



Singapore
Environment
Council

Green Building and Construction in Singapore

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By: Nur Adibah Majeed

Environmental Engineer (Eco-certifications)

Singapore Environment Council (SEC)

Established in 1995, we are an independently managed, *non-profit, non-government organisation*, and institution of public character that nurtures, facilitates and co-ordinates environmental causes in Singapore.

The Council is also an approved charity that can offer tax exemption to donors.



Vision & Mission

Vision

The SEC aims to be the preferred non-government organization partner for communities, businesses and governments to achieve best-in-class sustainable city development in Singapore and beyond.

Mission

To create a lasting impact on climate change by collaborating with people, industries and governments to encourage and achieve sustainable urbanization.



Our Partners



CITY DEVELOPMENTS LIMITED



Exceptional Workplaces



And many others....

Our Current Programmes

Labelling and Certifications Community Outreach

Awards

Training & Education






Agenda

- Going “Green”?
 - Buildings and the Environment
 - What are Green Buildings?
 - BCA Green Mark
 - Green Materials & Influencing the Supply Chain
 - Monitoring Success
 - Benefits and Future Developments
- 



Going “Green”

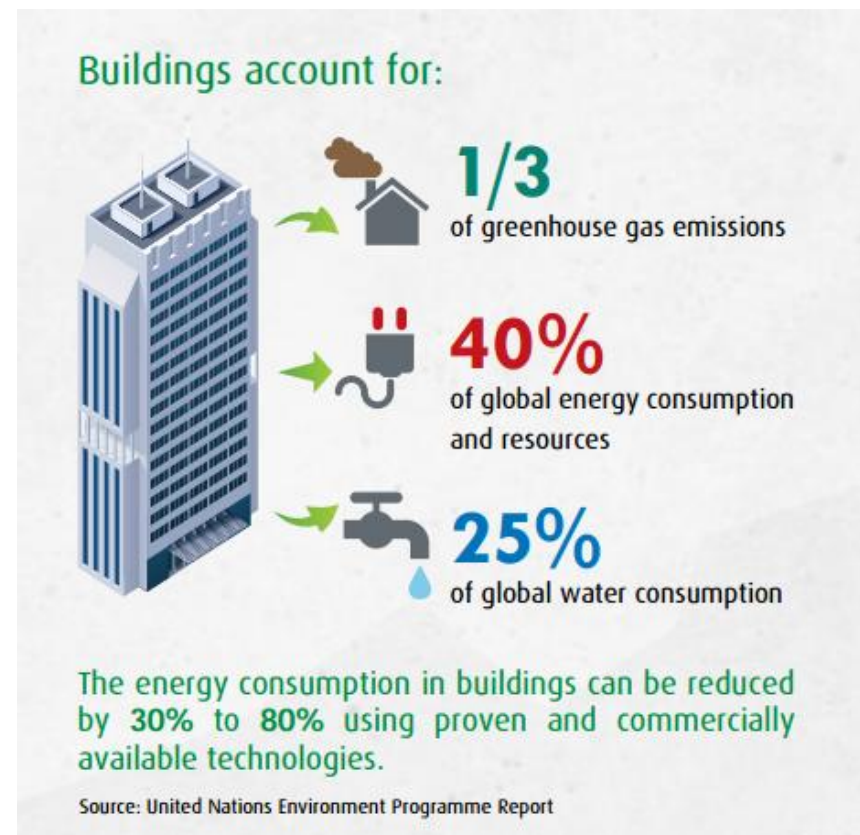
- “Green” = Ecology/ Environment.
 - “You don’t know what you got ‘till it’s gone,”
 - Post-Industrial Revolution
 - Asian development occurring simultaneously with green movement.
 - Humans critical in the ecosystem.
- 

Building Life Cycle



Buildings and the Environment

- Environmental Impacts occur in all phases:
 - § Design, construction, operation and demolition.
- Direct & Indirect impacts



Buildings and the Environment



Green Buildings

Simpler, low-tech solutions

- Passive designs
- Capturing sunlight and wind for natural lighting, heating, and cooling

