

# COP21とパリ協定の意義 及び今後の課題

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CIGSエネルギー環境セミナー



# アジェンダ

- 国際エネルギー機関(IEA)と気候変動
- COP21とパリ協定の評価
- 今後の課題



# 国際エネルギー機関(IEA)

- 1974年設立、加盟国:29か国
- The IEA's 4 “E”s
  - Energy security
  - Economic growth
  - Environmental sustainability
  - Engagement worldwide
- 環境・気候変動ユニット(2013~2016)

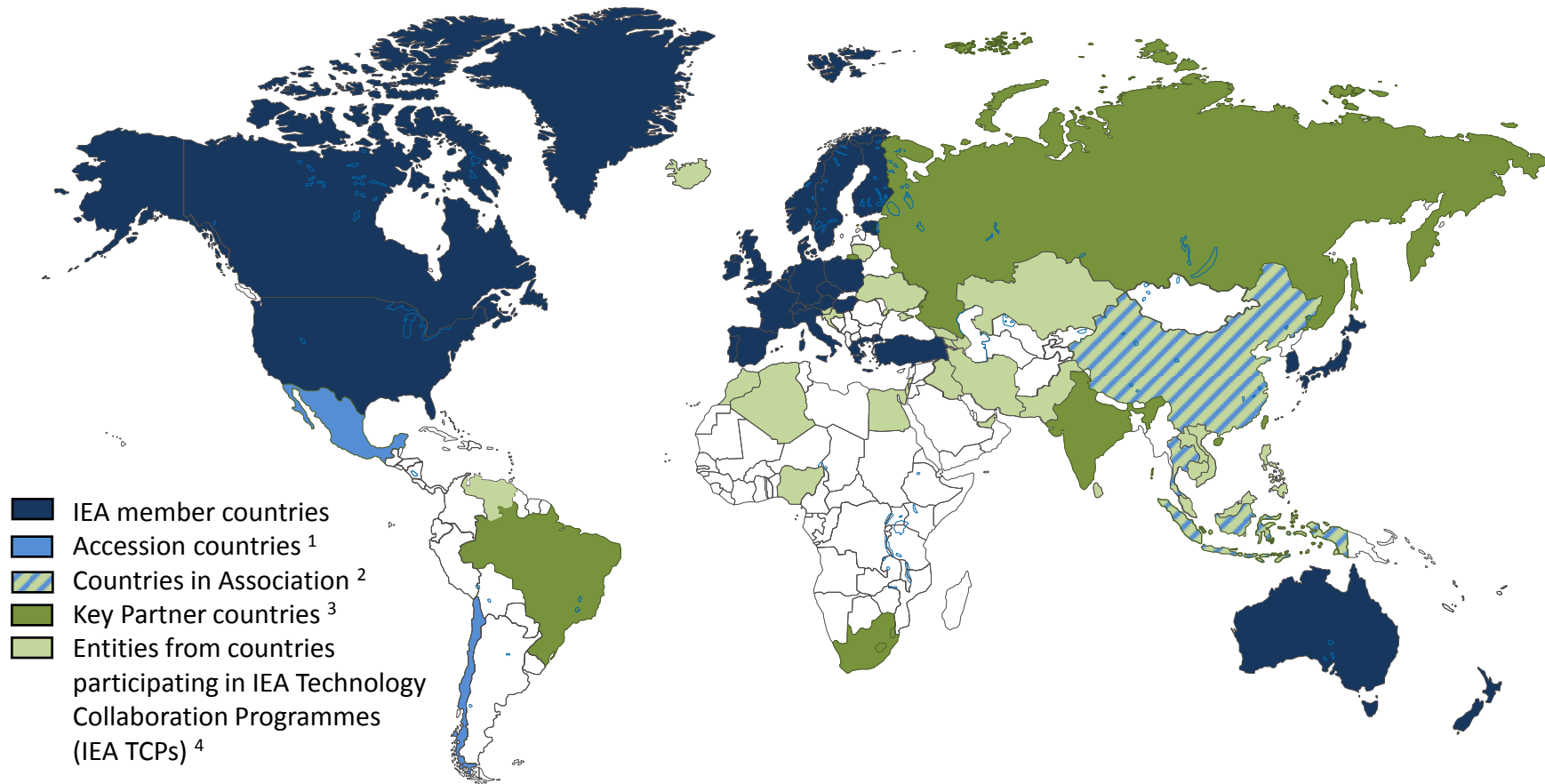


# IEAの新たな役割

- I. “Opening its doors” to the emerging economies
- II. Taking on a new role to safeguard natural gas security
- III. Becoming a global Clean Energy Hub



# IEA engagement worldwide



1. Accession countries are OECD member countries that have begun the formal process to become a full member of the IEA.
2. Countries in Association are partner countries with which the IEA has established joint activities.
3. Key Partner countries are countries with which the IEA is seeking enhanced engagement.
4. IEA member countries (except Estonia, Luxembourg and the Slovak Republic), Accession countries, Countries in Association (except Indonesia) and key Partner countries also participate in IEA TCPs. Entities participating in (signatories to) IEA TCPs may represent governmental or non-governmental organisations. The Economic Community of West African States (ECOWAS), the European Commission (EC), ITER, the Organisation for Petroleum Exporting Countries (OPEC), the Regional Centre for Renewable Energy and Energy Efficiency (RCREEE, located in Egypt), and the United Nations Industrial Development Organisation (UNIDO) are also participants in IEA TCPs.

*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.*



# UNFCCC: 交渉の歴史

- UNFCCC (1992)

気候変動枠組条約 1994年発効

- Kyoto Protocol (COP3, 1997) to Marrakesh Accord (COP7, 2001)

京都議定書 2005年発効

- Bali Action Plan (COP13, 2007) to Copenhagen Accord (COP15, 2009) / Cancun Agreements (COP16, 2010)

コペンハーゲン/カンクン合意

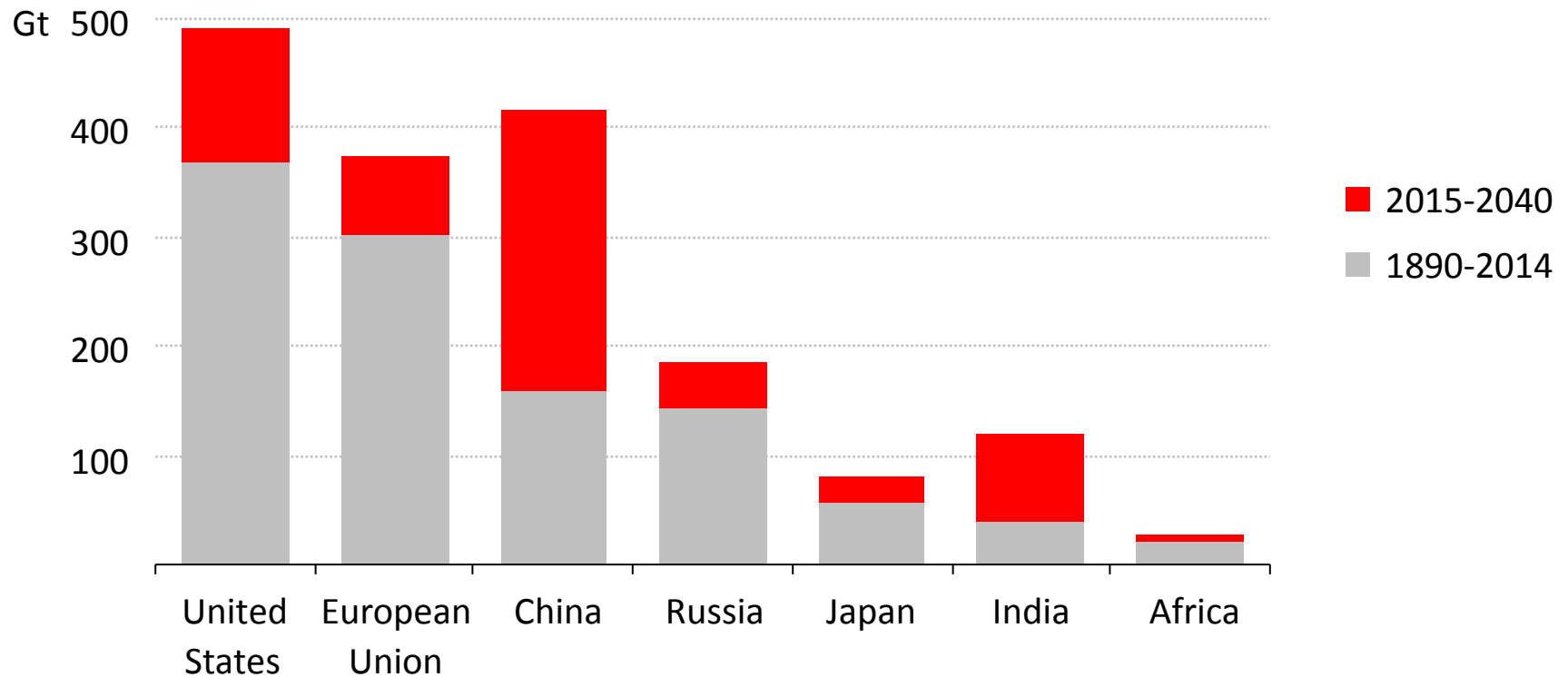
- Durban Platform (COP17, 2011) to Paris Agreement (COP21, 2015)

