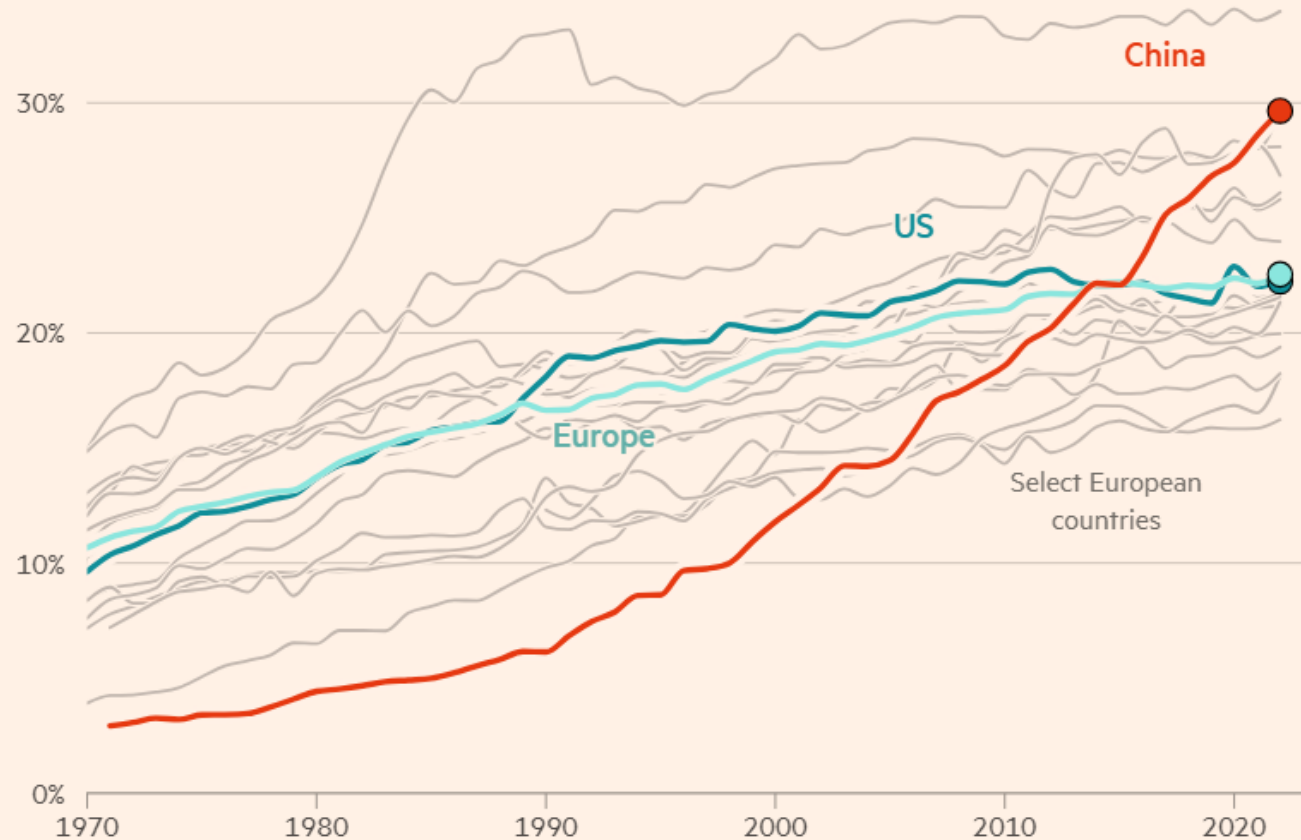


China is on its way to becoming world's first "ELECTROSTATE", electrification rate reaching 30%.

China paces ahead in electrification, while Europe and the US flatline

Electricity's share of final energy consumption



Source: RMI analysis of IEA data

- **2012:** Xi Jinping took over leadership of CCP & quickly identified a national security vulnerability→ **highly dependent on foreign nations for energy.**
- **Reliance on oil and coal imports had surged to record highs**→ exposing China to potential supply disruptions via chokepoints in trade channels.
- China is not only **rapidly advancing towards self-sufficiency in energy from secure domestic sources**, but also wields vast power over the markets for the resources and materials that underpin technologies of the future.
- Clean energy sectors accounted for a record 10% of the country's GDP & drove a quarter of its growth last year.
- China remains world's biggest GHG producer & its power sector emissions reached a new high last year, driven by a rise in coal consumption.

Operating capacity in China, 2024

Coal

1,175GW



Solar

887GW



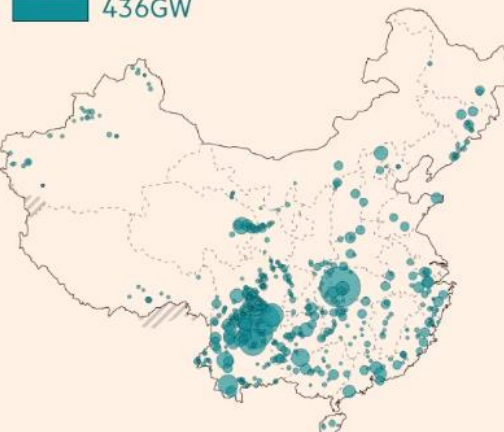
Wind

521GW



Hydro

436GW



The maps show utility-scale solar projects with a capacity of at least 1MW (450GW in total), wind farms with a capacity of at least 10MW (440GW total) and hydropower projects of at least 75MW (320GW total).

