



# Renewables 2018

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Madrid, 13 December 2018



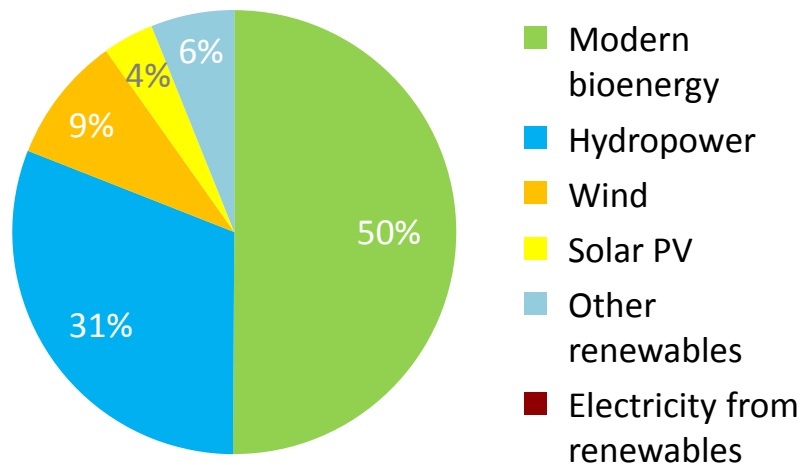
# Context



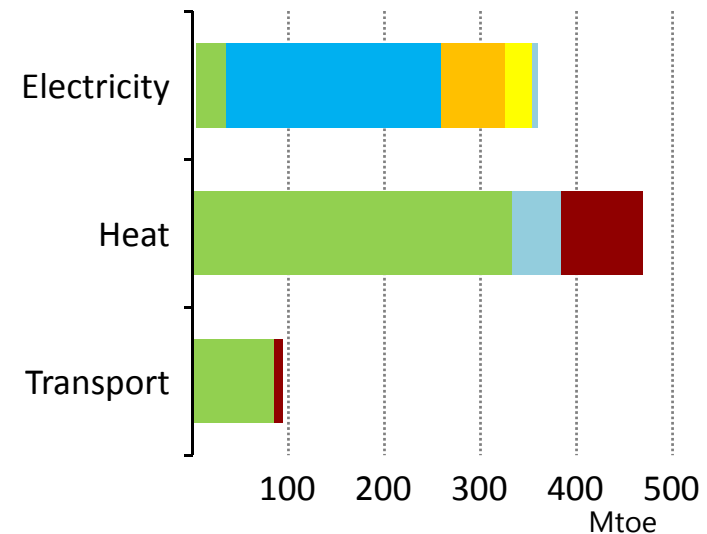
- CO2 emissions to rise again in 2018
- Progress in energy efficiency is slowing
- Expensive energy is back
  
- Solar PV capacity rose faster than any other fuel in 2017 driven by China; offshore wind installations broke a record with auction prices showing significant cost reduction potential
- Global electricity demand grew by over 3% in 2017, a faster rate than overall energy demand but electricity only accounts for 20% of total final energy consumption
- The world energy system has a number of “blind-spots” that require policy attention to achieve a secure , sustainable and affordable energy system

# Modern bioenergy: the overlooked giant of renewables

Total final energy consumption from renewables, 2017



Total final energy consumption from renewables by sector, 2017

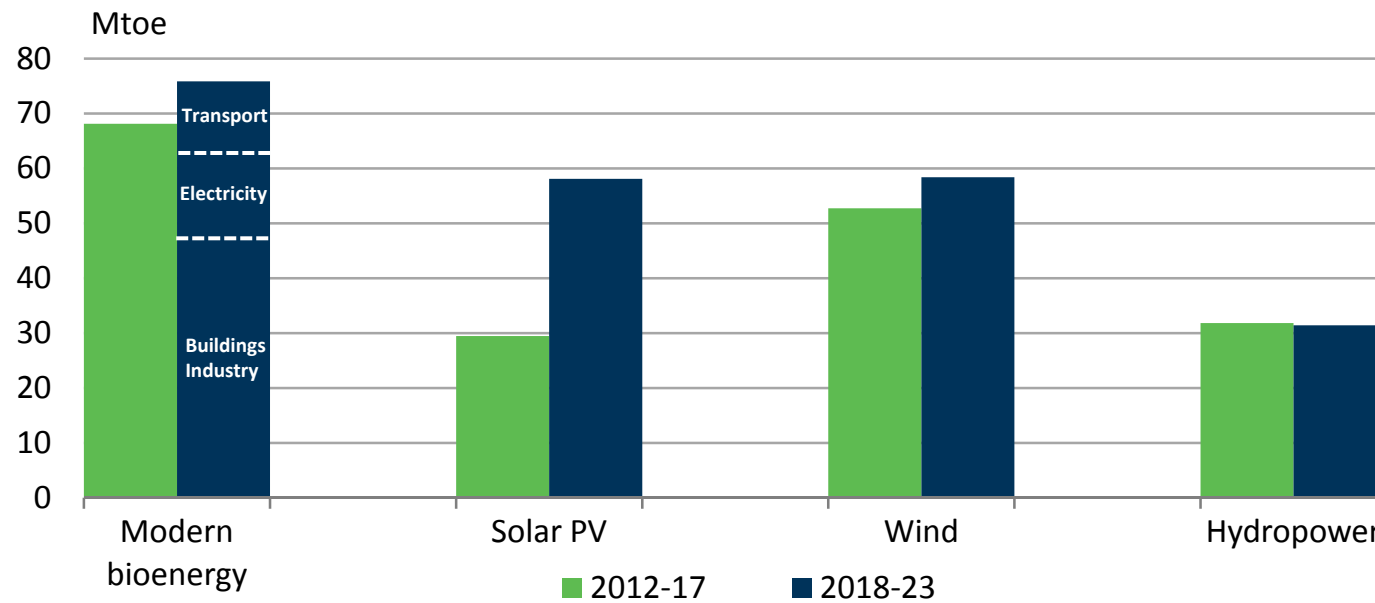


**Modern bioenergy is the only renewable source that can provide electricity, direct heat and transport fuels**  
**Two thirds of modern bioenergy heat is used in industry**

