



# Energy Technology Perspectives: Transitions to Sustainable Buildings

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# Global buildings status report

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## Tracking Clean Energy Progress 2017



Buildings



**Recommendation for 2017:** Countries can take immediate action to put forward commitments for low-carbon and energy-efficient buildings to implement their NDCs as a first step and a clear signal to scale up actions across the global buildings sector.



Building envelopes



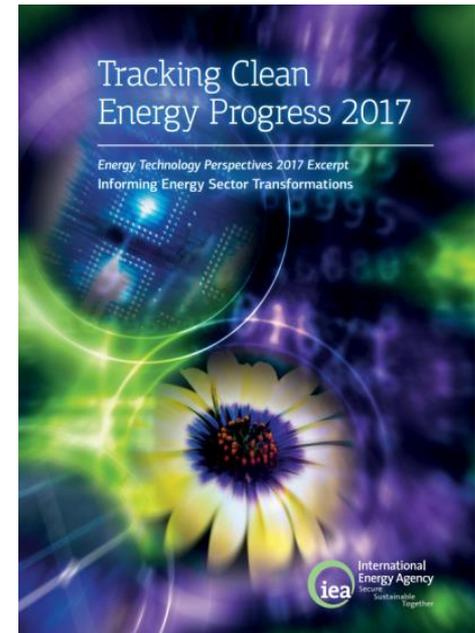
**Recommendation for 2017:** Global cooperation should seek to ensure that all countries implement and enforce building energy codes and standards for both new and existing buildings, with improvement in enforcement and verification of codes and standards to overcome barriers to their implementation.



Lighting, appliances and equipment



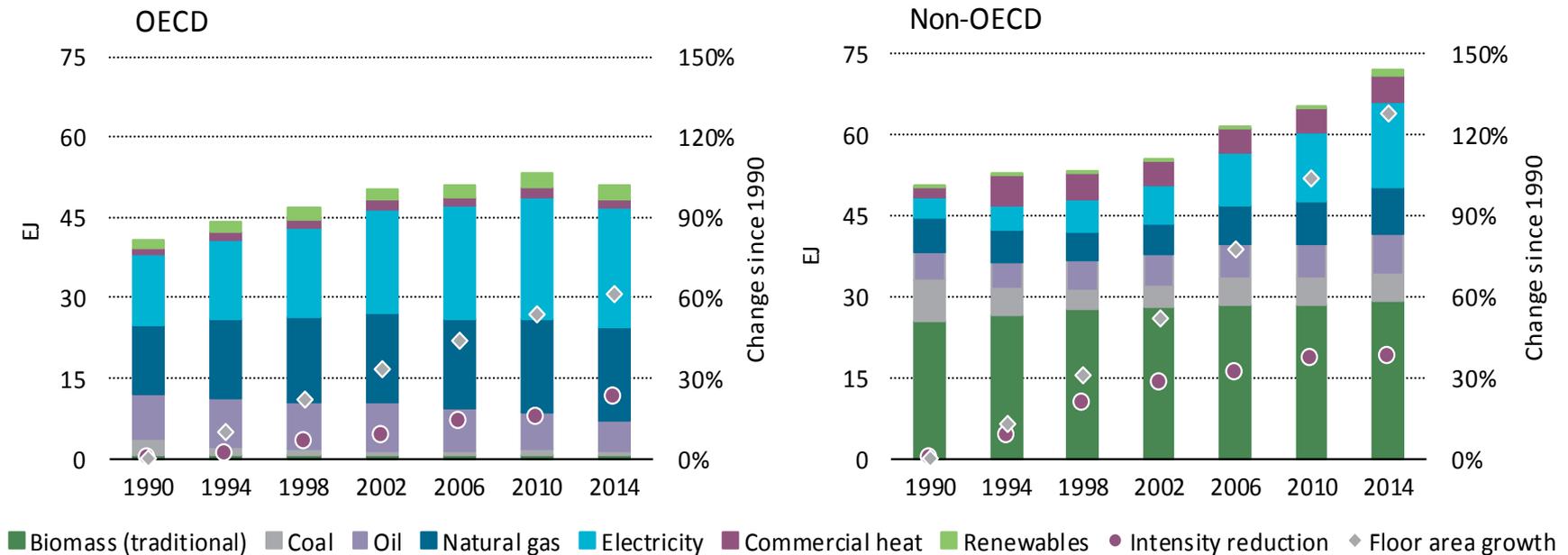
**Recommendation for 2017:** Countries should seize on momentum under the recent Kigali Agreement to rapidly move global markets for cooling equipment to much higher energy performances.



