Renewables 2018

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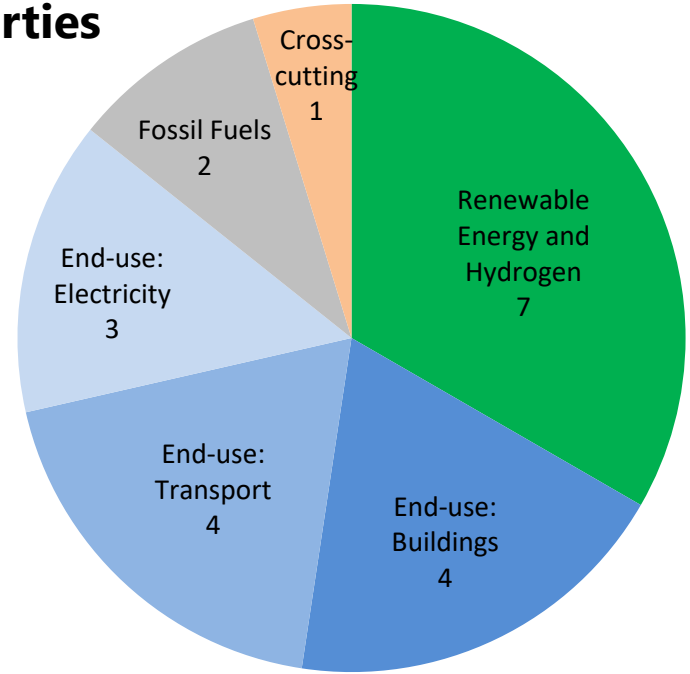
IEA

Switzerland's participation in TCPs

- Participation in **21 TCPs**

- **12 distinct entities,** of which 2 **Contracting Parties**
  - Swiss Federal Office of Energy (SFOE)
  - Paul Scherrer Institute
  - Swiss Federal Institute of Technology Zurich
  - Beratung Renz Consulting
  - R.Bruniger AG
  - Enercom AG Bern
  - Swisstopo
  - Ecole Polytechnique Fédérale de Lausanne
  - Frank Energy
  - NET Nowak Energy & Technology Ltd.
  - E4Tech
  - Ingenieurburo Muntwyler



Switzerland's participation in TCPs: recent trends and opportunities

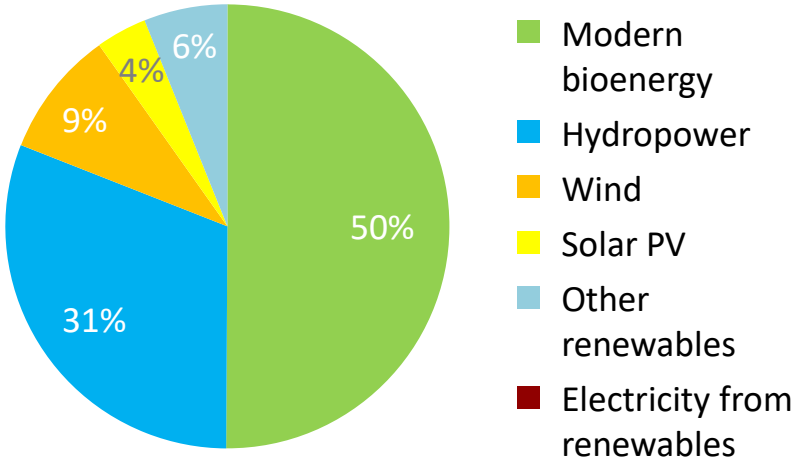
- **Most recent participations**
  - 2017: SFOE joined the TCP on Energy Conservation in Energy Storage (ECES TCP)
  - 2013: SFOE joined the TCP on Gas and Oil (GOTCP)
- **Most recent withdrawals**
  - 2017: State Secretariat for Education, Research & Innovation (SERI) withdrew from the TCP on Fusion Materials (FM TCP)
  - 2000: SFOE withdrew from the TCP on Industrial Technologies & Systems (IETS TCP)
- **Discussing/formalising**
  - Please let us know if you are discussing/considering participation in other TCPs!

Context

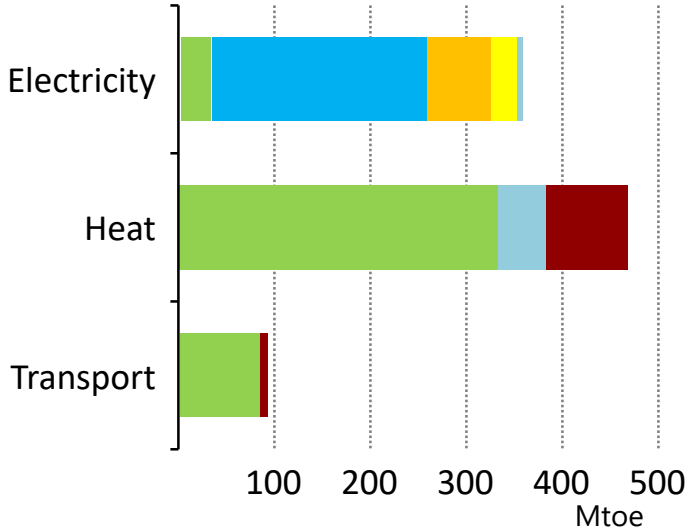
- Renewables grew three times faster than total energy demand in 2017 but this was not enough to stop global CO2 emissions from rising by 1.4% after three years of being flat
- Global electricity demand grew by over 3% in 2017, a faster rate than overall energy demand, with China & India accounting for 70% of this growth
- 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
- The world energy system has a number of "blind-spots" that require policy attention to achieve a secure , sustainable and affordable energy system
  - Air conditioning, trucks, petrochemicals… and modern bioenergy

