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The European Green Deal: When One Dependency Replaces Another

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Abstract

The European Union is pursuing a rapid energy transition based on renewables and new technologies. However, this process is also creating a new strategic dependency on critical raw materials and supply chains which are largely concentrated in China. In this way, Europe is trying to wean itself off fossil fuels, but at the same time it risks developing a new technological dependency. European institutions are beginning to recognise this problem, but their response is often hampered by slow decision-making, complex permitting processes and the bureaucratic quagmire of European regulation.

Key Takeaways

- Green transformation and new dependencies: The energy transition is increasing demand for critical minerals and technologies. The extraction and processing of which is largely concentrated in China.
- China and supply chains: Thanks to a long-term industrial strategy, China has gained a strong position in key segments of green technologies. This includes rare earth processing and the production of solar components and batteries.
- A strategic challenge for Europe: The EU is aware of the problem of dependency. The EU's response is hampered by regulations, lengthy permitting processes and a bureaucratic quagmire that complicates the building of its own capacities.

Introduction

In recent years, the European Union has set itself extremely ambitious climate goals and decided to accelerate the transition to a so-called green economy. The policy of rapid decarbonization, massive support for renewable sources, and a shift away from fossil fuels has become the central philosophy of Brussels' economic strategy. This approach is proving to be difficult to sustain in the reality of today's world and shows an error in strategic thinking. The European institutions have focused primarily on the speed of transformation, while they have long underestimated the issue of supply chain security and technological self-sufficiency.

The result is a paradoxical situation. Europe is trying to get rid of its energy dependence on traditional suppliers of fossil fuels. At the same time it is creating a new dependence on technologies, raw materials, and production capacities outside its own continent. The biggest beneficiary of this policy has been China, which, thanks to a systematic industrial strategy, has gradually taken control of key parts of the supply chains needed for the production of solar panels, wind turbines, batteries and hydrogen production equipment, exactly what a "green" energy and economy should be based on.

The European green transformation is now based on technologies and materials, the production of which is largely concentrated in China. The Union has thus created a strategic vulnerability that may have not only economic but also security consequences. The issue of dependence on Chinese raw materials and technologies is therefore no longer just an economic issue and is becoming a fundamental geopolitical challenge for the future of European energy.

Critical minerals and raw materials as a geopolitical tool

Critical minerals and strategic raw materials have become a key factor in global geopolitics in recent years. Materials such as lithium, cobalt, nickel, graphite, and rare earth elements are essential for the production of modern technologies including batteries, electric cars, wind turbines, semiconductors, and advanced military systems. In the context of energy transformation and digitalization of the economy, the strategic importance of 17 rare earth metals is growing. States that control their mining or processing gain significant economic and political advantage (IEA 2021, Glenny 2025).

One of the most significant players in this area is China. Over the past three decades China has built up almost complete control over the processing of 54 key raw materials that the US Geological Survey identifies as strategic. China is strengthening its influence in areas that are essential for the transition to a green economy including solar energy, wind turbines, and batteries for electric vehicles (Glenny 2025).

China's strategy was not only to develop domestic mining, but above all to gain control over processing capacities. While the deposits themselves are geographically dispersed around the world, the refining process and production of final materials are now largely concentrated in China. In some segments, Beijing controls a dominant share of world production.

This is particularly evident in rare earth metals, 70% of which are mined in China. These elements are essential for the production of high-performance magnets, which are used in wind turbines, electric cars or in the defense industry. According to available data, China controls more than 90% of the global processing of these materials, which gives it a strong negotiating position against other countries. It plays a similarly important role in the field of graphite, which is a key component of batteries for electric cars, or in some types of lithium and cobalt. However, China's strategy is not limited to its own territory. In recent years, Chinese state-owned and private companies have invested massively in mining projects in Africa, Latin America and Southeast Asia. In the Democratic Republic of Congo, Chinese companies control a significant part of cobalt production, while in Latin America they invest in lithium mining projects, which is described as the "oil of energy transformation". These investments

are often supported by Chinese state-owned banks and are part of a broader strategy to secure long-term supplies of strategic raw materials (Hart 2025).

