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Medium-Term Market Report 2015

International Energy Agency
Secure Sustainable Together

Medium-Term Renewable Energy Market Report 2015:
Renewables poised to lead world power market growth

Heymi Bahar
Renewable Energy Division
International Energy Agency

Market Analysis and Forecasts to 2020

Profound changes underway in energy markets

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- Signs of decoupling of energy-related CO_2 emissions and global economic growth
- Fossil-fuel prices at multi-year lows; emerging market economic growth slowing; uncertainty over monetary policy and interest rates in US
- But overarching policy drivers for renewable electricity – energy diversification, local pollution and decarbonisation – remain robust
- Renewable energy to be a priority area with high mitigation potential in over 90 INDCs
- Renewables to become first source for electricity in the longer term, but addressing policy uncertainty in the next five years is crucial

INDCs very good first step but not enough

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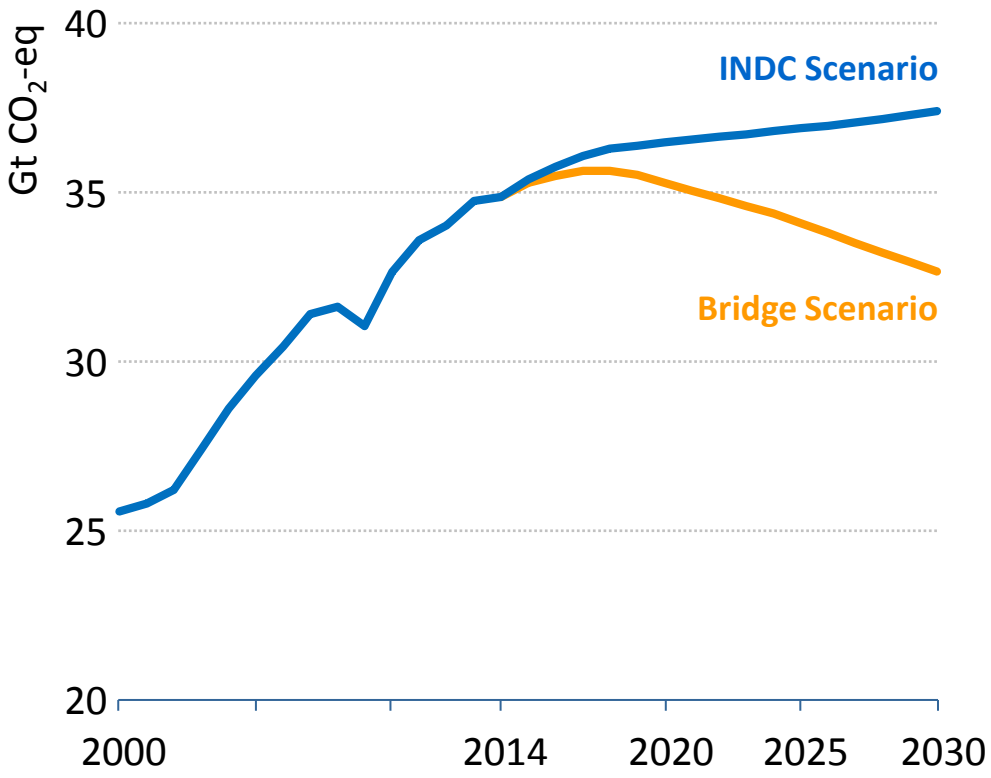
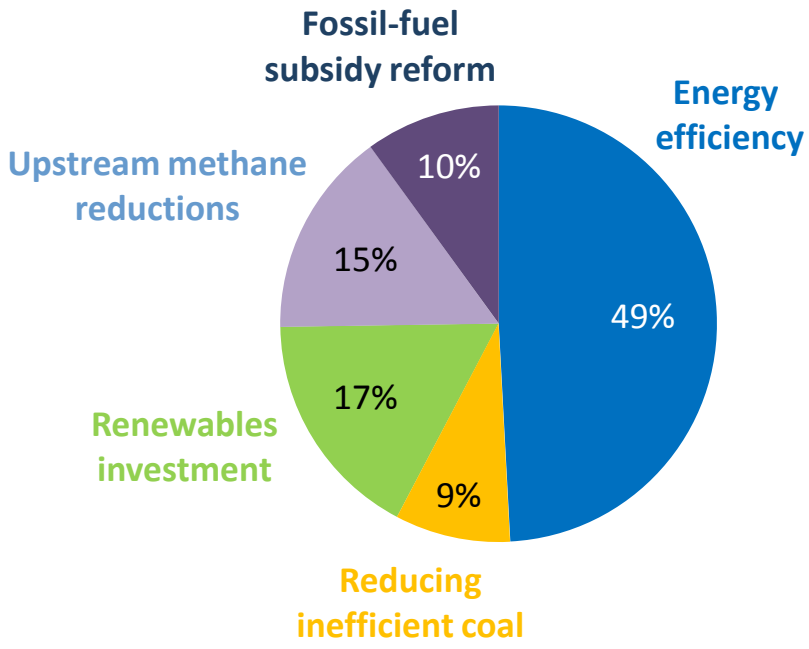
Global energy-related GHG emissions



Savings by measure, 2030



Five measures to achieve a peak in emissions around 2020; investment in renewables to reach $ 400 bn/y by 2030

Innovation critical to stay below 2°C

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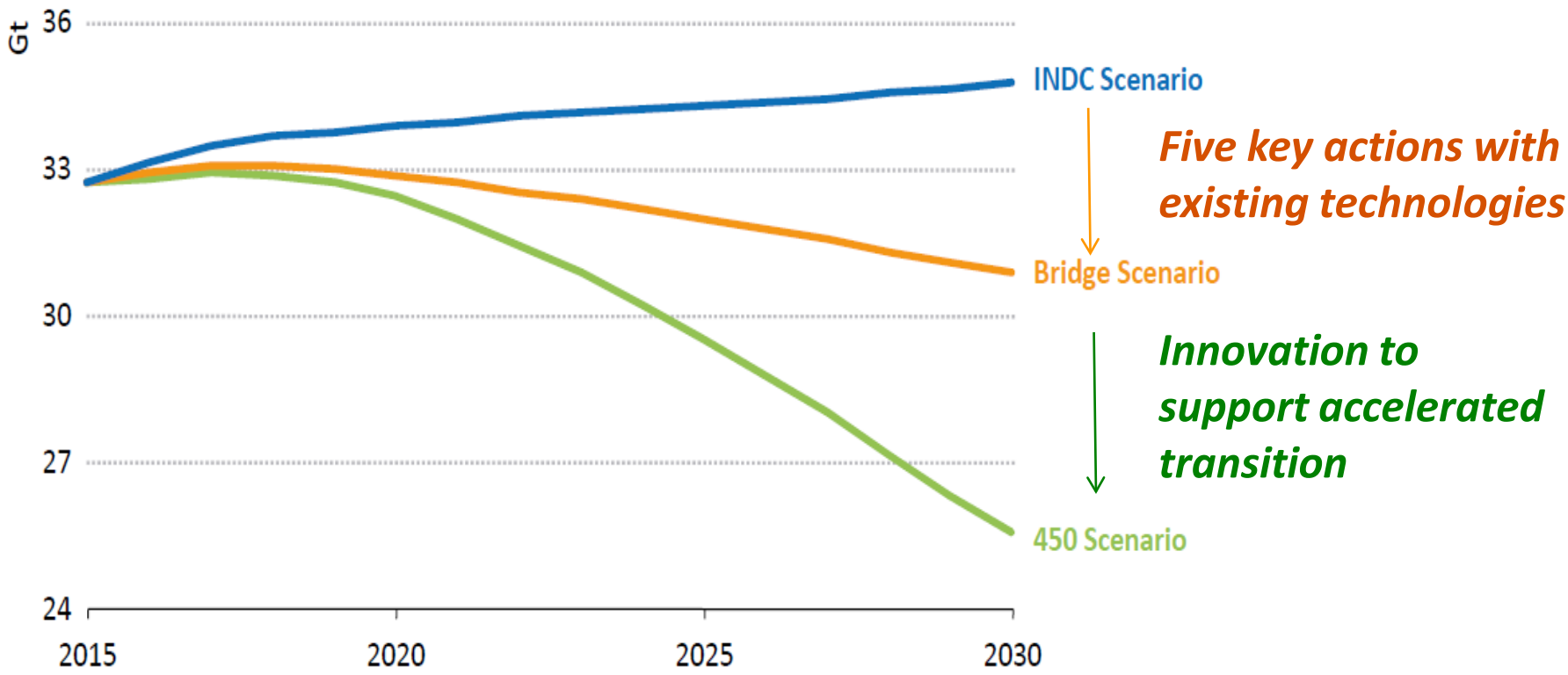
Global energy-related GHG emissions by scenario



By 2040, renewables should generate more than half global electricity in the 450 Scenario, with investments reaching $470 bn per year

