Quick Introduction of BCA Green Mark Score Calculator

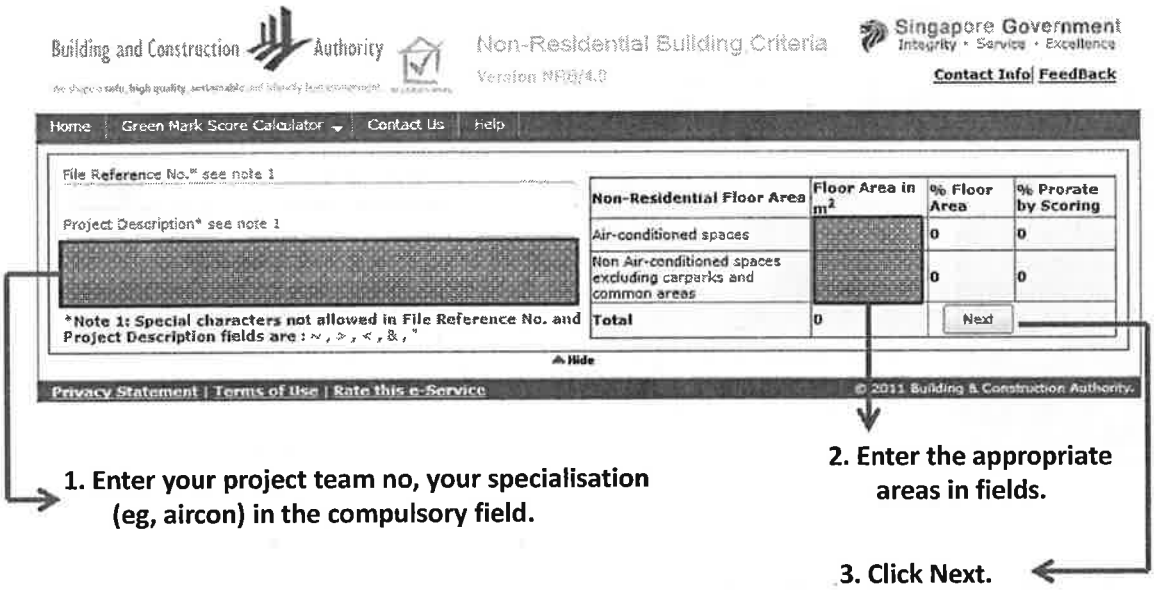


http://www.bca.gov.sg/GreenMarkScoreCalculator/e-PlannerHome.aspx

It is compulsory for the GMM's project teams to print (3 copies) and submit the Green Mark score in PDF format as part of the GM project presentation requirement.

How to start?

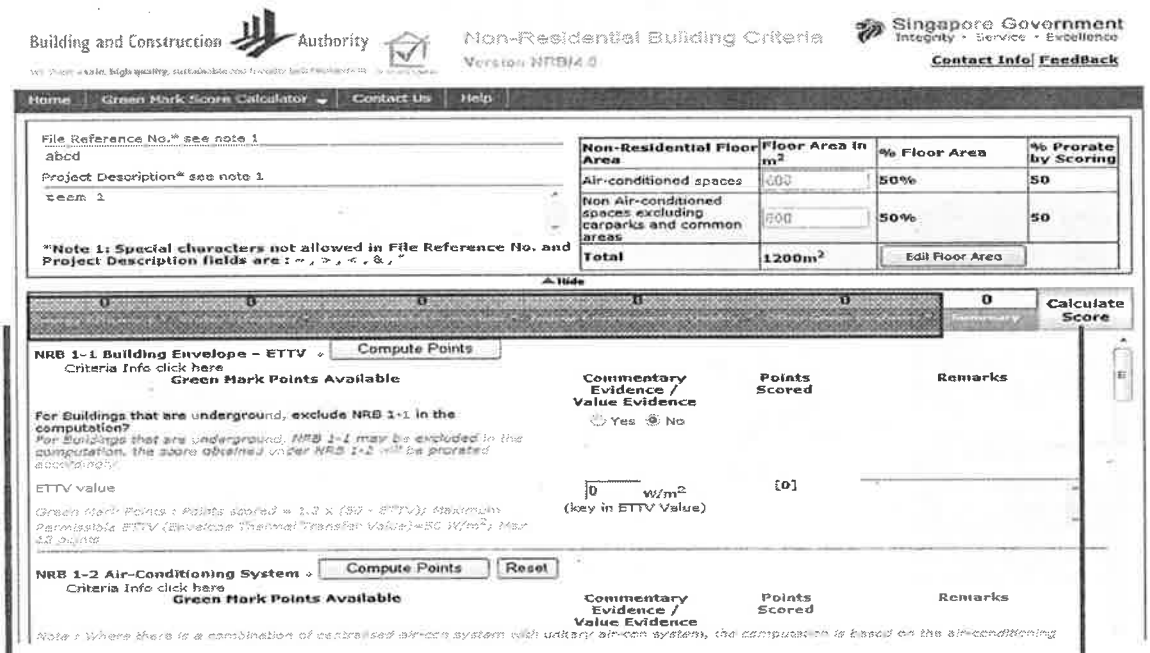




1. Enter your project team no, your specialisation (eg, aircon) in the compulsory field.

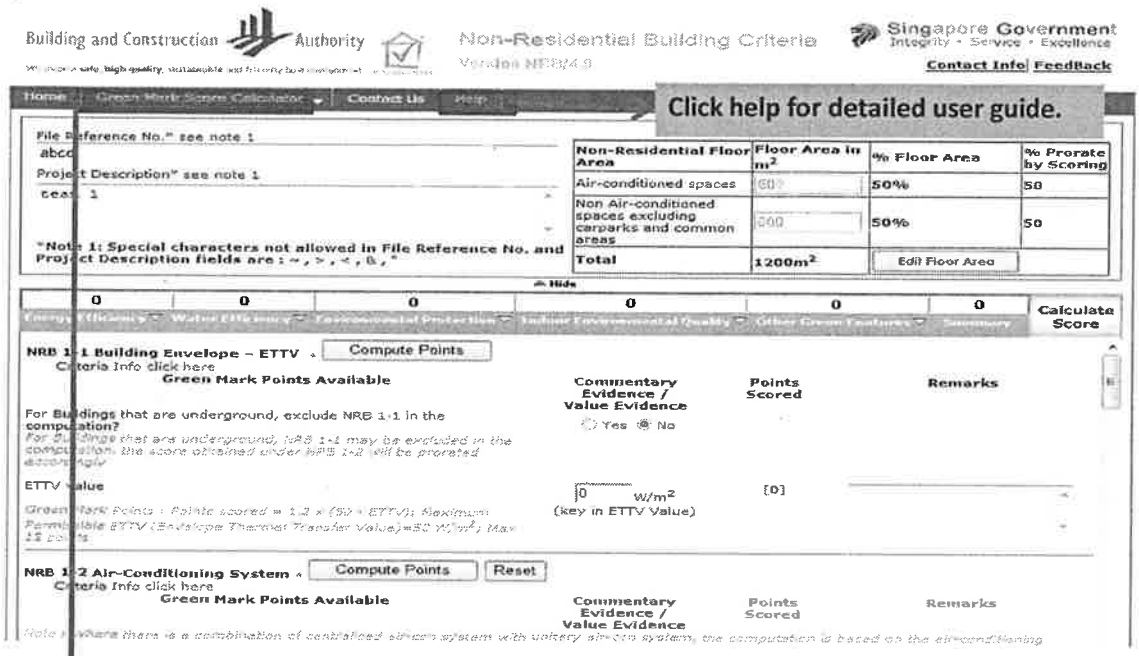
2. Enter the appropriate areas in fields.

3. Click Next.



Go though each tab to enter your score.

Click the calculator score to refresh the scoring on the active screen



Green Mark Score Calculator allows you to:

1. **Create a new calculation sheet**
2. **Open an existing sheet**
3. **Save or export a working sheet**
4. **Print a working sheet**

Requirement:

Project team to print 3 copies of completed GM score calculator for project presentation.