Improving built environment

High-tech strategies

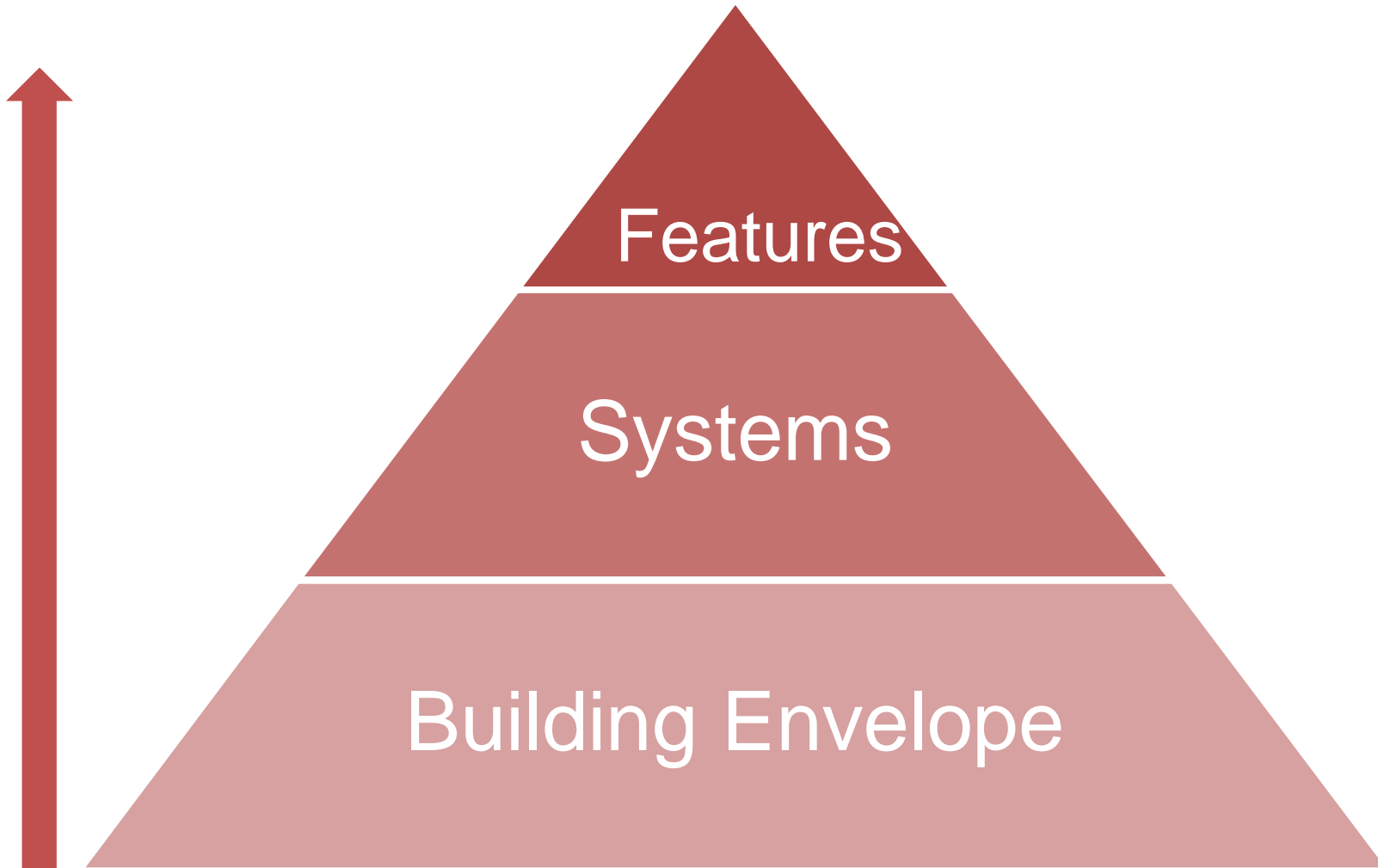
- Advanced chiller and ventilation systems
- Advanced Building Management System

