Asia launch of online course for Energy Efficiency in Buildings

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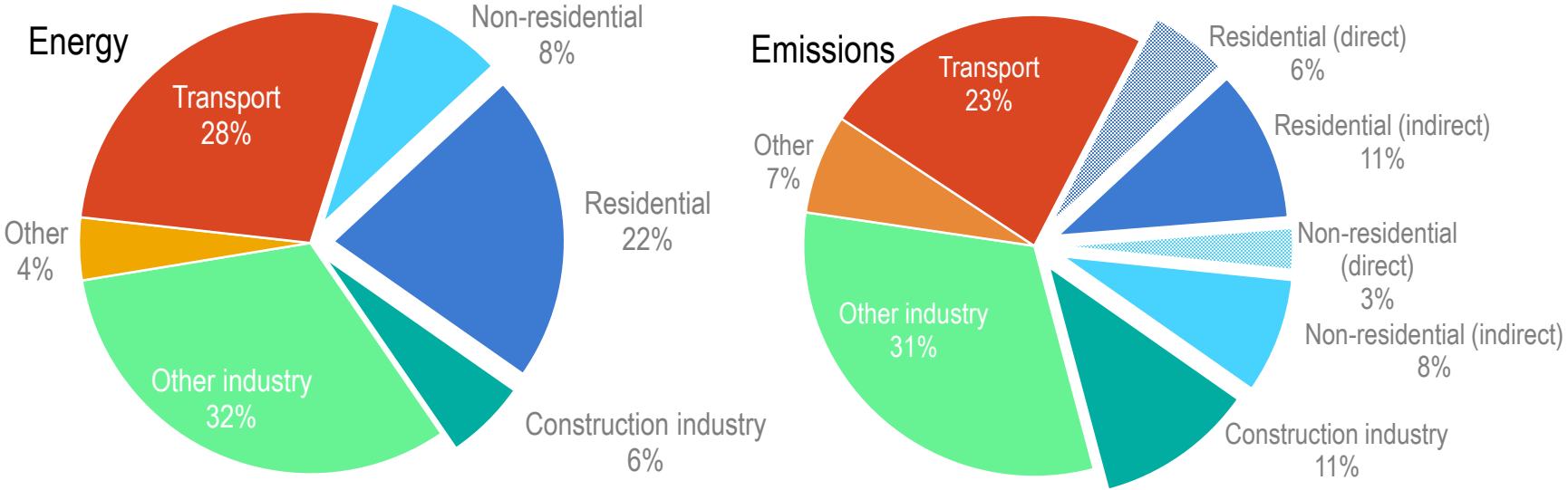
International Energy Agency

Why is buildings decarbonisation so critical?