Sources: China's National Energy Administration; Global Energy Monitor

Coal, solar, wind & hydropower make up majority of China's total installed capacity — which grew by 15% to over 3,300GW in 2024.

Planned coal

● under construction: 204GW
○ in development: 217GW



China accounts for 80% of coal-fired power under construction globally, with additional plants set to come online near population centres and industrial hubs

Source: Global Energy Monitor

Planned solar (utility-scale)

● under construction: 234GW
○ in development: 437GW



Some announced mega projects have as much as 8.5GW, enough to power more than 5 mn homes*

70% of the world's utility-scale solar under construction in China, many of the most ambitious solar projects are clustered inland in regions: Xinjiang & Inner Mongolia

*Based on average annual household electricity use in China
Source: Global Energy Monitor

Planned wind

● under construction: 181GW
○ in development: 363GW



most wind power in construction is in the north, while offshore projects are dotted along the south-eastern coast

Source: Global Energy Monitor

Planned hydro

● under construction: 171GW
○ in development: 390GW



A controversial new mega-dam in Tibet would be three times larger than the world's most powerful hydropower facility

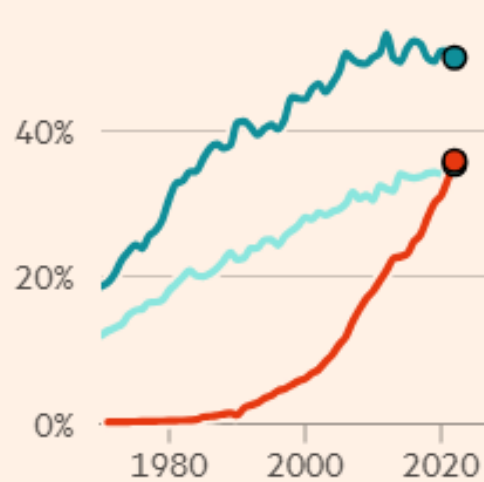
> 50% of world's planned hydropower is in China, w/ projects distributed across central & eastern provinces

Source: Global Energy Monitor

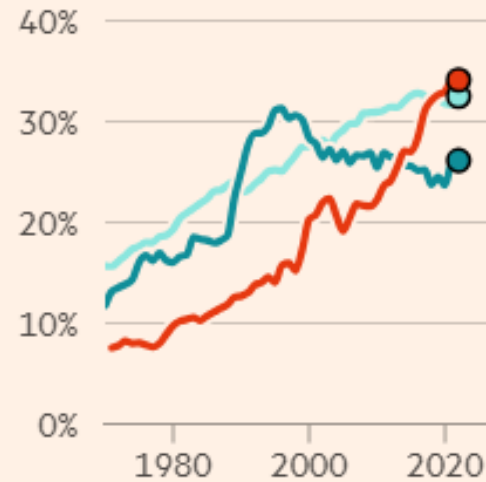
Rapid electrification across various sectors in China

