



Hydrogen
Europe

Resilience criteria in European public funding instruments

Hydrogen Europe Position Paper

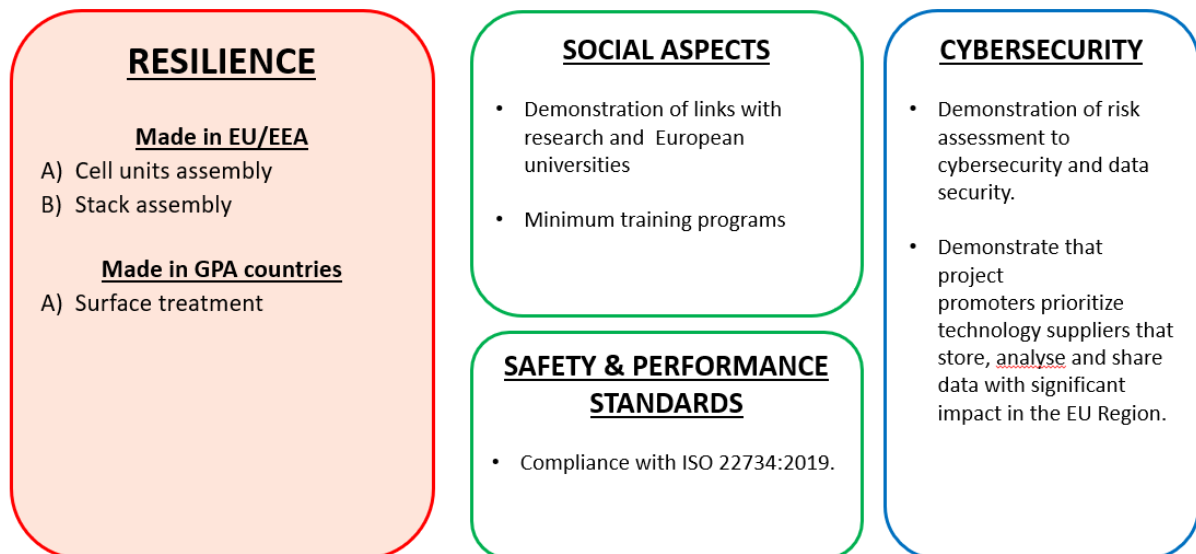
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Summary and recommendations

In an increasingly challenging global context for the deployment of clean technologies, Europe should build and retain a resilient supply chain for the electrolyser sector. While non-Western competitors produce at half the costs of European manufacturers, total cost of ownership and most importantly levelized cost of hydrogen production (LCOH) will make it cheaper to source European equipment in a medium-term perspective. Unfortunately, the current state of market development and the absence of any large-scale projects in operation have prevented the European industry from scaling up to the degree needed to provide the necessary economies of scale to bring down the cost of equipment. This is why it is important that public funding, in addition to the lowest price, is awarded to projects based on criteria which will safeguard the resilience of Europe’s electrolyser supply chain and allow the industry to scale and reduce costs further.

The European Commission, as part of the upcoming Hydrogen bank auction, should implement resilience criteria for key production processes that are deemed strategically significant in electrolysis. Those resilience requirements could be complemented alongside with social and cybersecurity requirements that are in line with EU values and build a sustainable, competitive European electrolyser industry.

Non-Price requirements for the upcoming Hydrogen Bank auction



1. Introduction

A truly European industry

Europe was the first mover in green hydrogen. Even before setting ambitious targets and adopting demand-side incentives, the EU started strategically investing into R&D and early demonstration of electrolyzers and fuel cells. To give but one example, the Clean Hydrogen Partnership, formerly FCH JU, has granted a total of €3.7 billion EUR in subsidies to date, creating important pilot projects for green hydrogen and derivatives throughout Europe. This early commitment to green hydrogen helped to bring about worldwide leaders in electrolysis technology. Today, 9 out of 15 globally leading manufacturers are based in Europe. Each one of these has a sizeable European supplier footprint, supporting a large number of SMEs, often in regions in transition. It is fair to say that electrolyser equipment, a strategic net-zero technology, has a home in Europe and provides a competitive supplier base, which companies can choose from to develop European projects.

