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Welcome to SBF Global's

Sustainable Financing Awareness Series - Episode 4

# **Embarking on Energy Efficiency Projects**

23 Sep 2021, Thursday | 2.00pm to 3.20pm (GMT +8)



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This webinar is being recorded and will be posted on SBF's YouTube Channel.



## PROGRAMME LINE UP

**2.00 pm Welcome Address**  
By Singapore Business Federation

**2.05pm Driving Environmental Responsibility  
Through Energy Efficiency Initiative**  
By Mr. Jasper Wong  
Head of Construction and Infrastructure,  
Sector Solutions Group, UOB



**Participant Poll 1**

**2.20pm Innovation Journey Towards A More  
Efficient Sustainability**  
By Mr. Ted Howland  
Vice President, Group Sustainability,  
CapitaLand Investment



**Participant Poll 2**

**2.35pm Financing Energy Efficiency Projects for the  
Built Environment**  
By Mr. Vincent Low  
Founder & Vice President, G-Energy Global Pte Ltd  
Chairman, Energy Efficiency Committee,  
Sustainable Energy Association of Singapore



**2.50pm Q&A / Panel Discussion**

**3.20pm Closing remarks and preview of what's next by  
SBF Global  
End of Webinar**



## **BUSINESS CONSULTATION SESSION**

For companies who may have questions on energy efficiency financing in Singapore or are interested to look for collaborative partners, sign up for our complimentary Business Consultation Session by emailing:

Contact:

Business Development & Origination, Infrastructure

Email to:

**Teo Chi Howe**

**[chihowe.teo@sbf.org.sg](mailto:chihowe.teo@sbf.org.sg)**







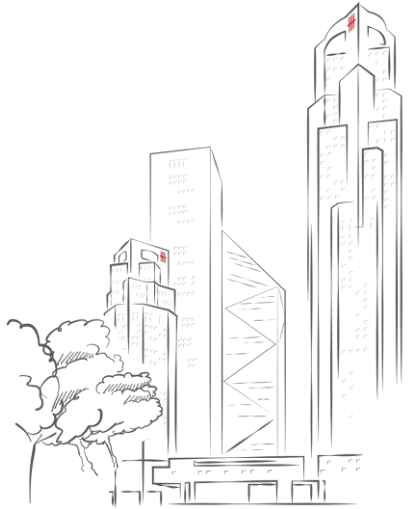
## **Driving Environmental Responsibility Through Energy Efficiency Initiative**

Mr. Jasper Wong

Head of Construction and Infrastructure, Sector  
Solutions Group, UOB

With over 25 years of extensive project and structured finance experience in the region focusing on power, renewable energy, oil & gas, petrochemical, infrastructure and telecoms financing, Jasper joined UOB in 2013 to head the Infrastructure & Project Finance team for Asia, under the Group Wholesale Banking before taking up the current role in Sector Solutions Group.





# Driving Environmental Responsibility Through **E**nergy **E**fficiency Initiative

**By Jasper Wong**

Head, Construction & Infrastructure COE  
Sector Solutions Group

23 September 2021

*Less is more with energy efficiency*

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# Executive Summary



Governments around the world are encouraged to ensure that the **post-Covid-19 economic recovery is a green one**



Energy efficiency (EE) could help **address the energy demand for sustainability**



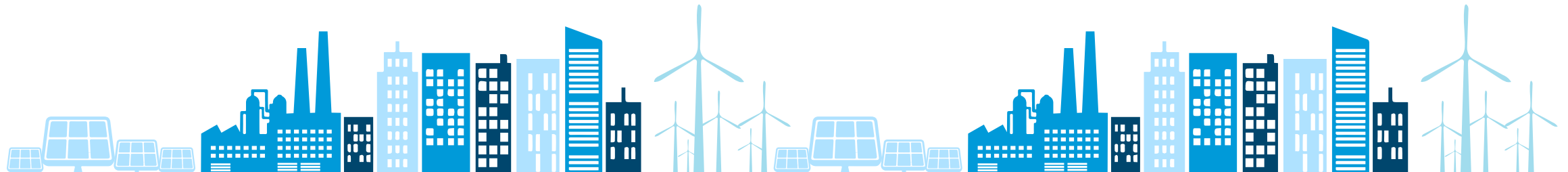
Aside from ESG considerations, building owners have an **opportunity to reap cost savings**



Potential to significantly reduce CO<sub>2</sub> could be through improving the EE of construction and buildings. **Globally, buildings & construction account for 39% of CO<sub>2</sub> emission**



**Potential collaborations** opportunities – between public and private sector and financial institutions to drive sustainability goals set by the government





# Sustainability in a post COVID-19 environment

*Less is more with energy efficiency*



# Sustainability – The challenges facing us...

Buildings are responsible for  
**50% of global material use**

**42.4bn** tonnes  
of materials consumed annually

Annually, buildings construction  
and operations accounted for

**39%** of the global CO<sub>2</sub>  
sector emissions

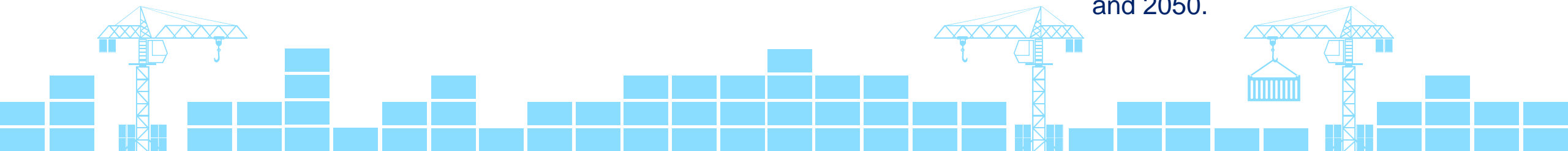


Global population will  
increase by 27% to

**9.8bn**  
and global floor area  
will increase by 100%

Embodied CO<sub>2</sub> will be  
responsible for almost







**50%**  
of total new construction  
emissions between now  
and 2050.





# EE growth supported by favorable Government policy



	Power Demand Outlook	Energy Targets	Regulations & Incentives	Regulators	ESCO Market Highlights
 <b>Singapore</b>	Power consumption is likely to grow at 1.3% with 10 year CAGR till 2030.	80% of new buildings to be Super Low Energy and 80% improvement in EE over 2005 baseline for green buildings by 2030.	Stricter regulations for building owners to comply with energy savings requirements.	NEA, EMA, BCA	With the stricter regulations for industrial buildings, the market is deemed to have more potential in EE take up rate as compared to commercial buildings.
 <b>Malaysia</b>	Moderate consumption with a 10 year CAGR of 2.79% till 2030. Fuel and gas remain dominant energy source in 2030 (81%).	Under Renewable Energy Transition Roadmap, 20% RE mix out of total energy mix by 2025.	Green Technology Financing Scheme 2.0. sets 2% p.a. rebate on interest for producer of Green Technology; user of Green Technology and ESCOs.	SEDA, Malaysia Energy Commission	Keen interest in EE projects, especially for 'energy as a service' model.
 <b>Indonesia</b>	Forecast rapid growth in consumption with a 10 year CAGR of 5.37% till 2030	Government has a greenhouse gas emissions reduction target of 29% by 2030, or 41% if international support is provided.	National Energy Policy, Institute of Essential Services Reform	Ministry of Energy and Mineral Resources	Major ESCOs are state-owned & private companies, with preferred financing from financial institutions.
 <b>Thailand</b>	Moderate forecast growth with 10 year CAGR of 2.7% till 2030. Gas remains as dominant power source in 2029	Reduce energy intensity by 30% by 2036 compared with 2010 levels for overall country and energy intensive sectors.	Thai Board of Investment (BoI) exempts EE businesses from tax for eight years	Ministry of Energy	With tax incentives for undertaking EE projects, both private and public sector are seeing more EE projects taken up.
 <b>Hong Kong</b>	Slow consumption growth with 10 year 1% CAGR till 2030. Political tension can deter investors to invest in country's RE.	Aim to rely on exported gas to move away from coal and fossil fuel. Gas forecasted to be 71% of total energy.	Government provided \$450m over 3 years to subsidize EE projects	The Environment Bureau	Guaranteed payment financing scheme preferred.
 <b>China</b>	Fast growth at 10 year CAGR of 3.0% till 2030 due to stimulus to boost economy. RE is expected to make up 35% of total source by 2030.	The 13th Five Year Plan (2016-20) has set targets of 18% carbon intensity reduction but has lowered risk of coal for the 3 <sup>rd</sup> time to boost its economy	Government is supporting market-based approaches such as ESCO, risk guarantees for ESCO financing.	National Development and Reform Commission	Prominent ESCOs are owned by State Owned Enterprises
	<b>Rising energy demand across Asia is encouraging the use of energy efficient strategies</b>	<b>Regional countries have developed aligned targets and plans</b>	<b>Government focus on renewables and ESCO regulation</b>	<b>Sub-agencies tasked to handle EE</b>	<b>Regional markets are nuanced and linked to their respective government's EE approach</b>



# Singapore's Green Plan 2030



■ Build environment Opportunities

■ Circular Economy Opportunities

EE Opportunities



**Green Economy**  
Green Finance, standards, frameworks & innovation pursuits

To be the **Green Finance Hub in Asia** through MAS's **Singapore Green Finance Action Plan (FCAP)**

Become a leading **Carbon Trading and Services Hub**, projected to be a multi-billion dollar industry

Attract **R&D activities in Singapore to develop new sustainability solutions** under Research, Innovation and Enterprise 2025 Plan (RIE2025)



**Sustainably Living**  
Circular Economy, Smart cities & Green Commuting

**Aim to introduce zero waste, recycling and closed loop systems** in managing our waste and water resources

**75% reduction of net carbon emissions from pre-tertiary schools by 2030, and at least 20% of these schools to be carbon neutral by 2030**

**Expand rail network by 1.5x to 360km and cycling network by 2.9x to 1,320km by 2030**



**Energy Reset**  
Electric Vehicle adoption, solar power & green buildings

All newly registered cars to be cleaner-energy models from 2030 and **phase out Internal combustion engine (ICE) vehicles by 2040**

**Quadruple the solar deployment by 2025 and five times by 2030** (base year 2020) with at least 2 gigawatt-peak

Reduce energy consumption from public housing by 15% through smart, energy efficient methods. **Target 80% of all buildings to be green by 2030**



**Resilient Future**  
Food supply chains, Cooling cities & rising sea level mitigation

**Climate adaptation infrastructure for coastal areas** to tackle rising sea levels

**Moderate rise in urban heat** with greenery and by design (i.e. use of cool paint) to cool our cities

Aim to improve self-sufficiency in **local food production to 30% by 2030**



**City in Nature**  
Biodiversity & Living spaces

Approx. one third of total land space in Singapore will be covered by trees

**One million more trees** to be planted across the island, which will **sequester additional 78k tonnes of CO<sub>2</sub>**

**Promote harmony** between people and wildlife

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## VISION

“A leading green Built Environment sector mitigating climate change and providing a healthy, liveable and sustainable Built-Environment for all.”



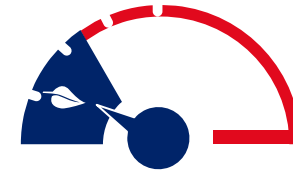
**80%** buildings (by GFA) to be green by 2030

- Step up the pace of greening our buildings.
- Raise the sustainability standards of our buildings.



**80%** of new developments to be SLE from 2030

- Mainstream Super Low Energy (SLE) performance of new buildings so that from 2030, large majority of new development would be achieving today's SLE energy performance standards.



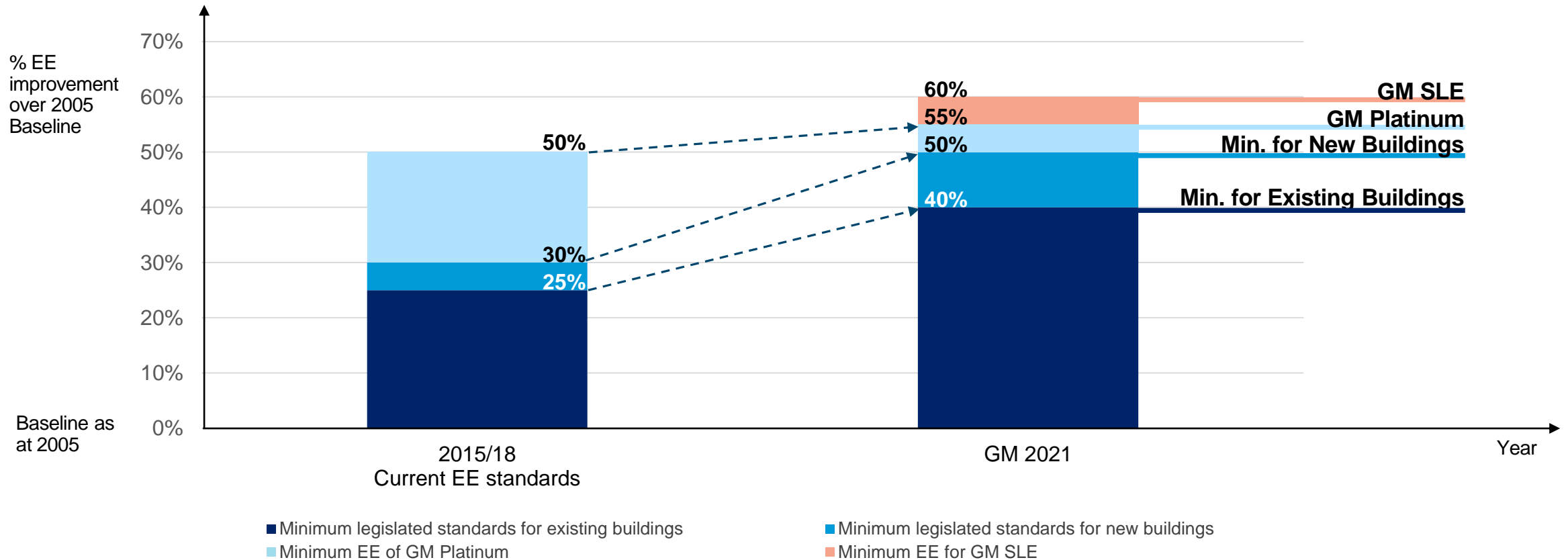
**80%** EE improvement (from 2005 levels) by 2030

- 80% improvement in energy efficiency for best in class green buildings by 2030, through research, innovation and implementation.



# 80% Buildings (by GFA) to be green

To future-proof and improve the quality of our building stock by raising minimum energy efficiency requirements for buildings in 2021

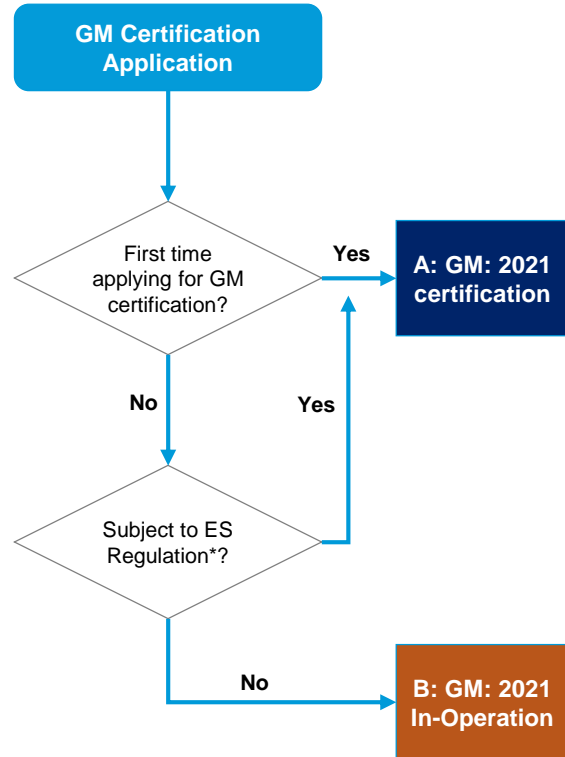


**Raising minimum EE standards for new and existing buildings to 50% to 40% respectively**

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# Green Mark: 2021

## Green Mark 2021 Application Process



A. Full GM: 2021 certification										
	Energy Efficiency				Sustainability Section					
	Energy Savings									
	≥50%	≥55%	≥60%	ZE	• 15 points for each sustainability section • ≥10 points in a section to qualify for a badge for exemplary performance					
<b>SLE</b> (incl. ZE, PE)			✓	✓	N/A					
<b>Platinum SLE</b> (incl. ZE, PE)			✓	✓	40 points					
<b>Gold<sup>PLUS</sup> SLE</b> (incl. ZE, PE)			✓	✓	30 points					
<b>Platinum</b>		✓			40 points					
<b>Gold<sup>PLUS</sup></b>	✓				30 points					
B. GM: 2021 In-Operation										
	Energy Efficiency				Sustainability Section					
	Energy Savings									
	≥40%	≥50%	≥55%	≥60%	ZE	Option to be assessed to qualify specific badges to demonstrate exemplary performance in operation				
<b>SLE</b> (incl. ZE, PE)				✓	✓	N/A				
<b>Platinum/Gold<sup>PLUS</sup> SLE</b> (incl. ZE, PE)				✓	✓	<ul style="list-style-type: none"> <li>Water consumption</li> <li>Energy and Water Improvement Plan</li> <li>Cooling Towers Cycles of Concentration</li> <li>Indoor environmental Quality</li> <li>Occupancy Evaluation</li> <li>Waste Audits</li> <li>Tenants/Occupancy Engagement</li> </ul>				
<b>Platinum</b>			✓							
<b>Gold<sup>PLUS</sup></b>		✓								
<b>Gold</b>	✓									

\* Projects subject to Environmental Sustainability Regulations, including projects with major change of cooling system or major retrofit would be subject to GM: 2021 certification. Projects which are not subject to ES regulations, AND have been previously held a Green Mark certificate can use GM 2021 In-Operation.

