



# Renewable surge after COP21

*Cédric Philibert, Renewable Energy Division*

**COP22, Marrakech, 15 November 2016**

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

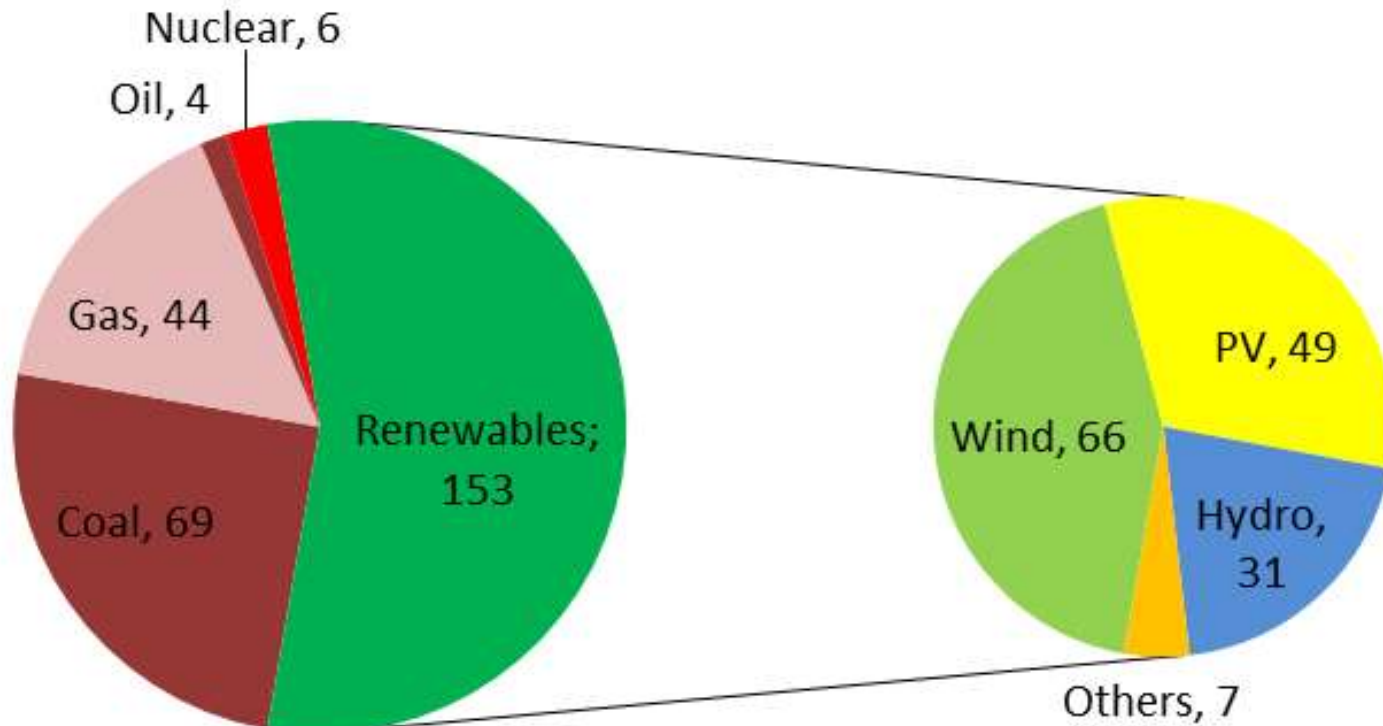
**enabled by real-world SOLUTIONS**

**supported by ANALYSIS**

**and built on DATA**

# New capacity in renewables, led by wind, exceeds fossil-fired plants

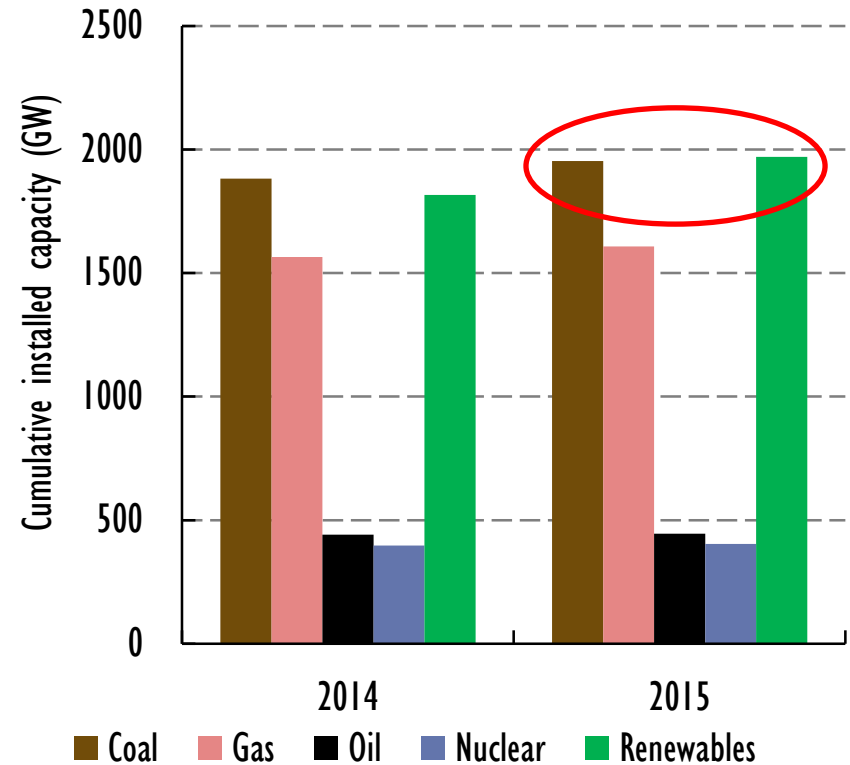
