



# ***Medium Term Renewable Energy Market Report 2016***

**Clean Energy Investment and Trends  
IETA Pavilion  
COP22, Marrakech  
November 10, 2016**

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**The IEA works around the world to support an accelerated clean energy transition that is**

**enabled by real-world SOLUTIONS**

**supported by ANALYSIS**

**and built on DATA**



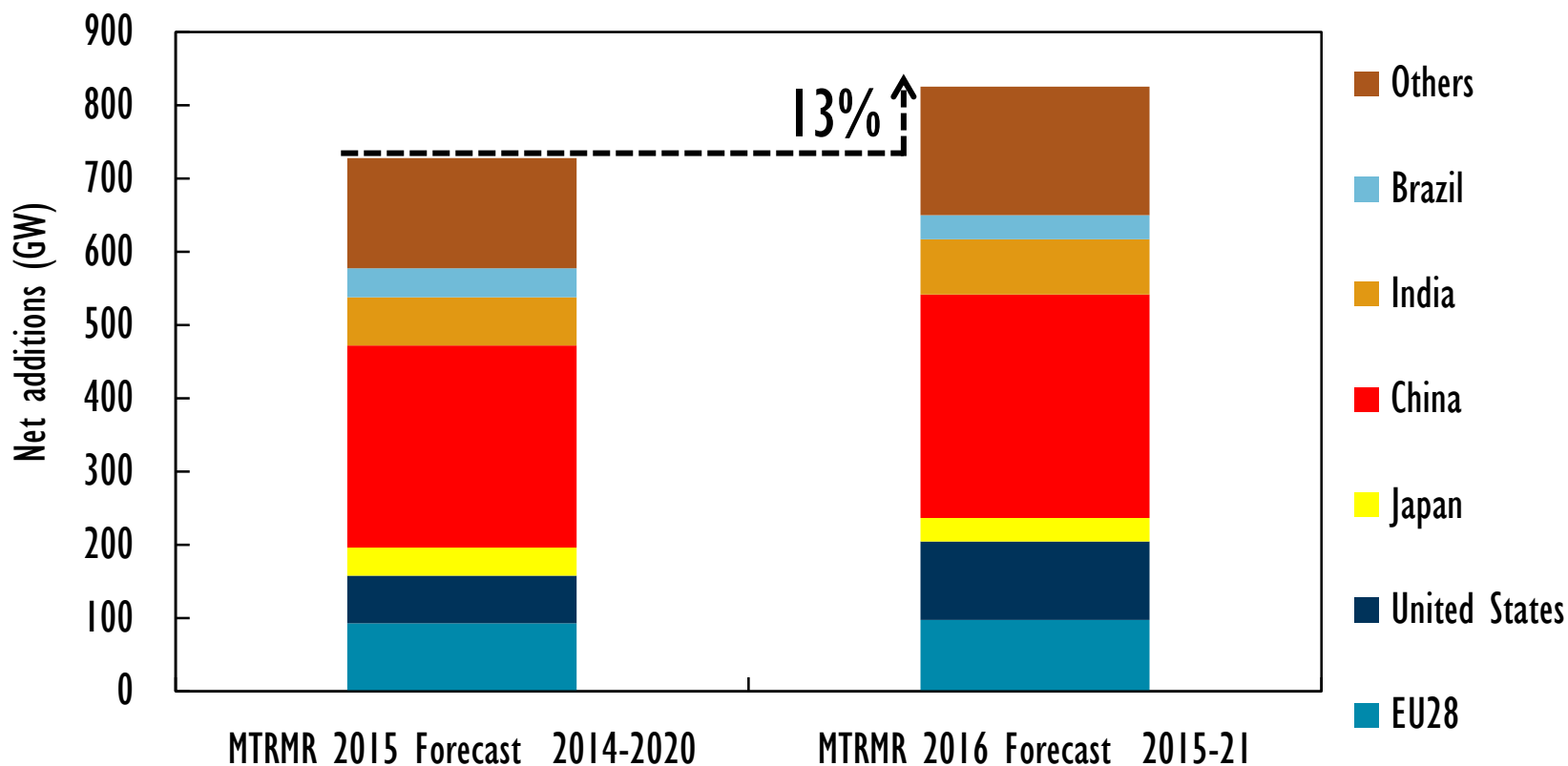
# Context

- **A year of records for renewable electricity**
  - *Total capacity has now overtaken coal*
  - *A record amount of new capacity was installed in 2015*
- **COP21 Paris Agreement gives momentum to renewables**
- **Local air pollution & energy security are also key drivers**
- **Energy investment flows confirm shift to renewables**
- **But policy makers need to heighten their commitments and provide investors more clarity & certainty**



# New policies underpin a more bullish forecast for renewables

Renewable electricity capacity growth (GW) in *MTRMR's main case*

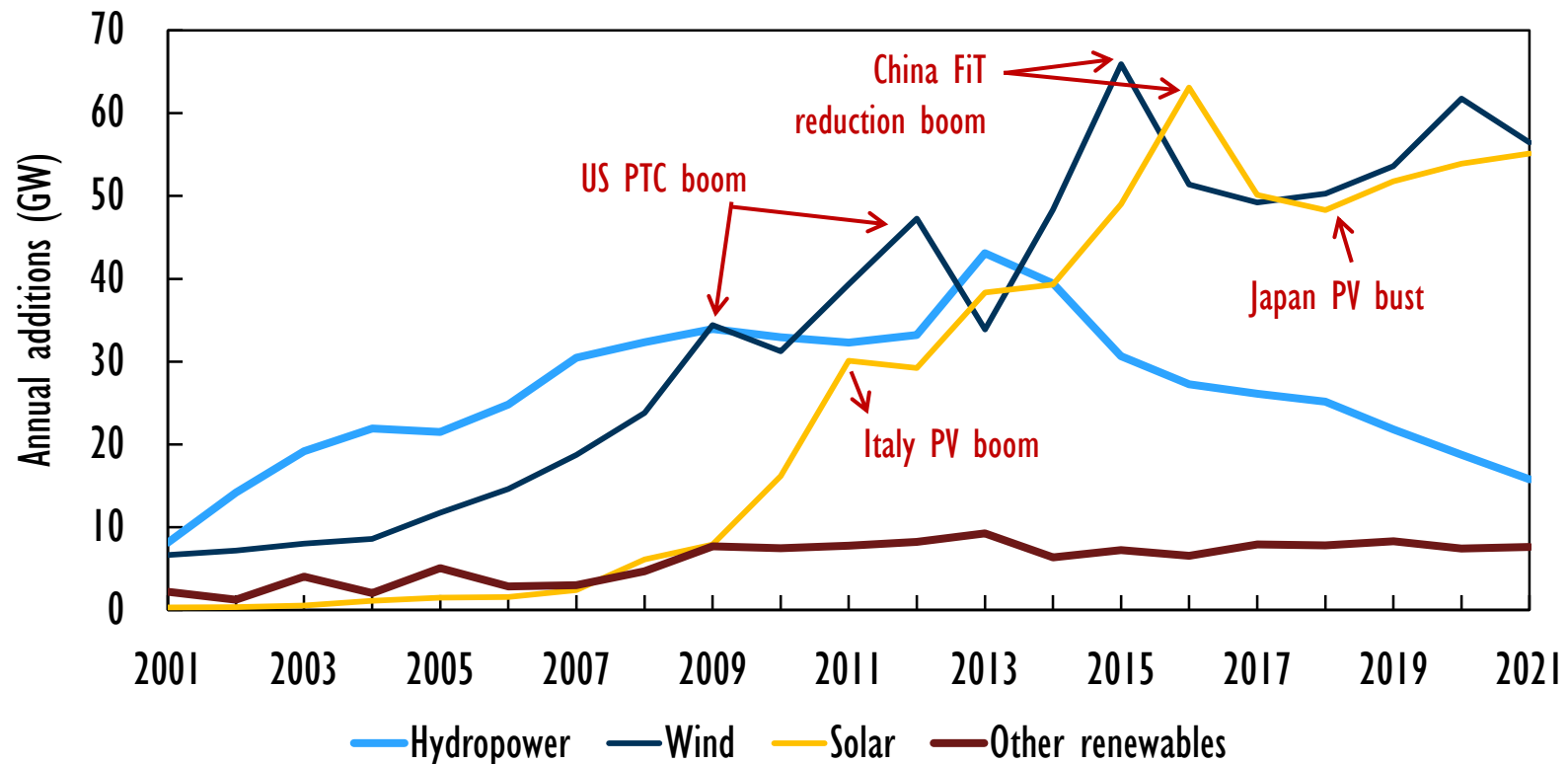


***China remains key growth market for renewable capacity, while the United States surpasses the EU for the first time***



# Wind and solar PV compensate for slower hydropower growth

Renewable electricity capacity additions by technology (2001-21)

