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Climate Change and Technology

Considerations in Outlook Development

APERC Annual Conference

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Kamel Ben-Naceur

Director, Sustainability, Technology and Outlooks

International Energy Agency

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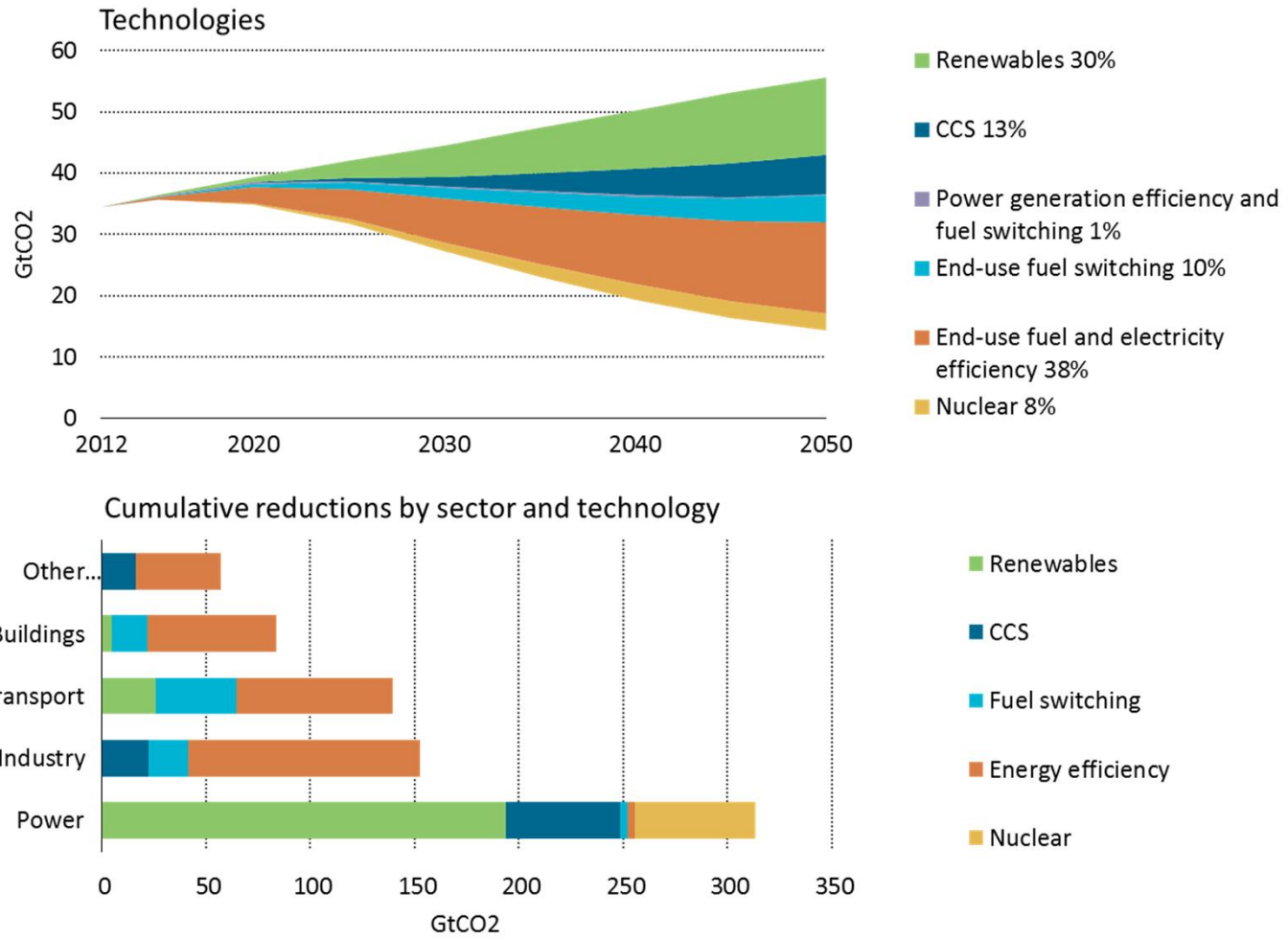
IEA's Scenarios

- **Current Policies Scenario (CPS)** takes into account only the energy policies for which implementing measures have been formally adopted
- **New Policies Scenario (NPS)** is the Central scenario also account for other relevant policy intentions. This includes the INDCs (Intended Nationally Determined Contributions)
- **450 Scenario (450S) /2DS** assumes a set of policies that bring about a trajectory of greenhouse-gas emissions from the energy sector that is consistent with the international goal to limit the rise in the long-term average global temperature to two degrees Celsius

Technologies/Decarbonization Wedges



A portfolio of technologies is needed – but some will need to target specific sectors

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The transition requires an exceptional effort

