International Energy Agency

Promoting a Peak in the Carbon Emissions of the Building Sector

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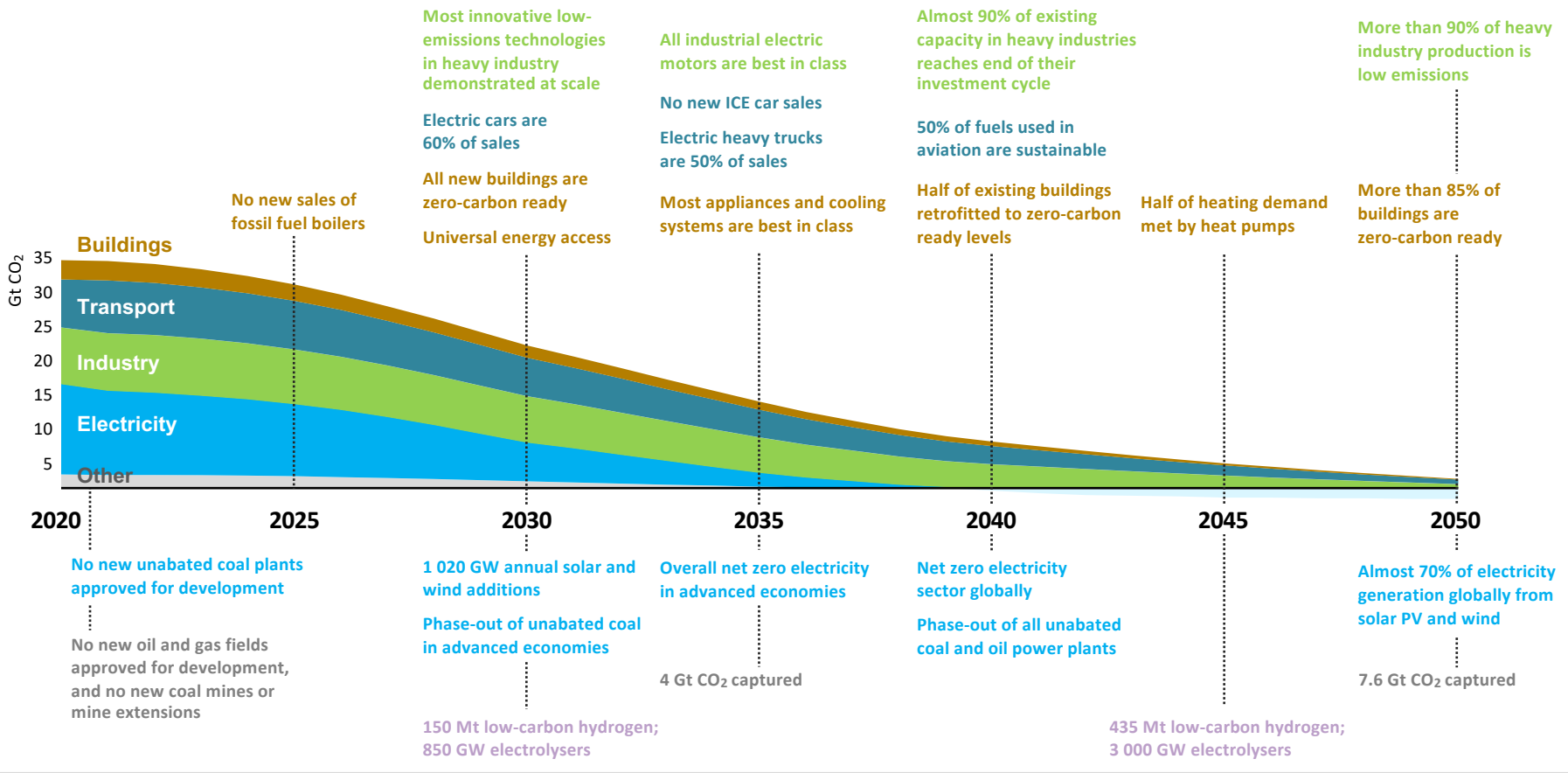
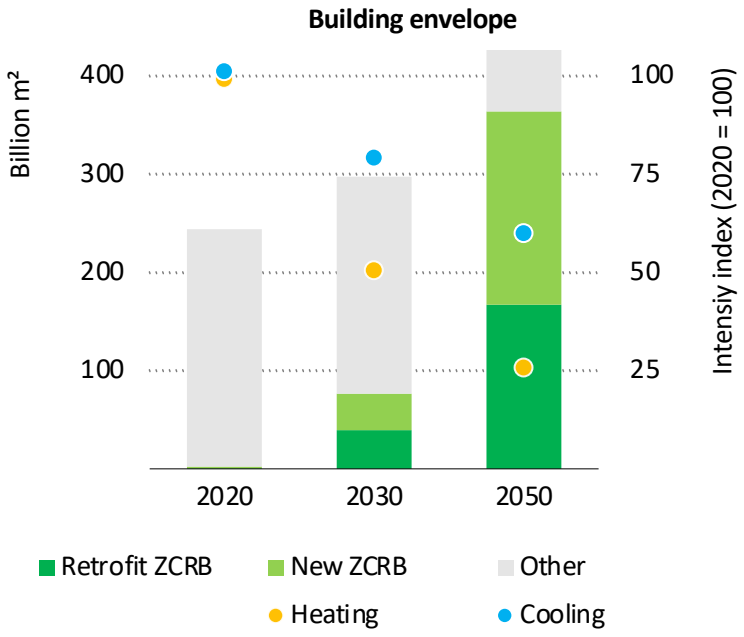
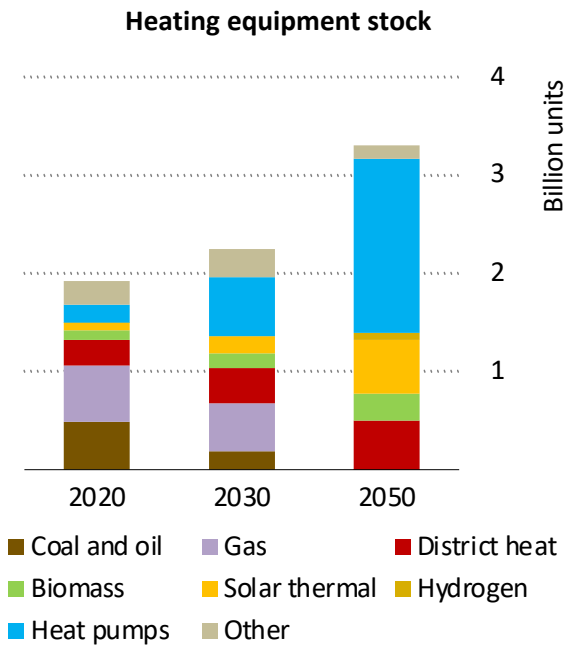
20 October 2021

