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ENERGY SUSTAINABILITY

Hydrogen stuck in the pilot phase

Hydrogen's advancement has stalled, with numerous project cancellations, high costs and sluggish demand. China may lead the way for global adoption in 2026, but scaling remains a complex, multi-stage process. Current efforts should focus on pilot projects reaching final investment decision (FID), which requires solid demand



Establishing hydrogen as a mainstream commodity is a complex, multi-stage process that will unfold over several decades.

Last year, we expected the [hydrogen industry](#) to move beyond hype and into meaningful execution. While the initial excitement has certainly faded, 2025 turned out to be a challenging year for actual project implementation. Around 50 projects have been publicly cancelled, but the real number is higher as many cancellations happen silently. Unexpectedly, cancellations were not limited to paper-only projects. One developer, for example, actually dismantled two hydrogen plants – one in Australia and another in the United States – and returned millions of dollars in government grants, effectively turning the financial support into a liability.

So what will 2026 look like? Here are our top 3 calls.

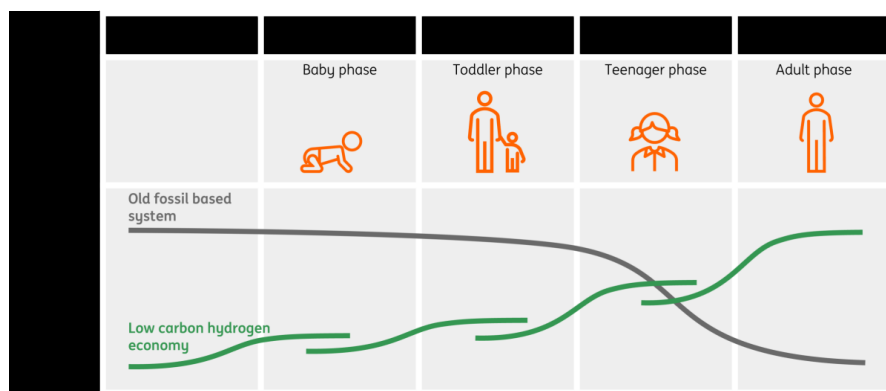
Call 1: Hydrogen stuck in the pilot phase

Low-carbon hydrogen – either from gas with CCS (blue hydrogen) or from electrolyzers with renewable energy (green hydrogen) – continues to hold significant potential for decarbonising high-emission sectors such as steel, plastics, fertilisers, and fuel production for aeroplanes,

ships, and trucks. From a chemical standpoint, these applications are feasible, and prominent advisors like Mario Draghi consistently highlight hydrogen's key role in helping industries reduce their reliance on fossil fuels, and for Europe to become less dependent on energy imports. Nevertheless, the poor economics and transformative changes required – particularly for existing industrial plants – present significant challenges. This underscores that establishing hydrogen as a mainstream commodity is a complex, multi-stage process that will unfold over several decades.

Building a low-carbon hydrogen economy is a multi-stage process

Phases of system change



Source: ING Research based on Transmission

The hydrogen industry's journey mirrors the stages of childhood. In the 'baby phase', the focus is on **learning from pilot projects** – testing out carbon capture in blue hydrogen, running green hydrogen electrolyzers flexibly with renewables, exploring nuclear-powered electrolyzers (pink hydrogen), and extracting white hydrogen from underground. It's also about building electrolyzers that use fewer rare metals. The goal at this stage is to figure out what works technically.

Next comes the 'toddler phase,' where hydrogen must prove itself as a **viable business**, requiring solid financial returns for first commercial-scale plants, often with substantial financial support. However, the volume of low-carbon hydrogen produced remains small – insufficient to replace current usage of grey hydrogen.

With established technology and economics, hydrogen enters the 'teenager phase,' **scaling up** production and building infrastructure to reach more industries and regions. Only then can hydrogen start to substitute fossil fuels, potentially facing pushback from fossil fuel interests.

Finally, in the 'mature phase,' – if cost problems and anti-lobbying forces are overcome, hydrogen could become **mainstream**, supported by robust regulations and infrastructure. The

focus shifts to phasing out old fossil fuel practices, managing workforce transitions, and supporting affected communities.

Although many hydrogen advocates thought the industry was advancing commercially, it has largely reverted to the pilot phase, especially for green hydrogen. There are about 1,700 clean hydrogen projects on the drawing boards globally, and moving these towards final investment decisions (FID) should be the focus for 2026 and beyond. Grants and subsidies are crucial for both innovative and large-scale projects, as is strong demand for low-carbon hydrogen. Streamlined permitting and planning are essential, and overly strict regulations on early projects – for example on the carbon intensity of low carbon hydrogen – should be avoided, as higher standards are more appropriate when the sector matures. To use the earlier analogy: expecting a baby to clean up its own mess is unrealistic; that will come in the ‘toddler and teenage phases’. Finally, it is also crucial to shield the emerging industry from unfair foreign competition – just as we ensure our children’s safety in nursery.