パリ協定 ？？年発効



# Emissions burden moves over time

## Cumulative energy-related CO<sub>2</sub> emissions by region

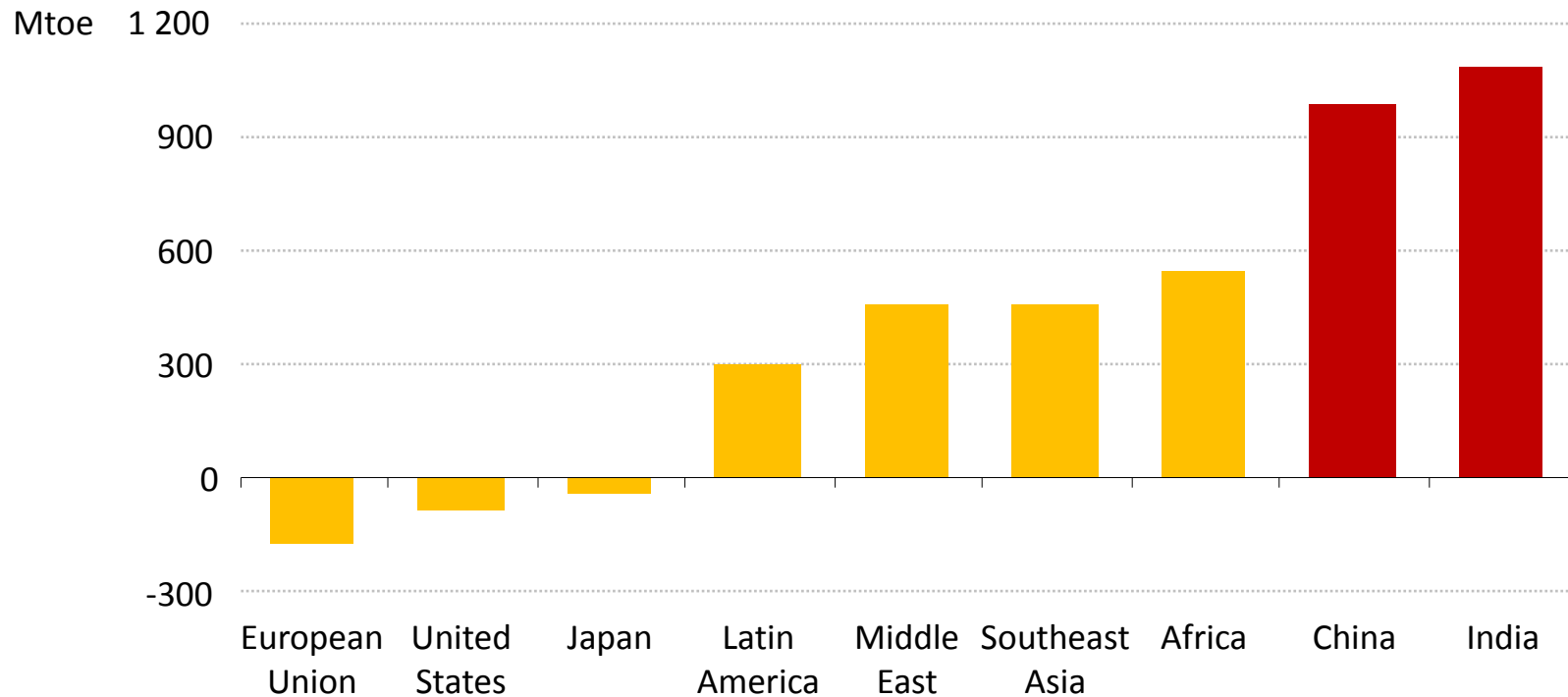


*Past emissions are important, although the source of emissions shifts with changes in the global economy*



# Global energy demand growth concentrates in Asia

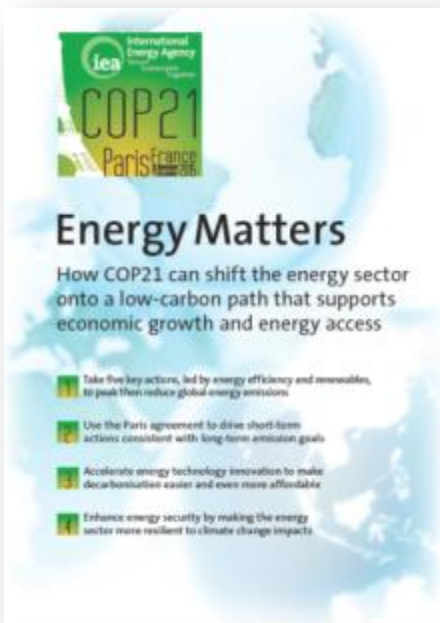
Change in energy demand in selected regions, 2014-2040



***Energy use worldwide grows by one third to 2040, driven by Asia; EU energy demand declines by 15% over the period***



# IEA key messages to COP21



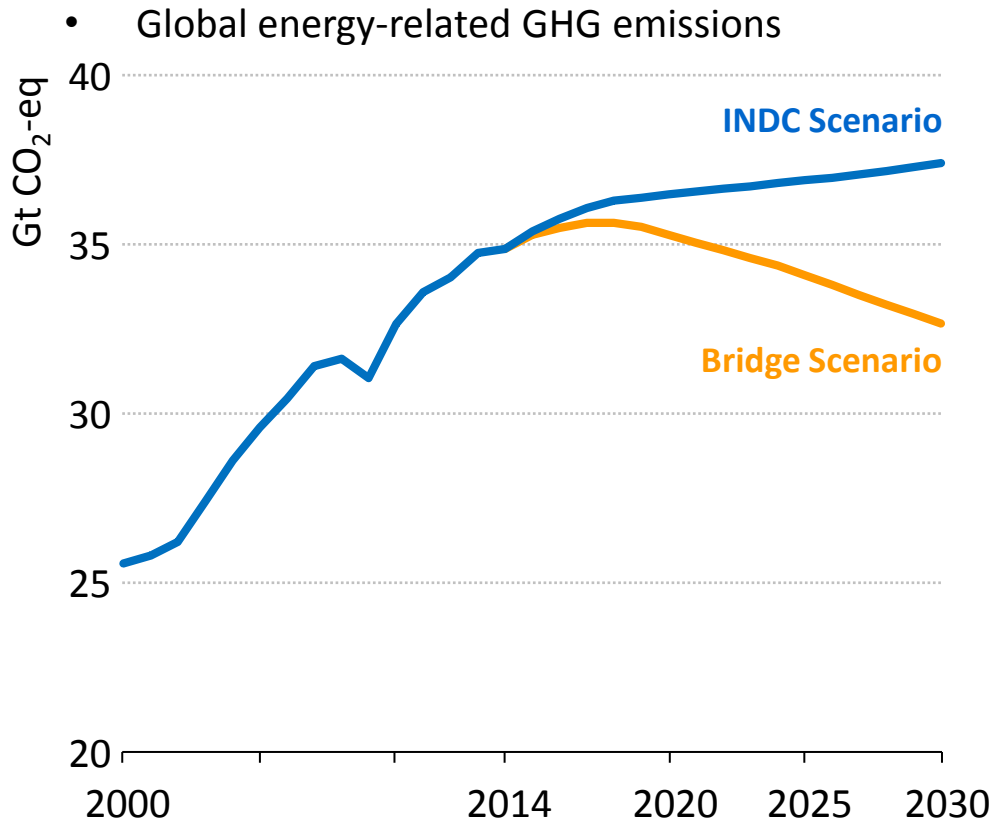
To shift the energy sector onto a low-carbon path that supports economic growth & energy access:

1. Take five key actions, led by energy efficiency & renewables, to peak then reduce global energy emissions
2. Use the Paris Agreement to drive short-term actions consistent with long-term emission goals
3. Accelerate energy technology innovation to make decarbonisation easier and even more affordable
4. Enhance energy security by making the energy sector more resilient to climate change impacts