# Modern bioenergy set to lead renewables growth

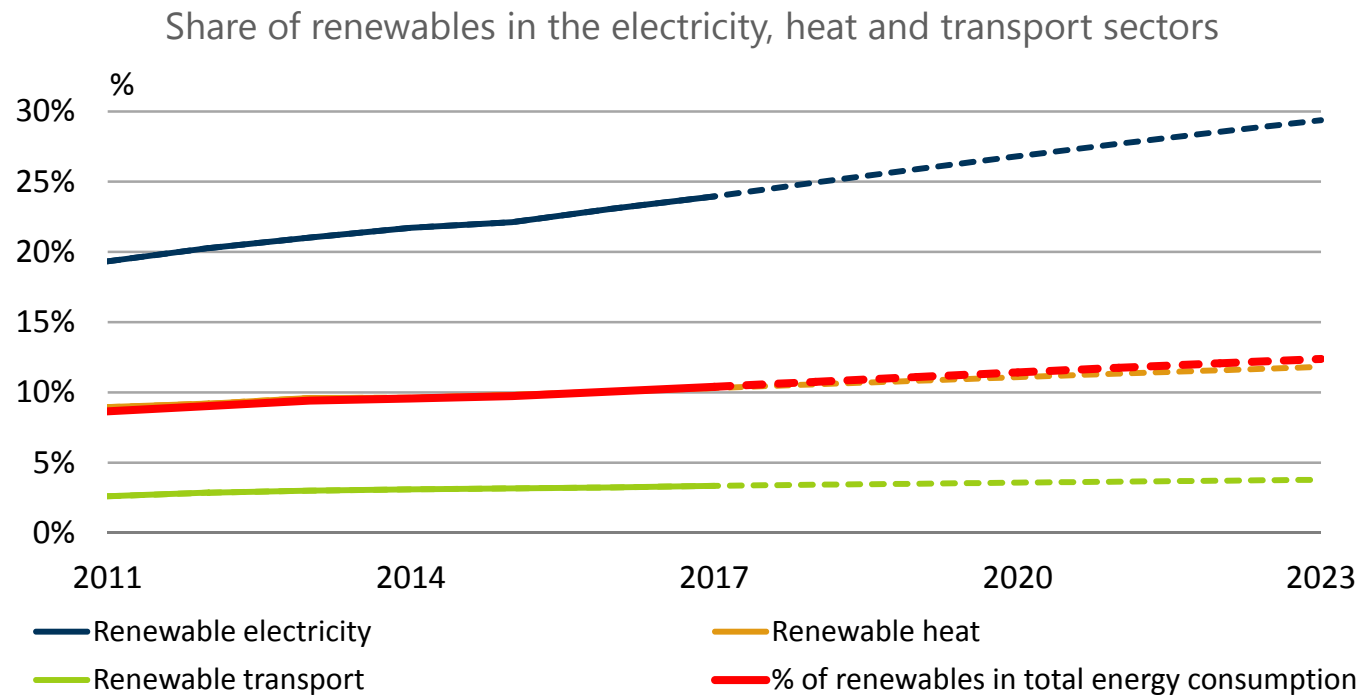


Total energy consumption growth of renewables over 2012-23



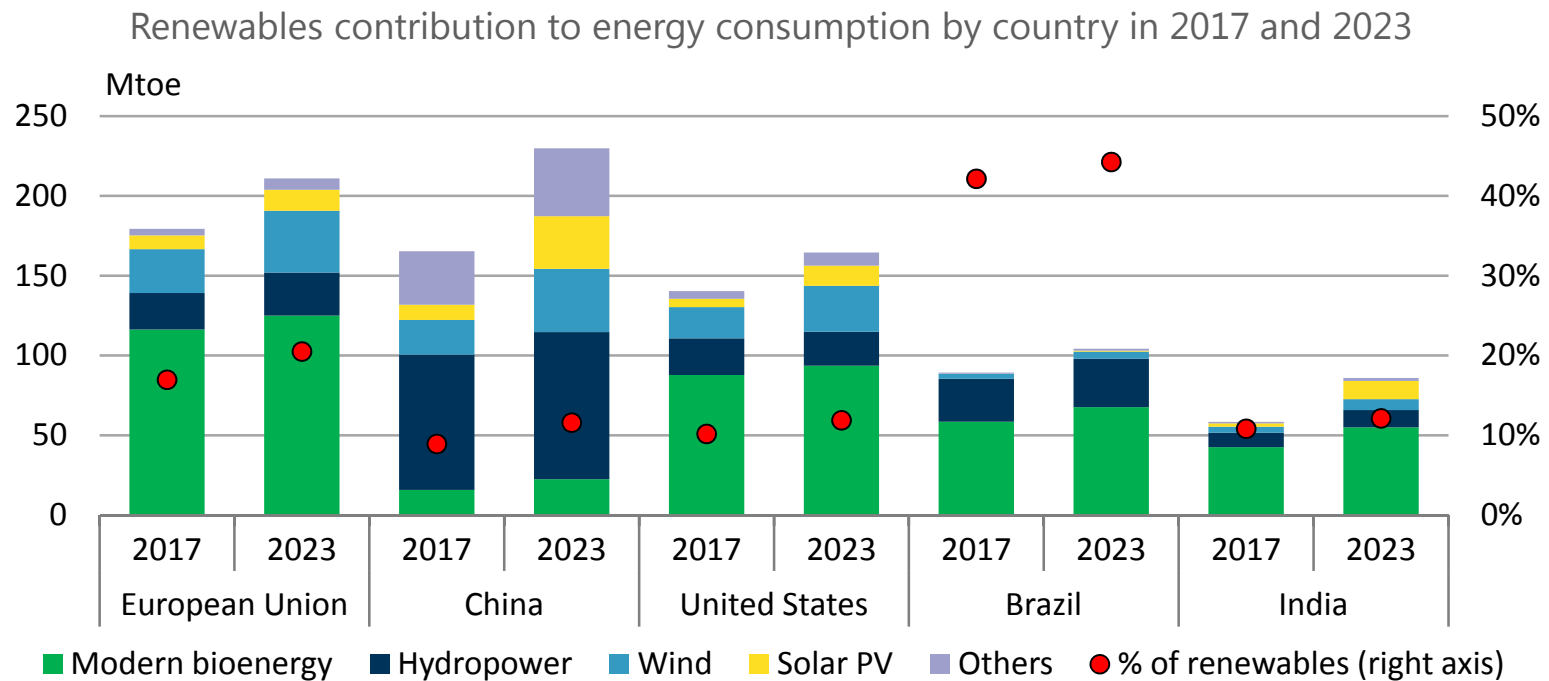
**Total renewable energy consumption is expected to increase by almost 30% over 2018-2023, covering 40% of global energy demand growth**

