

Agenda

1. Overview
2. MEI Regime
 - Buildings that are considered energy-intensive
 - Compliance requirements
3. Q&A



Buildings contribute about 20% of Singapore's carbon emissions.

Green buildings can contribute a big part in our transition to a low-carbon and climate resilient future.

Charting Singapore's Net Zero Future

Achieve net zero emissions by 2050
Long-Term Low-Emissions Development Strategy (LEDS)

Reduce 2030 emissions to 60 MtCO₂e
after peaking emissions earlier
2030 Nationally Determined Contribution (NDC)

Accelerating Low-Carbon Transition in Industry, Economy and Society

Catalyse business transformation

- Sustainable energy and chemicals hub in conjunction with industry
- Grants for energy efficiency and emissions reduction

Invest in low-carbon technologies

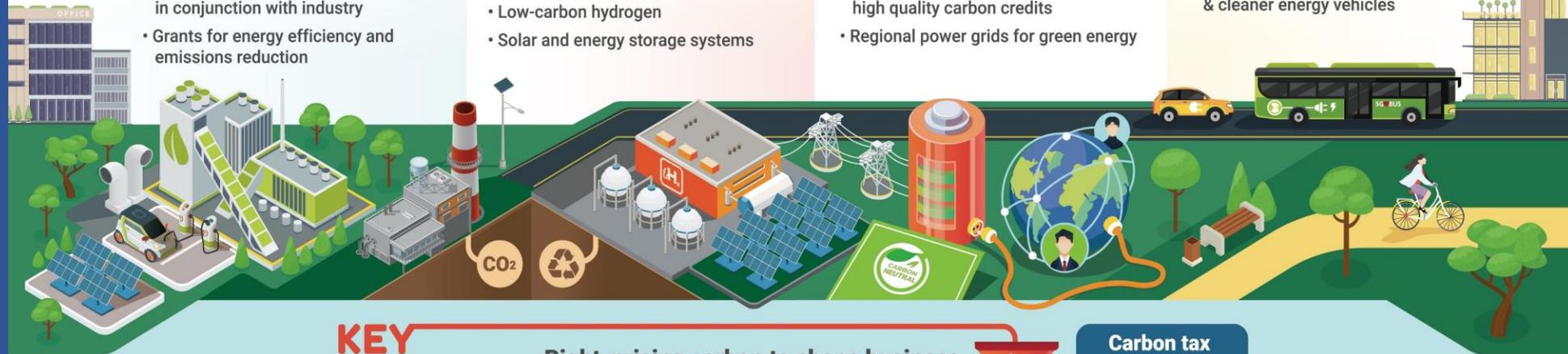
- Carbon Capture Utilisation and Storage
- Low-carbon hydrogen
- Solar and energy storage systems

Pursue effective international cooperation

- International carbon markets with high quality carbon credits
- Regional power grids for green energy

Adopt low-carbon practices

- Green commutes via public transport, Walk-Cycle-Ride & cleaner energy vehicles



KEY ENABLER

Right-pricing carbon to shape business decisions and consumer behaviour

Carbon tax
S\$50-80/tCO₂e
by 2030

EVERYONE CAN PLAY A PART

Public sector

Achieve net zero emissions across public sector around 2045 as part of GreenGov.SG



Private sector

Develop and adopt low-carbon solutions, and pursue green growth opportunities



Individuals

Contribute to climate friendly initiatives



Creating a Sustainable Built Environment



Singapore Green Building Masterplan (SGBMP)
“Building our Green Future Together”



Singapore Green Plan 2030

- Greener Infrastructure and Buildings under ‘Energy Reset’ pillar

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 GFA) by 2030



80% of new developments (by GFA) to be Super Low Energy (SLE) buildings from 2030



80% improvement in energy efficiency (from 2005 levels) for best-in-class buildings by 2030

Benchmarking of building performance

2013

- All building owners are required to submit their building energy performance data

- Building Energy Benchmarking Report published yearly

2017

- Building owners could opt to voluntarily have their building's energy data disclosed to the public

