



International
Energy Agency

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Implementing Climate Action through Global Energy Technology Innovation

The importance of international collaboration

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www.iea.org

- **First clear signs of decoupling of CO₂ emissions and GDP**
 - *Global energy-related CO₂ emissions flattened in 2015 after their slowest historical increase in 2014 , despite growing GDP*
 - *Renewable power capacity at record high with over 150 GW installed in 2015*
- **COP21 provided a historic push for clean energy**
 - *Start of a new era of collaboration: Country-based approaches preferred to top-down regulation*
 - *New goals put forward – going beyond what everyone already considered challenging when our first ETP was released in 2006*
- **Growing recognition that greater innovation is essential to meet ambitious climate goals**

INDCs: COP 21's success story

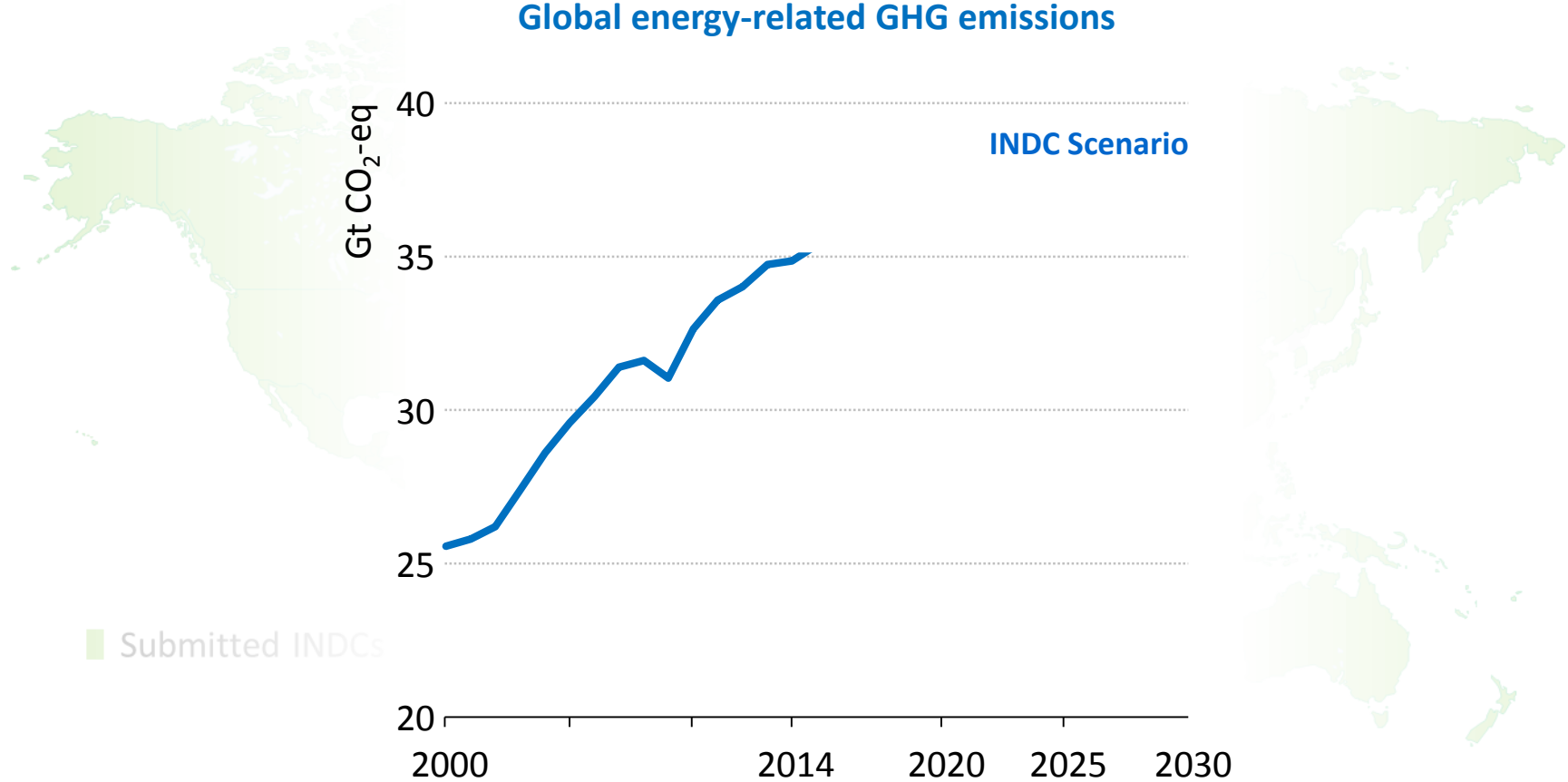


**By the end of COP 21: 160 INDCs, covering 187 countries.
These countries produce >95% of energy-related GHGs.**

INDCs: COP 21's success story



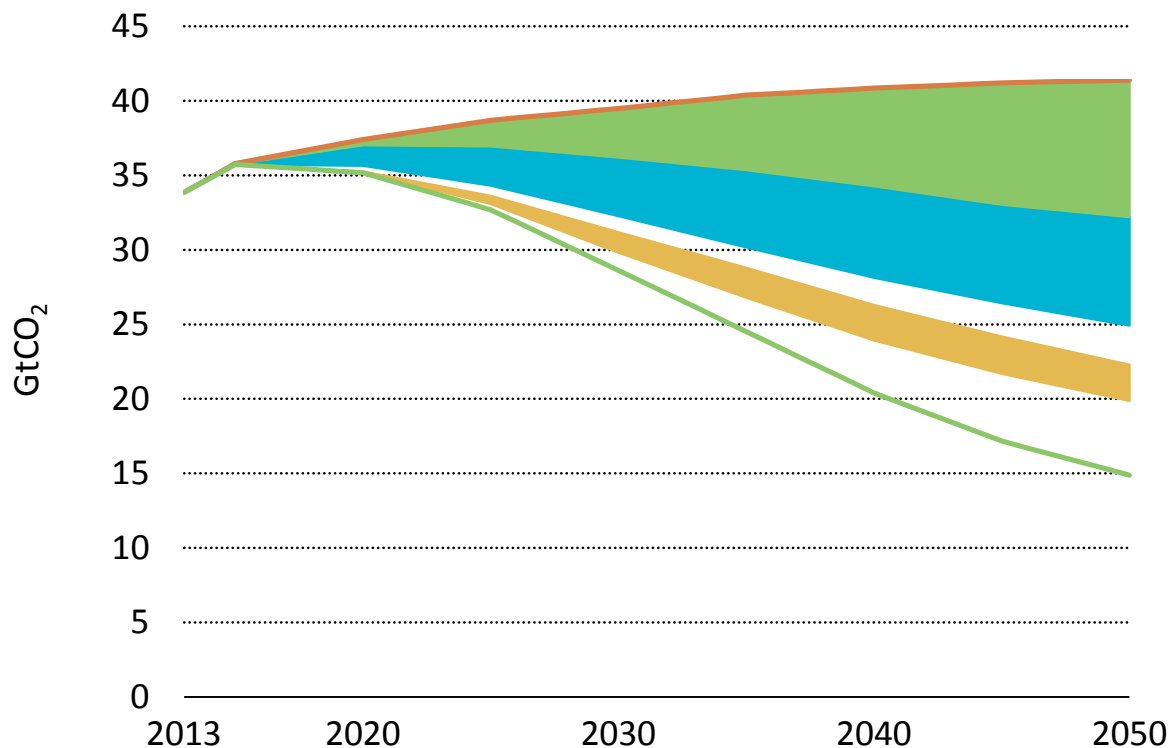
Global energy-related GHG emissions



By the end of 2015, 160 INDCs covered historic 187 countries.
 The cumulative emissions path covers 95% of energy-related GHGs.