# Renewables share of energy consumption increases by one-fifth



**Electricity contributes two-thirds of renewables growth  
But electricity accounts for less than 20% of total final energy consumption**

# China becomes the largest RE consumer, Brazil has the highest share

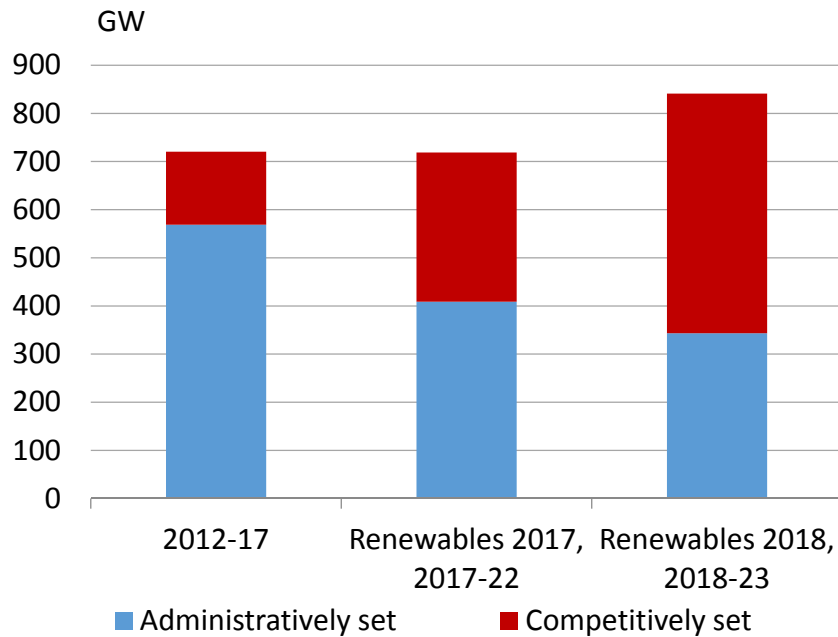


**China accounts for the largest absolute growth over the forecast period surpassing the EU, while renewable energy consumption in India increases by 50%**

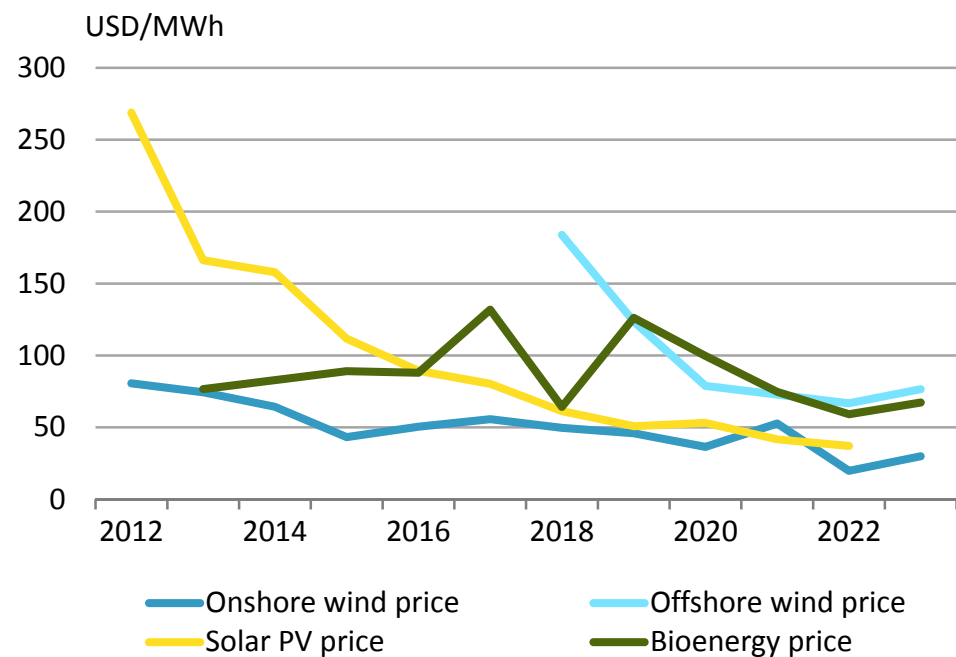
# Competition accelerating cost reductions



