable Built Environment for all.

¹ Singapore's Long-Term Low-Emissions Development Strategy aspires to halve emissions from its peak to 33 MtCO₂e by 2050, with a view to achieving net zero emissions as soon as viable in the second half of the century.

3. There are three key targets under the 4th edition of the SGBMP, or “80-80-80 in 2030”. These are:

- a. 80% of buildings by Gross Floor Area (GFA) to be green by 2030;
- b. <New> 80% of new developments by GFA to be Super Low Energy (SLE) buildings from 2030; and
- c. <New> 80% improvement in energy efficiency for best-in-class green buildings by 2030.²

a. 80% of buildings by Gross Floor Area (GFA) to be green by 2030

4. As of December 2020, more than 43% of our buildings’ GFA has been greened. This is good progress, but we need to do more. To spur building owners to retrofit their buildings to improve energy performance, BCA will identify all buildings in the building energy performance data that it publishes, starting with commercial buildings in the second half of this year. To future-proof Singapore’s building stock, BCA will also take measures to raise the sustainability standards of our buildings.

b. 80% of New Developments by GFA to be Super Low Energy (SLE) buildings³ from 2030

5. The Super Low Energy (SLE) programme⁴ was launched in 2018 to encourage the industry to achieve best-in-class building energy performance in a cost-effective manner. In conjunction, the SLE Challenge was also launched to invite developers to undertake at least one SLE project within 5 years. Under the GreenGov.SG initiative, the Government will continue to take the lead in bringing SLE buildings into the mainstream. BCA will also be exploring further measures to drive adoption of SLE buildings in the private sector.

² Compared to 2005 levels.

³ SLE buildings refers to buildings that have achieved at least 60% improvement in energy efficiency compared to 2005 levels.

⁴ Please refer to <https://www1.bca.gov.sg/buildsg/sustainability/super-low-energy-programme> for more information on the SLE programme.

c. 80% improvement in energy efficiency for best-in-class green buildings by 2030

6. Today, best-in-class buildings are able to achieve more than 65% improvement in energy efficiency over 2005 levels. BCA aims to raise this figure to 80% by 2030 by through the Green Buildings Innovation Cluster (GBIC) programme. Established in 2014, the programme serves as a one-stop research, development and demonstration platform for technologies and innovations that lead to highly energy efficient buildings, and BCA is looking into enhancing funding support for the programme.

Publication of Building Energy Performance Data

7. All building owners have been required to submit their building energy performance data since 2013. BCA has also gradually taken steps to increase the transparency of such data to the public. For instance, since 2017, building owners could opt to voluntarily have their building's energy data disclosed to the public.⁵

8. Last year, it was announced that BCA would identify all buildings in the building energy performance data that it publishes. Building owners were notified in August 2020 that the data submitted from 2020 onwards would be published in the coming years. BCA will begin with commercial buildings in the second half of 2021, and information on other building types will be made available progressively in the following years. There is no additional effort or cost to building owners, beyond what is currently required to complete the annual mandatory submission through the Building Energy Submission System.

Raising Sustainability Standards of our Buildings

9. Under the SGBMP, we will raise the sustainability standards of our buildings to achieve our ambitions and pave the way for a low-carbon Built Environment. We will do this by:

⁵ On average, owners of about 80% of commercial buildings volunteered to publish their building's name and address along with their energy performance data annually.

- a. Raising minimum energy performance requirements for new buildings and existing buildings that undergo major retrofitting/major energy use change.

BCA requires all new buildings and existing buildings undergoing major retrofitting works⁶ and/or major energy use change⁷ to meet minimum standards of environmental sustainability.

In line with the whole-of-nation push towards sustainability, BCA will raise the minimum energy performance requirements for new and existing buildings that undergo major retrofitting works and/or major energy use change from 30% and 25% compared to 2005 levels, to 50% and 40% respectively. This is comparable to the current Green Mark Platinum standards. For example, a large office building that utilises 10 million kWh in a year can potentially save 800,000 to 1,100,000 kWh of electricity annually from using energy efficient building systems.⁸ This translates to cost savings of \$180,000 to \$240,000 annually.⁹ In order to improve building energy performance, developers and building owners can review the major energy uses and systems of the building and identify opportunities to integrate energy saving elements (e.g. energy efficient building systems for cooling, lighting, lifts and escalators), and design for a better building envelope and ventilation.