Renewables are becoming the largest source of new power generation capacity

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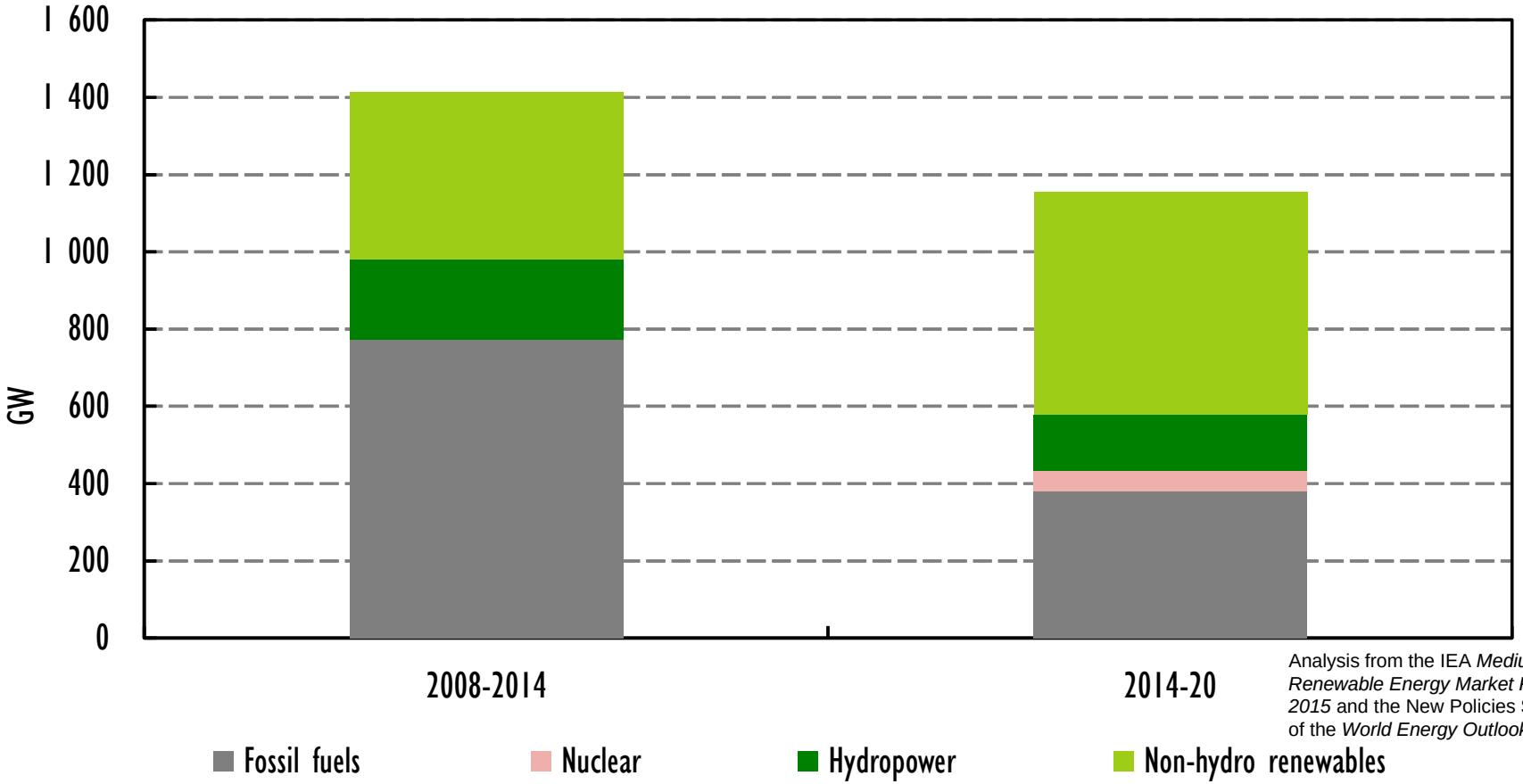
World net additions to power capacity



Analysis from the IEA *Medium-Term Renewable Energy Market Report 2015* and the New Policies Scenario of the *World Energy Outlook 2015*.

The share of renewables in net additions to power capacity continues to rise with non-hydro sources reaching nearly half of the total

Strong momentum for renewable generation growth

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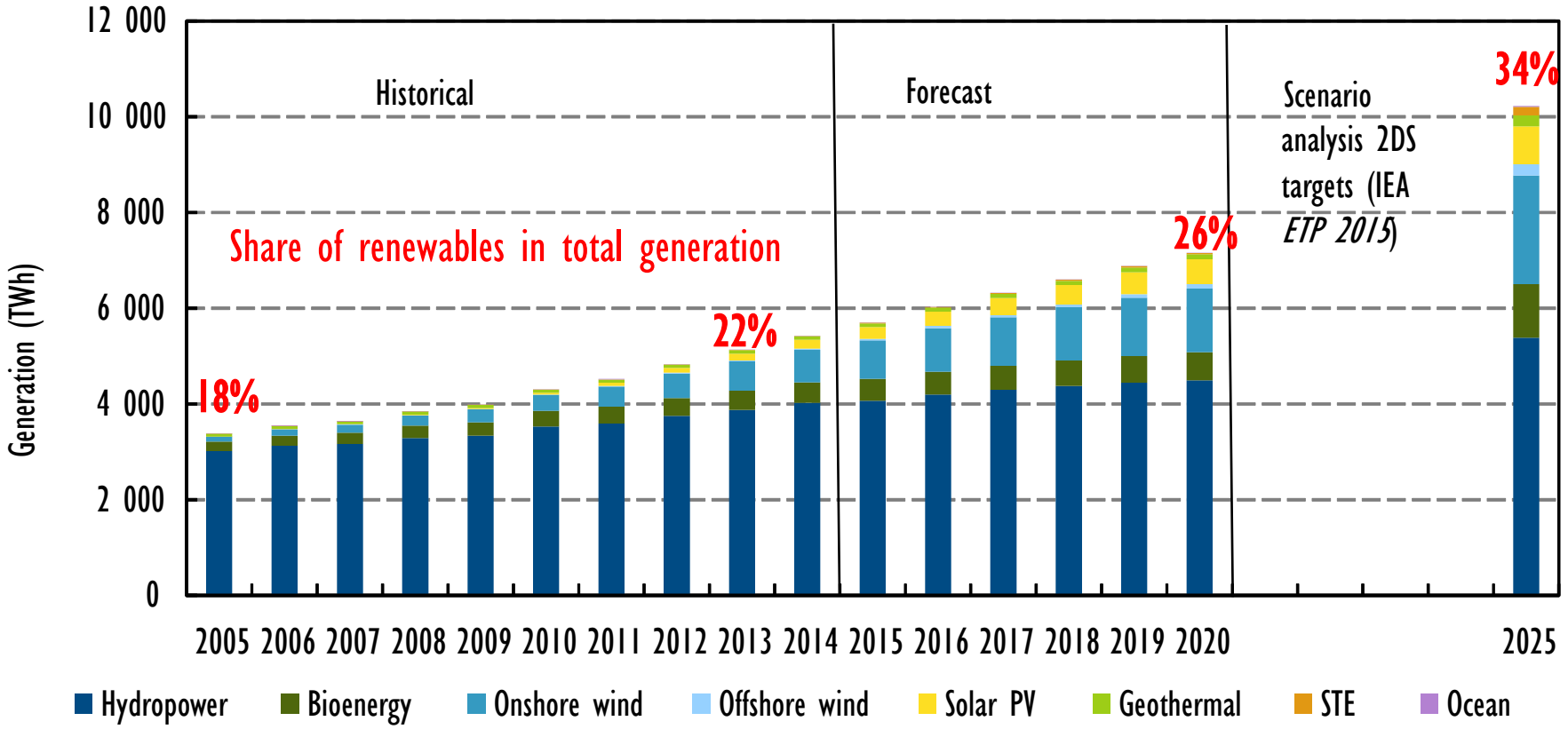
Renewable generation by technology, *main case* forecast and scenario analysis



Share of non-hydropower in renewable electricity generation is expected to increase significantly, but an acceleration is needed to meet climate change objectives

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Renewables generation costs will decrease further

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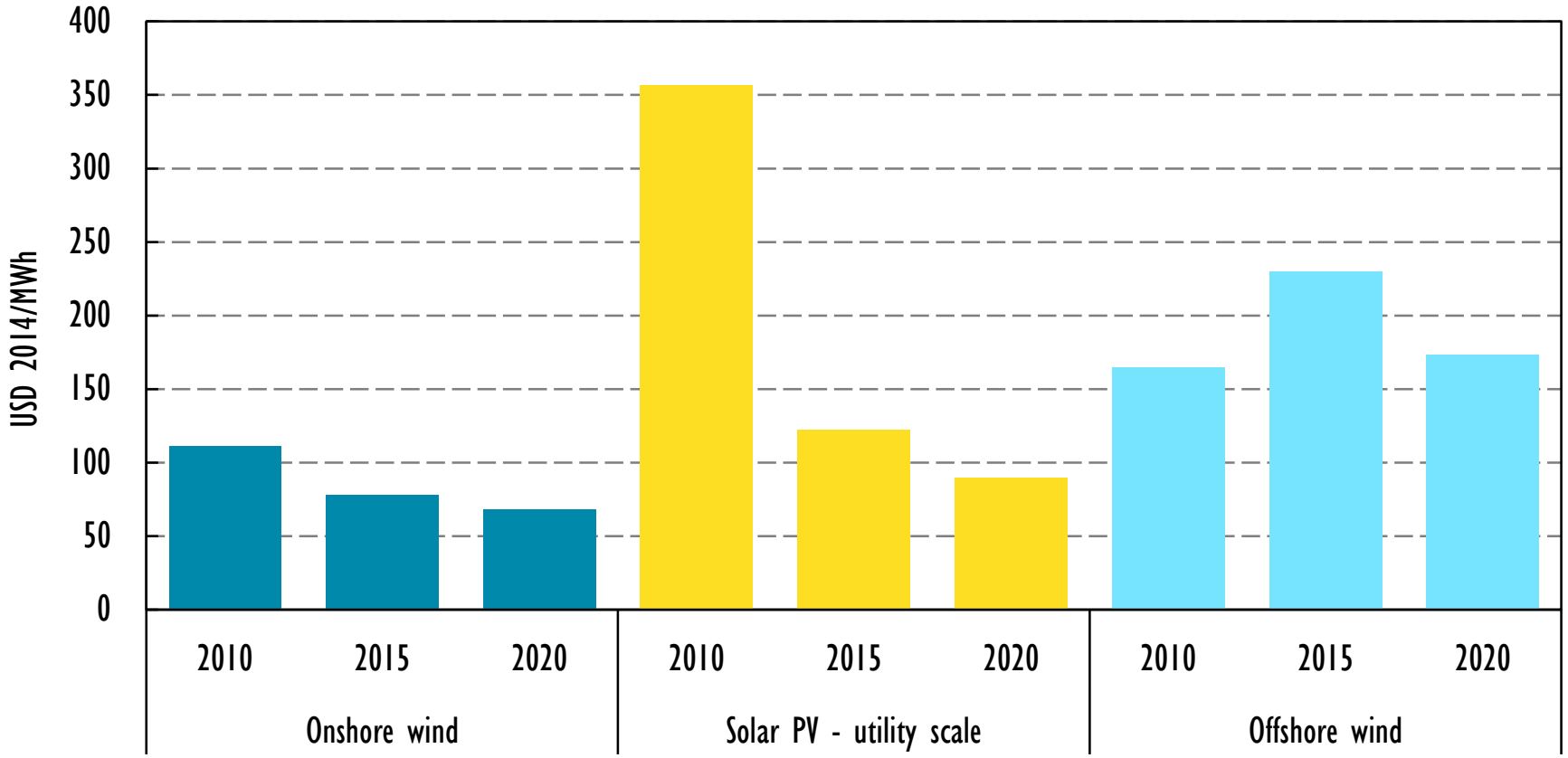
Historical and forecast global weighted average generation costs for new plants



