REPORT SERIES | CLEAN HYDROGEN PROJECTS IN THE GLOBAL SOUTH

Clean hydrogen as a catalyst for development: Re-defining Africa's role in a changing geopolitical context

H2Global Foundation

Table of contents

IMAGE CREDIT: H2GLOBAL FOUNDATION

About this report

Contributions

Valuable contributions to the final report were provided by Hanna Graul and Julian Reul (all H2Global).

The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of the Board of Trustees or the Board of Executive Directors of the H2Global Foundation, its subsidiary Hintco GmbH, or the funders of this project.

The H2Global Foundation does not guarantee the accuracy of the data included in this work.

The report is part of the “H2Global meets Africa” research program, sponsored by the 7th Energy Research Program of the German Federal Ministry of Education and Research.

Acknowledgements

Gratitude is extended to esteemed peer reviewers Anne-Sophie Corbeau (Center on Global Energy Policy, Columbia University) and Sami Ben-Rejeb (independent expert) for their important feedback that helped shape the report.

Lastly, appreciation is extended to Susana Moreira (Executive Director of the H2Global Foundation) for her valuable input and guidance.

Rights and permissions

Author

Leah Mpinga, H2Global Foundation

Publisher

Department—Analysis and Research

Trostbrücke 1
20457 Hamburg

H2Global Foundation

Federal Ministry of Education and Research

Executive summary

The global energy transition is unfolding in an era of intensifying geopolitical rivalry and economic protectionism. From the U.S.—China trade conflict to the Russia—Ukraine war, international tensions are putting strain on the established global economic order. These dynamics are prompting nations to prioritize strategic autonomy, energy security, and resilient supply chains, elevating clean energy systems from purely technological choices into critical instruments of geopolitical influence. In this context, clean hydrogen is emerging as a strategic factor that is reshaping global alliances, trade flows, and competition over industrial leadership.

Amid this systemic reconfiguration, Africa stands at a pivotal crossroads. The continent holds some of the world's most abundant solar and wind resources, sits in proximity to major demand markets such as Europe, and occupies a central position along global shipping routes. These advantages give Africa the potential to become a key supplier of clean hydrogen and its derivatives, positioning the continent as an increasingly important actor in emerging hydrogen markets.

H2Global's country clustering characterizes the potential of African countries to develop clean hydrogen industries into three groups: front runners, momentum builders, and strong foundation countries. While all possess substantial renewable resources, their institutional readiness, policy frameworks, domestic anchor demand, and export infrastructure differ significantly. Despite its vast potential, Africa faces a severe clean hydrogen investment gap. Of the USD 8 billion invested globally in clean hydrogen, only USD 13 million have reached the continent. Just 25 projects have been announced, and only five have reached a final investment decision (FID) as of 2025. Financing constraints, infrastructure limitations, regulatory uncertainty, and the scarcity of long-term offtake agreements hinder bankability.

At the same time, global actors are reshaping the geostrategic space that Africa must navigate:

- The United States (U.S.) is retreating from clean hydrogen leadership, creating a vacuum that other players—including African countries—may fill.
- China is rapidly advancing low-cost electrolyzer manufacturing, expanding overseas partnerships, and positioning itself as a future exporter—representing both an opportunity and a competitive challenge for Africa.
- India, the Middle East, and Latin America are emerging as potential competitors, with similarly strong renewable resources and growing export ambitions.
- The European Union (EU), Japan, and South Korea are poised to become major long-term hydrogen importers, offering significant opportunities for African producers, provided they can meet evolving regulatory standards such as the EU's Renewable Fuels of Non-Biological Origin (RFNBO) criteria and Carbon Border Adjustment Mechanism (CBAM) requirements.

These geopolitical dynamics underscore that Africa's hydrogen trajectory cannot be viewed solely through a techno-economic lens. Instead, the continent's success will depend on its ability to leverage geopolitical shifts, secure strategic partnerships, strengthen regional cooperation, and build domestic economic resilience.

The continent's success will depend on its ability to leverage geopolitical shifts, secure strategic partnerships, strengthen regional cooperation, and build domestic economic resilience.

To establish a strong position in this emerging global landscape, Africa must pursue a dual strategy. First, developing domestic demand anchors for African clean hydrogen projects in promising sectors such as fertilizer, steel, and mining applications offers a pathway to increased project bankability, strategic independence in key sectors, and a stimulus for domestic economies and long-term socioeconomic development. Second, developing export opportunities by aligning with key demand markets, building investor confidence, and attracting strategic capital—particularly through international finance institutions and global partnerships—offers a complementary pathway to leverage the emerging clean hydrogen economy.

If African countries succeed in aligning their renewable endowment with geopolitical opportunity, the continent can use clean hydrogen as a pathway to achieving long-term economic resilience, socioeconomic development, and a more influential role in the global energy transition.

The changing geopolitics of energy

Fossil fuels have long shaped global power structures, with access to, control over, and dependence on energy resources influencing political alliances, economic hierarchies, and security strategies worldwide. Today, the global energy transition—the shift from fossil-based systems toward renewable and low-carbon sources—is reconfiguring this established order. The transition to net-zero emissions requires not only technological innovation but also profound structural, economic, and sociotechnical transformations. As carbon-intensive systems give way to cleaner alternatives, new interdependencies are emerging. This shift is creating new alliances and "renewable superpowers" as nations and trading blocs compete for technological leadership, resource security, and strategic advantage in the clean energy era.

At the same time, the resurgence of economic protectionism and the intensification of geopolitical rivalries—for example, U.S.—China tensions and the Russia—Ukraine conflict—are putting additional strain on the global economic order. These dynamics are prompting countries to prioritize strategic autonomy and energy security over the pursuit of global trade. As supply chains become increasingly politicized and trade relations more fragmented, energy transitions are no longer purely technological or economic processes but key arenas of geopolitical competition and influence.

Energy transitions are no longer purely technological or economic processes but key arenas of geopolitical competition and influence.

Against this backdrop, this report examines how Africa can position itself within the evolving geopolitical landscape by leveraging the opportunities presented by the emerging clean hydrogen economy.

IMAGE CREDIT: ADOBE STOCK / 潔 丹野

The pivotal role of clean hydrogen in Africa's future

While perhaps the most immediate use of clean hydrogen[1] and its derivatives is the decarbonization of hard-to-abate sectors, its production is set to play a crucial role in the overall global energy transition. Currently, hydrogen is mainly produced from natural gas and used as a feedstock in the chemical industry—primarily in refining and ammonia production—accounting for 3.6% of total global emissions.[2] The production and consumption of this fossil-based hydrogen typically occur in close proximity, limiting international trade. In the global energy transition, clean hydrogen and its derivatives are set to become internationally traded commodities. Their production and trade will forge new interdependencies and bilateral relations centered on hydrogen technologies and molecules.

Africa holds

60%

of the world's solar potential.

In Africa, renewable hydrogen production is attractive due to the continent's abundant renewable energy sources. Africa holds 60% of the world's solar potential, yet only around 1% of global solar capacity (approximately 20 GW) is currently installed there. However, research suggests that by 2050 Africa's addressable market for renewable hydrogen could reach 30 to 60 Mt.[3] This potential is further strengthened by the continent's proximity to key demand centers, such as Europe, and access to major global shipping routes, facilitating long-term offtake. The production of renewable hydrogen also presents significant opportunities for regional development, including the creation of local value chains and a skilled workforce. By supplying domestic demand in sectors such as fertilizer production and steelmaking, renewable hydrogen can make African nations more resilient to external economic shocks.

IMAGE CREDIT: ADOBE STOCK / CONTRIBUTOR_AERIAL

Africa's diversity

H2Global's country clustering analysis provides a comprehensive framework to evaluate country readiness for a national hydrogen economy geared toward green industrialization. This framework evaluates countries across five key dimensions: renewable energy and water potential, national hydrogen commitment, domestic demand, country risk, and export infrastructure.[4]

When applied to Africa, H2Global's country clustering analysis identifies three groups with high potential for a renewable hydrogen economy, covering 15 nations. These groups are categorized as front runners, momentum builders, and strong foundation countries.

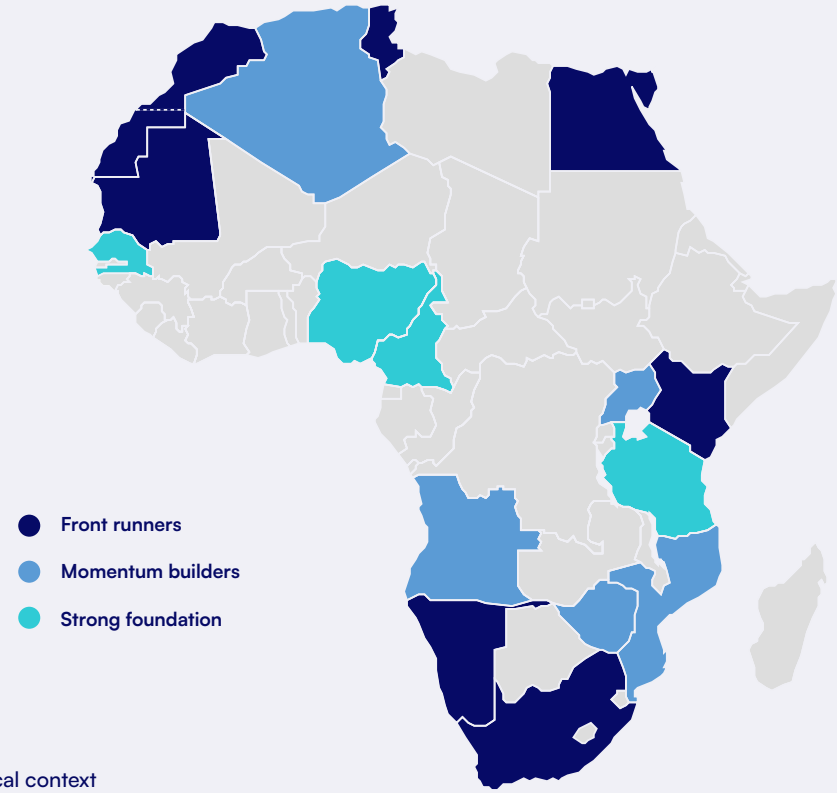
Front runners—Egypt, Kenya, Mauritania, Morocco, Namibia, South Africa, and Tunisia—have substantial renewable energy potential and access to water regions. These countries have all published national hydrogen strategies and have at least one active project in the feasibility study phase. They also have adequate export infrastructure and considerable potential for domestic demand for clean hydrogen and its derivatives.

