Differentiated De-risking

AN EU APPROACH TO MANAGING CHINA'S CLEANTECH DOMINANCE

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Europe will remain deeply economically intertwined with China, and slowing Europe's energy transition would do little to reduce that interdependence. But only some of Europe's dependencies on Chinese clean energy technology create strategic vulnerability, and the political debate rarely distinguishes them. The EU needs a policy of differentiated de-risking: one that assumes neither reciprocity nor benign intent from Beijing, matches its response to the type of dependency at stake, protects the control layers of its energy system first and uses the leverage it already holds.

Introduction and Summary

In October 2026, EU–China trade relations entered a new phase. Brussels and Beijing agreed a package in which Chinese hybrid-vehicle exports to the EU will be capped through a safeguard quota, expected to cut projected exports by more than half over the next four years.[1] China also agreed to keep facilitating export licences for rare earths and permanent magnets. In return, the EU committed to working with member states on facilitating priority licences to China in dual-use sectors. At the European Council the following week, EU leaders pressed the Commission to prepare new safeguards with quotas and tariffs to shield the chemicals and machinery industries.[2]

These developments make the question of how Europe manages its economic and technological relationship with China more immediate than ever. Decisions that were until recently discussed under the broad heading of "de-risking" are taking concrete form

[1] Financial Times, 2026, **China and EU avert trade conflict with 'understanding' on hybrid cars**

[2] Politico, 2026, **Von der Leyen eyes curbs on Chinese chemicals, machinery next**

through safeguards, licences and notification procedures. The deals reached in early October also show how much remains unresolved. The deal on hybrid vehicles responds mainly to trade-balance and industrial pressures, while the rare-earth arrangement offers faster, more predictable licensing but leaves Europe's underlying dependence unchanged.[3]

As the EU makes more of these choices, it needs a clearer basis for deciding which clean technology dependencies create genuine vulnerabilities, which can be managed, where alternatives need to be built and where Europe can use its own leverage. The framework developed in this briefing is intended to help structure those decisions, introducing two risk ladders to distinguish Europe's dependencies on China by mechanism, timing and severity:

- The **energy-system ladder** runs from passive, replaceable equipment (PV modules) through supply bottlenecks (cells, magnets, transformers) and remotely accessible devices (inverters, EV chargers, heat pumps) to critical control and recovery systems.
- The **industrial ladder** runs from efficient commodity imports, through competitive pressure on European sectors and strategic capability erosion, to structural lock-in.

Read together, they yield four strategic postures: use Chinese scale where it lowers costs; govern unavoidable dependencies while diversifying; make an open industrial policy case where European capability is worth defending; and apply the strictest rules where industrial value and system security overlap.

Applying this framework consistently is as much a political and governance problem as an analytical one: the costs fall on different stakeholder groups and member states, and the instruments are spread across institutions. It also requires "unboxing China", engaging the actor that controls a dependency, whether firm, province or central government, and recognising where Europe holds leverage of its own through market access, regulation, procurement and investment conditions.

Eight principles for managing Europe's clean energy technology interdependence with China

1. Diagnose the vulnerability before choosing the instrument.
2. Let the risk ladders inform the strategic posture.
3. Protect the energy system's control and recovery layers first.
4. Retain and build strategic capability rather than capacity for its own sake.
5. Convert European market access into collective leverage.

[3] These choices will also interact, as restrictions in one sector can trigger countermeasures elsewhere, making proportionality and Europe's capacity to absorb disruption part of the calculus from the outset.

6. Match engagement to decision rights and to ultimate authority.
7. Address different aspects of resilience across different time horizons.
8. Build interdependence with third partners.

The missing logic in Europe's clean technology relationship with China

China is now embedded in the material architecture of the global energy transition. The IEA's Energy Technology Perspectives 2026 estimates that China accounts for around 85% of solar supply-chain production capacity and 80% of lithium-ion battery capacity, with still higher shares in PV wafers and battery anode materials.[4] These concentrations are the result of sustained industrial policy, large domestic markets, manufacturing ecosystems, infrastructure and fierce competition among Chinese firms. They have also cut technology costs and accelerated the pace of global clean energy deployment.

