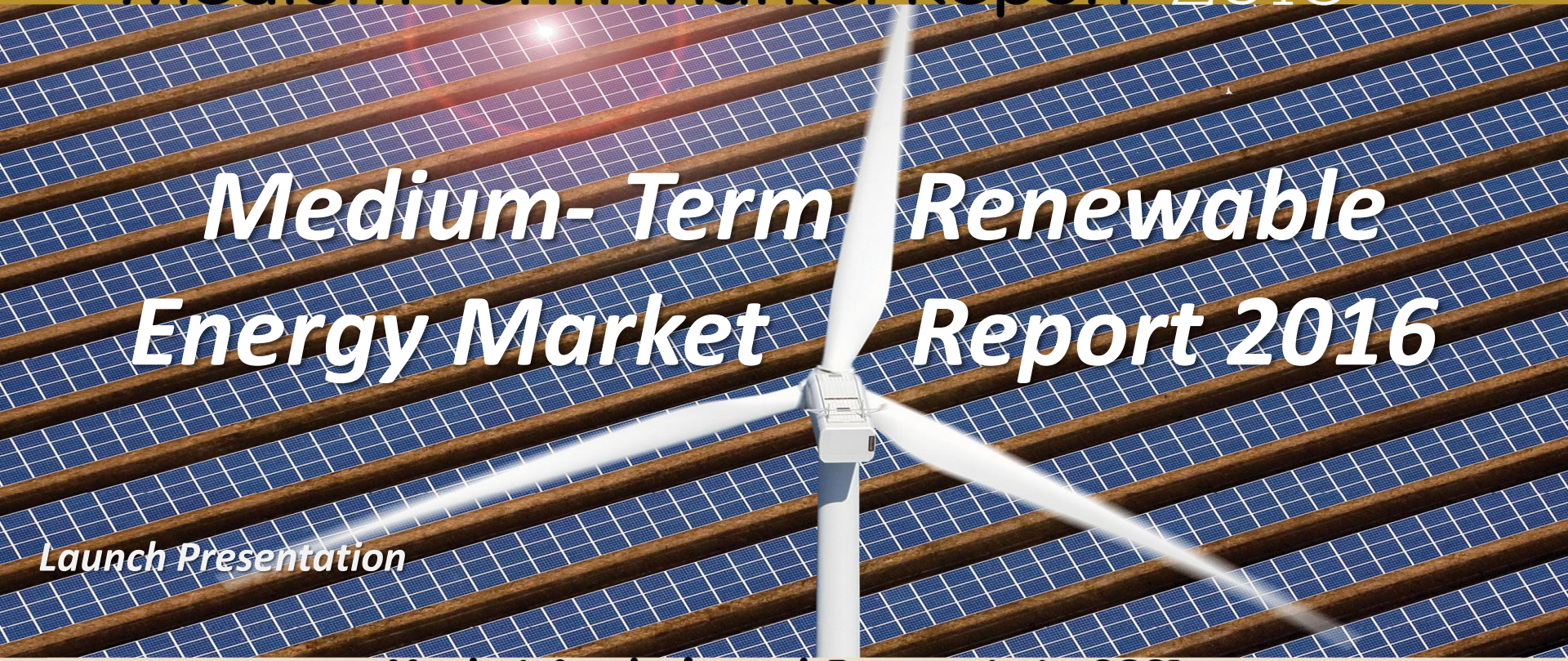
RENEWABLE ENERGY

Medium-Term Market Report 2016

International Energy Agency
Secure Sustainable Together



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Launch Presentation

Market Analysis and Forecasts to 2021

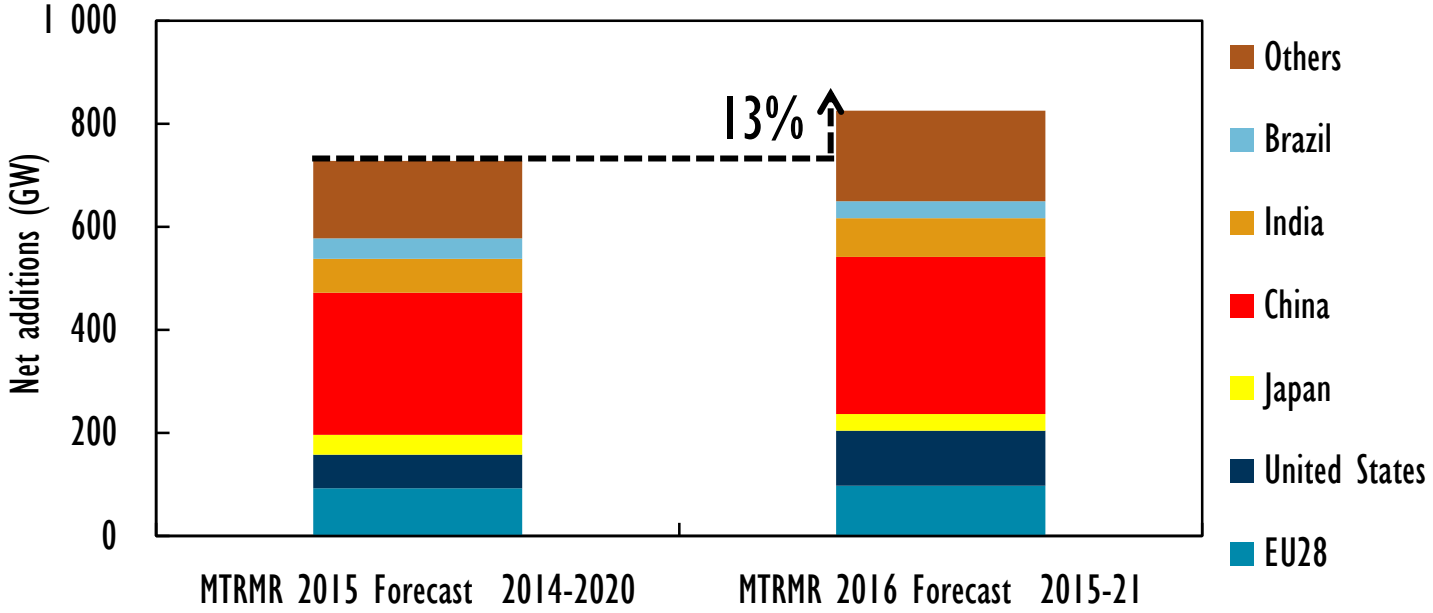
Singapore International Energy Week, Singapore, 25 October 2016

Context

- **A year of records for renewable electricity**
  - ***A record amount of new capacity was installed in 2015***
  - ***Total capacity has now overtaken coal***
- **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

