Asia launch of online course for Energy Efficiency in Buildings

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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.

Emissions from buildings in ASEAN, India and China in 2018 and in 2040 under the IEA STEPS and SDS

Emissions from buildings in the SDS in 2040 could be up to 3000 MtCO₂ per year lower than they are on track to be, while still ensuring the achievement of the SDGs and supporting a 200% growth in GDP per capita and increase in floor area of 2/3.

STEPS = Stated Policies Scenario
SDS = Sustainable Development Scenario
Online course for Energy Efficiency in Buildings
Online course developed by the IEA

Registration is open for the English version!
Why did we develop this course?

The way we design and renovate buildings can improve the quality of life, reduce the environmental impact, facilitate the energy transition, and create new jobs

- On average, we spend up to 90% of our time inside buildings
- The construction sector is a job machine: up to 30 jobs created for 1 million USD
- In 2018 buildings were responsible for 27% of the final energy, and 24% of CO2; emissions have grown by around 20% since 2010
- By 2060 the number of buildings will be 2 times what we see today
- Ownership of air conditioning is growing, with the increase 7.5 times by 2050 in Southeast Asia
- Buildings already consume around half of the electricity in ASEAN, and growing.
- Buildings are then paramount to managing electricity capacity and demand in the future

Course objectives

• What does energy efficiency in buildings mean?

• What technologies and design options can improve energy efficiency in buildings?

• What policies can be applied to reduce energy use in buildings and allow effective investment and financing for energy efficiency in buildings?

• What is the role of codes and standards, and how can they be structured to promote energy efficiency in buildings?

• How is it possible to measure, evaluate and verify energy efficiency?

• Who are the different actors involved and how can they participate productively?

• What are some additional resources for advancing my workplace with energy efficiency issues in buildings?
Who is the course for?

- Policy decision makers – national, state and city
- Architects and engineers
- Financial institutions
- Research and NGOs, society
The four modules

I. Introduction to energy efficiency in buildings
   1.1 Understanding energy use in buildings
   1.2 Potential for energy efficiency in buildings
   1.3 Energy efficient building design
   1.4 Energy efficient building technologies
   1.5 Special session: cooling comfort in hot climates

II. Implementing energy efficiency
   2.1 Energy efficiency policies
   2.2 Target setting and stakeholder engagement
   2.3 Building codes and standards
   2.4 Energy efficient building operation

III. Measuring energy efficiency
   3.1 Data and energy efficiency indicators
   3.2 Evaluation of energy efficiency
   3.3 The multiple benefits of energy efficiency

IV. Enabling investment in energy efficiency
   4.1 Energy efficiency investment
   4.2 Enabling investment through policy
   4.3 Enabling investment through project standardization
   4.4 Enabling investment through procurement
   4.5 Enabling investment through funding, finance and fiscal instruments
   4.6 Enabling investment through energy markets
Format of course

• Based on the MOOC model: open and massive online course, available 24/7

• 30-40 hours, for 6 to 8 weeks

• Classes:
  - Videos, reading, slides
  - Examples from Southeast Asia, and other countries
  - Downloadable content
  - One evaluation per module

• A final evaluation

• Discussion forum, questions to instructors through the IEA Energy Efficiency Policy in Emerging Economies LinkedIn Group

• Certificate:
  - Overall certificate: if you have completed more than 75% of the modules
What to expect?

Video lessons with our instructors, and audio with slides
What to expect?

The circular economy

- Raw Material: the extraction of the raw material from the earth.
- Production: the processing of the materials and manufacturing into building components.
- Transportation: transportation of the materials to the site for assembly and construction.
- Construction: the construction phase of the building process.
- Operation: the usage of the building by the occupants, i.e. lighting, heating, air conditioning, renewable energy generation, which can be used to offset operational energy use.
- Retrofit and Maintenance: the energy and materials used for the continuous maintenance of the building.
- Demolition: demolition and disposal of the building materials.

