



Bureau of Energy Efficiency



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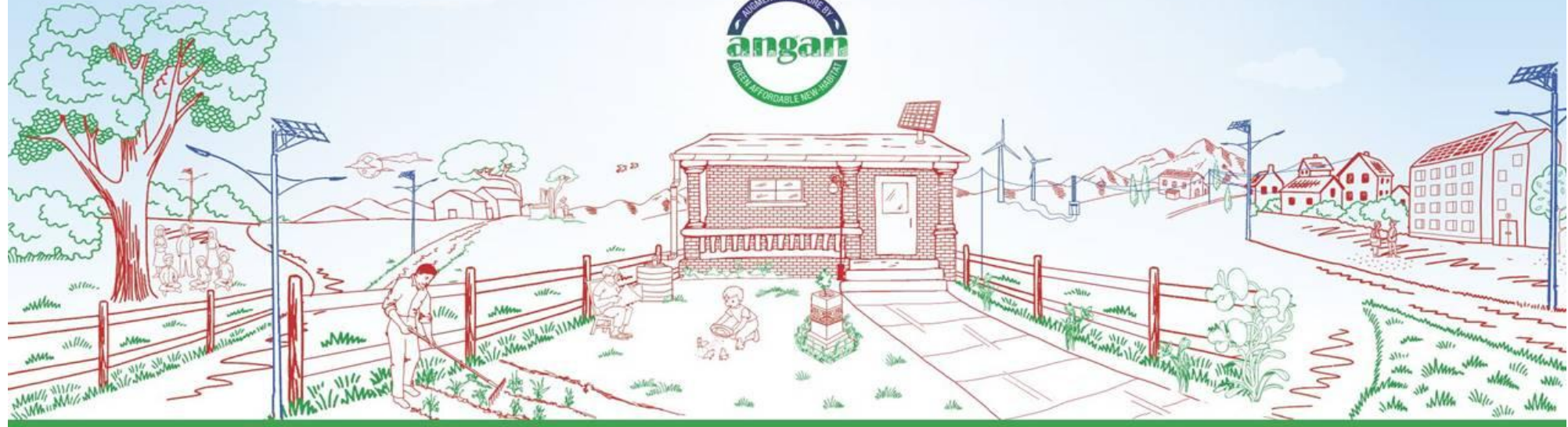
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Augmenting Nature by Green Affordable New-habitat

A Courtyard for Revolutionary Change in Building Energy Efficiency

An International Conference on Building Energy Efficiency

9th-11th September, 2019 | Hotel The LaLiT, New Delhi





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THIS PRESENTATION WAS SHARED BY

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FOR THE SESSION:

“Circular Economy”

DURING ANGAN 2019

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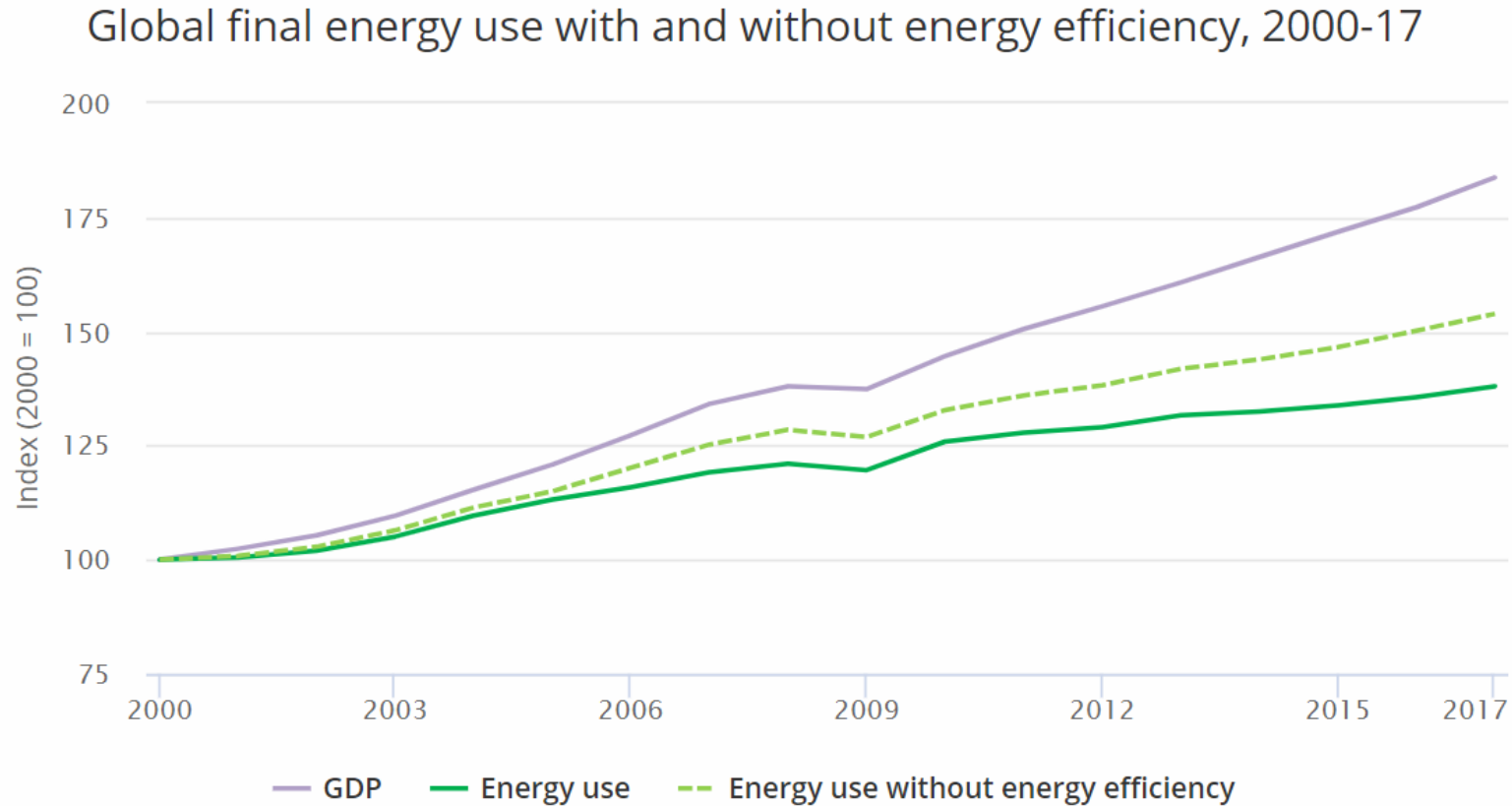
lead

The Role of Buildings in Clean Energy Transitions

Siddharth Singh, Lead Country Analyst and Coordinator - India (Consultant)

September 2019

Energy efficiency works



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Globally, efficiency gains since 2000 prevented 12% more energy use than would have otherwise been the case in 2017.