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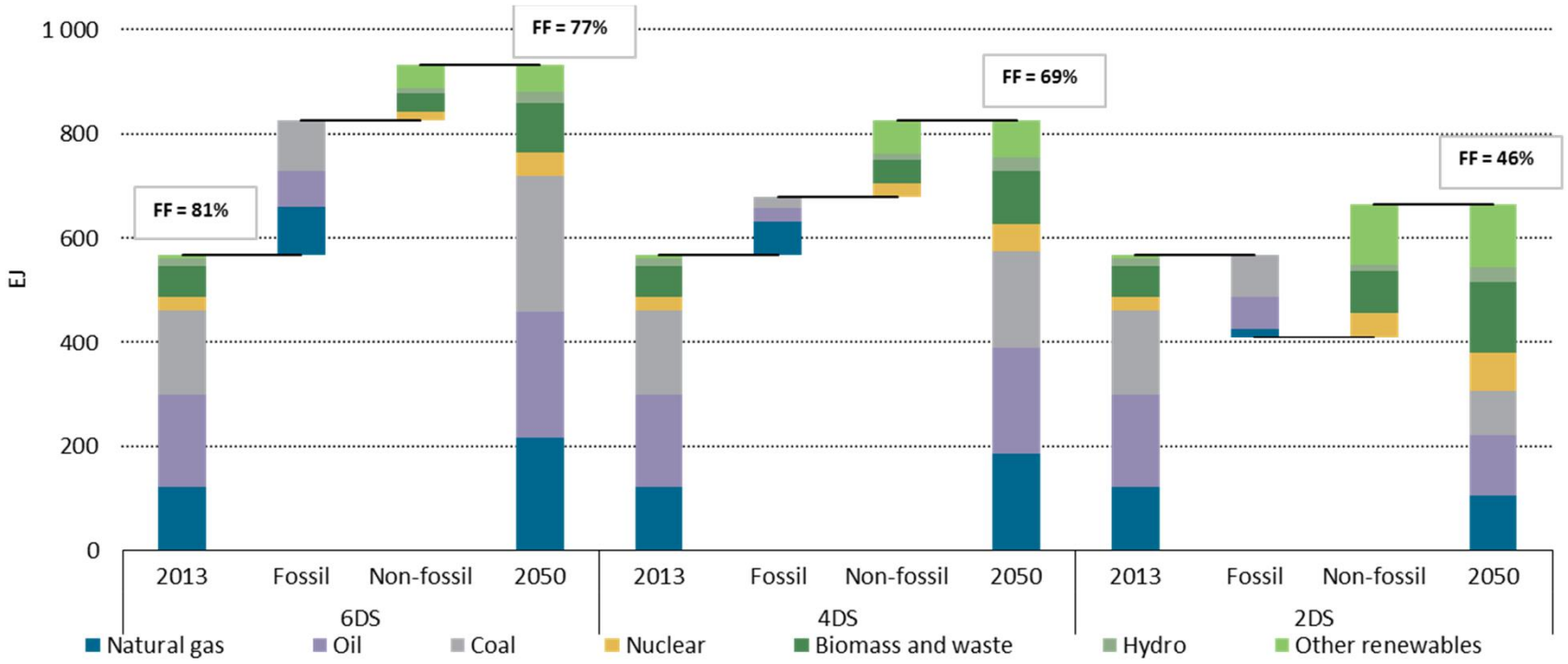
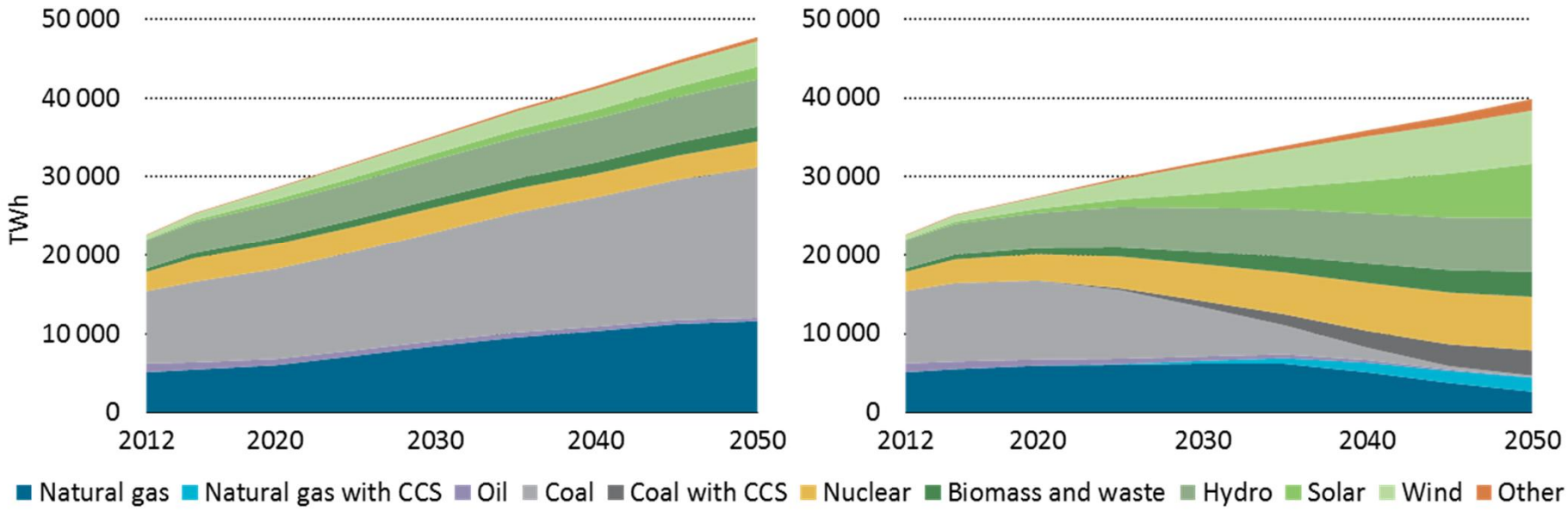
Global primary energy use by fuel, 2013-2050



Source: ETP2016 – Preliminary analysis

Meeting the 2DS requires significant changes in energy intensity and in the fuel mix over the next three decades

Global electricity generation mix – a share reversal



Today fossil fuels dominate electricity generation with a 68% share of the generation mix; by 2050 in the 2DS, renewables reach an almost similar share of 63%.

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2015: The start of a new energy era?