Electricity's share of final energy consumption

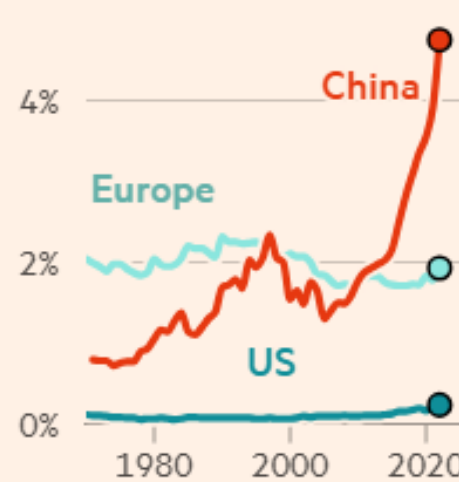
Buildings



Industry



Transport

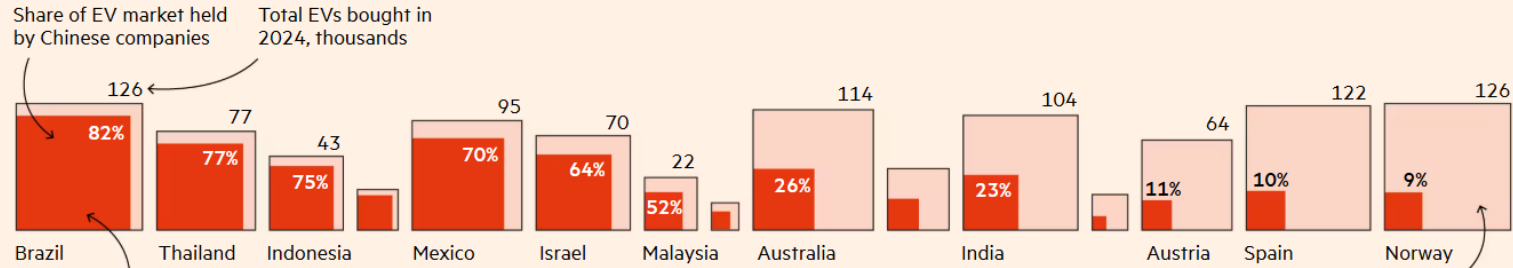


Source: RMI analysis of IEA data

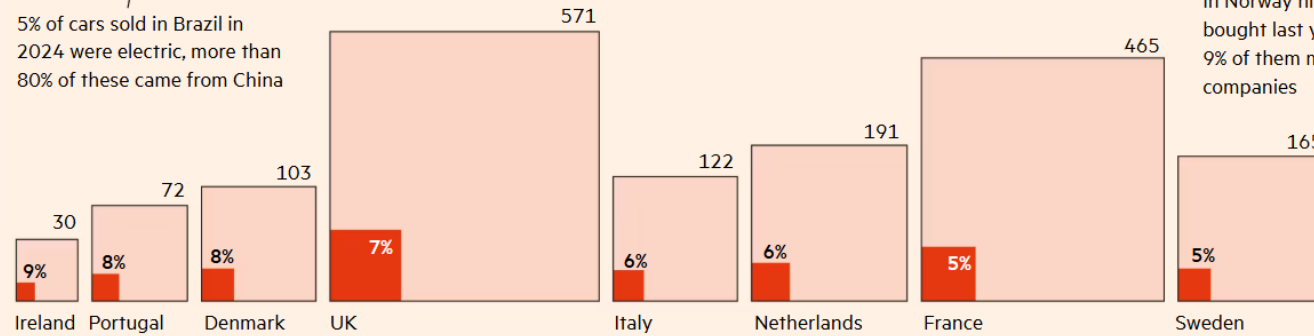
- China's advances reflect a hydra of policies aimed at fulfilling Xi's call for an energy revolution. Beijing has poured hundreds of billions of dollars into the clean tech sector, both to state-owned developers and the private sector, almost five times as much as the US and 15 times Japan.
- The most obvious manifestation of this growth is China's electric vehicle boom. This year domestic EV sales — including pure battery cars and plug-in hybrids — will hit about 12.5mn, more than double that of 2022.

Chinese EVs dominate several overseas markets

Sales of battery electric and plug-in hybrid electric vehicles in select countries, 2024

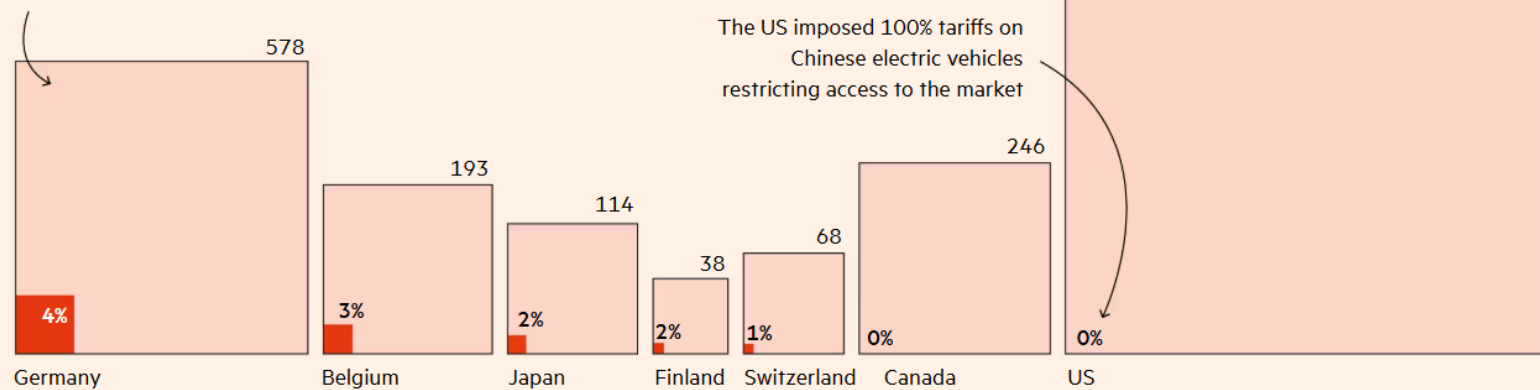


5% of cars sold in Brazil in 2024 were electric, more than 80% of these came from China



In Norway nine in 10 new cars bought last year were electric, with 9% of them made by Chinese companies