2020

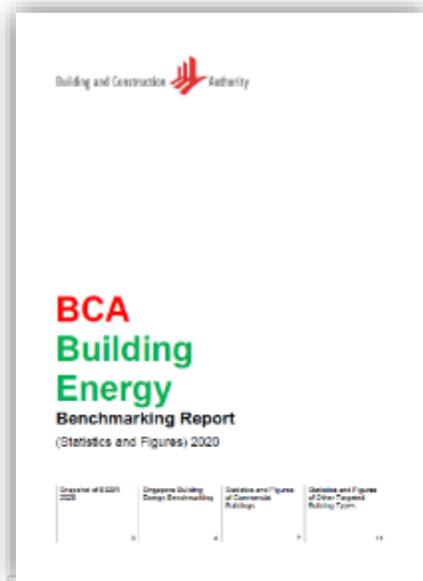
- Circular to give notice that data submitted from 2020 onwards would be published in the following year

2021

- **Identify all buildings in the data that we publish, beginning with commercial buildings**

➤ *Healthcare facilities, Educational institutions, Civic Community and Cultural Institutions and Sports & Recreation Centres*

Details of building energy benchmarking and dataset can be found on BCA website [Building Energy Benchmarking](#)



Current State

There is an existing building stock that are considered energy intensive but are not required to undergo any energy efficiency improvement if the building owners chose not to undertake any major A & A or major energy use change.

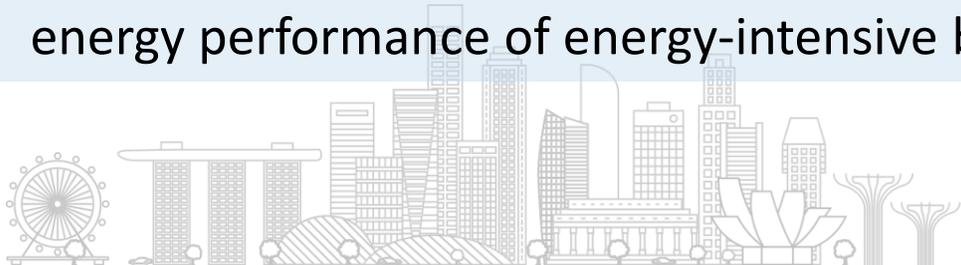


Existing buildings hold the KEY to unlock the potential in deep energy and carbon emissions reduction

Announcement of MEI at Budget 2023

Amendments to the Building Control Act to introduce MEI regime

Going forward, the suite of environmental sustainability measures for existing buildings under the Building Control Act will be expanded to include the MEI regime. This regime will bridge the gap by levelling up the energy performance of energy-intensive buildings.



Energy audits, improvements required for 'energy-intensive' buildings

By Ry Anne Lim
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ENERGY-INTENSIVE buildings will soon have to undergo mandatory energy audits and implement measures to improve their energy use, Senior Minister of State for National Development Tan Kai How announced during the ministry's Committee of Supply debate on Thursday (Mar 2).

The new regime, Mandatory Energy Improvement (MEI), is part of the Building and Construction Authority's (BCA) efforts to reduce carbon emissions in the built environment, particularly in buildings with 'poor energy performance' that are not subject to minimum energy standards.

For a start, the MEI will apply to the most energy-intensive commercial buildings, healthcare facilities, sports and recreation centres, as well as institutional buildings, with a gross floor area of 5,000 square metres and up.

Preliminarily, BCA predicts that fewer than 100 existing buildings could be audited under the regime.

Under current requirements, all new buildings must be 50 per cent more energy efficient than 2005 levels. All existing buildings that undergo major retrofitting works must also be made 40 per cent more energy-efficient compared to 2005 levels. However, there is currently no requirement for building owners to improve energy performance.

Under the MEI, buildings with energy use intensity (EUI) - that is, the amount of energy used within an establishment annually - below a predetermined threshold will be subject to an audit of the major energy-consuming systems in their building.

They will then have to come up with measures to optimise energy use and enhance its efficiency.

