

The Role of Solar in Energy Transition

Indonesia Solar Summit 2022

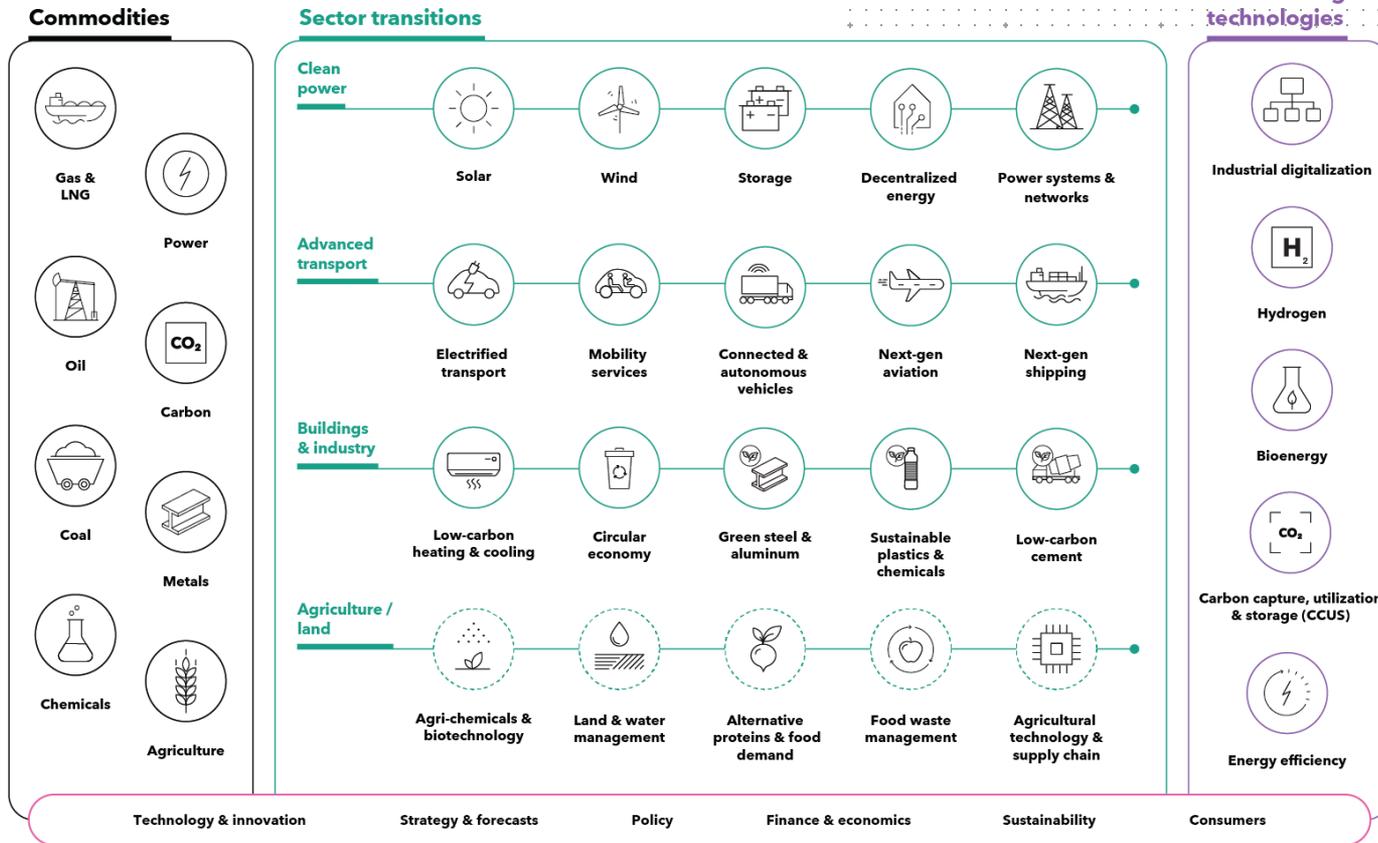
Rohit Gadre

April 20, 2022

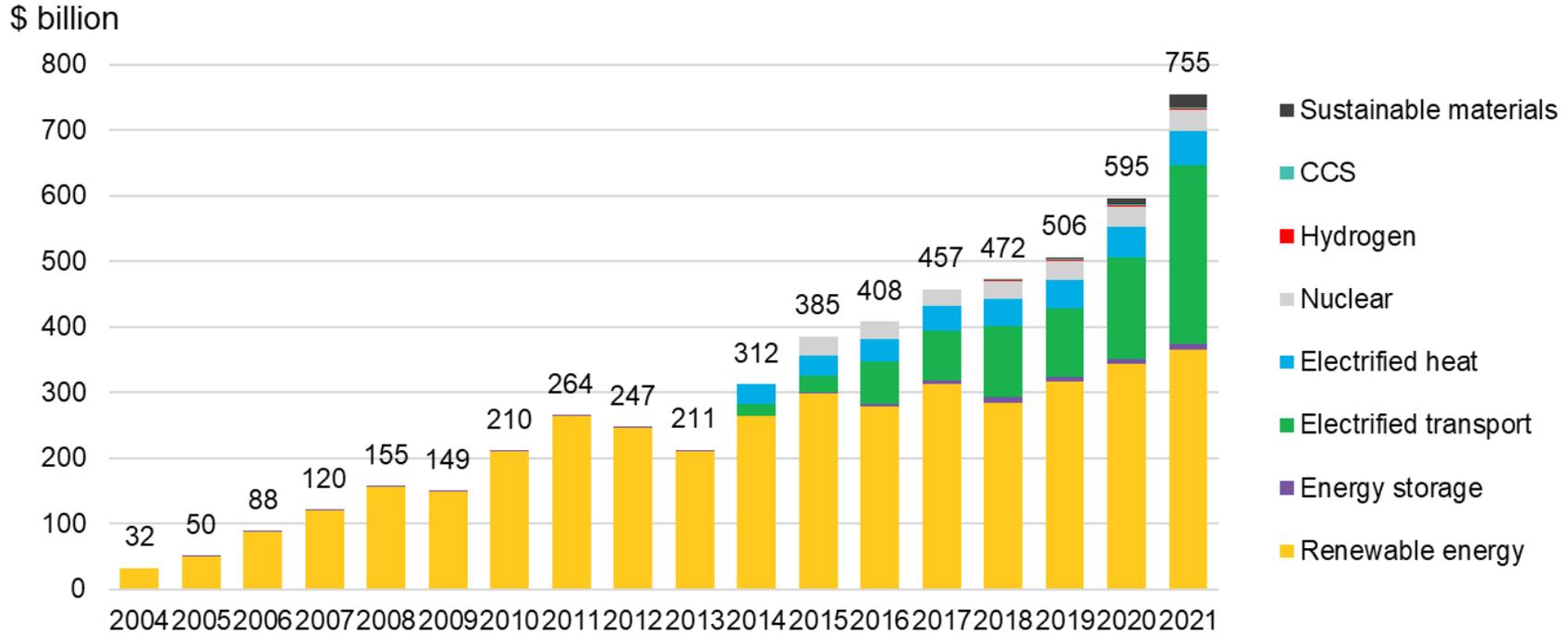


BNEF coverage

Strategies for a cleaner, more competitive future