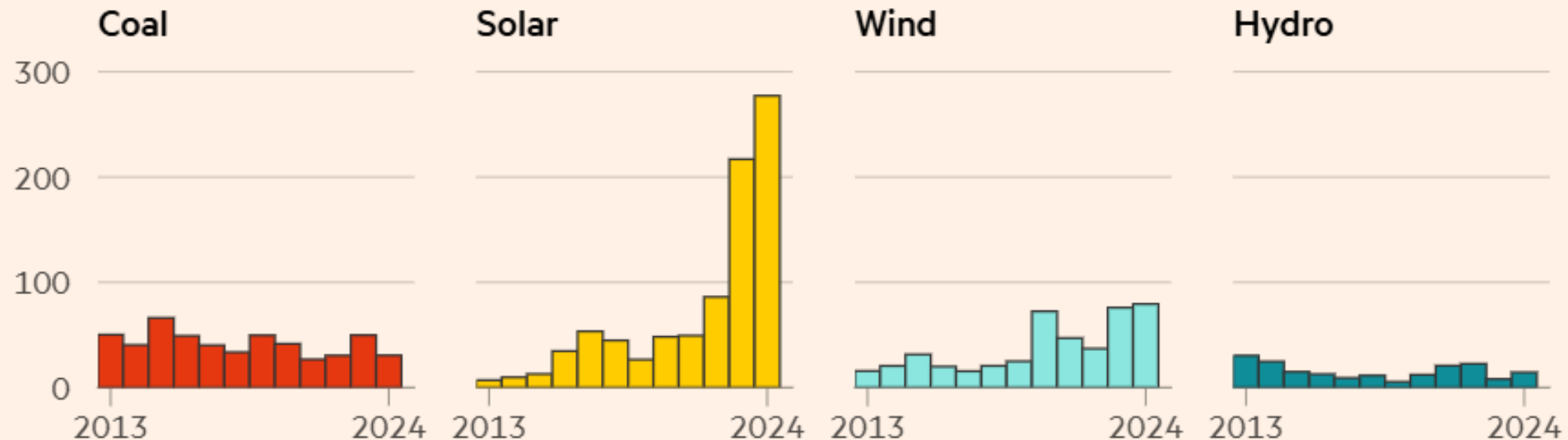
In Germany over half a million electric vehicles were purchased in 2024, 4% of these were Chinese



The US imposed 100% tariffs on Chinese electric vehicles restricting access to the market

China is adding many different power sources, with solar dominating

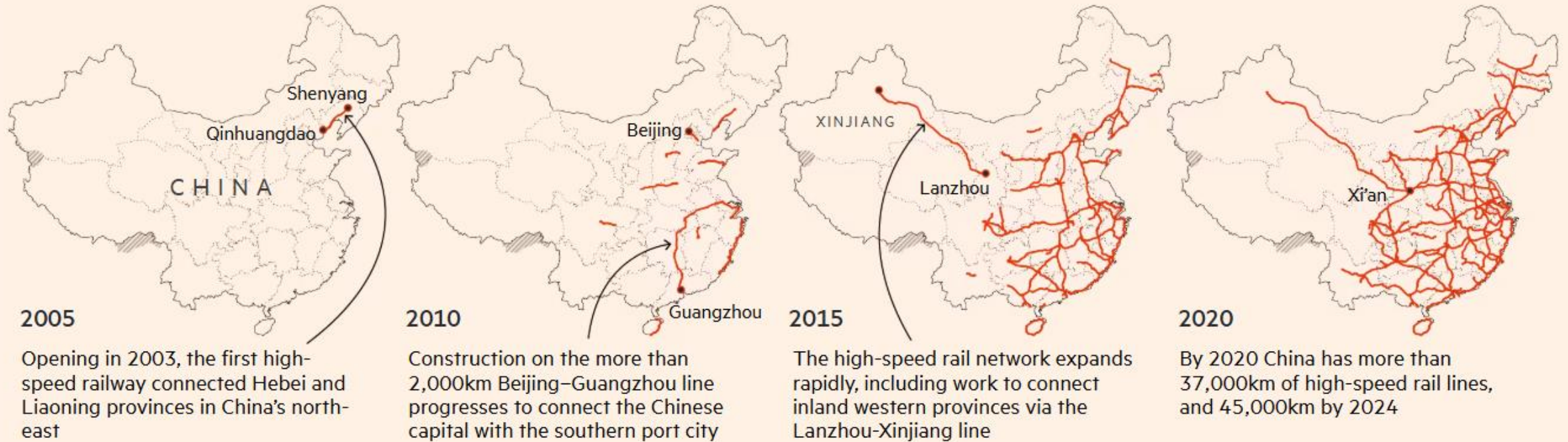
Annual power capacity additions by source, in gigawatts (GW)



Source: China Electricity Council, Centre for Research on Energy and Clean Air, Global Energy Monitor • Coal, solar, wind and hydro make up around 90% of China's total installed capacity

- A handful of leading Chinese solar groups are pouring billions of dollars each year R&D spending. This includes a pivot away from the polysilicon needed for solar panels — where China already dominates 80 % of the market — into potentially groundbreaking new materials, such as perovskite cells, which are up to 20 times thinner.
- Similarly, in wind, a clutch of rival Chinese companies are vying to produce ever bigger turbines at a lower cost. This competition has driven down the cost of offshore wind projects, on a dollar per megawatt-hour basis, from \$95 in 2020 to \$55 last year, implying a lower cost of production than conventional coal.

