
STRATEGIC HORIZON
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The
Electro-Hegemon
China's Monopoly Over
the Clean Tech Supply Chain
The green transition does not end energy dependency.
It transfers it — from oil wells in Riyadh to solar factories in Xinjiang.
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July 2026
THE NEW ENERGY ARCHITECTURE
Geopolitics, Power Transition, and the Remaking of the Global Balance

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THE NEW ENERGY ARCHITECTURE — 6-Volume Series

Vol. 1 (published): The Twilight of Petro-States

Vol. 2 (this volume): The Electro-Hegemon — China's Clean Tech Monopoly

Vol. 3: The Hydrogen Chessboard | Vol. 4: The Nuclear Renaissance

Vol. 5: The Chokepoint Grid | Vol. 6: Energy Poverty and the Global South Revolt

Executive Summary

The global green transition is the most consequential industrial reorientation in a century. It is also, in structural terms, the creation of a new monopoly — one far more concentrated than anything the oil cartel ever achieved. China controls over 80% of every stage of solar panel manufacturing, from polysilicon to finished module. Chinese companies hold 70.4% of global electric vehicle battery deployment (by installation volume in 2025). CATL alone commands 39% of the world's EV battery market — a level of market concentration that would trigger immediate antitrust action in any other industry. China holds 65% of global solar patents and produces the world's most efficient perovskite solar cells.

This is not the free market producing its most efficient outcome. It is the result of a twenty-year state-directed industrial strategy — $130 billion in manufacturing investment since 2023 alone — that has methodically captured every chokepoint in the clean energy supply chain. The green transition that the West is pursuing to achieve energy independence from authoritarian fossil fuel exporters is being powered almost entirely by an authoritarian clean technology manufacturer. The dependency has not ended. It has changed its address.

Washington and Brussels have recognised this problem and responded with unprecedented protectionism — US tariffs on Chinese EVs of 100%, EU tariffs reaching 45%, the Inflation Reduction Act's domestic content requirements, and the EU's Net-Zero Industry Act targeting 40% domestic clean tech manufacturing by 2030. None of these measures has materially changed the underlying supply chain architecture. Europe's last major solar panel manufacturer, Meyer Burger, went bankrupt in 2025. The US has no meaningful wafer or cell production. The IEA estimates that meaningful diversification requires $120 billion in new manufacturing investment through 2030. At current investment rates, the best-case scenario per the IEA is that China's share falls from 80%+ to 60-75% — still dominant, and still an existential supply chain risk for Western energy security.

This is the central paradox of the electro-hegemony: the clean energy transition is accelerating, costs are falling, deployment is surging — and the primary beneficiary of all of that is the country that Western governments have identified as their principal strategic competitor.

Keywords: *China, solar manufacturing, CATL, BYD, EV batteries, polysilicon, wafers, clean tech supply chain, electro-hegemon, IRA, tariffs, de-risking, Meyer Burger, rare earth, technology cold war, perovskite, LFP, CATL Hungary*

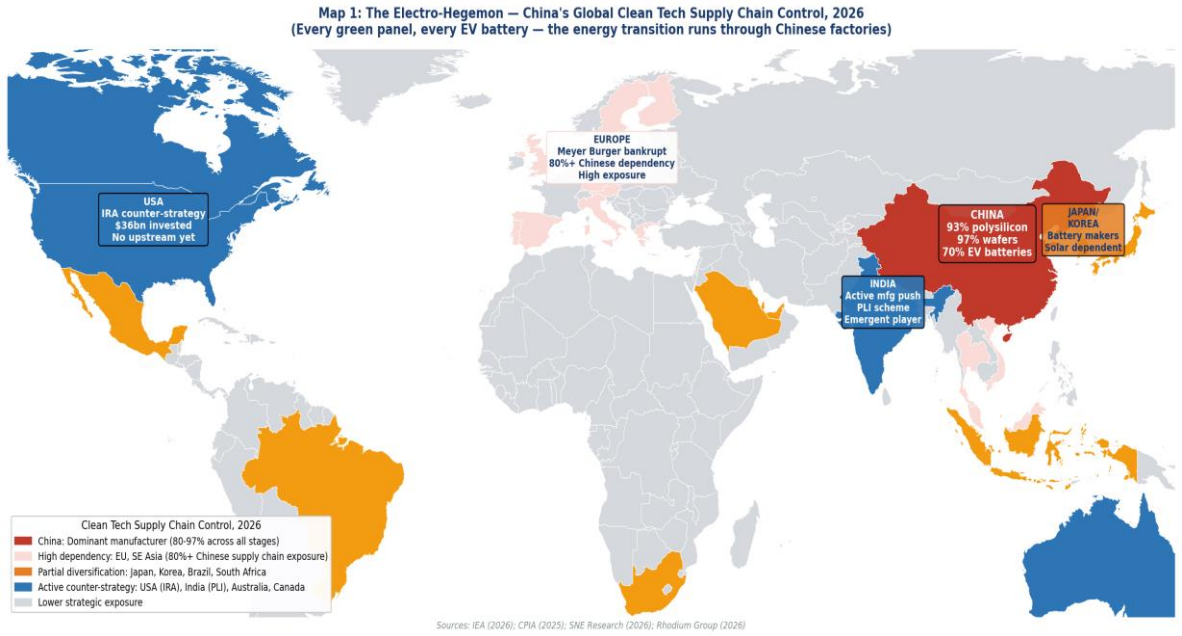
SECTION 1 The New Dependency — Clean Energy Without Energy Freedom