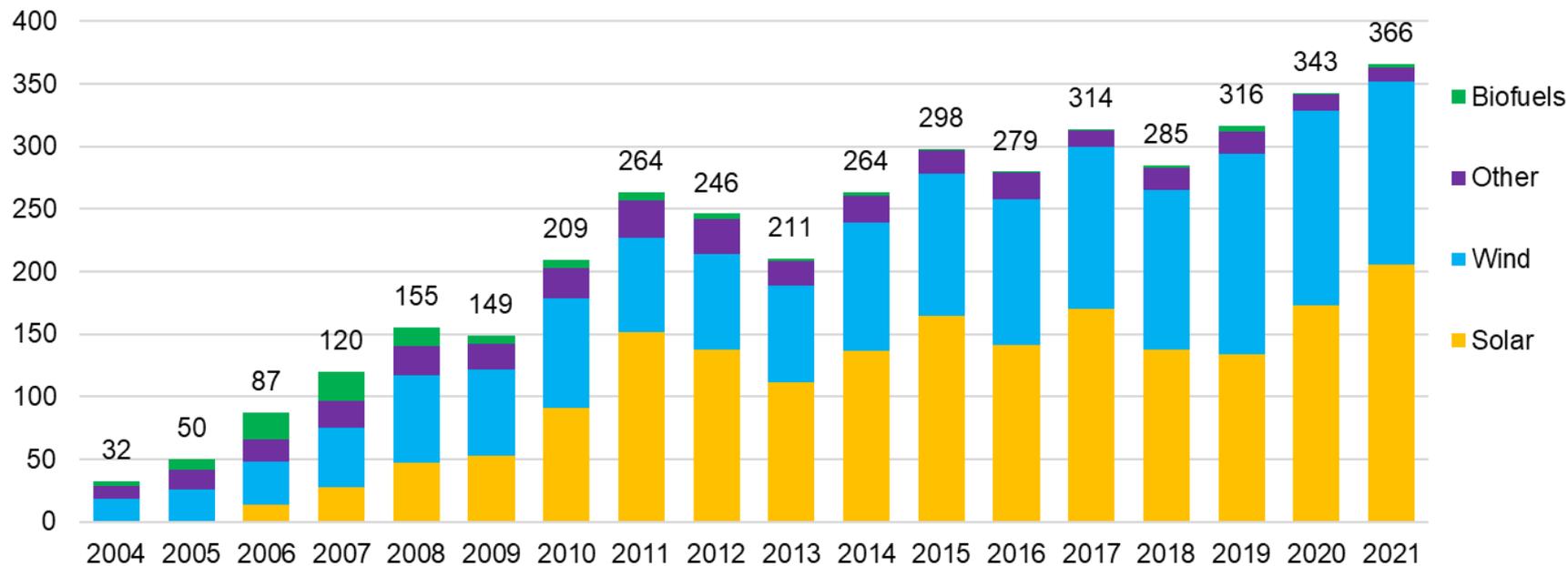
Global investment in the low-carbon energy transition accelerated in 2021



Source: BloombergNEF. Note: start-years differ by sector but all sectors are present from 2019 onward; see Appendix for more detail.

Solar and wind dominate investment flows in renewable energy

