



CA EED WG7.2 Efficiency in cooling: Global and EU perspectives

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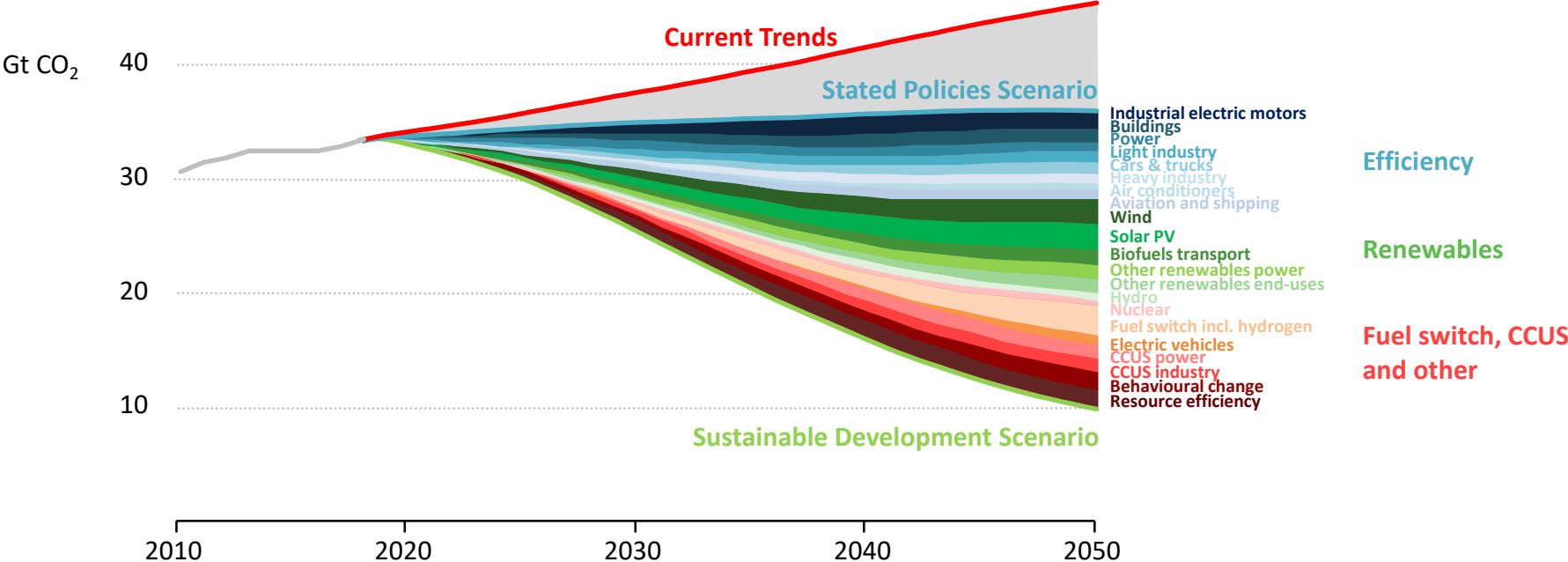
Paris, 14 October 2020

Outline

- Big picture:
 - global emissions, role of cooling and technology progress
- Drivers for cooling
- Potential from energy efficiency, other solutions
- Summary, EU policies:
 - MEPS (Ecodesign), labelling, building codes
 - Beyond efficiency