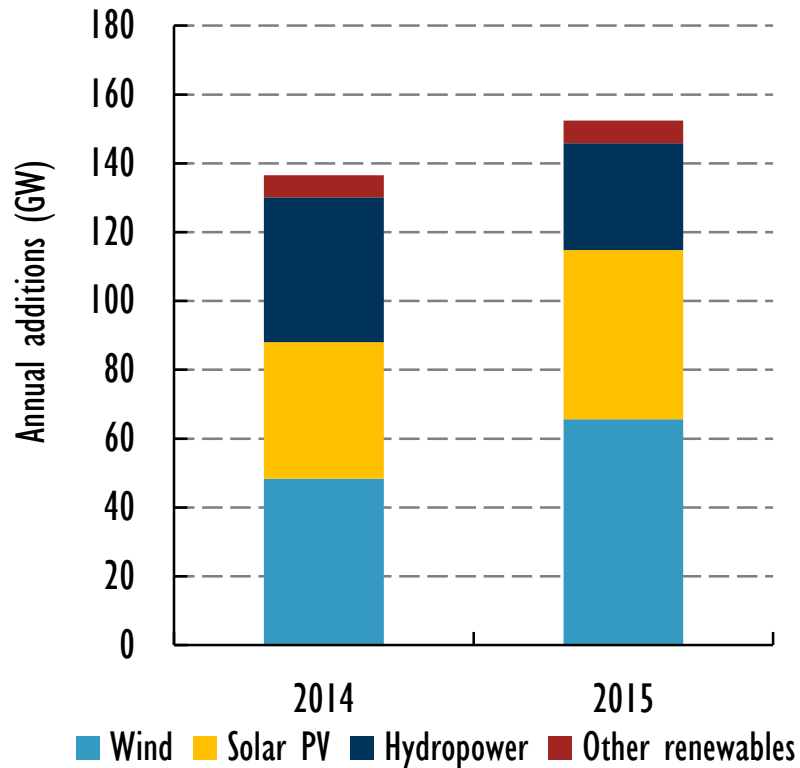
Net capacity increases, 2015 (in GW)



*2015 saw record level annual additions in wind and solar, compensating a decrease in*

# 2015: a record year for renewables

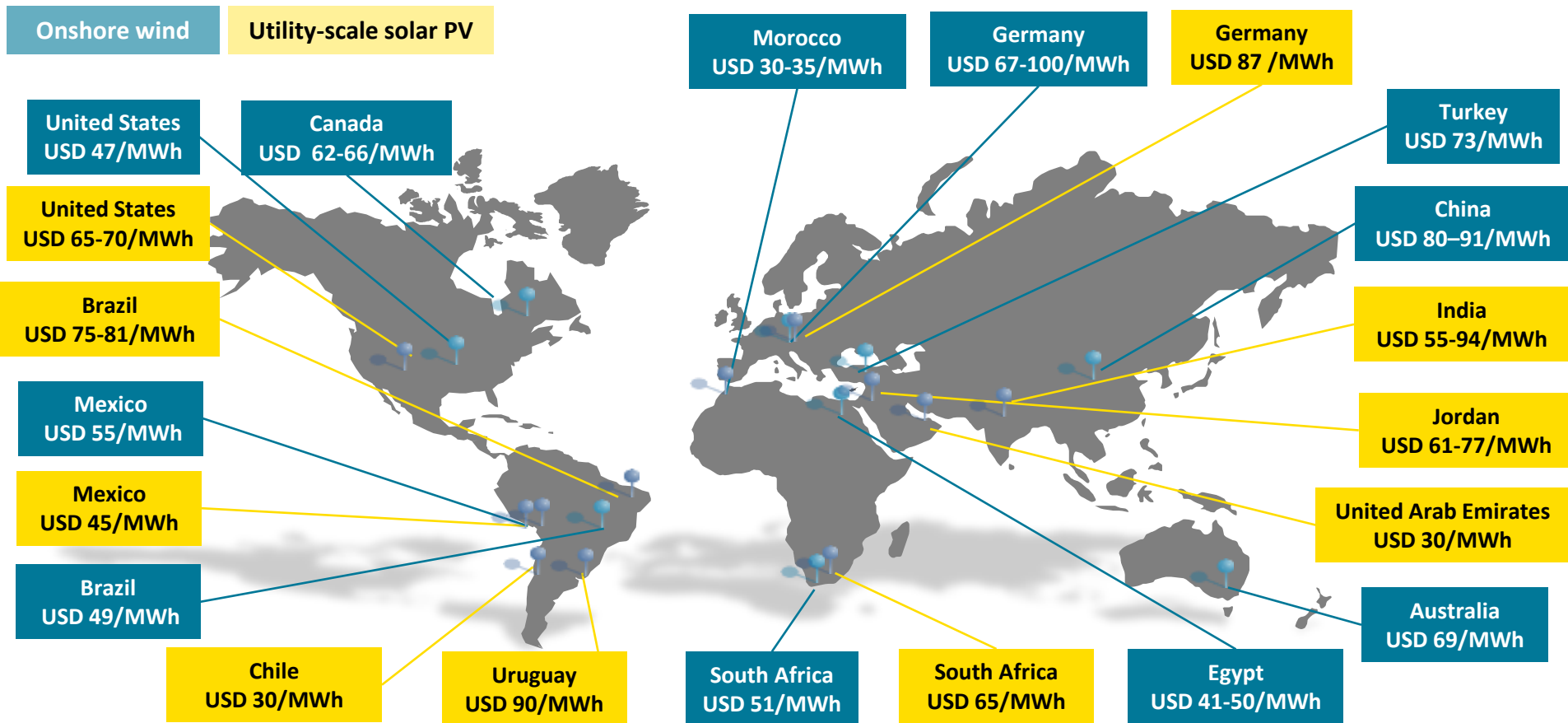
### Renewable additions (2014-15) and cumulative installed power capacity