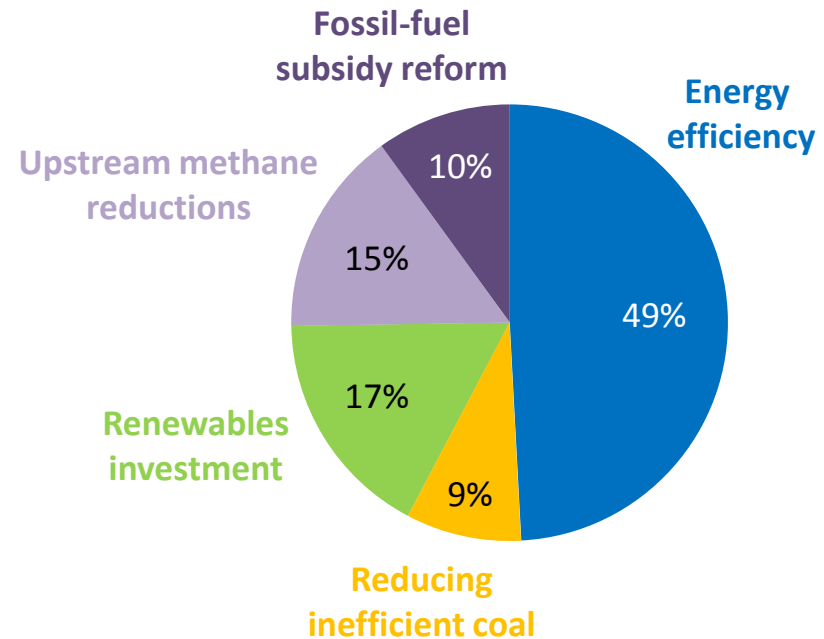




# 1. Take Key Five Actions



Savings by measure, 2030

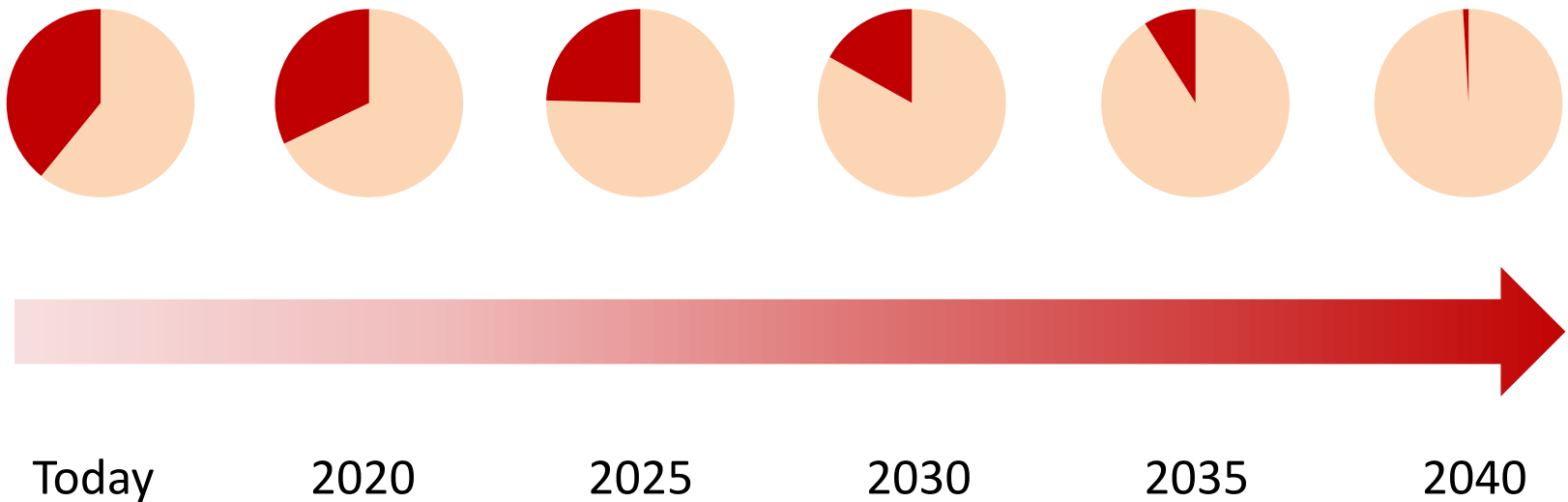


- Five measures – shown in a “Bridge Scenario” – achieve a peak in emissions
- around 2020, using only proven technologies & without harming economic growth



## 2. Five-year revision: World's carbon budget is shrinking

World's remaining carbon budget

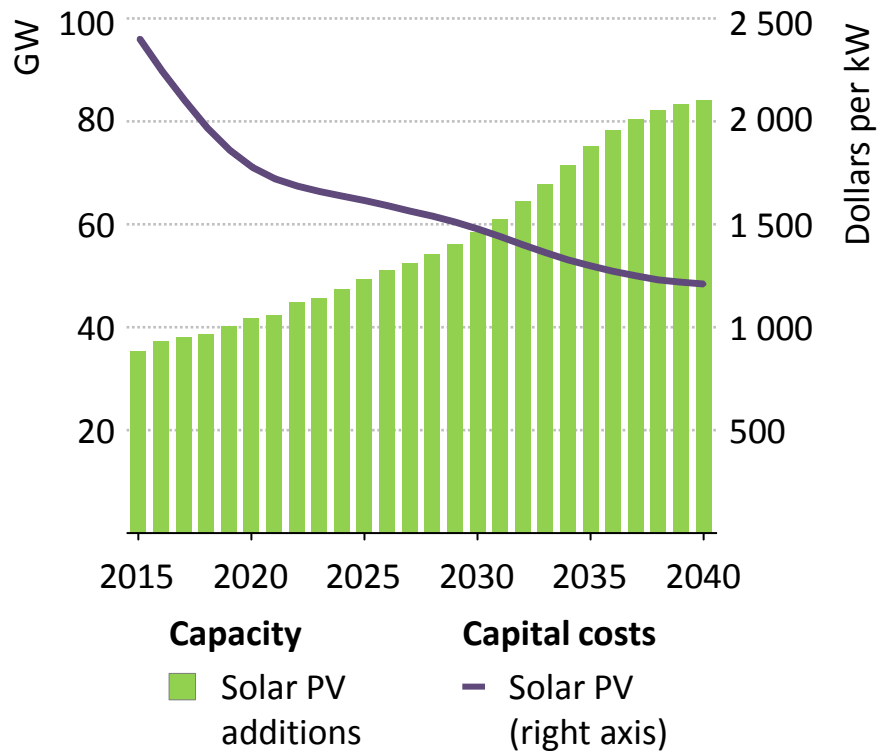


***A five-year review cycle would enable pledges to keep pace with energy sector innovation; building ambition before the carbon budget is consumed***

