ASEAN-IEA Webinar: The Role of Industry in Buildings Policy Development

Thursday, 22 July 2021 (14.00 – 16.00 GMT +7)
Opening Remarks

Mr. Gerald Gracius Y. Pascua
Senior Officer Energy, Energy and Minerals Division, ASEAN Secretariat
<table>
<thead>
<tr>
<th>TIME (Jakarta)</th>
<th>ACTIVITIES</th>
</tr>
</thead>
</table>
| 14:00 – 14:05  | Webinar opening by MC  
                 Kianda Syahindra, ASEAN Centre for Energy |
| 14:05 – 14:10  | Opening Remarks  
                 Mr. Gerald Gracius T. Pascua, ASEAN Secretariat |
| 14:10 – 15:50  | Introduction and Webinar Overview  
                 Kianda Syahindra, ASEAN Centre for Energy |
| 14:10 – 15:50  | Moderator: Dr. Ian Hamilton, UCL Energy Institute & International Energy Agency  
                 Panellists:  
                 15-minute presentations each, followed by a Q&A Session. |
| 15:50 – 15:55  | Closing Remarks  
                 Mr. Muhammad Indra Wahyudin, ASEAN Secretariat |
| 15:55 – 16:00  | Survey and Closing  
                 Kianda Syahindra, ASEAN Centre for Energy |
| 16:00         | End of Webinar |
Participants should ensure a convenient environment and reduce background noises such as turn-off cell phones and etc.

Participants should mute their microphones and keep their video cameras turned off so that the webinar can run smoothly without interruptions.

This webinar will be recorded and uploaded to our YouTube channel. We kindly ask for your understanding and consent in doing so.

For Q&A session:

- Those who wish to ask or speak may use the chat function in the control panel. The moderator will let the speakers know if there is any question for them.
Moderator

Dr. Ian Hamilton
Associate Professor,
UCL Energy Institute & International Energy Agency
ASEAN-IEA Webinar: The Role of Industry in Buildings Policy Development

22nd July 2021
Introduction

PANEL AGENDA

Moderator: Dr Ian Hamilton, UCL Energy Institute & International Energy Agency

Speakers:

• Mr. Ir. Mochammad Sulton Sahara, M.Eng., Pejabat Fungsional Tertentu (JFT) Tata Bangunan dan Perumahan, Directorate General of Cipta Karya, Ministry of Public Works and Public Housing, Indonesia

• Mr. Zulkifli Zahari, President, Malaysia Association of Energy Service Companies

• Mr. Matthieu Caille, Consultant in Energy Efficiency & Low Carbon Development, GreenBuilding SAS / Global Buildings Performance Network

• Mr. Christopher C. Seeley, Energy Efficiency & Climate Change Expert and CEO, Climate Change Solutions (ESCO in Thailand)
Net-Zero Carbon
Why is buildings decarbonisation so critical?

Buildings and construction are a key sector for the clean energy transition, and reaching the goals of the Paris Agreement.

Buildings in a Net Zero Emissions Scenario

Global direct CO2 emissions reductions by mitigation in buildings in the NZE

- Electrification and energy efficiency account for nearly 70% of buildings-related emissions reductions through to 2050

What is needed to get to net-zero buildings?

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
<th>2030</th>
<th>2050</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy intensity</td>
<td>Improve by 6% per year 2020-2030</td>
<td>4% per year 2030-2040</td>
<td>3% per year 2040-2050</td>
</tr>
<tr>
<td>Share of existing buildings net-zero ready</td>
<td>&lt;1%</td>
<td>20%</td>
<td>&gt;85%</td>
</tr>
<tr>
<td>Avoided demand in homes from behaviour</td>
<td>-</td>
<td>12%</td>
<td>14%</td>
</tr>
<tr>
<td>Stock of heat pumps</td>
<td>180 million</td>
<td>600 million</td>
<td>1 800 million</td>
</tr>
<tr>
<td>Dwellings with solar thermal</td>
<td>250 million</td>
<td>400 million</td>
<td>1 200 million</td>
</tr>
<tr>
<td>Appliances unit consumption (relative to 2020)</td>
<td>-</td>
<td>-25%</td>
<td>-40%</td>
</tr>
<tr>
<td>Distributed PV generation</td>
<td>320 TWh</td>
<td>2 200 TWh</td>
<td>7 500 TWh</td>
</tr>
</tbody>
</table>

And also:
- 100% lighting by LEDs by 2030
- Universal access to electricity and clean cooking by 2030
- Most appliances and cooling systems sold are at today’s best in class by 2035
- All new buildings are zero-carbon-ready by 2030
- 2.5% buildings are retrofitted to be zero-carbon-ready every year by 2030

ASEAN Roadmap for Sustainable Buildings and Construction 2020-2050
Building on the Regional Roadmap for Asia

Regional Roadmap for Asia

- Provides a comprehensive framework
- Contains info on “current status”
- Contains many examples and responses from ASEAN countries
- Network of key stakeholders (approx. 200 respondents/participants/reviewers)
- Highlights where the biggest data and ambition gaps are

Opportunity for ASEAN Roadmap

- More differentiation between member states or groups of member states
- Will be more specific in terms of which actions for which context, and about how to implement the recommended actions
- Integrate “enabling” actions on capacity building and finance with other actions
- More targeted and specific actions
**ASEAN Roadmap - Draft vision and strategies, per theme**

<table>
<thead>
<tr>
<th>Theme</th>
<th>Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NEW BUILDINGS</strong></td>
<td>New buildings are designed such that they enable higher levels of thermal comfort and energy efficiency, resulting in comfortable, affordable and low carbon buildings.</td>
</tr>
<tr>
<td></td>
<td>- Strengthen the adoption and compliance of mandatory building energy codes</td>
</tr>
<tr>
<td></td>
<td>- Boost market demand for efficient, low carbon buildings</td>
</tr>
<tr>
<td></td>
<td>- Boost capacity in delivery of efficient, low carbon buildings</td>
</tr>
<tr>
<td></td>
<td>- Promote the adoption of high performance fabric systems</td>
</tr>
<tr>
<td></td>
<td>- Boost the rate of energy efficiency retrofits</td>
</tr>
<tr>
<td></td>
<td>- Encourage uptake of clean, smart and efficient devices and systems</td>
</tr>
<tr>
<td></td>
<td>- Improve efficiency of building operation</td>
</tr>
<tr>
<td></td>
<td>- Promote the recognition of good system and operational energy performance</td>
</tr>
</tbody>
</table>

| **EXISTING BUILDINGS**        | Existing buildings are retrofit to achieve an appropriately high level of energy performance to reduce fuel costs and improve thermal comfort. |
|                               | - Improve quality, availability and efficiency of appliances and systems   |
|                               | - Encourage uptake of clean, smart and efficient devices and systems     |
|                               | - Improve efficiency of building operation                               |
|                               | - Promote the recognition of good system and operational energy performance |

| **SYSTEMS AND OPERATIONS**   | To promote the adoption of energy efficient systems and modes of operation that reduce energy bills and emissions, and increase comfort |
|                               | - Improve new design and construction practices for greater material efficiency |
|                               | - Decarbonise production of carbon intensive materials                     |
|                               | - Collect data and promote disclosure of embodied carbon                   |
|                               | - Governments leading by example                                           |

| **MATERIALS**                | To mainstream the use of materials and construction techniques that lower embodied carbon and improve energy performance |
|                               | - Improve adequacy and reliability of built environment resilience         |
|                               | - Foster a whole-of-government approach to resilience                       |
|                               | - Increase and monitor data and information on disaster risks              |

| **RESILIENCE**               | Cities are planned to limit construction in risk areas, ensuring critical urban infrastructure services, including vulnerable populations, and integrating resilience attributes in building materials. |
|                               | - Improve adequacy and reliability of built environment resilience         |
|                               | - Foster a whole-of-government approach to resilience                       |
|                               | - Increase and monitor data and information on disaster risks              |

| **URBAN PLANNING**           | Cities are developed using integrated approaches and policies to be more sustainable, resource-efficient, compact, connected, and liveable. |
|                               | - Improve coordination and policy alignment for low-carbon development    |
|                               | - Boost low-carbon urban infrastructure and construction                   |
|                               | - Support clean and renewable energy through regulatory frameworks         |
|                               | - Promote grid interactive efficient buildings                             |

<table>
<thead>
<tr>
<th><strong>INTEGRATION OF CLEAN ENERGY</strong></th>
<th>Cities are powered by clean, integrated energy systems enabling buildings to provide flexibility to the power system with the right policies and regulations.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>- Improve coordination and policy alignment for low-carbon development</td>
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<td></td>
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</tbody>
</table>
New buildings draft vision and strategy

**NEW BUILDINGS**

New buildings are designed such that they enable higher levels of thermal comfort and energy efficiency, resulting in comfortable, affordable and low carbon buildings.