Energy security has been the dominant rationale for the global clean energy transition. The 2022 Russia-Ukraine war, which weaponised Europe's gas dependency and sent energy prices to record highs, accelerated the political consensus that renewable energy deployment was an energy security imperative, not merely a climate one. The 2026 Iran war's oil price shock has reinforced that consensus with even greater urgency. The argument is simple: electrification eliminates dependence on authoritarian fossil fuel exporters.

The argument is correct about the destination but dangerously incomplete about the route. Electrification does eliminate dependence on Russian gas and Gulf oil — at the cost of creating dependence on Chinese manufacturing. The clean energy supply chain is not a diversified, competitive global market. It is, in structural terms, a monopoly more concentrated than OPEC at its peak. OPEC at its most cohesive controlled approximately 40-50% of global oil production. China controls more than 80% of every stage of solar panel manufacturing. China controls 70.4% of global EV battery deployment by installed volume — and more than 80% of global battery cell production capacity. China processes approximately 60% of the world's lithium, 70% of its cobalt, and dominates rare earth refining at shares exceeding 85%.

The geopolitical implications of this concentration are not hypothetical. China has already demonstrated its willingness to use clean energy supply chain dominance as geopolitical leverage. In July 2023, Beijing imposed export restrictions on gallium and germanium — two materials critical for semiconductors, solar cells, and military electronics — in direct retaliation for US semiconductor export controls. In 2024, China tightened graphite export controls, affecting the anode material that every lithium-ion battery requires. These were not accidental disruptions. They were deliberate signals that China's supply chain dominance in clean technology is not merely an economic asset — it is a strategic weapon that can be deployed with the same logic that Russia deployed gas.

The Western policy establishment has largely framed the China clean tech dependency as a de-risking challenge — a supply chain diversification problem to be solved through targeted industrial policy. This framing understates the structural depth of the problem. Two decades of state-directed investment, $130 billion deployed since 2023 alone, and learning-curve advantages accumulated through a decade of manufacturing at scale have created competitive advantages that cannot be neutralised by tariffs and subsidies on a five-year timeline. The IEA's most optimistic scenario has China's share of solar manufacturing falling from 80%+ to 60-75% by 2030. That is not diversification. That is a somewhat less catastrophic concentration.



Map 1: The Electro-Hegemon — China's Global Clean Tech Supply Chain Control, 2026. Every green panel and every EV battery — the energy transition runs through Chinese factories. Sources: IEA (2026); CPIA (2025); SNE Research (2026).

SECTION 2 The Solar Colossus: How China Captured Every Chokepoint

The story of China's solar manufacturing dominance is a story of deliberate strategic sequencing. Beginning in the early 2000s, when Germany's feed-in tariff programme created massive global demand for solar panels, China identified solar manufacturing as a strategic industrial sector and began deploying the full toolkit of state-directed capitalism: land at below-market rates, subsidised electricity, tax incentives, preferential credit from state banks, and government procurement commitments that provided the demand floor for new capacity.

The result, measured in 2024 data, is staggering. China produced approximately 93% of the world's polysilicon — the fundamental raw material from which every silicon solar cell is made. It produced approximately 97% of silicon wafers, the crystalline silicon substrates that polysilicon is processed into. It produced 92% of photovoltaic cells, and 86% of finished solar modules. At every stage of the solar supply chain, from raw material to finished panel, Chinese manufacturers hold shares that would be considered monopolistic in any regulated market. The IEA has confirmed that China's share in all manufacturing stages of solar panels exceeds 80%, and noted that this dominance is more than double China's share of global photovoltaic demand — meaning the overcapacity is structural and deliberate, designed for global export dominance rather than domestic consumption.

The scale of this overcapacity is itself a competitive weapon. By 2026, China's manufacturing capacity for solar modules exceeds 1,200 GW — roughly double global annual installation demand of approximately 600 GW. This overcapacity has driven solar module prices to below 1 RMB per watt — a level at which almost no producer outside China can compete. Module prices fell 50% in 2023 and a further 25% in 2024. Polysilicon prices crashed from RMB 230,000 per tonne in 2022 to RMB 40,500 per tonne by early 2026 — a decline of over 80%. The top 22 Chinese solar manufacturers posted combined losses of CNY 10.5 billion ($1.5 billion) in Q1 2026. LONGi, Tongwei, and TCL Zhonghuan have now logged ten consecutive quarterly losses. And yet the capacity keeps running, because the strategic calculus is not quarterly profit — it is market capture.

