Accelerating Net Zero Transition of the Buildings and Construction Sector in Developing Asia and the Pacific

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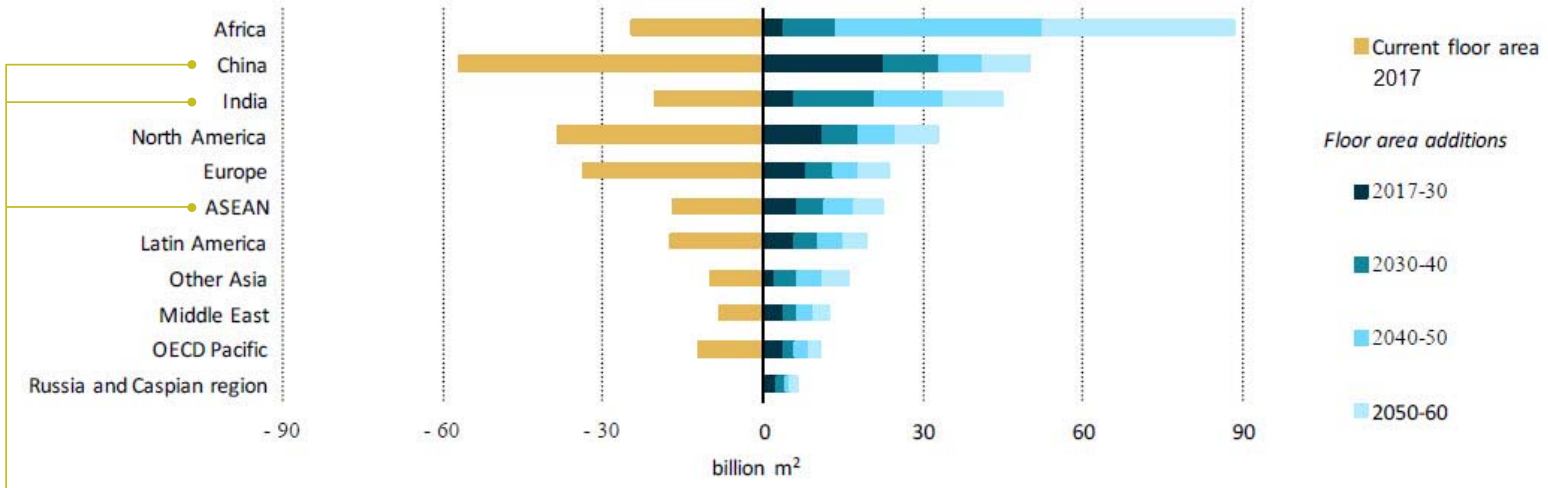
Expanding building stock, energy use and emissions

Total building stock in 2017 and expected growth to 2060 in key regions



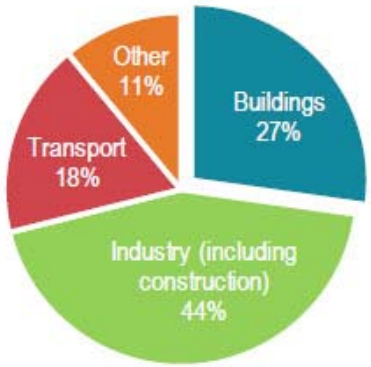
- Asia is the key driver of the growth of global building stock
- 65% of new floor area to be constructed from now to 2050,
  - about 70 billion m^2 in ASEAN, China and India
- Urgent need to avoid the lock-in of inefficient and carbon-intensive buildings (both new and existing)

Source: IEA (2017) Energy Technology Perspective 2017; UN Environment and International Energy Agency (2017) Towards a zero-emission, efficient, and resilient buildings and construction sector. Global Status Report 2017. GlobalABC/IEA/UNEP (2020) GlobalABC Regional Roadmap for Buildings and Construction in Asia: Towards a Zero-Emission, Efficient and Resilient Buildings and Construction Sector.