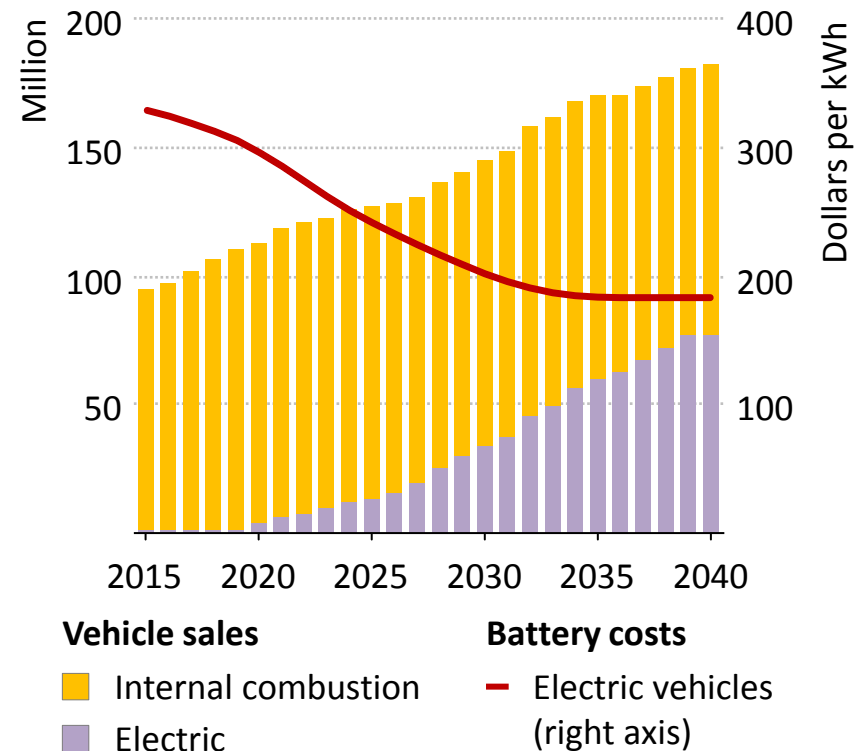


### 3. Lock in the vision: What more does it take for 2 °C?

Cost reductions & deployment of  
solar PV



Cost reductions & deployment of electric vehicles

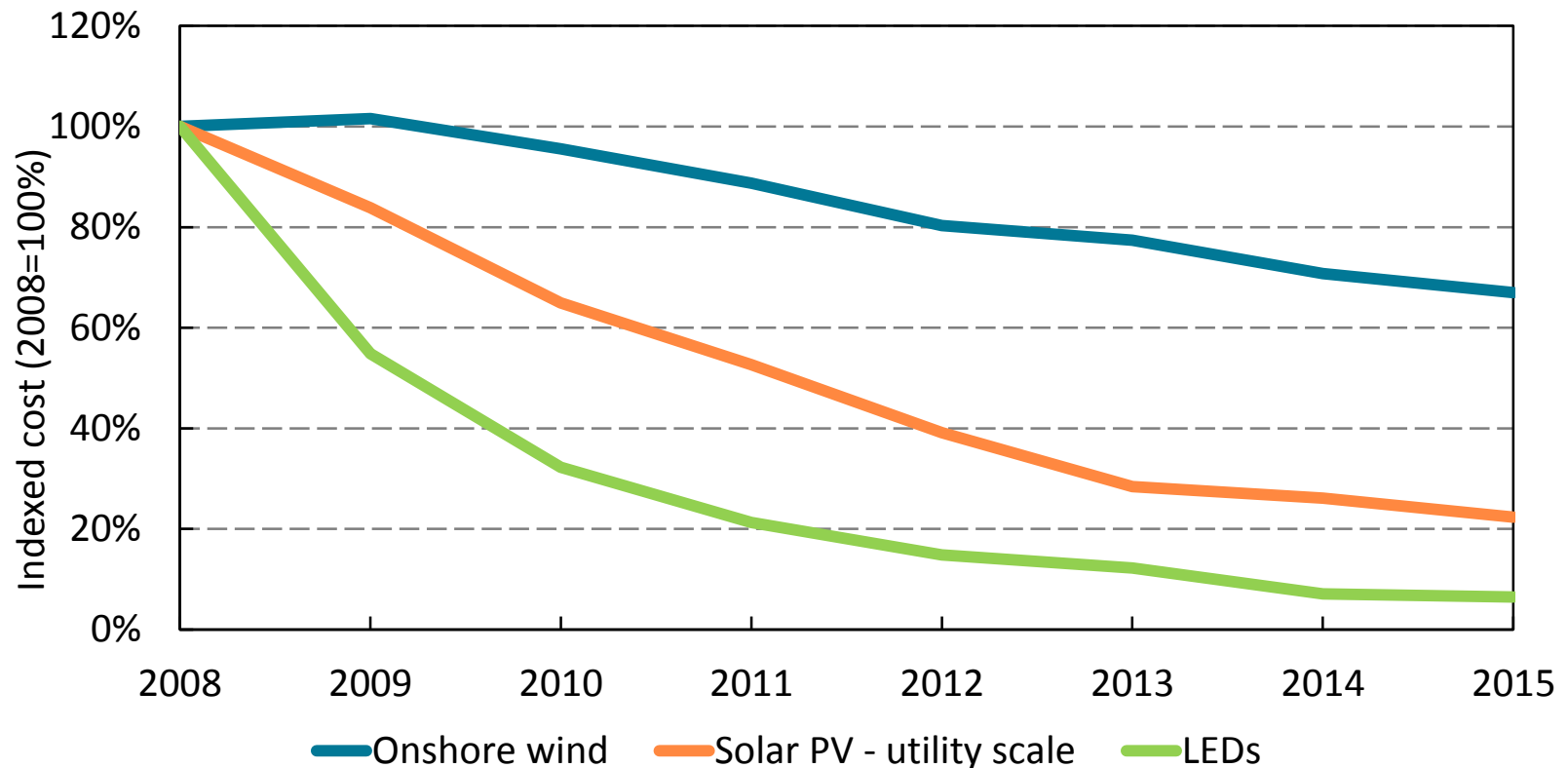


***An emissions goal would give greater clarity & certainty to the energy sector, strengthening the case for RD&D investment & technology transfer***



# The cost of clean energy continues to fall

## Indexed cost of onshore wind, utility scale PV and LED lighting



***The falling cost of clean energies opens new opportunities, but support mechanisms need to be reviewed as costs decline***



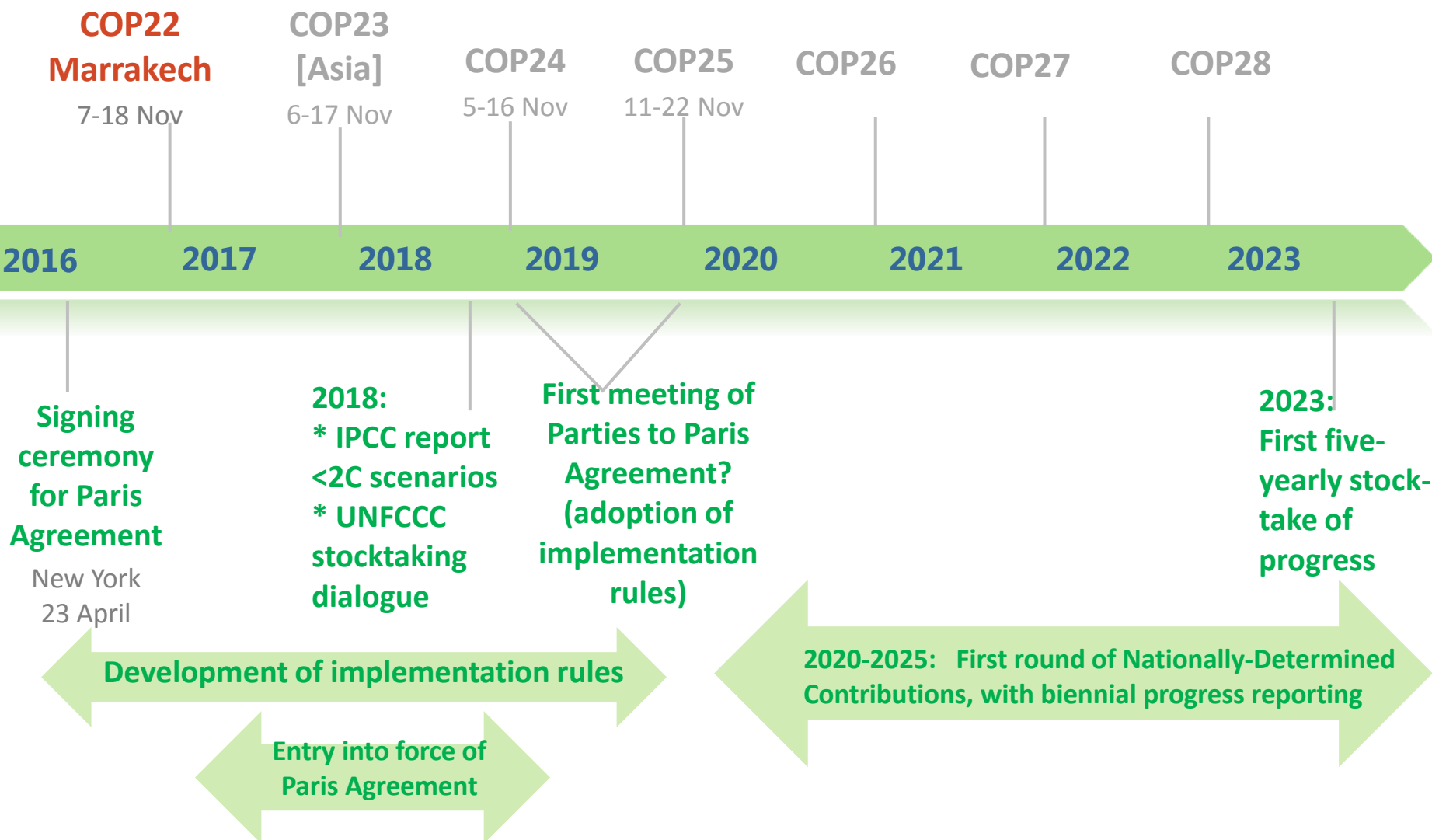
# INDCs to NDCs

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





# UNFCCC timeline





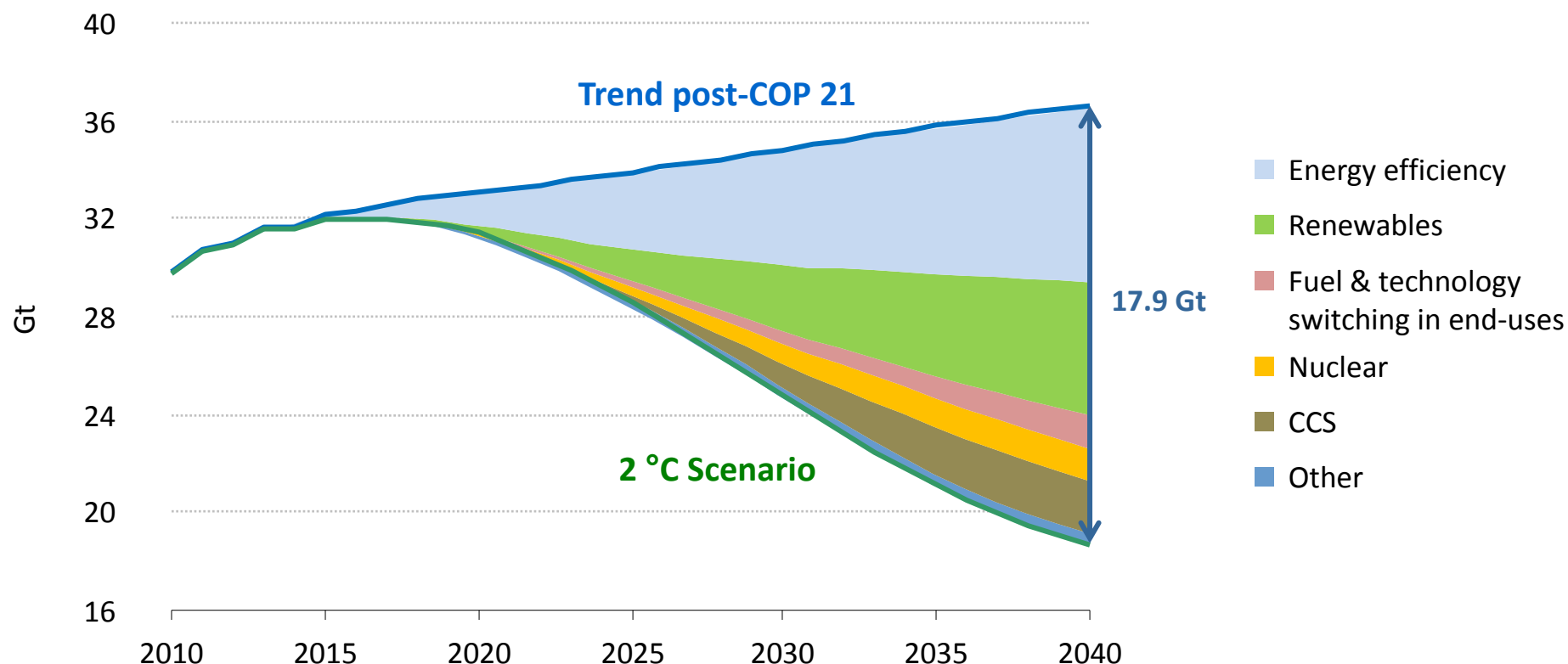
# Implications for energy sector

- Agreement sends clear signal to governments, business and investors; should speed up energy sector transformation by accelerating investments in clean technologies/energy efficiency
- Ambitious long-term targets for action by all Parties imply that all low carbon technologies must be considered, including CCS/BECCS
- Achieving 1.5°C is much more effort than 2°C
  - *Possible key actions*
    - a very decisive move towards **electrification** of all end-uses soon, coupled with
    - accelerated **decarbonised power sector**, e.g. within a couple of decades, and
    - a **major deployment of negative emissions** (i.e. carbon capture and storage with biomass in the energy sector, substantial afforestation, etc.)