- **Adoption of SDG-7 at the United Nations in September 2015**
- **2015 has seen lower prices for all fossil fuels**
  - Oil & gas could face second year of falling upstream investment in 2016
  - Coal prices remain at rock-bottom as demand slows in China
- **Signals turned green ahead of key Paris climate summit**
  - 2014/2015 emissions did not rise
  - Renewable capacity additions at two records high of 130GW in 2014/2015
  - Fossil-fuel subsidy reform, led by India & Indonesia, reduces the global subsidy bill below $500 billion in 2014
  - Pledges of 187 countries account for 98% of energy-related emissions
- **Multiple signs of change, but are they moving the energy system in the right direction?**

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Beyond COP21

LONG-TERM MITIGATION GOAL

- ***Temperature goal "well below" 2°C, with efforts to limit to 1.5°C***
- ***To achieve the temperature goal, Parties aim to reach a peaking of global emissions as soon as possible, and to undertake rapid reductions thereafter so as to achieve a balance between emissions and removals by sinks in the second half of this century (i.e. net-zero emissions but these words were not used).***
- ***Parties are encouraged to develop and communicate national long-term low greenhouse gas development strategies.***

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IEA messages to COP21

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

1. ***Take five key actions, led by energy efficiency and 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.***

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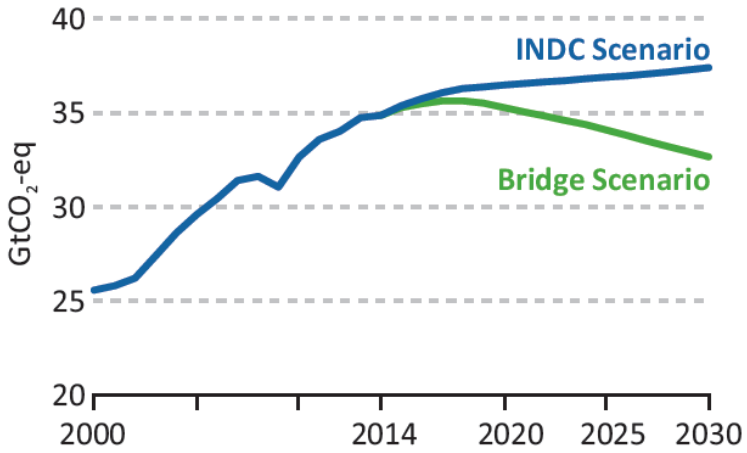
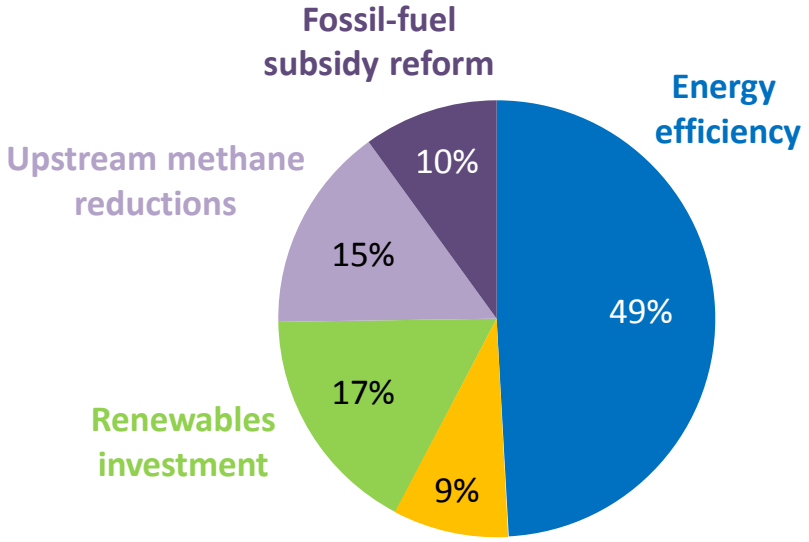
1. Take five key actions, led by energy efficiency and renewables, to peak then reduce global energy emissions.

Global energy-related GHG emissions



Source: *World Energy Outlook Special Report: Energy and Climate Change* (2015).

Emissions savings in the Bridge Scenario by measure, 2030



Five measures save almost 5 Gt of emissions by 2030 & achieve a global emissions peak by 2020, without harming economic growth & using only proven technologies

