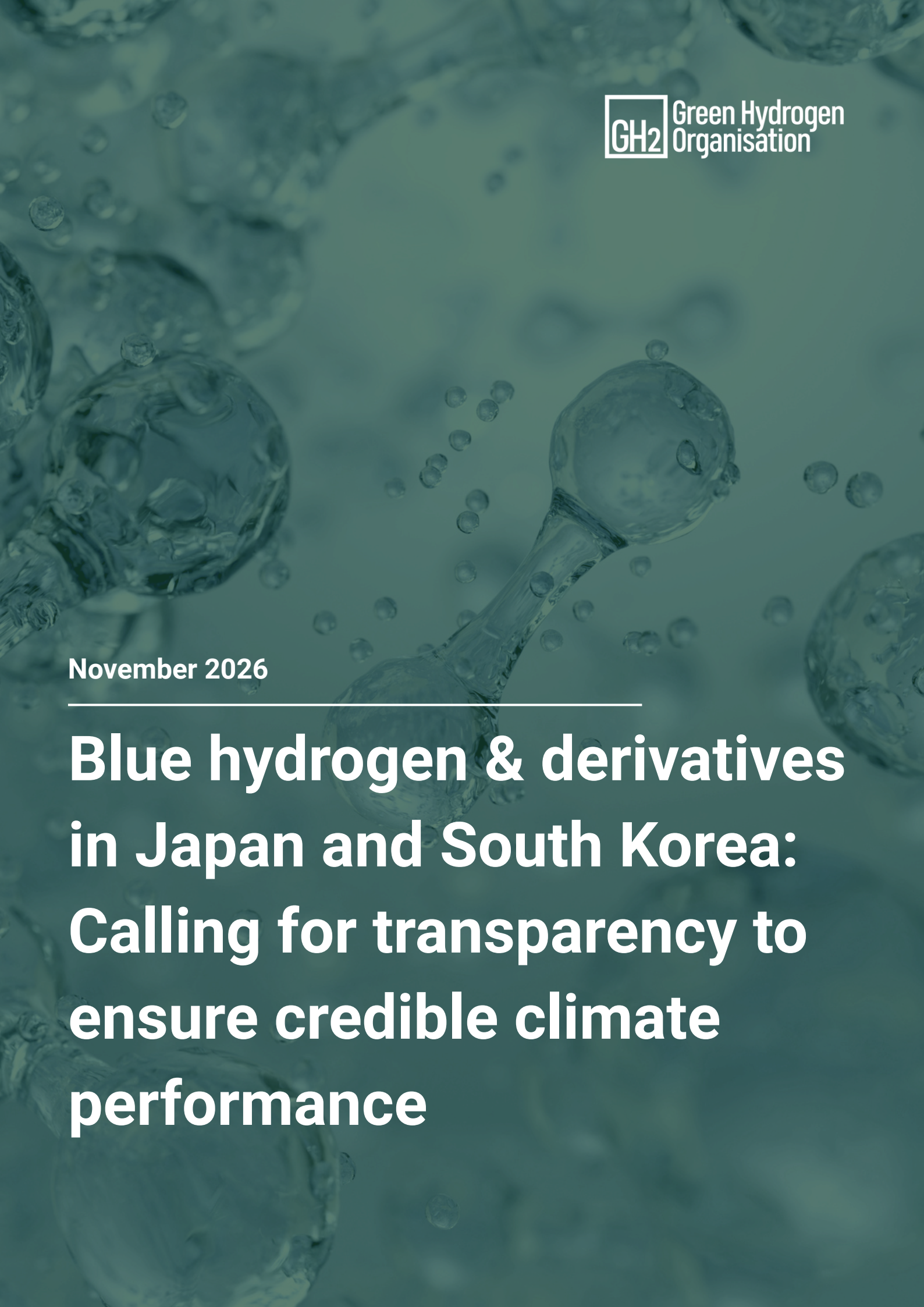


Green Hydrogen Organisation

November 2026

Blue hydrogen & derivatives in Japan and South Korea: Calling for transparency to ensure credible climate performance

About the Green Hydrogen Organisation (GH2)

The Green Hydrogen Organisation (GH2) is a Swiss non-profit foundation working to take renewables to industries that cannot be fully electrified, using green hydrogen. These sectors include fertiliser production, steelmaking, shipping and aviation.

Founded in 2021, GH2 has established a presence in Geneva, London, Cairo, Jakarta, Nairobi, and Oslo. It coordinates the Asia-Pacific Green Hydrogen Alliance, a community that unites governments, companies and civil society across the APAC region to accelerate the adoption and production of green electrofuels.

GH2 is a founding member of the Global Renewables Alliance (GRA).

This report builds on previous research conducted by GH2, including *Weak emissions accounting can undermine hydrogen's role in global decarbonisation* (GH2 & RMI, 2024) and *In search of the real price of blue hydrogen* (GH2, 2025).

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Key takeaways

1 Although blue hydrogen and ammonia have suffered setbacks globally due to the spike in natural gas prices triggered by the US-Iran war, some major projects are still going ahead and require careful monitoring. Blue hydrogen and ammonia projects present significant greenwashing risks, as demonstrated by GH2's analysis of operational “blue” projects in Japan and South Korea which, despite having started the production of gas-based hydrogen, have yet to actually start capturing and storing the carbon emitted.

2 Public funding of blue hydrogen and ammonia should be limited to projects that meaningfully and credibly reduce emissions instead of adding to the demand for natural gas, such as carbon capture retrofits on existing grey hydrogen and ammonia production. The GH2 project checklist provides a robust starting point to assess the credibility of blue hydrogen and ammonia projects’ climate credentials, evaluate their emission reduction potential, and ensure that they do not compound the climate crisis by delaying the transition.

3 In Japan and South Korea, public finance is being committed to blue hydrogen and ammonia projects based on standards that do not account for large shares of life-cycle emissions. Japan and South Korea should therefore extend the boundary of their low-carbon hydrogen standards to ensure that emissions across the full life-cycle are being measured and disclosed. Independent verification and disclosure should also be conditions for receiving public funding under Japan's Difference (CfD) scheme or South Korea's Clean Hydrogen Portfolio Standard and guarantee that only credible blue projects are supported.

4 GH2's analysis of Japan’s and South Korea’s planned imports finds that their emission reduction potential is limited, especially if used for co-firing in the power sector. In 2026, South Korea however withdrew support for low carbon ammonia imports for co-firing, and Japan began reconsidering the policy and cutting related budgets because of its high cost, its extension of the life of coal and gas plants, and its conflict with both countries’ decarbonisation goals. This is a welcome shift away from co-firing, and the remaining public funding should be directed towards sectors where hydrogen and ammonia can make a greater difference, such as fertilisers, shipping and steelmaking, including of green iron.

