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The Rise of the Electrostate: China, Electrification and Geopolitical Power

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Executive Summary

What is an Electrostate?

- The global economy is shifting from fossil fuels to electrified systems powered by renewables — an "electrotech revolution" driven by lower costs, higher efficiency, and rapid scalability.
- China is the clearest example of an emerging "electrostate," where electricity has become central to industrial policy, economic growth, and geopolitical power.
- The rise of the electrostate depends less on natural resources and more on a country's ability to build grids, scale infrastructure, and coordinate industrial transformation around electricity.

China's Electrostate Model and Electrification Pressures

- China has turned electricity into a core instrument of industrial policy, energy security, and geopolitical power, dominating global clean-tech and solar manufacturing.
- Despite remaining coal-heavy, China is rapidly scaling renewables, with wind and solar now supplying around 22% of electricity and beginning to reduce fossil-fuel dependence.
- The centrepiece of China's model is its highly integrated national grid, using ultra-high-voltage transmission to connect western energy production with eastern industrial demand.
- China's electrification push is driven partly by domestic pressures, including worsening climate impacts, pollution, rising electricity demand, and the need to maintain economic and social stability.
- More importantly, it is shaped by geopolitical tensions with the West, including tariffs, export controls, and restrictions on Chinese technology and clean-energy products.
- In response, China has adopted a "dual circulation" strategy that treats electrification not just as climate policy, but as a tool of economic sovereignty, industrial resilience, and technological autonomy.

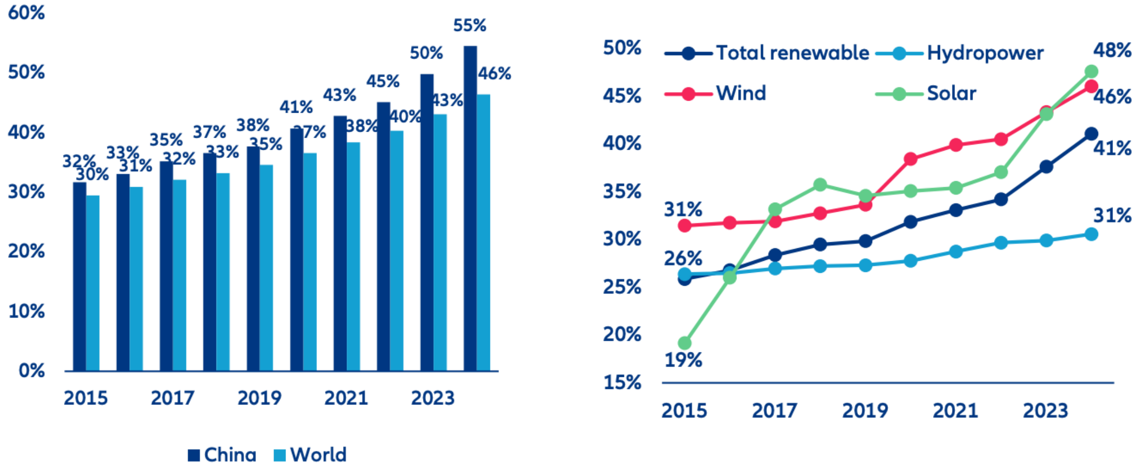
International Projection

- China is exporting not only power-generation capacity through the Belt and Road Initiative, but an entire electrical ecosystem including grids, standards, financing systems, and digital infrastructure under the vision of "Global Energy Interconnection."
- China's global electricity footprint has expanded rapidly: Chinese firms installed roughly 156 GW of overseas power capacity between 2013 and 2024, while Chinese capital supported 648 overseas power plants with a combined capacity of 171.6 GW.
- The BRI increasingly combines renewable infrastructure, climate finance, and digital grid systems to deepen China's geopolitical influence, while raising Western concerns over long-term technological dependence and vulnerabilities in connected electricity infrastructure.

The Geopolitics of the Grid

- Europe and the United States increasingly fear that China is becoming embedded within the operational architecture of electricity systems through infrastructure investments, grid operators, connected devices, and renewable supply chains.
- This has created a strategic dilemma for the West: Chinese technologies are central to rapid electrification and the green transition, yet deeper dependence on Chinese grids, software, and energy systems is increasingly viewed as a national security and geopolitical risk.

