



# Bioenergy

## The overlooked Giant of Renewables

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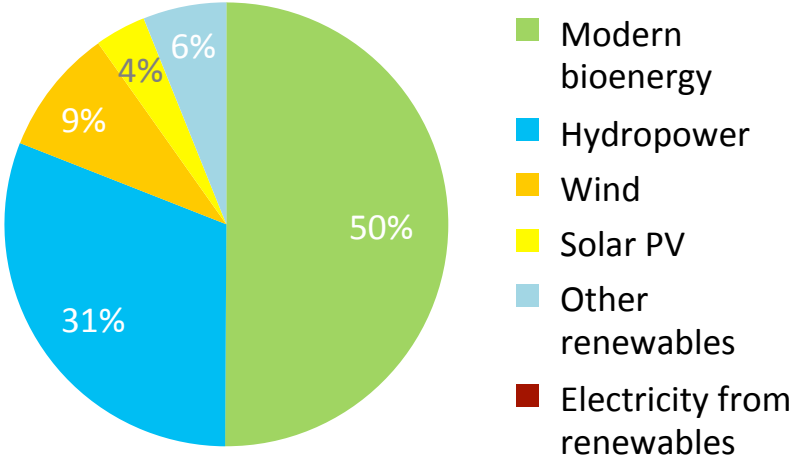
Dr. Paolo Frankl, Head Renewable Energy Division