**Despite some positive developments in the last two years, more assertive action is still needed to put the global buildings sector on track.**

# Building energy intensity is not dropping fast enough

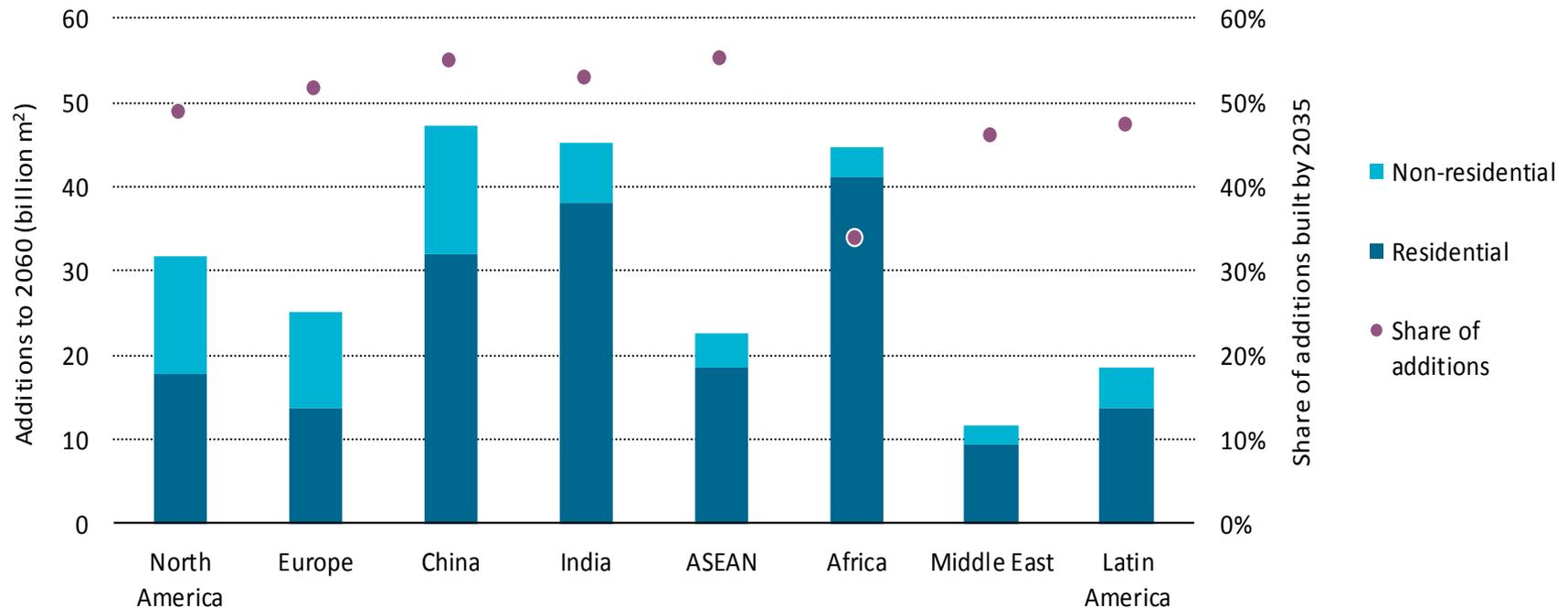
## Building energy use and intensity per m<sup>2</sup> since 1990



**Global building energy intensity per m<sup>2</sup> improved at roughly 1.5% per year since 1990, but this was not enough to offset strong growth in buildings sector floor area at nearly 3% per year.**