The review will also include a cost-benefit analysis of these measures to help building owners in their decision-making process, said Tan.

Measures could include simple and cost-effective ones, such as replacing faulty parts and sensors, or getting tenants to use energy-saving lighting, he said.

Building owners opting more extensive retrofits can also apply for grants under the Green Mark Incentive Scheme for Existing Buildings 2.0, which provides co-funding for retrofitting works to achieve at least Green Mark Platinum standards.

Owners could also work with occupants and tenants through sustainability initiatives - for instance, introducing green leases, where tenants work with them under the rental agreement to reduce energy consumption.

"They must thus maintain an 'improved level of energy performance over a stipulated period', said Tan.

BCA will engage the industry and the public on the MEI regime, with further details to come.

Tan noted that close to 55 per cent of Singapore buildings have been 'greened', about 30 per cent of new buildings in the past year achieved Super Low Energy standards, and best-in-class buildings achieved over 70 per cent improvement in energy efficiency over 2005 levels.

Starting this year, BCA will publish the energy performance data of individual buildings. This will allow building owners to determine their energy performance relative to other buildings of the same type, Tan said.

Pemilik bangunan dengan prestasi tenaga lemah perlu jalani audit

PEMILIK bangunan dengan prestasi tenaga yang lemah akan dikehendaki menjalankan audit tenaga dan melaksanakan langkah untuk mengurangkan penggunaan tenaga di bawah rejim Peningkatan Tenaga Wajib (MEI) baru yang akan diperkenalkan menjelang akhir 2024.

Langkah-langkah bagi mengurangkan penggunaan tenaga boleh termasuk penyelesaian mudah dan yang menjimatkan kos seperti menggantikan bahagian dan penderia yang rosak atau meminta penyewa menggunakan lampu yang menjimatkan tenaga.

Pemilik bangunan yang ingin melakukan pengubahsuaian yang lebih meluas juga boleh memohon geran di bawah Skim Insentif Green Mark untuk Bangunan Sedia Ada 2.0, yang menyediakan pembiayaan bersama bagi kerja-kerja pengubahsuaian untuk mencapai sekurang-kurangnya piawaian Green Mark Platinum.

Demikian kata Menteri Negara Kanan (Perhubungan dan Penerangan merangkap Pembangunan Negara), Encik Tan Kai How, dalam ucapannya semasa perbincangan Jawatankuasa Perbekalan (COS) Kementerian Pembangunan Negara.

Sebagai permulaan, MEI akan dikenakan terhadap bangunan komersial yang paling intensif tenaga, kemudahan penjagaan kesihatan, pusat sukan dan rekreasi serta bangunan institusi dengan Keluasan Lantai Kasar 5,000 meter persegi ke atas, katanya.

"Pemilik bangunan akan dikehendaki mengemukakan tahap prestasi tenaga yang lebih baik dalam tempoh yang ditetapkan.

"Penguasa Bangunan dan Pembinaan (BCA) sedang berunding dengan industri mengenai butiran dan keperluan MEI dan akan berkongsi lebih banyak butiran kelak," tambah Encik Tan.

Energy-Intensive Buildings

Buildings are considered energy-intensive if their energy use intensity (EUI) exceeds a predetermined EUI threshold over a period of three years.

For a start, defined as those in the top 25% of their sub-typologies in terms of energy consumption* over 3 years

** Energy consumption is calculated based on Energy Use Intensity (EUI), which measures the annual energy consumption of a building in kWh/m².yr.*

Building Typologies

- Commercial buildings
- Healthcare institutions
- Institutional buildings
- Sports & recreation buildings

Size

Gross floor area (GFA) of $\geq 5,000\text{m}^2$



- Retail
- Office
- Hotel



- Hospitals/ Specialist Clinics
- Polyclinics/private clinics
- Nursing Homes



- Autonomous Universities
- Other Educational Institutions
- Civic Institutions
- Community Institutions
- Cultural Institutions