These global trends also hold true for Europe. Parts of Europe's energy system have already been built with the help of Chinese technologies, components and materials. More than 97% of solar panels deployed in Europe have been imported, mainly from China. Chinese manufacturers have been supplying around 70% of solar inverters installed in Europe in recent years, with Huawei and Sungrow alone having remote access capabilities associated with 168 GW of European PV capacity.[5] Chinese battery manufacturers accounted for more than half of the EU electric vehicle battery market in 2025, almost twice their share two years earlier.[6] Some dependencies also sit below the final product: Europe remains a major manufacturer of wind turbines and electric motors, for example, but China supplies around 98% of the EU's rare-earth permanent magnets.[7]

This means Europe does not face a simple choice between dependence and self-sufficiency. Chinese modules, batteries and other equipment can strengthen energy security by accelerating the replacement of imported oil and gas. At the same time, reliance on a single production ecosystem can interrupt deployment or repair, expose European firms to price pressure they cannot survive, and allow remotely managed devices to accumulate into systemically relevant infrastructure.

These risks are not hypothetical. Chinese restrictions on rare earths and permanent magnets in 2025 were sufficient to shut down several automotive production lines and

[4] IEA, 2026, **Energy Technology Perspectives 2026: Supply chain risks and industrial competitiveness**

[5] ESMC, 30 April 2025, **Restrict Remote Access of PV Inverters from High-Risk Vendors**; Kate Abnett, Susanna Twidale and Nina Chestney, 11 June 2026, **EU curbs on Chinese inverters risk slowing solar rollout over security fears**, Reuters.

[6] IEA, 2025, **Global EV Outlook 2026 – Electric vehicle batteries**

[7] PERMANET, 9 December 2024, **Building Europe's Circular Rare Earth Magnet Supply Chain**

plants in Europe while firms waited for export licences.[8] The risks, however, differ in mechanism, timing and severity depending on the technology component in question. A European-made wind turbine can still depend on Chinese rare-earth permanent magnets. Conversely, a Chinese-made solar module is largely passive once installed, whereas the inverter attached to it may remain remotely accessible and perform functions relevant to grid operation. The security implications of these dependencies are therefore different and require different policies to manage them.

The European policy toolbox to respond to this challenge has expanded considerably in recent years, spanning defensive and offensive measures.[9] Trade defence has been applied to Chinese clean technology, most prominently through countervailing duties on Chinese EVs. The Foreign Subsidies Regulation has been used against Chinese bidders and suppliers in solar and wind. Alongside these sit stronger investment-screening arrangements, the Anti-Coercion Instrument and a growing cybersecurity layer. On the offensive side, the Net-Zero Industry Act sets an ambition for EU manufacturing capacity in strategic net zero technologies to approach 40% of annual deployment needs by 2030.[10] The Critical Raw Materials Act establishes benchmarks across extraction, processing and recycling.[11] The Battery Booster Facility provides €1.5bn in zero-interest loans for battery cell projects. On the demand side, the proposed Industrial Accelerator Act would introduce "Made in Europe" and low-carbon requirements for sectors and technologies including batteries, solar, wind and heat pumps, apply them to public procurement and public support schemes and set conditions for major foreign direct investments in strategic sectors.

The gap is not a lack of instruments. It is the lack of a sufficiently differentiated logic for deciding which dependencies need which response. Headline manufacturing targets often use European production as shorthand for resilience even when critical dependencies remain elsewhere in the supply chain or in the operation of the asset. Building capacity in Europe does not automatically make it resilient. European production will only strengthen resilience if it can remain commercially viable given Europe's energy and labour costs.

The external dimension is equally important. Europe cannot reproduce every relevant supply chain domestically, and doing so would be neither economically realistic nor necessarily more secure. Resilience can also come from diversified production outside of Europe, long-term partnerships, co-investment, interoperable standards, strategic inventories and the ability to switch suppliers. So far, the external leg of the EU's clean

[8] CLEPA, 4 June 2025, **Urgent action needed as China's export restrictions on rare earths disrupt European automotive supply chains**

[9] Defensive tools shield European markets and infrastructure from unfair competition, coercion and security risks. Offensive measures aim to build capabilities Europe currently risks losing.

[10] European Commission, 2024, **Net-Zero Industry Act**

[11] European Commission, 2024, **Critical Raw Materials Act**

technology resilience framework remains fragmented across several initiatives and far less developed than the domestic capacity agenda.

Without a clearer logic, Europe will struggle to identify genuine points of leverage. Instead, the loudest political concern of the moment (be it Chinese overcapacity, transition costs, cybersecurity or the competitiveness of European industry) will determine which instrument is deployed.