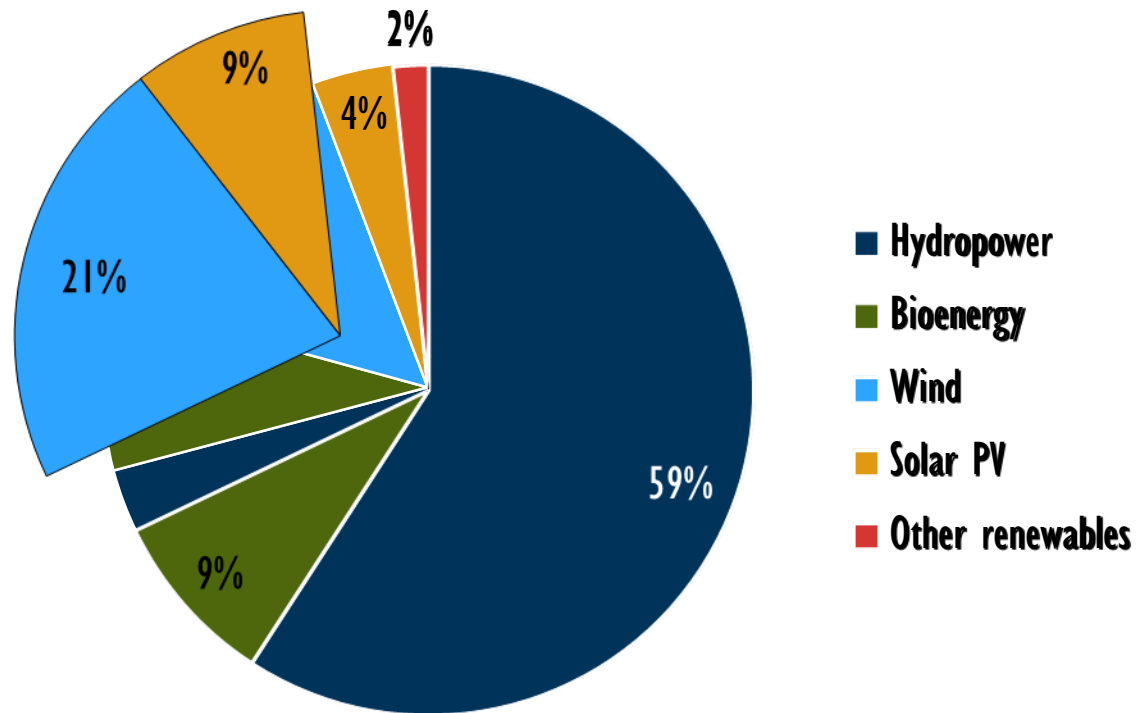


***Predicting policy-driven boom and bust cycles remains a challenge, which is expected to continue over the medium-term.***



# Wind and solar PV compensate for slower hydropower growth

Renewable electricity generation by source 2025

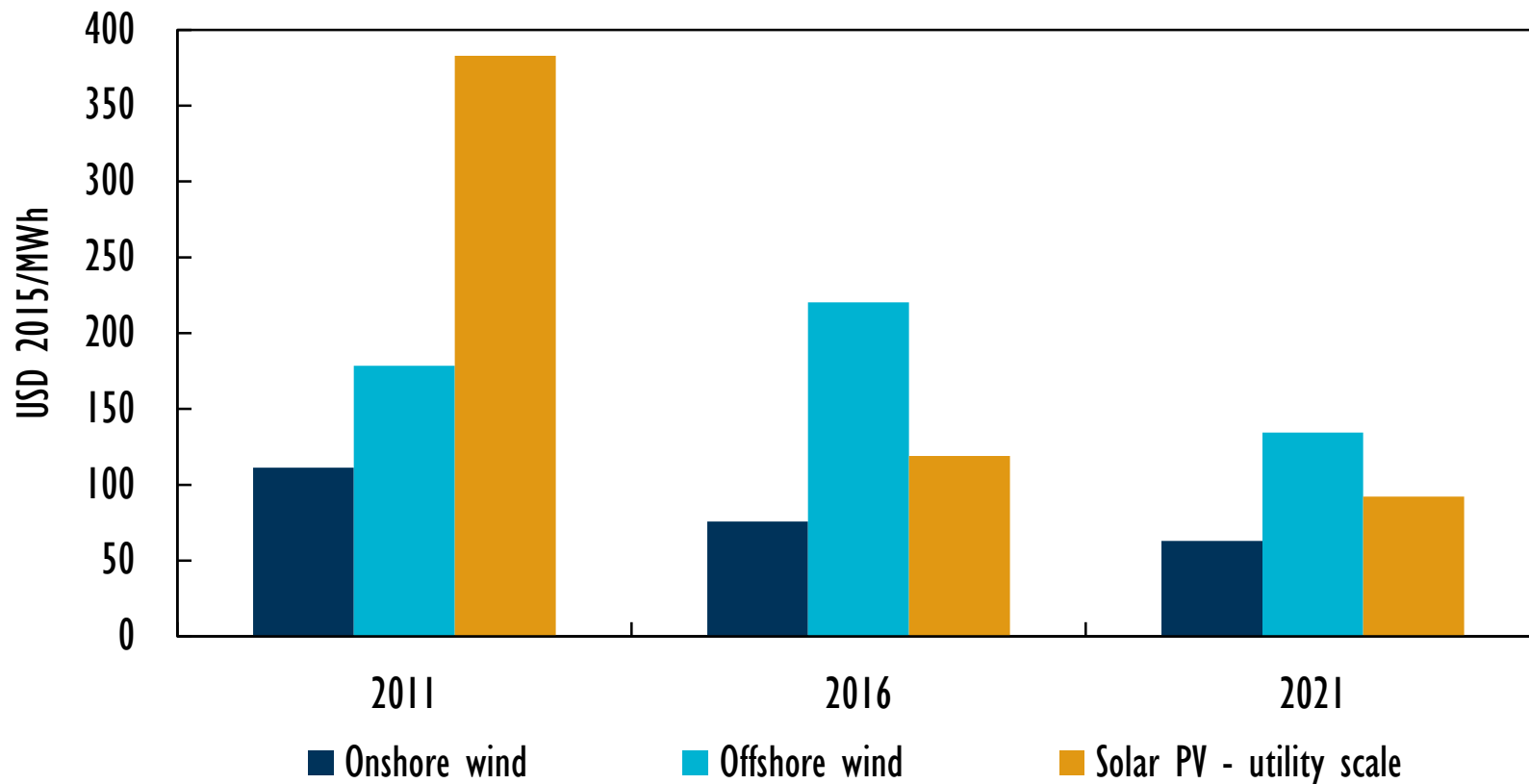


***Solar PV & wind account for almost 2/3 of rise in renewables generation; total renewable electricity overpasses 7600 TWh by 2021, equivalent to EU+US today***