5 Low-quality blue hydrogen can divert limited resources and attention away from proven climate and energy security solutions. Blue projects’ undisclosed lifecycle emissions leave their mitigation potential unclear, and their footprint can match or exceed that of grey hydrogen from unabated fossil gas. These projects also prolong energy vulnerability by deepening both countries’ dependence on volatile liquefied natural gas (LNG) and blue ammonia imports. Public funds should shift to renewables and green hydrogen for hard-to-abate sectors, which can both enhance energy security and meaningfully contribute to industrial decarbonisation.

Blue hydrogen and derivatives projets have suffered setbacks globally, but we should remain vigilant

Blue hydrogen, which is made from fossil gas coupled with carbon capture and storage (CCS) technology, has progressed at a slower pace than anticipated, with major project delays and cancellations this year. Project deployment, which was expected to accelerate, was pushed back until at least 2027 due to delays in five projects in the United States (US), Europe and the Middle East (IEA, 2026). Air Product's $4.5bn Louisiana Clean Energy Complex was cancelled as the firm no longer expected it to deliver the necessary financial returns (Argus, 2026). ExxonMobil's Baytown project and Equinor's Dutch H2M Eemshaven project were similarly cancelled in late 2025 and early 2026. Maturity remains uneven among projects, and only one project out of 44 reached FID (IEA, 2026).

The US - Iran war and the subsequent closure of the Strait of Hormuz by Iran contributed to the slow down of blue hydrogen and derivatives project deployment. Fossil fuels prices spiked as about 20% of the global LNG normally goes through the Strait (Hydrogen Insight, 2026), hence eroding blue hydrogen's cost-competitiveness to the point where green hydrogen became cheaper than grey and blue hydrogen in Asia. In China and India, which have substantially lower green hydrogen and ammonia production costs, long-term-contract green ammonia sales prices have averaged $629/tonne compared to prices of $700-800/tonne for grey ammonia (Hydrogen Insight, 2026). This highlights once again the price volatility of natural gas and the growing need to reduce exposure to fossil fuel supply disruptions by diversifying risk. It also draws attention to the underlying and inevitable reality of the electrotech revolution, with renewables and electrofuels increasingly becoming the cheapest and safest choice to ensure energy independence and security (EMBER, 2025).

Policy decisions made in major offtake regions for blue ammonia also reduced projects' prospects. In South Korea, the second round of clean hydrogen power generation bidding market was relaunched to focus only on domestically produced green hydrogen, excluding blue ammonia imports for co-firing (Argus, 2026). The country's clean ammonia import budget was also left entirely unspent, which reflects an important change of direction: South Korea now favours investing in large-scale domestic green hydrogen projects rather than low-carbon ammonia imports (Hydrogen Insight, 2026a).

If blue hydrogen and derivatives projects have suffered setbacks globally, some major projects are still going ahead. ENGIE and Equinor's H2 BE project was launched in February in Belgium (210kt pa); EET's 350MW Stanlow project in England is expecting to reach FID in the second half of 2026; and Yara's Sluiskil blue ammonia project in the Netherlands was formally inaugurated in September. The climate credentials of such projects are however uncertain: regarding Yara's Sluiskil project for example, no information was communicated about the source of the natural gas used nor the exact volumes of blue ammonia to be produced.

The company has “yet to decide how to calculate the emissions reductions across all the volumes produced at the plant” (Hydrogen Insight, 2026b). The greenwashing risks of blue hydrogen and derivatives projects therefore remain significant, and projects should be closely monitored worldwide, especially as gas prices eventually decrease and blue hydrogen and ammonia progress accelerates.

In Japan, public funds are helping to finance the development of blue hydrogen and ammonia projects, domestically and abroad. Japan’s CfD scheme is subsidising the Blue Point Project in Louisiana, a joint venture between CF Industries, JERA and Mitsui & Co., which reached FID in April 2025. Both Japanese companies were awarded $6.8 billion of funding and now benefit from preferential loans to finance the project. At its inception, South Korea’s Overseas Clean Hydrogen and Ammonia Production and Import Infrastructure Establishment Project similarly intended to finance clean ammonia production abroad for 800k ton/year (KNOC, 2024), although it was reported that the budget was left entirely unspent in 2026.

This brief argues that the use or potential use of public funds to finance blue hydrogen and ammonia justifies heightened scrutiny of projects in Japan and South Korea. Currently, public finance is however being committed to blue projects on the basis of standards that leave large shares of life-cycle emissions unmeasured and undisclosed, creating significant risks of greenwashing and inflated climate credentials.

The following report examines the existing low-carbon hydrogen standards and shows that they are currently insufficient to accurately measure blue projects’ emissions. The analysis then turns to import and domestic projects supported by Japan and South Korea and finds that their climate performance cannot be credibly assessed due to a lack of publicly available information. The brief therefore calls for greater transparency and accountability to prevent greenwashing, and to limiting public support to projects that reduce emissions from existing grey hydrogen production rather than locking in fossil fuel assets.

Low-carbon hydrogen standards exist, but they are insufficient in their current form to ensure the credible measurement of projects' emissions

The ISO 19870 series

The International Organization for Standardization (ISO) is an independent international organisation that develops and publishes voluntary, consensus-based global standards and is widely acknowledged as a leading reference for international standards. It is currently developing the ISO 19870 series, a set of standards that applies carbon footprint and life cycle assessment (LCA) principles to the hydrogen supply. It specifies a methodology for determining the greenhouse gas (GHG) emissions associated with the hydrogen supply chain and is recognised internationally. Both Japan's and South Korea's low-carbon hydrogen standards are designed to incorporate and align with ISO standards.

The ISO 19870 series is however still under development, and therefore insufficient in its current form to guarantee the credibility and climate performance of blue hydrogen and ammonia projects. The publication of the ISO 19870-1:2026 on emissions associated with the production of hydrogen up to the production gate represents a significant milestone and the most widely referenced methodology of its kind, but it only constitutes the first part of the ISO 19870. Parts 2 and 3, which cover emissions associated with the rest of the hydrogen and ammonia supply chains, are still under development and have yet to be released. Hence, although blue ammonia projects are progressing with Japan awarding CfDs and South Korea potentially implementing its Overseas Clean Hydrogen and Ammonia Production and Import Infrastructure Establishment Project, a complete methodology determining associated emissions all along the value chain still does not exist. This creates a risk of leaving GHG emissions unaccounted for and overstating the climate performance of blue hydrogen and ammonia projects.

