International Energy Agency

Renewables 2023

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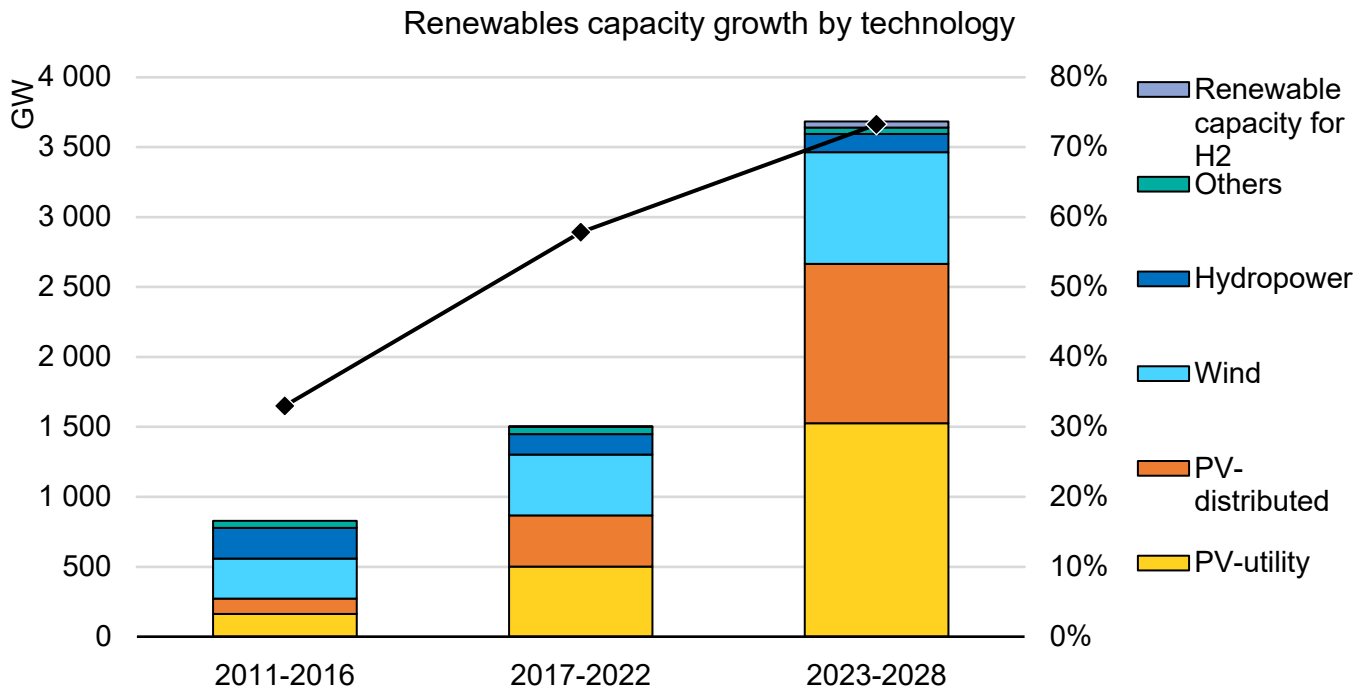
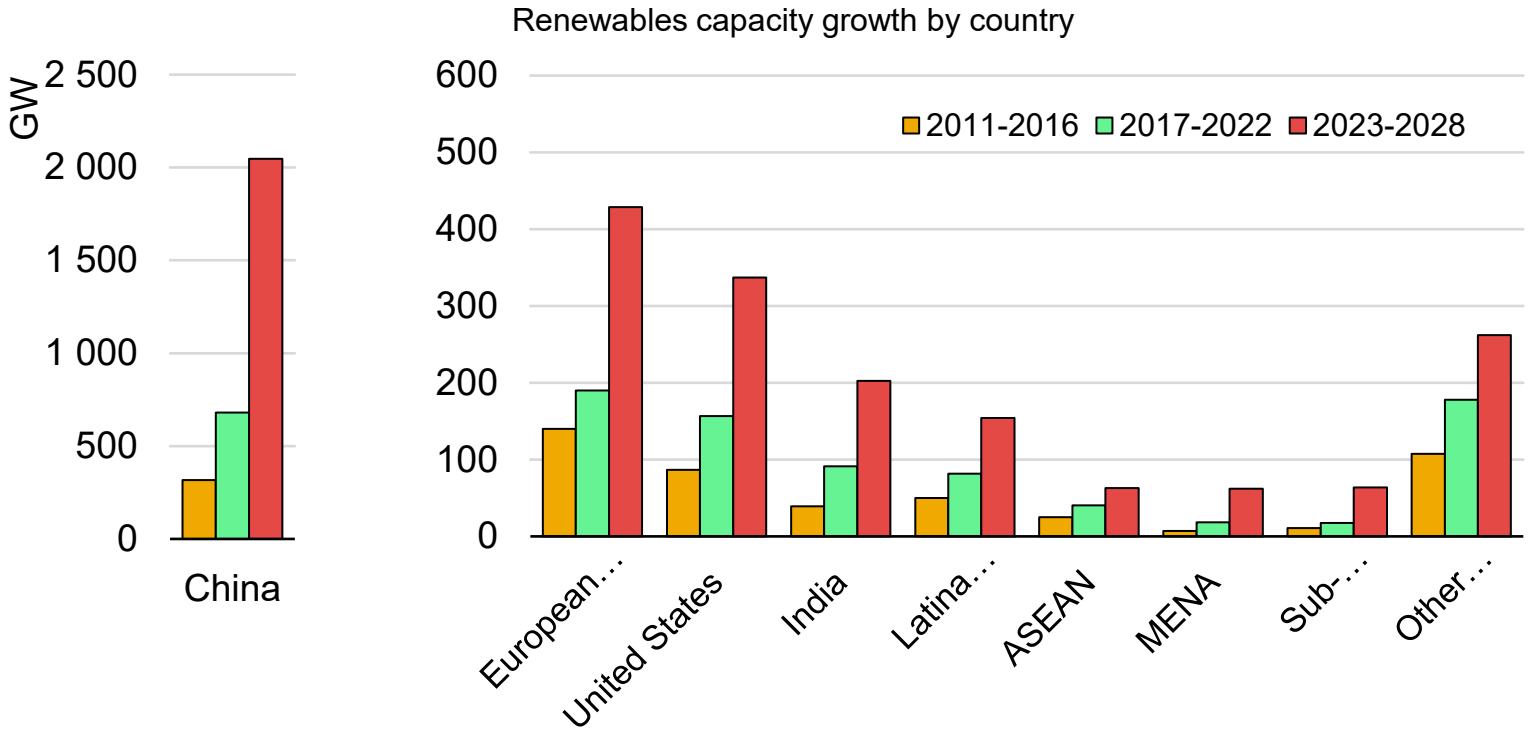
Unprecedented expansion of renewables driven by solar PV



