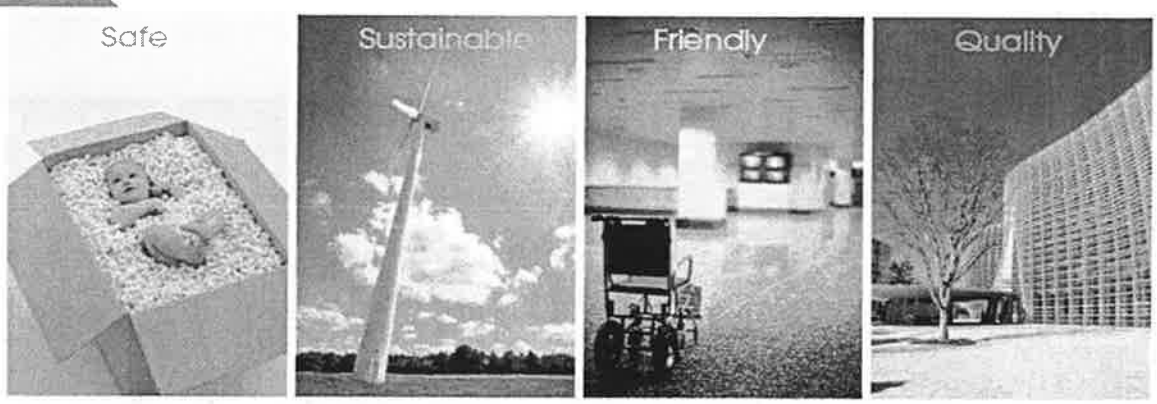
Requirements on Environmental Sustainability for Buildings



We shape a safe, high quality, sustainable and friendly built environment

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

Regulatory Requirement before 15 April 2008

Legislative Framework

- **Building Control (BC) Act**
- Building Control Regulations
- Building Control (Accredited Checkers) Regulations
- Building Control (Buildable Design) Regulations
- Building Control (Inspection of Building) Regulations
- Building Control (Temp Bldgs) and (Outdoor Advertising) Regulations
- **Approved Document – Energy Efficiency/ Lighting and Ventilation**

Only new building works need to comply with energy efficiency requirement under Approved Document

2 Key Requirements

- **ETTV and RTTV = 50 W/m²**
- **Air-Conditioning Equipment and lighting – newly revised code SS530 together with other requirements such as electrical sub metering etc**

Only if Air-Conditioned Space > 500 m²

Enabling Provision under the Building Control Act

Section 49 (a)(2)(e)(viii)

"Environmental sustainability measures that improve the total quality of life and minimises adverse effects to the environment, both now and in the future;"

Building Control (Amendment) Bill was passed by Parliament on 20 Sep 2007

Legislative Framework

Objective

- To establish a **minimum environmental sustainability standard** in the planning, design, construction and operation of building projects, to mitigate the environmental impacts of built structures

Legislative Framework

What is the minimum environmental sustainability standard ?

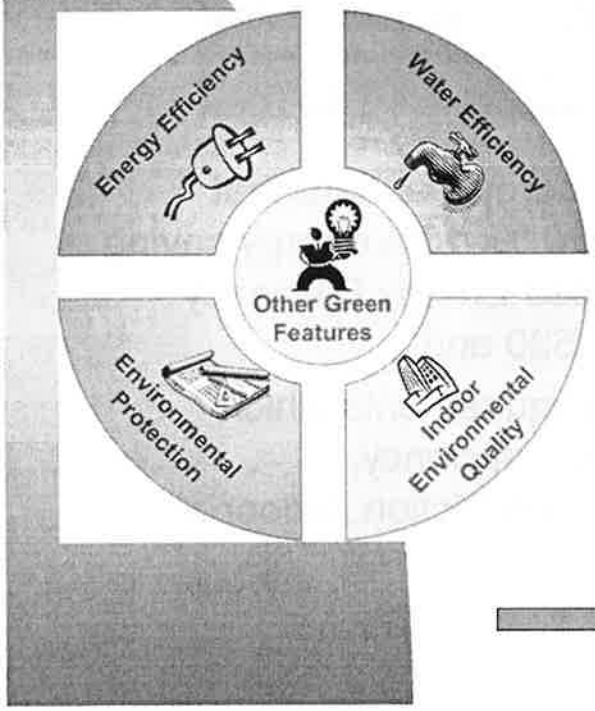
- A minimum energy standard that yields about 10 % -15% energy saving over our revised Energy Efficiency Standard SS 530 and
- Other green requirements which enhance water efficiency, environmental protection, indoor air quality etc

Agenda

1. Background
2. Legislative Framework
3. Responsibilities of QP & Practitioners
3. Administrative Procedures

Legislation using BCA Green Mark

BCA Green Mark is used as the compliance method



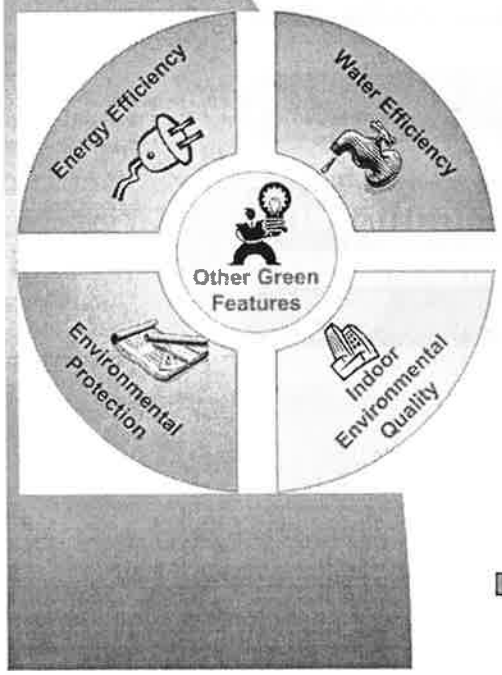
Min 50 points

Set minimum requirements for environmental sustainability that is equivalent to Green Mark Certified Level