\$ billion



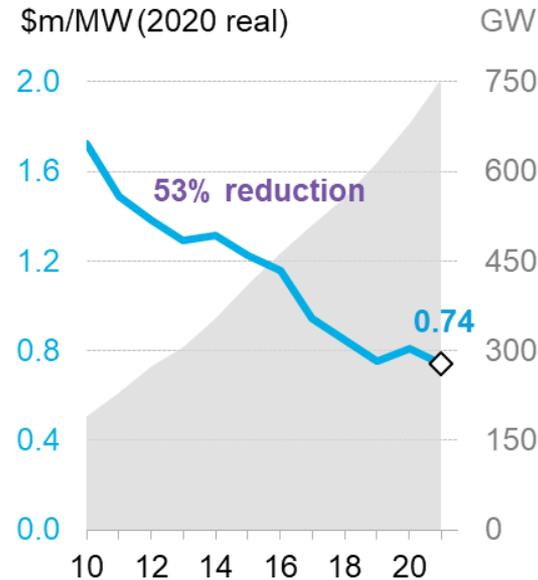
Source: BloombergNEF

Innovation and scale have driven down the costs of renewable technology

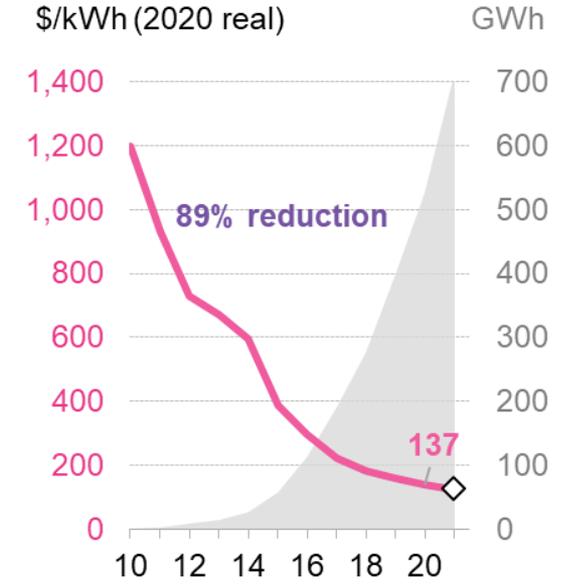
Solar module price and cumulative installed capacity