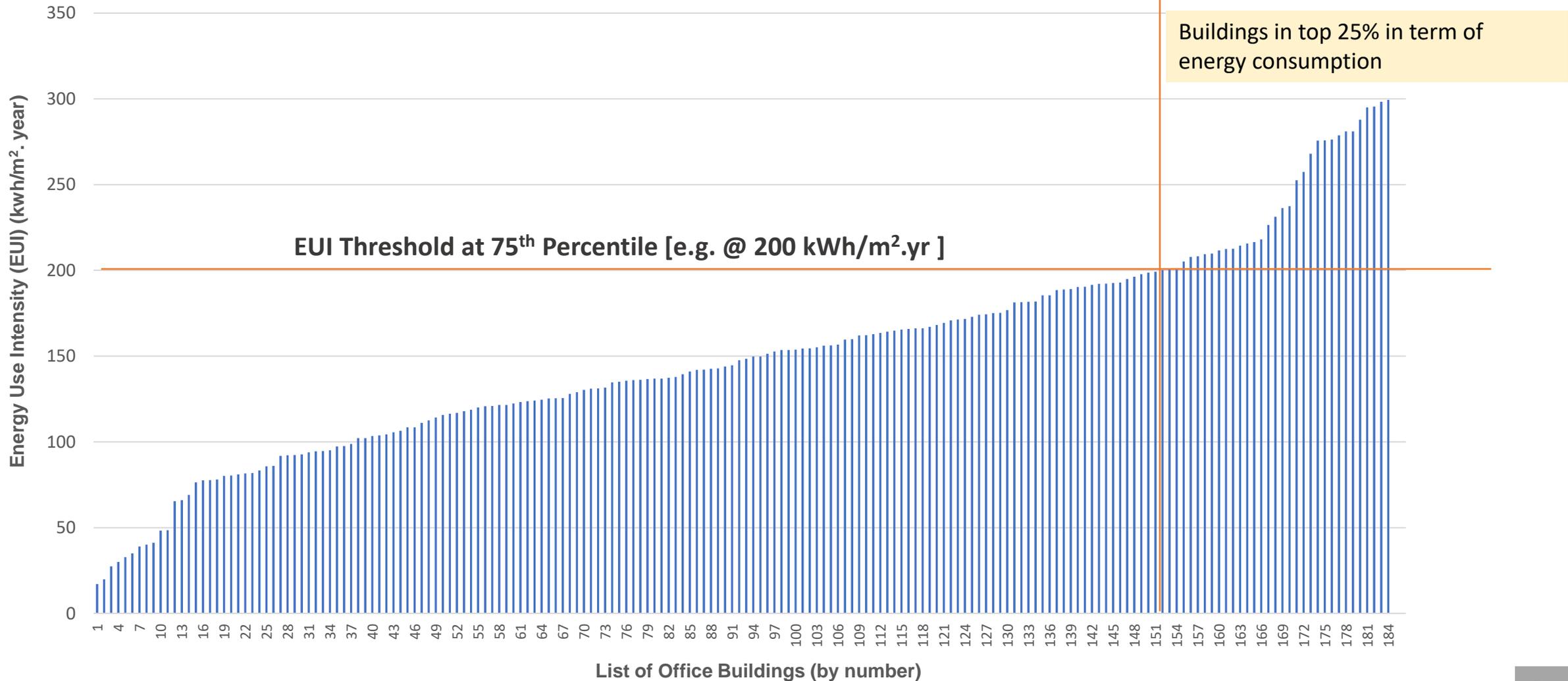


- Recreation Clubs
- Sport Facilities



Illustrative example for Office Buildings that would be subject to the MEI Regime

Energy Use Intensity (EUI) for Office Buildings (kWh/m².yr)



How are the EUI thresholds set?