BCA Green Building Initiatives

Championing Environmental Sustainability in the Built Environment

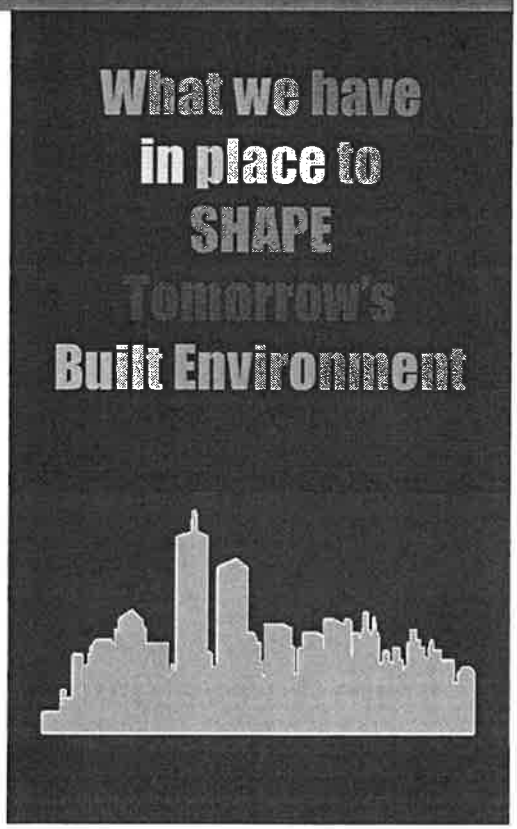


Presented by Yew Wey Ling
Technology Development Group
Building and Construction Authority



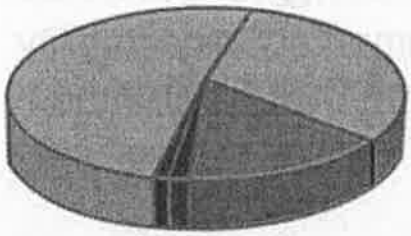
Presentation Outline

- **BCA Green Mark Scheme**
- **BCA Green Building Masterplan**



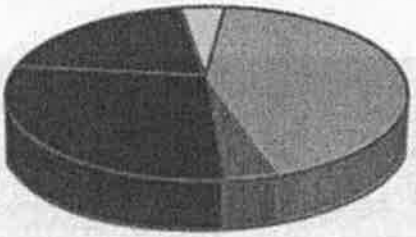
Singapore's Energy Consumption

Fuel Consumption in Singapore (2005)



- 51% Power Generation
- 31.7% Industry
- 15.8% Transport
- 0.9% Buildings
- 0.6% Households

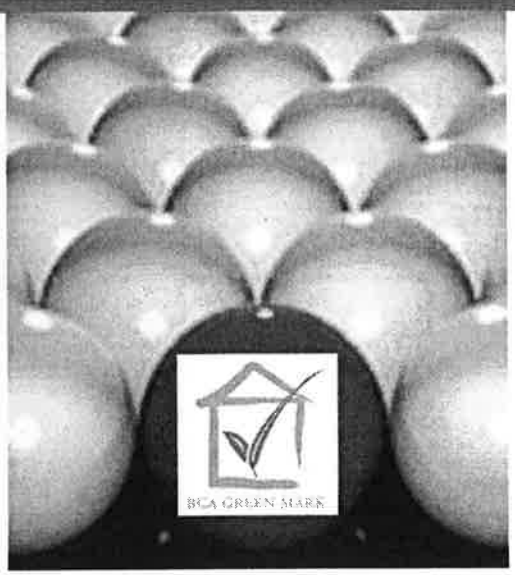
End-use Electricity Consumption in Singapore (2005)



- 3% Others
- 43% Industry
- 5% Transport
- 31% Buildings
- 18% Households

BCA Green Mark Launched in 2005





Our Singapore Brand - A green building rating system to evaluate building for its environmental impact and performance

International Green Building Assessments Systems

BCA's **Green Mark Scheme** recognised as one of the International Green Building Rating Systems by the World Green Building Council

LEED- Canada, GBTool
BREEAM- Green Leaf

BREEAM

LEED

CASBEE

LEED-INDIA

HK-BEAM

Green Mark

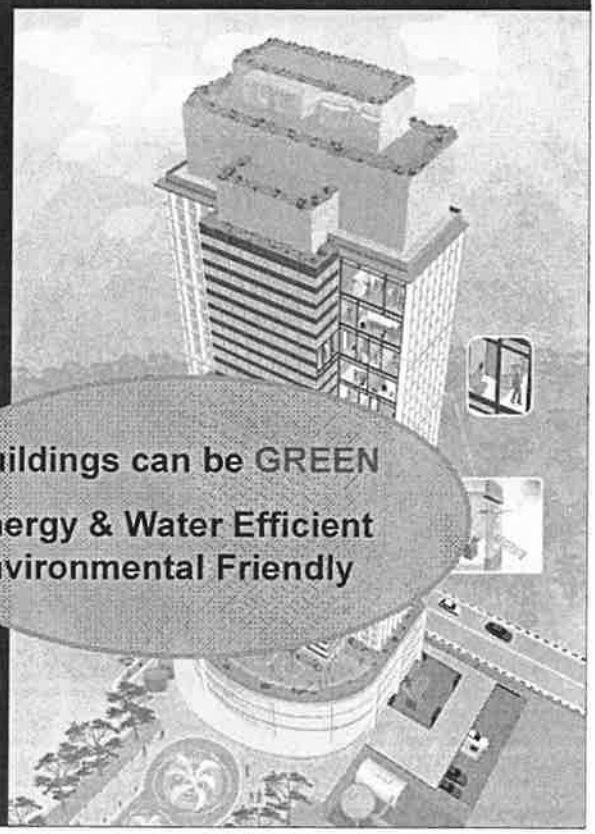
BCA Green Mark – A suitable green building assessment system for tropical countries

Green Star

Objectives of BCA Green Mark Scheme

Promotes Awareness – Assesses the Environmental Impact of Buildings

- **Energy**
- **Water**
- **Materials/Land**
- **Indoor Environment Quality**
  - Health
  - Comfort
  - Productivity

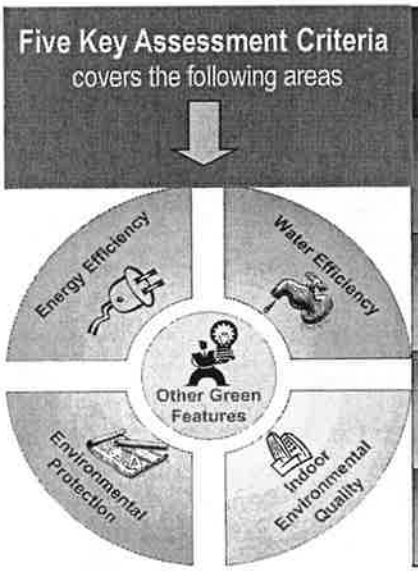


Objectives of BCA Green Mark Scheme

- Recognise the efforts made by developers / building owners and design teams in creating environmentally-sustainable buildings
- Benchmark and identify good practices in development, design, construction, management and maintenance of green buildings



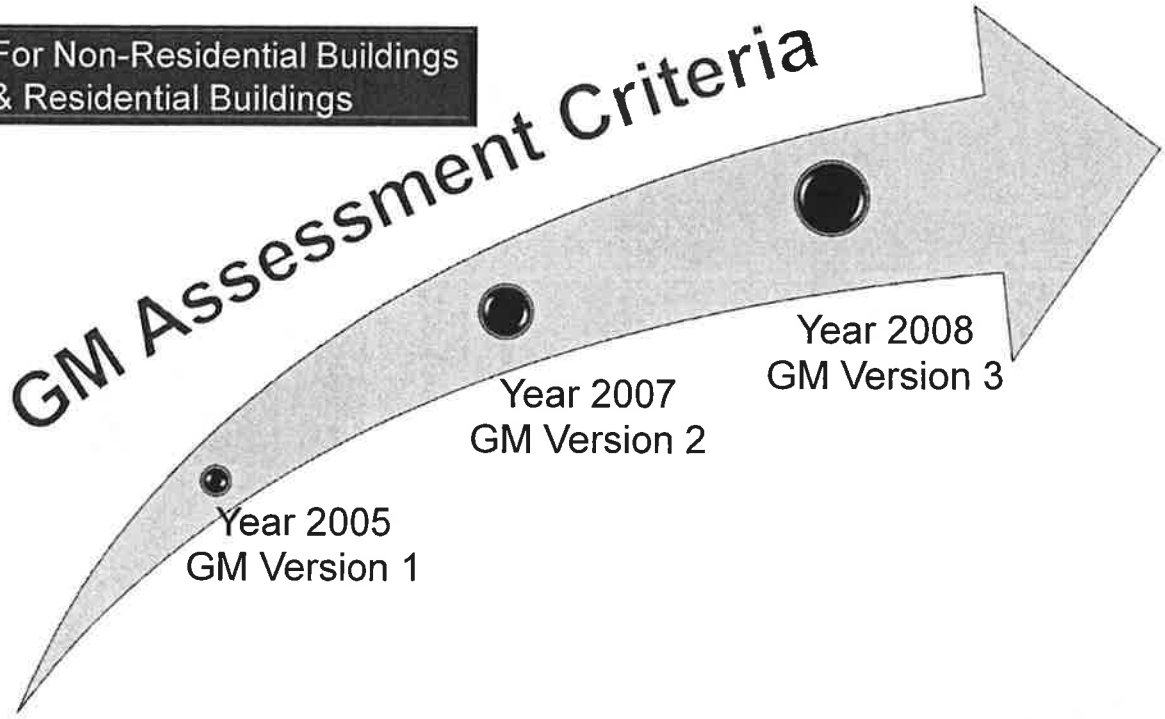
BCA Green Mark has 4 levels of rating



Green Mark Rating	Green Mark Points
Platinum	90 & above
Gold^{Plus}	85 to <90
Gold	75 to <85
Certified	50 to <75