# A 2 °C pathway requires more technological innovation, investment & policy ambition

## CO<sub>2</sub> emissions in a post COP 21 world

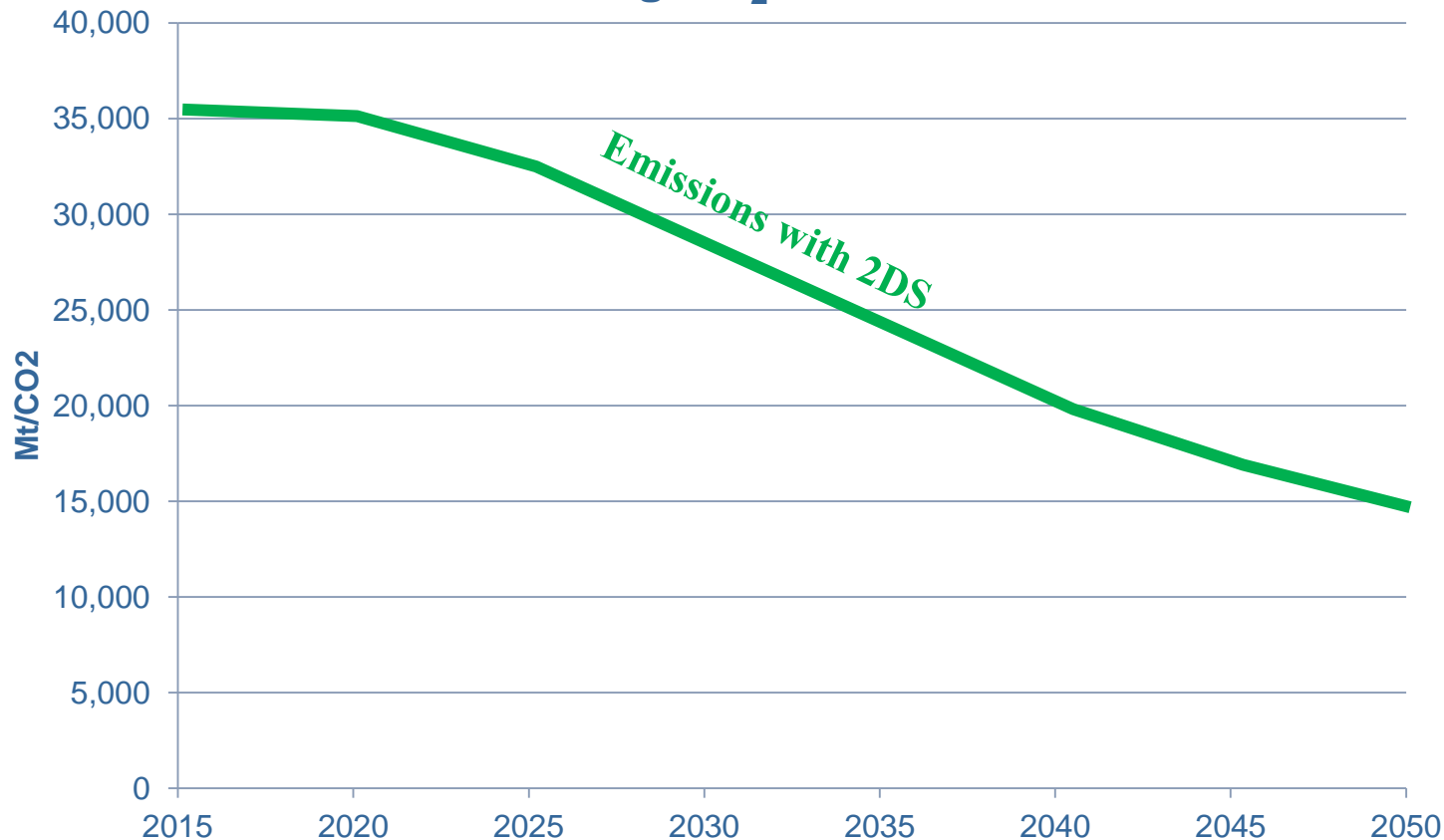


*Massive additional investments in efficiency, renewables, nuclear power and other low carbon technologies are required to reach a 2 °C pathway*



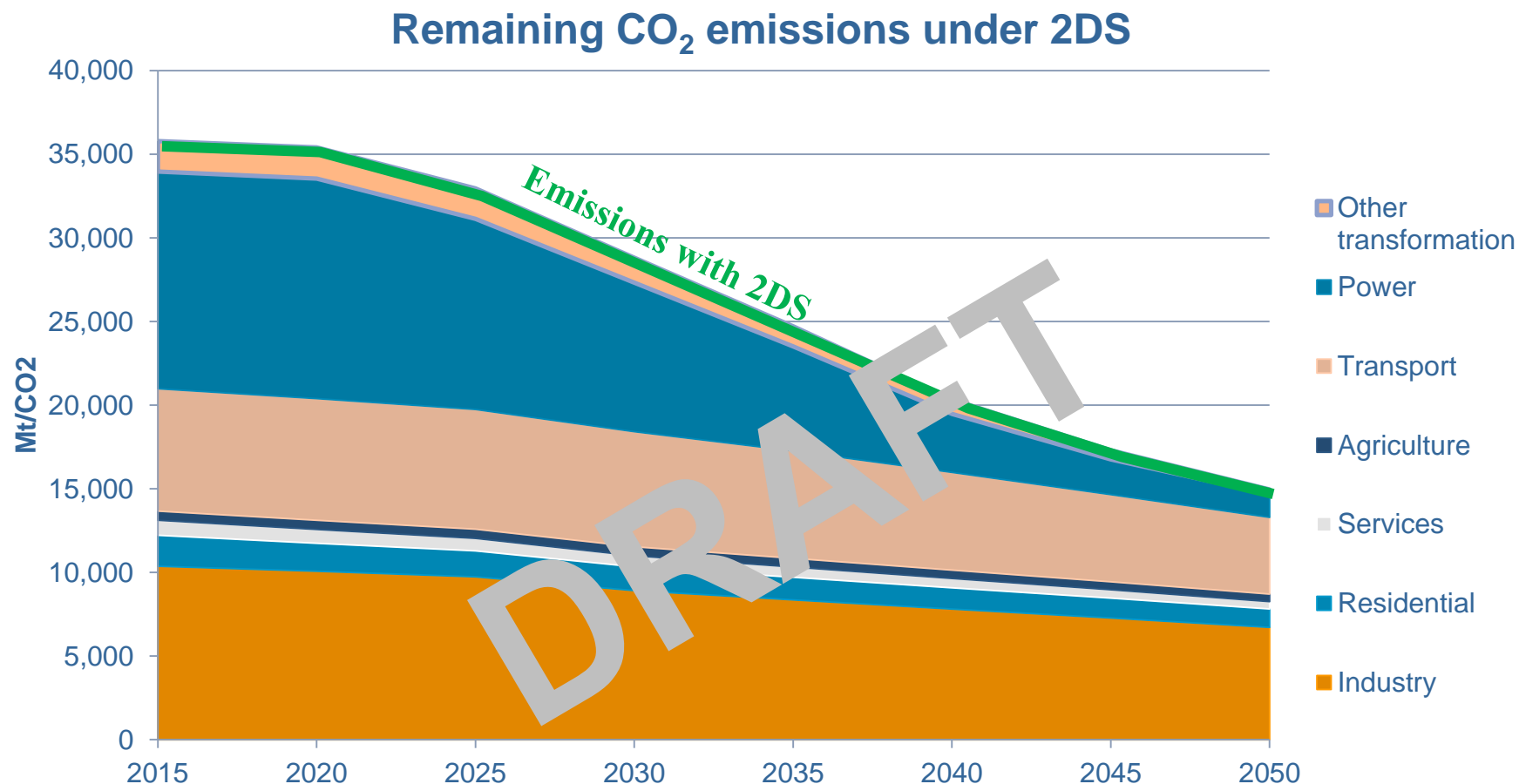
# From 2°C ... to 'well below 2°C'