- Strengthen the adoption and compliance of mandatory building energy codes
- Boost market demand for efficient, low carbon buildings
- Boost capacity in delivery of efficient, low carbon buildings

**Target audience:**

- National and subnational governments
- Private sector
- Building designers
## Example timeline: New buildings

### NB1: Strengthen the adoption of mandatory building energy codes

<table>
<thead>
<tr>
<th>Current status</th>
<th>By 2025</th>
<th>By 2030</th>
<th>For net-zero carbon</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NB.1.1 Increase strength and coverage of building energy codes</strong></td>
<td>Across ASEAN, only Singapore has mandatory building energy codes covering all sectors (residential, commercial and public). Others have voluntary or mandatory codes for certain parts of the sector, often for buildings above a certain floor area, and others are still in development.</td>
<td>All countries have mandatory building energy codes covering all sectors. Most countries have a national standard for net-zero carbon buildings.</td>
<td>Include requirements for embodied carbon, urban planning, resilience, RE in codes. All countries have a national standard for net-zero carbon buildings.</td>
</tr>
</tbody>
</table>

**Tools developed to facilitate compliance checking and implementation**

Training programmes rolled out within government.

Most states/provinces adopt mandatory building code for State/provincial buildings.

### NB.1.2 Strengthen implementation capacity

<table>
<thead>
<tr>
<th>Current status</th>
<th>By 2025</th>
<th>By 2030</th>
<th>For net-zero carbon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low implementation capacity at municipal level a barrier to adoption and enforcement of mandatory building codes. Low adoption of voluntary standards.</td>
<td>Tools developed to facilitate compliance checking and implementation</td>
<td>Continuation of capacity building and accreditation programmes to support the roll-out of building energy codes</td>
<td>Ongoing capacity building at all levels of implementation chain. Full enforcement and compliance with building codes across all jurisdictions.</td>
</tr>
</tbody>
</table>

All states/provinces adopt mandatory building code for State/provincial buildings.

Most local/municipal authorities adopt building codes into byelaws.

### Timeframes:

Define milestones vs dates, to serve as indicators for tracking progress.

### Targeted actions

To support strategy element, by group of countries where relevant.

### Examples of current good practice

From ASEAN or elsewhere.
Contribute and keep in touch!

• ASEAN Roadmaps collaboration [website: access here]
Buildings Roadmaps – next steps

- Seek feedback and input from AMS on policy mapping and available data sources to inform the roadmap.

- Continue analysis and research to inform and improve next drafts of roadmap alongside feedback from ASEAN.

- Continue to plan and deliver the webinar and workshop series with ACE

- if you have good case studies, reports, or datasets to support our roadmap on zero-emission, efficient and resilient buildings and construction in Southeast Asia, please get in touch!

- Project timeline:

  - 1st draft
    - April
    - Feedback on drafts
    - Webinars and roadmap development

  - 2nd draft
    - April to July
    - 2nd draft
    - Workshops to review and finalise

  - Final draft
    - July
    - August to September
    - October
Thank you for your engagement!

Keep in touch at
emily.mcqualter@iea.org
i.hamilton@ucl.ac.uk
Policy Energy Conservation in Building in Indonesia

Mr. Ir. Mochammad Sulton Sahara, M.Eng.
Certain Functional Officer, Associate Expert on Building and Housing, Directorate General of Cipta Karya, Ministry of Public Works and Public Housing, Indonesia
POLICY ENERGY CONSERVATION IN BUILDING IN INDONESIA

submitted by:

Ir. Mochammad Sulton Sahara, M.Eng. Certain Functional Officers Associate Expert on Building and Housing

at the event
Meeting ASEAN-IEA Webinar: The Role of Industry in Buildings Policy Development
Jakarta, 22 July 2021
BUILDING FACTS IN THE WORLD

GLOBAL WARMING?
CLIMATE CHANGE?
Working and related activities, 8.9
Sleeping, 7.7
Leisures and sports, 2.5
caring for others, 1.2
Eating and drinking, 1.1
household activities, 1
other, 1.6

Source: bureau of labor statistics, American time use survey, 2014

93.3% human time-activities carried out inside the building
BUILDING FACTS IN THE WORLD

Industry 21.1%

Transportation 34.3%

Building 44.6%

U.S. CO₂ Emissions by Sector

Source: US Energy Information Administration, 2012

Source: ©2013 2030, Inc. / Architecture 2030. All Rights Reserved.
Data Source: U.S. Energy Information Administration (2012)
BUILDING FACTS IN THE WORLD

Source: architecture2030.org
56.7% population of Indonesia live in urban areas in 2020, and will increase to 72.9% at 2045 and add 232 million (Source: senior Advisor to the Urban Regional Development Institute, Wahyu Mulyana, 2021).

Enter City Era/Urban
Buildings are getting crowded.
Cities as epicenters of growth, have various functions, but are faced with complicated actual problems that threaten their sustainability in the future.

<table>
<thead>
<tr>
<th>Social</th>
<th>Economy</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>• High urbanization and metropolis.</td>
<td>• Uneven economic growth, still concentrated in metropolitan and big cities.</td>
<td>• High Ecological Palm, low biocapacity, ecological overshoot occurs.</td>
</tr>
<tr>
<td>• Uncontrolled horizontal city sprawl.</td>
<td>• Level of competition against world cities</td>
<td>• Environmental carrying capacity is declining.</td>
</tr>
<tr>
<td>• The urban poverty rate is still high.</td>
<td>• Increasing land value, making it difficult to acquire land for public interest (especially infrastructure).</td>
<td>• Repetitive flooding</td>
</tr>
<tr>
<td>• Limited access to public services (infrastructure &amp; housing) for the poor.</td>
<td>• Increasingly limited natural resources (finite resources).</td>
<td>• Congestion traffic.</td>
</tr>
<tr>
<td></td>
<td>• Modernization that leads to the homogenization of the face of the city.</td>
<td>• The decline in the quantity and quality of urban green open spaces.</td>
</tr>
</tbody>
</table>
When cities with the smallest entities are buildings, Indonesia is transformed into a more modern one, almost not accompanied by an increase in the quality of its space.
Buildings are part of BIG PROBLEM. . .

. . .but, Buildings can be a BIG SOLUTION to this problem!
Law No. 28 of 2002 concerning Buildings (UUBG) is the legal basis for the implementation of Buildings in Indonesia to meet TECHNICAL STANDARDS.

Government Regulation Number 16 of 2021 concerning Implementing Regulations of Law Number 28/2002 concerning Buildings is a BUILDING CODE in Indonesia.
Article 3:
The building arrangement aims to realize a building that is functional and in accordance with the building layout that is **harmonious and in harmony with its environment**.
Spatial Level (Spatial Hierarchy)

as a whole and as a piece

Law 26/2007 on Spatial Planning mandates the creation of a safe, comfortable, productive and sustainable space, as a pillar of urban and regional development reform.

Sustainable Urban Development (SUD) at 4 levels: Building/Site, Neighborhood, District and City/Region
Law 26/2007 Spatial Planning

(Sustainable Cities)

City

Area/District

Neighborhood

(Sustainable Building)

Law 28/2002 Buildings

Rules Zoning

Building Code
Building Operation Mission Green

1960-2005
- Ecological Footprint

2005-2050, Scenarios
- Moderate business as usual
- Rapid reduction

y-axis: number of planet earths, x-axis: years

Sumber: Global Footprint Netwo
Building Operation Mission Green

LIFE CYCLE
In order to follow up on the Bali Action Plan agreement at the 13th Conferences of Parties (COP) of the United Nations Frameworks Convention on Climate Change (UNFCCC) and the results of COP-15 in Copenhagen and COP-16 in Cancun as well as fulfill the commitments of the Government of Indonesia in the G-20 in Pittsburgh, in order to reduce greenhouse gas emissions by 26% on their own (or by 41% if they receive international assistance) by 2020 from conditions without an action plan (business as usual / BAU), it is necessary to develop steps to reduce greenhouse gas emissions. 

