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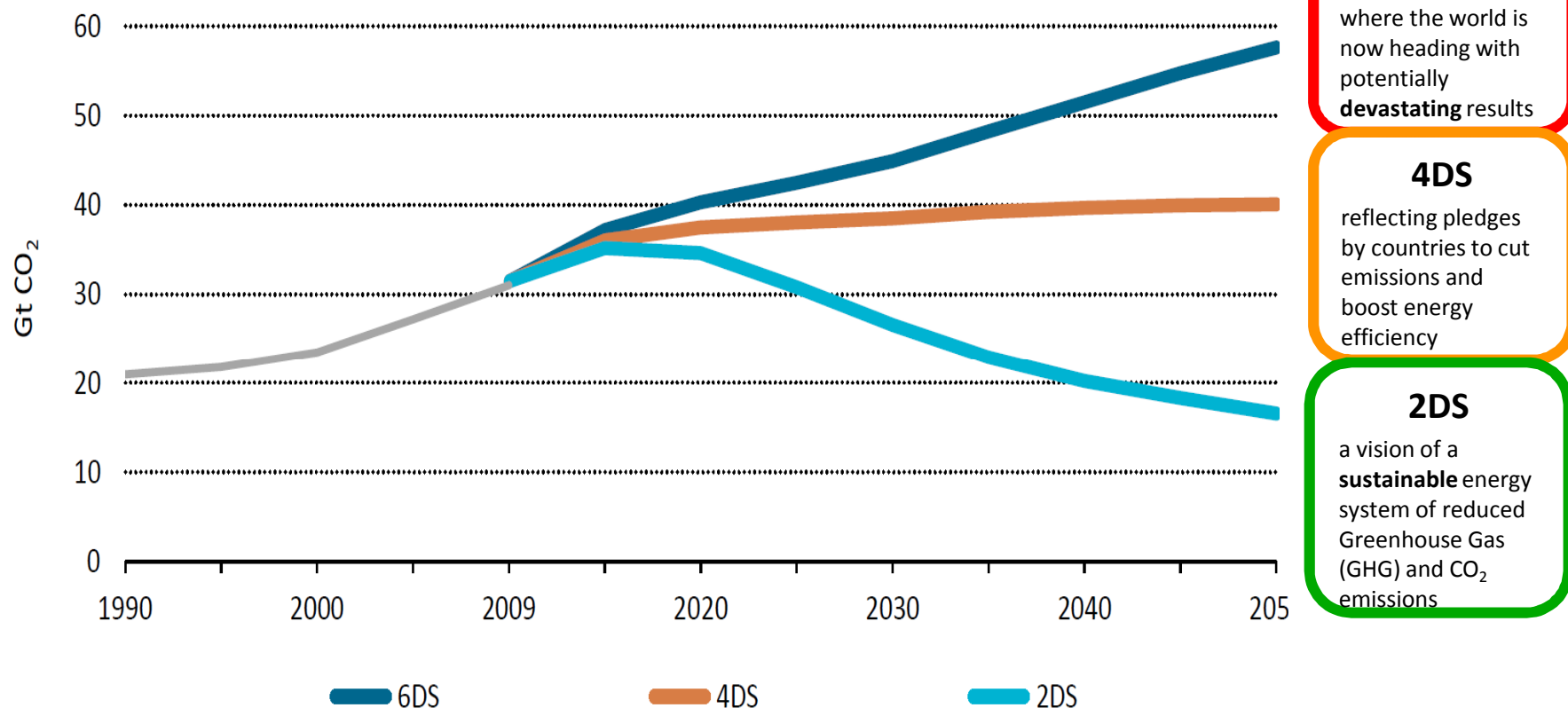
International
Energy Agency

Transforming our Energy System: Findings from the IEA's Energy Technology Perspectives and Technology Roadmaps