Momentum builders—Algeria, Angola, Mozambique, and Uganda—possess significant renewable energy potential and access to water resources. Their commitment to a national hydrogen economy is mixed; for example, Algeria published its National Hydrogen Development Strategy in 2023, while the others have yet to do so. These countries also have some level of domestic anchor demand from industries such as crude steel manufacturing, fertilizer production, and mineral extraction.

With medium policy commitment to renewable hydrogen and mixed country risk profiles, these nations can attract private sector investment through contracts-for-difference (CfD) schemes, supported by national policy and regulation. They can also focus on domestic demand opportunities, such as fertilizer production.[5] For instance, in Zimbabwe, Sable Chemicals is developing a renewable hydrogen project for fertilizer production at its ammonium nitrate plant in Kwekwe, with support from the government's Climate Change Management Department and the Green Climate Fund.[6]

Strong foundation countries—Cameroon, Nigeria, Senegal, and Tanzania—are at an earlier stage of hydrogen market creation, with no publicly available hydrogen strategy or planned hydrogen projects. Like front runners and momentum builders, these countries have technical renewable energy potential and corresponding water availability. They are also well-positioned to attract investment in renewable hydrogen due to their low to medium country risk profiles. This low risk will enable gradual implementation of a national hydrogen economy, leveraging significant domestic demand from fertilizer production, steel manufacturing, and mineral exploration. However, export infrastructure is mixed: For example, Nigeria has established liquefied natural gas (LNG) terminals, while both Cameroon and Senegal have floating liquefied natural gas (FLNG) infrastructure that can support renewable ammonia export.[7] Tanzania, on the other hand, lacks export terminals, which limits near-term prospects.[8]

Figure 1: H2Global's clustering of African countries, reflecting their readiness to develop clean hydrogen sectors.



Demand drivers

To maximize the value of its clean hydrogen economy, Africa should adopt a balanced approach that leverages both domestic applications and export ambitions. While reliance on exports alone risks reproducing the extractive patterns of previous industries, a strategic focus on exports offers significant financial benefits. It provides a crucial source of foreign exchange, which is essential for economic stability and for a capital-poor region to finance its development.

The promise of long-term export contracts also makes it easier to attract the large-scale private foreign direct investment (FDI) required for capital-intensive clean hydrogen projects. This dual approach can spur green industrialization and diversify African exports, making them more competitive and more robust in the face of international emissions regulations. Furthermore, realized projects provide opportunities for socioeconomic development, including job creation, skills development, and positive spillover benefits such as strengthening the electricity grid through new renewable energy sources.

Focusing on domestic applications of renewable hydrogen holds key geostrategic implications for Africa. The development of domestic industries such as fertilizer production and renewable steel production—including direct-reduced iron (DRI) and hot-briquetted iron (HBI)—can strengthen Africa's resilience to external shocks and reduce import reliance.

IMAGE CREDIT: ADOBE STOCK / JESTERCINE

Fertilizer production

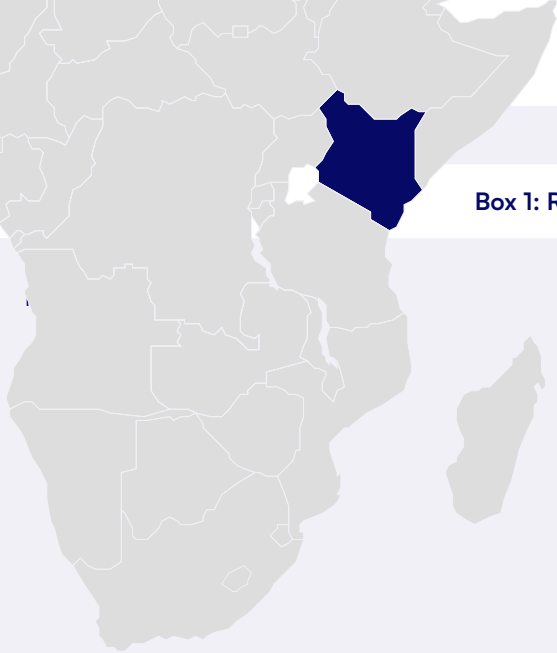
Fertilizers supply essential nutrients to crops. Africa's status as a large net importer of fertilizers leaves it vulnerable to market fluctuations and supply risks,[9] as demonstrated by the shock of the Russia—Ukraine war, which drove up food prices and increased food insecurity.[10] With agriculture contributing 17.5% to Sub-Saharan Africa's GDP in 2024 and employing nearly half of the continent's population, this import dependency leaves African farmers paying high retail prices, with transport costs alone accounting for up to half of the final cost of fertilizers.

Africa's fertilizer demand is expected to increase

5x

by 2050.

Africa's fertilizer demand is expected to increase fivefold by mid-century, making stable access to affordable fertilizer crucial for the region. Domestic production of renewable hydrogen can become a key element in achieving this. Ammonia—produced from hydrogen—is the main feedstock for many fertilizers used in Africa. Scaling up regional fertilizer production, as showcased in Kenya's business case (see Box 1), could contribute to enhanced food security, reduce reliance on volatile international markets, and strengthen the continent's overall economic



Box 1: Renewable ammonia — Kenya's business case

Kenya is one of six front-runner countries identified in H2Global's country clustering.

Kenya's Green Hydrogen Strategy and Roadmap emphasize renewable hydrogen's potential to improve the balance of payments, enhance food security, drive green industrialization, and attract increased investment. Phase 1 (2023—2027) emphasizes domestic market development through policy and regulatory instruments and aims to replace 20% of fertilizer imports with 100,000 t/a of green fertilizer production.

Ammonia is a key input in fertilizer production, accounting for 35—52% of production costs for diammonium phosphate (DAP) and nitrogen-phosphorus-potassium (NPK) fertilizers, and 77—84% for urea and calcium ammonium nitrate (CAN).

Domestic renewable ammonia production would significantly reduce Kenya's dependence on global markets and mitigate fertilizer price volatility. Access to fertilizer is a cornerstone of Kenya's agricultural and employment sectors, with agriculture contributing 20% to GDP and employing 40% of the population. Kenya relies entirely on imports for its fertilizers, as it lacks reserves of phosphate, potash, and natural gas. Around half of its fertilizers come from Saudi Arabia and Russia, with smaller shares from Turkey, Morocco, and China.[11]

Using fine-grained geographic information system (GIS) analysis, H2Global's assessment identified four suitable regions for renewable hydrogen production in Kenya. Simulated renewable ammonia production costs at these sites—with installed electrolyzer capacities of 10 MW, 100 MW, and 500 MW—produced a competitive price of EUR 999 per ton of renewable ammonia at Lake Turkana for a 500 MW electrolyzer.

Considering financial parameters such as the weighted average cost of capital (WACC) and internal rate of return (IRR), there is a significant opportunity to further process renewable ammonia into fertilizers. Under a low-cost scenario, renewable DAP, NPK, and CAN are cheaper than local retail prices. While renewable urea is slightly more expensive, renewable fertilizer prices remain universally below the record-high levels observed in 2022. These findings demonstrate that renewable fertilizer production could become a competitive and viable business opportunity in Kenya.

IMAGE CREDIT: ADOBE STOCK / SERGEY

Steel and mining

Steel imports are a significant economic burden for Africa. The continent's five largest steel producers account for just 1.2% of global output, at around 23 Mt.[12] In line with the African Union's Agenda 2063, many countries aim to reduce their reliance on imports by promoting domestic, low-emissions steelmaking.

The production of steel across the continent presents a unique opportunity for the uptake of renewable hydrogen. While carbon capture, utilization, and storage (CCUS) can serve as a near-term decarbonization solution, hydrogen-based direct reduced iron (DRI) and hot-briquetted iron (HBI) pave the way for a long-term transition to green steel, helping to reduce Africa's import dependence. The Hylron Oshivela project in Namibia, which produces green iron for export, exemplifies this emerging trend. In Mauritania, Project Nour provides a unique opportunity to link a renewable hydrogen project with a green steel offtaker, leveraging the country's position as a front runner in green industrialization as well as its longstanding iron ore industry.

One potential near-term application for renewable hydrogen in the mining sector is to provide a reliable, 24/7 energy supply for remote mining operations. In the long term, non-stationary uses represent a key future demand sector, with hydrogen-based solutions potentially powering conveyor belts or fuel-cell-powered mining vehicles. Demand in the sector is driven by the need for decarbonization and the imperative to reduce reliance on costly, carbon-intensive diesel. The pilot project by Anglo-American and Engie in South Africa is a well-known example of this trend. However, the project is facing significant challenges, with its partner First Mode filing for bankruptcy protection.[13] This signals that while the technology is promising, its widespread adoption faces hurdles, including the need for a more established hydrogen infrastructure. Despite this, integrating renewable hydrogen into mining could still enhance Africa's global export competitiveness by leveraging the continent's large reserves of critical minerals essential for the energy transition.