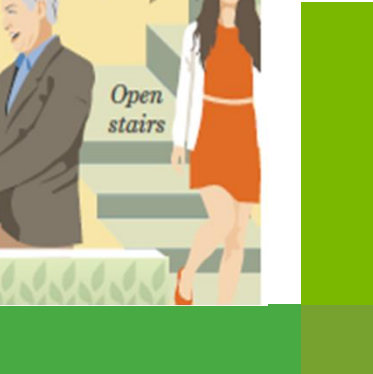
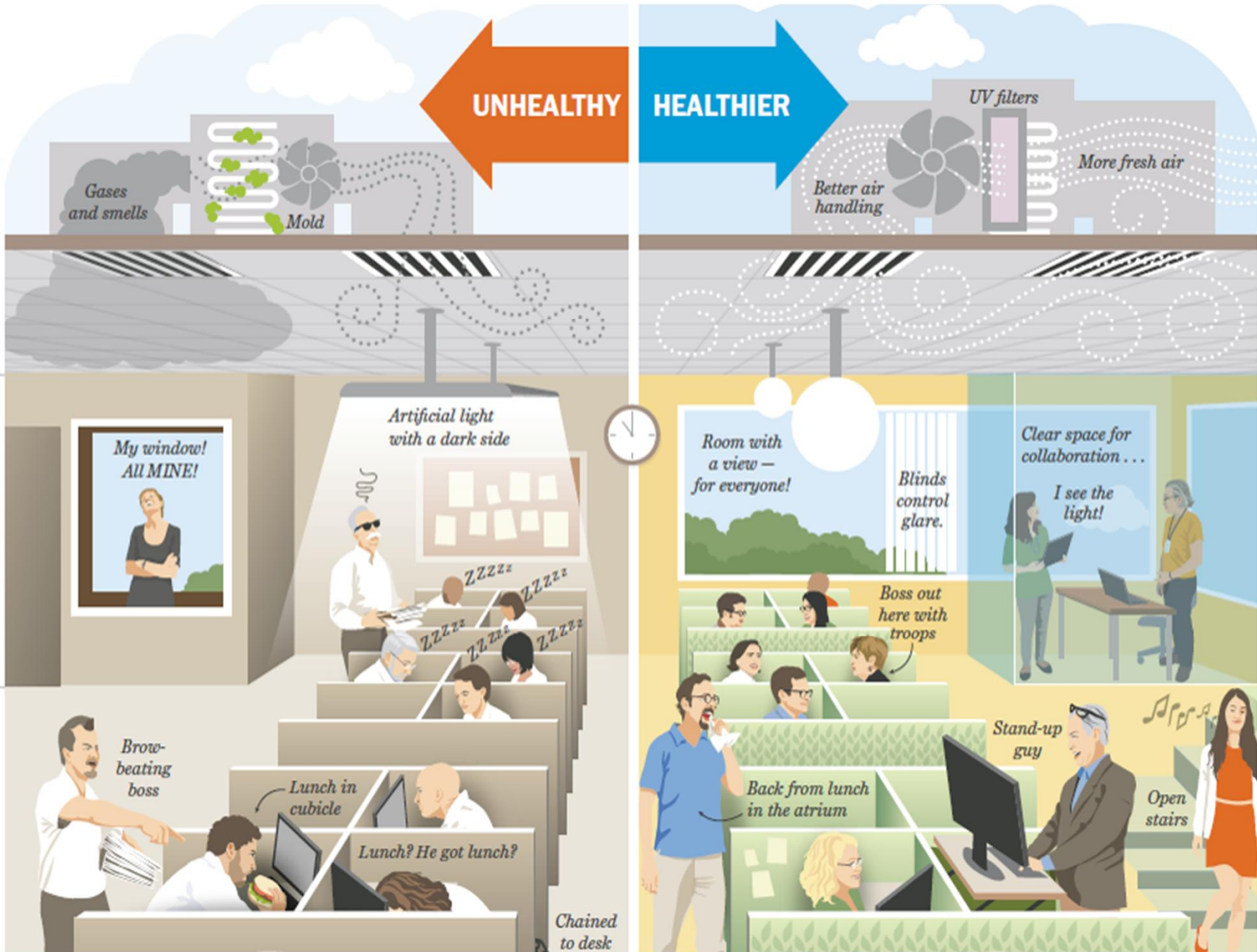
Green