# Renewable costs reductions to remain an important driver for future growth

Weighted average generation costs for solar PV and wind

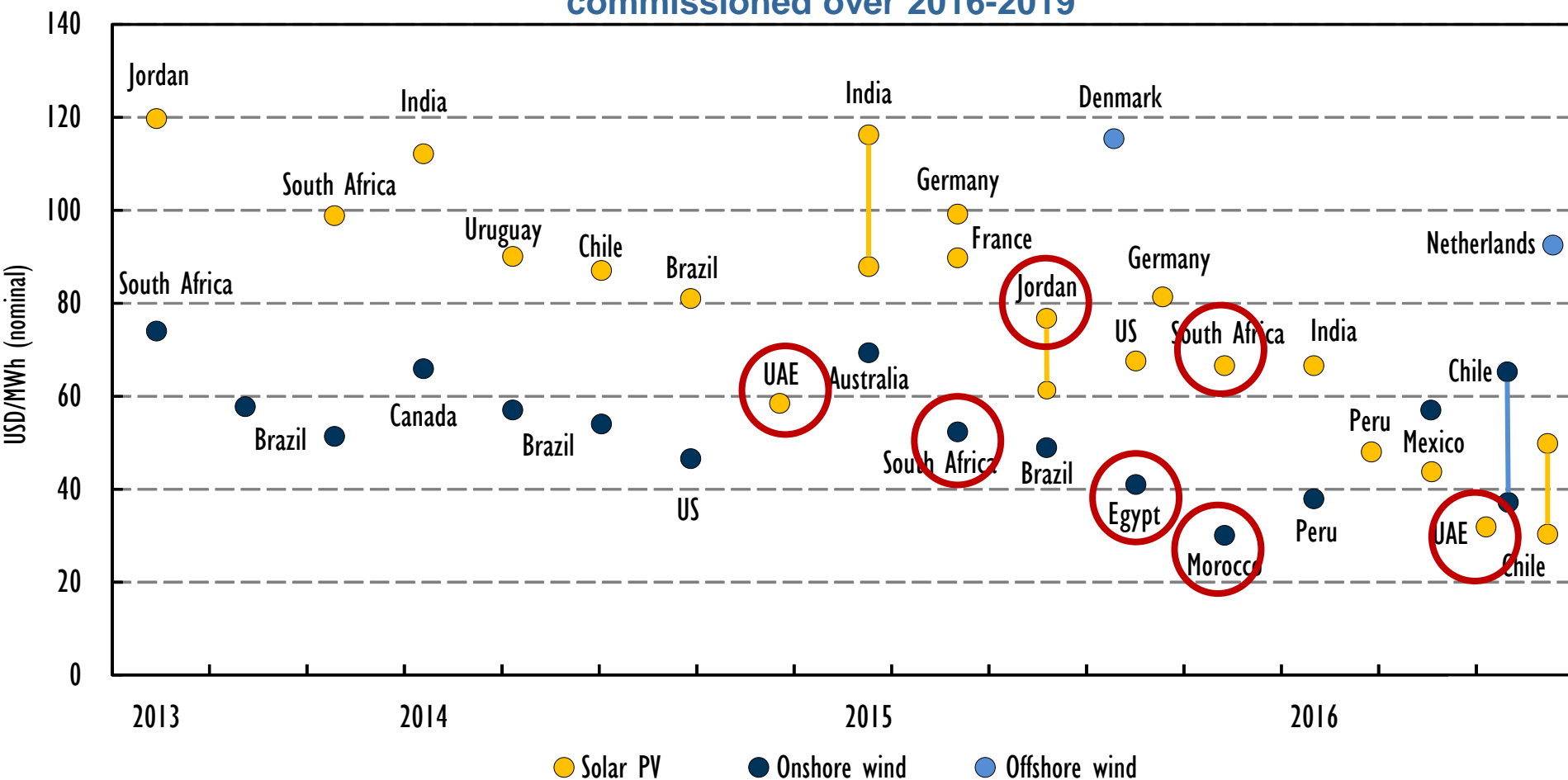


***Utility-scale solar PV generation costs to fall by another quarter and onshore wind by 15% over 2015-21, largest absolute cost reduction expected from offshore wind***



# Policy transition from government-set tariffs to policy-driven auctions/tenders

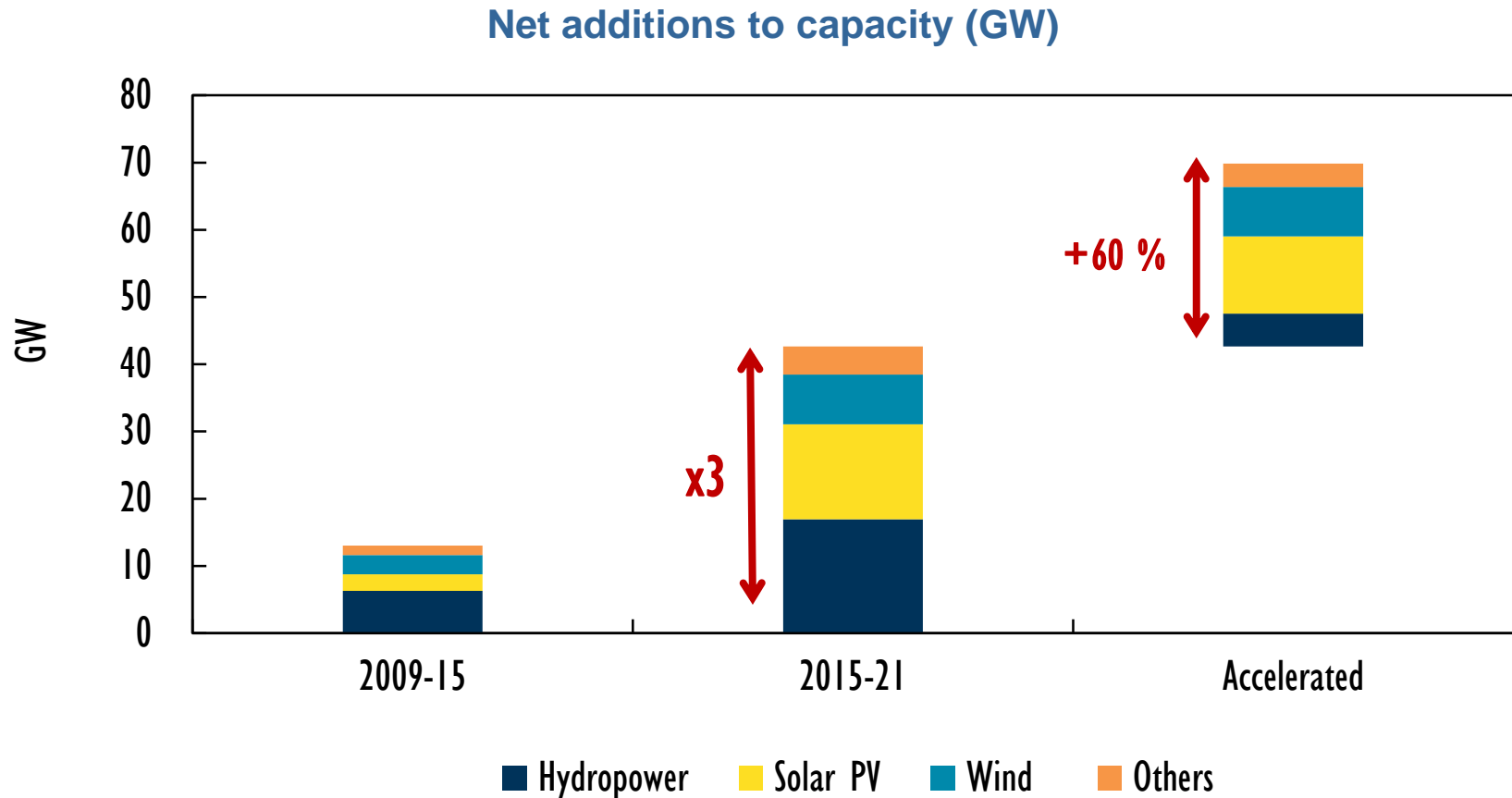
Recent announced long-term contract prices for new renewable power to be commissioned over 2016-2019



**Best results occur where price competition, long-term contracts and good resource availability are combined**



# Demand and diversification drive growth in Middle East & Africa

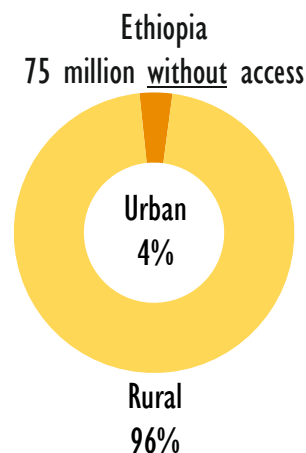
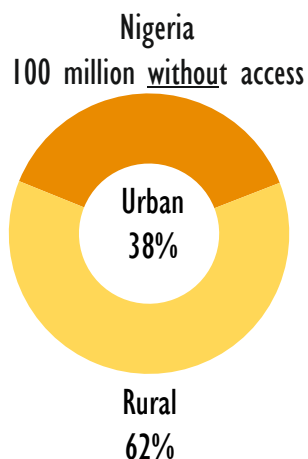
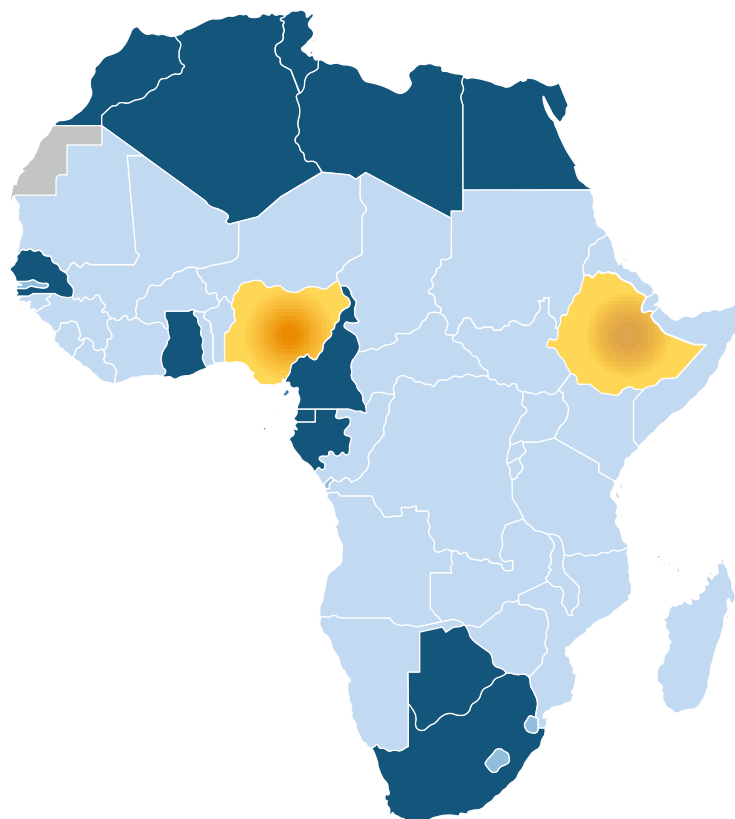
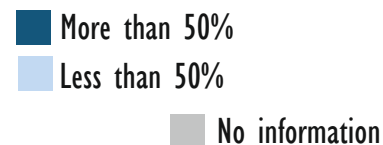