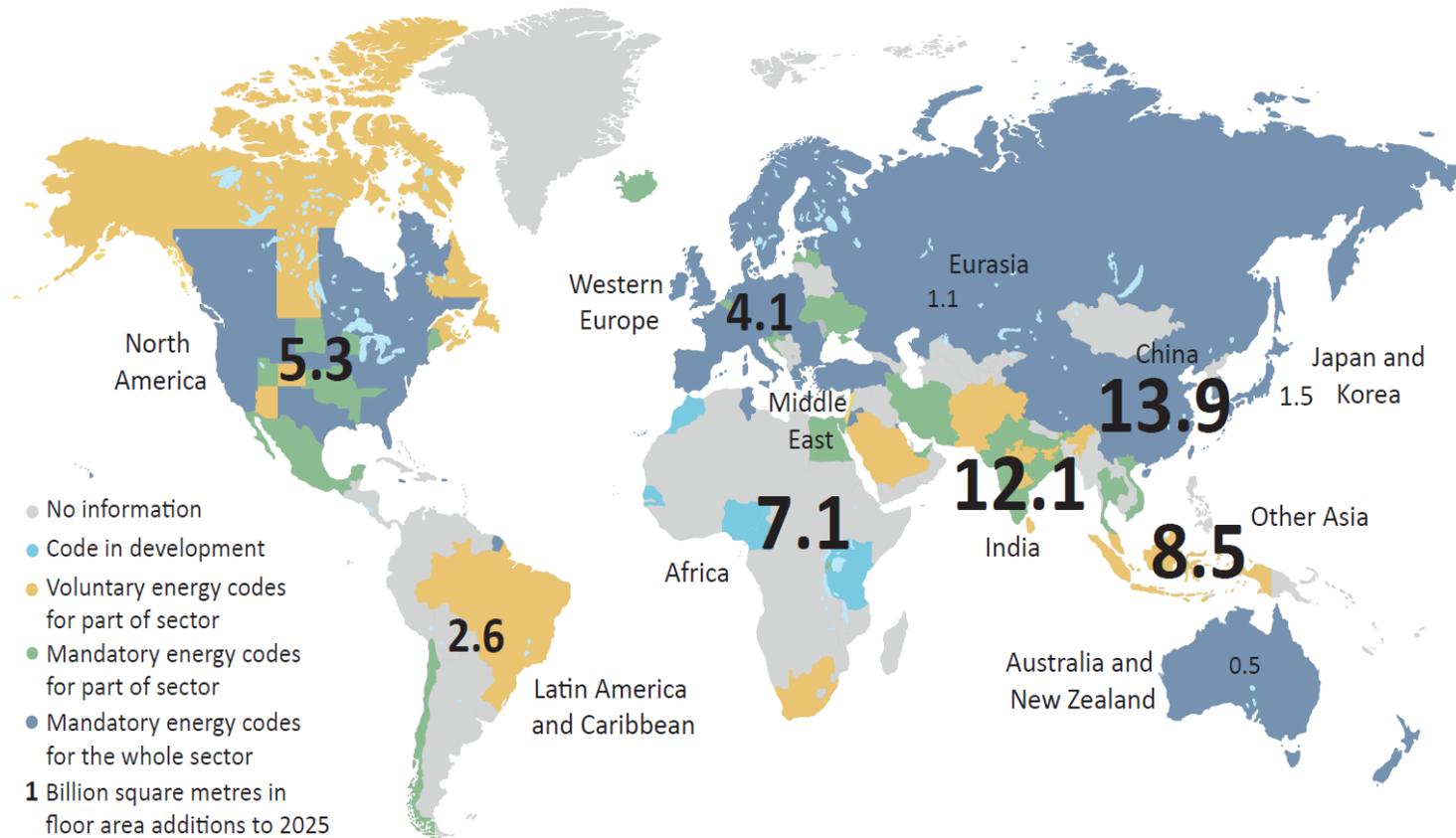
# Floor area will increase sharply over the next 20 years...

## Floor area additions to 2060 by key regions



**Floor area additions to 2060 will largely occur in developing countries. Half of global building additions will be completed by 2035.**

## Building energy code coverage, 2015



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.