ABLC, San Francisco, 7 November 2018

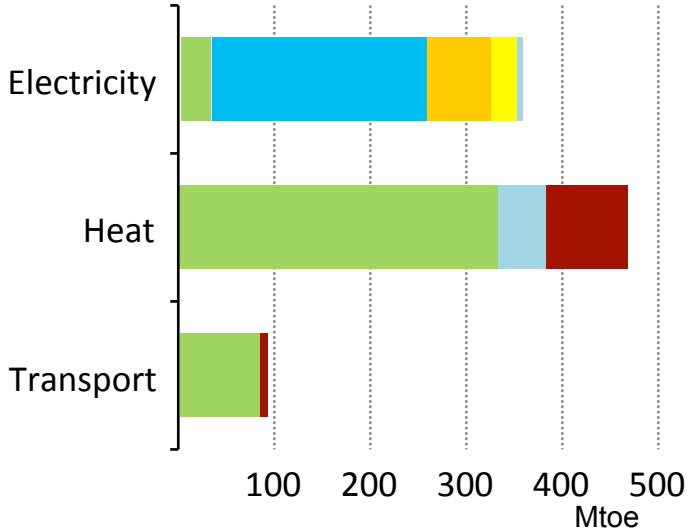


# Modern bioenergy: the overlooked giant of renewables

Total final energy consumption from renewables, 2017

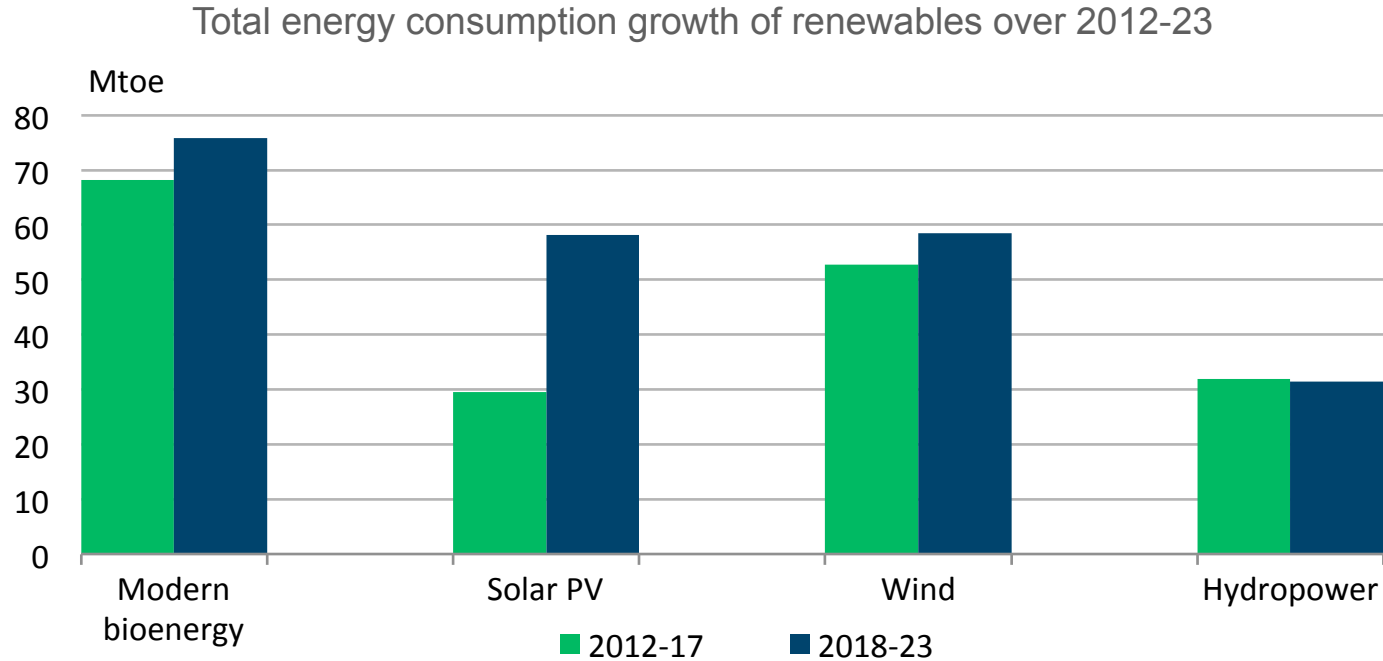


Total final energy consumption from renewables by sector, 2017



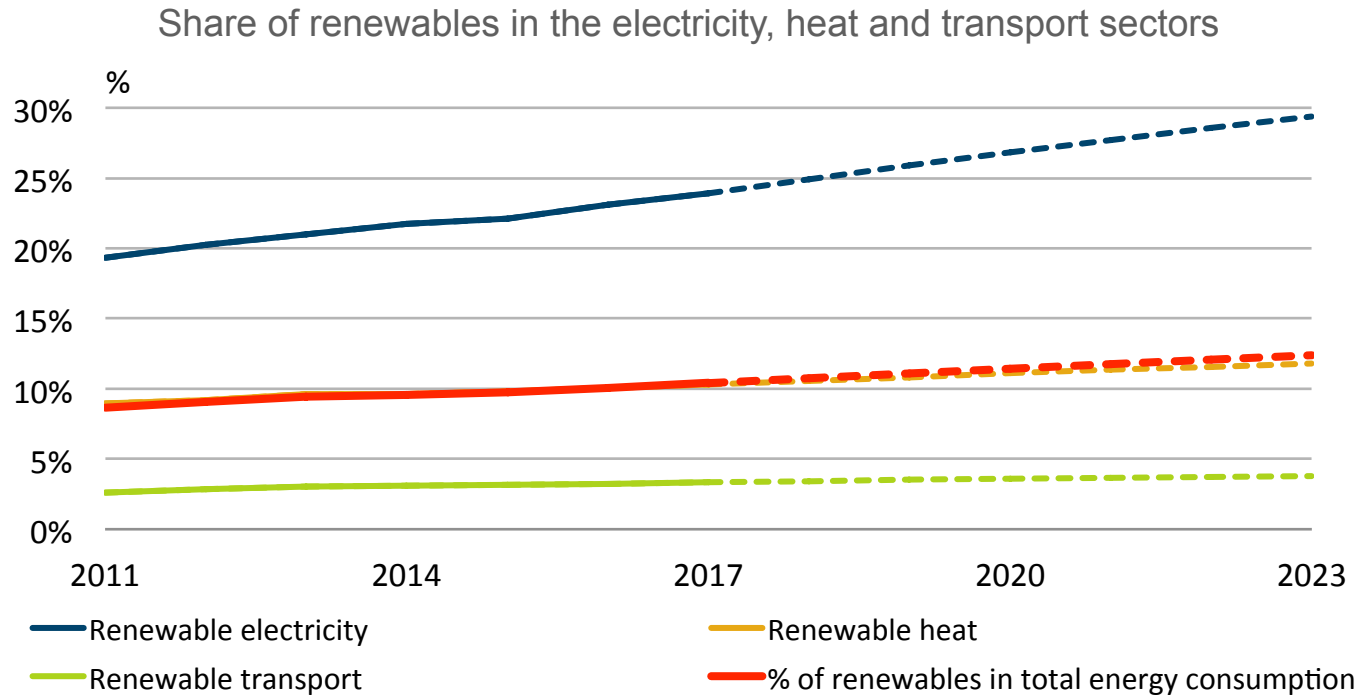
**Modern bioenergy is the only renewable source that can provide electricity, direct heat and transport fuels Two thirds of modern bioenergy heat is used in industry**