The revised minimum energy performance requirements will take effect for applications for new buildings by end 2021, followed by existing buildings from 2022.

- b. Revised Green Mark (GM) Framework for 2021

⁶ Major retrofits refer to building works that involve provision, extension or substantial alteration of the building envelope and building services in or in connection with an existing building.

⁷ This refers to the installation or replacement of chiller systems.

⁸ For a typical office building, the breakdown of building owners' and tenants' electricity consumption is almost an equal share. This estimate assumes that there are no changes in energy consumption of tenants and an overall energy efficiency improvement arising from improvements to typical common services such as for cooling, lightings, lifts and ventilation.

⁹ Based on electricity tariff of 22.21 cents per kWh (1 Jan to 31 Mar 2021).

BCA and SGBC have also engaged key stakeholders to review the GM scheme's certification standards and criteria. The revised framework will include higher energy performance standards, and key environmental sustainability aspects such as whole-of-life carbon, health and well-being, and design for maintainability elements. Work to revise the GM framework is currently ongoing and details will be provided later this year.

GreenGov.SG

10. Since 2006, public sector buildings have led by example in achieving best-in-class building energy performance standards under the Public Sector Taking the Lead in Environmental Sustainability (PSTLES) initiative. The current PSTLES targets for green buildings are:

- a. All new public sector buildings with air-conditioned floor area exceeding 5,000 sqm to attain Green Mark (GM) Platinum certification;¹⁰
- b. All existing public sector buildings with air-conditioned floor area of 10,000 sqm or more to attain GM Gold^{PLUS} certification by 2020; and
- c. All existing public sector buildings with gross floor area exceeding 5,000 sqm but air-conditioned area below 10,000 sqm to attain GM Gold certification by 2020.

11. From this year onwards, PSTLES will be renamed as GreenGov.SG. Under GreenGov.SG, the Government will take the lead in driving wider adoption of SLE buildings. The aim is to build industry capability in developing SLE buildings, provide use cases for the private sector to take reference from, and bring SLE buildings into the mainstream.

Green Buildings Innovation Cluster (GBIC)

¹⁰ Please refer to <https://www1.bca.gov.sg/buildsg/sustainability/green-mark-certification-scheme> for more information on the Green Mark certification scheme and detailed criteria to meet the respective Green Mark ratings.

12. The Green Buildings Innovation Cluster (GBIC) programme was established by BCA and the National Research Foundation in 2014 to push the boundaries of energy efficiency through technology development. To date, GBIC has supported the development of more than 60 innovative technologies from more than 50 firms. GBIC has also helped to build up deep industry capabilities in energy efficient solutions for green buildings. Programmes under the GBIC include:

a. GBIC Competitive Research Programme (GBIC CRP)

GBIC CRP aims to build deep research and development (R&D) capabilities for industry and academics. This is achieved through supporting innovative proposals that would lead to significant improvement in energy efficiency with high potential for adoption. GBIC CRP is also supported by BCA's dedicated infrastructure for translating R&D to industry applications, including guidelines on interfacing with Green Mark standards and real-world test-bedding at BCA SkyLab.¹¹

b. GBIC Design and Product Prototyping (GBIC Prototyping)

GBIC Prototyping is a scheme that helps firms to engineer R&D outcomes into commercial solutions and bring technologies from the lab to the marketplace.

c. GBIC Demonstration (GBIC Demo)

GBIC Demo is a dedicated building demonstration scheme that allows innovative technologies to be integrated at actual buildings at a commercial scale to deliver exemplary Zero Energy Buildings¹² and SLE buildings.

¹¹ BCA SkyLab is an advanced testing facility dedicated for energy efficient building technologies. Located at the BCA Braddell Campus, it is a plug-and-play testing platform for air-conditioning, lighting, facade and control solutions, with a 360-degree rotatable platform that can simulate various building orientations.