**Notes:**

- Offsite REC procurement is only applicable for projects meeting energy saving ≥60%. REC's must be generated in Singapore through renewables deployed within Singapore.
- GM: 2021 includes other sustainable requirement regulated by other agencies including BCA's Building Control (Environmental Sustainability) Regulations 2008 and Building Control (Environmental Sustainability Measures for Existing Buildings) Regulation 2013. Meeting these regulated requirements would have deemed meeting at least 50 GM points. Refer to Annex 1.
- Building projects that are subject to the Government Land sales, it is a mandatory requirement to also meet the Building Control (Environmental Sustainability) Regulations 2008 before Green Mark certification could be conferred.
- Gold rating is only applicable to projects applying for GM: 2021 In Operation



# Stricter regulatory standards for Singapore buildings



<b>Commercial buildings (BCA)</b>	For <b>new</b> buildings from Nov 2021 onwards: to be at least 50% (instead of 30%) more energy efficient as compared to 2005 levels	
	For <b>existing</b> buildings undergoing major retrofitting from Nov 2021 onwards: at least 40% (instead of 25%) more energy efficient compared to 2005 levels.	
	<b>Energy Efficiency Opportunities Assessment (EEOA)</b>	<b>Energy Performance/ Management (Ongoing operations)</b>
<b>Industrial buildings (NEA)</b>	For <b>new</b> industrial buildings	For <b>new</b> industrial buildings
	EEOA required for the following: <ul style="list-style-type: none"> <li>• Owner that applies for planning permission <b>or after 1 October 2018</b></li> <li>• Activities carried out at a single site and is attributable to one of the following industry sectors: manufacturing and manufacturing-related services; supply of electricity, gas, steam, compressed air and chilled water for air-conditioning; and water supply and sewage and waste management.</li> <li>• Estimated Annual Energy Consumption (AEC) <math>\geq 54</math> TJ</li> </ul>	<b>Implementation of Energy Performance Measurement (EPM):</b> <ul style="list-style-type: none"> <li>• Advised to plan for and install meters and instruments at design and construction phases to measure: <ol style="list-style-type: none"> <li>(1) Total energy consumption of the New Venture facility; and</li> <li>(2) Energy consumption and intended output of key energy-consuming systems that account for at least 80% of annual energy consumption.</li> </ol> </li> </ul>
	For <b>existing</b> industrial buildings	For <b>existing</b> industrial buildings
	<b>For the first EEOA</b> <ul style="list-style-type: none"> <li>• A registered corporation established <b>on or before 2 June 2017</b> must submit EEOA report by 31 Dec 2021.</li> <li>• A registered corporation established <b>after 2 June 2017</b> must submit EEOA report within 6 years from incorporation.</li> </ul> <b>For Subsequent EEOAs</b> <ul style="list-style-type: none"> <li>• For activities/facilities with energy use threshold of <b>more than 500 TJ</b> in at least 2 out of the 3 preceding calendar years, EEOA to be submitted within 6 years from the end of its current EEOA.</li> <li>• For activities/facilities with energy use threshold of <b>at least 54 TJ but less than 500 TJ</b> in at least 2 out of the 3 preceding calendar years will only have to conduct a subsequent EEOA upon receiving a notice of assessment from NEA.</li> </ul>	<b>First Energy Management System (EnMS) submission</b> <ul style="list-style-type: none"> <li>• Existing relevant business activities (before 1 January 2021) must submit EnMS report/ISO 50001 certification by: <ol style="list-style-type: none"> <li>31 December 2021 for Tier 1 facilities (annual energy consumption* <math>\geq 500</math> TJ); or</li> <li>31 December 2022 for Tier 2 facilities (<math>54\text{TJ} \leq</math> annual energy consumption* <math>&lt; 500\text{TJ}</math>).</li> </ol>                     *Based on 2 out of 3 preceding calendar year                 </li> </ul> <b>Subsequent EnMS submission</b> <ul style="list-style-type: none"> <li>• Three-year assessment cycle from the approval of the first EnMS report or certification cycle of the ISO 50001.</li> </ul>

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# What Is Energy Efficiency (EE)?

*Less is more with energy efficiency*



# What is Energy Efficiency?

## What is energy efficiency (EE)?

Energy efficiency simply means using less energy to perform the same task – i.e., eliminating energy waste. **Energy efficiency brings a variety of benefits:** reducing CO<sub>2</sub> emissions and lowering costs for households and economy-wide level. (Environmental and Energy Study Institute).

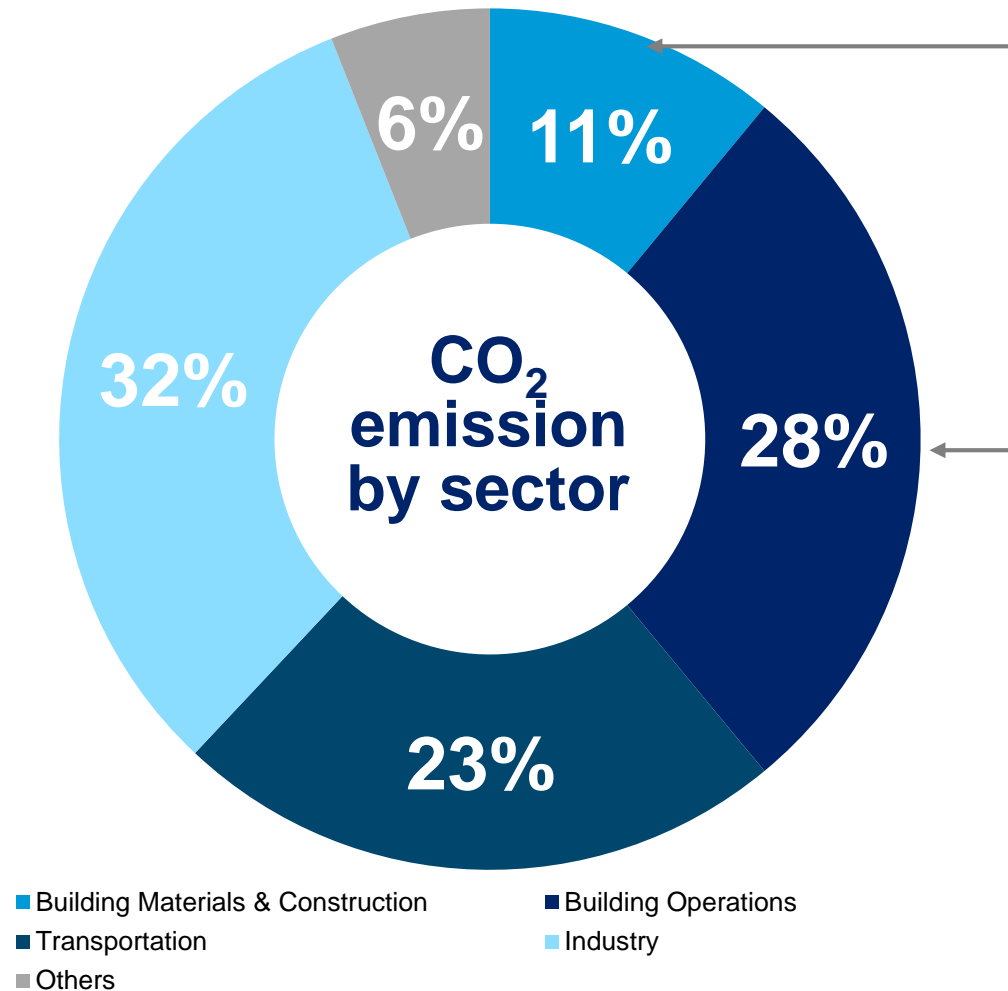


## Why EE? Returns include financial and non-financial benefits

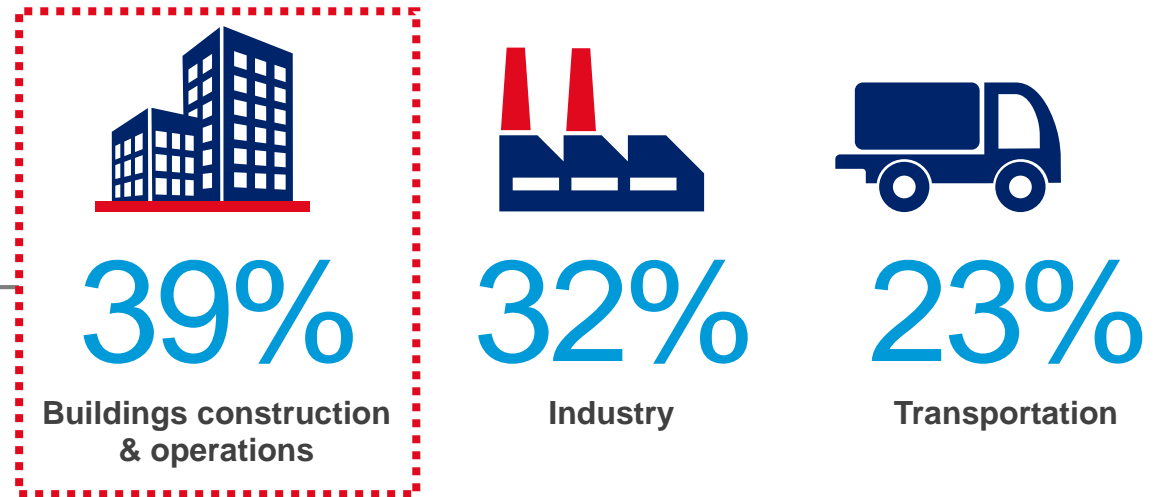
EE looks at the demand side management of energy and offers benefits including:

- Helping companies **meet its ESG objectives** and to be a more responsible corporate citizen
- Potential **cost savings** from lower energy consumption
- For selected assets, the **capital value of energy efficient assets** such as green buildings could be **enhanced**
- Adopting clear sustainability targets can **improve the company's branding** and ability to attract talents that is increasingly pre-disposed to preferring employers that adopt good ESG practices

# 39% of CO<sub>2</sub> emitted is contributed by buildings<sup>1</sup>



Globally, the breakdown of CO<sub>2</sub> emission are:



An area of focus could be the **largest component, buildings and construction** (including building operations) is the largest component for CO<sub>2</sub> emission.

In Singapore's context, this will be a **key pillar to help meet the country's target to reduce CO<sub>2</sub> emission by 36% in 2030** (using 2005 as a base).

<sup>1</sup> Source: Global alliance for Buildings and Construction, UOB Analysis



# Key energy efficiency emerging themes



## Smart and sustainable city

Energy efficiency has been identified as one of the key enabler in the transition to a smart and sustainable city



## Drive towards reduction of CO<sub>2</sub> emission

Paris Agreement- ASEAN countries have implemented policies in a bid to achieve goals for sustainability



## Stricter regulatory rules

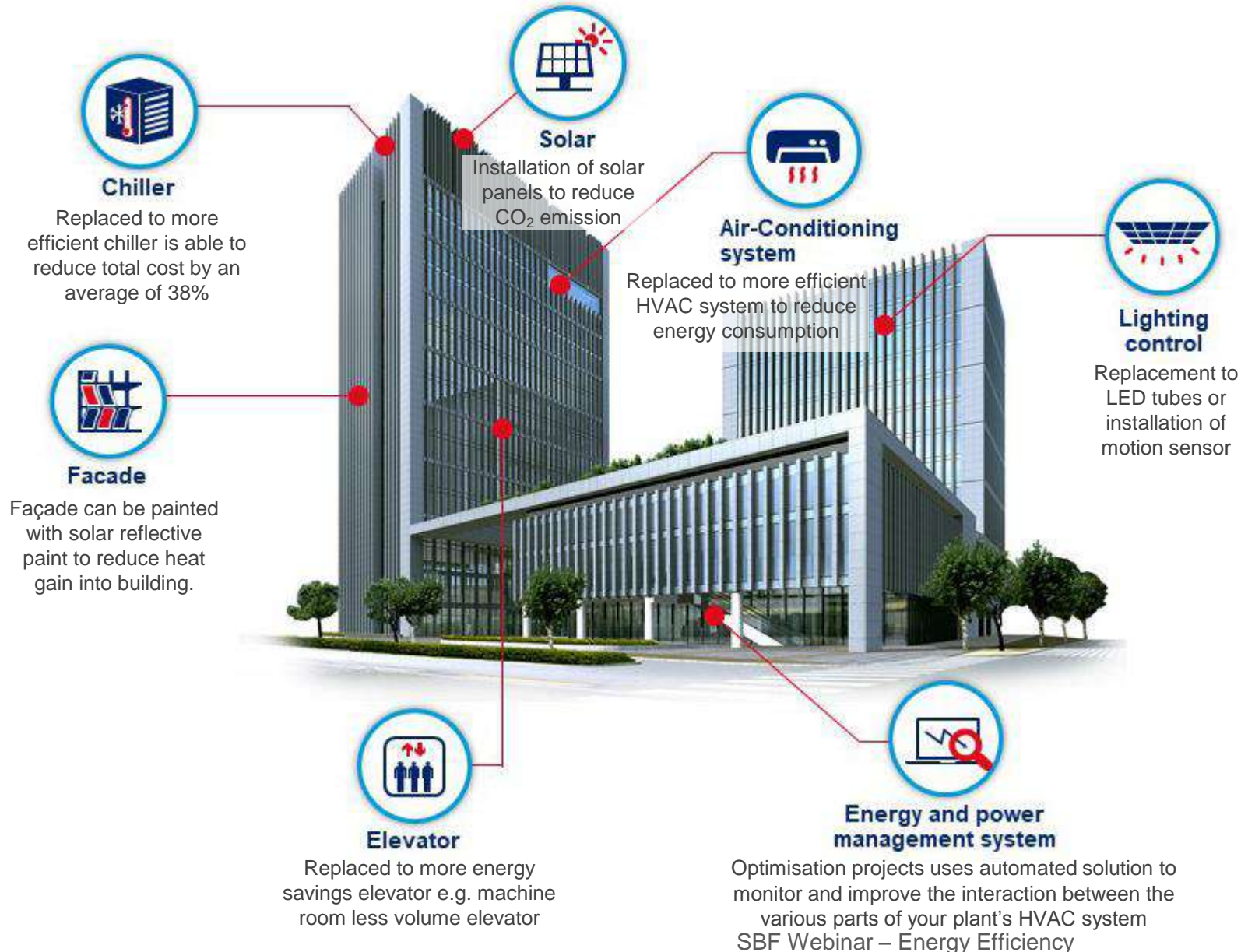
Governments are pushing for stricter regulations for energy usage assessments/ audits, especially for heavy-usage industries



## Sustainability and green financing drive

Companies are going green with increased sustainable initiatives. This is accelerating post COVID-19

# 7 areas of Energy Efficiency



Improvement in energy efficiency in any of these areas would reduce the total energy consumed in a building.

Building owner could experience energy savings of up to

**80%**  
Lighting

**50%**  
Chiller/HVAC

**30%**  
Energy and power management System



# Typical EE Contracting Models:



## Design-build model

- ✓ Traditional contracting model with Building Owners (BO) self-financing the CAPEX;
- ✓ BO is the owner of the asset/equipment immediately;
- ✓ Maximise financial benefits through realised tax benefits by treating the equipment as a depreciable asset;
- ✓ Increase market value for the building;
- ✓ Greater savings on electricity utility cost over the system lifetime with all the attributed benefits.



