Renewable development and climate change in China

Keisuke SADAMORI 貞森恵祐
Director, Energy Markets and Security
International Energy Agency

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INDCs are very good first step, but not enough

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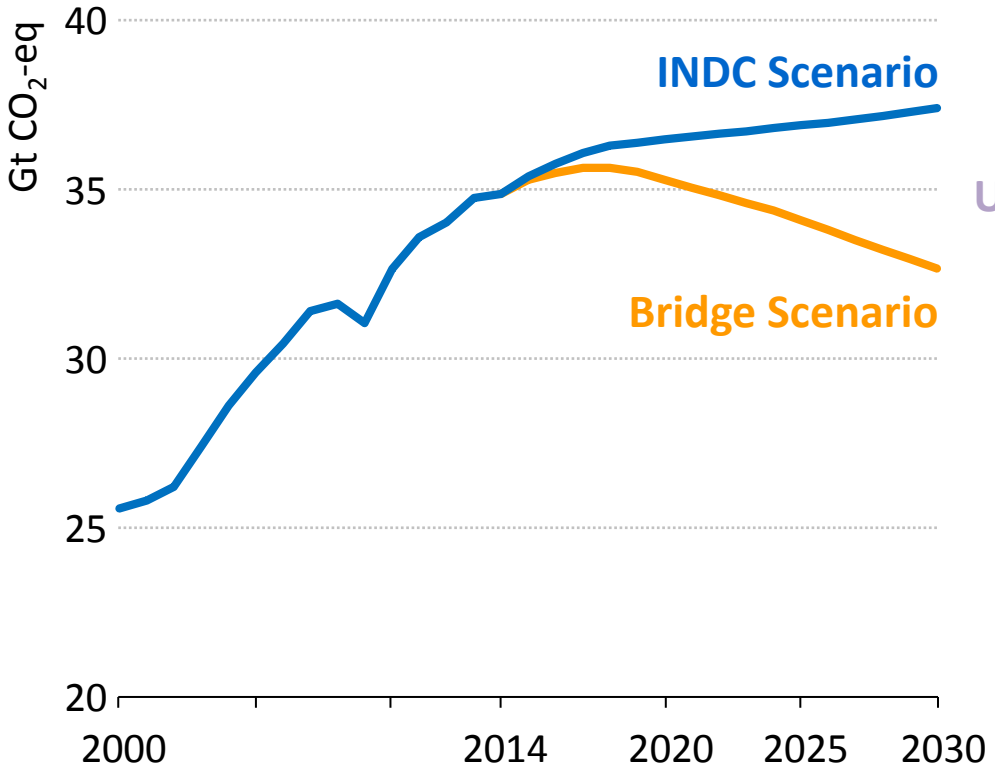
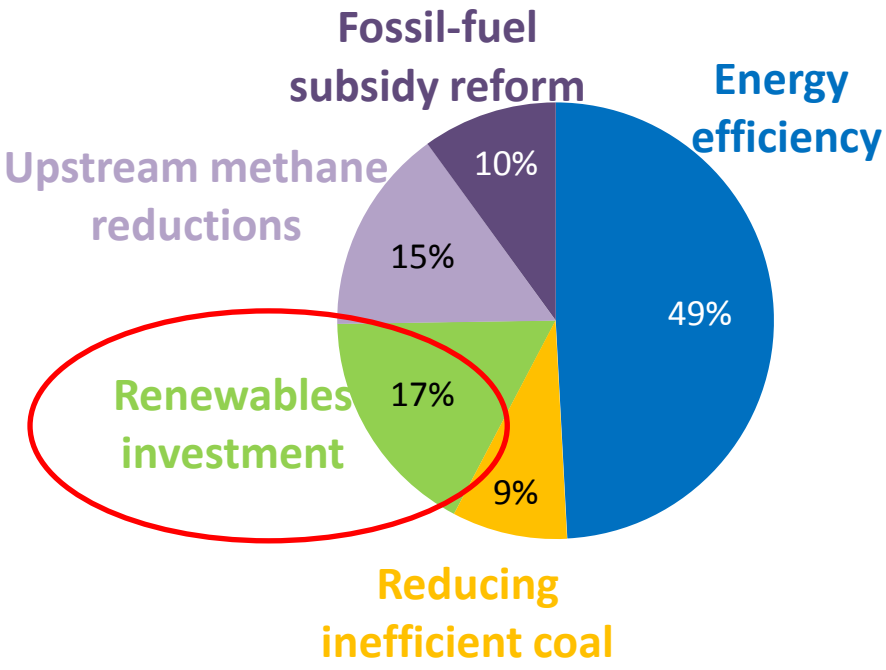
Global energy-related GHG emissions