# Modern bioenergy set to lead renewables growth



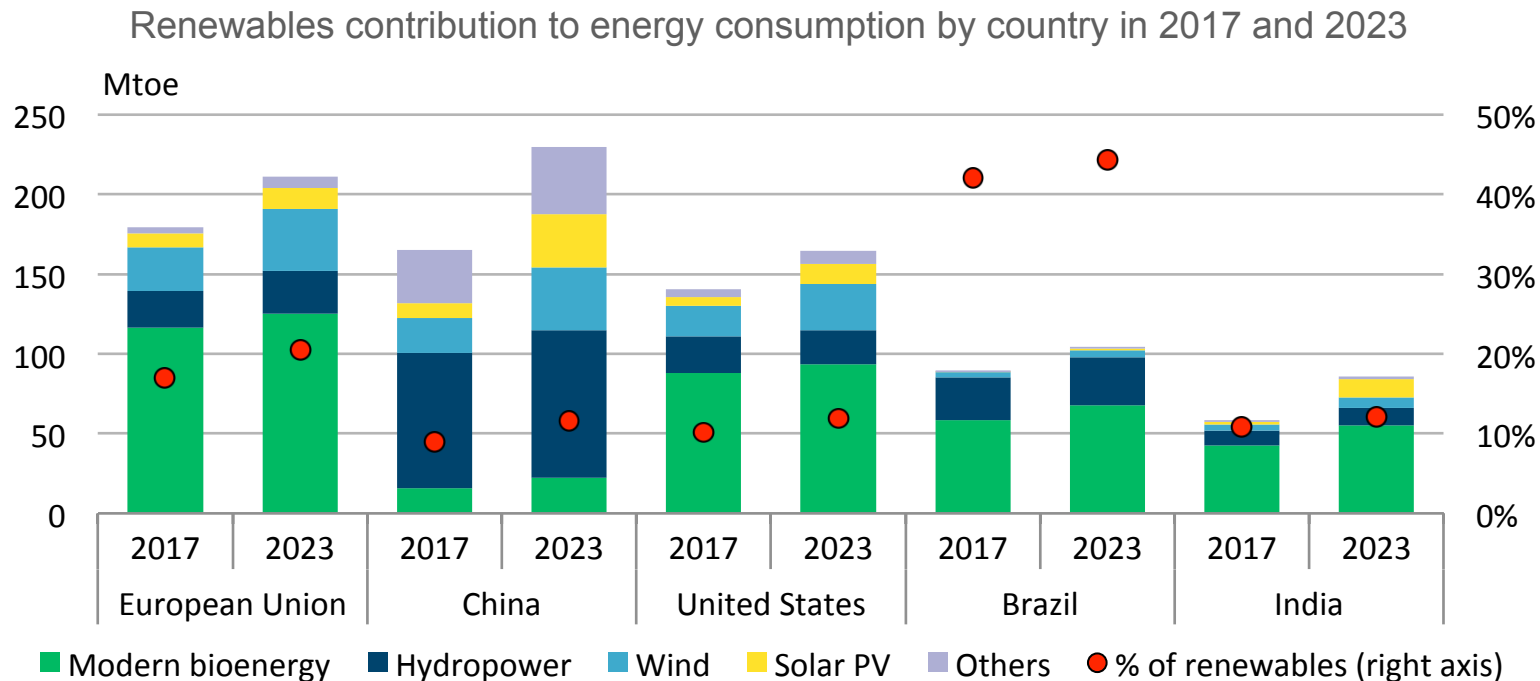
**Total renewable energy consumption is expected to increase by almost 30% over 2018-2023, covering 40% of global energy demand growth**