The casualties of this pricing strategy include every attempt at non-Chinese solar manufacturing at scale. Europe's Solarhybrid, Q-Cells Germany, and Solarworld all collapsed in the first wave of Chinese competition in the 2010s. The most recent victim is Meyer Burger — Switzerland-based, German-manufacturing, and marketed as Europe's premium solar panel producer — which announced bankruptcy and the closure of its Freiberg facility in 2025, unable to compete with Chinese module prices even with partial EU and German state support. The US, protected by 50% tariffs on Chinese solar cells and 100% on Chinese EVs, has attracted significant manufacturing investment under the IRA, but currently has no meaningful domestic wafer or cell production. It assembles modules, but the upstream supply chain remains overwhelmingly Chinese.

China's technological position is not merely one of manufacturing scale — it is increasingly one of innovation leadership. China holds approximately 65% of global solar patents as of 2024, up from just 13% in 2004. Chinese manufacturers led the transition from PERC (Passivated Emitter Rear Cell) to TOPCon (Tunnel Oxide Passivated Contact) technology — a transition that drove conversion efficiency improvements and saw TOPCon go from 8% global market share to 85% of global module shipments in just three years. LONGi Green Energy holds the world efficiency record for perovskite/silicon tandem cells at 34.85%, as certified by the National Renewable Energy Laboratory in January 2026. The West is not catching up on technology — it is falling further behind.

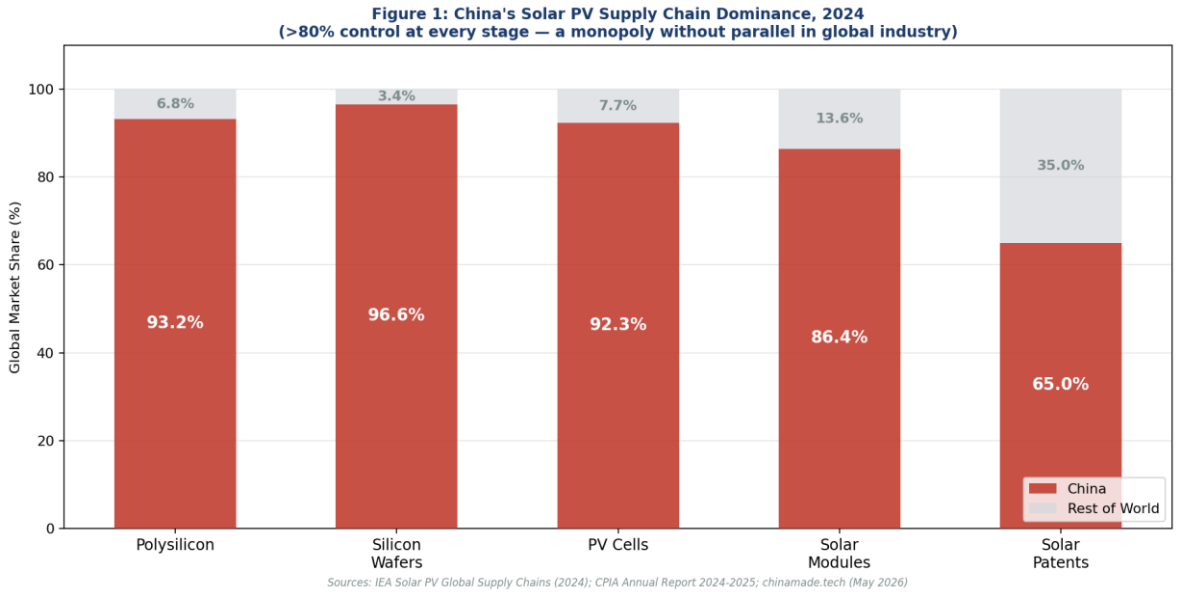


Figure 1: China's Solar PV Supply Chain Dominance, 2024. China controls 86-97% at every manufacturing stage — a monopoly without parallel in global industry. Sources: IEA Solar PV Global Supply Chains (2024); CPIA Annual Report 2024-2025.