The high-speed railway network rapidly expanded within 10 years



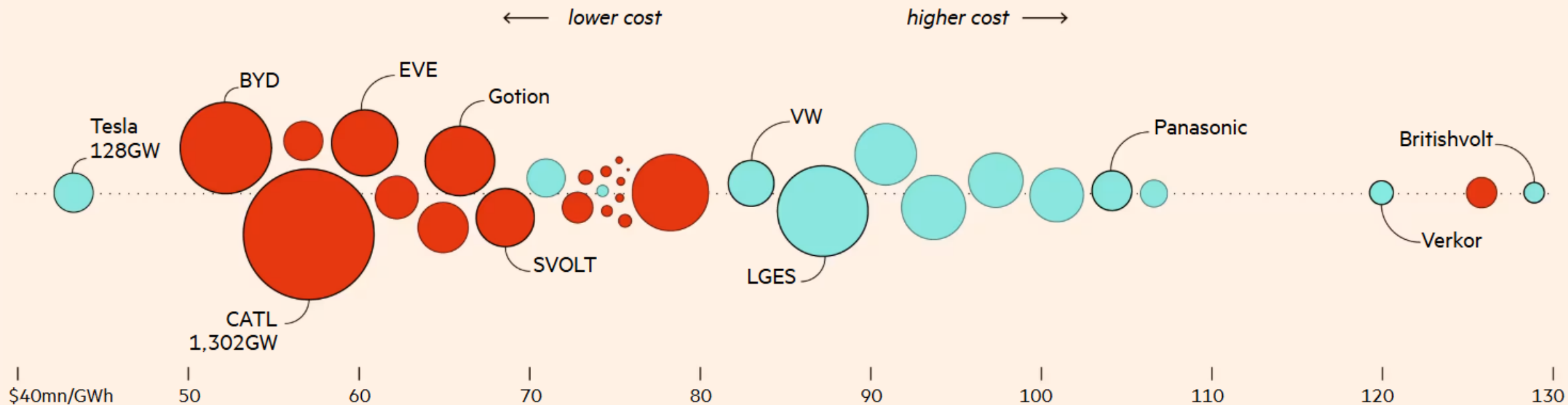
Source: [Davis, Qian & Zeng 2025](#)

- China's railways handled more than 4bn passenger trips last year, a record high. The network of high-speed rail spans 45,000km — 5 times the size of the EU's — and is forecast to expand to about 60,000km by 2030. This year, the state rail group expects to complete more than \$80bn in rail infrastructure investments.
- The country is forecast to spend as much as \$800bn by 2030 upgrading, its electricity grid, the system's hardware and software. The overall grid capex in China as high as 10% in 2025.

Chinese battery makers have lower costs compared with overseas rivals

Weighted-average battery plant cost by company (\$mn/GWh) based on current and planned projects