Modern bioenergy: the overlooked giant of renewables

Total final energy consumption from renewables, 2017

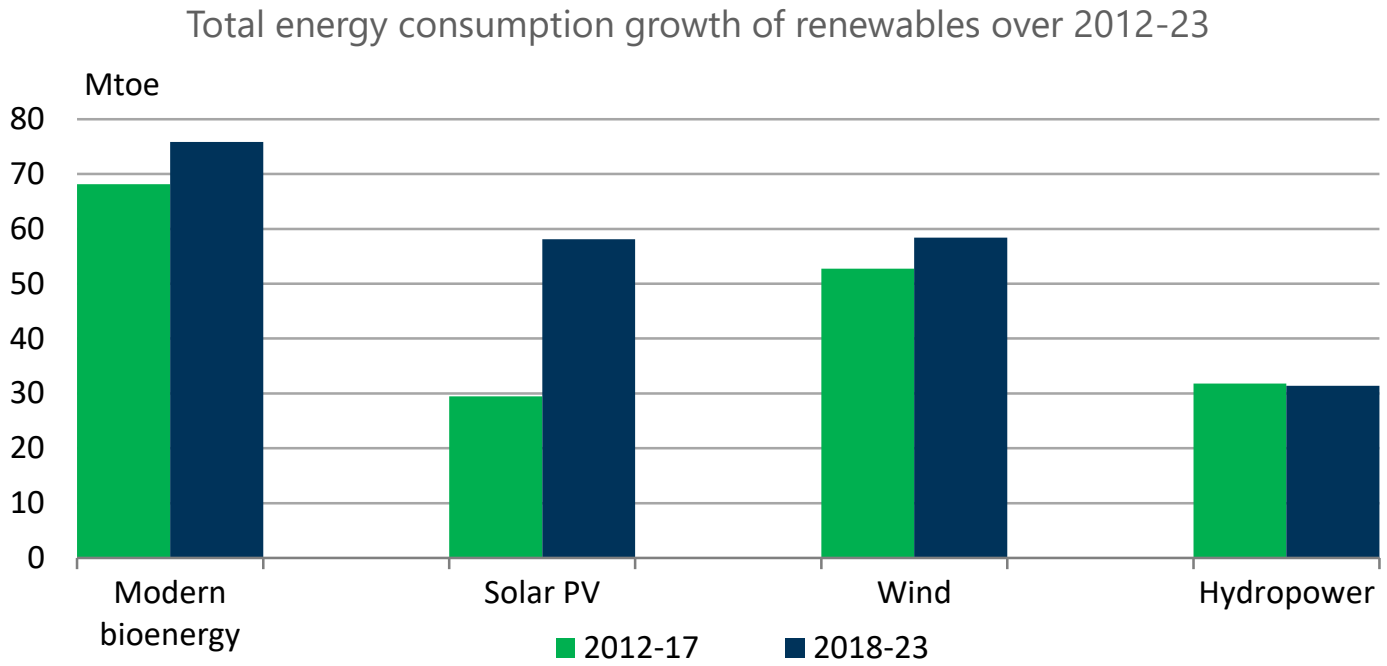


Total final energy consumption from renewables by sector, 2017



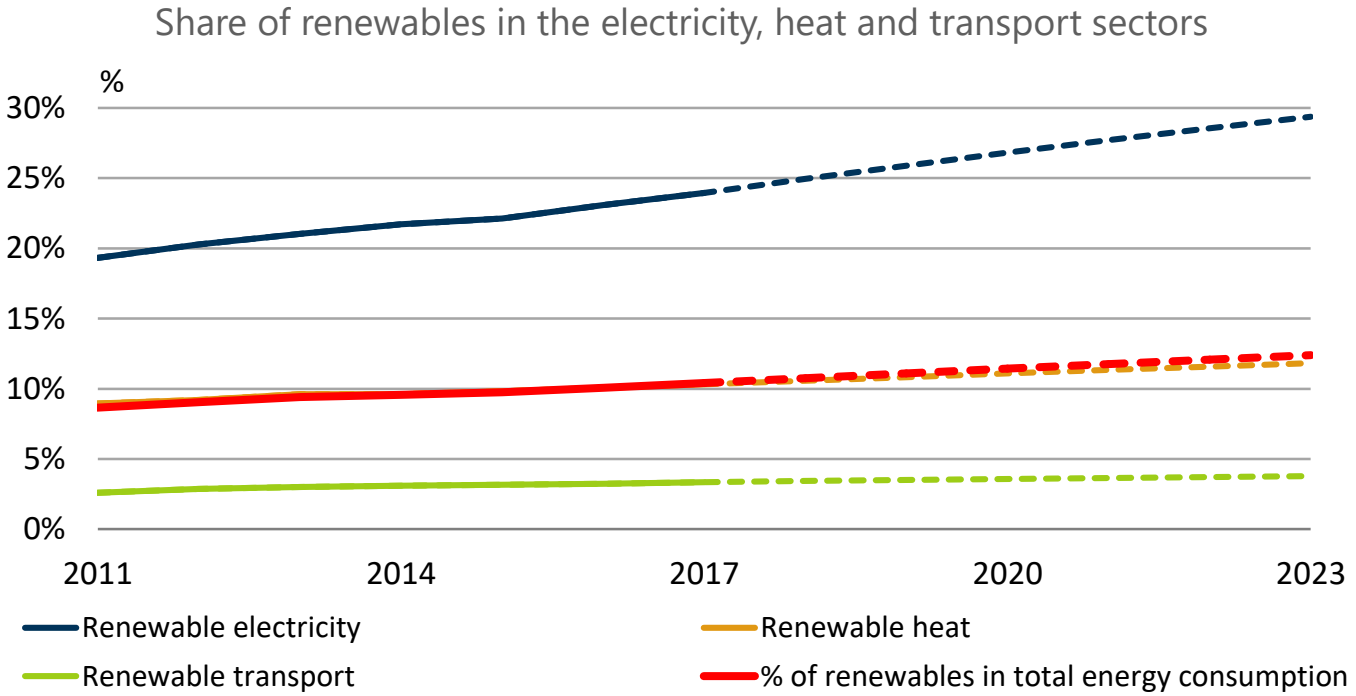
Modern bioenergy is the only renewable source that can provide electricity, direct heat and transport fuels