Onshore wind turbine price and cumulative installed capacity



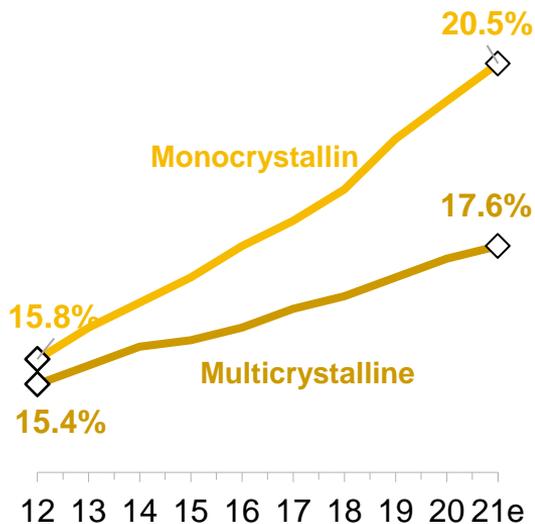
Lithium-ion battery pack price and demand



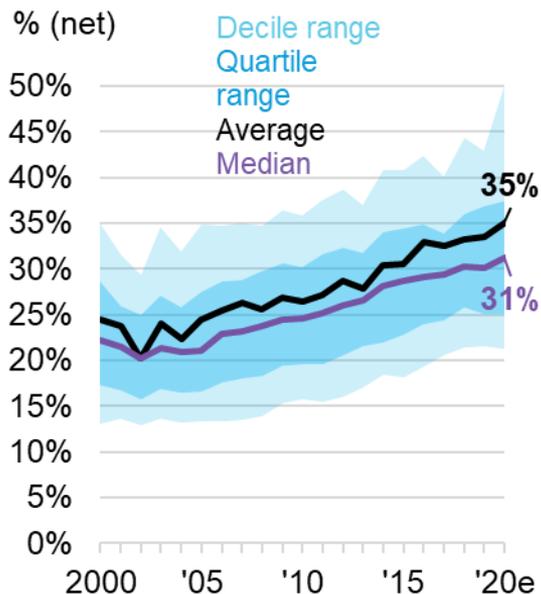
Source: BloombergNEF

...and at the same time the technology keeps getting better

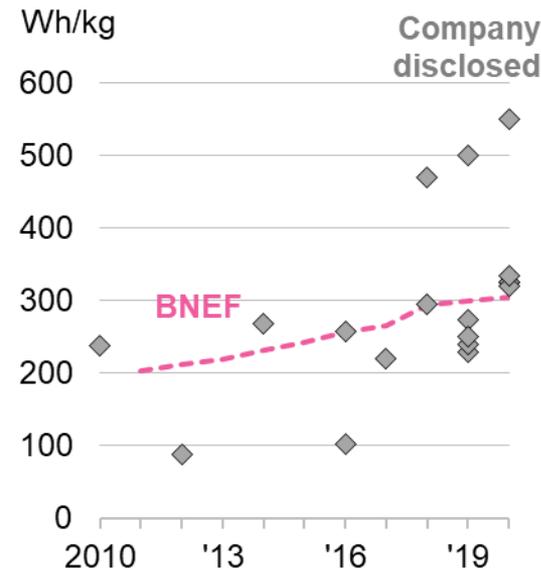
PV module efficiency



Onshore wind capacity factors



Battery cell energy density

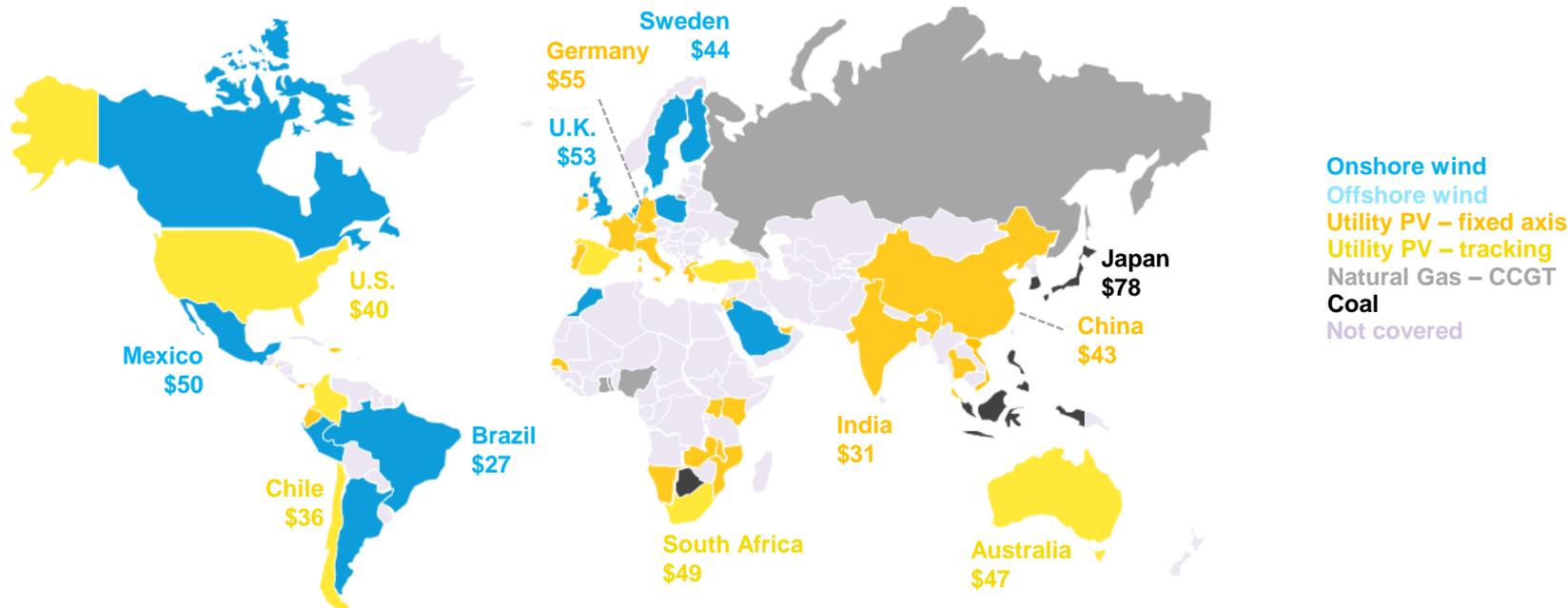


Source: BloombergNEF

Renewables are the cheapest source of new electricity in most of the world