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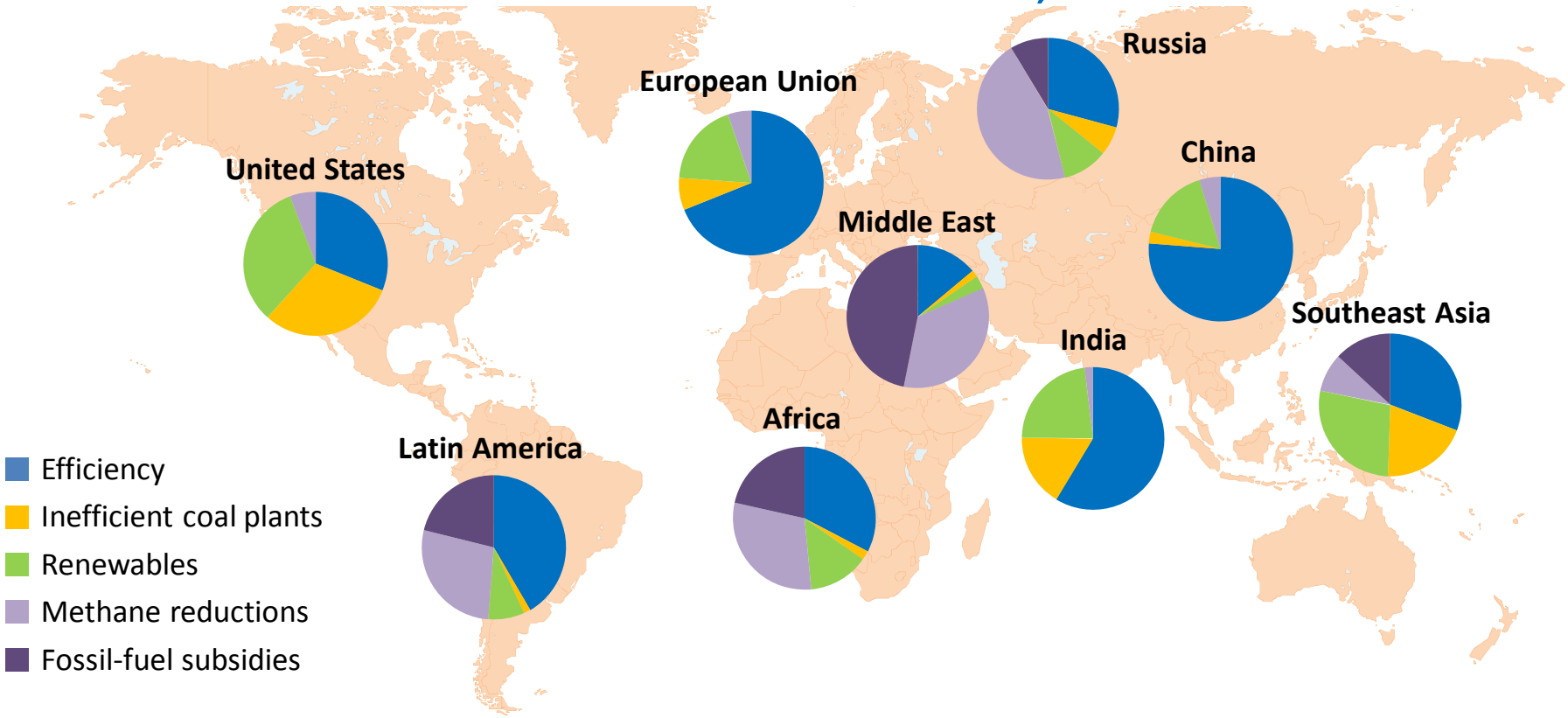
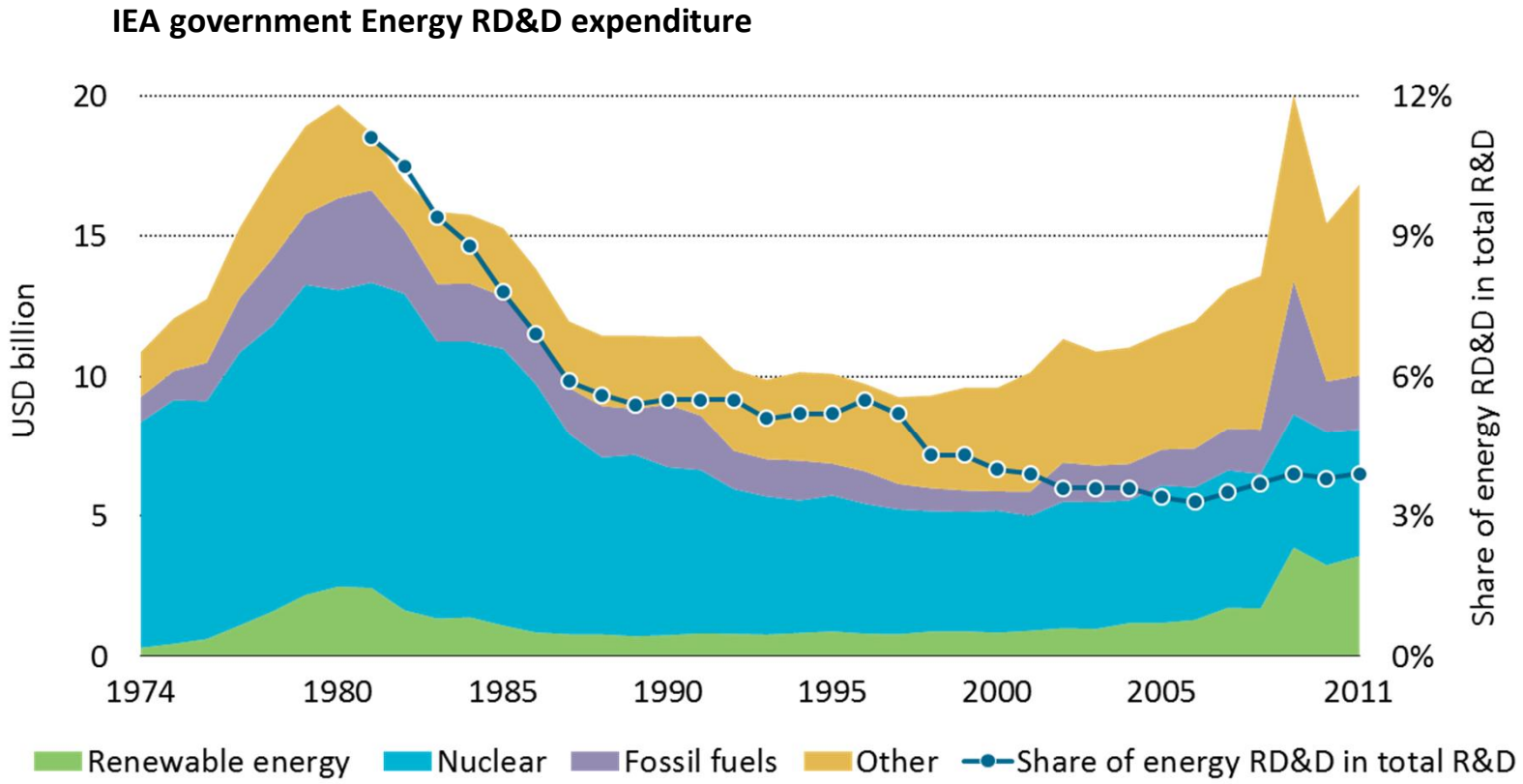
GHG emissions reduction by measure in the Bridge Scenario, relative to the INDC Scenario, 2030