Unpacking vulnerability

Europe has dependencies everywhere; dependency is the most basic type of relationship between economies and political systems. But only some dependencies create strategic vulnerability. A dependency becomes a strategic vulnerability when disruption, manipulation or the loss of an industrial capability could remove an essential function, and when Europe lacks a credible way to absorb the shock or reverse the loss (see Table 1).

Table 1: Two sets of questions to test whether a particular technological or industrial dependence creates a strategic vulnerability, and of what kind

What kind of vulnerability?	Core questions
Energy-system security	▸ **Consequence:** Could disruption or manipulation impair deployment, normal operation, system stability, repair or restoration, and would the effect remain local or become systemic? Is the same input or capability also critical to defence or other essential systems? ▸ **External leverage:** What can the supplier or its country of origin withhold or control through concentrated supply, servicing, licences, software, data or remote access, and would disruption create simultaneous pressure across energy and other strategic sectors? ▸ **Recovery:** Can Europe continue operating and restore the function through stocks, alternative suppliers, interoperability, offline operation or local servicing, including under conditions of competing civilian and defence demand, and how long would this take?
Industrial capability	▸ **Strategic value:** What would Europe lose beyond current output and employment: skills, innovation, repair and integration capacity, tech spillovers, influence over standards or access to future value or capabilities with critical defence applications? ▸ **Erosion and lock-in:** Would foreign control over inputs, machinery, intellectual property, data, standards or market scale make the loss of European capability self-reinforcing? ▸ **Reversibility:** Could Europe or its partners reconstruct the capability at an acceptable cost and within a useful timeframe?

An inexpensive solar module may carry limited operational risk. Whether European module manufacturing, however, warrants industrial support is a separate question about the capability at stake, its commercial viability and the cost to deployment. An inverter may represent a relatively small share of project value while giving its supplier continued access to a system-relevant asset. The loss of a European factory is not automatically a strategic vulnerability: the capability at stake must have wider value, and losing it must materially narrow Europe's future choices. Chinese vehicle imports are primarily an industrial-capability question, while connected vehicles and charging systems can also become energy-system relevant where large fleets are aggregated or remotely controlled.

Most of these characteristics apply not only to Chinese clean technologies. A heat pump, EV charger or battery may look like ordinary consumer equipment. But once millions of devices participate in flexibility markets through common cloud platforms, their aggregate behaviour becomes relevant to grid operation. Conversely, a foreign-sourced piece of technology can be "de-risked" via well-planned procurement choices such as local servicing, open standards, auditable code, diversified suppliers and enforceable offline operation.

Country of origin cannot substitute for a functional security assessment. Opaque remote access and vendor-controlled updates are a risk, whether the supplier is Chinese, American or European. But the same technical exposure can carry different strategic risk depending on the supplier's relationship with its home state, the legal powers that state can exercise over it, the wider geopolitical relationship and the state's willingness to weaponise dependencies. Applying the same functional rule to suppliers with comparable access and concentration strengthens both the security and the credibility of Europe's China policy.

The same discipline applies to industrial intervention. A capability can be strategically valuable and difficult to rebuild without implying that every stage of the supply chain must be recreated in Europe. Before subsidising it, policymakers should ask whether European production can reach sufficient scale and remain viable, or whether resilience would be better served through diversified external supply, control over standards or joint investment. A "Made with Europe" approach, rather than "Made in Europe", is more resilient, as it provides alternatives and partner capacity to prevent a single external dependency from becoming binding.

Dual-use relevance can increase the strategic significance of a dependency, where the same materials, components or capabilities underpin both energy and defence systems. It does not, however, create a case for restriction on its own. Instead, it raises the consequences of disruption and can make substitution harder during a crisis, especially when civilian and military demand may compete for the same limited supply.

The risk ladders in Tables 2 and 3 unpack the EU's vulnerability in more detail.[12] Table 2 asks what dependence on Chinese technology could do to Europe's energy system; Table 3 asks what Europe could lose as an industrial and technological actor through dependence. The appropriate policy response needs to consider both dimensions.

The placement of technologies on the ladders is not fixed. It will change as markets, technology and Europe's own capabilities change. Solar modules, for example, currently sit low on the energy security ladder because they are passive and relatively easy to replace. Inverters sit higher because the supplier can retain access after installation and many individual devices can become relevant to the wider system. Permanent magnets raise a different concern, given that disruption would affect several industries at once and alternatives remain limited.