Cheapest source of bulk generation, 2H 2021

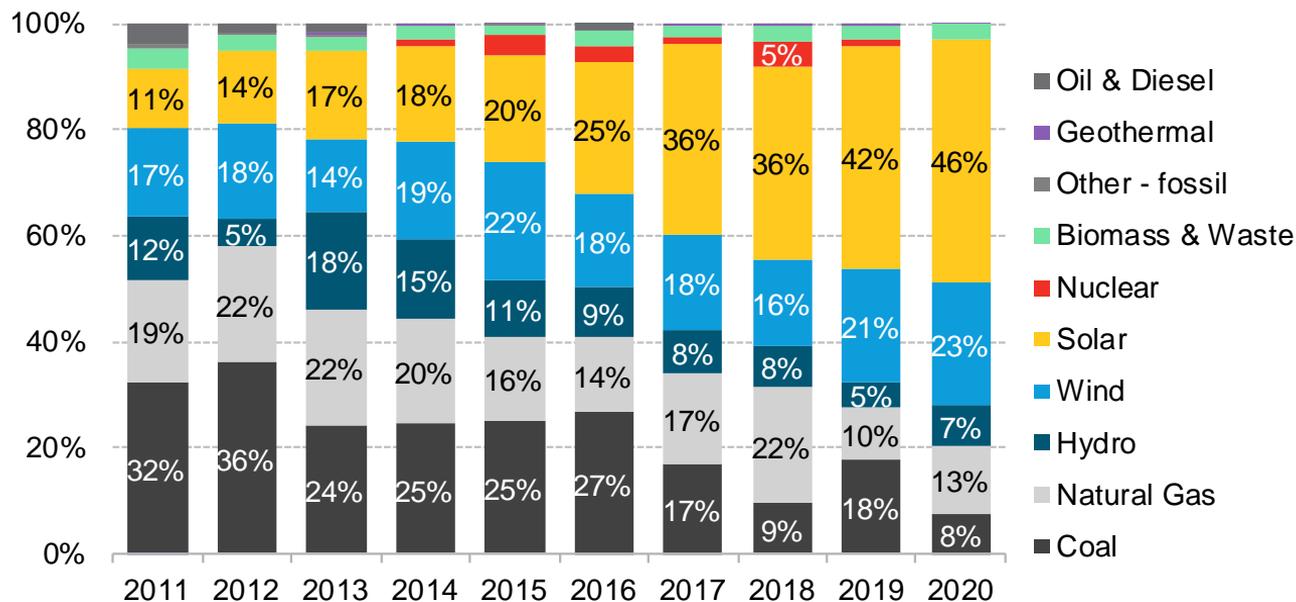
New-build solar, wind, coal and gas (benchmark LCOE)



Source: BloombergNEF. Note: The map shows the technology with the lowest LCOE (or auction bid for recent project delivery) for new-build plants in each country where BNEF has data. The dollar numbers denote the per-MWh benchmark levelized cost of the cheapest technology. All LCOEs are in nominal terms. Calculations exclude subsidies, tax-credits or grid connection costs. Our LCOEs include a carbon price where applicable.