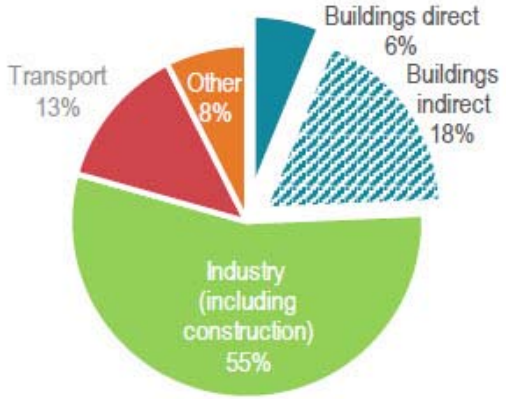
Expanding building stock, energy use and emissions

Share of buildings final energy and emissions in ASEAN, China and India, 2018

Buildings' share of total final energy consumption in ASEAN, China and India, 2018



Buildings' share of total CO_2 emissions in ASEAN, China and India, 2018

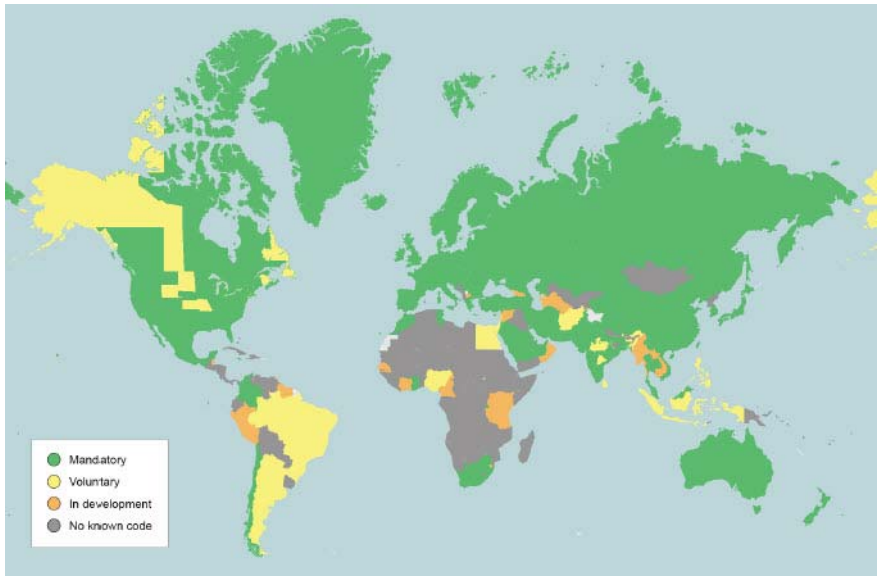


- In 2018, buildings accounted for 27% of the total final energy consumption and 24% of energy-related CO_2 emissions of ASEAN, China and India as a whole.
- In 2018, ASEAN, China and India collectively contributed 27% and 32% to total final energy consumption and energy-related CO_2 emission of the global buildings sector.

Source: IEA (2019). World Energy Outlook 2019. GlobalABC/IEA/UNEP (2020) GlobalABC Regional Roadmap for Buildings and Construction in Asia: Towards a Zero-Emission, Efficient and Resilient Buildings and Construction Sector. IEA (2020) Tracking Buildings 2020.

Evolving building energy policy landscape

Building energy codes



Tracking energy codes for new buildings

Regions	Mandatory	Voluntary	In development	No known code	Total
Africa	4	3	8	39	54
Americas	6	2	12	15	35
Asia	21	6	6	13	46
Europe	35		1	7	43
Oceania	3		3	10	16
Total	69	11	30	84	194