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

Legislation Framework

BCA Green Mark criteria are used as the compliance method



Min 50 points

Set minimum requirements for environmental sustainability that is equivalent to Green Mark Certified Level

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

Scope of Legislation

In other words, it shall apply to :

- Building works which involve a gross floor area of 2,000 m^2 or more
- Building works which involve increasing the gross floor area of an existing building by 2,000 m^2 or more

  ⇒ **Addition to a building**
- Building works relating to an existing building which involve a gross floor area of 2,000 m^2 or more and with major retrofitting works

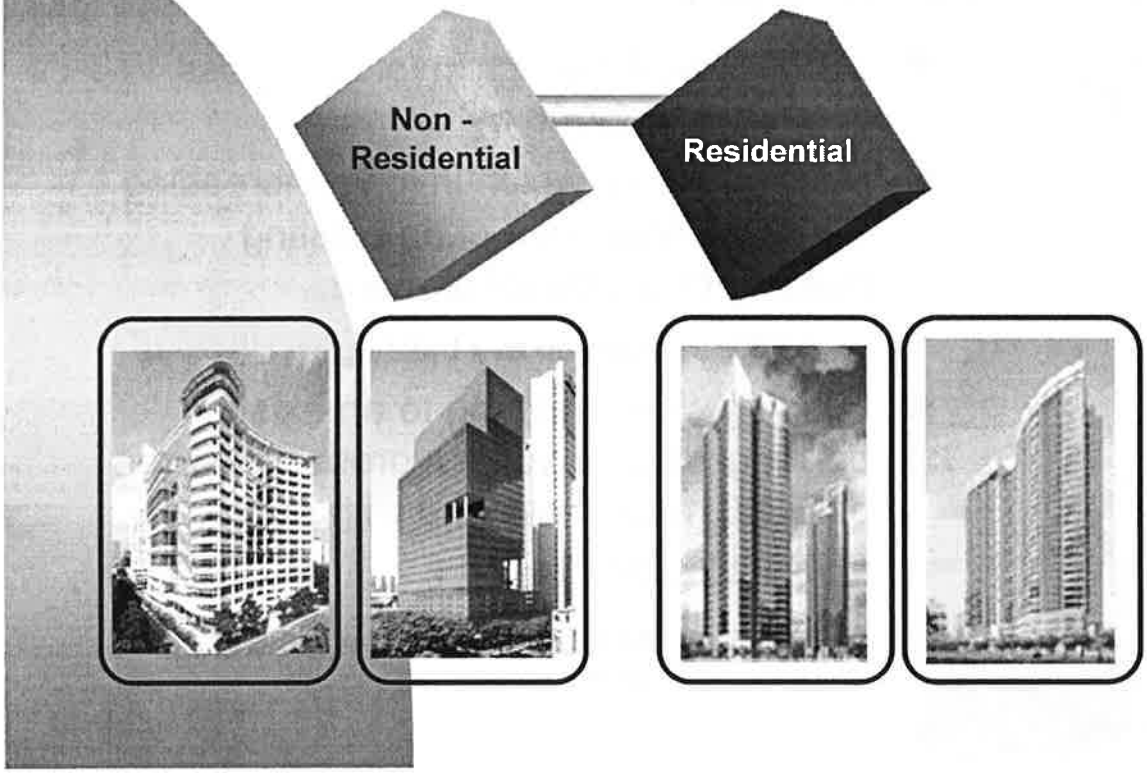
  ⇒ **Alteration with major retrofitting works as defined**

Scope of Legislation

Implementation Time Frame

- Requirement implemented from 15 Apr 08 onwards
- Effective date will be pegged with the 1st submission date to URA for Planning Permission

Green Mark Criteria



BCA Green Mark Criteria for Non-Residential Buildings (GM V4.0 & V4.1)

To meet Green Mark Score 50 points

Minimum requirements

Prerequisite requirement

All relevant prerequisite requirements for the specific Green Mark rating are to be complied with

- ETTV of 50W/m2
- Singapore Standard SS530:2006

Energy Related Requirements Min 30 points

Elective Requirement for Energy Improvement (Combination of the following items to meet 30 points)

Part 1 - Energy Efficiency

Additional requirements

- 1-1 Thermal Performance of Building Envelope (Air - Con)
- 1-2 Air-Conditioning System (Non Air-Con)
- 1-3 Building Envelope – Design/ Thermal Parameters (Non Air-Con)
- 1-4 Natural Ventilation (Non Air-Con)
- 1-5 Daylighting (Non Air-Con)
- 1-6 Artificial Lighting (General)
- 1-7 Ventilation in Carparks (General)
- 1-8 Ventilation in Common Areas (General)
- 1-9 Lifts and Escalators (General)
- 1-10 Energy Efficient Practices & Features (General)
- 1-11 Renewable energy (General)

Other Green Requirements Min 20 points

Elective Requirement from other areas Combination of the following items to meet 20 points)

- **Part 2 - Water Efficiency**
- **Part 3 – Environmental Protection**
- **Part 4 - Indoor Environmental Quality**
- **Part 5 – Other Green Features**

BCA Green Mark Criteria for Residential Buildings (GM V4.0 & V4.1)

To meet Green Mark Score
50 points

Minimum requirements

Prerequisite requirement

All relevant prerequisite requirements for the specific Green Mark rating are to be complied with

RETV of 25 W/m^2

Energy Related Requirements
Min 30 points

Other Green Requirements
Min 20 points

Additional requirements

Elective Requirement for Energy Improvement (Combination of the following items to meet 30 points)

Part 1 - Energy Efficiency

1-1 Thermal Performance of Building Envelope- RETV
1-2 Naturally Ventilated Design and Air-Conditioning System
1-3 Daylighting
1-4 Artifical Lighting
1-5 Ventilation in Carparks
1-6 Lifts
1-7 Energy Efficient Features
1-8 Renewable/Clean energy

Elective Requirement from other areas Combination of the following items to meet 20 points)