Remaining CO<sub>2</sub> emissions under 2DS



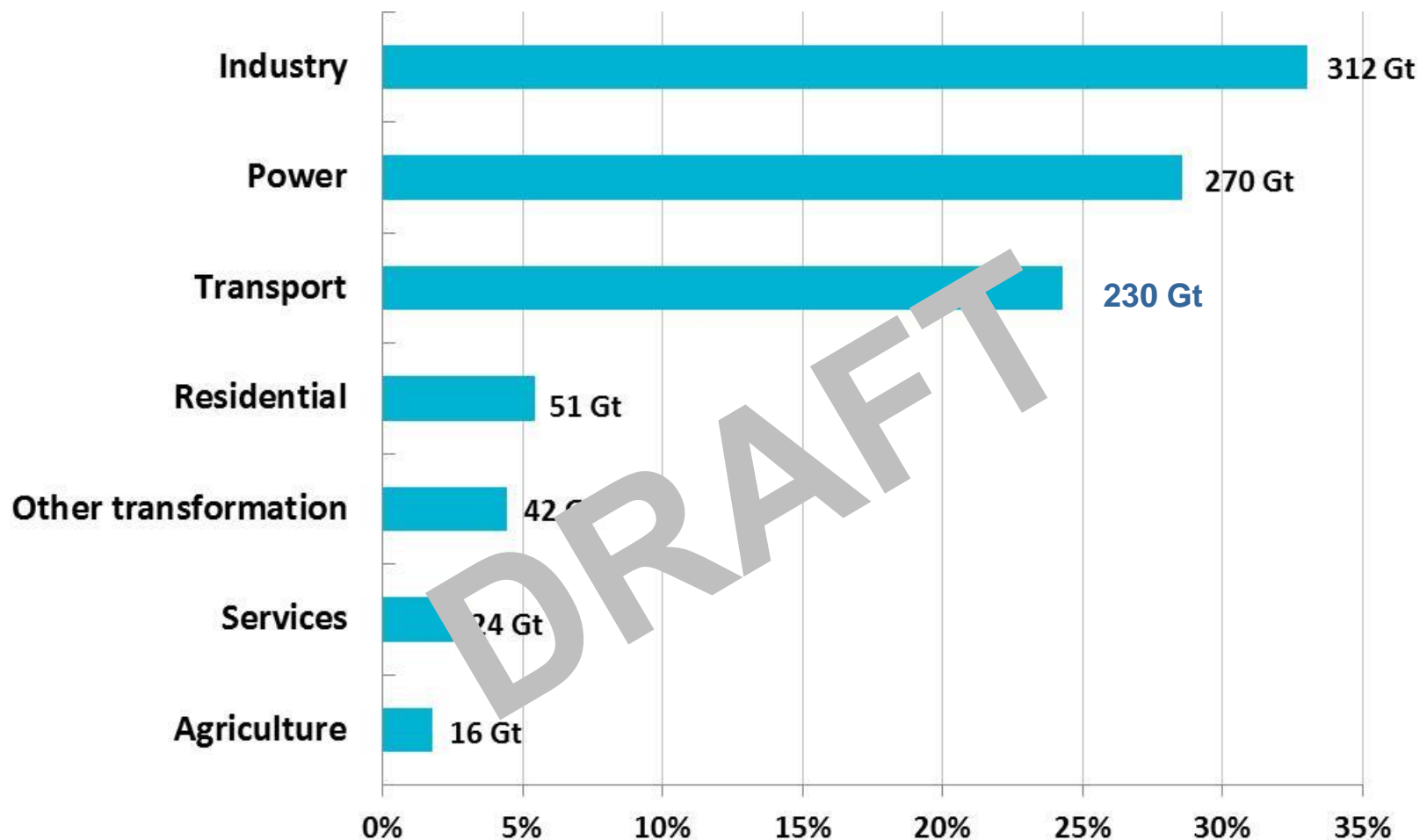


# From 2°C ... to 'well below 2°C'



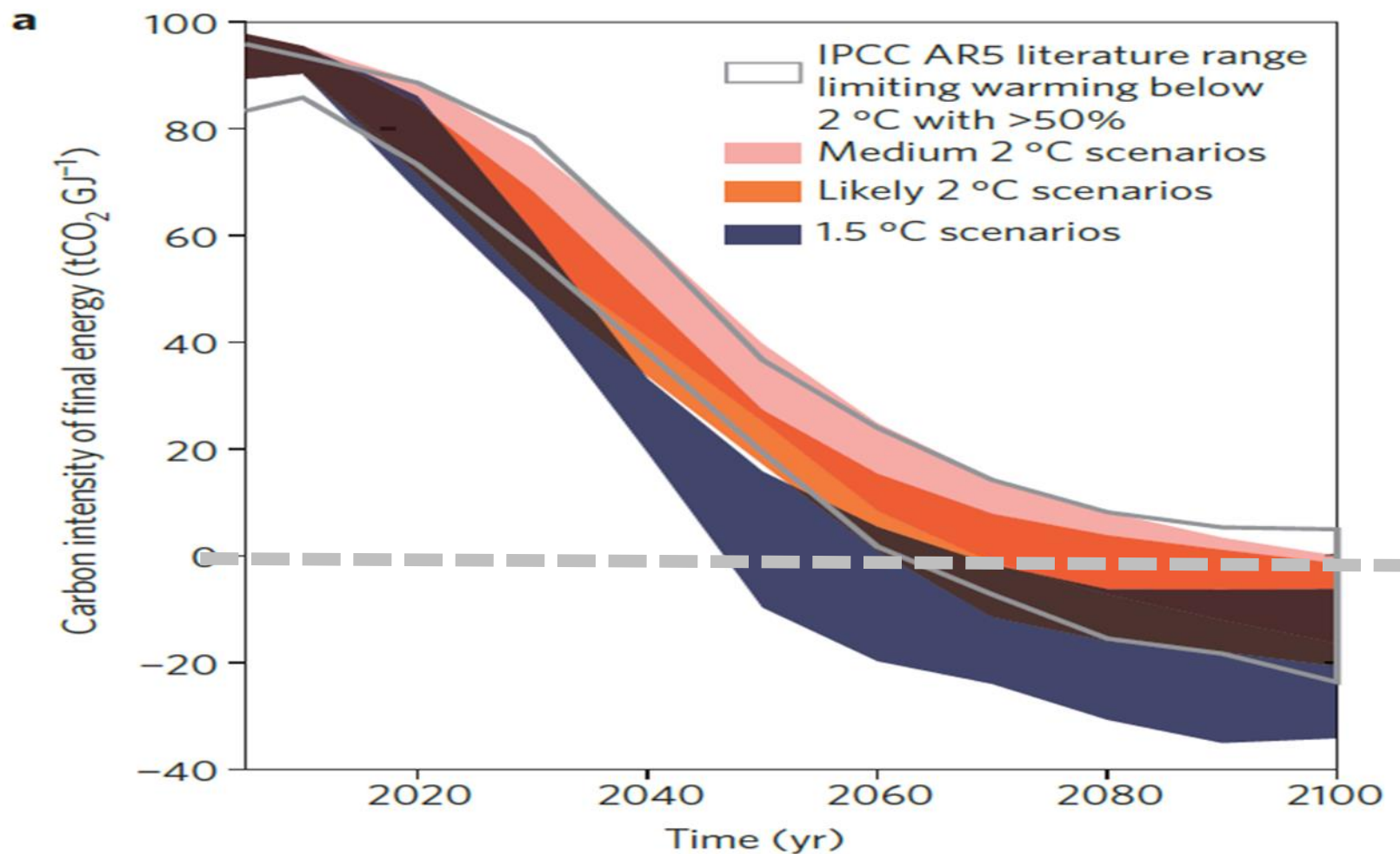


# Sectoral shares of cumulative residual 2DS emissions - 2015-2050





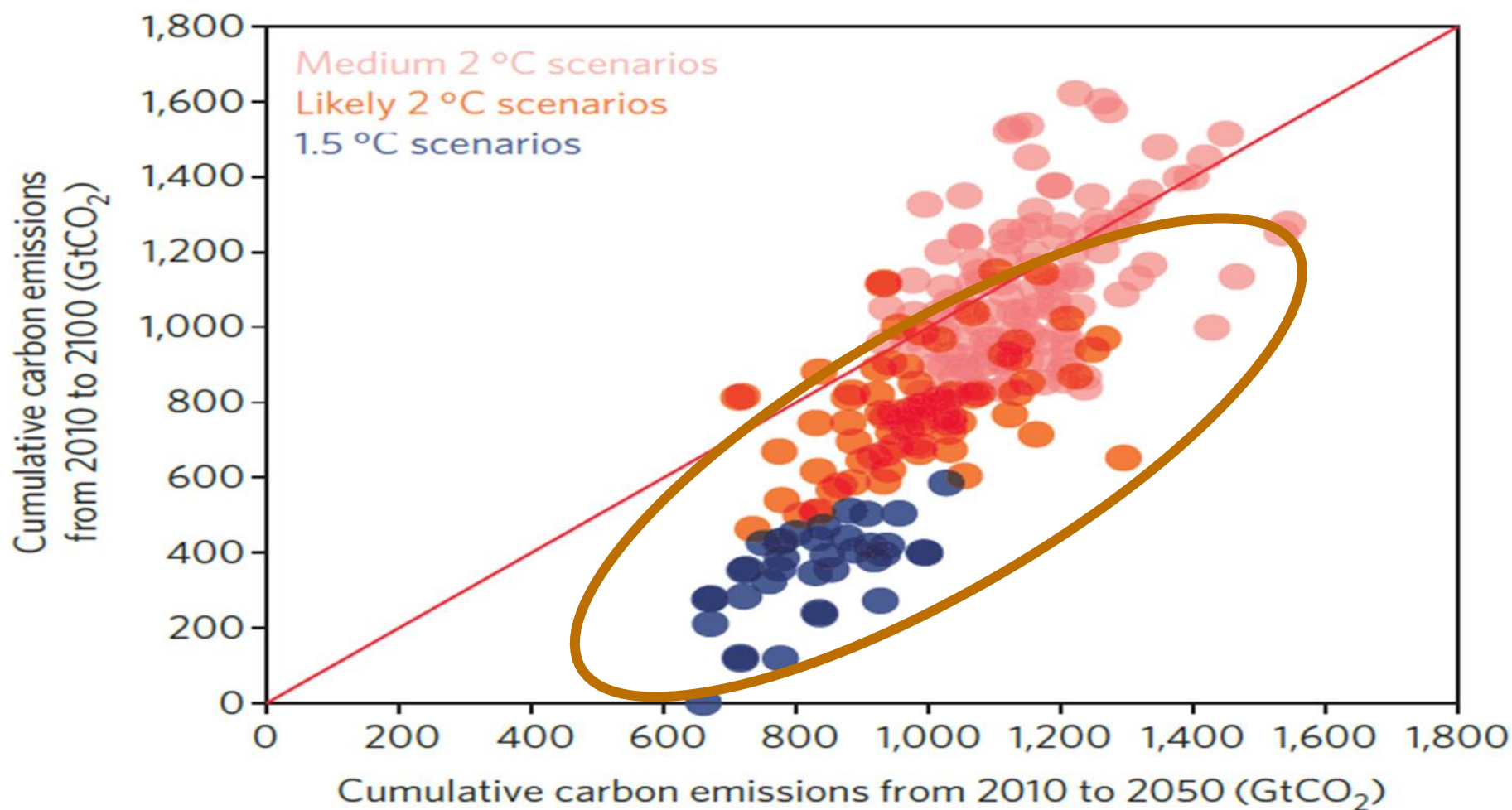
# From 2°C ... to 1.5°C



*Source: Rogelj et al. (June 2015)*



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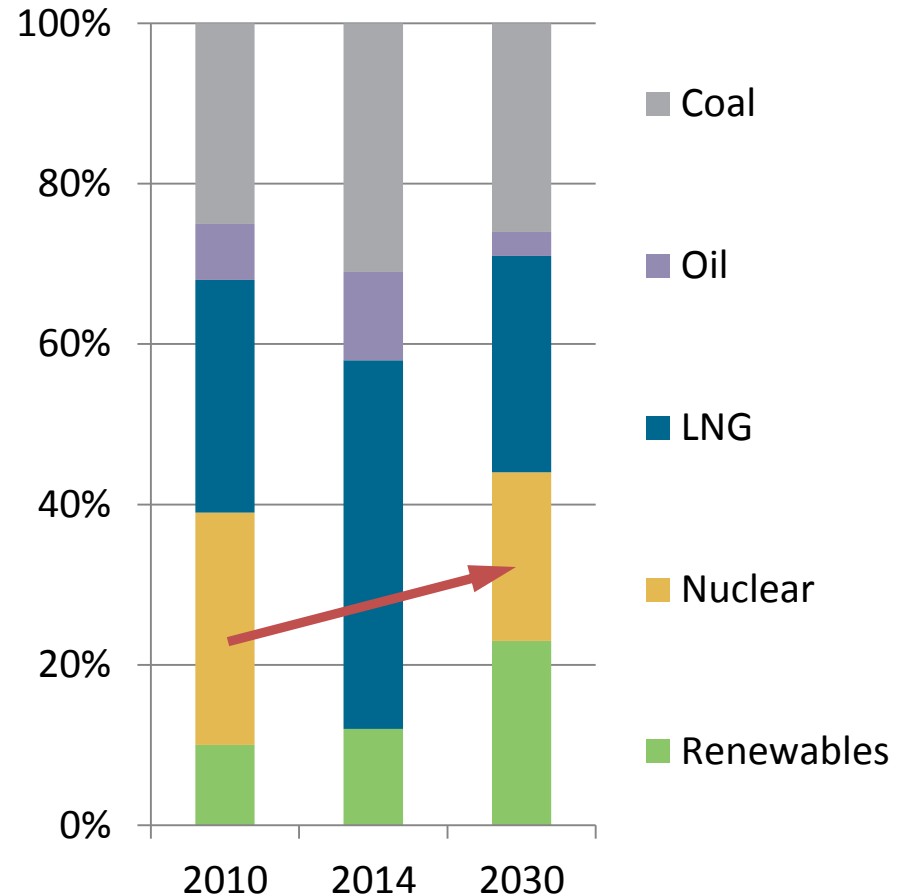
# Future work for IEA

1. Continuing to **analyse NDCs** (WEO 2016) and track their energy sector and energy technology implications.
2. **Refining long-term scenarios** below 2°C to understand the mix and timing of technologies and policies (2016/17), and contribute to the IPCC report and UNFCCC stocktaking dialogue in 2018.