Fixed remuneration type of utility-scale projects

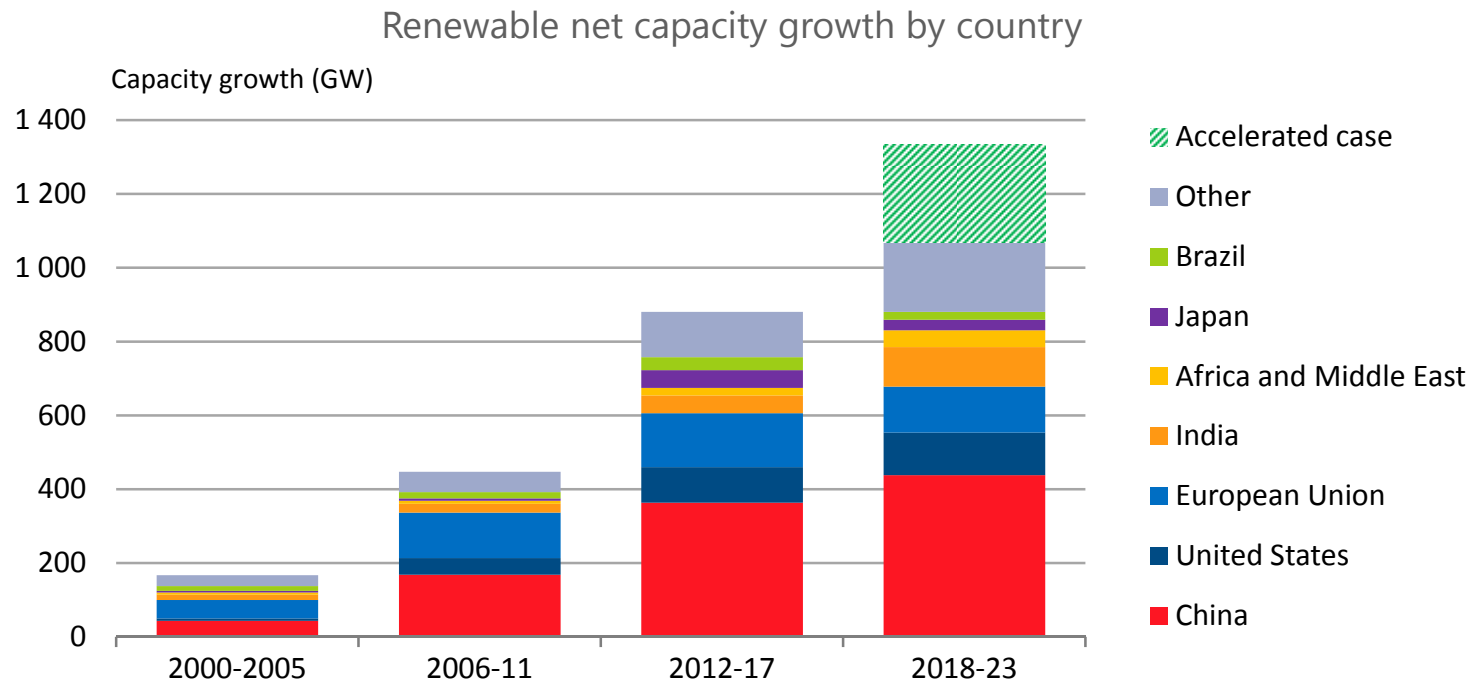


Average auction price by project commissioning date



**Around 60% of renewable capacity additions over 2018-23 driven by competitive remuneration schemes**  
**Announced contract prices need to be verified as project delivery schedules and final costs may differ**

# Renewables account for 70% of global capacity expansion



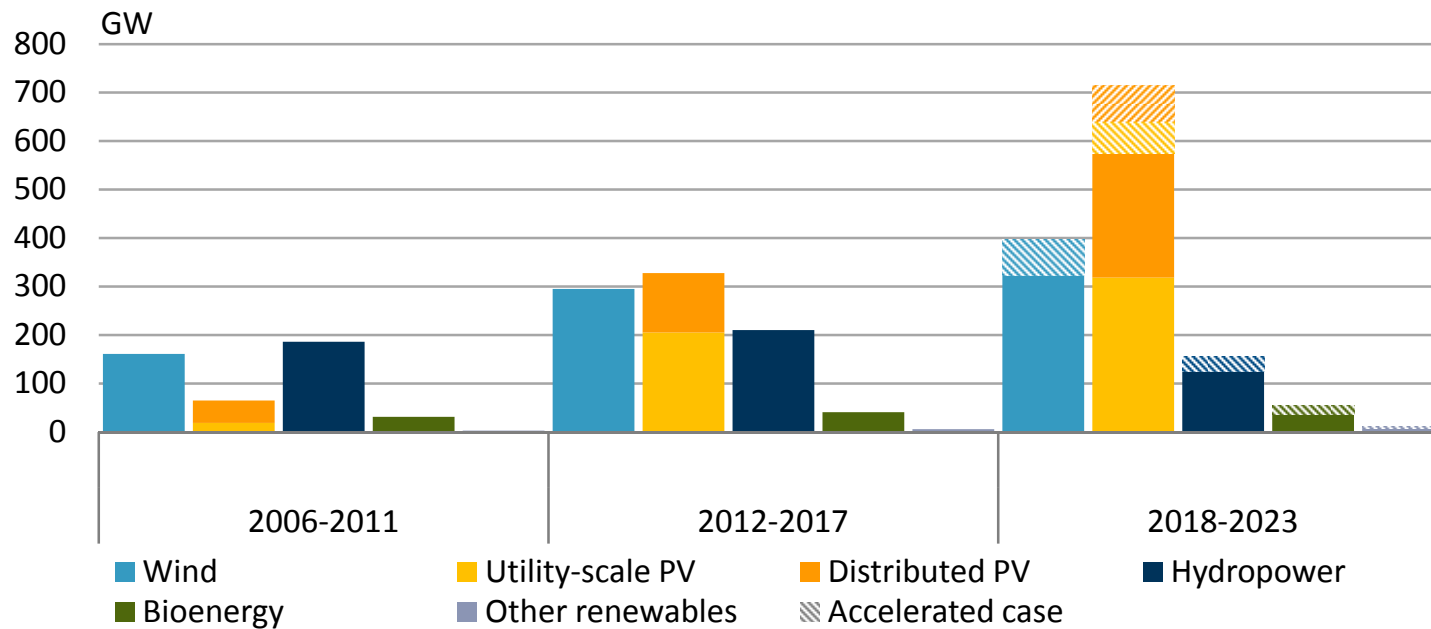
**In the accelerated case, renewable capacity could expand by 25% more reaching 1.3 TW, if governments address challenges concerning policy uncertainty, grid integration and affordable financing**