## Energy-as-a-service

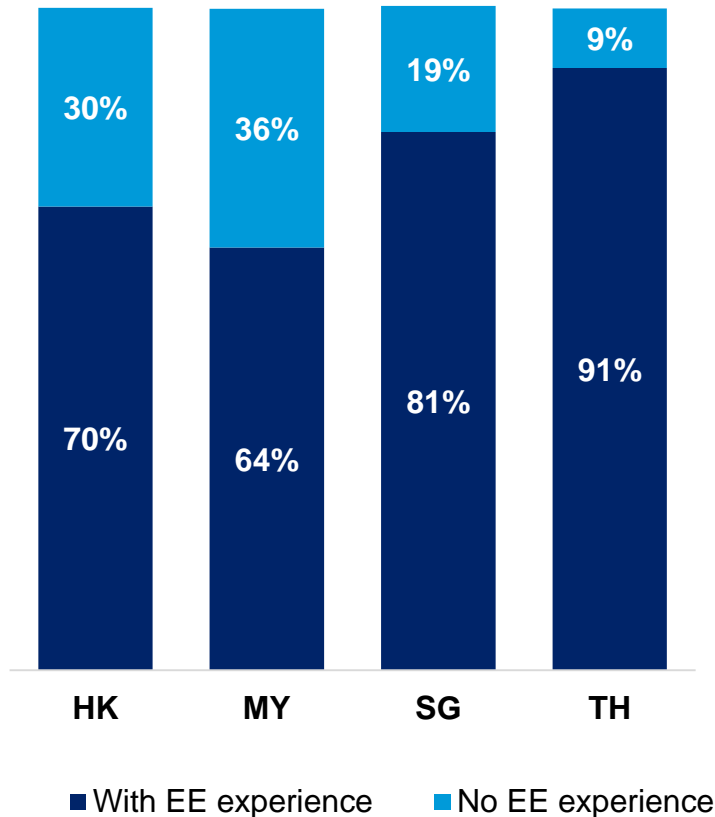
- ✓ Zero upfront capital investment from BO;
- ✓ ESCO develops EE retrofitting projects with own capital, including all the capital expenditure and project related costs, as well as operations & maintenance during the Energy Performance Contract (EPC) term;
- ✓ ESCO recoups the investment from sharing of the cost savings periodically with the BO;
- ✓ During tenor of contract, ESCO owns the system/equipment;
- ✓ BO has the option to takeover the ownership of system/equipment during or after the EPC tenor subject to agreement;
- ✓ BO reap the benefits of energy savings without expensive upgrades on the electrical/sensor equipment or software management system.

**Energy-as-a-service is gaining traction as the preferred contracting model**  
**(i) Zero upfront investment, (ii) financing by the ESCO, and (iii) maintenance-free for BOs**

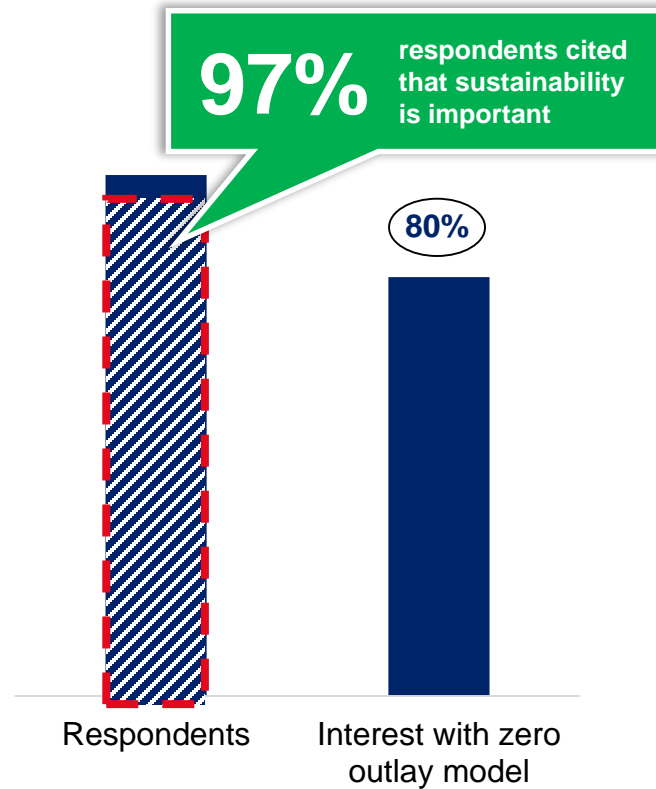
# Unique EE survey results across UOB markets



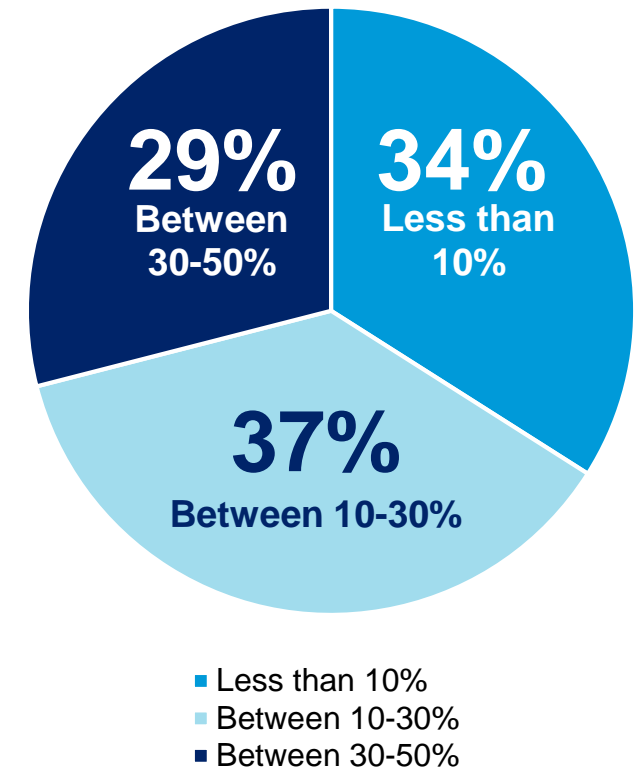
## Strong awareness of EE among Building Owners\*



## Capital outlay as respondent pain point



## Energy savings from respondents breakdown



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Source: UOB analysis  
\* With properties of minimum 8 years and above



# Common questions and misconceptions on EE (1/2)



EE projects are expensive and requires massive upfront capital

- Building owners can **tap on the government incentives**.
- 'Energy as a service' model **allows zero upfront payment**, instead of self-financed model.
- **Retrofits often pay for themselves over time in reduced energy costs**. Example: 14% improvement in energy efficiency for Singapore commercial building can translate to 1 gigawatt hours in energy, or \$0.2mn saved p.a.


My business operations will be disrupted

- Using **experienced and accredited ESCO** can provide assurance of **smooth implementation of the energy efficiency project** with minimal disruptions to the normal building operations
- **Optimisation and automation technologies** can be adopted to increase efficiency without equipment change.

Not convinced with the energy savings

- **IoT and cloud based technology** can allow that building owners to have **real time monitoring** of the operations and see the results of the energy savings.
- For retail properties, the **cost savings can range from about 9 - 17%** of the total annual operating expenses. **13.5% cost saving** in operating expenses translates to about **2.7% higher net income**.
- For office properties, the **cost savings ranged from 7 - 37%** of the total annual operating expenses.

# Common questions and misconceptions on EE (2/2)



EE is a new technology and subject to obsolescence

- **Operational risks can be minimised** by engaging accredited ESCO with successful track record in EE projects.
- The **advancement of IoT technologies and the fast declining equipment costs**, allows building owner to enjoy higher cost savings with faster deployment and shorter payback period.

There is no need to improve my building to achieve green building certification

- **Lower energy usage**  
Based on research by Singapore BCA over a nine year period, overall energy use intensity (**EUI**) for green buildings has **improved by 14%** since 2008 with EE improvements such as upgrading and retro-fitting of their air-conditioning, lighting system and use of solar systems.
- Research indicates green buildings **enhance health and wellbeing** of those living and working in them.
- **As energy management technology advances and higher tenant/employee expectations**, there is a growing gap in rental yield and operating expenses between green and non-green building.

No tangible benefits for me in the long run

- The **return on retrofit** based on the ratio of the change in valuation to the total retrofit cost, **ranges from two to seven times** for office buildings and **one to nine times** for retail properties.
- Over the **useful life of the building**, the savings in energy and operating costs will increase the value of the green properties far exceeds their total retrofit cost.

# Example - Savings & benefit analysis – C&I Buildings (1/3)



## Case study 1

<b>Type of project</b>	Resorts World Sentosa – Maritime Experiential Museum
<b>Project specification</b>	Double-glazed with low emissivity glass; Use of energy efficient fixtures such as LED and T5 fluorescent lighting
<b>Annual energy savings</b>	1.3mn kWh p.a. Est water savings: 10,564m <sup>3</sup> p.a.



<https://genenergyglobal.com/project/resorts-world-sentosa-maritime-experiential-museum/>



## Case study 2

<b>Type of project</b>	Great World City (Mixed Development)
<b>Project specification</b>	Retrofit of chiller plant and pre-cool coils
<b>System cost (SGD)</b>	8.0mn
<b>Annual savings (SGD)</b>	1.2mn
<b>Payback period</b>	6.8 years



## Case study 3

<b>Type of project</b>	UOB Plaza 1
<b>Project specification</b>	Retrofit of chiller plants
<b>Annual energy savings</b>	6.3mn kWh
<b>Annual savings (SGD)</b>	1.5mn





# Example - Savings & benefit analysis – C&I Buildings (2/3)



## Case Study 1

<b>Type of project</b>	Integrated solutions for Cadbury plant
<b>Project scope</b>	Tri-Generation - 600KW of electricity with the heat recovery converted into cooling totalling to 180RT for internal food manufacturing purposes.
<b>Achievements</b>	30% Reduction in Electricity Cost ~50% carbon emission reduction



<http://investenergygroup.com/Cadbury.aspx>



## Case Study 2

<b>Type of project</b>	Tune Hotel in KL
<b>Project scope</b>	Lighting, Window glaze, HVAC upgrade
<b>Implementation cost (MYR)</b>	3.1mn
<b>Annual cost savings (MYR)</b>	0.5mn
<b>Payback period</b>	6 years



Private & Confidential

# Example - Savings & benefit analysis – C&I Buildings (3/3)



## Case Study 1

Type of project	IT Mall – Mixed Development
Project scope	Conversion of original Water Cooled Package Unit to Chilled Water system
Annual Energy savings	1.4mn kWh
Annual savings (THB)	4.3mn
Energy savings (%)	~50%



## Case Study 2

Type of project	Empire Tower – Office	
Project scope	Phase 1 and 2&3: Upgrading of building air-conditioning and mechanical ventilation	
Annual Energy savings	Phase 1: 1.6mn kWh	Phase 2&3: 1.7mn kWh
Annual savings (THB)	6.7mn	7.1mn
Energy savings (%)	67%	47%



<https://www.energyconservation.sg/our-success-stories/empire-tower-bangkok>

# What is the U-Energy programme?

*Less is more with energy efficiency*



# Key objectives of the U-Energy programme



U-Energy program is *Asia's first integrated Energy Efficiency financing platform* across UOB's key Southeast Asian markets. It provides financing solutions to attract building owners, ESCO, green contractors and supports the 'green' agenda of homeowners, businesses and regional governments, in building a sustainable ecosystem and partnership.

## Objectives of the U-Energy platform

1

Promoting sustainability awareness to the public

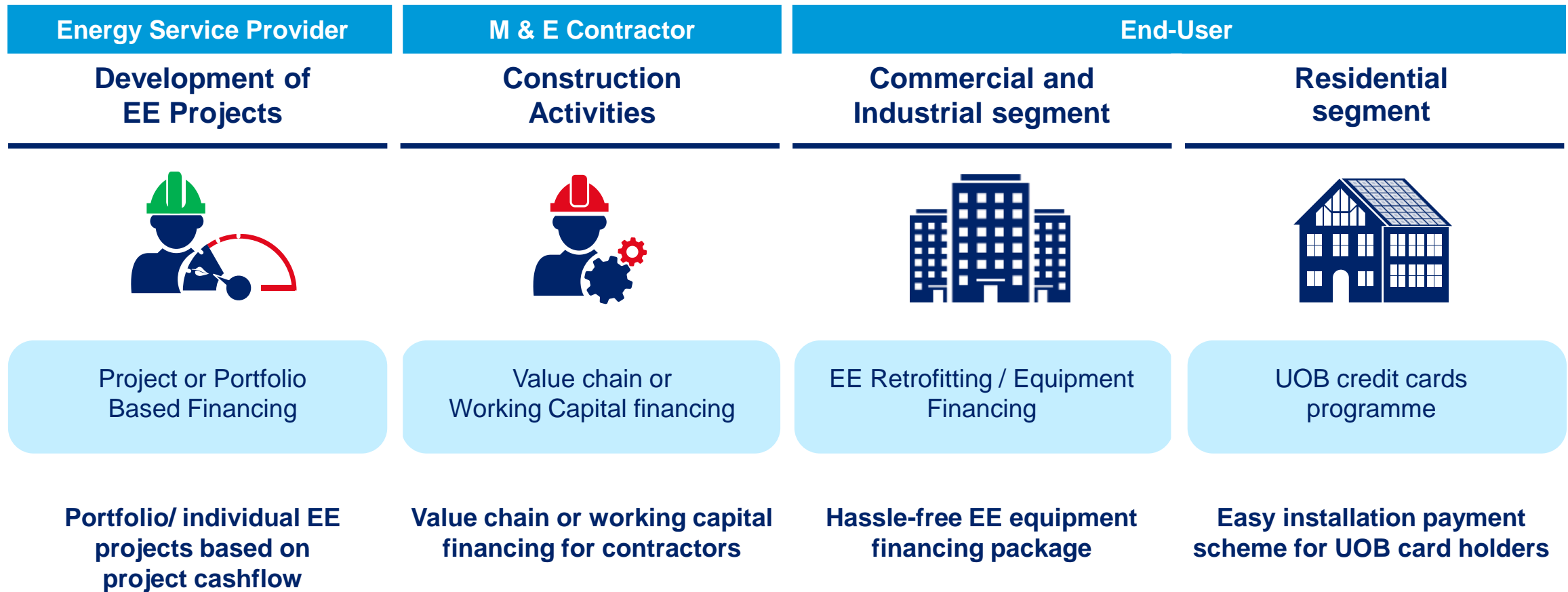
2

Supporting EE ecosystem players with end-to-end solutions on one platform

3

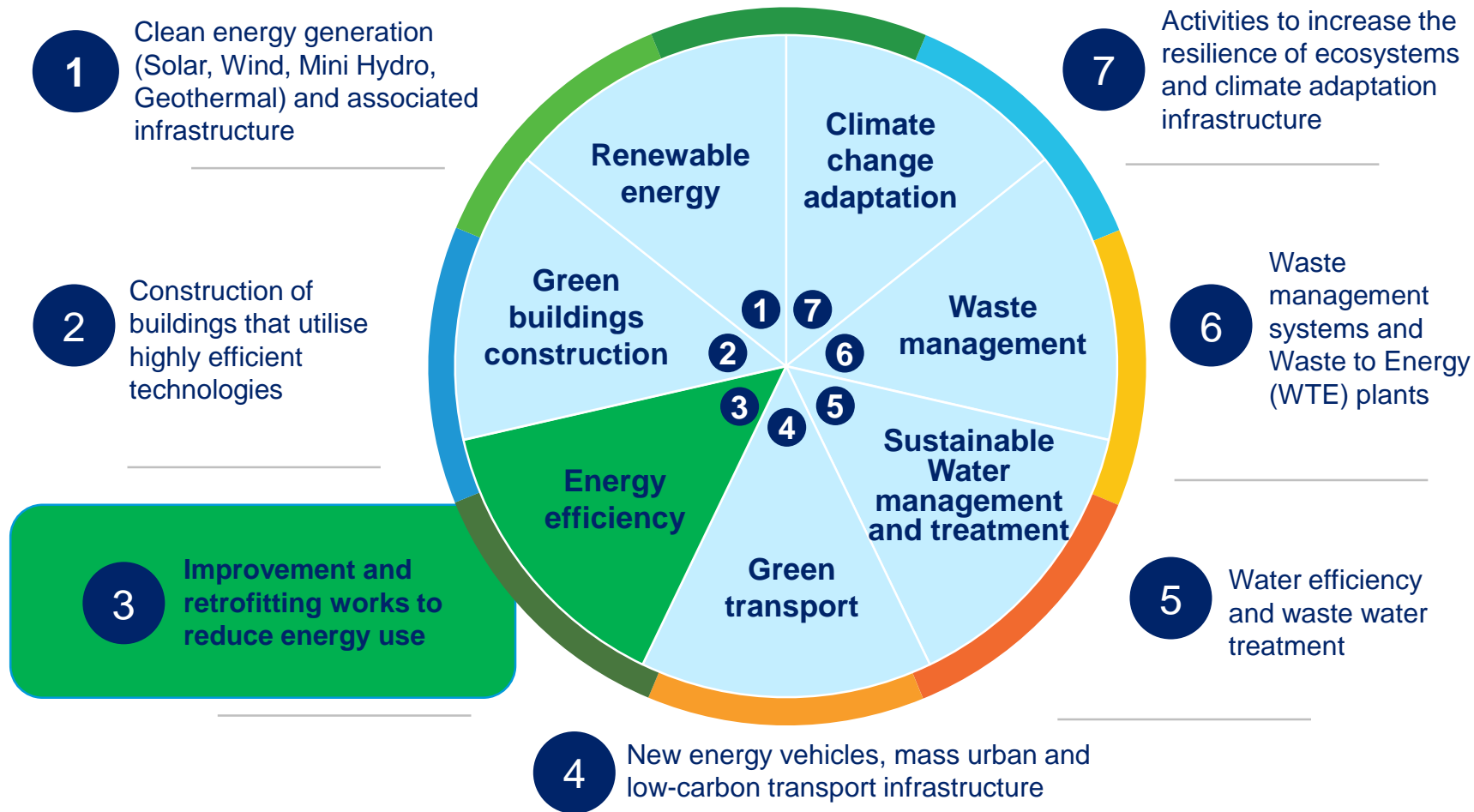
Simplifying sustainability with end-user EE financing

# Financing solutions for the ecosystem at a glance



Private & Confidential

# UOB's Smart City Sustainable Finance Framework



This framework guides the Bank's financing efforts to encourage the development of smart and sustainable cities across the region through a streamlined and transparent process.