This potential for green industrialization and export diversification is particularly important given Africa's significant labor market challenges. With youth unemployment in Sub-Saharan Africa at 9.95% in 2024—and soaring to 60.9% in South Africa and 76.3% in Djibouti[14]—the clean hydrogen sector's capacity to create a cumulative 13 million job-years by 2050 presents a critical opportunity to address the continent's pressing need for widespread employment.[15]

Africa's clean hydrogen investment gap

Africa's potential to develop clean hydrogen projects, foster related industries, and stimulate socioeconomic development stands in stark contrast to the limited investment that has thus far materialized on the continent. According to Bloomberg New Energy Finance (BNEF), global investment in clean hydrogen projects has reached around USD 8 billion. By comparison, African projects have attracted only USD 13 million—a mere fraction of the global total.

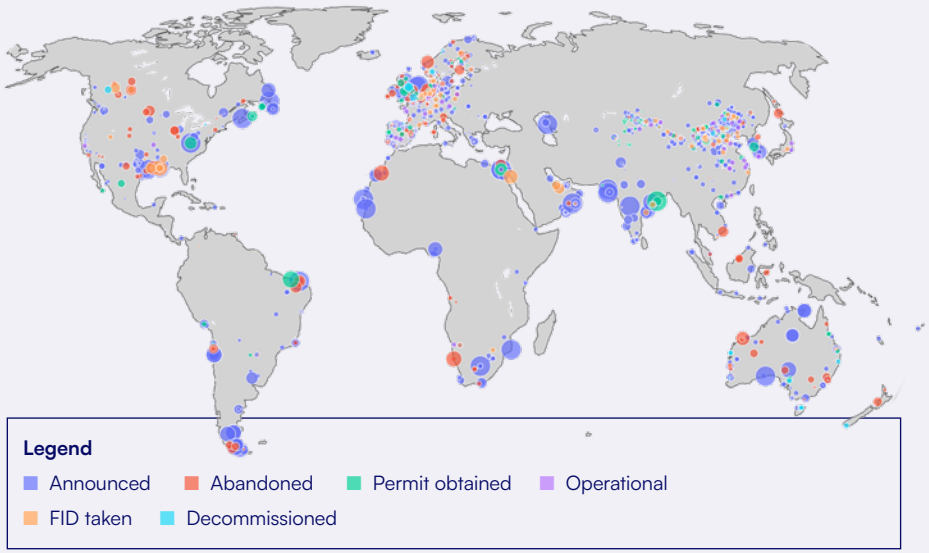
Only five

clean hydrogen projects in Africa have advanced to the stage of a final investment decision.

A similar disparity is evident in the project pipeline: BNEF tracked more than 1,400 clean hydrogen projects worldwide in 2024, but just 25 are in Africa. Of these, only five have advanced to the stage of a final investment decision (FID), with a total electrolyzer capacity of 40.5 MW.

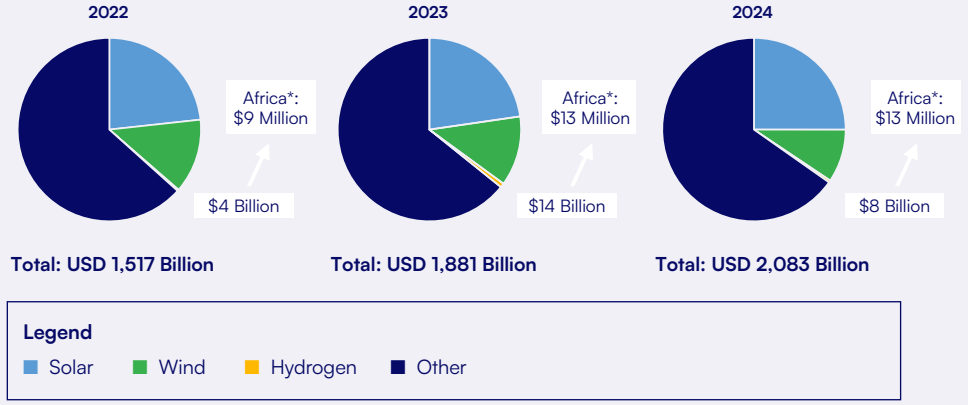
This investment gap arises from both global market conditions and regional challenges. Globally, the absence of a functioning market for clean hydrogen and its derivatives makes securing long-term offtake agreements the central hurdle to project bankability. Compounding this, in contrast to other regions, African countries face additional structural barriers, including limited infrastructure, higher financing costs, restricted access to capital and concessional finance, limited renewable energy integration, and regulatory uncertainty around the certification of "clean" and "renewable" hydrogen.

Figure 2: Global overview of hydrogen projects



Source: BNEF (2025), Hydrogen Assets Production Dataset

Figure 3: Investment flows into clean energy and hydrogen



Source: BNEF (2025), Energy Transition Financing Tool

* Tracked investments in electrolyzer purchases made by a single project in South Africa (2022) and Namibia (2023, 2024).

The role of strategic stakeholders and cooperation

To realize Africa's vast clean hydrogen potential, the continent must bridge a critical gap between high potential and low investment. African governments often lack the fiscal space to support the capital-intensive projects needed to launch a new industry. This is a common dilemma in emerging markets, where a global shortage of bankable projects persists.[16] Developing a pipeline of such projects requires coordinated interventions by governments and other key stakeholders to address unique barriers and risks, thereby attracting the necessary private sector investment and, in the process, helping to develop local value chains.

Development finance institutions are uniquely positioned to address the financing gap of clean hydrogen projects.

Development finance institutions (DFIs) are uniquely positioned to address these challenges by providing financial support and technical assistance. While DFIs account for a relatively small portion of total energy financing,[17] their role extends beyond direct investment. They can use innovative financial models, such as blended finance, to attract private capital by absorbing initial risks.

In Latin America, the Inter-American Development Bank approved a USD 400 million loan and the World Bank (WB) a USD 150 million loan to Chile to support financing for renewable hydrogen projects, applied research, technological development, and entrepreneurship in the sector.[18] [19] In addition, the WB has a Hydrogen for Development (H4D) Partnership that provides technical assistance to countries such as Mauritania, Namibia, and South Africa, focusing on everything from policy frameworks to project financing. The African Development Bank (AfDB) and other DFIs have also launched initiatives to provide similar support, helping to transform announced projects into bankable ventures.

IMAGE CREDIT: ADOBE STOCK / AA+W

IMAGE CREDIT: SHUTTERSTOCK / CANDYRETRIEVER

Regional cooperation

Regional cooperation is fundamental to creating an enabling environment for the clean hydrogen industry in Africa. Alliances such as the African Green Hydrogen Alliance (AGHA), a group of ten countries with significant hydrogen potential, aim to demonstrate political leadership and mobilize key partnerships. Its efforts are supported by international organizations such as the United Nations, the World Bank, and the African Union. Similarly, regional blocs like the Southern African Development Community (SADC) help harmonize regulatory frameworks and foster shared infrastructure, strengthening regional value chains.[20] This collaboration also enhances collective bargaining power with international partners.

Regional cooperation is fundamental to creating an enabling environment for the clean hydrogen industry in Africa.

For example, the EU's Global Gateway initiative has launched the Africa-Europe Green Energy (AEGE) package to support Africa's energy transition.[21] As part of this initiative, a EUR 11.5 billion investment package was announced to support South Africa,[22] specifically targeting the energy transition, including large-scale solar, wind, and green hydrogen projects. These funds are intended to leverage both public and private investment, providing technical assistance to accelerate market integration and build a green economy.

State-owned enterprises

African state-owned enterprises (SOEs), while often dominating carbon-intensive sectors,[23] are strategically positioned to be key enablers of the continent's clean hydrogen economy. Despite challenges such as underfunding and outdated infrastructure—unlike their Chinese counterparts (see Box 2)—their close alignment with government policy makes them indispensable partners in a successful energy transition.

As part of their USD 13 billion investment plan, the Moroccan SOE— Office Chérifien des Phosphates (OCP)—has announced a USD 7 billion ammonia production facility that will be powered by 3.8 GW of wind and solar photovoltaic (PV) power. The plant is expected to produce 3 million tons of renewable ammonia by 2032, reducing Morocco's large fertilizer import dependency.[24]

By actively participating in market creation, SOEs can act as anchors for domestic demand and leverage their existing infrastructure to provide credible market signals, which in turn helps lower risk perceptions for foreign investors.[25] By strengthening governance and focusing on targeted, strategic interventions, these enterprises can help mobilize financing and broaden international partnerships.

Africa's immense clean hydrogen potential is poised to drive a new era of sustainable development and green industrialization. With strong government commitment and tangible progress already underway, African nations are actively working with global partners to unlock this potential. This journey, however, is not without its challenges. The upcoming section analyzes the shifting roles of global players in the energy transition—such as the U.S.'s pullback from clean hydrogen and competition from emerging players such as China, the Middle East, Latin America, and India. It also examines the actions of key importing regions—namely the EU, Japan, and South Korea—which are pursuing clean hydrogen imports for industrial decarbonization.

IMAGE CREDIT: SHUTTERSTOCK / HUMPHERY

Box 2: China's state-owned enterprises

In China, SOEs are at the center of renewable hydrogen development. Following the publication of its national hydrogen strategy in 2022, the government tasked 98 SOEs with leading the early development of the hydrogen sector, from production and storage to end-use applications. Companies such as Sinopec and China Energy Investment Corp (CEIC) are spearheading project announcements and building supply chains. SOEs are uniquely positioned to accelerate deployment due to their alignment with the central government, preferential treatment in project approvals, and ability to mobilize large-scale capital. By leveraging its SOEs, China has already reached a cumulative production capacity of 125 ktpa of renewable hydrogen, exceeding its 2025 target.