Efficiency brings benefits to all levels of the economy

USD 700 billion

Avoided energy imports in the EU, China and India

USD 600 billion

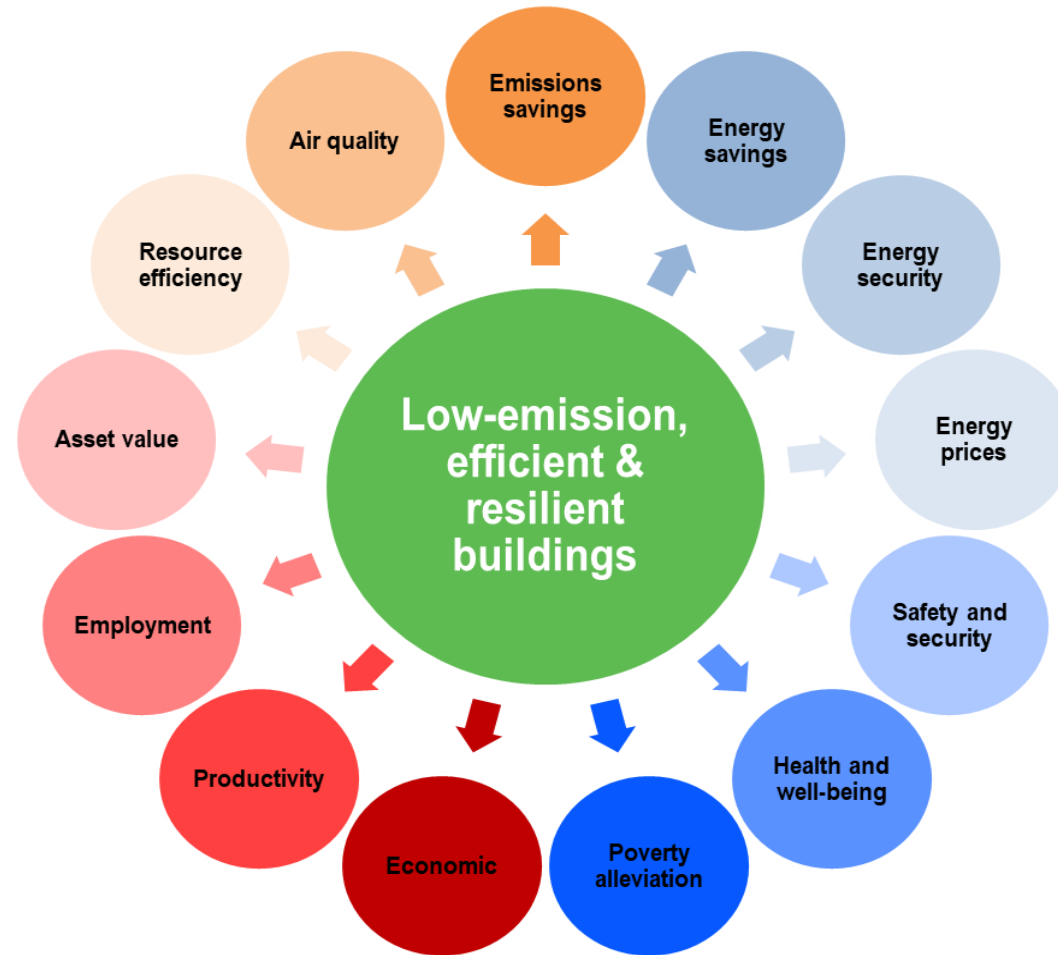
Avoided energy expenditure in industry

USD 550 billion

Avoided household energy spending

The Efficient World Scenario also fully delivers the energy efficiency target (Target 7.3) of the UN Sustainable Development Goals

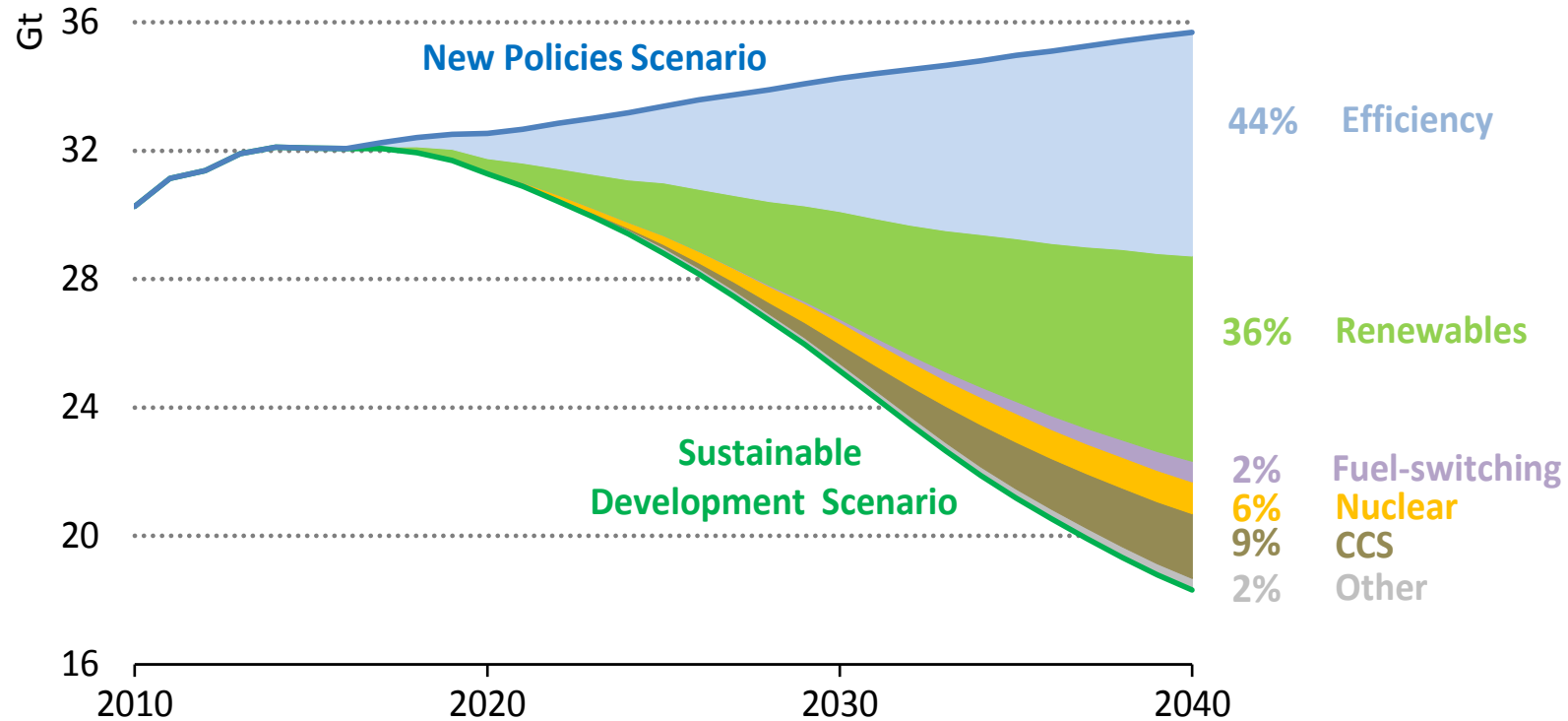
Multiple benefits



Improving energy efficiency of buildings can contribute to a range of policy objectives

The role of energy efficiency in global CO₂ emission reductions

Global CO₂ emissions reductions in the New Policies and Sustainable Development Scenarios

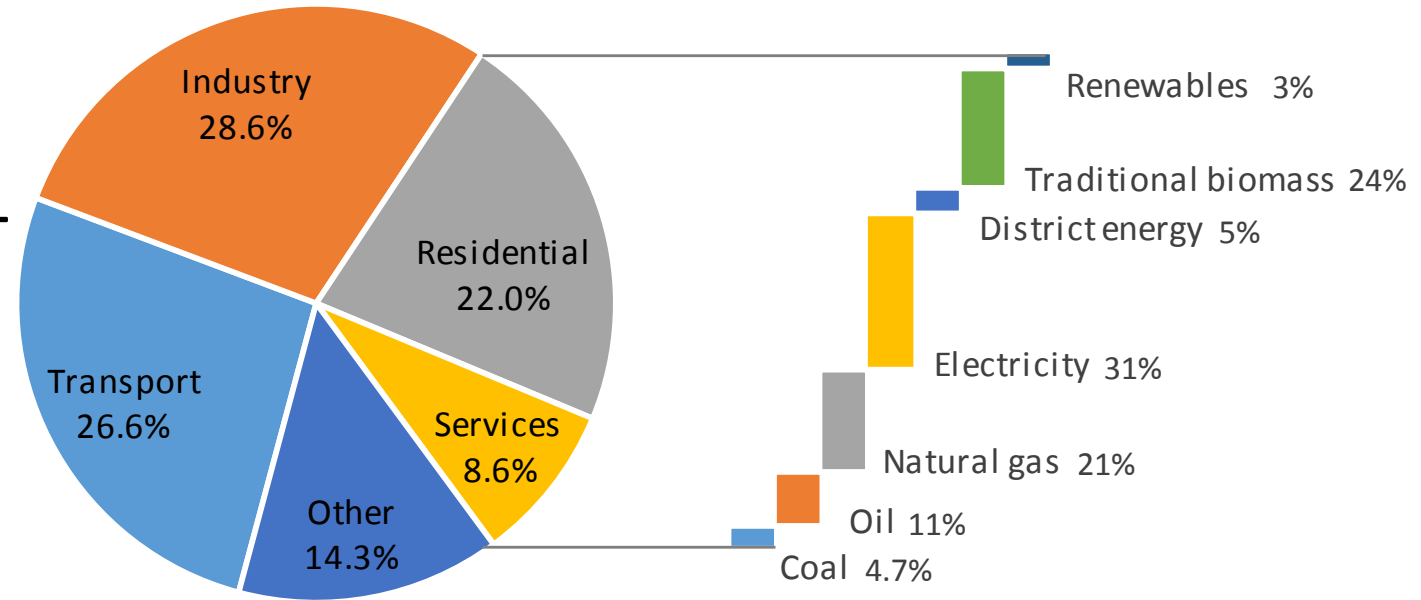


The IEA's World Energy Outlook 2017 provides the context for the role of energy efficiency in the Sustainable Development Scenario

Building energy use: globally

- over 30% of global final energy demand
- 55% of global electricity use,
- more than a quarter of energy-related CO₂ emissions,
- two-thirds of halocarbon,
- and 25–33% of black carbon emissions (GEA 2012)

Buildings account for...