Sustainable

Energy-efficient

Green Buildings





Sustainability



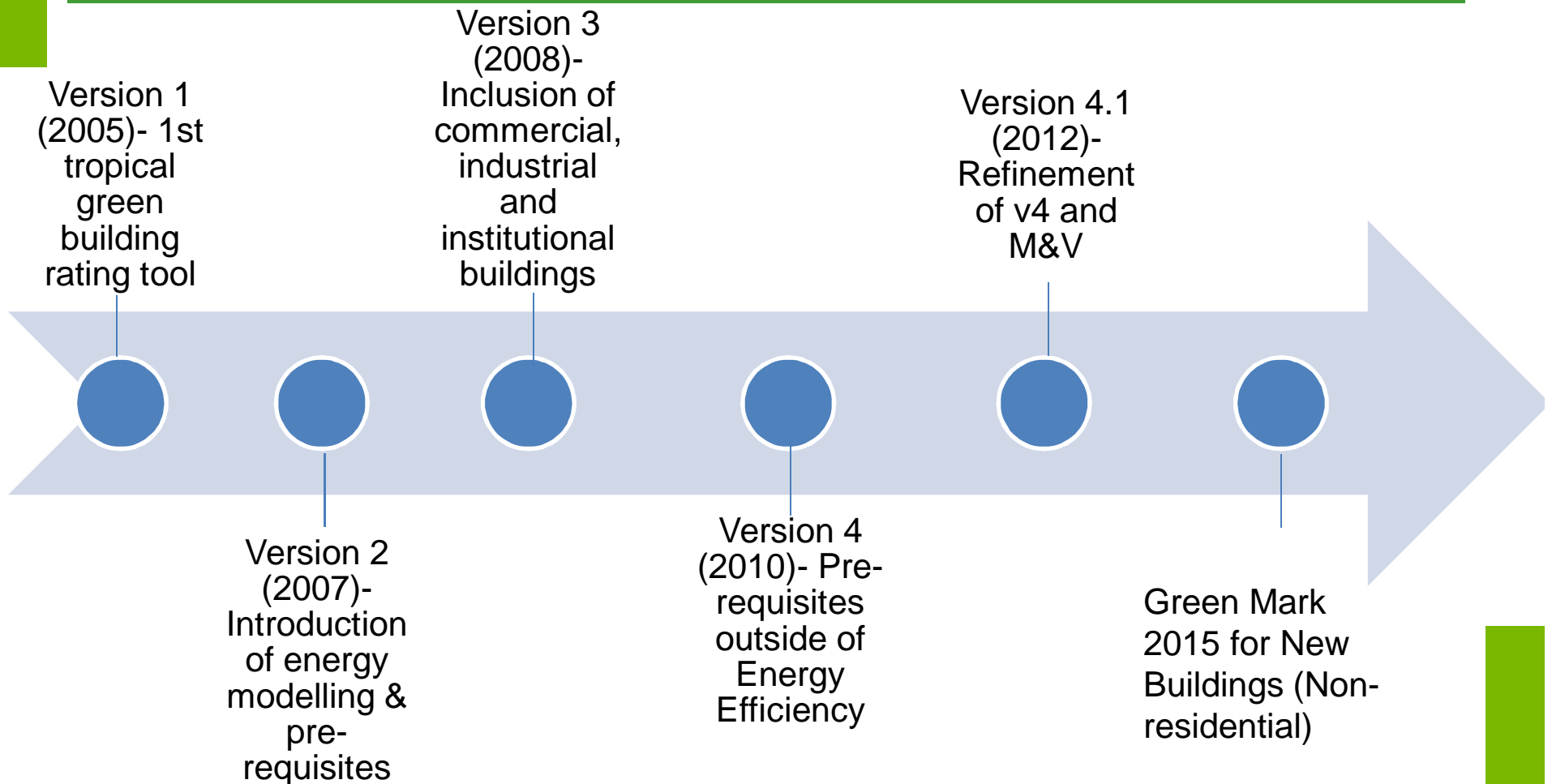
Sustainability defined - <https://www.youtube.com/watch?v=-g21O7a9280>

Singapore Green Building Rating Systems

- Evaluate buildings for its environmental impacts and performance
- Promote sustainability and environmental responsibility in the processes of design, construction and operation practices in buildings
- Common assessment criteria-
 - Resource (Water & Energy) efficiency
 - Environmental Protection
 - Indoor environmental quality
 - Other green features and innovations
- Widely used green rating systems- BREEAM, LEED, Green S