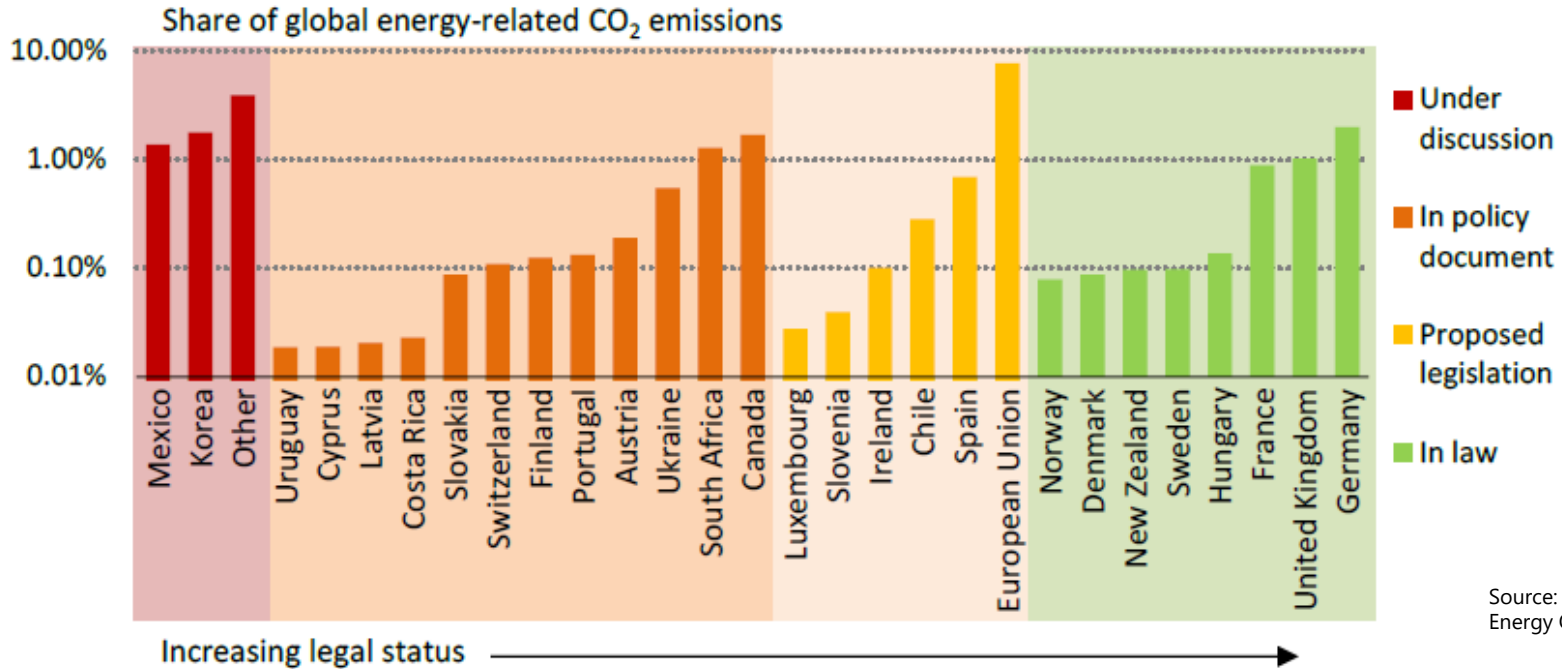
No single or simple solutions to Reduce carbon emissions

Energy-related CO2 emissions and reductions in the Sustainable Development Scenario by source



A host of policies and technologies will be needed across every sector to keep climate targets within reach, and further technology innovation will be essential to aid the pursuit of a 1.5°C stabilisation

Announced net-zero CO₂/GHG emissions 2050 reduction targets



Source: IEA (2020) World Energy Outlook 2020

More than a dozen countries and the European Union, which accounted for around 10% of global CO₂ emissions in 2019, have net-zero emissions targets in law or proposed legislation

Technology and innovation is not on track...

● Power

- Renewable power
 - Solar PV
 - Onshore wind
 - Offshore wind
 - Hydropower
 - Bioenergy
 - Geothermal
 - CSP
 - Ocean
- Nuclear power
- Gas-fired power
- Coal-fired power
- CCUS in power

● Industry

- Chemicals
- Iron and steel
- Cement
- Pulp and paper
- Aluminium
- CCUS in industry & transformation

● Transport

- Electric vehicles
- Fuel economy
- Trucks & buses
- Transport biofuels
- Aviation
- Shipping
- Rail

● Buildings

- Building envelopes
- Heating
- Heat pumps
- Cooling
- Lighting
- Appliances & equipment
- Data centres & networks