This is done by setting out the eligible activities under each green category and the qualifying criteria for sustainability-linked loans, such as:

- Sustainability strategy and objectives
- Sustainability performance targets

## Carbon Trust provided Second Party Opinion (SPO)



Benefits to clients

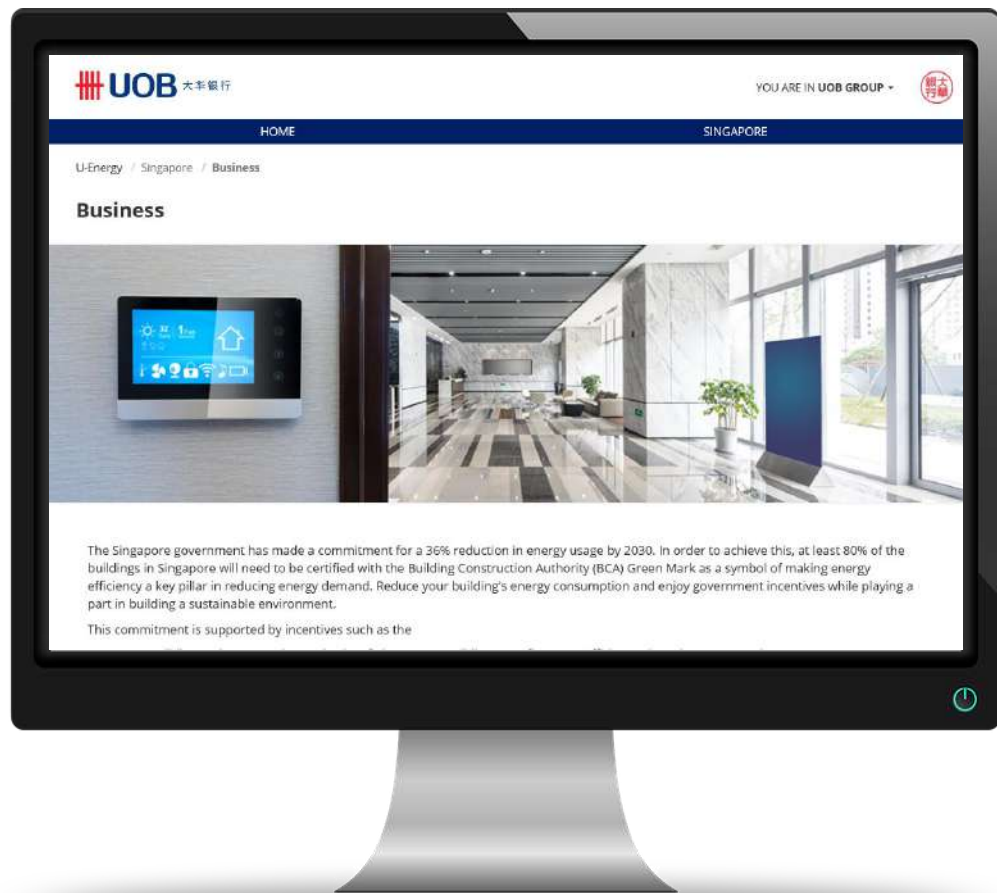
**Streamlined process**  
Saves time and reduces complexity

**No additional cost**  
A universal "umbrella"

**Common reporting**  
Standards for impact reporting



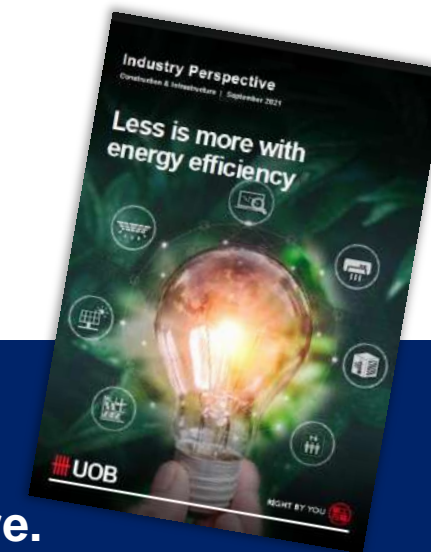
UOB. Simplifying sustainability for business.



# U-Energy Programme official launch in Singapore on **October 11, 2021**



Visit our website [www.UOBgroup.com/sustainable-financing](http://www.UOBgroup.com/sustainable-financing) or  
e-mail us at [sustainable-financing@uobgroup.com](mailto:sustainable-financing@uobgroup.com) to find out more.



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## About UOB

# Who we are



Established in 1935, United Overseas Bank (UOB) is a leading bank in Asia with:



> 500

Branches and offices



19

Countries and territories in Asia Pacific, Europe and North America



> 7

Offices in Asia; Singapore (Head office), Mainland China, Hong Kong, Indonesia, Malaysia, Thailand, Vietnam



2021

Rated among the world's top banks; "Aa1" by Moody's and "AA-" Standard & Poor's and Fitch Ratings

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At UOB, we believe in being a responsible financial services provider and we are committed to making a difference in the lives of our stakeholders and in the communities in which we operate.



# What we do



**UOB provides a wide range of financial services globally through our business segments:**

## Group Wholesale Banking (GWB)

**Covers:** corporate and institutional client segments which include medium and large enterprises, local corporations, multi-national, corporations, financial institutions, government-linked entities, financial sponsors and property funds.

### Products and Services

- Capital Markets Solutions and Advisory
- Cash Management
- Commodities
- Credit
- Equities
- Financing
- Foreign Exchange
- Interest Rate
- Management of Funding and Liquidity
- Market Making Activities
- Structured Investment
- Trade services
- Treasury Products



# UOB Awards and Accolades 2021



## **Alpha Southeast Asia**

### **Best Financial Institution Awards**

- Best Digital Bank – TMRW Indonesia

## **Asian Banking and Finance**

### **Asian Banking and Finance Retail Banking Awards 2021**

- International Retail Bank of the Year
- Digital Banking Initiative of the Year
- International Retail Bank of the Year
- New Consumer Lending Product of the Year
- Domestic Retail Bank of the Year
- Banking for Women Initiative of the Year
- Branch Innovation of the Year – Gold
- Investment Product Innovation of the Year

## **Asian Banking and Finance Wholesale Banking Awards 2021**

- Singapore Domestic Initiative of the Year – U-Solar
- Malaysia International Initiative of the Year
- Malaysia International Trade Finance Bank
- Brunei International Project Finance Bank of the Year

## **Euromoney**

### **Euromoney Awards for Excellence 2021**

- Asia's Best Bank for SMEs

## **The Asian Banker**

### **Excellence in Retail Financial Services Awards 2021**

- Best Retail Bank in Singapore
- Best SME Bank in Singapore
- Best SME Bank in Asia Pacific

## **International Finance**

### **International Finance Awards 2021**

- Best Digital Bank – TMRW Thailand
- Best Digital Bank – TMRW Indonesia

## **Transaction Finance Awards 2021**

- Best Cash Management in Singapore
- Best Transaction Bank in Singapore
- Best API Initiative, Application or Programme – APIs for End-to-End Client Solution
- Best Financial Supply Chain Initiative, Application or Programme – Dealer Financing – Import Invoice Financing solution
- Best Corporate Trade Finance Deal in Singapore – Barramundi Asia Pte Ltd
- Best Cash Management Project in Indonesia – One Family Indonesia
- Best Supplier Relationship Management in China

## **The Asset**

### **The Asset Triple A Digital Awards 2021**

- Best in Treasury and Working Capital – LLCs
- Best Financial Artificial Intelligence Project
- Best Mobile Banking Application in Thailand

### **The Asset Triple A Sustainable Capital Markets Country & Regional Awards 2021**

- Best Local Currency Bond in Thailand Role: Bookrunner and Lead Manager

### **The Asset Triple A Treasury, Trade, Supply Chain and Risk Management Awards 2021**

- Best in Treasury and Working Capital-LLCs
- Best in Treasury and Working Capital-SMEs
- Best Service Provider – Trade Finance
- Best Service Provider – Transaction Bank
- Best Service Provider – E-Solutions Partner
- Best Service Provider – Liquidity Management
- Best Service Provider – Risk Management
- Editors' Triple Star for Electronic Banker's Guarantee (eBG)
- Best Trade Finance Solution (5 Awards)
- Best Payment and Collections Solution (9 Awards)
- Best Liquidity and Investments Solution (5 Awards)
- Best Structured Trade Finance Solution (1 Award)
- Best Supply Chain Solution (6 Awards)



RIGHT BY YOU





## **Innovation Journey Towards A More Efficient Sustainability**

Mr. Ted Howland

Vice President, Group Sustainability, CapitaLand  
Investment

Mr Ted Howland is Vice President in Group Sustainability at CapitaLand and leads the Environmental Management and Innovation team. He has nearly 22 years of experience in sustainability, development, project management, and environmental engineering. Previously he has led innovation, certification (Green Mark, LEAF, SITES), and operational environmental monitoring and management plan implementations. He is also a subject matter expert in ventilation and thermal comfort, water treatment, water recycling, and wastewater treatment. Ted is a registered Professional Engineer (Civil; Massachusetts, USA) holding both Masters' and Bachelors' degrees in Civil and Environmental Engineering from Stanford University.



The background of the slide is a high-speed photograph of water splashing, creating a dynamic and energetic feel. The water is captured in various stages of movement, from a large splash on the left to a more fluid, horizontal wave on the right. The lighting is bright, highlighting the texture and bubbles of the water.

 **Innovation Journey  
Towards A More Efficient  
Sustainability**

Ted Howland  
Vice President, Group Sustainability  
CapitaLand Investment

23 September 2021



# CapitaLand's 2030 Sustainability Master Plan



Raffles City Beijing, China

CapitaLand



# Sustainability is at the core of everything we do

We will grow in a **responsible** manner, deliver **long-term** economic value, and contribute to the **environmental and social well-being** of our communities.

探索地 观景台



# CapitaLand's 2030 Sustainability Master Plan Framework is Our Strategic Blueprint to Guide Our ESG Efforts

## ENVIRONMENT



**Low Carbon Transition**  
Science-based targets validated by SBTi for “well below 2 deg C” scenario



**Water Conservation & Resilience**



**Waste Management & Circular Economy**

## SOCIAL



**Healthy & Safe Buildings**



**Robust Supply Chain Management**



**Proactive Customer Relationship Management**



**Dynamic Human Capital**

## MARKET LEADERSHIP



**Sustainable Operational Excellence**



**Sustainability Innovation & Technology**  
\$50 million CapitaLand Innovation Fund



**Sustainable Finance**



**RETURN ON SUSTAINABILITY**

# Because Sustainability Matters

## CapitaLand Global Sustainability Report 2020 Highlights



**Carbon Emissions**  
intensity reduction of  
**53.8%** since 2008<sup>1</sup>



**Energy & Water intensity** reduction  
of **40.2%** & **52.6%** (per m<sup>2</sup> from base  
year 2008) respectively<sup>1</sup>



**Utilities Cost Avoidance** of  
**S\$270 million** since 2009 due  
to operational efficiency<sup>1</sup>



**Inaugural 'CapitaLand  
Sustainability X Challenge'** crowd-  
sourced the world for best  
sustainability innovations



**Raised S\$3.8 billion** through sustainable  
finance, including largest sustainability-  
linked bilateral loan of **S\$500 million** in  
Singapore's real estate sector<sup>2</sup>

1. Significant reduction compared to baseline year of 2008 likely due to drop in activities amid COVID-19 in 2020.

2. S\$3.8 billion includes sustainable finance raised by business units, stable of REITs & business trusts up to 31 December 2020, which amounts to almost S\$2 billion.

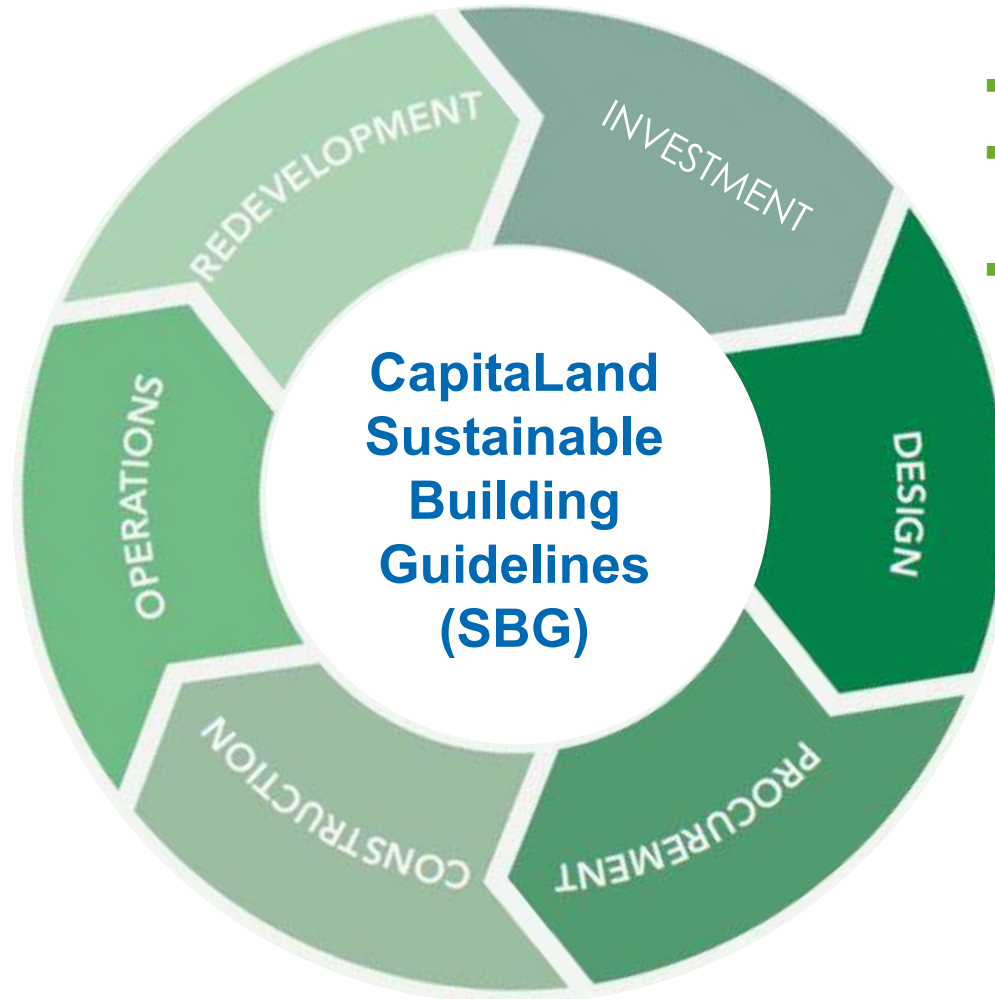




# Integrating Sustainability in CapitaLand's Real Estate Lifecycle

## #3 Operations

- **Asset planning** to align with SMP
- **Sustainable operational excellence**
- **Innovation & Collaboration**
- **EHS Committee**