Source: *World Energy Outlook Special Report: Energy and Climate Change (2015).*

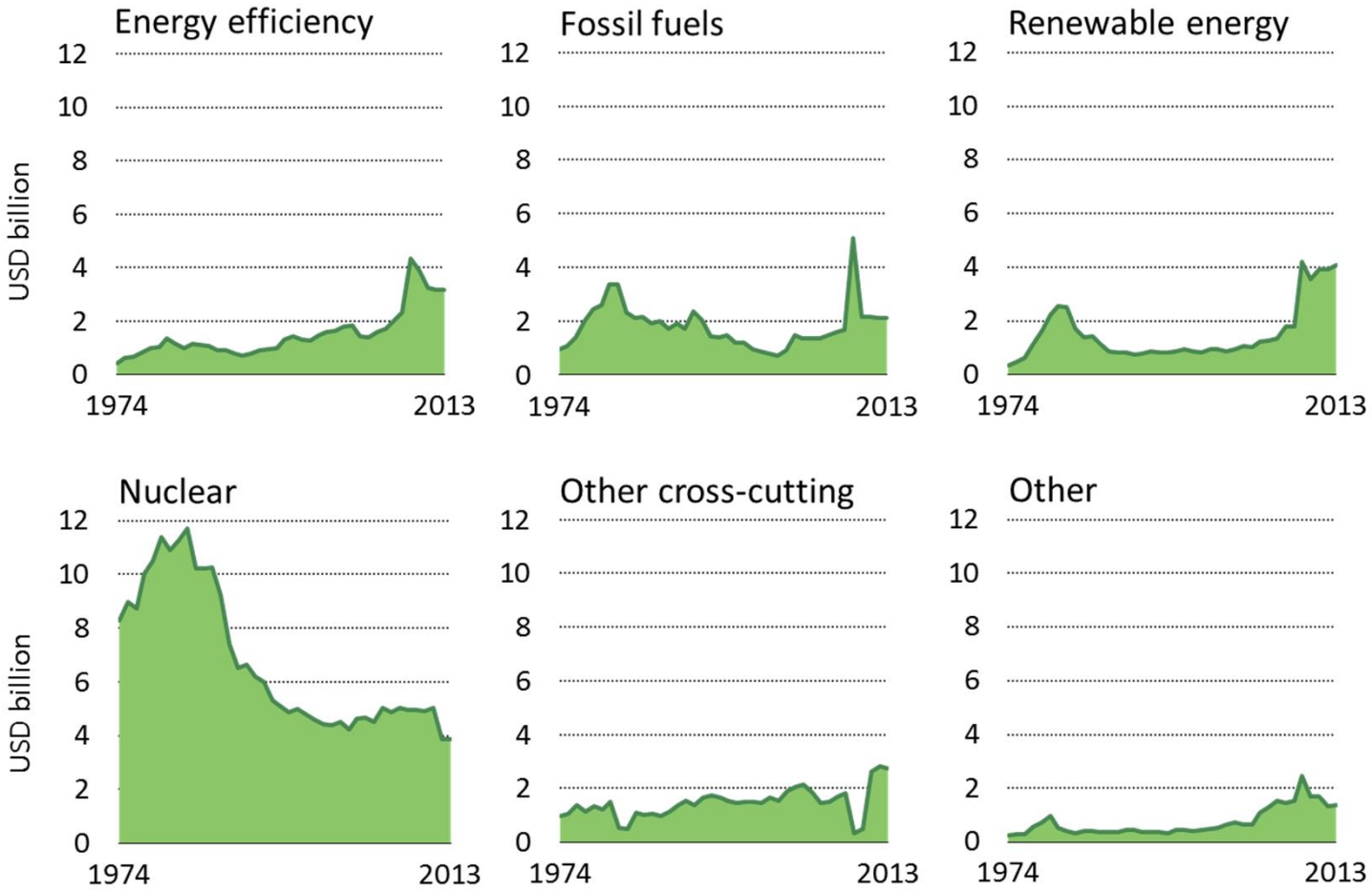
The measures in the Bridge Scenario apply flexibly across regions, with energy efficiency & renewables as key measures worldwide

Energy RD&D support is increasing



But has slipped in priority in IEA member countries

RD&D is more broadly directed towards the transition



Renewables and energy efficiency have surpassed fossil fuel spending

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Supporting Energy Innovation: The right policy at the right time