● Fuel supply

- Methane emissions from oil and gas
- Flaring emissions

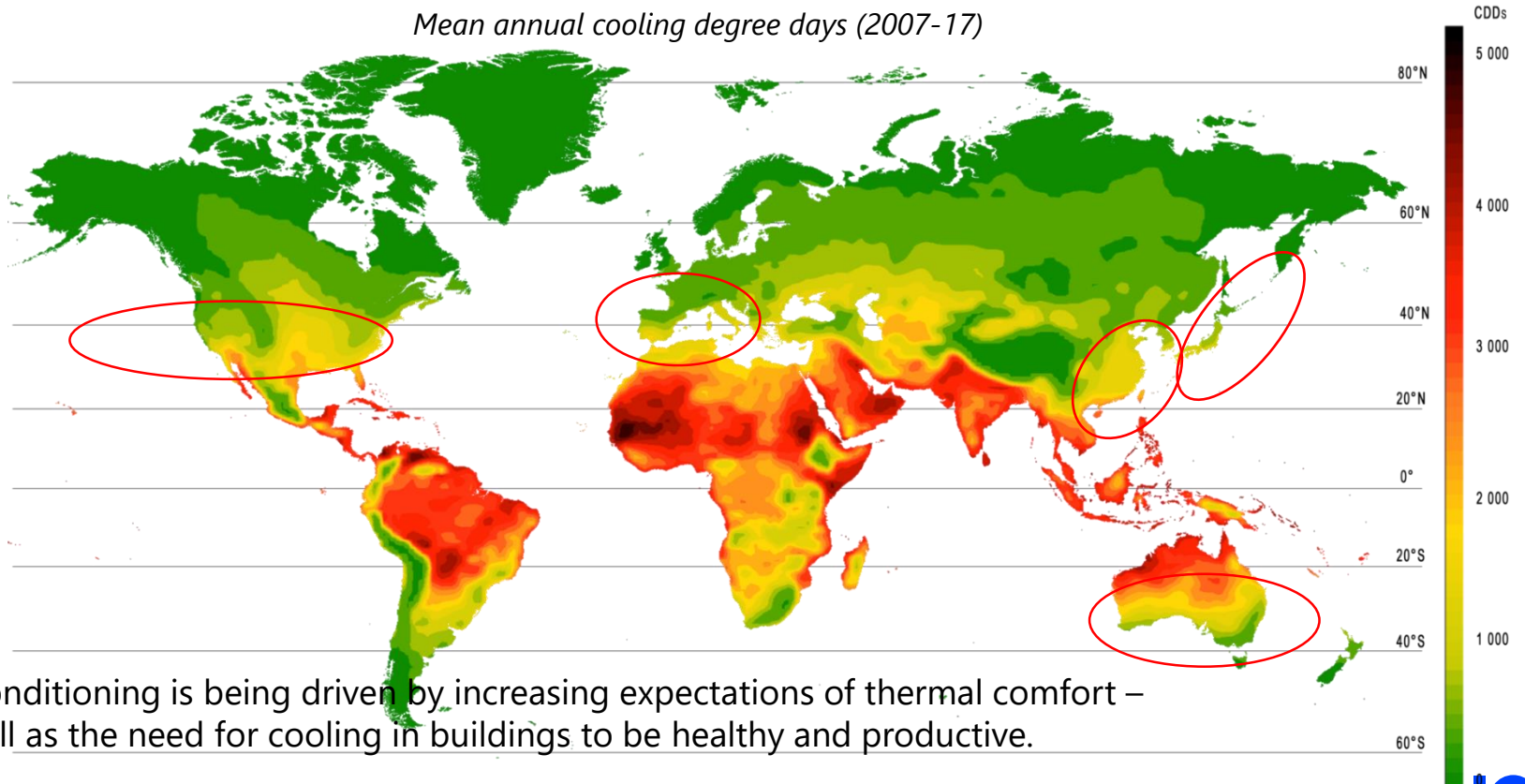
● Energy integration

- Energy storage
- Smart grids
- Direct air capture
- Hydrogen
- Demand response

Cooling, a key technology in buildings, is not on target to meet the Sustainable Development Scenario.