Key Picture: Share of Renewable in Total Electricity Capacity / Share of China in Global Renewable Capacity



Source: [IRENA, Allianz Research]

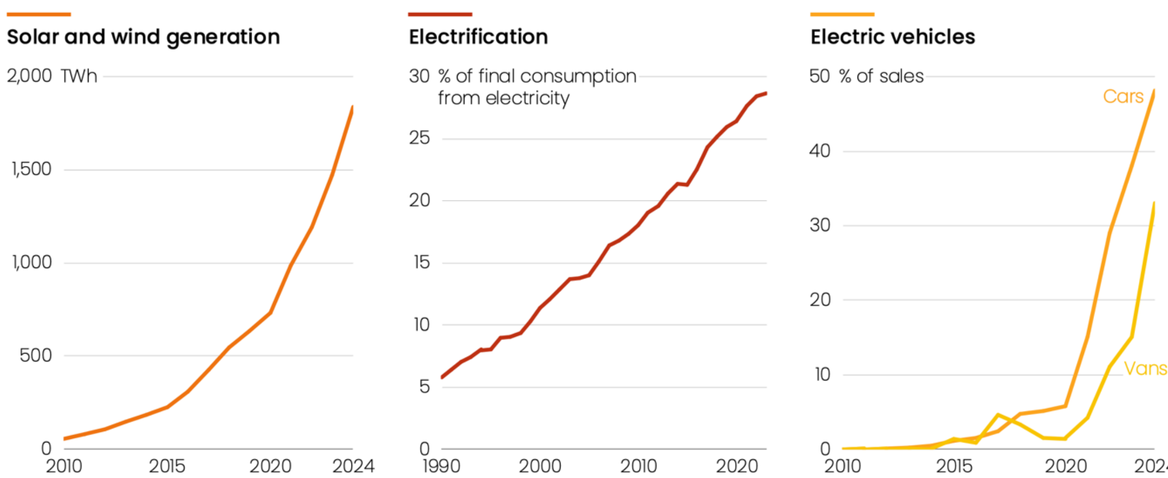
What is an Electrostate?

The global energy system is undergoing a structural shift from fossil fuels (burning resources) to electrified technologies (using renewable electricity like solar and wind)—a transformation called the "electrotech revolution." The shift is driven by cost, efficiency and scale. [Electrotech is cheaper, about three times more efficient, and growing exponentially, rapidly outcompeting fossil systems]. Overall, it marks a system-wide economic and geopolitical transformation, not just an energy transition.

At the heart of this transformation lies China, the clearest embodiment of the emerging electrostate—a system where electricity, not fossil fuels, becomes the central axis of industrial policy, economic growth, and geopolitical power.

An electrostate is a country in which a large and rising share of total final energy consumption is delivered in the form of electricity. Electrification is not merely a technological shift; it reflects a structural transformation of the economy, how energy is produced, distributed, and ultimately used across industry, households, and infrastructure. By this definition, China is rapidly becoming the world's most consequential electrostate.

Figure 1: China is Moving at Lightning Speed across Renewables and Electrification