"Indonesia will reach 26% (41% with help international) for subtraction emission GHG, compared with “Business as Usual” year 2020”

President Yudhoyono, 2009
A Green Building (BGH) is a building that:

2. Fulfill: **BGH standard** must in tune and compatible with friendly environment life.
Certificate of Eligibility for Building Functions

SLF
Sertifikat Laik Fungsi

Building Worthiness

Feasibility of Building

Standard Document

Standard Technical

- Status of Land Rights
- Ownership Status
- Permission to Establish Building

Building System

- Building System
- Planning Building

- Building Architecture

- Building Intensity

- Building Appearance
- Inside Spatial
- Balance, Harmony and Harmony Building with Environment
- Considerations of Social Cultural Value of Application of Architecture and Engineering

- Strong and Strong
- Load Bearing Ability
- Effect of Earthquake
- Allows BG Users to Save Ourselves

- Protected Against Fire Hazards
- Passive and Active Protection
- Fire Safety Management
- Lightning Protection System
- Electrical Installation
- Safety Due to Explosive Disaster

- Safety
- Insulation
- Sanitation
- Use of Building Materials

- Safety
- Sanitation
- Connection to, from, inside the building infrastructure and facilities

- Health
- Sanitation
- Connection to, from, inside the building infrastructure and facilities

- Convenience
- Accessibility
- Relationship between spaces
- Air Condition
- View
- Noise Level

- Convenience
- Accessibility
- Relationship between spaces
- Air Condition
- View
- Noise Level

- Easy
- Sanitation
- Connection to, from, inside the building infrastructure and facilities
Implementation of BGH (mandatory)

**PLANNING**
- Examination Requirements Administrative, Fulfillment Standard Technical, and Fulfillment Standard BGH

**IMPLEMENTATION**
- Examination SLF and Rating BGH audits

**UTILIZATION**
- SLFn Evaluation and BGH Audit conducted every 5 years

**DEMOLITION**
- Inspection of Dismantling Technical Plan Documents

---

**Owner/Applicant**
**Provider Service Planner**
**Party third 1)**

**APPLICATION PBG**
- Document/BGH Report
- Document Proposed BGH Penilaian Performance Assessment

**PBG**
**SLF1**
**SLFn**
**RTB**

**PLACE CERTIFICATE**
**PLACE CERTIFICATE**
**PLACE CERTIFICATE**

**BGH DATA COLLECTION**

---

**Information:**
- Cycle Line
- Process Line
- Output Line
- BGH data collection

1) Party third is person individual or body effort that have competence SKK BGH.
Implementation of BGH (recommended)

<table>
<thead>
<tr>
<th>PLANNING</th>
<th>IMPLEMENTATION</th>
<th>UTILIZATION</th>
<th>DEMOLITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination Requirements Administrative, Fulfillment Standard Technical, and Fulfillment Standard BGH</td>
<td>Examination SLF and Rating BGH audits</td>
<td>SLFn Evaluation and BGH Audit conducted every 5 years</td>
<td>Inspection of Dismantling Technical Plan Documents</td>
</tr>
</tbody>
</table>

Owner/Applicant

Provider Service Planner

Party third 1)

APPLICATION PBG

PBG

SLF1

SLFn

RTB

1) Document/BGH Report

1) Document Proposed BGH Penilaian Performance Assessment

Information:
- Cycle Line
- Process Line
- Output Line
- BGH data collection

1) Party third is person individual or body effort that have competence SKK BGH.

Detection

PLACE CERTIFICATE

PLACE CERTIFICATE

PLACE CERTIFICATE

Letter Information

BGH DATA COLLECTION

DISPOSAL REPORT
Buildings that meet the Technical Standards for buildings and have significantly measurable performance in saving energy, water, and other resources through the application of green principles in accordance with functions and classifications in each stage of its implementation.
### Comparison Rating

<table>
<thead>
<tr>
<th>BREEAM</th>
<th>LEED</th>
<th>Green Mark</th>
<th>Green Star</th>
<th>GREENSHIP</th>
<th>BGH-GARUDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass</td>
<td>Certified</td>
<td>Certified</td>
<td>4 Star</td>
<td>Bronze</td>
<td>Pratama</td>
</tr>
<tr>
<td>30 %</td>
<td>40 Points</td>
<td>50 Points</td>
<td>45 Points</td>
<td>35 %</td>
<td>45%</td>
</tr>
<tr>
<td>Good</td>
<td>Silver</td>
<td>Gold</td>
<td>5 Star</td>
<td>Silver</td>
<td>Madya</td>
</tr>
<tr>
<td>45 %</td>
<td>50 Points</td>
<td>75 Points</td>
<td>60 Points</td>
<td>46 %</td>
<td>65%</td>
</tr>
<tr>
<td>Very Good</td>
<td>Gold</td>
<td>Gold Plus</td>
<td>6 Star</td>
<td>Gold</td>
<td>Utama</td>
</tr>
<tr>
<td>55 %</td>
<td>60 Points</td>
<td>85 Points</td>
<td>75 Points</td>
<td>57 %</td>
<td>80%</td>
</tr>
<tr>
<td>Excellent</td>
<td>Platinum</td>
<td>Platinum</td>
<td></td>
<td>Platinum</td>
<td></td>
</tr>
<tr>
<td>70 %</td>
<td>80 Points</td>
<td>90 Points</td>
<td></td>
<td>73 %</td>
<td></td>
</tr>
<tr>
<td>Outstanding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>85 %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Pratama | 45% | 74,25 poin |
| Madya   | 65% | 107,25 poin|
| Utama   | 80% | 132,00 poin|
## Performance Assessment of Indonesian Green Buildings

### Indonesia Green Building Standard

### Technical Standards

<table>
<thead>
<tr>
<th>165 Standard Points</th>
<th>7 Order of Fulfillment</th>
<th>4 Tahapan</th>
<th>3 Peringkat</th>
<th>2 Kategori</th>
<th>1 Logo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site management; energy use efficiency; efficiency of water use; indoor air quality; the use of environmentally friendly materials; waste management; wastewater management; green construction principles; utilization management; demolition methods that refer to improving the quality of post-demolition sites since the planning, implementation, utilization and demolition yg mengacu pada peningkatan kualitas tapak pasca pembongkaran sejak dari perencanaan, pelaksanaan, pemanfaatan dan pembongkaran.</td>
<td>Planning</td>
<td>UTAMA (PLATINUM)</td>
<td>Mandatory</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>MADYA (GOLD)</td>
<td>Recomended</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Utilization</td>
<td>PRATAMA (SILVER)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Demolition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 16 Green Building Performance Assessment

#### Green Building

- **New Green Building**
  - 01. Planning
  - 02. Construction
  - 03. Utilization
  - 04. Demolition

- **Existing Green Building**
  - 05. Utilization
  - 06. Demolition

#### Residential Community-Green Area

- **Community Green Residence**
  - 07. Planning
  - 08. Construction
  - 09. Utilization
  - 10. Demolition

- **New Green Area**
  - 11. Planning
  - 12. Construction
  - 13. Utilization
  - 14. Demolition

- **Existing Green Area**
  - 15. Utilization
  - 16. Demolition
National Placard Green Building

ONLY CERTIFICATE "GREEN BUILDING"
PANCASILA GARUDA LOGO

45% ≤ PRATAMA < 65%
74.25% ≤ PRATAMA < 107.25
65% ≤ MADYA < 80%
107.25% ≤ MADYA < 132.00
80% ≤ UTAMA ≤ 100%
132.00% ≤ UTAMA ≤ 165.00
CERTIFICATE

Green Building

DISTRICT / CITY GOVERNMENT
STATE THAT THE BUILDING BELONGS TO

CATEGORY: BUILDING / AREA / COMMUNITY GREEN HOUSING
WHICH IS LOCATED AT

HAS MET THE REQUIREMENTS OF A GREEN BUILDING WITH A RATING OF
UTAMA/MADYA/PRATAMA

TECHNICAL PLANNING / CONSTRUCTION IMPLEMENTATION / UTILIZATION STAGE
NEW BGH PLANNING GREEN BUILDING PERFORMANCE

Rating Performance Step Planning, as tool for rate plan technical building that have fulfill requirements technical for published Building Approval (PBG Persetujuan Bangunan Gedung).
Rating Performance Step planning consist from 7 aspect with total score 165 points that is:
1. Site Management
2. Efficiency Use Energy
3. Efficiency Use Water
4. Indoor Air Quality
5. Eco-Friendly Material
6. Solid Waste Management
7. Waste Water Management
THE PERFORMANCE OF DEMOLITION GREEN BUILDING

Decase GHG

26% 41%

Effort Recovery Waste Construction
ENVIRONMENTAL SITE RECOVERY EFFORT
Effort Recovery Footprint Building

With Help International

Documentation Whole Material
DISPOSAL PROCEDURE

documentation Material Used Back
Documentation Structure Y Will disassembled

SPECIAL!
PERFORMANCE OF DEMOLITION GREEN BUILDING

Decrease GHG

41%
26%
GREEN COMMUNITY RESIDENTIAL GREEN BUILDING PERFORMANCE

Urban Heterogeneous Residential

Traditional Residence

Source: http://way4x.wordpress.com/cepat-tanah-teluhur/sejarah-suku-baduy/perkampungan-suku-baduy/
CONCLUSION

the need for strong **CHANGE** support from all actors implementing energy conservation, to jointly strengthen the Green Building institution in government agencies and the community. So that we can carefully anticipate global warming and climate change with a focus on conserving energy, and eliminating waste through empowering state institutions. So that the value of this business can become a reality to be able to save the world. Because in essence, the Earth that we inhabit comes from the inheritance of our ancestors, but it is a loan from our children and grandchildren. Our obligation to return it in a state of sleep: **GREEN**.