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.

Drivers for increased consumption, and opportunities, in Europe

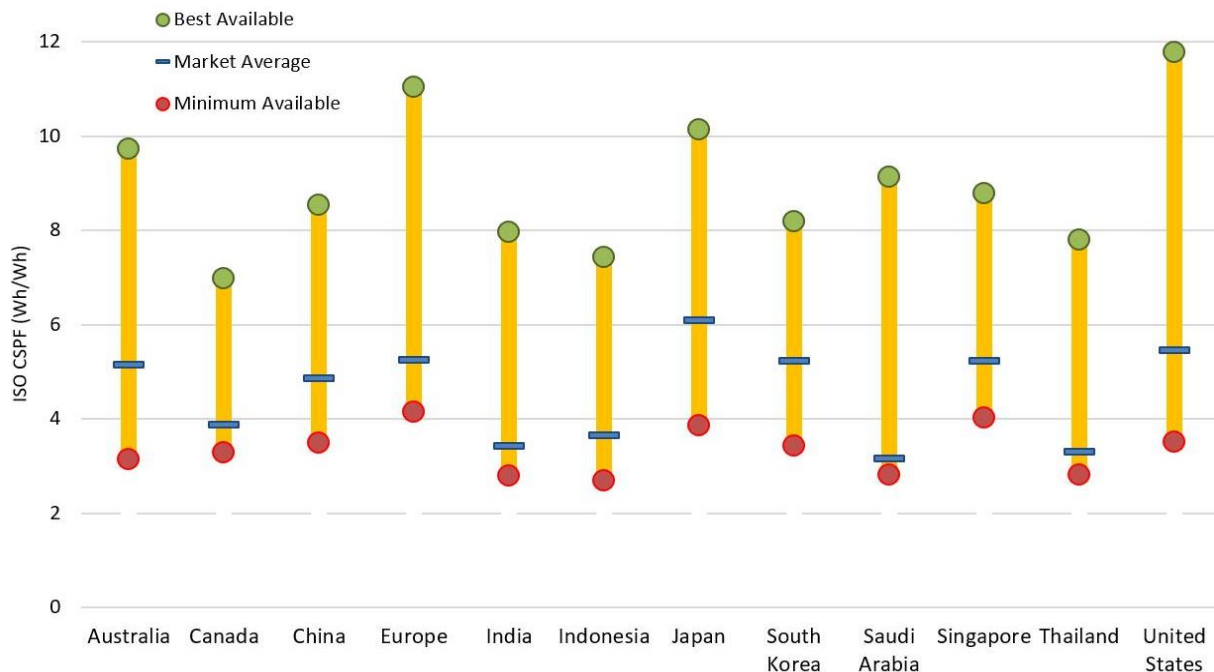
Drivers:

- Increasing temperatures
 - Higher (thermal) expectations
 - Rising income
- 
- Increased ownership (EU stock over 100 million)
 - Increased use (floor space and temperature)
- Issues - further south, Summer, commercial sector

Opportunities for reducing emissions

- Increased efficiency of equipment
- Improved buildings (insulation, shading) to lower cooling loads
- Alternative cooling (e.g. fans), higher internal temperatures
- District cooling, cogeneration, waste heat recovery
- Demand side response
- Lower GWP refrigerants