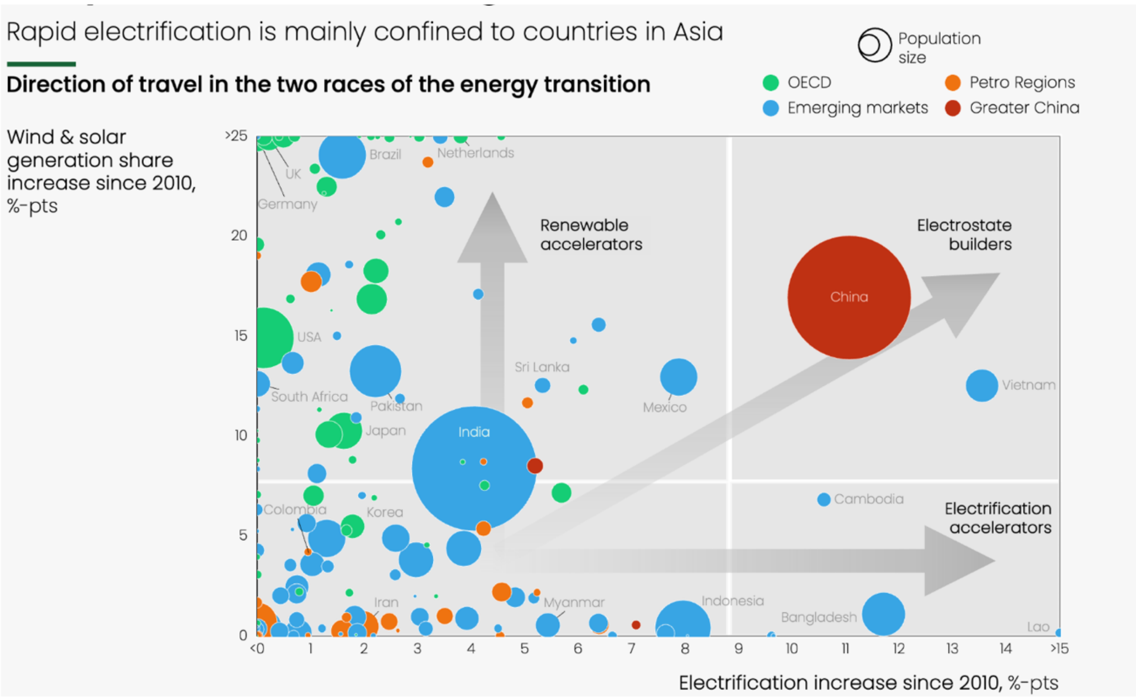
Source: [Ember Energy]

Yet the logic of the electrostate is not unique to China. Historically, large-scale electrification depended on specific geographic advantages such as coal reserves or hydroelectric potential. Today, however, the spread of renewables, battery storage, and liquefied natural gas has fundamentally altered this equation. Cheap and scalable electricity is no longer restricted to resource-rich states; it has become a viable developmental pathway for almost every economy.

The emergence of the electrostate therefore reflects not geography alone, but political and institutional capacity. Countries as different as Brazil, the Gulf monarchies, and even Texas within the United States are rapidly expanding renewable electricity systems. The decisive factor is increasingly the ability to build grids, integrate generation, scale infrastructure, and coordinate industrial transformation. This is why even the United States—despite being a technological leader—faces constraints not primarily in generation capacity, but in transmission bottlenecks, grid interconnection failures, and political fragmentation.

The electrostate is thus best understood not as a category limited to certain countries, but as a model of economic organisation centred around abundant, scalable, and increasingly low-cost electricity. The distinction between states lies in the speed and coherence with which they are able to construct this new electrical order.

Figure 2: Many Countries are Building Renewables, Few an Electrostate



Source: Ember Energy

China's Electrostate Model

China's electricity system is not just energy policy; it is state strategy. Since the early 2000s, electricity has moved from a supporting role to the core of China's economic architecture. Between 2000 and 2023, electricity production increased roughly sixfold, reflecting both rapid industrialisation and a deliberate policy shift toward electrification. China today accounts for roughly 27% of global energy investment and spends close to USD 900bn annually on the energy sector, with the majority directed toward clean electricity infrastructure, including solar, wind, and grid systems. It now accounts for more than 60% of global manufacturing capacity in key clean-energy technologies and roughly 80% of solar manufacturing.

This system serves three simultaneous objectives. Firstly, industrial expansion sustaining manufacturing scale and export competitiveness; secondly, energy security and autonomy, reducing dependency on external inputs; and lastly, geopolitical positioning, building capabilities that can be projected outward.

The Energy Mix: A Structural Contradiction

China's electricity model is defined by a central paradox. It remains heavily dependent on fossil fuels. Coal alone accounted for roughly 55% of electricity generation in 2024, while gas plays only a marginal role (2%). Yet at the same time, China is the largest builder of renewable energy globally.

Wind and solar generation rose sharply, supplying around 22% of total electricity in 2025, above the global and Asia average of 17% and up from 9% in 2020 and just 4% in 2015. In 2025, China's coal generation saw its first absolute decline since 2015, dropping by 71 TWh. This shifted the fossil fuel share of total electricity from 62% to 58% in just one year.

This structural pivot, driven by exponential renewable growth and rapid electrification—, marks a potential peak in China's fossil fuel consumption ahead of the 2030 target. If this downward trend in fossil generation (-56 TWh in 2025) continues, it sets the stage for a permanent decline in both national and global fossil fuel demand.