3. **Expanding IEA's statistics, indicators and tracking** efforts to monitor the drivers of energy sector transformation.
4. Deepen **support for technology innovation** (e.g. Mission Innovation)
5. Expand work on enhancing energy sector **resilience**
6. Support the French and future Moroccan Presidency during the upcoming year in the lead-up to **COP22 in Marrakech**



# Japan: a closer look

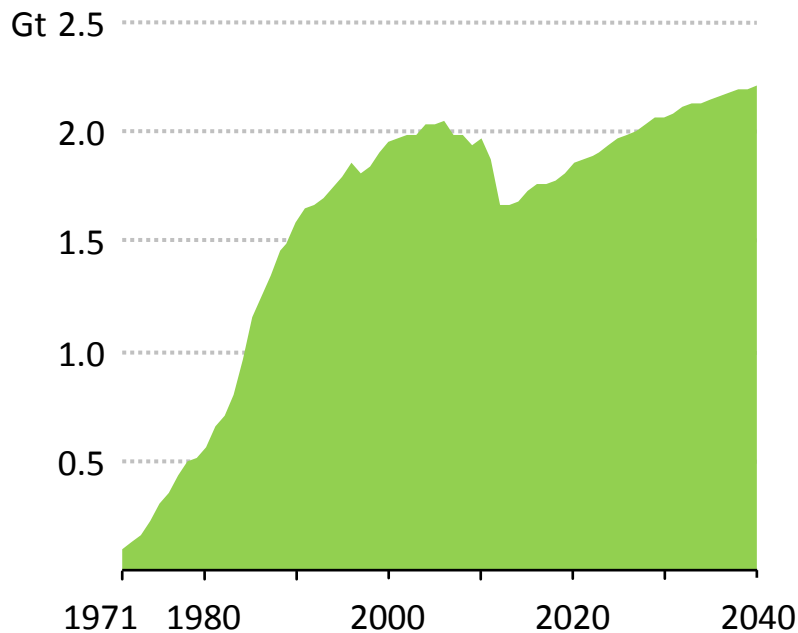
- INDC: 26% below 2013 by 2030
- Unique challenges:
  - limited resources
  - high energy prices
  - already high efficiency
- Nuclear post-Fukushima