Energy Innovation is crucial to a sustainable energy transition

Contribution of technology area to global cumulative CO₂ reductions

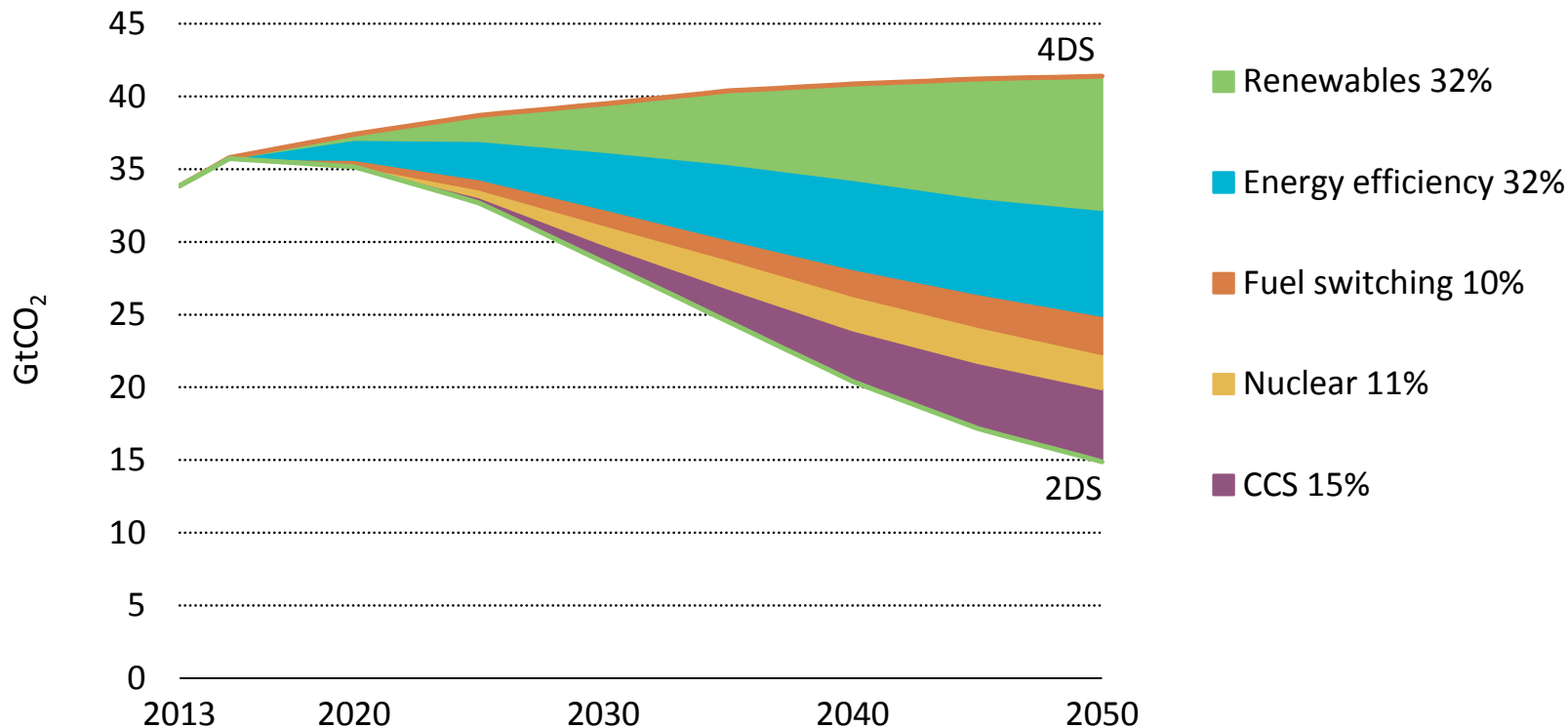


Energy innovation has already yielded solutions,

ETP
2016

Energy Innovation is crucial to a sustainable energy transition

Contribution of technology area to global cumulative CO₂ reductions

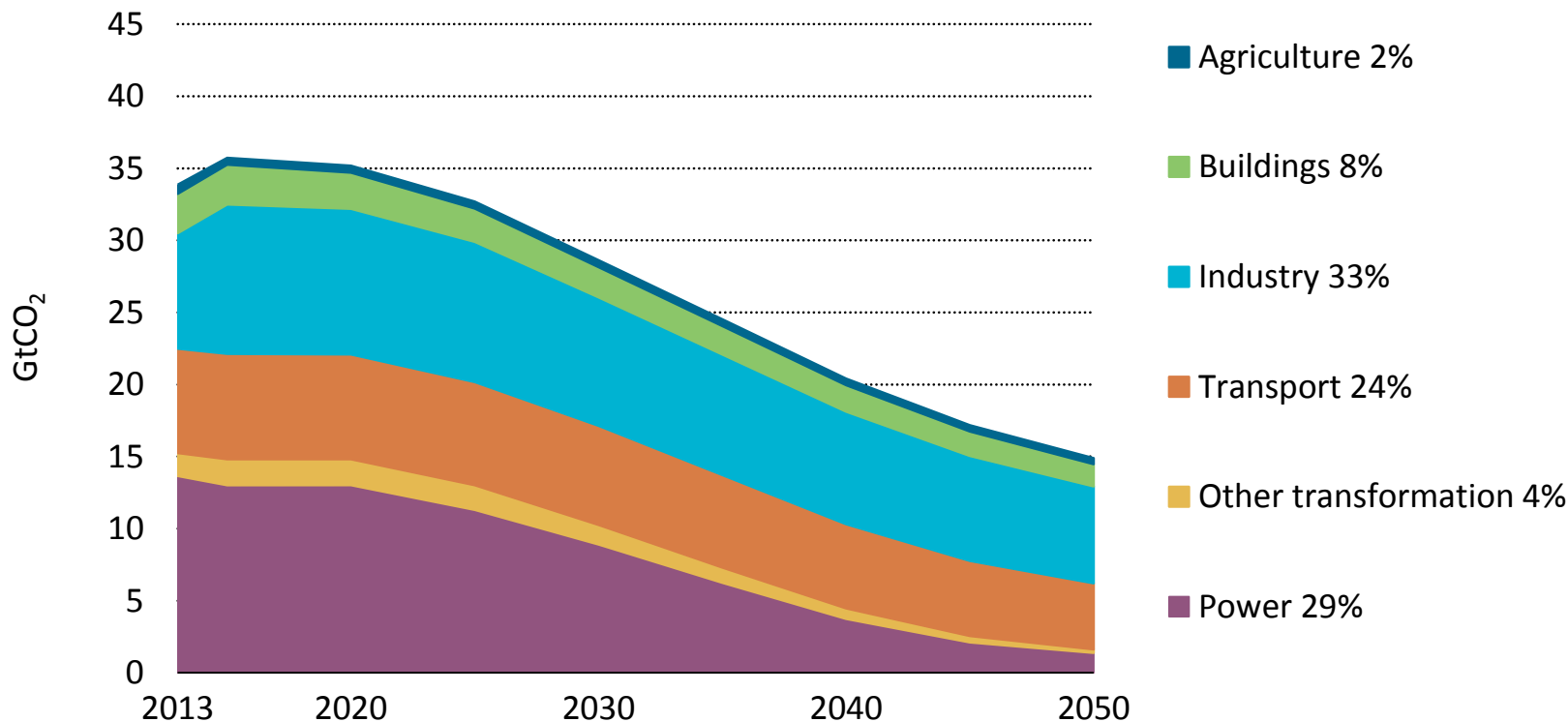


Energy innovation has already yielded solutions, but needs support and guidance to deliver on its promises