**Cumulative renewable capacity surpassed coal at the end of 2015**

# Record low price announcements

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



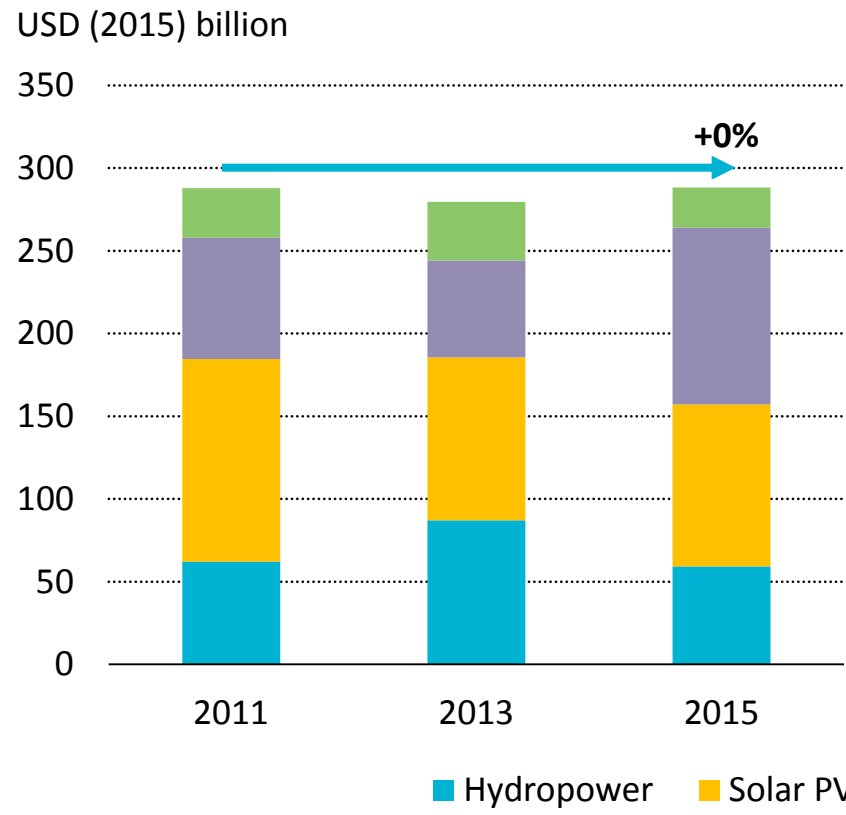
This map is without prejudice to the status or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area

Note: Values reported in nominal USD includes preferred bidders, PPAs or FITs. US values are calculated excluding tax credits. Delivery date and costs may be different than those reported at the time of the auction.