While the situation is still positive, the challenge is to ensure that European electrolyser manufacturing remains in Europe, driving decarbonization and bringing value to the European economy. Once an industry is lost, it is unlikely to return, as supplier networks, know-how and workers will be gone with it. It would be a great mistake if after the early efforts and the substantial support granted, Europe would now lose ground in the critical scale-up phase ahead. It is important that the EU does not repeat the mistakes of the past. Once leaders in solar manufacturing technologies, Europe failed to provide adequate support to industry in the key moment of upscaling and large industrialisation, leading to a loss of competitiveness to e.g., Chinese producers, and resulting in the collapse of solar manufacturing capacity within Europe. Discussions currently under way on EU level and in several Member States on the solar PV industry's resilience show the pains of reshoring an industry which has already been outsourced. Our story, in contrast, is not one of reshoring, but boosting Europe's strategic autonomy and resilience in the face of a worldwide race to dominate clean tech.

The Global Context

Today's major funding mechanism for Hydrogen production in Europe is the Hydrogen Bank. Under its current mechanism, competition is solely based on price which encourages competition but will lead a race to the bottom (CAPEX focus) without addressing the objectives of resilience, strategic autonomy and European cleantech leadership. This situation has been experienced recently in the wind sector, where major European OEMs are facing a harsh price-only competition in auctions, and are struggling to keep up with innovation, and so the threat of Chinese OEMs growing into Europe is looming.

While the EU continues to champion the rules of fairness, openness and free trade, the Chinese market is all but closed to European manufacturers. Green hydrogen projects in China are generally carried out by state-owned entities and Chinese companies are allowed to go through extended periods of operational loss. Moreover, Chinese manufacturers have access to low-cost raw materials, especially steel and nickel. And capacity expansion (i.e. investment in new factories) is supported via zero interest government loans, free land and building provisions.

All around the globe, countries are pursuing policies to make Hydrogen a strategic sector and electrolyzers a key domestic technology. Countries have introduced policies and requirements to promote local value chains (see a summary in Figure 1). The USA’s IRA introduces local content requirements for some sectors and provides additional funding for companies using equipment, components and materials made in the USA. India, the UK, Japan all favour local value chains in their hydrogen production support schemes. And this is not special to hydrogen. In the wind sector, for instance, countries such as Brazil, Turkey and Canada are well known for having used for many years local content requirements. This is the reality in which European manufacturers need to operate.

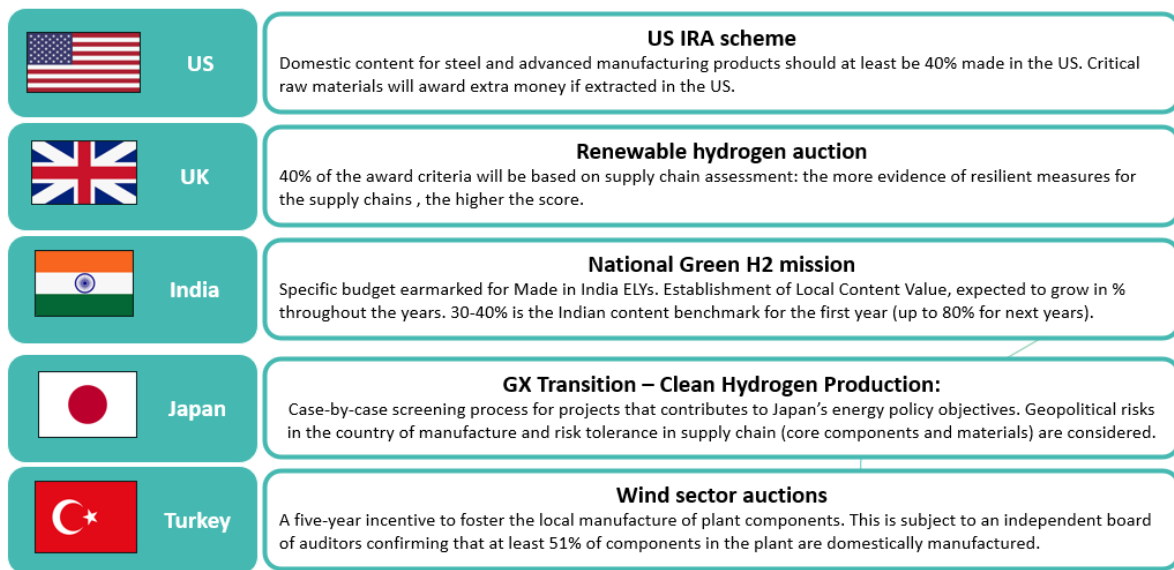


Figure 1. Overview of global policies supporting domestic value chains. Source: Hydrogen Europe

