Towards Carbon Neutrality in Building Sector in ASEAN

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Presented by
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Outline

1. Pathways of ASEAN Member States towards Carbon Neutrality
2. Energy Efficiency is main strategy towards Carbon Neutrality
3. Energy Consumption in Building Sector
4. Policy Status and Roadmap towards Net Zero Building in ASEAN
5. Policy Package Recommendations for Building
6. Conclusion and Outlook
Most ASEAN Member State (AMS) have announced carbon neutrality targets by 2050 and NZE by 2065 but will require international cooperation and support.

Source: IEA (2022), Southeast Asia Energy Outlook 2022
Energy Efficiency and Conservation and Renewable Energy are the main strategies for achieving Carbon Neutrality in AMS

<table>
<thead>
<tr>
<th>Carbon Neutrality Target</th>
<th>Singapore</th>
<th>Thailand</th>
<th>Indonesia</th>
<th>Brunei Darussalam</th>
<th>Vietnam</th>
<th>Malaysia</th>
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**Energy Efficiency and Conservation**

**Renewable Energy**

**Electric Vehicle**

**Digitalisation**

**Grid Modernisation**

**Low-Carbon Alternatives**

**Carbon Tax/Pricing**

**No New Coal Plants**

Source: Kick-off Meeting AJEEP Scheme 5
ASEAN Member States have set up energy efficiency and conservation-related targets

- **Myanmar**
  - Reduce the national electricity demand by 20% by 2030

- **Lao PDR**
  - Reduce 17% of energy intensity by 2025

- **Vietnam**
  - Reduce Total final energy consumption by 8-10% by 2030 compared to BAU

- **Thailand**
  - Reduce energy intensity by 30% by 2037

- **Cambodia**
  - Reduce the final energy consumption by 20% by 2035

- **Indonesia**
  - 1% of energy intensity reduction per annum up to 2025

- **Singapore**
  - 35% Energy Intensity Reduction by 2030 based on 2005 levels

- **Malaysia**
  - Reduce electricity consumption by 8% by 2025

- **Brunei Darussalam**
  - 45% energy intensity reduction by 2035

- **The Philippines**
  - at least 10% of energy saving on electricity from all sectors by 2040, based on 2016 BAU

- **ASEAN**
  - reduce energy intensity by 32% by 2025
Mandatory Energy Management System is a common policy for the application of EE&C practices in AMS....

- AMS required the energy intensive establishments to implement EMS in their respective energy efficiency Law, Act, or Decree.
- The threshold value and units are varied among the countries.
- All of AMS includes commercial building within the scope of coverage.
- Malaysia and Cambodia only covers electrical system.
Why buildings play a pivotal role towards **Carbon Neutrality** in ASEAN?

Energy consumption trends in buildings (commercial sector)

ASEAN Commercial Sector Demand in ktoe

ASEAN Energy consumption per commercial sub-sector in ktoe

Commercial sector consumption will increase by 4 times in 2050 (2020 levels). The sector is highly electrified and consume significant biomass, LPG, and diesel. Efficient lighting and appliances and increased electrification is beneficial.

Energy intensity reduction in facilities of office, hospital, retail, hotel, and other commercial space will lead to significant improvement.
Why buildings play a pivotal role towards *Carbon Neutrality* in ASEAN?

**Energy consumption trends in buildings (residential sector)**

- Residential sector energy consumption is expected to increase by 1.5 times in 2050 (2020 levels). The Sector is mainly electrified and consumes a large share of biomass for heating and cooking.
- Efficient lighting and appliances policies on increased electrification and clean cooking are crucial.
- MEPS and labelling were seen as effective policies in several AMS that could be adopted by the region as a whole.

Source: The ASEAN Energy Outlook 7th (AEO7)
Energy Efficient Buildings Become Increasingly Important in ASEAN

APAEC Phase II:
Energy intensity reduction target of 32% by 2025 based on 2005 level. Renewable energy share of 23% in total primary energy supply (TPES) Renewable energy share of 35% in power generation by 2025

To meet the goals, ASEAN’s buildings will need to become highly energy-efficient and use primarily zero-carbon energy source

- **Urbanisation rate** is expected to increase from 50% in 2018 to 60% by 2040, adding 120 million of urban dwellers, and increasing floor area by 60%.

- **ASEAN’s building energy consumption** is expected to grow by around 60% by 2030 and by 120% by 2040, while energy efficiency measures could help to mitigate this growth by at least 20%.

- A joint collaboration of the International Energy Agency (IEA), the ASEAN Centre for Energy (ACE), the ASEAN Secretariat, and the Energy Efficiency and Energy Conservation Sub-Sector Network (EE&C-SSN).