High levels of incentives are no longer necessary for solar PV and onshore wind, but their economic attractiveness still depends on the regulatory framework and market design

Evidence of lower costs on the horizon

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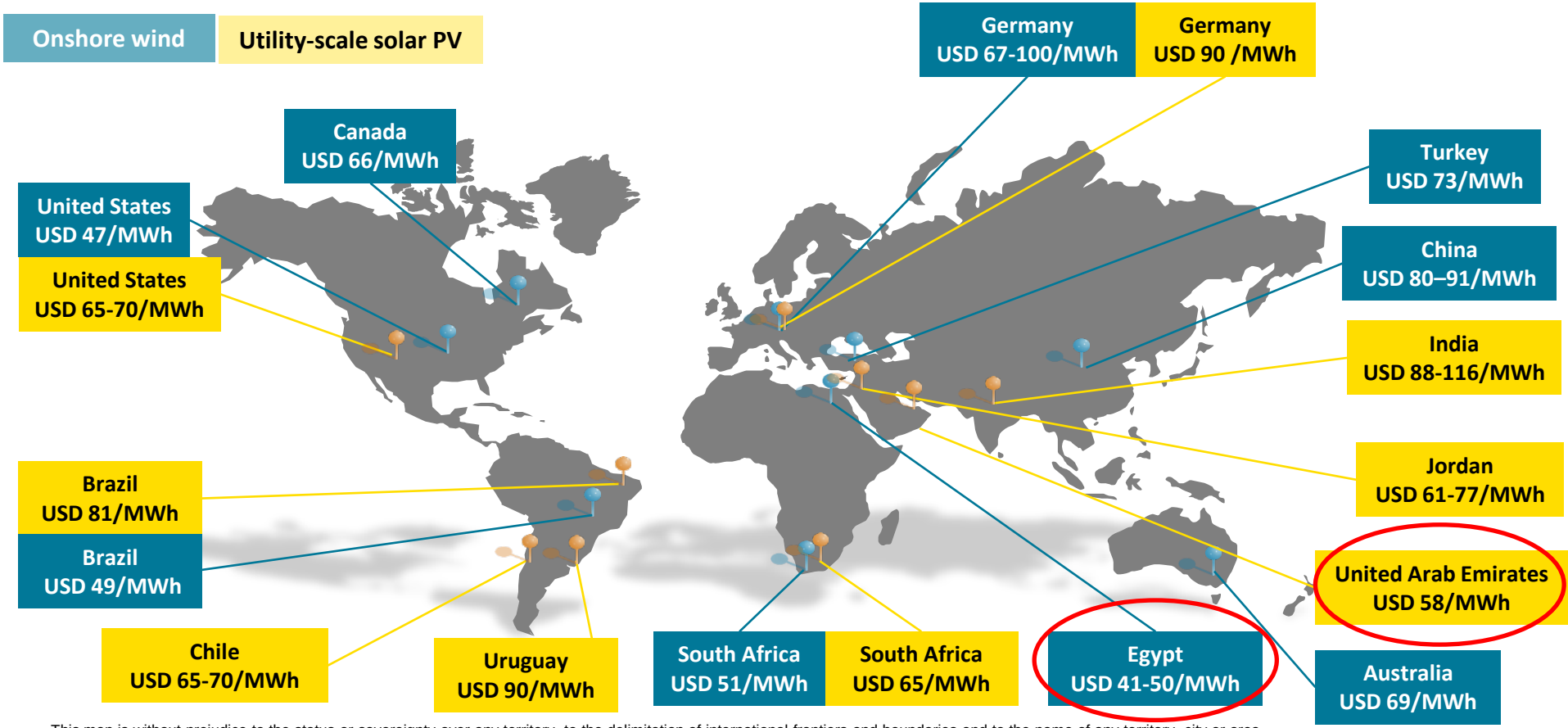
Recent announced long-term contract prices for new renewable power

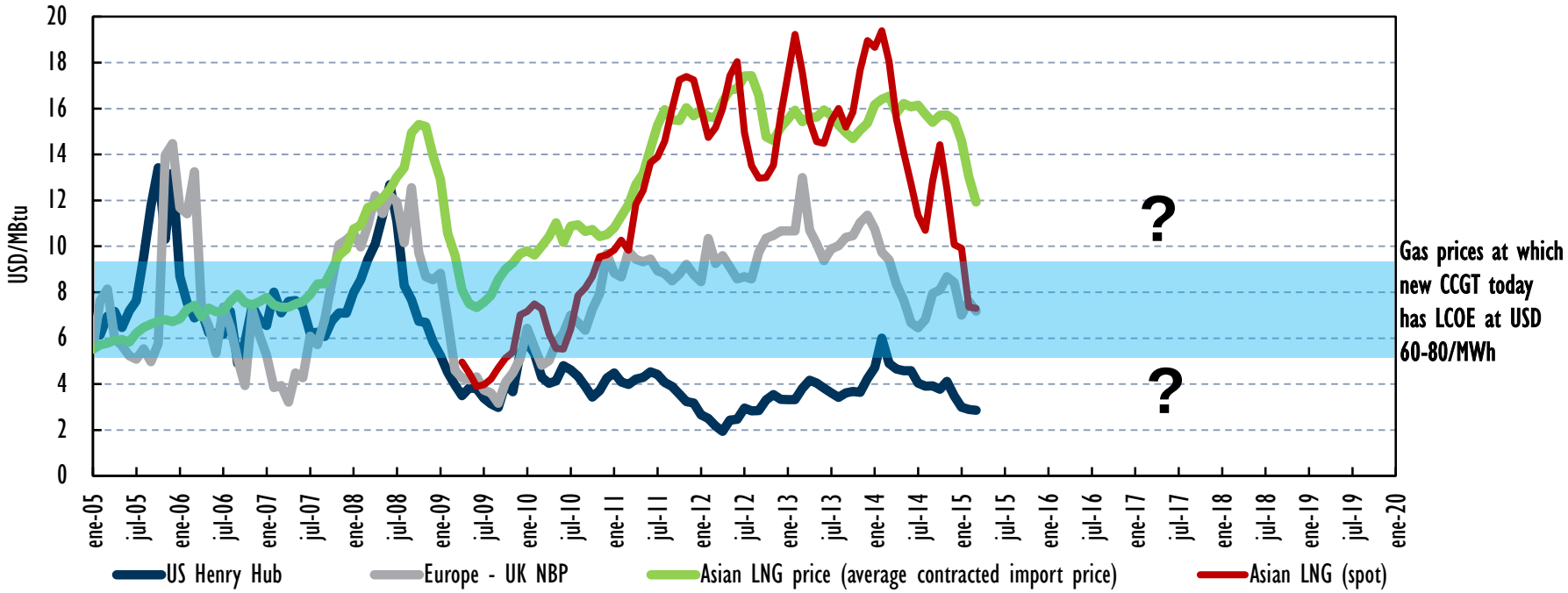


This map is without prejudice to the status or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area

A combination of price competition, long-term contracts, good resources and financial de-risking measures is creating deployment opportunities in newer markets and at lower costs

Generation cost profile of alternatives vary with fossil fuel prices

Historical natural gas prices by region vs price range for LCOE of new CCGT at USD 60-80/MWh



Note: LCOE for CCGT is calculated using a ~65% capacity factor and 7% discount rate. No carbon pricing is included in LCOEs.