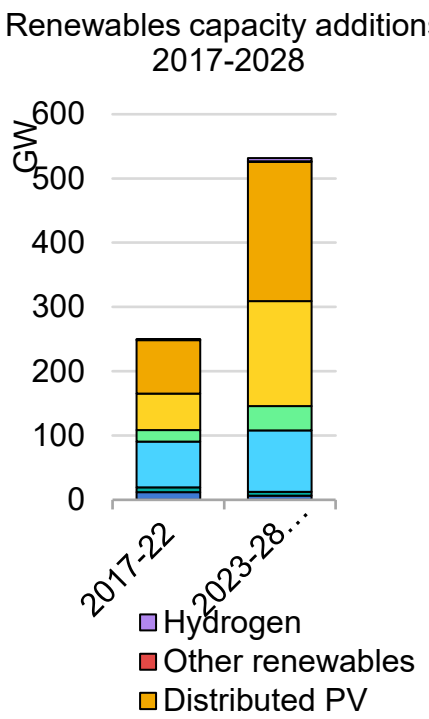
Declining prices and faster adaption of rooftop systems push PV forecast up. Wind forecast outside of China is less optimistic due to higher costs and slow permitting.

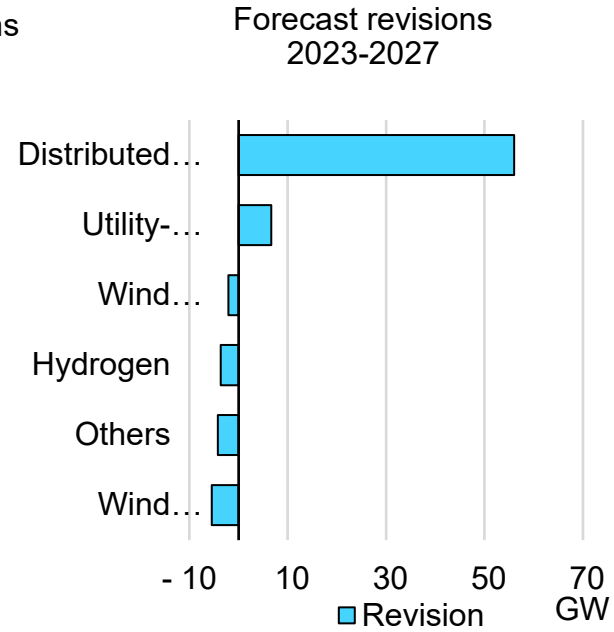
Policies accelerate renewable deployment everywhere

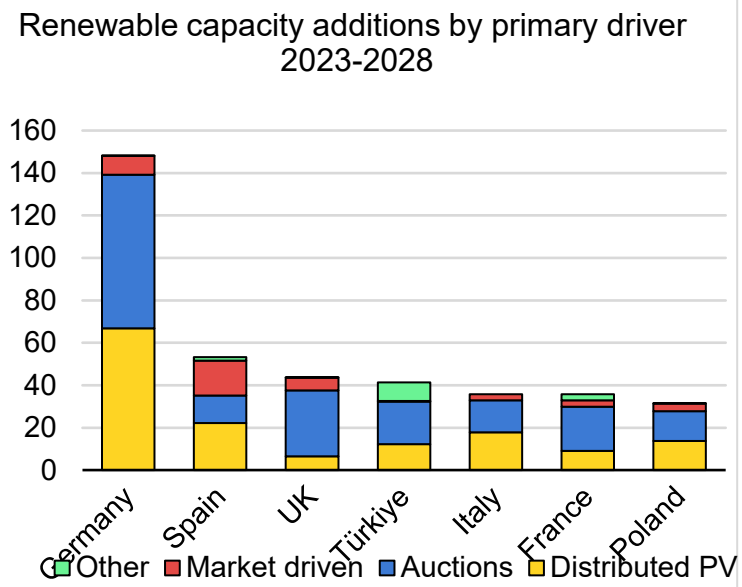


China, EU, US and India account for almost 85% of global expansion but renewables expansion rapidly catches up also in other parts of the world. For instance, growth in MENA and Sub-Saharan Africa matching ASEAN.