## #1 Investment

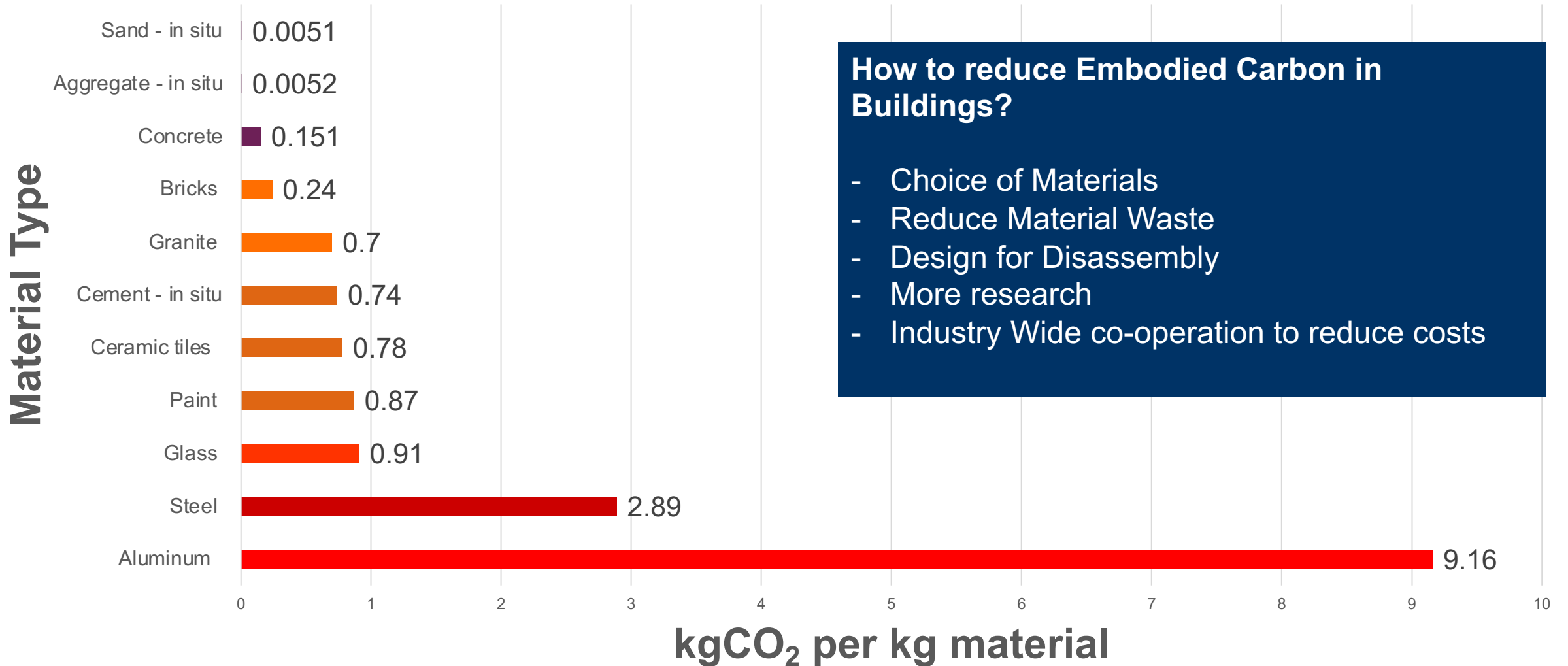
- Align with **Sustainability Master Plan (SMP)**
- Conduct **Environment, Health and Safety Impact Assessment (EHSIA)**
- Quantify **Return on Sustainability (ROS)**

## #2 Design, Procurement, Construction & Redevelopment

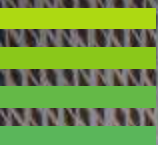
- Design in accordance with **CapitaLand Sustainable Building Guidelines**
- **Testbed innovations**
- **Monitor and report performance**

# Embodied Carbon in Materials has an impact

## Default Embodied Carbon Intensity (kgCO<sub>2</sub> per kg material)







# Funan: Embedding Sustainability in the Future of Retail



Funan, Singapore





## Reimagining Sustainability



### 1 Energy Efficient Chilled Water Plant

- 1<sup>st</sup> with GWP 1 refrigerant in a retail mall in Singapore.

### 2 Low Energy and Energy Efficient Design

- Energy efficient façade designed to minimise solar heat transmission.
- LED light fittings designed with an intelligent scene control system.

### 3 Renewable Energy

- Solar panels to power urban farm.





## 4 Extensive Greenery and Rainwater Harvesting

- the largest area for **urban agriculture** in the city with a 18,000-sq-ft food garden and a 5,000-sq-ft urban farm.



## 5 Encouraging More Sustainable Lifestyles

- **Indoor rock climbing**
- **indoor cycling path** that takes cyclists straight to the Bicycle Hub, where end-of-trip amenities can be found.





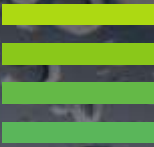


## Reimagining Construction & Retail Experience

- 1 Innovative construction methods** which include applying Virtual Design and Construction and top-down construction method.
- 2 Tree of Life** – a 25-metre-tall design centerpiece that “grows” from Basement 2 all the way to Level 4.
- 3 Digital initiatives** – from facial recognition access at the office blocks to searching and browsing for trending merchandise at the mall, Funan has smart directories that can also make product recommendations based on shoppers’ demographic profile.



# Embedding Sustainability in the future of Lodging



Galaxis, Singapore

CapitaLand



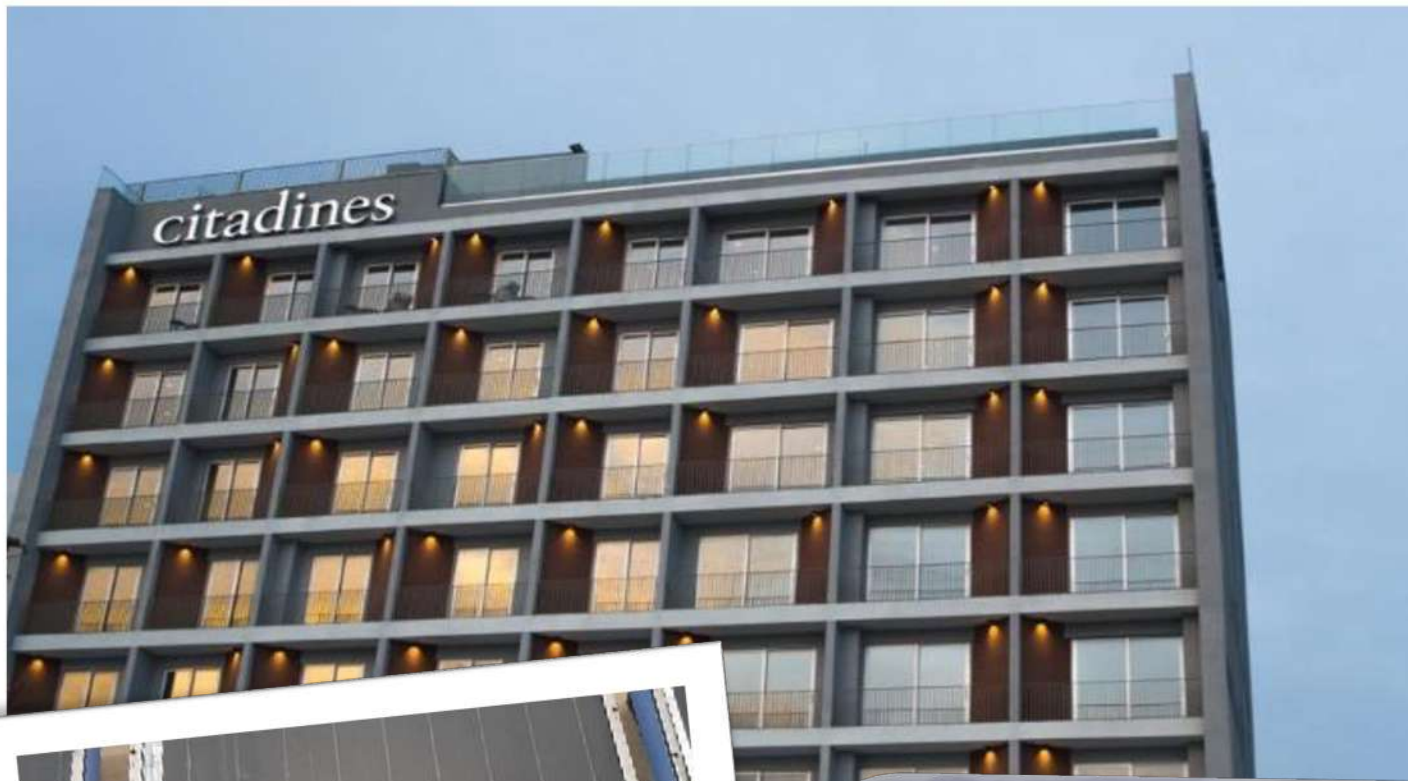
A photograph of the Somerset Greenways Chennai building at night. The building is a tall, modern structure with a grid of windows, some of which are illuminated from within. The name 'SOMERSET' is visible at the top of the building. In the foreground, there are palm trees and a covered entrance area with warm lighting. A car is parked on the right side of the image.

# Somerset Greenways Chennai

*(Achieved EDGE Advanced certification)*

- 1** **Motion sensors** along common areas & use of energy-efficient LED lights
- 2** **Higher thermal performance glass & external shading devices** reduce amount of external heat permeating through facade
- 3** Upgraded centralised air conditioning plant with **energy efficient chillers and variable speed drives** for pumps and cooling tower fans
- 4** **Achieved energy savings of 42%** (1,565 megawatt-hour/year)





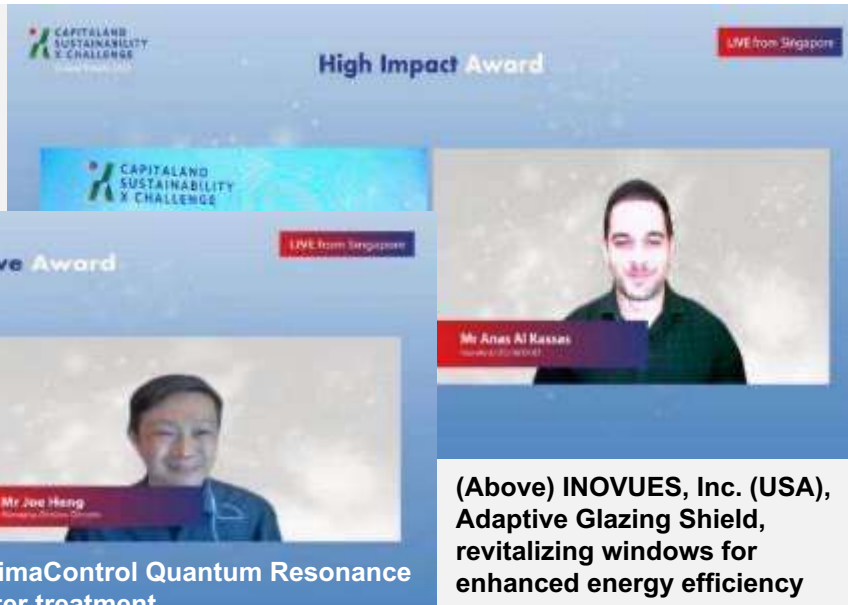
## Somerset Greenways Chennai & Citadines OMR Chennai

- 1** 100% green energy, electricity purchased from off-site wind farm
- 2** 70 rooftop solar panels generate hot water for guest rooms
- 3** Purpose-built Sewage Treatment Plant (STP)
  - Wastewater is 100% recycled & reused for secondary purposes
  - Wastewater treated to tertiary standards
  - Treated water used for irrigation of plants, water closet flushing & cooling towers of central air conditioner
  - Approx. 60,000 litres water/day saved at both properties



# Sustainability Innovation & Collaboration

Inaugural **CapitaLand Sustainability X Challenge:**  
270 Entries, 25 Countries,  
12 Months, 6 Finalists,  
2 Top Winners



(Above) INOVUES, Inc. (USA), Adaptive Glazing Shield, revitalizing windows for enhanced energy efficiency

Climatec Corp Pte Ltd (Singapore), ClimaControl Quantum Resonance Water, revolution in cooling tower water treatment

Launch of S\$50M  
CapitaLand  
Innovation Fund



## CapitaLand Smart Urban Co-Innovation Lab (SmartLab)

Intelligent Estates  
Smart Mobility  
Advanced Manufacturing



Digital Wellness  
Urban Agriculture  
Sustainability

An Innovation lab in partnership with **Infocomm, Media Development Authority (IMDA)** and **Enterprise Singapore** provides CapitaLand with a platform to support the group's innovation needs and catalyse new potential partnerships.





Cap/taLand





## **Financing Energy Efficiency Projects for the Built Environment**

Mr. Vincent Low

Founder & Vice President, G-Energy Global Pte Ltd  
Chairman, Energy Efficiency Committee, Sustainable Energy Association of Singapore

Mr Vincent Low is the Founder and Vice President of G-Energy Global Pte. Ltd, a Singapore award-winning Energy Services Company (ESCO). He is a Qualified Energy Services Specialist (QuESS) administered by the Building and Construction Authority (BCA) and the National Environment Agency (NEA), Green Mark Advanced Accredited Professional (GM AAP) accredited by the BCA and Singapore Certified Energy Manager (Certified SCEM) accredited by The Institution of Engineers, Singapore. Vincent is also the Chairman of the Energy Efficiency Committee, Sustainable Energy Association of Singapore (SEAS).



# FINANCING ENERGY EFFICIENCY PROJECTS FOR THE BUILT ENVIRONMENT

GLOBAL CONNECT @ SINGAPORE BUSINESS FEDERATION

## Vincent Low

Founder & Vice President – G-Energy Holdings Pte. Ltd.

Chairman – Energy Efficiency Committee,  
Sustainability Energy Association of Singapore (SEAS)



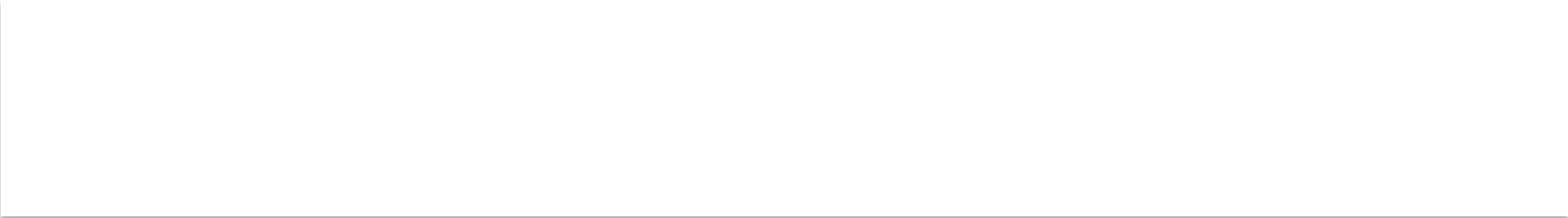
# POTENTIAL OPPORTUNITY IN ENERGY EFFICIENCY FINANCING

FICO Building



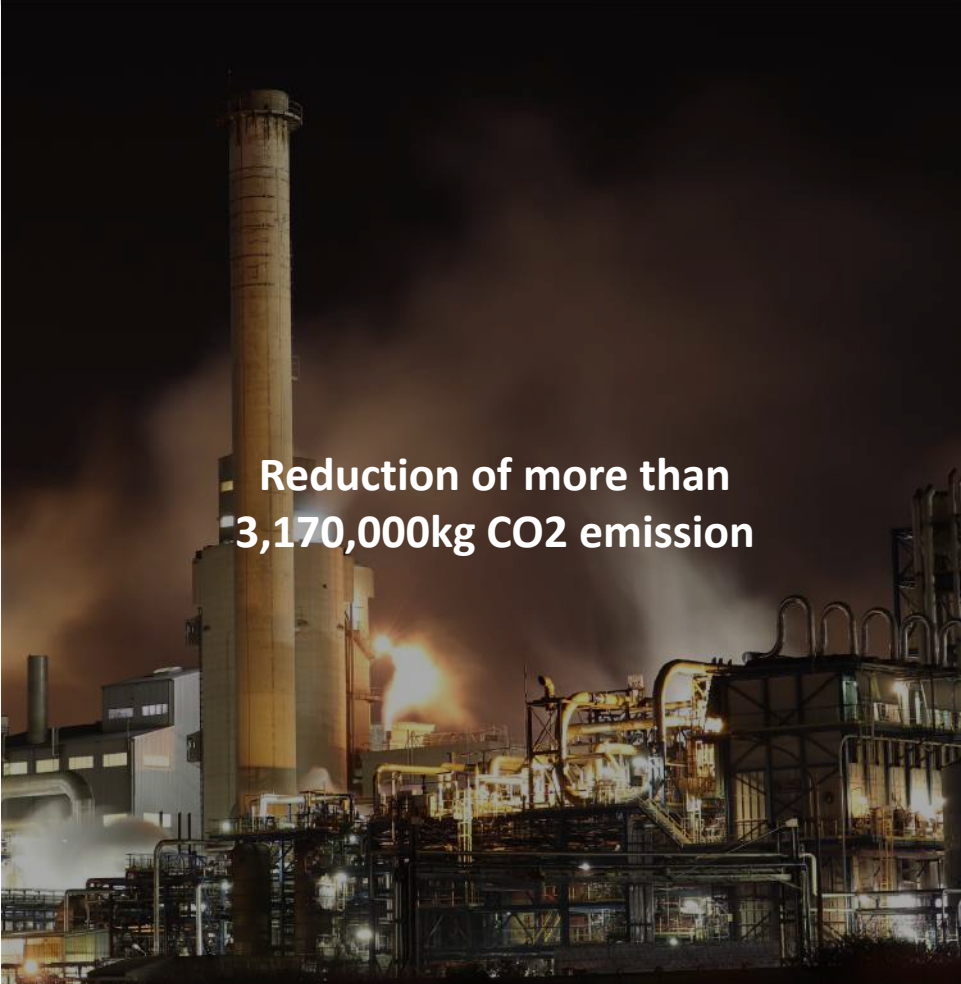
Preliminary  
Energy Audit Finding





First 7 Hotels/Building created  
**an estimated accumulative  
savings of more than  
SGD858,000** per year