# Solar PV expansion in electricity larger than all renewables combined



Renewable electricity capacity growth by technology

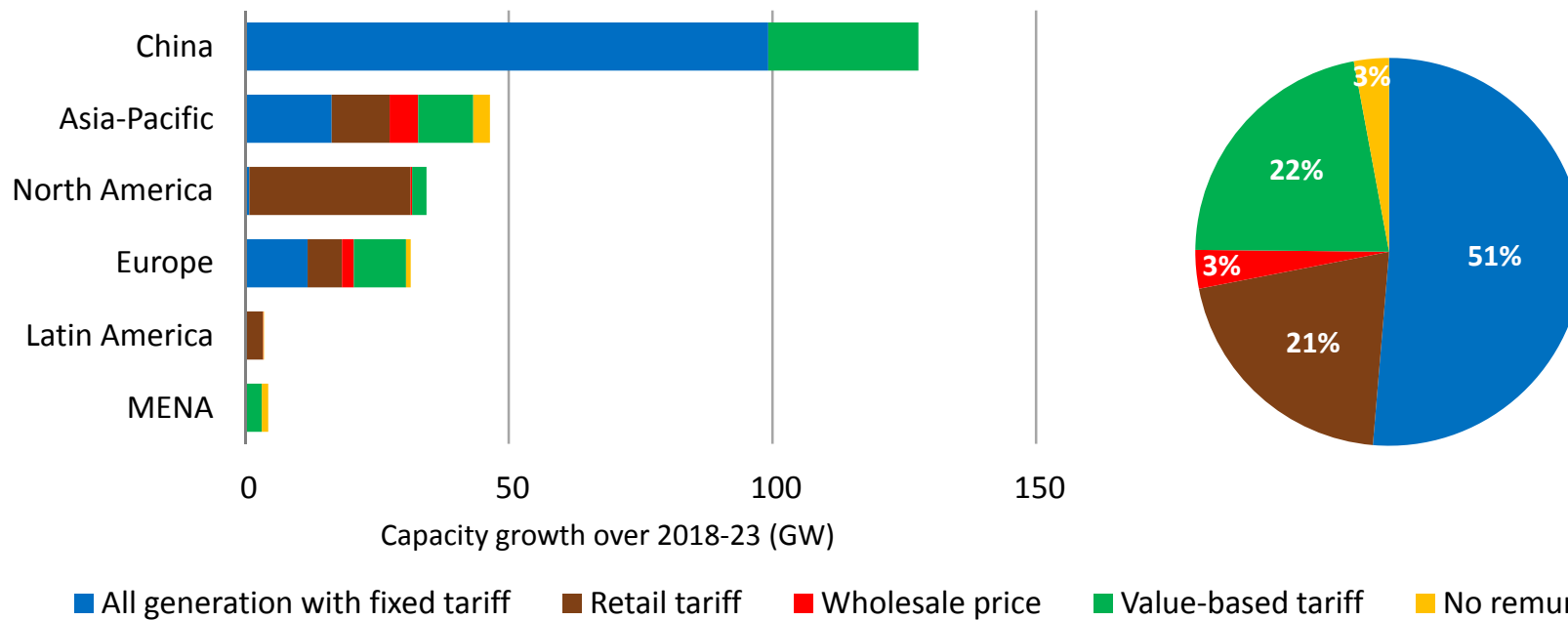


**Distributed generation capacity growth makes the difference in solar PV's leadership**  
**Cumulative PV capacity could reach 1.1 TW and wind over 0.9 TW by 2023 under the accelerated case**

# Policies for remuneration to play a key role for distributed generation

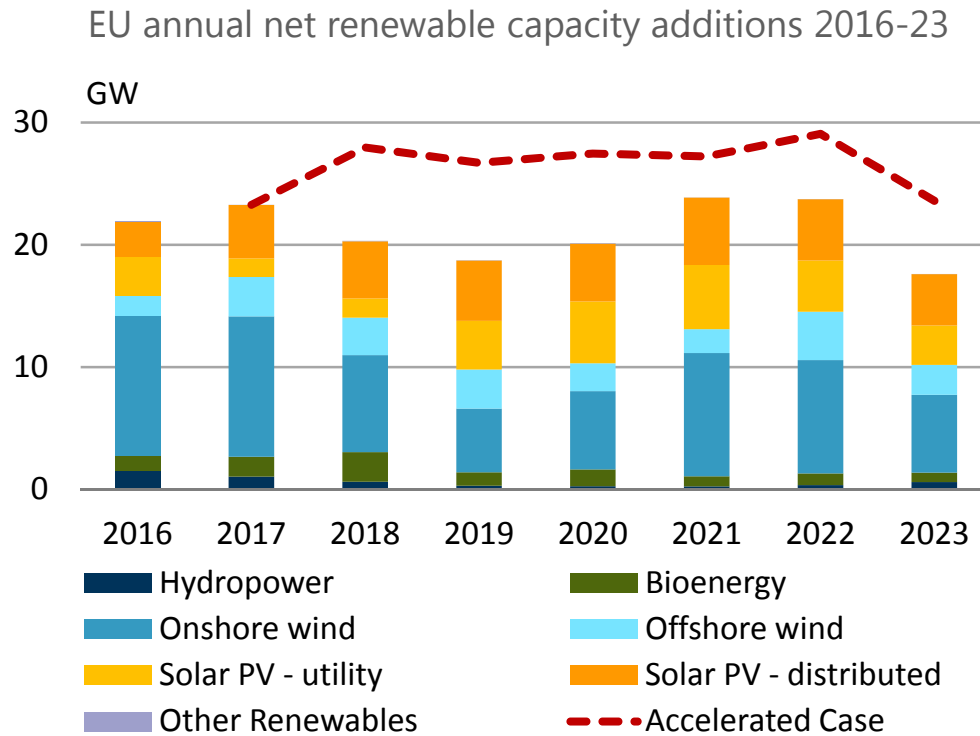


Distributed PV capacity growth by policy type for remuneration of excess generation



**Utilities revenue losses due to self-consumption to almost quadruple (USD 12 bln) by 2023 but accounting for less than 0.3% of total retail bill collection revenues**