Two thirds of modern bioenergy heat is used in industry

Modern bioenergy set to lead renewables growth



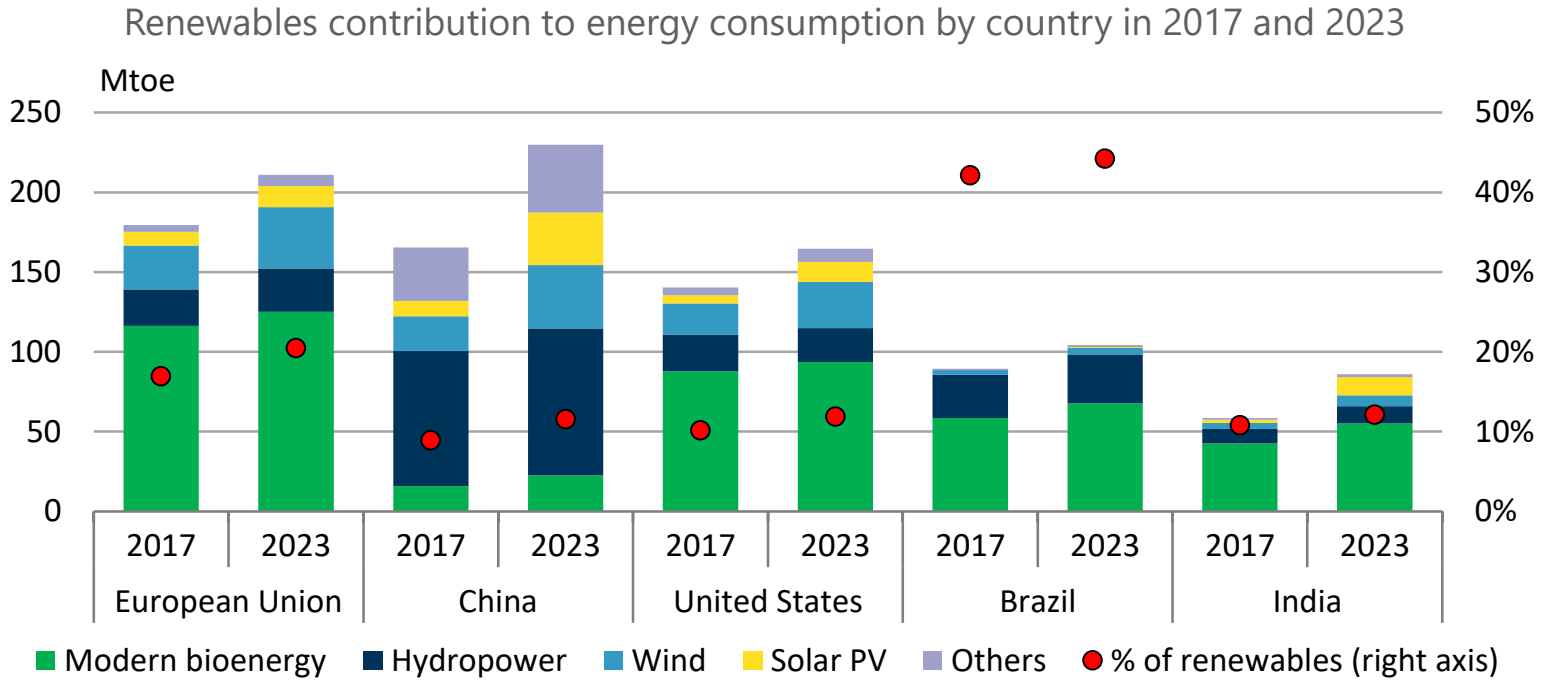
Total renewable energy consumption is expected to increase by almost 30% over 2018-2023, covering 40% of global energy demand growth