Savings by measure, 2030

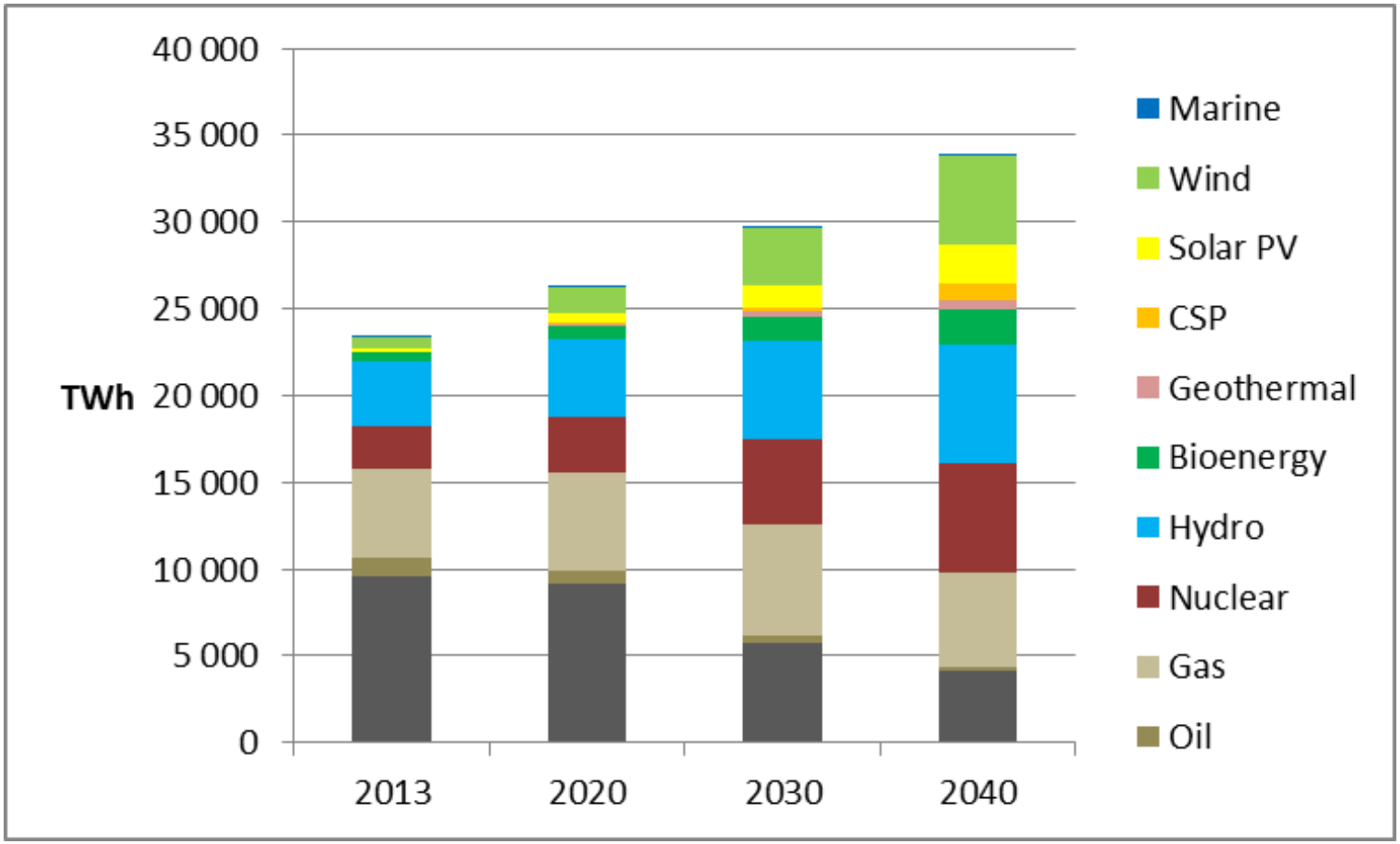


Source: *IEA World Energy Outlook Special Report: Energy and Climate Change (2015)*

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

Power mix: a shift reversal

Evolution of the global power mix in the 450 Scenario

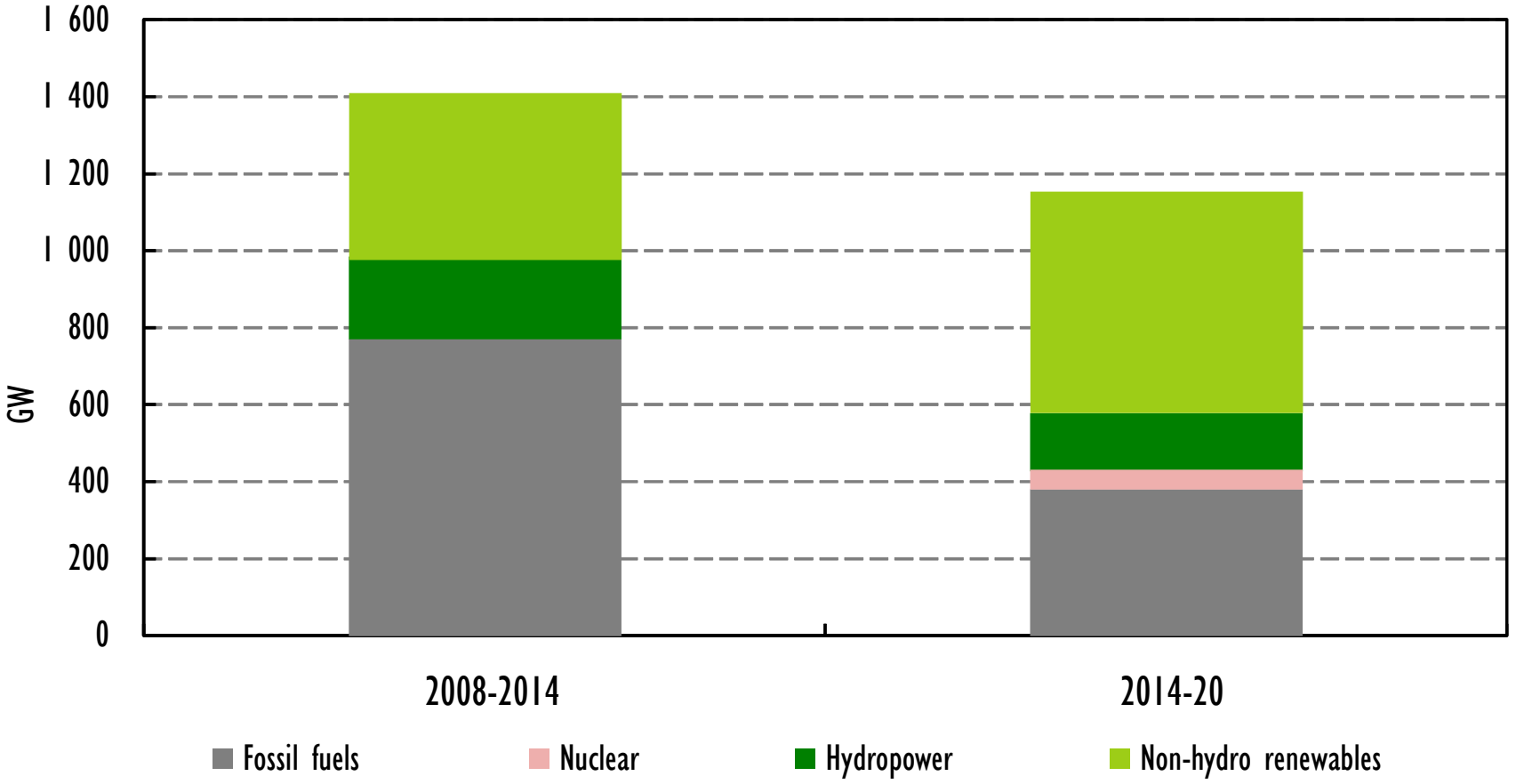


Source: *IEA World Energy Outlook 2015*

Renewables should account for over 50% of global electricity generation by 2040

Over the next five years, renewables dominate new power capacity

World net additions to power capacity – *main case*



Source: *IEA Medium-Term Renewable energy Market Report 2015*

Renewables set to account for almost two thirds of global net capacity growth over the medium-term

