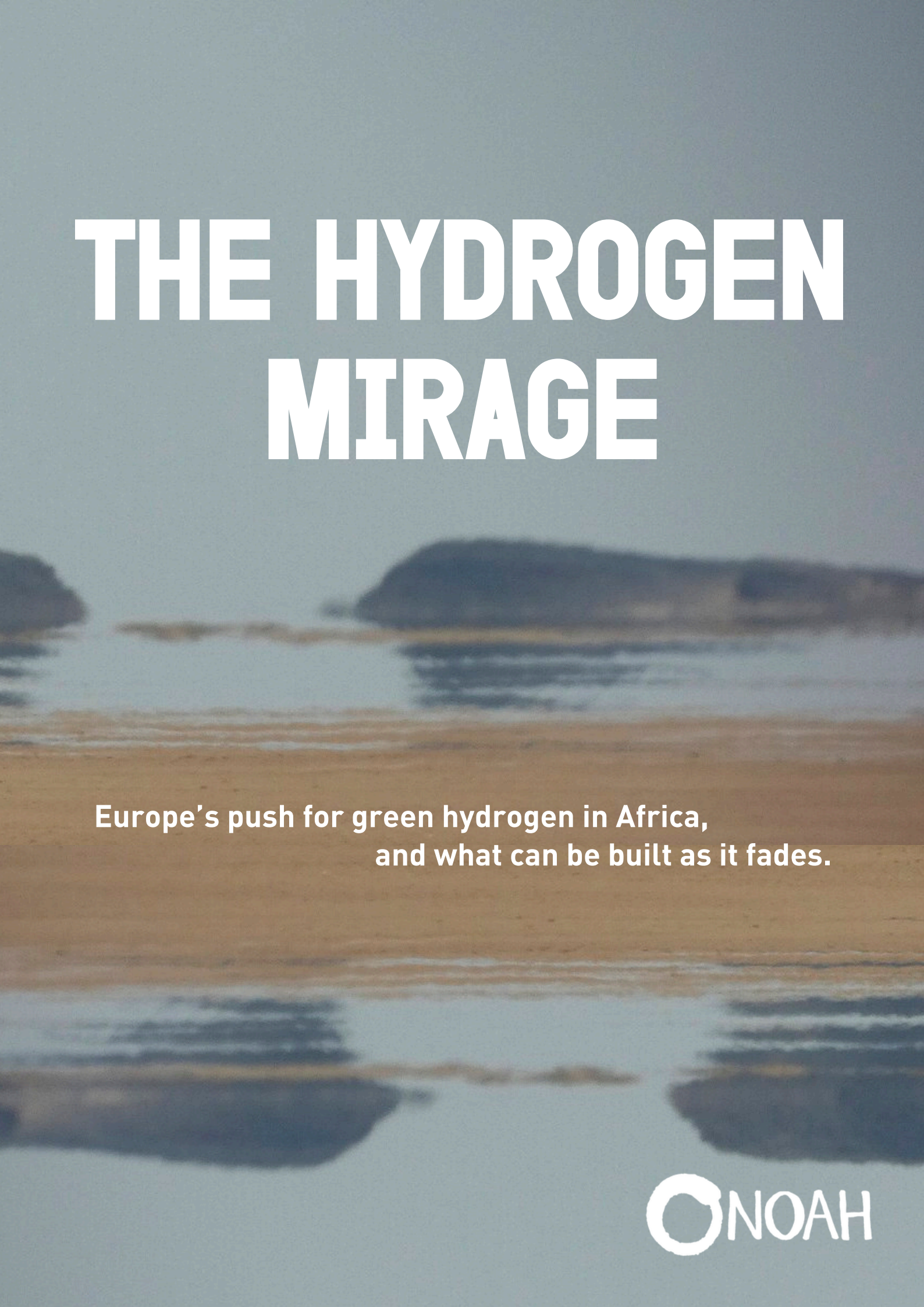


THE HYDROGEN MIRAGE

Europe's push for green hydrogen in Africa, and what can be built as it fades.

NOAH

key findings

Green hydrogen is being promoted as Africa's route to green industrialization and Europe's route to clean energy. This report draws on a tailor-made dataset covering all 111 African hydrogen projects in the IEA's database to provide sector-wide insights. It finds a sector that is led by Europe, largely speculative, and structured so that African host countries carry the earliest costs and risks, while most of the value is set to flow abroad.