Europe’s pace of growth doubles thanks to solar PV



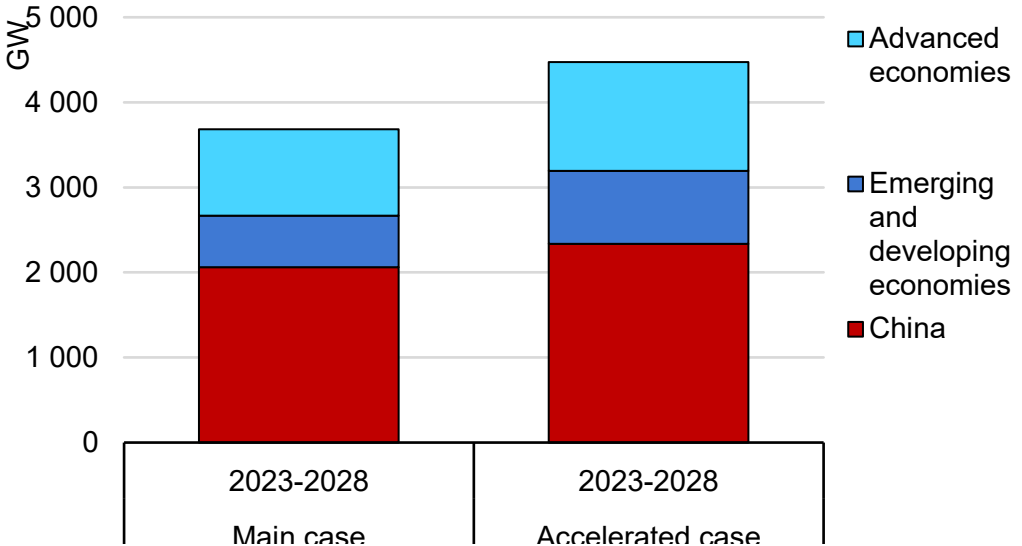




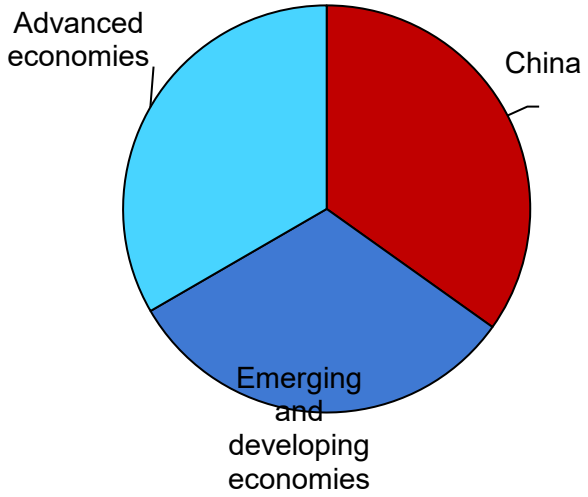
Europe’s forecast is revised up by 12% mostly due to economic attractiveness of distributed solar PV. Policies are still a major for utility-scale growth, however unsubsidised business models do play a larger role in some markets.

Improved policies can push renewables to be on track with the tripling pledge

Renewable capacity growth, main and accelerated cases

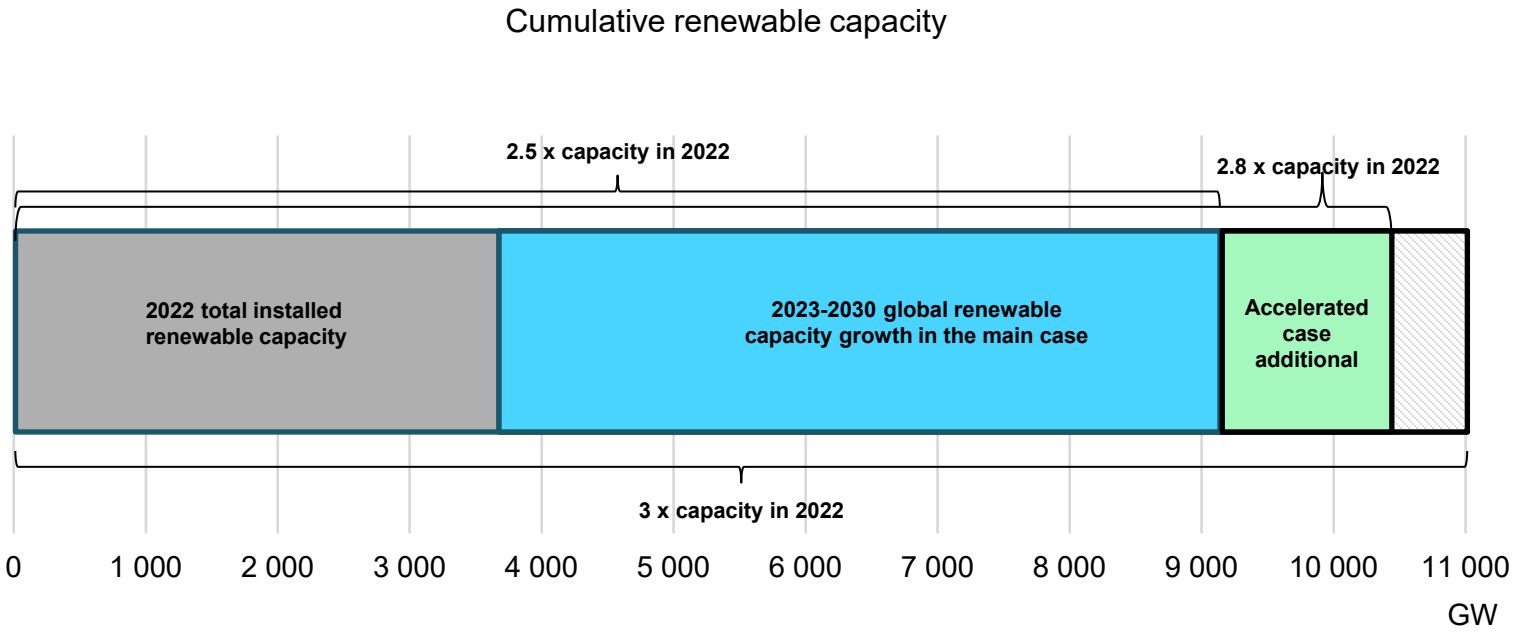


Main & accelerated case difference



Grid integration & faster permitting dictates renewables upside in advanced economies. EMDEs account for 15% of global expansion but 1/3 of the upside in the accelerated case. Policies de-risking investment and low-cost financing is key to unlock the full potential.

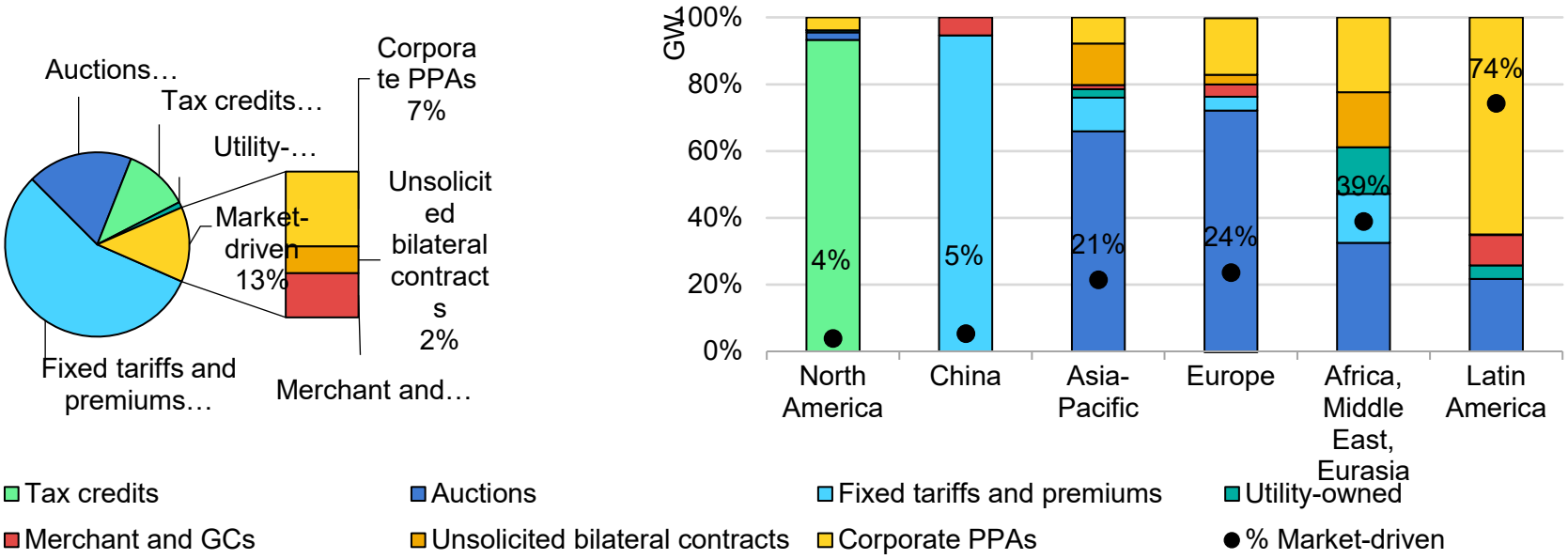
Tripling of RE capacity by 2030 is within reach but more effort is needed