**Cecilia Tam, Head of Energy
Demand Technology Unit**

**APERC Annual Conference
Tokyo 2014**

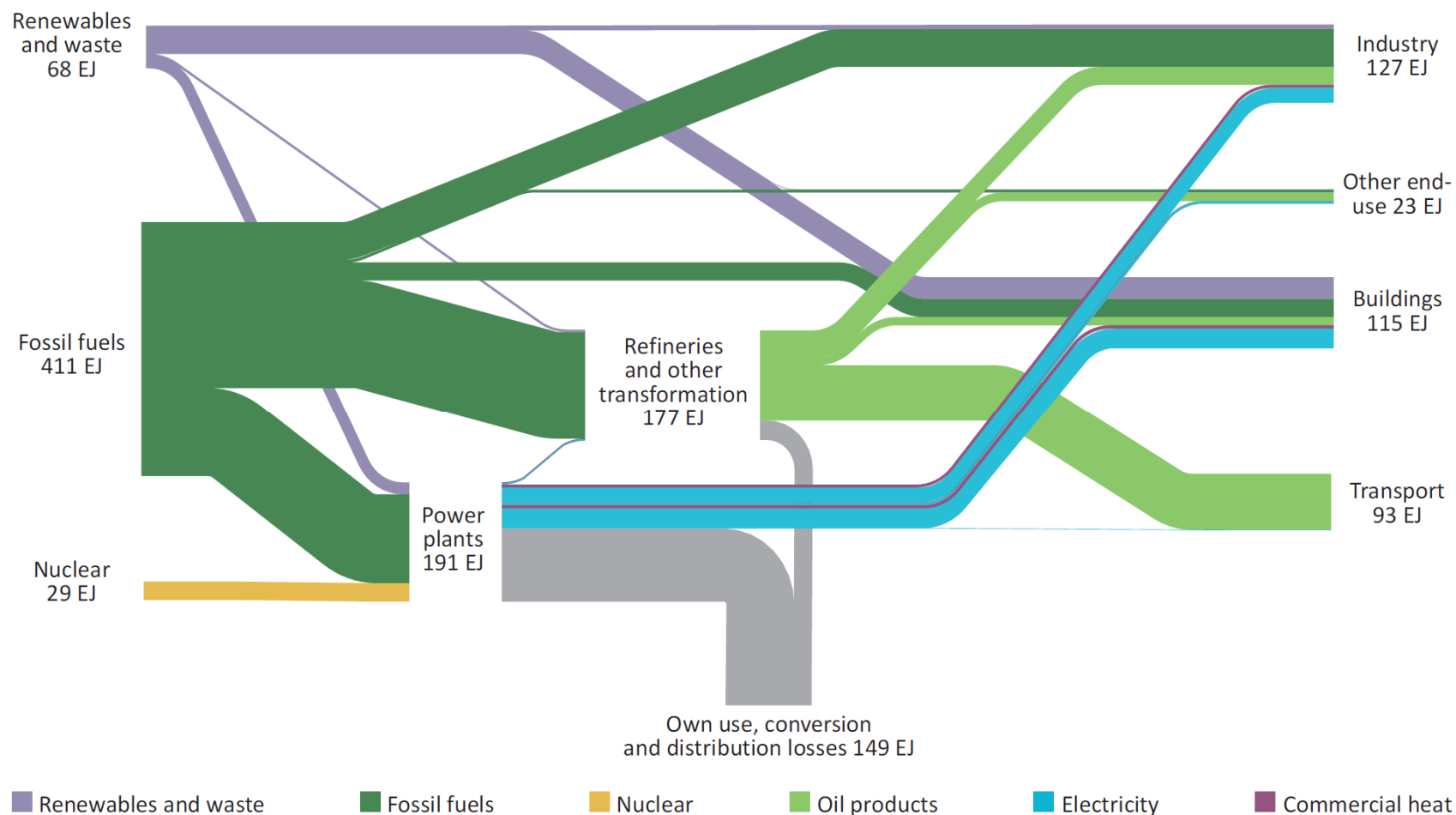
ETP 2012 – Choice of 3 Futures



To achieve the 2DS, energy-related CO₂ emissions must be halved until 2050.