What the data shows

→ **African hydrogen is a European project.**
92 of the 111 projects involve the EU, its member states or European companies, and EU institutions take part directly in nearly half of all projects. When public money is used to make projects safer for private investors, through guarantees, cheap loans or promises to buy the hydrogen at a fixed price, it comes from the EU and its member states in four out of five cases.

→ **The sector is highly speculative.**
Only 13 projects have moved past planning, and together they account for less than 3 % of the money announced. Most of the headline investments have not been committed by anyone.

→ **Host countries pay first.**
African governments provide land, new laws and infrastructure up front, and have already delivered this support in nearly two-thirds of all projects. The EU has delivered its support in less than a quarter, and private investors have so far delivered in just a single project. If the boom fails, host countries lose what they have spent, while investors can walk away.

→ **The conversation is one-sided.**
Coverage of the projects is overwhelmingly positive, and for most projects, risks to the host country are never mentioned at all. Those quoted are almost always companies and governments; local communities are heard in only two projects.

→ **Benefits are promised, not counted.**
Projects state their production targets in precise numbers, but promises of local jobs and industrial development rarely come with any figure at all, leaving host countries and local communities little to hold investors to.

→ **The solutions offered are the ones available, not the ones needed.**
Public money, purchase guarantees and new regulations may get individual projects started, but none of them offers a path to a sustainable and mature green hydrogen sector. Problems such as water use, land conflicts and disputed territory are rarely discussed and have no real solution attached.

Why it matters

→ **Hydrogen is a wasteful way to use renewable power.**
Turning electricity into hydrogen and back again loses around 70 % of the energy. Hydrogen has a role in shipping, fertilizer and storing energy between seasons, but building vast wind and solar farms solely to export hydrogen is indefensible from the standpoint of a just global energy transition.

→ **To be worth the resources, African hydrogen must do two jobs at once:**
Help end fossil fuel use globally and bring green industry and electricity to the countries that host it. As currently structured, it does neither reliably.

Recommendations

The EU is the only actor in a position to change the sector's direction. It is involved in most projects, it is the main intended buyer, and its rules already decide which hydrogen counts as "green" on the European market. Regardless of whether hydrogen falters or becomes the fuel of the future, the EU should use that leverage.

If the hydrogen boom materializes

→ **Attach conditions to EU support.**
Public guarantees, finance and access to the European market should depend on projects supplying the local power grid, training local workers for skilled jobs, giving host governments a share of ownership, and helping host countries move into more valuable parts of the industry.

→ **Stop pushing projects off the grid.**
EU rules make it simplest for export plants to cut themselves off from the national power grid. Supplying energy to the local grid should be expected, not merely allowed.

→ **End the race to the bottom.**
African countries compete for scarce investment by offering tax breaks, cheap land and lighter rules. Common EU conditions would keep such concessions at a balanced level.

If the boom becomes a bust

→ **Plan the fallback now.**
Forecasts of costs, technology and demand have repeatedly proven too optimistic, and projects are already being canceled.

→ **Build the wind and solar farms first.**
Renewables should be made grid-ready and built first, so that hydrogen projects can be converted into ordinary renewable power plants if hydrogen fails.

→ **Redirect support where projects stall.**
Where studies show strong wind or solar potential, but investors never commit, the EU should move its support to renewable power for local use. The land, permits and legal groundwork are already in place.

→ **Keep supporting projects that no longer serve Europe's targets.**
The climate does not care where emissions are cut. The EU has itself promised to help bring electricity to the 570 million people in sub-Saharan Africa who lack it, with hydrogen exports to follow only "once local needs are covered".

Development in Africa should not depend on whether hydrogen becomes profitable for European firms. By refocusing on a global green developmental agenda, the EU can still salvage the African hydrogen push to benefit the climate and host country development.