China leading global RE growth

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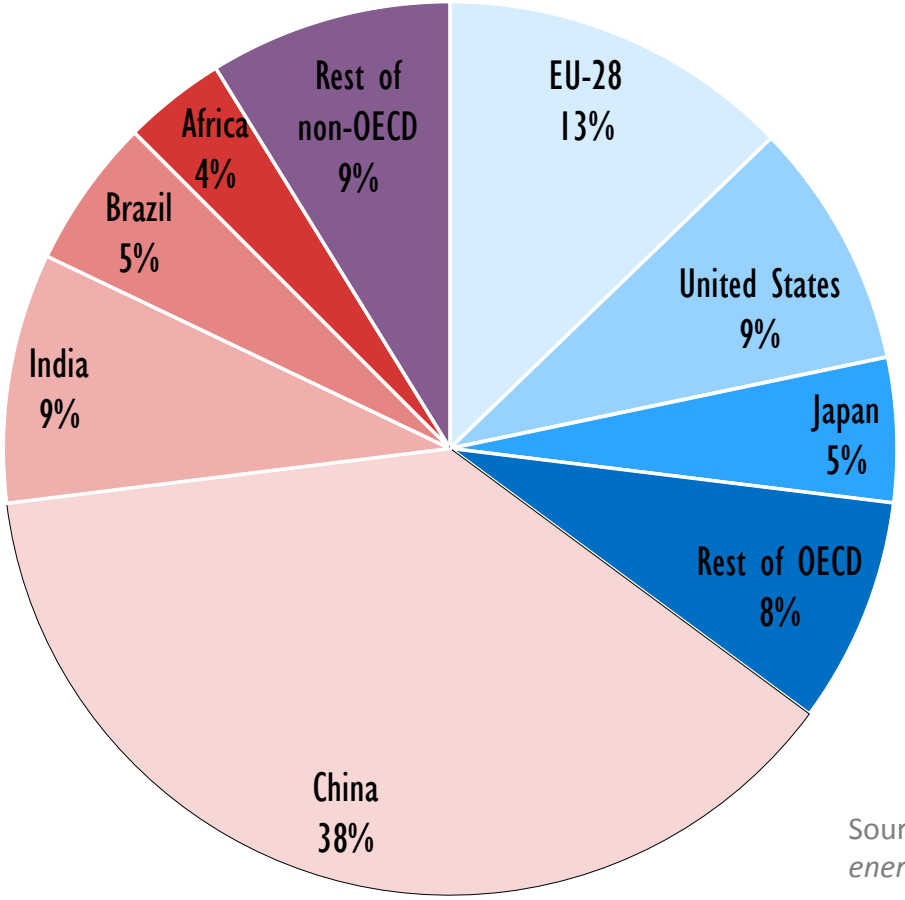
Shares of net additional renewable capacity, 2014-20



Source: *IEA Medium-Term Renewable energy Market Report 2015*

China alone will add more renewable power capacity than all OECD countries together, and than all other non-OECD countries together

Renewable electricity generation is on the rise

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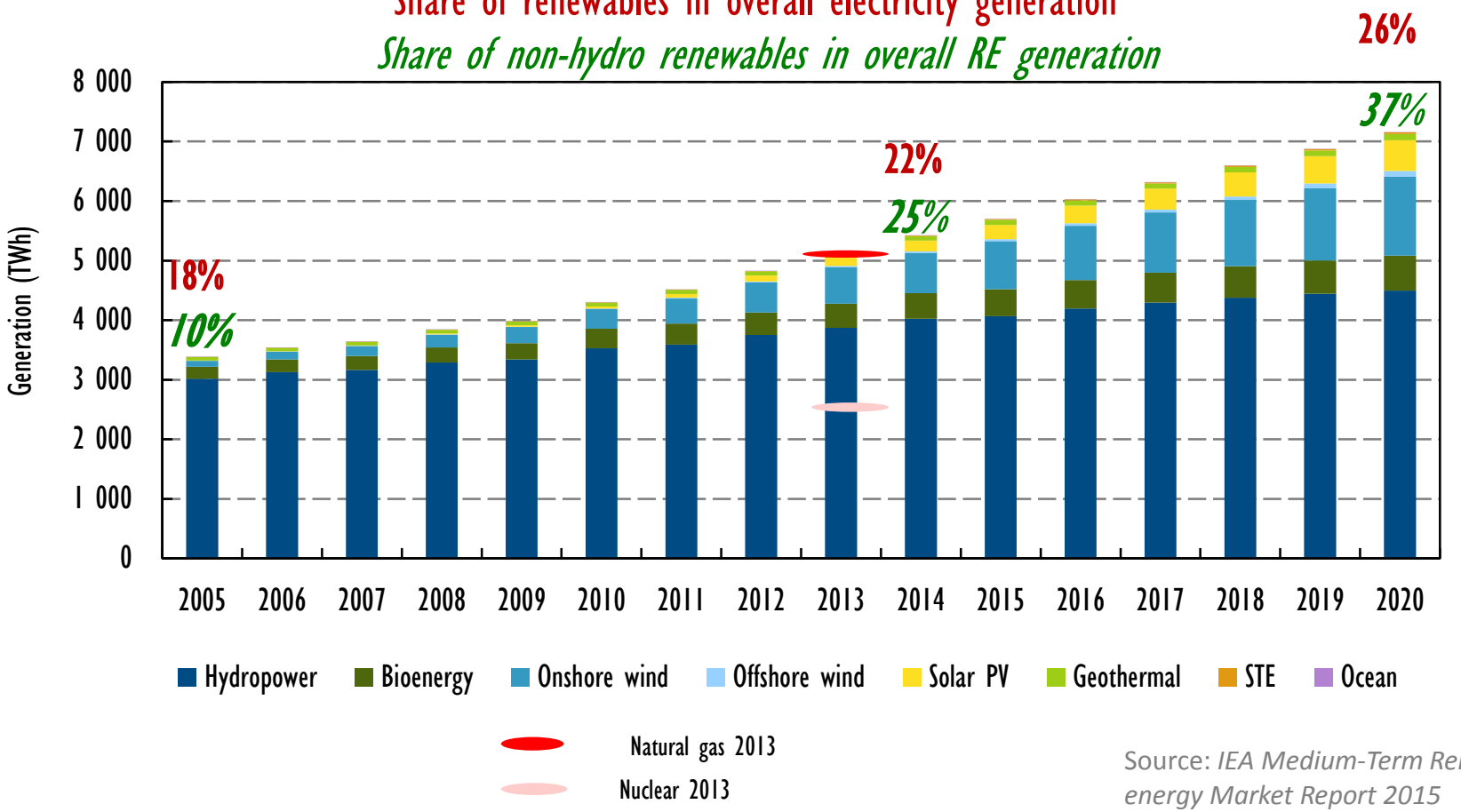
Renewable generation by technology (2005-20)