# A more optimistic capacity forecast for the EU

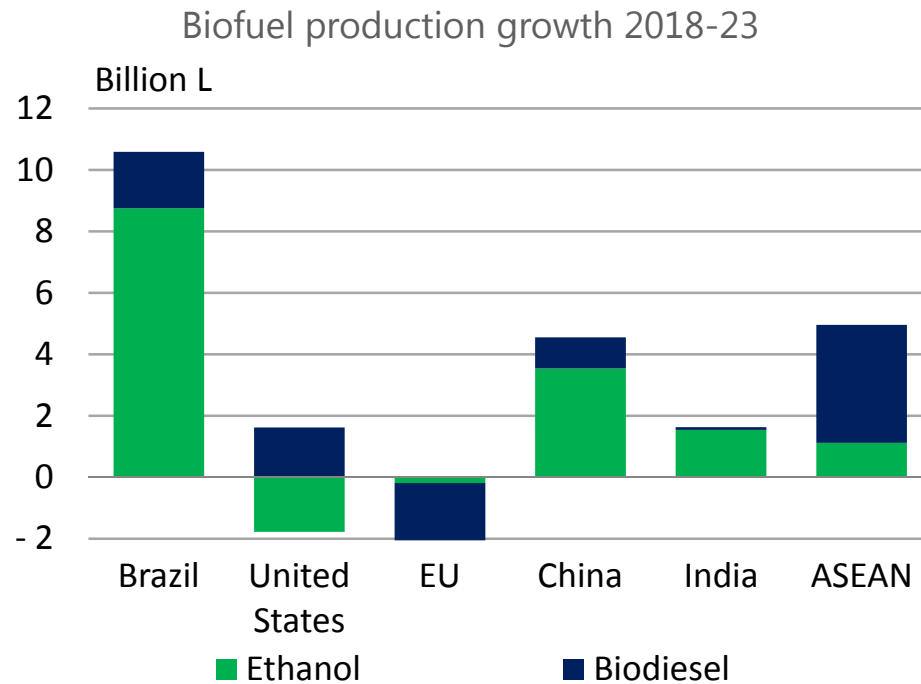


### Key policy actions

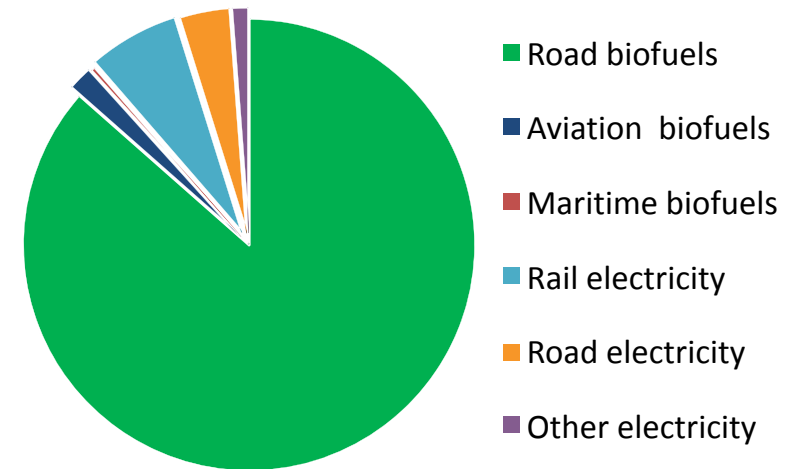
- Longer-term visibility of auction volumes and capacity targets
- Better auction design reflecting permitting and grid connection challenges
- Provide roadmap for onshore wind repowering
- Faster grid build-out in Northern Europe
- Improve social acceptance of onshore wind
- Provide clarity on distributed PV incentives and self-consumption auctions

**Over half of the EU's expansion in Germany, France and the UK but growth could be 30% higher if additional auctions and more attractive economics for corporate PPAs and distributed PV occur**

# Asia and Latin America dominate biofuel production growth



Renewables consumption in transport in 2023

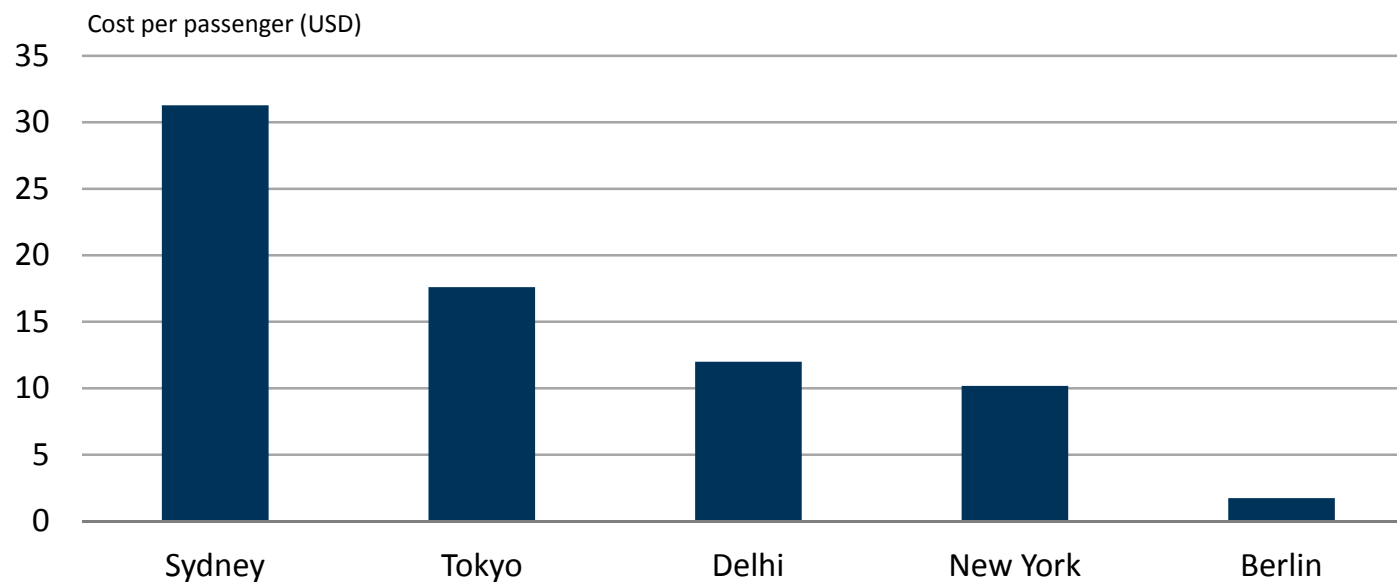


**Biofuels production grows by 16%; EVs electricity consumption triples, with renewables providing 30% of demand from electrified transport by 2023**