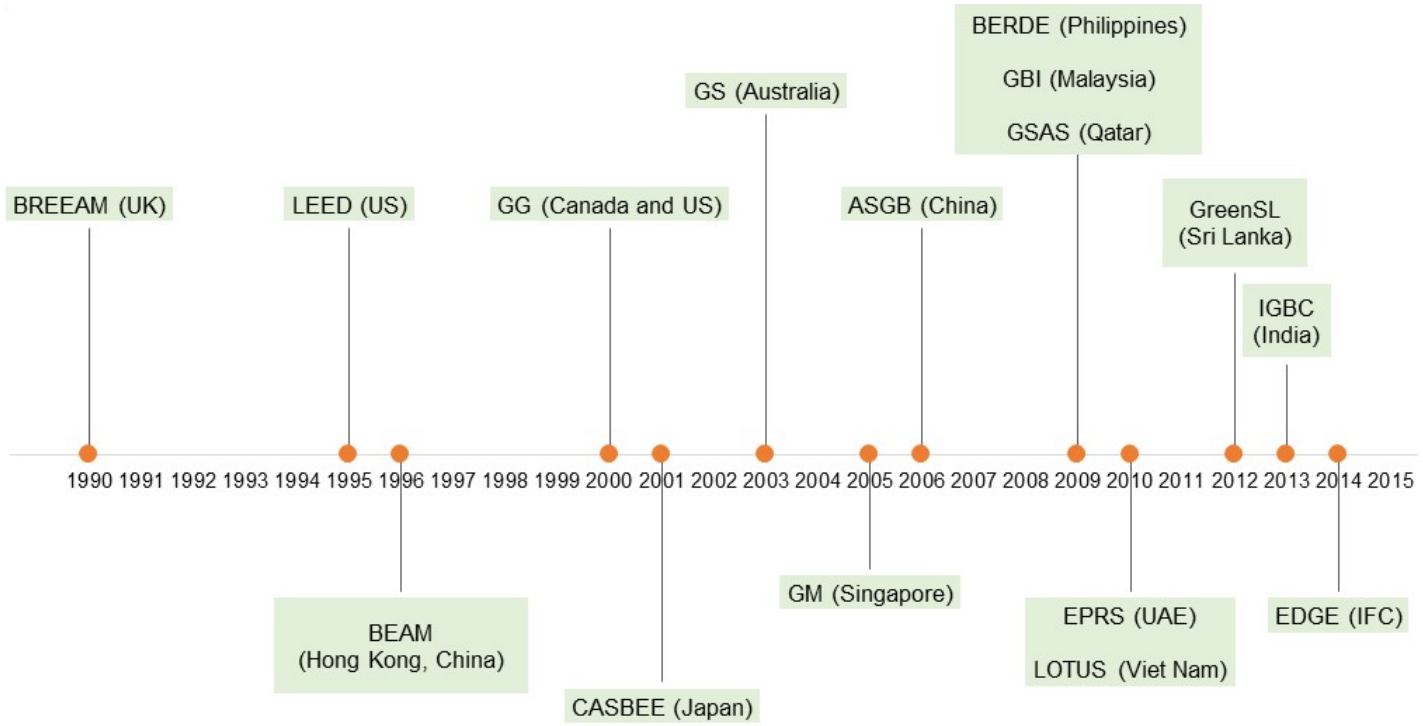
Source: IEA (2021) Energy Efficiency 2021.

- Less than 50% of the countries in Asia had mandatory codes
- 68% of 294.3 million population to be added in Asia from 2021 to 2030 will live in countries without any building energy codes or only voluntary codes
- Urgent need for greater coverage, adoption and strength of building energy codes
- Strong system of enforcement to ensure compliance

Evolving building energy policy landscape

Green building certification

Timeline of major green building certification schemes used in Asia



Source: Author.

- A surge of building certification schemes in the region over the past 15 years
- As of 2018, 48% of countries in Central, South, East and Southeast Asia already adopted building energy performance certification programmes
- In some countries where building codes are absent or outdated, building certification has been used as a de facto building code
- Compared to the EU, there is still a lack of large-scale adoption of full, mandatory certification schemes in Asia
- Limited tracking of stock-level building energy performance and disclosure of information

Evolving building energy policy landscape

Nationally Determined Contributions (NDCs)

Climate actions relating to buildings and construction in NDCs of selected countries in the region

