POLICY BRIEF

Achieving the Carbon Reduction Goal: Opportunities in the Green Hydrogen Industry for Economic Growth in Developing Countries

2025

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Accelerating Climate Action and the Just Energy Transition

Abstract

Green hydrogen (GH2) is emerging as a key element in the global energy transition, with the potential to account for over a third of international energy trade by 2050. For developing countries, this industry offers a chance not only to decarbonise their economies and meet global greenhouse gas emission goals but also to become competitive exporters, leveraging their resources and renewable energy potential to strengthen industrial development.

However, its adoption faces structural challenges. High production costs and limited infrastructure hinder scalability. Water scarcity poses an additional barrier, as GH2 production requires large volumes of water, particularly in water-stressed regions. Finally, the absence of clear regulatory frameworks complicates trade and investment, while weak incentives limit global demand for GH2-based products, reducing competitiveness.

To address these barriers and accelerate a just and sustainable GH2 transition, we propose three concrete strategies:

- Create a public–private collaboration hub, led by the G20, that brings together governments, businesses, and civil society to exchange knowledge, build capacity, and foster innovation in GH2 production and commercialisation. This hub should promote clear and harmonised regulatory standards that facilitate investment and industry growth, including water efficiency strategies in GH2 production plans.
- Promote blended finance models and create regional hydrogen financing windows to reduce investment risks, as current funding for clean energy remains far below what is needed globally.
- Establish markets that reflect the true value of carbon, incentivising investments in projects covering the entire GH2 value chain.

Notably, implementing these recommendations will accelerate GH2 adoption globally, ensuring equitable benefits for developing countries and contributing to worldwide economic decarbonisation.

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Diagnosis of the issue

Green hydrogen (GH2) is emerging as a critical component of the global energy transition and a key enabler for meeting international commitments under the Paris Agreement and the UN Sustainable Development Goals (SDGs). Its potential to decarbonise hard-to-abate sectors and facilitate energy storage positions it as a strategic vector in the fight against climate change.

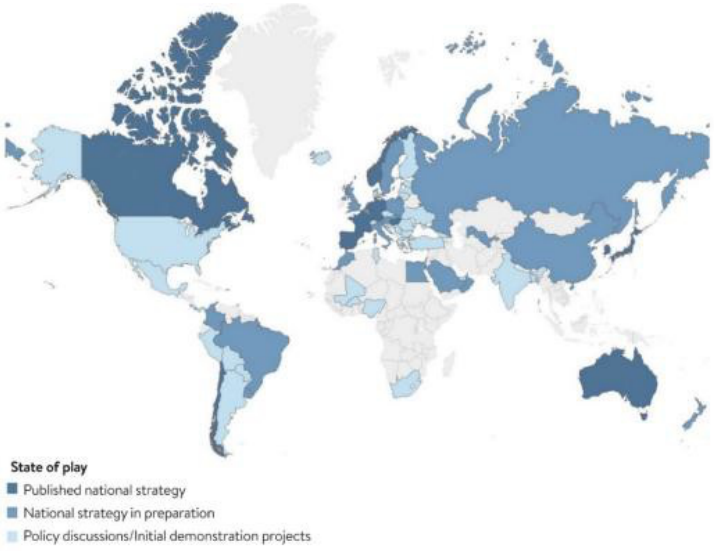
This potential has been widely recognised in international forums, including the G20, which adopted the High-Level Voluntary Principles on Hydrogen to foster a sustainable and equitable global ecosystem that benefits all nations (G20 2022). For developing countries – particularly those with abundant renewable energy resources (solar, wind, hydro) – this represents a transformative opportunity.

However, the current landscape presents a mixed picture, with significant long-term opportunities tempered by immediate and medium-term challenges that must be addressed to ensure effective implementation.

Charting a promising path forward

The global momentum behind GH2 is undeniable, with over a dozen countries, including EU members, having already adopted national hydrogen strategies, while 19 others are in the process of drafting policies (Ovalle et al. 2023).