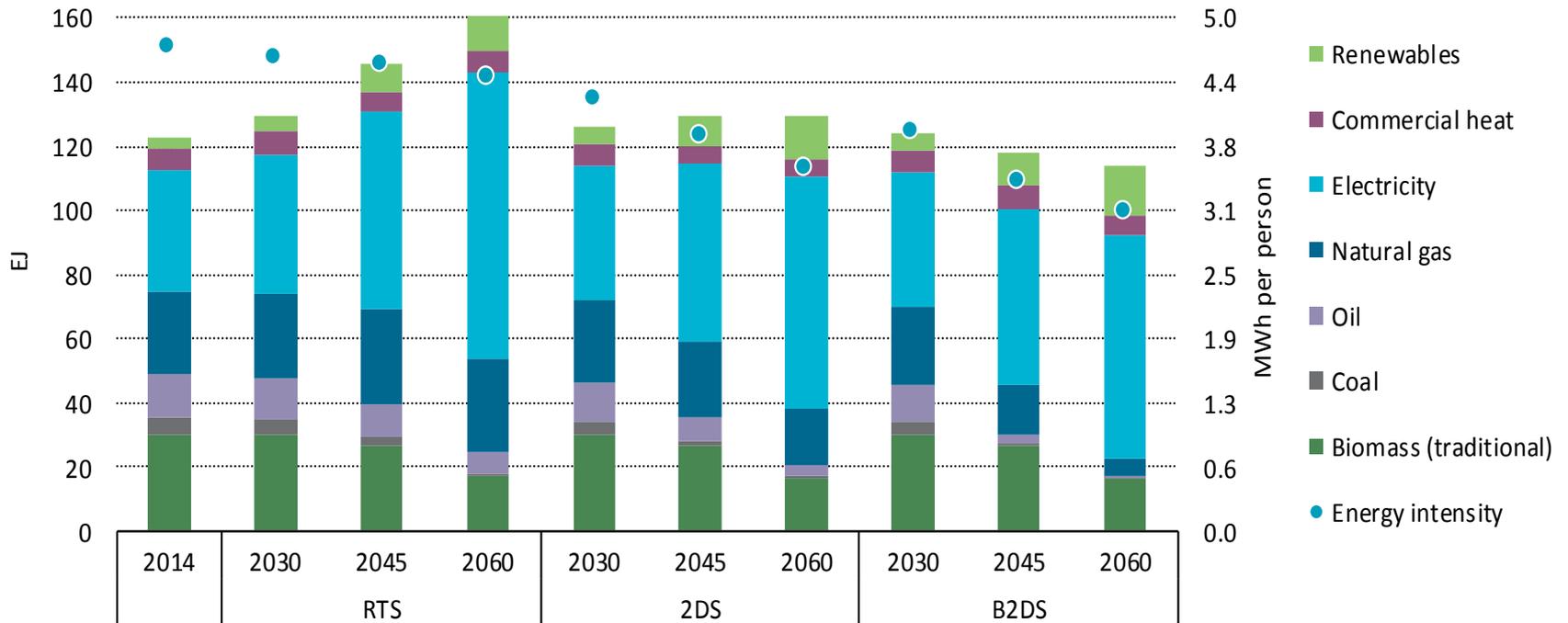
**Swift action is needed to address building envelope performance over the next 20 years to avoid the lock-in of energy-intensive building investments, especially in developing regions.**