***Non-hydro pace dictated by auction schedules and grid integration; faster growth possible with quicker implementation and more access to low-cost financing***



# Decentralised renewables could improve electricity access and reliability

Share of population with access to electricity:

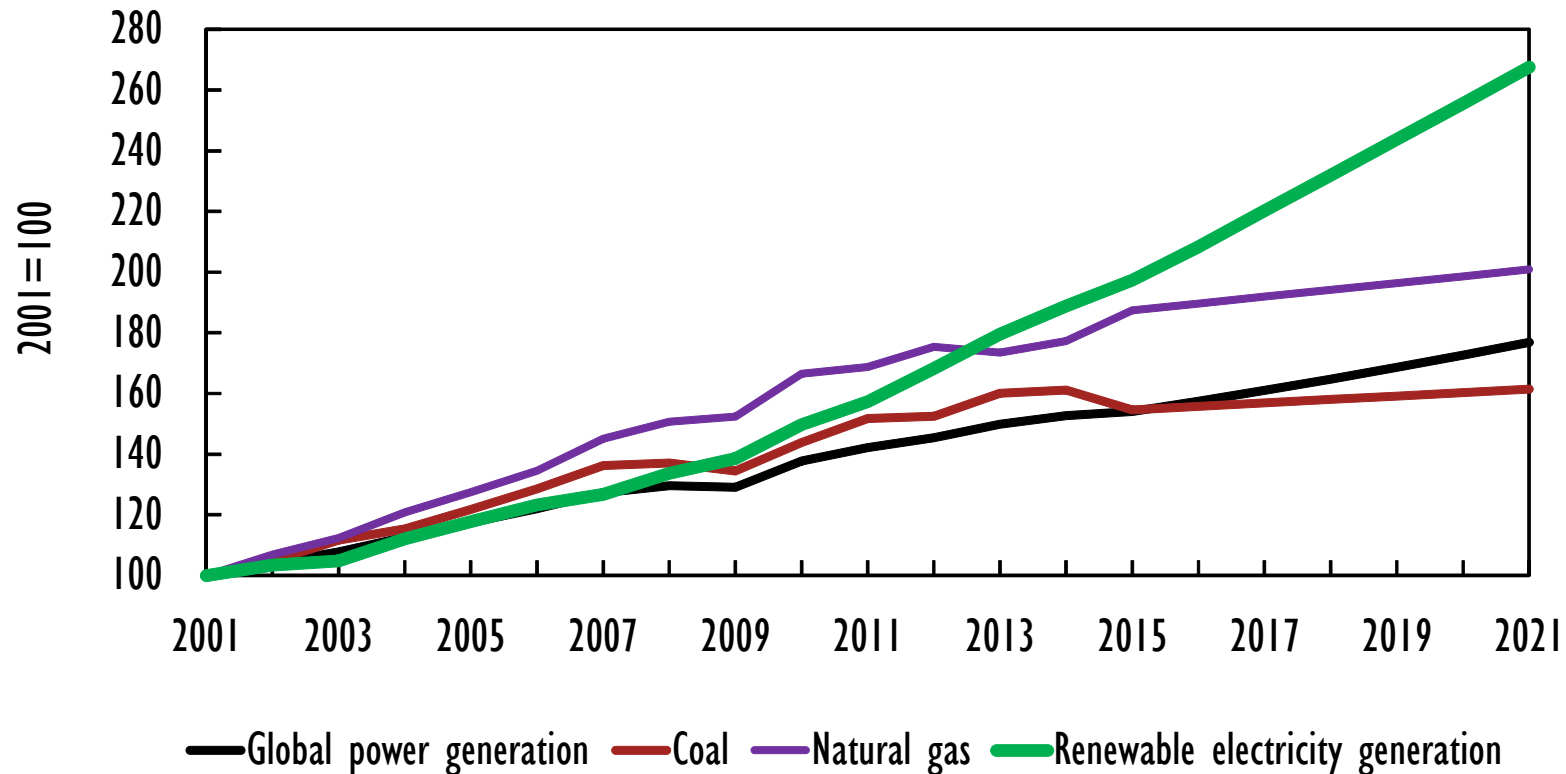


*Sub-Saharan Africa requires electrification solutions tailored to population density. Affordable small-scale solar PV can help access in rural areas and improve reliability in urban zones.*



# Renewables to remain fastest growing source of electricity generation

Indexed electricity generation by fuel (2001-21)

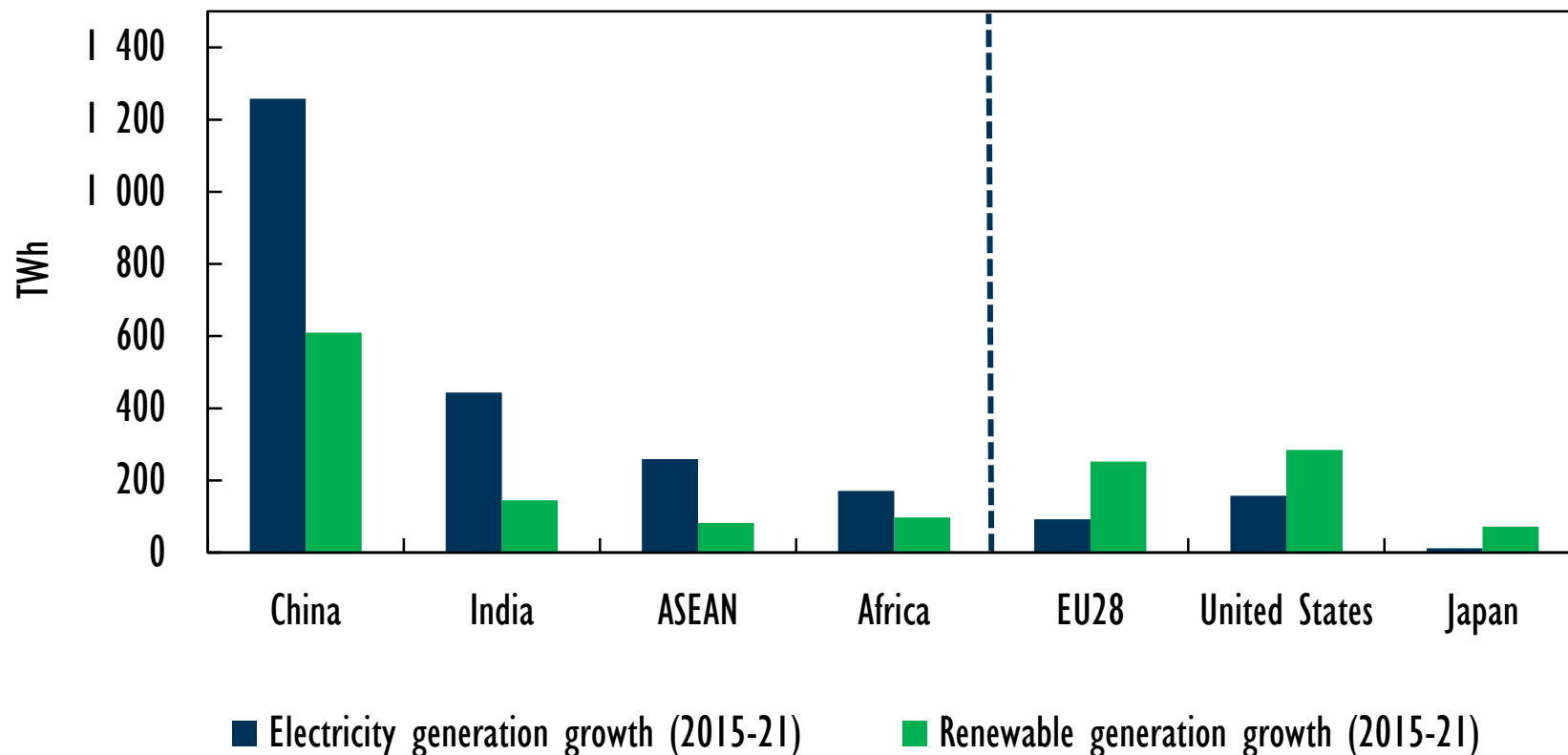


***Generation from renewables to rise by almost two-fifths over 2015-2021, pushing their share of total electricity generation from 23% to 28%***