Set near-term milestones to get on track for long-term targets



Global building envelopes and heating/cooling equipment in NZE

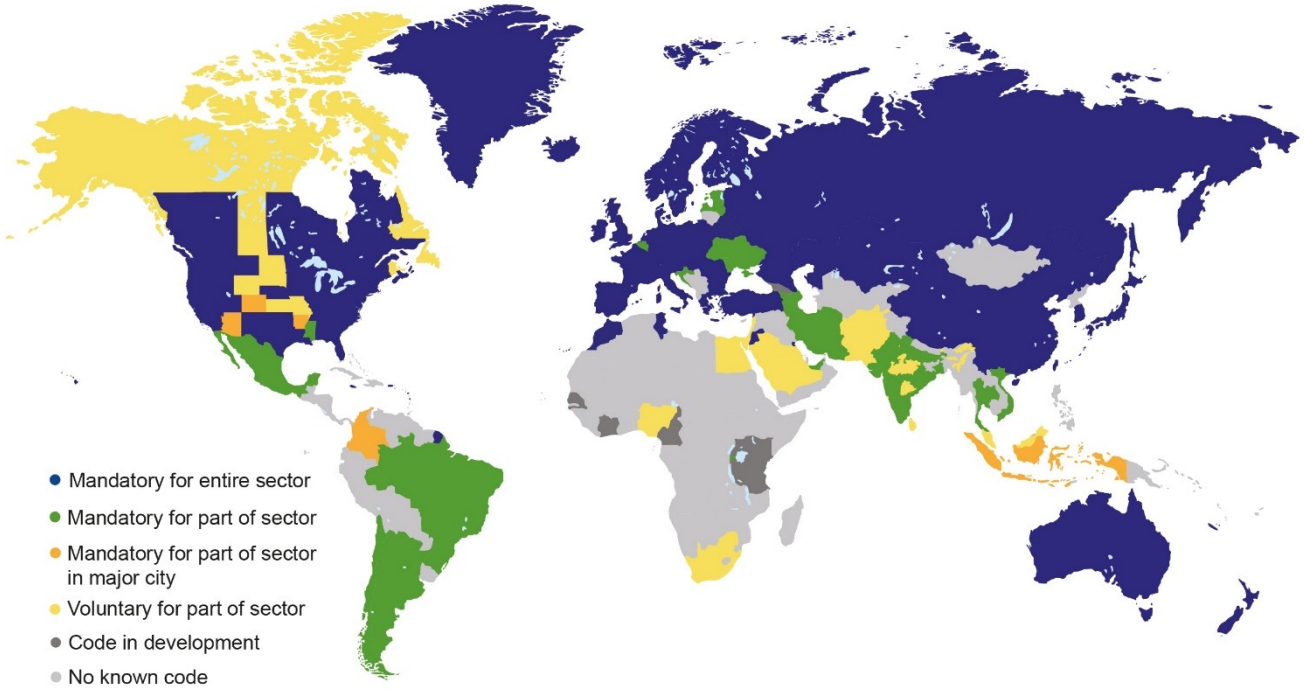




Source: (IEA) Net zero by 2050

By 2050, over 85% of buildings are zero-carbon ready, reducing average useful heating intensity by 75%, with heat pumps meeting over half of heating needs