Figure 1. Global landscape of national hydrogen strategy developments



Source: Adapted from Ovalle et al. (2023), sourced from the World Economic Forum.

This growing commitment signals that GH2 is rapidly evolving from a niche technology to a central pillar of the energy transition, capable of generating new value chains across the global energy system. Our research identifies the following strategic opportunities.

- **Natural resource endowment offers a competitive advantage for developing nations:** Countries with abundant solar, wind, or hydro resources and relatively clean electricity grids are well positioned to produce low-cost GH2, opening the door to competitive energy exports.
- **GH2 can be a driver of inclusive economic development:** The emerging GH2 value chain has the potential to create diverse employment opportunities, support industrial diversification, and reduce reliance on fossil fuels.
- **Significant market potential lies ahead:** According to the International

Renewable Energy Agency (IRENA 2023), by 2050 renewable hydrogen could represent 94% of global production and supply one-third of the world's energy trade, with GH2 accounting for up to one-third of international energy trade and 14% of final energy consumption. The market potential is staggering, offering particularly significant opportunities for energy-hungry regions like Africa and Asia.

Regarding challenges, particularly for developing countries, the following must be noted.

- **Financing constraints:** High capital requirements create substantial barriers, particularly for developing nations with limited fiscal space. For instance, in Latin America only 0.1% of announced projects have reached investment decisions despite the region's strong potential (IEA 2024).
- **GH2 is not yet cost-competitive with fossil fuels:** Persistent cost disparities with conventional fossil fuels hinder mass adoption, especially in price-sensitive markets (Cordonnier y Saygin 2022). Additionally, demand volatility and unclear offtake agreements create investor uncertainty, as evidenced by Latin America's situation where the projected 2030 production exceeds 7 million tonnes annually but few projects have reached the operational stage (IEA 2024).
- **Lack of regulatory harmonisation undermines trust and market development:** Developing regulatory interoperability and local technical capacity remains crucial for global trade development (IEA 2024a).
- **Equity risks:** Concentrated demand in developed economies risks reducing developing nations to mere clean energy exporters without local benefit distribution (Komorowski 2024; IEA 2024). The absence of clear governance standards and inclusion mechanisms could perpetuate the energy inequities seen in traditional energy markets.
- **Water concerns:** Producing 1 tonne of GH2 via electrolysis requires around 18 tonnes of purified water, creating tensions in water-scarce areas and increasing production costs (AlZohbi 2022).

These challenges collectively create a complex implementation landscape that requires coordinated policy solutions, technological innovation, and financial mechanisms to ensure GH2 can fulfil its promise as an equitable energy transition solution. The G20's leadership will be particularly crucial in addressing these structural barriers through international cooperation and standard-setting.

Recommendations

This policy brief proposes three priority action lines focused on fostering international collaboration, mobilising sustainable financing, and promoting value-added and low emission markets.

1. G20-led public–private green hydrogen hub

Complex challenges and the global energy transition demand a coordinated response that engages all international stakeholders. In this sense, a G20-led public–private green hydrogen hub would serve as a pivotal platform to address current market barriers and implementation challenges by uniting public and private sector actors, civil society, and academic experts. Its primary objective would be to function as a central mechanism for knowledge sharing and capacity building while driving systemic change. Key functions of the hub should include:

- disseminating regulatory best practices and promoting harmonised standards to strengthen institutional capabilities in developing nations;
- providing access to advanced technical knowledge and fostering strategic partnerships to bridge the technology gap between industrialised and developing economies;
- establishing robust sustainability governance mechanisms, with a focus on water-efficiency strategies to ensure sustainable resource use. This must involve active participation from civil society and Indigenous

communities, aligned with the UN Declaration on the Rights of Indigenous Peoples, to maintain social licence and integrate local knowledge; and

- enhancing long-term investment certainty through improved legal predictability and adaptive regulatory frameworks that account for technological advancements and multi-stakeholder interests.