Additionally, although the ISO 19870-1:2026 is a substantial technical achievement, it does not include any public reporting requirement and does not provide guidelines regarding the transparency companies should display on climate performance, CCS rate achieved, permanence of carbon capture and methane leakage rate assumptions.

Japan

Japan's Hydrogen Society Promotion Act supports producers and importers of low-carbon hydrogen and derivatives whose business plans are approved by the Minister (Ministry of Economy, Trade and Industry, 2024). The implementing ordinance sets maximum carbon intensities of 3.4 $kgCO_2e/kgH_2$ for hydrogen and 0.87 tCO_2e/tNH_3 for ammonia, both well-to-gate. Each equals a 70% reduction relative to grey production (REI, 2024a).

These thresholds are looser than the EU's and UK's (REI, 2024a), but the larger gap is the boundary for emissions measurement. METI excluded storage and transport emissions because international debate on measurement methods is unresolved (REI, 2024a), yet synthetic fuels and synthetic methane are already assessed across the whole supply chain. For an import-dependent supply chain, this leaves out conversion, shipping and reconversion. GH2 and RMI found that 43–69% of the life-cycle emissions of Australian blue ammonia used for power in Japan fall outside the standard (see Figure 1, GH2 & RMI, 2024). Modelling of hydrogen imported to Japan shows conversion and transport can push emissions well above the 3.4 kg threshold (Kudoh & Ozawa, 2025).

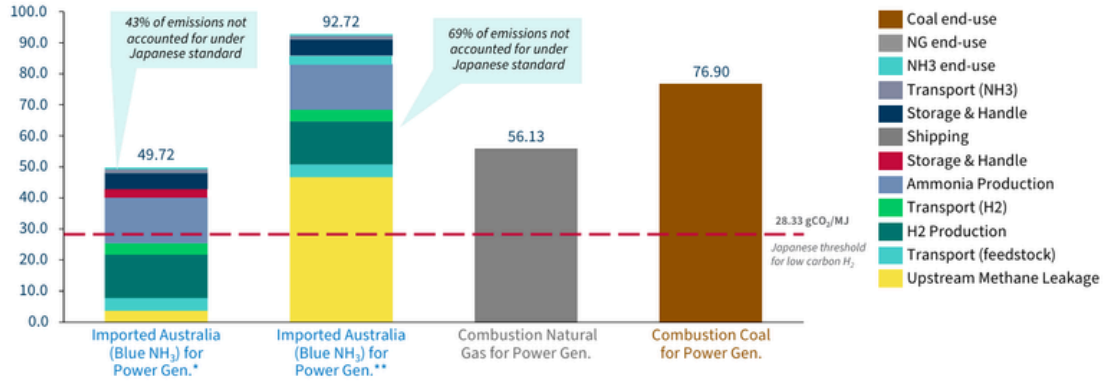
Three further features weaken the framework (REI, 2024a):

- Upstream emissions can be calculated using secondary data rather than measured values.
- Projects certified under current thresholds stay eligible even if standards are later tightened, for 15 years of support plus a further 10 years of supply obligation.
- The basis for support prices and the selection of projects is not disclosed.

There is also no requirement to publish capture rates, methane leakage assumptions or other information needed to assess emissions. JOGMEC is preparing guidance for third-party verification of carbon intensity under the CfD scheme, designed to align with ISO 19870-1 and 19870-3, and plans a certification pilot (AEA, 2026). This is welcome, but contracts are already being awarded. They include around 770,000 tonnes a year of ammonia from Louisiana for JERA and Mitsui, used mainly for co-firing with coal (AEA, 2026).

Exhibit 3: Scenario Analysis — Calculated emissions intensity of landed Australian blue ammonia versus combustion of natural gas and coal in Japan

gCO_2e/MJ



*National average methane leakage value used for Australia
**Regional methane leakage value used for Canning Basin

Note: Route from Australia to Japan. Hydrogen is synthesized into ammonia for power generation end-use, not cracked back into hydrogen. Conservative (national average) and aggressive (regional) upstream methane leakage values modeled.

Sources: RMI Analysis, Ammonia Energy Association, US DOT Maritime Organization, Methanol Institute, US DOE, Lloyds, UMAS, TechnoEconomic Assessment ZeroCarbonFuels, IPCC, Electricity Maps

Figure 1. *GH2 & RMI, 2024*

South Korea

South Korea's Clean Hydrogen Certification Scheme sets a maximum of 4 $kgCO_2e/kgH_2$ on a well-to-gate basis, with four grades down to below 0.1 $kgCO_2e/kgH_2$ (IEA, 2026a). Producers supplying power generators submit clean hydrogen certificates or a carbon intensity projection to the operating agency of the Hydrogen Power Generation Bidding Market. Certification is required to take part in the Clean Hydrogen Portfolio Standard. Since February 2025, projects can also be pre-certified on design data and operating plans before they operate (IEA, 2026a).

As in Japan, there is no requirement to disclose emissions data publicly. The standard also excludes shipping LNG for domestic blue hydrogen production and transporting captured CO_2 to overseas storage (Solutions for Our Climate, 2024b). These omissions are particularly relevant for projects such as South Korea's Boryeong project, which plans to import LNG for blue hydrogen production and transport the captured CO_2 to Australia for storage.

Conclusion

In their current form, Japan's and South Korea's low-carbon hydrogen and ammonia standards do not capture the full life-cycle emissions of imported blue hydrogen and ammonia, rely on default data for upstream emissions, and do not require public disclosure. They therefore cannot provide a credible assessment of projects' climate performance. The gap is made more serious because it appears that certified projects can keep their status even if standards are later tightened.

To ensure the climate performance of blue hydrogen and ammonia projects, the Green Hydrogen Organisation (GH2) created a project checklist (see Figure 2). Only blue projects that answer positively to all six questions can be considered to credibly reduce emissions, and only those should therefore qualify for receiving public funding from Japan and South Korea. All other projects are considered to be "low-quality" blue hydrogen projects.

GH2's blue hydrogen and derivatives project checklist

To ensure the credibility of blue hydrogen and derivatives projects and guarantee their climate performance, the below checklist should be followed:

1. Does the project capture at least 95% of the CO_2 from all process streams, at measured rather than nameplate rates?

Many blue projects capture only the concentrated process stream. That limits overall capture to roughly 50–60%, with little benefit over unabated gas. The test should ask for the actual operating capture rate across all streams, including flue gas. No CCS project reviewed by IEEFA has consistently captured more than 80%, so a design figure alone is not evidence (IEEFA, 2023).