Renewables share of energy consumption increases by one-fifth



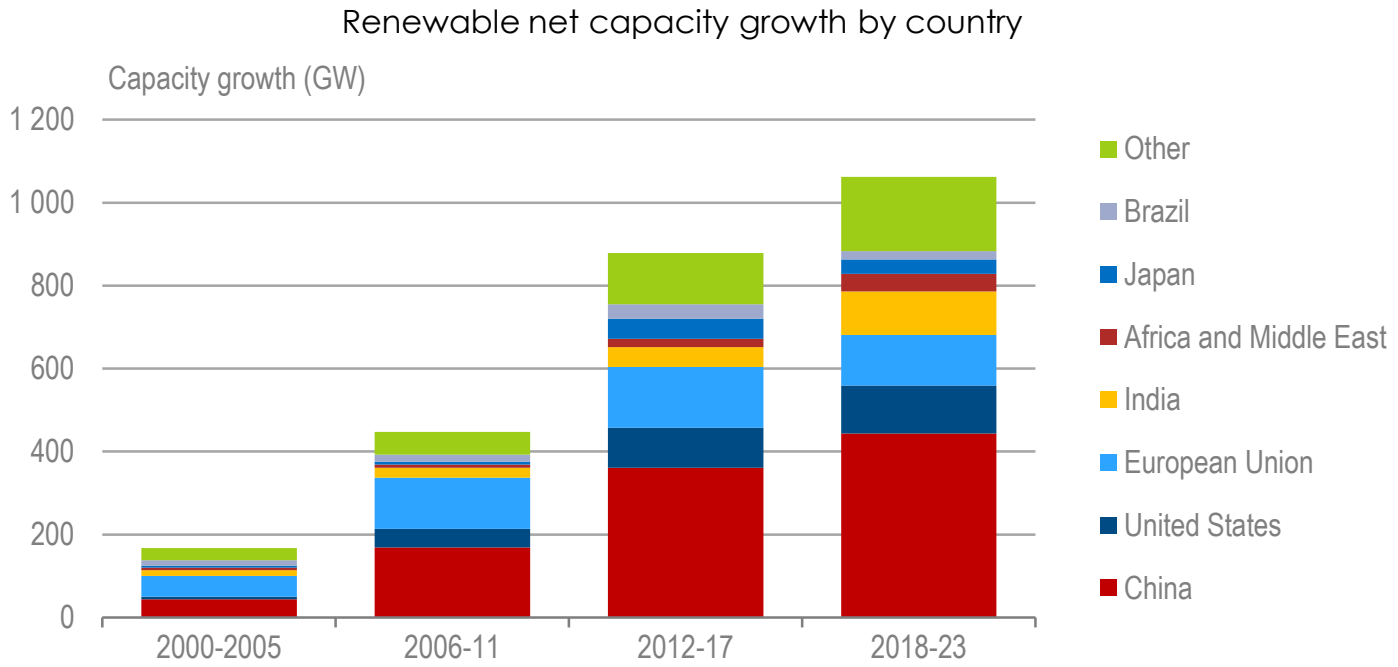
Electricity contributes two-thirds of renewables growth
But electricity accounts for less than 20% of total final energy consumption