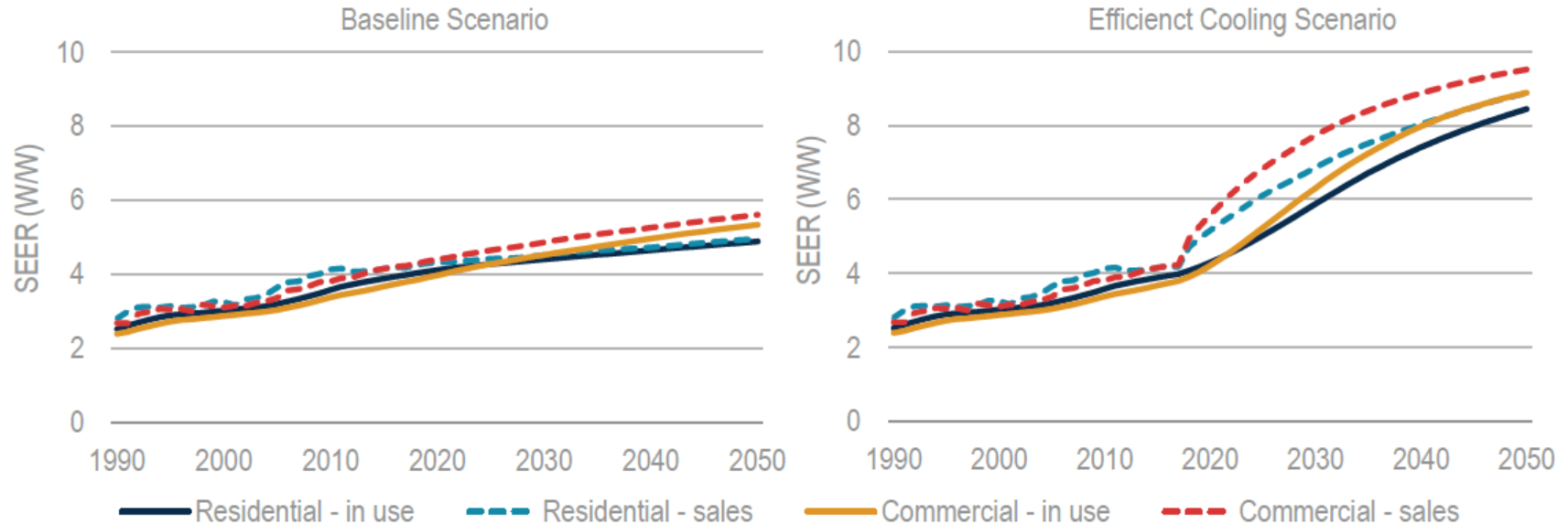
Market distribution of RAC equipment



Source: Park et al,
based on IEA

Significantly more energy efficient AC are already available on the current markets of the world.