Source: *IEA Medium-Term Renewable energy Market Report 2015*

Wind power, followed by solar power, are the most dynamic technologies

Wind and PV prices declining

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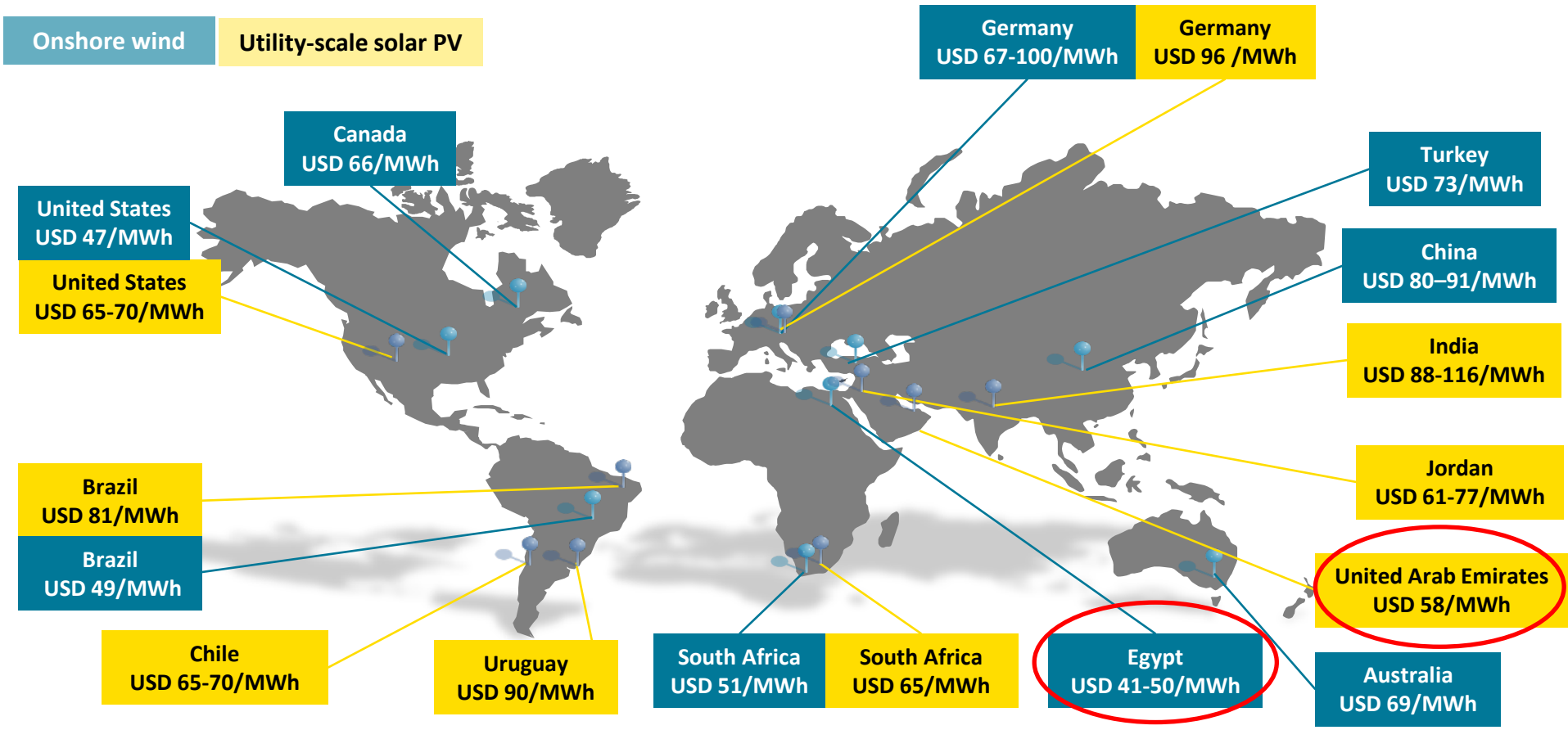
Long-term contract prices for new renewable power to be commissioned in 2016-2018

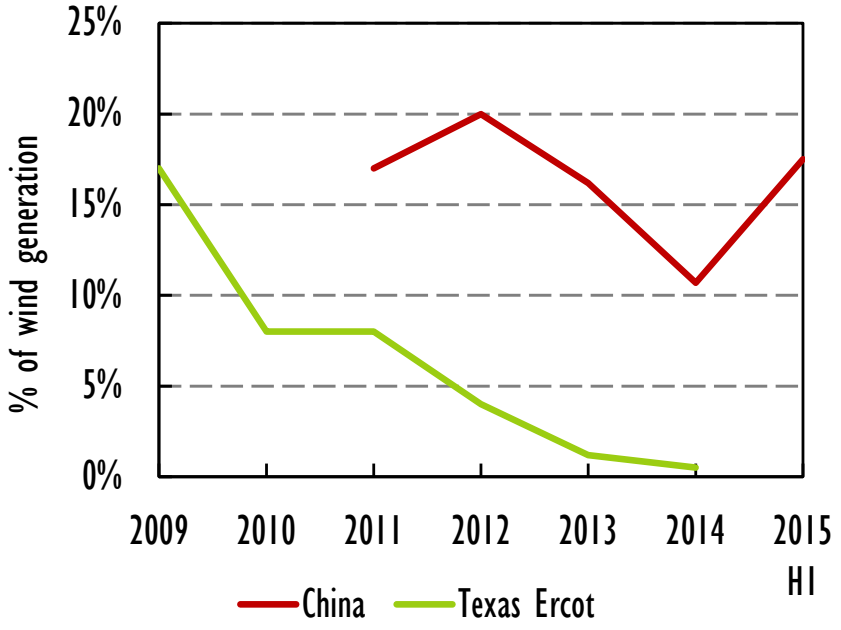


Source: *IEA Medium-Term Renewable energy Market Report 2015*

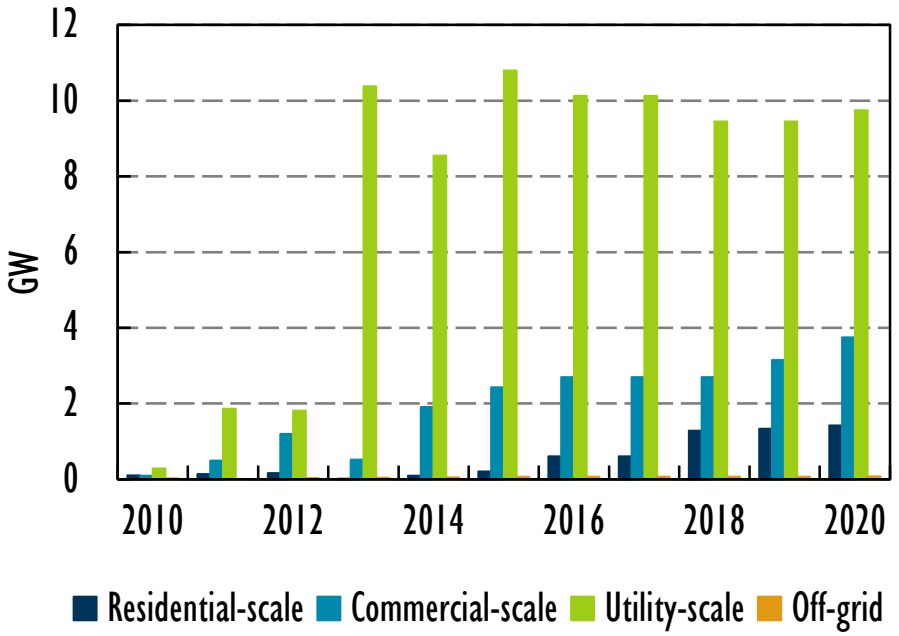
Price competition, long-term contracts, good resources and financial de-risking measures create lower-cost deployment opportunities in newer markets