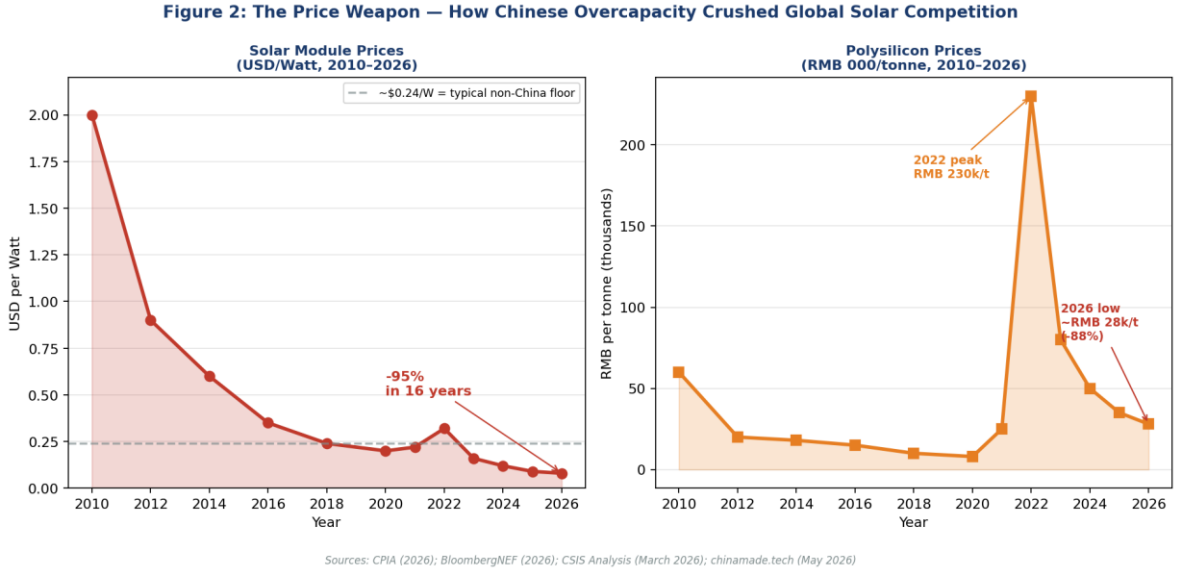


Figure 2: The Price Weapon — How Chinese Overcapacity Crushed Global Solar Competition. Solar module prices fell 95% in 16 years; polysilicon crashed 88% from peak to 2026. Sources: CPIA (2026); BloombergNEF (2026); CSIS Analysis (March 2026).

SECTION 3 The Battery Empire: CATL, BYD, and the Electrochemical Hegemony

If solar manufacturing represents China's absolute dominance of the upstream clean energy supply chain, the electric vehicle battery market represents its dominance of the downstream — the technology that converts renewable electricity into mobility and storage capacity that can replace fossil fuel consumption in transportation and grid management.

The numbers are unambiguous. In 2025, Chinese EV battery manufacturers controlled 70.4% of global EV battery installations — up from approximately 50% in 2021. CATL alone commanded 39.2% of the global market, with 464.7 GWh of installations in 2025. In the first five months of 2026, CATL's market share reached 40.2%, with seven of the world's top ten EV battery manufacturers Chinese. Together, CATL and BYD held 54.6% of the global market in January-May 2026. The level of concentration is extraordinary: CATL's 39% global market share in a $92.7 billion market represents a commercial dominance with no close parallel in any major industrial sector at global scale.

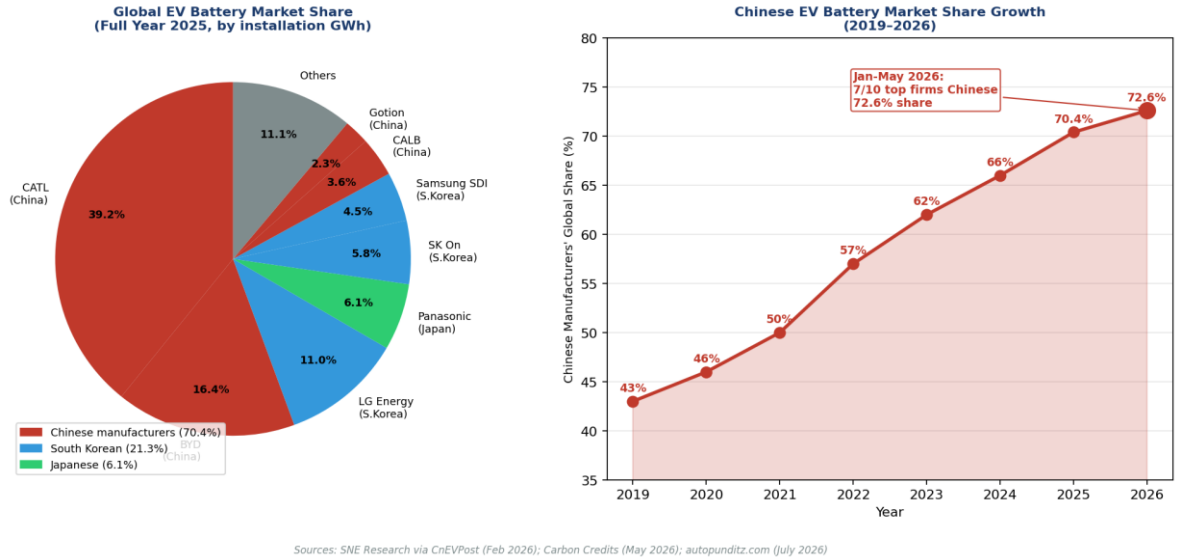
CATL's competitive position is not merely one of scale — it is built on a vertically integrated supply chain and an innovation model that has consistently outpaced Western competitors. In fiscal year 2025, CATL posted

record net profit of CNY 72.2 billion (approximately $10 billion) — a 42% year-on-year increase achieved despite the global EV demand slowdown and intense domestic competition. Its customer roster spans Chinese brands (Zeekr, Li Auto, NIO, Xiaomi) and Western majors (Tesla, BMW, Mercedes-Benz, Volkswagen, Stellantis) — meaning that buying a premium German or American electric vehicle increasingly means relying on a Chinese battery.