Reduction of more than  
**3,170,000kg CO2 emission**



Trees to offset = **15,850 Trees/year**

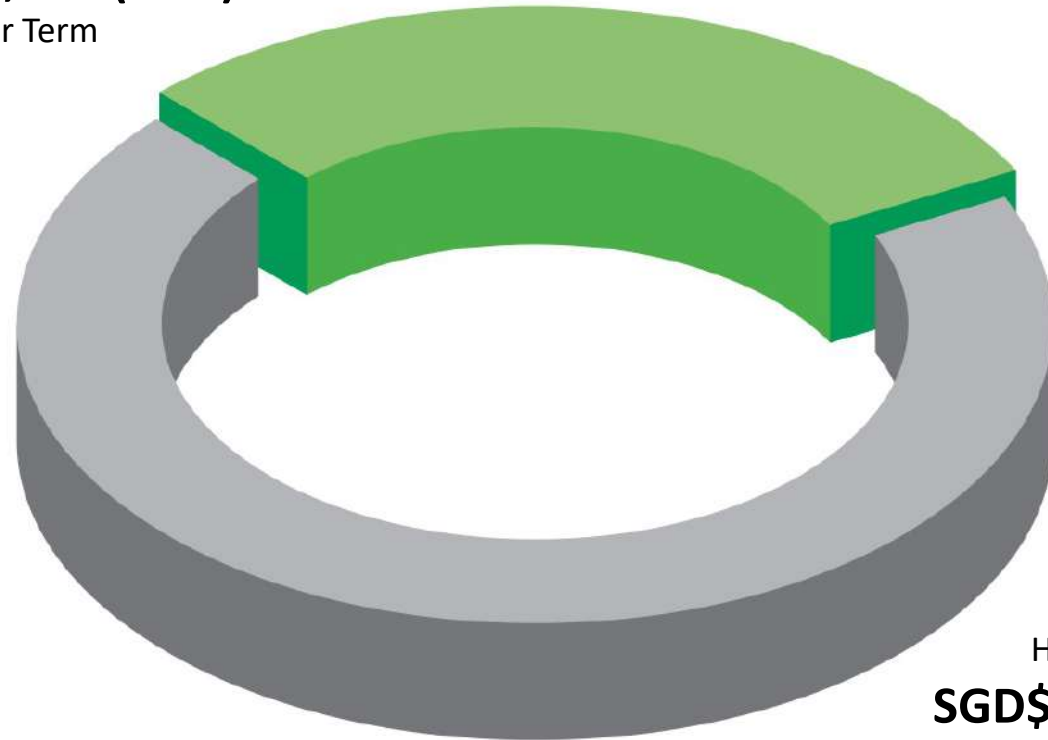


# EXECUTIVE SUMMARY

Building	Energy Conservation Measure	Total saving	TOTAL INVESTMENT	Payback (Years)
Holiday Inn	Re-Design of Chiller Plant	SGD 858,000	SGD 4,132,000	4.81
Le Fenix	Re-Design of Chiller Plant			
Hotel Muse	Re-Design of Chiller Plant			
Pullman Hotel	Re-Design of Chiller Plant			
Novotel Ploenchit	Re-Design of Chiller Plant			
Novotel Silom	Re-Design of Chiller Plant			
FICO Building	Re-Design of Chiller Plant			
	TOTAL			

## G-ENERGY VS HOTEL GROUP PROFIT

G-Energy Profit  
**SGD\$1,946,000 (30%)**  
15 year Term

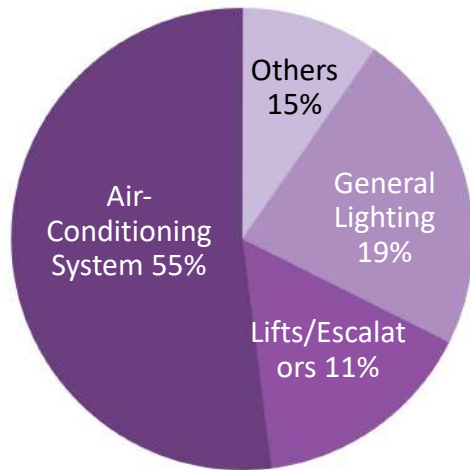


Hotel Group Profit  
**SGD\$4,456,000 (70%)**

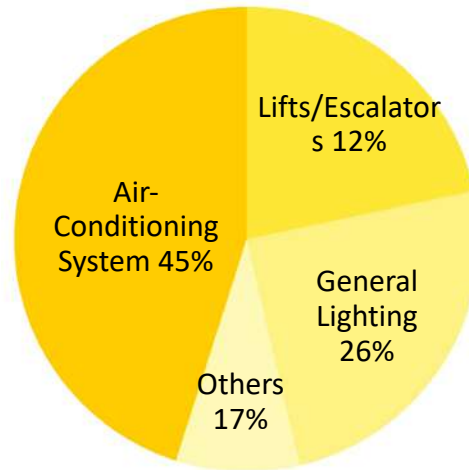


# ENERGY USE IN BUILDING

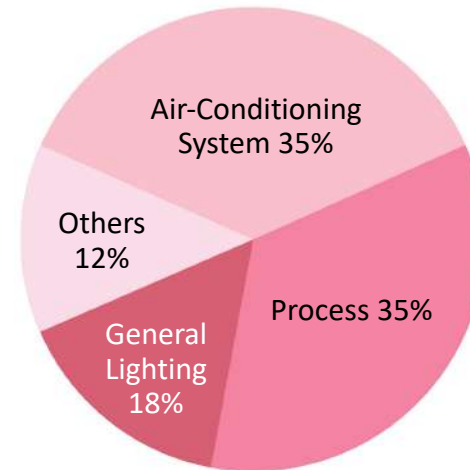
ENERGY USE IN OFFICE BUILDINGS



ENERGY USE IN HOTELS

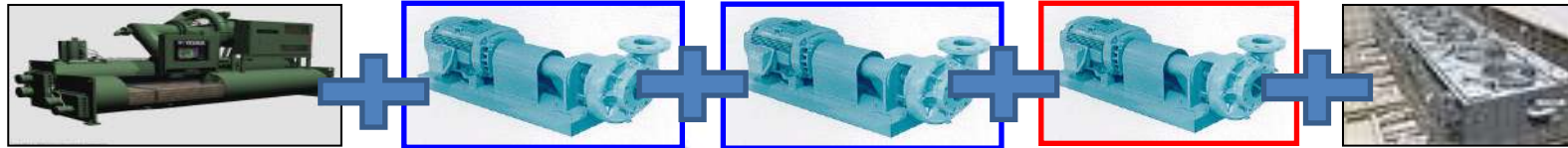


ENERGY USE IN FACTORIES

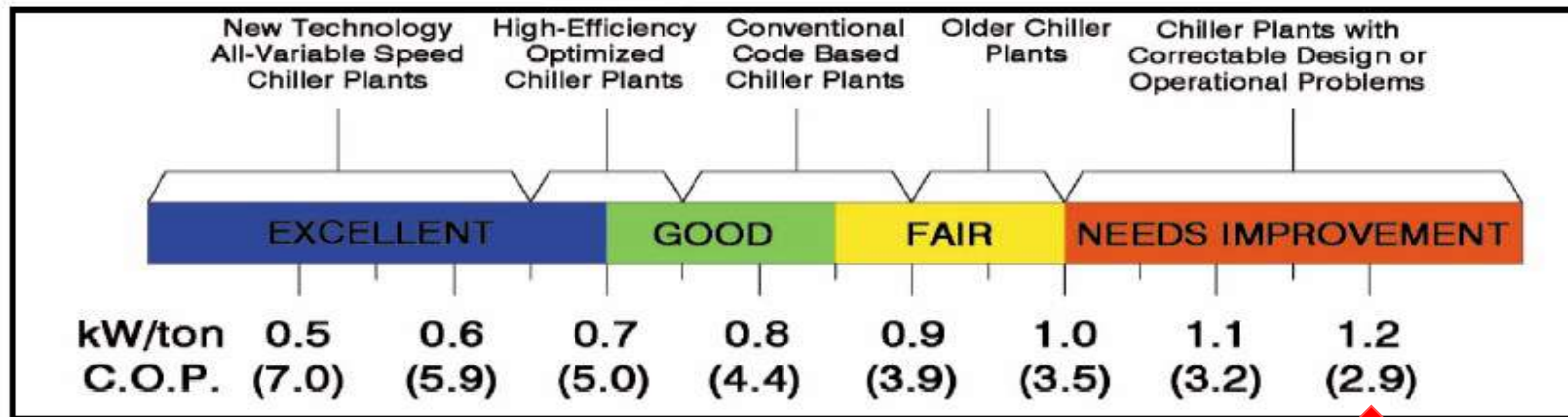


	<b>Air-Conditioning System</b>	<b>General Lighting</b>	<b>Lifts / Escalators</b>	<b>Process</b>	<b>Others</b>	<b>Annual Electrical Cost</b>
<b>Office Buildings</b>	55%	19%	11%		15%	\$ 800,000
	\$ 440,000	\$ 152,000	\$ 88,000		\$ 120,000	
<b>Hotels</b>	45%	26%	12%		17%	\$ 1,500,000
	\$ 675,000	\$ 390,000	\$ 180,000		\$ 255,000	
<b>Factories</b>	35%	18%		35%	12%	\$ 2,400,000
	\$ 840,000	\$ 432,000		\$ 840,000	\$ 288,000	

# ENERGY PERFORMANCE SERVICES CONTRACT



## ASHRAE Journal

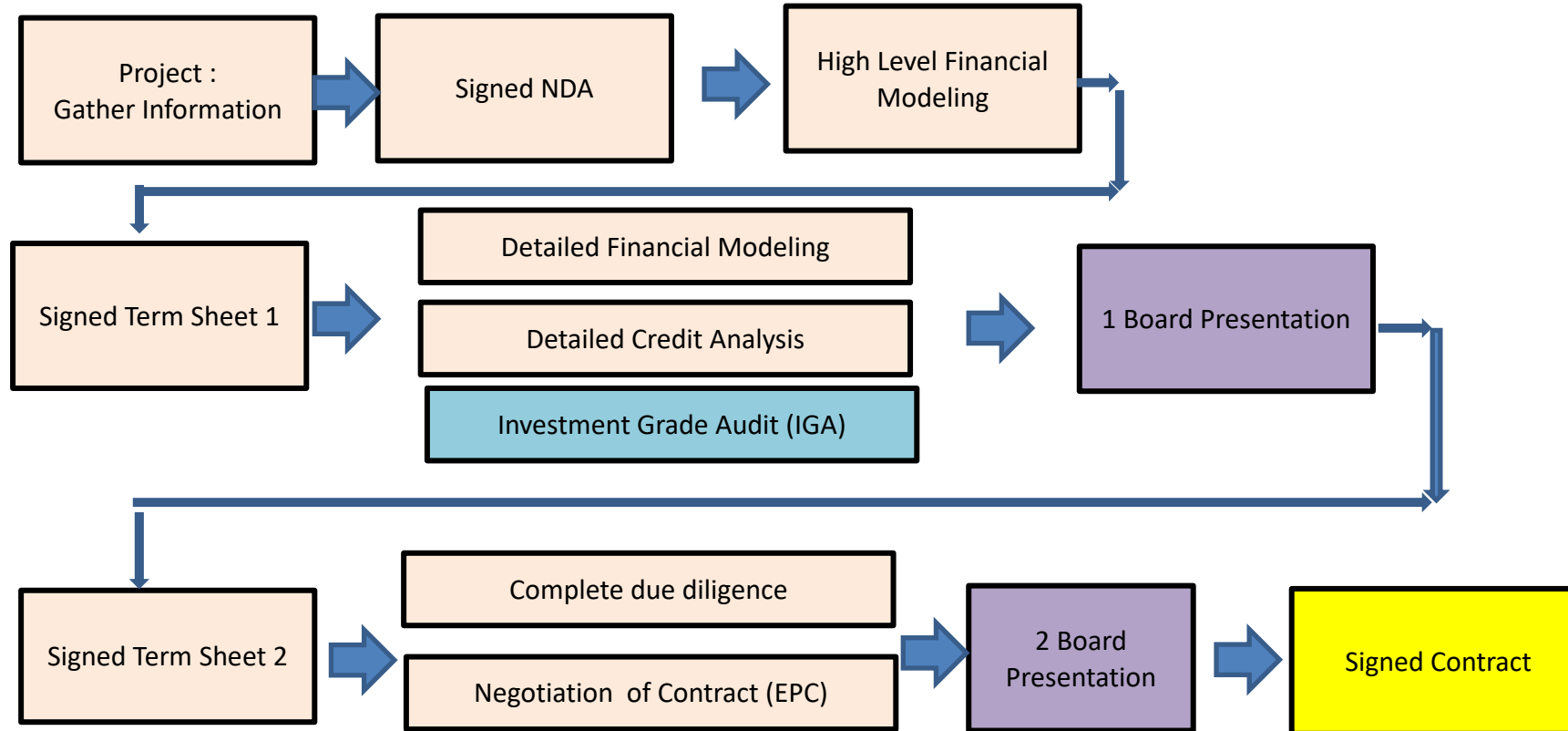


Existing System Efficiency





# ENERGY PERFORMANCE SERVICES CONTRACT



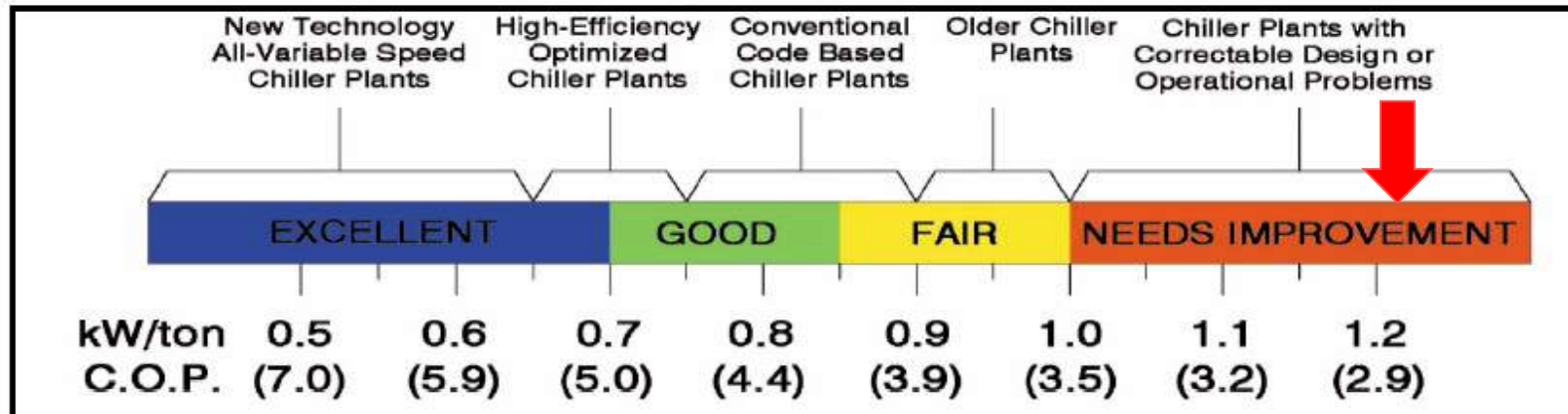
# HOTEL SINGAPORE





# WALK THROUGH FINDINGS

System	Findings
Chilled Water Plant	<ul style="list-style-type: none"> <li>- Chillers and pumps are 16 years old</li> <li>- Cooling towers are 27 years old</li> <li>- Cooling towers are in a very bad condition as the structure has been badly corroded. Water leakages can be observed.</li> <li>- 1.20 kW/RT plant estimated efficiency</li> <li>- Target post retrofit efficiency, 0.65 kW/RT</li> </ul>