Part 2 - Water Efficiency

Part 3 – Environmental Protection

Part 4 - Indoor Environmental Quality

Part 5 – Other Green Features

The Building Control (Environmental Sustainability) Regulations

Legislative Framework

- Building Control (BC) Act
- Building Control Regulations
- Building Control (Accredited Checkers) Regulations
- Building Control (Buildable Design) Regulations
- Building Control (Inspection of Building) Regulations
- Building Control (Temp Bldgs) and (Outdoor Advertising) Regulations
- Approved Document – Energy Efficiency/ Lighting and Ventilation

New Regulation incorporated under BC Act

Building Control (Environmental Sustainability) Regulations 2008

For more details on the Environmental Sustainability Regulations 2008, refer to http://www.bca.gov.sg/BuildingControlAct/building_control_env_sus_regulations.htm

Definition of Appropriate Practitioner

Appropriate Practitioner in relation to any building works means –

(a) The qualified person appointed to prepare building plans

(b) A professional engineer registered under the Professional Engineers Act in mechanical or electrical engineering

Responsibilities of QP and Practitioners

Compliance to regulation based on Qualified Person's and Practitioners' Declaration

Who is responsible for the submission ?

QP – Architect or C&S Engineer

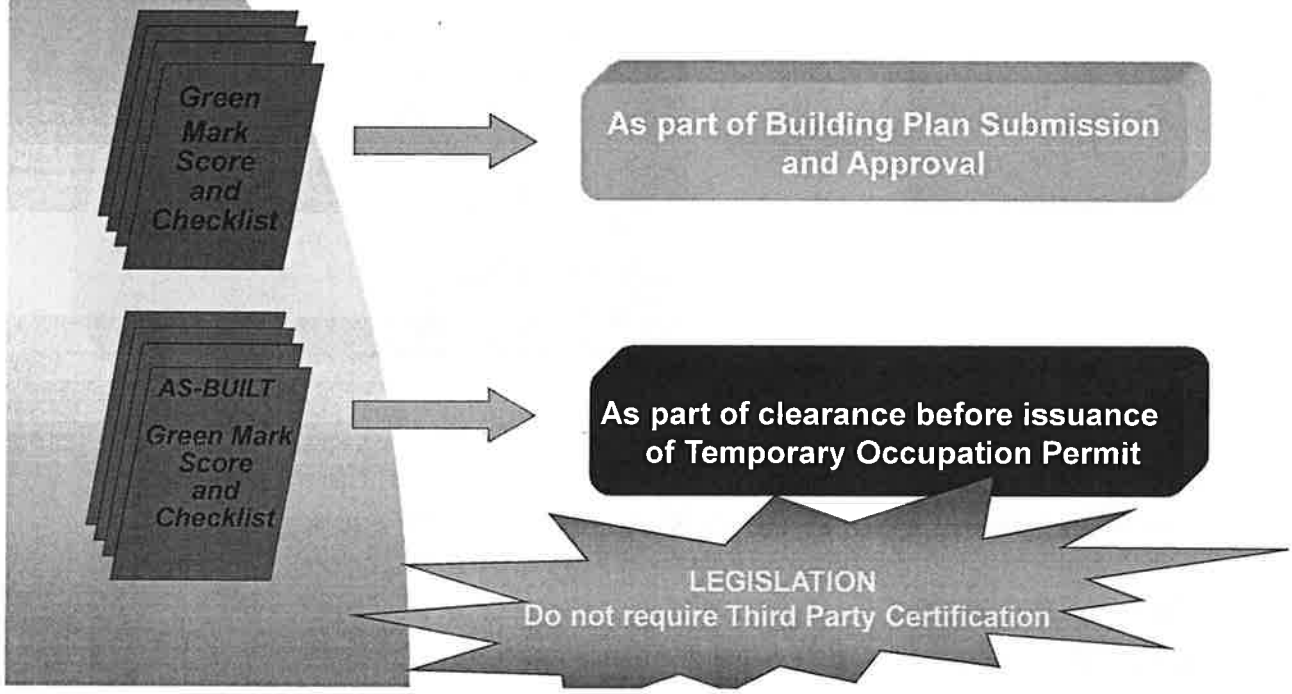
Overall-in-charge to ensure that the minimum environmental sustainability standard is achieved that is Green Mark Score of 50 points