Energy and emissions from buildings, globally

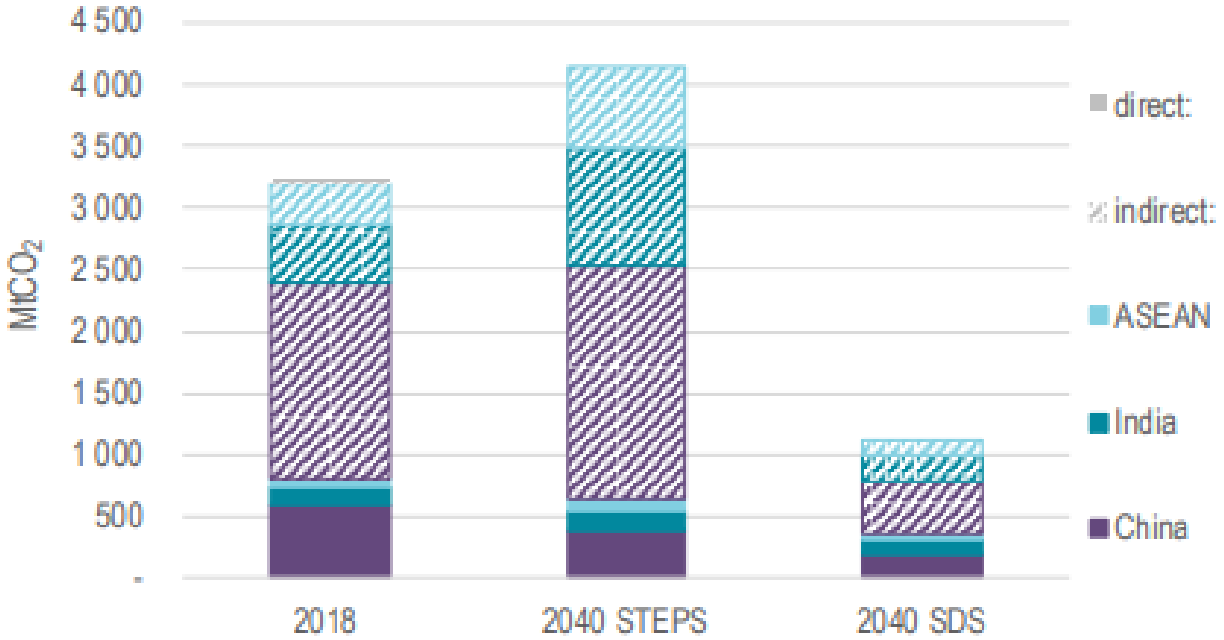


Source: GlobalABC/UNEP/IEA, (2019), *Global Status Report for Buildings and Construction 2019*

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

The building sector's potential for reduction in Asia

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



STEPS = Stated Policies Scenario
SDS = Sustainable Development Scenario

Emissions from buildings in the SDS in 2040 could be up to 3000 $MtCO_2$ 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.

Online course for Energy Efficiency in Buildings

Online course developed by the IEA

International Energy Agency

Energy Efficiency Indicators: Fundamentals on Statistics

International Energy Agency

Energy Efficiency Indicators: Essentials for Policy Making

International Energy Agency

Energy Efficiency in Buildings

International Energy Agency

Sustainable Energy Policies for Smart Cities

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

Source: IEA 2018, The Future of Cooling; IEA 2020, GlobalABC Regional Roadmap for Buildings and Construction in Asia

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?

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

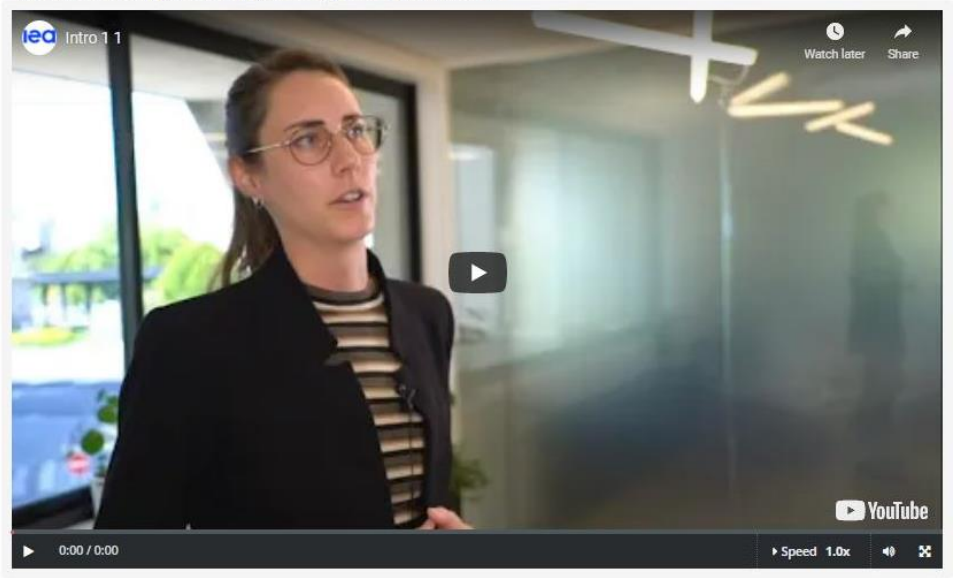
Format of course

- 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

Understanding building energy use (Intro 1.1)



What to expect?

Reading, questions for reflection

The circular economy

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Consider the following phases of the lifecycle of a building:

- **Raw Material:** the extraction of the raw material from the earth.
- **Production:** the processing of the materials, and manufacturing into building componen
- **Transportation:** transportation of the materials to the site for assembly and constructio
- **Construction:** the construction phase of the building process.
- **Operations:** the usage of the building by the occupants, i.e. lighting, heating, air conditio renewable energy generation, which can be used to offset operational energy use.
- **Retrofit and Maintenance:** the energy and materials used for the continuous maintena lifespan.
- **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 minim the building.