BYD occupies a uniquely dangerous competitive position from the Western strategic perspective. Unlike CATL, which primarily supplies batteries to other manufacturers, BYD is a vertically integrated EV producer — it makes its own batteries, its own chips, its own motors, and its own vehicles. This vertical integration gives it a cost structure that Western automakers cannot replicate on any near-term timeline. BYD sold more than 130,000 vehicles outside China in November 2025 alone — nearly four times the previous year's level — representing the vanguard of a Chinese EV export surge that is reshaping automotive markets from Southeast Asia to Europe. BYD's competitive expansion in the EU market, even with tariffs of 17% on top of existing duties, reflects the degree to which the BYD cost advantage is structural rather than marginal.

The battery chemistry dimension adds further strategic depth. China dominates lithium iron phosphate (LFP) battery chemistry — a chemistry that is increasingly preferred for mass-market EVs and grid storage because of its lower cost, better cycle life, and reduced fire risk compared to nickel manganese cobalt (NMC) alternatives. In 2025, LFP batteries represented 81.2% of Chinese EV battery installations. As LFP becomes the dominant global chemistry — driven by China's technology lead and cost advantage — Western dependence on Chinese battery manufacturing will deepen, not diminish.

Figure 3: China's EV Battery Empire — CATL, BYD and the Electrochemical Hegemony, 2025-2026



Sources: SNE Research via CnEVPost (Feb 2026); Carbon Credits (May 2026); autopunditz.com (July 2026)

Figure 3: China's EV Battery Empire — CATL, BYD and the Electrochemical Hegemony, 2025-2026. Chinese companies hold 70.4% of global EV battery market; CATL alone commands 39.2%. Sources: SNE Research via CnEVPost (Feb 2026); Carbon Credits (May 2026).

The CATL Dominance — Key Facts

CATL global market share 2025: 39.2% (464.7 GWh installed) — rising to 40.2% in Jan-May 2026

CATL FY2025 net profit: CNY 72.2 billion (+42% YoY) — record profit despite global EV demand slowdown

CATL customers include: Tesla, BMW, Mercedes-Benz, Volkswagen, Stellantis — the world's premium automakers

CATL Hungary plant: first European gigafactory came online end of 2025 — now inside the EU customs area

7 of world's top 10 EV battery manufacturers are Chinese (Jan-May 2026 data)

SECTION 4 The De-Risking Illusion: Western Counter-Strategies and Their Limits

Western governments have identified China's clean tech supply chain dominance as a strategic vulnerability and responded with the most significant industrial policy interventions since the post-war reconstruction era. The US Inflation Reduction Act, the EU's Net-Zero Industry Act, and a cascade of tariff measures represent genuine commitments of political capital and financial resources. The honest assessment of their effectiveness through mid-2026 is: significant progress in specific segments, fundamental supply chain architecture unchanged.

The US IRA's domestic content requirements and advanced manufacturing production credits have catalysed a genuine American solar and battery manufacturing expansion. Over $36 billion has been invested in US solar manufacturing since the IRA's passage, and domestic module assembly capacity has expanded dramatically. American factories are now capable of producing enough panels to meet nearly all US installation demand. The weakness is in the upstream: the US has no meaningful domestic polysilicon, wafer, or cell production. The modules assembled in Georgia, Ohio, and Texas depend on wafers from China or Chinese-owned facilities in Southeast Asia (Vietnam, Malaysia, Thailand). The IRA has built a downstream industry on top of an upstream dependency that remains structurally unchanged.

The EU's position is, if anything, more exposed. The EU's Net-Zero Industry Act targets 40% of clean technology demand met by European manufacturing by 2030, and sets a goal of 30 GW of European solar manufacturing at each stage of the value chain. Against the reality of Meyer Burger's bankruptcy, an energy cost structure 3x China's that makes upstream manufacturing economically marginal, and a capital deployment rate that falls well short of the IEA's estimated $120 billion diversification requirement, these targets appear aspirational rather than operational. European clean tech manufacturing support funds committed through 2026 total approximately $15 billion — a meaningful sum, but one-eighth of the IEA's estimated requirement for meaningful diversification. The EU's primary clean energy supply chain response has been tariffs: up to 45% on Chinese EVs (announced in 2024), and anti-dumping measures on Chinese solar panels. Tariffs raise the cost of Chinese products; they do not build European manufacturing capacity.