# 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**

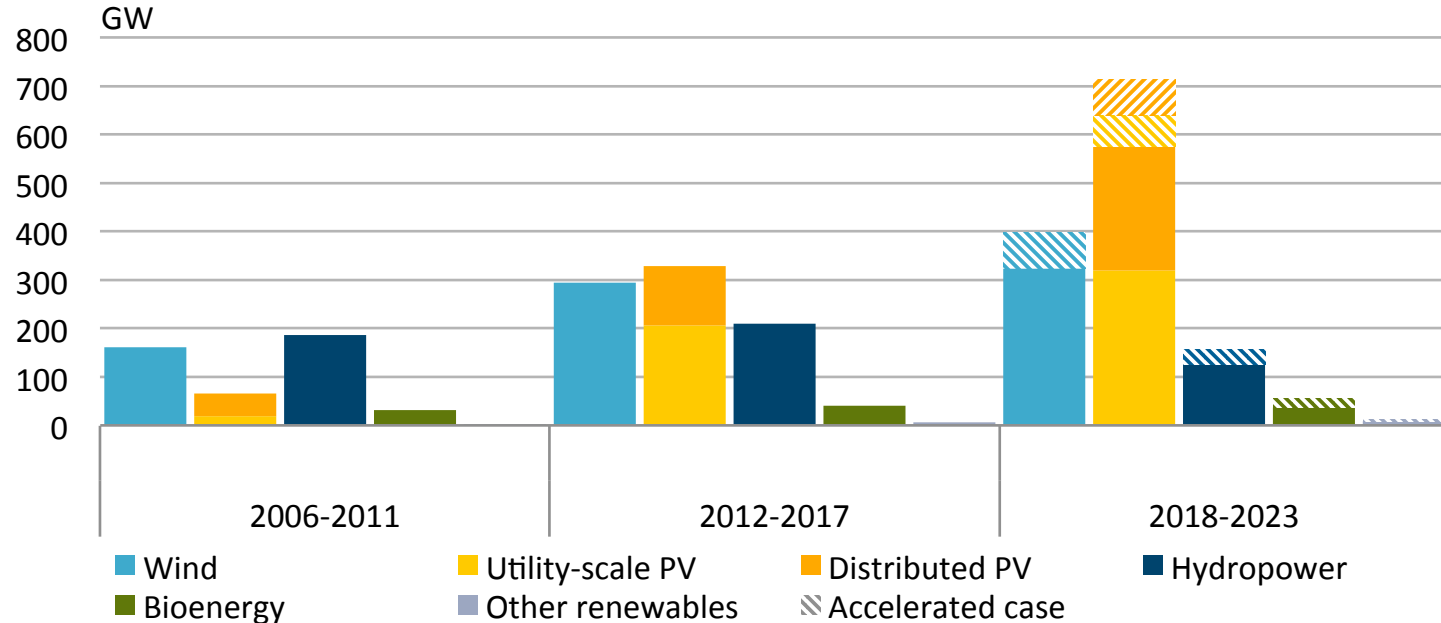
# China becomes the largest RE consumer, Brazil has the highest share



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

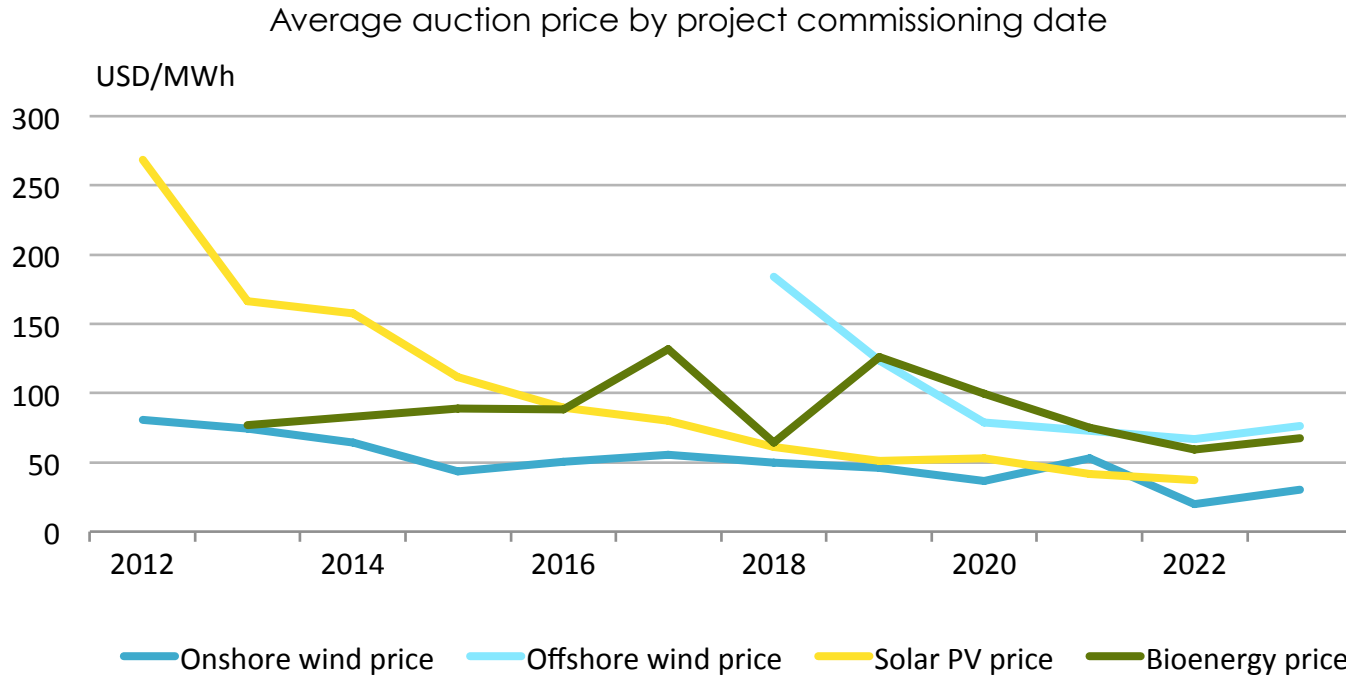
# Solar PV expansion in electricity larger than all renewables combined