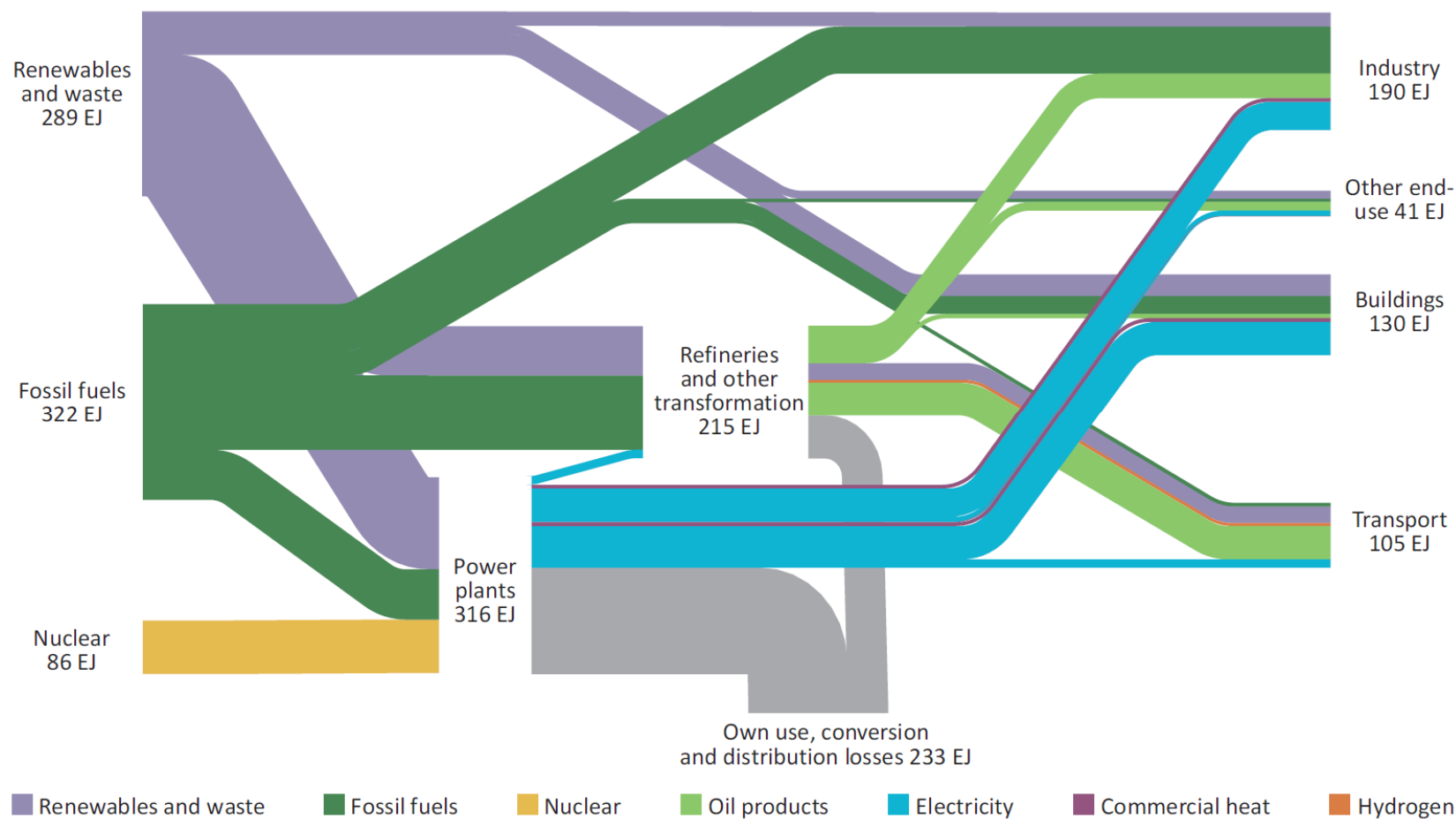
The Global Energy system today

Dominated by fossil fuels in all sectors



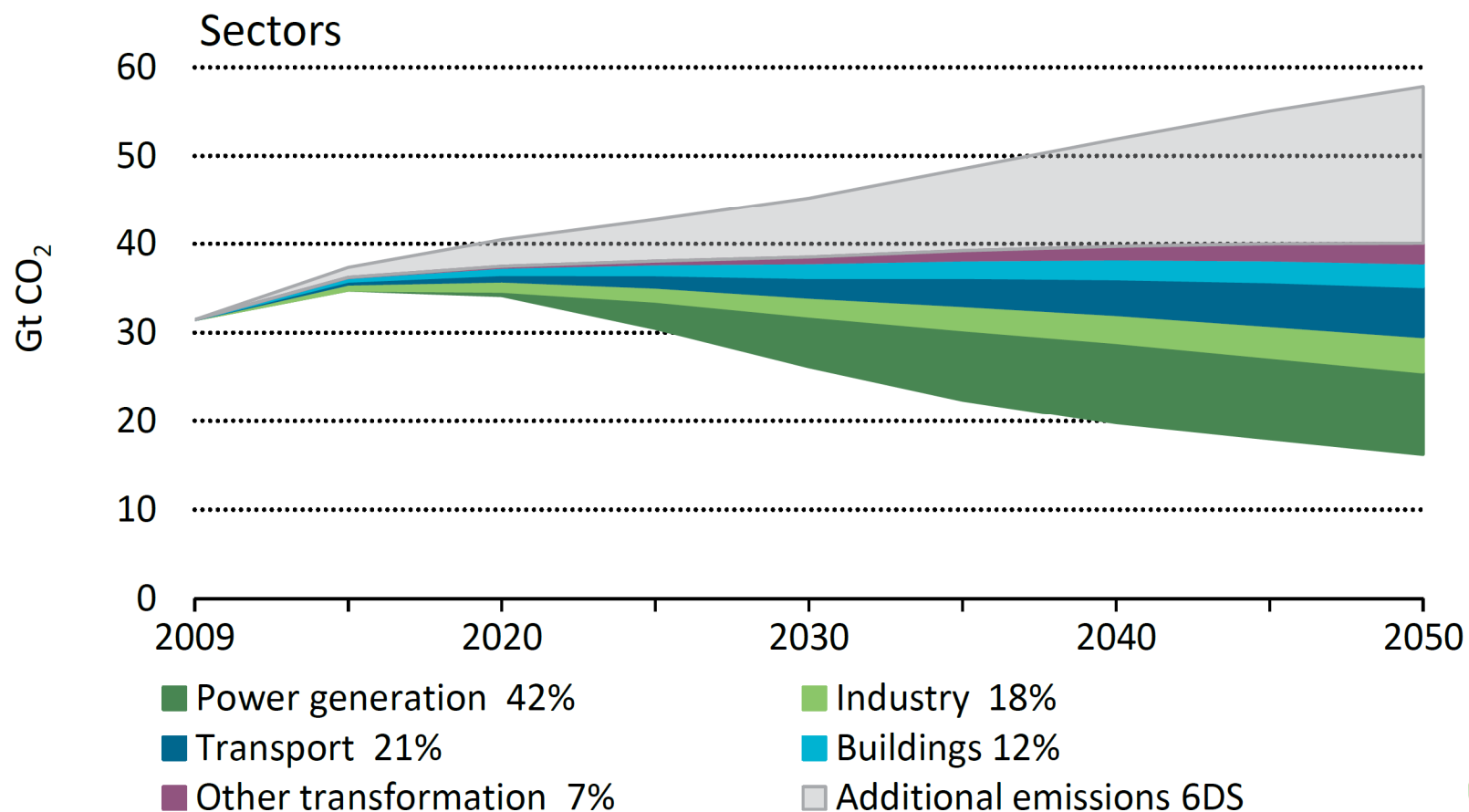
The future low-carbon energy system

The 2DS in 2050 shows a dramatic shift in energy sources and demands

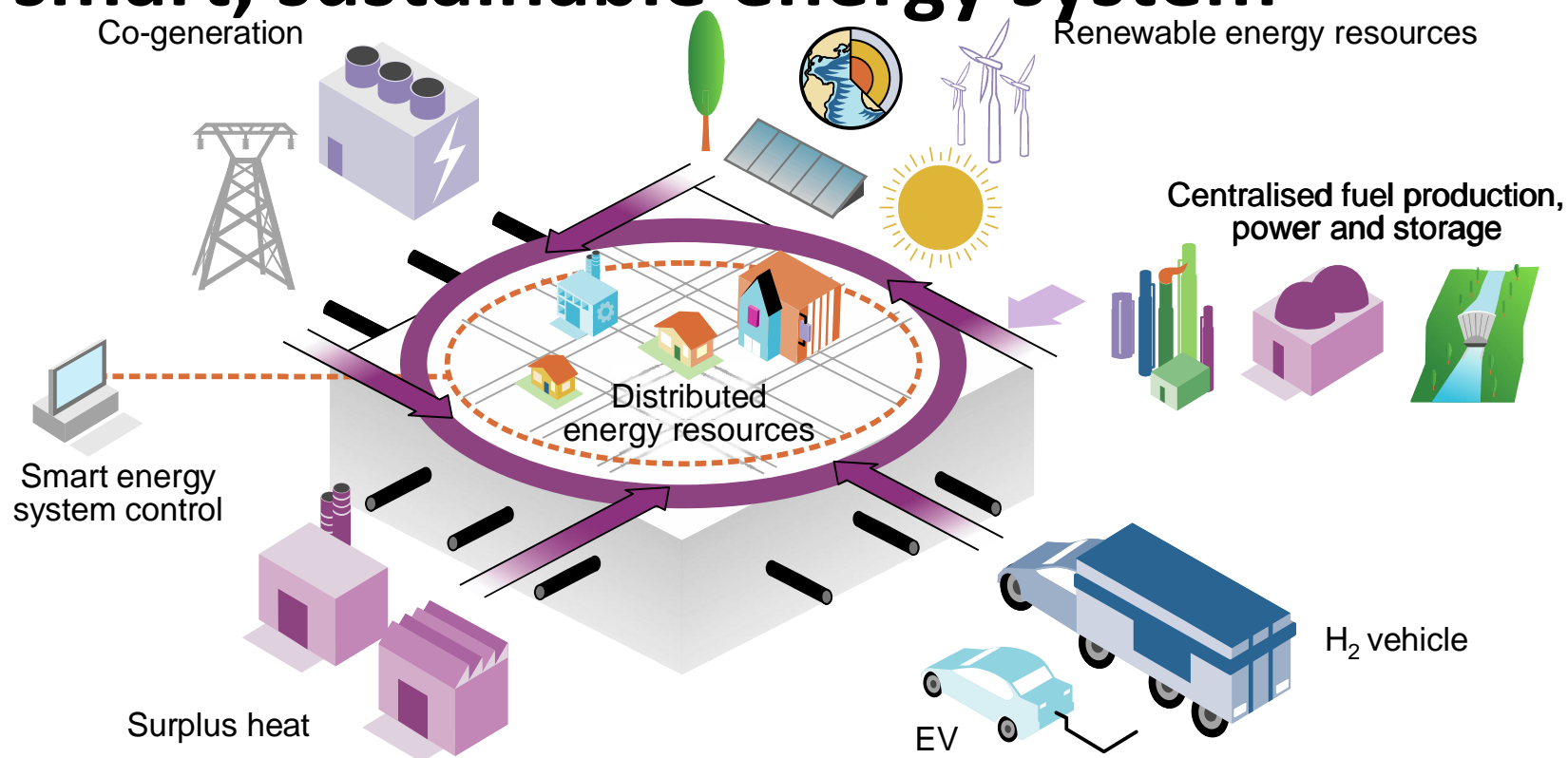


All technologies have a role to play

Technology contributions to reaching the 2DS



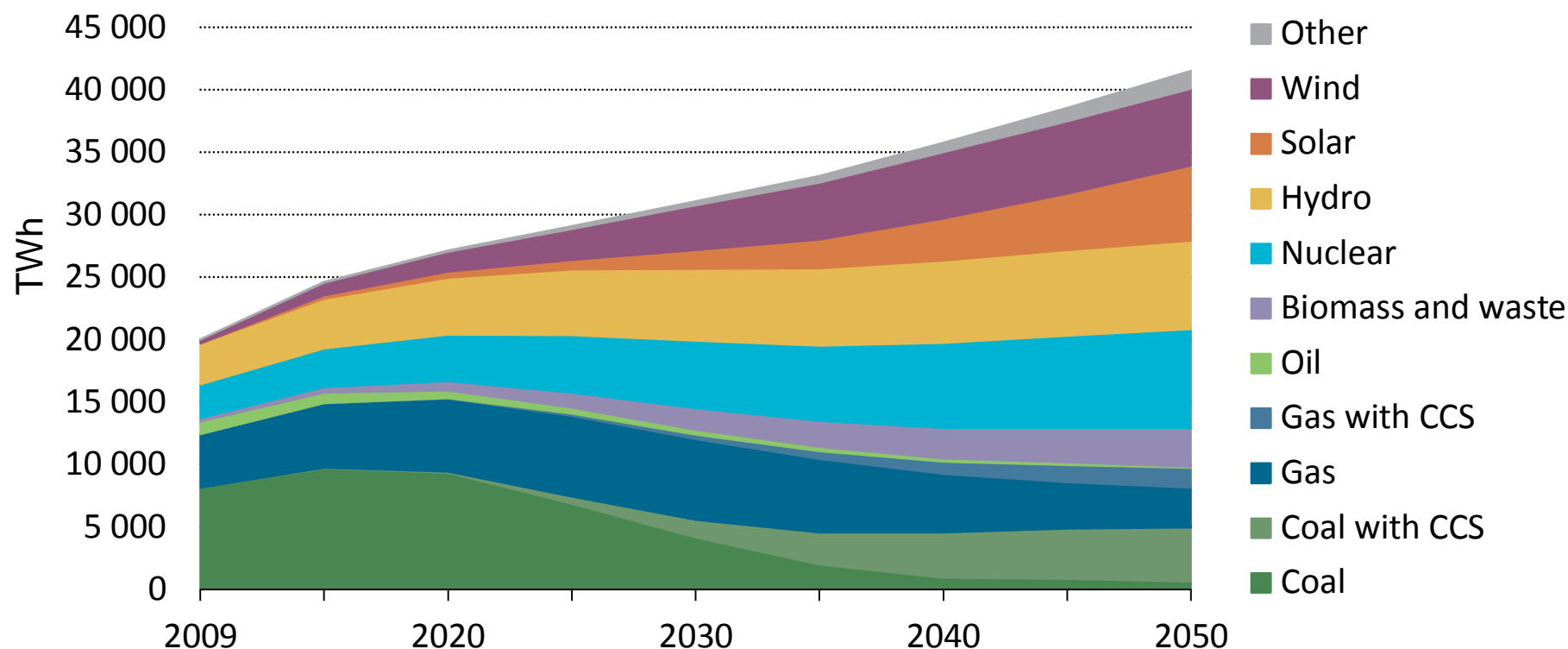
A smart, sustainable energy system



A sustainable energy system is a smarter, more unified and integrated energy system

Low-carbon electricity: a clean core

Global electricity generation in the 2DS



Renewables will generate more than half the world's electricity in 2050 in the 2DS

Technology roadmaps provide answers...

■ Where is technology today?

- “ GW installed capacity/kWh of savings
- “ Leading countries/regions
- “ Cost, efficiency



■ What is the deployment pathway needed to achieve 2050 goals?