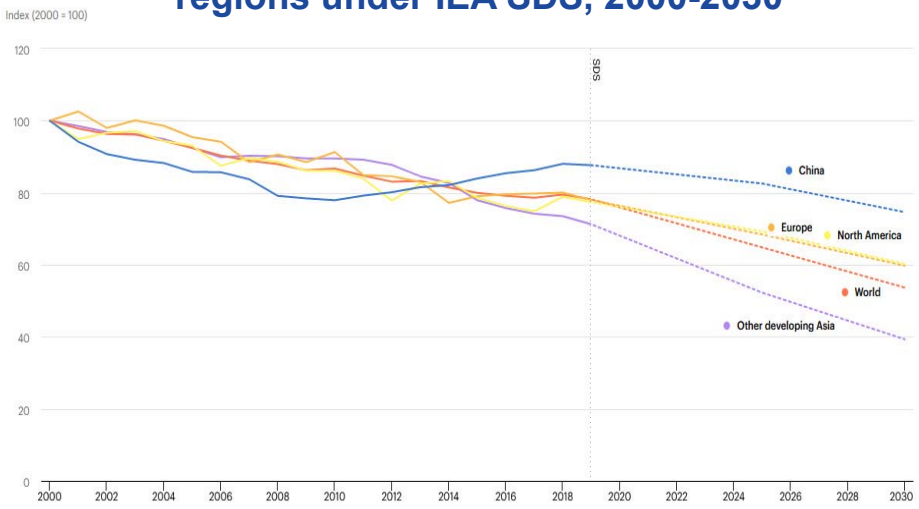
Subregion	Country	Actions and measures relating to buildings	NDC status
Central and west Asia	Azerbaijan	Massive use of control and measurement devices in electrical, heat energy and natural gas systems, application of energy-efficient bulbs, use of modern energy-saving technologies in heating systems, as well organization of public awareness programs on energy use.	1st NDC (Jan 2017)
	Pakistan	Green Building codes and certification for new and refurbished buildings, including revolving guarantee mechanism for energy efficient appliance	Updated 1st NDC (Oct 2021)
	Uzbekistan	Further introduce energy saving technologies in construction	Updated 1st NDC (Oct 2021)
East Asia	China	Improve energy efficiency standards for new buildings and accelerate the development of ultra-low energy-consuming, near-zero energy-consuming and low-carbon buildings on a large scale. Support the energy-saving renovation of existing buildings in cities and towns as well as municipal infrastructures, improving their energy-saving and low-carbon level. Apply green building standards to all new urban buildings by 2025. Practice building energy efficiency labelling and conduct performance assessment of low-carbon development in the building sector	Updated 1st NDC (Oct 2021)
	Mongolia	Insulate old precast panel buildings in Ulaanbaatar city. Limit the use of raw coal in Ulaanbaatar city and switch to the use of improved fuel	Updated 1st NDC (Oct 2020)
South Asia	Bhutan	Energy Efficiency Roadmap 2030 covering buildings was launched in 2019 covering 155 gigawatt-hours annually in materials, appliances, and construction. Solar PV on buildings. Energy efficient building design.	2nd NDC (Jun 2021)
	Maldives	Building labelling and building standards to improve energy efficiency. Improve building code for climate resilience.	2nd NDC (Dec 2020)
	Nepal	Adopt national building code emphasizing low-carbon and climate-resilient urban settlements.	2nd NDC (Dec 2020)
	Sri Lanka	Introduce mandatory building energy efficiency code in 2021-2022. Establish sectoral databases for eco-certification system, minimum performance and energy efficiency labelling programmes, green building and building management system.	Updated 1st NDC (Jul 2021)
Southeast Asia	Cambodia	Building codes, enforcement/certification to for new buildings to reduce electricity consumption by 10% in 2030. Improve cooling in public sector buildings to reduce 43,000 tCO_2 per year. Passive cooling in buildings to reduce 74.5 tCO_2e.	Updated 1st NDC (Dec 2020)
	Thailand	Relies on the implementation of the National Energy Efficiency Plan B.E. 2558-2579 (2015-2036), which aims to reduce energy demand by 30% in 2036 compared to a business-as-usual trajectory	Updated 1st NDC (Oct 2020)
	Viet Nam	Reducing GHG emissions by replacing construction materials and improving the cement and chemical production processes together with reducing the consumption of HFCs. Improving, developing and applying technology in manufacturing construction materials. Reducing clinker content and implementing other measures to reduce GHG emissions in cement production. Developing and using energy-saving construction materials and green materials in housing and commercial sectors	Updated 1st NDC (Sep 2020)
Pacific	Papua New Guinea	Improved building insulation and energy efficiency. Introduce building codes to mitigate impacts of heat waves and cyclones and for adaption.	2nd NDC (Dec 2020)
	Tonga	Introduce energy efficiency standards for buildings and energy performance audits and minimum energy performance standards for appliances in buildings.	2nd NDC (Dec 2020)

Source: UNFCCC (2022). NDC Registry.

- By 2019, 72% of Asian countries mentioned buildings in their NDCs. However, many still did not include specific actions to address buildings sector energy use and emissions.
- Following the new reporting phase beginning in 2020, policy actions on building energy performance and climate resilience have been increasingly mentioned in updated 1st or 2nd NDCs of many Asian countries.
- Inadequate breadth and depth of mitigation (and adaptation) measures for buildings and construction to put the countries on track with NZ emissions scenario by 2050
- 73% of 294.3 million population to be added in Asia from 2021 to 2030 would live in countries that have NDCs without building codes and/or building energy efficiency measures

Roadmap to zero-carbon-ready buildings in developing Asia

Building sector energy intensity in selected regions under IEA SDS, 2000-2030



Source: IEA (2022) Buildings

- Global buildings EI improved at 0.5% to 1% per year since 2010
- Not enough to offset growth in building floor area, at 2.5% per year since 2010
- Globally, building EI needs to drop by at least 2.5% per year to get on track with SDS
- Compared to 2019 levels, building EIs in 2030 need to be reduced by:
  - 45% in developing Asia (excluding China)
  - 23% in Europe
  - 22% in North America
  - 31% in the world

Building sector pathway to net zero emissions by 2050 under IEA NZE scenario

Year	Total Emissions (Gt CO_2)	Building Emissions (Gt CO_2)	Recommended Action
2020	33.9	2.9	No new sales of fossil fuel boilers by 2025.
2030	21.1	1.8	All new buildings zero-carbon-ready. Universal energy access.
2035	12.8	1.2	Most appliances and cooling systems sold are best in class.
2040	6.3	0.7	50% of existing buildings retrofitted to zero-carbon-ready levels. 50% of heating demand met by heat pumps by 2045.
2050	0	0.1	More than 85% of buildings are zero-carbon-ready.