# Biofuels open new avenues for more sustainable aviation



Cost premium of commercial aviation biofuels (15% blend) per passenger from London

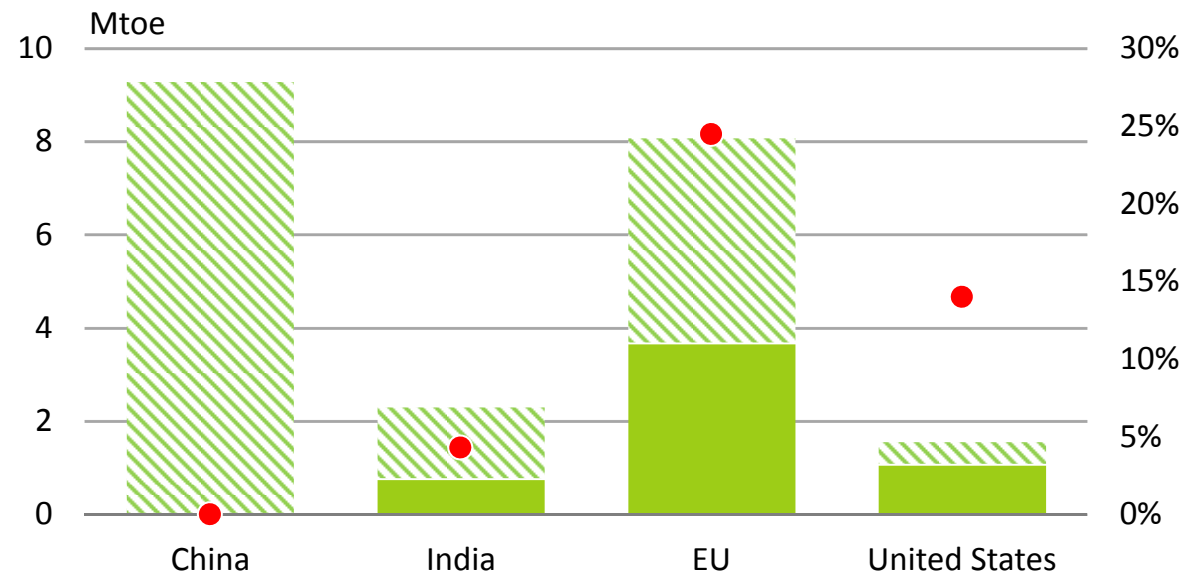


**Policies remain key to bridge the cost gap between aviation biofuels and fossil jet fuels**  
**The most efficient aircraft could reduce fuel costs by around 15%**

# Waste: a key resource for “greener” cement production

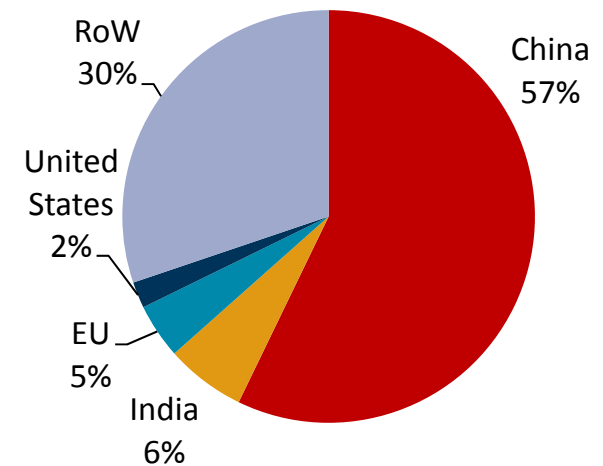


Bioenergy and waste consumption in the cement industry by country



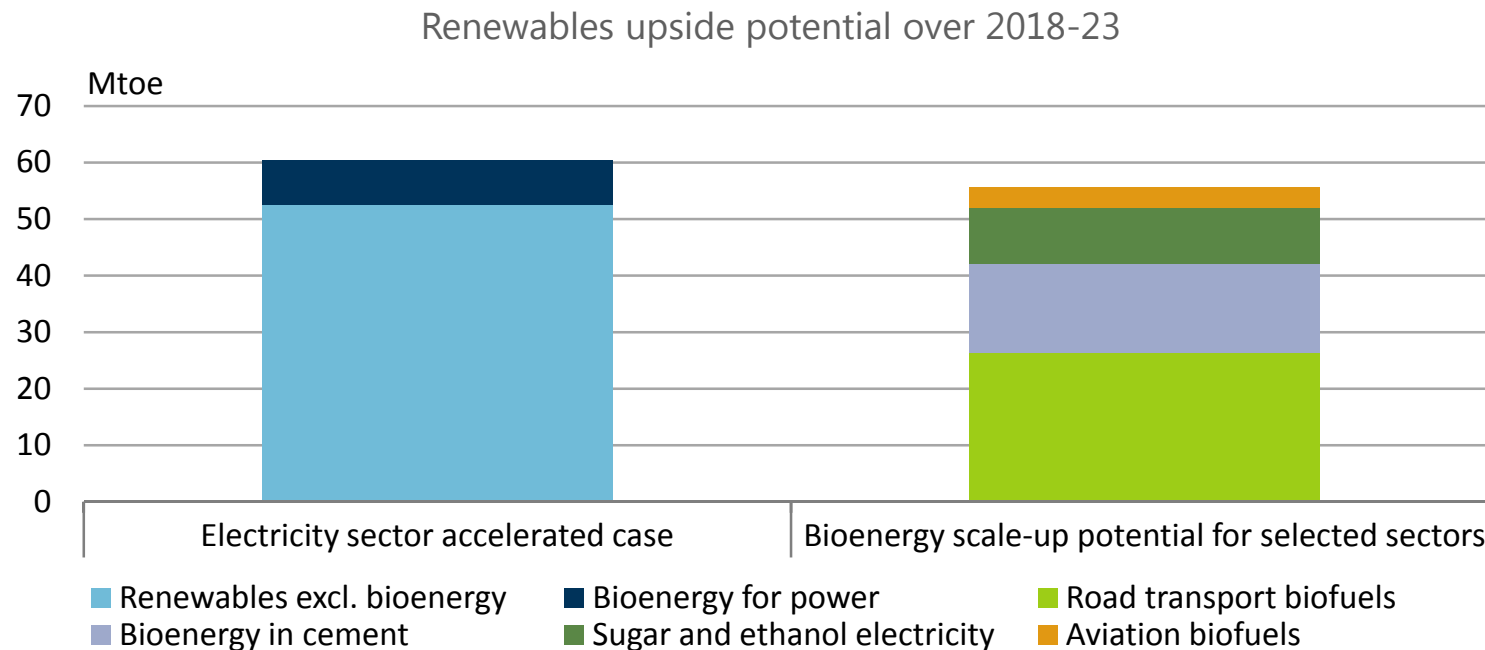
■ Bioenergy and waste consumption in 2017 ● % of bioenergy and waste in 2017 (right axis)  
 ▨ Bioenergy and waste 2023 potential