Two important challenges to further renewable growth

Share of curtailed wind generation in China and ERCOT



Solar PV capacity additions by segment (2010-20)



Source: *IEA Medium-Term Renewable energy Market Report 2015*

Still, grid integration of renewables and non-economic barriers to distributed solar PV remains as major challenges to China's accelerated deployment

System innovation to enable wind and solar power

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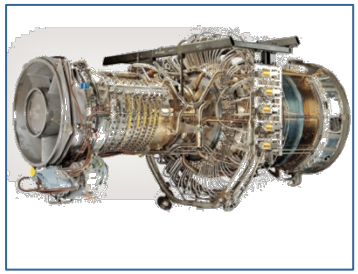
Invest in necessary flexibility to integrate large shares of vRE

Grids

Generation

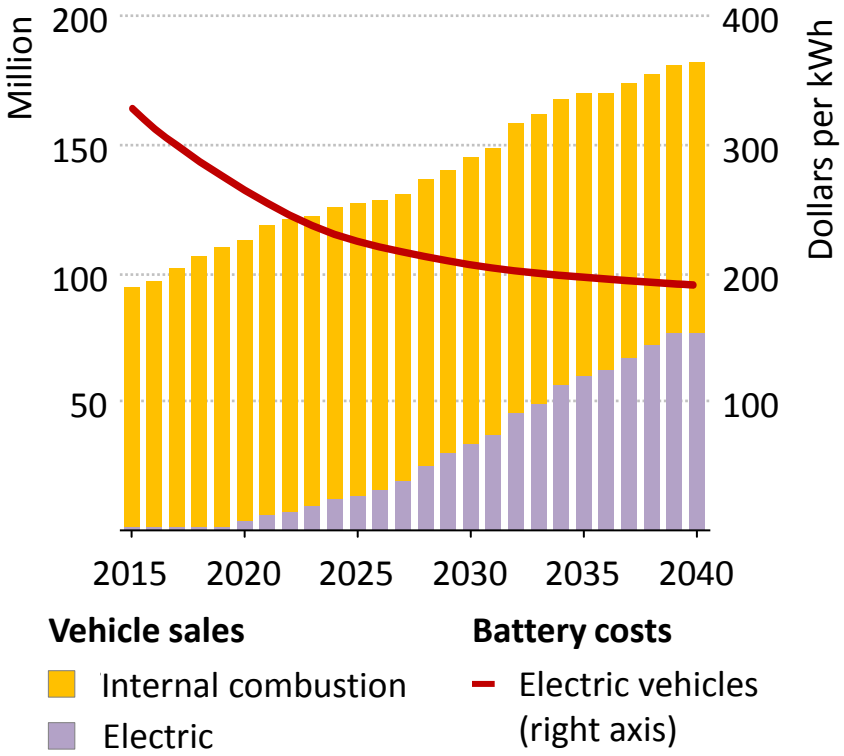


Storage

Demand Side

Source: *IEA The Power of Transformation (2014)*

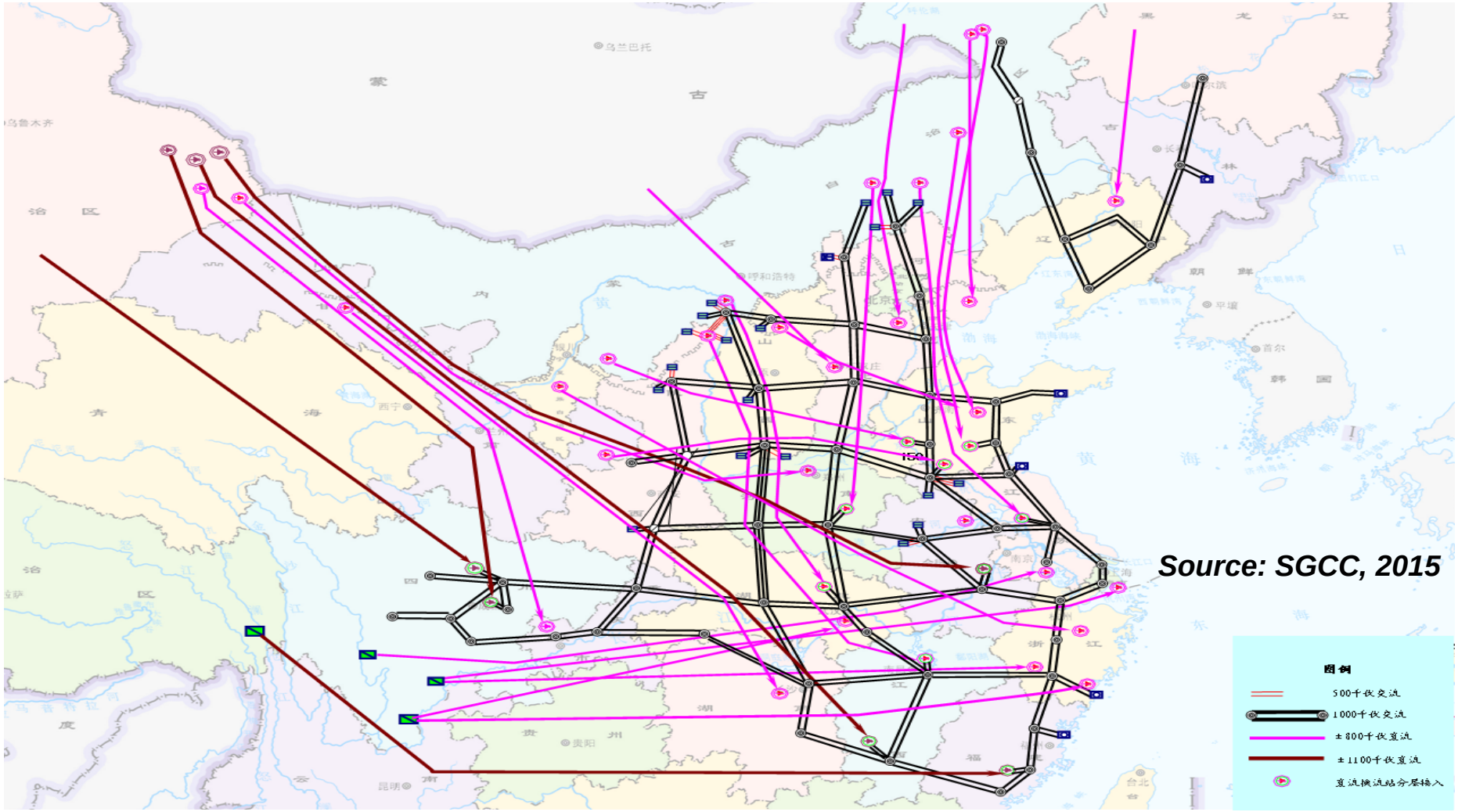
Cost reductions & deployment of electric vehicles in the 450 Scenario