ETP
2016

And the challenge increases to get from 2 degrees to “well below” 2 degrees

Energy- and process-related CO₂ emissions by sector in the 2DS

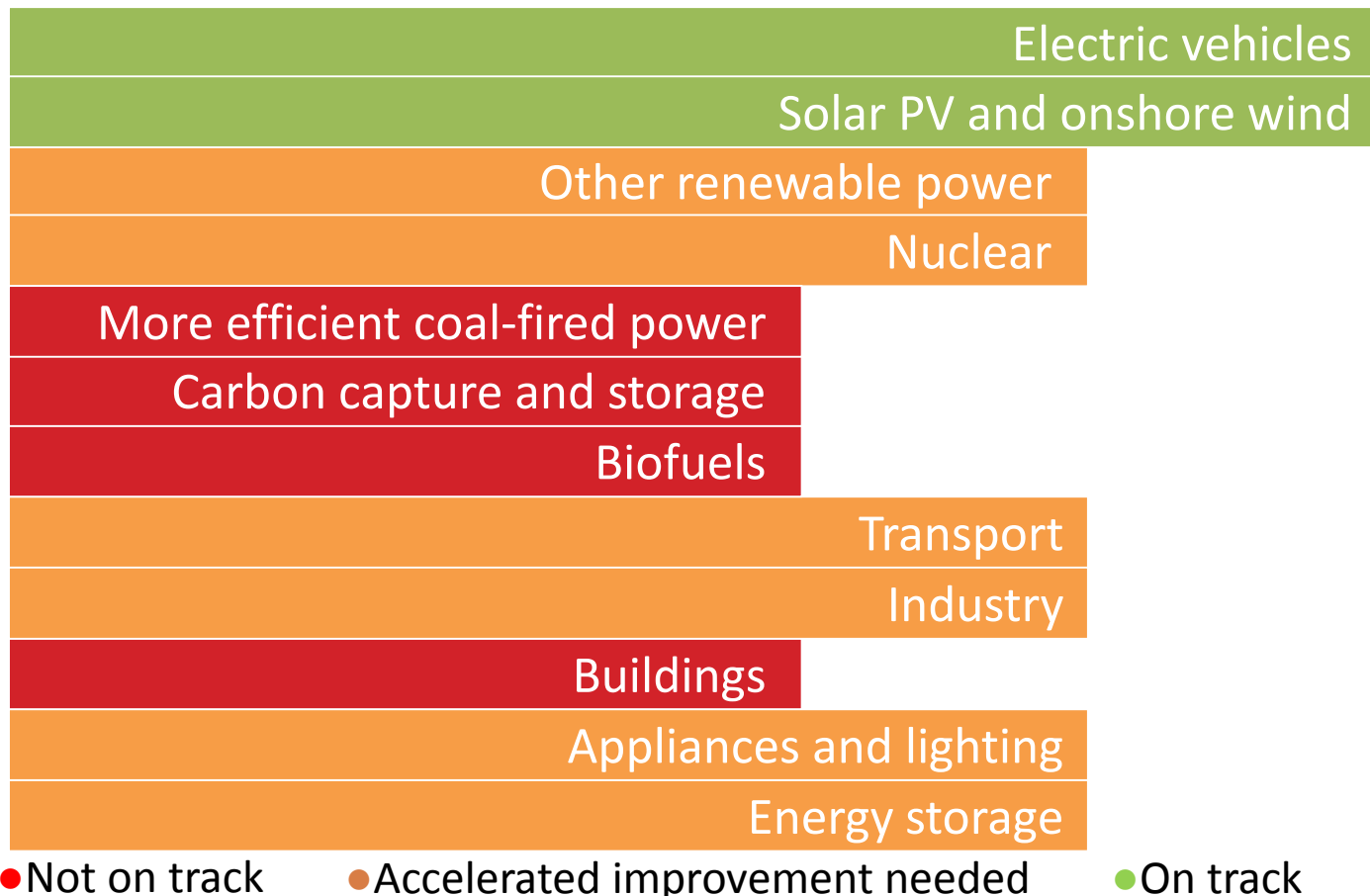


Industry and transport account for 75% of the remaining emissions in the 2DS in 2050.

ETP
2016

Progress in clean energy needs to accelerate

Technology Status today against 2DS targets



Clean energy deployment is still overall behind what is required to meet the 2°C goal, but recent progress on electric vehicles, solar PV and wind is promising