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**

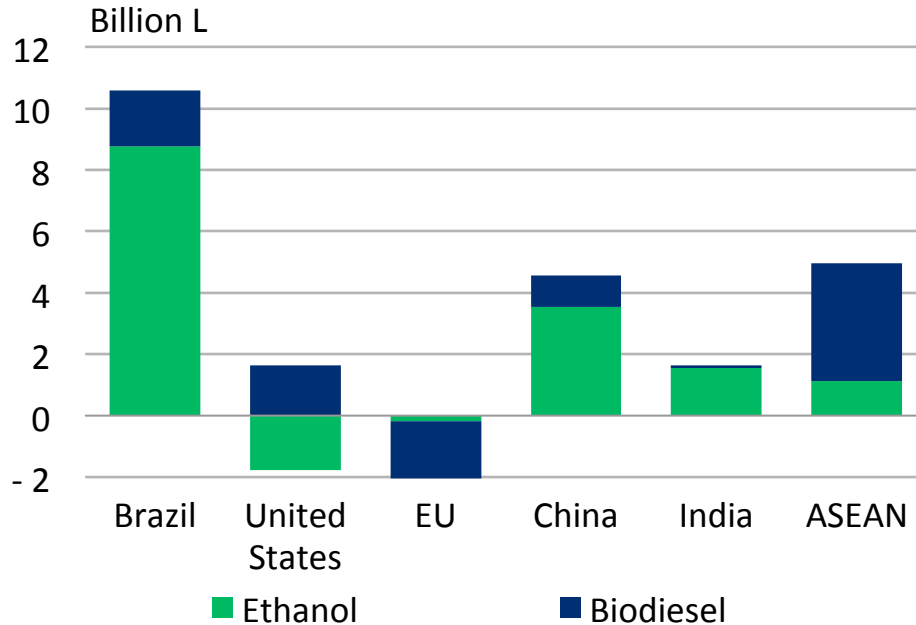
# Competition accelerating cost reductions



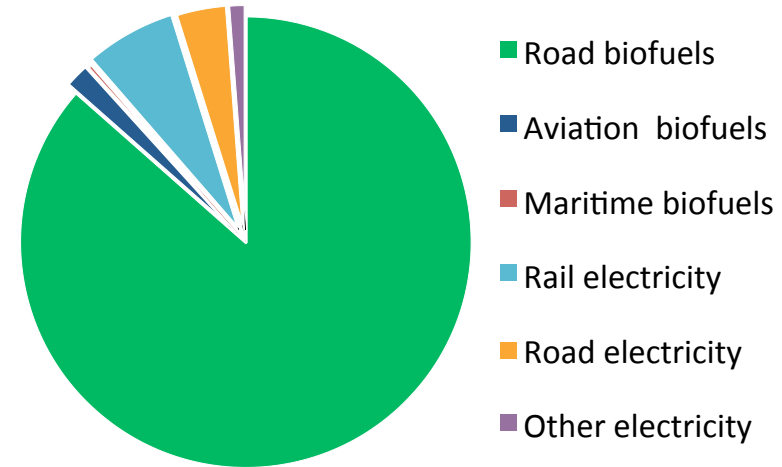
**More than the half of renewable capacity additions over 2018-23 remunerated by competitive auctions; announced contract prices need to be verified as project delivery schedules and final costs may differ**

