The Future of Cooling:

Opportunities for healthy, resilient & stable societies

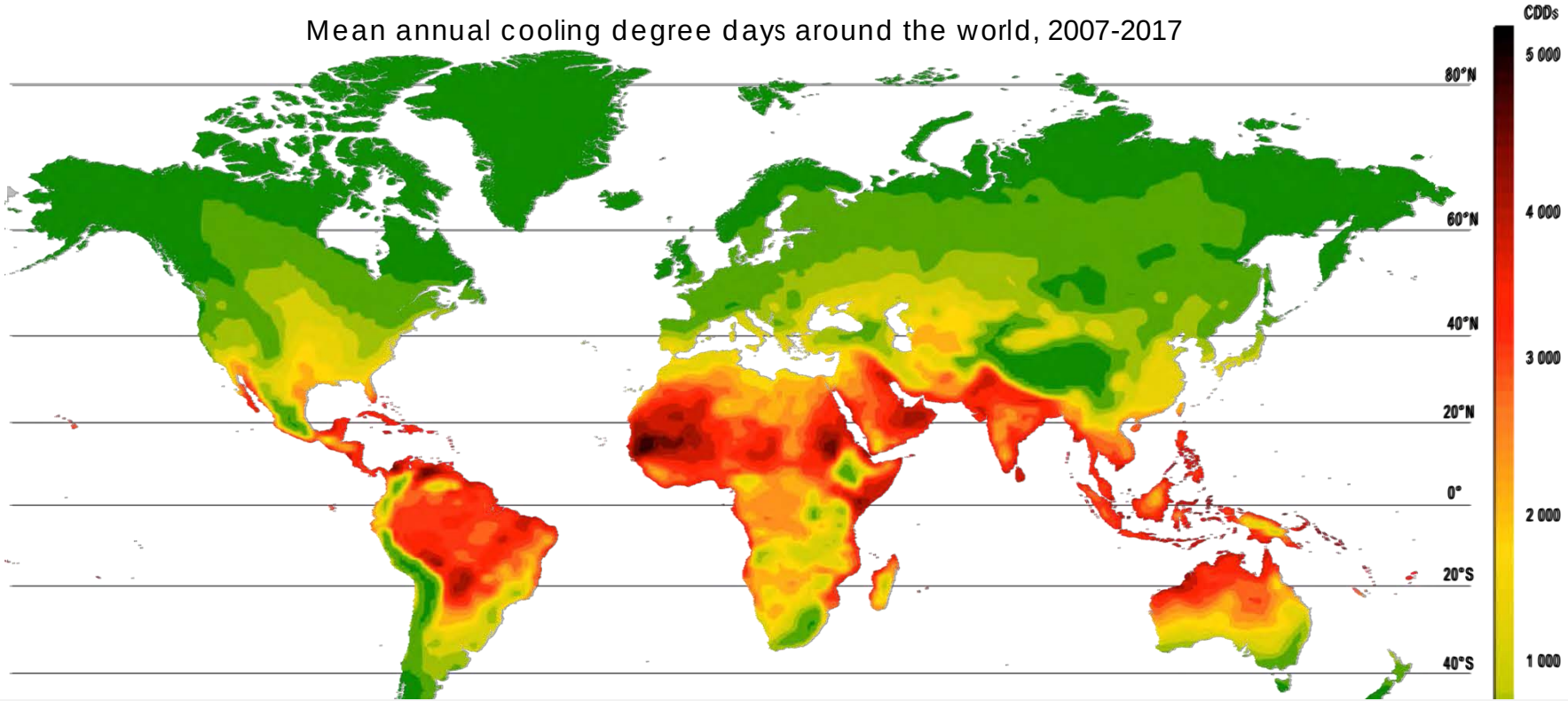
Kathleen Gaffney

cooling@iea.org and www.iea.org/cooling

IEA

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

Mean annual cooling degree days around the world, 2007-2017

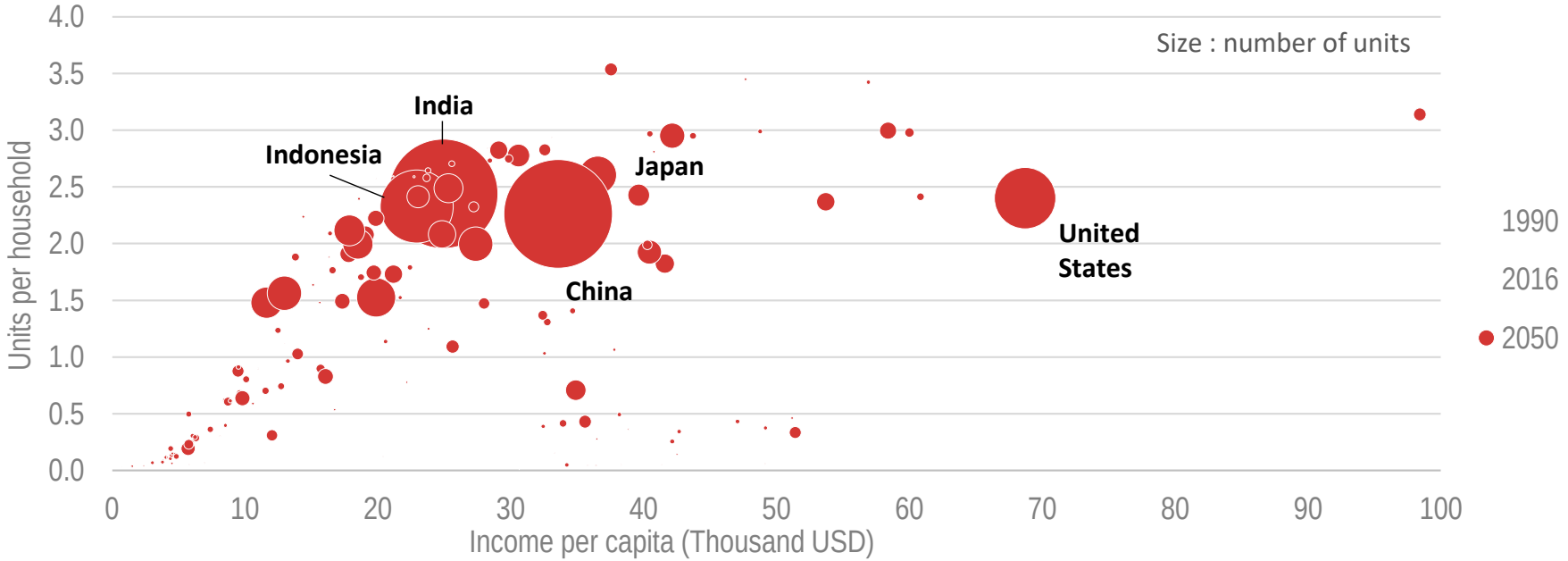


There are around 2.8 billion people living in places where it is