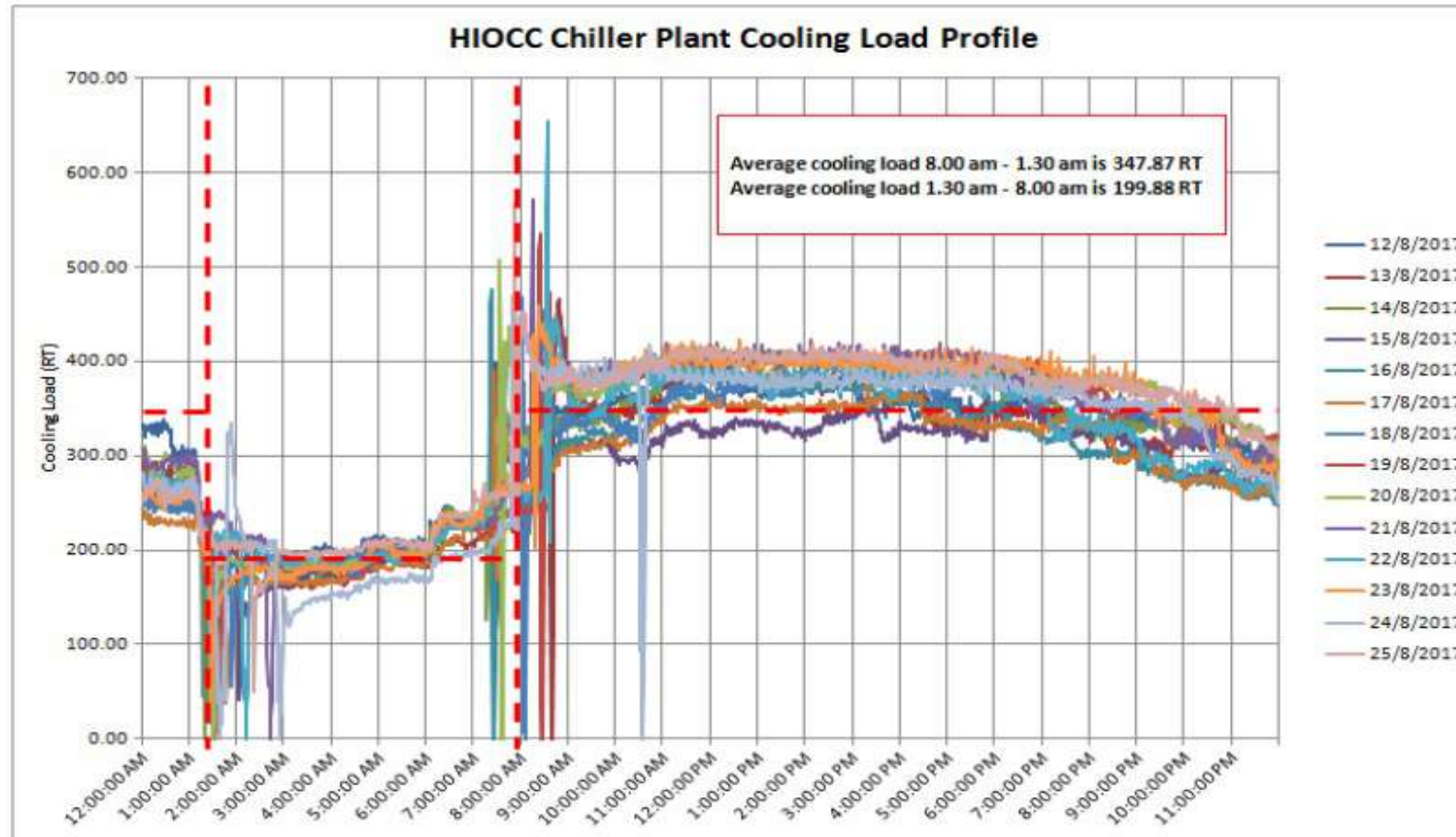


# WALK THROUGH FINDINGS

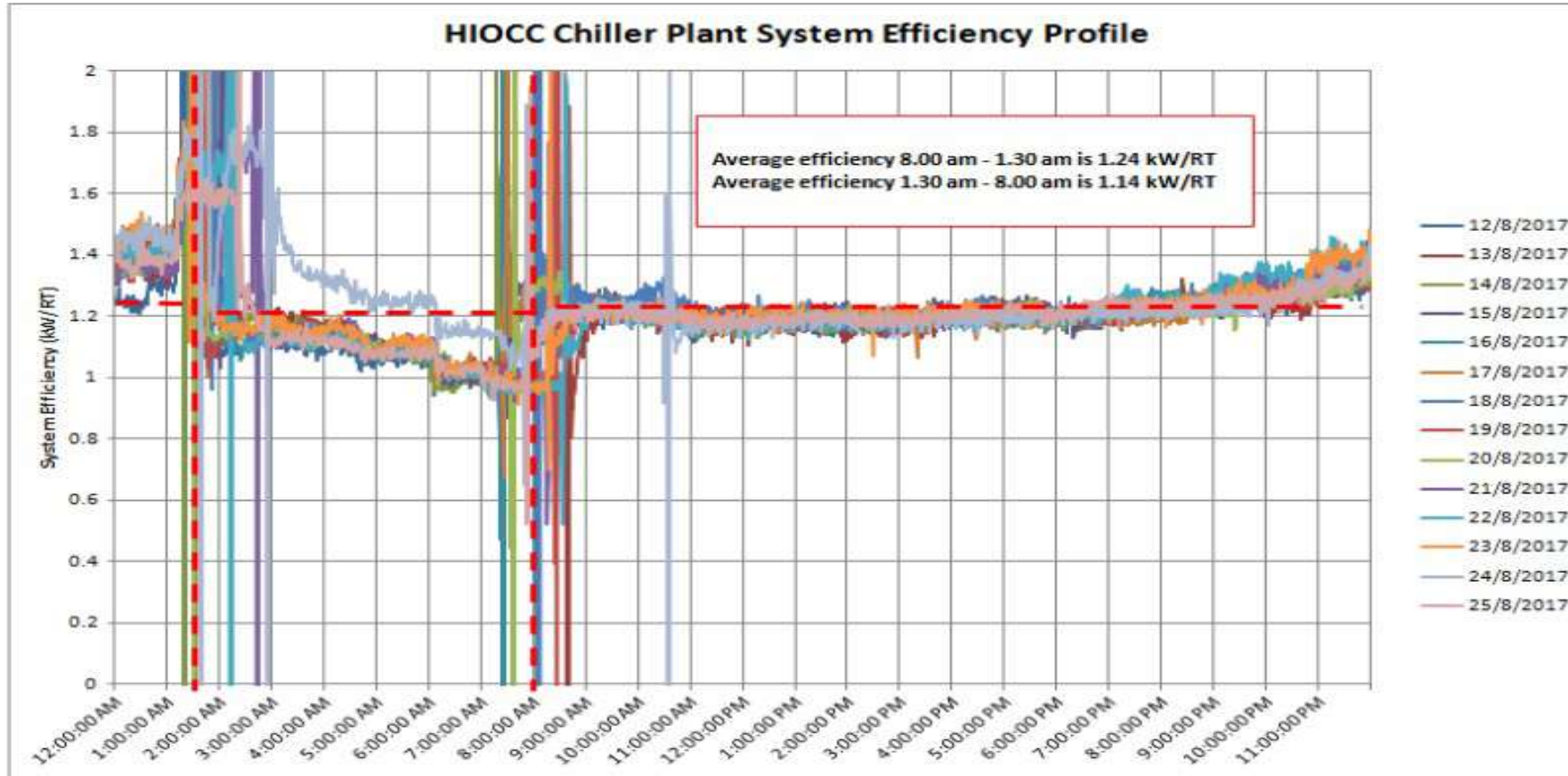




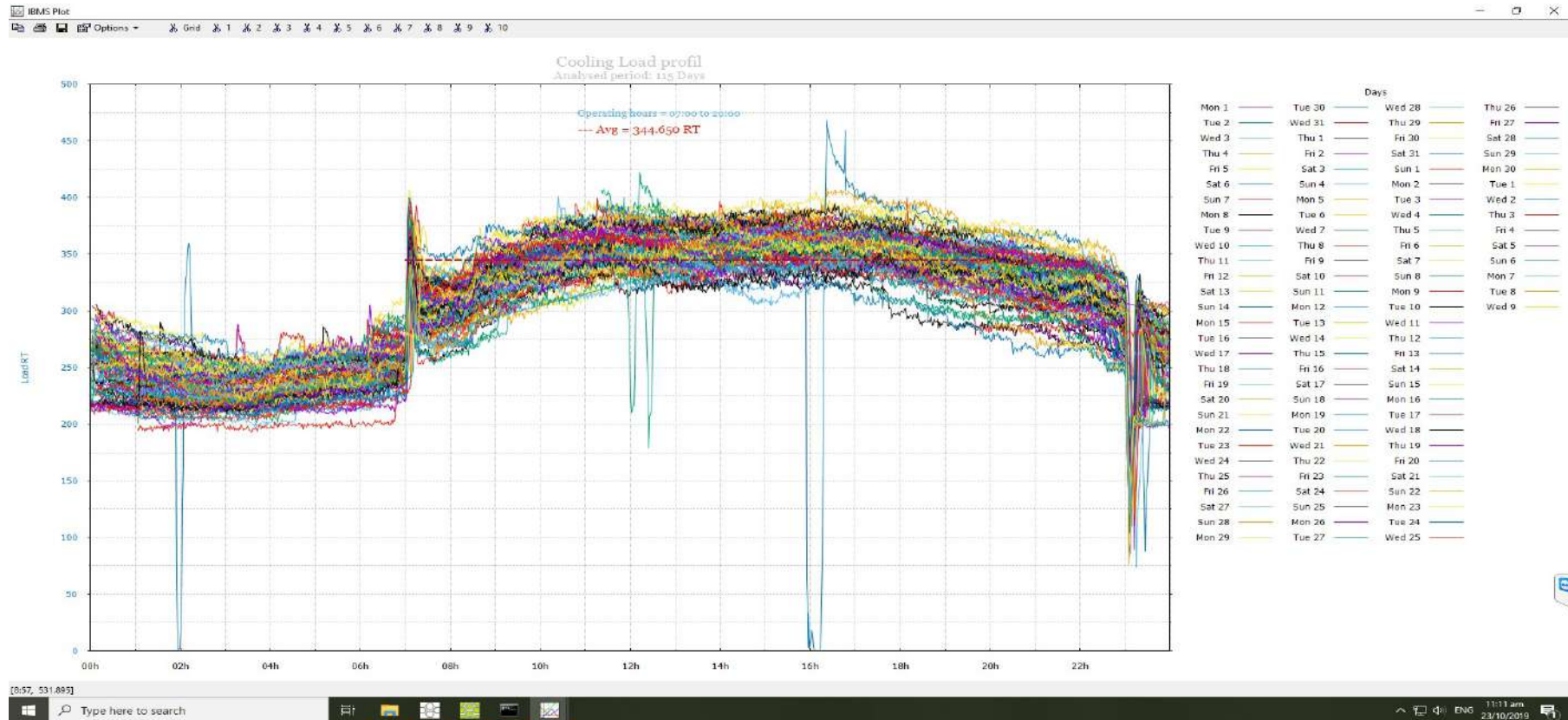
# Pre-Retrofit Audit Results



# Pre-Retrofit Audit Results

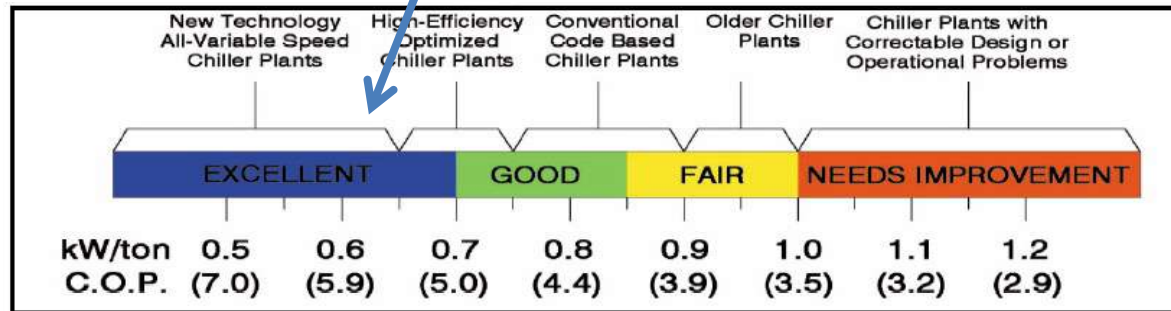
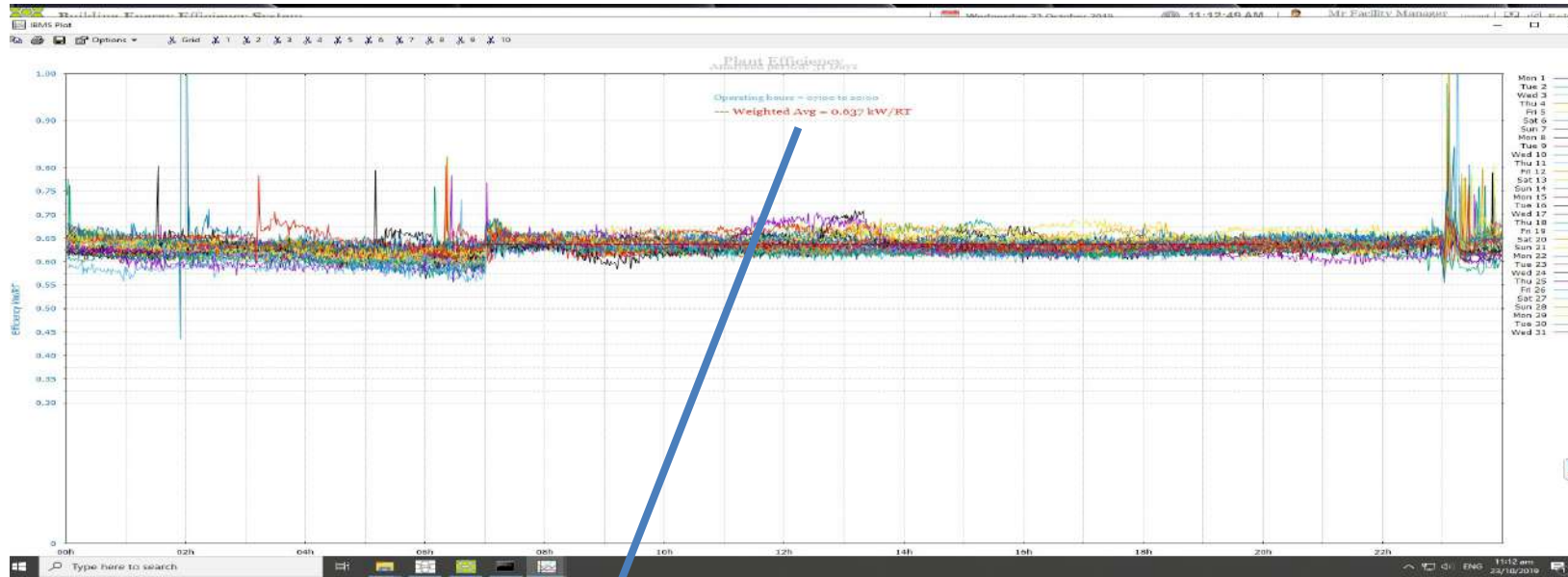