ETP
2016

Supporting Energy Innovation: The right policy at the right time

Market deployment

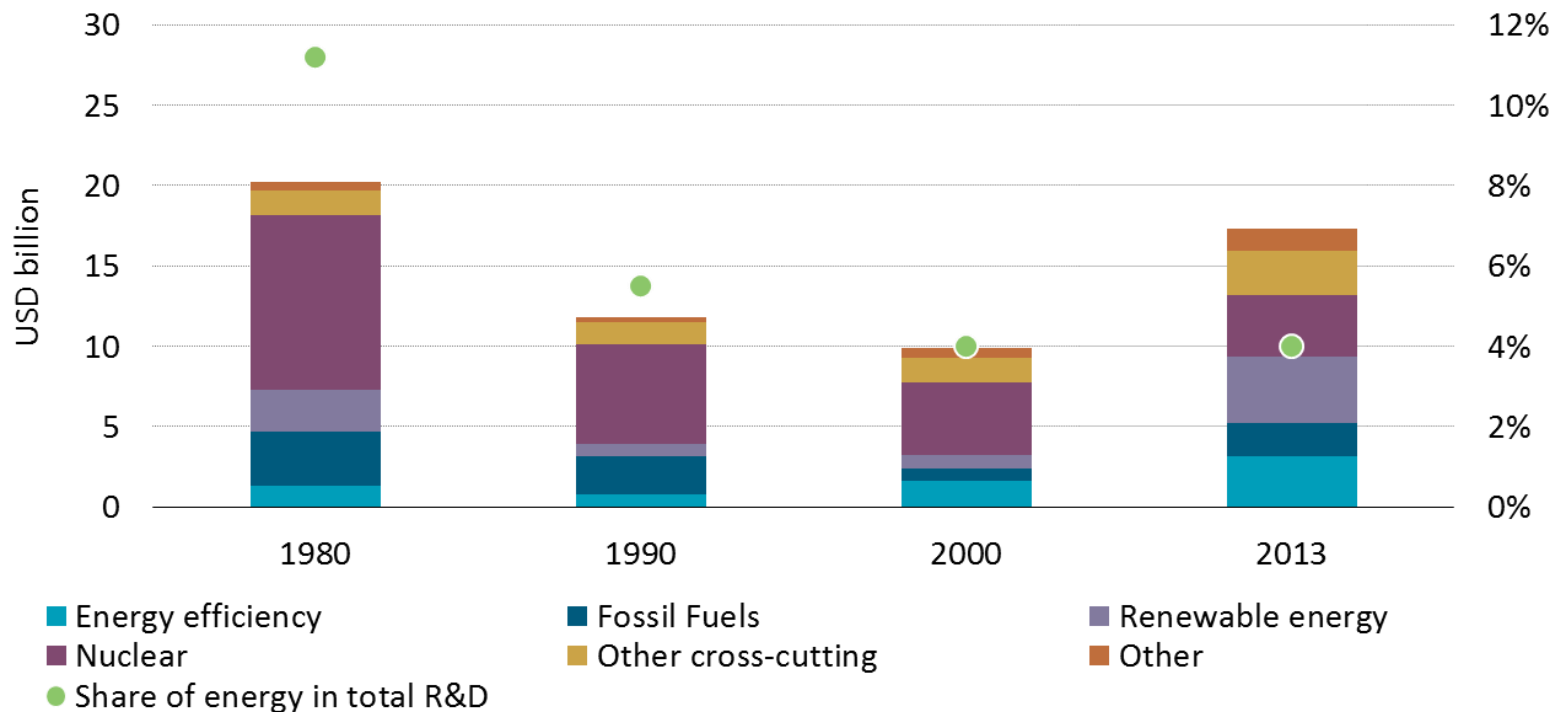
Time

The right support depends on the maturity of the technology and the degree of market uptake

ETP
2015

Energy RD&D funding now targets the right issues, but is not enough

IEA government Energy RD&D expenditure



Energy RD&D spending should reflect the importance of energy technology in meeting climate objectives

ETP
2015

Innovation in a diverse world: no “one-size fits all” solution

Different regions have differing technology shares today and in 2050-2DS

*National circumstances and resources will drive
different technology portfolios and pathways*

ETP
2015

Better understanding innovation can increase confidence in its outcomes

Linear model of innovation process



In order to accelerate technological progress in low-carbon technologies, innovation policies should be systemic

ETP
2015

IEA Technology Roadmaps

Mapping where we need to go

2009

2010

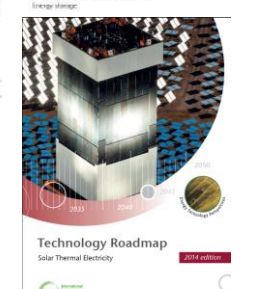
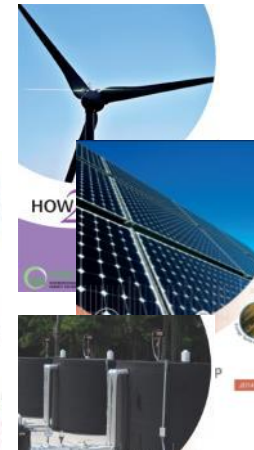
2011