*You know personal following this? Look not anyone.... ?*
For a power, for Becomes hero them must:

CHANGE!!

we must CHANGE, so that heroism is always there...
# 01. Performance Assessment of New Building Planning

<table>
<thead>
<tr>
<th>NO</th>
<th>PERFORMANCE ASSESSMENT</th>
<th>VALUE</th>
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<tbody>
<tr>
<td>A.</td>
<td>SITE MANAGEMENT</td>
<td>23%</td>
<td>38</td>
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<tr>
<td>B.</td>
<td>ENERGY USE EFFICIENCY</td>
<td>28%</td>
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<td>WATER USE EFFICIENCY</td>
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<td>D</td>
<td>INDOOR AIR QUALITY</td>
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<td>USE OF ENVIRONMENTALLY FRIENDLY MATERIALS</td>
<td>13%</td>
<td>21</td>
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<tr>
<td>F</td>
<td>WASTE MANAGEMENT</td>
<td>4%</td>
<td>7</td>
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<td>G</td>
<td>WASTEWATER MANAGEMENT</td>
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02. Performance Assessment of New Building Construction

<table>
<thead>
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<td>45%</td>
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<tr>
<td>B</td>
<td>GREEN CONSTRUCTION PROCESS</td>
<td>36%</td>
<td>60</td>
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<td>C</td>
<td>GREEN BEHAVIOR PRACTICES</td>
<td>12%</td>
<td>20</td>
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<td>D</td>
<td>GREEN SUPPLY CHAIN</td>
<td>7%</td>
<td>11</td>
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<td>NUMBER OF POINTS</td>
<td>100%</td>
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<td>VALUE</td>
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<tr>
<td>A</td>
<td>ORGANIZATION AND GOVERNANCE OF GREEN BUILDINGS</td>
<td>35%</td>
<td>58</td>
</tr>
<tr>
<td>B</td>
<td>MAINTENANCE OF BGH PERFORMANCE AT THE TIME OF UTILIZATION</td>
<td>59%</td>
<td>98</td>
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<tr>
<td>C</td>
<td>ROLE OF RESIDENTS / USERS OF GREEN BUILDINGS</td>
<td>5%</td>
<td>9</td>
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<td><strong>NUMBER OF POINTS</strong></td>
<td><strong>100%</strong></td>
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<tr>
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<td>A</td>
<td>DISASSEMBLY PROCEDURE</td>
<td>58%</td>
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<td>B</td>
<td>ENVIRONMENTAL FOOTPRINT RECOVERY EFFORTS</td>
<td>42%</td>
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<tr>
<td></td>
<td>NUMBER OF POINTS</td>
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## 05. Performance Assessment of Utilization of Existing Buildings

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<tr>
<td>A.</td>
<td>ORGANIZATION AND GOVERNANCE OF GREEN BUILDINGS</td>
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<td></td>
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<td>B.</td>
<td>RETROFITTING CONSTRUCTION PROCESS</td>
<td>16%</td>
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<td></td>
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<tr>
<td>C.</td>
<td>MAINTENANCE OF BGH PERFORMANCE AT THE TIME OF UTILIZATION</td>
<td>30%</td>
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<tr>
<td></td>
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<td>50</td>
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<tr>
<td>D.</td>
<td>ROLE OF RESIDENTS / USERS OF GREEN BUILDINGS</td>
<td>4%</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td><strong>NUMBER OF POINTS</strong></td>
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</table>
# 06. Performance Assessment of Demolition of Existing Building

<table>
<thead>
<tr>
<th>No</th>
<th>Performance Assessment</th>
<th>Value</th>
<th>Point</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Demolition Procedure</td>
<td>58%</td>
<td>95</td>
</tr>
<tr>
<td>B</td>
<td>Environmental Footprint Recovery Efforts</td>
<td>42%</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td><strong>Number of Points</strong></td>
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## 07. Performance Assessment of Planning of Community Green

<table>
<thead>
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<th>PERFORMANCE ASSESSMENT</th>
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<th>POINT</th>
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<tbody>
<tr>
<td>A.</td>
<td>REDUCTION OF ENERGY CONSUMPTION</td>
<td>24%</td>
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<tr>
<td>B.</td>
<td>REDUCTION OF WATER CONSUMPTION</td>
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<tr>
<td>C.</td>
<td>SELF-MANAGEMENT OF WASTE</td>
<td>22%</td>
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<tr>
<td>D.</td>
<td>USE OF LOCAL AND ENVIRONMENTALLY FRIENDLY BUILDING MATERIALS</td>
<td>9%</td>
<td>15</td>
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<tr>
<td>E.</td>
<td>OPTIMIZATION OF GREEN OPEN SPACE</td>
<td>15%</td>
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<td>F.</td>
<td>SITE MANAGEMENT</td>
<td>15%</td>
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<td><strong>NUMBER OF POINTS</strong></td>
<td><strong>100%</strong></td>
<td><strong>165</strong></td>
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08. Performance Assessment of Construction of Community Green

<table>
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<tr>
<td>A</td>
<td>CONFORMITY OF CONSTRUCTION IMPLEMENTATION PERFORMANCE</td>
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<td>B</td>
<td>GREEN CONSTRUCTION PROCESS</td>
<td>55%</td>
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<td></td>
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<td>GREEN SUPPLY CHAIN</td>
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<td></td>
<td><strong>NUMBER OF POINTS</strong></td>
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<td></td>
<td></td>
<td><strong>165</strong></td>
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</table>
09. Performance Assessment of Utilization of Community Green

<table>
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<tr>
<th>NO</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>A</td>
<td>GREEN ENVIRONMENT ORGANIZATION AND GOVERNANCE</td>
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<tr>
<td>1</td>
<td>Community Adherence to Green Norms</td>
<td>54.5%</td>
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<tr>
<td>2</td>
<td>Environmental Conservation Ordinances</td>
<td>45.5%</td>
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<td></td>
<td>NUMBER OF POINTS</td>
<td>100%</td>
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### 10. Performance Assessment of Demolition of Community Green

<table>
<thead>
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<tr>
<td></td>
<td></td>
<td>%</td>
<td>POINT</td>
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<tr>
<td>A.</td>
<td>MATERIAL MANAGEMENT</td>
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<td>B.</td>
<td>ENVIRONMENTAL FOOTPRINT RECOVERY</td>
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**NUMBER OF POINTS**

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</table>
11. Performance Assessment of Planning of Green Area

<table>
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<tr>
<td>A</td>
<td>IMPROVING THE WELFARE OF THE LOCAL POPULATION</td>
<td>10%</td>
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<td>B</td>
<td>IMPROVEMENT OF INFRASTRUCTURE AND FACILITIES SERVICES IN THE REGION</td>
<td>16%</td>
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<td>C</td>
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<td>23%</td>
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<td>D</td>
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<td>E</td>
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<td>32%</td>
<td>52</td>
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<td>F</td>
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<tr>
<td></td>
<td><strong>NUMBER OF POINTS</strong></td>
<td><strong>100%</strong></td>
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</tbody>
</table>
12. Performance Assessment of Construction of Green Area

<table>
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<th>POINT</th>
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<tbody>
<tr>
<td>A.</td>
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<td>24.2%</td>
<td>40</td>
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<tr>
<td>B.</td>
<td>GREEN CONSTRUCTION PROCESS</td>
<td>58.2%</td>
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<td>C.</td>
<td>GREEN SUPPLY CHAIN</td>
<td>17.6%</td>
<td>29</td>
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<td></td>
<td>NUMBER OF POINTS</td>
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</table>
13. Performance Assessment of Utilization of Green Area