The cost of reducing a dependency also needs to be weighed against the risk it addresses and the transition benefits that may be lost. Full substitution may make little sense where the underlying risk can be reduced more cheaply through diversification, standards or other safeguards.[13]

How the ladders interact

Read together, the two ladders show why dependence on Chinese technology does not produce a single policy answer. The interaction matrix (Table 4) translates their overlap into four strategic postures: use Chinese scale where it lowers costs; govern unavoidable dependencies while diversifying; make an open industrial policy case where European capability is worth defending; and apply the strictest rules where industrial value and system security overlap.

[12] The risk ladders build on a number of different sources: Arjona, Connell and Herghelegiu, **"An enhanced methodology to monitor the EU's strategic dependencies and vulnerabilities"**, European Commission, 2023; the **NIS2 Directive**, particularly its approach to critical supply chains, alternatives, lifecycle resilience and third-country influence; the EU's **coordinated risk assessment of 5G networks**; Richard Baldwin and Rebecca Freeman, **"Risks and Global Supply Chains: What We Know and What We Need to Know"**; Henry Farrell and Abraham Newman, **"Weaponized Interdependence"**; and Réka Juhász, Nathan Lane and Dani Rodrik, **"The New Economics of Industrial Policy"**; Meidan, in "**One Transition, Several Debates: Bridging Different Perspectives on Chinese Clean-Tech Dependence"**, 2026, distinguishes operational, defence and intelligence, prosperity, and political and geopolitical risks, and proposes a "protect, buy and build" framework, Meidan and Hove, **Chinese participation in Europe's offshore wind sector: the good, the bad and the unknown**; Lipke et al., **Trust and trade-offs: How to manage Europe's green technology dependence on China**; and García-Herrero et al., **De-risking and decarbonising: a green tech partnership to reduce reliance on China**. The ladders are a synthesis of these approaches, bringing them together in a framework to assess clean energy technology dependencies, distinguish energy-system risk from loss of industrial capability.

[13] Meidan, 2026, "**One Transition, Several Debates: Bridging Different Perspectives on Chinese Clean-Tech Dependence"**

Table 2: EU–China clean technology risk ladder: **energy-system security**

Level	Dependency and indicative technologies	Is dependency a vulnerability?	Default EU response
1. Managed market dependency	Passive, modular and replaceable equipment: PV modules; standard fixed-tilt PV mounting and racking components; basic non-digital balance-of-system components; consumer equipment with no material remote control function	Disruption may raise costs or slow deployment, but failure is normally local, and the supplier cannot influence real-time grid operation	Use and monitor; enforce quality and sustainability; diversify gradually; avoid restrictions that slow electrification and prolong fossil-fuel exposure
2. Transition and recovery bottleneck	Battery cells and active materials; processed critical minerals; permanent magnets; selected electrolyser components; transformers, switchgear, cables and HVDC components with long lead times	Supply interruption can delay build-out, repair or recovery for months or years. Risk can arise from Chinese concentration or from inadequate global capacity	Diversify suppliers and processing; build strategic inventories and scale recycling systems; standardise components; retain repair capacity; use long-term procurement and partnerships to create additional supply
3. Operational vulnerability	Solar inverters; battery management systems; smart meters; connected EV chargers and heat pumps; DER and demand-response platforms; cloud-connected storage controls	Remote updates, common firmware and aggregation can turn many small assets into a system-relevant control point. Data and servicing dependencies persist after purchase	Condition market access; require cyber certification, auditable software and updates, access controls, EU-based servicing and incident response, open interfaces, supplier-switching and safe offline operation
4. Critical system and recovery risk	SCADA, EMS and DMS[14]; critical grid optimisation and operational cloud services; converter station controls; grid-forming inverter and control functions used for system stability or restoration; black-start and emergency control functions	Compromise or withdrawal could impair system stability, coordinated operation or restoration. External permission or opaque vendor access is incompatible with operational sovereignty	Apply the highest trusted-supplier threshold; ensure isolation, redundancy and full auditability; retain sovereign operating capability; restrict external control where risk cannot be governed down

Source: *Authors' own analysis building on sources outlined in footnote 12.*

[14] SCADA: supervisory control and data acquisition; EMS: energy management system; DMS: distribution management system.