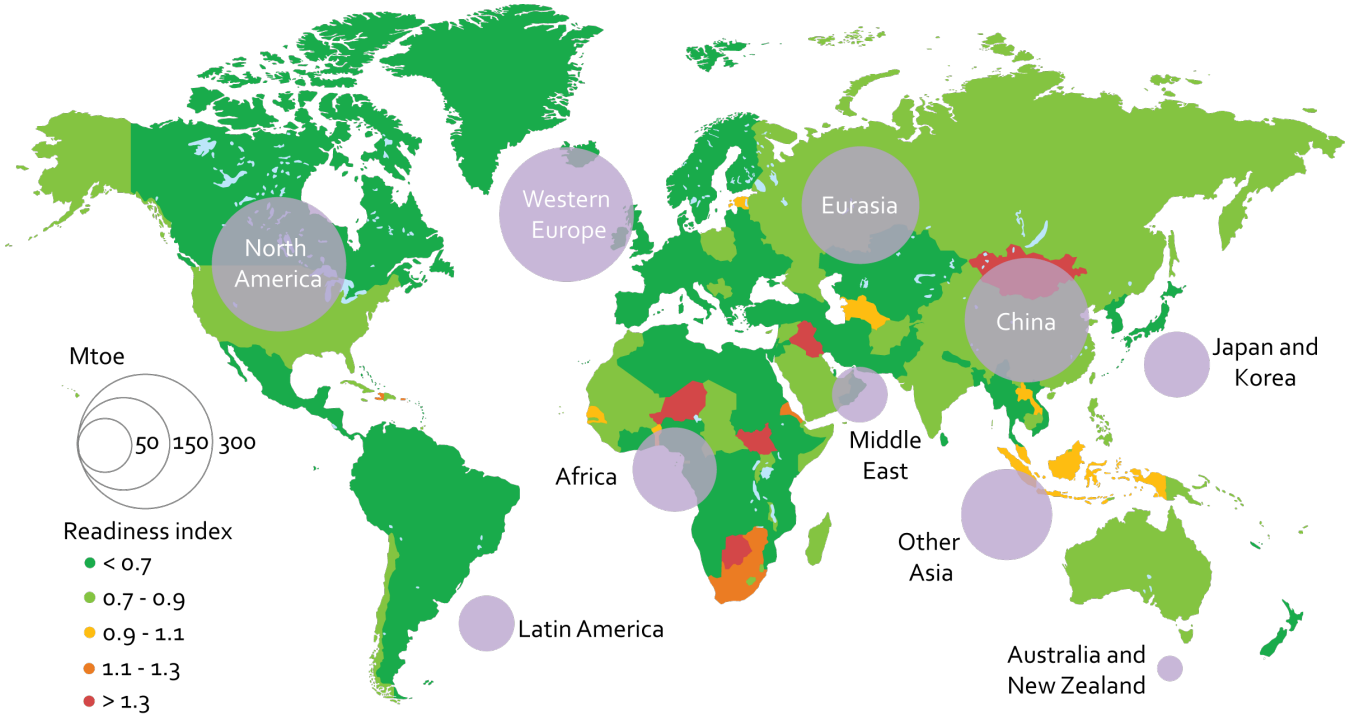
Building energy codes are key policy instruments for buildings



This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.

Primarily for new buildings, 78 countries have mandatory or voluntary energy codes. Future development will see these codes include requirements to be nearly zero energy buildings (nZEB)