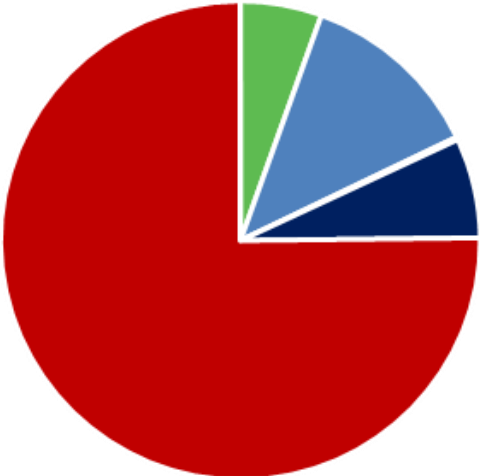


Building energy use plays a large role in the global energy system.

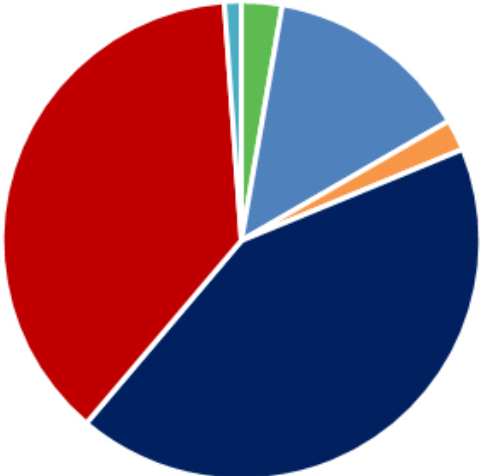
Building energy use: India

Share of total final energy consumption by source

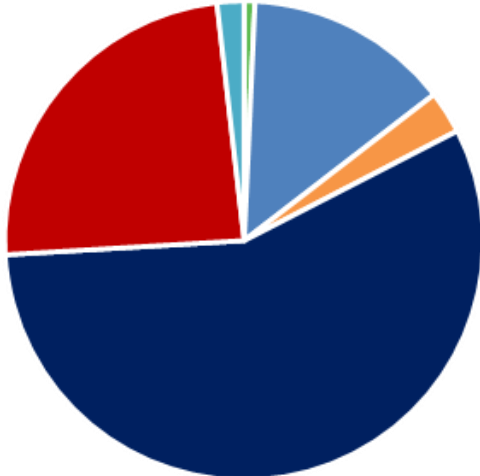
Share of energy sources (2020)



Share of energy sources (2035)



Share of energy sources (2050)

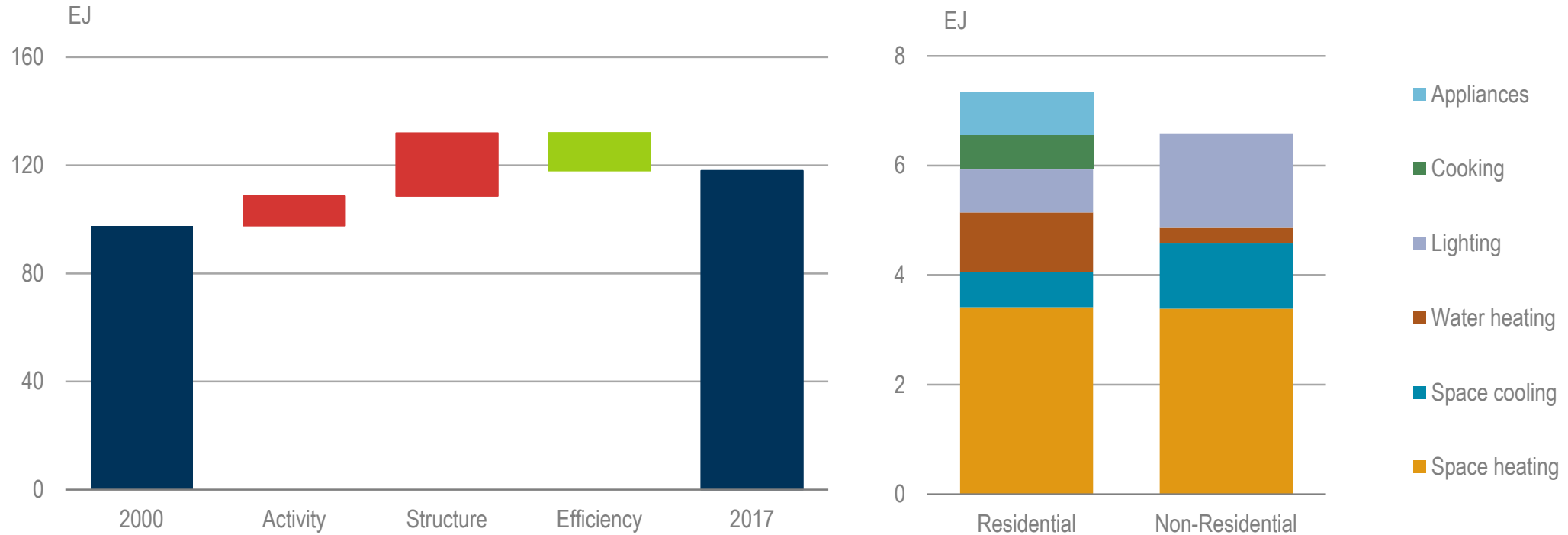


■ Coal ■ Oil ■ Natural Gas ■ Electricity ■ Biomass ■ Solar

Buildings energy demand is set to will increase more than double over the coming decades, with an increased demand for electricity (approximately 4.5 times).

Buildings sector energy use

Decomposition of buildings global final energy use, 2000-17 (left) and end-use contribution to efficiency savings (right)