# Asia and Latin America dominate transport biofuel production growth

## Biofuel production growth 2018-23



## Renewables consumption in transport in 2023

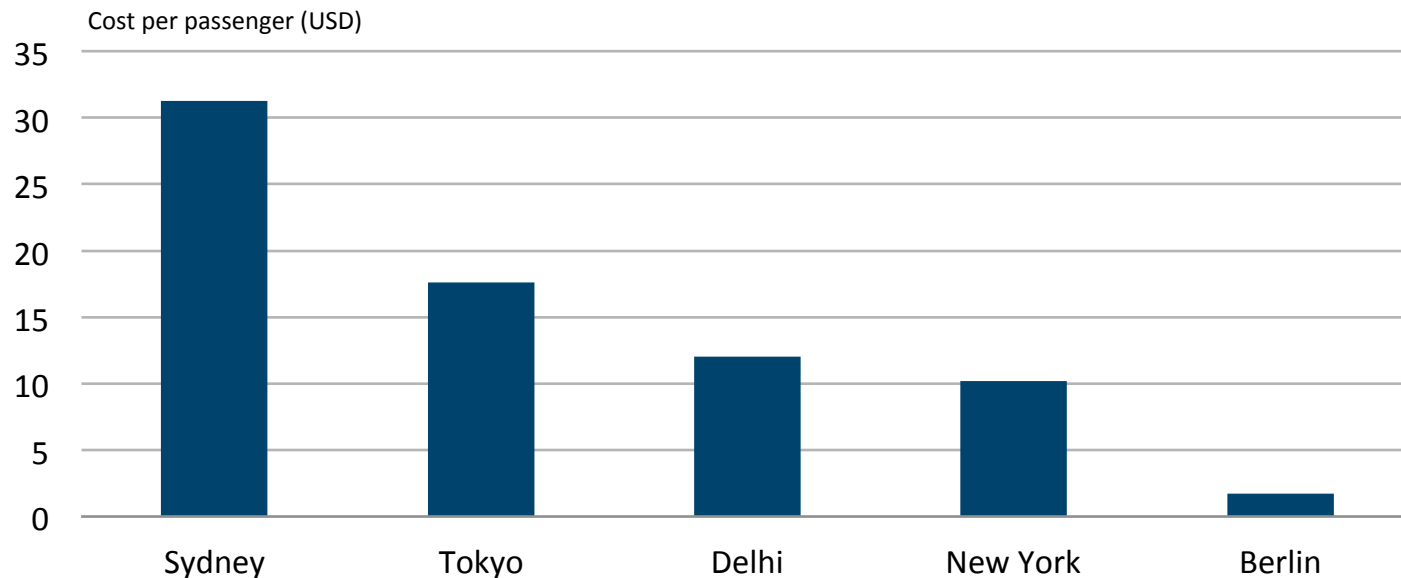


**Biofuels production grows by 16%; EVs electricity consumption triples, with renewables providing 30% of demand from electrified transport by 2023**



# Biofuels open new avenues for more sustainable aviation

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

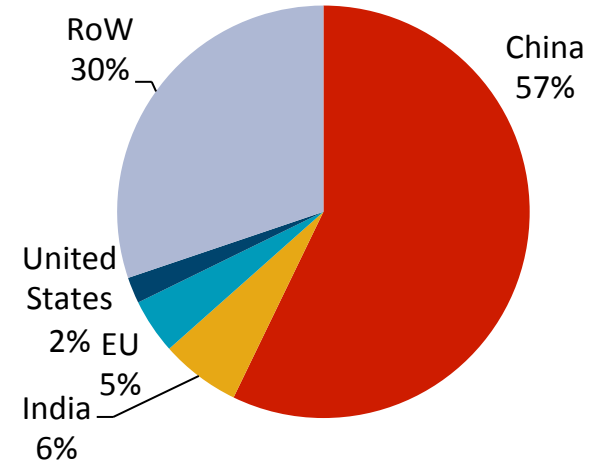
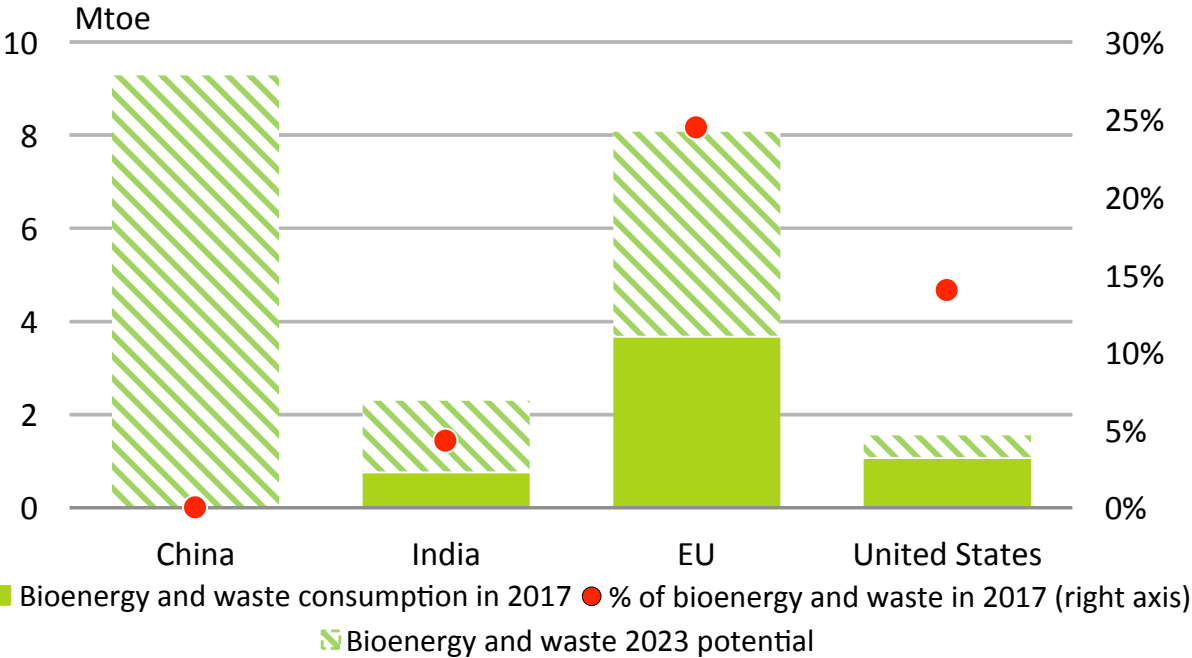