Electric heat pumps will reduce emissions in nearly all countries



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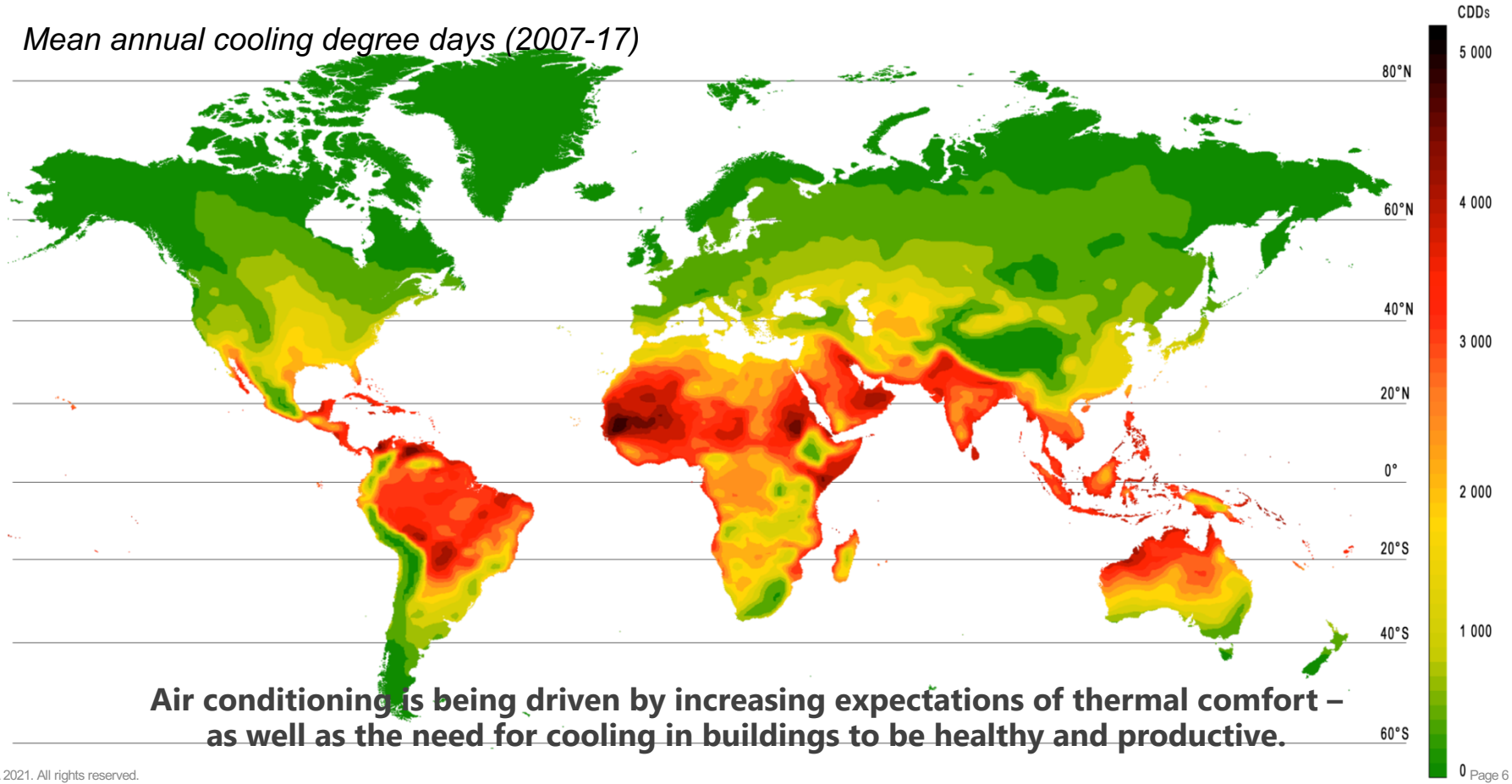
Heat pumps are significantly more efficient than fossil fuel boilers.
Even with current generating mix, electric heat pumps will lower emissions.

Keeping cool is a growing need

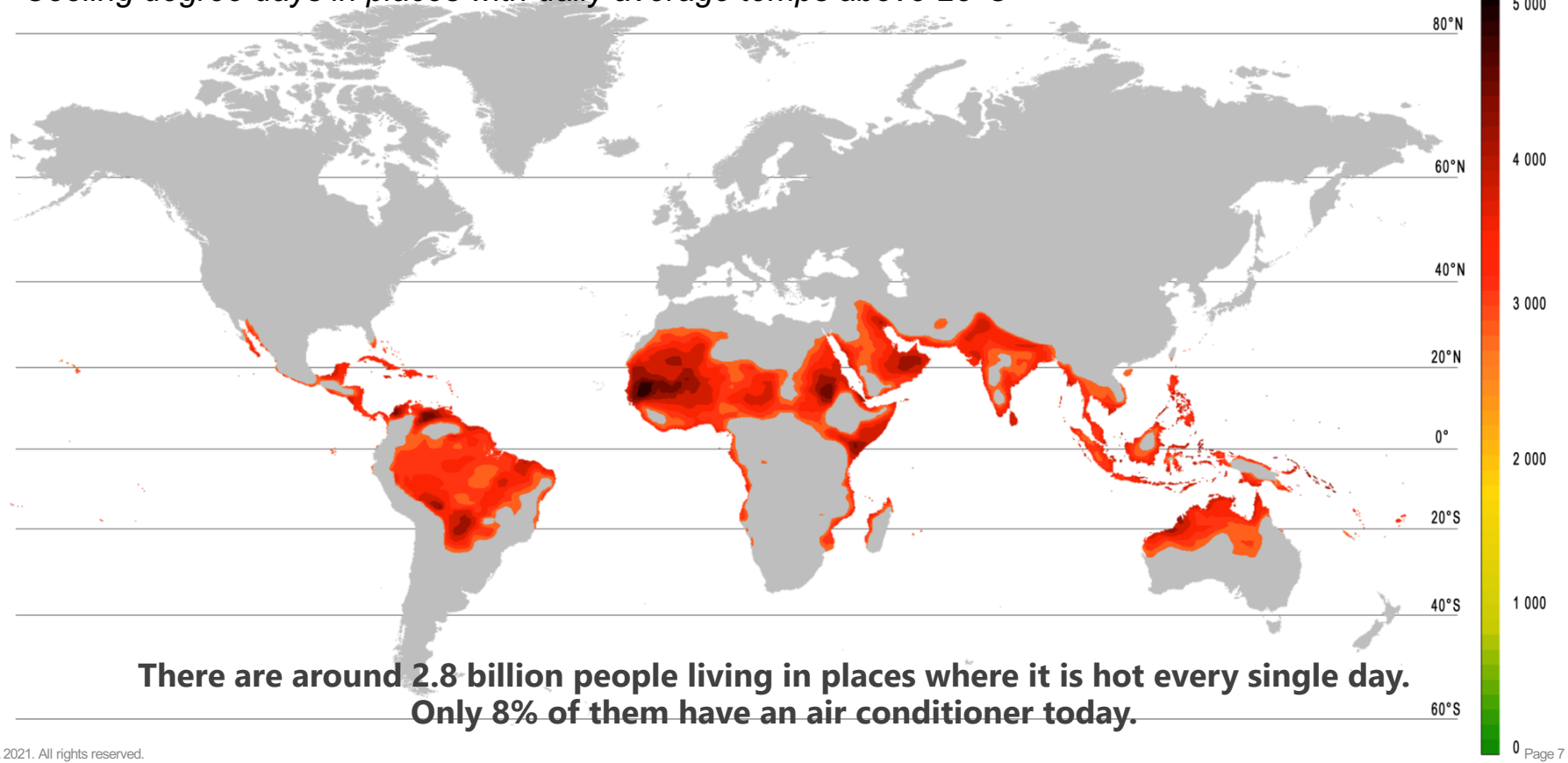
Mean annual cooling degree days (2007-17)