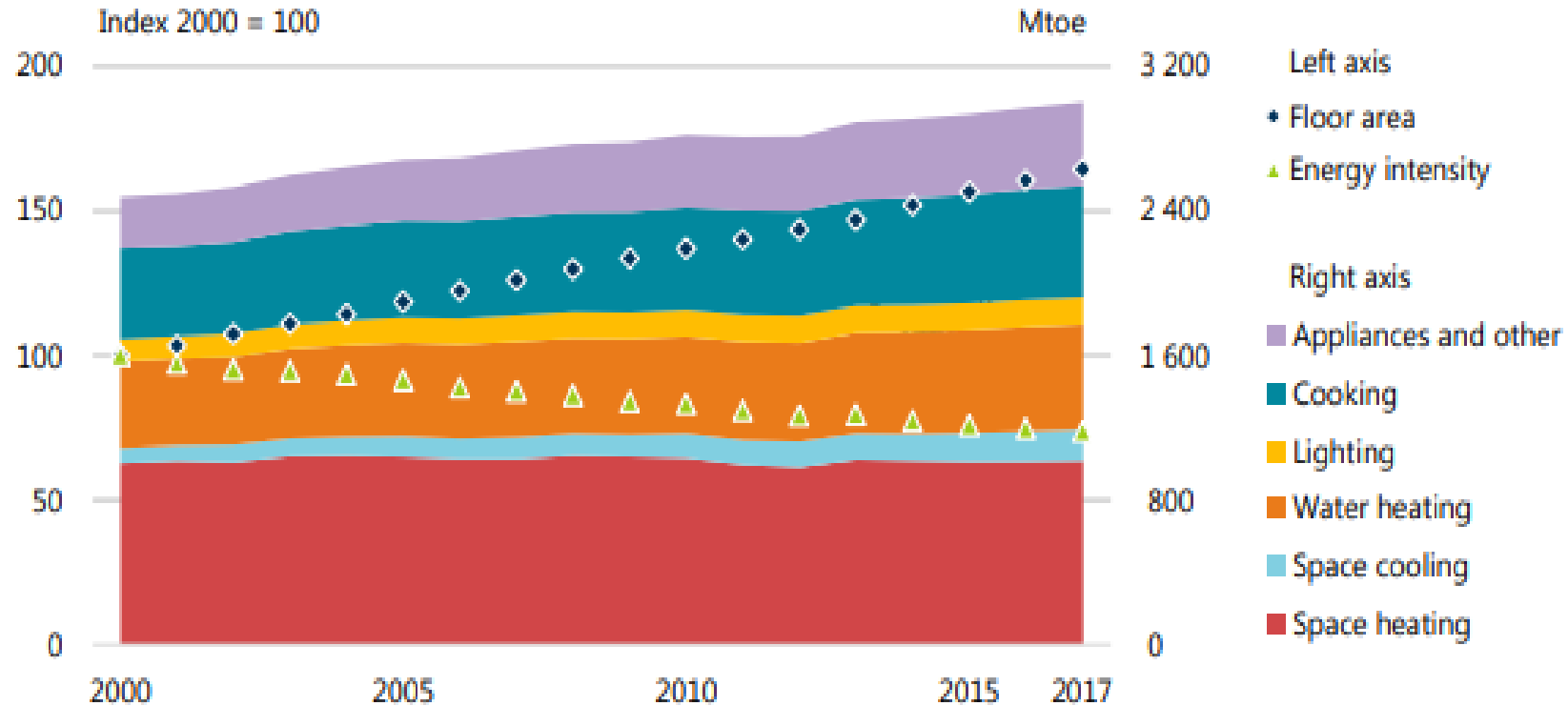


Sources: Adapted from IEA (2018a), *Energy Efficiency Indicators 2018* (database) and IEA Energy Technology Perspectives Buildings model (www.iea.org/etp/etpmodel/buildings/).

Growth in building sector energy use is linked to increasing floor space and appliance ownership. Space heating is driving savings across both all building types.

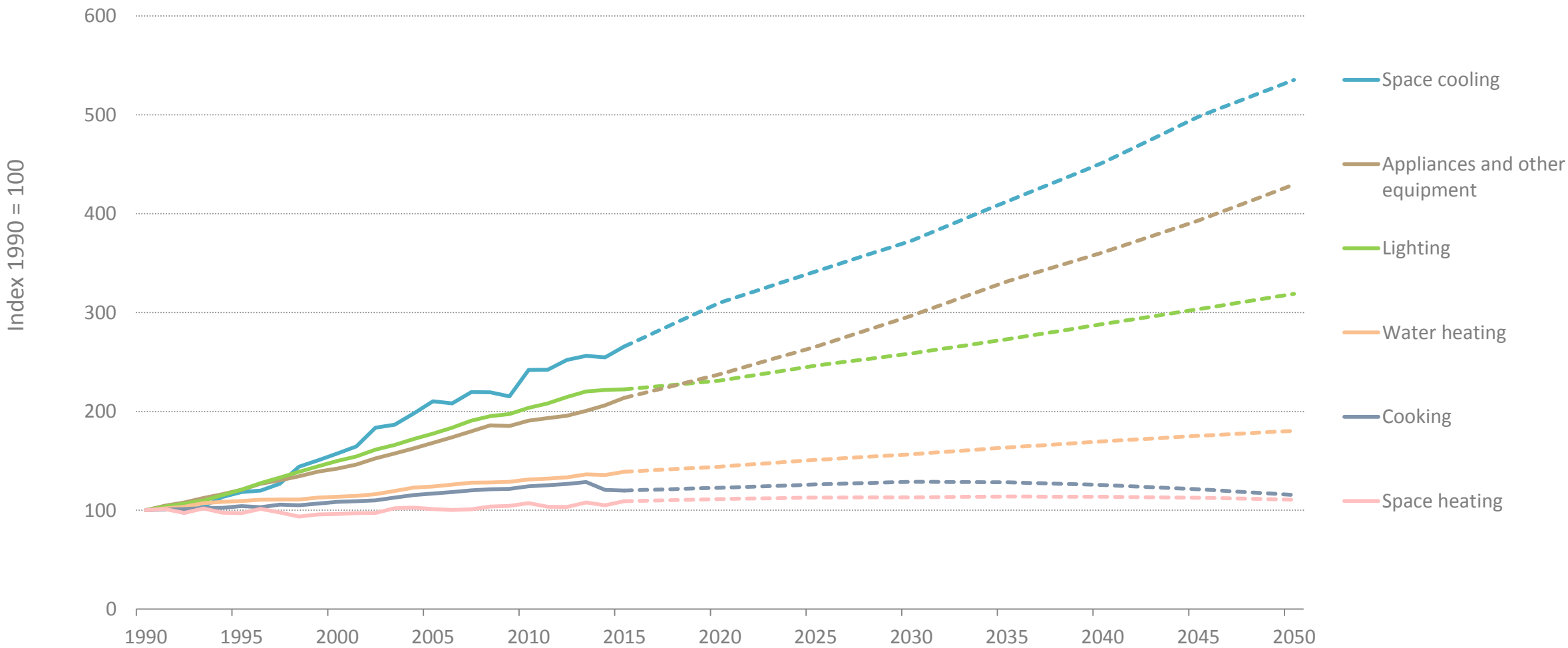
Building sector energy use growth

Global building sector energy use and intensity by end use, 2000-2017



Global building sector energy demand rose by more than 20% between 2000 and 2017 – energy efficiency reductions did not offset growth in floor area and demand for energy services

Building energy use: how important is space cooling becoming?



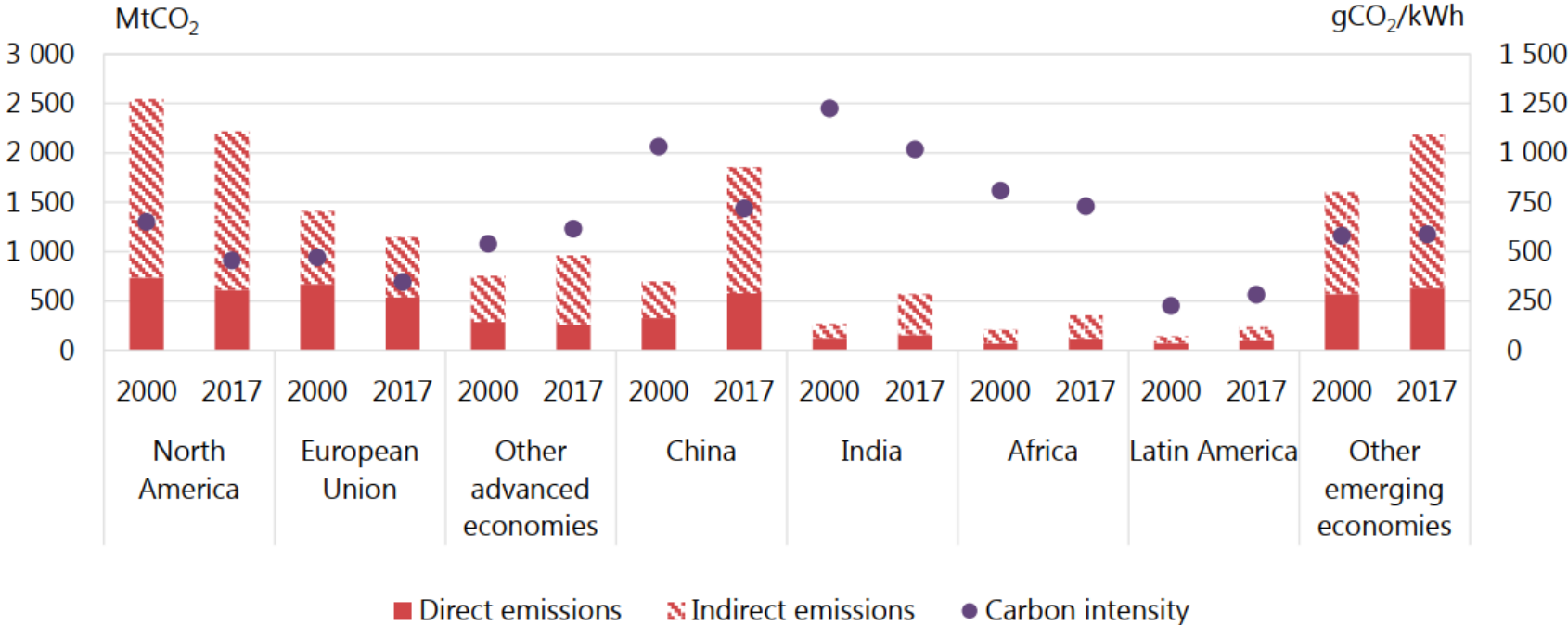
Space cooling energy use in business as usual scenario (RTS) is expected to have significant increases due to increased ownership.