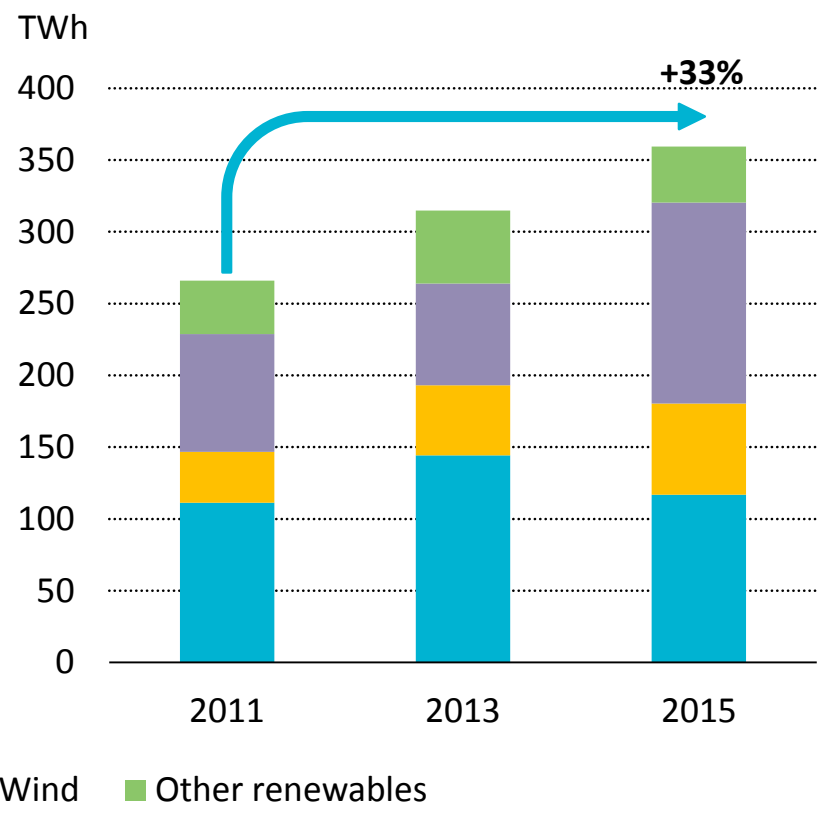
**Best results occur where price competition, long-term contracts and good resource availability are combined**

# Renewables investment buys much more electricity

## Global renewable power investment



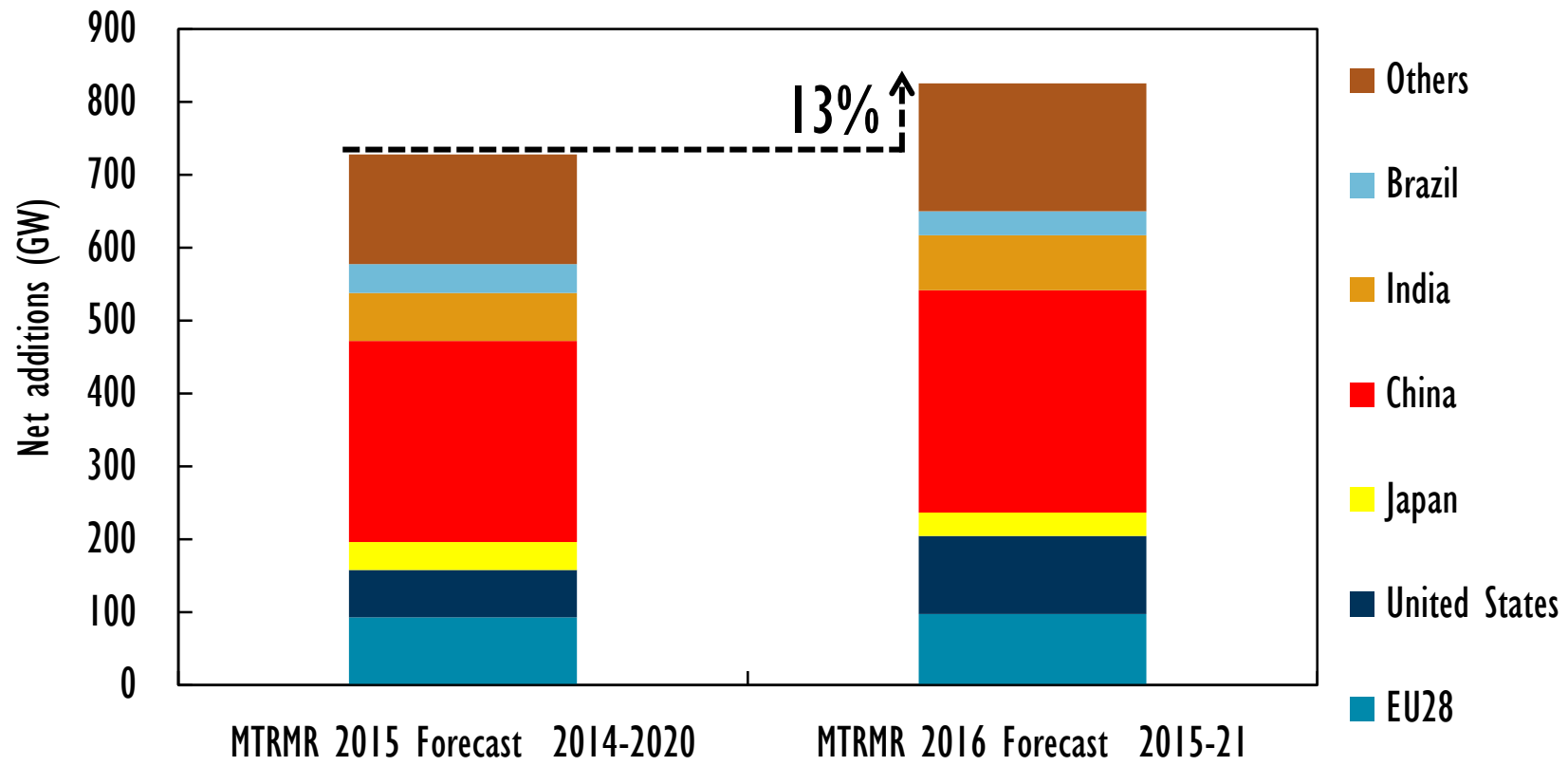
## Generation from investment in capacity