Wind measurement mast
Many hydrogen projects never leave the feasibility stage
Photo: Sam P Raj (via imaggeo.egu.eu)

introduction

The formal end of colonial rule did not bring an end to external control over African economies. Rather, foreign influence took on new shapes. In the 1980s and 1990s, many African governments facing debt crises could only access IMF and World Bank lending by accepting structural adjustment programs. These programs required them to liberalize trade, cut public spending, privatize state enterprises and remove protections for infant industries[1]. Critics have argued that these conditions deepened dependence on raw commodity exports and stalled industrialization, keeping many economies at the lowest-value end of global supply chains[2]. The programs were later softened and partly replaced, but the underlying pattern has persisted: African economies supplying raw resources on terms set elsewhere.

The push for green hydrogen risks becoming the latest form of that pattern. As of 2026, large-scale projects are under development in 16 African countries, eight of which have adopted national strategies to attract foreign investors and energy companies. African host country governments see hydrogen as a catalyst for green industrialization and are committing substantial public resources to it. Europe is central to these plans, as the leading partner and main intended export market, and as the regulator whose rules determine which hydrogen counts as "renewable" on the European market[3,4]. As this report shows, the sector as currently structured threatens to repeat the extractive patterns of history, with host countries bearing the costs while most of the value flows abroad.

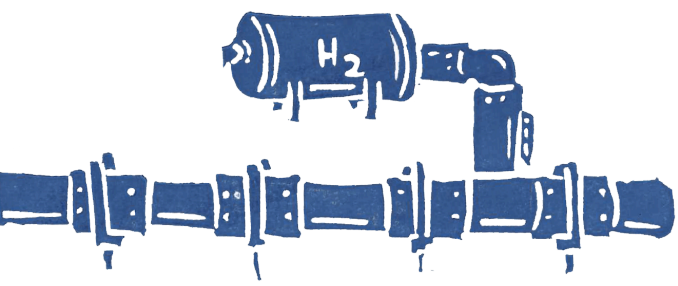
The report proceeds as follows:

In section 1, we show the extent to which Europe is at the helm of African hydrogen expansion, explain how the hydrogen sector is still highly speculative with a risk of underperforming or collapsing altogether, and discuss the instruments which are being employed to entice private investors.

In section 2, we delve into the discourse surrounding current hydrogen projects, what themes are dominating the discussion, and who is being represented in the conversation.

Section 3 builds on these findings, critiquing blind spots and the outsized focus on private investment, before giving our recommendations for what can be done to salvage the failing hydrogen agenda in favor of climate transition and host country opportunities.

This report draws on a purpose-built dataset of 1,256 corporate, media and policy documents covering every African hydrogen production project in the IEA's database as of October 2026, 111 in total. A breakdown of the data and methodology can be found in section 4.





section 1 – who pays and for what?