The role of these materials in the energy transformation is crucial. Modern energy technologies are significantly more material-intensive than traditional energy systems. For example, the production of an electric car requires several times more critical minerals than the production of a vehicle with an internal combustion engine. Similarly, wind turbines or battery storage require large amounts of metals and rare elements.

China as a dominant player in green energy supply chains

China's dominance in green technologies is not a random result of market developments, but the result of a long-term and systematic industrial and political strategy. For more than two decades, Beijing has considered energy technologies, critical raw materials, and manufacturing capacity as key tools for economic growth and geopolitical influence. This strategy has been clearly enshrined in China's five-year plans. These plans identify renewable energy sources, battery technologies, and the hydrogen economy as strategic sectors of the future (Hobhouse 2026).

The most visible is China's dominance in the field of solar energy. Today, China controls almost the entire global production chain of solar components from the processing of raw materials to the final products in the form of solar panels. According to available data, in 2023 it controlled approximately 98% of the world's production of solar wafers, a key intermediate step in the production of photovoltaic panels. Such a high concentration of production allows Chinese manufacturers to determine the price and technological standards of the entire industry. The result is a situation where most new solar power plant installations in the world, including in Europe, use components originating from China. Similar developments can be observed in other sectors of the energy transformation. In 2024, approximately 70% of the world's production of wind turbines came from Chinese factories. Chinese companies are significantly expanding in the production of electrolyzers for the production of hydrogen and synthetic fuels, which are to play an important role in the decarbonization of industry and transport. Thanks to extensive state investment, cheaper energy, and a large domestic market, Chinese companies have been able to dramatically reduce production costs in recent years and gain a competitive advantage over European manufacturers (European Commission 2026b; Hobhouse 2026; IEA 2022; Krumins 2026).

From a European perspective, the problem is not only China's dominance in the extraction and processing of raw materials, but also the fact that the European Union has long lagged behind in this area. Meanwhile, the United States is trying to restore domestic mining and build new strategic supply chains like in Latin America. European projects often encounter strict environmental regulations, bureaucracy, and long permitting processes or resistance from environmental organizations. Europe has gradually found itself in a situation where it is heavily dependent on the import of raw materials and technologies in strategic sectors, often from one dominant supplier (Glenny 2025).

This development has direct implications for European industry. Many European companies that were once technological leaders in the energy sector now face strong competition from Chinese manufacturers supported by state subsidies and Beijing's industrial policy. This is particularly evident in the automotive industry and energy technology production, where European companies have complained about dumping prices and the uncertainty of key component supplies (Krumins 2026).

At the same time, it appears that the technological rivalry between the United States and China is increasingly focused on the control of critical materials and production capacities. Europe finds itself in the role of a passive actor in this competition, dependent on both American technological services and Chinese raw material processing. In the context of the rapid energy transition, a paradox arises: the European effort to build a low-emission economy actually strengthens China's technological and industrial dominance (Glenny 2025).

Security and strategic implications for Europe

Europe's growing dependence on external suppliers of energy technologies and critical raw materials has significant security and strategic implications. It is evident that the energy transition, which is one of the main political projects of the European Union, is also creating new types of dependencies that can affect not only economic stability but also the politics of European states.

In recent years, Beijing has been tightening controls on the export of certain strategic materials and technologies related to their processing. These steps are often presented as part of national security protection or environmental regulation, but in practice they can also serve as a tool of industrial and geopolitical strategy. For states dependent on these supplies, this means increased uncertainty and the potential risk of supply chain disruption (ČTK 2025; Glennly 2025).

The risk of political abuse of economic dependence on China cannot be underestimated. Beijing has previously indicated that it is willing to use its control over critical materials as a tool for political pressure. For example, earlier this year, China restricted exports of rare earths to Japan in connection with a diplomatic dispute between the two countries (Reuters 2026).