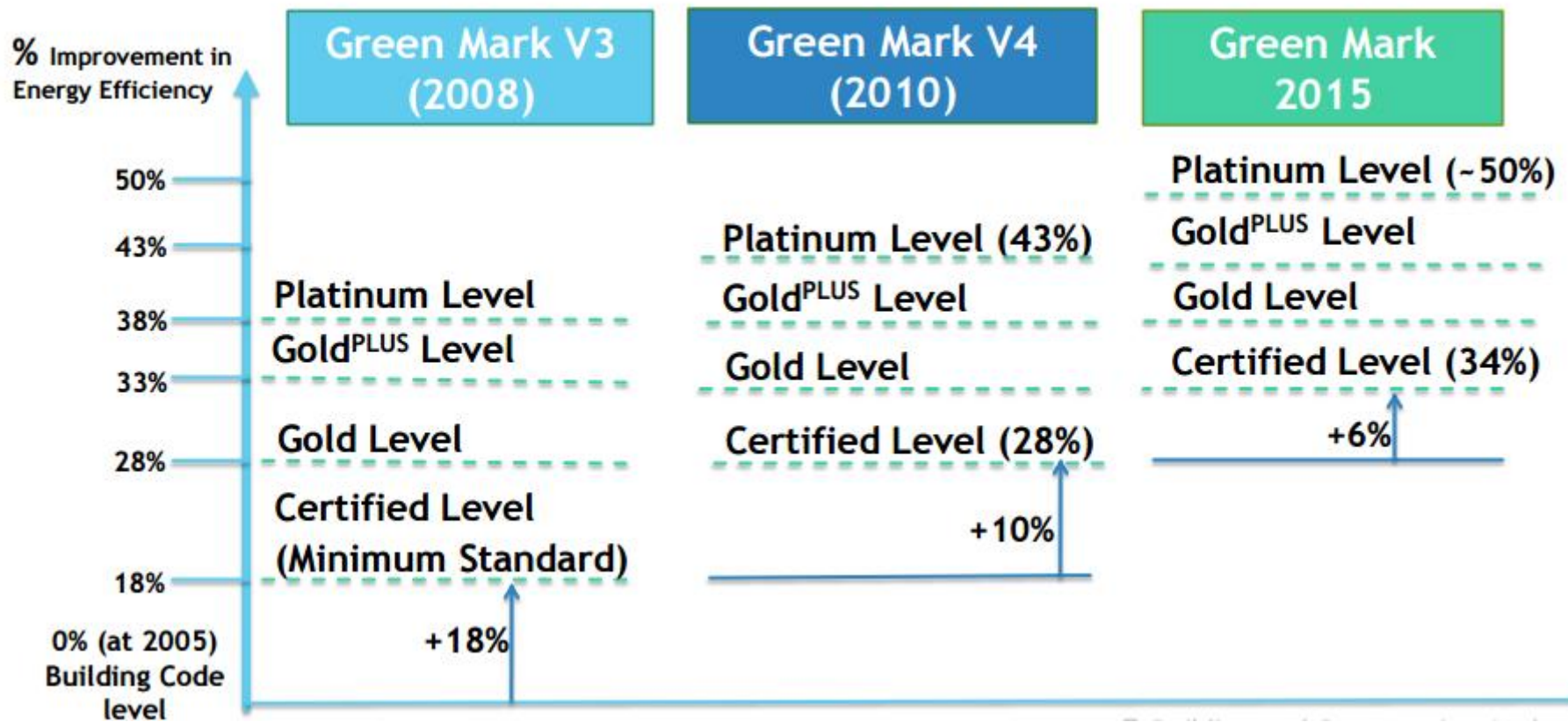
BCA Green Mark Scheme



Inter-Ministerial Committee on Sustainable Development (IMCSD)'s key target:

100% of buildings certified green by 2020

Driving Higher Performance



Building Life Cycle





Green Building Materials

- Embodied energy vs operational energy
- Environmentally responsible because impacts are considered over the life of the material

- Aspects:



Life cycle
Considerations



Health and
Environment

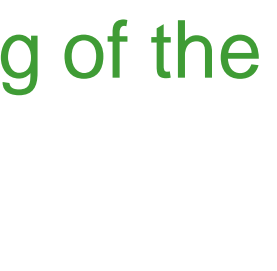


Product
Performance





Influencing the Supply Chain

- Incentive Schemes
 - § Additional Points to Green Mark Evaluation
 - § Sustainable Construction Capability Development Fund
 - § Joint pilot-projects between BCA and Industry:
 - Tampines Concourse
 - Samwoh Eco-green Building
 - Setting “Green” targets at the beginning of the Project (Design and Tender Phase)
 - § Sustainable Construction Masterplan
- 