Global actors in clean hydrogen

United States

At the end of 2024, the **U.S.** appeared well positioned to assume a leading role in the global clean hydrogen economy. The combination of the Inflation Reduction Act (IRA) and the Bipartisan Infrastructure Law (BIL) together represented one of the most comprehensive packages of support for clean hydrogen anywhere in the world.[26] Generous tax credits—including the landmark 45V production credit, a federal tax incentive for clean hydrogen production—were complemented by up to USD 9.5 billion allocated for the development of regional clean hydrogen hubs. Together, these measures signaled strong federal commitment to scaling clean hydrogen, advancing electrolyzer manufacturing, and accelerating commercialization across multiple end-use sectors.[27] These measures created expectations that the U.S. would emerge as a technological, industrial, and regulatory frontrunner in the global hydrogen landscape.

The U.S.'s role in the future of clean hydrogen has become uncertain.

A year later, however, the U.S.'s role in the future of clean hydrogen has become significantly more uncertain. In October 2025, the Trump administration began rolling back previously approved funding for the hydrogen hubs. The Department of Energy (DOE) rescinded USD 2.2 billion in awards to two of the seven federally backed hubs—the California hub (ARCHES) and the Pacific Northwest hub—both designed to focus exclusively on renewable hydrogen rather than hydrogen produced from natural gas with carbon capture, utilization, and storage (CCUS) or nuclear power. A leaked DOE document suggested that further cuts may be forthcoming, with funding for all seven hubs potentially under review, amounting to more than USD 4.5 billion in possible cancellations.[28]

IMAGE CREDIT: SHUTTERSTOCK / SNEHIT PHOTO

Regulatory and planning shifts have also weakened incentives for clean hydrogen producers. The revised guidance on the 45V tax credit, issued in July 2025, accelerated the deadline for project construction from 2033 to January 1, 2028, undermining the investment certainty needed for long-lead-time projects.[29] These policy changes are reflected in the International Energy Agency's (IEA's) *Annual Energy Outlook 2025*, which projects that while U.S. hydrogen production will grow to 12.3 million tons by 2050, nearly 12 million tons will come from unabated steam methane reforming, with renewable hydrogen production remaining below one million tons annually.[30]

The U.S. has also retreated from international cooperation on clean hydrogen. Its withdrawal from International Maritime Organization (IMO) negotiations on shipping decarbonization—negotiations that would have enabled greater uptake of hydrogen-based fuels such as ammonia and methanol—reinforces a broader shift toward fossil energy dominance and a more isolationist approach to global energy governance.[31]

Taken together, these developments cast doubt on the U.S.'s future role as a global leader in clean hydrogen. While the country retains enormous technological potential and private sector capacity, the federal government's strategic pullback has created a vacuum in global hydrogen leadership. This shift opens space for other key players—such as China, India, the Middle East, and emerging hydrogen producers, including African countries—to shape future market norms, standards, and investment flows.

China

Parallel to the U.S.'s pullback, **China** has rapidly emerged as a new global leader in the clean hydrogen sector, propelled by declining electrolyzer costs for clean hydrogen production and the absence of a complex regulatory environment. China is already the largest hydrogen user and producer, accounting for one-third of global fossil-fuel-based hydrogen production.[32]

This leadership is a direct result of its 2022 Medium- and Long-Term Plan for Hydrogen Energy Industry Development, which outlines a long-term vision to build an integrated hydrogen supply chain and establishes clear goals for production, infrastructure, and industrial application.

Renewable hydrogen production is

40-45%

less expensive in China than in regions like the EU and the U.S.

IMAGE CREDIT: SHUTTERSTOCK / WEIMING XIE

Additional policies, such as China's 2025 Renewable Portfolio Standard, extend green power consumption to steel, cement, and data centers. China's effective hydrogen deployment is also shaped by strong provincial ambitions. Provincial authorities have set targets five to twelve times more ambitious than the National Plan, with regions leveraging different advantages, such as renewable energy and coal resources, and prioritizing different applications.

Ambitious regional targets play a crucial role in driving sector development and enable the central government to systematically draw on lessons learned.[33]

Backed by supportive state and provincial government measures, China now accounts for approximately 60%[34] of both global production and installed electrolyzer capacity, giving it a significant cost advantage.[35] This manufacturing prowess, combined with a highly developed supply chain, makes renewable hydrogen production in China 40—45% less expensive than in regions like the EU and the U.S.[36]

The country's 125 ktpa renewable hydrogen production capacity is spearheaded by state-owned enterprises (SOEs) such as Sinopec, State Power Investment Corporation (SPIC), and China Energy Investment Corporation (CEIC), which are actively developing and financing large-scale projects. For example, SPIC's Da'an Wind and Solar Green Hydrogen Integrated Demonstration Project in Jilin Province is one of the world's largest renewable ammonia facilities and has already received EU low-carbon certification, making its products eligible for export.[37]

Chinese electrolyzer manufacturers such as LONGi and Sungrow have already begun expanding internationally, securing contracts in countries like Uzbekistan, Oman, and Namibia. For instance, the Hylron Oshivela plant in Namibia successfully produced its first green hydrogen using a Chinese 12 MW electrolyzer.[38] China is poised to become the world's leading electrolyzer supplier, with the IEA projecting that roughly three-quarters of the electrolyzers produced in China in 2030 will be exported.

However, despite their competitive pricing, Chinese firms may face challenges, including scrutiny over supply chain security and potential regulatory restrictions in Western markets.

While cooperation in the clean hydrogen sector between Africa and China is still in its early stages, it presents a clear opportunity for future green investments.

IMAGE CREDIT: SHUTTERSTOCK / CHUYUSS

Existing Sino-African relations in the energy and commodities sectors, along with China's commitment to launching 30 new clean-energy projects in Africa through the Forum on China—Africa Cooperation (FOCAC), lay the groundwork for a strategic partnership.

At the same time, a competitive dynamic exists. As China's own clean hydrogen production scales up, it could eventually become a large-scale, low-cost exporter of hydrogen-based fuels. This poses a direct mid- to long-term risk to Africa's export prospects, as the two may increasingly compete for the same key markets in Europe and Asia. China's advantages in workforce capacity, engineering capability, and a large domestic market capable of absorbing renewable hydrogen in place of fossil-based alternatives further reinforce its competitive edge.

India

India is also emerging as a successful first mover in clean hydrogen. In 2023, the government published the National Green Hydrogen Mission, aiming to produce 5 Mtpa of clean hydrogen.[39] The policy framework includes financial and non-financial mechanisms to support low-cost renewable hydrogen and the manufacturing of technologies such as electrolyzers. Initiatives like the Strategic Interventions for Green Hydrogen (SIGHT) plan include incentive programs that scale up domestic production and aggregate demand through competitive auctions. Under India's National Green Hydrogen Mission, the SIGHT scheme was implemented with INR 174.9 billion (EUR 1.9 billion) of allocated funding for electrolyzer manufacturing and renewable ammonia production. The completion of the Solar Energy Corporation of India's (SECI's) e-Reverse Auctions (see Box 3) set a record low price threshold for renewable ammonia production at ACME Cleantech's planned facilities in Odisha state.[40]

In addition to public procurement tenders, the Indian government plans to deploy USD 47 million in 2025/26 to support infrastructure development and USD 117 million to support demand projects. Bloomberg New Energy Finance reports that five projects have reached final investment decision (FID), though production capacities are disclosed for only three; together, these account for an estimated 90 kt of annual output and 768 MW of electrolyzer capacity.

India's rapid advancements and low-price discoveries position it as a potential exporter of choice to key demand markets in Europe and Asia, increasing export competition for Africa.

IMAGE CREDIT: SHUTTERSTOCK / ALESSANDROBIASCIOLI

Nevertheless, while India has a significant advantage in renewable energy costs, its ambitions to become a major global supplier face key challenges. These include a substantial infrastructure gap and the need to align its domestic Green Hydrogen Certification Scheme with stringent EU standards, such as certification for Renewable Fuels of Non-Biological Origin (RFNBO). In addition to being a competitor, India is also emerging as a partner in Africa, with several large Indian conglomerates actively discussing investments in renewable hydrogen projects on the continent.

Latin America and the Caribbean

Latin America and the Caribbean (LAC) is another region with strong commitments to the clean hydrogen sector. Like Africa, LAC shows great potential for clean hydrogen production, with abundant solar, wind, hydro, and gas resources. In 2024, 65% of electricity was generated from renewable energy sources—nearly 20% above the global average.[41]

This renewable energy advantage has led many LAC countries to demonstrate a strong commitment to hydrogen, particularly renewable hydrogen, with one-third having a national hydrogen strategy, including all the region's largest economies.

Most of these strategies are oriented toward exports to the future global clean hydrogen market. The region boasts low country risk premiums and provides an investor-friendly environment that attracts foreign capital, making LAC the second-largest destination for clean hydrogen investments.[42]

Currently, the region has operational projects in Argentina, Brazil, Chile, Costa Rica, and Colombia. LAC's largely decarbonized power sector positions the region as a direct competitor with Africa for renewable hydrogen exports to high-demand regions, and its extensive hydropower capacity provides a valuable baseload advantage that supports stable, low-cost production.