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



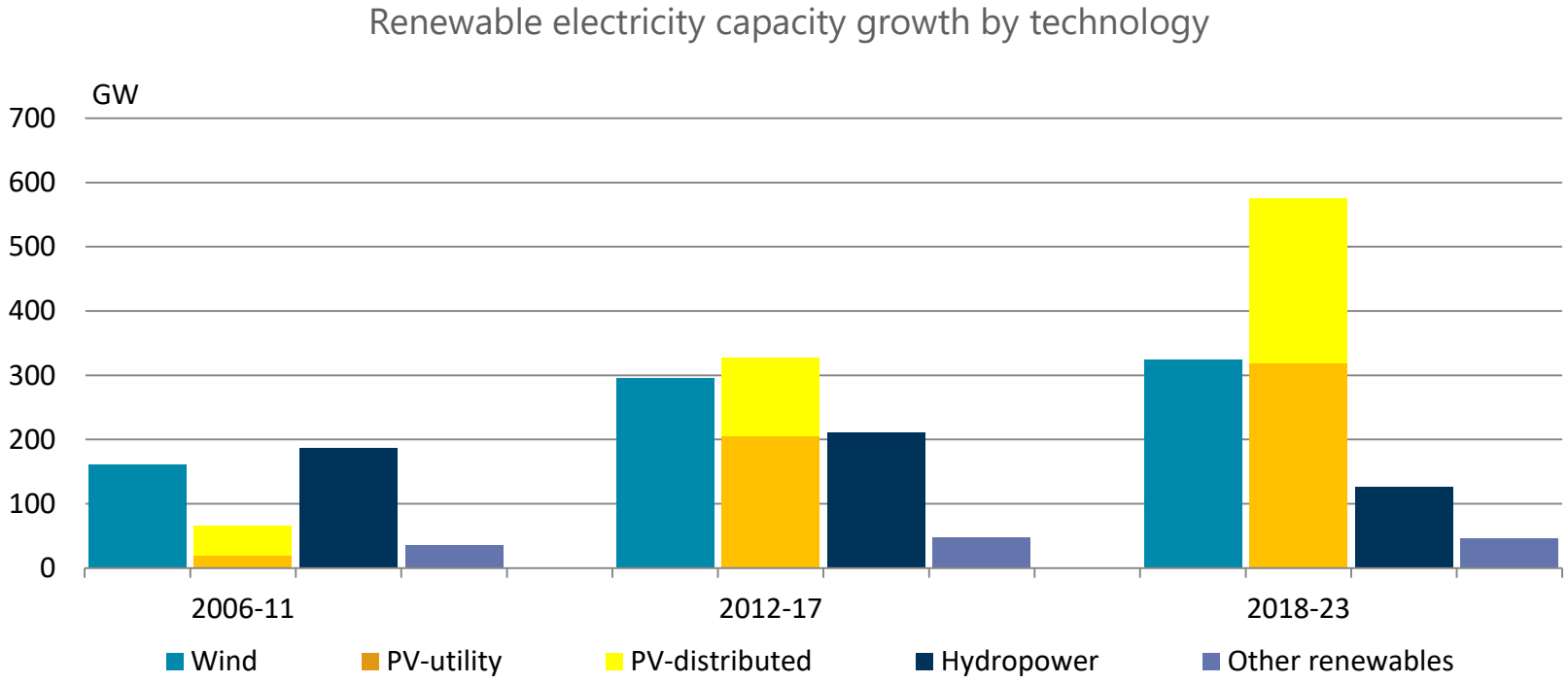
China accounts for the largest absolute growth over the forecast period surpassing the EU, while renewable energy consumption in India increases by 50%

Renewables account for 70% of global capacity expansion



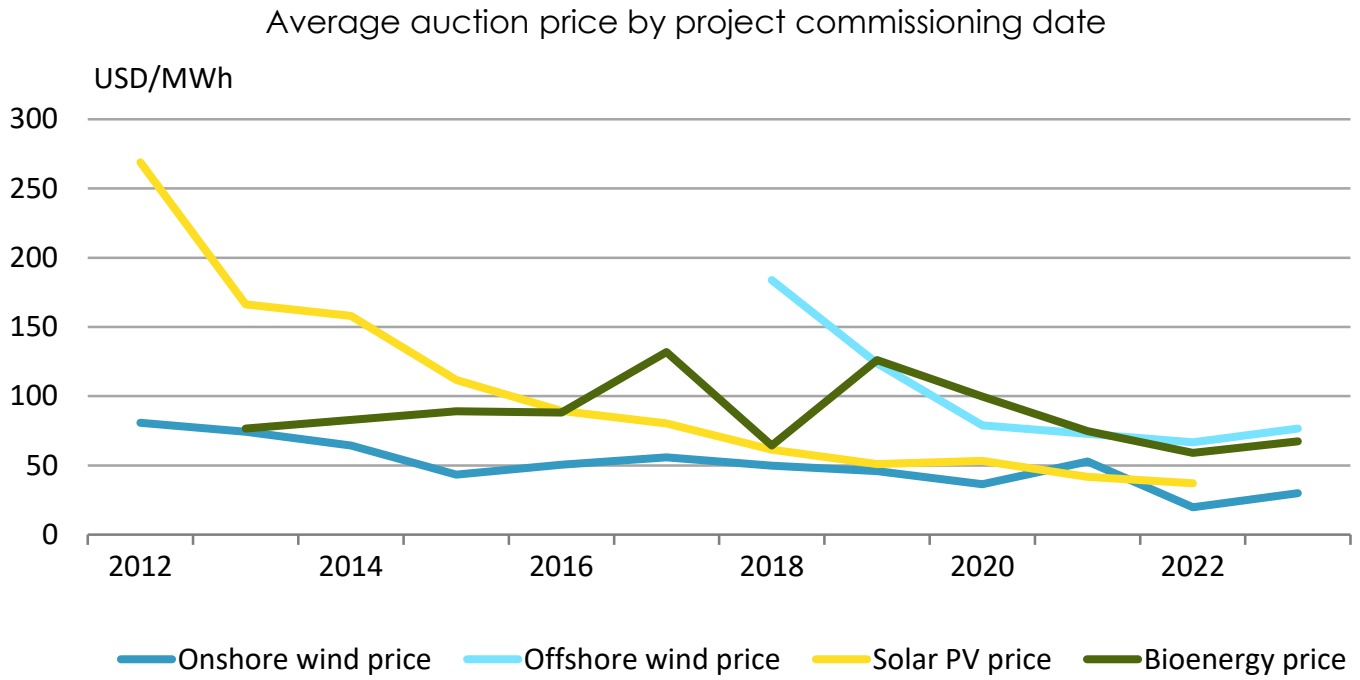
Europe's forecast revised up due to new auction announcements and new 2030 targets; US growth revised down due to tax reform and trade tariffs; India's expansion stable