Commercial
Office Buildings
Hotel Buildings
Retail Buildings
Healthcare Institutions
Hospital/Specialist Centres
Polyclinic/Private Clinic
Nursing Home
Education Institution
Autonomous Universities
Other Educational Institution
Civic, Community and Cultural Institution
Civic Institutions
Community Institutions
Cultural Institutions
Sports & Recreation Centres
Sports Complexes
Recreational Centres
Data Centres
Laboratories

- The EUI thresholds are established by building sub-typologies to account for the energy use profiles of different types of buildings
- The thresholds also account for energy-intensive usage such as data centres and laboratories, as well as mix of different uses
- Buildings that tap on district cooling system will similarly be benchmarked with relevant EUI thresholds based on building typologies

EUI Thresholds for different building sub- typologies

Note: This is subject to finalisation. The final EUI thresholds will be published officially in the Code for compliance in 1H 2025.

The EUI thresholds listed below are subject to finalisation	
Building Type (Single Use Bldg)	EUI Threshold kWh/m ² .yr (TBC)
Office Buildings	200
Hotel Buildings	310
Retail Buildings	495
Hospitals & Specialist Clinics	360
Polyclinics & Private Clinics	190
Nursing Homes	120
Autonomous Universities	190
Other Education Institutions	130
Civic Institutions	195
Community Institutions	155
Cultural Institutions	270
Sports Complexes	180
Recreation Centres	275
Data Centres	6,595
Laboratories	560

What happens if my building is a mixed-use building?

- If your building has a combination of different uses, the EUI threshold can be pro-rated accordingly

What if my building has a combination of office and retail spaces say 70% office & 30% retail? Will my building be subject to office EUI threshold ?

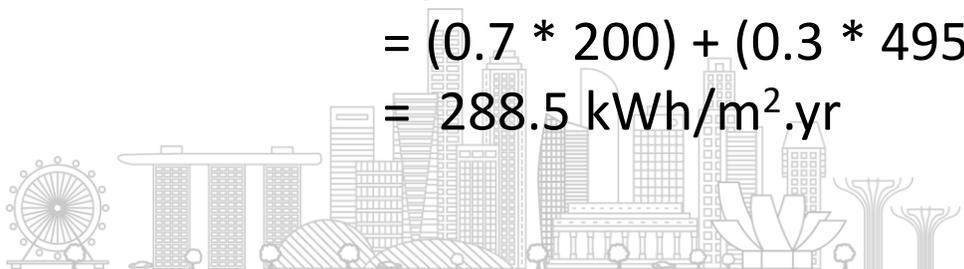
For example, a building with a gross floor area of 20,000 sqm

- **70% Office space (by GFA)**
- **30% Retail space (by GFA)**

In this case, if the building's EUI exceed the threshold of **288.5 kWh/m².yr** for 3 years, it will be considered as energy intensive and may be subject to MEI the regime.

The EUI threshold that is specific to this building will be:

$$\begin{aligned}\text{EUI threshold} &= (70\% * \text{EUI Threshold for Office}) + (30\% * \text{EUI Threshold for Retail}) \\ &= (0.7 * 200) + (0.3 * 495) \\ &= 288.5 \text{ kWh/m}^2.\text{yr}\end{aligned}$$



What happens if my building has uses that are energy-intensive?

- We have established the EUI thresholds for data centres and laboratories.
- The EUI threshold will be pro-rated accordingly to account for these energy-intensive uses.

What if my building has systems/equipment that are for data centre operation or laboratories which are of high energy consumption? Wouldn't my building always be considered energy-intensive when compared to buildings of the same typology without such uses?

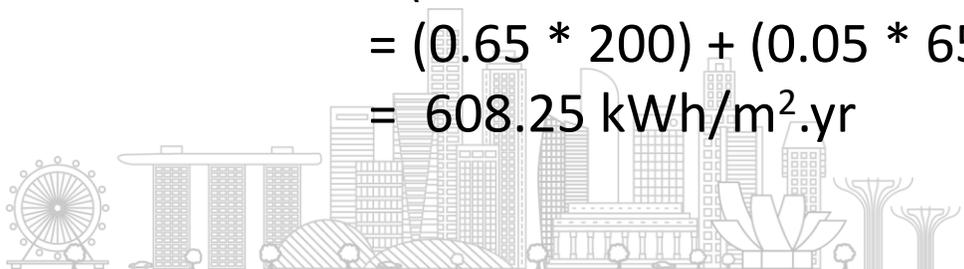
For example, a building with a gross floor area of 20,000 m²