**Investment in renewables-based capacity more than covers 2015 global electricity growth. Wind leads, surging 35% in 2015 on economics and record offshore growth**

# New policies underpin a more bullish forecast for renewables

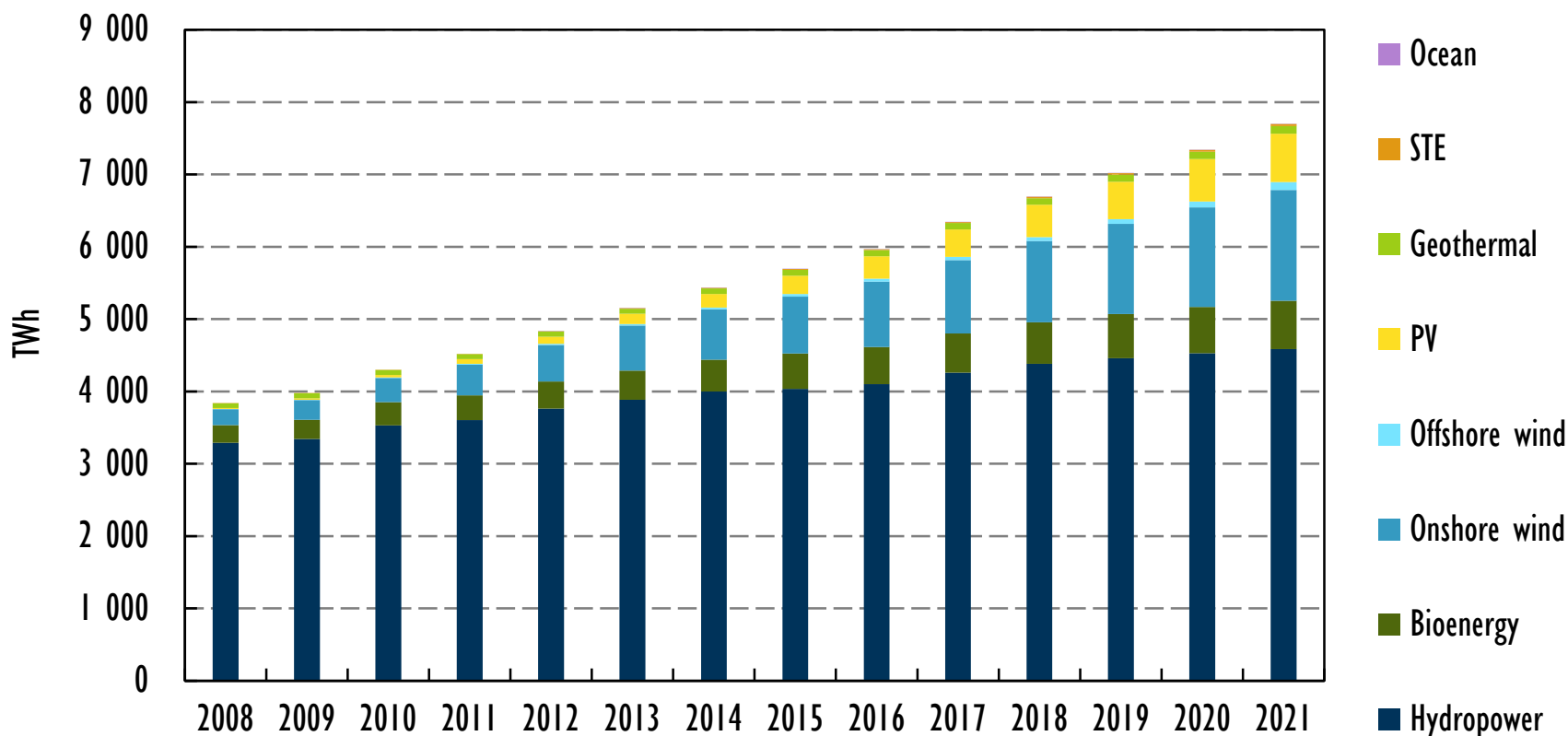
Renewable electricity capacity growth (GW) in MTRMR's main case