- **More robust competitiveness assessments would account for:**
  - **Value of electricity generated – when and where**
  - **Flexibility needs from high shares of variable renewable generation**
  - **Fossil fuel and carbon price volatility, hedging costs**

→ System Transformation and Market Design Reform

More renewables for less money

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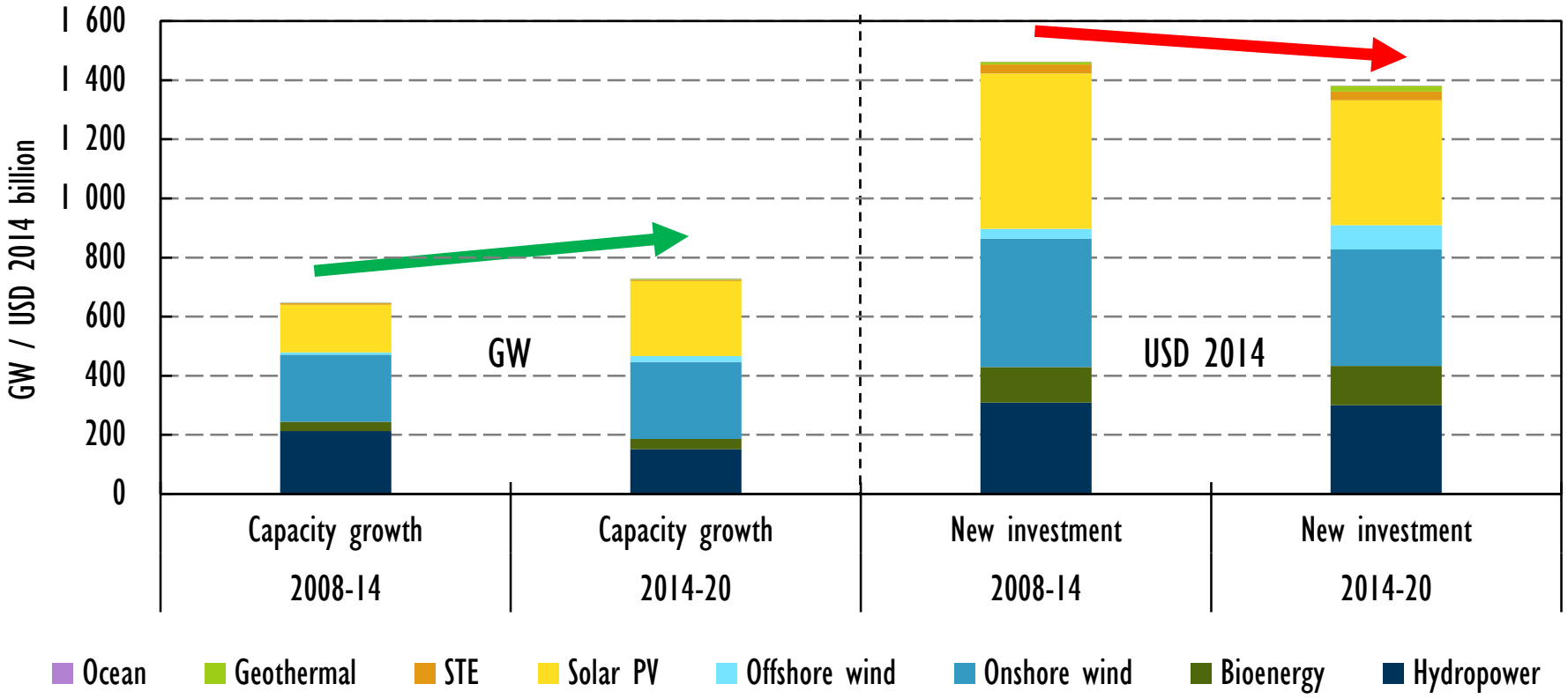
Renewable power capacity – net additions versus new investment



Wind and solar PV comprise two thirds, or USD 900 billion, of new investment needs to 2020 and capacity increases are being made at lower cost than in the past

Growth shifting to emerging markets and developing countries

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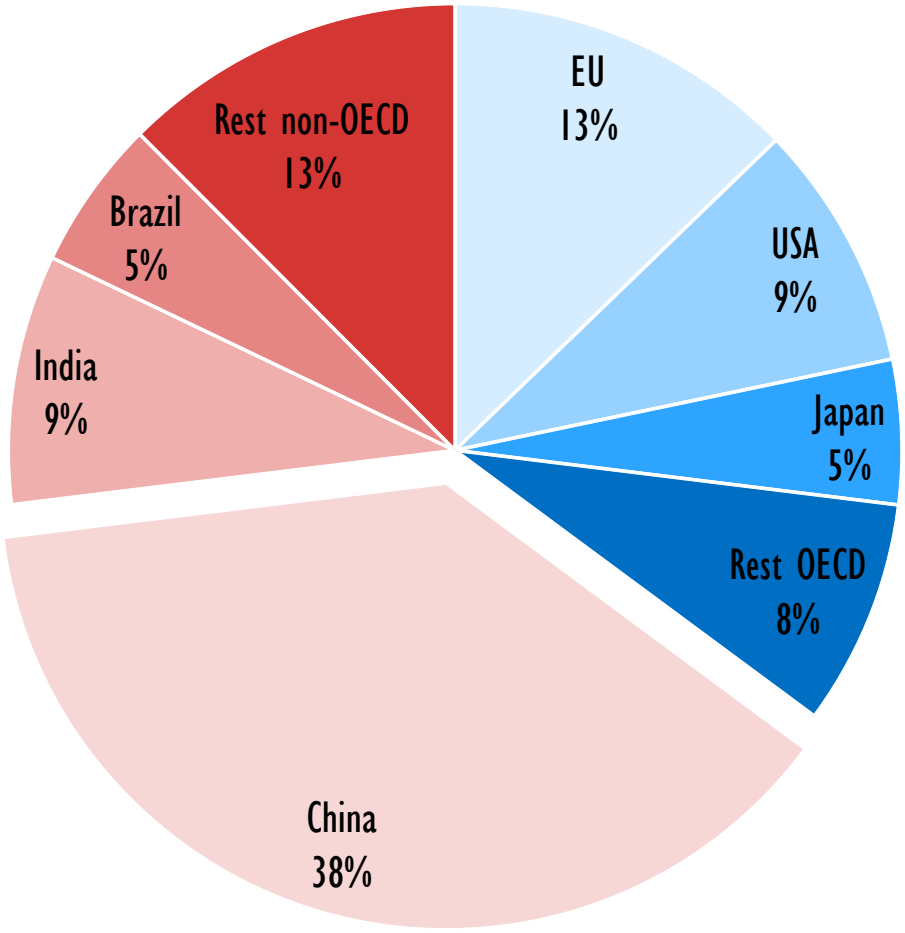
Shares of net additional renewable power capacity, 2014-20



As the OECD slows, non-OECD countries account for two-thirds of renewable growth, driven by fast-growing power demand, diversification needs and local pollution concerns

China to be market leader in both wind and solar PV by 2020

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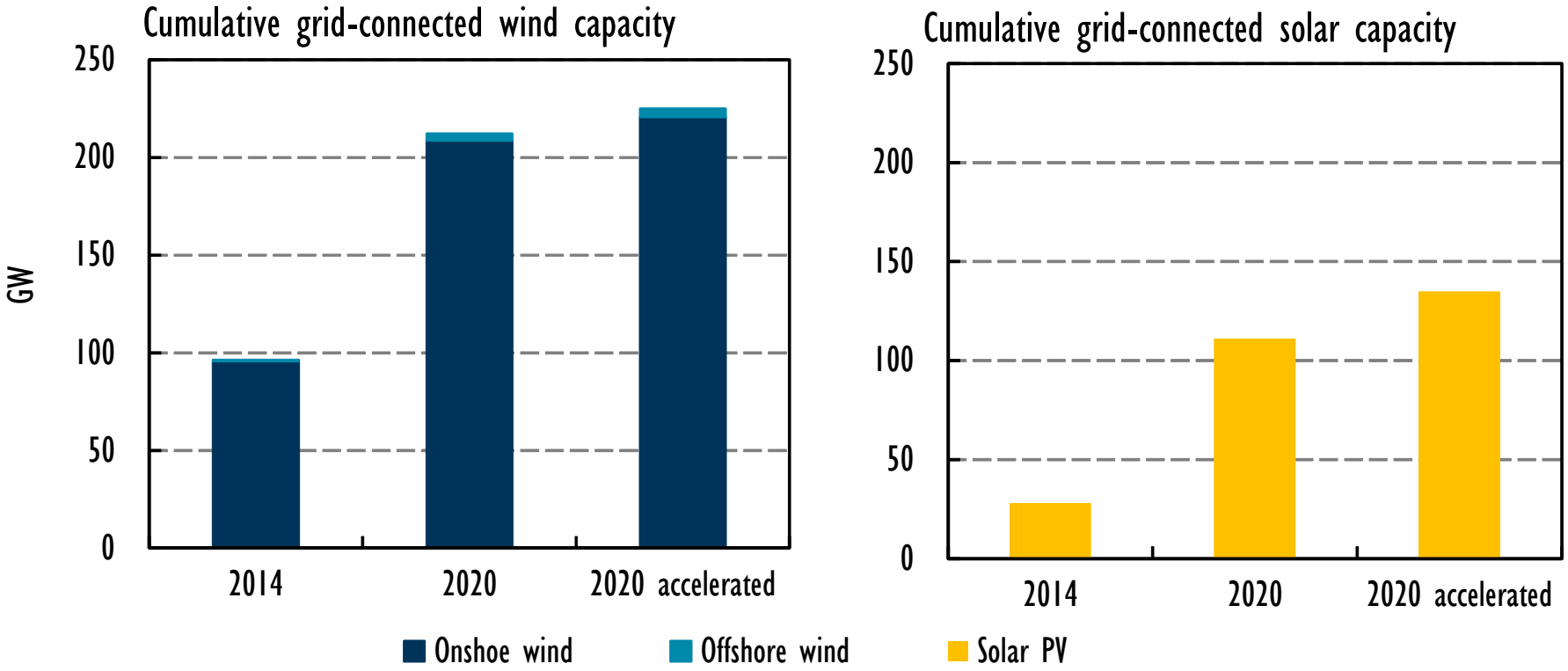