Air conditioning is being driven by increasing expectations of thermal comfort – as well as the need for cooling in buildings to be healthy and productive.

Access to cooling is a critical issue in some of the hottest places

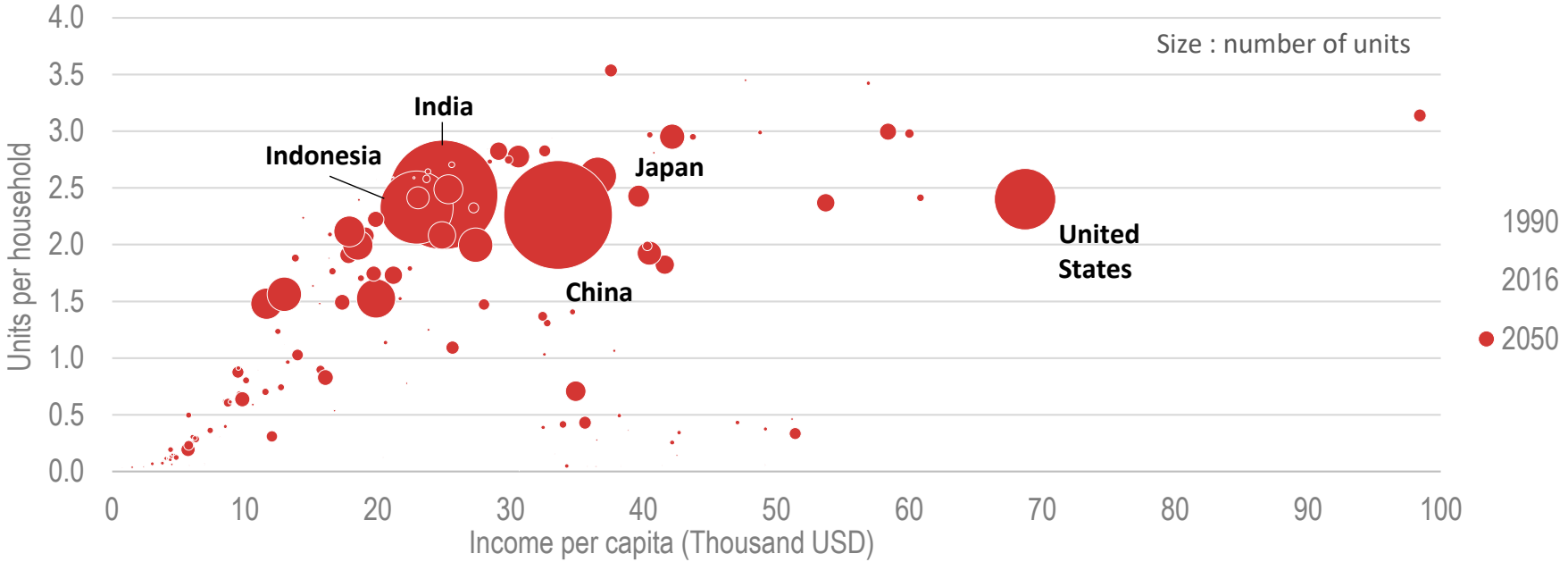
Cooling degree days in places with daily average temps above 25°C



There are around 2.8 billion people living in places where it is hot every single day.
Only 8% of them have an air conditioner today.