Cement production by country, 2017



**The share of bioenergy and waste in the cement industry could be doubled if the robust waste management frameworks present in Europe were replicated in large producing countries**

# Accelerated deployment is possible with right policies



**Policies could accelerate renewable electricity growth by 25%; bioenergy could accelerate RE consumption across all sectors with an enhanced use of available waste resources**

# Conclusions



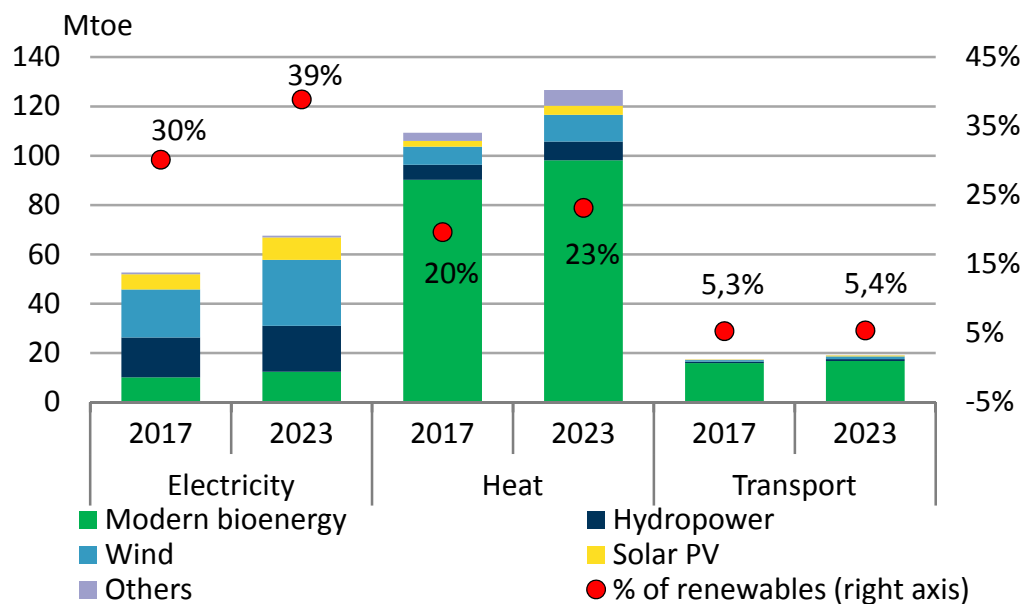
- Even with ongoing cost reductions, government policy remains crucial to attract investment in renewables, ensure appropriate market design and reliable & cost-effective system integration
- Modern bioenergy will continue to lead renewables growth in the next five years and its untapped potential remains huge particularly in China, India, Brazil and the EU
- Further accelerating the use of modern bioenergy hinges on policies & incentives to foster innovation and on rigorous sustainability frameworks
- Greater use of solar, wind, bioenergy & other renewables – together with energy efficiency & other clean energy technologies – is needed in all sectors for emissions to peak rapidly then decline
  - Electrification of end-use sectors
  - Better alignment of energy efficiency and renewable energy policies
  - Enhanced direct renewable heat uses
  - Stronger renewables penetration in industry, including through hydrogen-based fuels & feedstocks



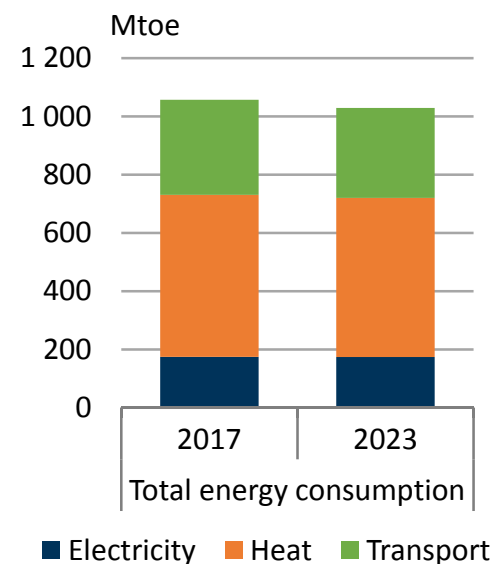
# Renewable consumption expands by one-fifth led by wind and bioenergy



EU renewable energy consumption by sector in 2017 and 2023



EU total final energy consumption in 2017 and 2023



**Heat drives renewable penetration growth followed by electricity; transport share remains flat  
EU energy demand is expected to decline 3% as energy efficiency policies are successfully implemented**