A CIRCULAR ECONOMY FOR THE BUILT ENVIRONMENT

Access to cooling (Part II)

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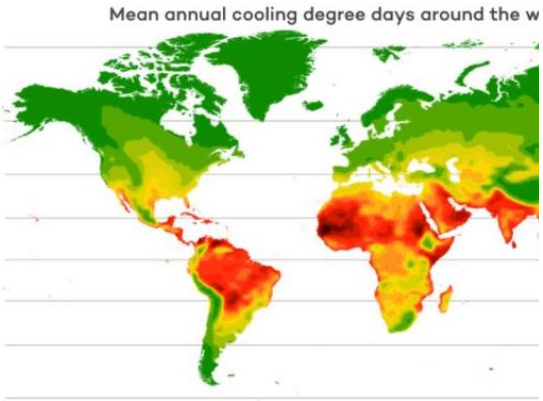

Source: IEA The Future of Cooling 2018

As we saw previously, temperature and population are leading drivers of cooling demand. And the 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 3 billion people live in a place 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.

Evaluation Module 1

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For each question, please select the correct answer(s). There may be more than one correct answer

Multiple Choice

0.0/7.0 points (ungraded)

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 those.
- [ ] Identify the latest technologies with the biggest technical potential for energy savings, no matter how expensive they are, 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 first.
- [ ] Start drafting a building energy code based on existing codes in other jurisdictions.

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!**

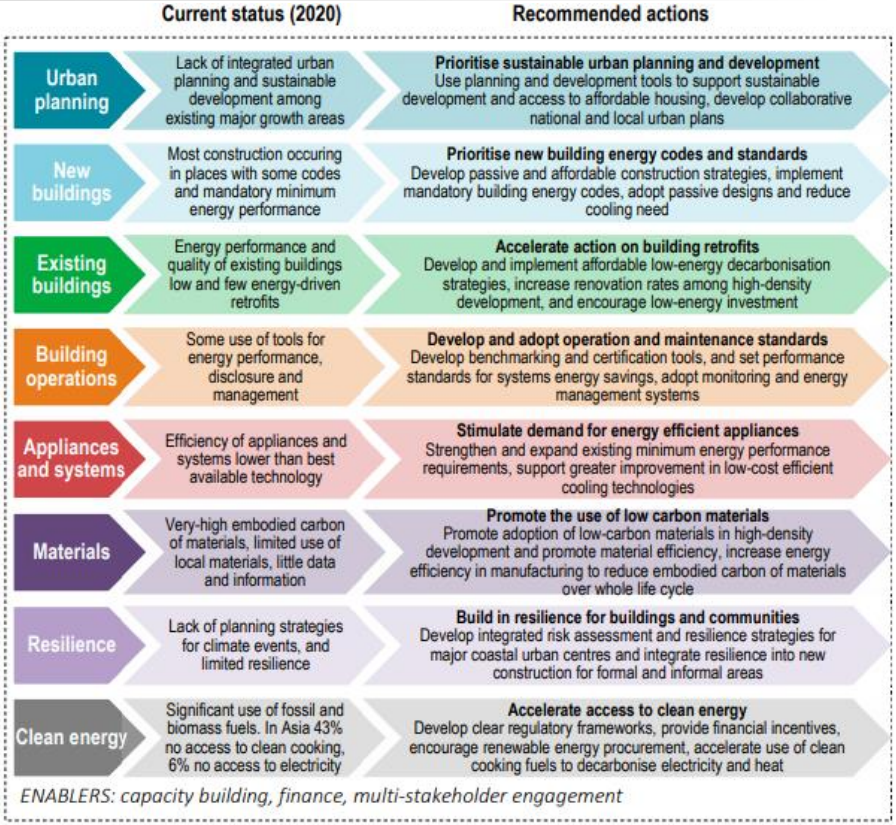
A tool for advancing knowledge and exchange

- 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

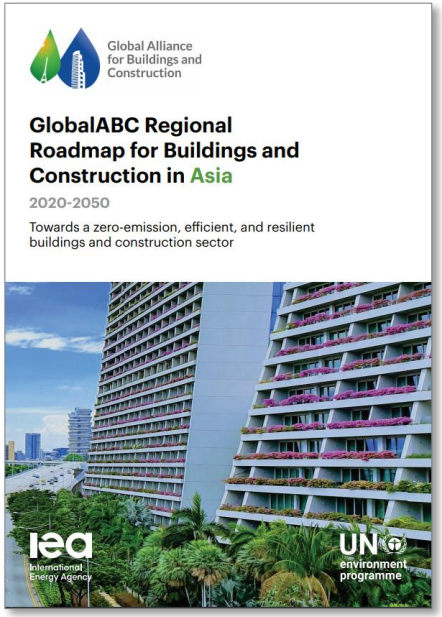
GlobalABC Regional Roadmaps for Buildings and Construction