Renewables to remain fastest growing source of electricity generation

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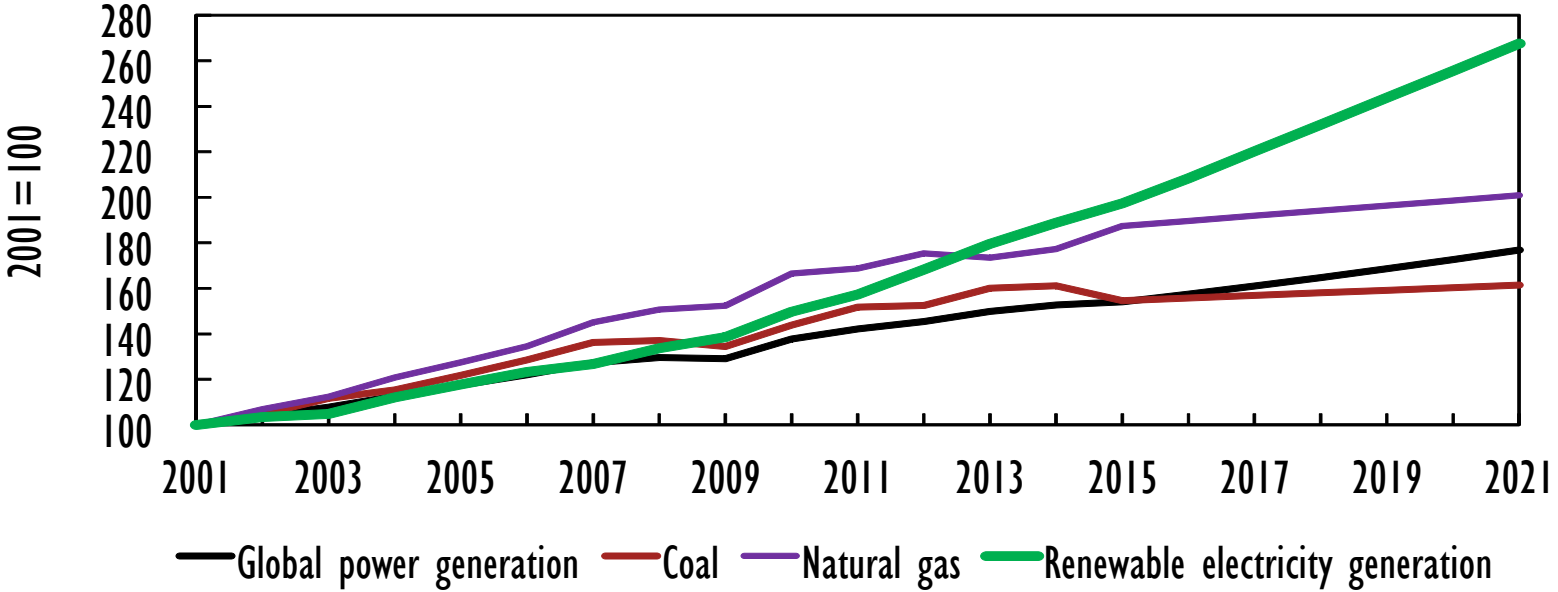
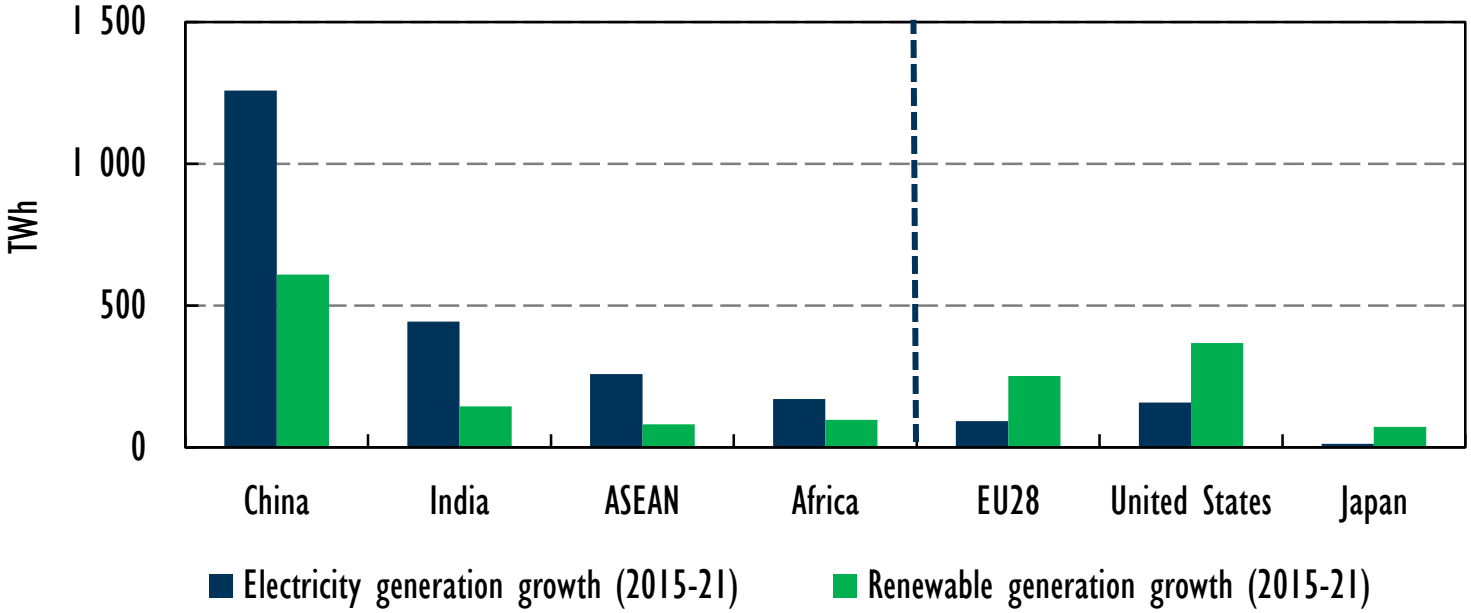
Indexed electricity generation by fuel (2001-21)