Source: www.iea.org/eemr16



Buildings-related CO2 emissions

Buildings-related CO2 emissions and power sector carbon intensity by region, 2000-17

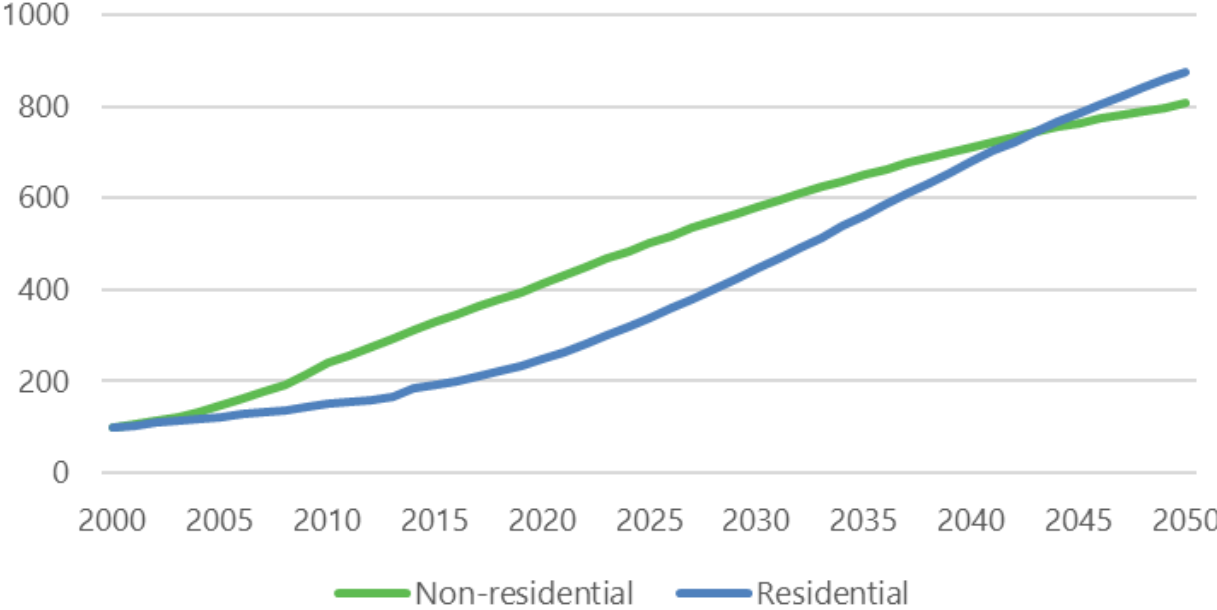


Notes: MtCO₂ = megatonnes of CO₂. Indirect CO₂ emissions result from upstream generation of electricity and heat used in buildings. Carbon intensities for the power sector represent the total grammes (g) of CO₂ emissions per kilowatt-hour (kWh) of electricity consumption.

Rapidly increasing electricity demand in emerging economies is contributing to growth in CO2 emissions related to buildings energy use, despite improving carbon intensity of power generation

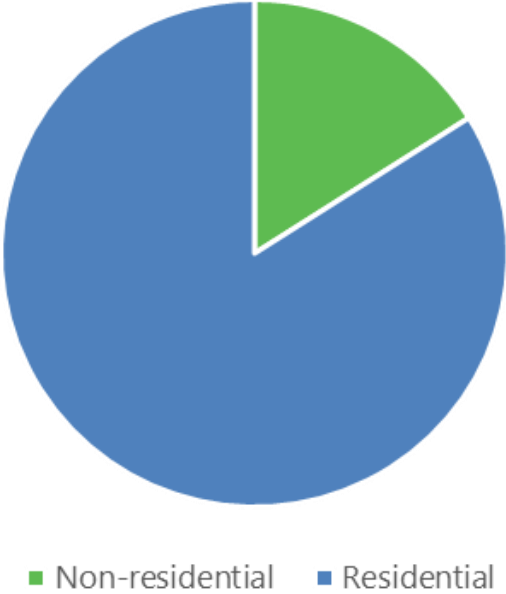
India projected floor area growth

Floor area growth in India



Year 2000 = 100

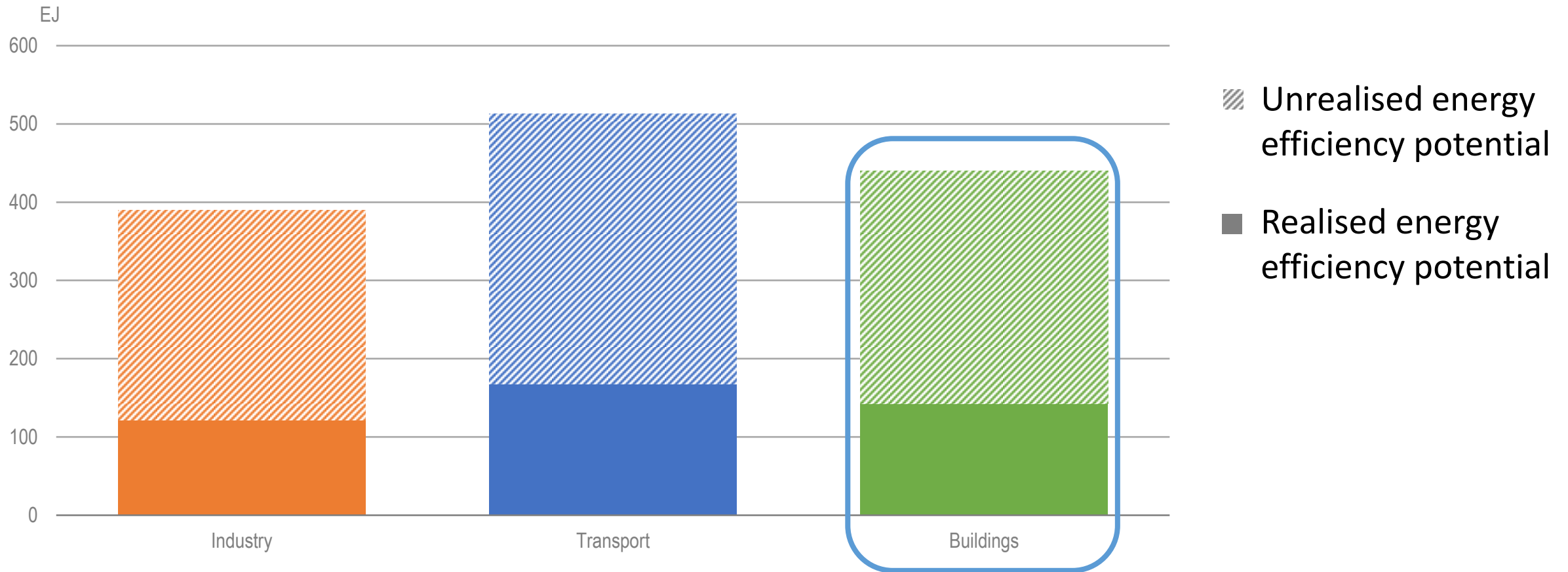
Share of floor area (2018)



Floor area requirements are expected to grow at a rapid rate over the coming decades