The G20's role as the premier forum for international economic cooperation uniquely positions it to host this initiative. By creating a dedicated GH2 platform, the G20 could provide the institutional architecture needed to coordinate the multi-stakeholder effort required to scale GH2 globally and ensure an equitable transition that benefits all nations across the hydrogen value chain.

2. Innovative financing instruments

Current GH2 investment remains inadequate, especially in emerging economies grappling with high debt, budget constraints, and rising borrowing costs (IMF 2022). These challenges are exacerbated by private sector hesitation regarding high-risk projects. In this context, innovative financing mechanisms are needed to reduce investment barriers and crowd in private capital.

Blended finance offers a pragmatic solution for countries with strong renewable energy potential but limited access to capital. By helping align private sector incentives with long-term sustainability goals, this approach can mobilise much-needed investment while reducing perceived risks. This model has been taking root across the Global South, where several countries are developing national strategies for GH2 backed by blended finance initiatives. Namibia launched the SDG Namibia One Fund, a public–private platform supporting large-scale renewable energy projects for green hydrogen production. In South Africa, the SA-H2 Fund aims to mobilise $1 billion through partnerships with domestic and international institutions to accelerate

hydrogen infrastructure. Chile's Green Hydrogen Facility catalyses private and international investment with state-backed risk mitigation, funding projects across various stages – from renewable generation and hydrogen demand to equipment like solar panels and electrolysers. These cases show how public, private, local, and international actors can work together to catalyse the emergence of a new energy sector despite implementation still being at the initial stages, necessitating expeditive advances.

To complement national efforts, this brief proposes the creation of regional hydrogen financing windows hosted by regional development banks. These mechanisms would serve not only as platforms to channel public, multilateral, and private funding into strategic regional projects but also as tools to integrate efforts among countries with complementary resources. This could unlock economies of scale, enable regulatory coordination, and help spread investment risks. Additionally, these windows could centralise access to financing information, harmonise eligibility criteria, and tailor financial conditions to local and community realities.

The G20 could play a central role in advancing this proposal. With its economic weight – representing 85% of global GDP, over 75% of world trade, and two-thirds of the global population – and its proven convening power, the G20 is well positioned to drive this agenda. Its involvement would help facilitate knowledge exchange between borrowing and recipient countries, institutions, and technical bodies, allowing for context-sensitive adjustments. A useful precedent is the IDA Regional Window at the World Bank, which provides complementary financing for regional initiatives.

3. Building markets that recognise carbon value

The development of GH2 is constrained by the absence of carbon pricing or other signals that recognise its climate value, making it less competitive than fossil-based alternatives. High production costs, investor hesitation regarding unproven technologies, and challenges in scaling innovations further limit progress. In addition, new technologies face steep technical and institutional learning curves that delay early adoption.

In this context, implementing carbon pricing mechanisms – such as carbon taxes or robust carbon markets – can help redirect investment toward low-emission projects and sustainable value chains. However, these instruments must be complemented by public policies that support the production, distribution, and use of GH2, particularly in energy- and emissions-intensive sectors, through targeted subsidies.

Some developed countries, such as Japan and Germany, have already implemented subsidy schemes to narrow the price gap between hydrogen and conventional fossil fuels. These measures help stimulate demand and create market certainty, offering a potential opportunity for developing countries to position themselves as exporters of value-added GH2. However, such schemes also raise concerns about long-term financial sustainability and the risk of subsidising forms of hydrogen with limited climate benefits, such as grey hydrogen. The G20 could play a pivotal role in promoting coordinated approaches, encouraging transparent and targeted subsidies that prioritise GH2. In addition, fostering dialogue between importing and exporting countries is essential to address trade challenges and ensure that support mechanisms are both environmentally sound and economically viable.

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