We need to assess all of these phases one by one, and then as a whole, to be able to minimize the overall impact.

Reading, questions for reflection

Access to cooling (Part II)

Mean annual cooling degree days around the world

Multiple Choice

1. An influential NGO is urging for all new construction to be zero emission or net zero energy. What factors are key to achieving zero emission or net zero energy buildings?

   - Recommend that all new buildings should have their roofs covered in PV panels for electricity generation.
   - Focus on improving building envelopes and design to reduce the energy needs of the building.
   - Identify what low-carbon energy sources could be used to supply each energy end-use.
   - Limit the ability of people to buy more air conditioning equipment.

2. You have been asked to recommend new policies for energy efficient buildings. How do you determine where to start?

   - Identify the building end-uses responsible for the highest energy use in the past, and design policies to reduce these.
   - Identify the latest technologies that are the most energy efficient, and make them mandatory for all new buildings.
   - Identify the most common building types and largest energy end-uses today and in the future, and investigate the drivers behind these.
   - Start drafting a building energy code based on existing codes in other jurisdictions.

As we saw previously, temperature and population are leading drivers of cooling demand. And the areas as well as the areas with some of the highest growth in population, are also some of the hottest, as measured by mean annual cooling degree days.

Nearly 2 billion people live in places where the average temperature is hotter than 25°C every single day. Yet, only 8% of those people own an AC. In all of Southeast Asia, Latin America & Caribbean, we estimate that only around 15% of households own an AC.
Why take this course

• **A broad target audience:** necessary to facilitate communication and collaboration between a fragmented sector such as buildings

• **Comprehensive content:** public policies, technical issues, market instruments

• Designed with **Regional** examples from **Southeast Asia**, as well as **global best practices**

• **Downloadable** content

• **Free!**
A tool for advancing knowledge and exchange

• Course inspired by in-person and online Energy Efficiency Training Week, buildings module, held in Singapore and across Asia since 2015.

• Part of ongoing engagement in the region.
  - Online format expands outreach.
  - Cross-disciplinary approach encourages a holistic understanding of the sector and tools for collaboration.
  - Community of practice.
  - Supporting existing initiatives mentioned today.

• Meant to facilitate an ongoing dialogue!
ASEAN Roadmap for Sustainable Buildings and Construction 2020-2050
GlobalABC Regional Roadmaps for Buildings and Construction

- 3 Regional Roadmaps: Asia, Africa, Latin America
- Extensive stakeholder engagement, over 700 people overall
- Feedback on targets and timelines, submission of best practice case studies, feedback on key actions
- Key findings include:
  - Ambition is there
  - Excellent examples of existing programmes
  - A wide range of multiple benefits for range of stakeholders
  - Need for increased integration and coordination across disciplines
  - Need for more mandatory regulatory policies
  - Need for more data and knowledge of the baseline
  - Significant information gaps for materials and resilience

Source: GlobalABC/UNEP/IEA, (2020), GlobalABC Regional Roadmap for Buildings and Construction in Asia
ASEAN Roadmap for Energy Efficient Buildings and Construction

- 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
The ASEAN Roadmap development process

1. **Develop strategy and strategy elements**
2. **Compile information for current status for each country**
3. **Propose and validate milestones for 2025, 2030, For NZC**
4. **Propose and validate key actions required to meet these milestones**
5. **Compile best practice case studies as examples**

In parallel: data collection, survey, stakeholder mapping, identification of best case studies
### ASEAN Roadmap - Draft vision and strategies, per theme