Box 3: SECI's renewable auction scheme

SECI is a public sector company under the Ministry of Renewable Energy, serving as the nodal agency for developing renewable energy. The company functions as an intermediary, signing long-term offtake agreements with project developers.[43]

In September 2025, SECI completed its first round of renewable ammonia auctions, awarding thirteen contracts to seven ammonia producers for the delivery of 740,000 tons per year. Producers will receive production subsidies for the first three years of a ten-year, fixed-price delivery contract. The renewable ammonia will be produced and transported directly to fertilizer manufacturers across India.[44]

ACME Cleantech won six of the thirteen auctions, with contracts totaling 370,000 tons per year, and all six delivery points located on India's coastline. It is estimated that 220,000 tons per year will come from ACME Cleantech's project in Odisha state, which is expected to produce 1.3 million tons of renewable ammonia per year at full capacity. There are also plans to export renewable ammonia produced at the Odisha site to Japan, establishing an ammonia trade corridor between the two countries.[45]

The SECI auctions set a historically low price for renewable ammonia production at 55.75 INR/kg (633 USD/ton). This low-price threshold results from access to cheaper renewable electricity, lower debt costs, and significant state and federal subsidies. For example, the state of Odisha will provide 30% of a renewable hydrogen project's capital expenditure as a subsidy to project developers. In addition, interstate grid transmission subsidies allow project developers to produce renewable hydrogen in distant, resource-rich areas at lower costs.

Canada

Canada has long been positioned as a top-tier competitor to African nations for the European export market, particularly Germany. Its ”Atlantic Hydrogen Alliance” aims to leverage vast wind resources in Nova Scotia and Newfoundland to ship renewable ammonia across the Atlantic.[46] To support this, the federal government passed the Clean Hydrogen Investment Tax Credit (ITC) into law in June 2024, offering a refundable tax credit of up to 40% of eligible project costs.[47] This fiscal firepower was intended to bridge the cost gap and accelerate projects like Project Nujio’qonik, which aims to be the country’s first commercial-scale green hydrogen exporter to Europe.[48]

The Canadian government also officially announced in 2024 its commitment to participate in a bilateral EUR400 million H2Global tender co-funded by the German government.[49] However, Canada’s export ambitions have recently collided with economic reality. By late 2025, several flagship projects faced significant delays or cancellations due to high electricity costs and the inability to secure binding offtake agreements with European buyers, who remain price-sensitive.[50] For instance, Fortescue’s Project Coyote in British Columbia was cancelled in September 2024 due to infrastructure uncertainty and a lack of viable buyers,[51] while other major initiatives in the Atlantic provinces have seen European contracts evaporate as the delivered cost of Canadian hydrogen proved higher than anticipated.

Despite these setbacks, Canada remains a formidable long-term rival. Its political stability, existing trade corridors with the EU (via the Canada-Germany Hydrogen Alliance), and established skilled workforce give it a ”safe harbor” advantage over emerging markets. If Canada can resolve its infrastructure bottlenecks and effectively deploy its new tax credits, it could rapidly recapture market share, challenging North African producers for dominance in the European supply chain.

IMAGE CREDIT: ADOBE STOCK / FOTOFOTOFOTO

Middle East

The **Middle East** is positioned to become a global leader in the clean hydrogen economy, with countries such as Saudi Arabia, the United Arab Emirates (UAE), and Oman leveraging abundant, low-cost solar and wind resources alongside existing energy infrastructure. These nations are backed by strong government support and significant financial resources, making them formidable competitors to Africa for key export markets in Europe and Asia. Imported hydrogen from the Middle East could even be cheaper than locally produced hydrogen in those regions, despite transport costs.

A prime example of this ambition is Saudi Arabia's NEOM Green Hydrogen Project, a joint venture between ACWA Power, Air Products, and Neom, and one of the world's largest clean ammonia production facilities. This project aims to produce up to 600 tons of carbon-free hydrogen daily, powered by 4 GW of integrated solar and wind energy, with the hydrogen intended for export as renewable ammonia. Other regional players are also setting ambitious targets: the UAE's National Hydrogen Strategy aims for the country to be a top-10 global hydrogen producer by 2031,[52] while Oman has set a production target of 1.38 mtpa by 2030, with a long-term goal of 7.5 to 8.5 mtpa by 2050.[53]

Beyond their domestic production projects, Middle Eastern companies are actively investing in Africa, transforming the competitive dynamic into one of potential partnership. For instance, ACWA Power has been selected as a key developer for a renewable hydrogen project in Morocco, where it plans to produce green steel for export. Similarly, Masdar is a co-developer of a major renewable hydrogen project in Mauritania that aims to produce up to 2 mtpa of renewable hydrogen.[54] This demonstrates that while the Middle East is a competitor, its companies are also becoming important investment partners for Africa's hydrogen ambitions.

IMAGE CREDIT: SHUTTERSTOCK / CORONA BOREALIS STUDIO

Australia

Australia is often cited as Africa's most direct competitor for the Asian market, particularly for supply to Japan and South Korea. With its National Hydrogen Strategy 2024 and the massive Hydrogen Headstart program—complemented by a Hydrogen Production Tax Incentive of AUD 2 per kg[55] —Australia has aggressively positioned itself as a global export superpower. The country's strategy originally relied on shipping liquefied hydrogen and renewable ammonia to decarbonize Asia's heavy industries, directly rivaling Southern African export corridors.

However, in September 2024, Australia committed roughly €400 million (AUD 660 million) to a joint H2Global funding window with Germany.[56] This move aims to diversify its export base by guaranteeing European buyers for its producers, effectively bridging the distance gap that previously favored African exports. Despite this government support, the Australian sector is currently navigating a period of "commercial gridlock."

Since late 2024, Australia has seen a wave of cancellations for gigawatt-scale projects that had previously been heralded as game-changers. Notably, the CQ-H2 project in Queensland—a massive export venture backed by Japanese investors—stalled as partners exited due to spiraling costs and complex logistics.[57, 58] Similarly, Fortescue and Origin Energy have rolled back or exited major renewable hydrogen developments, citing market immaturity and high renewable energy costs.[59] In response to these headwinds, Australia is pivoting its strategy away from pure bulk exports toward "Green Metals"—using domestic hydrogen to process iron ore into green iron before export.[60]

This shift presents a new form of competition for African nations like Namibia and Mauritania, which are pursuing identical "green industrialization" strategies. While Australia's momentum has slowed, its massive project pipeline (over 100 announced projects) and deep integration with Asian economies mean that any breakthrough in cost reduction could quickly restore its position as the dominant supplier to the East.

IMAGE CREDIT: H2GLOBAL FOUNDATION

European Union

The **EU** is projected to be a major demand market for the clean hydrogen industry, driven by its need to diversify energy imports and strengthen resilience against geopolitical shocks. The ongoing Russia—Ukraine war has highlighted the EU's vulnerability, accelerating its push for a domestic clean hydrogen industry.

The REPowerEU plan sets an ambitious target of 10 million tons of domestic renewable hydrogen production and 10 million tons of imports by 2030. To support this, the EU has introduced key policy instruments, including the Net-Zero Industry Act, the RED III directive, and the European Hydrogen Bank. The Hydrogen Bank, a crucial financing tool, has already committed over EUR 1.7 billion in grants to provide investment certainty for renewable hydrogen projects.

Nevertheless, these ambitions face significant challenges. It is estimated that the EU will miss its 2030 targets by 90%,[61] a reality underscored by recent setbacks in the second Hydrogen Bank auction, where seven of the 15 selected projects—representing over 75% of the allocated capacity and funding—withdrew.[62] These withdrawals were due to factors such as infrastructure delays and failure to provide completion guarantees. Despite these challenges, the EU remains committed, planning to redirect funds to reserve projects and preparing a third auction with a budget of up to EUR 1 billion in late 2025.

Beyond the EU-wide Hydrogen Bank, Germany and the Netherlands—both EU frontrunners—have allocated a combined EUR 4.2 billion to H2Global double auctions to support the import of renewable hydrogen and its derivatives from non-EU countries. In July 2024, an Egyptian renewable ammonia project won the H2Global pilot auction. This was the first of its kind, offering a firm offtake contract for a total of 397,000 tons of renewable ammonia, to be delivered to Europe by 2033 at a price of EUR 1,000 per ton.[63] This initial contract provided the market's first price signal for renewable ammonia. H2Global's second auction, launched in 2025, includes both a global lot and a regional lot dedicated to Africa.

African projects are well positioned to use these tenders to help meet Germany's and the Netherlands' demand for renewable hydrogen and its derivatives.

The EU is projected to be a major demand market for the clean hydrogen industry.

IMAGE CREDIT: H2GLOBAL FOUNDATION

The EU's new Carbon Border Adjustment Mechanism (CBAM) is set to reshape its historic trade relationship with Africa, impacting key exports such as clean hydrogen, ammonia, fertilizers, cement, iron, steel, and aluminum. Designed to prevent "carbon leakage", the mechanism places a carbon price on imports to ensure a level playing field with EU producers. However, it also creates an opportunity for both regions: By leveraging its vast clean hydrogen potential, Africa can produce CBAM-compliant goods, allowing the EU to diversify its energy imports, strengthen its energy security, and foster a more resilient partnership with Africa.

Japan

Japan is the fifth-largest energy consumer in the world and imports approximately 90% of its energy supply.[64] Recognizing this import dependency, the country has set an ambitious goal to become the world's second-largest demand market for hydrogen imports and was the first to publish a national hydrogen strategy. To foster its domestic clean hydrogen market, Japan has employed demand-side policy instruments, including economic and financial incentives such as the promotion of clean hydrogen hubs, contracts-for-difference (CfDs), a double-sided auction pilot, and green premia.

Japan's government is also leveraging the country's geography, which naturally clusters cities and industries along the coast. Consequently, in March 2025, the Ministry for Economy, Trade and Industry (METI) launched a Hydrogen Hub Development Program. The program provides a budget of USD 38 million (JPY 5.7 billion) to cover up to 50% of front-end engineering design (FEED) for shared infrastructure in eligible hubs, such as hydrogen tanks and pipelines.[65] At the second stage, a limited number of hubs is expected to receive capital expenditure (CAPEX) support for the planned infrastructure, although the budget has not yet been defined.