Solar has led global capacity additions since 2017

Share of global capacity additions by technology

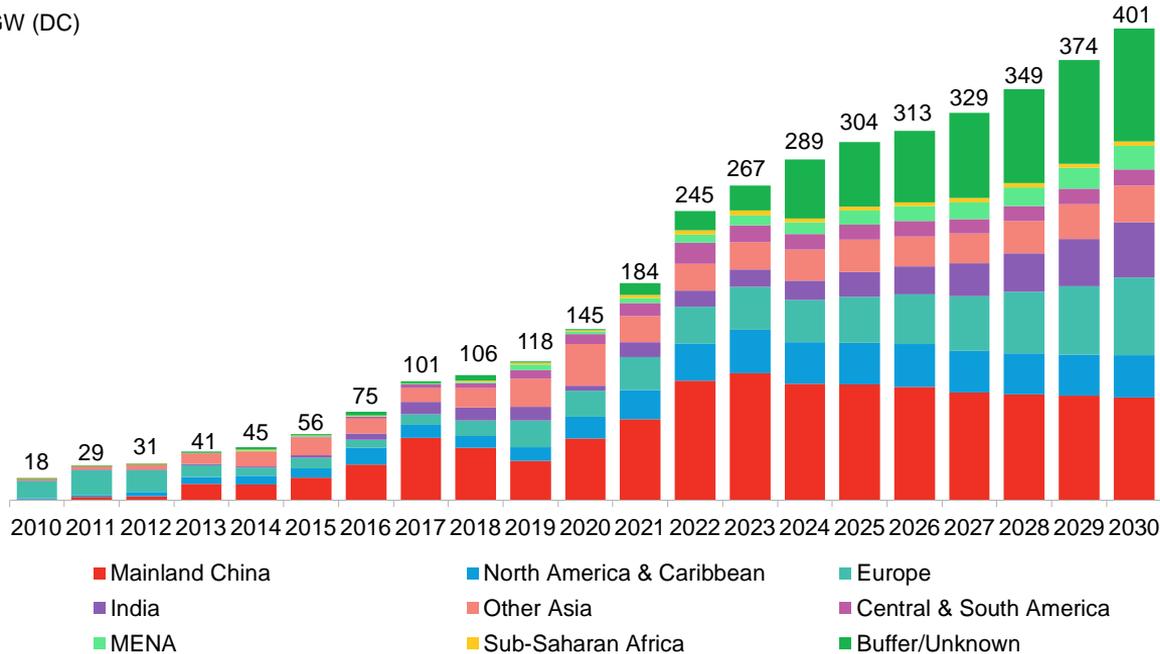


Source: BloombergNEF. Note: Share of global capacity additions excluding retirements.