The Southeast Asia rerouting problem illustrates the structural limits of tariff-based de-risking. The US responded to earlier Chinese solar tariffs by sourcing panels from Vietnam, Malaysia, and Thailand. This appeared to be diversification. In reality, the solar panels assembled in Vietnam and Malaysia use Chinese wafers, Chinese cells, and Chinese equipment — the manufacturing operations are Chinese-owned or Chinese-financed, operating outside China to avoid tariff barriers rather than to genuinely diversify supply chain control. The US Commerce Department's anti-circumvention investigations into Southeast Asian solar imports confirmed this dynamic, and the resulting tariff extension created supply disruptions without creating domestic supply chain alternatives. The lesson: tariffs that are not accompanied by domestic manufacturing investment create higher-cost Chinese supply chains, not non-Chinese ones.

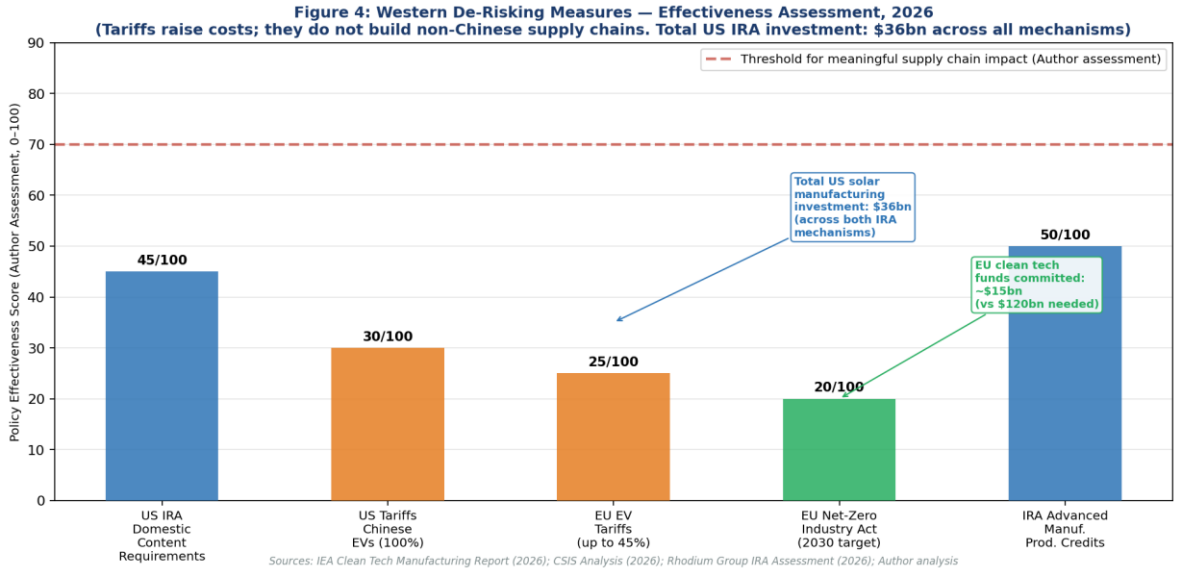


Figure 4: Western De-Risking Measures — Effectiveness Assessment, 2026. Tariffs raise costs; they do not build non-Chinese supply chains. The IRA domestic content approach is the most effective instrument but lacks upstream investment. Sources: IEA (2026); CSIS Analysis (2026); Author analysis.

SECTION 5 The Tech Cold War: From Trade Measures to Deep Decoupling

The tariff wars and industrial policy competitions of 2022-2026 represent the surface layer of a deeper structural contest — a technology cold war in which the United States and China are competing not just for market share in existing technologies but for control of the next generation of clean energy technologies that will define the energy system of the 2030s and beyond.

China's strategic investment in next-generation solar technology is particularly alarming for Western competitors. Perovskite solar cells — widely considered the most promising next-generation photovoltaic technology, offering potential efficiencies above 30% at dramatically lower manufacturing cost than silicon — are a domain in which China has moved from follower to leader. LONGi's world-record 34.85% efficiency perovskite/silicon tandem cell represents the cutting edge of the technology globally. Chinese patent filings in perovskite technology have surged, mirroring the dynamic that played out in PERC and TOPCon — in which China identified a technology transition, acquired the patents, built the manufacturing scale, and drove prices below the threshold at which any competitor could profitably enter the market.

Solid-state batteries — the most promising next-generation battery technology, offering higher energy density, faster charging, and improved safety compared to liquid-electrolyte lithium-ion — represent the critical battleground for the 2030s EV market. CATL and BYD are investing heavily in solid-state development, with CATL announcing plans for limited solid-state battery deployment in premium vehicles by 2027. Toyota, Samsung SDI, and QuantumScape are the primary Western competitors. The race is genuine and its outcome is not predetermined. But the structural advantage that China holds — in upstream materials, in manufacturing infrastructure, in the domestic EV market that provides demand pull for innovation, and in government support for strategic industries — means that the default trajectory, absent deliberate policy intervention, points toward Chinese leadership in solid-state batteries as in every preceding battery chemistry.