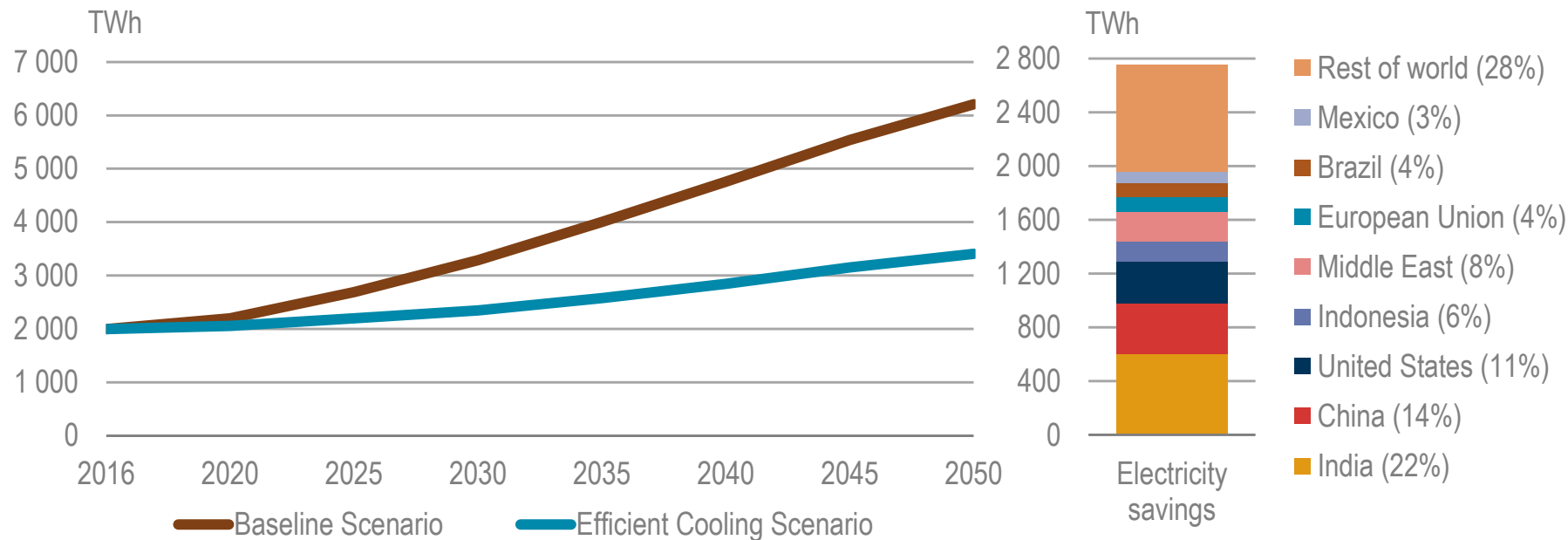
Average global SEER of ACs by scenario



Scenario to doubling the efficiency of ACs, through a combination of international co-operation, market regulation and incentives. This will meet the SDS scenario.

Energy-efficient air conditioning can halve cooling demand growth

Electricity savings using energy-efficient air conditioning



Energy efficiency can deliver nearly 2 800 TWh of electricity savings in 2050 – equivalent to all the electricity consumed by the European Union in 2016.

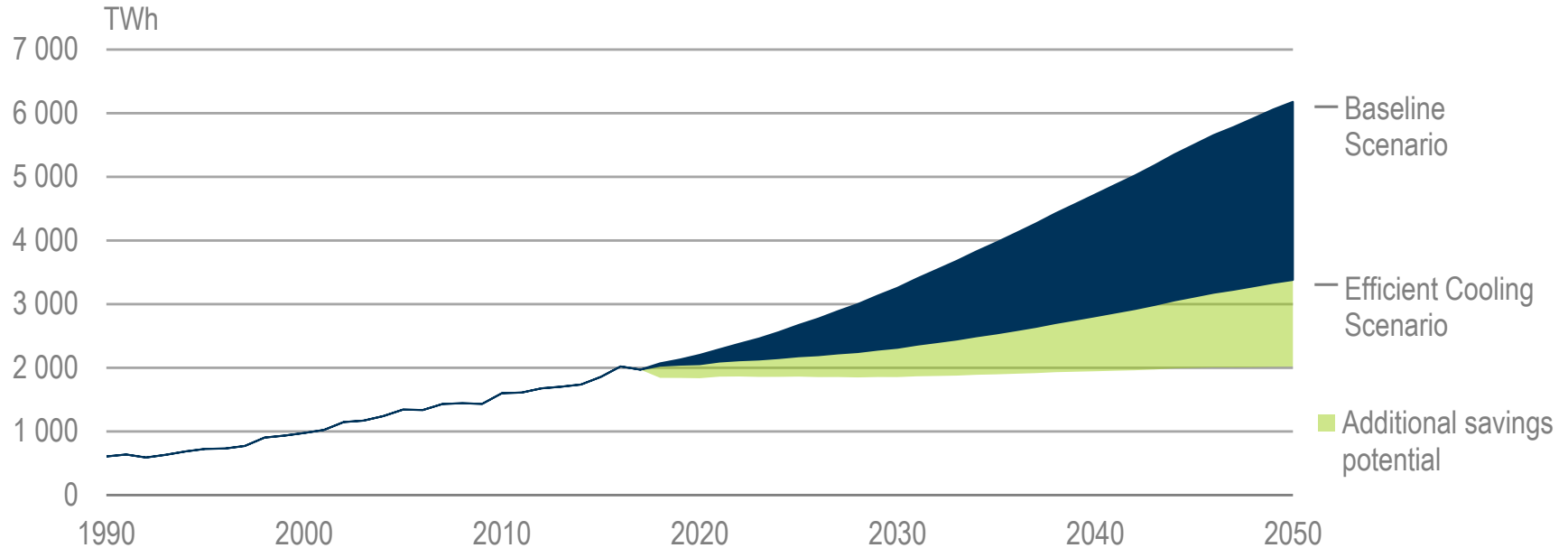
Building envelope measures can provide cooling comfort



Ancient and modern cooling techniques can be a no- or low-cost energy efficiency measures.