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

# Renewables to meet new generation needs and replace old power capacity

## Global renewable electricity generation

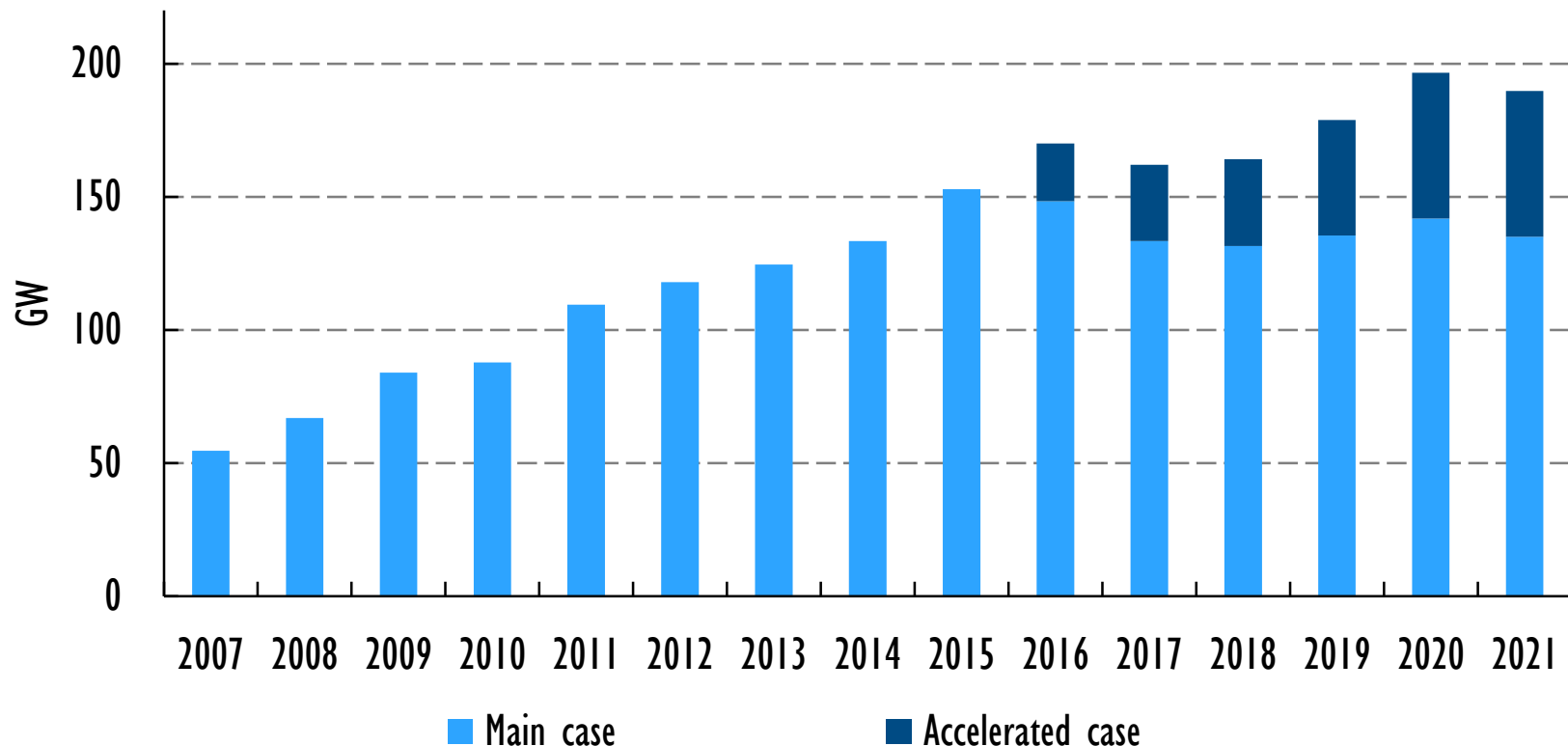


**Between 2015-21 wind generation doubles and solar PV almost triples, with renewables reaching around 27% of total electricity by 2021**