Monitoring Success

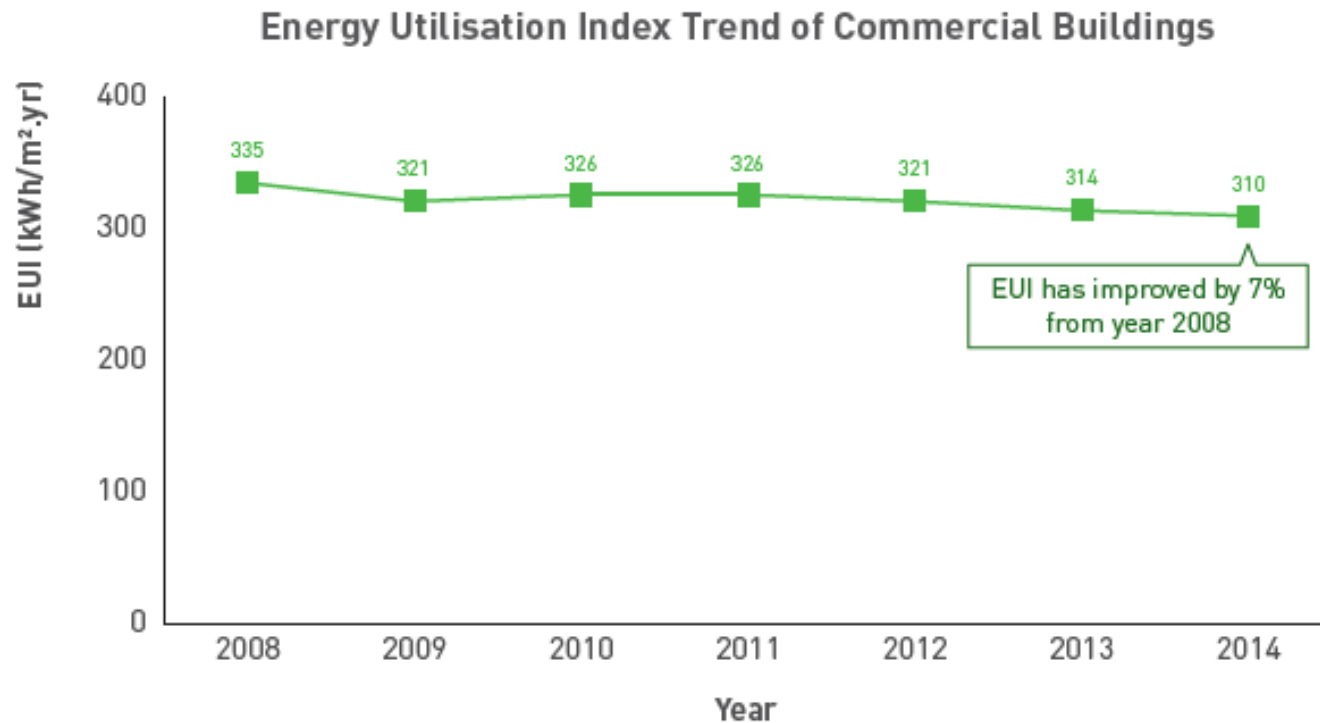
- Quantitative Data for Commercial Buildings
- Increase in:
 - § No. of Participants
 - § Efficiency of Analysis
 - § Buildings Benchmarked

	No. of Buildings in 2013	No. of Buildings in 2014
Total Targeted	964	1,065
Total Submission	954	1,018
Total Analysed	884	1,018
Total Benchmarked	783	913
Total No. for Comparison	-	783