Mechanical and Electrical Engineer

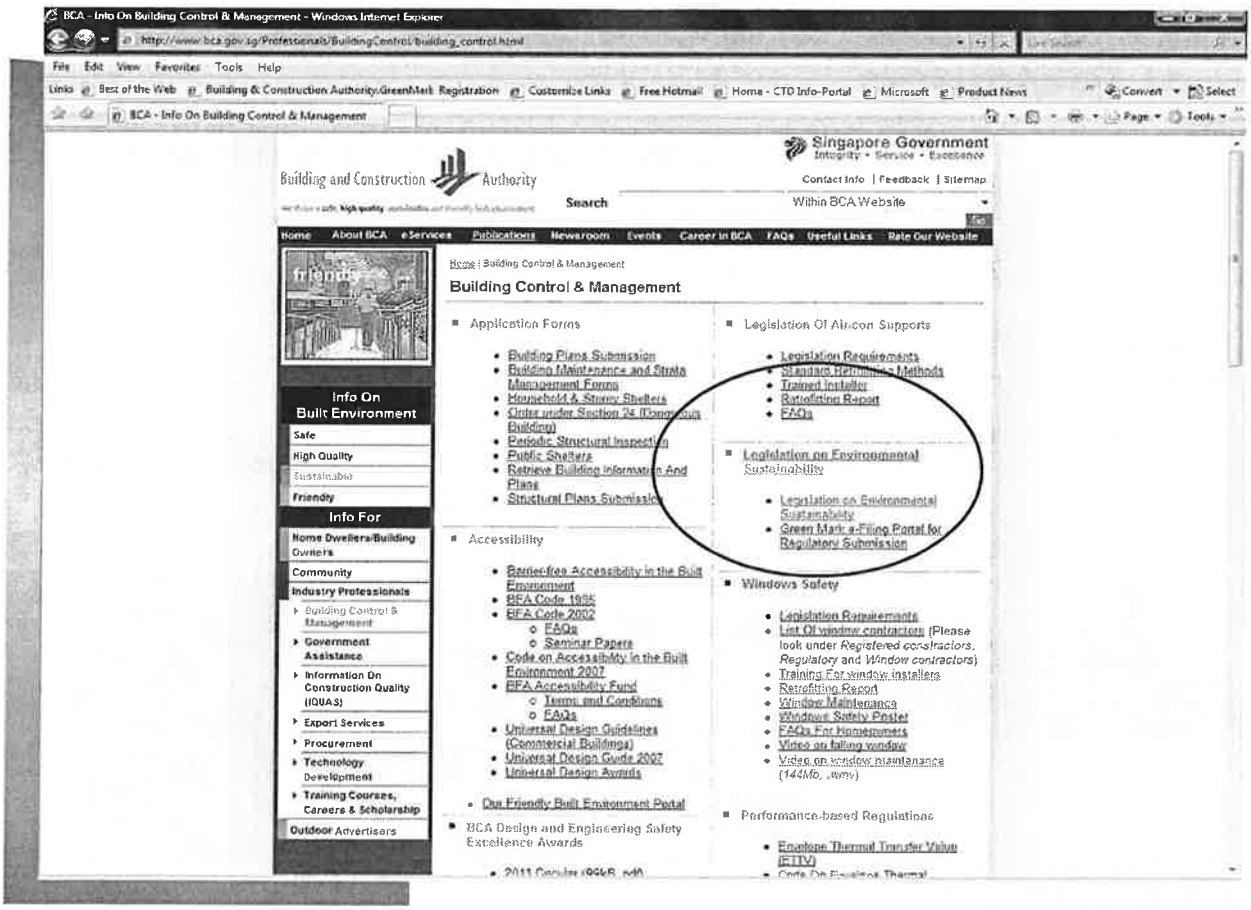
To be responsible for their part of the design and the respective points allocated

Compliance to Regulation

- Qualified Person's and other appropriate practitioners' declaration



http://www.bca.gov.sg/Professionals/BuildingControl/building_control.html



Building Control (Environmental Sustainability) Regulations

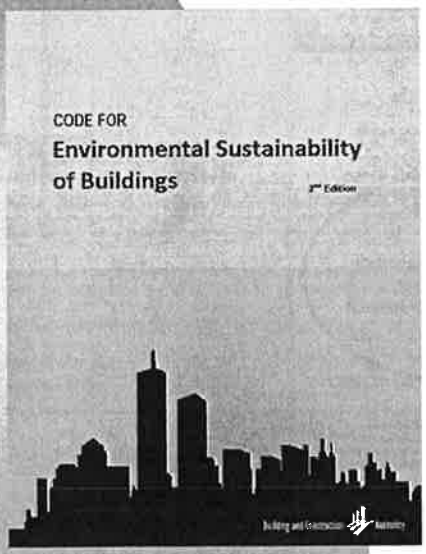
- Code will spell out the compliance method

Building Control (Environmental Sustainability) Regulations → **Code for Environmental Sustainability of Buildings**

- Statutory Requirements
- Areas of responsibility
- Submission Procedures
- Compliance Method

- QP and other appropriate practitioners are to ensure that their design meet the minimum environmental sustainability standard that is a minimum Green Mark score of 50 points using the scoring methodology or compliance method stated in the Code

Code for Environmental Sustainability of Buildings



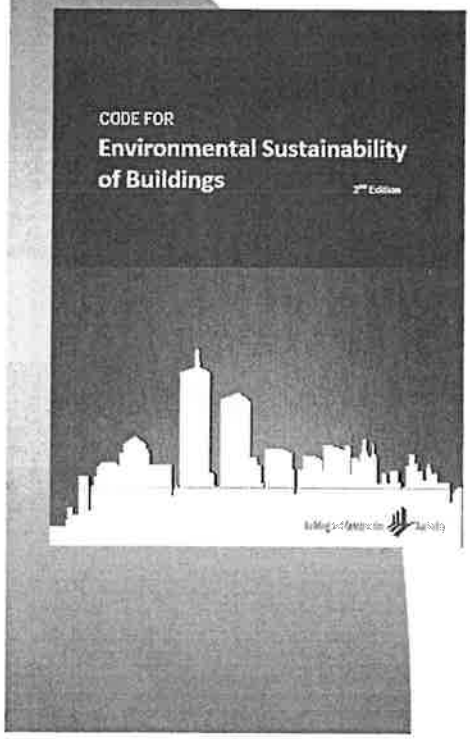
Code for Environmental Sustainability of Buildings

- **Scope**
- **Definitions**
- **Statutory Requirements**
- **Compliance Method**
- **Submission Procedures**
- **Annex A – Areas of Responsibility**
- **Annex B – Scoring Methodology & Documentation**
  - ➢ **Residential Building Criteria**
  - ➢ **Non-Residential Building Criteria**

Annex B consists of the following sections:

- ❑ Objectives
- ❑ Applicability
- ❑ Baseline Standard
- ❑ Requirements
- ❑ Documentary Evidences
- ❑ References
- ❑ Worked Examples