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

Wind and solar PV compensate for slower hydropower growth

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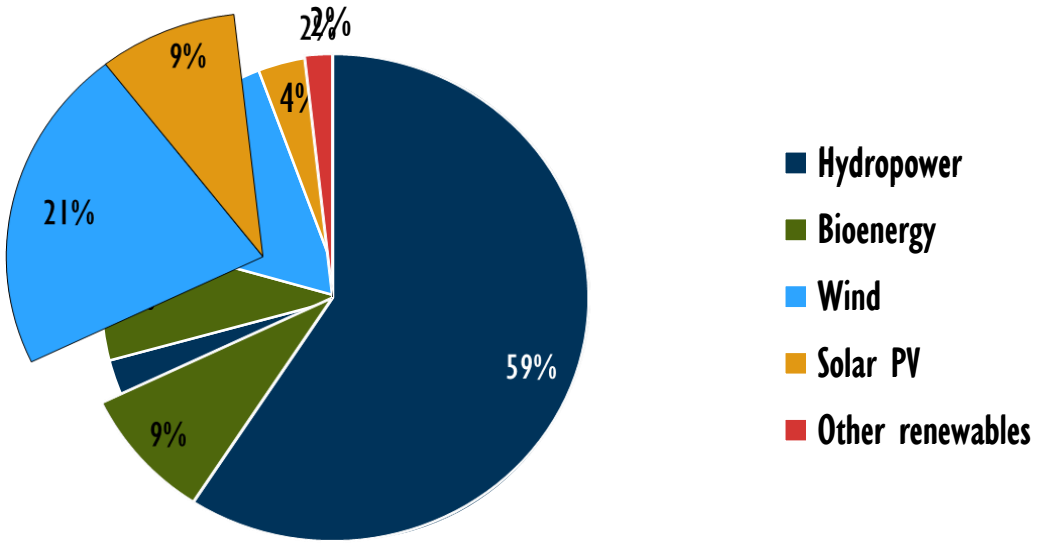
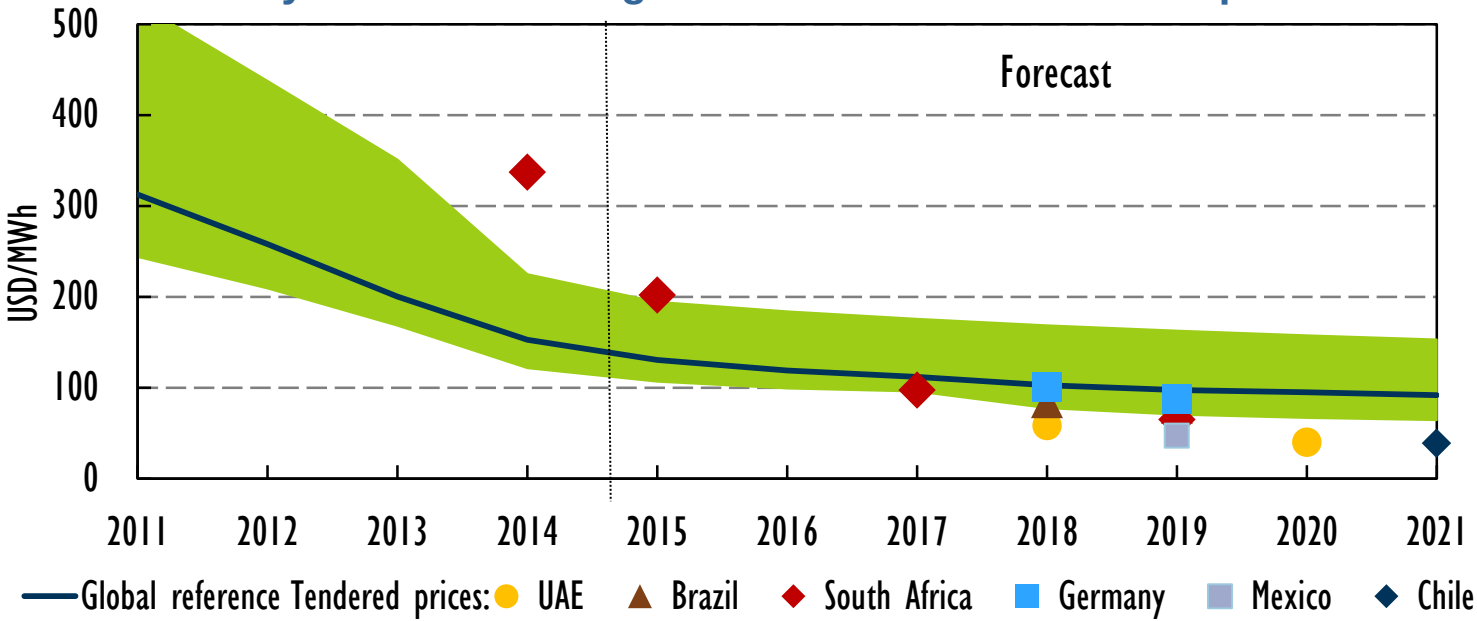
Renewable electricity generation by source 2015