# A two-speed world for renewable electricity

Electricity and renewable generation growth by country/region



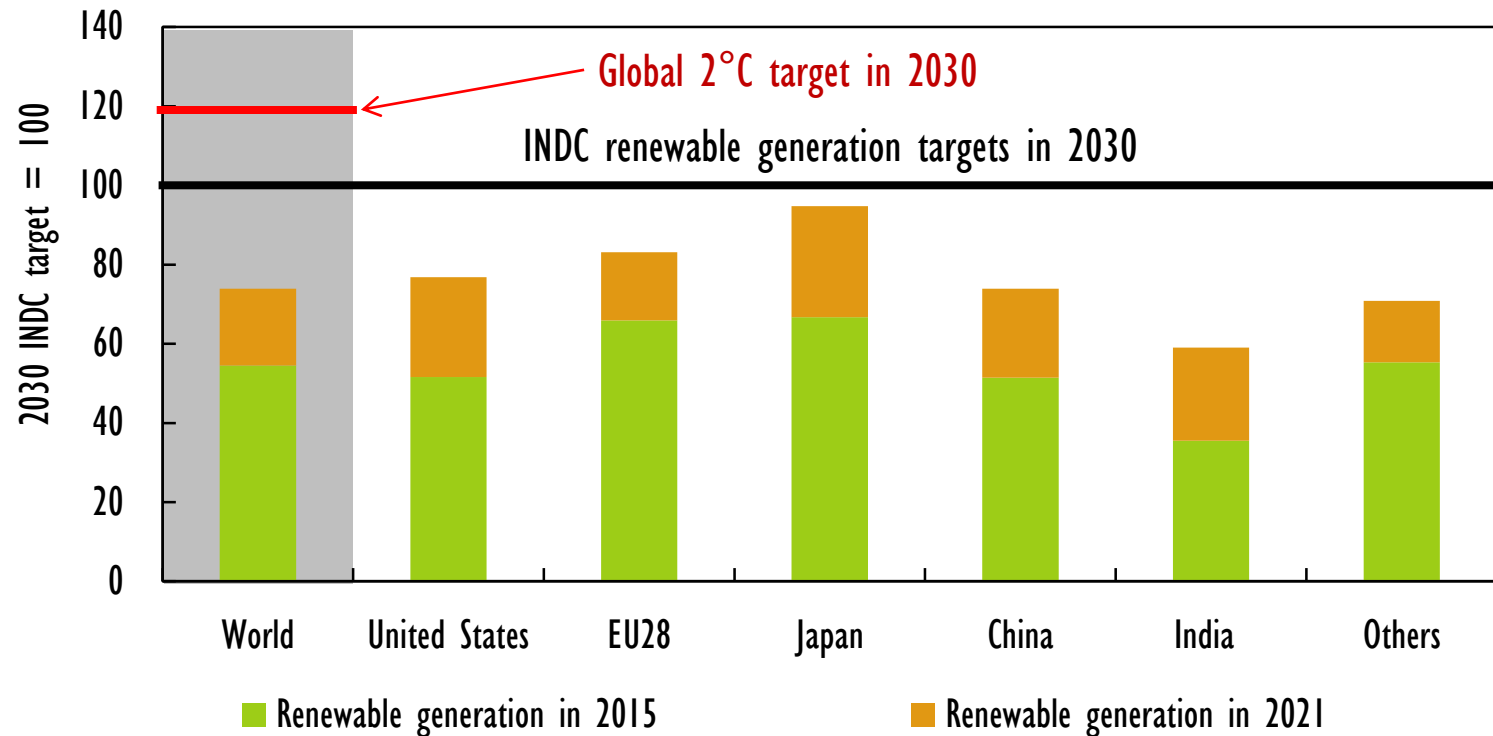
Source: Total electricity generation from World Energy Outlook 2016, forthcoming.

***The increase in generation from renewables in 2015-2021 represents 60% of the global increase in electricity output, but prospects vary across regionally***