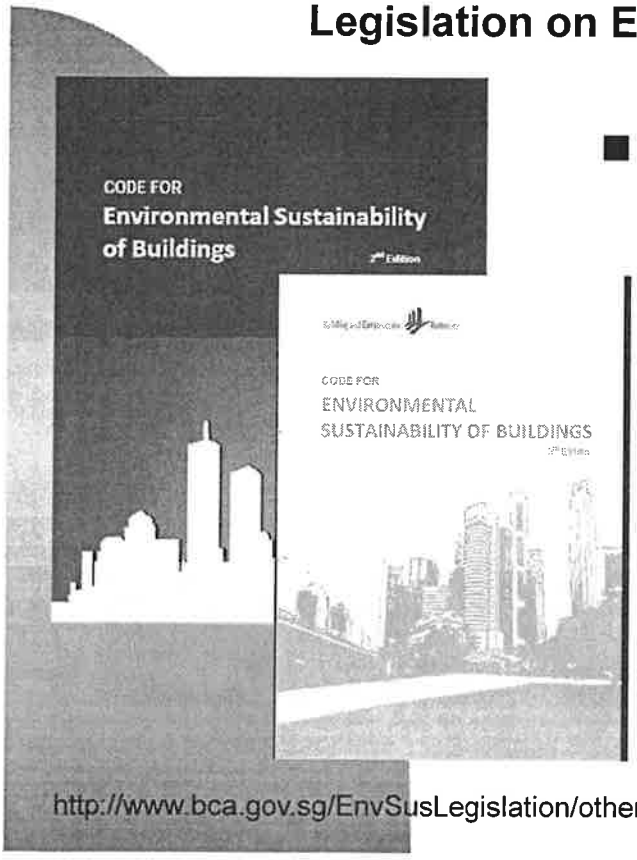
Code for Environmental Sustainability of Buildings



Code for Environmental Sustainability of Buildings

- **Annex C – Ventilation Simulation Methodology & Requirements**
- **Annex D – Daylight & Glare Simulation Methodology & Requirements**

Legislation on Environmental Sustainability



- The BCA Green Mark V4.0 and 4.1 are incorporated in the Code for Environmental Sustainability of Buildings (2nd Ed and 3rd Ed)

No change to the minimum GM score



http://www.bca.gov.sg/EnvSusLegislation/others/Env_Sus_Code2012.pdf

Compliance to Regulation

- Random audit and site checks may be conducted by BCA prior or during TOP inspection to be carried out to ensure compliance

Third party assessment by BCA will be conducted to award projects with Green Mark Gold Rating and above on a voluntary basis

Documentary Evidences

Documentary evidences :

For example :

- Tender specifications or equivalent
- Plan layouts and elevations showing the applicable areas, locations and types of green features
- Computation showing the relevant evidences in meeting the criteria

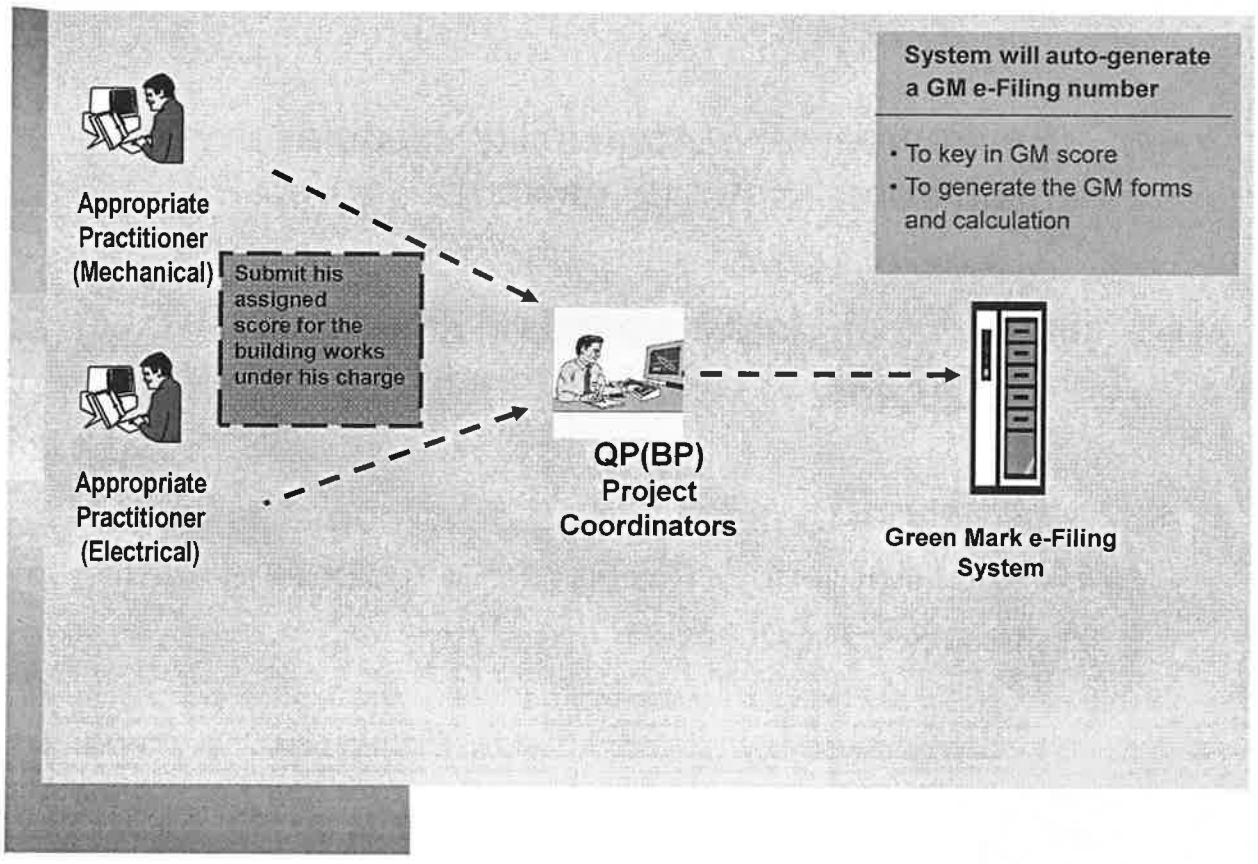
Submittal of documentary evidences may be required and shall be made in such manner and be in such form as the Commissioner of Building Control requires upon request.