<table>
<thead>
<tr>
<th>Theme</th>
<th>Strategies</th>
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<tbody>
<tr>
<td><strong>NEW BUILDINGS</strong></td>
<td><strong>Strengthen the adoption and compliance of mandatory building energy codes</strong>&lt;br&gt;<strong>Boost market demand for efficient, low carbon buildings</strong>&lt;br&gt;<strong>Boost capacity in delivery of efficient, low carbon buildings</strong></td>
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<tr>
<td><strong>EXISTING BUILDINGS</strong></td>
<td><strong>Promote the uptake of high performance fabric systems</strong>&lt;br&gt;<strong>Boost the rate of energy efficiency retrofits</strong>&lt;br&gt;<strong>Boost the quality of energy efficiency retrofits</strong>&lt;br&gt;<strong>Promote the adoption of building performance standards and codes</strong></td>
</tr>
<tr>
<td><strong>SYSTEMS AND OPERATIONS</strong></td>
<td><strong>Improve quality, availability and efficiency of appliances and systems</strong>&lt;br&gt;<strong>Encourage uptake of clean, smart and efficient devices and systems</strong>&lt;br&gt;<strong>Improve efficiency of building operation</strong>&lt;br&gt;<strong>Promote the recognition of good system and operational energy performance</strong></td>
</tr>
<tr>
<td><strong>MATERIALS</strong></td>
<td><strong>Promote new design and construction practices for greater material efficiency</strong>&lt;br&gt;<strong>Decarbonise production of carbon intensive materials</strong>&lt;br&gt;<strong>Collect data and promote disclosure of embodied carbon</strong>&lt;br&gt;<strong>Governments leading by example</strong></td>
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<tr>
<td><strong>RESILIENCE</strong></td>
<td><strong>Improve adequacy and reliability of built environment resilience</strong>&lt;br&gt;<strong>Foster a whole-government approach to resilience</strong>&lt;br&gt;<strong>Integrate resilience in building codes and materials</strong>&lt;br&gt;<strong>Increase and monitor data and information on disaster risks</strong></td>
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<td><strong>URBAN PLANNING</strong></td>
<td><strong>Improve coordination and policy alignment for low-carbon development</strong>&lt;br&gt;<strong>Boost low-carbon urban infrastructure and construction</strong>&lt;br&gt;<strong>Expand capacity to deliver low-carbon urban development</strong></td>
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<td><strong>INTEGRATION OF CLEAN ENERGY</strong></td>
<td><strong>Make commitments to net-zero carbon buildings over whole-life cycle</strong>&lt;br&gt;<strong>Foster the uptake of clean and renewable energy</strong>&lt;br&gt;<strong>Support clean and renewable energy through regulatory frameworks</strong>&lt;br&gt;<strong>Promote grid interactive efficient buildings</strong></td>
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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
### Example timeline: New buildings

**NB1: Boost capacity in delivery of efficient, low carbon buildings**

<table>
<thead>
<tr>
<th>Current status</th>
<th>By 2025</th>
<th>By 2030</th>
<th>For net-zero carbon</th>
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<tbody>
<tr>
<td><strong>Mainstream practice of passive and low carbon design</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>Increase availability of EE and low carbon materials</strong></td>
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**Strategy elements to meet desired outcome**
- eg. NB1

**Targeted actions to support strategy element, by group of countries where relevant**

**Examples of current good practice, from ASEAN or elsewhere**

**Timeframes:**
- Define milestones vs dates, to serve as indicators for tracking progress
Contribute and keep in touch!

• ASEAN Roadmaps collaboration [website: access here]

Please answer our survey [here]:

Collaboration site for the ASEAN Sustainable and Energy Efficient Buildings Roadmap and the ASEAN Space Cooling Roadmap

This is the project website for developing the two ASEAN Roadmaps. The website provides resources for those interested in being involved in the Roadmaps with the resources and instructions for input in their development process. Below you will find different pages dedicated to each Roadmap and activity area.

Contribute to the Buildings Roadmap Survey

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 2010.

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 existing buildings.

The roadmaps are intended to assist policymakers 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.

This survey has been designed to gather some insights and data on the buildings and cooling sectors in the region, to strengthen our understanding of the current status and trends in policy and technology.

The questionnaire contains a total of 6 sections, and each should take around 15 to answer. Please prioritise the sections you are the most familiar with.
Thank you!
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