2. Are upstream and midstream methane emissions measured at source and independently verified?

Methane leakage is often the largest and least reported part of blue hydrogen's carbon footprint. It varies from <1% to over 9% depending on the basin. National averages and default values systematically understate it. Credible projects should use site-specific data from gas suppliers reporting to OGMP 2.0 Level 5 (or equivalent), verified by a third party. Conservative defaults should be used as a last resort.

3. Is the captured CO_2 permanently stored, with long-term monitoring and liability?

Capture means little if the CO_2 is later released or used for enhanced oil recovery, which enables more fossil extraction. The project should show:

- dedicated geological storage;
- a site-specific leakage risk assessment over at least 100 years;
- ongoing monitoring;
- clear responsibility for any reversal.

GH2's blue hydrogen and derivatives project checklist

To ensure the credibility of blue hydrogen and derivatives projects and guarantee their climate performance, the below checklist should be followed:

4. Are emissions accounted for across the full value chain to the point of use, not just to the production gate?

For derivatives, a large share of emissions occurs after production. This includes ammonia synthesis, N_2O, storage, shipping, cracking, hydrogen leakage and combustion. The project's carbon intensity should be reported well-to-end-use.

5. Is the project's emissions data publicly disclosed and independently verified?

GH2's review of eight Japanese and Korean projects could not find basic information for most of them, such as capture rate, gas source and use of captured CO_2. Without disclosure, climate claims cannot be tested. The greenwashing risk is significant. Credibility requires public reporting of each value chain stage, the gas supply route, and the assumptions behind the figures.

6. Does the project reduce existing emissions, or does it lock in new fossil gas demand?

Retrofitting carbon capture onto existing grey hydrogen production can cut current emissions. A new-build blue plant creates decades of new gas demand and fossil infrastructure. It also competes with green hydrogen for public support. Projects should show they do not underwrite new gas exploration or development. Any renewable electricity they claim should meet the same rules that apply to green hydrogen

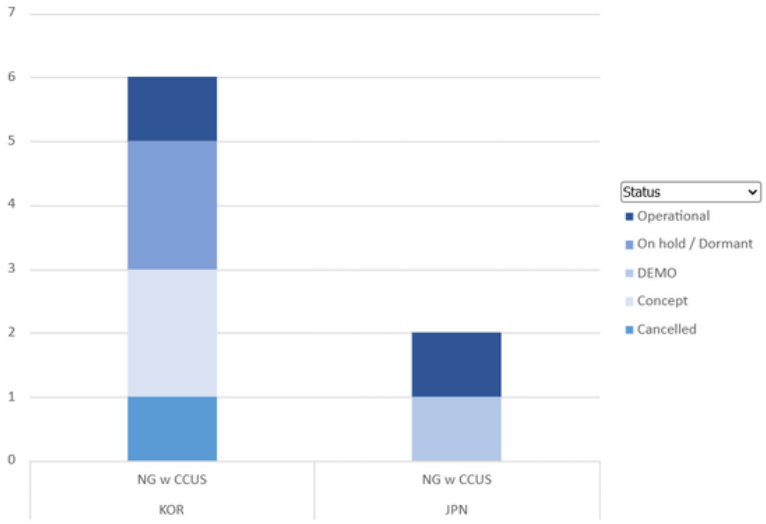
Figure 2. GH2 blue hydrogen and derivatives project checklist (2026)

Domestic blue hydrogen and ammonia projects in Japan and South Korea lack transparency, thus credibility

Japan and South Korea are seeing the development of domestic blue hydrogen and ammonia projects. Based on the IEA database of hydrogen production projects (IEA, 2026b), GH2 identified eight such projects across Japan and South Korea. Three projects are operational, three projects are cancelled or on hold/dormant, and two projects are at the concept phase, and they all use or plan to use natural gas coupled with carbon capture technology.

Using publicly available information and the GH2 blue hydrogen and derivative project checklist, GH2 attempted to determine the climate performance of each project. In most cases however, the carbon capture rates and source of natural gas were not disclosed, and information regarding upstream methane leakage assumptions were unavailable. The use of carbon once captured was not systematically disclosed either, preventing any assessment of the permanence of carbon storage. Overall, none of the analysed projects in Japan and South Korea disclosed enough information for GH2 to assert whether they will credibly reduce carbon emissions.

This matter deserves particular attention as 75% of these blue hydrogen and ammonia projects are new builts rather than retrofits: their uncertain climate credentials is likely to delay the energy transition further by locking in fossil fuel assets, compounding the issue rather than mitigating emissions from existing production.



Number and status of blue hydrogen and ammonia projects in Japan and South Korea, using the IEA hydrogen production projects database (updated June 2026)

Additionally, the lack of transparency of blue hydrogen and ammonia projects in Japan and South Korea leaves significant room for greenwashing, which is further illustrated by projects currently in operations.

In South Korea, the Changwon City project, which finished construction in 2023, became South Korea's first completed blue hydrogen project (Hydrogen Insight, 2023). The 3bn won pilot facility planned to produce hydrogen from natural gas, which would be used at an adjacent refuelling station for buses and trucks, and with the CO_2 captured used at a water treatment plant. Half of the cost of the pilot project was covered by the city of Changwon. The project was said to be "a step towards realising carbon neutrality from grey hydrogen [...] to blue hydrogen", according to the vice-minister of environment, Yu Je-cheol (Hydrogen Insight, 2023).

Although the pilot project reached completion in April 2023, it only started production in July 2025. The hydrogen produced was, however, referred to as "grey" (Hydrogen Insight, 2026c), seemingly indicating that the carbon capture process of blue hydrogen production never actually started. The City of Changwon has since been sued for unpaid liquid hydrogen, and its hydrogen refuelling stations risk being seized.

In Japan, the Chita-Midorihama Hydrogen factory started operations in June 2024, according to Toho Gas' business strategy (Toho Gas, 2024). Although this project is presented as part of the company's efforts to "achieve carbon neutrality", no information can be found about the carbon capture process of the project.