Monitoring Success

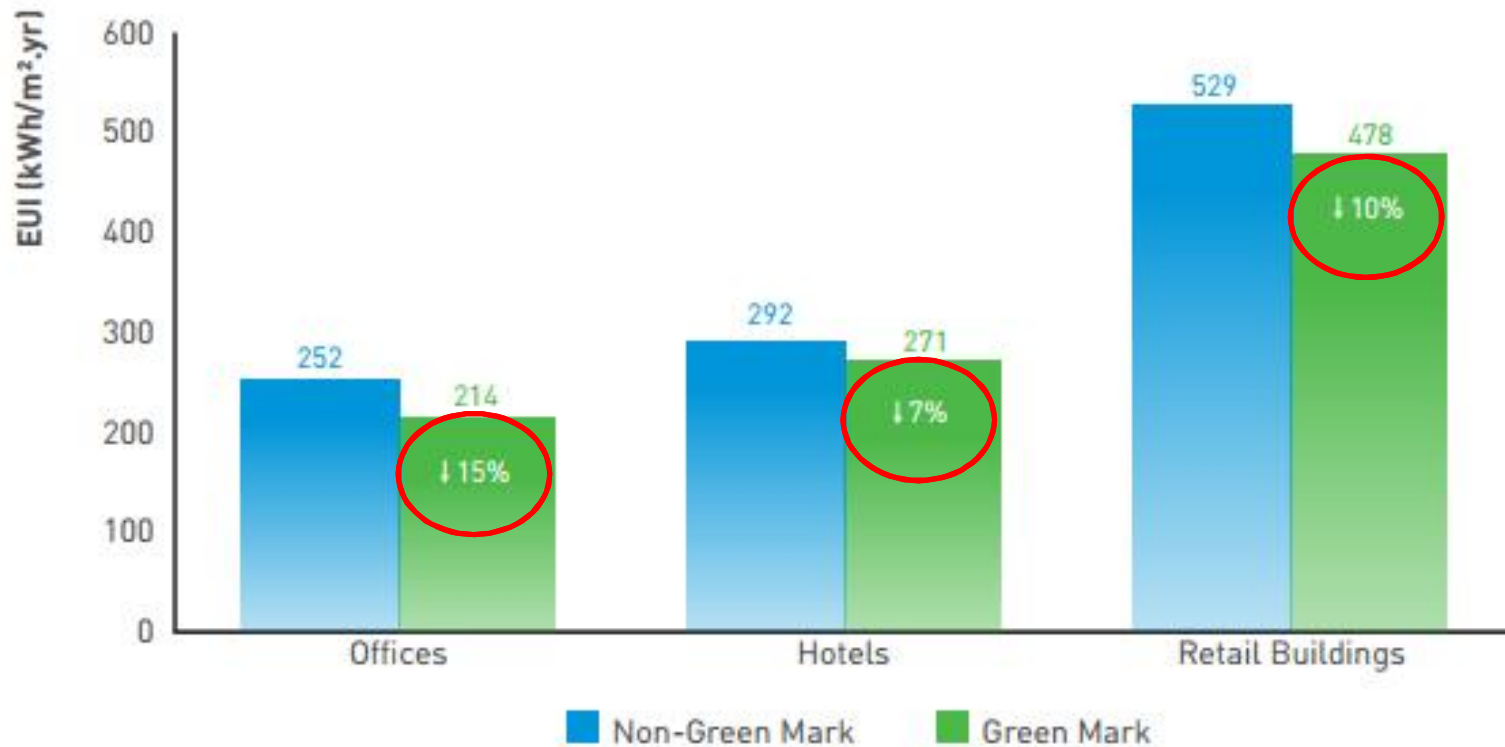
- Energy Utilization Index (EUI)

§ Measures the total energy consumed in a building in a year, expressed as kilowatt hour (kWh) per gross floor