Circles scaled by total battery capacity

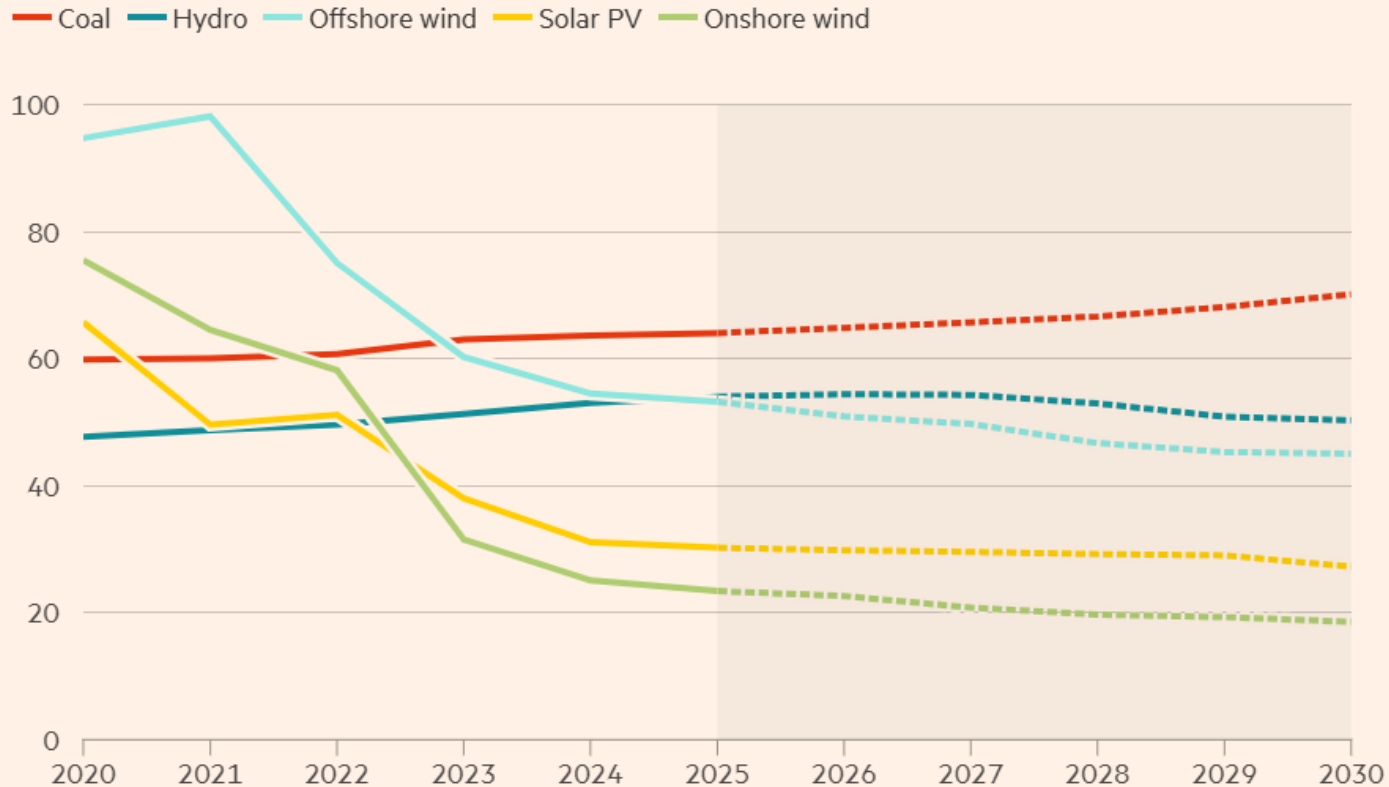


Source: AllianceBernstein

- **Energy storage:** China's two biggest battery groups, CATL and BYD, each channel about 5% of their annual revenues — \$50bn and \$100bn in 2024, respectively — towards efforts targeted at incremental gains in cutting-edge materials, chemistry and manufacturing processes, as well as longer-term foundational research.
- Their tech gains coupled with expansive economies of scale benefits have led to steep reductions in the cost of lithium batteries for both EVs and battery storage for supporting wind and solar use in China.

Renewables have become cheaper than coal power in China

Average levelised cost of electricity (LCOE) in China, dollar per megawatt-hour (\$/MWh)



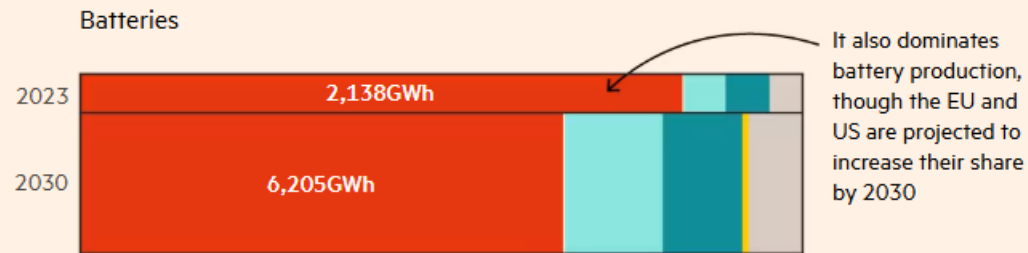
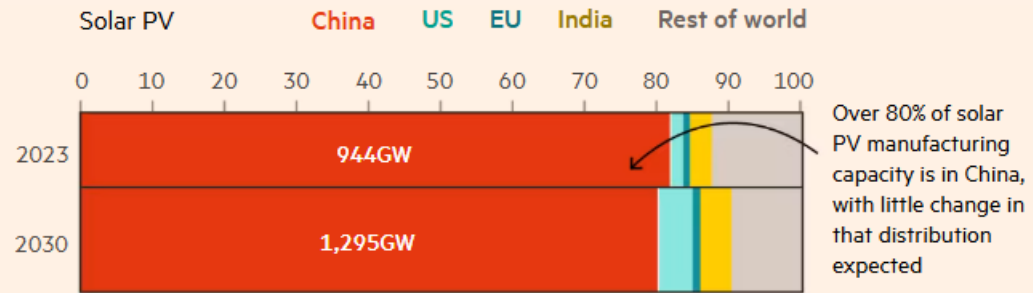
Source: Wood Mackenzie • LCOE is a standard power industry metric used to evaluate the total cost of power generation over a project's lifetime

- **Xi's dual pledges** that China's carbon emissions would peak before 2030 and the country would achieve carbon neutrality by 2060, the fuel is expected to over time be used more and more as a back up for a renewables-dominated electricity system.
- China opened renewable energy to market pricing, confident that it was cost-competitive with traditional energy.

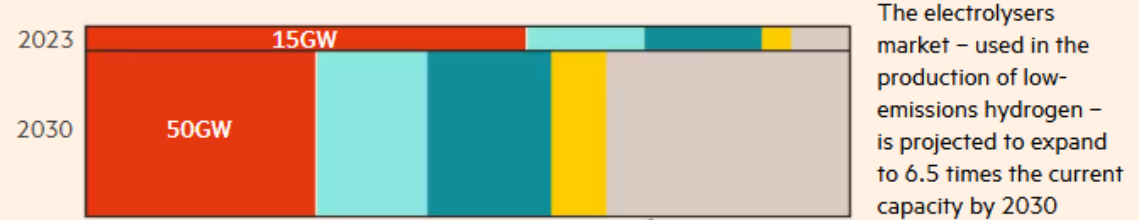
China dominates cleantech production

Global manufacturing capacity by country for select clean energy technologies

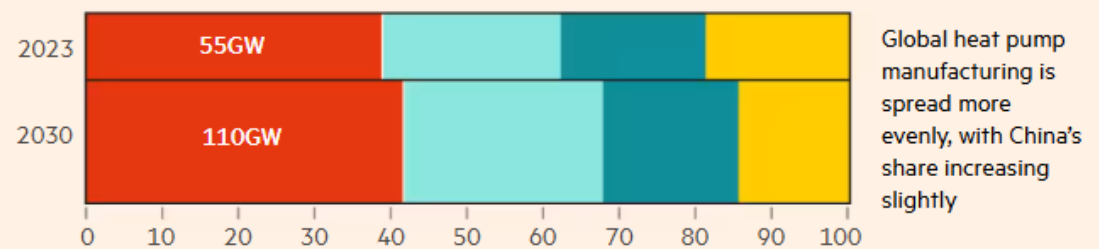
↓ Height of bars indicates relative size of capacity for each technology, 2023 vs 2030