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

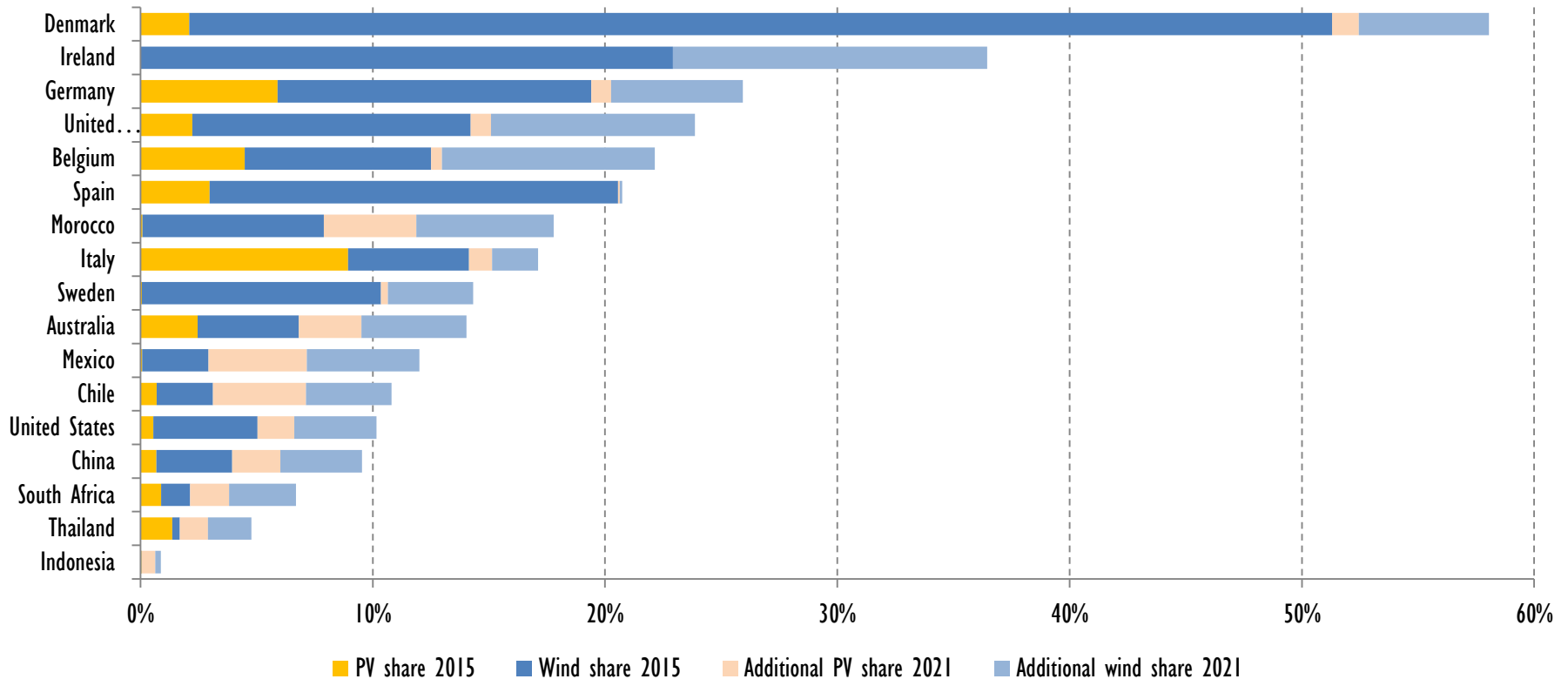
Renewable electricity capacity additions in Accelerated Case vs. Main Case



**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**

# Towards high shares of variable renewables

Share of variable electricity generation in 2015 and 2021



**Experience in a number of countries shows how to integrate significant shares of VRE**

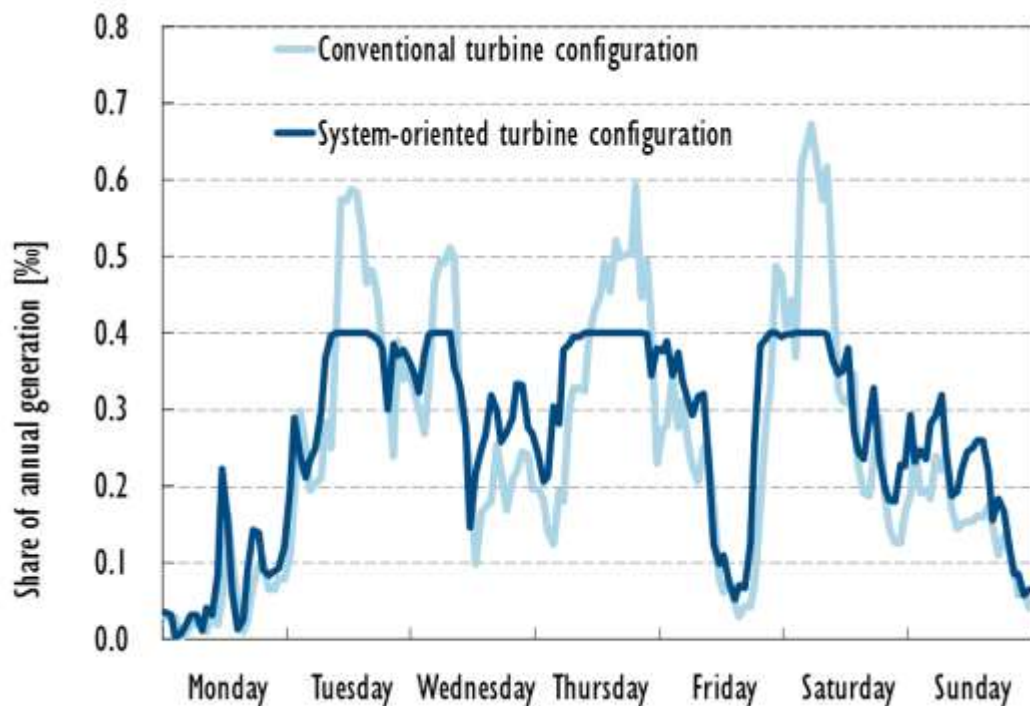
Source: IEA estimates from IEA Medium-Term Renewable Energy Market Report 2016.