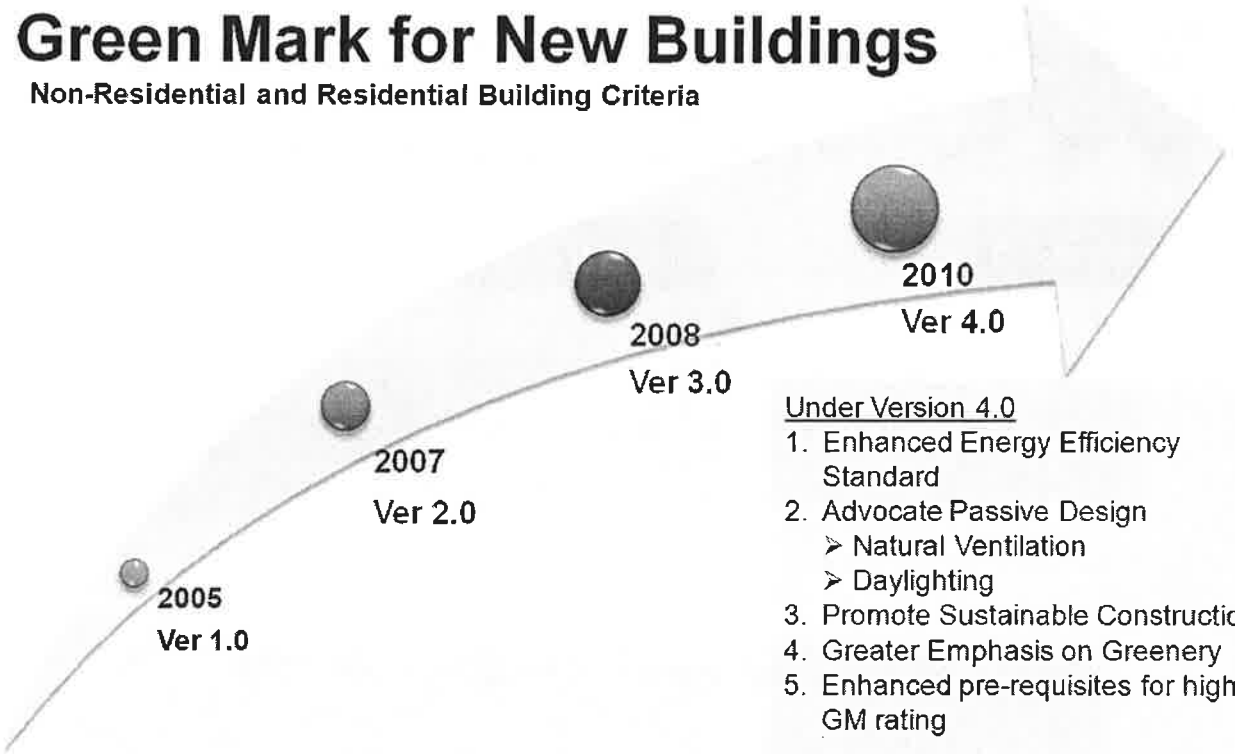
BCA Green Mark for New Buildings Assessment Criteria

For Non-Residential Buildings & Residential Buildings



Green Mark for New Buildings

Non-Residential and Residential Building Criteria



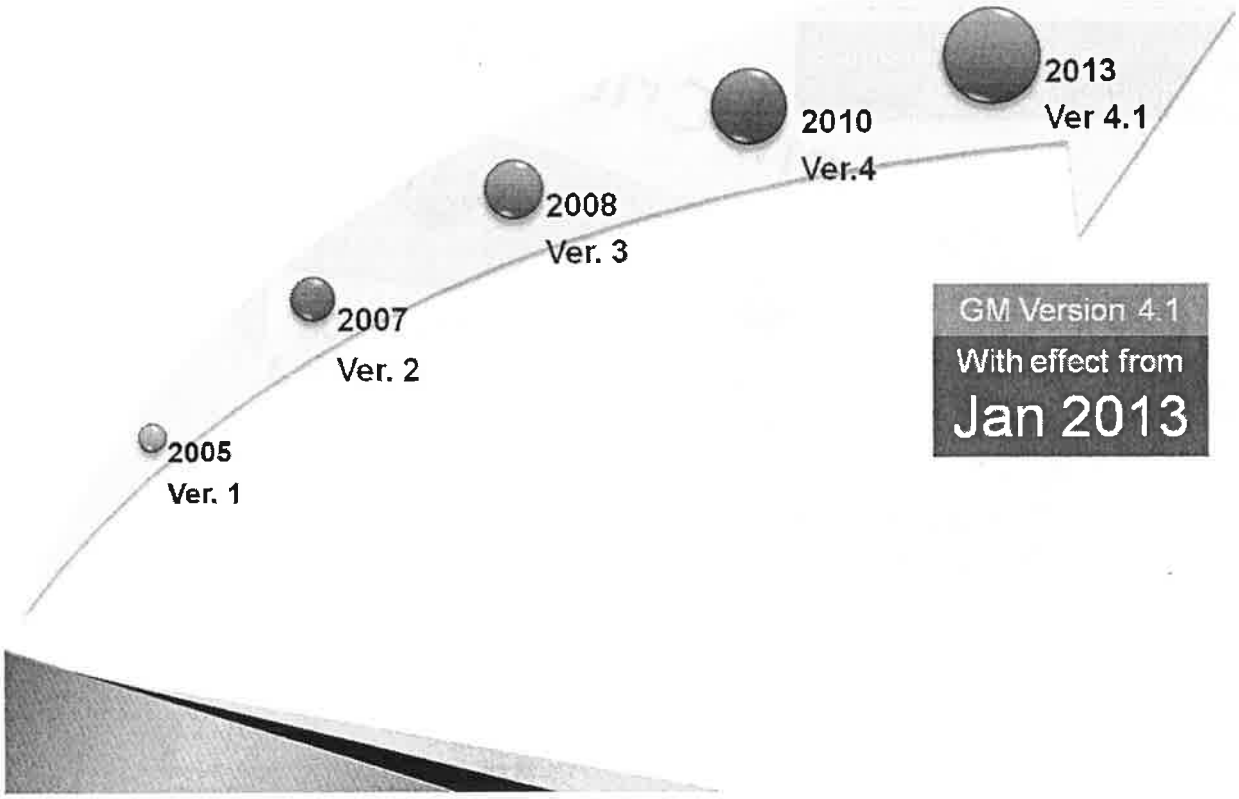
Under Version 4.0

1. Enhanced Energy Efficiency Standard
2. Advocate Passive Design
   - Natural Ventilation
   - Daylighting
3. Promote Sustainable Construction
4. Greater Emphasis on Greenery
5. Enhanced pre-requisites for higher GM rating

From Prescriptive to Performance Based Framework

Green Mark for New Buildings

Non-Residential and Residential Building Criteria



All new GM applications are based on GM V4.1

For BCA Green Mark Certification

Implementation timeline for the adoption of GM V4.1 is based on the date of GM application

15 Jan 2013

GM applications submitted **before 15 Jan 2013** will be assessed under GM V4.0

15 Oct 2013

Projects where GM applications were submitted **before 15 Jan 2013** will be assessed under GM V4.1 from 15 Oct 2013 onwards

GM applications submitted **on or after 15 Jan 2013** will be assessed under GM V4.1

BCA GREEN MARK

BCA Green Mark Certification



- The details of BCA Green Mark V4.1 is incorporated in the BCA Green Mark – Certification Standard for New Buildings
- Note: Ensure compliance with pre-requisite requirements

A copy of the Standard can be obtained from BCA website at

http://www.bca.gov.sg/EnvSusLegislation/others/GM_Certification_Std2012.pdf

Certification Process

Application	Pre-Assessment	Actual Assessment	Verification
• Application via Green Mark On-line website NEW http://www.bca.gov.sg/GreenMarkOnline • Supporting Documents	• Conceptual design, key documentary evidences and preliminary GM scoring to be ready	• Design and supporting documentary evidences and computation to be ready. • Presentation to BCA's management for potential GM Gold^{Plus} and Platinum rating projects	• Inform BCA upon project completion. • Necessary declaration and list of variation (if any) • Documentary evidences, site records and photos in support of the implementation of the proposed design and green features /practices
• Fee payable • GM Assessors assigned	Pre-assessment for better understanding of criteria and evaluation of the of certification level sought	Assessment includes design and documentary reviews based on relevant GM criteria and pre-requisites.	Verification includes site checks of building design & green features, building performance measurements, documentary reviews &

BCA Green Mark Verification

Application → Pre-Assessment → Actual Assessment → Verification

Objectives

- Implementation of the green features, site installation and/or control strategies; operation functionalities and performance; and
- Energy savings over the code-compliance buildings which were committed during the Actual Assessment.



BCA Green Mark Certification

Application → Pre-Assessment → Actual Assessment → Verification

Stage 1

Site Verification Upon Project Completion

■ Site Inspection of Green Features ■ Review of Records ■ Measurement

Stage 2

Energy Modelling and Audit

Applicable to GoldPlus and Platinum Projects

■ Verification on the energy savings committed

We are expanding...