- 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

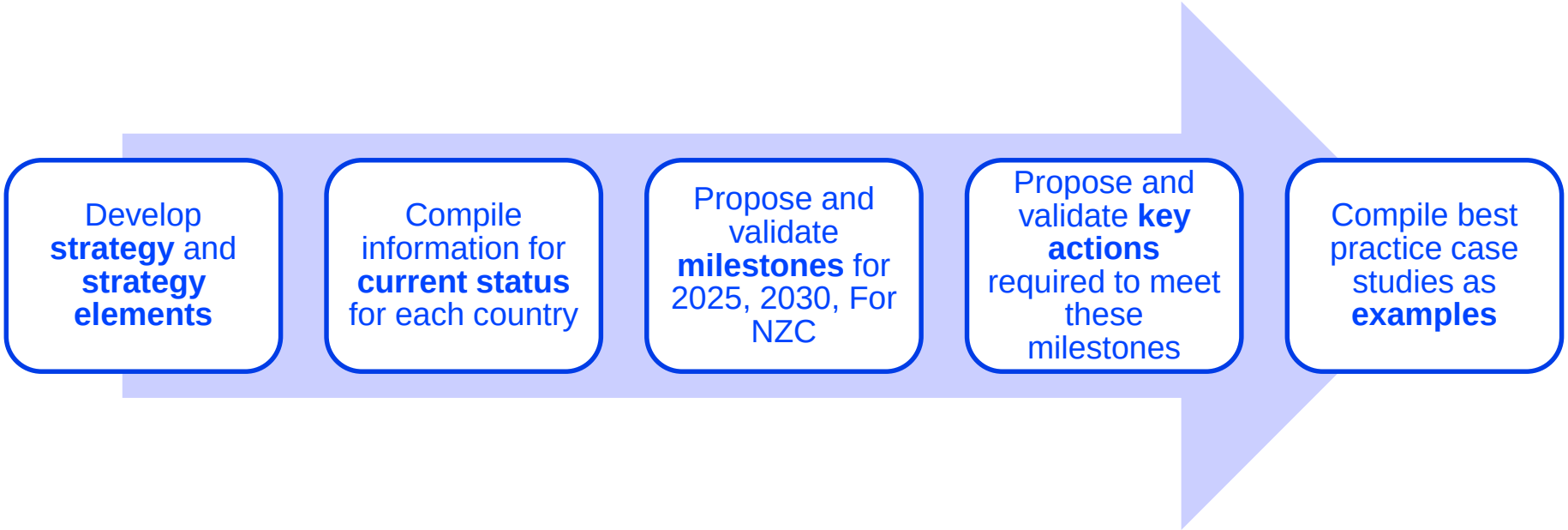


- Provides a comprehensive framework
- Contains info on “current status”
- Contains many examples and responses from ASEAN countries
- Network of key stakeholders (approx. 200 respondents/ participants/ reviewers)
- Highlights where the biggest data and ambition gaps are

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



In parallel: data collection, survey, stakeholder mapping, identification of best case studies

ASEAN Roadmap - Draft vision and strategies, per theme

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

EXISTING BUILDINGS

Existing buildings are retrofit to achieve an appropriately high level of energy performance to reduce fuel costs and improve thermal comfort.

- Promote the uptake of high performance fabric systems
- Boost the rate of energy efficiency retrofits
- Boost the quality of energy efficiency retrofits
- Promote the adoption of building performance standards and codes

SYSTEMS AND OPERATIONS

To promote the adoption of energy efficient systems and modes of operations that reduce energy bills and emissions, and increase 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

MATERIALS

To mainstream the use of materials and construction techniques that lower embodied carbon and improve energy performance

- Promote 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

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
- Integrate resilience in building codes and materials
- 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
- Expand capacity to deliver low-carbon urban development

INTEGRATION OF CLEAN ENERGY

Cities are powered by clean, integrated energy systems enabling buildings to provide flexibility to the power system with the right policies and regulations.

- Make commitments to net-zero carbon buildings over whole life-cycle
- Foster the uptake of clean and renewable energy
- Support clean and renewable energy through regulatory frameworks
- Promote grid interactive efficient buildings

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

Strategy elements to meet desired outcome eg. NB1

Timeframes:

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

	Current status	By 2025	By 2030	For net-zero carbon
Mainstream practice of passive and low carbon design				
Increase availability of EE and low carbon materials				