# Increasing variable RE will need more system flexibility

1) Foster System-friendly RE

2) Better market design & operation

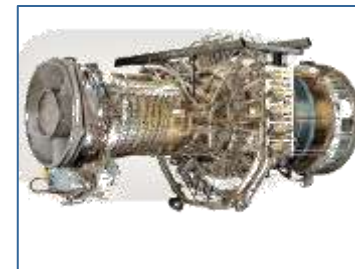
3) Increase flexibility of other power system components



Grids



Generation



Storage

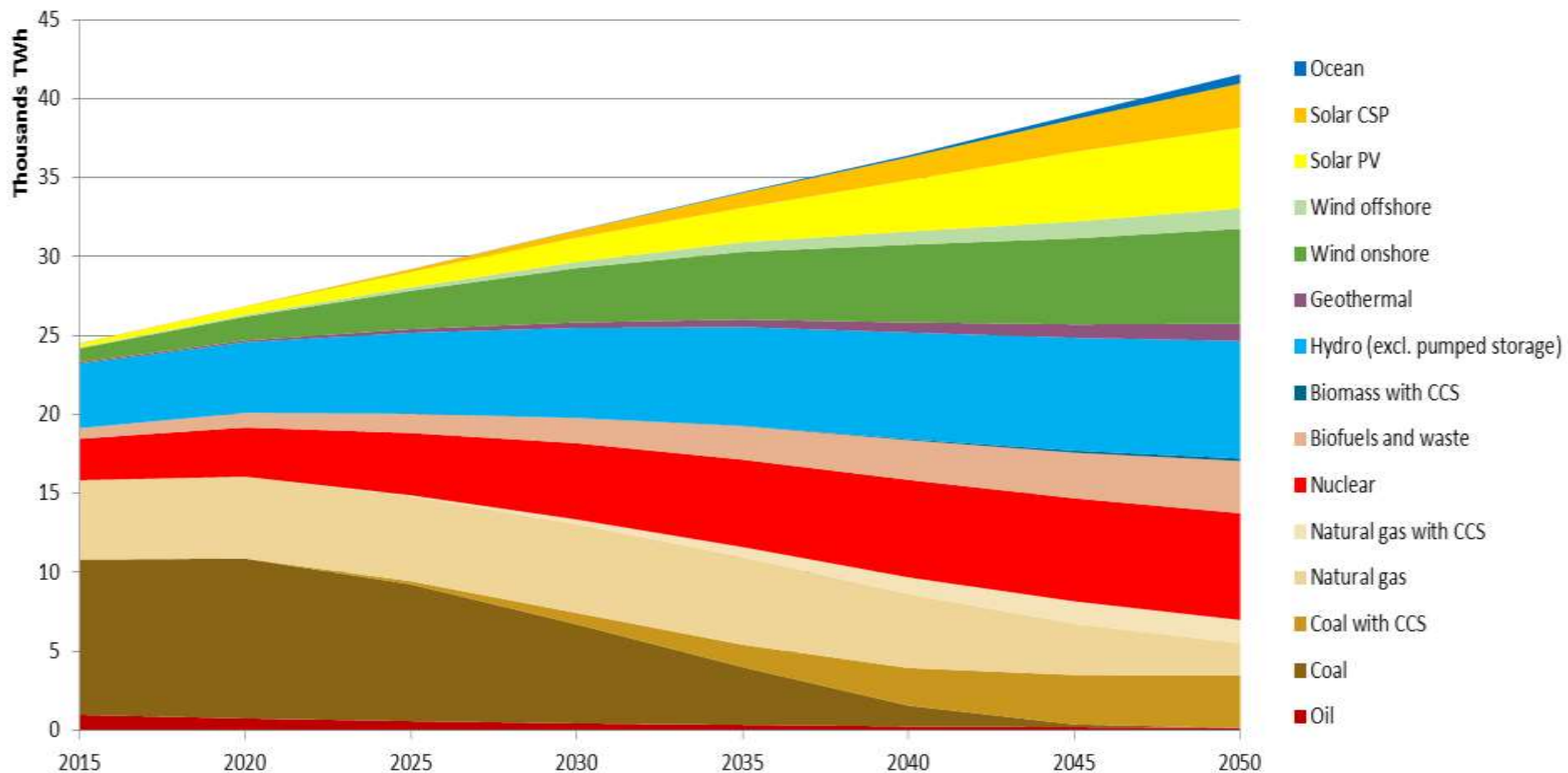


Demand Side



# Global electricity mix changes in the 2DS

ETP  
2016



**A shift reversal is needed with renewables providing over 60% of global electricity by 2050 or before**