¹² Zero-Energy Buildings are buildings that use both on and off-site renewable sources to generate 100% (or more) of the energy needed for their building operations.

d. GBIC SLEB Buildings (SLEB) Smart Hub

GBIC SLEB Smart Hub is a national database for technologies and solutions that improve energy efficiency. Its online portal¹³ and embedded resource tools allow for the creation and dissemination of actionable knowledge to the industry and research community. Industry engagement workshops are carried out periodically to train end-users on the functions and features of the SLEB Smart Hub.

Other Measures for Green Buildings

13. BCA also has existing financing and workforce development measures to encourage the adoption of green buildings:

a. Building Retrofit Energy Efficiency Financing (BREEF) scheme

Building owners who need financial assistance to improve the energy efficiency of their buildings may tap on the BREEF scheme, through March 2023. The BREEF scheme helps to finance the upfront costs for energy efficiency retrofits of existing buildings, through an energy performance contract arrangement. Applicants can obtain financing from participating financial institutions and pay off the loan through the energy savings reaped. BREEF can cover the cost of equipment, installation, and professional fees. The maximum loan quantum is up to \$4 million, or 90% of total retrofit costs, whichever is lower.

b. Workforce Development

BCA targets to train 25,000 green professionals to support the Green Buildings pillar of the Construction ITM by 2025. As of December 2020, more than 20,000 green professionals have been trained through courses conducted by IHLs, TACs and BCA Academy. One example is the Green

¹³ Please refer to www.sleb.sg for more information on the SLEB Smart Hub.

Mark Professional Qualification Scheme, which recognises professionals with specialist knowledge in the design and operation of environmentally friendly buildings. BCA also has a Continuing Professional Development certification renewal framework to ensure that certified Green Mark Specialists continue to keep their knowledge and skills current with industry and regulatory developments.

Annex B – Factsheet on Growth and Transformation Scheme (GTS)

1. The Growth and Transformation scheme (GTS) is a new scheme that will take a value chain approach to drive transformation in the Built Environment (BE) sector. This is a shift from project-based support schemes where stakeholders usually focus on the immediate need to deliver the project on hand. The GTS will support the formation of strategic alliances among progressive developers, builders and consultants across the entire value chain. In gist, the key objectives of GTS are to:

- a. Groom a core group of strong industry leaders to drive industry transformation;
- b. Achieve higher capability building through these strong industry leaders to spur widespread adoption of advanced technologies such as DfMA, IDD and Green Buildings; and
- c. Achieve higher workforce development and business growth/strategic collaboration goals.

2. Each alliance will comprise a combination of developers, builders and consultants. Alliances will need to present their minimum three-year business and transformation plans, outlining how they intend to deliver higher capability building, workforce development, business growth and strategic collaboration outcomes for BCA's evaluation.

3. The key performance indicators (KPIs) for alliances are guided by the ITM goals for the industry, such as the higher adoption of DfMA, IDD and Green Buildings technologies in their projects.
4. BCA plans to launch the scheme in the second half of 2021. More details will be released when ready.

Annex C – Factsheet on Construction Productivity and Capability Fund (CPCF)

1. In 2010, we launched the Construction Productivity and Capability Fund (CPCF) to steer the Built Environment (BE) sector towards higher productivity, and to build capability in handling complex construction projects.
2. The current list of schemes under the CPCF can be summarised according to two broad categories:
 - a. Incentives for **workforce development** through Workforce Training & Upgrading (WTU) and Scholarships & Sponsorships; and
 - b. Incentives to encourage the adoption of **productive technologies** through the Productivity Innovation Project (PIP) and Productivity Solutions Grant (PSG).
3. We will extend the CPCF by one year from March 2021 to March 2022. We will also maintain funding support of PIP of up to 80% from January 2021 until March 2022. We had previously raised the funding quantum for PIP from 70% to 80% from 1 April to 31 December 2020. Maintaining this higher level of support until March 2022 will encourage firms to pursue longer term transformation despite the current challenges due to COVID-19.
4. The schemes under the CPCF are summarised as follows:

Table: List of Schemes under the CPCF

Scheme	Objective	Maximum Funding Support
Workforce Development		
Workforce Training and Upgrading (WTU)	To facilitate competency building and skills upgrading amongst construction Professionals, Managers, Executives and Technicians (PMETs).	90% of training fees for Singapore Residents.
Scholarships/ Sponsorships	To build up local construction manpower capabilities at the PMET level by attracting new entrants into the BE sector through scholarships/sponsorships for students to pursue relevant BE-related courses at the University, Polytechnic and Institution of Technical Education (ITE) levels. The fees for scholarship/sponsorship recipients are co-funded by the Government (through CPCF) and industry firms that will provide job placements for the scholarship/sponsorship recipients upon the completion of their studies.	100% of school fees, and other training incentives after graduation and bond completion.
Technology Adoption		
Productivity Innovation Project (PIP)	To defray the cost premium for undertaking projects that involve the application of technology or re-engineering of work processes that can achieve a productivity improvement of at least 30%.	80% of qualifying costs for firms.
Productivity Solutions Grant (PSG)	To help SMEs defray the cost of adopting pre-approved digital solutions that can achieve a productivity improvement of at least 15%.	80% of qualifying costs until March 2022, and 70% from April 2022 until January 2023. <i>[Note: The PSG will expire in January 2023, after the expiry of the CPCF.]</i>

Annex D – Factsheet on the Buildability Framework

1. The Buildability legislative framework was introduced in 2001 to require developers, architects and engineers to deliver buildable designs that facilitate more productive construction downstream. The Buildability Framework is an appraisal system that includes a wide range of options of industry-accepted building designs, systems and technologies for designers to adopt. Productive designs (e.g. modularisation) and technologies (e.g. structural steel construction) are awarded more points than labour-intensive ones (e.g. cast in-situ concrete construction). In this regard, developers and designers have the flexibility to find the most cost-effective solution to meet the buildability requirement for their projects.

2. Currently, projects with Gross Floor Area (GFA) of 5,000 sqm and above are required to comply with minimum buildable design scores (B-scores), which differ according to the GFA and development type. Designers are required to meet these minimum B-scores in order for their building plans to be approved by BCA. The minimum B-scores have been raised progressively over the years to promote more labour-efficient designs and technologies such as Design for Manufacturing and Assembly (DfMA).

Enhancing the Buildability Framework

a. Buildability 2019

3. The following changes were implemented on 15 December 2019:

a. **Raising the minimum B-score for large residential (non-landed) projects**

The minimum B-score for large residential (non-landed) projects was raised to require them to adopt DfMA. Large residential (non-landed) projects are needle-movers that can improve DfMA adoption and construction productivity.

b. Introducing outcome-based options for large residential (non-landed) projects

Through outcome-based options, Qualified Persons (QPs) can propose solutions that achieve at least 20% minimum productivity improvements (from 2010 levels) to meet buildability requirements. QPs will need to submit a detailed plan to demonstrate how the proposed productivity requirement can be achieved. BCA also provided the industry with standard solutions that the industry could use to meet buildability requirements without submitting calculations on productivity improvements.¹⁴

c. Exempting projects below GFA of 5,000 sqm from the Buildability legislation

Previously, only projects below GFA of 2,000 sqm were exempted from meeting buildability requirements. As there are fewer economies of scale for projects below GFA of 5,000 sqm to adopt DfMA, we had exempted these projects from the Buildability requirements.