hot every single day. Only 8% of them have an air conditioner today.

Source: IEA The Future of Cooling 2018

AC ownership is expected to soar

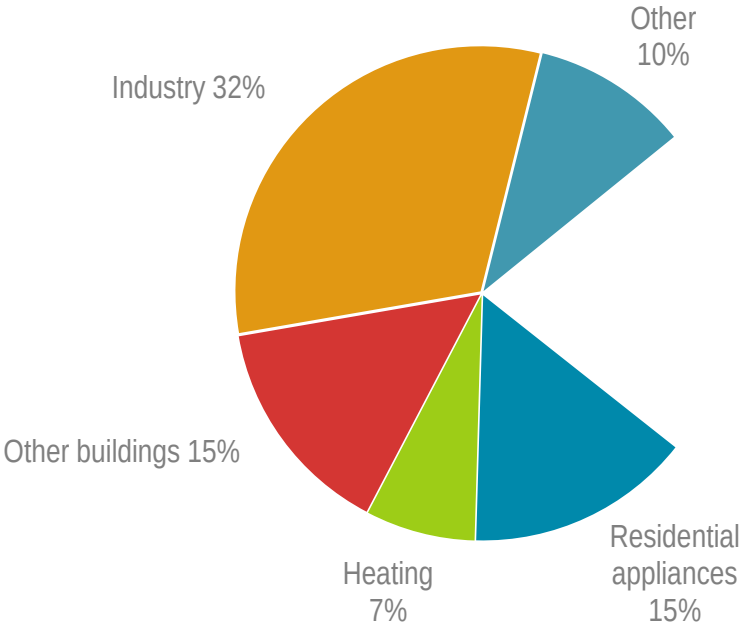
Evolution of global air conditioner ownership



By 2050, around 2/3 of the world's households could have an air conditioner.
Emerging economies like India and Indonesia are likely to see rapid growth in the next 3 decades.