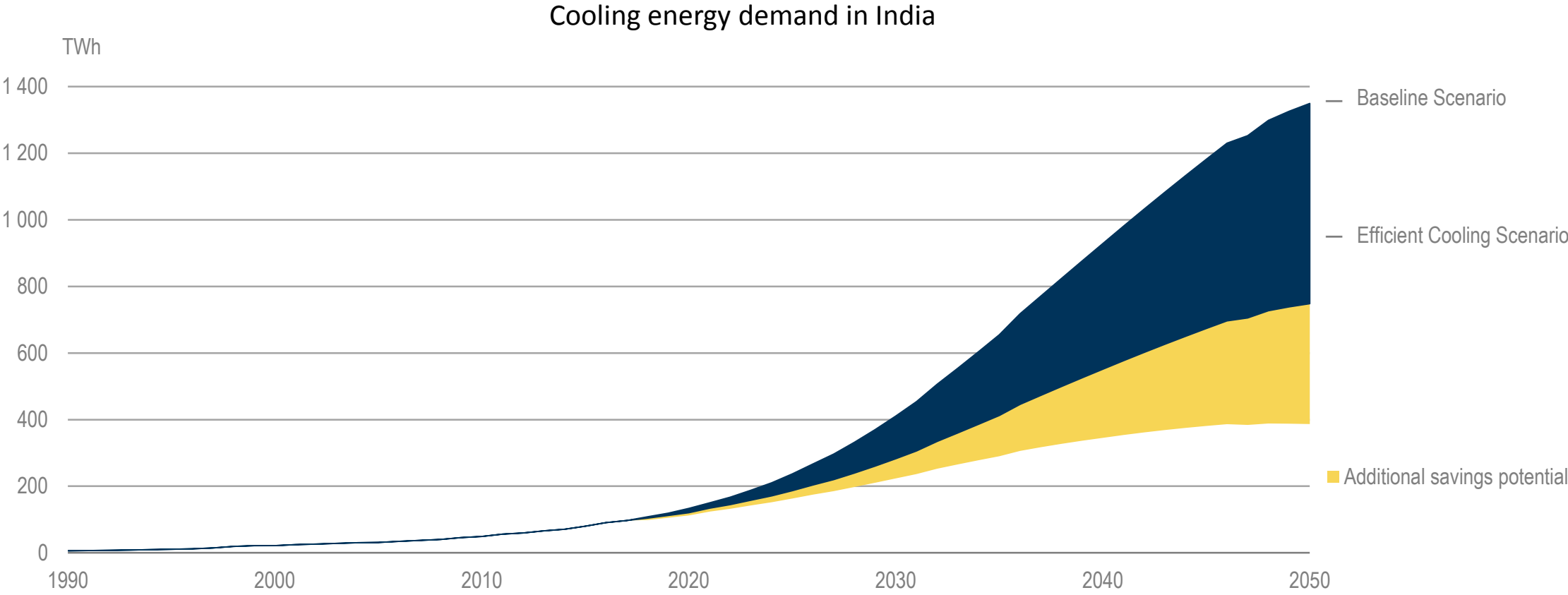
Global energy efficiency potential

Energy efficiency potential by sector



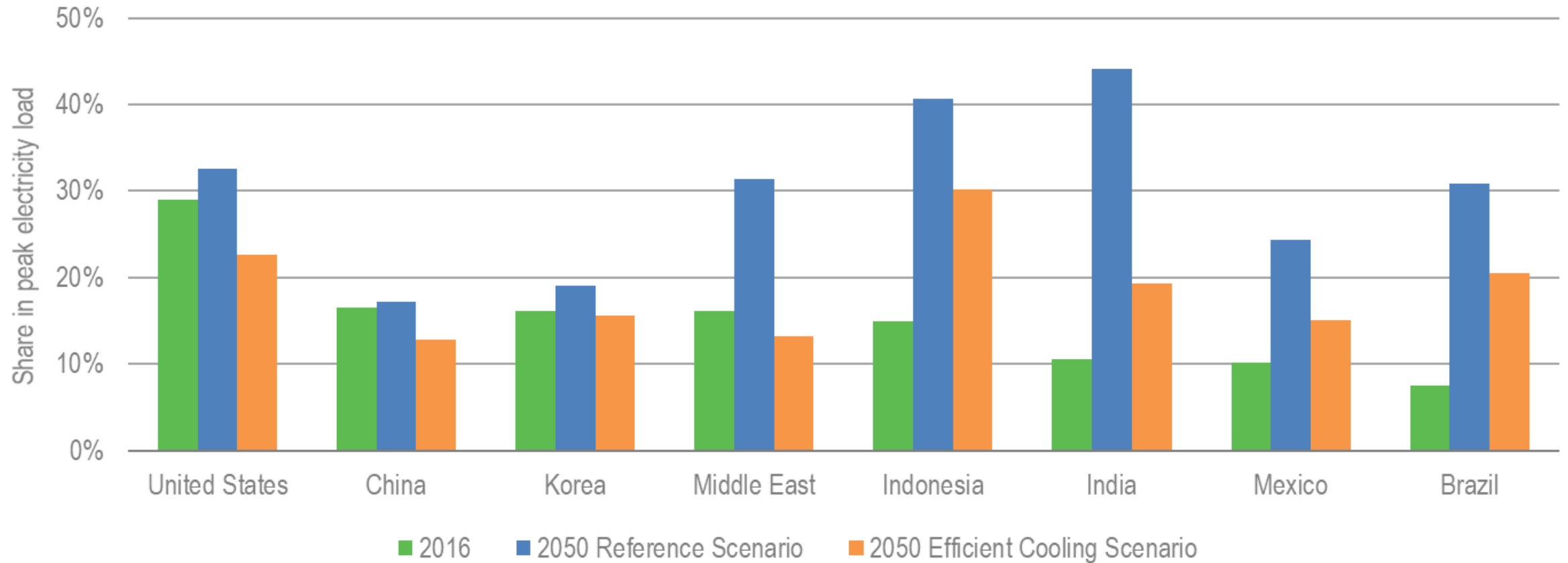
70% of the economic potential to improve energy efficiency in buildings remains untapped

Potential cooling savings in India



Additional measures such as better building design and construction, can reduce cooling energy demand in India while also allowing millions of people better access to cooling.

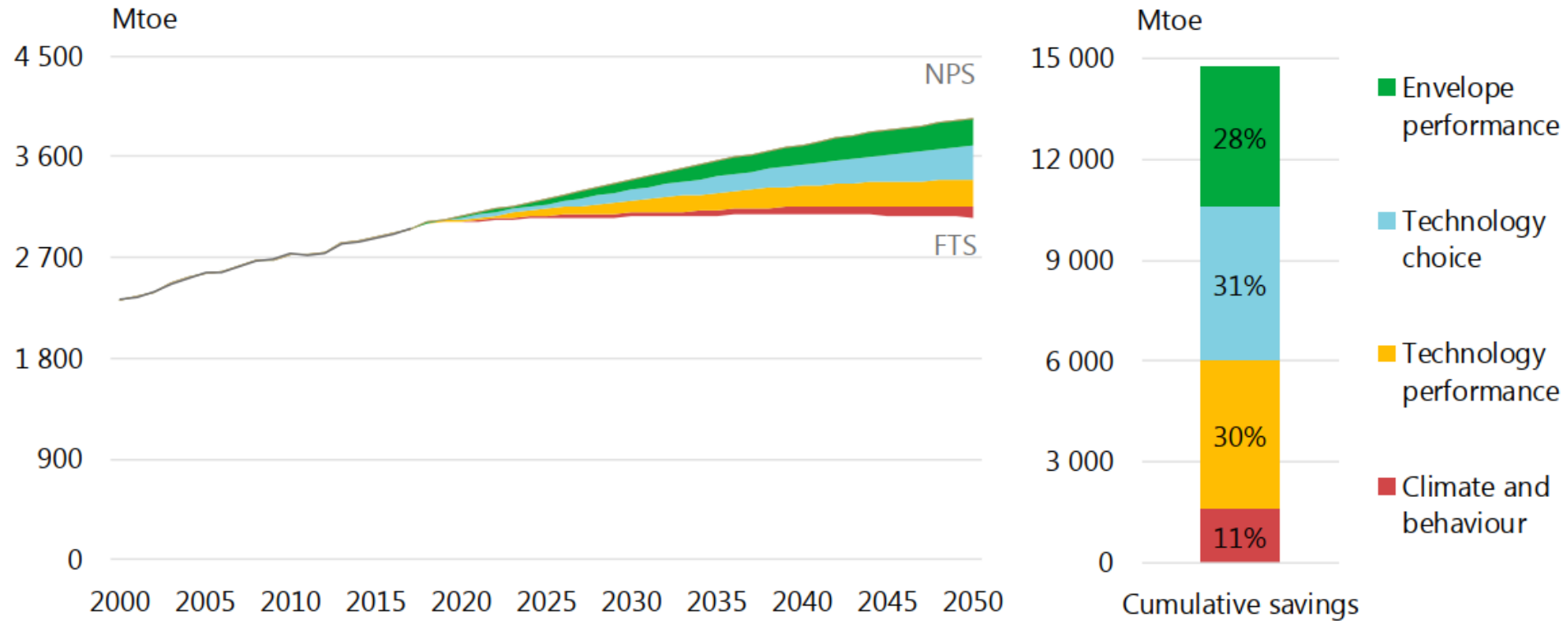
Share of cooling in electricity system peak loads



In 2016, India was one of the countries with a low share of cooling in peak electricity load. But by 2050 without significant energy efficiency improvements, India could top this list.