Electrolysers



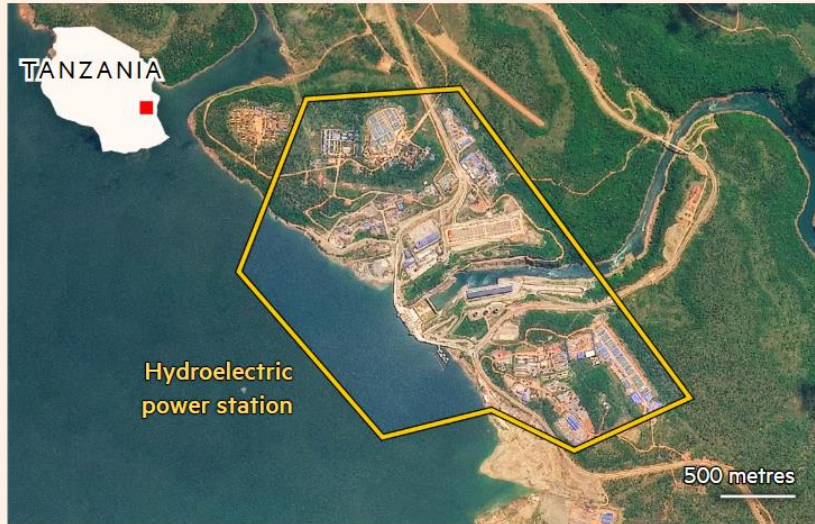
Heat pumps



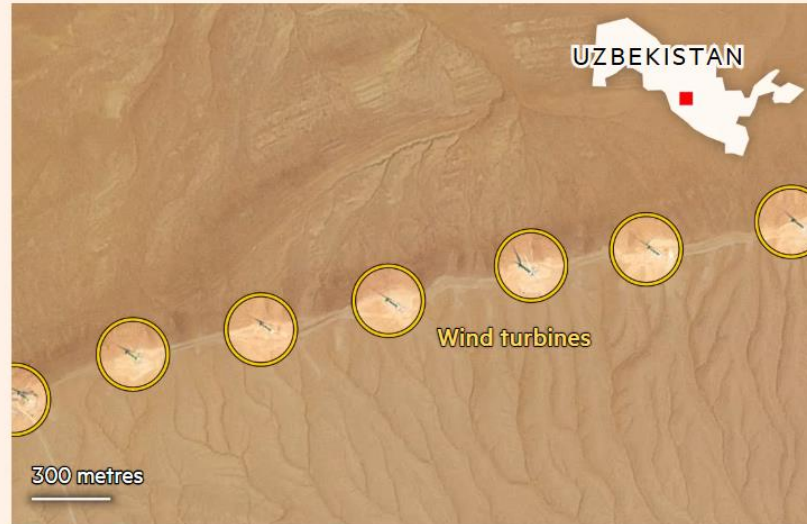
Source: IEA • Capacity at year-end. 2030 manufacturing capacity includes existing and planned capacity based on project announcements.

- While China's industrial policy is boosting energy and resource security, it has also led to overcapacity, hammered countless foreign rivals and contributed to an overwhelming trade imbalance. The country's cleantech manufacturing capacity massively outstrips domestic demand, according to data from Wood Mackenzie. This has led to stunning price falls but also sparked allegations from Washington and Brussels that Beijing has violated international trade rules through years of unfair state support.
- Immense supply gluts in solar, for example, have led to warehouses overflowing & low-grade Chinese-made panels being used for fencing in Europe.

China is investing billions in clean energy projects abroad



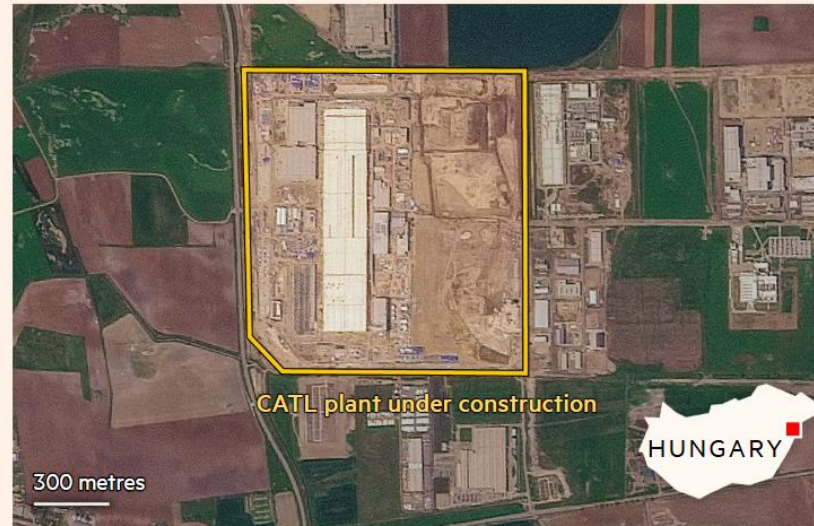
Companies from China supplied the equipment and installed most of the units at the 2.1 gigawatt (GW) **Julius Nyerere hydroelectric power plant** in eastern Tanzania. The facility will double the African country's power generation capacity.