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

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

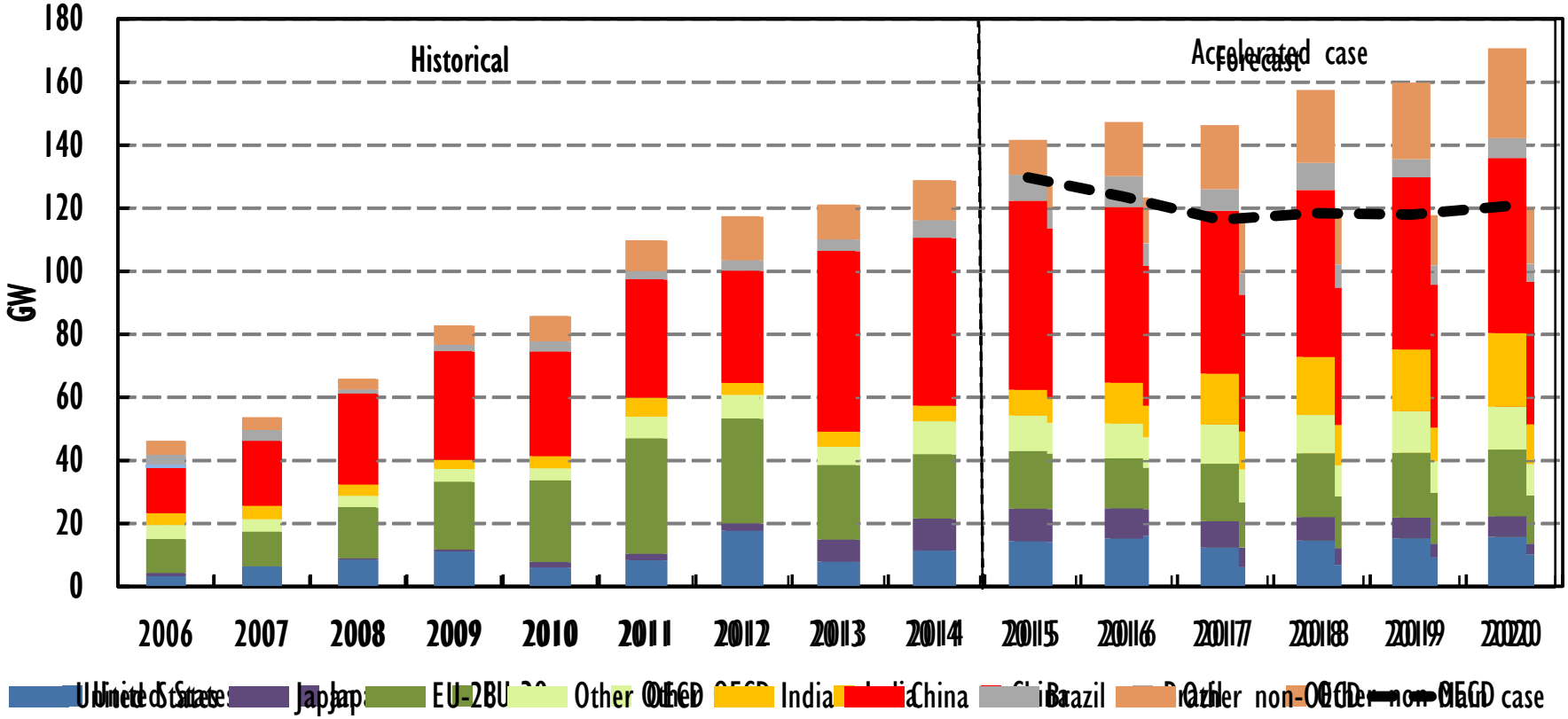
Transport grid is key to integrate variable renewables



By 2020, more than 22 UHVDC lines will link over 200 GW wind power turbines and 100 GW solar power plants to the Chinese load centers

Enhanced policies can get renewables growth back on track to meet climate goals

World renewable power annual capacity additions, *main* vs. *accelerated case*



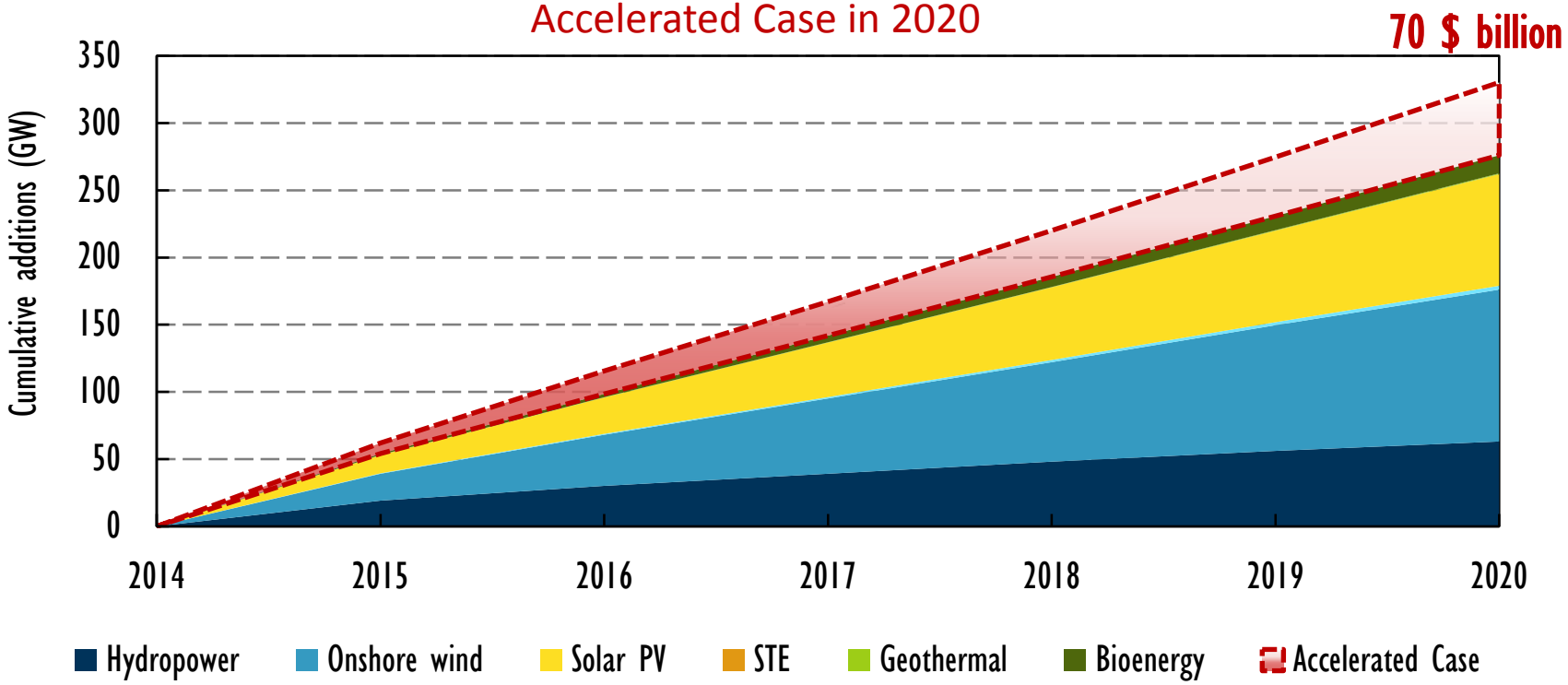
Source: *IEA Medium-Term Renewable energy Market Report 2015*