- The project aims to develop a detailed roadmap for the buildings and construction sector and a roadmap for space cooling in the ASEAN region, to help reduce energy demand in the sectors and improve stakeholder collaboration.

- The project is funded by the ASEAN-Australian Development Cooperation Project Phase II (AADCP II) and supports outcome-based strategies (OBS):
  
  **OBS 1.** Expand, Harmonise, and Promote Energy Efficiency Standards and Labelling on Energy-related Product

  **OBS 3.** Strengthen Sustainability of Energy Efficiency in Buildings

- This Roadmap for Energy Efficient Buildings and Construction in ASEAN should be considered alongside the Roadmap towards Sustainable and Energy-Efficient Space Cooling in ASEAN.

- This will ensure that space cooling, as one of the fastest growing electricity-consuming end uses in the region, is approached holistically.
Roadmaps’ objectives and key principles

Roadmaps intend to support policy-makers in developing, adopting, and enforcing energy efficiency and low-carbon policies and programmes for energy efficiency in buildings and space cooling.

The Roadmaps provide milestones for the short-term (2025), mid-term (2030), and long-term (net-zero carbon). These milestones and timelines are not intended to represent the views of AMS, but to provide guidance towards energy-efficient, low-carbon and eventually net-zero carbon buildings and space cooling in the region.

- **Adaptability** – configuration of the Roadmaps recommendations into an effective implementation plan based on in-depth knowledge of the local context.
- **Holistic approach** – applying an integrated view, while acknowledging complexity and fragmentation of buildings and space cooling issues.
- **Strategic planning** – integrating the selected from the Roadmaps actions into specific policy processes and strategic plans or developing new ones, where it is needed.
- **Multi-stakeholder collaboration** – establishing effective communication channels and coordination mechanisms between national, subnational, and local governments, as well as considering the interests of various stakeholder groups.
The Roadmap’s Implementation Brings Multiple Impacts

- Contribution to the achievement of low carbon initiatives
- Contribution to the improvement of regional energy access and energy security
- Creation of a new business and industry
- Green Recovery

Enhancing Industry Innovation and Business Innovation

- GHG reduction in buildings is a common challenge in ASEAN countries.
- Renewable energy at building is “local production for local consumption business model”.
- Due to difficulties in implementing energy saving measures in existing buildings, early action in the new urban development stage is key to success.

Zero Energy Building (ZEB) is a key measure for achieving Low carbon cites

Enhancing the value of buildings
- Reduction in utility costs, improvement of real estate value, comfortable office environment, etc.

Creating new markets in the fields of new construction, reform, supply of materials/ hardware, maintenance/ operation, energy management, etc.

Due to difficulties in implementing energy saving measures in existing buildings, early action in the new urban development stage is key to success.
Regulations “push” up energy efficiency across the market, including:
- Minimum energy performance standards
- Building energy codes
- Mandatory disclosure programs

Information programmes to ‘lift the market’ by support regulations and incentives and informing consumer choices, including:
- Certification & Labelling
- Audit programmes
- Product registries
- Information campaigns
- Education, training, capacity building
- Smart meter and controls

Incentives provide a “pull” to shift the market towards high-efficiency, and include:
- Rebates and loan programmes
- Bulk and public procurement programmes
- Manufacturing and innovation grants
- Equity programmes
- Non-financial incentives
<table>
<thead>
<tr>
<th>Country</th>
<th>Building Energy Codes</th>
<th>Certification/ Labelling for buildings</th>
<th>MEPS for appliances</th>
<th>Labeling for appliances</th>
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**Building Energy Codes, Certification, Labelling for buildings**
- **Mandatory for all buildings**
- **Mandatory for certain building types**
- **Voluntary**
- **Under development**
- **No known policy**

**MEPS for appliances, Labelling for appliances**
- **Mandatory**
- **Voluntary**
- **Under development**
- **No known policy**

AC - air-conditioners
R - refrigerators/ freezers
L - lighting
F - fans
ASEAN Buildings Roadmap: Action Areas

**Introduction**
- Vision
- Guiding principles

**Current context**
- Trends and challenges
- Current policies

**Summary of strategy**
- Milestones to Net Zero Carbon
- Summary of strategy elements
- Stakeholder mapping

**Actions, Activities and Timelines**
- Timelines
- Actions, Activities, Near-term recommendations
- Examples

**Tracking progress**
- Proposed regional and national indicators for tracking
Summary of Proposed Milestones towards Net Zero Building