Beijing is investing in several renewable energy projects in central Asia, such as China Southern Power Grid's stake in Uzbekistan's **Bash and Dzhankeldy wind farms**. The 1GW project, located in the Kyzylkum desert, is the largest wind power facility in the region.



Chinese companies are playing a growing role in clean energy developments in the Gulf region, including at the **Mohammed Bin Rashid Al Maktoum solar park** in Dubai. The megaproject is one of the largest solar farms in the world, with a planned capacity of 7.2GW by 2030.



Battery giant CATL expects to start production at its €7.3bn plant in Debrecen, Hungary, this year. The project is the largest-ever greenfield foreign direct investment in the country and is set to become the biggest battery 'gigafactory' in Europe.

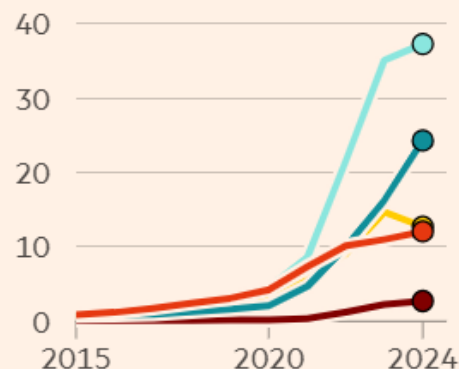
- China spent decades securing access to the world's critical resources, building out the processing and refining infrastructure, and subsidising local manufacturing and consumption. It now dominates all stages of the supply chain, from mines to factories.
- Chinese entities issued loans worth nearly \$57bn from 2000 to 2021 to secure access to critical minerals such as copper, cobalt, nickel, lithium and rare earths across the developing world.
- Chinese companies have, since the start of 2023, committed \$156bn in outbound foreign direct investment across more than 200 clean technology transactions. This effort is expanding Beijing's political and economic influence globally.

The majority of China's rising green tech exports are now going to developing countries

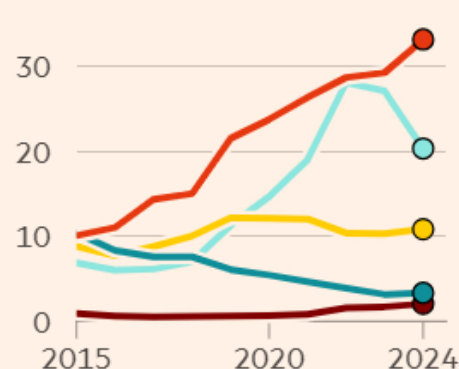
Value of green tech exports from China, in \$bn

— Developing countries — US — EU — UK — Other developed countries

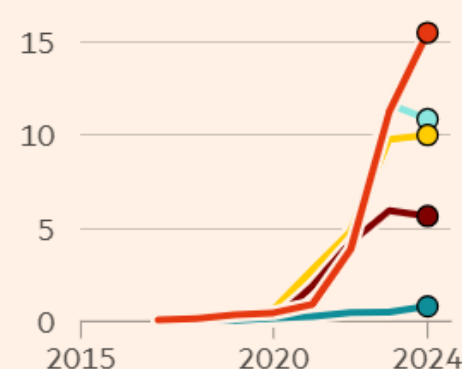
Battery



Solar



Vehicle



Source: Centre for Research on Energy and Clean Air analysis of Comtrade data • Value of imports shown at constant 2022 prices, based on averaged unit costs

Other Interesting Sources on the topic:

- ✓ **Why China is Electrifying Everything:** <https://www.youtube.com/watch?v=fDcxa0RSVPg>
- ✓ Why is China electrifying its economy at such dizzying speeds?: https://x.com/Dr_Keefer/status/1884340433070833687
- ✓ **China responsible for 95% of new coal power construction in 2023, report says:** <https://www.carbonbrief.org/china-responsible-for-95-of-new-coal-power-construction-in-2023-report-says/>
- ✓ Powering China's New Era of Green Electrification: <https://ember-energy.org/latest-insights/powering-chinas-new-era-of-green-electrification/>
- ✓ [China has launched the world's first and largest fleet of 100 driverless electric mining trucks, equipped with Huawei self-driving technology](#)
- ✓ [China Zorrilla: How The World's Largest Electric Ferry Changes Maritime Electrification.](#)

- While Beijing is betting on clean technologies to boost its exports, Washington is pursuing a very different approach. The White House is insisting countries increase imports of American gas to reduce their trade surpluses with the US and secure favourable trade terms. For many countries weighing up the costs of Trump's trade war, the choice between American liquefied natural gas and Chinese clean power technologies could be a defining one both financially and for decarbonization.
- Analysts & officials have also **identified an emerging national security risk** in China's rising dominance over green energy supply chains and technology, citing potential risks from economic dependence as well as espionage and military threats.
- the tariffs may provide "unintentional incentive" of strengthening China's energy transition
- In 2024 China's energy storage systems capacity was above 73GW, >20 times higher than 4 years ago but still far short of the more than 500GW of storage the country is expected to need to fully support its renewable roll out.