China's cumulative wind capacity to more than double while solar PV to quadruple in 2020 but further growth is possible if higher targets are set

Europe's new power capacity needs to be almost fully met by non-hydro renewables

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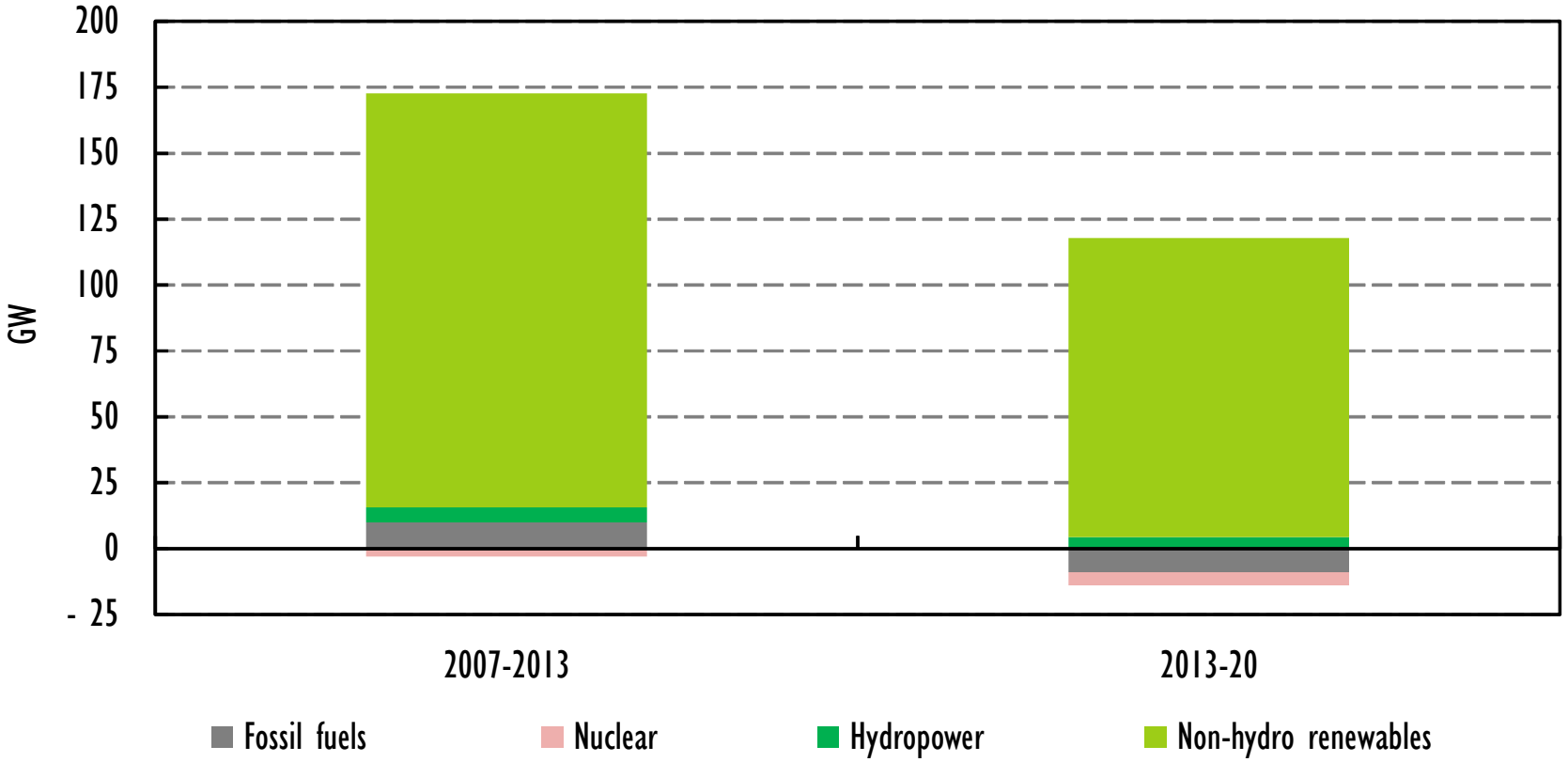
European Union-28 net additions to power capacity



Analysis from the IEA *Medium-Term Renewable Energy Market Report 2015* and the New Policies Scenario of the *World Energy Outlook 2015*.

EU will need less capacity mainly due to energy efficiency improvements and sluggish economic growth

Europe transitioning to slower renewable growth profile

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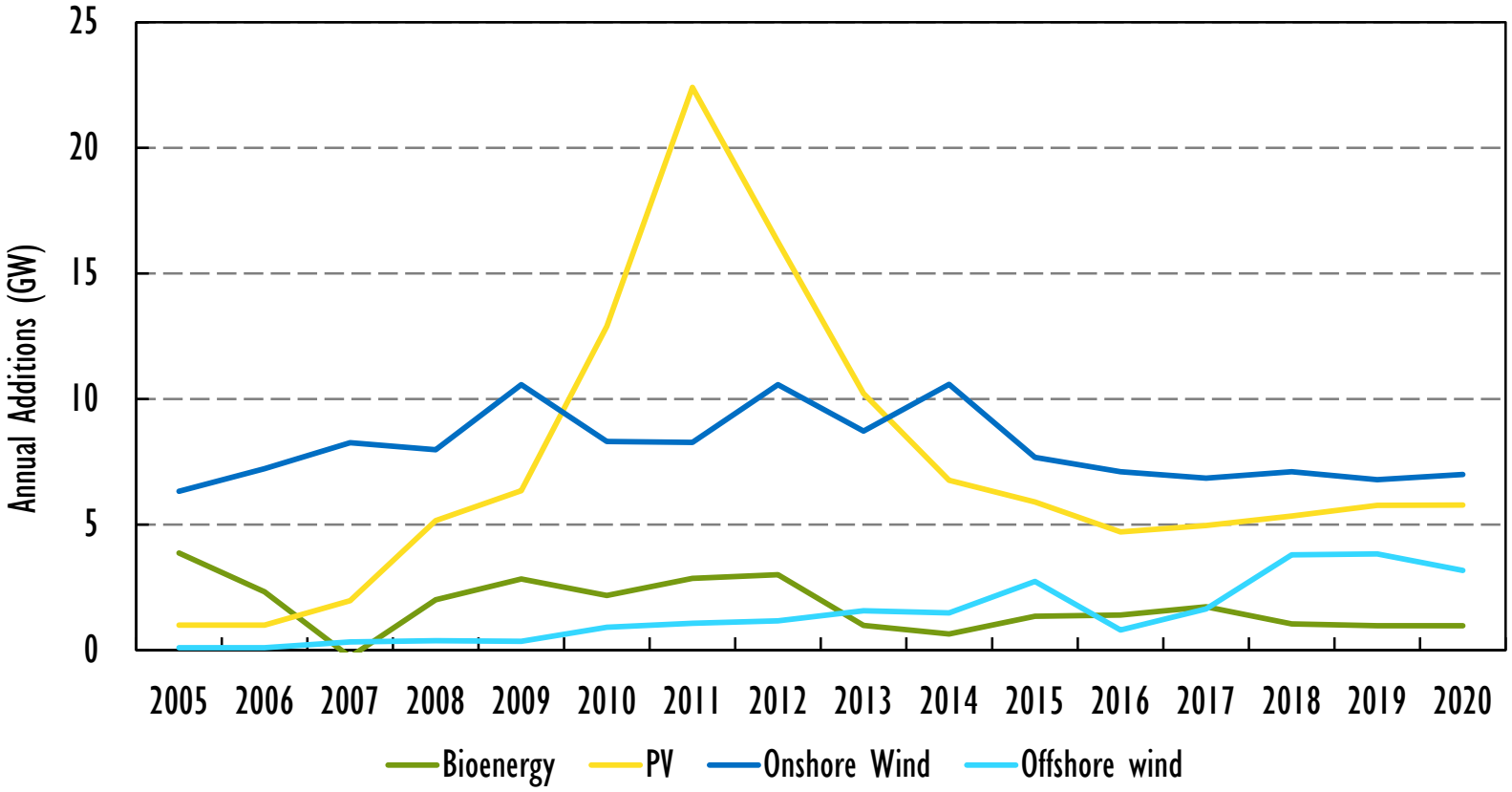
OECD Europe annual net additions to renewable capacity



- Weak power demand growth, overcapacity, incentive reductions in a number of markets
- Uncertainties over policy frameworks (e.g. EU, UK) and integration of high levels of VRE
- Still, offshore wind deployment triples by 2020 and decarbonisation drivers remain robust

Forecast progress towards indicative EU 2020 renewable electricity targets varies by market