<table>
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<tbody>
<tr>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>A.</td>
<td>ORGANIZATION AND GOVERNANCE OF GREEN</td>
<td>49%</td>
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<td>B.</td>
<td>MAINTENANCE OF GREEN AREA PERFORMANCE AT THE TIME OF UTILIZATION</td>
<td>51%</td>
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<td>NUMBER OF POINTS</td>
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14. Performance Assessment of Demolition of Green Area

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<th>VALUE</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>A.</td>
<td>DISPOSAL MATERIAL MANAGEMENT</td>
<td>55%</td>
</tr>
<tr>
<td>B.</td>
<td>ENVIRONMENTAL SITE RECOVERY</td>
<td>45%</td>
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<td>NUMBER OF POINTS</td>
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15. Performance Assessment of Utilization of Existing Green Area

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<tr>
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<tr>
<td>A.</td>
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<td>B.</td>
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<td>C.</td>
<td>MAINTENANCE OF GREEN AREA PERFORMANCE DURING UTILIZATION</td>
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<td><strong>NUMBER OF POINTS</strong></td>
<td><strong>100%</strong></td>
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</table>
16. Performance Assessment of Demolition of Existing Green Area

<table>
<thead>
<tr>
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<th>VALUE</th>
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<tbody>
<tr>
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<td></td>
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<tr>
<td>A.</td>
<td>DISPOSAL MATERIAL MANAGEMENT</td>
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<tr>
<td>B.</td>
<td>ENVIRONMENTAL SITE RECOVERY</td>
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Mr. Zulkifli Zahari
President, Malaysia Association of Energy Service Companies (MAESCO)
<table>
<thead>
<tr>
<th>INITIATIVES</th>
<th>YEAR</th>
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<tbody>
<tr>
<td>Malaysian Industrial EE Improvement Project (MIEEIP)</td>
<td>2000-2007</td>
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<tr>
<td>Efficient Management of Electrical Energy Regulation (EMEER)</td>
<td>2008</td>
</tr>
<tr>
<td>National EE Action Plan (NEEAP)</td>
<td>2016-2025</td>
</tr>
<tr>
<td>Building Sector EE Project (BSEEP)</td>
<td>2011-2016</td>
</tr>
</tbody>
</table>
No strong integrated energy policy or strategy by GOM to guide activities and investments for EE in Buildings.

Statements on EE in 11th Malaysia Plan are general and without distinct targets. 12th Malaysia Plan (2021-2025) not tabled.

The current voluntary code of practice for EE building design, MS 1525:2007, has not yet been made mandatory incorporated into the Uniform Building Bylaws (UBBL) despite various efforts to this end over the last 5 years.

There are no regulations or mandatory legislation in place to support Energy Efficiency in the building sector.

Subsidized energy prices skew the market, and furthermore it is not clear that electricity tariffs give enough incentive for spontaneous EE project development and implementation.

There is no clear system to monitor, gather, analyze and disseminate information on developments and progress on energy efficiency. This hampers not only awareness in general but also the development of effective policies and targets, as well as making it impossible to assess whether or not existing initiatives are successful or not and thus whether or not to continue funding, strengthen it, or redirect it to other, more effective, measures.
MS 1525

Energy efficiency and use of renewable energy for non-residential buildings - Code of practice
(Second revision)

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DEPARTMENT OF STANDARDS MALAYSIA
PURPOSE OF THE STANDARDS

➢ To encourage the design of new and existing buildings so that they may be constructed, operated and maintained in a manner that reduces the use of energy without constraining the building function, nor the comfort or productivity of the occupants and with appropriate regard for cost considerations.
➢ To provide the **criteria and minimum standards** for energy efficiency in the design of new buildings, retrofit of existing buildings and provide methods for determining compliance with these criteria and minimum standards.

➢ To provide **guidance for energy efficiency designs** that demonstrate good professional judgement and exceeds minimum standards criteria.
SCOPE OF STANDARDS

The Malaysian Standard sets forth the requirements for the effective use of new and existing buildings for human occupancy, covering:

- passive design strategies
- electric power and distribution,
- lighting,
- air conditioning,
- building envelope and
- control system for energy management.
The Malaysian Standard covers new and existing buildings such as offices, hotels, shopping complexes and department stores as well as those portions of factory and industrial buildings that are used primarily for human occupancy.
GREEN BUILDING TOOLS IN MALAYSIA
ADOPTING MS 1525

-GREEN BUILDING INDEX
-GREEN RE
-My CREST
FIGURE 6: GBI WEIGHTING ON MAIN CRITERIA

- Energy Efficiency: 35%
- Indoor Environmental Quality: 10%
- Sustainable Site Planning & Management: 11%
- Material & Resources: 16%
- Water Efficiency: 21%
- Innovation: 7%
FIGURE 7: GREENRE WEIGHTING ON MAIN CRITERIA

- Energy Efficiency: 60%
- Water Efficiency: 19%
- Environmental Protection: 8%
- Indoor Environmental Quality: 5%
- Other Green Features: 5%
- Carbon Footprint of Development: 3%
FIGURE 8: MYCREST WEIGHTING ON MAIN CRITERIA

- Pre-design: 36%
- Infrastructure & Sequestration: 15%
- Energy Performance Impacts: 7%
- Occupant & Health: 5%
- Lowerring the Embodied Carbon: 3%
- Water Efficiency Factors: 3%
- Social Cultural Sustainability: 5%
- Demolition & Disposal Factors: 3%
EFFICIENT MANAGEMENT OF ELECTRICAL ENERGY REGULATION 2008 (EMEER 2008)
EMEER 2008

EFFICIENT MANAGEMENT OF ELECTRICAL ENERGY REGULATIONS 2008

Applicable to:

- Any installation which receives electrical energy from a licensee or supply authority—Consume equal or exceeding 3,000,000 kWh any period of 6 consecutive months
- Installation worked or operated by a private installation licensee—Generate equal or exceeding 3,000,000 kWh any period of 6 consecutive months
kWh SAVING PER ACTIVITY IMPLEMENTED IN 2015

No of Company Appointed REEM
Building Sector Energy Efficiency Project (BSEEP)
BSEEP Achievements

Reduction in the annual growth rate of GHG emissions from the Malaysian building sector

Improving the energy conserving design of new buildings

Improving the energy utilization efficiency in the operation of existing buildings

Improvement of the energy utilization efficiency in Malaysian buildings; commercial and government sectors

C1: Institutional Capacity Development

C2: Policy & Regulatory Framework

C3: EE Financing Capacity Improvements

C4: Information & Awareness Enhancement

C5: Building EE Demonstration

Removal of barriers to the uptake of energy efficiency technologies, systems and practices

PROJECT CUMULATIVE EMISSION REDUCTION
2011 - 2017 - 2037

122 GWh/
89.9 kt CO2eq by 2017

1,888.12 kt CO2eq by 2037
Fig. 4: BSEEP - Buildings Sector Forecast Energy Annual Savings & Annual CO₂ Emission Reductions
THE NEED FOR A DEDICATED BUILDING SECTOR ENERGY EFFICIENCY REGULATION

• Implementing Agency
• Data collection and establish Database
• Building Energy labelling
• Compliance with prescribed Building Energy Intensity
• Building Energy Audits
• Reporting
• Penalties for non-compliance
RM200 Mln EPC Fund To Boost Energy-Efficient Projects

PUTRAJAYA, Aug 16 (Bernama) — The RM200 million Energy Performance Contracting Fund (EPC Fund) is now available for energy service companies (ESCOs) to implement energy-efficient projects in the country, said Energy, Green Technology and Water Minister, Datuk Seri Dr Maximus Ongkili.

He said the fund was provided by Malaysia Debt Ventures Bhd, a subsidiary of Finance Ministry with a credit guarantee fund support of RM12 million from the ministry and the United Nations Development Programme-Global Environmental Facility.