**URBAN PLANING**

- By 2025: Urban planning decisions and strategies not integrated across themes, and exclude the informal city
- By 2030: Incremental integration of sectors and stakeholders in planning to incorporate energy efficiency, emissions and equity
- For NZC: Integrated and efficient planning for low-carbon and equitable cities

**NEW BUILDINGS**

- By 2025: Net zero carbon compatible standards and guidelines adopted across AMS
- By 2030: Most new construction meets Zero Carbon Ready standard
- For NZC: All new construction meets Zero Carbon Ready standard

**EXISTING BUILDINGS**

- By 2025: Large buildings targeted for energy efficiency improvement during major renovations. Development of baseline information.
- By 2030: Increased renovation rate and scope and increased repair and refurbishment, increased labelling and disclosure
- For NZC: Most buildings operating at net-zero carbon emissions

**MATERIALS**

- By 2025: Standard methodologies developed for assessing embodied carbon and increasing material efficiency. Stronger and consistent materials criteria in green building rating systems
- By 2030: Benchmarks developed for all building types across AMS; 40% reduction in upfront carbon
- For NZC: All new buildings zero embodied carbon over entire lifecycle

**SYSTEM AND OPERATIONS**

- By 2025: Promote use of tools for energy performance, disclosure and management
- By 2030: Sustained adoption of energy performance tools, systems and standards
- For NZC: Widespread use of tools and disclosure to reach operational net-zero carbon

**INTEGRATION OF CLEAN ENERGY**

- By 2025: Increase access to clean cooking to 90% and electricity to 70%
- By 2030: Increased share of hydro, wind and solar PV to reduce carbon intensity of grid. Increased distributed generation
- For NZC: Most buildings net-zero carbon emissions over whole life. Universal access to electricity and clean cooking
Policy package for buildings

• The roadmap explores potential policy measures under these three categories and across seven action areas, including:
  - Current status of policies and initiatives across ASEAN
  - Milestones to drive improvements across 2025, 2030 and zero-carbon
  - Near-term actions to support improvements
  - Examples and case studies.

• We know that there is no silver bullet for improving energy efficiency in buildings and a ‘policy package’ approach is key.

• Effective and timely policy development and implementation are crucial.

Regulation

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<tr>
<th>Product standards</th>
<th>Procurement regulation</th>
<th>Regulation on materials</th>
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<tr>
<td>Framework regulations</td>
<td>Building Energy Codes and Building Standards</td>
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- Minimum energy and thermal performance requirements, requirements for renewable energy systems installation or utilisation, covering all building types, new and existing buildings.
- Mandatory minimum energy performance standards (MEPS) for all types of appliances and building systems that are progressively and regularly updated, etc.

Information

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<th>Certification</th>
<th>Labelling</th>
<th>Disclosure &amp; benchmarking</th>
<th>Training programs</th>
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<tr>
<td>Education programs</td>
<td>Awareness raising</td>
<td>Digital tools and data</td>
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- Certification of energy and carbon performance for new and existing buildings; Mandatory rating labels, disclosure and benchmarking schemes for new and existing buildings based on energy and carbon performance.
- Mandatory labelling for appliances based on their energy efficiency
- Training on integrated policy portfolio and solutions for net zero carbon buildings; Accreditation systems for professionals; Awareness raising programs for consumers on benefits of net zero carbon buildings

Incentives

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<tr>
<th>Financial incentives</th>
<th>Non-financial incentives</th>
<th>Tariff policies</th>
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- Grants, preferential loans, tax rebates, tied to energy and carbon performance levels of new or renovated buildings, building materials, systems, appliances, reflective energy pricing, etc.
Conclusion and Remarks

• To meet the goals of APAEC Phase II, ASEAN’s buildings will need to become highly energy-efficient and use primarily zero-carbon energy sources.

• In commercial building, energy efficiency can potentially reduce the total energy demand from 92 Mtoe to 43 Mtoe between Baseline and Advanced Scenario Policy (APS) of AEO7.

• While policies and financing frameworks provide support for low carbon and sustainable building, regulations and standards can present effective means to force buildings to higher efficient technology, thus adopting a push-pull strategy.

• The ASEAN Centre for Energy (ACE), as the regional grouping’s hub, can act as a catalyst in supporting the implementation of relevant initiatives in building energy efficiency by conducting studies, managing project implementation, capacity building and providing other facilities to foster the adoption of efficient technologies in buildings.

• ACE and the IEA recently published the Roadmap for Energy-Efficient Building and Construction in ASEAN to support policy-makers in developing, adopting, and enforcing energy efficiency and low-carbon policies and programmes for energy efficiency in buildings.
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Thank You