# Post-Retrofit Audit Results

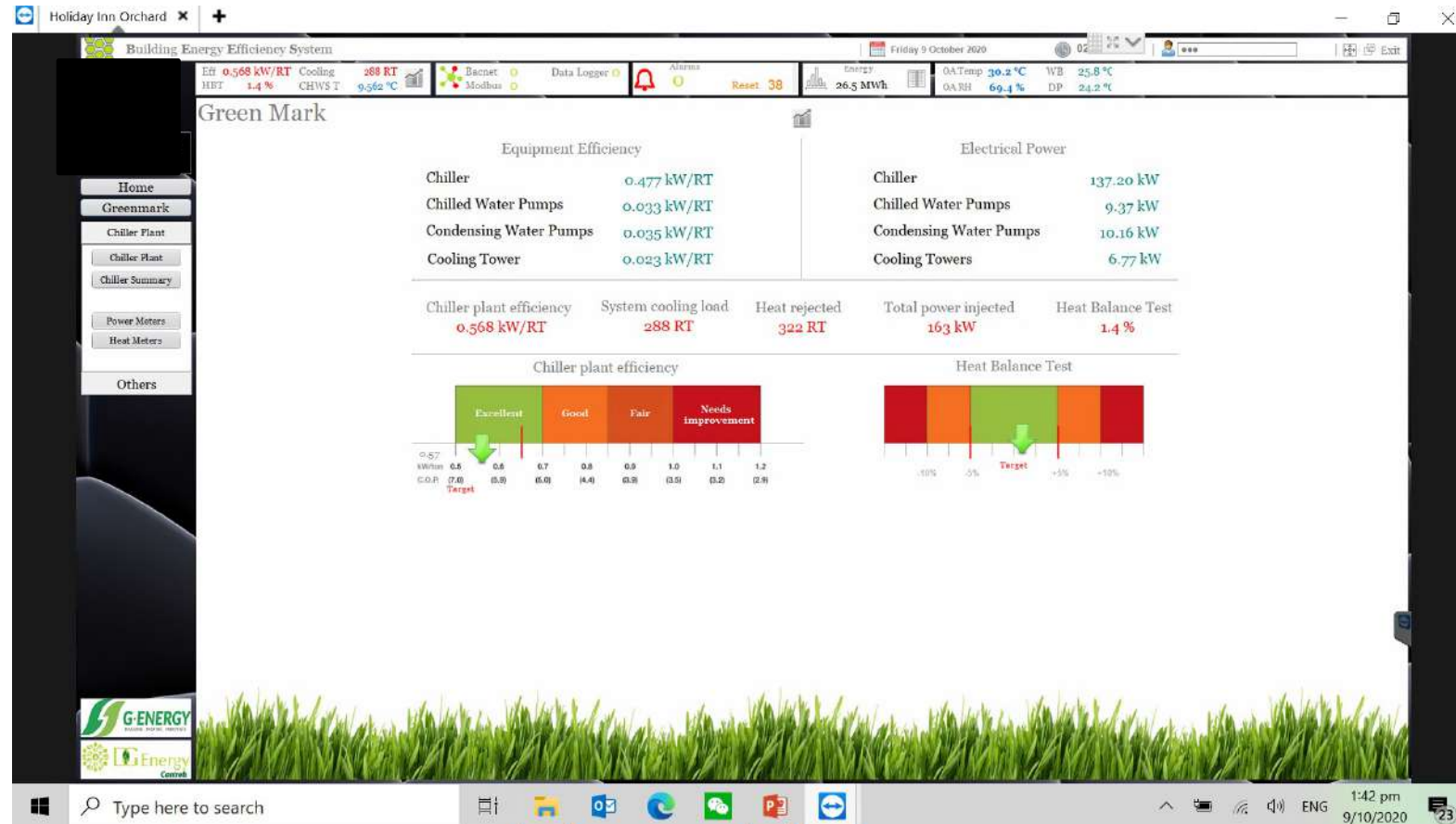




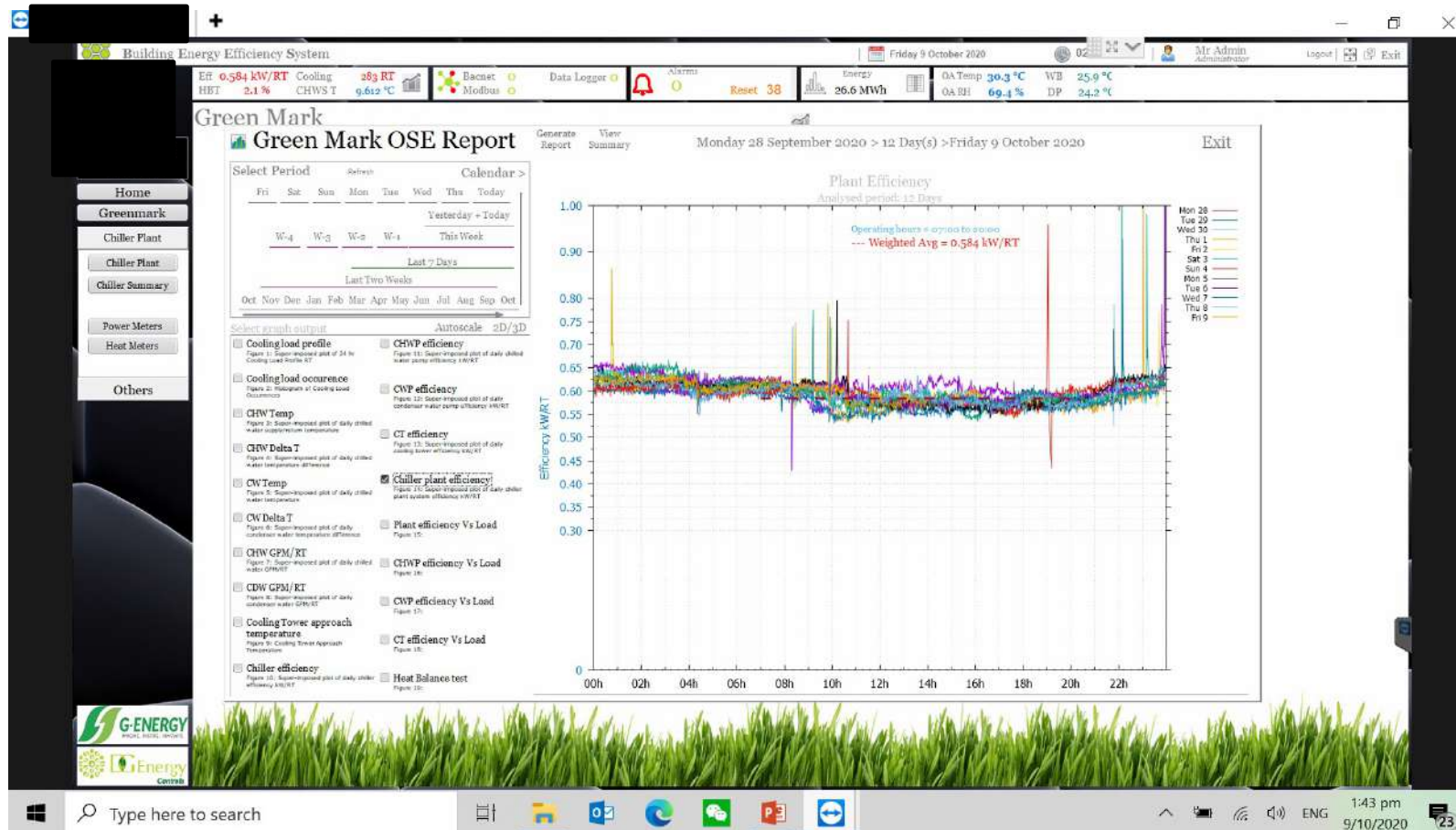
# POST-RETROFIT AUDIT RESULTS



# POST-RETROFIT AUDIT RESULTS



# POST-RETROFIT AUDIT RESULTS





# POST-RETROFIT AUDIT RESULTS

With the prescribed scope of works detailed above, the achievable chiller plant efficiency is 0.65 kW/RT. Financial aspects of this project can be detailed as shown below:

Cooling Load (daily)	7,387	RTh
System Energy (daily)	8977	kWh
Current System Efficiency	1.22	kW/RT
<b>Target System Efficiency</b>	<b>0.65</b>	<b>kW/RT</b>
Target System Energy (daily)	4,802	kWh
Energy Savings (daily)	4,175	kWh
Projected Annual Energy Savings (kWh)	1,523,965	kWh
<b>Projected Annual Energy Savings (\$)</b>	<b>\$243,834</b>	<b>Assume tariff of \$0.16/kWh</b>
<b>Estimated Project Cost</b>	<b>\$1,200,000</b>	<u>Scope of works</u> -1 x 500 RT Chillers -Associating pumps -3 x 300 HRT CTs -New Chiller Plant Automation System
<b>Simple Payback</b>	<b>4.9</b>	<b>years</b>

Annual Saving  
Of More than  
**SGD250K**



## OUR MISSION

We aim to inspire and empower people to take small steps in energy conservation every day, to create a significant and positive impact on our environment as a collective whole.

## OUR VISION

Leading a Sustainable World for People, through People.





## WHO WE ARE

We are an international award winning Energy Services Company (ESCO) with 3 Qualified Energy Services Specialists (QuESS).

We have also been recognized as an ESCO with the largest pool of professional team of Energy Specialists and Qualified Green Mark Consultants in the Asia Pacific Region.

We were recently named as the Outstanding Energy Services Provider of the Year for 2018 by the Energy Efficiency National Partnership (EENP), organized by the National Environment Agency (NEA) of Singapore.







## SAVING TODAY'S EARTH, IMPACTING TOMORROW'S GENERATION

Imagine a world of advocates creating a better place to live in, by **saving Energy in all things possible while building a communities of like-minded people** to pursue their dreams in the best living environment.

***This is what G-Energy stands for.***

We believe in **showing our love for Mother Earth** in the most practical way and at the same time, **showing our care for the next generation** by developing them into leaders who make a difference.



# OUR SERVICES & MARKET PRESENCE

## HEADQUARTER

Singapore

## SUBSIDIARY

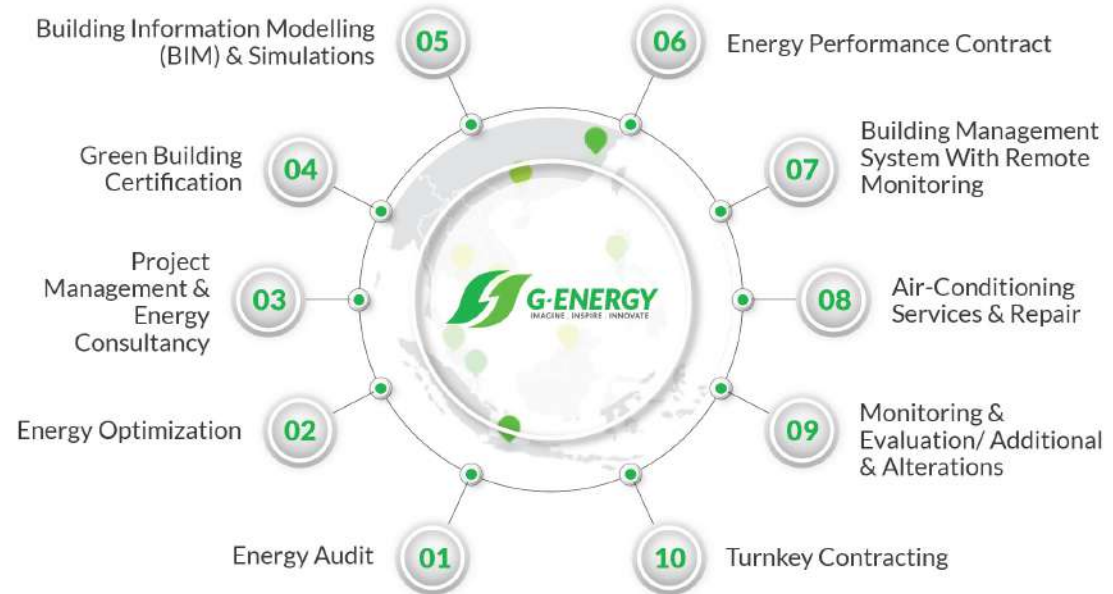
Indonesia  
Malaysia  
Shanghai

## STRATEGIC PARTNERS

Guangzhou  
Philippines  
Shenzhen  
Thailand  
Xlamen

## CROSS-BORDER PROJECTS

Brunei  
Cambodia  
China  
Myanmar  
Taiwan  
Vietnam



# ENERGY SAVINGS = COST SAVINGS

Building Name	Project Type	Annual Saving
Great World City	Chiller Replacement Consultancy	S\$1,158,000
York Hotel	Chiller Replacement Turnkey with Saving Guarantee	\$360,000
Traders Hotel	Chiller Replacement Turnkey with Saving Guarantee	\$565,000
Goodwood Park Hotel	Chiller Replacement Turnkey with Saving Guarantee	\$ 300,000
Fortune Centre	Chiller Replacement Performance Contract	\$210,000
North Bridge Centre	Chiller Replacement Performance Contract	S\$ 233,000
PSA Tanjong Pagar Complex	Chiller Replacement Turnkey with Saving Guarantee	S\$365,000
Singapore Land Tower	Chiller Replacement Turnkey with Saving Guarantee	\$600,000
Bukit Timah Shopping Centre	Chiller Replacement Turnkey with Saving Guarantee	\$ 200,000



# ENERGY SAVINGS = COST SAVINGS







# PROMINENT PROJECTS IN SINGAPORE



# TRACK RECORDS

Hotels	Residential & Club Houses	Schools	Hospitals	Overseas Projects
				
<ul style="list-style-type: none"> <li>• Amara Hotel</li> <li>• Chagala Hotel (Kazakhstan)</li> <li>• Changi Village Hotel</li> <li>• Orchard Parade Hotel</li> <li>• Shangri-La Hotel</li> <li>• Traders Hotel</li> <li>• Specialist Centre Hotel Phoenix</li> <li>• Furama Riverfront</li> <li>• Fullerton Hotel</li> <li>• Intercontinental Hotel</li> <li>• Resorts World Sentosa</li> <li>• Marina Mandarin Hotel</li> <li>• Mandarin Orchard Hotel</li> <li>• Hilton Hotel</li> <li>• V Hotel</li> <li>• Hotel Star</li> <li>• Kallang Hotel</li> <li>• Bencoolen Hotel</li> <li>• Park Royal, Kitchener</li> <li>• St Regis Singapore</li> <li>• YMCA Orchard</li> <li>• Goodwood Park Hotel</li> </ul>	<ul style="list-style-type: none"> <li>• Buckley 18</li> <li>• Hindhede Drive</li> <li>• Kim Lin</li> <li>• Nassim Hill</li> <li>• Oceanfront</li> <li>• One Shenton</li> <li>• Parkview</li> <li>• Shelford</li> <li>• Solitaire</li> <li>• 68 Binjai Park</li> <li>• 16A Leedon Park</li> <li>• Great World Service Apartment</li> <li>• Orchid Country Club</li> <li>• Singapore Island Country Club</li> <li>• Singapore Turf Club</li> <li>• Resorts World Sentosa (Universal Studio)</li> </ul>	<ul style="list-style-type: none"> <li>• Singapore Library (Central, Geylang East)</li> <li>• Paya Lebar Methodist Girls' School (Secondary)</li> <li>• Nanyang Polytechnic</li> <li>• Temasek Polytechnic</li> <li>• Republic Polytechnic</li> <li>• Nanyang Technological University</li> <li>• National University High School</li> </ul>	<ul style="list-style-type: none"> <li>• Ministry of Health Holdings</li> <li>• Alexandra Health</li> <li>• Jurong Health</li> <li>• Parkway Novena Pte Ltd &amp; Parkway Irrawaddy Pte Ltd</li> <li>• Khoo Teck Phuat Hospital</li> <li>• Ng Teng Fong1 Hospital</li> <li>• Mt. Elizabeth Novena</li> </ul>	<p>CHINA:</p> <ul style="list-style-type: none"> <li>• Jin Mao Tower</li> <li>• Nan Hui Condo</li> <li>• Lakeside Condo</li> <li>• Amara Hotel</li> <li>• TianJin Eco-city</li> </ul> <p>PHILLIPINES:</p> <ul style="list-style-type: none"> <li>• LV Losin</li> <li>• SM Mall</li> <li>• PB Com</li> </ul> <p>MALAYSIA:</p> <ul style="list-style-type: none"> <li>• G Tower KL</li> <li>• IB Tower KL</li> <li>• Sentral Platinum</li> <li>• Sunway Pinnacle</li> <li>• W Hotel &amp; Residence</li> <li>• Sunway Pyramid</li> <li>• Tropicana International School</li> <li>• Bangsar Enclave</li> <li>• Tropicana Avenue</li> <li>• Rawang Land</li> <li>• Setia Greens</li> <li>• The Light Collection</li> <li>• Emerald Bay Johor</li> <li>• Danga Bay Parcel A</li> </ul>



# TRACK RECORDS

## Commercial



- 396 Alexandra (UOB)
- National Museum
- OCBC Tampines 1 & 2
- Jewel @Changi Airport
- Commerce Point
- Fuji Xerox Tower
- Hong Leong Building
- JTC Summit
- New Tech Park
- Ocean Tower

- Plaza By The Park
- Raffles City
- Republic Plaza
- Keppel Tower
- Marina BFC
- Tokio Marine
- Icon @ IBP
- 20 Anson Rd
- Robert Bosch HQ
- 6 Battery Road
- Robertson Walk

- Square Two Mall
- King's Centre
- MND Building
- Palais Renaissance
- DBS Tower
- OCBC Centre
- One Raffles Quay
- HSBC Building
- Apple Centre
- Orchard Emerald
- Metropolis
- Fusionopolis Phase 3
- (Bedok Interchange)

- Environment Bldg
- One George Street
- Great World City
- Tanglin Mall
- Capital Tower
- Tung Centre
- OG Albert Complex
- North Bridge Centre
- Nepal Hill
- Ocean Financial Centre

- Jurong Gateway
- Lot One
- Junction 8
- Mewah IBP
- Shaw House
- Shaw Centre
- Cold Storage
- Chinatown Point
- Bartley Biz Hub
- Bukit Timah S C
- Orchard Gateway
- NTFGH/JCH
- Prudential Tower

## Industrial



- BAX Global
- British America Tobacco
- Tic Tech Center
- Siltronic Semiconductor
- Shell Eastern Petroleum
- Shell Marketing Centre
- Singapore Airline (Computer)
- Glaxosmithkline

### Singtel:

- (Bukit Timah SES)
- (East Exchange)
- (Geylang Exchange)
- (Seletar SES)
- (Tuas Exchange)
- Universal Terminals
- Tampines Industrial Building
- Singapore Aerospace Manufacturing
- Shell Bukom
- SATS AFT 1-6

- TOTAL Petrochemicals
- Asia Pacific Breweries
- Rolls Royce
- Hyflux
- DORMA GmbH
- ST Marine
- Tractors Singapore
- BP Petroleum
- SMRT
- Jurong Port
- ASM Technology
- Abbott

# TRACK RECORDS

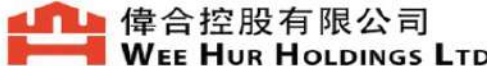


# TRACK RECORDS





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# Panel Discussion Q&A





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