2012

2013

2014

2015



2016

Smart Grids Update

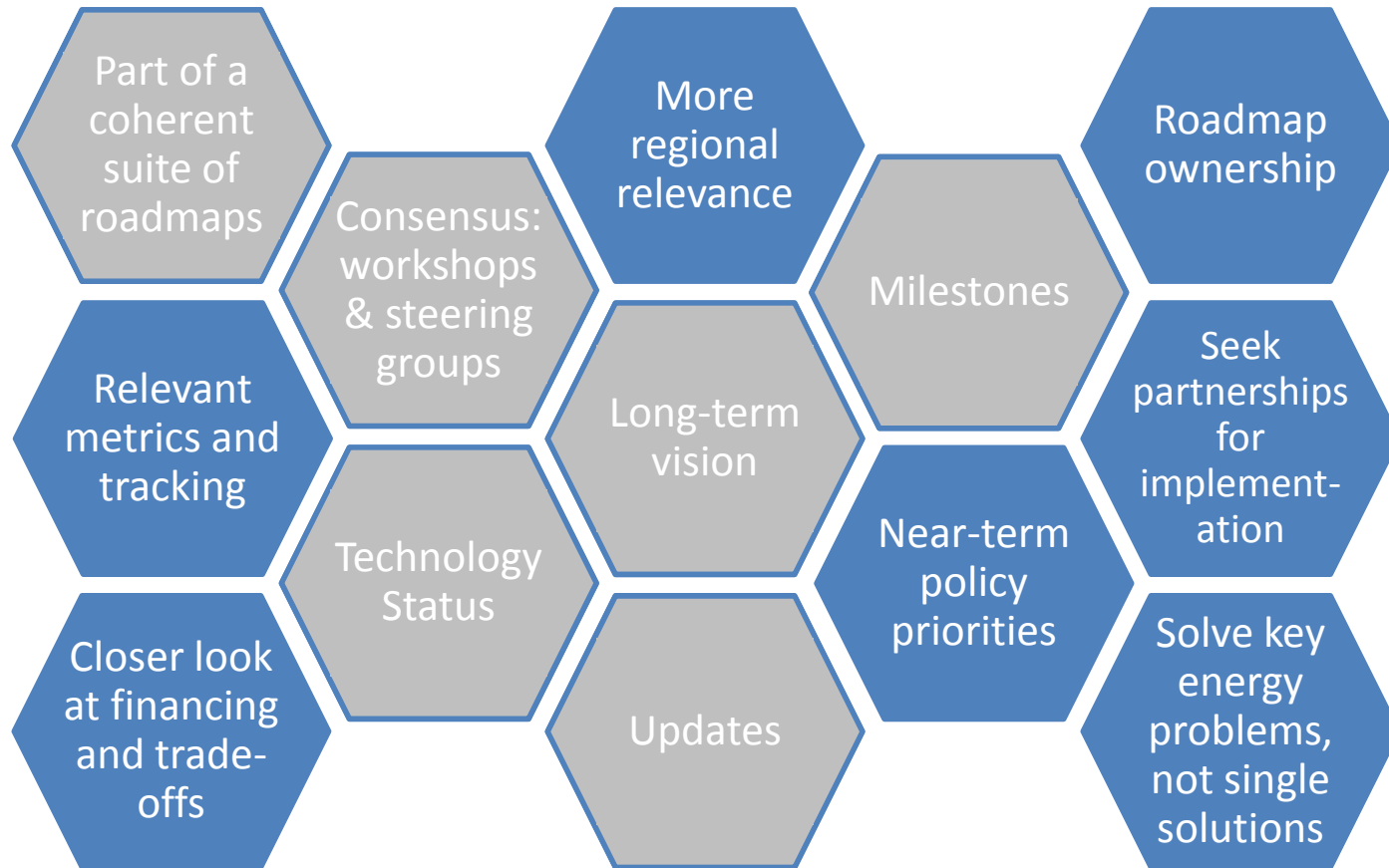
<https://www.iea.org/roadmaps/>

Low-Carbon Technology Roadmaps

- 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



Building a new cycle on existing foundations

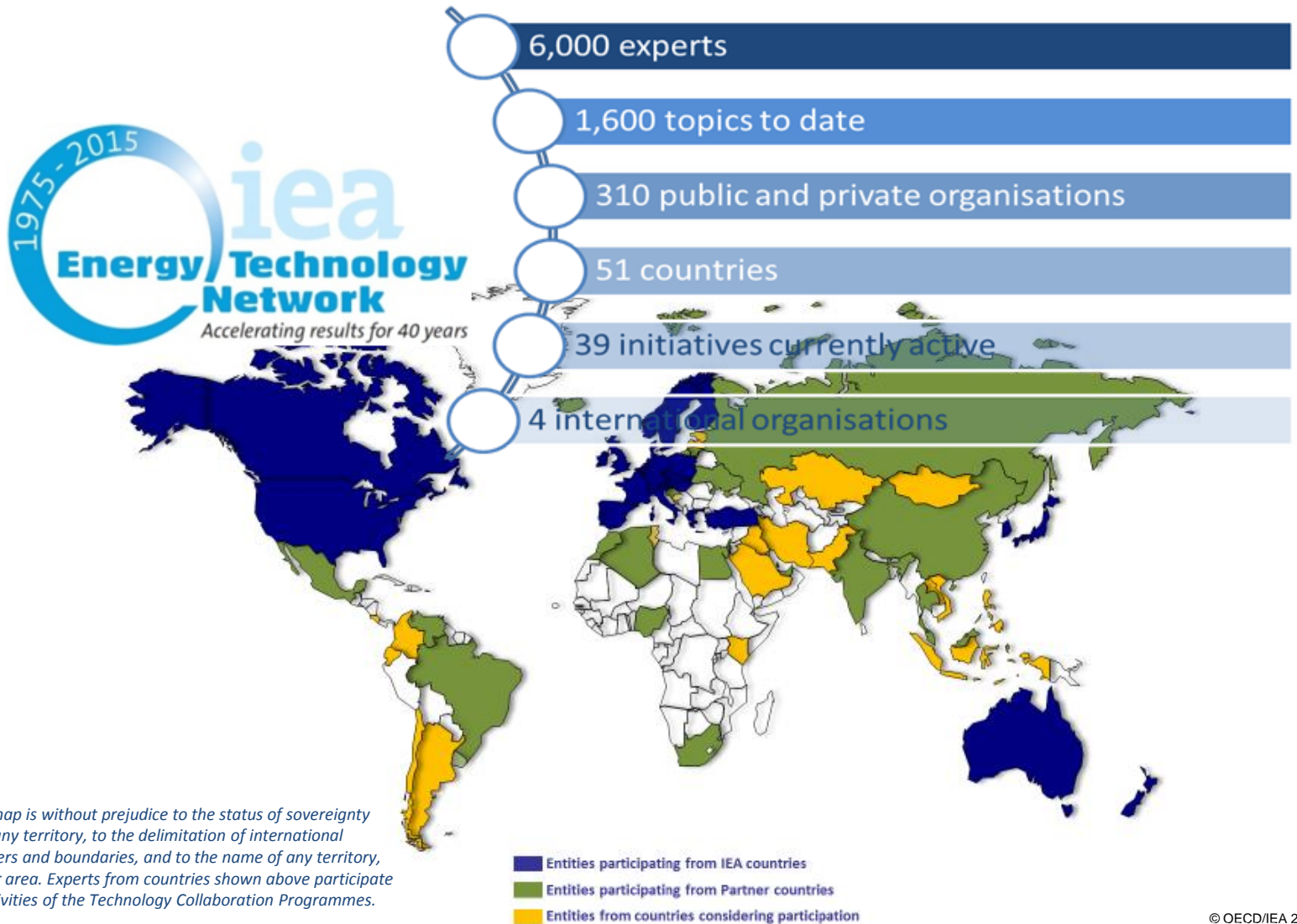


Low-Carbon Technology Roadmaps



Sharing knowledge through the IEA Technology Collaboration Programmes

www.iea.org



This map is without prejudice to the status of sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area. Experts from countries shown above participate in activities of the Technology Collaboration Programmes.