Cooling is outpacing all other energy end-uses in buildings

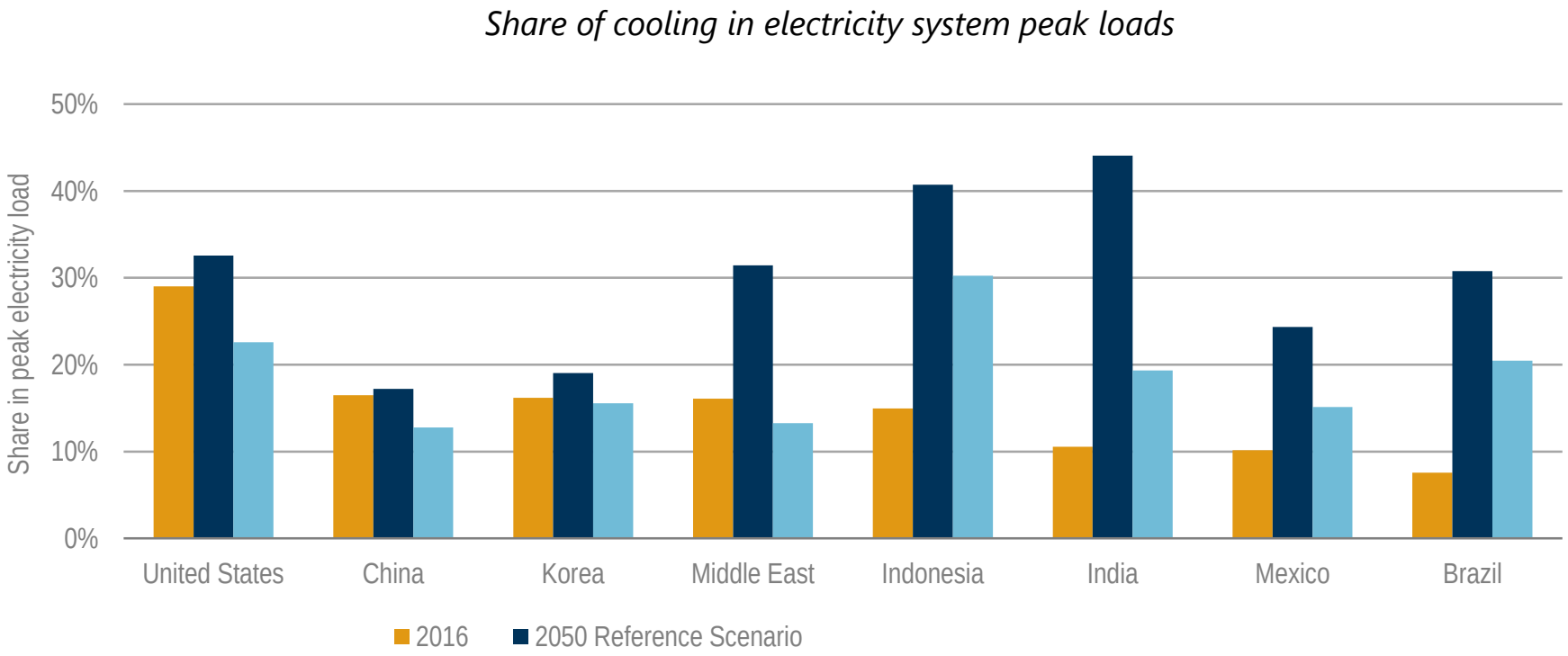
Share of final electricity demand growth to 2050



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.