Additionally, Japan strives for technological leadership through key pilot projects. For example, Kawasaki Heavy Industries plans to build Japan's first liquefied hydrogen carrier and has already developed the country's first industrial-scale hydrogen liquefaction system.[66]

To achieve the goals of its national policy, Japan is strengthening energy cooperation with Africa. A key example is the Letter of Intent signed between the African Development Bank (AfDB) and JGC Corporation to develop sustainable aviation fuels in Africa.[67] This partnership establishes a framework for joint knowledge sharing and co-financing. It also presents an opportunity for Africa to meet Japan's future hydrogen demand by exporting renewable hydrogen to the country, helping it diversify its energy supply.

Japan has set an ambitious goal to become the world's second-largest demand market for hydrogen imports and was the first to publish a national hydrogen strategy.

IMAGE CREDIT: ADOBE STOCK / TAMPATRA

South Korea

South Korea stands out as a major offtaker of clean hydrogen, given its heavy reliance on imported energy resources. The country views clean hydrogen as a way to enhance energy security and reduce its vulnerability to geopolitical tensions, similar to the EU's efforts to diversify its energy sources. The government's Hydrogen Economy Roadmap of Korea sets ambitious targets for deploying fuel cell electric vehicles (FCEVs) and large-scale stationary fuel cells for power generation.

A central component of this strategy is the Clean Hydrogen Certification System and the Clean Hydrogen Power Bidding Market. Launched in May 2024, the bidding market is the world's first of its kind, allowing power generators to sell electricity produced from certified clean hydrogen through long-term 15-year contracts. This provides a stable demand signal for producers, including those in Africa.

Regarding Africa, discussions are underway with countries like Namibia to establish renewable hydrogen partnerships, with South Korea seeing a competitive advantage in Namibia's low production costs. Major Korean corporations such as Samsung, LG, Hyundai-Kia, SK, and Doosan have been promoted as strategic partners.

South Korea's existing financial and cooperation frameworks, such as the Korea-Africa Energy Investment Framework (KAEIF)—a USD 600 million co-financing facility with the AfDB, and the Korea-Africa Economic Cooperation Trust Fund (KAECTF), are crucial tools in this effort. These frameworks, which focus on renewable energy projects, are expected to be leveraged to finance clean hydrogen initiatives and build the necessary infrastructure in Africa, solidifying South Korea's position as a strategic partner in the continent's energy transition.

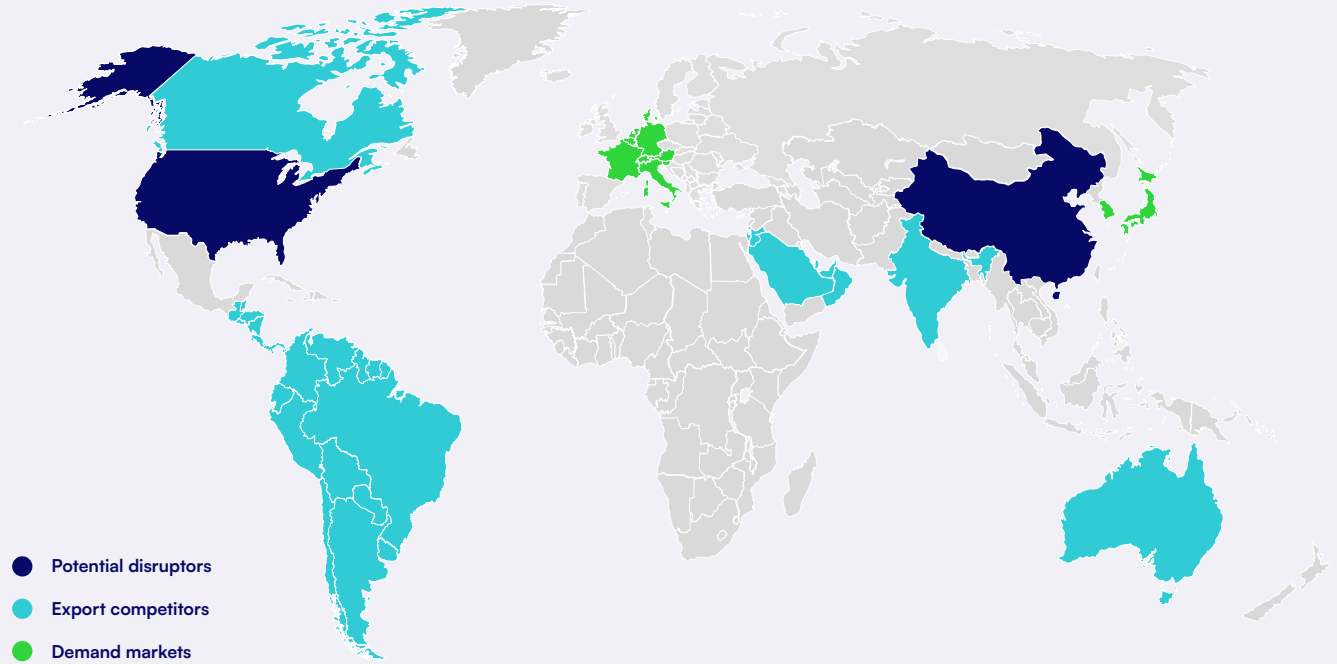
IMAGE CREDIT: ADOBE STOCK / NUTTAWUTNUY

Navigating geostrategic forces on African countries through clean hydrogen

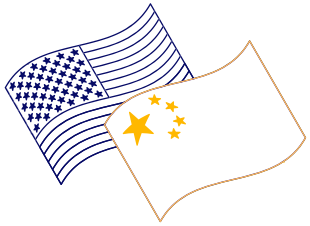
Africa's clean hydrogen sector is being shaped by a new era of global geopolitical rivalries. The resurgence of conflicts such as the Russia—Ukraine war, along with intensifying U.S.—China trade tensions, is driving a global push for strategic autonomy and economic protectionism across critical sectors, including energy. This has mixed implications for the continent. While a heightened focus on domestic priorities in major economies could reduce foreign investment in Africa, the same drive for strategic autonomy is motivating countries to diversify their supply chains. This positions Africa as a key partner in emerging hydrogen trade relationships.

Figure 4 illustrates how strategic positioning toward clean hydrogen in each observed region impacts the development of a clean hydrogen economy in Africa.

Figure 4: Influence of global players on Africa's strategic orientation on the global hydrogen market.



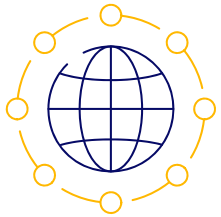
Global clean hydrogen actors through an African lense



Potential disruptors

The U.S. has recently pivoted away from its initial clean hydrogen ambitions. This shift is underscored by government actions, such as the cancellation of billions of dollars in federal funding for hydrogen hubs. These policies signal a turn toward economic protectionism and a reliance on nonrenewable energy sources such as oil, gas, and coal. By prioritizing domestic fossil fuels, the U.S. could limit its foreign investment and participation in the African market. However, this pullback creates a potential gap in the global clean hydrogen supply—one that African countries are well-positioned to fill with their abundant resources.

Conversely, China's rapid emergence as a global leader in low-cost electrolyzer manufacturing presents a dual impact. While its domestic focus and ambitious production targets could create a competitive dynamic, intensifying trade tensions with the U.S. are pushing China to seek new markets and strengthen its engagement with Africa through existing frameworks like the Forum on China—Africa Cooperation (FOCAC).



Export competitors

The Middle East, India, and Latin America are emerging as strong export competitors, posing a direct challenge to Africa's clean hydrogen ambitions. Latin America, with a similar resource base and proximity to Europe, has successfully mobilized early investment. Similarly, India's recent low-price discoveries for renewable ammonia position it as a promising exporter, though it remains hindered by infrastructure gaps.

They are joined by Canada and Australia, traditional resource giants able to invest significant public funding to support the sector—a fiscal luxury unlike that of many African nations. Yet, despite this government support, both face momentum-slowing costs and offtake difficulties that have led to a series of project cancellations. These "stalling giants" are currently creating space for African producers, but their eventual resurgence would pose a significant risk to Africa's market share in both Europe and Asia.

Meanwhile, the Middle East creates a dynamic interplay. While the region is a fierce competitor for the same export markets, its major energy companies are also becoming key investment partners for African projects, producing a relationship characterized by both rivalry and collaboration.

Demand markets

Regions with significant hydrogen demand, such as the EU, Japan, and South Korea, remain key destinations for African exports. These countries are actively seeking to diversify their energy imports, positioning Africa as a critical new trade partner. By leverage existing policies and partnerships, they can mobilize project development on the continent, creating a significant opportunity for African countries to monetize their clean energy potential.

Recommendations

Africa is at a pivotal moment to leverage its clean hydrogen potential to drive sustainable development and green industrialization. The following recommendations outline a strategic approach to navigating the evolving geopolitical landscape and securing a key role in the emerging energy economy.