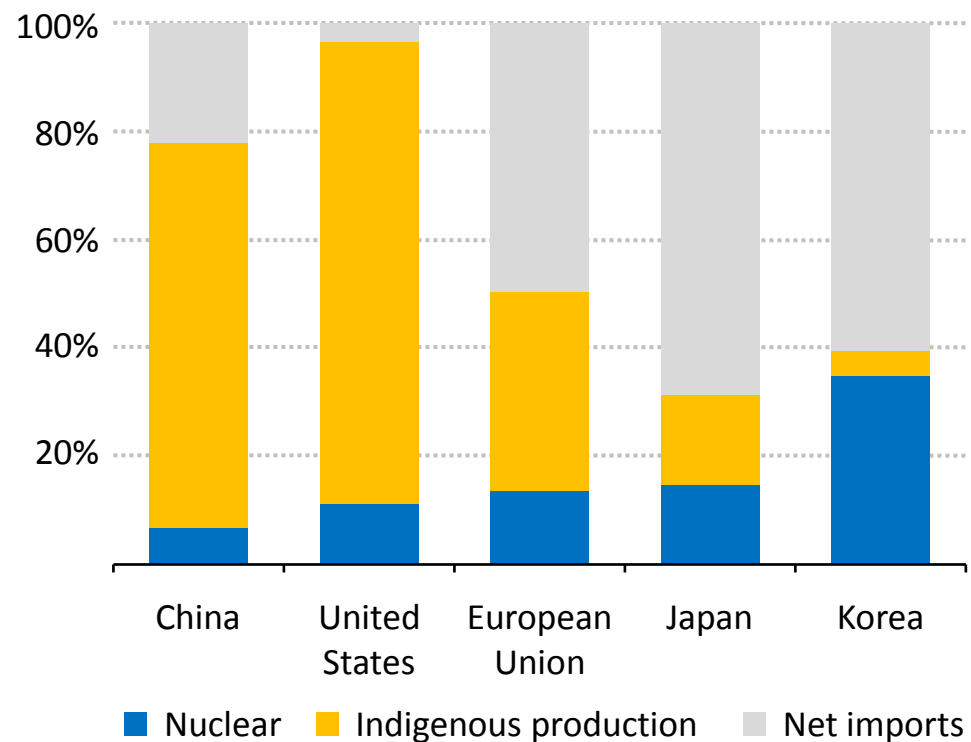


# Nuclear power can play a role in CO<sub>2</sub> abatement & energy security

CO<sub>2</sub> emissions avoided annually by nuclear power  
1971-2040



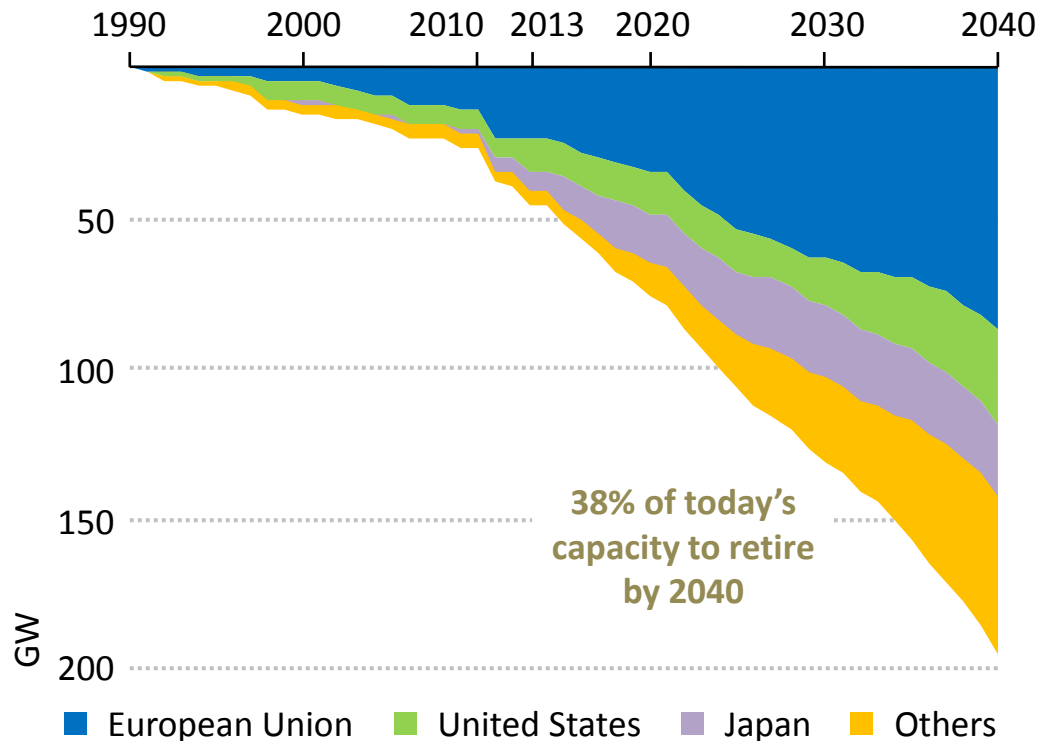
Share of energy demand met by domestic sources  
and nuclear power in 2040



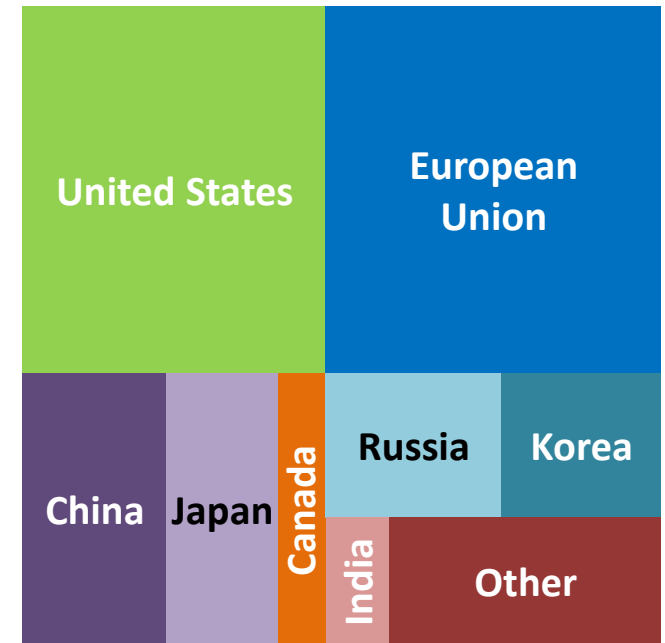


# Nuclear power issues

Retirements of nuclear power capacity



Spent nuclear fuel  
1971-2040: 705 thousand tonnes

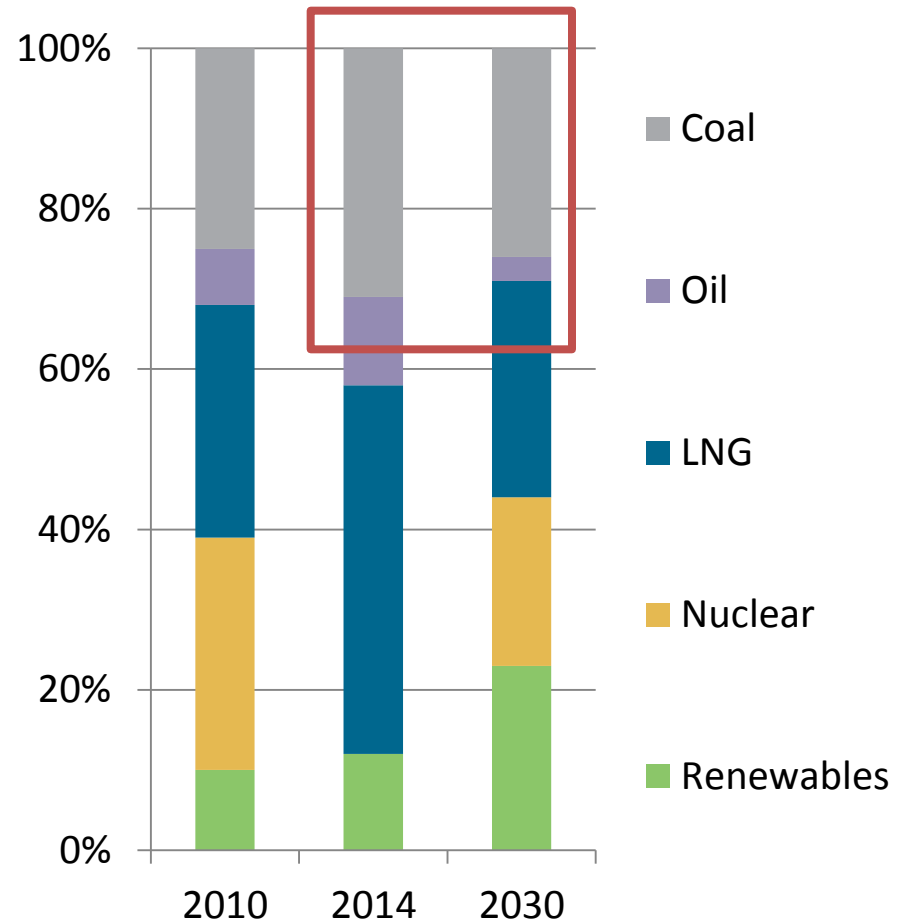


***By 2040, almost 200 reactors are retired & the amount of spent fuel doubles***



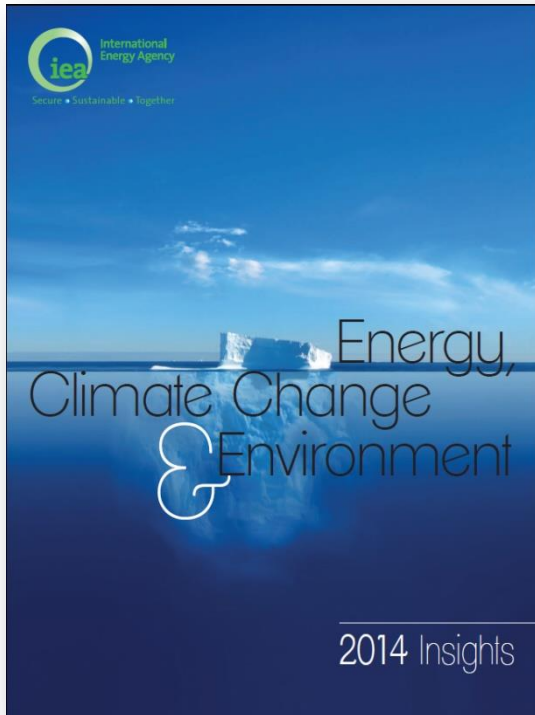
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# Energy, Climate Change & Environment 2014: Unlocking high-emission assets



- Chapter on policies and actions to “unlock” existing high-emissions assets
  - Retirement of coal plant
  - Change dispatch of existing power plant fleet
  - Efficiency retrofit of coal plant
  - Retrofit of coal plant for CCS
- Examples from Canada, China, UK, US, EU



# **Energy, Climate Change and Environment: 2016 Insights**

- Implications of COP21 for the energy sector
- Coal and gas power in a low carbon world
- The role of moderate carbon prices in electricity sector decarbonisation
- Renewables after COP21; Energy efficiency and decarbonisation
- Complementary measures for decarbonisation
- Tools to track energy sector decarbonisation
- Enhancing energy sector resilience to the impacts of climate change



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