AC ownership is expected to soar

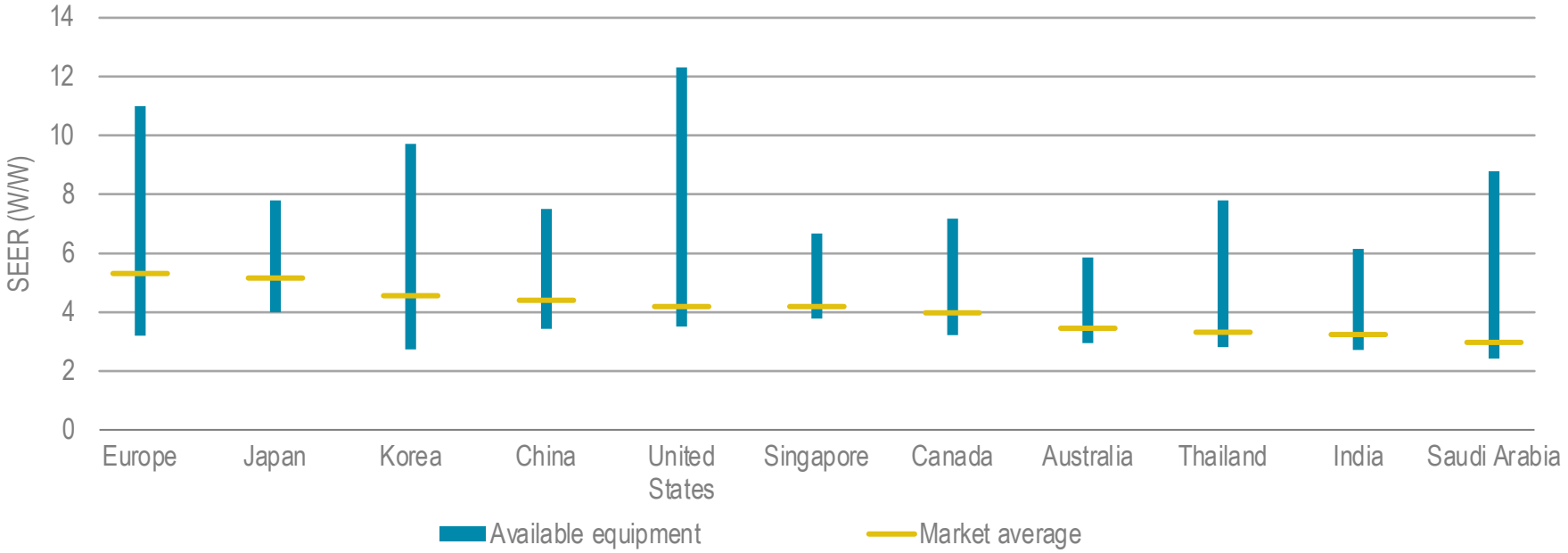
Evolution of global air conditioner ownership



By 2050, around 2/3 of the world's households could have an air conditioner. China, India and Indonesia will account for half of all AC units in buildings in 2050.

Markets are not keeping up with energy efficiency potential

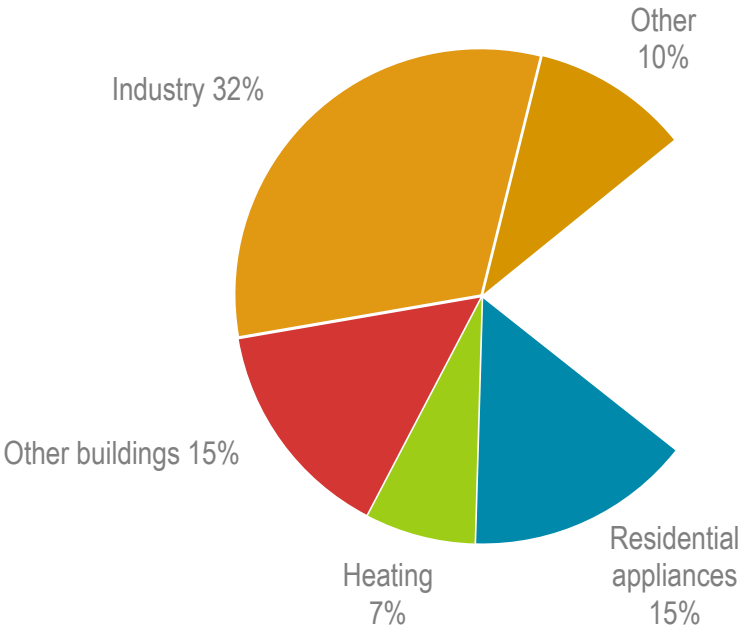
Energy performance of air conditioners already available in markets today



The average efficiency of air conditioners sold today is less than half of what is typically available on shelves – and one third of best available technology.