Submission using GM e-Filing and Corenet e-Submission

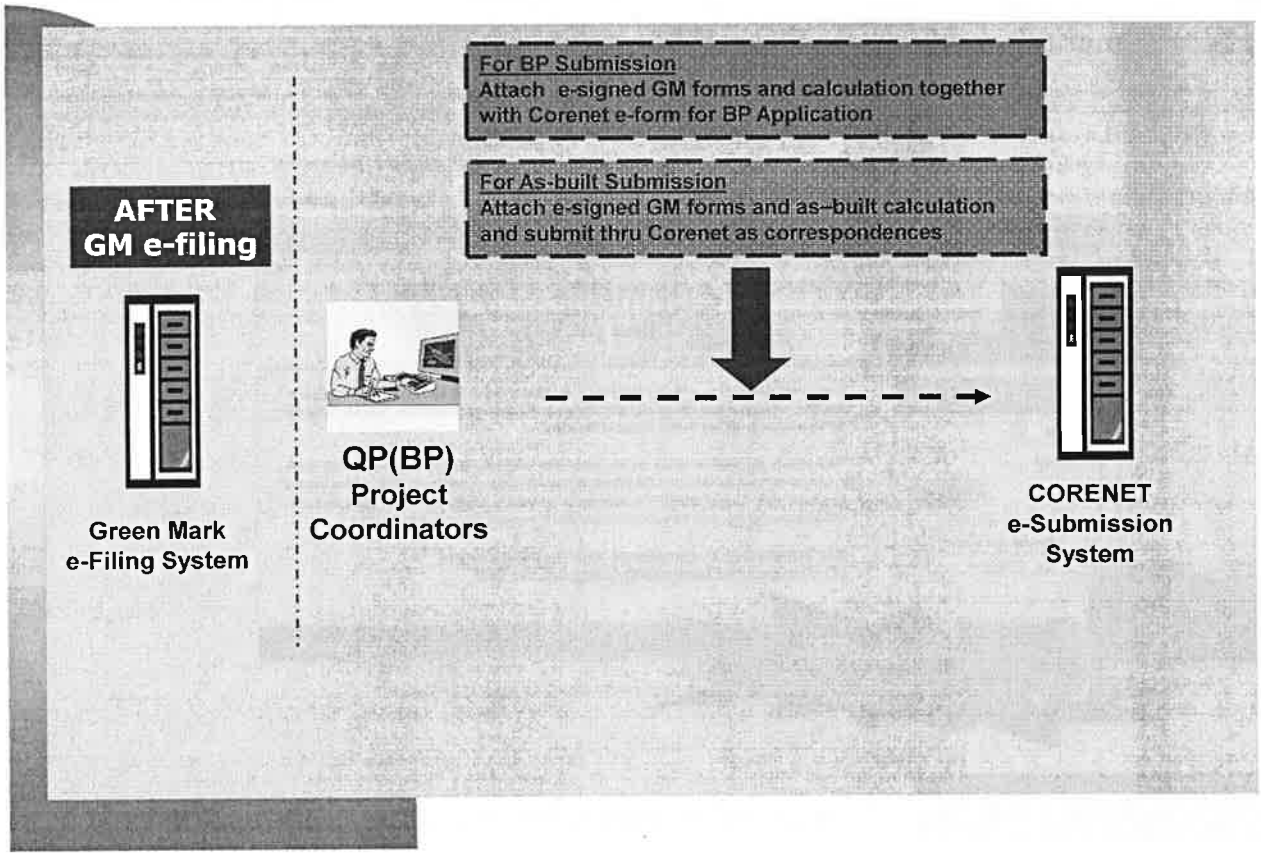


This portal is meant for regulatory submission only

Building Plan and As-Built Submission Stage



Building Plan and As-Built Submission Stage



In Summary…

Building control

- BC (Environmental Sustainability) Regulation is in operation from 15 Apr 08 onwards
- Implementation date is based on the 1st submission date to URA for planning approval
- It is applicable to new building developments and existing building undergoing major retrofitting with GFA of 2,000 m^2 or more

In Summary…

- Requirements form part of building plan submission process and TOP clearance
- Both QP(BP) and appropriate practitioners are responsible for this requirement
- Compliance method - Green Mark Criteria

LEGISLATION
No Third Party Certification Required

For Regulatory Requirement for Applicable Building Works

Implementation timeline for the adoption of GM V4.0 is based on the 1st submission date to URA for planning permission

On or after 15 April 2008 — Scoring Methodology - Current Code on Environmental Sustainability of Buildings that is BCA GM Version 3.0

On or after 1 Dec 2010 — Scoring Methodology - Revised Code on Environmental Sustainability of Buildings, 2nd Edition that is BCA GM Version 4.0

For Regulatory Requirement for Applicable Building Works

Implementation timeline for the adoption of GM V4.1 is based on the 1st submission date to URA for planning permission

On or after 1 Dec 2010

Scoring Methodology - Current Code on Environmental Sustainability of Buildings, 2nd Edition that is BCA GM Version 4.0

On or after 15 Jan 2013

Scoring Methodology - Revised Code on Environmental Sustainability of Buildings, 3rd Edition that is BCA GM Version 4.1

BCA Green Mark for New Buildings Assessment Criteria

For Non-Residential Buildings & Residential Buildings

GM Assessment Criteria

Year 2005
GM Version 1

Year 2007
GM Version 2

Year 2008
GM Version 3

Year 2010
GM Version 4

Regulatory Submission
GM Version 3 adopted in the Code (1st)



Regulatory Submission
GM Version 4 adopted in the Code (2nd)



BCA Green Mark for New Buildings
Assessment Criteria

For Non-Residential Buildings & Residential Buildings

GM Assessment Criteria

Year 2005
GM Version 1

Year 2007
GM Version 2

Year 2008
GM Version 3

Year 2010
GM Version 4

Year 2012
GM Version 4.1

CODE FOR
ENVIRONMENTAL
SUSTAINABILITY OF BUILDINGS



Regulatory Submission
GM Version 4.1 adopted in the Code (3th)

Important to note ....they are independent

MANDATORY

Regulatory Submission and Requirement

- Compliance with the Code on Environmental Sustainability for Buildings
- It is part of the Building Plan Process before BP approval and TOP clearance