"The establishment of the fund was approved during the first Green Technology and Climate Change Meeting 2017, which was chaired by Prime Minister Datuk Seri Najib Tun Razak on March 2 this year...."
FISCAL INCENTIVES

Companies Providing Conservation Services

- Pioneer Status (PS) with tax exemption of 100% of statutory income for 10 years
- Investment Tax Allowance (ITA) of 100% on qualifying capital expenditure incurred within a period of 5 years to be utilized against 100% of the statutory income for each year of assessment (Through Energy Performance Contracting (EPC) Services Activity)

ELIGIBLE COMPANIES

Companies which incur capital expenditure for conserving energy for own consumption

- ITA of 100% on qualifying capital expenditure incurred within a period of 5 years to be utilized against 100% of the statutory income for each year of assessment

ALL APPLICATION OF EE INCENTIVES SHALL APPLY THROUGH MIDA
GENERAL CRITERIA OF EE ITA EVALUATION

Energy Efficiency

- Ex 1: Chiller replacement with high efficient chiller
- Ex 2: Application of VSD at pump and motor

Energy Conservation

- Ex 1: Heat pump application
- Ex 2: Heat Recovery
- Ex 3: Co-Generation

For Lighting type of project, under LHDN and MOF code of definition, it was not categorized as CAPEX as the nature of lighting to be replaced yearly basis (consumable), thus, lighting will not be considered under the existing ITA.

ROI ≤ 10 Years
<table>
<thead>
<tr>
<th>No.</th>
<th>Demonstration Project</th>
<th>Building Type</th>
<th>Tentative Energy Efficiency Technology / Technique to be Demonstrated</th>
<th>Estimated Annual Energy Savings kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design and Construction of Nurses College at Parit Jaya</td>
<td>Institutional</td>
<td>Application of insulated facades and roof, window shading and ID design for maximum daylight use and maximum visual comfort, use of VRV split A/C systems, airtight building, high efficiency lighting system controlled according to occupancy and daylight availability.</td>
<td>711,750</td>
</tr>
<tr>
<td>2</td>
<td>Design and Construction of Government Health Clinic &amp; Quarters at Nilai, Seremban</td>
<td>Institutional/Residential</td>
<td>Strategic layout of A/C zones and naturally ventilated zones for reduced A/C load and reduced risk of humidity and mold growth, insulated facades and roof, façade, shading and ID design for maximum daylight use and maximum visual comfort, high performance glazing, use of VRV split A/C systems, airtight building with CO₂ control of ventilation air inlet, high efficiency lighting system controlled according to occupancy and daylight availability, individual fluorescent desk lamps.</td>
<td>209,625</td>
</tr>
<tr>
<td>3</td>
<td>Design of New UTM Building, Jl. Semarak</td>
<td>Institutional/Office</td>
<td>Building orientation, insulated facades and roof, façade, shading and ID design for maximum daylight use and maximum visual comfort, low E glazing, design of staircases for reduced use of lifts, high performance chiller, low pressure ventilation system and AHU’s with VAV, high efficiency pumps, motors and AHU fans, airtight building with CO₂ control of ventilation air inlet, high efficiency lighting system controlled according to occupancy and daylight availability, individual fluorescent desk lamps.</td>
<td>1,935,000</td>
</tr>
<tr>
<td>4</td>
<td>Retrofit of JKR Blok F Building</td>
<td>Office</td>
<td>Installation of a high efficiency lighting system controlled according to occupancy and daylight availability, installation of a new internal shading system for improved daylight availability and improved visual comfort, personal fluorescent desk lamps, weather stripping of windows and doors for reduced infiltration of outside air, improved fans and fan motors, high EE pumps, implementation of awareness program to improve energy performance.</td>
<td>1,520,000</td>
</tr>
<tr>
<td>5</td>
<td>Retrofit of Prime Minister's Office</td>
<td>Office</td>
<td>Optimization of the Building and Energy Management System for optimal energy performance and user comfort, adjustment and optimization of the performance of the AHUs with fans and motors, rewiring of wiring of the lighting system in offices towards the façade so that daylight controls can be installed, installation of motion controls of lighting in chosen areas of the building, use of fluorescent task lights in offices towards the façade to reduce the use of general office lighting, implementation of an awareness program to improve energy performance.</td>
<td>4,800,000</td>
</tr>
<tr>
<td>6</td>
<td>Retrofit of Ministry of Natural Resources and Environment’s Building</td>
<td>Office</td>
<td>Optimization of the Building and Energy Management System for optimal energy performance and user comfort, adjustment and optimization of the performance of the AHUs with fans and motors, rewiring of wiring of the lighting system in offices towards the façade so that daylight controls can be installed, installation of motion controls of lighting in chosen areas of the building, use of fluorescent task lights in offices towards the façade to reduce the use of general office lighting, implementation of an awareness program to improve energy performance.</td>
<td>4,800,000</td>
</tr>
<tr>
<td>No.</td>
<td>Demonstration Project</td>
<td>Building Type</td>
<td>Tentative Energy Efficiency Technology /Technique to be Demonstrated</td>
<td>Estimated Annual Energy Savings kWh</td>
</tr>
<tr>
<td>-----</td>
<td>----------------------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>7</td>
<td>Design and Construction of New Building of Ministry of Trade and Industry</td>
<td>Office</td>
<td>Building orientation, use of vegetation, use of water body, energy efficient transport/lift system, insulated facades and roof, façade, shading and ID design for maximum daylight use and maximum visual comfort, high performance glazing, high performance chiller, low pressure ventilation system and AHU’s with VAV, high efficiency pumps, motors and AHU fans, high performance lifts with electricity regeneration, airtight building with CO₂ control of ventilation air inlet, high efficiency lighting system controlled according to occupancy and daylight availability. Image/impact of Malaysia’s seriousness on sustainability to potential foreign investors.</td>
<td>3,800,000</td>
</tr>
<tr>
<td>8</td>
<td>Design and Construction of Housing Estate, Klang Valley</td>
<td>Residential</td>
<td>Building orientation, shading of walls via window overhang and other measures, use of improved glazing with less heat transmission, use of vegetation around the building, use of water bodies, insulated walls and highly insulated roofs, use of VRV split A/C systems, implementation of an airtight building envelope, design of windows and ventilation openings for optimal natural ventilation when the climate allows for this, use of efficient lighting systems, installation of energy efficient fridges and energy efficient washing machines, installation of solar water heaters.</td>
<td>550,000</td>
</tr>
<tr>
<td>9</td>
<td>Design and Construction of New Office Building of Putra Perdana</td>
<td>Office</td>
<td>Building orientation, insulated facades and roof, façade, shading and ID design for maximum daylight use and maximum visual comfort, high performance glazing, design of staircases for reduced use of lifts, high performance chiller, low pressure ventilation system and AHU’s with VAV, high efficiency pumps, motors and AHU fans, airtight building with CO₂ control of ventilation air inlet, high efficiency lighting system controlled according to occupancy and daylight availability, individual LED desk lamps.</td>
<td>2,250,000</td>
</tr>
<tr>
<td>10</td>
<td>Design and Construction of New Office Building of Sime Darby</td>
<td>Office</td>
<td>Building orientation, insulated facades and roof, façade, shading and ID design for maximum daylight use and maximum visual comfort, high performance glazing, high performance chiller, low pressure ventilation system and AHU’s with VAV, high efficiency pumps, motors and AHU fans, high performance lifts with electricity regeneration, airtight building with CO₂ control of ventilation air inlet, high efficiency lighting system controlled according to occupancy and daylight availability.</td>
<td>2,250,000</td>
</tr>
</tbody>
</table>

**TOTAL (kWh savings)**

22,826,375

**TOTAL CO₂ (ton CO₂eq)**

15,613

**NOTES:** Electricity price = 0.4 MYR/kWh (USD 0.11/kWh); CO₂ Factor = 0.684 ton/MWh
ESCO’s Contribution towards Delivering Energy Efficient Buildings
COMMON Options for EPC MODEL

1. GUARANTEED SAVING
   • The loan goes on the client’s balance sheet

2. SHARED SAVING
   • The loan goes on ESCO’s balance sheet

BOTH PERFORMANCE GUARANTEED!
EPC – SHARED SAVING

Before

Baseline

Detailed Energy Audit

Implement EPC Project

Owner’s Share (10-30%)

ESCO’s share (70-90%)

(Loan & interest, O&M, spare parts, insurance, profit & etc)

EPC contract period (5-10 years)

Electricity bill saved

100% saving enjoyed By Owner

After EPC contract period

ELECTRICITY BILL

YEARS

“ZERO Upfront Cost” to the owner
Case Study 1

Telco Company, Malaysia by Factor Four Technology Sdn. Bhd – Shared Savings Contract for 10 years

BEFORE RETROFIT – 591 kW

• Air Cooled Chillers operating
  – 300 kW +
• Additional pumps in operation to counter valve problems
  – 48 kW +
• Measured CHWS Temperature Summary
  – Ave CHWS Temp June 2003 = 9 Deg C