- **65% Office space (by GFA)+ 5% spaces used for data centres**
- **30% Retail space (by GFA)**

In this case, if the building's EUI exceeds the threshold of **608.25 kWh/m².yr** for 3 years, it will be considered as energy intensive and may be subject to MEI the regime

The EUI threshold that is specific to this building will be

$$\begin{aligned}\text{EUI threshold} &= (65\% * \text{EUI threshold for Office}) + (5\% * \text{EUI threshold for Data centre}) + (30\% * \text{EUI for retail space}) \\ &= (0.65 * 200) + (0.05 * 6595) + (0.3 * 495) \\ &= 608.25 \text{ kWh/m}^2.\text{yr}\end{aligned}$$



What happens if my building taps on District Cooling System (DCS) ?

- For buildings that tap on DCS, the energy consumption from the air-conditioning plant is not included in the EUI computation. Hence, the EUI threshold set will have to be reduced correspondingly.

For example, a building with a gross floor area of 20,000 sqm

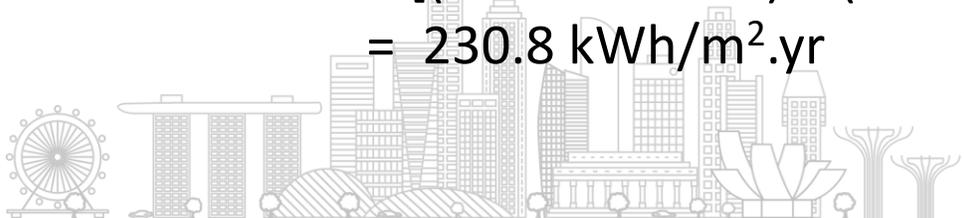
- **70% Office space (by GFA)**
- **30% Retail space (by GFA)**

The EUI threshold that is specific to this building will be:

$$\begin{aligned} \text{EUI threshold} &= [(70\% * \text{EUI Threshold for Office} * 0.8) + (30\% * \text{EUI Threshold for Retail} * 0.8)] \\ &= [(0.7 * 200 * 0.8) + (0.3 * 495 * 0.8)] \\ &= 230.8 \text{ kWh/m}^2.\text{yr} \end{aligned}$$

What if my building taps on DCS ? What should be the EUI threshold ?

In this case, if the building's EUI exceeds the threshold of **230.8 kWh/m².yr** for 3 years, it will be considered as energy intensive and may be subject to MEI the regime



Compliance Framework under MEI Regime



Owner of energy-intensive building

Engage Person to conduct energy audit and develop Energy Efficiency Improvement Plan (EEIP)

Carry out EEIP

Maintain building energy performance

1

Within 90 days from the date of MEI audit notice to appoint a Specified Person to do the following:

- Carry out an energy audit of the building and major energy consuming systems
- Determine if building is able to meet the prescribed EUI reduction without undergoing major energy use change
- Develop the EEIP which sets out the measures to meet the specified reduction in EUI
- Prepare an audit report which includes the assessment and EEIP

2

Within one (1) year from the date of MEI audit notice to submit the audit report and EEIP endorsed by the Specified Person to BCA

Note: The building owner may appoint either (a) a professional engineer (Mechanical); or b) an energy auditor registered with BCA to carry out the energy audit and develop the EEIP.

Energy Audit Scope and Requirements

Understand Building Characteristics and Operational Conditions

01

- Analysis of past three (3) years of energy consumption patterns
- Building Information e.g. building type/activity, no. of floors, floor area, occupant density, daily operational hours, days of operation per week etc
- Description of equipment/systems audited, including corresponding capacity ratings, operating hours etc and their contribution to total building energy usage



Review of the Energy Performance of Key Building Energy Systems thru' a comprehensive energy audit

02



Central Chilled-Water Plant/VRF



Air Handling Units and Distribution System



Other Building Energy Systems – Level 1 audit



Lighting (indoor & outdoor)