b. Buildability 2020

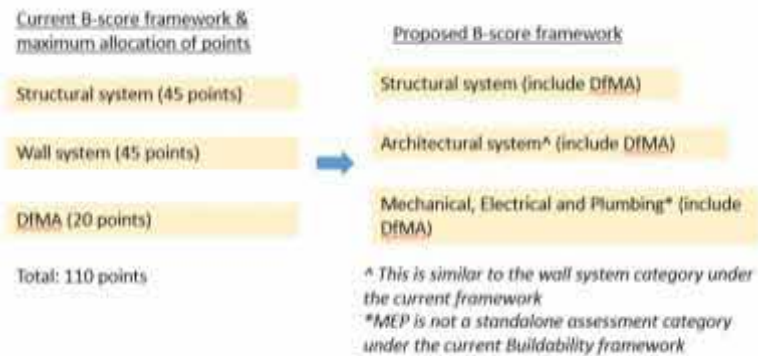
4. The following changes were implemented on 28 December 2020:

a. Implementing the revised Buildability scoring framework

The Buildability scoring framework was revised following a year-long voluntary trial. Under the revised framework ([Figure](#)), DfMA is no longer a separate scoring component, and has been integrated into the three major components of building works (i.e. structural, architectural and MEP works). This is intended to encourage developers to employ DfMA as the default method of construction.

¹⁴ These “standard” solutions are: (i) 50% prefabrication level (for structural and architectural systems) + 70% system formwork + 50% MEP; (ii) 65% prefabrication level (for structural and architectural systems) + 70% system formwork; or (iii) 60% Prefabricated Prefinished Volumetric Construction (PPVC) adoption.

Figure: Revised Buildability Scoring Framework



b. Rolling out outcome-based options for all large developments

Following the introduction of outcome-based options for large residential (non-landed) developments in December 2019, BCA rolled this out for all large developments. Similarly, QPs are required to fulfil at least 20% minimum productivity improvements (from 2010 levels) and will need to submit a detailed plan to demonstrate how the proposed productivity requirement can be achieved.

c. Buildability 2022

5. BCA will increase the minimum B-scores for large commercial, industrial and institutional projects in April 2022. Following this, all large projects will effectively be required to adopt suitable DfMA technologies for their respective typologies. For example, to meet the raised minimum B-scores, industrial and institutional developments can adopt Advanced Precast Concrete System (APCS),¹⁵ and commercial developments can adopt the structural steel system.¹⁶ The raised minimum B-scores will allow us to meet the 70% DfMA adoption target by 2025 or earlier.

¹⁵ APCS is a type of DfMA construction method which involves producing at least two precast components as a single component to reduce handling, and using mechanical connections to join different precast components on site to simplify the assembly process. The use of APCS can lead to on-site manpower savings of up to 20% compared to conventional construction methods.

¹⁶ Structural steel is a DfMA construction method which involves the prefabrication of steel components for on-site assembly of a building frame. The use of structural steel can lead to on-site manpower savings of up to 20% as compared to conventional construction methods.

6. BCA will support firms in meeting the raised minimum B-scores:

a. Financial incentives to fund DfMA cost premium

Currently, for public sector projects, firms can tap on the Public Sector Construction Productivity Fund (PSCPF) to fund the DfMA cost premium in full. For private sector projects, firms can tap on the Productivity Innovation Project (PIP) scheme under the Construction Productivity and Capability Fund (CPCF), which supports up to 80% of funding for projects that adopt DfMA technologies until March 2022.¹⁷ The new Growth and Transformation Scheme (GTS) will also support the adoption of DfMA and other best-in-class technologies and practices.

b. Project experience to build capacity in DfMA

To date, most of the large consulting firms and builders have already acquired experience in various DfMA technologies. More firms will gain experience in DfMA with the roll out of more productive public and private sector projects through the Productivity Gateway Framework (PGF) and Government Land Sales (GLS) programme respectively.

c. Training programmes to increase DfMA competencies

BCA has also put in place training programmes at the BCA Academy to strengthen the competency of industry professionals in DfMA. These programmes include the BCA-Specialist Trade Alliance of Singapore (STAS) course on modular MEP design and prefabrication, the Advanced Certificate in Construction Productivity, and the Specialist Diploma in DfMA.

¹⁷ Under the PIP, firms that adopt DfMA technologies with between 30% to 40% of productivity improvement (e.g. advanced precast, prefab MEP modules, structural steel) and more than 40% of productivity improvement (e.g. PPVC, Mass Engineered Timber (MET)) can claim up to \$1 million and \$10 million per project respectively.