# Medium-term renewable power forecast in line with COP21 goals

Renewable electricity generation indexed to INDC targets

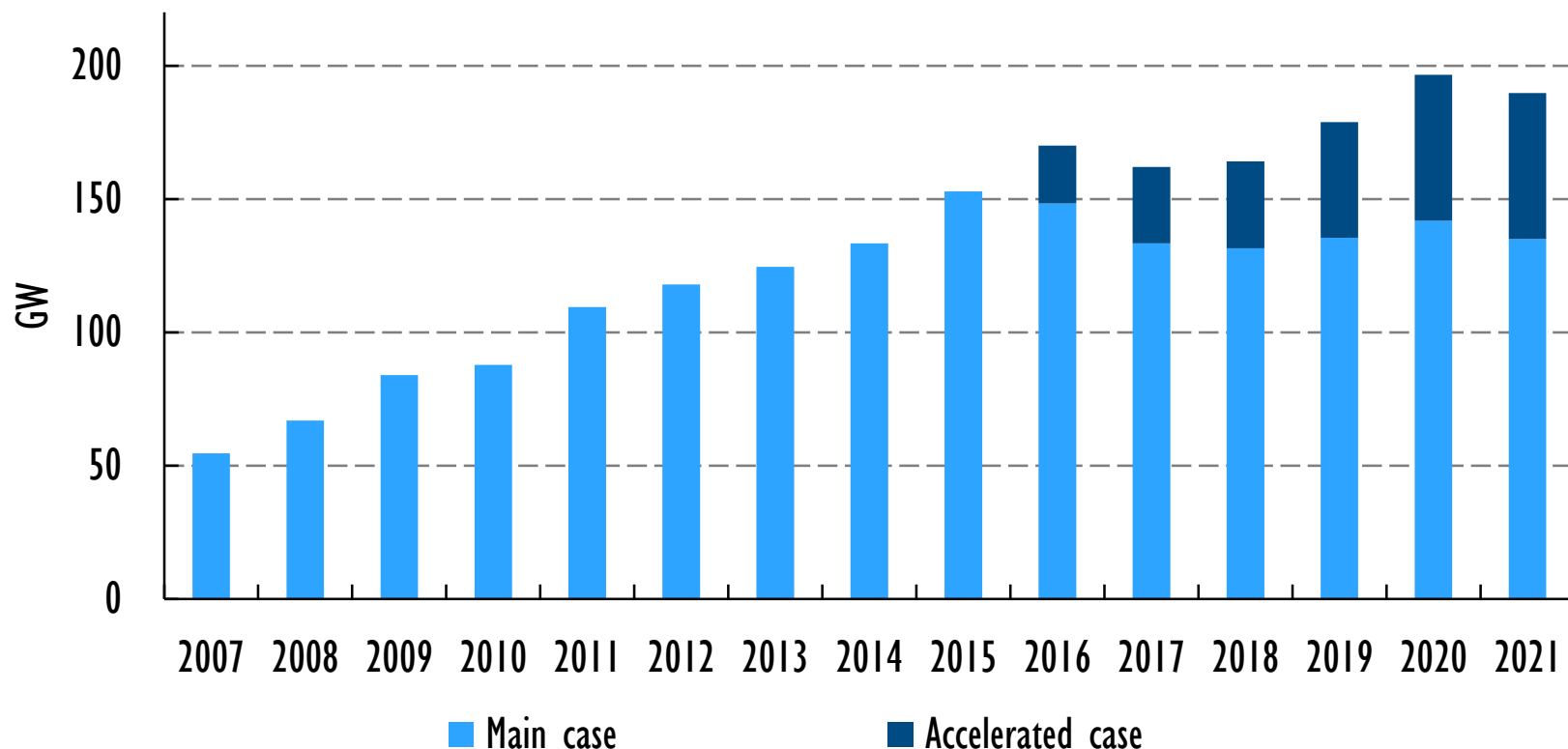


***But even more is needed to meet the ambitious climate targets agreed at COP21***



# More ambitious policies could further enhance the outlook in line 2°C target

Renewable electricity capacity additions in Accelerated Case vs. Main Case

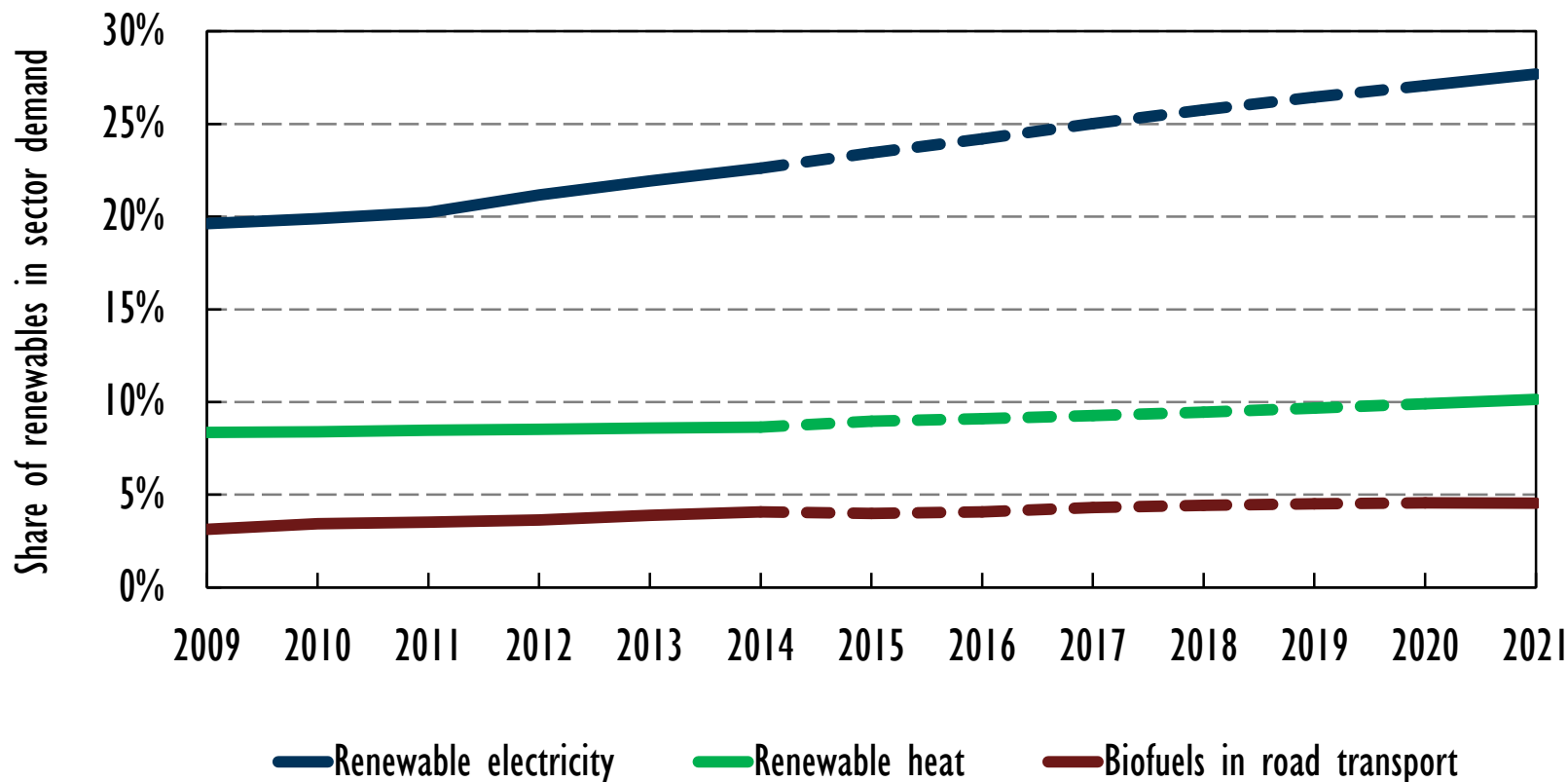


***Renewables are in line with NDC pledges by 2030 but reducing policy uncertainty and overcoming financing & grid integration challenges remain key to achieve 2°C target***



# Renewables to dominate electricity growth, but less progress in heat and transport

Share of renewables in electricity, heat and transport sectors



***The share of renewables rises in all sectors, despite persistent challenges in heat & transport; interactions between energy efficiency & renewables become critical***



# Conclusions

- **Prospects for renewables electricity revised upwards, driven by policy improvements, cost reductions & efforts to improve air quality**
- **The impact of lower fossil fuel prices on renewables varies by sector. Wind (onshore) & solar PV are the only technologies on track for a 2°C scenario**
- **Competition in Asia between renewables & coal/gas will be critical to meeting global decarbonisation targets**
- **Attracting investment in renewables hinges on appropriate market rules & regulations, particularly in markets with slow electricity demand growth**
- **IEA is working to accelerate energy transition with its analysis on policy & technology and system integration of renewables.**



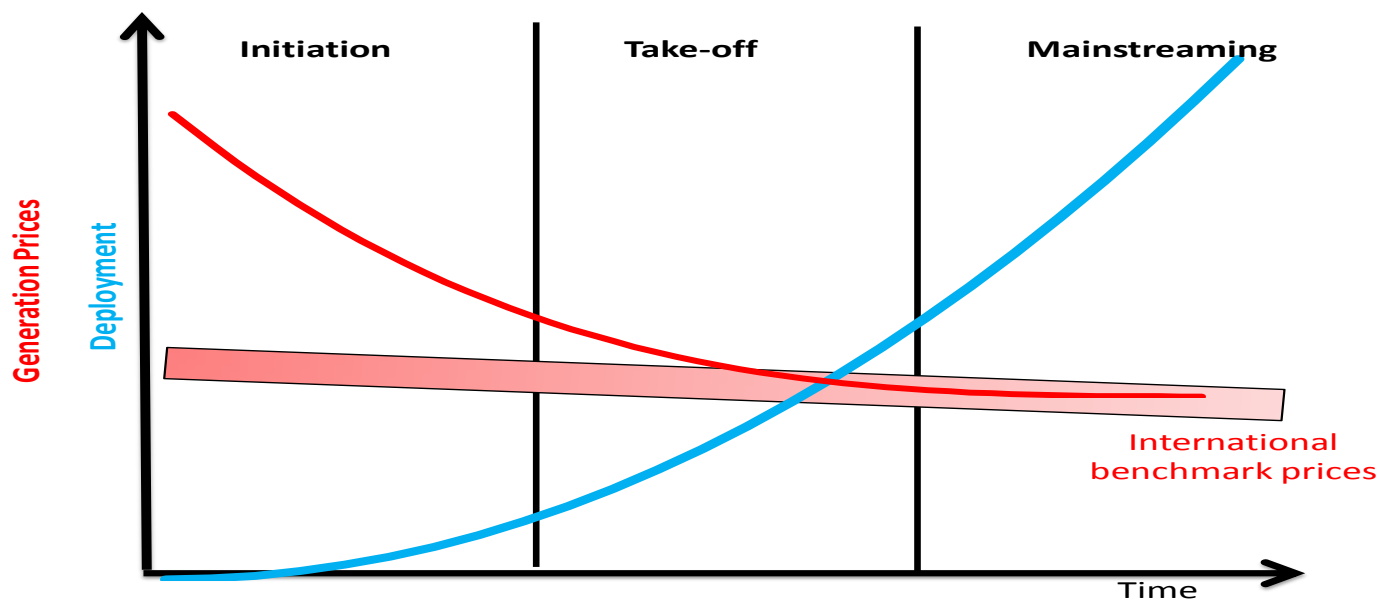
# Any questions?

**IEA-MTRMR@iea.org**



# Africa can leapfrog to growth based on more affordable renewables

## Policy priorities change over time



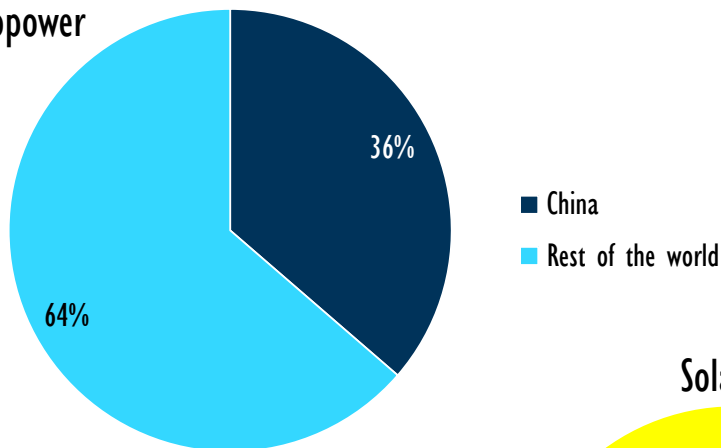
Key Objective	Critical Mass	Reduce Costs	System Integration
Policy Priorities	Clear regulatory framework	Cost convergence with international benchmarks	Develop flexible energy system
	Secure financial support	Introduce competition	Market reform



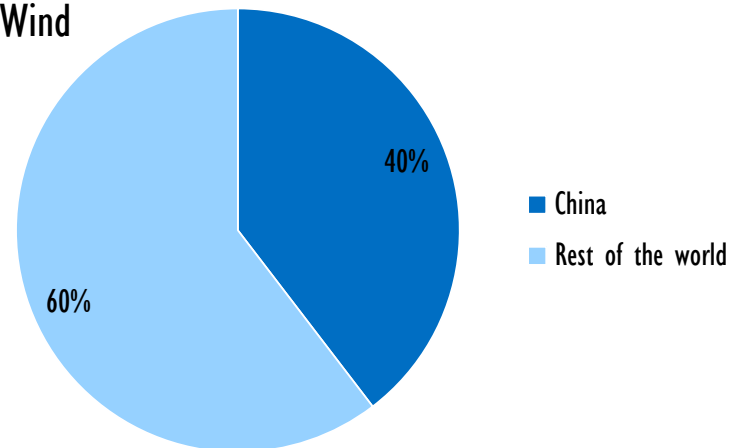
# China is the undisputed leader of renewable capacity growth