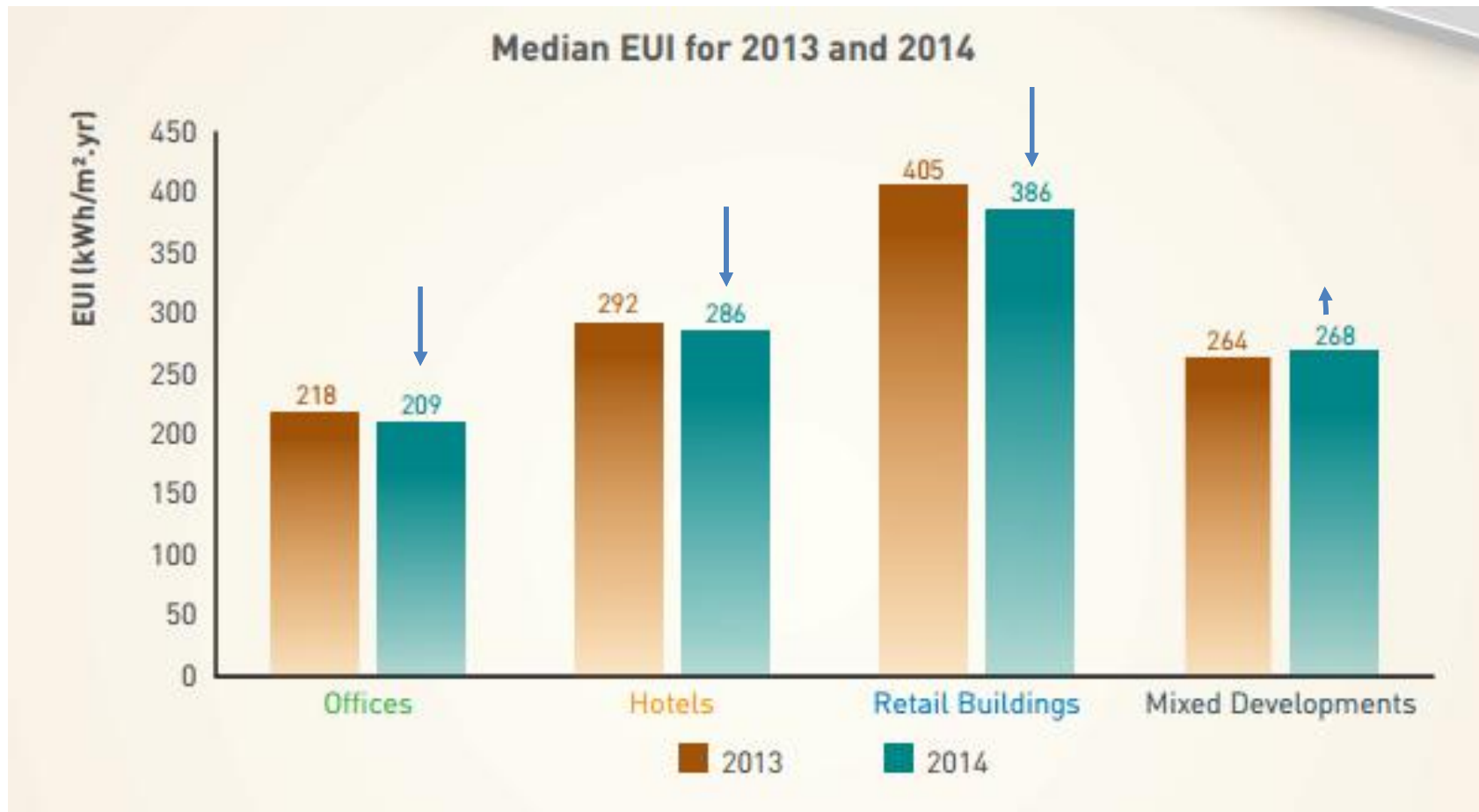


Commercial Building Performance 2014

Average EUI of Green Mark & Non-Green Mark Commercial Buildings



Commercial Building Performance 2014



Commercial Building Performance 2014

Comparison of Commercial Buildings' Energy Performance in terms of EUI

Building Type	No. of Buildings	2013 Median EUI	2014 Median EUI	Improvement in Median EUI
Offices	351	218	209	4.0%
Hotels	230	292	286	2.2%
Retail Buildings	145	405	386	4.6%
Mixed Developments	57	264	268	-1.6%
Total Stock	783			

BCA Green Mark 2015

Outcomes:

- Climate Responsiveness
- Conservation of Ecological Systems
- Resource Stewardship
- Health and Wellbeing






Moving Forward...

- Extending mandatory submission beyond Commercial Buildings
- Improve efforts at engaging Stakeholders
- Increase pool of available of data
 - § Comprehensive evidence of GB efficiency and environmental benefits.
- R&D for Smart Tech
 - § BCA SkyLab
- Tapping into Nature for Power

“The only limit is your imagination”







Resources

- **BCA Building Energy Benchmarking Report 2015**

https://www.bca.gov.sg/GreenMark/others/BCA_BEER_Abridged_FA_2015.pdf

- **BCA Publication “Singapore; Leading the Way for Green Buildings in the Tropics”**

https://www.bca.gov.sg/greenmark/others/sg_green_buildings_tropics.pdf





Singapore
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Council

THANK YOU

www.sec.org.sg

+65 6337 6062



@SECSingapore



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Videos

Green Supply Chain by NTU - <https://www.youtube.com/watch?v=BkSpVgZsotw>

UNEP Buildings Day - <https://www.youtube.com/watch?v=nHZYyi00XPo>

Sustainable Paints BASF - <https://www.youtube.com/watch?v=c3nUtscrHys>

Sustainability defined - <https://www.youtube.com/watch?v=-g21O7a9280>

BCA SkyLab - <https://www.youtube.com/watch?v=tiQ5RtC5Bbw>