Massive renewables capacity growth is led by steadily cheaper solar PV, while wind and hydropower's accelerated expansion is challenged by permitting, financing and social acceptance issues

Policy remains a major driver for renewable growth

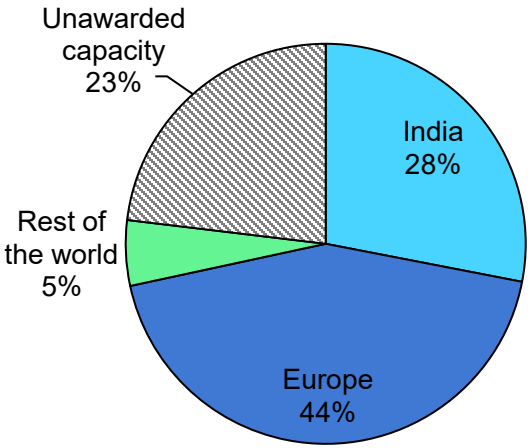
Utility-scale renewable electricity capacity by primary driver, 2023-2028



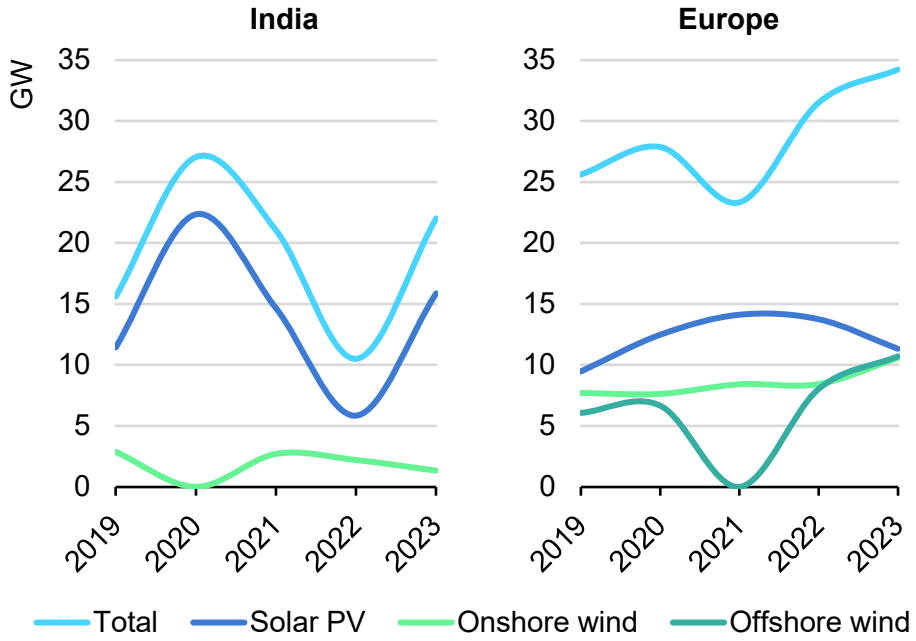
Over 85% of expansion will depend on government policies that substantially influence the final investment decision. Growth from market-driven business models only account for 13% but some regions will see it playing a larger role.

Higher auction volumes in Europe & India in 2023 maintains global volume of 2022

2023 auction results, global and regional



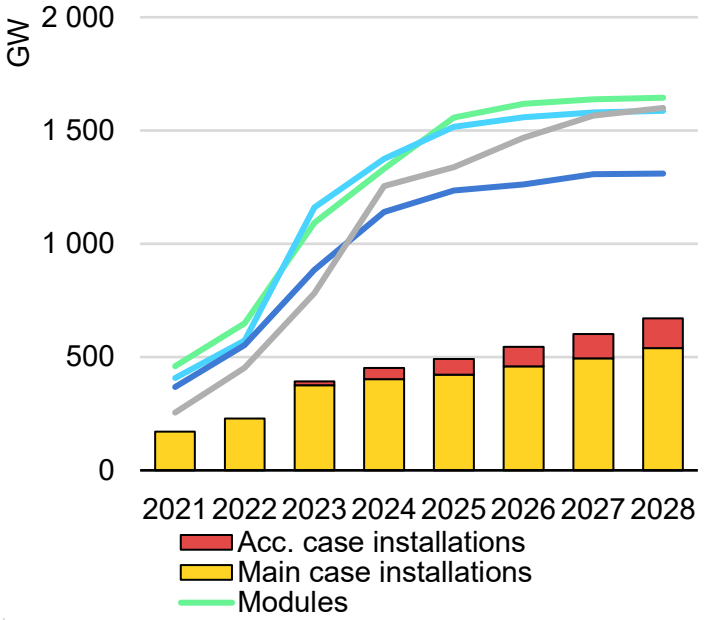
79 GW



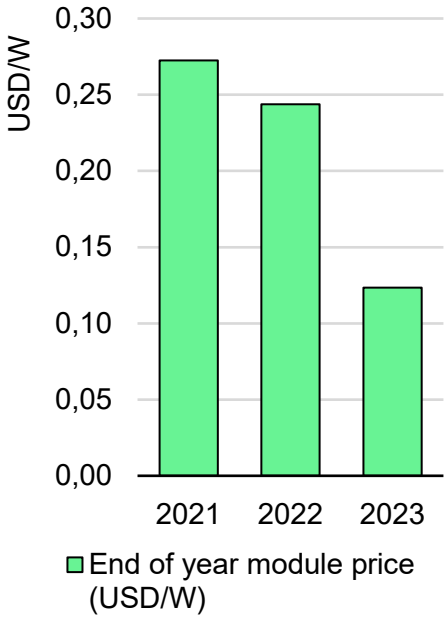
Europe and India awarded 11% more capacity in 2023 compared with last year. Solar PV in India and wind in Europe drove this trend.