BCA Green Mark Schemes for New Buildings

- Green Mark for New Non-Residential Buildings
- Green Mark for New Residential Buildings
- Green Mark for Landed Houses



BCA Green Mark Schemes for Existing Buildings

- Green Mark for Existing Non-Residential Buildings
- Green Mark for Existing Residential Buildings
- Green Mark for Existing Schools

We are expanding...



BCA Green Mark Schemes for Beyond Buildings

- Green Mark for Existing Parks
- Green Mark for New Parks
- Green Mark for Infrastructures
- Green Mark for Districts
- Green Mark for Rapid Transit System



BCA Green Mark Schemes – Occupants Centric

- Green Mark for Office Interior
- Green Mark for Restaurants
- Green Mark for Retails
- Green Mark for Supermarkets
- Green Mark for Data Centre

Validity Period of GM Certification

- **Certification are valid for 3 years, except for GM for Districts and Existing Residential buildings which is 5 years**

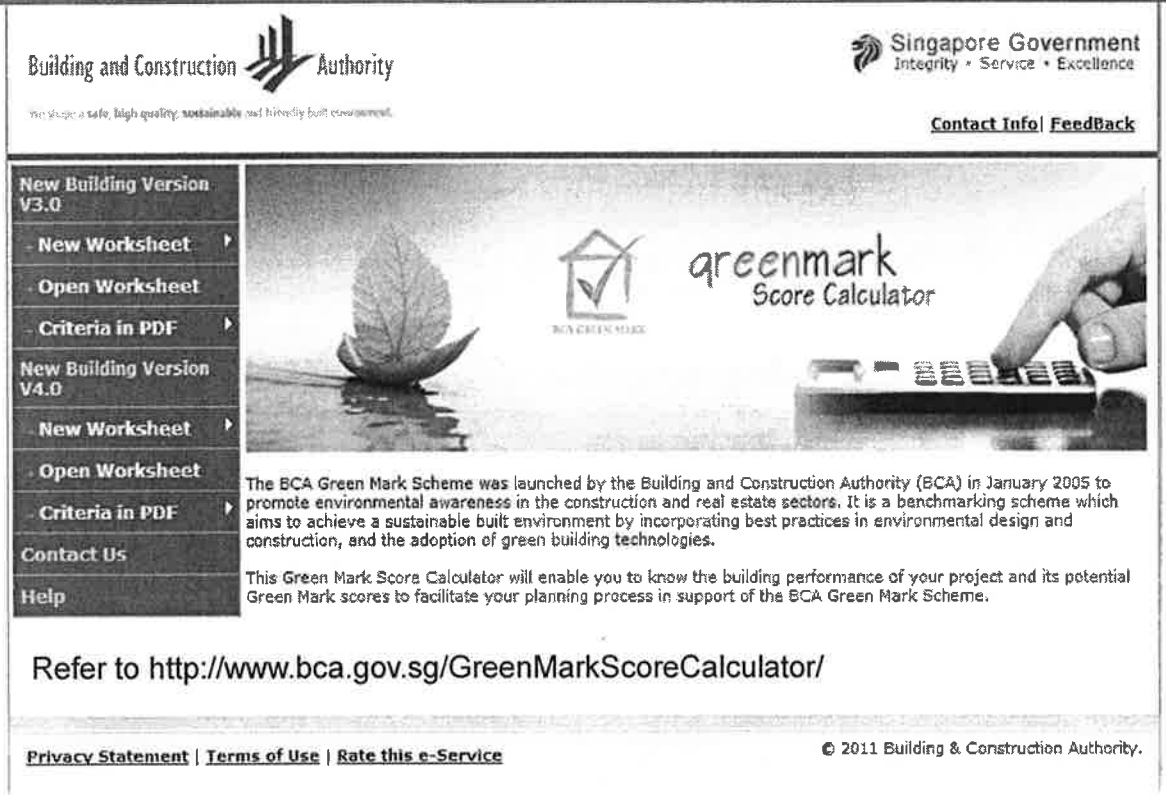
- **Expiry date of cert is 3 years based on either:**

a) **Date as stated in BCA's Letter of Award to Client; or**

b) **TOP date of project + 3 years;**

whichever is later

Green Mark Tool - Score Calculator



Green Mark Mobile App

Now available on iPhone App Store

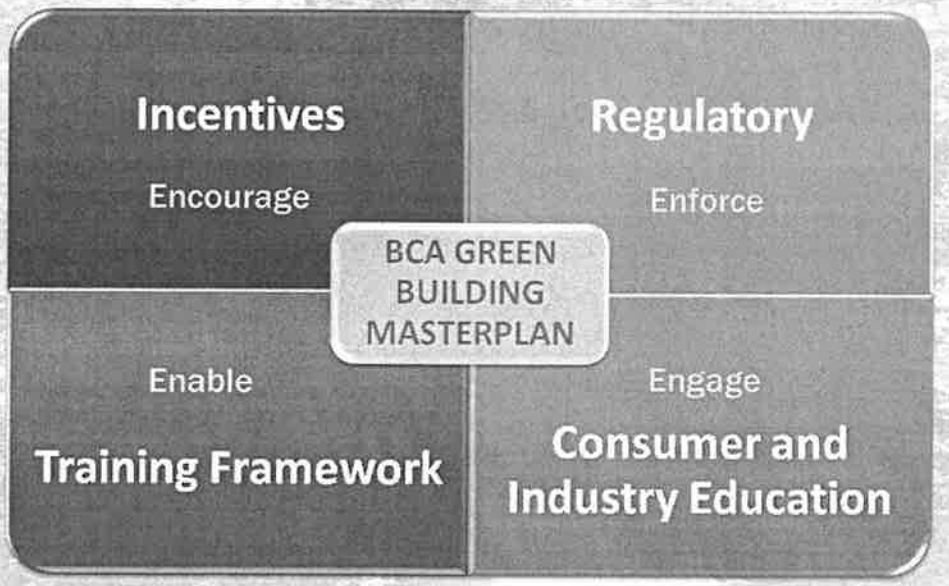


Main functions

1) E-books
2) Score Calculator
3) Ability to import and export the score calculation
4) Assistive calculator

BCA GREEN MARK

1st Green Building Masterplan



Success of 1st Green Building Masterplan



IMCSD (Inter-Ministerial Committee on Sustainable Development)

Key Planning Objective – promotion of green buildings is essential to sustainable development (SD)

BCA formulated the 2nd Green Building Masterplan

- In support of the IMCSD's targets
- To step up efforts in delivering a sustainable built environment



www.sustainablesingapore.gov.sg

IMCSD's Target for our Built Environment

80% OF BUILDINGS 'GREEN' 2030



2nd Green Building Masterplan

The SECOND GREEN WAVE: THE BCA 2nd GREEN BUILDING MASTERPLAN

6 Strategic Thrusts



A copy of the 2nd Green Building Masterplan can be obtained from BCA website at

http://www.bca.gov.sg/GreenMark/others/gbmp2.pdf ✓

2nd Green Building Masterplan

New Buildings



Key Initiatives: Implemented in April 2009

NEW Public Sector Buildings with more than 5000 m^2 air-conditioned floor areas to achieve Green Mark Platinum rating

- Beyond current mandatory requirement of GM Certified rating



For Public Sector Taking the Lead

Implementation timeline for the adoption of GM V4.1 is based on the date of tender notices for consultancy or design and build contract

Projects with tenders for design that are called before 15 Jan 2013 will be assessed and certified using the BCA Green Mark Criteria for new Buildings (GM V4.0)

15 Jan 2013

Projects with tenders for design that are called on or after 15 Jan 2013 will be assessed and certified using the BCA Green Mark Criteria for new Buildings (GM V4.1)

2nd Green Building Masterplan

Existing Buildings



Key Initiatives:

- **Existing Public Sector Buildings with more than 10,000 m² air-conditioned floor area to achieve Green Mark Gold^{Plus} rating by 2020**



2nd Green Building Masterplan

New Buildings



Key Initiatives:

GOVT Land Sales Sites to require higher-Tier Green Mark ratings *(Platinum and GoldPlus)*

For strategic development projects in new growth areas



Objective : To achieve at least 25% reduction in energy use

2nd Green Building Masterplan

Projects In GLS



Key Initiatives:

Regulation in place since 5 May 2010

GOVT Land Sales Sites to require higher-Tier Green Mark ratings *(Platinum and Gold^{Plus})*

For strategic development projects in new growth areas

Any new development located on land sold on or after 5 May 2010 under the GLS programme are subject to building regulatory control.