Solar PV expansion in electricity larger than all renewables combined



China remains the absolute solar PV leader by far, holding almost 40% of global installed PV capacity in 2023. The US remains the second-largest growth market for solar PV, followed by India, whose capacity quadruples

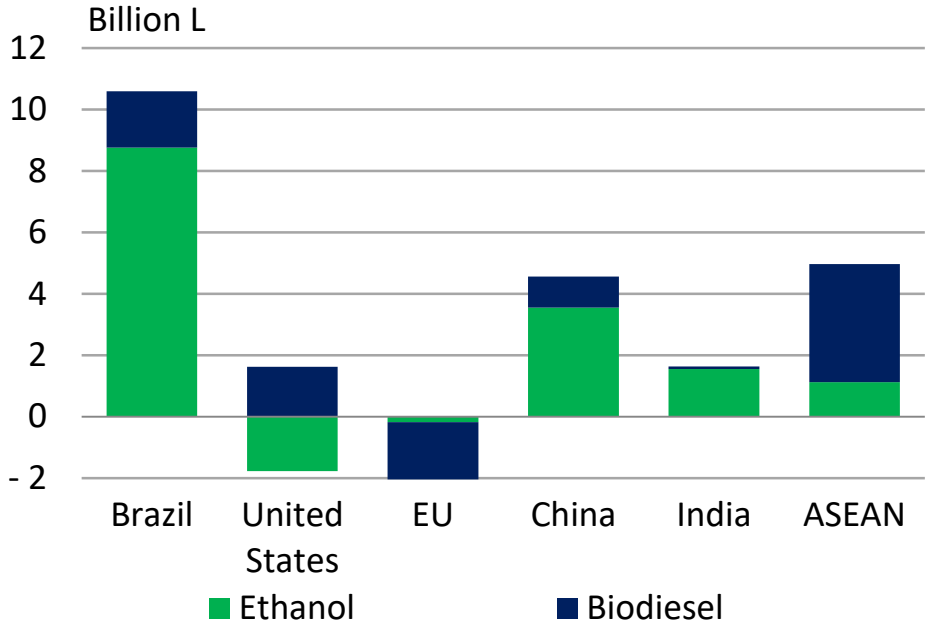
Competition accelerating cost reductions



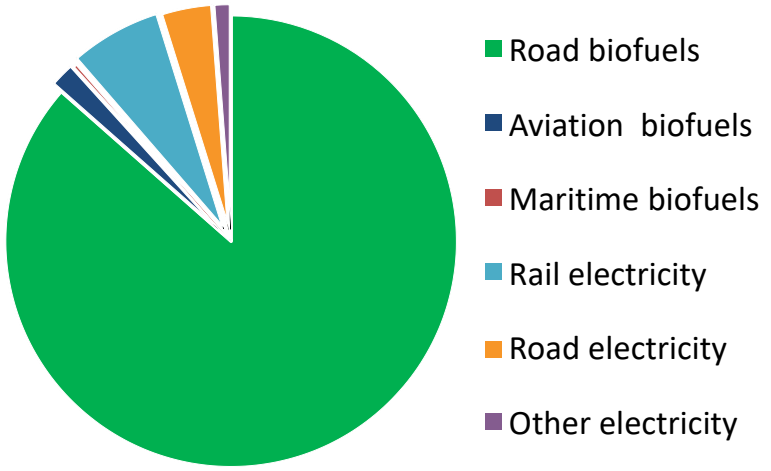
More than the half of renewable capacity additions over 2018-23 remunerated by competitive auctions; announced contract prices need to be verified as project delivery schedules and final costs may differ