Policy enhancements can accelerate renewables growth by 25% vs. the main case and increase annual investment to over USD 315 billion by 2020

Onshore wind and solar PV to lead China's renewable growth

China cumulative additions to renewable capacity (2014-2020)

The necessary annual investment amount for China to realize the Accelerated Case in 2020

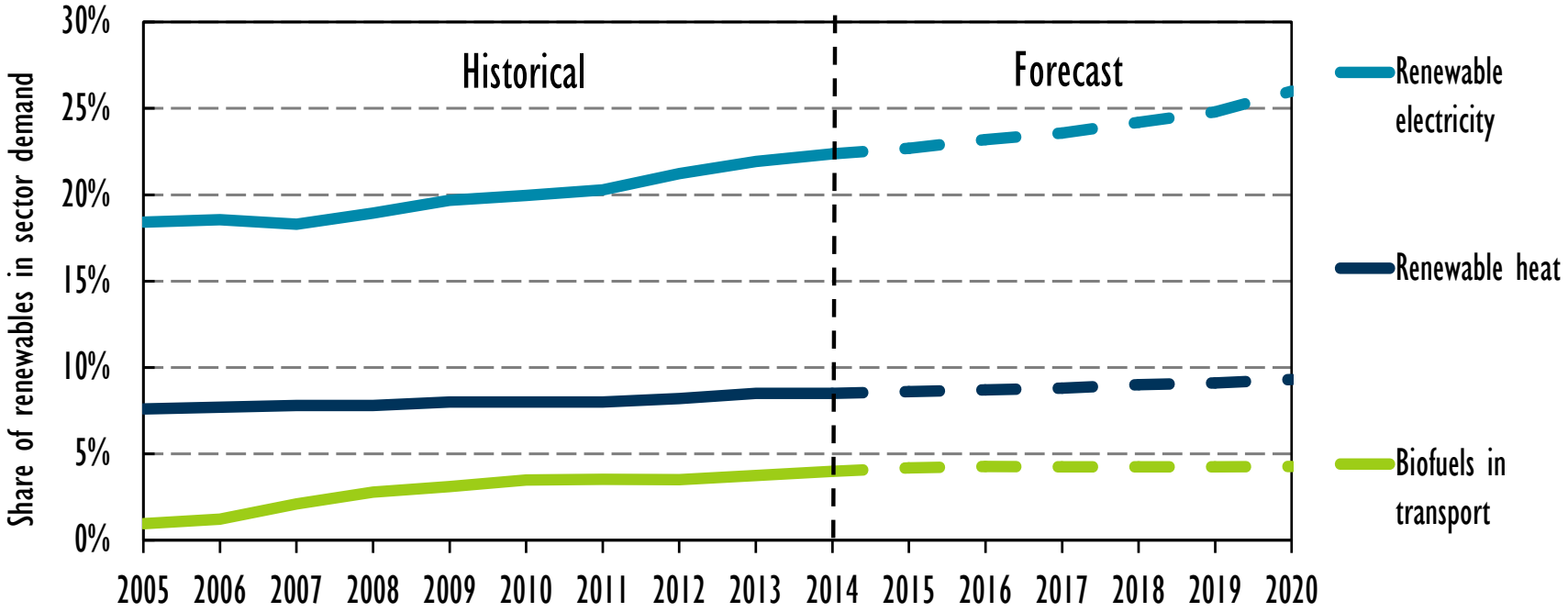


Source: *IEA Medium-Term Renewable energy Market Report 2015*

Renewable capacity to increase by 60% over 2014-20 but could increase by 75% if challenges concerning power sector reform implementation and grid integration are tackled

Meeting climate change objectives requires more renewable growth in all sectors

Historical and forecast share of renewables in electricity, heat and transport sectors 2005-20 (Base Scenario)