1. Leverage the evolving geopolitical landscape

Africa should capitalize on the shifting strategies of global players to attract investment and build a competitive clean hydrogen sector.

a) **Fill the gap left by the U.S. pullback:** The U.S. government's recent cancellation of billions of dollars in funding for hydrogen hubs highlights its strategic retreat from clean hydrogen. This creates an opportunity for African countries to fill the resulting void. African governments should proactively engage private investors and developers previously involved in U.S. projects to attract new investment and accelerate the continent's project pipeline.

b) **Leverage China's technological leadership**: China's dominance in low-cost electrolyzer manufacturing and production offers Africa an opportunity to reduce capital costs. African nations should build on existing Sino-African relations to pursue technology transfer and investment that enhance local capabilities and competitiveness in renewable hydrogen production. However, it is important to recognize the competitive dynamic, as China could eventually become a low-cost exporter, posing a risk to Africa's export ambitions.

c) **Attract private and state-backed funds from the Middle East**: The Middle East's strategic investments in clean energy provide an avenue for African countries to attract capital. While a significant competitor for the same export markets, major Middle Eastern energy companies are becoming key investment partners for African projects. North African countries should leverage their geographic and cultural proximity to promote regional cooperation and facilitate a regional clean hydrogen market.

d) **Deepen cooperation with major demand markets**: The EU, Japan, and South Korea are committed to importing clean hydrogen to diversify energy supplies and enhance energy security. Africa should strengthen its engagement with these major import markets by aligning production with import regulations and product standards, such as the EU's Carbon Border Adjustment Mechanism (CBAM) and Renewable Fuels of Non-Biological Origin (RFNBO) standards. This approach will secure long-term trade opportunities and stable demand for African hydrogen exports. African projects are also well-positioned to benefit from initiatives like Germany's and the Netherlands' H2Global double auctions, which support the import of renewable hydrogen and its derivatives from non-EU countries.

2. Strengthen intra-African cooperation

Leverage platforms such as the African Green Hydrogen Alliance (AGHA) and the Southern African Development Community (SADC) to harmonize regulations, develop shared infrastructure, and build regional value chains. Stronger coordination will reduce costs, create regional markets, and enhance Africa's collective bargaining power in the global clean hydrogen market.

3. Prioritize knowledge exchange with emerging hydrogen exporters

To enhance competitiveness, African countries should engage in knowledge-sharing with other emerging exporters, such as Latin America and India, through South-South cooperation. Development finance institutions (DFIs), through initiatives like the World Bank's Hydrogen for Development (H4D) Initiative, can facilitate policy exchange and international research partnerships, helping African nations learn from the successes and challenges faced by other exporting regions.

4. Use concessional finance effectively to attract private investment

Available concessional finance from international financial institutions should be directed to early-stage project finance and technical assistance to develop a mature pipeline of clean hydrogen projects. This should be complemented by effective financial support instruments, such as blended finance vehicles and contracts-for-difference (CfD) structures, to de-risk projects and attract private capital.

5. Leverage domestic anchor demand

African countries should explore domestic markets for clean hydrogen and its derivatives to complement export opportunities as demand anchors. Scaling key sectors—such as fertilizer production, green steel (direct reduced iron [DRI] and hot-briquetted iron [HBI]), and mining—stimulates industrial development, increases economic resilience, and reduces dependence on global markets.

6. Invest in local skills

Building a skilled workforce is critical for a new industry. This process should begin with mapping required skills, identifying gaps in national curricula, and introducing measures to address them. Leveraging lessons and resources from other energy sectors, such as oil, gas, mining, and renewable energy, will be essential in resource-constrained environments. Actively focusing on the inclusion of women from the start of the sector's development can help address gender gaps in the workforce.

Endnotes

1 Clean hydrogen can be produced in various ways, including electrolysis powered by renewable energy resources (known as renewable hydrogen) or steam reforming of natural gas with carbon capture, utilization and storage (CCUS) (known as low-carbon hydrogen). After its production, hydrogen is typically either fed into a pipeline network for transportation or is converted for shipping.

2 Hannah Richie, 'Sector by Sector: Where Do Global Greenhouse Gas Emissions Come From?', n.d. https://ourworldindata.org/ghg-emissions-by-sector.

3 Africa Green Hydrogen Alliance (AGHA) and McKinsey&Company, *Africa's Green Hydrogen Potential* (The Africa Green Hydrogen Alliance, 2022) https://gh2.org/sites/default/files/2022-11/Africa%27s%20Green%20Hydrogen%20Potential.pdf.

4 H2Global Stiftung, *Opportunities for Renewable Hydrogen Development in Africa: Insights from an Innovative Country Clustering Analysis* (H2Global Stiftung, 2025).

5 H2Global Stiftung, *Opportunities for Renewable Hydrogen Development in Africa: Insights from an Innovative Country Clustering Analysis*.

6 Wallace Mawire, 'Zimbabwe's Proposes Green Hydrogen For Increased Fertilizer Production', Pan African Visions, 2024 https://panafricanvisions.com/2024/01/zimbabwes-proposes-green-hydrogen-for-increased-fertilizer-production/.

7 Enerdata, 'Senegal and Mauritania Start Producing LNG', Enerdata, February 2025 https://www.enerdata.net/publications/daily-energy-news/senegal-and-mauritania-start-producing-lng.html; Global Energy Monitor Wiki, 'Cameroon FLNG Terminal', Global Energy Monitor Wiki, October 2025 https://www.gem.wiki/Cameroon_FLNG_Terminal.

8 H2Global Stiftung, *Opportunities for Renewable Hydrogen Development in Africa: Insights from an Innovative Country Clustering Analysis*.

9 National Competitiveness Comission, *Fertilizer Value Chain Report* (National Competitiveness Institution, 2022).

10 Angela Kongolo, 'Two Years on: Assessing the Russia—Ukraine War's Toll on African Economies', *ODI Global*, March 2024 https://odi.org/en/insights/two-years-on-assessing-the-russiaukraine-wars-toll-on-african-economies/.

11 H2Global Stiftung, Fraunhofer IEE, and Strathmore University, *Renewable Ammonia: Kenya's Business Case* (2025) https://www.h2-global.org/library/renewable-ammonia-kenyas-business-case [accessed 6 May 2025].

12 African Development Bank Group, The Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development, *Critical Mineral Insights: Iron Ore* (African Development Bank Group, The Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development, 2025).

13 AngloAmerica, 'Anglo American Unveils a Prototype of the World's Largest Hydrogen-Powered Mine Haul Truck - a Vital Step towards Reducing Carbon Emissions over Time', 14 October 2025 https://www.angloamerican.com/media/press-releases/2022/06-05-2022.

14 *Global Employment Trends for Youth 2024: Decent Work, Brighter Futures. Retrieved From* (International Labour Organization, 2024) https://www.ilo.org/publications/major-publications/global-employment-trends-youth-2024.

15 Hydrogen Council and McKinsey & Company, *The Africa Hydrogen Opportunity. The Potential, Practical Challenges, and Possible Unlocks* (2024) https://hydrogencouncil.com/wp-content/uploads/2024/03/Hydrogen-Council-Africa-Hydrogen-Opportunity-.pdf.

16 Sabine Mathilde Isabelle Cornieti and Claire Marion Nicolas, *How to Unlock Pipelines of Bankable Renewable Energy Projects in Emerging Markets and Developing Countries?*, 1 (World Bank Group, 2024).

17 IEA, *Global Hydrogen Review 2025* (2025) https://iea.blob.core.windows.net/assets/12d92ecc-e960-40f3-aff5-b2de6690ab6b/GlobalHydrogenReview2025.pdf.

18 World Bank Group, 'Hydrogen for Development Partnership Profile', ESMAP, n.d. https://www.esmap.org/Hydrogen%20_or_Development_Partnership_Program_Profile.

19 'Chile to Accelerate Its Green Hydrogen Industry with World Bank Support', *World Bank Group*, 29 June 2023 https://www.worldbank.org/en/news/press-release/2023/06/29/chile-to-accelerate-its-green-hydrogen-industry-with-world-bank-support#:~:text=Washington%20D.C.%2C%20June%2029%2C%202023,to%20carbon%20neutrality%20by%202050. [accessed 2 December 2025].

20 'Industrial Development & Market Creation', Southern African Development Community, n.d. https://www.sadc.int/pillars/industrial-development-market-integration.

21 'Africa-Europe Green Energy', European Commission, n.d. https://international-partnerships.ec.europa.eu/policies/global-gateway/africa-europe-green-energy_en.

22 Africa Green Hydrogen Alliance (AGHA), 'Africa Hydrogen Transition: Where to Act? Who to First Engage', February 2024 https://www.esmap.org/sites/default/files/2022/Presentations/AGHA_H4D%20-%20IRENA%20.pptx.pdf.

ENDNOTES

23 Philippe Benoit and Alex Clark, 'Engaging State-Owned Enterprises in Climate Action: Workshop Report', Center on Global Energy Policy at Columbia University SIPA | CGEP, 10 October 205 AD https://www.energypolicy.columbia.edu/publications/engaging-state-owned-enterprises-climate-action/.

24 Geofrey Njovu, 'RFNBO Pre-Certification for Morocco-Based Renewable Ammonia Project', June 2025 https://ammoniaenergy.org/articles/rfnbo-pre-certification-for-morocco-based-renewable-ammonia-project/.

25 Anica Nerlich and Caputo Anderson Silva, *Listing State-Owned Enterprises in Emerging and Developing Economies: Lessons Learned from 30 Years of Success and Failure*, no. 160917 (World Bank Group, Oliver Wyman, The Government of the Grand Duchy of Luxembourg, ASEA, 2021), https://documents.worldbank.org/en/publication/documents-reports/documentdetail/984431624443117178/listing-state-owned-enterprises-in-emerging-and-developing-economies-lessons-learned-from-30-years-of-success-and-failure.

26 'Investing in American Energy: Significant Impacts of the Inflation Reduction Act and Bipartisan Infrastructure Law on the U.S. Energy Economy and Emissions Reductions', *US Department of Energy*, 16 August 2023 https://www.energy.gov/policy/articles/investing-american-energy-significant-impacts-inflation-reduction-act-and [accessed 2 December 2025].