Table 3: EU–China clean technology risk ladder: **industrial capability**[15]

Level	Dependency and indicative technologies	Is dependency a vulnerability?	Default EU response
1. Efficient import dependency	Mature commodity segments, most clearly solar PV modules and standard fixed-tilt PV mounting and racking components, where imports deliver large deployment or consumer benefits, and Europe has limited strategic spillovers or no credible scale pathway	Protection would impose high transition costs while preserving little future capability; import share alone does not create a strategic industrial case	Keep markets open; monitor concentration and product quality; use sustainability rules; preserve optionality through trade diversification; avoid broad protection
2. Competitive pressure, viable European capability	Sectors where EU firms, skills and innovation remain material: EV and automotive powertrain integration, selected wind, heat-pump, grid-equipment, electrolysis, recycling and advanced manufacturing segments	Unequal finance, scale or market conditions may shrink a commercially and technologically viable ecosystem before European demand matures	Use explicit industrial policy: innovation, scale finance, faster permitting, demand creation, non-price procurement criteria, skills and reciprocal market access tools
3. Strategic capability erosion	Power electronics and inverters; battery cells and management systems; permanent magnets and advanced materials; selected semiconductors and control electronics, specialised grid equipment; manufacturing machinery and system integration	Loss removes engineering, service, repair and innovation capacity with spillovers across energy, mobility, defence and other critical sectors; rebuilding later may be slow or prohibitively costly	Select capabilities to retain or build in Europe and partners; aggregate demand; tie support to productivity and innovation; use conditional market access where a credible alternative can scale
4. Structural industrial lock-in	Foreign control over standards, firmware, data, servicing platforms, critical intermediate inputs or production equipment needed to manufacture and operate the next technology generation	Europe may remain an end-market while knowledge, future value and decision rights accumulate elsewhere; apparent localisation can leave the decisive layer externally controlled	Require ownership and control transparency, interoperability, local service and genuine value creation; protect key intellectual and production assets; build alternative ecosystems with trusted and non-exclusive partners

Source: *Authors' own analysis building on sources outlined in footnote 12.*

[15] "Industrial capability" goes beyond the presence or absence of manufacturing capacity. It includes the skills, engineering and repair capability, production know-how, intellectual property, integration capacity and ability to scale or rebuild production that determine whether Europe can retain or recover strategic functions over time.

Table 4: Interaction matrix[16]

	Low energy-system security risk	**High energy-system security risk**
Low remaining EU industrial value	**Efficient import dependency** *Examples:* Commodity solar modules, standard fixed-tilt racking and basic non-digital balance-of-system components. *Approach:* Use Chinese scale where it lowers deployment costs; monitor concentration and preserve alternative supply.	**Managed unavoidable dependency** *Examples:* Installed control-layer dependencies, including inverters and other connected clean energy assets; selected minerals-processing dependencies where substitution is slow but rebuilding European capacity is not a strategic priority; selected cloud and remote-service dependencies. *Approach:* Govern risk while substitution remains slow; require fallback and a time-bound diversification path.
High remaining EU industrial value	**Industrial policy case (not securitisation)** *Examples:* EV and automotive powertrain capability, selected wind and heat-pump manufacturing, electrolysis, recycling and advanced manufacturing segments. *Approach:* Defend or build European capability openly, without presenting every import as a critical-infrastructure threat.	**Industrial security priority** *Examples:* Inverters, power electronics, battery management systems, DER platforms, grid software and SCADA. *Approach:* Build EU or partner capability because here competitiveness and system security overlap; apply high-risk supplier rules.

Differentiated de-risking would also help Europe assess its relationship with China from a position of greater agency. Mapping dependence, substitutability and adjustment capacity in both directions makes it possible to distinguish where China holds genuine leverage, where that leverage can be reduced, where mutual dependence limits it, and where Europe retains bargaining power of its own. This moves the debate beyond assessing Europe's

[16] Technologies may appear in more than one category where different forms of exposure coexist. Inverters, for example, raise an immediate operational-risk question for the installed fleet; hence, they are added to the "managed unavoidable dependency" category, while future inverter capacity also presents an industrial capability question and, as such, is part of the "industrial security priority" category.

vulnerability alone, towards the question of where Europe can reduce dependence, build alternatives and use its own market, regulatory, technological and diplomatic assets to shape the terms of interdependence.

The next three sections address these points in turn: first "unboxing China" to better understand who actually controls dependency on the Chinese side; second, looking at where Europe holds leverage and how it can be used; and third, how the relationship is being reshaped through third countries.