# Forging a pathway to sustainable buildings

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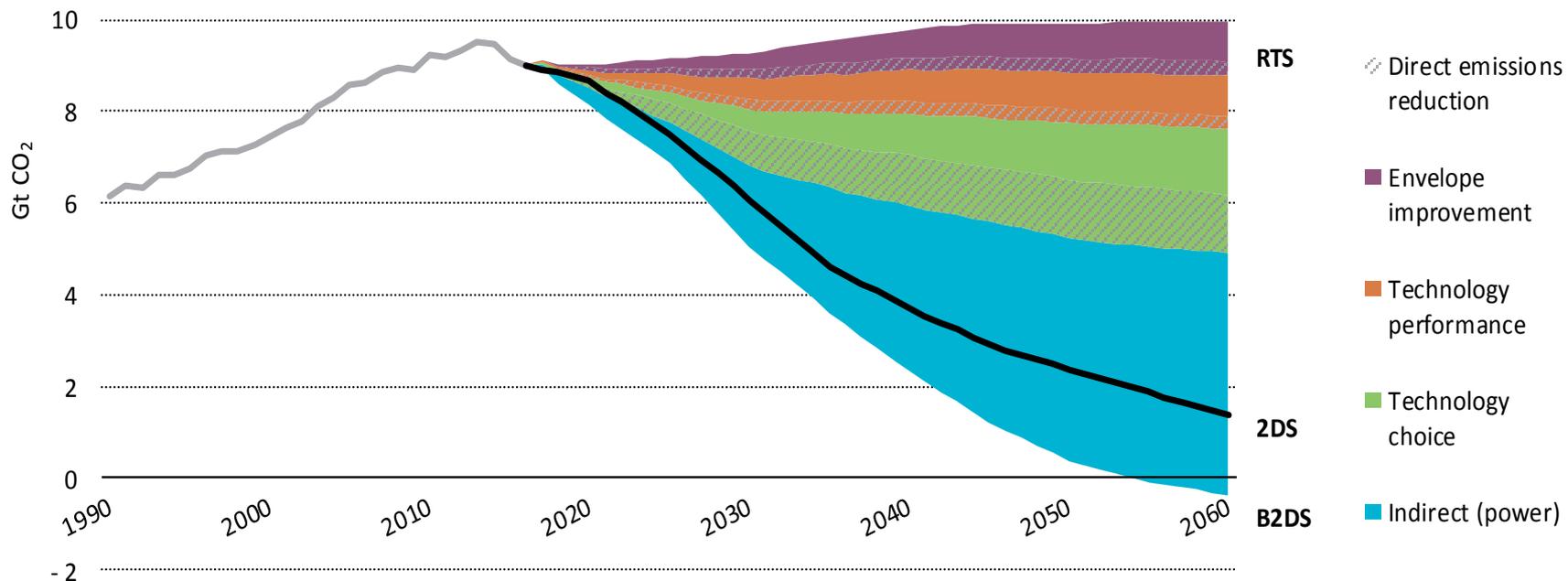


## Buildings final energy consumption by scenario and fuel type



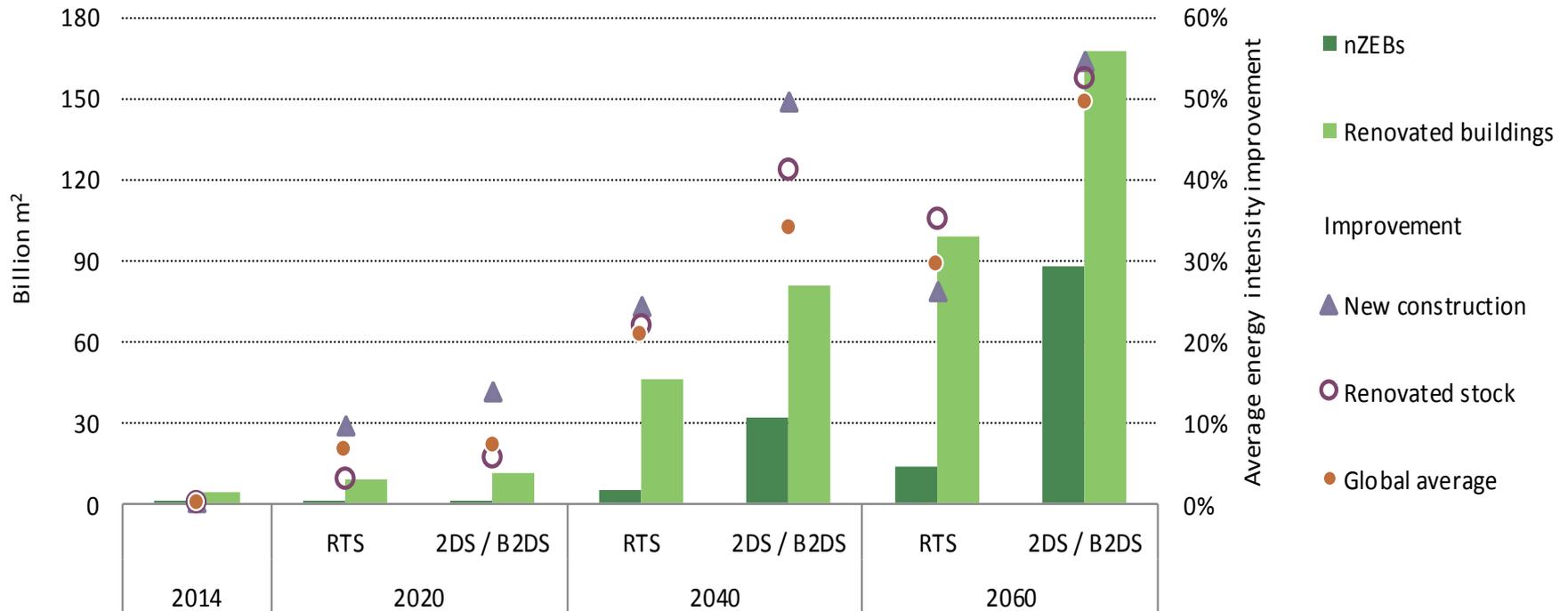
**Going from RTS to B2DS would save the equivalent of twice global energy production in 2014.**