27 H2Global Stiftung, *Unlocking Potential: Scaling Demand through Hydrogen Hubs* (2024) https://www.h2-global.org/library/unlocking-potential-scaling-demand-through-hydrogen-hubs [accessed 17 January 2024].

28 'US Department of Energy to Cancel All Hydrogen Hub Grants, Leaked Documents Reveal', *Fuel Cells Works*, 8 October 2025 https://fuelcellsworks.com/2025/10/08/energy-policy/us-department-of-energy-to-cancel-all-hydrogen-hub-grants-leaked-documents-reveal [accessed 2 December 2025].

29 'Senate Greenlights 2028 Deadline for 45V Hydrogen Tax Credit as "Beautiful Bill" Inches Forward', *Fuel Cells Works*, 2 July 2025 <https://fuelcellsworks.com/2025/07/02/clean-hydrogen/senate-greenlights-2028-deadline-for-45v-hydrogen-tax-credit-as-beautiful-bill-inches-forward> [accessed 2 December 2025].

30 IEA, *World Energy Outlook 2025* (2025) https://iea.blob.core.windows.net/assets/af5ac385-8fce-4cc7-8c73-107a3aade95e/WorldEnergyOutlook2025.pdf [accessed 12 November 2025].

31 Priante Martin and Craig Eason, 'Deeply Unfair' | US Pulls out of Critical Shipping Talks That Could Drive Uptake of Green Hydrogen-Based Fuels', https://www.hydrogeninsight.com/industrial/deeply-unfair-us-pulls-out-of-critical-shipping-talks-that-could-drive-uptake-of-green-hydrogen-based-fuels/2-1-1804910, n.d.

32 Lina Li and others, *Hydrogen Factsheet - China*, Factsheet (Adelphi consult GmbH, 2022), p. 30 https://adelphi.de/system/files/mediathek/bilder/H2%20Factsheet%20China.pdf.

33 Yushan Lou and Anne-Sophie Corbeau, 'China's Hydrogen Strategy: National vs. Regional Plans', October 2023 https://www.energypolicy.columbia.edu/publications/chinas-hydrogen-strategy-national-vs-regional-plans/.

34 IEA, *Global Hydrogen Review 2025*.

35 IEA, *Global Hydrogen Review 2025*.

36 IEA, *Global Hydrogen Review 2025*.

37 GH Bureau, "World's Largest Integrated Green Hydrogen-Ammonia Plant in China," Discover Green Hydrogen, July 2025, https://www.discovergreenhydrogen.com/articles/hydrogen-news/2025/july/world-s-largest-integrated-green-hydrogen-ammonia-plant-in-china.

38 Polly Martin, "First Green Hydrogen Produced in Southern Africa — Using Chinese Electrolysers," Hydrogen Insight, March 20, 2025, https://www.hydrogeninsight.com/production/first-green-hydrogen-produced-in-southern-africa-using-chinese-electrolysers/2-1-1794839.

39 Ministry of New and Renewable Energy, "National Green Hydrogen Mission," n.d., https://nghm.mnre.gov.in/demand-creation.

40 Julian Atchinson, "SECI Completes Renewable Ammonia Auction Round," Ammonia Energy Association, September 1, 2025, https://ammoniaenergy.org/articles/seci-completes-renewable-ammonia-auction-round/.

41 The Solar Energy Corporation of India, 'Unique Business Model of SECI', Solar Energy Corporation of India, n.d. https://www.seci.co.in/upload/static/files/Unique%20Business%20Model%20of%20SECI%20Ltd.pdf [accessed 8 October 2025].

42 IEA, *Global Hydrogen Review 2025*.

43 Hydrogen Council. *Hydrogen Insights: December 2023 Update*. December 2023. https://hydrogencouncil.com/wp-content/uploads/2023/12/Hydrogen-Insights-Dec-2023-Update.pdf.

44 Julian Atchinson, 'SECI Completes Renewable Ammonia Auction Round', Ammonia Energy Association, 1 September 2025 https://ammoniaenergy.org/articles/seci-completes-renewable-ammonia-auction-round/.

45 Atchinson, 'SECI Completes Renewable Ammonia Auction Round'.

ENDNOTES

46 Atlantic Hydrogen Alliance, 'Atlantic Hydrogen Alliance', Atlantic Hydrogen Alliance, n.d. https://atlantichydrogen.ca/.

47 Atlantic Hydrogen Alliance, 'Atlantic Hydrogen Alliance', Atlantic Hydrogen Alliance, n.d. https://atlantichydrogen.ca/.

48 World Energy GH2, 'World Energy GH2 Becomes the First North American Company to Be Invited to Join the Port of Wilhelmshaven's Energy Hub Project', World Energy GH2, 2024.

49 H2Global Foundation, 'Canada Announces CAD 300 Million for H2Global Initial Auction', H2Global Foundation, August 2024.

50 Irene Galena, 'Canada's Plans to Export Hydrogen to Germany Stall amid Slow Demand, Infrastructure Delays', The Globe and Mail, October 2024, https://www.theglobeandmail.com/business/article-canadas-plans-to-export-hydrogen-to-germany-stall-amid-slow-demand/, [accessed 7 December 2025].

51 Environmental Assessment Office of British Columbia, 'Coyote Hydrogen Project: Application Withdrawn', Coyote Hydrogen Project: Application Withdrawn, September 2024, https://projects.eao.gov.bc.ca/p/650b5adc5d77c20022fb59fc/project-details.

52 Ministry of Energy and Infrastructure, "National Hydrogen Strategy," United Arab Emirates Federal Government, July 2023.

53 Hydrogen Oman, "Oman Green Hydrogen Strategy," Hydrogen Oman, May 2024, https://hydrom.om/Media/Pdf/Oman-Green-Hydrogen-Strategy-2024.pdf.

54 Australian Taxation Office Australian Government, 'Hydrogen Production Tax Incentive', Australian Government | Australian Taxation Office, February 2025, https://www.ato.gov.au/businesses-and-organisations/income-deductions-and-concessions/incentives-and-concessions/production-tax-incentives/hydrogen-production-tax-incentive, [accessed 7 December 2025].

55 H2Global Foundation, 'Australia and Germany Commit EUR 400 Million to Joint H2Global Auction', H2Global Foundation, September 2024, https://h2-global.org/news/australia-and-germany-commit-eur-400-million-to-joint-h2global-auction/, [accessed 7 December 2025].

56 'Australia's Largest Green Hydrogen Project, CQ-H2, Scrapped Due to Lack of Offtakers', Hydrogen Newsletter, July 2025, https://www.hydrogennewsletter.com/australias-largest-green-hydrogen-project-cq-h2-scrapped-due-to-lack-of-offtakers/.

57 David Caroll, 'Stanwell Exits Gladstone Green Hydrogen Project', PV Magazine, July 2025, https://www.pv-magazine-australia.com/2025/07/01/stanwell-exits-gladstone-green-hydrogen-project/.

58 Origin Energy, 'Update on Hunter Valley Hydrogen Hub', Origin Energy, October 2024.

59 Naom Boussidan and Julia Scarselli Franchi, 'How Australia Can Lead the Global Transition to Green Iron', How Australia Can Lead the Global Transition to Green Iron, December 2025, https://www.weforum.org/stories/2025/12/australia-global-transition-green-iron/, [accessed 7 December 2025].

60 Rachel Parkes, "10GW Electrolyser' | Masdar and Partners Plan Massive $34bn Green Hydrogen Project in Mauritania," Hydrogen Insight, August 8, 2025, https://www.hydrogeninsight.com/production/10gw-electrolyser-masdar-and-partners-plan-massive-34bn-green-hydrogen-project-in-mauritania/2-1-1415956.

61 Leigh Collins, "EU Will Miss Its 2030 Green Hydrogen Supply Target by More than 90%: Hydrogen Europe," Hydrogen Insight, September 30, 2025, https://www.hydrogeninsight.com/production/eu-will-miss-its-2030-green-hydrogen-supply-target-by-more-than-90-hydrogen-europe/2-1-1878444.

62 Fuel Cells Works, "EU Shifts Hydrogen Bank Subsidies to Reserves After Major Project Withdrawals," Fuel Cell Works, September 18, 2025, https://fuelcellsworks.com/2025/09/18/energy-policy/eu-shifts-hydrogen-bank-subsidies-to-reserves-after-major-project-withdrawals.

63 Hintco, *H2Global Pilot Auction Results: Lot1 and Lot 3* (Hint.co GmbH, 2024), https://cdn.sanity.io/files/u4w9plcz/production/8df5b11af3214c47b1d8ffd8fccc63ad81985b6b.pdf.

64 Asian Natural Gas and Energy Association, *Japan's Energy Production Sources*, n.d., accessed June 6, 2025, https://angeassociation.com/location/japan/.

65 Rachel Parkes, "Japan Launches First Billion-Yen Tender under Hydrogen Hubs Programme," Hydrogeninsight.Com, March 12, 2025, https://www.hydrogeninsight.com/industrial/japan-launches-first-billion-yen-tender-under-hydrogen-hubs-programme/2-1-1791662.

66 "Kawasaki Vision for the Future," Kawasaki Hydrogen Road, October 9, 2025, https://global.kawasaki.com/en/hydrogen/.

67 AfDB, "African Development Bank and JGC Corporation Sign Agreement to Advance Use of Sustainable Aviation Fuel and Africa's Green Aviation Agenda," AfDB, October 2, 2025, https://www.afdb.org/en/news-and-events/press-releases/african-development-bank-and-jgc-corporation-sign-agreement-advance-use-sustainable-aviation-fuel-and-africas-green-aviation-agenda-87389.

H2Global Foundation

T: +49 40 36197500
E: info@h2-global.org

www.h2-global.org