- “ Use IEA Energy Technology Perspectives 2DS scenario

■ What are the priority near-term actions?

- “ R&D gaps and how to fill them
- “ Identify barriers and obstacles and how to overcome
- “ Market requirements and policy needs
- “ Technology diffusion/transfer and international collaboration needs



Low-carbon energy technology roadmaps



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...through a common understanding among all stakeholders

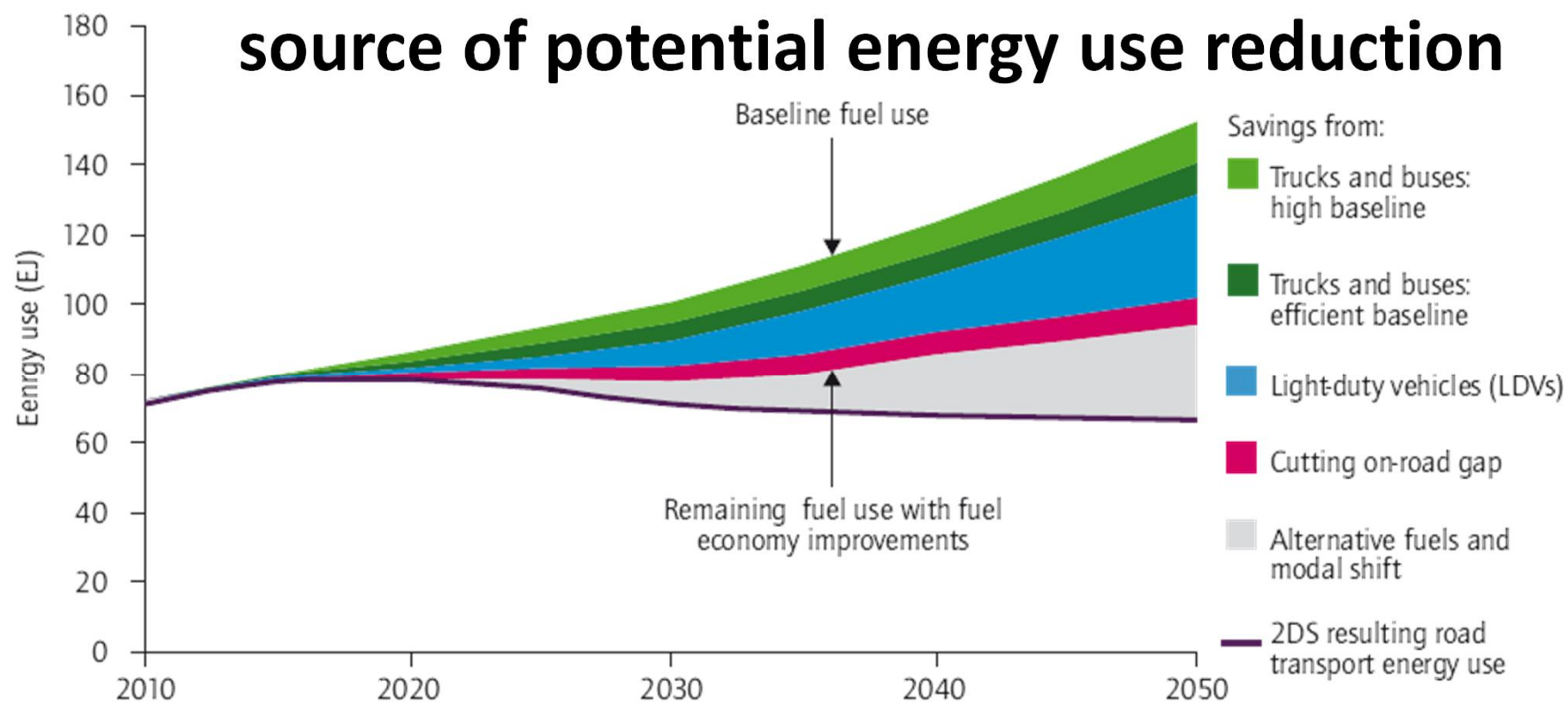
- Goal to achieve
- Milestones to be met
- Gaps to be filled
- Actions to overcome gaps and barriers
- What and when things need to be achieved



Impact of Fuel Economy measures



Fuel economy represent the bigger source of potential energy use reduction



Note: two-wheelers' energy savings do not show up, as the savings are too small to be visible.



