

#30 The EU's China challenge: Rethinking offshore wind and electrolysis strategy

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Key Takeaways

- China has become a world leader in offshore wind and alkaline water electrolyser technology, supported by market size, national policy and control over key parts of strategic value chains.
- The EU's main offshore wind dependence on China currently lies in permanent magnets and rare earth mining, refining and processing, but future dependence may broaden as Chinese firms expand globally.
- European offshore wind and electrolyser producers remain competitive in some areas, but face financial pressure, high costs and an uneven playing field with Chinese manufacturers.
- Europe faces a strategic trade-off between limiting Chinese involvement to protect energy and national security, and using Chinese capacity to reduce costs and accelerate the energy transition.

Policy Recommendations

- The EU should restrict market access for Chinese parties where trade does not take place in a level-playing field. A level playing field can be created by limiting access for Chinese parties in sectors where EU companies face restrictions in China.
- The EU should increase non-financial requirements in public procurement, including safety, efficiency, circularity and ESG criteria. These criteria need not block imports, but they can strengthen the position of EU players if Chinese products score weaker on these dimensions.
- The EU should protect and expand its offshore wind and electrolyser industries, including through support for alternative technologies and substitution of critical inputs. This includes reducing dependence on permanent magnets through alternative generator designs and reducing iridium dependence through alternative catalysts.
- The EU should cooperate with China on technology development only where this accelerates the energy transition without creating unwanted technology transfer. At the same time, it should collaborate with EU Member States, trusted partners and neutral parties to ensure sufficient alternatives to Chinese wind turbines and electrolyzers.

Executive Summary

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A fast energy transition is essential for Europe to meet its ambitious climate targets, but China has a crucial role in many of the key technologies that are essential for that transition, including wind energy and electrolysis. This report therefore examines the current and possible future role of China in the offshore wind and electrolyser supply chains, with specific focus on the Netherlands, the EU and China. Its aim is to provide a thorough understanding of the past, current and possible future supply chains of offshore wind energy and electrolysis, and to provide policy recommendations on international cooperation and the future organisation of international competition for these supply chains.

The report finds that China has become a world leader in offshore wind and alkaline water electrolyser technology. In offshore wind, China's position is linked to the size of its home market, national policy support, and control over specific critical raw materials such as rare earth materials and permanent magnets. In electrolysis, China has made substantial progress in alkaline electrolysers, benefiting from rapid scaling, cost-effectiveness and significant government support, while Europe retains strengths in PEM technology, engineering quality, system integration and safety standards.

For offshore wind, both the EU and China have strong local supply chains, but China dominates the global supply chain for many key components and is expected to become even more dominant in the global offshore wind market in the next five years. The EU's main dependence on China is currently in permanent magnets and rare earth mining, refining and processing, but dependence may increase in other areas such as vessels for offshore installation. At the same time, the report stresses that European OEMs and specialist equipment suppliers remain important, and that China is not yet completely independent from Western suppliers.

For electrolysers, the report finds that the global market has grown rapidly but remains uncertain because future demand depends strongly on government plans and investment decisions. Chinese alkaline electrolysers are much cheaper and increasingly available, but for use in Europe they still need to comply with European quality, efficiency and safety standards. Chinese companies are already exporting to Europe and are establishing offices, collaborations and manufacturing locations in Europe, which could strengthen competition but may also lead to an uneven playing field for European companies.

The geoeconomic risk assessment shows that the strongest current risk is the lack of a level playing field in trade relations with China, which could allow China to dominate global production of offshore wind and electrolyser technologies. Other risks, such as export restrictions on critical raw materials, key components or end-products, may become more significant in the medium term. The report presents two broad strategic options: raising barriers to China together with reliable allies, which could increase prices and slow the energy transition, or accepting greater Chinese dominance, which could reduce prices and speed up the rollout but create significant energy and national security risks.