## Key contributions to CO<sub>2</sub> emissions reduction in buildings



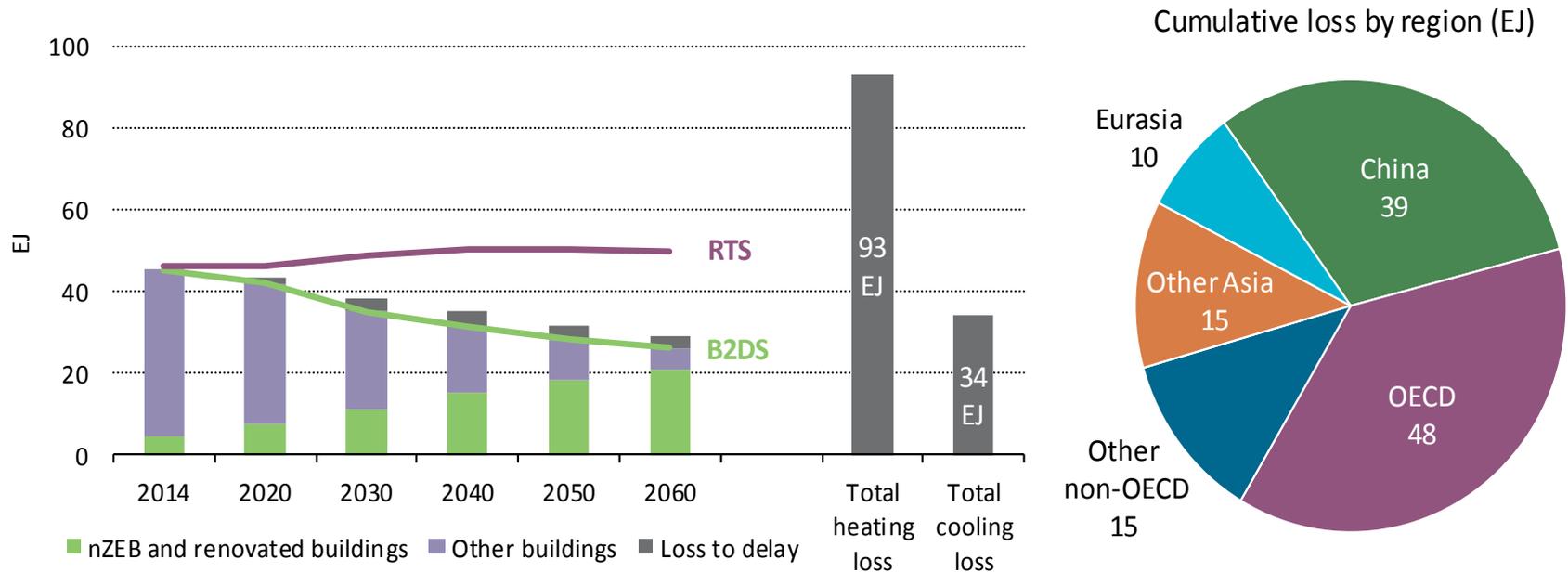
**More than 50% of cumulative CO<sub>2</sub> emissions reduction in buildings to 2060 under the B2DS results from shifts to low-carbon and high-performance technologies.**