Energy technology roadmaps

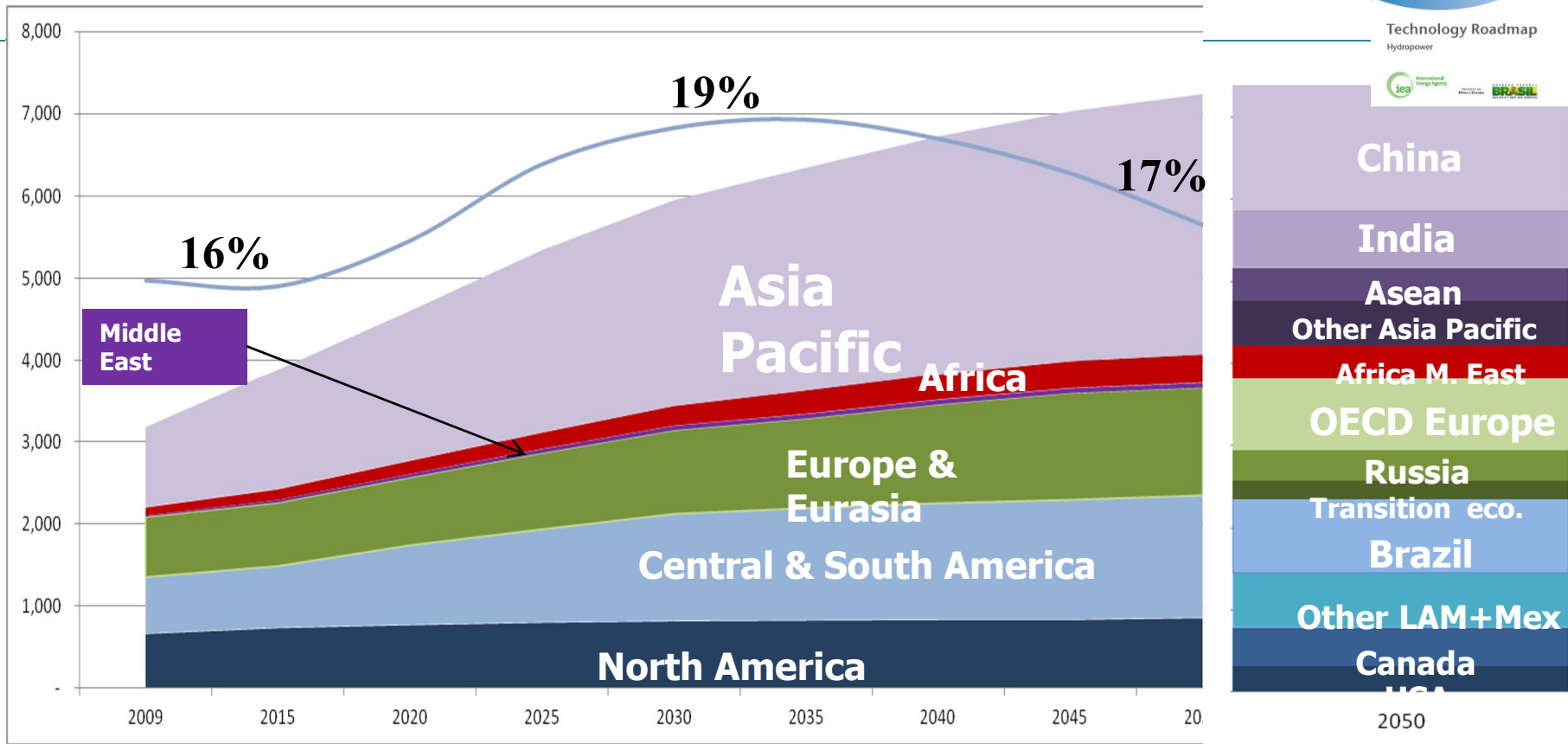


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Vision for Hydropower Roadmap



Technology Roadmap
Hydropower



Hydropower generation will double by 2050 to 7 000 TWh



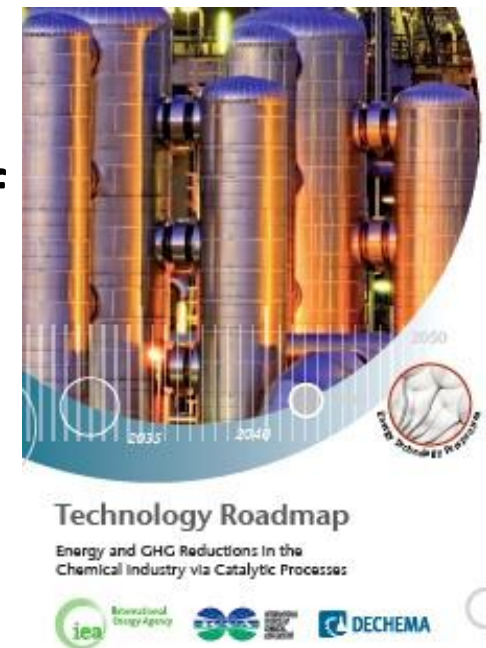
Energy technology roadmaps



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Chemical Roadmap

- Catalyst and related improvements could save 13 EJ and 1 Gt of CO₂ eqCO₂-eq per year by 2050.
- Deeper energy & emissions cuts will require emerging technologies that exceed the capacity of current BPTs.
- Hydrogen and sustainable biomass are potential “Game changer” technologies
- Long-term investment and support for R&D is needed to continue advances in new technologies.