Share of China in global renewable capacity growth(2015-21)

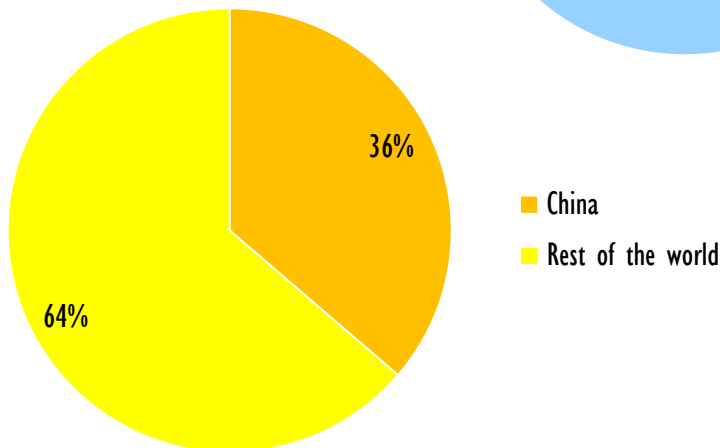
Hydropower



Wind



Solar PV

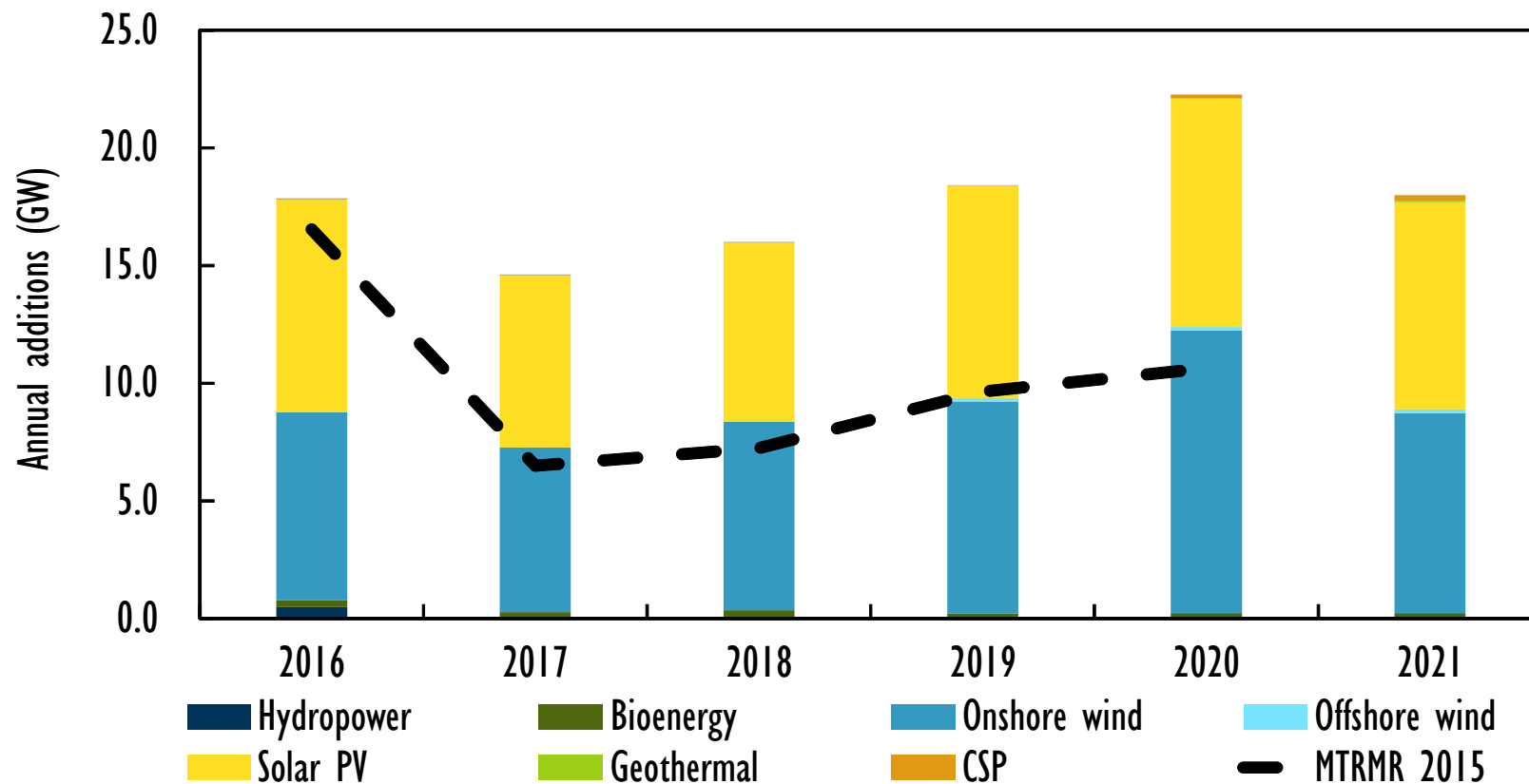


***Despite strong growth, grid integration remains an important challenge along with overcapacity in the power sector***



# US multi-year tax credit extension to drive 60% more growth

United States annual renewable capacity additions

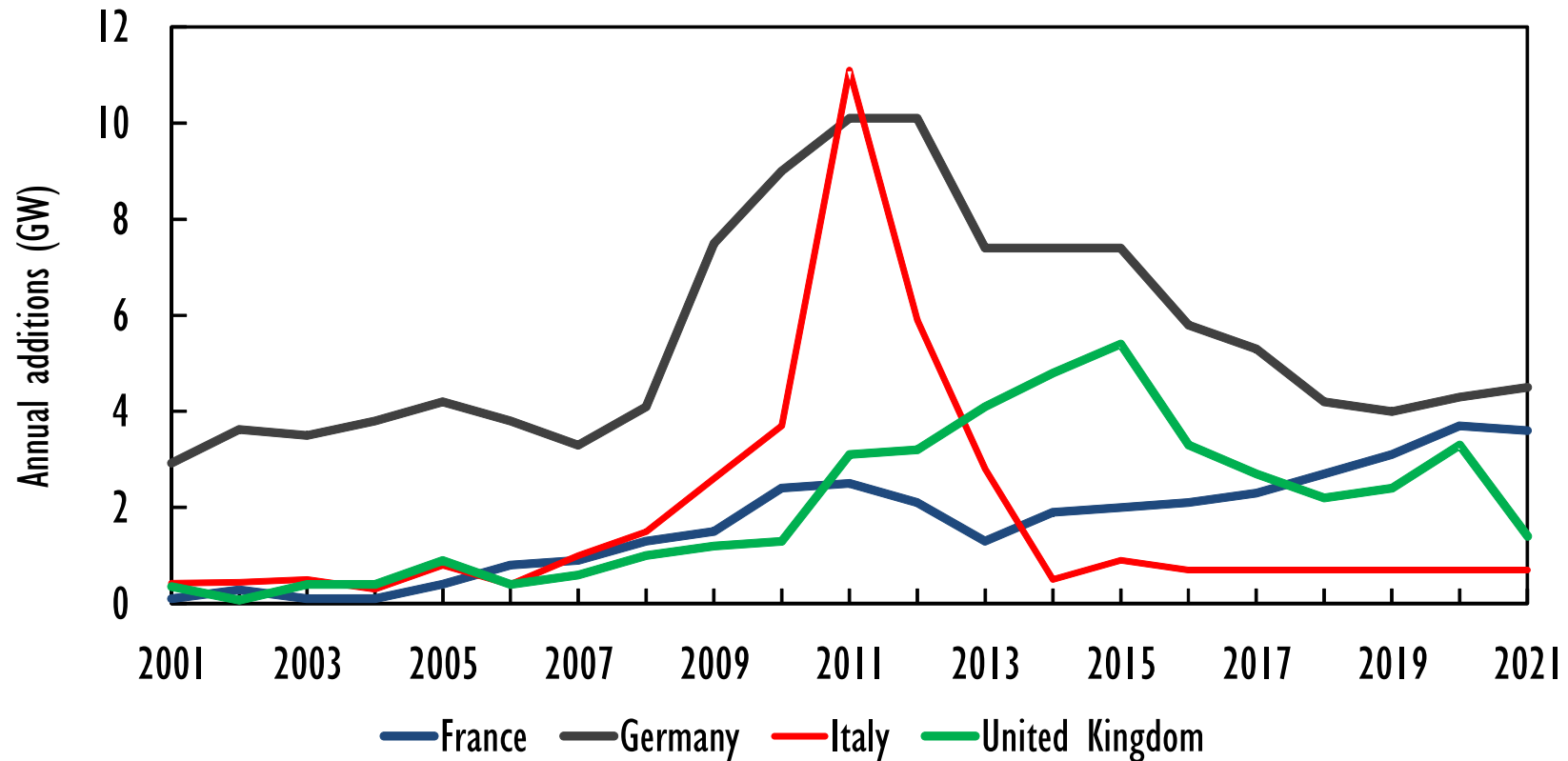


**ITC and PTC extension to give more policy visibility to wind and solar developers  
but uncertainty remains for other renewables**