China-led PV supply glut is driving module prices to record lows

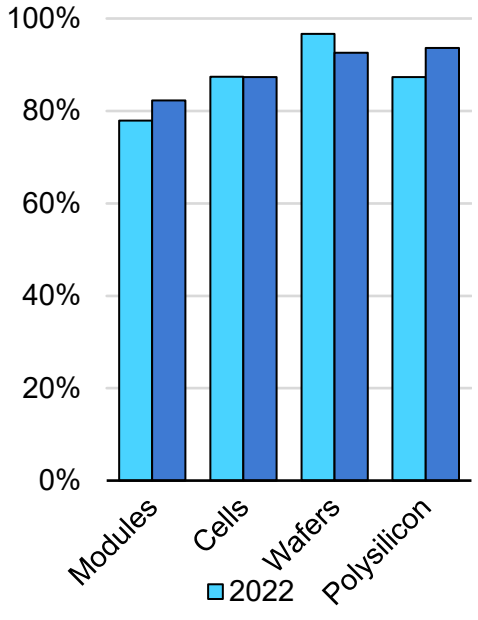
PV manufacturing capacity and installations, 2021-2028



PV module spot price, end of year, 2021-2023

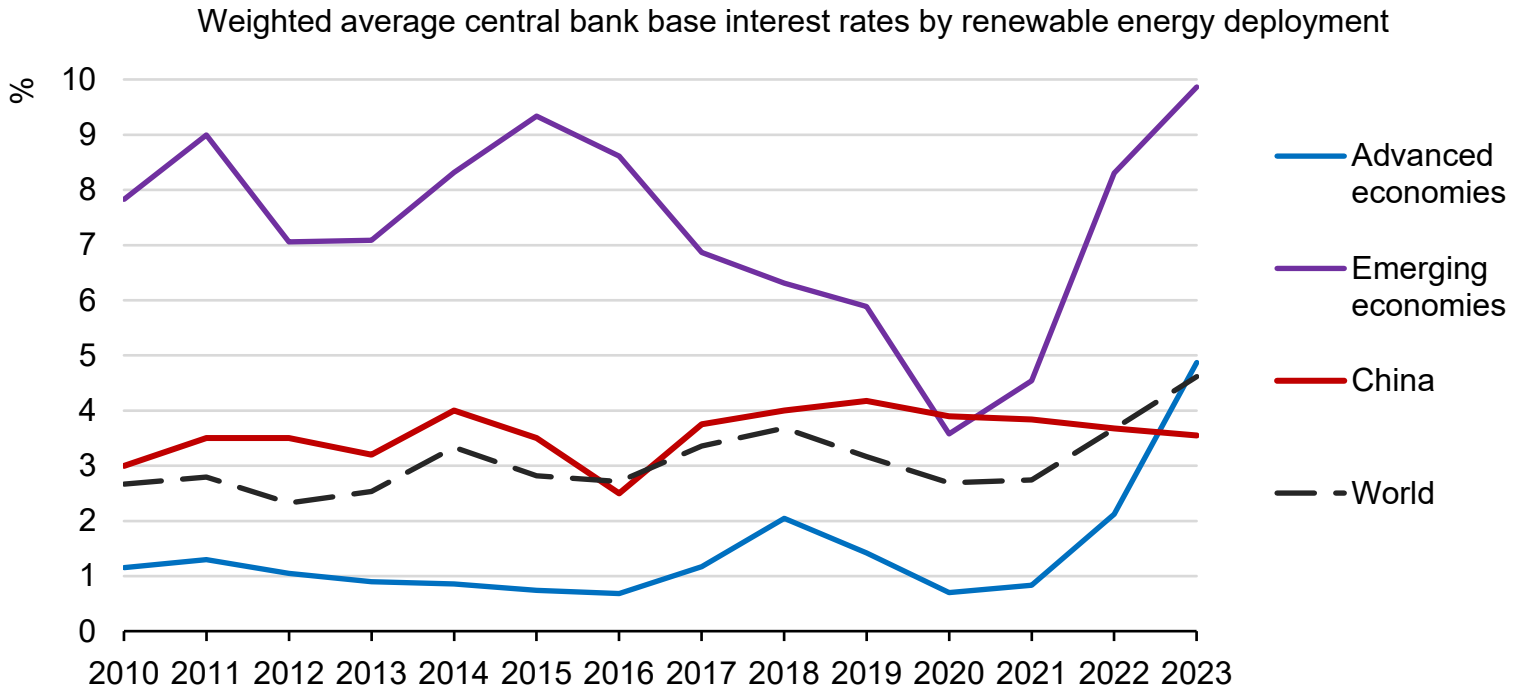


China's share in PV manufacturing capacity, 2022-2028



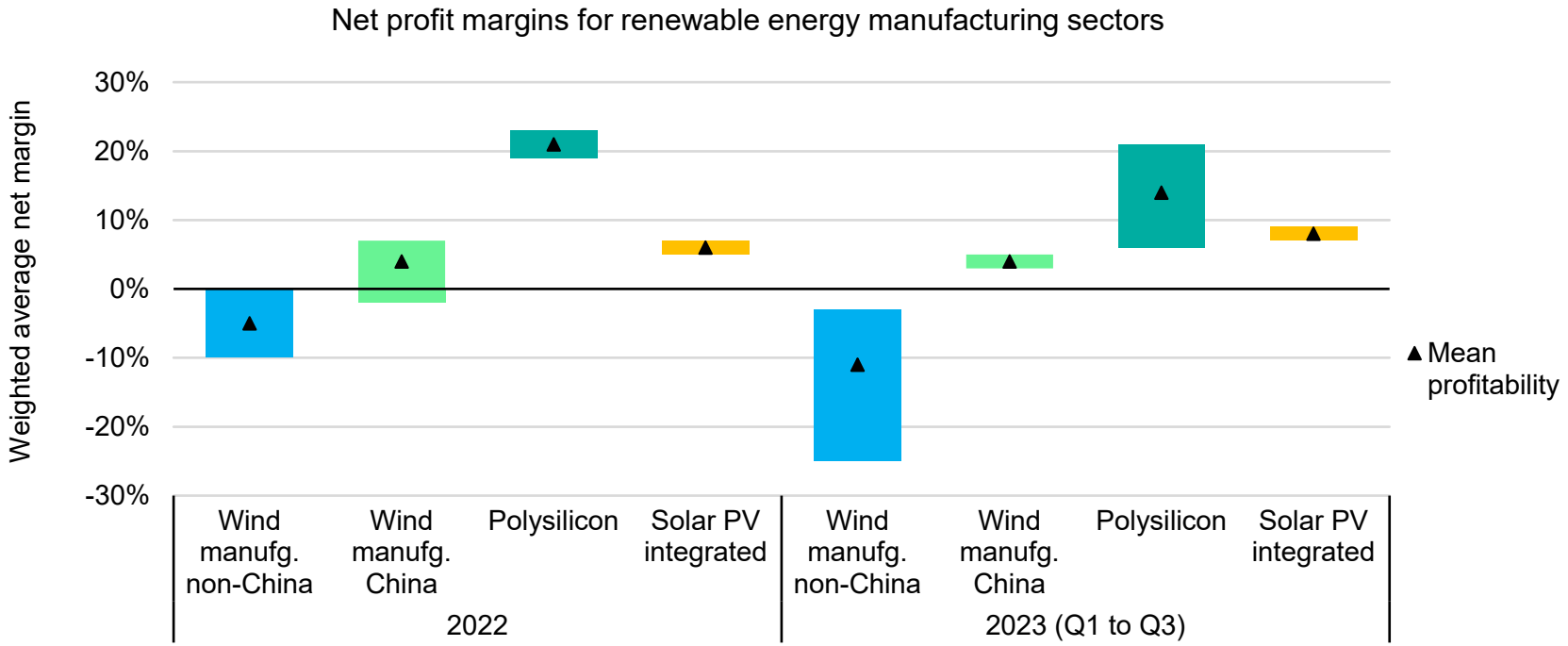
PV manufacturing capacity tripled between 2021 and 2023. It is forecast to reach 1300 GW until 