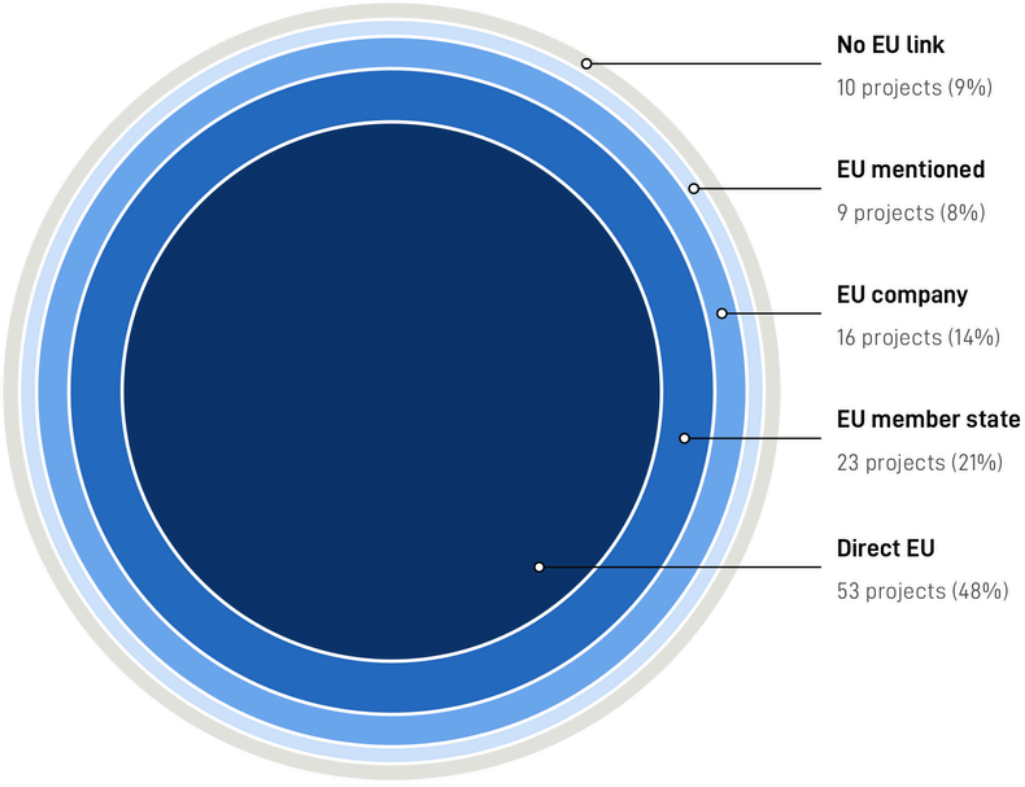
An EU project

Spanning host countries, stages of development, and product types, the EU is the major player in the vast majority of African hydrogen projects. As figure 1 shows, the EU is directly involved – meaning that EU organs, institutions or initiatives are directly participating in the project's financing or providing guarantees – in nearly half of all African hydrogen projects. EU member states are involved in a further 21 % and EU companies in a further 14 %. All told, there are only 19 of the 111 African hydrogen projects without any EU involvement, and of those, half still discuss the EU, for instance as a target market for exports.

To put this into perspective, the United States and US companies are involved in only 17 projects, mostly as technology suppliers, while China, India, South Korea and Japan are involved in only 18 projects combined. The largest non-European presence comes from the Gulf, with actors from the United Arab Emirates and Saudi Arabia involved in 22 projects. In total, non-European foreign actors are involved in half of the projects (55 of 111) – but in two-thirds of these, European actors are involved as well. Only 18 projects have foreign involvement without any European participation.

One caveat: since the analyzed documents are limited to English-language sources, the real level of Chinese involvement is likely to be higher, but still unlikely to be near the European level.

Figure 1: EU involvement



Source: 1,256 news articles, press releases, webpages, company and policy documents on all 111 current African hydrogen projects.

A speculative market

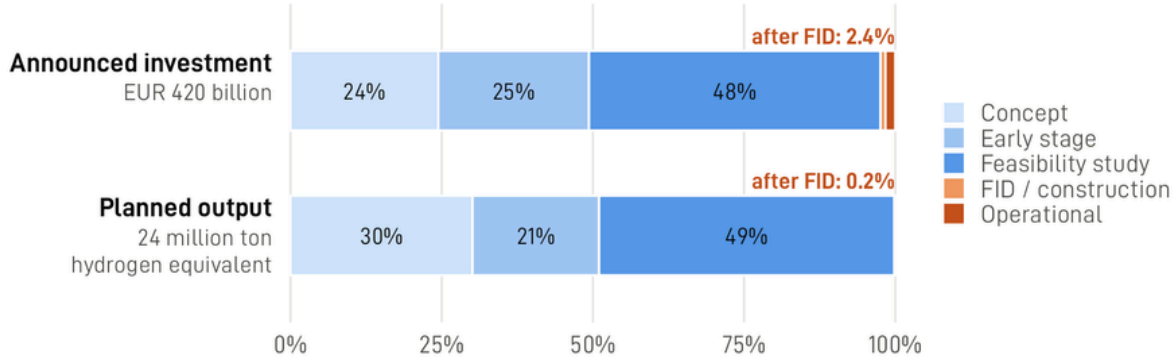
At present, hydrogen is not a cost-competitive alternative to fossil fuels. As such, the African push is largely predicated on uncertain projections regarding future European demand. Reflecting this, only a small fraction of projects, announced investments, and planned output, have reached Final Investment Decision (figure 2). Before this stage, private investors are likely to have expressed their interest, and may be directly involved in the project's development, but have not yet committed to investing the large sums which appear in headlines promoting the hydrogen boom.

Attracting investors

The low levels of investor commitment are not for lack of trying. Many of the countries aiming to become hydrogen producers have launched expansive hydrogen strategies, enacted supportive legislation, adopted targeted tax breaks, and acquired vast land masses for companies to cheaply lease. These instruments are referred to below as direct support. Simultaneously, the EU, through entities such as the European Investment Bank (EIB) and targeted initiatives like Global Gateway, has backed a series of so-called derisking instruments (see box 1).