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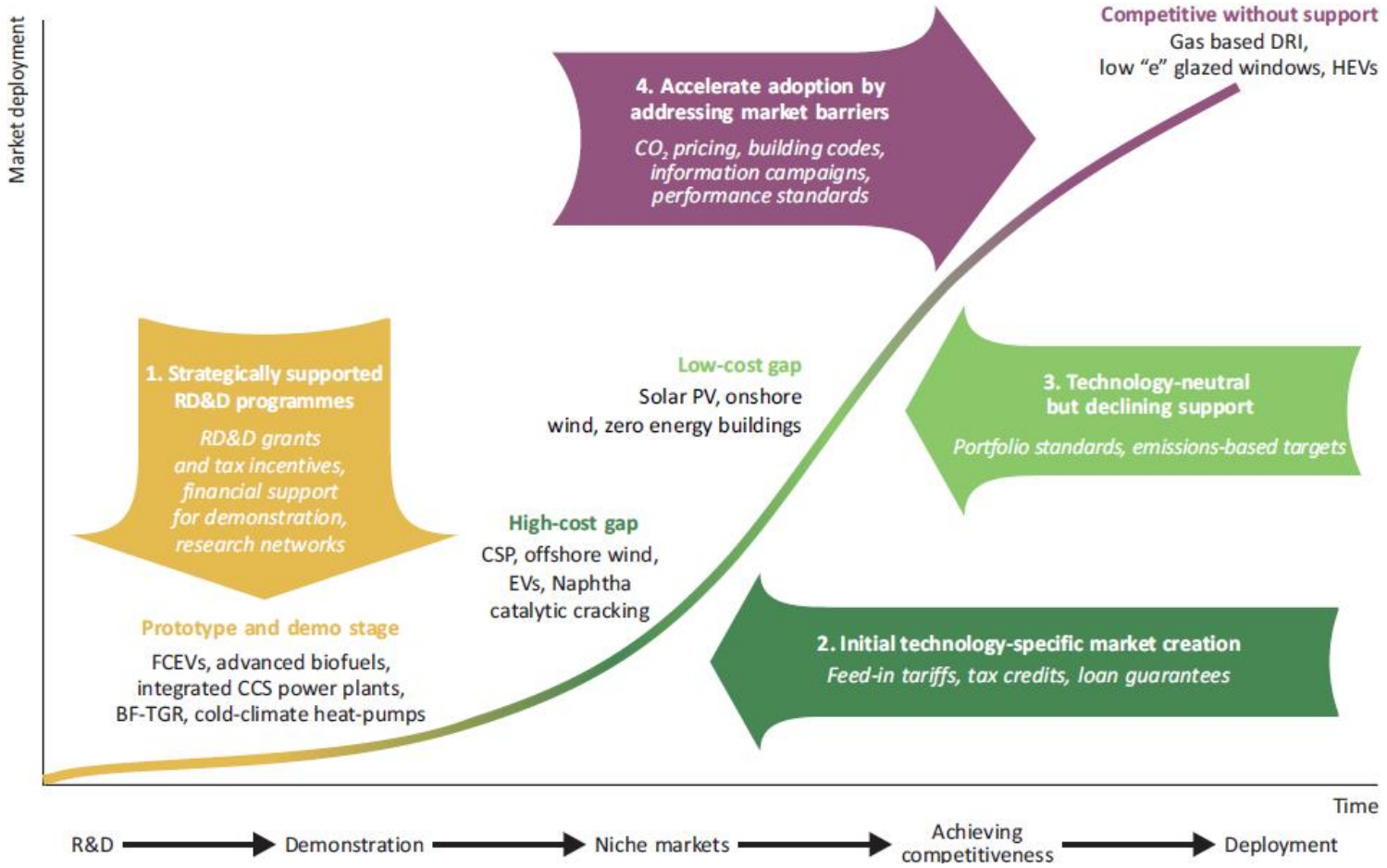
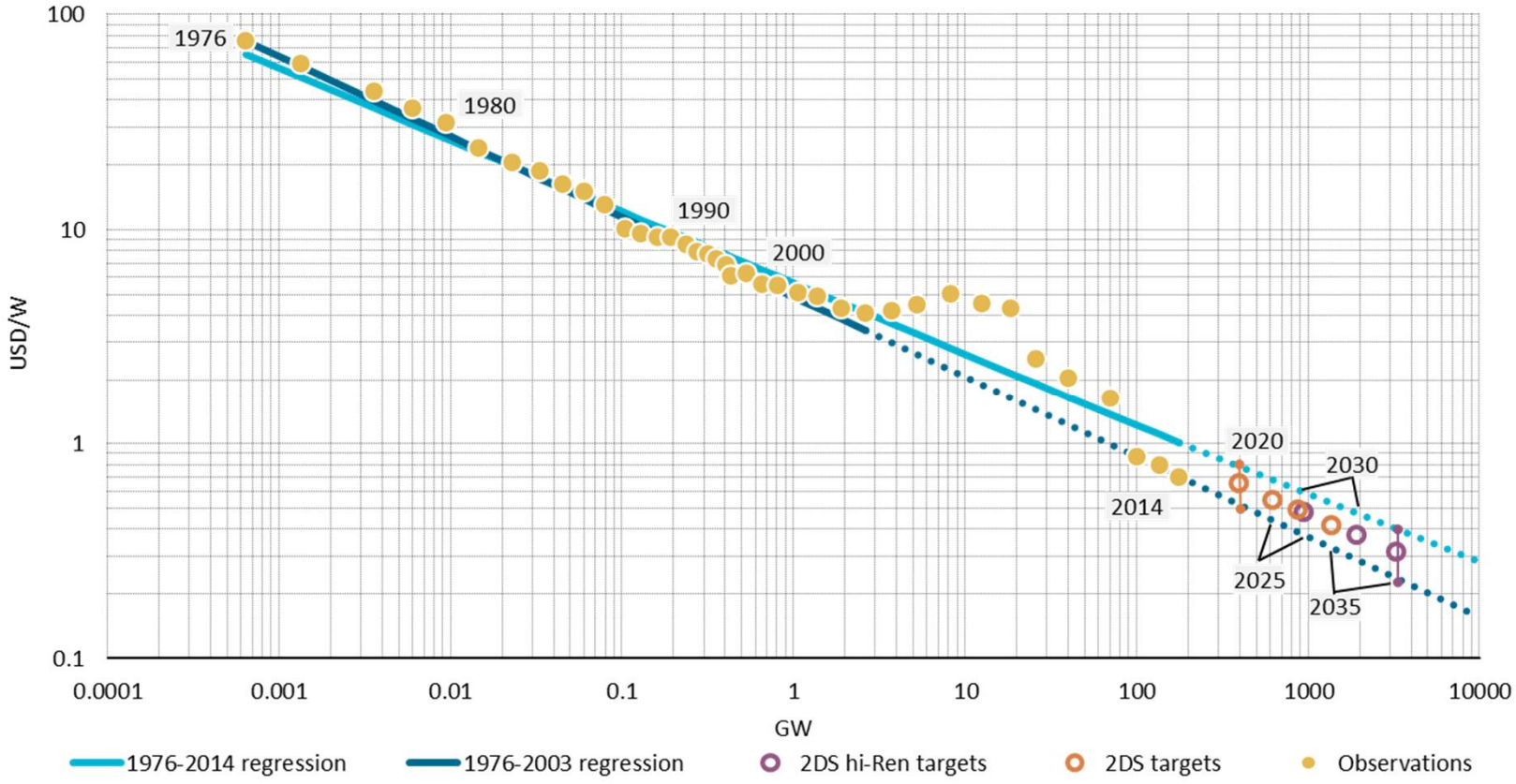