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

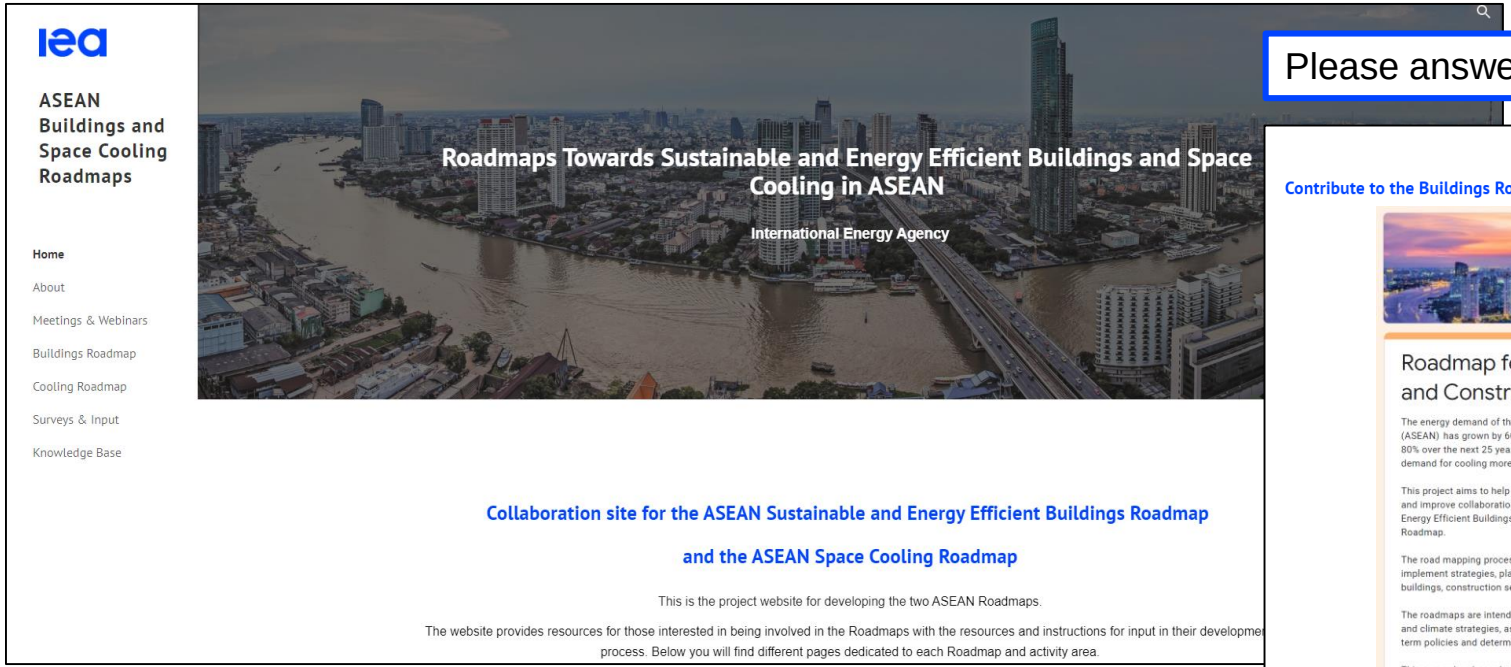
Targeted actions to support strategy element, by group of countries where relevant

Examples of current good practice, from ASEAN or elsewhere

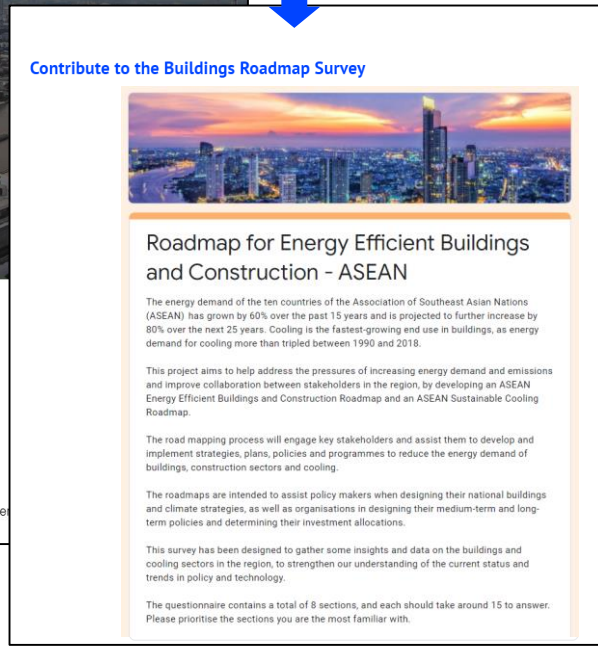
ons, examples, indicators for tracking progress>

Contribute and keep in touch!

- ASEAN Roadmaps collaboration website: access here



Please answer our survey here:



Thank you!

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