These projects must attain the prescribed ratings under the BCA Green Mark Certification Process before TOP/CSC can be granted

For more details refer to BCA website : Circular issued on 6 May 2010
Reference : BCA BC 15.0.3

For GLS Programmes in Strategic Areas

Implementation timeline for the adoption of GM V4.1 is based on the GLS tender closing date for the land sold

On or after **1 Dec 2010**

- To comply with Green Mark Gold^{Plus} or Platinum Rating
- BCA Green Mark Assessment and Certification based on GM V4.0

On or after **15 Jan 2013**

- To comply with Green Mark Gold^{Plus} or Platinum Rating
- BCA Green Mark Assessment and Certification based on GM V4.1

2nd Green Building Masterplan

New Buildings



Green Mark Gross Floor Area (GM GFA) Incentive Scheme

for private sector to achieve higher Green Mark ratings

Building and Construction Authority

URBAN REDEVELOPMENT AUTHORITY

For more information
http://www.bca.gov.sg/greenMark/gmgfa.html

- *Enhanced GM GFA criteria is with effect from 2 Jul 2012 to 28 Apr 2014*

Green Mark GFA Incentive Scheme

New Buildings



Green Mark Platinum

- Up to 2% additional GFA beyond MP GPR
- Subject to cap of 5,000 sqm

Green Mark GoldPlus

- Up to 1% additional GFA beyond MP GPR
- Subject to cap of 2,500 sqm

Eligibility – GM GFA Incentive

- New private developments, redevelopments and reconstruction developments (major A&A and major retrofitting for EB may be considered)
- New developments that have obtained Planning Approval but not yet commenced construction of superstructure works
- Applicable to existing developments (>10 yrs old from TOP date) if they undergo "substantial energy efficiency (EE) enhancements" to achieve high GM rating under GM New Bldg category

Eg.
- Facade upgrade
- AHU upgrade
- change lighting

Residential	Non-landed, Mixed commercial & residential development and others (approved case-by-case)
Non-Residential	Commercial, office, retail, business parks, industrial, institutional, community building, hotel, hospital, white site development and others (approved case-by-case)

Quantum of GM GFA

The quantum of GM GFA is based on the equivalent value of the additional ost (i.e. Green Premium) to achieve higher Green Mark Rating

$$\text{GM GFA} = \frac{\text{Total Permissible GFA} \times \text{Green Premium}}{\text{Land Value}}$$

where Land Value = DC Rate X 10/7

Note : Payment of Development Charge (DC) / Differential Premium is applicable

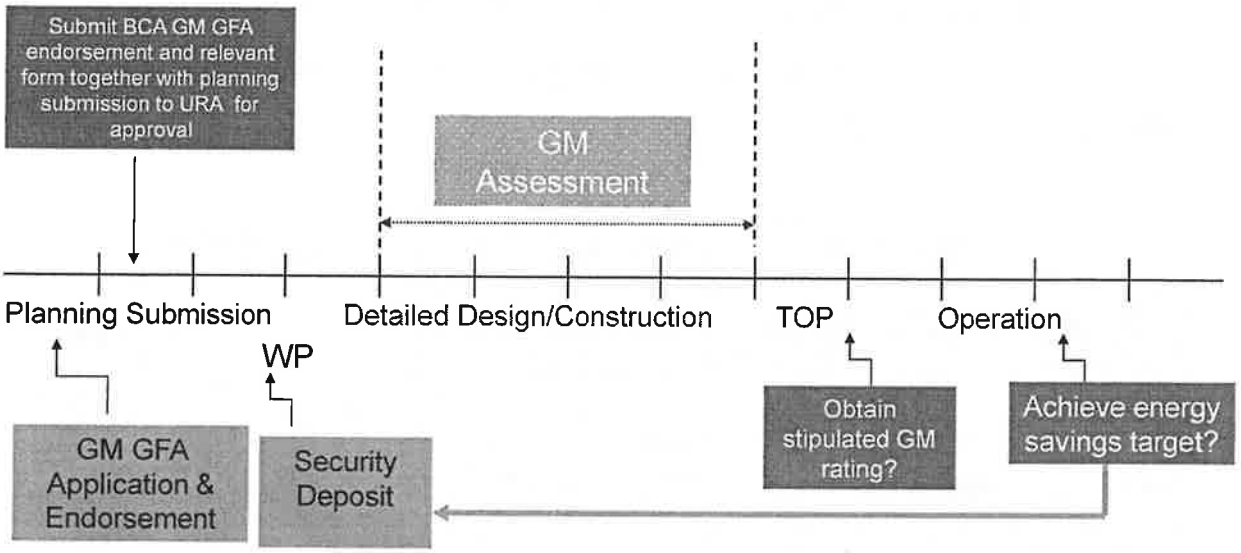
Prescribed Green Premium

- Prescribed Green Premium is the average green premium derived from past GM projects taking into account the market price changes.
- Review every 6 months (1 Mar & 1 Sep)
- Latest rates of Prescribed Green Premium (from 1 Mar 2014 to 31 Aug 2014)

Type of Development	GM Platinum	GM Gold^{Plus}
Non-Residential	$166 / sqm	$97 / sqm
Residential	$123 / sqm	$97 / sqm

For green premium rates, please refer to:
http://www.bca.gov.sg/GreenMark/others/gfa_appa08_29042014.pdf

BCA GM GFA Application and Evaluation Process



Provision of Security Deposit

Applicants need to raise security deposit (SD) which is the equivalent market value of the allowable GM GFA

50%

Security Deposit (SD) = Equivalent Market Value (EMV) of allowable GM GFA

where the Equivalent Market Value (EMV) is based on the Land Value and Full Quantum of Allowable GM GFA. That is:

Equivalent market value (EMV) = Land Value x Full Quantum of Allowable GM GFA

Important note : Currently, applicants will only need to provide SD at 50% of the EMV

Non-Compliance Cases

At TOP Stage

- If projects cannot meet the target GM rating, the security deposit will be forfeited depending on the outcome of the GM rating attained.

Targeted / Attained	Platinum	Gold^{Plus}
Gold^{Plus}	50% of EMV	-
Gold or below	100% of EMV	100% of EMV

Non-Compliance Cases

One Year After TOP Stage

- Site validation & energy savings (if applicable)
- Amount to be deducted for not achieving energy saving :

Targeted / Achieved energy saving	GM Platinum *(at least 30% energy savings)*
27.5% to less than 30%	10% of EMV
25% to less than 27.5%	30% of EMV
Less than 25%	50% of EMV
Targeted / Achieved energy saving	**GM Gold^{Plus} *(at least 25% energy savings)***
22.5% to less than 25%	10% of EMV
20% to less than 22.5%	30% of EMV
Less than 20%	50% of EMV

Private commercial development at CBD with Total Permissible GFA of 50,000 sqm. Target : GM Platinum rating

COMPUTATION OF ALLOWABLE GM GFA	
DC Rate	$7,000 / sqm
Land Value	$7,000 x 10/7 = $10,000 / sqm
Prescribed Green Premium (Commercial - GM Platinum)	$166/sqm
Equivalent GM GFA	= Total Permissible GFA x Green Premium / Land Value = (50,000 x 166) / 10,000 = 830 sqm
Allowable GM GFA	**830 sqm**

Important note :
(1) For projects with GM Platinum Rating, the allowable GM GFA is up to 2% GFA and capped at 5000m²
(2) For projects with GM Goldplus Rating, the allowable GM GFA is up to 1% GFA and capped at 2500 m²

Provision of Security Deposit

COMPUTATION OF SECURITY DEPOSIT	
Allowable GM GFA	830 sqm
DC Rate	$7,000 / sqm
Land Value	$7,000 x 10/7 = $10,000 / sqm
Equivalent Market Value (EMV) of allowable GM GFA	Land Value x Allowable GM GFA = 10,000 x 830 = $8,300,000
Security Deposit Current arrangement of 50% of EMV – subject to further review.	50% of EMV = $8,300,000 x 0.5 = **$4,150,000**

If cannot meet the targeted GM rating after GM certification....