VOLUNTARY

BCA Green Mark Certification

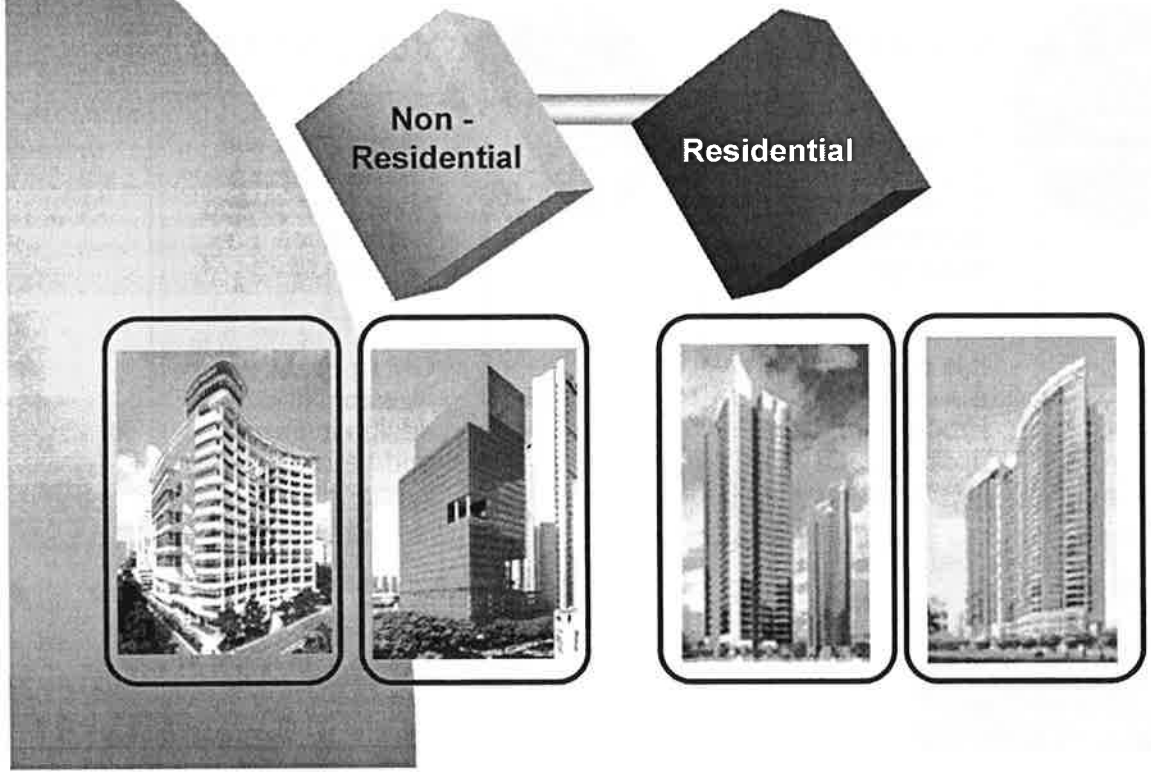
- Compliance with the BCA Green Mark Criteria and Certification Standard
- GM Application can be submitted once design is firmed up and before project completion

Except for Projects under Government Land Sales (GLS) in KEY STRATEGIC GROWTH AREAS

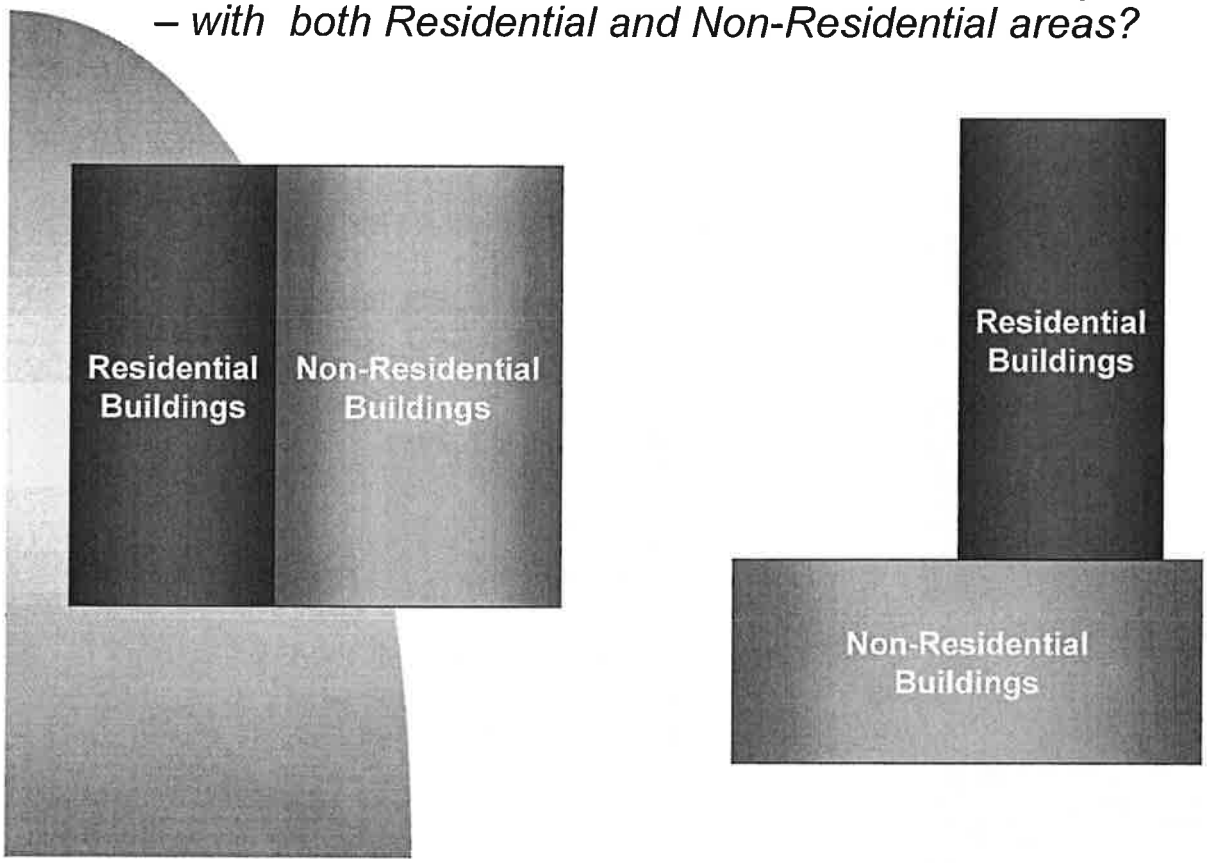
Conclusion

Legislation together with other Green Initiatives will help to accelerate Green Building Developments in Singapore