Looking for the point of intervention: unboxing China

References to "China" compress several actors into a single strategic mind (often "Beijing") while outcomes emerge not only from central-party-state priority setting but also from bargaining and competition within the system.

- **Central-party-state authorities** set national industrial priorities, control export and investment rules and can mobilise companies during political conflict. They are the relevant interlocutors for strategic guardrails, national market access questions and managing any eventual retaliation.
- **Provincial and municipal governments and local financial institutions** influence land, electricity, permits, credit, factory support and whether excess capacity closes. Their incentives often revolve around employment, tax revenue, debt and political targets. They matter for understanding implementation and the durability of industrial pressure, even where the formal policy direction comes from Beijing.
- **Corporate groups, parent companies and investors** control product design, intellectual property, investment decisions, supply relationships and much of the servicing model. Their interest in EU market access can create scope for compliance, localisation or changes in corporate behaviour.
- **Overseas subsidiaries, joint ventures and operational-service providers** may hold the immediate relationship with European customers, while important rights over firmware, data, cloud platforms, intermediate inputs or strategic decisions remain with the parent company or another entity. European incorporation does not by itself establish European control, unless sensitive functions and decision rights are transferred as well.

Distinguishing between these layers is important because a central commitment may not necessarily be implemented in the same way at the provincial or company level. Equally, a company- or province-level arrangement cannot insulate Europe from subsequent central decisions. Europe should engage the actor able to change the relevant decision, whether

that is a company on product architecture and servicing, a province on investment conditions, or Beijing on export controls and political direction.

Corporate and technical channels are needed to change architectures, contracts and investment structures, but they cannot substitute for common EU rules or a country risk assessment. For technologies that can affect the operation or recovery of the energy system, Europe should retain control over remote access, credentials, software updates and fallback operation, so that a later instruction to the supplier cannot itself become a system vulnerability.

Table 5: EU strategic postures mapped against relevant actors and channels in China

Strategic posture	Relevant actors and channels	Questions for EU policy
Efficient import dependency	Suppliers, buyers, market-surveillance authorities, certification bodies and financiers	Can Europe retain the cost and deployment benefits while improving transparency, quality, traceability and continuity of supply? Who monitors concentration and hidden dependencies behind the final product?
Managed unavoidable dependency	Parent companies, software and service providers, cybersecurity and technical regulators, system operators and, where supply continuity is politically sensitive, central authorities	Who controls data, credentials, updates, servicing and remote access? Can contracts and technical requirements provide local control, fallback operation and supplier switching? Who can change these arrangements, and where could central direction override them?
Industrial policy case	Chinese investors and corporate groups, relevant provinces, European manufacturers and financiers, EU and member state policymakers, and third-country partners	Would Chinese investment create European skills, intellectual property, suppliers and decision-making capacity, or mainly localise final assembly? Which capabilities could European or partner production sustain, and what market conditions would make them viable?
Industrial security priority	EU rule-setters, member state security authorities, regulators and system operators; Chinese parent companies for compliance and transition; central channels for guardrails and off-ramps	Who can impose and implement restrictions without national carve-outs? How will the installed base be managed? Who verifies compliance, absorbs transition costs and determines when changed behaviour is sufficient to modify a restriction?

From defensive de-risking to strategic leverage

EU policy towards China remains largely defensive, focused on identifying European dependencies, restricting the most dangerous forms of access, and building alternatives. It should also ask where Chinese actors depend on access that Europe controls, and whether this can be used to improve the terms of interdependence.

Europe's single market remains highly valuable to Chinese clean technology companies, particularly as access to other advanced markets narrows. China's weak domestic demand also increases the importance of exports, while firms and provinces face their own pressures around margins, employment, debt and factory utilisation. This gives Europe several potential points of leverage:

- **Market access.** Continued access can be linked to transparency, fair competition, cybersecurity, repair, recycling and local service requirements.
- **Regulation and procurement.** Certification, product rules, public funding and auctions can require auditable updates, open interfaces, locally controlled credentials, offline operation and supplier-switching rights. These conditions change the technology installed in Europe, rather than relying on assurances about how it will be used.
- **Investment and localisation.** Chinese interest in manufacturing inside Europe creates scope to require genuine local value, skills, supplier development, engineering and R&D capability, local servicing and meaningful decision rights, alongside transparent ownership. Final assembly alone should not count as resilience where intellectual property, software, critical inputs and strategic decisions remain controlled elsewhere.
- **European technology and industrial capabilities.** China continues to value selected European machinery, engineering, research relationships and specialised components.
- **Coalition power.** As Europe rarely controls an entire strategic chain, coordination with Japan, Korea, Taiwan and other producer countries can strengthen alternative supply, make circumvention harder, and distribute the costs of diversification.