Hence, in both Japan and South Korea, operational "blue" hydrogen projects appear to produce hydrogen from natural gas without actually capturing and storing the emitted carbon. Despite using climate neutrality as a rationale, these projects seem to amount to nothing else than grey hydrogen production in disguise. The risks of greenwashing are significant, and more accountability is needed in the sector to ensure the credibility of projects' climate credentials.*

Case study: Boryeong LNG Terminal, South Korea

The Boryeong LNG Terminal project was announced in 2021 to become the world's largest blue hydrogen plant (Business Korea, 2021). SK E&S and Korea Midland Power, the companies leading the project, announced an annual production capacity of 250,000 tons of blue hydrogen to be used mainly for emission reductions in power generation at four gas-fired power plants, with 30% co-firing planned for these processes (Solutions for Our Climate, 2024).

However, several concerns surround Boryeong's emission reduction potential. According to Solutions for Our Climate (2024), the project lacks sufficient transparency regarding its actual GHG emission intensity, which, under South Korea's Clean Hydrogen Certification System, must remain below 4 $kgCO_2e/kgH_2$ to qualify as clean.

First, Boryeong plans to import LNG from the Barossa gas fields in Australia. SK E&S has stated that 99% of carbon from the extraction of this natural gas will be captured; the LNG will then be shipped to South Korea and reformed into blue hydrogen (S&P Global, 2022). Following this process, 95% of the resulting CO_2 will be captured and either shipped back to Australia or Timor-Leste for reinjection into a depleted gas field (Asia Business Daily, 2023). Despite these announced capture rates for LNG extraction and hydrogen production, the project has not

** This analysis is solely based on publicly available information*

Domestic blue hydrogen and derivatives projects in Japan and South Korea

	Project	Status	Technology	Source of Gas	Product	H2 production capacity	CO2 capture capacity	CO2 capture rate	Use of CO2 captured	Limitations	Classification
Japan	**Kashiwazaki Clean Hydorgen/Ammonia Project Niigata Demostration**	Operational	Natural gas with CCUS	Domestic (Minami-Nagaoka Gas Field)	Blue H2 / Blue NH3	0.001 Mt/year	No mention	No mention	Reinjected into a reservoir	No mention of capture capacity or emission reduction measures	New project – Delaying transition
	Chita-Midorihama Hydrogen factory	Demo	Natural gas with CCUS	Imported	Blue hydrogen	0.001 Mt/year	No mention	No mention	No mention	No mention of capture capacity or emission reduction measures	New project – Delaying transition
South Korea	**Boryeong LNG Terminal**	Dormant	Natural Gas with CCUS	Imported (likely from Australia)	Blue H2 / blue NH3	0.25 Mt/year	2 CO2 Mt/year	99% LNG extraction, 95% H2 production	Reinjected into a reservoir	No mention of emission reduction potential or capture beyond the production process.	New project – Delaying transition
	Hyundai Olibank – Blue H2 Ecosystem	Dormant	Natural gas with CCUS	Imported	Blue hydrogen	0.1 Mt/year	No mention	No mention	Dry ice, fertilisers	No mention of capture capacity or emission reduction measures	New project – Delaying transition
	SK Ulsan Complex	On hold	Natural gas with CCUS	Imported	Blue hydrogen	No mention	0.4 CO2 Mt/year	No mention	Reinjected into a reservoir	No mention of emission reduction potential or capture beyond the production process.	Retrofit – emission reduction
	Doosan Changwon City	Operational	Natural Gas with CCUS SMR + CCUS	Imported	Blue hydrogen	0.002 Mt/year	0.01752 Mt/year	No mention	Water treatment.	No mention of emission reduction potential or capture beyond the production process.	Retrofit – emission reduction
	Yeosu Blue Hydrogen Project	Concept	Natural gas with CCUS	Imported	Blue hydrogen	0.008 Mt/year	0.4 CO2 MT/year	No mention	Reinjected into a reservoir	No mention of emission reduction potential or capture beyond the production process.	New project – delaying transition
	Gwangyang LNG terminal blue hydrogen	Concept	Natural gas with CCUS	Imported	Blue hydrogen	No mention	No mention	No mention	No mention	No mention of capture capacity or emission reduction measures.	New project – delaying transition

Table 1: Blue hydrogen and ammonia projects in Japan and South Korea
GH2 research, using the IEA hydrogen production projects database (updated June 2026)

disclosed the upstream, midstream and downstream methane leakage assumptions from transporting, handling and using the LNG, nor the estimated intercontinental transport emissions of shipping the LNG and the captured CO_2 (Solutions for Our Climate, 2024). **If accounted for, the project's emission intensity would likely exceed the South Korean threshold for classification as "clean."**

This lack of transparency is compounded by the intended end use of the hydrogen produced. Boryeong will supply gas-fired power plants originally expected to reach the end of their design life by 2027 (Solutions for Our Climate, 2024). However, using blue hydrogen as co-firing feedstock would extend their operational lifespan, significantly delaying the energy transition (Solutions for Our Climate, 2024).

Secondly, co-firing blue hydrogen in South Korea may not deliver any net emission reduction at all. If three of the four gas-fired plants were to implement 30% blue hydrogen co-firing, the GHG emissions from the hydrogen's own production process would offset any reductions achieved at the power plants (Solutions for Our Climate, 2024).

The Boryeong LNG Terminal project is currently on hold, and South Korea has stepped back from its co-firing plans, having recognised the risk of extending the lifespan of fossil fuel power plants and falling behind on its national decarbonisation targets.

The emission reduction potential of Japan’s blue ammonia imports is limited

Japan’s context for blue ammonia imports

In addition to domestic production, imports of blue ammonia are set to play a central role in Japan's decarbonisation strategy. In its 7th Strategic Energy Plan, published in February 2025, Japan placed special emphasis on the role of CCS, blue hydrogen and blue ammonia as means of decarbonisation, particularly in the power sector, where it remains highly dependent on fossil fuels (Ministry of Economy, Trade and Industry, 2025). In line with this, the 2025 Transition Roadmap for the Power Sector established blue ammonia specifically as the main feedstock for emissions reduction through co-firing, setting targets of 20% co-firing by 2030, 50% or more after 2030, and 100% by 2050 (Ministry of Economy, Trade and Industry, 2025; IEEFA, 2026).

To support this strategy, Japan has developed a Difference (CfD) scheme for low-carbon production projects. This mechanism has so far supported green and blue hydrogen projects, as well as imports of blue ammonia from abroad. However, its eligibility criteria follow a well-to-gate approach for “clean” hydrogen and ammonia projects, considering only GHG emissions from feedstock supply and derivative production, and therefore leaving a large share of life-cycle emissions unaddressed.