Source: IEA The Future of Cooling 2018

Cooling demand has serious implications for grids

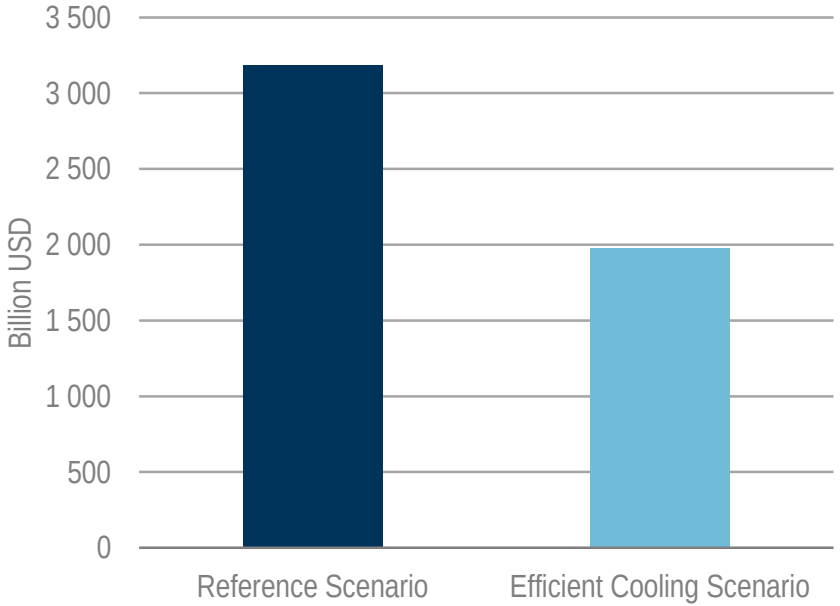


Efficient air conditioners can help to dampen the impact on the power system.