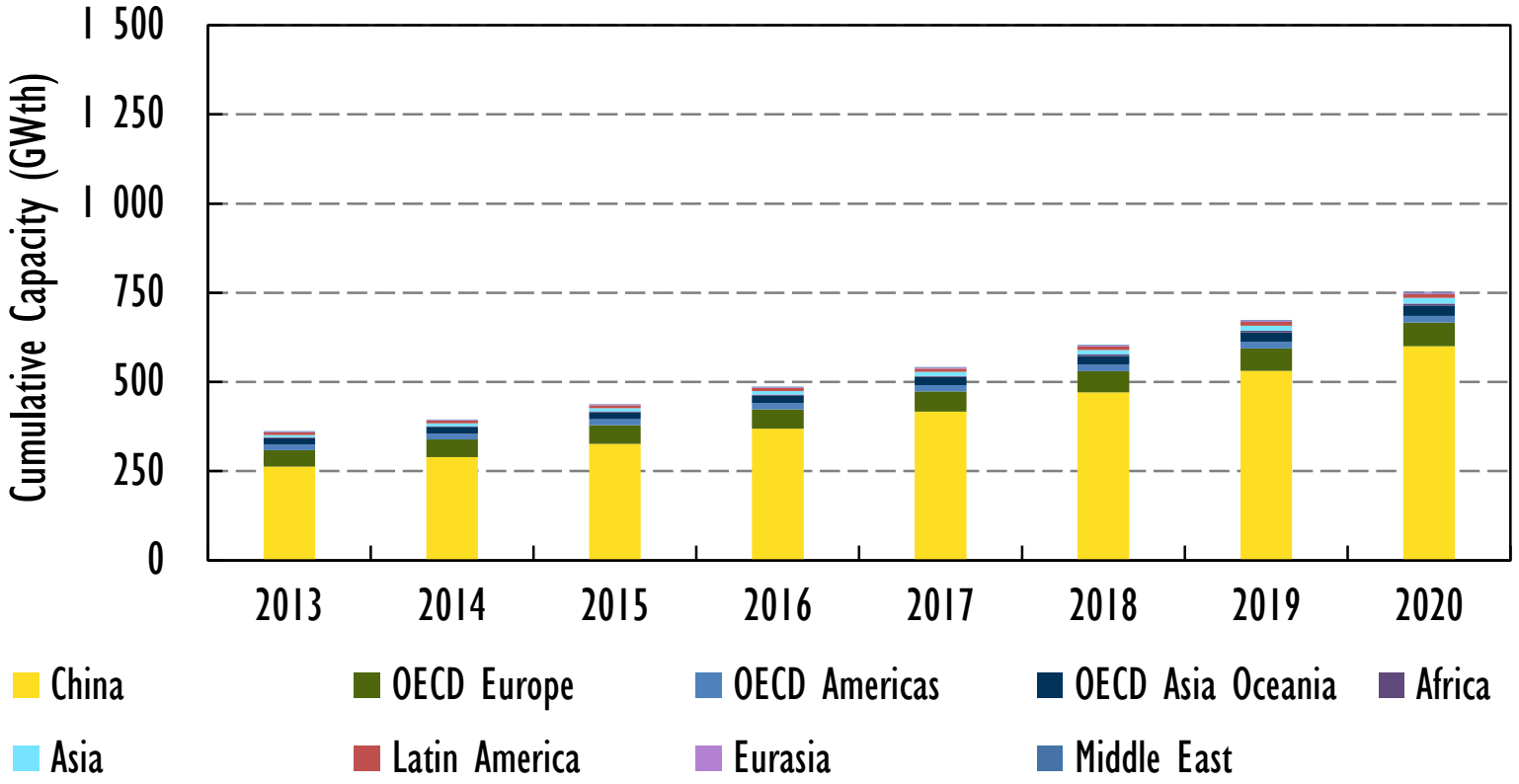


Source: *IEA Medium-Term Renewable energy Market Report 2015*

Growth of renewable electricity generation is increasing but under levels required to meet 2DS scenario, while renewable heat and transport are falling behind.

China drives global solar thermal deployment

Cumulative solar thermal capacity by region 2013-20



Source: *IEA SHC Programmes, Solar Heat Worldwide 2015 edition, IEA Medium-Term Renewable energy Market Report 2015, IEA Renewables Information 2015 (database)*

Global installed capacity is expected to almost double over 2014-2020, with over three-quarters of the growth from China alone

IEA Technology Collaboration Programmes on Renewables and Hydrogen

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SolarPACES

International Energy Agency
Photovoltaic Power Systems Programme

SHC
SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

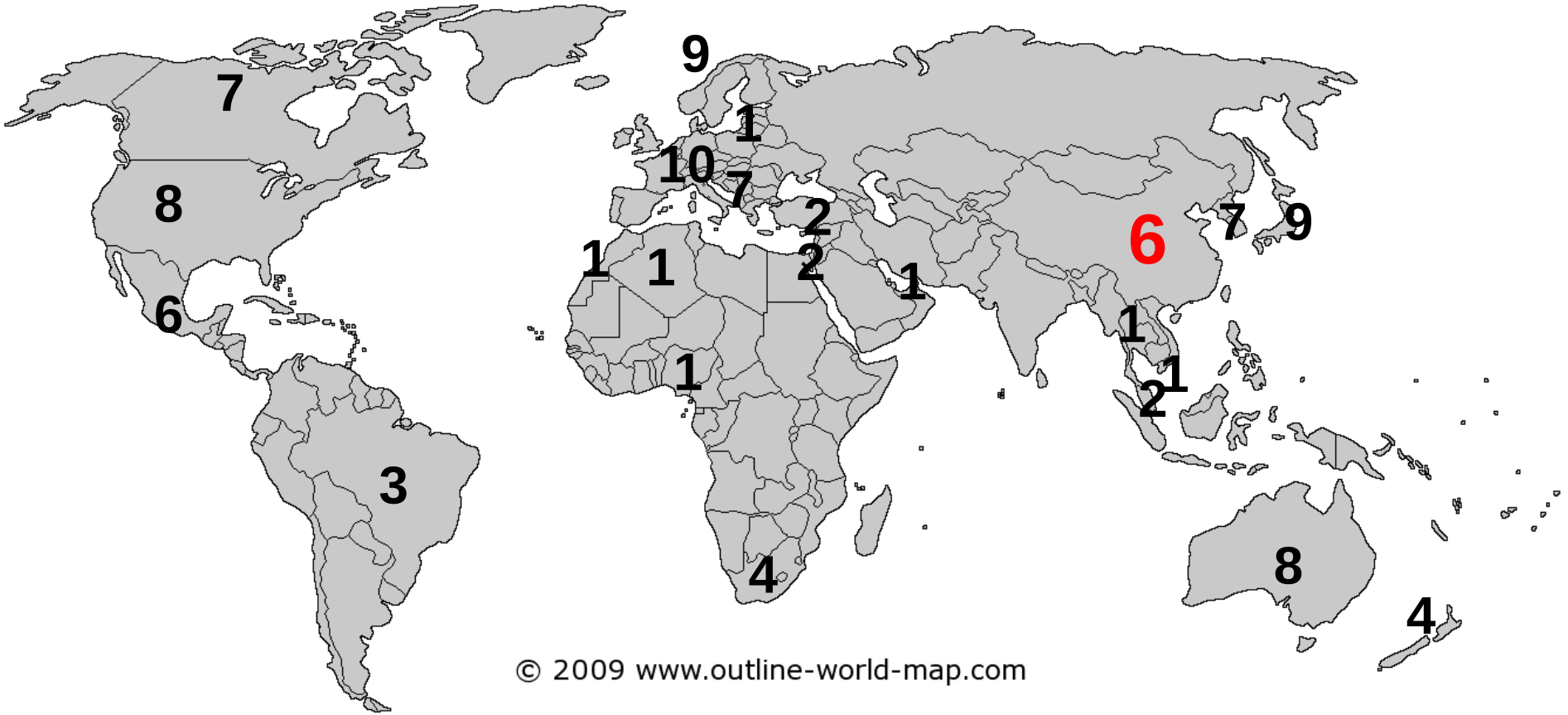
iea wind

IEA Bioenergy

OES
OCEAN ENERGY SYSTEMS
An IEA Technology Initiative

IEA Geothermal Implementing Agreement

IEA-RETD
Renewable Energy Technology Deployment



This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries, and to the name of any territory, city or area.

A decisive moment for renewables

- Accelerated growth of renewables and efficiency can help meet energy security and access, air quality and climate protection goals
- Increasingly affordable renewables are set to dominate the growing power systems of the world, with China leading global growth
- A better alignment, consistency and predictability of policies is crucial to foster effective and cost-efficient energy transitions
- A well-thought market reform could help China in accelerating renewables deployment towards a cleaner energy mix
- The IEA stands ready to support China in its energy transition

Thank you for your kind attention