Figure 2: Speculative investment and output

Share of all announced investment and planned hydrogen output, by the stage of the project



Source: 1,256 news articles, press releases, webpages, company and policy documents on all 111 current African hydrogen projects. Announced investment reported for 67 projects, planned output for 88 projects. Derivatives as hydrogen-equivalent.

According to a 2024 OECD/World Bank report, the global rates of announced projects reaching FID are between 5 and 10 %, with lower levels in developing economies[5]. As such, there is a substantial chance that most projects at the concept, early, and feasibility stages will never materialize.

In practice, this likely renders the REPowerEU target of importing 10 million tons of hydrogen by 2030 unattainable. Even if EU demand reaches that level (which is itself an open question) and applying the most generous completion rate estimates, African hydrogen production will not be able to exceed 3 million tons by 2030, with a more realistic estimate landing far below that level. In fact, of the 31 projects scheduled to come online by 2030, only one has reached FID[6].

Proponents of direct support and derisking argue that the speculative nature of the hydrogen market necessitates public support to attract the necessary funding from private investors[5]. The upshot, however, is that costs and risks are socialized, leading to what Gabor & Sylla have termed derisking developmentalism – the supplanting of state-led and development efforts with a heavy reliance on enticing private foreign capital[7]. While the public sphere expends resources and is exposed to risks, it is the private sector that stands to gain most in the case of success.

BOX 1 – Derisking

Derisking is the umbrella term for a toolkit of instruments that shift risks and costs away from private investors, either transferring them to another party, usually a public actor, or absorbing and reducing them, so that projects become more attractive for private capital.

In the African context, derisking comes overwhelmingly from the EU and its member states, through the European Commission, the EIB and national bodies such as Germany's KfW and H2Global, which appear in four out of five projects where derisking is mentioned. Development banks and host governments carry out the remainder.

Offtake and demand guarantees

Long-term commitments to buy the hydrogen or ammonia, or guarantees backing those purchases, so the producer is assured of a buyer, a revenue stream and a set price before building.

Concessional finance

Loans below market rates, grants paid into the project, or junior debt that takes the first losses, making the project cheaper or safer to finance for commercial lenders and investors.

Blended finance

Funds or vehicles that pool public or development money with private capital, so governments and development banks share the risks of the investment alongside the private investors.

Project preparation funding

Grants or technical assistance that pay for feasibility studies, engineering design and impact assessments, taking the costly early development stage off the developer.

Price support (contracts for difference)

A public scheme pays the gap between what the hydrogen costs to produce and what buyers will pay, closing the gap to fossil-based prices.



Visit of European Commissioner for International Partnerships, Jozef Síkela, to Namibia
Photo: © European Union, 2025, licensed under CC BY 4.0

Figure 3 shows the extractive dynamic in action, highlighting how both host countries and the EU are providing extensive support for private companies and joint ventures (JVs, which are project-specific companies owned jointly by several partners, sometimes including host governments).

Ultimately, the pervasive use of support and derisking instruments amounts to a systematic transfer of resources from public actors to private companies, and largely to European ones: around 60 % of the foreign companies involved are based in Europe. The transfer also runs from south to north, as host states provide land, infrastructure and regulatory concessions to foreign investors whose profits flow abroad. Of note, our data consists only of documents related to hydrogen production projects, not specific infrastructure projects, which are recorded separately by the IEA.