Further savings are possible!

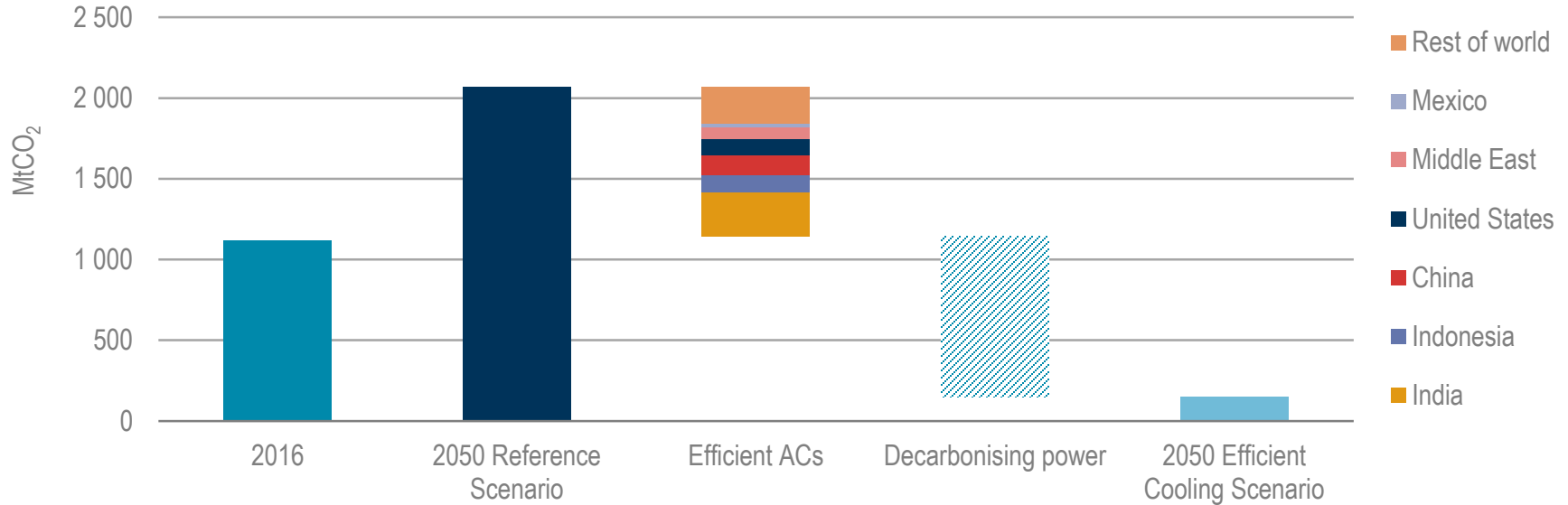
Additional energy savings potential through energy efficiency measures



Additional measures – such as better building design and construction, can keep cooling energy demand stable – while also allowing billions of people better access to keep cool

More efficient ACs will help cut emissions

Contribution of more efficient space cooling on CO₂ emissions



More efficient ACs cut CO₂ emissions from space cooling in half.
Efficiency also helps enable cleaner power – drastically reducing cooling-related emissions.

Summary - Policy action to curb cooling-related energy needs

- Without firm policy interventions, cooling-related energy demand will soar, and rise in Europe
- Policy action can deliver substantial energy savings by making AC equipment much more efficient
 - Priority must be given to improving mandatory standards and labelling for ACs, **Ecodesign**
 - Measures to improve the energy performance of building envelopes would contribute to even bigger energy savings in the longer term, **EPBD**, and **renovation**
 - Government procurement, early adopters
- Incentives for integrated solutions could deliver broader benefits to the energy system
 - District cooling and cogeneration. Renewables. Heat recovery.
 - Demand side response (manage grid), new cooling business models

Energy efficiency is key to delivering cooling comfort – affordably and sustainably

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