National Electricity Grid Model

The defining feature of China's electricity model is not generation capacity; it is the grid. In 2024 alone, China added approximately 357 GW of wind and solar capacity, reaching its 2030 renewable targets years ahead of schedule. To integrate this expansion, the state investment around RMB 608 billion (USD 85 billion) in grid infrastructure.

At the centre of the system is ultra-high-voltage (UHV) transmission, a technology that allows electricity to be transported over thousands of kilometres with limited losses. Projects such as the Zhangbei-Shengli 1000 KV line link inland production zones to coastal demand centres.

China has deliberately chosen a highly integrated national grid model, closer to the European system that the fragmented structure seen in the US. The objective is to operate the country as a single electrical system, enabling long-distance transmission, coordination across regions, optimisation of resource allocation. China's energy strategy is also about bridging a massive geographic divide. This system is designed to exploit a fundamental regional imbalance: the West is the producer, rich in renewables, while the East is the center of demand. The primary challenge is not generating power, but ensuring its transmission and stability. Because production and consumption are thousands of miles apart, the grid faces constant congestion and instability. This is why, China has invested heavily in UHV lines, transforming the grid itself into a piece of strategic infrastructure essential for national energy security

Why Electrification? Domestic and External Pressures

China's push toward electrification is driven by a convergence of domestic and geopolitical pressures. Internally, the environmental dimension has become increasingly difficult for the state to ignore. China is among the countries most exposed to the effects of climate change, with recurring heatwaves, droughts, flooding, and growing stress on energy systems. Unlike other politically sensitive issues that remain tightly controlled, environmental degradation and climate impacts are openly discussed in Chinese media and widely visible to the population. As electricity demand rises and pollution concerns intensify, the government faces mounting pressure to modernize the energy system while maintaining economic growth and social stability.

Yet the more decisive drivers are external. China's electricity strategy has evolved in the context of growing geopolitical confrontation with the West, particularly the United States. Trade wars, tariffs, export controls on advanced technologies such as semiconductors, and anti-dumping measures targeting Chinese solar products have reinforced Beijing's perception of strategic vulnerability. These measures exposed the risks of dependence on foreign technologies and external markets at a moment when electricity, digital infrastructure, and advanced manufacturing were becoming increasingly intertwined.

The response has been the doctrine of "dual circulation": reducing reliance on foreign inputs while deepening the world's dependence on Chinese industrial capacity and exports. Within this framework, electrification is no longer simply an environmental or technological project. It becomes a strategy of economic sovereignty, aimed at securing industrial continuity, strengthening technological autonomy, and insulating China from external pressure.

China's Developmental Model

Electricity today underpins the entirety of China's development model. It is the foundation upon which the country's manufacturing system, export machine, and increasingly its technological and military ambitions operate. In an economy built around industrial scale and continuous production, electricity supply cannot be treated as a secondary policy concern. Power shortages, grid instability, or transmission bottlenecks directly threaten factory output, logistics chains, export performance, and ultimately economic growth itself. In this sense, uninterrupted electricity supply has become a strategic imperative for the Chinese state.

The role of electricity extends far beyond civilian industry. The electrification of advanced manufacturing, data infrastructure, artificial intelligence systems, semiconductor fabrication, and military-industrial production has deepened the dependence of national power on reliable and expandable electrical capacity. As China attempts to move up global value chains while reducing reliance on foreign technologies, the grid becomes inseparable from broader questions of industrial competitiveness and national security.

The electricity system, therefore, is not neutral infrastructure. It is a production system enabler embedded at the core of China's industrial policy. The expansion of transmission networks, ultra-high-voltage corridors, renewable integration, storage technologies, and smart grid systems are all tied to the long-term objective of sustaining China's industrial transformation while insulating it from external vulnerabilities.

China's domestic electricity model should thus not be understood simply as an energy transition story. It is more accurately a state-led project of structural transformation that integrates industrial policy, technological upgrading, energy security, and geopolitical strategy into a single infrastructural framework. At the centre of this transformation lies the grid itself—not as a technical detail, but as the architecture of power through which economic production, territorial integration, and strategic autonomy are organised.