On an unlevel playing-field, European OEMs cannot win on price only

This skewed playing-field in addition to the inherent EU location conditions (more regulation, higher energy prices, higher cost of land and labor, etc.) makes it impossible for European companies to compete on price. Backed by large-scale projects on a home market with 100% market share, the leading Chinese manufacturers already started gaining ground in the EU. Today, China accounts for over 40% of global electrolyser manufacturing capacity, up from only 10% in the past year, whereas Europe accounts for approximately 25%. And besides closing its market to national OEMs only, Chinese support to its manufacturing industry (see figure x) is significantly higher than what European Member states can afford. In relative terms (as % of GDP), China provides 3 to 4 times more support than Germany and France. The difference is much larger for many other countries across Europe. Recent market reports point to electrolyser CAPEX of Chinese electrolysers at less than half the price of those manufactured in Europe.

Industrial support spending in China and key OECD countries, 2019 (% of GDP)

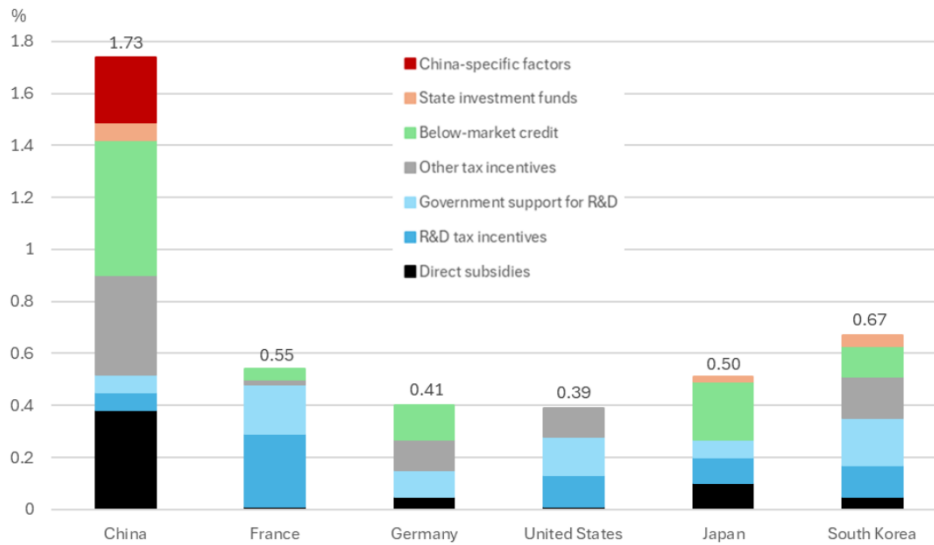


Figure 2. source: *Source: FOUL PLAY? ON THE SCALE AND SCOPE OF INDUSTRIAL SUBSIDIES IN CHINA Kiel Policy Brief, 173 (2024) by Frank Bickenbach, Dirk Dohse, Rolf J. Langhammer, and Wan-Hsin Liu*

The Opportunities ahead

Given the delay in hydrogen market ramp-up and project realization, the electrolyser industry is facing a period of consolidation where smaller actors, especially the pure-play hydrogen technology companies, will face existential challenges. It is generally expected that many companies will not be able to survive the next 5-7 years. In this scaling game where size matters most, Europe has traditionally fared worse than China, given the lack of an industrial policy & strategy. The threat of repeating the solar PV tragedy, where a thriving industry which supported tens of thousands of jobs was entirely lost in the course of little over a decade, could be repeated, only in shorter time. The next 2-3 years are critical.

Thankfully, the European Union, with its recently adopted Net-Zero Industry Act (NZIA) has understood the challenges presented above and set targets and measures to preserve EU manufacturing capabilities while aligning with the ambitions of the Green Deal. Although its policy effectiveness may be debated, the Act introduces a new era marked by sustainability and resilience criteria in procurement and auction processes, ushering in a vision where environmental and societal considerations hold equal weight alongside economic imperatives.