At TOP Stage

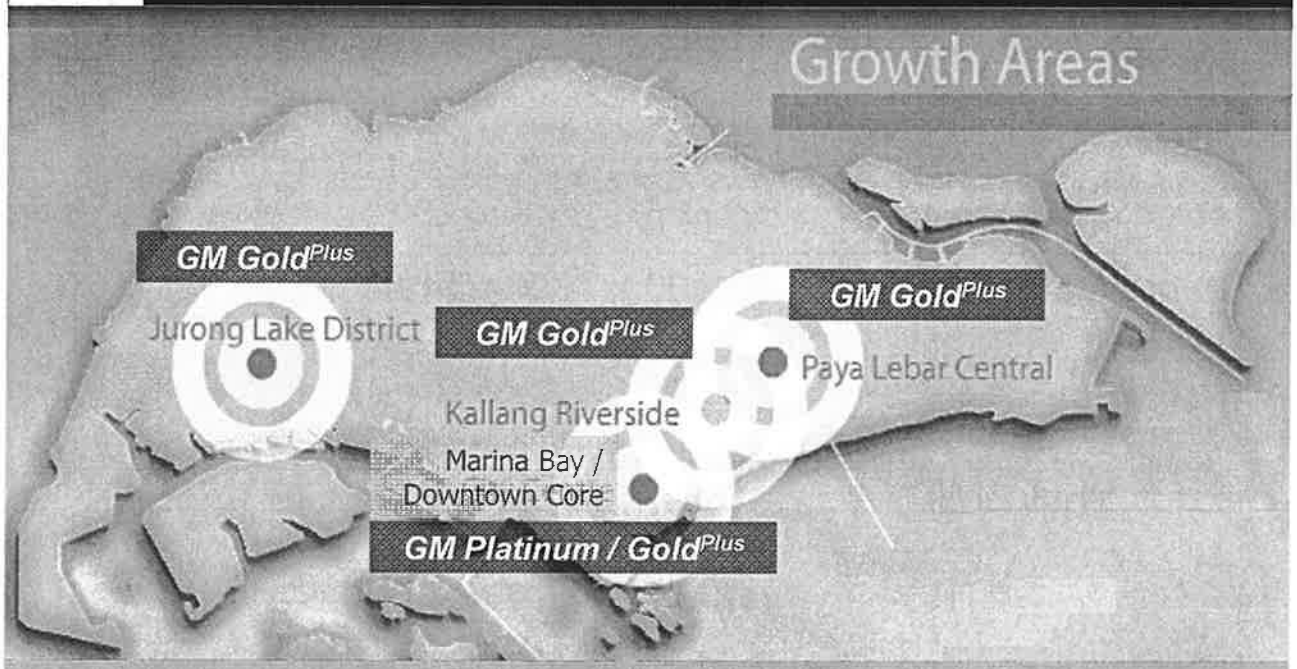
PAYABLE AMOUNT FOR NOT ACHIEVING GM RATING	
GM Rating attained	Goldplus
GM GFA granted	830 sqm
DC Rate	$7,000 / sqm
Land Value	$7,000 x 10/7 = $10,000 / sqm
Equivalent Market Value (EMV) of GM GFA granted	Land Value x GM GFA granted = 10,000 x 830 = $8,300,000
Amount to be deducted	50% of EMV = $8,300,000 x 0.5 = **$4,150,000**

If project cannot achieve the energy saving required....

PAYABLE AMOUNT FOR NOT ACHIEVING **ENERGY SAVING**	
GM Rating attained	Goldplus
Energy savings	23%
Amount to be deducted	10% of EMV = $8,300,000 x 0.1 = **$830,000**

Achieved energy saving / Targeted	Goldplus
22.5% to less than 25%	**10% of EMV**

Eligibility – GM GFA Incentive for GLS sites



Developers with projects in Govt Land Sale (GLS) sites that come with GM Gold^{Plus} rating as the land sale conditions can apply for incremental GM GFA incentive for attaining GM Platinum

Private commercial development at CBD with Total Permissible GFA of 30,000 sqm under GLS site with mandatory GM Goldplus standard as sales condition. Project Target : GM Platinum Rating

COMPUTATION OF ALLOWABLE GM GFA (for Platinum Rating)	
DC Rate (from URA)	$2,800/ sqm
Land Value	$2,800 x 10/7 = $4,000/ sqm
Prescribed Green Premium (Commercial - GM Platinum)	$166/sqm
Equivalent GM GFA	= Total Permissible GFA x Green Premium / Land Value = (30,000 x 166) / 4,000 = 1,245 sqm
Allowable GM GFA	**= 600 sqm (Cap at 2% GFA)**

Important note :
(1) For projects with GM Platinum Rating, the allowable GM GFA is up to 2% GFA and capped at 5000m²
(2) For projects with GM Goldplus Rating, the allowable GM GFA is up to 1% GFA and capped at 2500 m²

Private commercial development at CBD with Total Permissible GFA of 30,000 sqm under GLS site with mandatory GM Goldplus standard as sales condition. Project Target : GM Platinum Rating

Cont'd

COMPUTATION OF ALLOWABLE GM GFA (for Gold^{Plus} Rating)	
DC Rate (from URA)	$2,800/ sqm
Land Value	$2,800 x 10/7 = $4,000/ sqm
Prescribed Green Premium (Commercial - GM Gold^{Plus})	$97/sqm
Equivalent GM GFA	= Total Permissible GFA x Green Premium / Land Value = (30,000 x 97) / 4,000 = 727.5 sqm
Allowable GM GFA	**= 300 sqm (Cap at 1% GFA)**

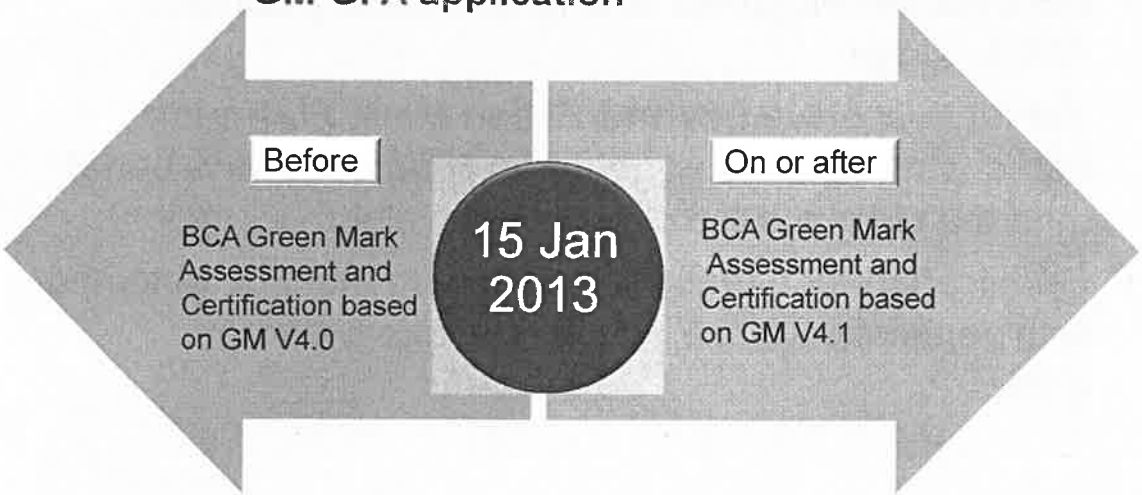
Private commercial development at CBD with Total Permissible GFA of 30,000 sqm at GLS site with mandatory GM Goldplus standard as sales condition. Project Target : GM Platinum Rating

Cont'd

COMPUTATION OF INCREMENTAL ALLOWABLE GM GFA FOR PROJECT AT GLS SITE WITH MANDATORY GM GOLD^{Plus} RATING)	
Allowable GM GFA For GM PLATINUM Rating **600 sqm**	Allowable GM GFA For GM GOLD^{Plus} Rating **300 sqm**
Incremental Allowable GM GFA	600 – 300 = 300 sqm

For BCA Green Mark GFA Incentive Scheme

Implementation timeline for the adoption of GM V4.1 is based on the **submission date of BCA GM-GFA application**



INCENTIVES FOR DESIGN PROTOTYPE

Design Workshop
Emphasis on Integrated Design
Higher Energy Efficiency Standard

Funding for engagement of ESD consultants
To conduct design workshops and simulation studies in the early design stage to achieve a breakthrough and optimal design

Up to 70% of qualifying costs or $600,000 whichever lower

S$5 million



- *Effective from 1 Oct 2010 or when the GMIS-EB fund is fully disbursed, whichever is earlier*

Eligibility for GMIS-DP

- Potential development is in its preliminary concept design stage
- Target to achieve **beyond Green Mark Platinum**, demonstrating **energy savings of at least 40%** better than the current base code or equivalent
- Certification for Green Mark Platinum must be obtained with verification of the energy savings & energy modeling.

For more information:
http://www.bca.gov.sg/GreenMark/gmisdp.html

S$100 million

GREEN MARK INCENTIVES FOR EXISTING BUILDINGS (GMIS-EB)

For private sector to retrofit their building for better energy efficiency and building performance



Existing Buildings

Objectives of GMIS-EB

Existing Buildings



Key Objectives:

- Opportunity for existing buildings to meet new 'green' standards
- Accelerate the pace of energy improvement in our buildings
- Key step towards setting minimum environmental sustainability standards for existing buildings