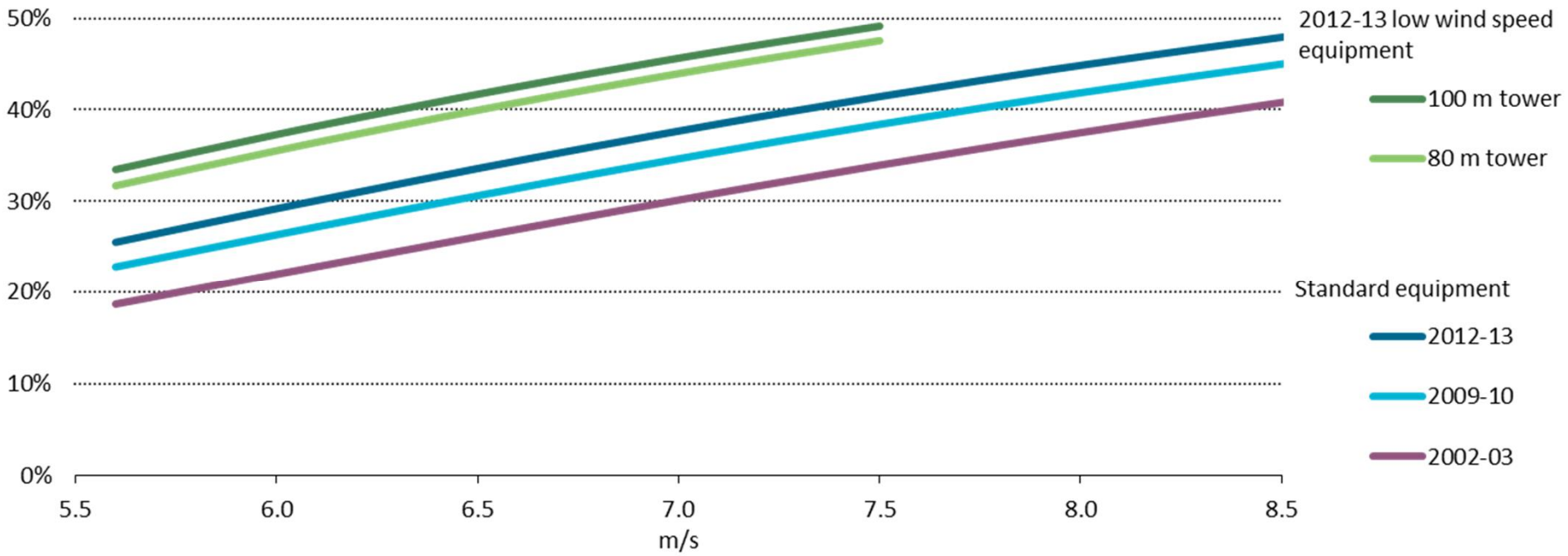
The right support depends on the maturity of the technology and the degree of market uptake

Innovation already plays a role: Solar PV



Nearly 40 years of data demonstrates a determined effort to reduce Solar PV Module Costs