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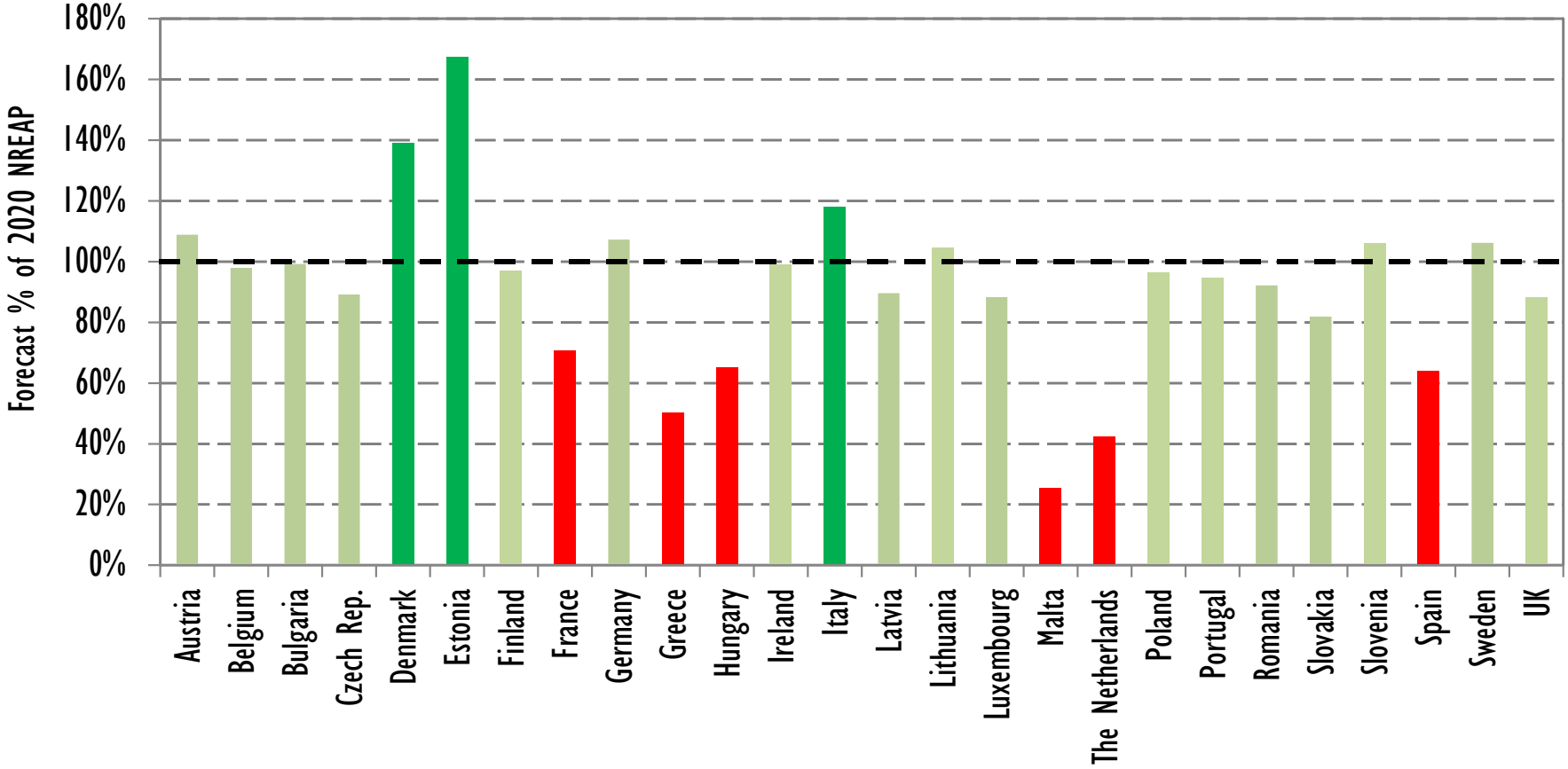
Comparison of *MTRMR 2015* total renewable electricity forecast with NREAPs in 2020



2030 target more challenging as uncertainty over the governance structure remains unresolved

Mixed policy signals in EU countries

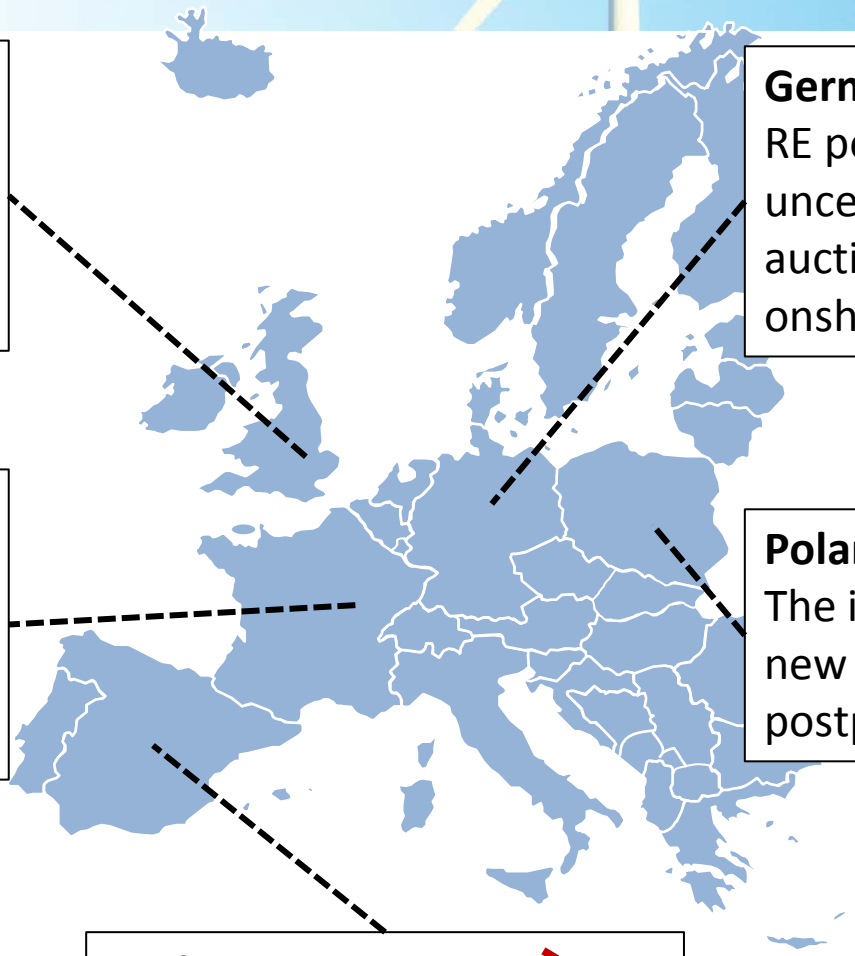
UK:
Reduced or cancelled renewables support, uncertain regulatory environment

Germany:
RE policy in transition, uncertainty over the new auction implementation for onshore wind

France:
New law with ambitious targets and improvement in administrative procedures

Poland:
The implementation of the new renewable energy law postponed by 6 months

Spain:
Retroactive policy for renewables and new taxes for distributed solar PV



Policy uncertainty in the US: Is it over?

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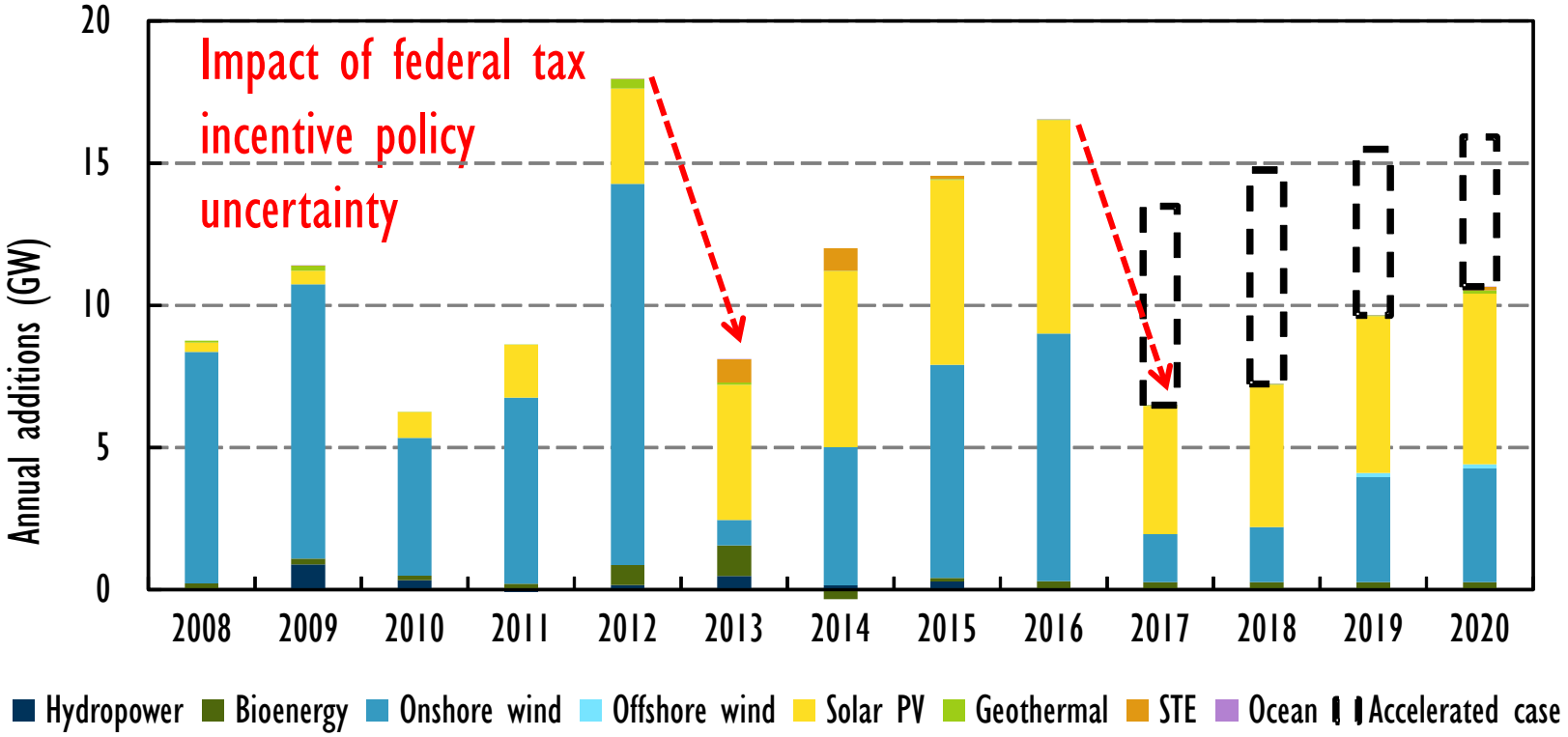
US annual net additions to renewable capacity