2028, outstripping the demand. China is expected to keep its dominating position, despite manufacturing expansion in US and India.

New macroeconomic reality for renewables needs policy attention



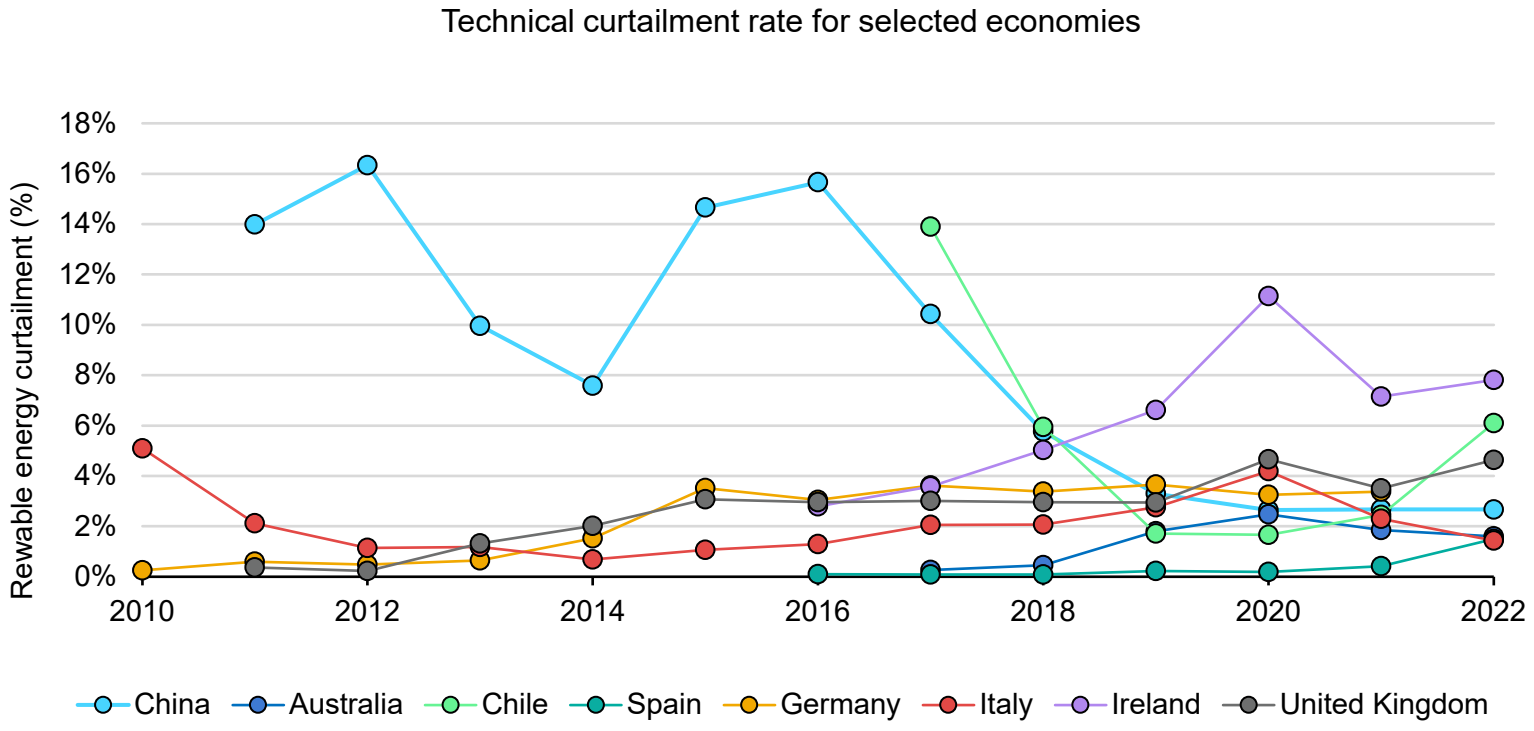
Renewables success came in an era of low interest rates in advanced economies. In 2023, wind and PV deployment in advanced economies faced higher interest rates then emerging economies for the first time.