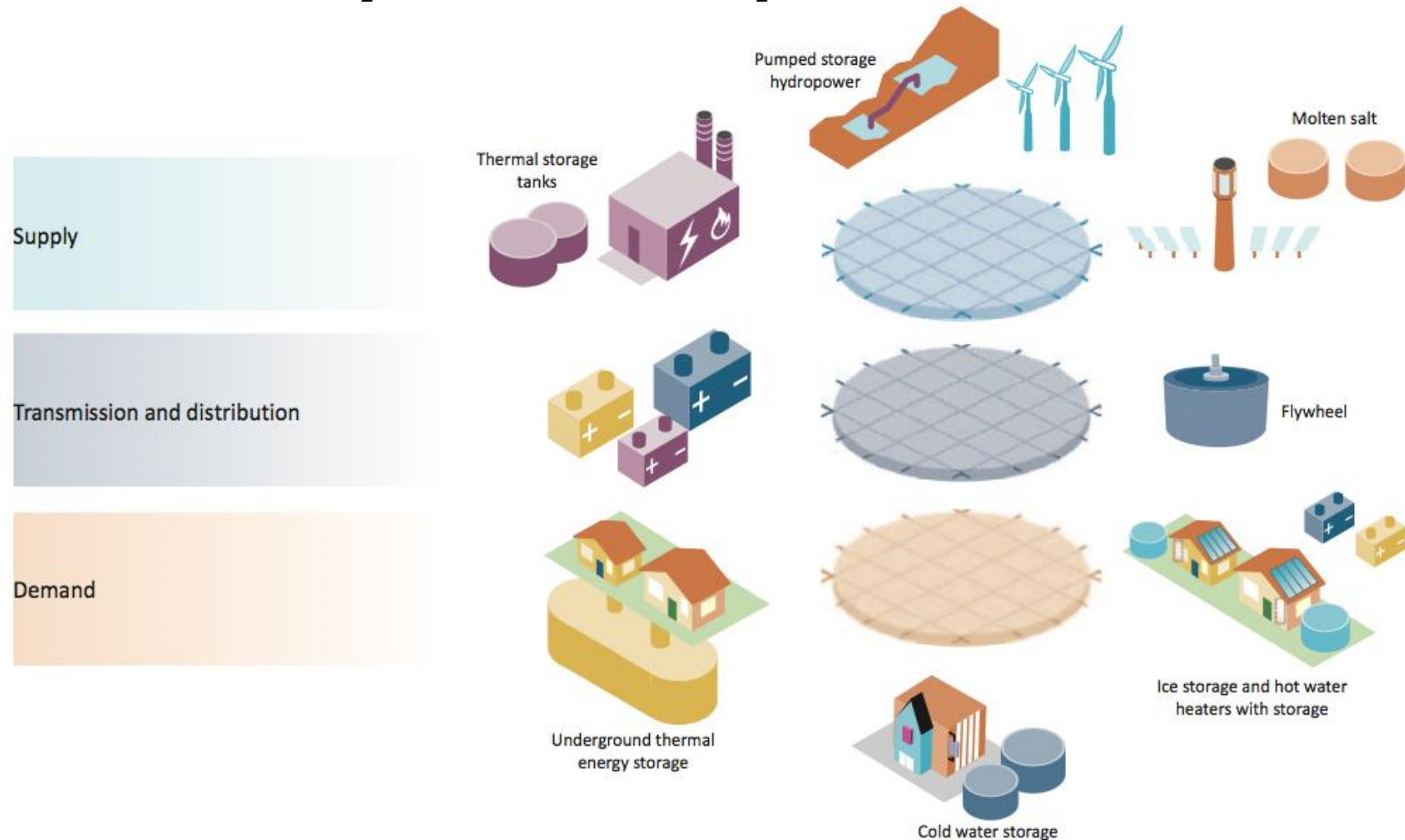
Energy technology roadmaps



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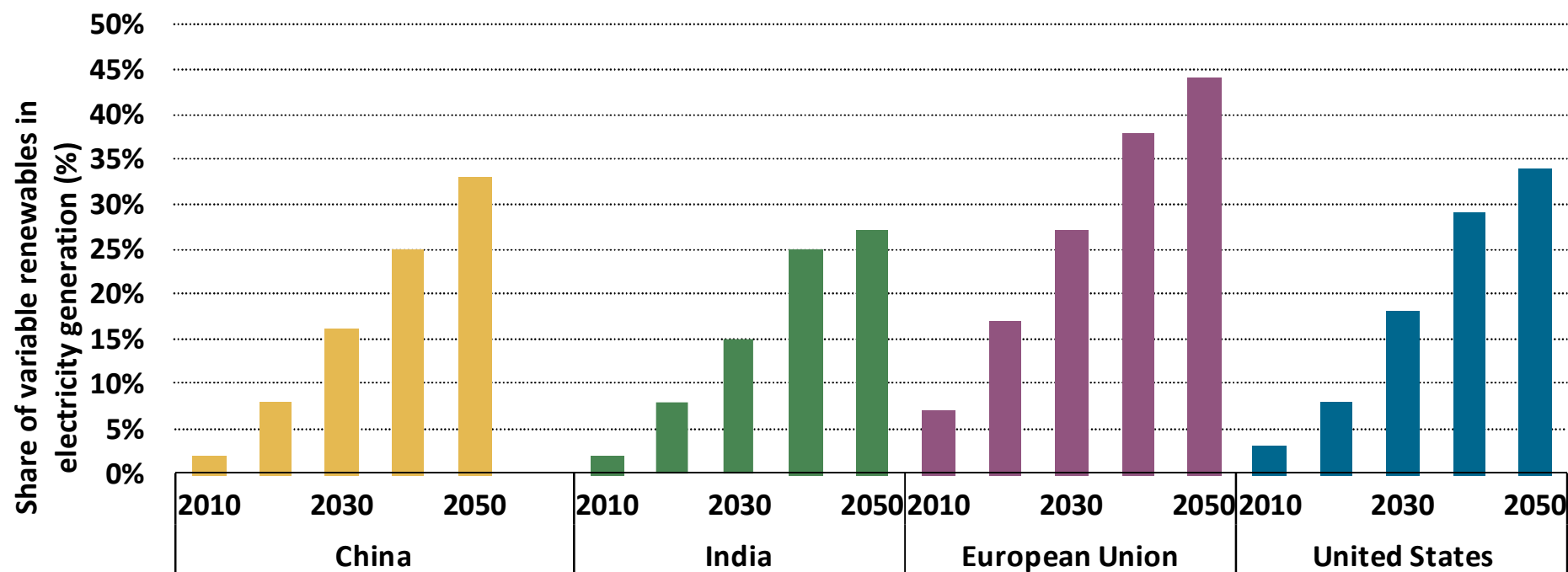