Cooling is outpacing all other energy end-uses in buildings

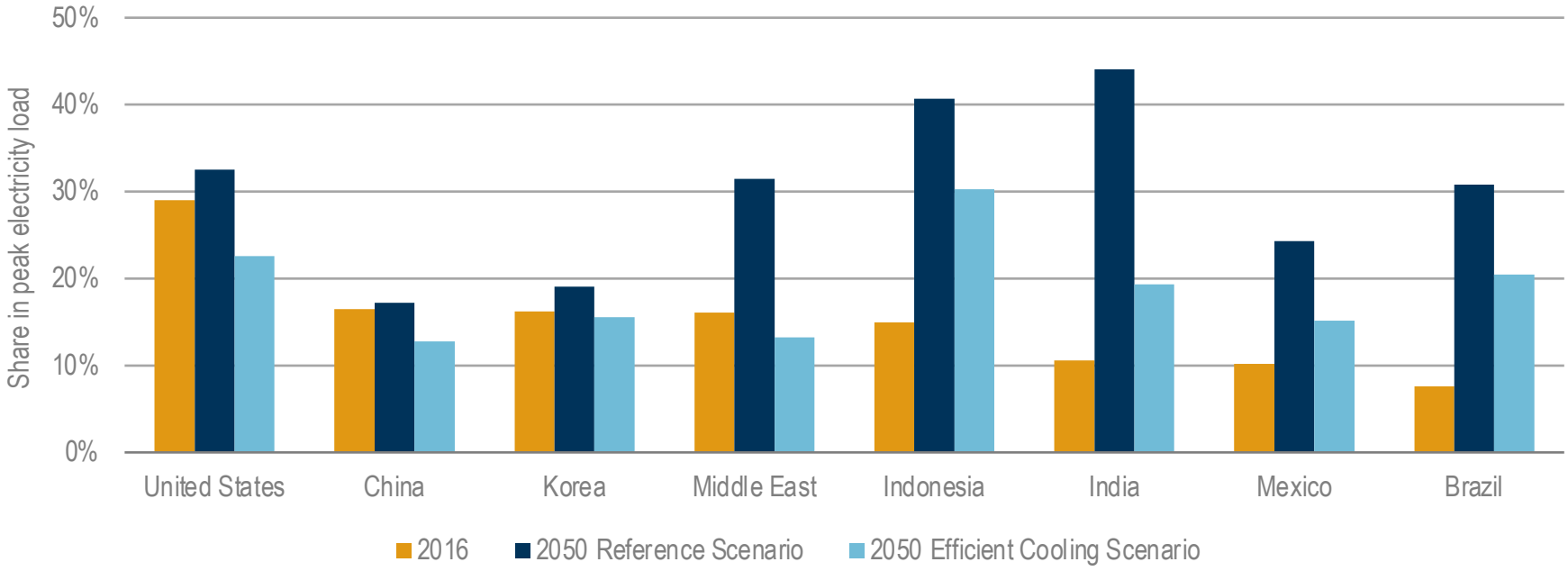
Share of final electricity demand growth to 2050



Without action to address energy efficiency, energy demand for space cooling will consume nearly 40% of electricity growth in buildings and more than 20% of global electricity growth.

Cooling demand has serious implications for grids

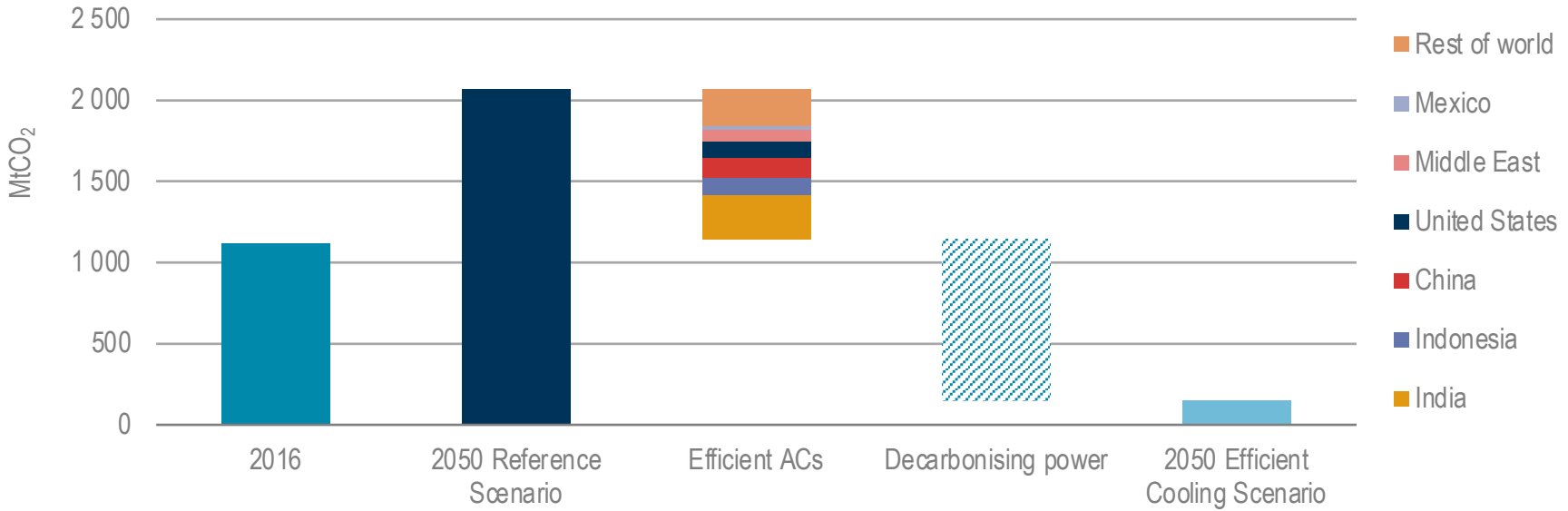
Share of cooling in electricity system peak loads



Efficient air conditioners can help to dampen the impact on the power system.