…and financial health of the renewable industry



The wind manufacturing sector outside of China struggles for profitability due to a combination of ongoing supply chain disruption, higher costs and long permitting timelines, which require stronger policy attention

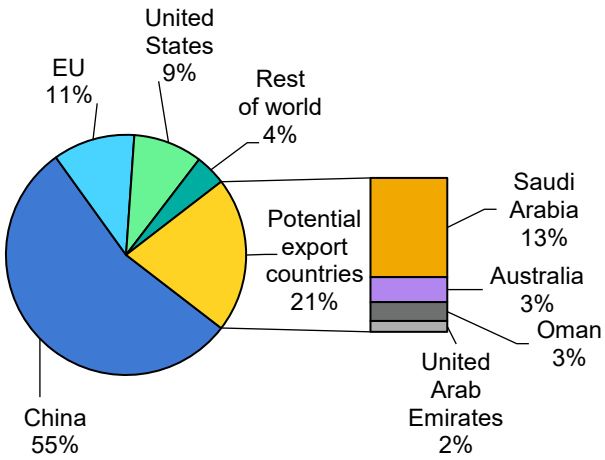
Wind and solar PV uptake faces curtailment challenges in some markets



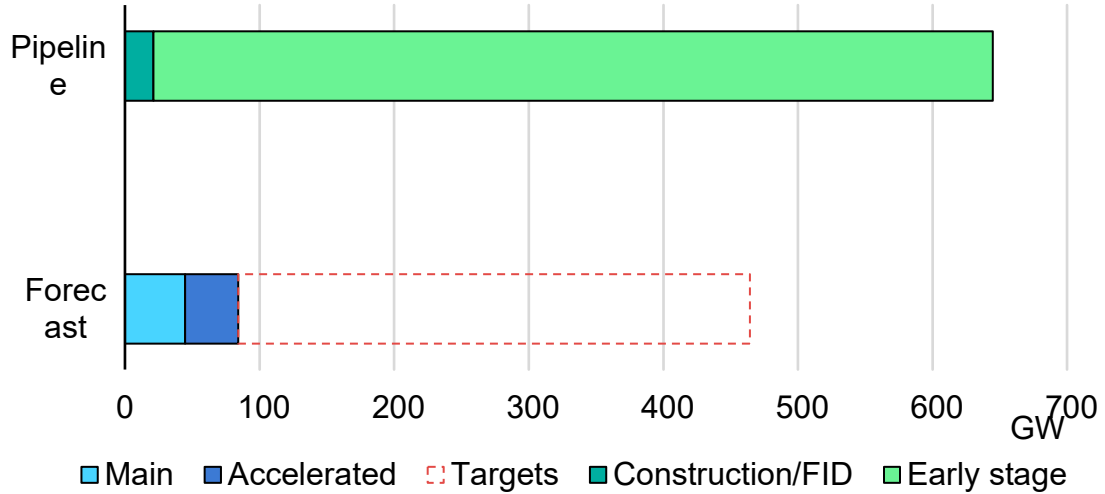
Strategic system planning is crucial for minimising curtailment: grid expansion, regional distribution, and system flexibility.

Renewable capacity for hydrogen: Reality does not match ambitions

Renewable capacity additions dedicated to hydrogen production 2023-2028

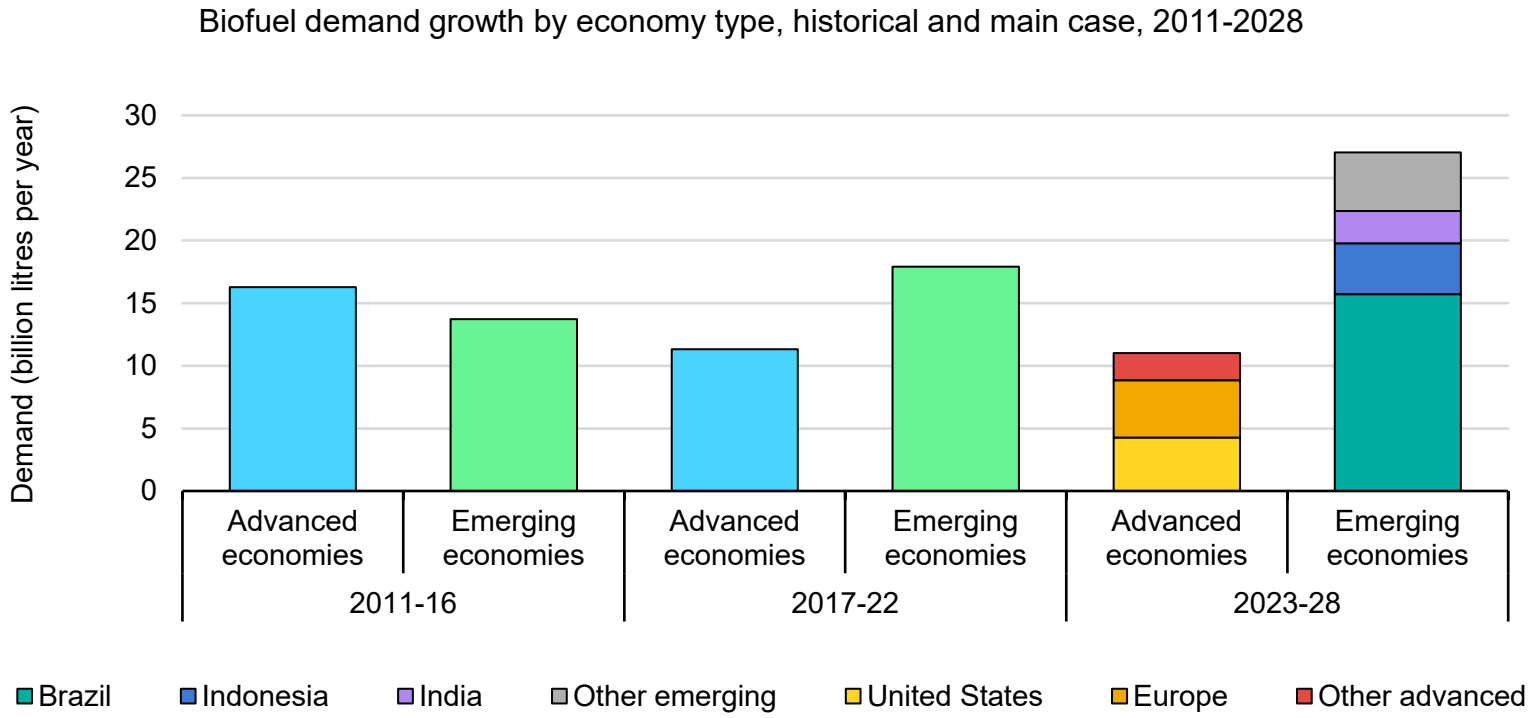


Renewable capacity additions dedicated to hydrogen: forecast vs. project pipeline and global 2030 targets