# Slower growth in Europe as policy transition continues

Annual renewable additions for France, Germany, Italy and UK

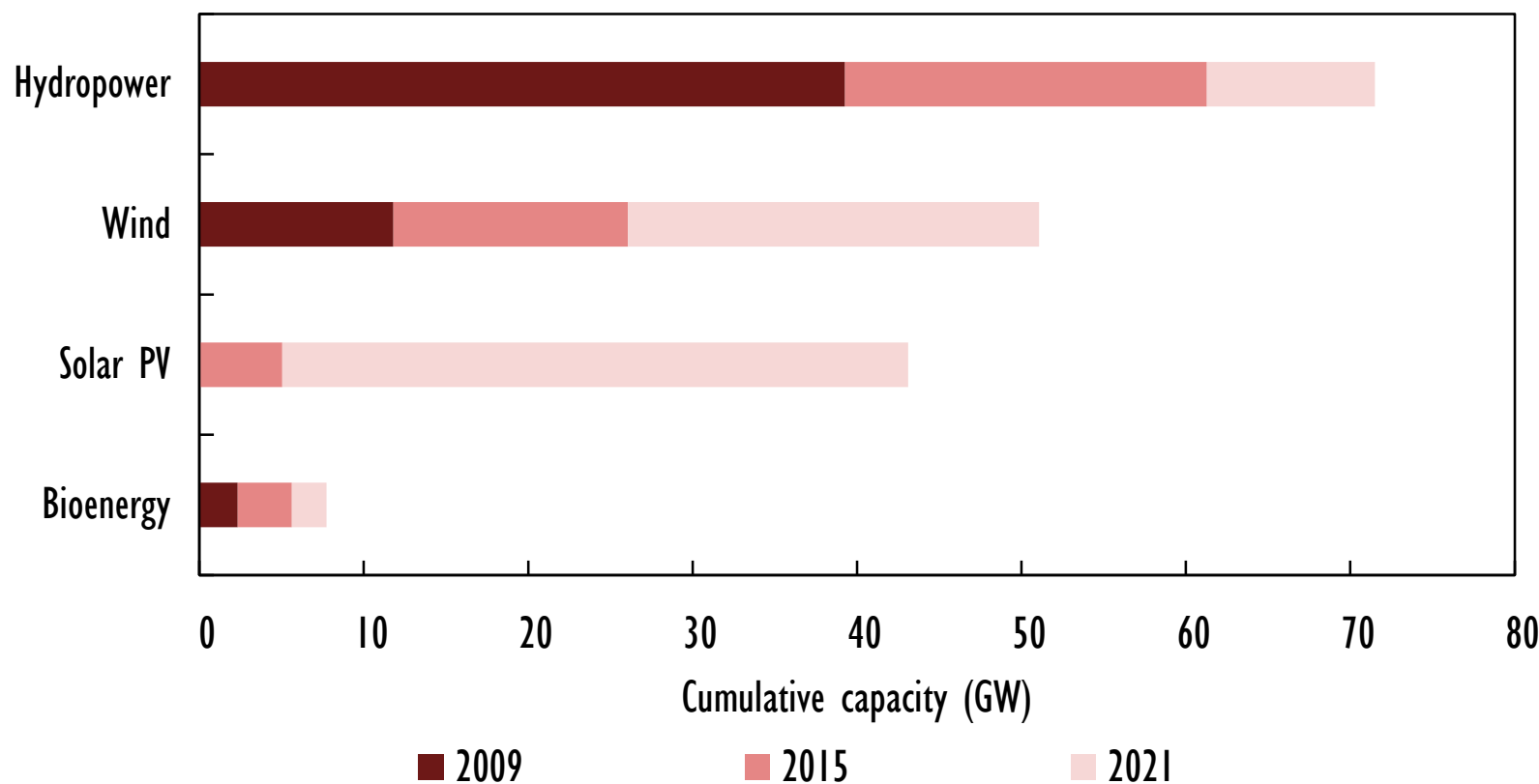


**Pending EU legislations concerning 2030 renewable targets, incentive reductions, policy uncertainties at country level and overcapacity remain challenges**



# Solar PV to drive India's forecast but meeting the target remains a challenge

India renewable capacity by technology

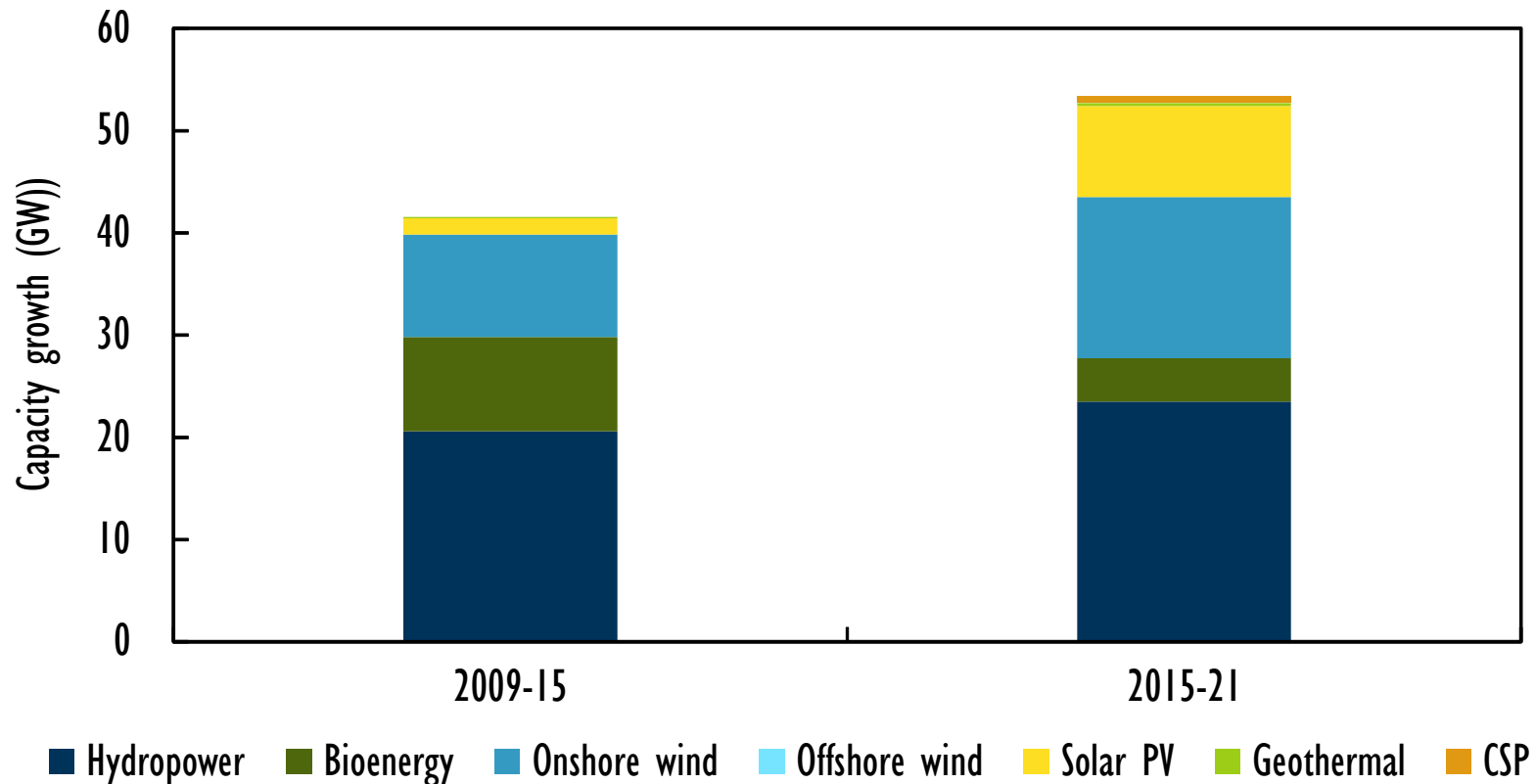


**Financial health of utilities, better state-level implementation of RPOs, faster grid infrastructure expansion and reducing land acquisition barriers remain challenges**



# Latin America to take advantage of more affordable solar PV and onshore wind

Latin America renewable capacity growth (GW)



**Diversification needs, energy security concerns and decreasing prices, drive solar and wind expansion in Latin America while large-scale hydropower growth will continue.**