Asia and Latin America dominate transport biofuel production growth

Biofuel production growth 2018-23



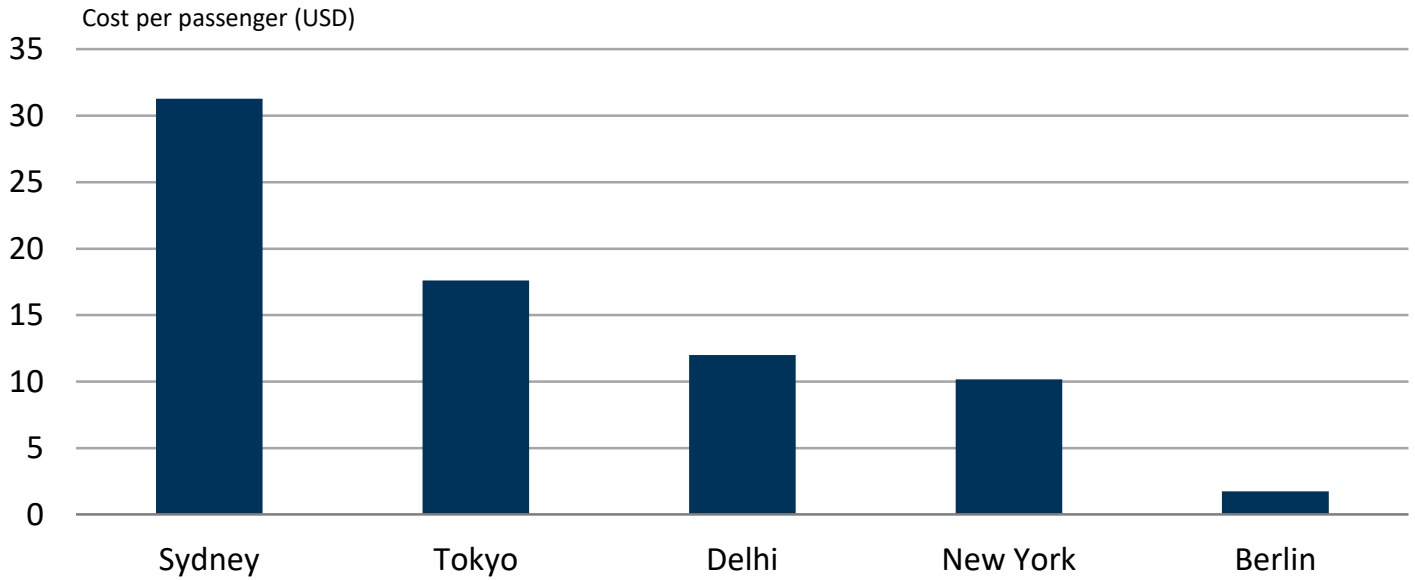
Renewables consumption in transport in 2023



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

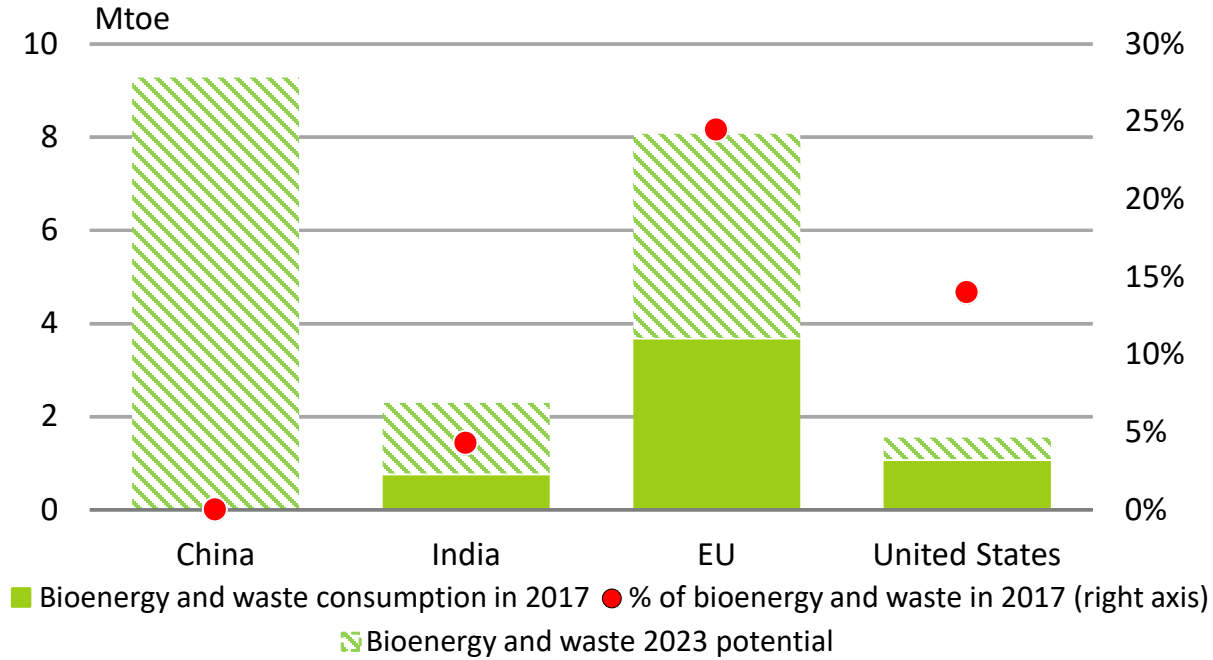
Cost premium of commercial aviation biofuels (15% blend) per passenger from London