International Projection: Exporting the Grid

Exporting the Grid

China's electricity strategy does not stop at its borders. As its domestic electrical system expanded and matured, Beijing increasingly began projecting this model outward through the Belt and Road Initiative (BRI) and broader overseas infrastructure investments. What China exports is not simply electricity generation capacity or renewable technology, but an entire electrical ecosystem: infrastructure, technical standards, grid architecture, operational practices, and increasingly the digital systems that manage and coordinate electricity flows.

At the centre of this vision lies the concept of "Global Energy Interconnection", a Chinese strategic framework that proposes the progressive integration of national and regional electricity systems into interconnected transnational grids. On the surface, the concept is presented as a technical solution to climate change and renewable integration: a globally connected system capable of transmitting renewable electricity across borders and continents. Yet embedded within this vision is also a geopolitical logic. Integration creates dependence, and dependence creates influence.

China's international electrical expansion therefore operates simultaneously as an industrial, technological, and strategic project. Through investments in foreign transmission infrastructure, acquisitions of stakes in electricity networks, exports of critical grid components, and the promotion of Chinese technical standards, Beijing is embedding itself within the energy infrastructures of other states. In many cases, Chinese firms are not merely building infrastructure; they are participating in the operation, maintenance, software management, and technological upgrading of electrical systems abroad.

The Scale of China's Global Electricity Expansion

The scale of this expansion is substantial. According to Wood Mackenzie, Chinese companies installed approximately 156 GW of power capacity across Belt and Road countries between 2013 and 2024 through 369 overseas power projects worth around USD 281bn. Roughly 70% of these projects are concentrated in Asia, followed by Africa at 15%, highlighting the BRI's focus on rapidly industrialising and energy-constrained regions.

Broader datasets suggest China's global energy footprint is even larger. According to Boston University's China's Global Power Database, Chinese capital had supported 648 overseas power plants by mid-2022, representing 1,423 generating units with a combined capacity of 171.6 GW. These investments include foreign direct investment, mergers and acquisitions, and large-scale debt-financed infrastructure supported by policy banks such as the China Development Bank and the Export-Import Bank of China.

Recent academic research similarly demonstrates the scale and complexity of China's overseas electricity strategy. A comprehensive dataset covering 412 BRI energy investments between 2013 and 2023 shows that Chinese financing increasingly targets power generation, transmission infrastructure, renewable energy systems, and grid modernisation across multiple strategic corridors.

Geography of the Electrical Belt and Road

China's overseas electricity strategy is not geographically uniform. Different BRI corridors reveal distinct strategic priorities shaped by local resource endowments, market demand, and geopolitical considerations.

In Central Asia and the Middle East, investments remain heavily concentrated in oil, gas, and pipeline infrastructure. Southeast Asia has seen major expansion in hydropower, gas-fired generation, and grid modernisation, while Sub-Saharan Africa displays a more diversified mix including solar, wind, hydropower, and transmission infrastructure.

The next phase of expansion is expected to focus increasingly on renewables. Pakistan, Indonesia, Vietnam, Saudi Arabia, and Malaysia are projected to account for substantial future growth in wind and solar installations, requiring an estimated USD 73bn in investment over the coming decade. Saudi Arabia alone plans to install 41 GW of solar and 13 GW of wind capacity.

"Advanced Capacity" and Developmental Logic

Chinese officials increasingly reject Western claims that the BRI merely exports industrial overcapacity. Instead, Beijing frames these projects as the export of "advanced capacity": renewable technologies, electrification systems, and industrial capabilities built around clean energy.

Projects such as the Cirata Floating Solar Plant in Indonesia illustrate this model. Built by Power China, the facility became Southeast Asia's largest floating solar installation and was designed both to expand Indonesia's renewable-energy capacity and reduce dependence on imported fossil fuels. Similar projects across Southeast Asia, Africa, Latin America, and the Gulf increasingly combine Chinese financing, engineering, equipment, and technical standards.

Supporters argue that this approach reflects economic complementarities rather than "dumping" or "debt-trap diplomacy." Many developing economies face rising electricity demand, fossil-fuel import dependence, and limited access to affordable financing for large-scale renewable infrastructure. China positions itself as uniquely capable of filling this gap through low-cost technology, integrated infrastructure delivery, and long-term financing.