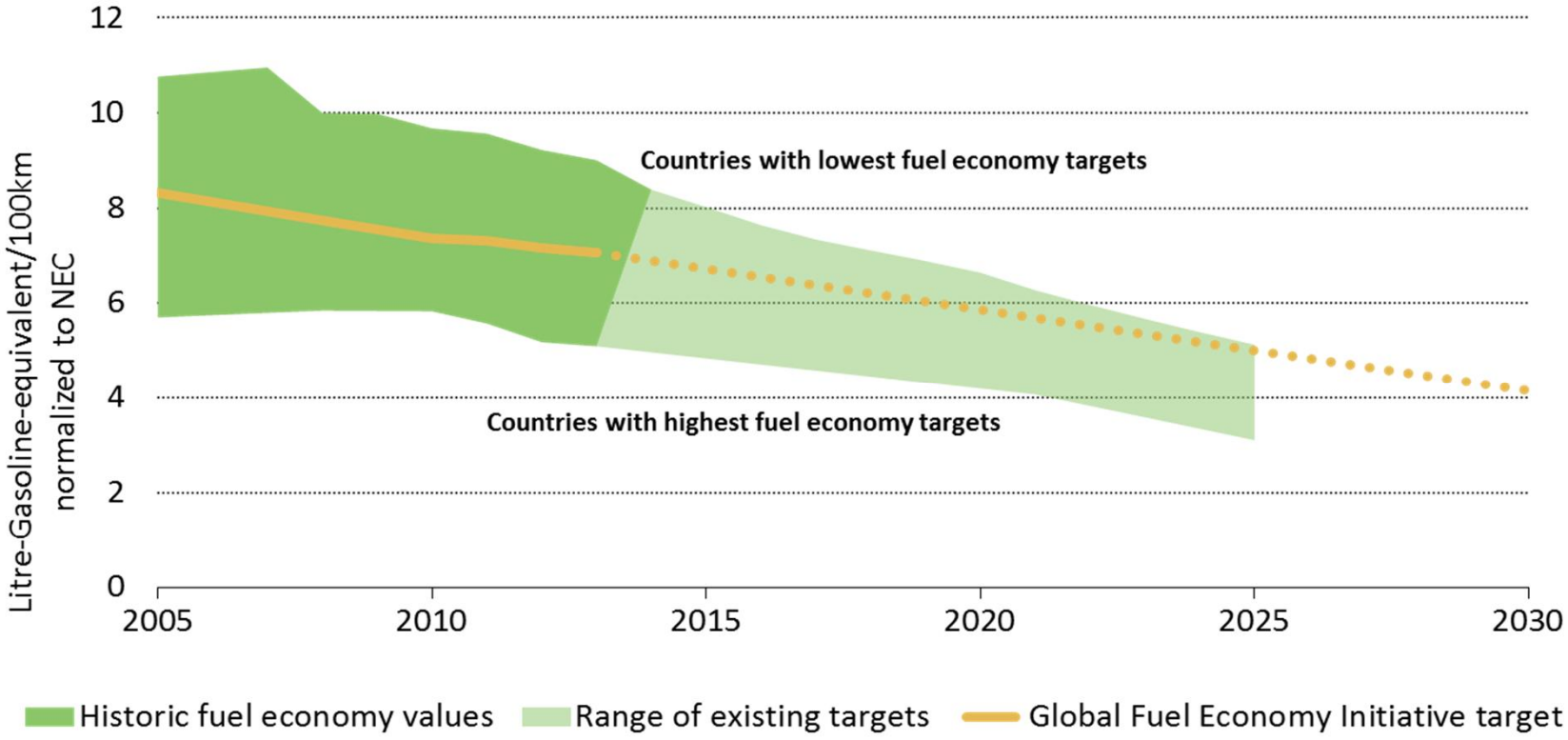
Innovation already plays a role: Wind



Improving the performance of wind to harness more wind in lower wind regimes and increase capacity factors

Energy efficient technologies are constantly improving

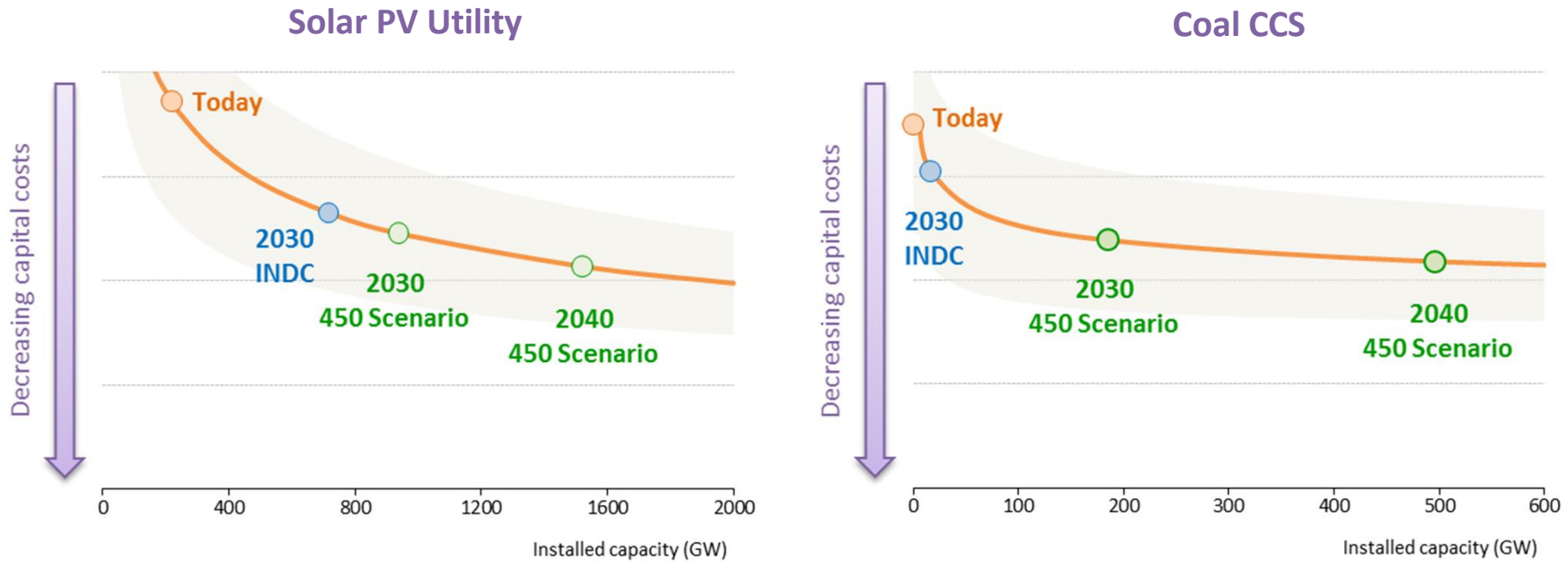
Average new Light-duty vehicle fuel economy evolution by country, 2005 to 2013



Fuel economy is improving as policy increasingly drives the deployment of more efficient vehicle technologies

INDC policies could catalyse an even more ambitious transformation

Global average capital costs as installed capacity increases



The INDCs help continue to drive down commercially available clean energy technology costs, but greater emphasis on earlier stage developments is also needed to help meet climate goals

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Suggested Focus Points for APEC

- Tracking the energy transition: Data acquisition, analysis and sharing, including investment on clean energy and innovation
- Focus on Urban Systems
- Capacity building
- Innovation: Clean energy portfolio

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