## Changes in global residential building stock and energy intensity to 2060



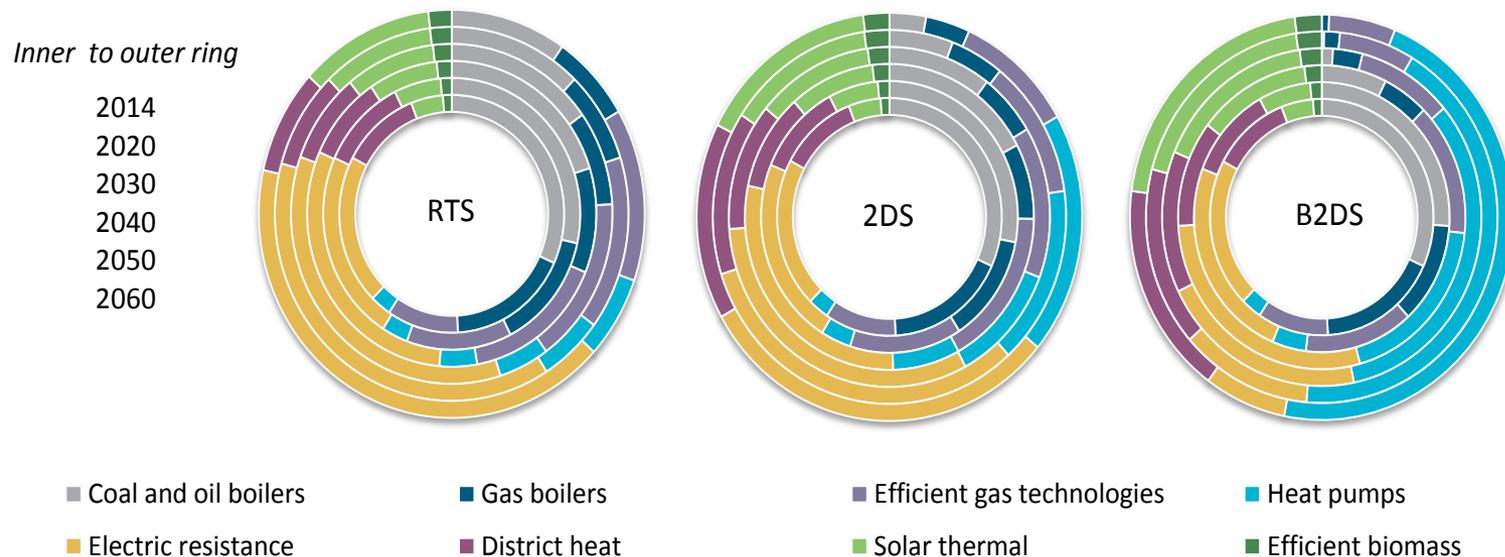
**High-performance building construction and deep energy renovations of existing buildings play a critical role in reducing buildings sector energy demand.**

## Consequences of a ten-year delay in achieving building envelope objectives



**Delaying implementation and enforcement of building envelope measures would result in the equivalent of three years of additional energy consumption for heating and cooling in the buildings sector.**