The gallium, germanium, and graphite export restrictions that China has deployed since 2023 represent the weaponisation dimension of the technology cold war. These restrictions demonstrate that China is willing to use its supply chain chokepoints as retaliatory instruments — not (yet) in a way that causes catastrophic disruption, but in a way that creates uncertainty, raises costs, and signals that the option of more severe restrictions exists. The strategic logic is deterrence: by making it clear that US semiconductor export controls and allied clean tech tariffs will be met with countermeasures that impose economic costs on Western clean energy deployment, Beijing is attempting to make the technology cold war too expensive for Washington to sustain at full intensity.

China's Supply Chain Weaponisation — Export Restrictions Timeline

July 2023: Export restrictions on gallium and germanium — critical for semiconductors, solar cells, military electronics

2024: Graphite export controls tightened — affects every lithium-ion battery anode globally

2025: Rare earth processing export permits tightened — affecting motor magnets for EVs and wind turbines

Strategic signal: each restriction is a demonstration that clean tech supply chain dominance can be deployed as geopolitical leverage

Deterrence logic: making Western clean tech tariffs and semiconductor export controls too costly to sustain at full intensity

SECTION 6 Strategic Policy Imperatives: Navigating the Electro-Hegemony

Western governments face a genuine strategic dilemma in responding to China's clean tech supply chain dominance. The dilemma has three horns: accepting the dependency (energy security risk), paying the cost of diversification (higher clean energy costs that slow the transition), or delaying the transition (climate risk). All three horns are real. The policy challenge is to minimise the worst outcomes across all three simultaneously, recognising that the optimal response cannot fully avoid any of them.

First, a realistic assessment of timelines is essential. The IEA's analysis makes clear that meaningful reduction of Chinese clean tech supply chain dominance — from 80%+ to 60-75% in solar — requires $120 billion in new investment through 2030 and the mobilisation of manufacturing capacity in regions where labour costs, energy costs, and capital availability are all structurally disadvantaged relative to China. A 2030 target for meaningful supply chain diversification is optimistic. A 2035 target is achievable with sustained policy commitment. Western industrial policy must be calibrated to this realistic timeline rather than to politically motivated 2030 ambitions that create stranded assets when targets are missed.

Second, the distinction between acceptable and unacceptable dependency requires careful analysis. Not all Chinese clean tech dependency carries the same strategic risk. Dependence on Chinese solar modules for domestic rooftop installation carries different risk than dependence on Chinese wafers for utility-scale solar supporting military bases. Dependence on CATL batteries in commercial EVs carries different risk than dependence on Chinese battery supply chains for defence electric vehicles. A differentiated de-risking strategy that prioritises strategic applications — defence, critical infrastructure, energy storage systems with national security implications — over commercial applications, would allow Western governments to focus scarce manufacturing investment capital where it matters most strategically.

Third, the IRA's architecture should be expanded and deepened, not abandoned. The domestic content requirements and advanced manufacturing credits in the IRA represent the correct structural approach to incentivising domestic manufacturing — they create demand pull for upstream investment that tariffs alone cannot generate. Extending IRA-style incentives to polysilicon, wafer, and cell manufacturing specifically — the upstream stages where domestic production is currently absent — would address the fundamental gap in the existing policy framework. The political challenge is that these upstream investments take 5-7 years to produce commercially viable output and require sustained policy commitment across multiple administration cycles.

Fourth, alliance coordination is essential and currently insufficient. The US, EU, Japan, South Korea, India, and Australia are all pursuing clean tech manufacturing expansion largely in isolation from each other, creating duplicative investment in downstream assembly while leaving upstream chokepoints unaddressed. A coordinated allied approach — through AUKUS, the Quad, the G7 Critical Minerals Action Plan, or a purpose-built clean tech supply chain alliance — that allocates upstream manufacturing investment across allies according to comparative advantage (Australia for polysilicon feedstock, Japan for cell manufacturing technology, South Korea for battery chemistry, India for module assembly) would achieve genuine diversification more efficiently than the current national-level approaches.