Energy storage can help to better integrate our electricity and heat systems



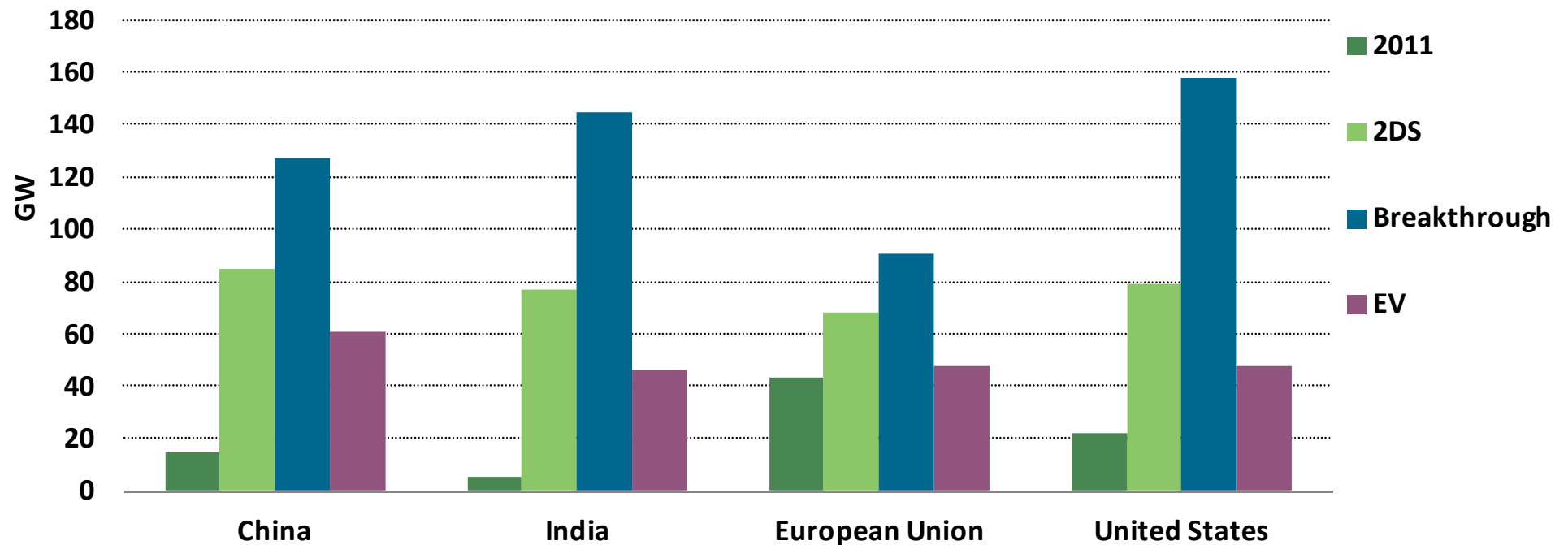


Storage can help to integrate higher levels of variable renewables



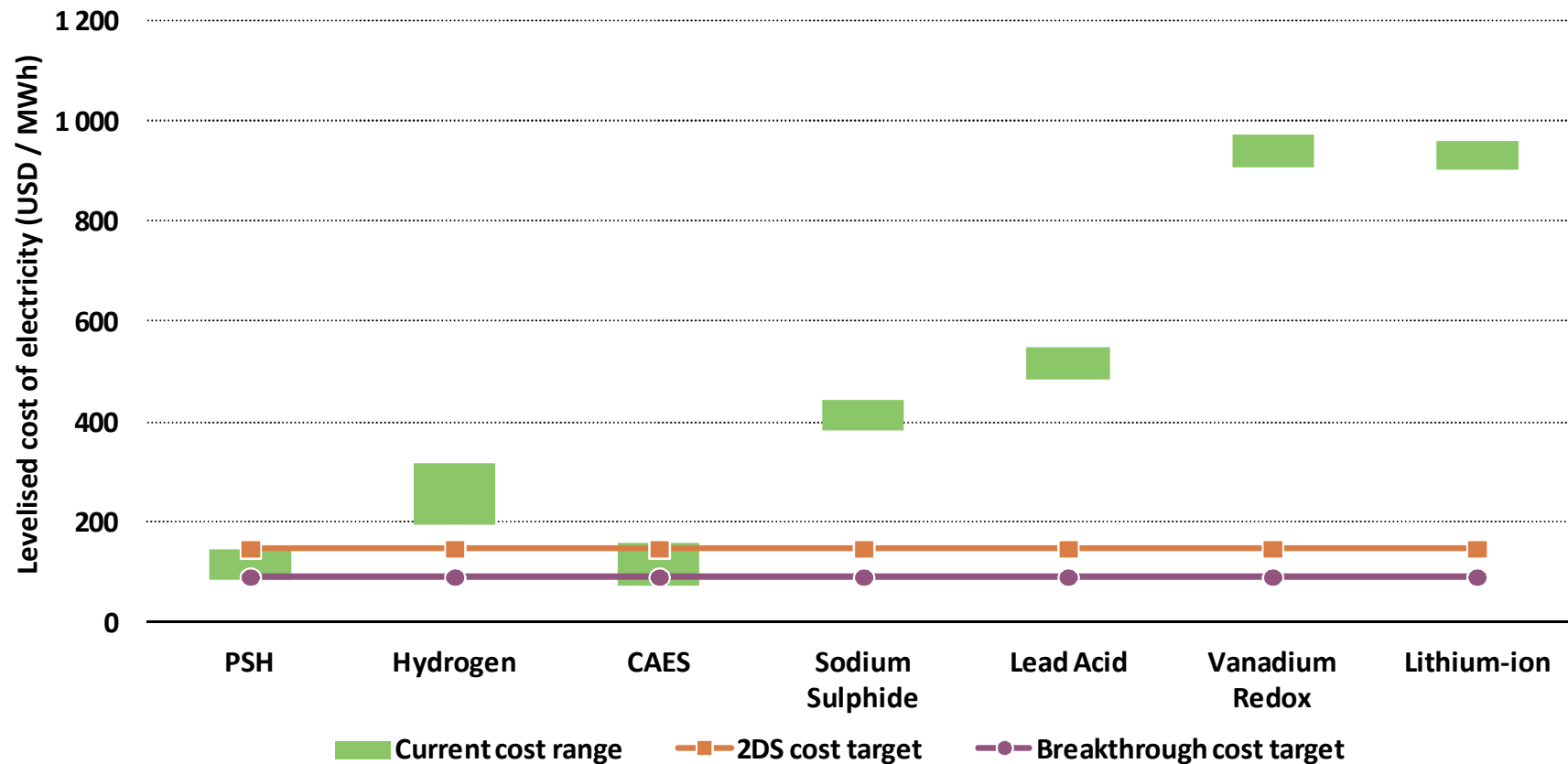


2DS vision for storage in the electricity systems





Sharp Declines in Costs Needed



Thank you

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