AFTER RETROFIT – 164 kW

• Measured Average Power Consumption by Each Equipment (Water Cooled Chiller) in April 2001
  • 400 RT Chiller = 140 kW (Max 215 kW)
  • CHW Pump = 8.1 kW (Max 8.9 kW)
  • CW Pump = 7.5 kW (Max 9.2 kW)
  • Cooling Towers = 9 kW (Max 19 kW)
• Measured Power Consumption Summary
  – Ave Ch Plant kW for March 2006 = 160 kW (Max 180 kW)
• Measured CHWS Temperature Summary
  – Ave CHWS Temp March 2006 = 7.5 Deg C

Measured Chiller Plant Efficiency : 2.0 kW/ton

Measured Chiller Plant Efficiency : 0.60 kW/ton
Case Study 2

Universiti Teknologi Malaysia

MAIN RESULTS:

a) Saving of 318.00 kW or 39%
b) Lighting intensity Watt/m² reduced from 24.7 to 7.5 - reduction of 70%
c) kWh per annum /area (kWh/m²) from 169 to 99 - reduction of 58%
d) Improvement in comfort condition of the library
e) Savings worth RM 340,000 per annum

The electronic ballast was selected based on this criteria:

1. Total Harmonic Distortion (THD) of less than 20% or 10% depending on the model of the ballast.
2. Power factor > 95%
3. Lamp current Crest Factor less than 1.7
4. Minimum starting temperature of ~20°C to 50°C
5. Minimum detectable flicker – high frequency

The retrofit works undertaken to improve the efficiency were:

- Replaced old oversized motor with new Super-E type
- Replace old fan and motor pulleys with optimally designed size
- Alignment of pulleys to reduce transmission losses
- Electrical connection to motor and necessary adjustment of over load relay setting.
- Control and Monitoring

Total Savings Calculation for Phase I, II and III

Power (kW) Savings
The total savings from Phase I, Phase II and Phase III  >  Total Savings = (15) + (8) + (11) = 31.5 kW  = 318 kW
With the cost of electricity at:
- kWh Cost = 0.19 RM/kWh
- Peak kW Cost = 17.30 RM/kW/kWh

Calculation of savings per month can be expressed as follows:

Savings = kWh savings + Max. demand savings
= (318 kWh x N x 0.19 RM/kWh) + (318 x 17.3 RM/kW)

where N is the number of operating hours per month.

To calculate average savings per month, we will use 20 weekdays @ 15.5 working hours, 4 Saturdays @ 9 working hours, and 4 Sundays @ 8 working hours, which makes:

N = (20 x 15.5) + (4 x 9) + (4 x 8) = 378 hours per month

Average monthly kWh savings and max. demand savings, therefore:

KWH Savings = RM 12,639.56 per month
Max. Demand Savings = RM 550.07 per month

Total Monthly Savings : RM 28,341.07
Annual Savings = RM 340,092.84
ESCO is a one-stop solution provider which aims to bring together capital and technology to develop and implement turnkey solutions that enable companies to reduce their energy consumption and operating costs while meeting sustainability goals:

- No upfront investment for the Host on Shared Savings Basis.
- Enduring Operating Cost Savings.
- Asset Upgrade and Value Uplift.
- Corporate Social Responsibility agenda.
- Highest Performance Standards with equipment and technology that is commercially proven and with warranties and guarantees as to the performance of contractors and suppliers.
- Savings Cover the Investment Cost.
- Risk Transfer.
- Service payment only starts when the equipment is fully installed and commissioned. As a result, the Host transfers all the procurement and construction risks to ESCO
- Flexible Service Payment including shared savings, progressive payment, buy-out clause etc.
- Collateral or Guarantee Requirement subject to a credit risk assessment funding for the project without any collateral or corporate/directors guarantee from the Host.
<table>
<thead>
<tr>
<th>TRAINING PROGRAMS</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Management Training Course (EMTC) including EE Project Presentation and Interview</td>
<td>5 Days</td>
</tr>
<tr>
<td>Certified Energy Auditor Training Course (CEA)</td>
<td>4 Days</td>
</tr>
<tr>
<td>Accredited Energy Measurement and Verification (AEMVP)</td>
<td>4 Days</td>
</tr>
<tr>
<td>Technical and Professional Practice courses for CPD and capacity Building Purposes</td>
<td>1/2 to 2 days</td>
</tr>
</tbody>
</table>
MAESCO a founding member of Asia-Pacific ESCO Industry Alliance (APEIA)

On 17 June 2019, a new milestone was set when our President Ar Zulkifli Zahari signed a Joint Statement among the eight (8) national ESCO associations of Asia-Pacific to form APEIA. Besides MAESCO, the other seven (7) country ESCO associations of APEIA are EMCA (China), JAESCO (Japan), PE2 (Philippines), SEAS (Singapore), TESA (Taiwan), AEEE (India) and KAESCO (Korea).

The primary objectives of APEIA are:

1. To liaise with national and international ESCO, EE industry and business organizations for the benefit of Members and to represent the Association at international organizations, networks, meetings and forums;
2. To provide a regular forum for discussion, exchange of views and information on matters of common interest among Members and organizations/associations with similar aims;
3. To organize educational programmes, training and professional examinations on subjects relating to EE systems, practices and policies, and related subjects; and,
4. To maintain a directory of Member organizations promoting EE and ESCO practices and policies.
We look forward to synergise with all ESCO organisations of APEIA to achieve the 7 deliverables as depicted below.

1. **Knowledge flow**
   - Build technical capacities in nascent ESCO markets by organizing and conducting training programs leading to the certification of energy managers, measurement & verification professionals and other ESCO specialists.

2. **ESCO sector development**
   - Facilitate carbon asset management projects, carbon emission reduction and energy savings offset trading for RE and EE companies.

3. **Carbon market transactions**
   - Facilitate and encourage research & development, test-bedding & pilot-testing of technologies in energy efficiency.

4. **Easing technology deployment**
   - Provide a platform for governmental, developmental and commercial investor to engage with developers of energy efficiency projects.

5. **Facilitating investments**
   - Promote business development through conferences, ESCO trade missions, business matching meetings, exhibitions and other networking events.

6. **Business development**
   - Engage with the relevant government agencies, development agencies, international financial institutions and industry associations to mobilize grant, debt capital, knowledge and other in-kind resources to enable the implementation of the above-mentioned activities.

7. **Enabling market interventions**
   - [Additional content related to the image]
Thank You

MAESCO
(Pelaksanaan Syarikat Syarikat Perkhidmatan Tenaga Malaysia
Malaysia Association of Energy Service Companies)

9, Jalan SS7/10, 47301, Kelana Jaya. Petaling Jaya, Selangor Darul Ehsan
Tel : 03-78730784/5/6
Fax : 03-78730769
Email : training@maesco.org.my
Website : www.maesco.org.my
How Industries can Best Support Building’s Policies Development Efforts toward Reaching NDC Targets?

Mr. Matthieu Caille
Webinar on
Role of Industry in
Buildings Policy Development

How can industries best support building's policies development efforts toward reaching NDC targets?

Prepared by: Matthieu Caille
Created July 2021
Matthieu Caille (Mamat)
31, French citizen
Mechanical Engineer
Based in Yogyakarta / 8 years in Indonesia
Presentation Agenda

- Indonesian buildings: context
- Toward a more holistic and comprehensive supply chain of buildings
- **Industry support**: Inform policy makers on policies development & implementation gaps
- **Industry support**: Inspire policies reform & market growth through sharing best practices
- **Industry support**: Leverage and accelerate market transformation through activities/capacities alignment and coordination
Indonesian Buildings Context:
Slow and challenging improvement

70% of the Indonesian population will live in cities by 2045. (World Bank)

Urban sprawl in Indonesia: example of the urban development in Yogyakarta

Energy Usage Intensity – Stock Average

- Office
- Library
- Retail/Mall
- Hotels
- Hospital

ASEAN
Indonesia

Energy Usage Intensity

Office Library Retail/Mall Hotels Hospital

Stock Average

(kWh / m² / year)

Electricity prices for households (>900 VA)

Malaysia Vietnam China Indonesia South Korea Thailand Hong Kong Singapore Australia

1985
2000
2017
Toward a **more holistic and comprehensive approach** of the building's supply chain

- Building's Energy Efficiency and Conservation Roadmaps
- Policies Development/Reform

*Should be holistic*

Distributed along the supply chain
GBPN-HIDUP’s Coalition approach
Breaking barriers between public and private stakeholders
Creating safe-space to enable policies reform

Public / Private stakeholders Focus Group Discussion toward building regulation reform

Engagement with local actors: Understanding gaps and policy ask

Webinar: Industries decarbonization champions (industries)
Building materials manufacturer / developer / ESCO
Inform policy makers on policies development & implementation gaps.