However, while the NZIA makes concrete policy proposals to strengthen the resilience of solar and wind manufacturing in public auctions, it leaves a policy gap in the hydrogen sector. By integrating European resilience criteria into competitive bidding frameworks, such as the upcoming second auction of the Hydrogen Bank, the EU can support the scale up of the European electrolyser industry. This approach is not aimed at limiting competition. The presence of more than 20 electrolyser manufacturers represented in the EU's Electrolyser Partnership¹ illustrates the potential for the development of a competitive electrolyser market in Europe, as long as manufacturers are able to operate on a true level-playing field where industrial players comply with all relevant EU laws and

respect the EU's values and principles. The absence of such conditions will lead to the dumping of highly subsidized Chinese electrolysers gaining large market shares in Europe.

It is within this context that Hydrogen Europe presents a series of recommendations for future competitive mechanisms of the EU.

2. Boosting resilience through auction requirements

2.1 The resilience requirements

In order to qualify for Hydrogen Bank funding, **certain critical production steps of the electrolyser have to be carried out:**

Within the EU/EEA:

- **Cell units assembly:** It is the process of integrating the core components (separators and electrocatalysts) of individual electrolysis cells to create functional units capable of carrying out water electrolysis reaction.
- **Stack assembly:** It refers to the process of stacking individual electrolysis cells into a cohesive unit, the stack.

Within countries signatories of the Global Procurement Agreements (GPA):

- **Surface treatment:** Refers to the application of a coating to the stacks cell, including galvanizing and etching. It also refers to the coating of catalysis of membranes and other activities in the forming of Membrane electrode assembly (MEA).

2.2 Pre-conditions of the requirements

Hydrogen Europe believes the Hydrogen Bank auctions should include **mandatory resilience requirements**. Few pre-conditions are important. The requirements should:

1. **be easily understandable**, closing any possibility of circumventions. Applying requirement to a fraction of the components (e.g. 40% of the value to be in Europe) is not desirable.
2. **be easily implementable** as a prequalification (pass/no pass) test. This approach is necessary to exclude *ex-ante* competitors that might be participating in European funding tenders by using distortive and unfair practices.
3. be applicable **for all electrolysis technologies**.
4. **be applicable at the time of Commissioning** (or right before), not when submitting the bids. This will allow any company, whichever its origin and actual location, to consider the conditions provided by European funding schemes and decide whether moving and investing in Europe manufacturing.
5. **should not lead to dependency on a very limited number of suppliers**, as this could raise the price of equipment and could lead to more vulnerable value chains. This is why

Hydrogen Europe believe that the focus should be put now on electrolyser's cell unit and stack assembly in the EU/EEA, and surface treatment in countries under GPA regime.

6. **be of temporal nature**, to allow OEMs based in Europe to scale up in the critical next years of market consolidation, further derisking the technology and move into the phase of GW scale projects.
7. **be the responsibility of OEMs**. Demonstrating that the requirements are met in full and on time should be done by OEMs, reducing the burden on project promoters.

2.3 Justification for the requirements on those specific processes

- There is a large number of highly innovative cells and stack manufacturers in the EU/EEA for all commercially available electrolyser technologies, ensuring high level of competition, required manufacturing capacities, economies of scale and reasonable lead times for delivery of products. The requirements of production within the EU/EEA would assure a resilient and robust supply chain and would guarantee sufficient price competition and cost decrease over time. Establishment of cell unit assembly and stack assembly within EU/EEA is feasible for those companies that today do not have a European footprint but are willing to play an important role in the EU hydrogen market and want to leverage European funding and financing from tax-payer's money. Such establishment of European manufacturing leads to further increase of competition and assures resilience by supporting EU supply chains and a level playing field and creates jobs and values in the EU.
- There are critical production steps such as the coating of membranes with catalyst materials, th galvanisation and etching of cells, that are essential to build electrolyzers, are irreplaceable and mandatory for the key performance of electrolyser. This critical know-how influences efficiency, performance and durability of hydrogen producing installations. It should be the goal to secure this critical technical know-how to remain in Europe. European companies are well placed to deliver on most of those critical processes, with an important footprint also based in UK, USA and Japan. Europe should progressively build a strong and resilient supply chain, cooperating with strong trade partners and ensuring a sufficient level of supply diversification to maintain a healthy, innovative and competitive environment. Dependence on a single third country for any one of these critical components represents a supply chain risk and should be avoided. Therefore, ensuring these processes take place within GPA signatory countries seems suitable.

2.4 Procedural considerations

At the time of submitting an official bid in a hydrogen bank auction, project developers should present an Lol/MoU with an OEM, asserting that prequalification criteria will be met, i.e. that for the project for which a bid is submitted the production steps identified above are carried out at a site in the EU/EEA.