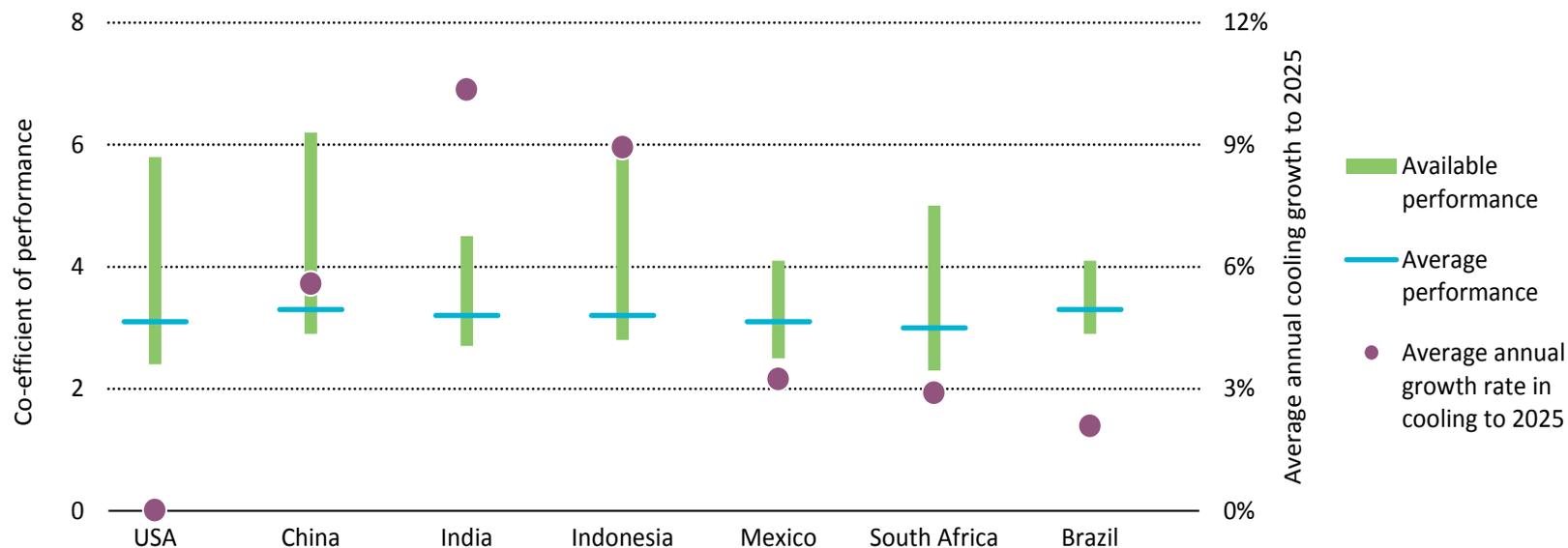
## Evolution of heating equipment in buildings to 2060



**The B2DS represents a strategic shift away from fossil fuel equipment to high-efficiency and renewable technologies, such as heat pumps, solar thermal and modern district energy.**

# Cooling sales aren't keeping up with performance potential

## Typical energy efficiency ratios of split-package air conditioners in 2015



**Cooling demand could increase as much as tenfold in some countries over the next 40 years, and average equipment performance is far from its energy efficiency potential.**

# A call to action

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## *Whole building*

- High-performance envelope components and whole building packages
- nZEB(+) building construction across all countries
- Low-cost deep energy renovation solutions
- Zero-carbon building energy communities

## *Heating and cooling equipment*

- Improved thermal distribution and control
- High-performance heat pumps and solar thermal solutions
- Responsive and affordable thermal energy storage
- Integrated, flexible district energy solutions

## *Lighting and appliances*

- High-performance, lower cost solid state lighting
- Integrated design and control for lighting service
- High-efficiency appliance technologies
- Performance standards for plug loads and smarter use of connected devices

## *Cooking and energy access*

- Clean, affordable cooking solutions for developing countries
- Low-cost solar thermal and storage solutions
- Efficient, low-polluting biomass solutions

## *Building construction & renovation*

- Mandatory building energy codes for new *and* existing buildings
- Capacity building and training
- Financing schemes and market incentives
- Cooperation and knowledge sharing

## *Transition to zero-carbon buildings*

- Long-term, strategic vision for energy transition
- Phase-out of fossil fuel subsidies and other perverse incentives
- Assertive market frameworks
- Integrated, flexible district energy solutions

## *Rapid energy efficiency deployment*

- Minimum energy performance standards
- Labelling and awareness programmes
- Financing schemes and market incentives
- Support for market scale (e.g. bulk procurement)

## *Technology innovation*

- Supporting R&D beyond current BAT
- Cost reductions for critical technologies
- Integrated energy technology solutions
- Advances in clean energy technologies



**Thank you!**

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