More efficient ACs will help cut emissions

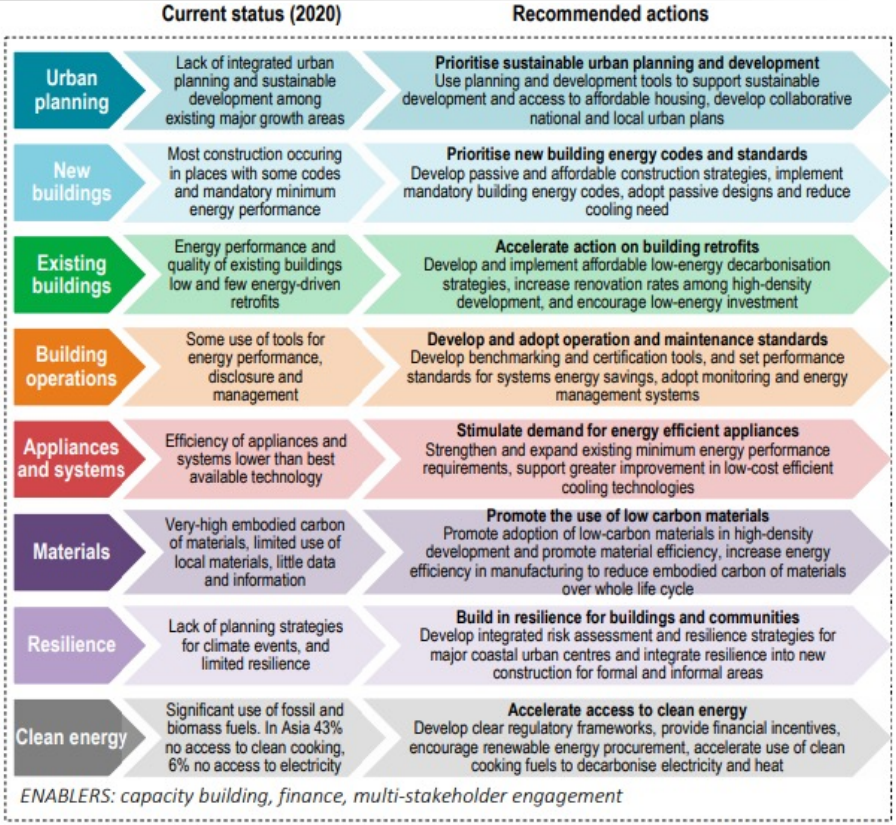
Contribution of more efficient space cooling on CO_2 emissions



More efficient ACs cut CO_2 emissions from space cooling in half.
Efficiency also helps enable cleaner power – drastically reducing cooling-related emissions.

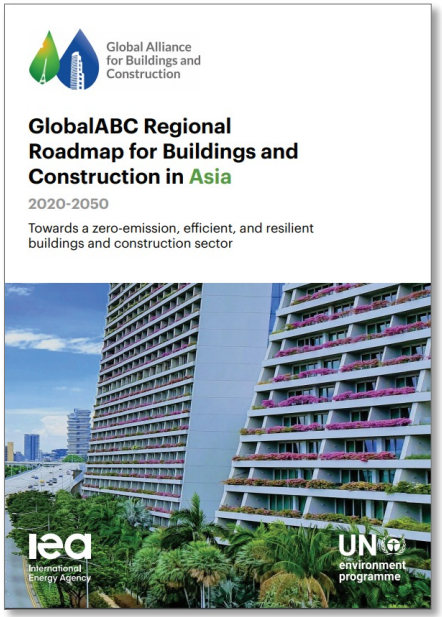
GlobalABC Regional Roadmaps for Buildings and Construction

- 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*

Building on the Regional Roadmap for Asia



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

Conclusions

- China's impressive economic growth story has lifted hundreds of millions of people out of energy poverty. China today is the world's largest producer and consumer of energy, as well as its largest emitter of CO_2.
- China's carbon neutrality pledge demands an energy system transformation that results in growth for clean energy in the coming decades similar to what fossil fuels experienced over the past two decades.
- China's clean energy efforts have brought down costs of many efficient and low-carbon technologies.
- An accelerated transition can lead to a CO_2 emissions peak by the mid-2020s and a 20% reduction by 2030; it would make the transition more orderly and result in almost 1 million net additional jobs by 2030.
- Decarbonising buildings and construction and making building services as efficient as possible play an essential role in the transition.
- Digitalisation and advanced buildings controls now mean that buildings can become a flexible resource and an integral part of the energy system.
- Investing in buildings energy efficiency at the pace and scale needed is still a major challenge.