**Policies remain key to bridge the cost gap between aviation biofuels and fossil jet fuels**  
**The most efficient aircraft could reduce fuel costs by around 15%**

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

Bioenergy and waste consumption in the cement industry by country

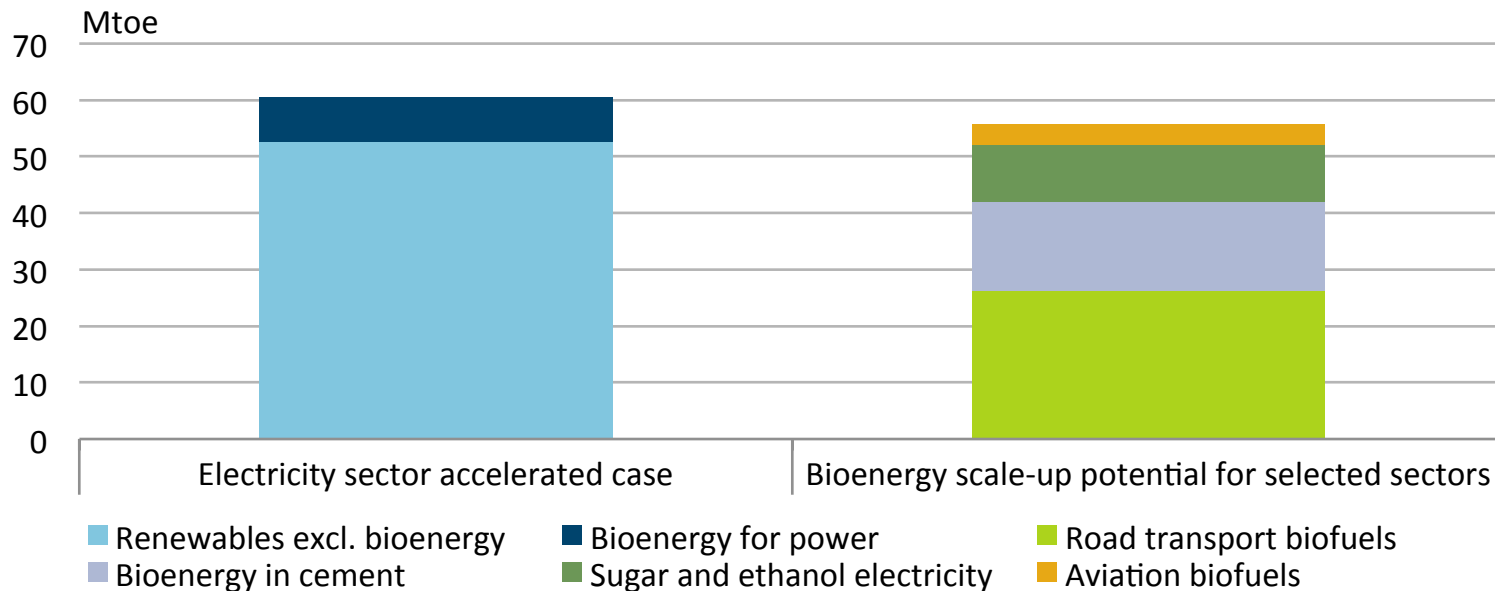
Cement production by country, 2017



**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

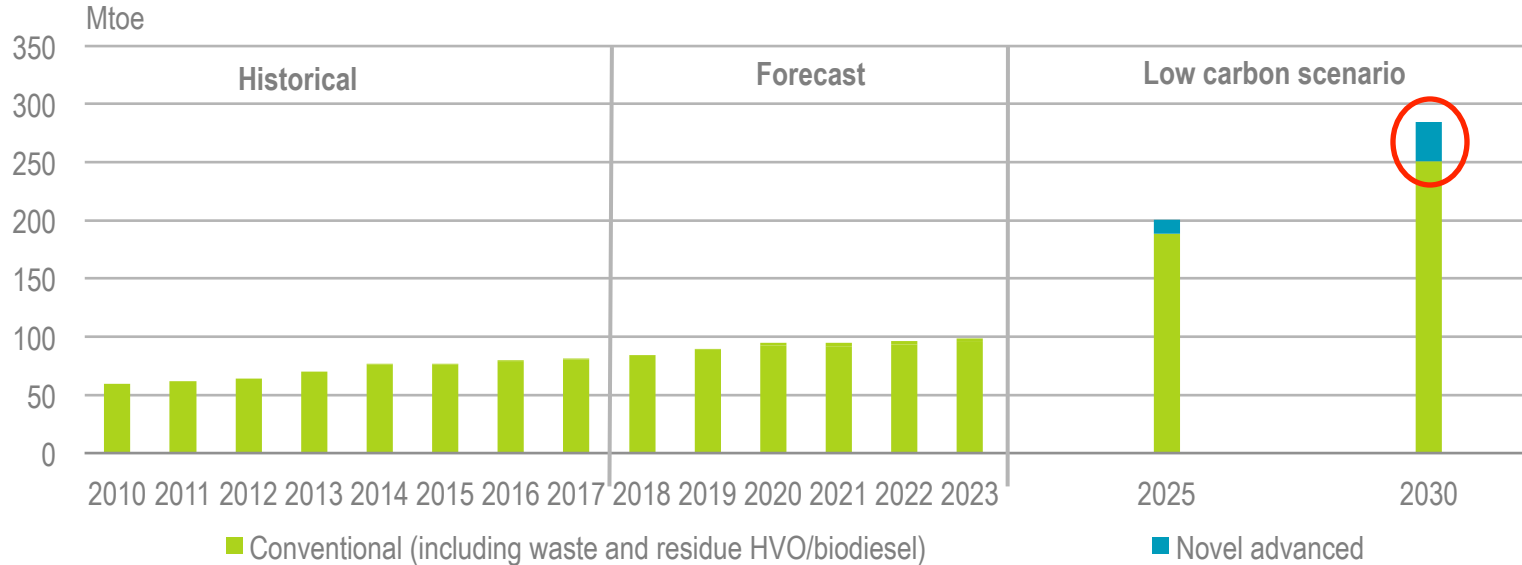
Renewables upside potential over 2018-23



**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**

# Accelerated deployment of sustainable biofuels is required

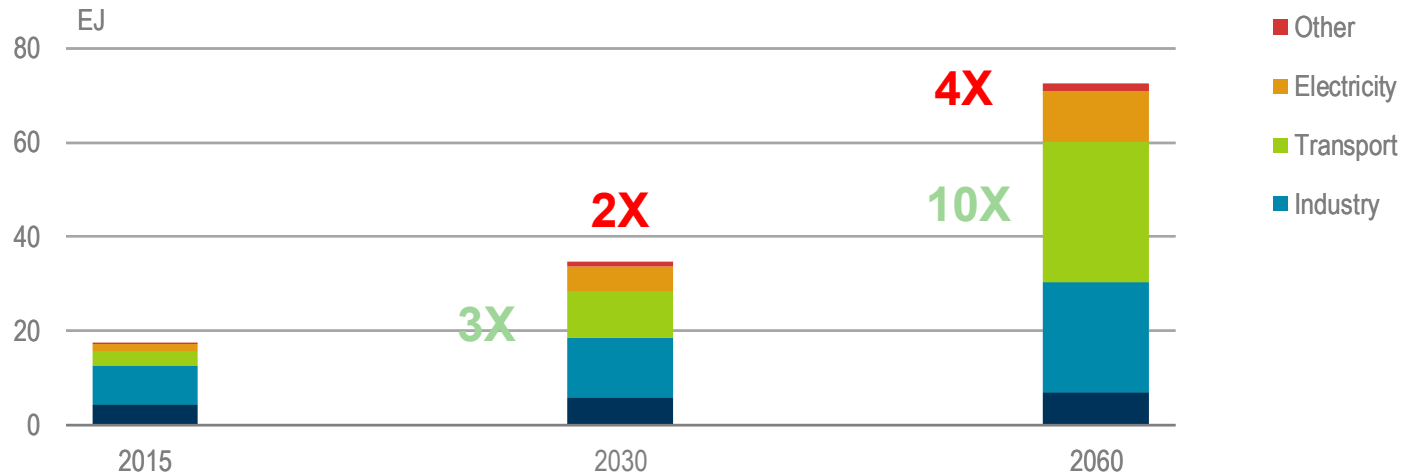
Historical and forecast transport biofuel production compared to volumes within the IEA's low carbon scenario



**Current market growth of sustainable biofuels falls short of the volumes required to keep on track with the COP 21 global climate agreement.**

# Strong acceleration needed between now and 2030

## Modern bioenergy in final energy consumption in 2DS



**Bioenergy in final energy consumption needs to double by 2030, and biofuels in transport treble. Advanced biofuels will need a massive scale up**

# 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