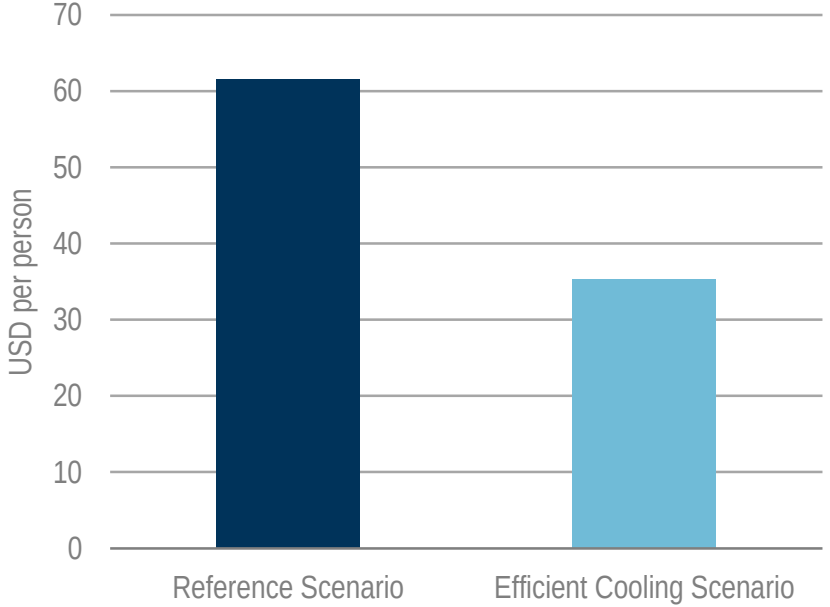
Source: IEA The Future of Cooling 2018

More efficient ACs can lessen the costs of new power generation

Cumulative investments in power generation for space cooling to 2050



Global average electricity costs per capita for space cooling in 2050

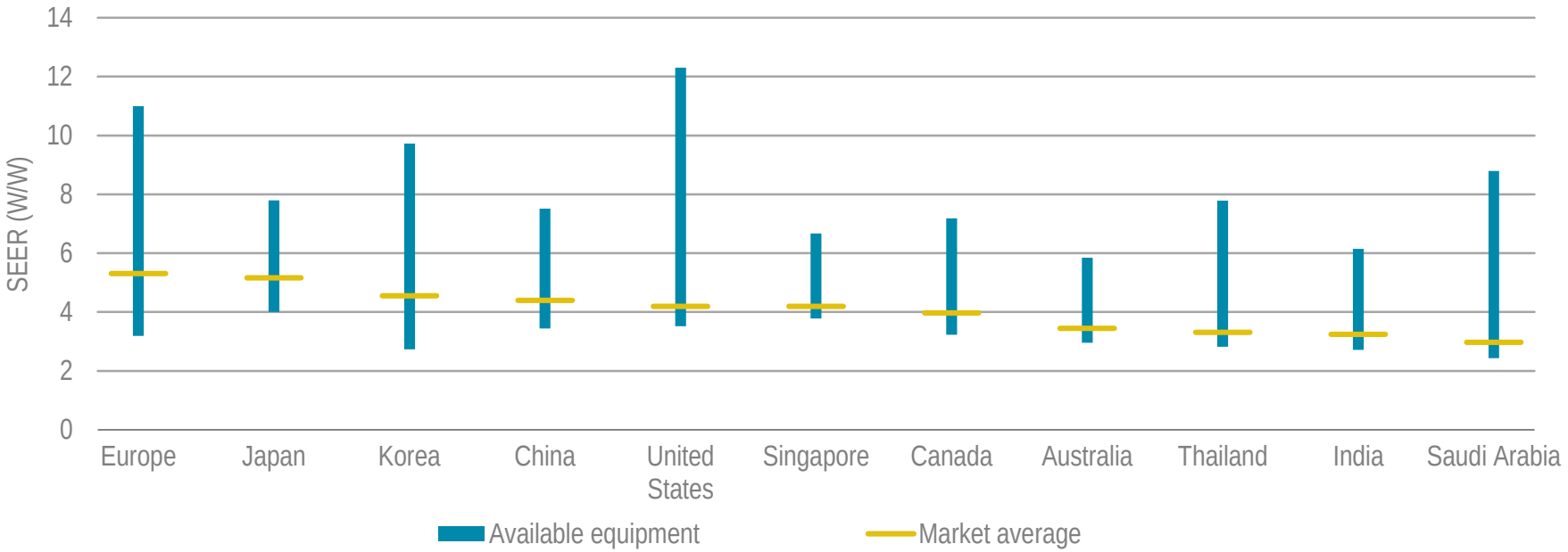


USD 1.2 trillion in power generation investments can be saved globally with more efficient ACs. Average per capita electricity costs for cooling would be almost halved.

Source: IEA The Future of Cooling 2018

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.

Source: IEA The Future of Cooling 2018

Policy action to curb cooling-related energy needs

Capturing the major energy efficiency potential for space cooling in buildings

- Absent firm policy interventions, cooling-related energy demand will soar
- Policy action can deliver substantial energy savings quickly by making AC equipment much more efficient
- Priority must be given to mandatory standards and labelling for ACs
- Measures to improve the energy performance of building envelopes would contribute to even bigger energy savings in the longer term
- Integrated solution could deliver broader benefits to the energy system

Energy efficiency can deliver cooling comfort – affordably and sustainably.

Source: IEA The Future of Cooling 2018

Tracking Cooling (energy, emissions, policy, technology, refrigerants)

K-CEP has kick started a new way of tracking data and information

- First: Kigali Tracker data template, December 2017
- Second: Kigali Tracker online, April 2018 (www.iea.org/exchange/cooling)
- Third: the entire IEA website is evolving for data and information, October 2018
  - To have core webpages oriented to data and tracking
  - Sharing more information to enable global consistency
  - Bringing together Kigali Tracker, Tracking Clean Energy Progress, Global Tracking Framework and other tracking efforts into a single database and online format

K-CEP planted the seed that is growing into a major digitalization effort.

Recent global engagement: new data and research

IEA is engaging globally on cooling data and research

- China
  - IEA signed an agreement with China NDRC
  - Collaborating with CNIS on data, information and analysis
- Europe
  - Increased access from Eurovent to data on cooling
- Japan
  - Interest in increased data sets from manufacturers through Japan METI
- IEA's Technology Collaboration Programme
  - Energy in Buildings and Communities: Annex 80 Resilient Cooling
  - Research supporting Mission Innovation Challenge 7 on new heating/cooling technology

The groundwork is starting to pave the way to increased data access.

Recent global engagement: analysis and messaging

IEA is engaging globally on cooling analysis and delivering messages

- The Future of Cooling report follow-on
  - Just released: Cooling section included in Energy Efficiency 2018 (www.iea.org/efficiency2018)
  - Scoping: The Future of Cooling: China (joint with Tsinghua University)
  - Scoping: The Future of Cold Chain
- ASEAN
  - ASEAN cooling analysis under Thailand's chairmanship of ASEAN (1 year project)
- Asia Clean Energy Forum (ACEF) Thailand Edition, 2019
  - IEA is coordinating the energy efficiency agenda and will include cooling
- Training
  - Incorporate *Cooling for All* into training materials and support *Ozone Twinning* efforts
  - Increasing participation in training events (next training is in Delhi in December)

Cooling is becoming a key topic across multiple teams at the IEA.

Thank you!

cooling@iea.org

www.iea.org/cooling

IEA