After China and Europe, the US is the third largest market for new renewable generation, but federal and state-level policy uncertainties create volatile deployment pattern

Improving cost effectiveness supports stronger renewable growth in India

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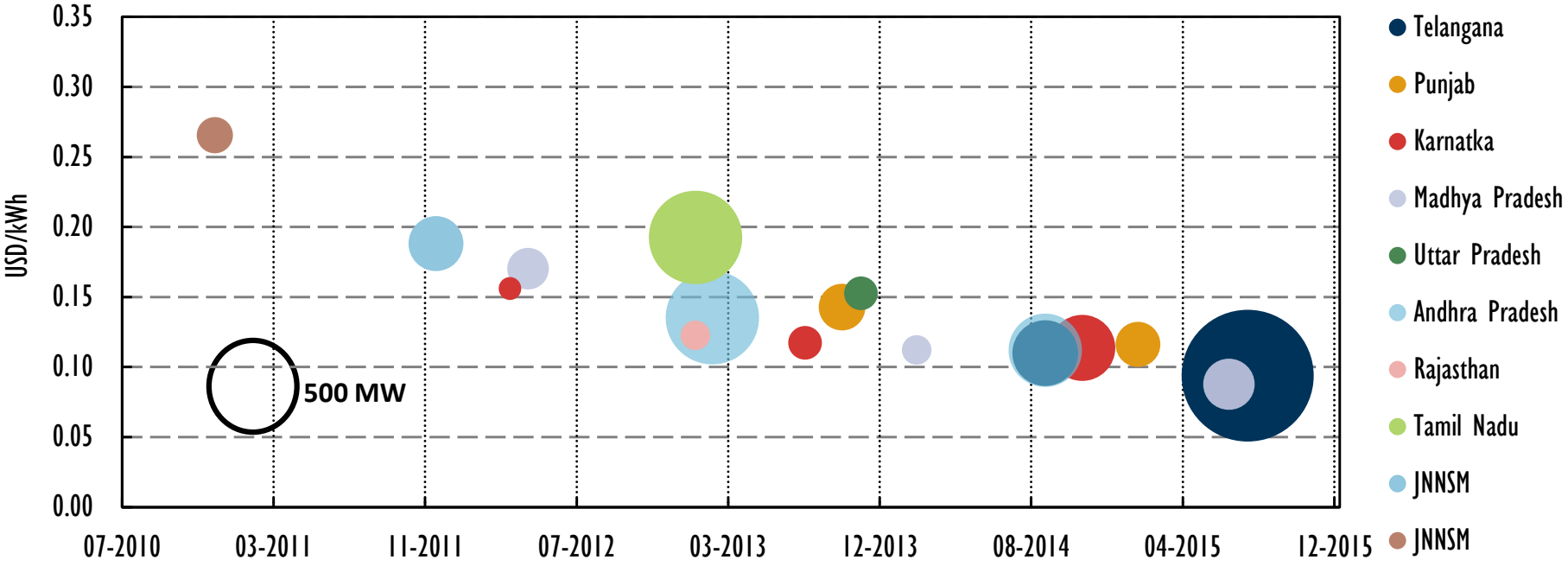
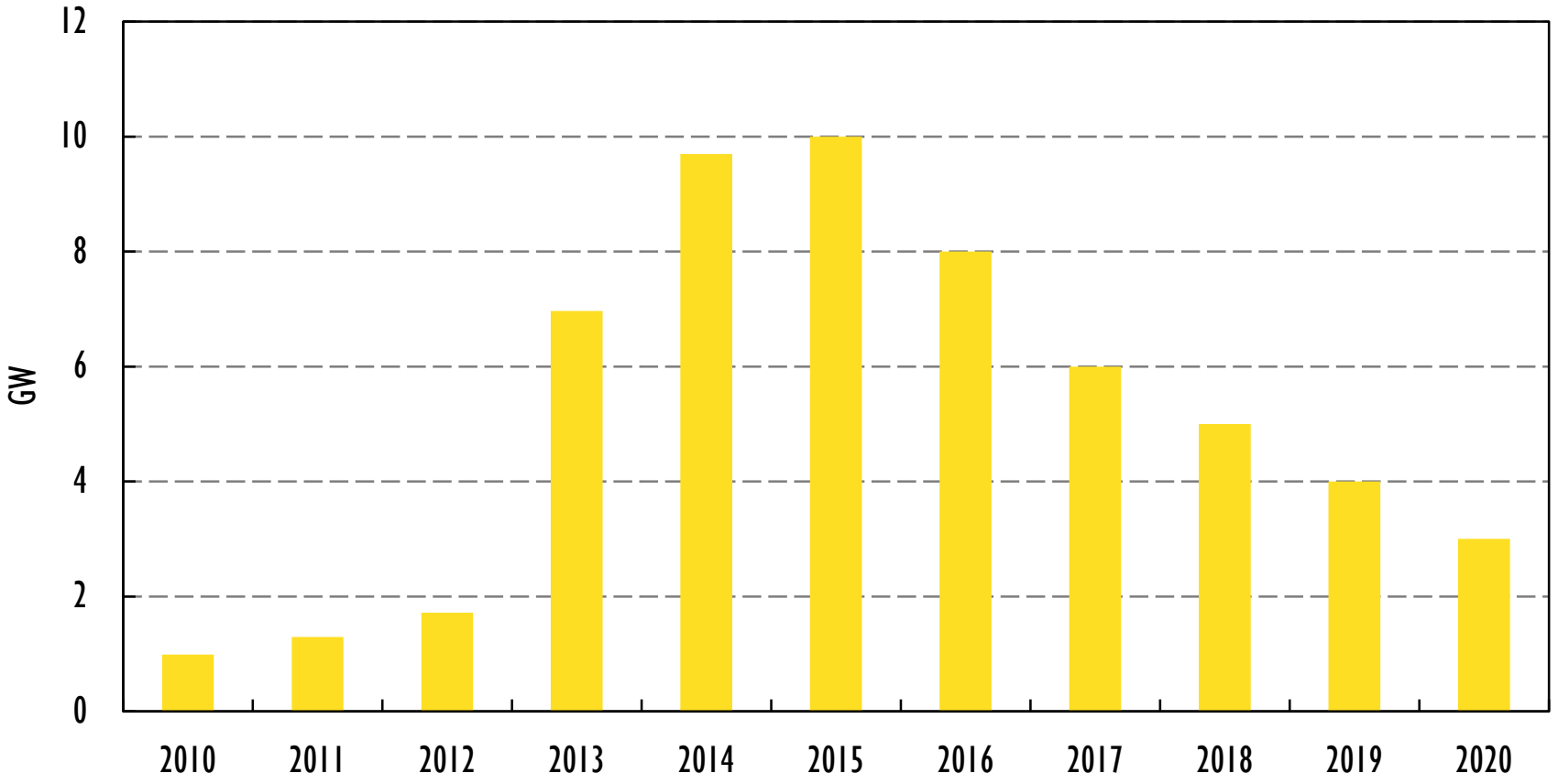
India weighted average PPA bid prices in PV auctions, state and JNNSM



- Ambitious target of 100 GW solar PV by 2022, but MTRMR sees < 30 GW by 2020
- Auctions for utility-scale PV reducing costs, though they remain higher than coal
- Clear and credible implementation of supporting regulations needed to reduce offtaker risks, promote net metering and reduce administrative barriers
- Significant grid expansion, strengthening and management needed

Grid and system integration main constraint to Japan PV deployment

Japan annual solar PV capacity additions, historical and forecast



Power diversification needs and generous incentives support Japan's PV growth, but greater progress is needed in variable renewable integration and power sector reform

