

China's Rising Energy Dominance

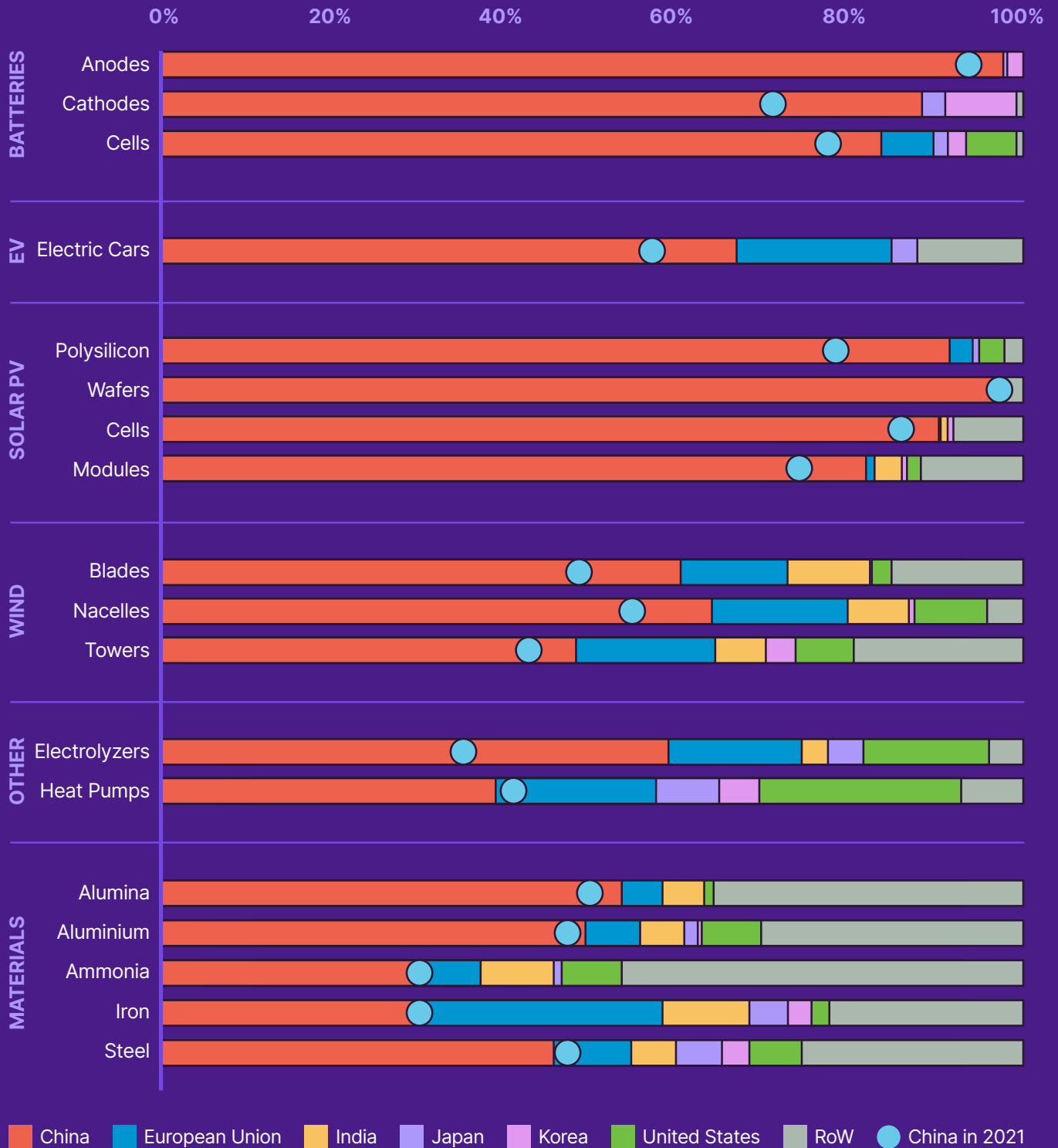
China's Control of Key Clean Energy Supply Chains

China's industrial strategy for clean energy sectors has been comprehensive. Beijing has sought to control global markets for end-use technologies, such as solar panels and electric vehicles; components, like solar cells and batteries; raw materials, such as polysilicon and lithium; and industrial equipment, like robotics and specialized production machinery. Its systematic approach, backed by massive investments of public resources, diverges radically from conventional western development models.