Japan has also focused on building international partnerships to secure ammonia supply, including blue ammonia agreements and ongoing discussions with energy companies in the United Arab Emirates, the United States, and Australia (ADNOC, 2024; Mitsubishi Corporation, 2024; Gas World, 2026). Moreover, four blue ammonia import projects for coal co-firing have been approved under Japan's CfD scheme, accounting for 97% of the supported volume (Ishihara, 2026). However, despite this institutional support, blue ammonia co-firing is now facing a setback. Japan's government has indeed begun reconsidering the policy due to its high costs, heavy reliance on subsidies, and unproven technology (Gas Outlook, 2026). METI has since cut the budget for ammonia co-firing projects and scaled back capacity plans for technology development and imports (Gas Outlook, 2026). **This opens a window to redirect those funds toward proven green energy alternatives instead.**

Case study: Blue Point Facility and Japan's blue ammonia imports

In line with the government's co-firing targets, Japan has turned to overseas suppliers to secure "clean" ammonia. Through its CfD scheme, Japan has committed $6.8 billion to blue ammonia imports from the Blue Point facility in Louisiana, United States (Energy Institute, 2026; Hydrogen Insight, 2025). Blue Point is a joint venture between CF Industries (US), JERA (Japan) and Mitsui (Japan) to produce 1.4 million tonnes of blue ammonia annually through autothermal reforming (ATR), using natural gas as feedstock, with a dedicated CCS facility capturing the resulting CO_2 (JERA, n.d.). It is the first major international ammonia project to receive funding under Japan's CfD scheme and is expected to begin operations in 2029.

However, Blue Point raises several concerns for Japan's decarbonisation strategy. First, the project lacks transparency: its estimated carbon emission intensity remains undisclosed, which prevents a clear picture of the climate performance of these announced imports, a situation that is especially concerning given the public funding involved. The only figure currently available is the expected CO_2 capture rate during ATR for ammonia production, around 95% (FuelCellsWorks, 2026), though no ATR project worldwide has yet demonstrated this capture rate at scale (IEEFA, 2026). Moreover, this figure covers only the CO_2 produced at the ammonia plant itself, excluding lifecycle emissions such as upstream methane leakage and the transport emissions from shipping blue ammonia from the US to Japan (IEEFA, 2026). Secondly, co-firing blue ammonia with coal may have a limited impact on reducing power sector emissions. According to the Renewable Energy Institute (REI, 2024), 20% co-firing would reduce thermal plant emissions by only 12.4%, and 50% co-firing by 31%. However, these reductions are likely overstated since the calculation excludes transport emissions from imported blue ammonia, which could offset or diminish the gains.

GH2 and RMI (see Figure 3., 2024) have highlighted the scale of this problem: when the full value chain is considered, the GHG emission intensity of importing blue ammonia from the US for power generation would be comparable to burning natural gas directly. This lack of accuracy is reinforced by Japan's CfD criteria themselves, as their well-to-gate boundary does not account for intercontinental transport emissions (REI, 2024a).

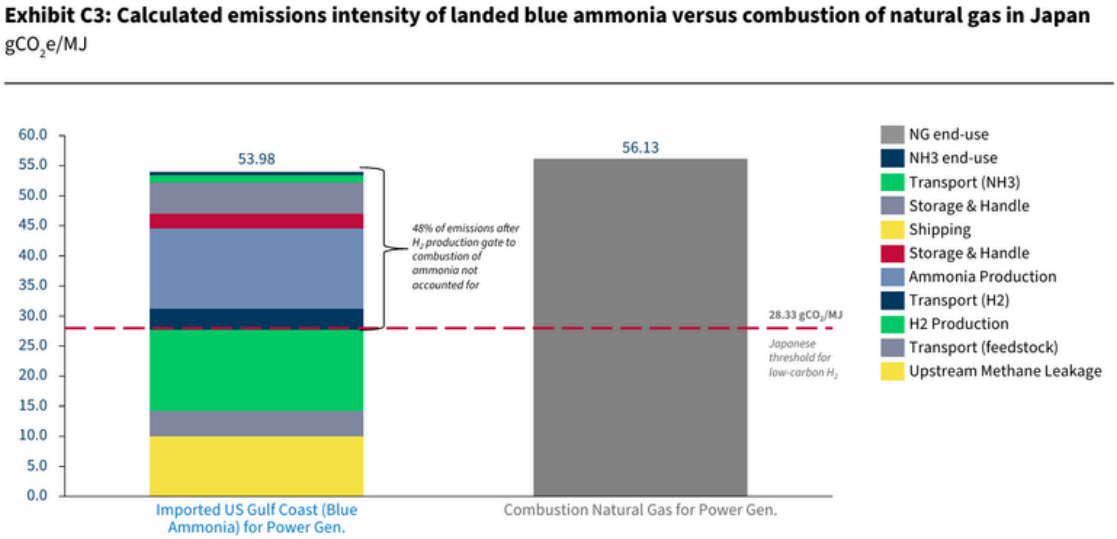


Figure 3. *GH2 & RMI, 2024*

Beyond the project's opacity regarding its associated GHG emissions, Blue Point also raises financial concerns. According to IEEFA, US natural gas prices are highly volatile and have been rising since 2016; once the whole value chain is considered, ammonia co-firing from Blue Point could make power generation 145% to 220% more expensive than onshore wind, and 240% to 464% more expensive than solar PV in Japan (IEEFA, 2026). Ammonia co-firing also depends heavily on subsidies, which, combined with its weak cost-competitiveness against other alternatives, makes it increasingly unattractive: ammonia and hydrogen subsidies already reached USD 3.7 billion in FY2025 alone (IEEFA, 2026). As a result, only 4 of more than 100 planned power plants are currently expected to adopt co-firing (Gas Outlook, 2026).