At the same time, these projects clearly serve China's broader strategic objectives. Green-energy cooperation enables Chinese firms to maintain industrial scale, secure overseas demand for batteries, solar panels, and grid equipment, and expand China's influence through infrastructure integration.

Climate Finance and Strategic Influence

In parallel, the Belt and Road Initiative has increasingly become a vehicle for exporting RMB-denominated climate finance and expanding China's influence through green infrastructure. In 2024, the Bank of China issued nearly USD1bn in sustainability bonds to finance projects ranging from EV battery production in Hungary to wind power in Uzbekistan. Increasingly, China is using climate finance not simply as development lending, but as a form of strategic economic diplomacy.

By combining low-cost financing with dominance in clean technologies, Beijing positions itself not only as a supplier of infrastructure, but also as a provider of development capital. For many developing economies with limited access to Western financing, Chinese green lending offers an attractive alternative.

At the same time, China's growing role in electricity systems is generating rising concern in Europe and the United States. Electricity infrastructure is now deeply digitised and increasingly dependent on software, remote management systems, smart-grid coordination technologies, and communication modules. As Chinese firms become more deeply embedded within these systems, fears have emerged that long-term technological dependence could eventually translate into political leverage or systemic vulnerability.

In this sense, the BRI is evolving beyond traditional infrastructure diplomacy. It represents the international projection of an electrostate model in which grids, finance, standards, industrial policy, and digital systems become intertwined instruments of geopolitical influence.

The Grid as Geopolitical Infrastructure

China's growing role in global electricity systems is increasingly generating alarm in Europe and the United States. The concern is no longer limited to dependence on imported hardware or clean-energy supply chains. Rather, Western policymakers increasingly fear that China is becoming embedded within the operational architecture of electricity systems themselves. As a recent EUISS report warned, "China is already inside Europe's energy system," embedded not only in physical infrastructure, but also in connected devices, software systems, and grid operators.

These concerns overlap with wider debates in the United States around critical infrastructure resilience and warnings raised by institutions such as the North American Electric Reliability Corporation (NERC). The issue increasingly extends across multiple layers of the electrical system. China dominates major segments of global renewable supply chains, including solar wafers and wind turbines, while Chinese state-linked firms have acquired stakes in European transmission operators and electricity infrastructure in countries such as Portugal, Greece, Italy, Luxembourg, and Malta. European officials increasingly fear that these investments create not only economic dependencies, but also strategic influence over infrastructure planning, procurement decisions, and access to sensitive system data.

The most sensitive dimension, however, concerns digital control and connected technologies. Modern electricity systems rely heavily on software, smart-grid coordination systems, cloud connectivity, communication modules, and remotely managed devices. Particular concern has emerged around Chinese-made solar inverters—dominated globally by firms such as Huawei and Sungrow—which function not only as electrical components, but increasingly as digitally connected grid-management systems.

Western concerns intensified after US analysts identified unexplained communication components inside some Chinese-manufactured inverters, raising fears over potential remote-access vulnerabilities. European officials have since warned that disruptions involving connected solar infrastructure could trigger cascading failures across electricity networks. The issue is therefore less about the simplistic possibility of China "switching off" foreign grids, and more about the systemic vulnerabilities created by long-term dependence on externally controlled technologies.

At the same time, Beijing interprets Europe's growing emphasis on "strategic autonomy" differently. Chinese commentators increasingly argue that EU de-risking policies reflect excessive dependence on the United States in technology, trade, and security affairs. From this perspective, restricting Chinese technologies and supply chains is viewed as economically self-defeating, likely to increase costs, weaken industrial competitiveness, and slow Europe's energy transition.

European policymakers, however, increasingly see these dependencies as structural vulnerabilities rather than ordinary commercial relationships. The debate over Chinese involvement in grids, renewable supply chains, connected devices, and electricity infrastructure has therefore become part of a broader effort to reduce exposure to external leverage in strategically sensitive sectors.

This creates a growing strategic dilemma for Europe. Chinese technologies are often cheaper, scalable, and central to rapid electrification, yet deeper integration may also increase long-term technological and infrastructural dependence. As electricity becomes increasingly central to industrial competitiveness, AI infrastructure, military systems, and economic resilience, control over electrical networks is no longer viewed simply as an economic issue, but as a question of national security, sovereignty, and geopolitical power.