Data collected by the International Energy Agency provides insights into China's position. Across six key clean technologies—electric vehicles, batteries, solar panels, wind turbines, heat pumps, and hydrogen electrolyzers—China's share of global manufacturing capacity is around 70% (Figure 3).¹ For electric vehicles and solar panels, China's capacity is so large that it must export its surplus, often at rock-bottom prices.² Government support enables many companies that would not be viable in competitive markets to survive for years without making profits.



FIGURE 3. Manufacturing capacity by country/region in 2023.⁸



Note: RoW = Rest of World. "Electric cars" values are calculated based on 2023 production numbers, adjusted according to the utilisation rates of car assembly plants in the region.

Source: IEA analysis based on IEA (2024a); and IEA (2023b).

The supply chain for nuclear power provides a vertical example of China's approach. China is a latecomer to nuclear construction and exports, but it is rapidly making up ground.³ In addition to offering the capacity to build and finance reactors, China can supply many key components—notably those that require large-scale forging and casting—that the United States currently cannot. Once a supply relationship is established in this industry, it is nearly impossible to switch vendors since the components are so specialized.⁴

Minerals and materials lie at the base of clean energy supply chains, and China's control at this level is daunting. In extreme cases like graphite (used in anodes for EV batteries), rare earths (magnets for wind turbines and EV motors), and manganese (cathodes for EV batteries), China accounts for over 90% of at least one stage of the supply chain.⁵ In cases like nuclear fuel, where China lacks the domestic natural resources for key inputs, it seeks to own mines overseas that can feed refineries at home.

Finally, when it comes to production equipment, China is closing the gap with or taking the lead from international competitors. China is the world's largest user of robotics, which are used across clean energy supply chains.⁶ It is similarly gaining ground or leading the world in making specialized production equipment, such as mills, dryers, and furnaces used in battery factories.⁷

These advances are not staying within China's borders. Chinese clean energy manufacturing firms are investing and building globally, expanding their footprint geographically. This strategy capitalizes on access to global primary resources and unlocks emerging markets for a wide range of energy technologies.⁹

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¹ International Energy Agency (IEA), "Energy Technology Perspectives 2024," October 2024. <https://www.iea.org/reports/energy-technology-perspectives-2024>

² Mercator Institute for China Studies, "Beyond overcapacity: Chinese-style modernization and the clash of economic models," April 1, 2025. <https://merics.org/en/report/beyond-overcapacity-chinese-style-modernization-and-clash-economic-models>

³ Seaver Wang and Ouzel Lloyd, "China's Impressive Rate of Nuclear Construction," The Breakthrough Institute, March 5, 2024. <https://thebreakthrough.org/issues/energy/chinas-impressive-rate-of-nuclear-construction>

⁴ Sarah Sobalvarro, "US Inaction Is Ceding the Global Nuclear Market to China and Russia," Wilson Center, April 2, 2025. <https://www.wilsoncenter.org/article/us-inaction-ceding-global-nuclear-market-china-and-russia>

⁵ International Energy Agency (IEA), "Global Critical Minerals Outlook 2025," 2025. <https://iea.blob.core.windows.net/assets/a33abe2e-f799-4787-b09b-2484a6f5a8e4/GlobalCriticalMineralsOutlook2025.pdf>

⁶ Robert D. Atkinson, "How Innovative Is China in the Robotics Industry?" Information Technology & Innovation Foundation, March 11, 2024. <https://itif.org/publications/2024/03/11/how-innovative-is-china-in-the-robotics-industry/>

⁷ International Energy Agency (IEA), "Global Critical Minerals Outlook 2025," 2025. <https://iea.blob.core.windows.net/assets/a33abe2e-f799-4787-b09b-2484a6f5a8e4/GlobalCriticalMineralsOutlook2025.pdf>

⁸ International Energy Agency (IEA), "Energy Technology Perspectives 2024," October 2024. <https://www.iea.org/reports/energy-technology-perspectives-2024>

⁹ Xiaokang Xue and Mathais Larsen, "China's Green Leap Outward: The Rapid Scale-Up of Overseas Chinese Clean-Tech Manufacturing Investments," Net Zero Industrial Policy Lab, September 9, 2025. <https://www.netzeropolicylab.com/china-green-leap>