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

Solar PV costs continue to decline with increasing competition

Utility-scale solar PV generation cost and contract prices



Utility-scale solar PV generation costs to fall by another quarter over 2015-21; competitive tenders may result in even faster cost reductions

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

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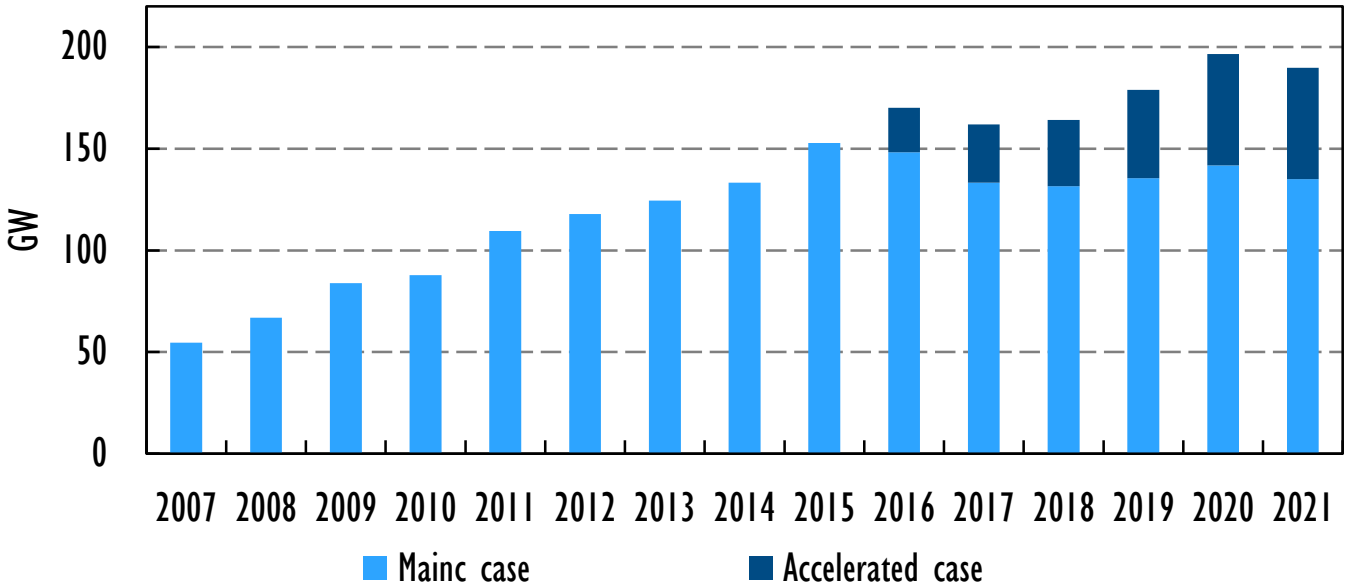
Renewable electricity capacity additions in Accelerated Case vs. Main Case