Source: IEA (2021) Net Zero by 2050 - A Roadmap for the Global Energy Sector.

- A zero-carbon-ready building is highly energy efficient and either uses renewable energy directly, or uses an energy supply that will be fully decarbonised by 2050, such as electricity or district heat.
- A zero-carbon-ready building will become a zero-carbon building by 2050, without any further changes to the building or its equipment.
- Include both operational and embodied emissions.

Roadmap to zero-carbon-ready buildings in developing Asia

New Buildings	• Develop, implement and comply with mandatory building energy codes • Adopt quantitative energy labelling of buildings and building components (voluntary to mandatory) • Introduce fiscal and administrative incentives to reward high energy performance
Existing Buildings	• Retrofit existing buildings to realise cost-effective potential of energy performance • Increase annual retrofit rate of existing stock and increase retrofit depth • Establish codes and standards to govern retrofit of existing buildings • Adopt quantitative energy labelling of existing buildings (voluntary to mandatory) • Introduce fiscal and administrative incentives to support retrofit of existing buildings
Systems & appliances	• Develop, enforce and strengthen minimum energy performance standards for appliances and equipment • Quantitative labelling of energy performance of appliances, lighting and equipment • Green procurement based on energy efficiency and/or environmental standards • Financial and administrative incentives to promote manufacturing and purchase of efficient products
Building operations	• Benchmarking, certification, and labelling of operational performance of commercial buildings • Regular energy audits of buildings with high energy consumption • Disclosure of energy performance, certificates, and/or labels (voluntary to mandatory) • Fiscal and administrative incentives to encourage efficient operation of buildings
Building materials	• Strategies to decarbonise building materials and targets for overall embodied carbon/ energy of buildings • Reduce primary material demand and use low-carbon alternative materials • Track and benchmark energy/carbon intensity of building material production • Integrate whole-lifecycle carbon thinking into planning and design processes

ADB

Relevance to ADB strategies and operations

Strategy 2030 (2018)

- **OP 3:** Increase supply- and demand-side energy efficiency to contribute to the reduction of GHG emissions and to temper the need for additional power generation.
- **OP 4:** Promote increased energy efficiency in buildings, and reduce demand for energy, thereby lessening the impact of environmental pollution.
- **OP 4:** Increase access to heating and cooling systems using renewable energy, which contributes to uplifting the poor in urban areas while reducing pollution.

Energy Policy 2021 (2021)

- Support the construction, expansion, efficiency improvement, and rehabilitation of district heating networks
- Promote clean and efficient heating supply solutions, in particular heat pumps
- Promote clean and efficient cooling solutions, such as renewable energy based, energy efficient, and thermally driven technologies and systems

Urban Sector Directional Guide (2022)

- Clean and low-carbon urban energy is one of the 18 development solutions
- Urban renewable energy applications, sustainable cooling, clean and efficient heating, digitalization and smart controls in built environment

Climate Change Action Plan (2023)

- Decarbonization of buildings is identified as a mitigation priority for enhanced actions in supporting ADB DMCs to implement their NDCs and contributing to ADB's ambition of delivering $ 100 billion climate finance by 2030.

Relevance to ADB strategies and operations

- Increasing recognition of the importance of supporting DMCs with developing energy efficient and low-carbon buildings
- Strengthen **upstream engagement** with governments to integrate the buildings and construction sector as a prioritized intervention area into CPS
- Recognize and factor in the substantial **heterogeneity** across DMCs in terms of building stock characteristics, economic development, level of urbanization, building energy efficiency market maturity, endowment of renewable resources, access to finance and technologies, institutional capacity, policy environment and priorities, etc.
- Take a **differentiated approach** to design targeted interventions to support DMCs' ambitions and actions relating to decarbonizing buildings.
- Appropriate "**grouping**" of countries in the same climatic zone and facing highly similar issues and opportunities for their buildings and construction sector to deliver results at scale with high effectiveness and efficiency
- Develop a strong pipeline of sizeable programs and projects with **transformative impact** on the sectoral decarbonization in DMCs.

Thank you!