Renewables can power Africa's economic growth

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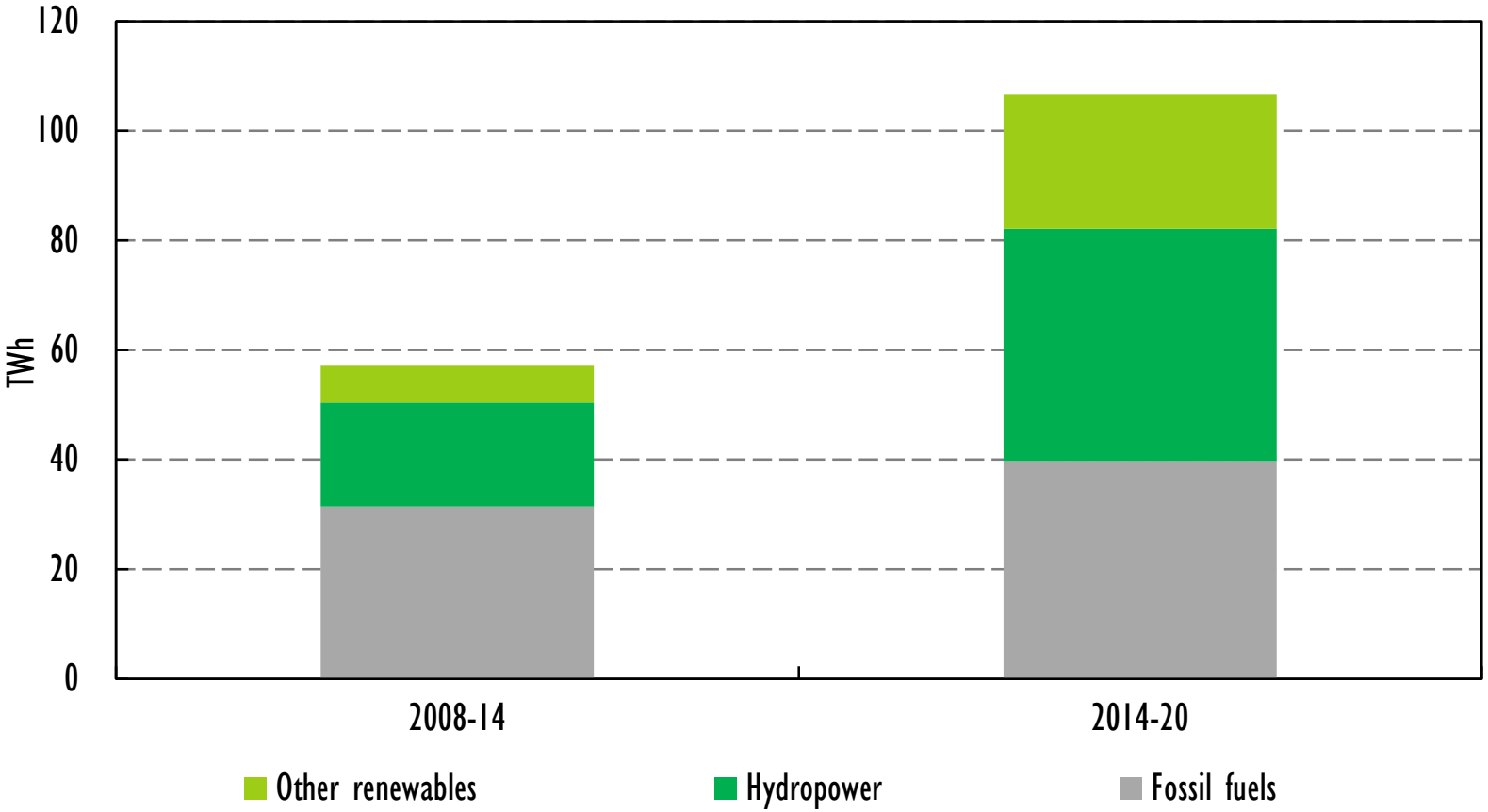
Sub-Saharan Africa power demand growth versus supply sources



With huge resources, improving cost-effectiveness and policy momentum, renewables account for almost two-thirds of demand growth in Sub-Saharan Africa

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

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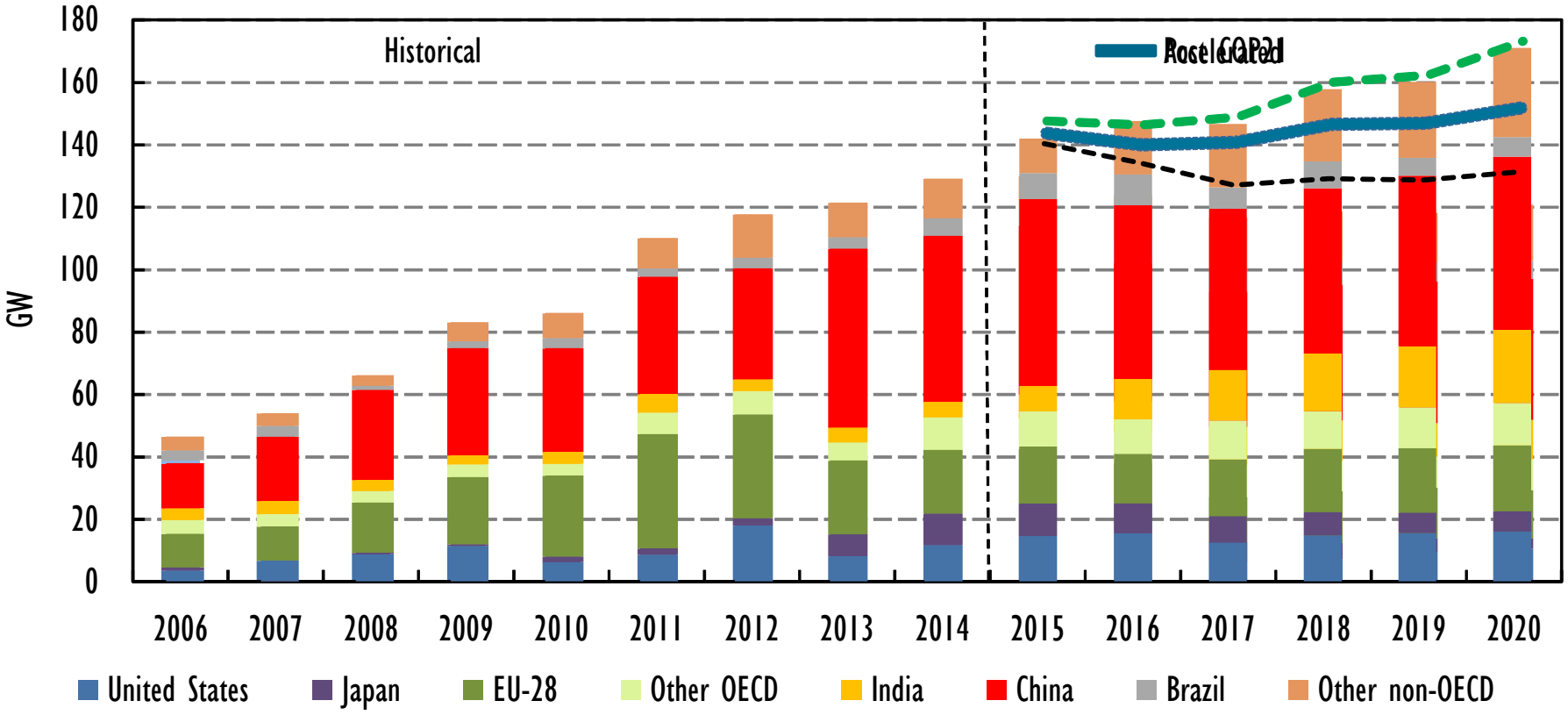
World renewable power annual capacity additions, *main* vs. *accelerated case*



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

A decisive moment for the future of renewables

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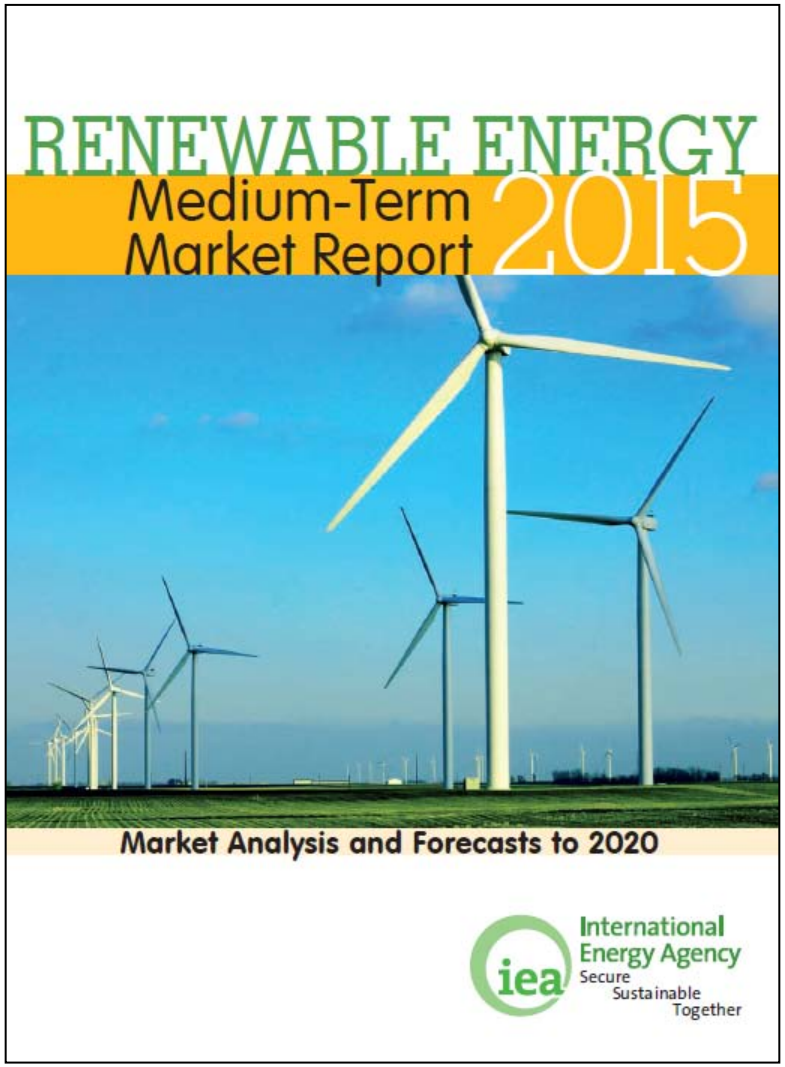
- **Increasingly affordable renewables are set to dominate power additions and developing countries can now leapfrog to cleaner power systems**
- **The impact of the lower oil price environment on global deployment of renewables is limited over the medium term – in particular for the power sector**
- **Cost-effective integration of high shares of variable renewables requires transformation of the system as a whole towards enhanced flexibility**
- **Greater progress needed to accelerate growth and meet climate objectives:**
  - ***Financing and investments*** **– a better enabling environment and market rules to provide the right price signals for investment in renewables and flexibility**
  - ***Focus on heat and transport sectors*** **– advanced biofuels and renewable heat both require a long term policy vision**
- **While variability of renewables is a challenge energy systems can learn to adapt to, variability of policies poses a far greater risk in many countries**

For further insights and analysis



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