Solar growth will continue, despite current challenges

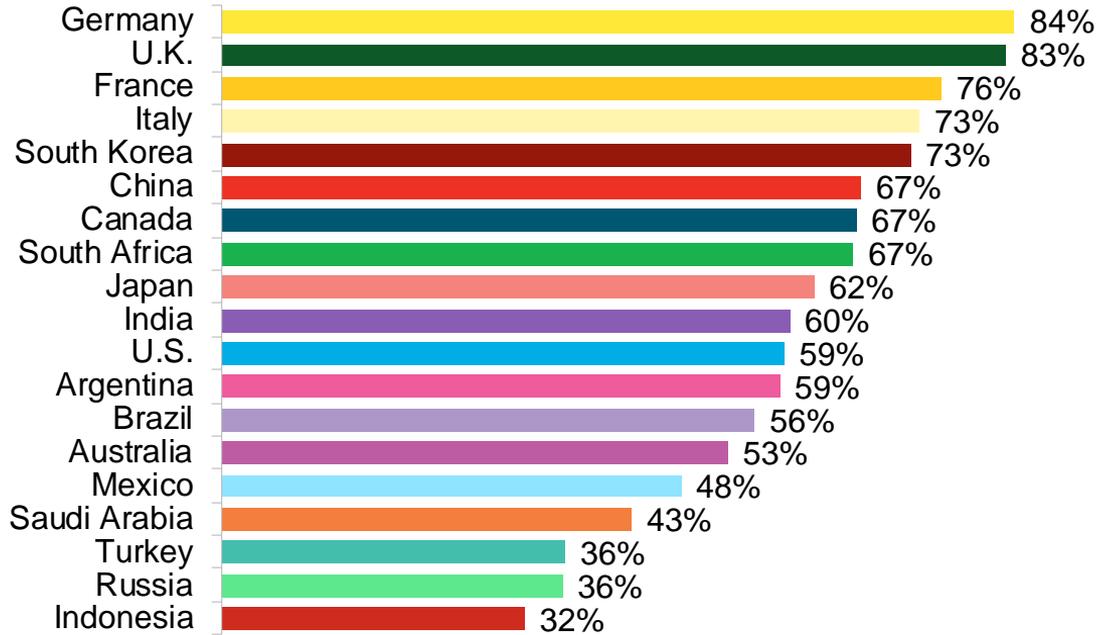
Solar new build forecast to 2030, mid scenario

GW (DC)



Source: BloombergNEF

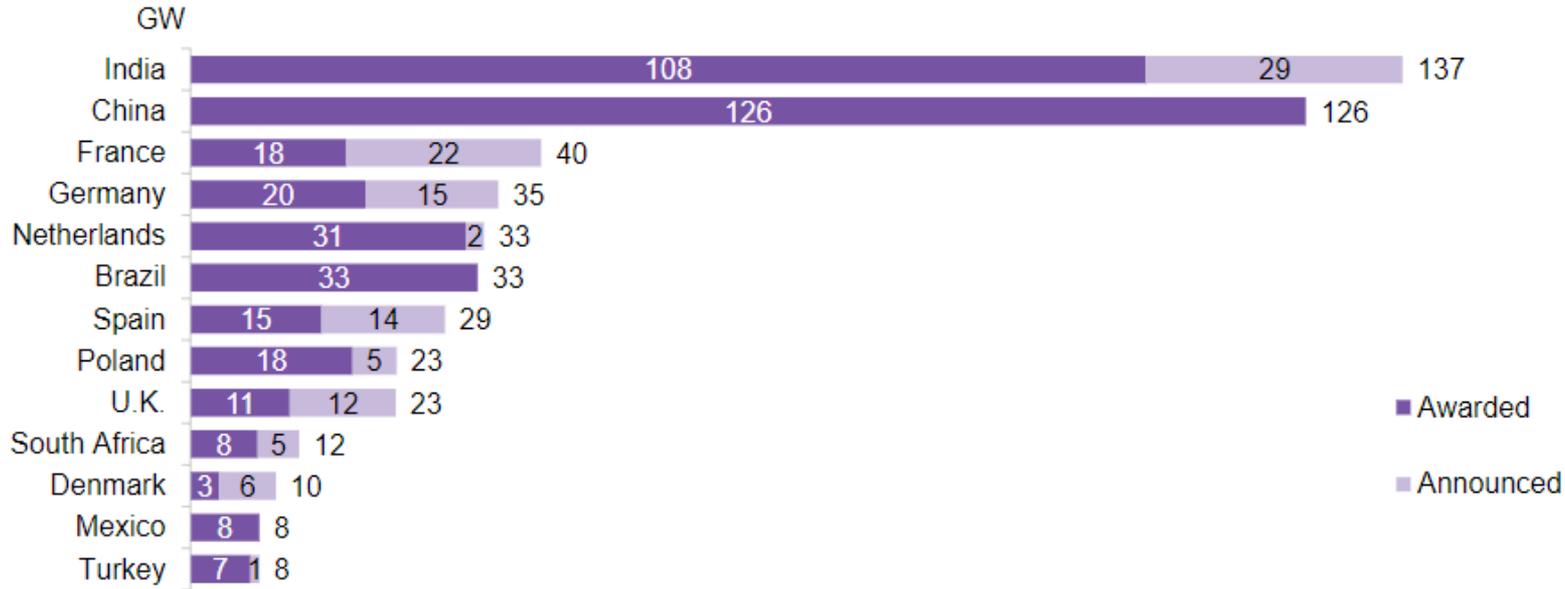
Germany and U.K. led BNEF's Zero-Carbon Policy Scoreboard for power



Source: BloombergNEF. Note: Unweighted scores.