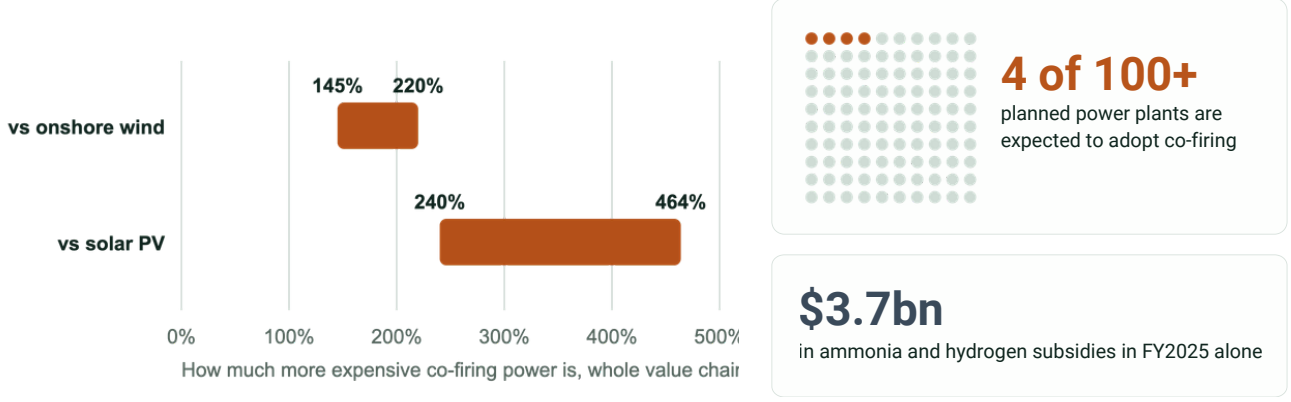


Figure 4. James, 2026 (IEEFA); Gas Outlook, 2026

Public funding schemes for “clean” hydrogen therefore risk missing their purpose by supporting expensive blue ammonia projects that fail to report transparently and actually reduce GHG emissions. Since the main objective of these schemes is to open the market to decarbonisation solutions, complete life-cycle emissions assessment and reporting should be minimum conditions for receiving public finance. This is necessary to mitigate greenwashing risks, which are significant.

The emission reduction potential of South Korea’s blue ammonia imports is limited

South Korea's context for low-carbon ammonia imports

Blue hydrogen holds a special place in South Korea's Hydrogen Economy Roadmap, which highlights the comparative advantage the country holds through its nationwide LNG infrastructure and the benefits this brings to hydrogen production and supply (Government of Korea, 2019). Accordingly, the strategy rests on three pillars: green hydrogen, blue hydrogen, and overseas clean hydrogen and derivatives imports. In line with this, South Korea plans to import 9.27 million tons of green and blue ammonia by 2030, from countries such as Australia, Saudi Arabia, Oman and the UAE (Solutions for Our Climate, 2024a). Blue ammonia is viewed as a cost-competitive and clean option to reduce power generation emissions through co-firing (Kim, 2022), with a target of 20% ammonia co-firing across 24 of its 43 coal-fired power plants (Solutions for Our Climate, 2024a).

To support this strategy, South Korea has established several government mechanisms: the Overseas Clean Hydrogen and Ammonia Production and Import Infrastructure Establishment Project, a financial scheme promoting the international clean hydrogen and ammonia value chain, the Clean Hydrogen Certification System and the Clean Hydrogen Portfolio Standard (a CfD scheme), both aimed at promoting clean hydrogen and derivatives in the power sector. Under these schemes, imports must meet a set GHG emission intensity threshold, calculated on a well-to-gate basis that considers emissions from feedstock supply and production. This interest has translated into several partnerships between Korean and overseas energy companies, primarily aimed at securing blue ammonia imports for co-firing: the agreement between Mitsui, TA'ZIZ, Fertiglobe and GS Energy Corporation to build an ammonia facility in the UAE (Mitsui & Co., 2024), and the memorandum of understanding between Hyundai Heavy Industries, KEPCO and Saudi Arabia's Aramco for cooperation on blue hydrogen and ammonia production (Ministry of Trade, Industry and Energy, 2022).

However, in August 2026, South Korea's position shifted toward promoting domestic green and pink hydrogen to strengthen its energy security and independence, withdrawing support for low-carbon ammonia co-firing imports as inconsistent with its decarbonisation pathway and a risk of extending coal power's lifespan (Nikkei Asia, 2025; HydroXpand, 2026; FuelCellsWorks, 2026a). The budget of the country's Overseas Clean Hydrogen and Ammonia Production and Import Infrastructure Establishment Project dedicated towards low-carbon ammonia imports was left unspent, as Korea's minister for climate, Kim Sunghwan, explained that they found "it would be much more effective to invest the budget in large-scale domestic green hydrogen production" (Hydrogen Insight, 2026a).

This shift was reinforced by evidence that the 20% co-firing target could have increased fine dust emissions by 23% to 85%, with some regions reaching levels equivalent to adding four new coal-fired power plants, without even accounting for the hidden GHG emissions from blue ammonia production and transportation overseas (Solutions for Our Climate, 2024a). As a result, the Clean Hydrogen Portfolio Standard, which determines eligibility for government financial support, has since excluded ammonia co-firing (Gas Outlook, 2026).

Conclusion:
Low-quality blue hydrogen and derivatives projects divert resources and attention away from actual climate and energy security solutions

Blue hydrogen's climate credentials ambiguity

Transparency about GHG emissions across the full value chain is the only way to know a project's real climate performance. For blue hydrogen production, where the feedstock is natural gas combined with CCS, this is particularly critical, yet most projects do not disclose upstream methane leakage from gas extraction and processing or the additional emissions from the gas burned to power CCS facilities (Howarth & Jacobson, 2021). Overall, the GHG footprint of blue hydrogen with CCS can be as intensive as, or even more intensive than, grey hydrogen production, given that methane leakage is 86 times more harmful than CO_2 over a 20-year horizon and that the blue sector requires even more fossil fuel input to operate (Howarth & Jacobson, 2021).

This lack of transparency becomes even more significant for blue hydrogen export projects, since transport emissions to the final destination are usually omitted in the assessment of emission intensity (GH2 & RMI, 2024; Renewable Energy Institute, 2024a). This is evident in blue ammonia exports to Japan and South Korea from regions such as MENA, Australia and the US, whose real life-cycle GHG emission intensity exceeds what current thresholds classify as clean. Both countries calculate emissions on a well-to-gate basis under their CfD schemes, excluding intercontinental transport emissions (Renewable Energy Institute, 2024; S&P Global, 2023). For instance, Japan's blue ammonia imports from Australia, currently classified as low-carbon, omit 43% of their life-cycle emissions (GH2 & RMI, 2024). Once accounted for, their intensity would be comparable to burning gas or coal directly, a pattern also evident for US imports (GH2 & RMI, 2024).

Even domestic blue hydrogen production in Japan and South Korea is problematic. Beyond avoiding intercontinental transport of the final product, these countries do not account for the transport emissions and upstream methane leakage associated with importing the LNG feedstock itself, which cannot be fully controlled, or cross-border CO_2 transport emissions due to the lack of domestic reservoirs (Solutions for Our Climate, 2024). The intended end-use of the captured carbon is not systematically disclosed either, making it difficult to estimate the permanence of carbon capture. These elements are currently omitted from both countries' institutional schemes, adding a further layer of climate credential ambiguity to the real emission intensity of these projects.