Mech Ventilation (carpark & kitchen)

and, if applicable:



Central Hot Water System



Develop Energy Efficiency Improvement Plan (EEIP)

03

- Identify energy improvement measures which can comprise a combination low-cost measures or EE retrofits
- Conduct cost and benefit analysis
- Estimate energy savings and formulate a 3-year EEIP roadmap to realise the energy improvement in EUI by **10%** over the pre-audit level

Compliance Framework under MEI Regime



Owner of energy-intensive building

Engage Person to conduct energy audit and develop Energy Efficiency Improvement Plan (EEIP)

Carry out EEIP

Maintain building energy performance

3

Within three (3) years from the date of EEIP submitted

- Ensure that the **measures set out in the EEIP** are carried out and completed to reduce the building energy consumption
- Submit progress update prior to completion, when requested
- Submit **the certificate of completion** certifying that
 - (a) the measures have been carried out and completed; and
 - (b) the specified reduction in energy use intensity in respect to the building has been achieved

Depending on the building/system condition, there are various solutions that the building owners can undertake to meet the specified reduction in EUI.

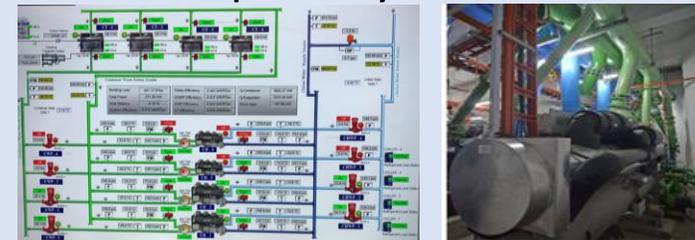
Simpler Measures

- Replacement of faulty sensors
- Replacement of air filters
- Hot water insulation
- Installation of occupancy sensors



Energy Efficiency Retrofits

- Upgrading of building management systems
- Component replacement
- Full replacement of air-handling units and chiller plant systems



Green Mark Incentive Scheme for Existing Buildings 2.0 (GMIS-EB 2.0)

- Encourage building owners to improve on their buildings' energy performance and to strive for deeper carbon emission reduction
- Co-funding support will help lowering the upfront cost of EE retrofits and improve on ROI. The funding quantum is based on carbon emission reduction and Green Mark standard attained.
- Applicable to privately-owned commercial, institutional, light industrial and residential buildings (common areas and services) under the Buildings Sector and with **GFA ≥ 5000 m²**



Qualifying Criteria	Funding Factor	Funding Cap
Green Mark Platinum	\$25/tCO ₂ e	\$600,000 or up to 50% of qualifying cost, whichever is lower
Green Mark Super Low Energy (SLE)	\$35/tCO ₂ e	\$900,000 or up to 50% of qualifying cost, whichever is lower
Green Mark Zero Energy (ZE)	\$45/tCO ₂ e	\$1,200,000 or up to 50% of qualifying cost, whichever is lower

Compliance Framework under MEI Regime



Owner of energy-intensive building

Engage Person to conduct energy audit and develop Energy Efficiency Improvement Plan (EEIP)

Carry out EEIP

Maintain building energy performance

4

On completion of measures in the EEIP

- Review and monitor building energy performance
- **Maintain the EUI improvement** for a minimum period of **one (1) year**
- **Within 3 months after the last day of the maintenance period**, submit a report setting out the EUI of the building during maintenance period

What if the EUI improvement is not maintained ?

- **Supplement the EEIP** with additional measures and implement them **to ensure that the prescribed reduction in EUI is achieved.**



Maintain the 10% reduction in EUI for one year

Case Closed

The specified reduction in EUI attained but what happens if my building stills exceed the EUI threshold in the next MEI cycle?

The building will not be issued another MEI audit notice for 3 years after the 1-year maintenance period has been achieved. However, if the building exceeds the EUI threshold in these 3 years, it may be subject to the MEI regime again.

For further clarification, please contact [Building & Construction Authority \(bca.gov.sg\)](http://bca.gov.sg)

Thank you



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