Leverage is usable only where Europe genuinely controls the relevant access point and member states can maintain a common position on the use of that leverage. It also requires endurance: as Europe must be able to absorb higher prices, supply disruption or retaliation against European companies.

Resilience and leverage, therefore, need to be developed together. Architectural safeguards, including local credentials, controlled remote access and offline operation of the most sensitive technologies, can begin now. European and partner industrial capacity will take longer to build. Full self-sufficiency is unnecessary, but Europe needs enough resilience in the form of domestic capacity or stockpiles to prevent an attempt at leverage from disrupting its own transition.

Beyond the bilateral frame

EU–China interdependence is being reorganised through third countries. Chinese firms are investing in manufacturing, industrial parks, infrastructure and clean energy projects across Southeast Asia, the Gulf, Latin America and other regions. The ASEAN–China Plan of Action for 2026–2030, for example, envisages deeper cooperation on clean energy, infrastructure, industrial supply chains and a dedicated clean energy cooperation centre.[17]

Diversification through third countries as a resilience strategy depends on what the new investment creates: additional processing, engineering, ownership, skills and decision-making capacity outside the existing Chinese ecosystem; a route for local firms into higher-value activities; and an arrangement that remains viable without one upstream supplier. However, a product assembled in a third country may still rely on Chinese capital, machinery, cells, firmware or critical inputs, so rules of origin alone cannot tell Europe whether strategic control has changed. Traceability must therefore extend beyond final assembly. Where dependencies emerge, they may sit as much in financing, ownership and contractual arrangements as in the equipment itself.

Partner countries are participants in this reorganisation, with ambitions of their own: industrialisation, affordable technology, infrastructure, finance and a larger share of value. For many emerging economies, Chinese clean technology is first and foremost a source of affordable technology, energy access and lower fossil-fuel exposure.[18] An EU offer framed principally around reducing China exposure will struggle against Chinese packages that combine equipment, investment, construction, finance and market access. The EU's emerging Clean Trade and Investment Partnerships could provide a vehicle, provided they offer finance, long-term demand, local processing, skills, infrastructure, technology cooperation and credible routes into the European market.[19]

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[17] ASEAN, 2025, **Plan of Action to Implement the ASEAN-China Comprehensive Strategic Partnership**

[18] Meidan; 2026; Ember, 2026, **China Energy Transition Review 2025**; Ember/CVF, 2026, **The Electric Fast-Track for Emerging Markets**; Carnegie Endowment, **China Is Building New Financial Architecture for Clean Energy Tech**. See also Borojo & Miao, 2026, **The impacts of China's low-carbon technology trade on modern energy access in Africa**, *Scientific Reports*.

[19] European Commission, 2025, **Clean Industrial Deal**

The politics of differentiated de-risking

The risk ladders introduced above could provide a more coherent basis for managing Europe's dependence on Chinese clean energy technologies. But a logic for differentiated de-risking is a framework for judgement, not a formula that settles decisions on its own. Deciding what risks are acceptable, the cost of resilience and who bears it remains political and depends on governance and institutional capacity as much as on the quality of analysis.

Even a well-designed assessment leaves decisive questions open. Analysis can establish how concentrated a supply chain is, how quickly a supplier could be replaced or whether a device can be accessed remotely. It cannot, by itself, determine how much risk is acceptable or what premium Europe should pay to reduce it. Switching away from Chinese inverters, for example, has been estimated to add only 2–4% to total project costs.[20] Maintaining a minimum European production base for modules or battery cells would cost considerably more. These costs fall on different groups (developers, energy consumers, taxpayers, manufacturers), and the benefits accrue unevenly across sectors and member states. Each threshold in a framework for differentiated de-risking is also a distributional decision.

Nor is there a single European actor making these decisions. The European Commission has competences over trade, competition and parts of industrial and economic-security policy, but many of the political and economic consequences of de-risking are felt nationally. Member states enter the debate from different starting points, shaped by their industrial structures, exposure to Chinese trade and investment, energy costs and employment interests. Within countries, manufacturers and regions may seek protection, developers and installers may resist anything that raises costs, and security institutions focus on low-probability but potentially severe vulnerabilities. These interests do not add up to a common position. Differentiated de-risking will create winners and losers among them.