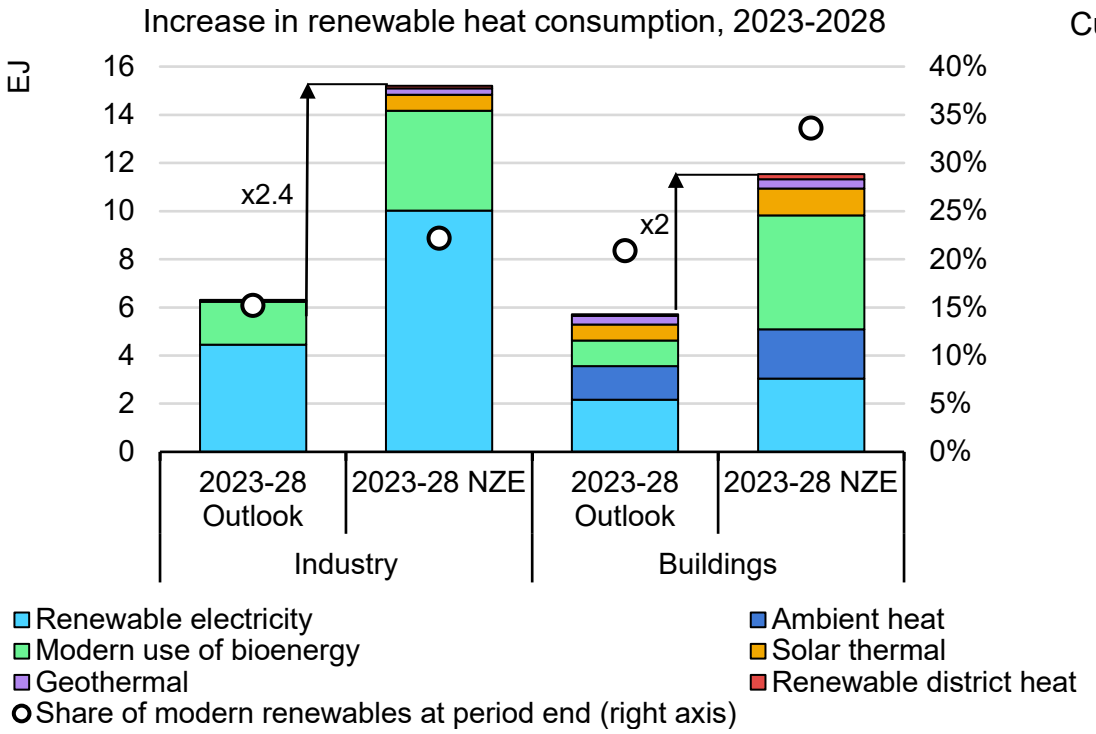
Renewable capacity dedicated to hydrogen grows by 45 GW; equal to bioenergy, CSP, and geothermal combined. But this is 10 times less than governments' announced 2030 targets and only 7% of the planned project pipeline.

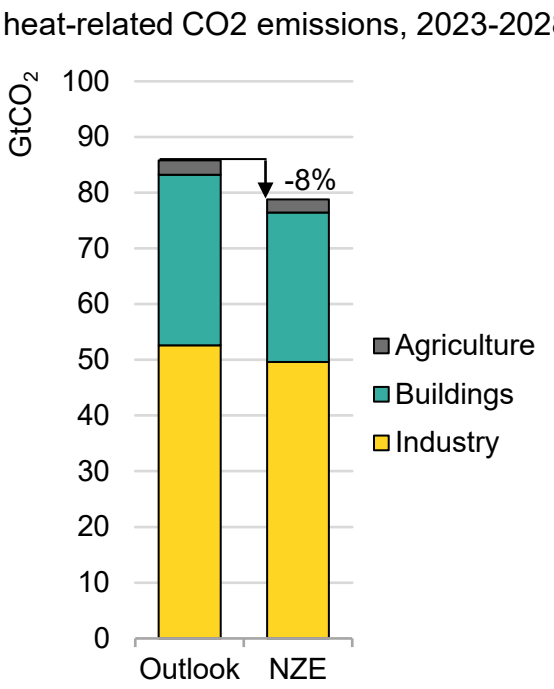
Biofuels demand is accelerating, led by emerging economies



Brazil and India account for near 50% of new biofuels growth supported by robust policies, growing fuel demand and abundant feedstocks. Electric vehicles and vehicle efficiency bring declining fuel demand in advanced economies.

Heat pumps and electricity for heating lead renewable heat growth





Without strong energy conservation measures to contain fossil fuel use, the heat sector alone in 2023-2028 could consume more than one-fifth of the remaining carbon budget for an even chance to limit global warming to 1.5°C.

https://www.iea.org/data-and-statistics/data-tools/renewable-energy-progress-tracker

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Renewable Energy Progress Tracker

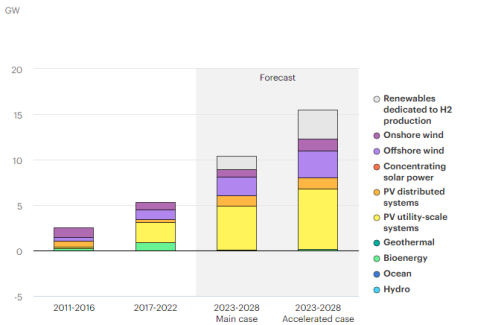
Explore electricity, heat and transport data from Renewables 2023

Country/region
Denmark

Cumulative capacity | Net additions | Generation

5-year capacity growth by generation technology, Denmark

Generation technology
All



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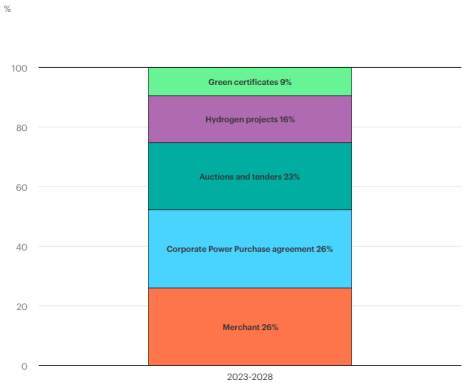
Primary policy and market drivers for utility-scale renewable growth, Denmark



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