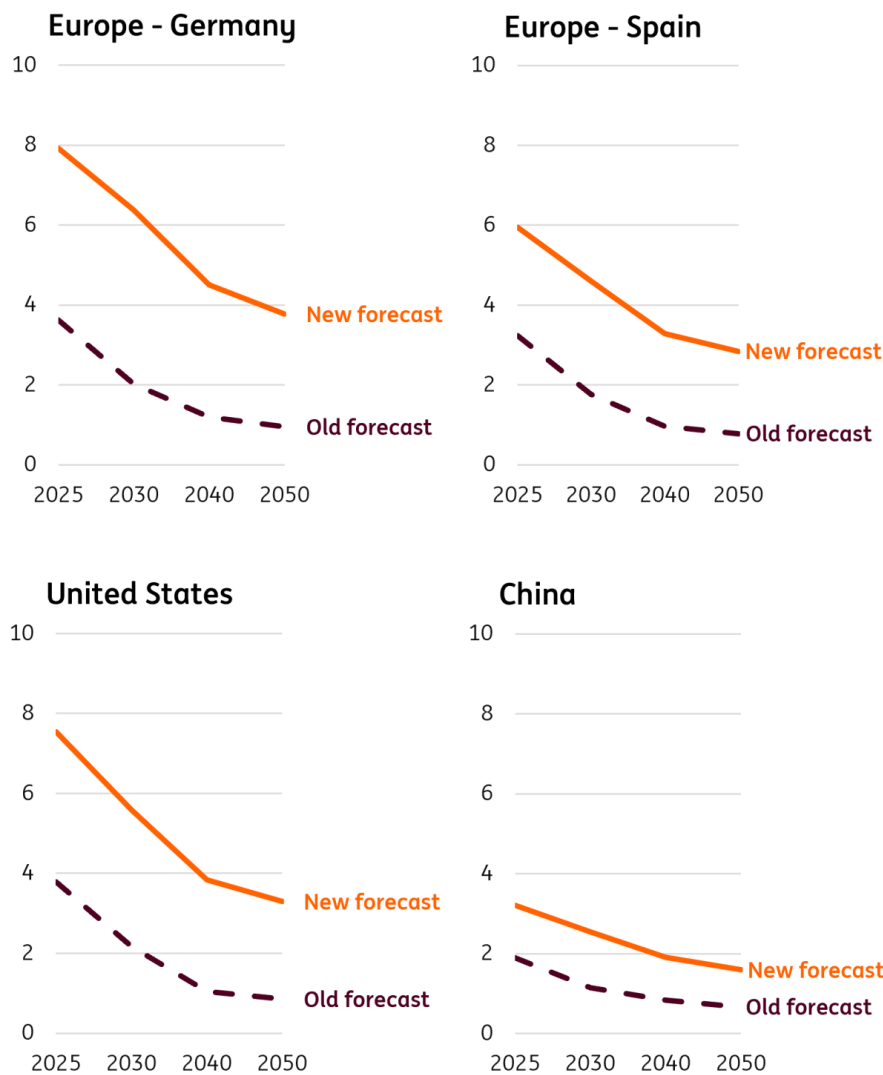
Call 2: The sector remains subdued due to the high cost and low off-take

The clean hydrogen sector remains subdued in 2026. While global production is expected to double to 1.8 million tons per annum (mtpa) due to projects under construction coming online, this volume is less than 2% of current global (non-clean) hydrogen use. Production is expected to rise to 5.5 mtpa by 2030, according to Bloomberg New Energy Finance, significantly short of the 25 mtpa combined targets from national governments across the globe. These targets are ripe for a reset based on market realism, but they might remain in place in 2026 as it is still a long way from 2030, at least in political terms.

Executives in the industry rank costs and weak demand as the main bottlenecks for viable business cases. Costs for green hydrogen production have been revised upward, notably due to higher energy, labour, material and trade costs and don’t make up for the oversupply in the Chinese equipment market.

Green hydrogen costs are expected to be higher for longer

Comparing BNEF's 2023 forecast with its current forecast for the levelised cost of on-site production of green hydrogen in \$/kg



Source: ING Research based on Bloomberg New Energy Finance

Due to persistent high costs, the industry requires vast amounts of government support throughout the full supply chain; from hydrogen production, transportation to hydrogen use; every link requires assistance. Governments across the globe allocated \$222 billion for blue and green H₂ in 2025, which was down 20% mostly due to cuts in the US.