From a European perspective, the issue of strategic autonomy and the EU's ability to protect its critical infrastructure is therefore increasingly being discussed, and calls are increasingly being made to diversify sources and strengthen domestic capacities. The concept of strategic autonomy does not imply complete self-sufficiency, but rather the ability to diversify supply chains and reduce critical dependencies on one dominant supplier. In practice, this may include supporting European industry, investing in domestic technological capacities, or building partnerships with other countries. The European Union has adopted several initiatives in recent years aimed at supporting the extraction and processing of critical minerals, including legislative proposals (e.g. the Critical Raw Materials Act). Nevertheless, building alternative supply chains will be a long-term process that Europe will find very difficult to catch up on (European Commission 2026a; European Commission 2026b; Glennly 2025; Krumins 2026).

The debate on strategic autonomy also concerns other aspects, such as foreign investment in European energy infrastructure. The energy system including electricity grids, transmission systems, power generation plants and battery storage is one of the critical infrastructures of every state. Control over these assets can provide significant economic and political influence. In the past, there have been legitimate concerns that some foreign investments, especially from non-democratic states, may be motivated not only by economic interests but also by broader strategic goals. In this context, there are a number of risks, such as the growing presence of Chinese technology companies in some segments of the energy and infrastructure sector. These companies are often supported by state programs and can offer technological solutions at very favorable prices. From a short-term economic perspective, these offers may be attractive to European investors, but from a long-term security perspective, they raise questions about technological dependence and control over key systems (Hobhouse 2026; Krumins 2026).

This goes hand in hand with technological and cyber risks. Modern energy systems are increasingly digitalised and interconnected through sophisticated control systems and communication networks. This increases their efficiency, but at the same time creates new vulnerabilities. If key components or software are supplied by foreign companies, there may be concerns about potential security weaknesses or the possibility of remote intervention in the operation of the infrastructure.

Cybersecurity is therefore becoming one of the main topics of European energy policy.

Experts warn that energy infrastructure is among the most common targets of cyberattacks, both by state actors and organized hacking groups. Ensuring the security of these systems requires not only

technical measures but also strategic decisions about who supplies key technologies and how these systems are managed (Hobhouse 2026).

Another strategic issue is the gradual erosion of European industrial capacity in some technological sectors. If the production of key components is moved outside Europe, European industry could find itself in the position of a technological follower instead of an innovator. This could have long-term implications not only for economic competitiveness but also for Europe's ability to respond to security challenges.

For Europe, the energy transition is not only a technological and environmental challenge, but also a fundamental strategic issue. The ability to ensure secure, diversified, and technologically independent energy systems will be one of the key factors determining Europe's position in the future global order.

Conclusion

Europe has found itself in a situation where it has no control over its digital technologies or access to the raw materials it needs. When energy, industry, and security increasingly rely on critical minerals and advanced technologies, this dependency represents a major strategic weakness. While the European Union is striving to build a low-carbon economy and strengthen its role in global climate policy, it is also creating a new type of dependency. This dependency is on raw materials, technologies and production capacities outside its own continent, mainly in China.

The problem lies not only in the dependence itself, but above all in Europe's slow and ineffective ability to respond to this situation. Although European institutions have adopted a number of strategies and legislative initiatives in recent years, their actual implementation often encounters the well-known obstacles of the European decision-making system. Complex regulations, lengthy permitting processes, and often political disputes between member states create an environment that can be described as a bureaucratic quagmire without exaggeration. In such an environment, it is difficult to quickly build new mining projects, develop processing capacities or support the emergence of strategic industries.

While Europe is discussing and preparing further regulations, its global competitors are taking a much more pragmatic approach. China has systematically built its position in the supply chains of critical raw materials and energy technologies for more than two decades and is now benefiting from this lead. Meanwhile, the United States is actively investing in domestic mining, promoting strategic partnerships with resource-rich countries, and seeking to create alternative supply chains.

Europe is therefore faced with a fundamental strategic choice. Either it can simplify the regulatory environment, speed up permitting processes and truly support its own industrial capacities, or its dependence on external suppliers will continue to deepen. The positive news is that European institutions and many Member States are starting to realize this problem. However, awareness alone is not enough. If Europe fails to break out of its own bureaucratic swamp and transform strategic documents into concrete steps, it may happen that the energy transformation that was supposed to strengthen its economic and political position will ultimately lead to the opposite result.

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