Adopting a **strong participative approach** with local actors *throughout policy reform processes* to:

- Develop a **common understanding** of the goals and objectives achieved from transitioning
- Comprehend **challenges and capacity building needs**
- Facilitate **regulation adoption and improve compliance rates**

**Enhance regulations adoption through collaborative regulation design & drafting**

- Status-quo and capacity mapping
- Raising awareness and knowledge sharing
- Technical and administrative guidelines development
- Multi stakeholder consultations

**Acceptance by the private sector:**
- Building practitioners
- Industries (building materials manufacturers)
- Associations
- Building owners

**Greater ownership among public authorities:**
- Across key ministries
- Throughout key city / regency services
Inspire policies reform & market growth through sharing best practices.
Leverage and accelerate market transformation through activities/capacities alignment and coordination among peers.

The **up-take** of sustainable and decarbonized strategies and solutions within the industries and local experts (developers, designers, builders, utility providers) best practices **highly depends on each other’s motivation**.

In line with the government commitment to address climate change issues, as stipulated within the Indonesia Nationally Determined Contribution (NDC), such initiatives should be:

- Recognized
- Socialized and
- Encouraged.

Establishing alliances and coalitions of decarbonisations champions, at national and sub-national levels, is a strong alternative to **foster the large-scale adoption** of best practices and high performance buildings throughout Indonesia, as a **contribution toward NDC targets completion**.
THANK YOU...

For joining us to drive change together,
*Toward a sustainable and low carbon future in Indonesia*

Consult our web site:
www.gbpn.org

Follow us on Twitter:
@GBPN_org

Send us an email:
info@gbpn.org
The Role of Industry in Buildings Policy Development

Mr. Christopher C. Seeley
Energy Efficiency & Climate Change Expert and CEO, Climate Change Solutions (ESCO in Thailand)
ASEAN-IEA Webinar: The Role of Industry in Buildings Policy Development

Hosted by: ASEAN Centre for Energy
Organised by: International Energy Agency, the ASEAN Centre for Energy, and the ASEAN Secretariat.
With support from: ASEAN-Australia Development Cooperation Program Phase II (AADCP II)

22 July 2021

Christopher C. Seeley
ccseeley@climate-change-solutions.net
A specialist firm providing advisory, project development, and project implementation services in the areas of Energy Efficiency and small-scale Renewable Energy projects across the ASEAN region since 2010.

We offer turnkey energy efficiency projects using traditional ESCO delivery models (guaranteed savings/performance and Energy Purchase Agreements) with the ability to invest into projects on long-term repayment structures.
Energy Efficiency Technologies & Solutions

- HVAC systems (VRV, Chillers, absorption chillers)
- Heat Pump systems
- Co-generation/Tri-generation systems (waste heat recovery)
- Building Energy Management Systems (BEMS)
- Energy Recovery Ventilation (ERV) systems
- LEDs & Lighting Control systems
- Solar

Magnetic Bearing Oil Free Chiller

High Efficiency VSD Chiller

Waste Heat Recovery Boiler

Air-Source & Water-source Heat Pumps, CO2-based Heat Pump

Gas engine generator/absorption chiller

LNG Gas Plant (for Tri-gen)
## 4-Star Resort Chonburi, Thailand

<table>
<thead>
<tr>
<th>#</th>
<th>Project Description</th>
<th>Total Contract Value (US$)</th>
<th>Term (Yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Magnetic bearing (Oil-free) Chiller</td>
<td>~700,000</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Heat Pump System (Water-Water)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Solar PV Rooftop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Lighting - LEDs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 5-Star Resort Samui, Thailand

<table>
<thead>
<tr>
<th>Item</th>
<th>Solutions</th>
<th>Contract Value (US$)</th>
<th>Term (Yrs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HVAC system</td>
<td>~1,000,000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Heat Pump System</td>
<td>~1,000,000</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Occupancy Based Control System for guestrooms</td>
<td>~1,000,000</td>
<td>7</td>
</tr>
</tbody>
</table>
Background Information

Total Electricity Consumption in Thailand 2012-2018 (by Building Type)

(Ministry of Energy Thailand, 2019)
ESCO – Energy Efficiency Retrofit Case Studies in Thailand (x42)

**Average of Energy Reduction Achieved (%)**

- Office: 15.20%
- Retail: 17.48%
- Hotel: 18.78%

**Payback Period (Years)**

- Office: 4.85 years
- Retail: 4.14 years
- Hotel: 4.25 years
## Investment ‘Opportunity’

<table>
<thead>
<tr>
<th>Building Type</th>
<th>Total ‘Size’ (m2)</th>
<th>Total Energy Reduction (MWh/annum)</th>
<th>Total GHG Reduction (mtCO2e/annum)</th>
<th>Total Reduction in Energy Cost (US$/annum)</th>
<th>Total Investment (US$)</th>
<th>Payback (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hotel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>29,580,450</td>
<td>1,091,275</td>
<td>618,098</td>
<td>123,208,470</td>
<td>429,708,338</td>
<td>3.49</td>
</tr>
<tr>
<td>Office</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3 Key Points

Objective:
To reduce Greenhouse Gas (GHG) emissions by scaling up private sector ‘investment’ (participation/commitment) in energy efficiency in both commercial buildings and industrial buildings

1. SMEs (Building Owners) - High Potential
   - Large opportunity for Energy Efficiency / Energy Reduction in buildings in Thailand (as a group represent ~50% of total electricity consumption)
   - Many programs have focused on Designated Buildings and Factories (very large energy consumers) but not on SMEs
   - Have a need for ESCO services (both external expertise and financing options)

2. Banks and Financial Institutions – an essential group to provide loans (to ESCOs) so that they can invest into energy efficiency projects.

2. Model of preference/highest potential – Shared savings, leasing, ‘chauffage’ (EPA)
Initiatives/Policies/Partnerships that will deliver:

1. **Greater participation by Private Financial Institutions**
   - Identify and establish other sources of capital for ESCOs - Regional banks, (VC, PE, FinTech)

2. **Risk sharing facilities (to enable ESCOs to satisfy bank requirements and access loans more easily):**
   - Portfolio guarantees (for banks)
   - Individual project guarantees
   - Partial credit guarantees
   - Insurance policies

3. **Establish a grant facility to co-finance the costs of Investment Grade Audits (IGA)**
   - Build a pipeline of projects (no IGA = no projects)
   - Build capacity of ESCOs to undertake IGAs (‘bankable’ projects)
   - Build capacity of building owners to understand the value of an IGA (investment decision)
Thank you

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634/1 Pracha Uthit Rd., Wangthonlang, Bangkok 10310
Tel: +66 87 86 0880

Christopher Seeley: ccseeley@climate-change-solutions.net
Q&A Session

Moderator

Dr. Ian Hamilton
Associate Professor, UCL Energy Institute & International Energy Agency

Panelists

Mr. Ir. Mochammad Sultan Sahara, M.Eng.
Certain Functional Officer, Associate Expert on Building and Housing, Directorate General of Cipta Karya, Ministry of Public Works and Public Housing, Indonesia

Mr. Zulkifli Zahari
President, Malaysia Association of Energy Service Companies (MAESCO)

Mr. Matthieu Caille

Mr. Christopher C. Seeley
Energy Efficiency & Climate Change Expert and CEO, Climate Change Solutions (ESCO in Thailand)
Closing Remarks

Mr. Muhammad Indra Wahyudin
Officer, Energy and Minerals Division, ASEAN Secretariat
Roadmap for Energy Efficient Buildings and Construction - ASEAN

The energy demand of the ten countries of the Association of Southeast Asian Nations (ASEAN) has grown by 60% over the past 15 years and is projected to further increase by 80% over the next 25 years. Cooling is the fastest-growing end use in buildings, as energy demand for cooling more than tripled between 1990 and 2018.

This project aims to help address the pressures of increasing energy demand and emissions and improve collaboration between stakeholders in the region, by developing an ASEAN Energy Efficient Buildings and Construction Roadmap and an ASEAN Sustainable Cooling Roadmap.

The road mapping process will engage key stakeholders and assist them to develop and implement strategies, plans, policies and programmes to reduce the energy demand of buildings, construction sectors and cooling.

The roadmaps are intended to assist policy makers when designing their national buildings and climate strategies, as well as organisations in designing their medium-term and long-term policies and determining their investment allocations.