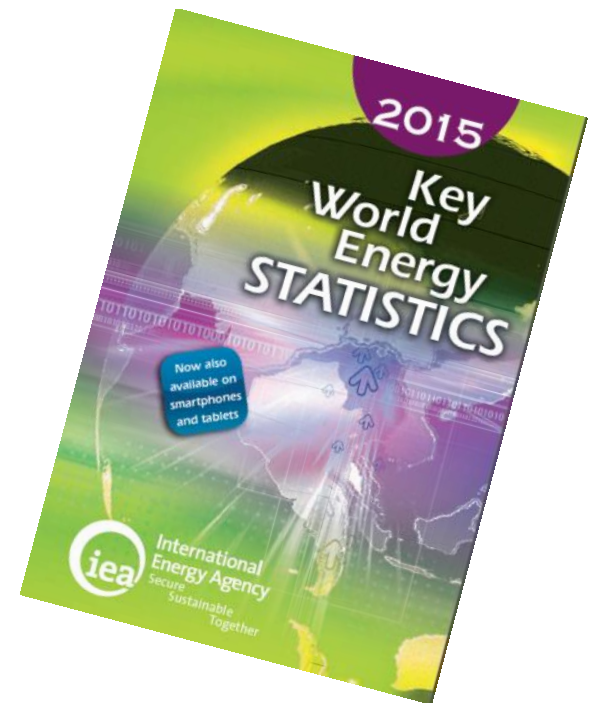
- Where do we need to go?
- Where are we today?
- How do we get there?



Explore the data behind *ETP*



www.iea.org/etp



www.iea.org/statistics



International
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Secure • Sustainable • Together

- ***Energy Security***
- ***Environmental Protection***
- ***Economic Growth***
- ***Engagement Worldwide***

ETP 2014

ETP 2015

ETP 2016

ETP 2017

ETP 2018

Part 1. Setting the Scene

Global Outlook, Tracking Clean Energy Progress

Part 2. Driving the Change (Thematic Focus)