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

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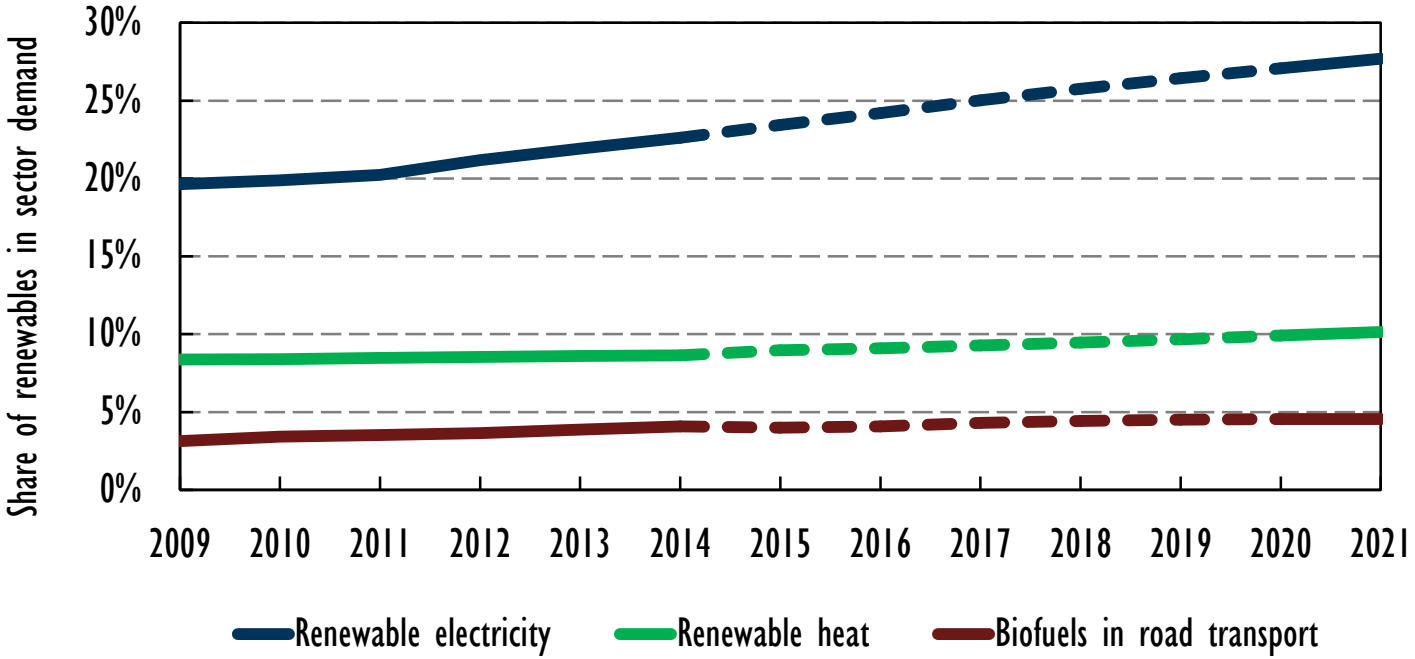
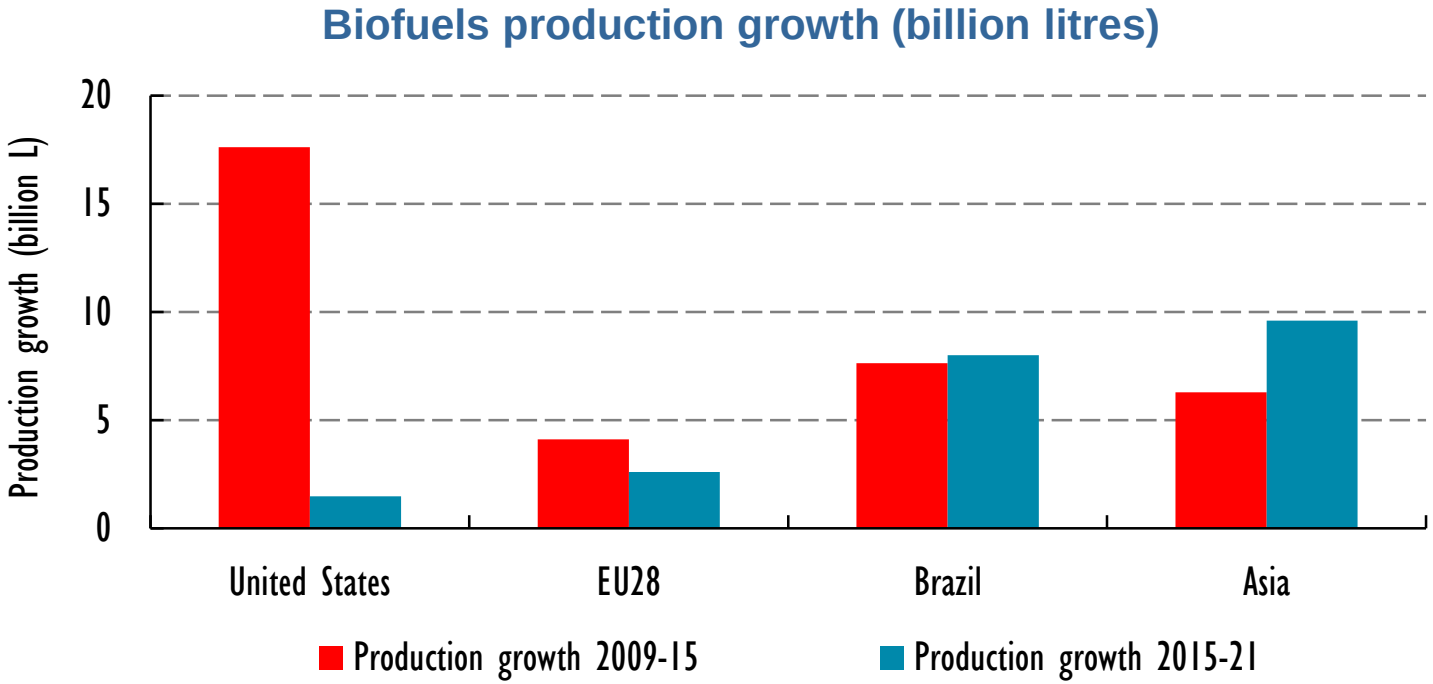
Share of renewables in electricity, heat and transport sectors



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

Biofuel production shifts to Asia, as EU and US slows



Structural challenges in the US & policy uncertainty post-2020 in the EU slow growth; Thailand, India & Indonesia have strengthened policies despite low oil prices

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