At the time of commissioning, the project developer will have to provide evidence that the manufacturing-related criteria have been met. Otherwise, the grant agreement is considered void, and the project will lose both the funding and the completion bond. Taking the terms and conditions

of the Hydrogen Bank pilot auction as a reference, project developers have to complete their projects within a 5-year window. As such, having project promoters provide evidence at the time of commissioning gives ample time for manufacturers from all over the world to come to Europe to manufacture their products, ensuring a level playing field for all and encouraging competition.

If, after the date of the award or the grant agreement and before the commissioning, the project developer decides to procure its electrolyser from a different OEM than the one providing the LOI/MoU, the requirement remains the same. Hence, the criteria relate to the resilience of the manufacturing process and not to the domicile of individual companies.

3. Establishing a level-playing field: a world that plays by the same rules

Besides the criteria on resilience, there are other important requirements the Hydrogen bank should address:

3.1. Cybersecurity

- Project promoters should demonstrate how they applied risk assessment to cybersecurity and data security, in compliance with international standards.
- Promoters should also demonstrate that they prioritize technology suppliers that store, analyse and share data with significant impact in the EU or within third party countries that are signatories of the GPA. The EU Data Act has already entered into force (applicable by Sep 2025) and requires a commonly agreed data classification scheme at EU level which would need to be fit for purpose for the hydrogen sector. This information can be about how asset developers include safeguards against unlawful international data transfers while promoting the development of interoperability standards for data sharing and data processing, in line with the EU standardisation strategy. These safeguards are also required as part of the EU data act.
- Benchmarks like Network and Information Directive (NIS 1 and NIS 2 Directive), the EU Cyber Resilience Act (EU CRA), the EU Data Act, and the Network Code for Cyber Security should be further explored.

3.2. Social aspects: Promoting job creation and centres of excellence

- EU funding mechanisms should benefit European citizens and contribute to the scale up of our industry and creating new jobs and reskilling our work force to the needs of the evolving European economy. As such project promoters should present information on job creation prospects across the value chain, as is the case for IPCEI projects. To deal with the shortage in workforce and skills/training, the European Commission should explore introducing pre-qualification criterion so that bidders commit to establish KPIs to measure delivery against

apprenticeship and skills outcomes & to suggest the most appropriate number of apprenticeships to be created throughout the delivery of the contract (without a specific target to avoid discriminating smaller companies).

- Moreover, in this early scale up phase of our sector, there will be significant learnings to take back into the R&D process to ensure the constant improvement of our products. EU funding tools should promote and encourage the development of centres of excellence e.g., partnerships with local universities and local research centres that are in close proximity to the operation of the electrolyser. This proximity will contribute to more indirect job creation and speed up time frames for electrolyser maintenance and/or replacement of stacks by trained and skilled workers that know the technology.

3.3. Safety & performance standards

- Safety of operations is paramount in the electrolyser business, hence Hydrogen Europe fully supports the development of relevant ISO standards on safety and performance. A universally recognised standard will not only ensure safety operation but could provide further transparency on technologies performance, allowing for faster comparisons and market adoption of new solutions. **Regarding safety standards**, Electrolyser companies should comply with ISO 22734:2019
- **Regarding standards on measuring performance**, as shown in BNEF's most recent Electrolyser report, China uses a different methodology to measure hydrogen production yields that indicate higher efficiency of their equipment compared that used by European OEMs. Today there is no single international recognized methodology for measuring the performance and efficiency of electrolyser equipment. And due to the absence of those European standards, voluntary certification schemes, coordinated by individual market players, are already under development, leading to an uncoordinated proliferation of such schemes; hence not contributing to a transparent market situation.

There are numerous factors that require careful consideration when assessing performance e.g., varying operating and weather conditions affecting the electrolyser; placing of the electrolyser (inside or outside, containerized or not), electricity generation profile, load factor, water specifications...). Developing an internationally recognized standard would take significant time. While it is premature to introduce such requirements in the upcoming Hydrogen Bank auction, Hydrogen Europe supports the ongoing work of the EC and JRC under the Electrolyser Partnership on evaluating existing ISO standards and identifying gaps where EU has a stricter stance on areas like safety, performance, etc.

The EC should facilitate talks with CEN & CENELEC to gather the opinion of relevant stakeholders, via commissioning of appropriate research. And if feasible, EC should mandate CEN & CENELEC to develop standards accordingly.



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