Harnessing Electricity's Potential

Mobilising Innovation to Accelerate Climate Action

Building Urban Energy Systems

Re-Defining Clean Energy Technology Ambitions

TBD
Investing in sustainable infrastructure

Partner Country

India

China

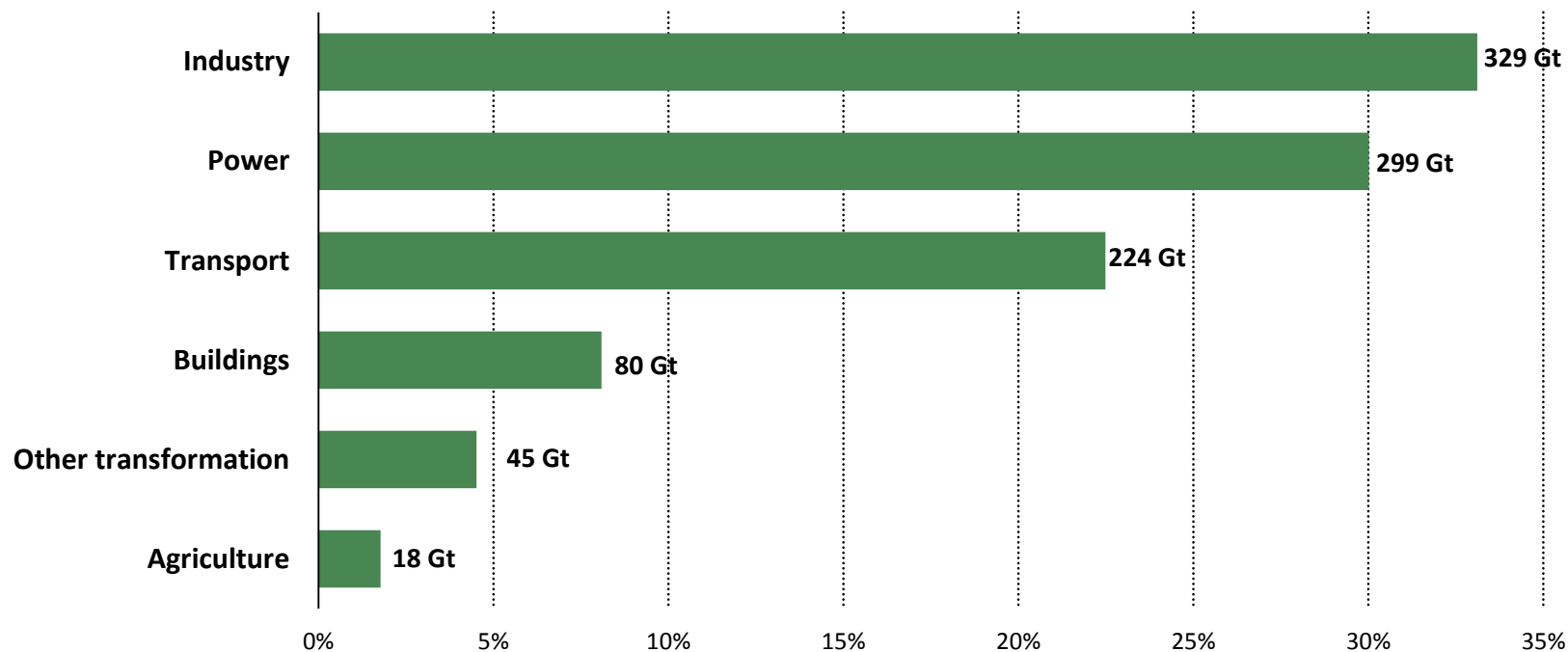
Mexico

None
(Global focus)

TBD
(Indonesia; Russia; Brazil)

Industry, Power and Transport will be the greatest emitters in the 2DS