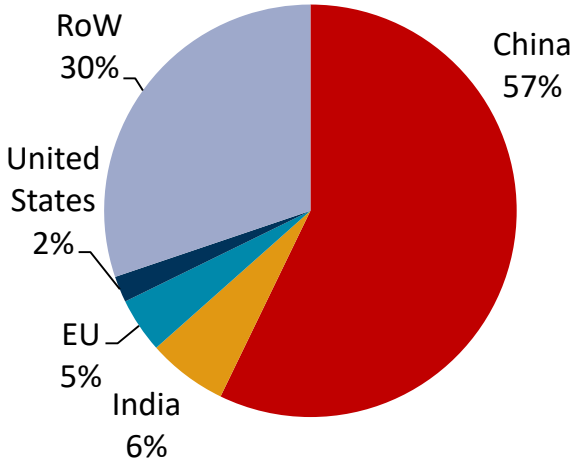
Policies remain key to bridge the cost gap between aviation biofuels and fossil jet fuels
The most efficient aircraft could reduce fuel costs by around 15%

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

Bioenergy and waste consumption in the cement industry by country

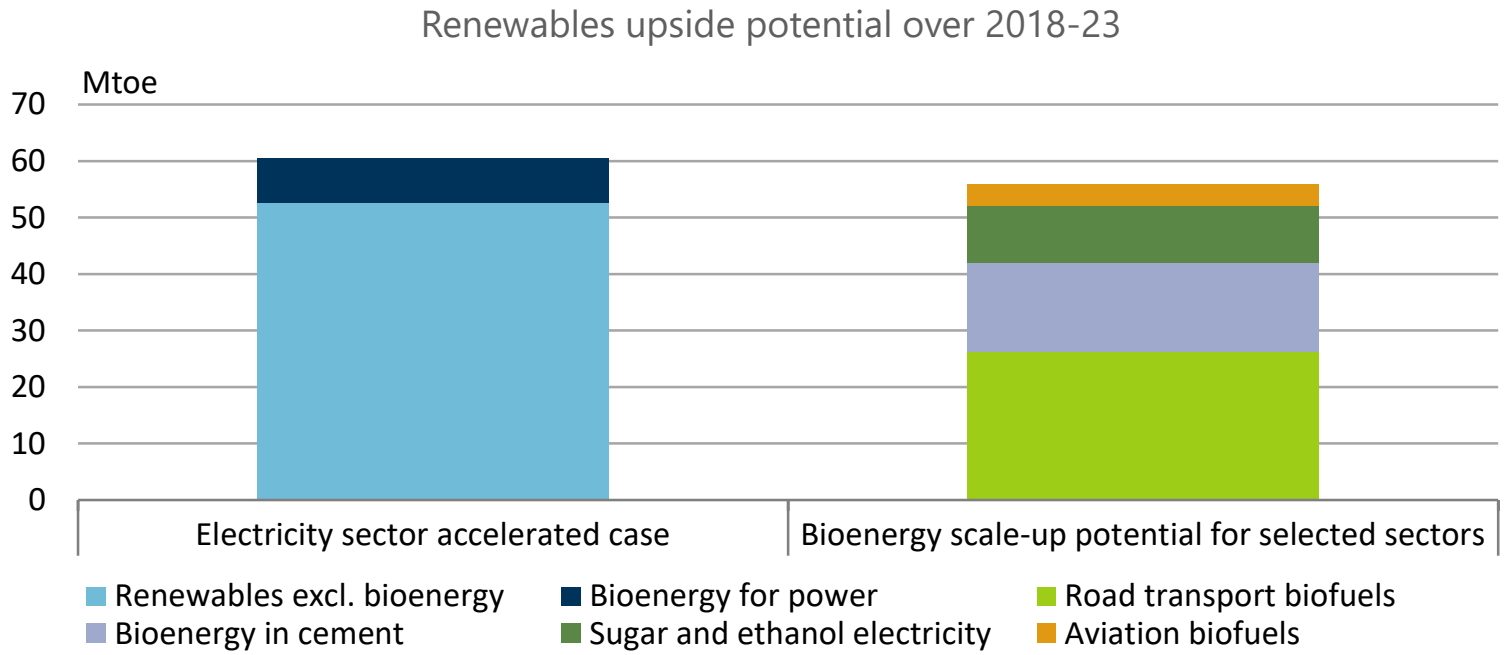


Cement production by country, 2017



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 and biofuels 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