For more information
http://www.bca.gov.sg/greenMark/gmiseb.html

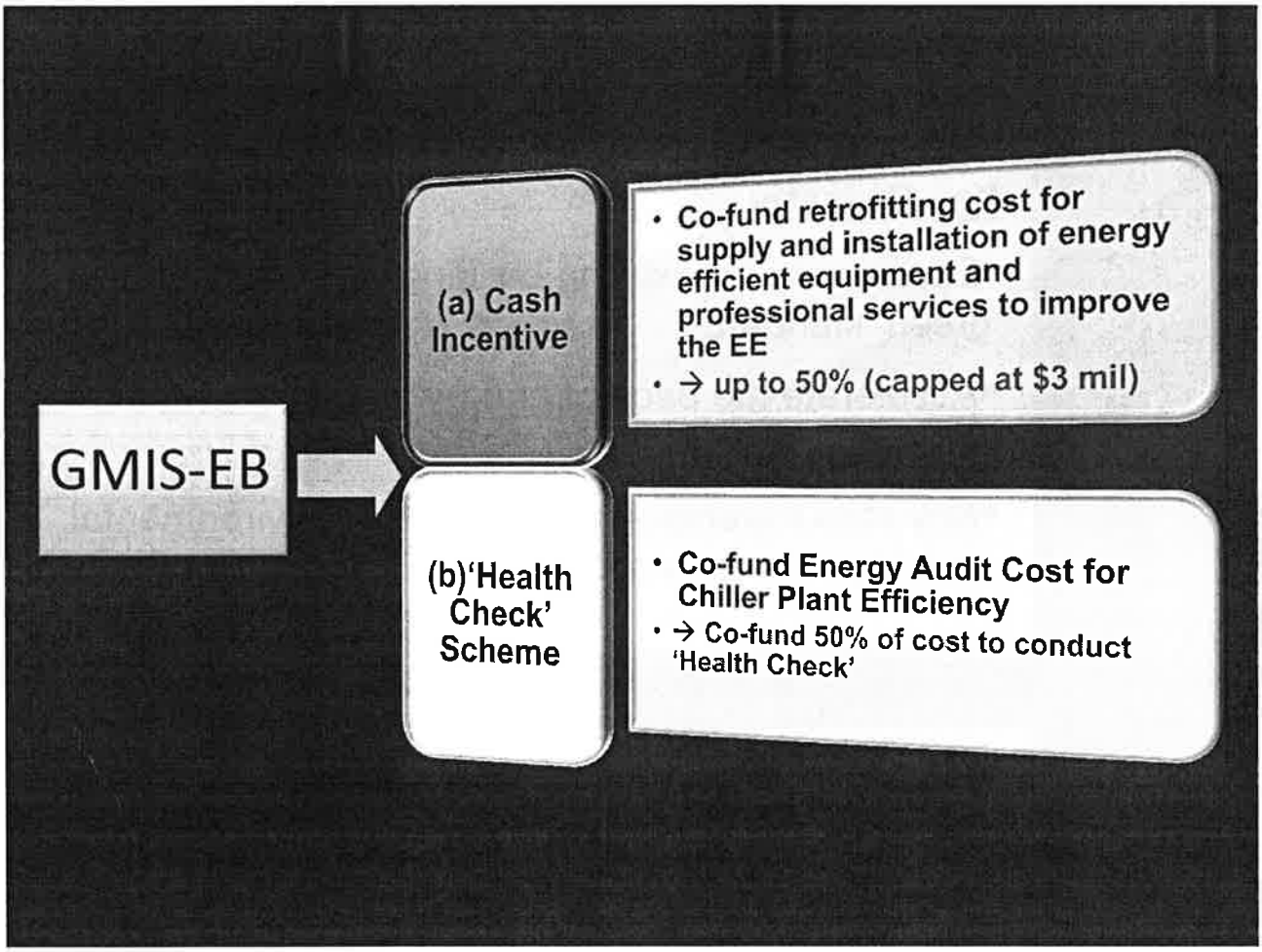
➢ *Note that the GMIS-EB fund is already fully committed*

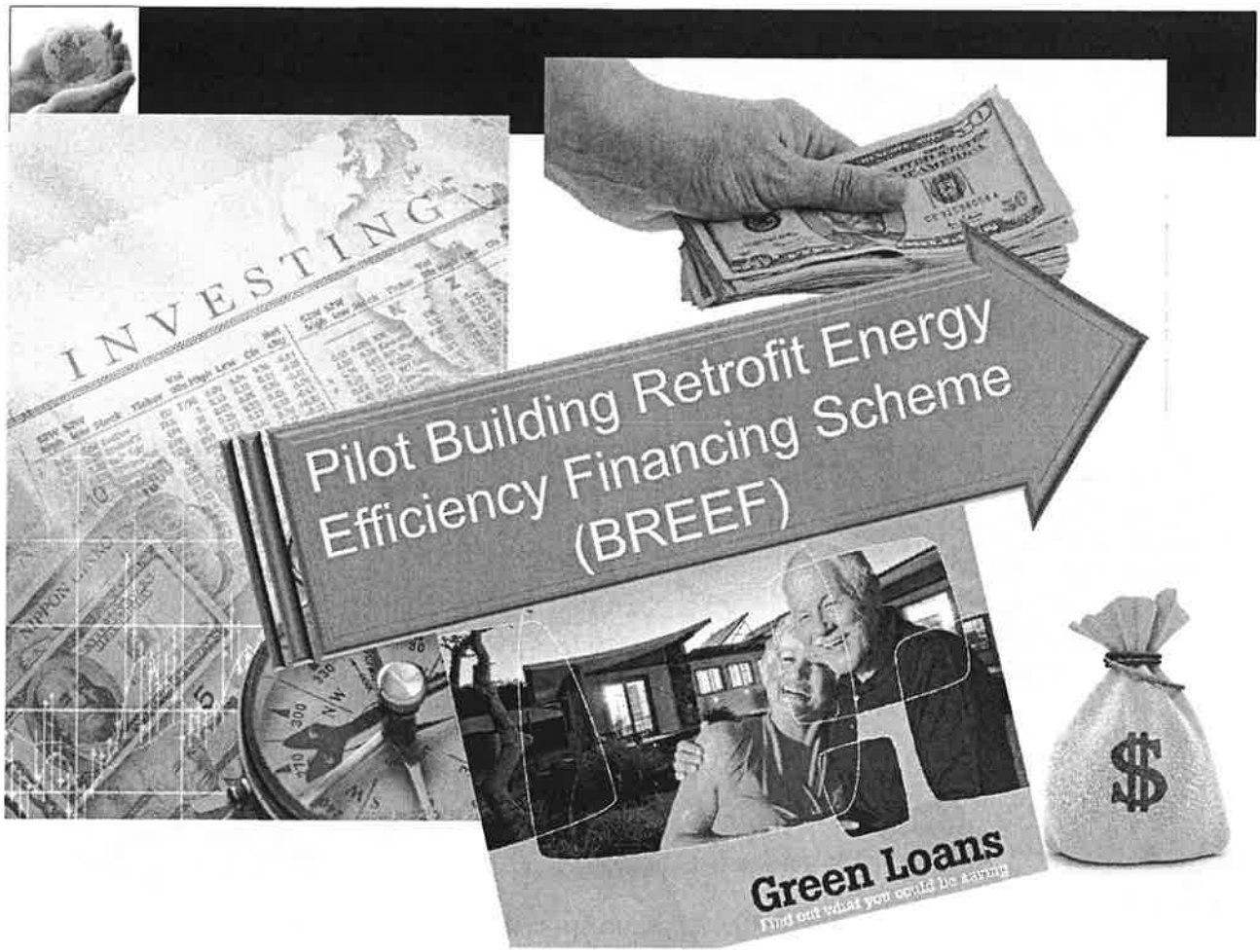
Eligibility – GMIS-EB

- Existing private non-residential development that is centrally air-conditioned (for example, shopping malls, offices, hotels, hospitals etc.
- GFA > 2000 m^2
- Upgrading / retrofitting works commenced after 29 Apr 09

▪Must have central chilled water air-con plants or which will be upgraded to have central chilled water plants

▪Attained a Green Mark rating or have applied for Green Mark certification under Green Mark for Existing Non-Residential Buildings (Version 3)





2nd Green Building Masterplan

New Buildings



Key Initiatives:

Green Mark Incentive Schemes (GMIS)

1. $20 million GMIS (New Building) – Fully committed
http://www.bca.gov.sg/GreenMark/gmis.html

2. Enhanced GM GFA Incentive – Only for Gold^{Plus} and Platinum projects
http://www.bca.gov.sg/GreenMark/gmgfa.html

3. $100 million GMIS (Existing Building)- Fully committed
http://www.bca.gov.sg/GreenMark/gmiseb.html

4. $5 million GMIS (Design Prototype)
http://www.bca.gov.sg/GreenMark/gmisdp.html

5. BREEF Scheme
http://www.bca.gov.sg/GreenMark/breef.html

2nd Green Building Masterplan

Green Building Professionals



Certification Programmes

Green Mark Manager Course
Green Mark Professional Course
Green Mark Facility Manager Course

Executive Programmes

Leadership in Environmental Sustainability
Innovation in Sustainable Design and Technology

Academic Programmes

M(Sc), Graduate Degree, Degree, Specialist Diploma, Diploma and Technical Courses









To train 18,000 to 20,000 green specialists within the next 10 years

2nd Green Building Masterplan

International Profiling & Raising Awareness

International Green Building Conference 2014
Singapore

IGBC 1-3 September 2014
Marina Bay Sand, Singapore





5

International Profiling & Raising Awareness

Collaborative Partnerships

Strategic Alliance

BCA Centre for Sustainable Buildings Singapore

A Centre Collaborating with UNEP

Policy Development & Capacity Building





Collaborations amongst SEA countries on SB initiatives

Connectivity into International Network

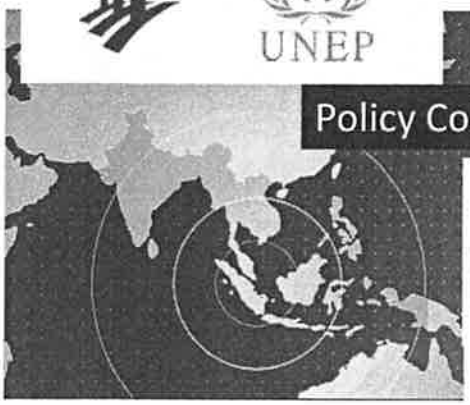




Information Sharing & Outreach

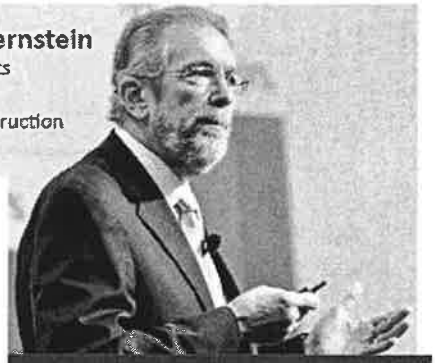
BCA

UNEP



Policy Collaboration

Mr Harvey Bernstein
VP Industry Insights & Alliances
McGraw Hill Construction



International Green Building Conference 2014
Singapore

1-3 SEPTEMBER 2014
MARINA BAY SANDS, SINGAPORE

International Network

Imposing Minimum Standards – Closing the Loop



Ensure that a building that is designed and constructed as a green building would continue to operate efficiently through its life cycle

- Minimum Green Mark Standard for New Buildings Implemented in Apr 2008.