China is also only part of Europe's wider industrial challenge. Loss of manufacturing capacity in some clean technologies reflects Chinese competition, but also Europe's own energy and labour costs, investment conditions and innovation performance. China can become an easier explanation for industrial decline than addressing these underlying problems. Measures designed primarily to preserve jobs or industrial capacity should therefore be assessed as industrial policy, rather than automatically justified as energy security measures. Equally, genuine security concerns should not substitute for addressing weaknesses in European competitiveness.

[20] ESMC, 24 April 2026, **ESMC Welcomes EU Commission Decision: Inverters from High-Risk Countries Excluded from EU Funding**

Applying a framework for differentiated de-risking consistently is also a governance problem. The instruments described above are spread across institutions and levels of government. Trade-defence and foreign-subsidy investigations sit with the Commission, while investment screening remains largely national. Member states design renewable auctions in which Net-Zero Industry Act non-price criteria are applied. The security of grid-connected devices involves national cybersecurity authorities, energy regulators and grid operators. A differentiated approach, therefore, needs an agreed process: who assesses a dependency, against which criteria, how disagreements between member states are resolved, and how decisions are reviewed as technologies and markets change.

Differentiated de-risking also requires capacity that European institutions do not fully have. Assessing substitutability, replacement times or remote-access exposure depends on detailed and often commercially sensitive information about supply chains, installed equipment and ownership. Much of that information is held by companies rather than governments. Analytical capacity is unevenly distributed across member states and dispersed across trade, energy, industry and security bodies. Without investment in data, monitoring and technical expertise, decisions will continue to default to whichever risk is most visible or whichever interest is best organised.

The framework introduced in this paper does not remove political choices, but it can make them clearer and easier to negotiate. Europe needs to know whether a measure is primarily intended to reduce strategic leverage, protect the operation of the energy system, preserve a particular industrial capability or support employment. Those are different objectives, even if they overlap. Making them explicit makes it easier to debate trade-offs and distribute costs deliberately, rather than letting the strongest coalition in each case determine the outcome. It also takes political commitment: member states need to accept common assessments even when they cut across national interests, and to sustain decisions long enough for firms and investors to act on them.

Eight principles for managing Europe's clean energy technology interdependence with China

1. **Diagnose the vulnerability before choosing the instrument.** Assess energy-system exposure through consequence, external leverage and recovery. Assess industrial exposure through strategic value, erosion and lock-in, and the reversibility of capability loss. Country-specific behaviour then changes the likelihood and assurance burden; neither import share nor country of origin alone should determine the response.
2. **Let the two risk ladders inform the strategic posture**. Use Chinese scale where it lowers transition costs without creating serious system or industrial risk. Govern dependencies that cannot be quickly replaced; build European or partner capabilities

where industrial value remains high; and protect technologies where industrial and energy-security risks overlap.

3. **Protect the energy-system control and recovery layers first.** Europe cannot manufacture every component, but it must be able to operate and restore its energy system without external permission. Auditability, open interfaces, locally controlled credentials, safe offline operation, incident response and supplier-switching rights take priority over manufacturing capacity.

4. **Retain and build strategic capability instead of capacity for its own sake.** Industrial policy should concentrate on capabilities with wider value, including skills, innovation, repair and integration, standards, advanced materials, power electronics and cross-sector spillovers. Support requires a credible route to scale and viability in Europe or in partner countries.

5. **Convert European market access into collective leverage.** The single market, regulation, procurement, public finance, investment opportunities and selected European technologies are EU assets that Chinese firms value. Leveraging them requires a clear objective, a common European position, sufficient resilience to retaliation, and a credible off-ramp.

6. **Match engagement to decision rights and to ultimate authority.** Beijing is the necessary interlocutor for strategic guardrails, export controls and national policy. Provinces provide information about implementation and local incentives; firms can make verifiable changes to products, investment and servicing. These channels complement common EU rules but cannot substitute for them, and critical protections must remain effective if the party-state overrides commercial discretion.

7. **Address different aspects of resilience across different time horizons.** Technical safeguards can be introduced now, procurement choices can be advanced with the investment cycle, and industrial ecosystems will take years to build. Protective measures need not wait for complete substitution.

8. **Build interdependence with third partners.** Diversification should create additional centres of production, skills and decision-making in partner countries. Europe needs to offer local value, finance, infrastructure, technology cooperation and long-term demand.

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