Levers to reduce energy demand in buildings

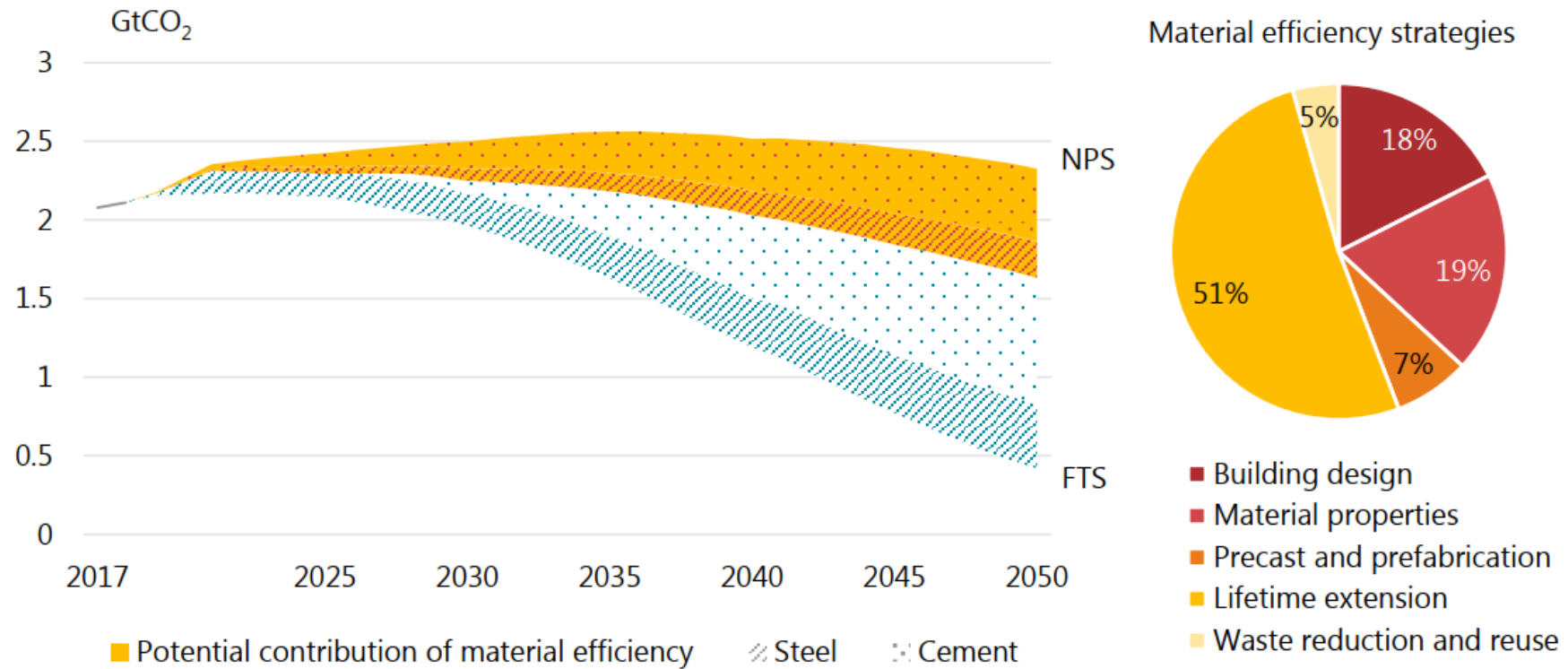
Change in buildings energy use in Faster Transition Scenario 2017-50



Envelope improvements, technology choice and equipment performance are the three most relevant levers to reduce energy demand in buildings in the Faster Transition Scenario

Sustainable construction

Emissions reduction from cement and steel use in buildings using material efficiency strategies, 2017-50

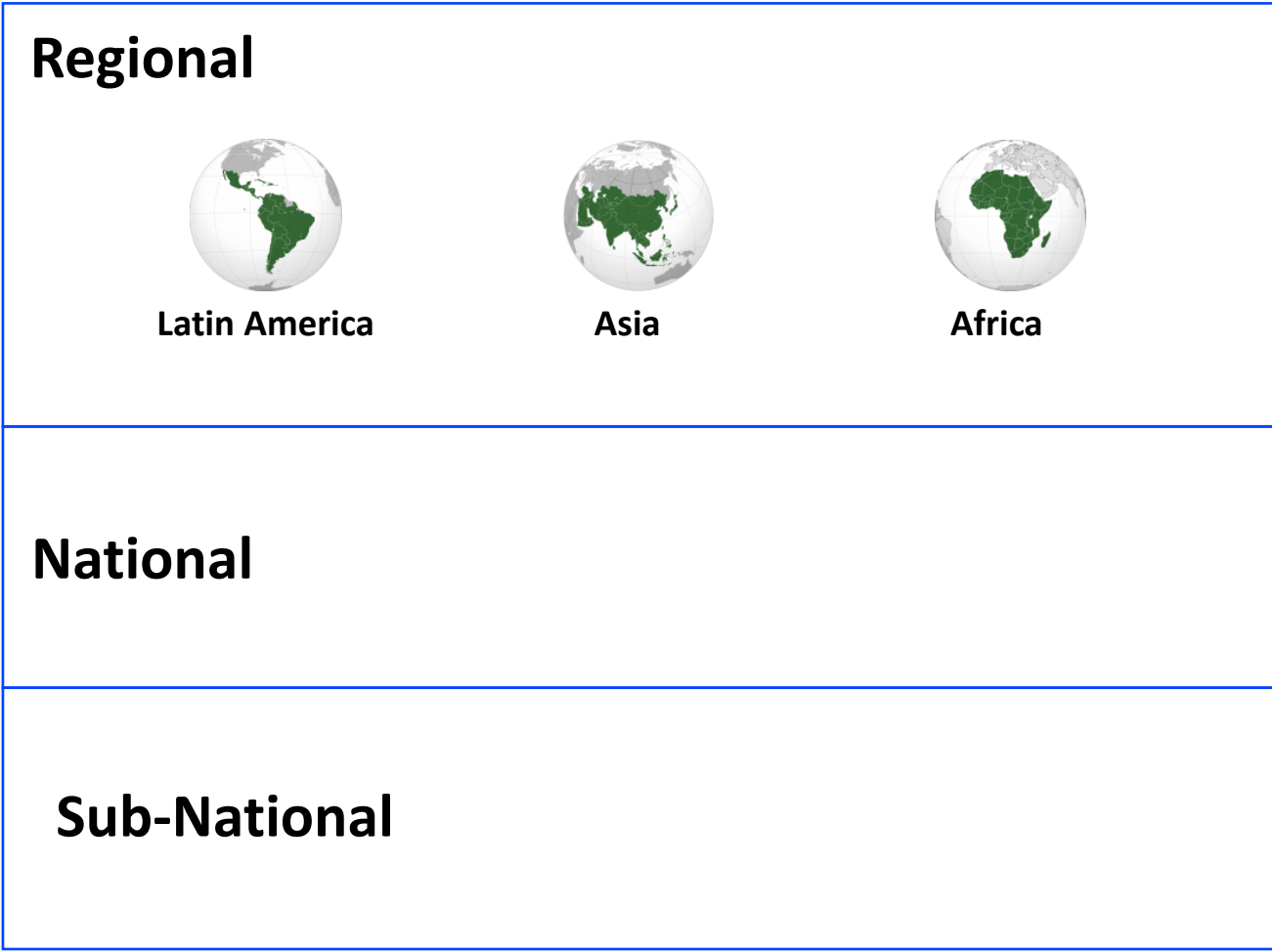
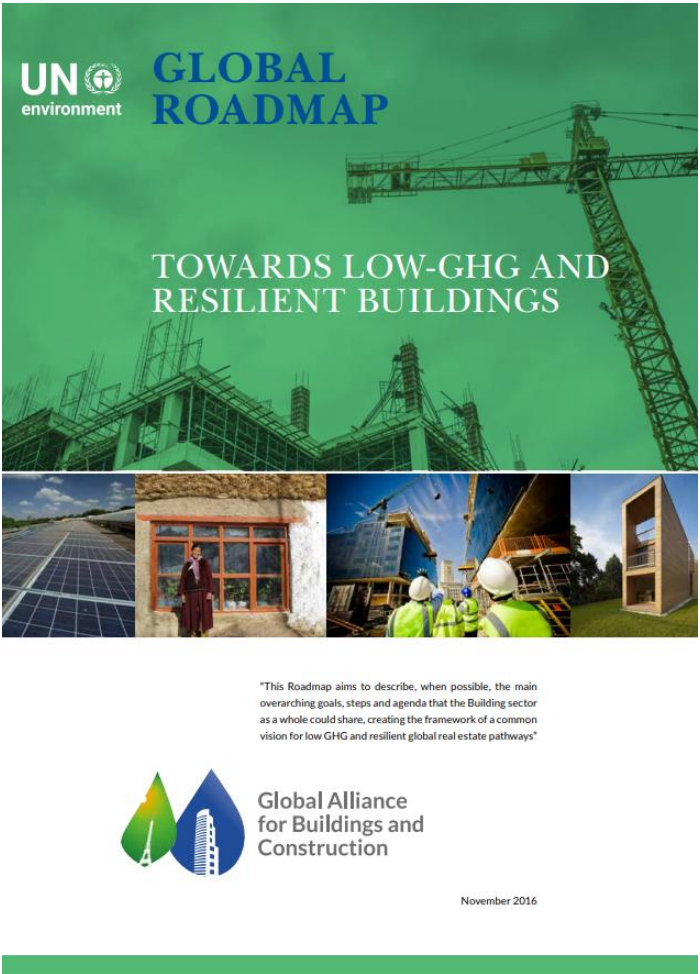