Growth of large-scale renewables in the G-20 is driven by market-based schemes

Countries with highest auctioned and announced renewables capacity



Source: BloombergNEF. Note: Figures are cumulative over 2003-2022. Uses plant-level data for auctions where support is awarded for generation. Numbers are rounded to the nearest whole value for addition purposes.

The evolution of India's auctions is a window into the future of renewables

Auction Design	Technology choice	Key features	Match demand to supply	Increase grid use	Increase capacity factor	Improve intermittent supply	Capacity auctioned
Wind-solar hybrid	Wind, solar	Annual CF of 35% - 50%. Each technology to be at least 33% of contracted capacity	Grey	Green	Yellow	Grey	5.3GW in six auctions
RE peak power supply	Wind, solar and storage (mandated)	Annual CF 35%. Assured supply of at least 600MW for six hours of daily peak demand	Green	Yellow	Yellow	Yellow	1.2GW in one auction
Round-the-clock RE (RTC-I)	Wind, solar, use of storage likely	Annual CF 80% and minimum 70% CF in all months.	Yellow	Yellow	Green	Yellow	400MW in one auction
Bundling RE with firm power (RTC-II)	Renewables paired with any other firm source	Minimum 85% availability annually and during peak hours. At least 51% of energy supplied to be from RE sources	Green	Grey	Yellow	Green	2.5GW in one auction

Source: BloombergNEF, tender documents. Note: Green is high benefit, yellow is medium benefit and grey is not applicable. These are based on BNEF's assessment of the tender terms. CF is capacity factor, RE is renewable energy. Data as of November 2, 2021. Capacity is effectively AC for solar, as it is the grid connection/maximum output.

Government policies are a key enabler for the growth of renewables in India

Making renewables cost-competitive

Accelerated depreciation

Transmission waiver

Capital subsidy

100% foreign direct investment

Lower corporate tax rate

Demand creation and attracting investors

National targets

Renewable Purchase Obligations

'Must-run' status

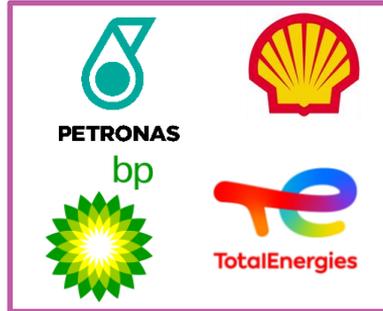
Green Energy Corridor

Solar parks

Source: BloombergNEF

The supportive policy framework has attracted foreign investors to India

Equity investors in India clean power



Source: Company logos, BloombergNEF

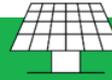
Reforms needed to support Indonesia's solar sector

Raising ambition



- Legislate emissions targets and a long-term net-zero objective
- Set clear and binding targets for renewables deployment
- Clarify role of measures such as carbon pricing in the power sector

Lifting development barriers



- Encourage renewables deployment by lifting tariff caps and local content requirements
- Help developers secure land and pre-develop sites for grid-scale PV installations
- Incentivize rooftop solar by lifting restrictions on net metering export tariffs

Enhancing investment signals



- Run a national procurement program that offers visibility on available support
- Hold auctions transparently by opening up participation beyond pre-selected providers
- Standardize procurement contracts to reduce development expenses

Unlocking project opportunities



- Expand areas where procuring power from private generators is allowed
- Ease operation of mini-grid developers in state utility PLN's service areas
- Group diesel conversion projects into bundles to attract investment

Boosting corporate sustainability



- Open up electricity retail to private competition to increase procurement options
- Facilitate solar procurement to increase sustainability of manufactured goods
- Bring retail power prices in line with production costs to incentivize onsite PV

Navigating capacity oversupply



- Formalize a proposed moratorium on the development of new coal plants
- Clarify the time-frame by which coal plants are to be phased out
- Give a greater emphasis to reducing emissions when planning capacity additions

Source: Institute for Essential Services Reform, BloombergNEF.

Scaling Up Solar in Indonesia

Reform and opportunity

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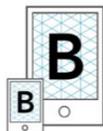
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We help commodity trading, corporate strategy, finance and policy professionals navigate change and generate opportunities.

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