Moreover, the few operational projects in Japan and South Korea have yet to start capturing and storing carbon, despite producing hydrogen from natural gas, which illustrates the significant greenwashing risk of so-called “blue” hydrogen projects.

Finally, the majority of domestic blue projects are new builts and contribute to locking in fossil fuel assets instead of mitigating emissions from existing grey hydrogen production. Given that current “low-carbon” hydrogen standards in Japan and South Korea leave large shares of life-cycle emissions unmeasured or undisclosed, blue hydrogen projects that do not credibly reduce GHG emissions can compete for and receive government support, creating an uneven playing field for green hydrogen projects.

In conclusion, there is little evidence that low-quality blue hydrogen projects deliver meaningful climate benefits for the energy transition in Japan and South Korea. Instead, they risk diverting public funding and policy attention away from solutions with real emission reduction potential, such as green hydrogen and ammonia made from renewable electricity, which can deliver genuine decarbonisation in sectors where few alternatives exist, notably fertilisers and shipping and, above all for both countries, steel.

Blue hydrogen’s energy security concerns

Additionally, low-quality blue hydrogen and derivative projects are prolonging Japan and South Korea’s energy vulnerability. Countries with limited land and scarce natural resources, such as Japan and South Korea, are especially dependent on fossil fuel imports to meet their energy demand. In Japan, 87% of energy comes from imported fossil fuels, and in South Korea, 81%, which leaves both countries highly vulnerable to external energy shocks (Zero Carbon Analytics, 2026). Given this exposure, decarbonisation in both countries must reduce emissions without deepening dependence on imported fuels. In this case, the focus on low-quality blue hydrogen and derivatives risks preventing Japan and South Korea from achieving either emissions reductions or energy independence. Moreover, it exposes them to the same energy security risks as conventional fossil fuel imports, given the volatility of gas prices and geopolitical tensions in the regions supplying their LNG and blue ammonia.

Japan and South Korea need to diversify risk in decarbonising their energy sectors by redirecting public funding toward projects with genuine potential to cut emissions and strengthen energy independence, such as offshore wind and domestic green hydrogen for hard-to-abate sectors. The opportunity cost of the current approach is already clear: in the past 11 years, both countries have channelled USD 166 billion of public funding into fossil fuels (Solutions to Our Climate, 2026). Had this money gone to renewables such as solar, it could have returned about USD 500 billion in fuel savings over 25 years; three times the investment (Solutions to Our Climate, 2026)

Revising the thresholds and standards used to classify “low-carbon” hydrogen projects under support schemes is another key next step. It is necessary to ensure that full life-cycle GHG emissions of blue hydrogen and blue ammonia projects are properly accounted for. If no action is taken, Japan and South Korea risk remaining trapped in fossil fuel dependency and falling behind their own decarbonisation and climate commitments. The recent shift away from blue ammonia as a decarbonisation strategy in Japan and South Korea is a positive sign and an opportunity to refocus on funding real energy alternatives for decarbonisation.

Key recommendations

This report argues that public support for blue hydrogen and ammonia should cut emissions from existing fossil hydrogen production instead of creating new demand for natural gas and locking in fossil fuel assets. This is the only case where blue hydrogen and ammonia can meaningfully reduce emissions.

As demonstrated in this analysis, Japan and South Korea are committing public funding to blue hydrogen and ammonia based on standards that leave large shares of life-cycle emissions unmeasured and undisclosed. Although recent decisions from both countries seemed to indicate a shift away from blue ammonia as a decarbonisation strategy, a robust framework based on the following recommendations is required to ensure the credibility of blue hydrogen and ammonia climate credentials and mitigate significant greenwashing risks.

1 Limit blue hydrogen to decarbonising existing production.

Japan and South Korea should restrict support for blue hydrogen and ammonia to carbon capture retrofits on existing grey hydrogen and ammonia production. This would ensure that blue projects mitigate existing emissions rather than compound the climate crisis by delaying the transition. If new blue hydrogen and ammonia projects that add to natural gas demand are to be built, they should demonstrate high performance by answering positively to all questions set out in GH2's indicative project checklist. Projects should therefore (1) capture at least 95% CO_2 capture across all process streams, measured in operation rather than at nameplate capacity; (2) have upstream and midstream methane leakage below 1%, measured at source and independently verified across the whole gas supply chain, including LNG; and (3) secure permanent, monitored geological storage, excluding enhanced oil recovery.

2 Measure emissions across the full life-cycle.

Japan and South Korea should extend the boundary of their low-carbon hydrogen standards from well-to-gate to the point of use to cover emissions along the full value chain. This means including (1) the shipping of LNG, hydrogen and ammonia; (2) the cross-border transport of captured CO_2 for storage abroad; (3) ammonia cracking; and (4) nitrous oxide from combustion. Additionally, to ensure robust and accurate emission accounting, upstream methane leakage rates should be calculated from measured, independently verified data. If default values are to be used, they should be conservative enough to reward measurement.

3 Make verification and disclosure a condition of public funding.

Independently verified lifecycle emissions and transparent reporting should be requirements for blue hydrogen and ammonia projects to receive public subsidies in Japan and South Korea. No project should receive support under Japan's CfD scheme or South Korea's Clean Hydrogen Portfolio Standard unless it publishes independently verified data on capture rate, methane leakage, source of natural gas, storage and use of captured carbon, and life-cycle emissions intensity. The GH2 blue hydrogen and derivatives project checklist sets out the basic questions that should be answered to ensure the quality and credibility of blue projects. Governments applying ISO 19870 should require this disclosure, and the remaining ISO 19870 series should include reporting guidance.

4 Ensure that there is no grandfathering.

Projects certified today should not keep their status if standards are tightened later. Contracts already awarded, including for the Blue Point Facility, should be reviewed against these tests and against GH2's indicative project checklist. Blue hydrogen and ammonia projects in operations should also be closely monitored to reduce the risks of greenwashing, ensure the proper capture and storage of CO_2, and thus avoid grey hydrogen production in disguise.

5 Secure the shift away from co-firing.

Co-firing blue hydrogen and blue ammonia has proved to be a weak option for reducing emissions in the power sector in Japan and South Korea; it offers limited potential to reduce GHG emissions and is less financially attractive than other renewable energy sources. South Korea’s exclusion of ammonia co-firing in its public auction, and Japan’s budget cuts are welcomed signs. Public funding should therefore be directed towards sectors where hydrogen and ammonia can make a greater difference, such as fertilisers, shipping and steelmaking, including imports of green iron.

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