A dimension of the electro-hegemony that has received insufficient attention in Western corporate and regulatory discourse is its ESG implications. Companies across Europe and North America are improving their Scope 2 and Scope 3 emissions metrics by purchasing Chinese solar panels and CATL batteries — and receiving credit for doing so under ESG frameworks, sustainability ratings, and EU Taxonomy compliance assessments. The ESG paradox is that the clean technology being deployed to improve corporate sustainability scores is manufactured using an energy mix that is approximately 60% coal-fired, in a country where independent environmental and labour auditing is structurally constrained. The Xinjiang supply chain risk — Xinjiang province accounts for approximately 40% of global polysilicon production, and credible evidence of forced labour in the region has been documented by multiple independent investigators — represents a material Social pillar (S) risk under ESRS, GRI, and SASB standards that most corporate ESG disclosures are not adequately capturing. A solar panel that reduces a company's operational emissions while being manufactured using coal energy and potentially exposed to forced labour supply chain risks does not represent the ESG performance improvement that the disclosure frameworks currently imply. Sustainability leaders engaging with the clean tech supply chain need a more granular, upstream-aware ESG analysis framework — one that accounts for the carbon intensity of manufacturing, not merely the carbon intensity of operation.

The fundamental strategic insight is this: the energy transition is not an escape from geopolitical dependency — it is a renegotiation of which dependencies matter and with whom. Western governments that treat clean tech supply chain diversification as a secondary industrial policy objective, subordinate to the primary goal of maximising deployment speed, are accepting a dependency on Chinese clean technology that will be harder to unwind in 2035 than it is today. The time to build non-Chinese supply chains is before Chinese dominance becomes so entrenched that it is physically impossible to challenge — not after.

Table 1: The Electro-Hegemon Scorecard — China's Clean Tech Dominance by Segment, 2026
(Note: EV Batteries row shows >80% production capacity share vs 70.4% deployment/installation share — both metrics are relevant)

Technology Segment	China's Global Share	Key Chinese Players	Western Gap	Strategic Risk Level	Diversification Timeline
Polysilicon	~93%	Tongwei, Daqo, GCL	No scale production outside China	CRITICAL	2030–2035
Silicon Wafers	~97%	LONGi, TCL Zhonghuan, GCL Tech	Near-zero non-Chinese capacity	CRITICAL	2032+
PV Cells	~92%	Tongwei, Aiko, JA Solar	Meyer Burger bankrupt (2025)	CRITICAL	2030–2035
Solar Modules	~86%	Jinko, LONGi, Trina, JA Solar	US assembly; EU negligible	HIGH	2028–2030
EV Batteries (cell production)	>80% capacity 70.4% installs	CATL, BYD, CALB, Gotion	LG, Samsung SDI, Panasonic (declining)	CRITICAL	2030–2035
Rare Earth Refining	85%+	China Northern RE, Shenghe Resources	US, Australia upstream; no refining at scale	CRITICAL	2030+
Solar Patents	~65%	LONGi, Tongwei, Jinko Solar	Japan/US legacy; losing ground fast	HIGH	Structural gap
EV Market (global)	70%+	BYD, SAIC, Geely, NIO, Xpeng	Legacy OEMs transitioning late	MEDIUM-HIGH	2027–2030

Sources: IEA (2024-2026); CPIA (2025-2026); SNE Research (2026); chinamade.tech (2026); Author analysis

Table 1: The Electro-Hegemon Scorecard — China's Clean Tech Dominance by Segment, 2026. Critical risk (red) at polysilicon, wafers, cells, and EV batteries; IEA estimates $120bn needed for meaningful diversification. Sources: IEA (2026); CPIA (2026); SNE Research (2026).

Conclusion

China's clean tech supply chain monopoly is the defining structural feature of the global energy transition. It is simultaneously an environmental success story — Chinese manufacturing has driven solar costs down 90% in a decade, enabling deployment at a scale that would have been impossible under a diversified, higher-cost supply chain — and a geopolitical challenge of the first order. The energy transition that the West is pursuing to achieve freedom from authoritarian fossil fuel dependency is being manufactured, largely, by an authoritarian clean technology hegemon.

The electro-hegemony is not inevitable. China's competitive position can be eroded — through sustained allied investment in upstream manufacturing, through technology competition in next-generation chemistries, through coordinated demand-side policies that create the market pull for non-Chinese supply chains. But the timeline for meaningful change is a decade, not five years, and the investment required is measured in hundreds of billions, not tens of billions. Western governments that acknowledge this reality and calibrate their industrial policy ambitions accordingly will make genuine progress. Those that respond with tariffs, political targets, and wishful thinking about near-term supply chain transformation will find themselves, in 2030, still dependent on Chinese wafers, Chinese batteries, and Chinese technology — and wondering why.

Volume 3 of the New Energy Architecture series will examine the hydrogen economy — the one domain of clean energy in which no single country has achieved the kind of dominance that China holds in solar and batteries, and in which the geopolitical competition for supply chain control is just beginning.

The New Energy Architecture — Series Overview

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Vol. 2 (this volume): The Electro-Hegemon — China's monopoly over the clean tech supply chain

Vol. 3: The Hydrogen Chessboard — New energy geographies and the molecule of the future

Vol. 4: The Nuclear Renaissance — SMRs, Rosatom BOO models, and atomic sovereignty

Vol. 5: The Chokepoint Grid — Energy infrastructure as target of hybrid warfare

Vol. 6: Energy Poverty and the Global South Revolt — The fractured transition

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