The **EU** and its members offer the most support – \$123 billion across EU pots such as the EU Innovation Fund and Next Generation EU Funds, and state support via programmes such as the Important Projects of Common European Interest (IPCEI).

In the **US**, the One Big Beautiful Bill Act (OBBBA) reshaped the industry. It erased uncertainty around the 45V tax credit but moved the start-of-construction deadline forward to end-2027, squeezing green hydrogen developers. Some will speed up to meet the deadline, while others are likely to give up. Large scale electrolyser projects are particularly at risk as they struggle to secure big off-take agreements faster. Meanwhile, the 45Q credit for CO₂ capture has strengthened the business case for blue hydrogen, allowing it to take the lead. By 2030, over 90% of clean hydrogen is expected to be blue. Overall, funding for clean hydrogen was reduced from \$90 billion to \$28 billion.

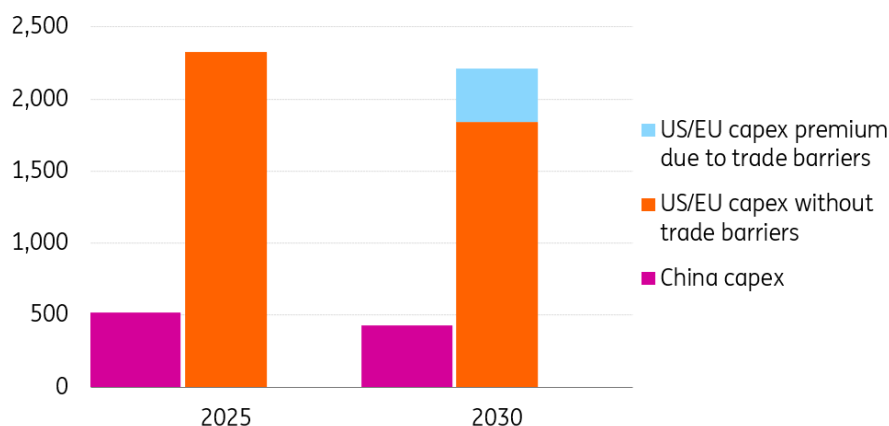
Demand remains severely underfunded - just 3% of the total support available is directed towards creating hydrogen demand. This compounds imbalances in the market: most proposed clean hydrogen suppliers have yet to find a buyer. Incentives to raise demand such as the Renewable Energy Directive (RED III quotas in Europe) have been watered down and regulation to green global shipping has been postponed (the proposals from the International Marine Organisation). Most binding off-take contracts so far have been driven by voluntary corporate decarbonisation goals in niche markets where few clients are willing to bridge the price gap by paying a green premium.

Call 3: China is likely to showcase a playbook for industry-wide adoption

Amid a green hydrogen backlash in the US, and Europe's ongoing challenges to stimulate hydrogen demand, global attention is shifting to China. In late 2025, hydrogen advanced from a niche pilot project to a central strategic priority within China's 15th Five-Year Plan (2026–2030). Building on its proven track record in rapidly scaling solar, wind, and electric vehicle sectors, China is positioned to take an assertive approach to developing and expanding its hydrogen industry. This strategy could fundamentally alter global cost dynamics for hydrogen equipment, as Chinese electrolyzers are currently priced at just a quarter of those in the US and Europe. However, trade restrictions limit future cost reductions for European and American markets.

Chinese electrolyzers are significantly cheaper, but ongoing trade restrictions limit further cost reductions for American and European electrolyzers

Capex cost of electrolyzers in \$ per 0.2 cubic meters of hourly hydrogen yield



Source: ING Research based on Bloomberg New Energy Finance

The National Energy Administration in China has outlined four foundational pillars for this effort: robust policy support, technological innovation, enhanced project governance, and expanded international trade. On the policy front, a new capex subsidy scheme now covers up to 20% of project investment for green hydrogen, e-fuels, CCUS, and related infrastructure. This measure is intended to reduce renewable power curtailment and help China achieve its emissions targets.

Regional governments have interpreted these national signals as a call to action. Provinces like Inner Mongolia, Hebei, and Shandong are accelerating large-scale electrolyser deployments and hydrogen pipeline construction, leveraging their abundant renewable resources and proximity to major industrial hubs.

Ultimately, China intends to transform hydrogen into a major new industry, potentially demonstrating a scalable blueprint for the rest of the world. Nonetheless, the sector will likely face familiar hurdles, including the gap between manufacturing capacity and end-use demand, as well as infrastructure challenges connecting supply and demand regions. It will be fascinating to observe how China addresses these challenges and what valuable lessons Europe and the US can glean from China as they work to develop a comprehensive hydrogen supply chain—including production, transportation, and utilisation in hard-to-abate industries.

Despite the tough environment for the industry overall, 2026 promises to be a dynamic year, with significant trends to watch.

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