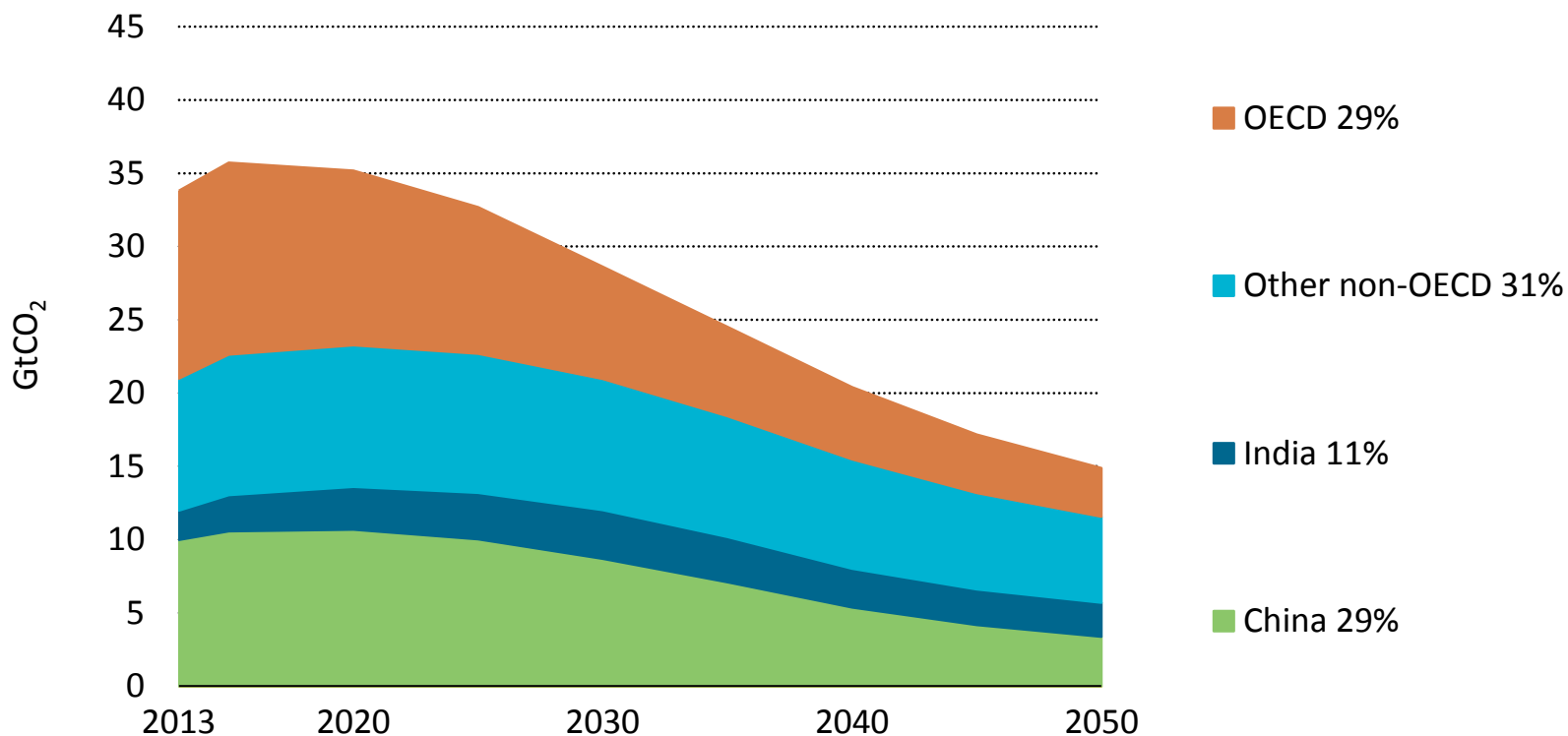
Cumulative energy- and process-related CO₂ emissions by sector in the 2DS, 2013-2050



Industry, power, and transport account for 85% of cumulative direct CO₂ emissions between 2013 and 2050 in the 2DS

Developed and emerging economies need to work together

Energy- and process-related CO₂ emissions by region in the 2DS



*In 2013, OECD made up 38% of total emissions.
In 2050 OECD makes up 22% of emissions*