Material efficiency measures could reduce upstream emissions from cement and steel use in buildings by 23%

The path forward

- Work towards **integrating energy efficiency in urban, building and housing** policies and programmes
- Continue to develop comprehensive efficiency policies, targeting both new and existing building stock and appliances and **strengthen state-level implementation capacity**
- Provide **incentives to encourage consumers to adopt high efficiency appliances** and stimulate demand for energy efficient buildings
- Ensure that **pre-conditions for energy efficient buildings** are in place – availability of affordable **energy efficient materials and technologies** and raising capacity of building sector professionals
- Work towards **improved quality and availability of buildings energy performance information and tools**

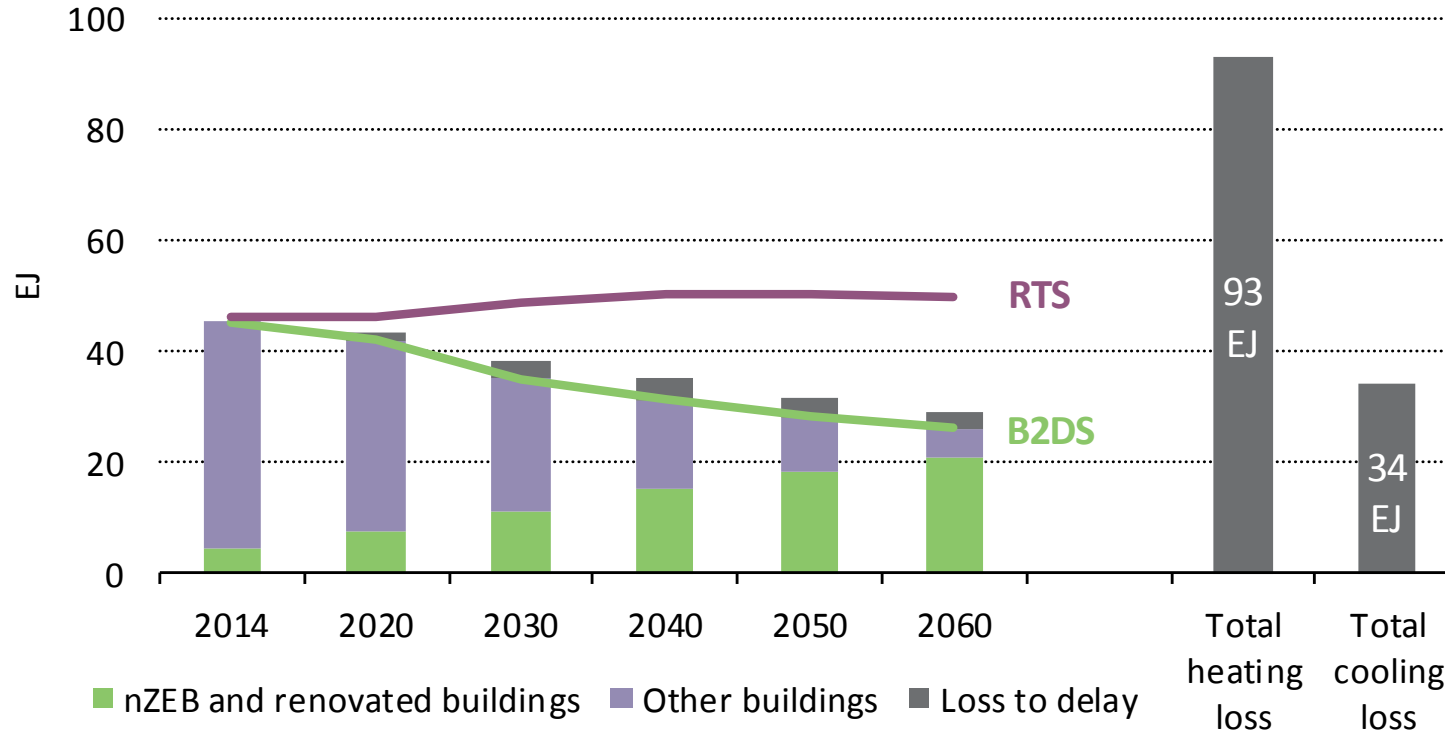
Building energy efficiency roadmaps can accelerate progress



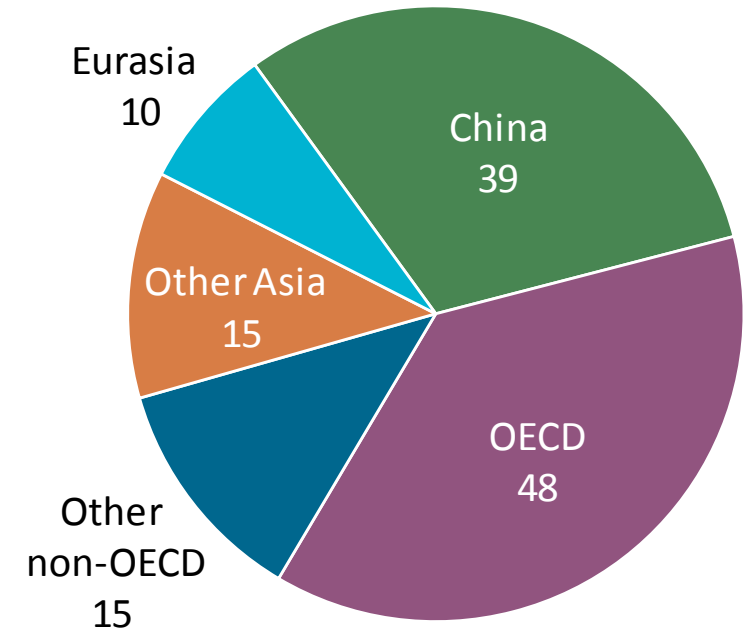
The importance of urgent action

Risk of lock-in of
50 – 100 years

Consequences of a ten-year delay



Cumulative loss by region (EJ)



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.

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