Green Mark Criteria

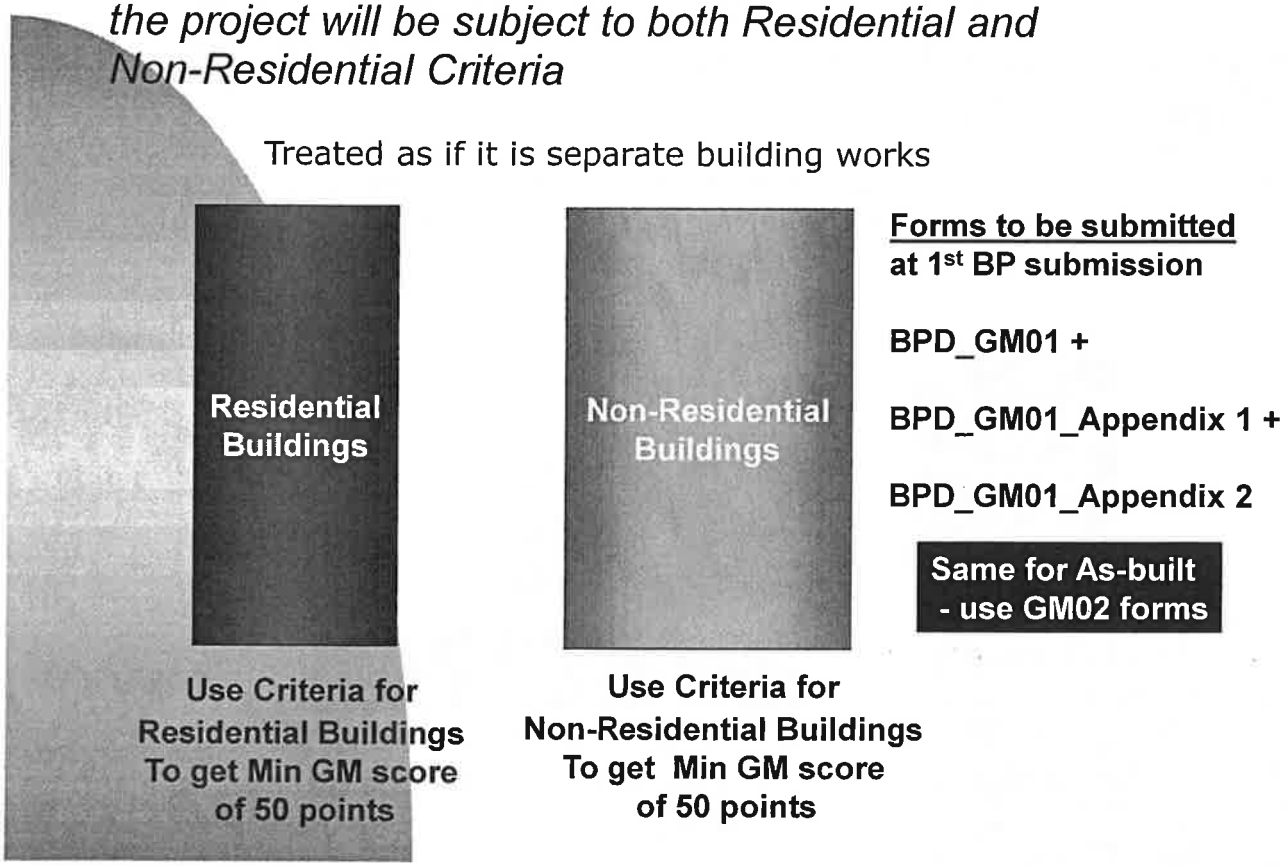


What happen if the project is a mixed use building – with both Residential and Non-Residential areas?



Then….
the project will be subject to both Residential and Non-Residential Criteria

Treated as if it is separate building works



Use Criteria for Residential Buildings To get Min GM score of 50 points

Use Criteria for Non-Residential Buildings To get Min GM score of 50 points

Forms to be submitted at 1st BP submission

BPD_GM01 +

BPD_GM01_Appendix 1 +

BPD_GM01_Appendix 2

Same for As-built - use GM02 forms

What if the areas for non-residential use is small (< 2000m²) - is there a need to submit GM calculation using non-residential criteria ?

Residential Buildings

Use Criteria for Residential Buildings To get Min GM score of 50 points

Forms to be submitted at 1st BP submission

BPD_GM01 + BPD_GM01_Appendix 1

Non-Residential Buildings < 2000 m²

NO NEED ..to submit the GM score for these non-Residential Buildings

AND vice versa

What if the residential building with areas is also less than 2000 m² but the total GFA (including non-residential buildings) is more than 2000 m² ?

It is still subject to legislation but only need to use the Criteria for the larger part of the building works, in this case the criteria for the residential buildings

Residential Buildings < 2000 m²

Use Criteria for Residential Buildings To get Min GM score of 50 points

Forms to be submitted at 1st BP submission

BPD_GM01 + BPD_GM01_Appendix 1

Non-Residential Buildings < 2000 m²

It is smaller in areas as compared with residential buildings

NO NEED….. to submit the GM score for these non-Residential Buildings

AND vice versa

What is the definition of residential buildings ?

Residential building means a building that is constructed or used, or is to be constructed or used solely as residence or private dwelling

What is the definition of non- residential buildings ?

Non-Residential building means a building other than a residential building....

which will include service apartment and dormitory



Together we can build a World Class Built Environment

Thank You