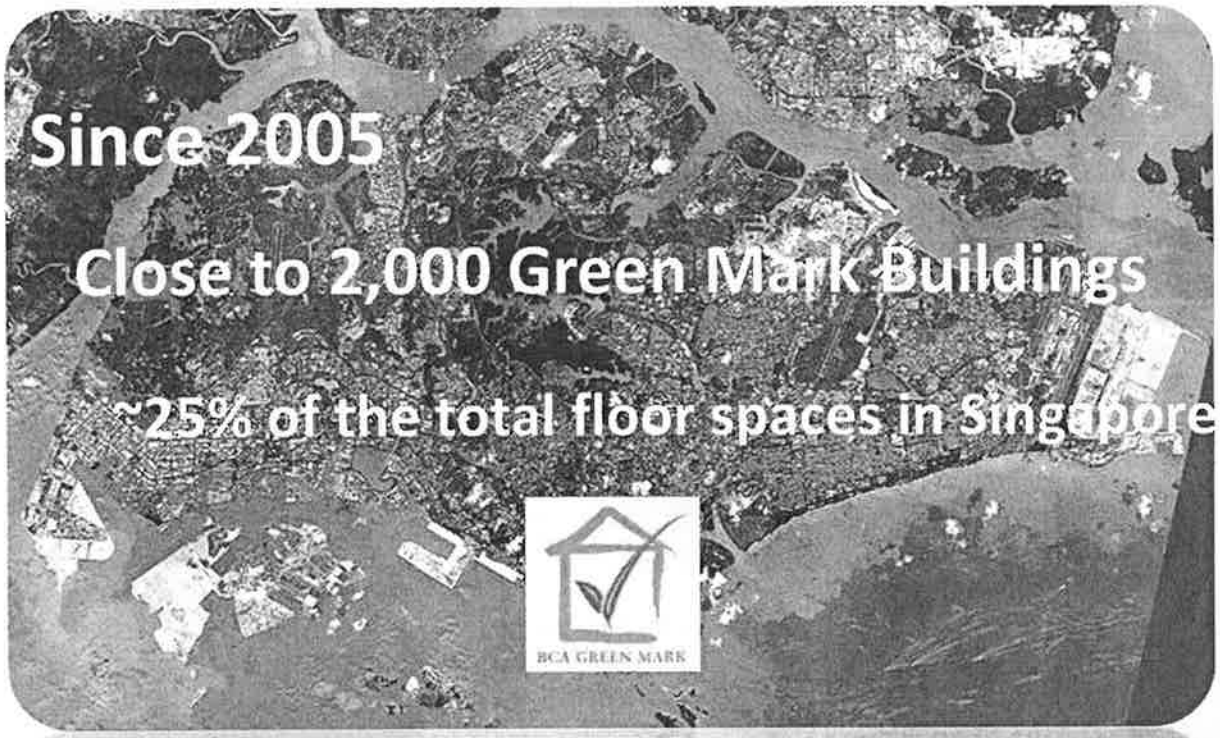
New Building Legislation

- Minimum Green Mark Standards for Existing buildings
- Scope: Existing bldg with A/C areas > 15,000m^2 (Phase 1)
- Periodic energy audit (3 year submission & compliance)
- Mandatory Energy submission (yearly)

Existing Building Legislation

6

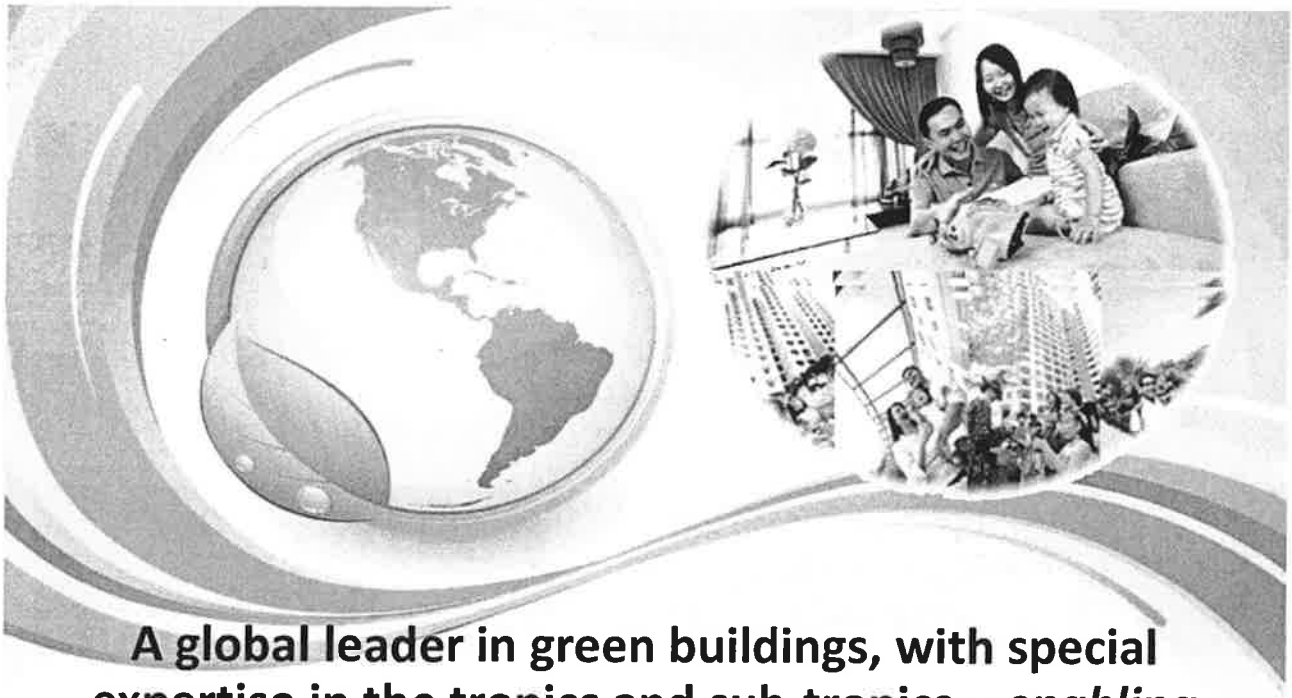
Our Green Journey





The Direction Ahead – 3rd Green Building Master Plan

OUR GREEN BUILDING VISION ...



A global leader in green buildings, with special expertise in the tropics and sub-tropics – *enabling sustainable development and quality living*

Join us this September at IGBC

International Green Building Conference 2014
Singapore



Build Green - Lead, Engage, Sustain

1 - 3 Sep 2014 • Sands Expo & Convention Centre, Marina Bay Sands

For more information, please refer to http://www.sgbw.com.sg/ or email to bca_igbc_marketing@bca.gov.sg

For sponsorship opportunities, please contact Mr Benjamin Huang Tel: +65 6325 5084 Email: benjamin_huang@bca.gov.sg

- ✓ Singapore 3rd Green Building Masterplan *<New>*
- ✓ Preview on Green Mark Version 5
- ✓ Latest update of BCA Green Mark Schemes
- ✓ Updates from the Asia-Pacific region on Sustainable Development
- ✓ Green Building Trends, Technologies & Strategies
- ✓ Converge with 10,000 delegates from over 50 countries
- ✓ Green Tours
- ✓ Held alongside the annual BEX ASIA 2014 (exhibition of green construction and building products and services)



International Green Building Conference 2014

Singapore

BUILD GREEN - Lead, Engage, Sustain

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Must Attend

Conference • Workshops • Tours • Exhibition • Networking

1 - 3 Sep 2014, Singapore
Sands Expo & Convention Centre
Marina Bay Sands



Organised by Building and Construction Authority

Strategic Partner Singapore Green Building Council

Diamond Sponsor Mitsubishi Electric — Changes for the Better

Co-Located Event BEX Asia



Together we can make a difference in shaping a Sustainable World Class Built Environment



THANK YOU