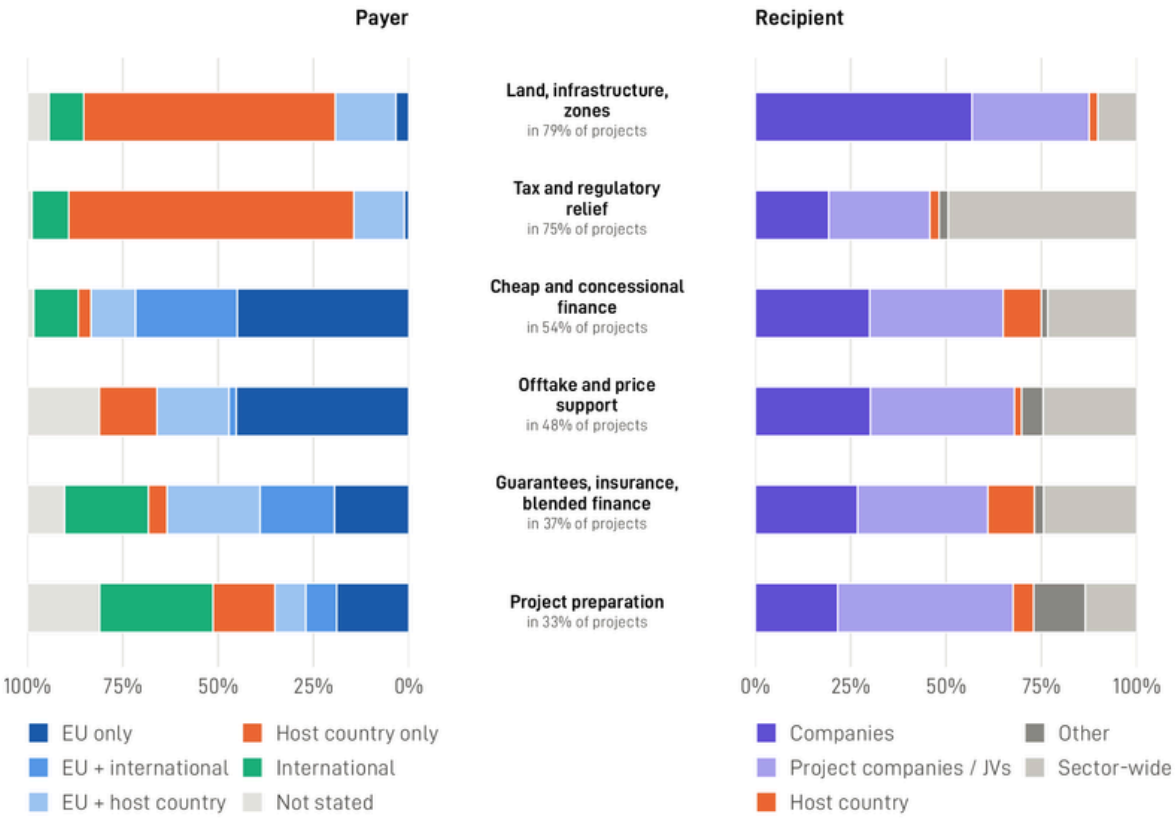
Since such infrastructure is largely built and financed by public actors, our figures likely understate the public contribution to the sector (see section 4).

In addition to the value transfer to private actors, it is unclear whether these investors will support host countries' ambitions to move into the more complex and valuable parts of the hydrogen value chain. If host countries are left to export hydrogen and ammonia with little processing at home, the sector risks repeating the history of mineral and fossil-fuel extraction. As Gabor and Sylla put it:

"The new green rules written by powerful investors and global North governments threaten to transform global South countries into consumers of green hydrogen technology and generators of yield for portfolio investors, thus reinforcing the structural drivers of their ongoing external debt vulnerabilities." [7]

Figure 3: Who pays and who receives

Percent of projects where each kind of support is mentioned



Source: 1,256 news articles, press releases, webpages, company and policy documents on all 111 current African hydrogen projects.

Figure 3 further reveals a clear divide in the forms of support headed by the host country and those headed by the EU. Host countries are predominately providing types of support which are concentrated in the early stages of development in the form of land acquisition and regulatory support (necessary for feasibility studies to commence). Acquiring the necessary land is frequently a difficult and contested process, relying on notions of unclaimed territories while in practice displacing local peoples – often ethnic minorities[8, 9]. In contrast, the EU is primarily providing offtake and price support, which will be ongoing over the early lifetime of the projects.

Host countries are exposed

The result of this disparity is twofold. First, if green hydrogen demand and production do expand exponentially and prices fall as a result, the EU will remain bound to pay high costs even as investors' operating expenses decline, further shifting public resources to private actors. Second, much of the support for green hydrogen has presently only been pledged rather than delivered, and the burden is unevenly distributed: host countries have already invested substantial resources, while the EU and private actors have largely committed funds they have yet to disburse (see figure 4).

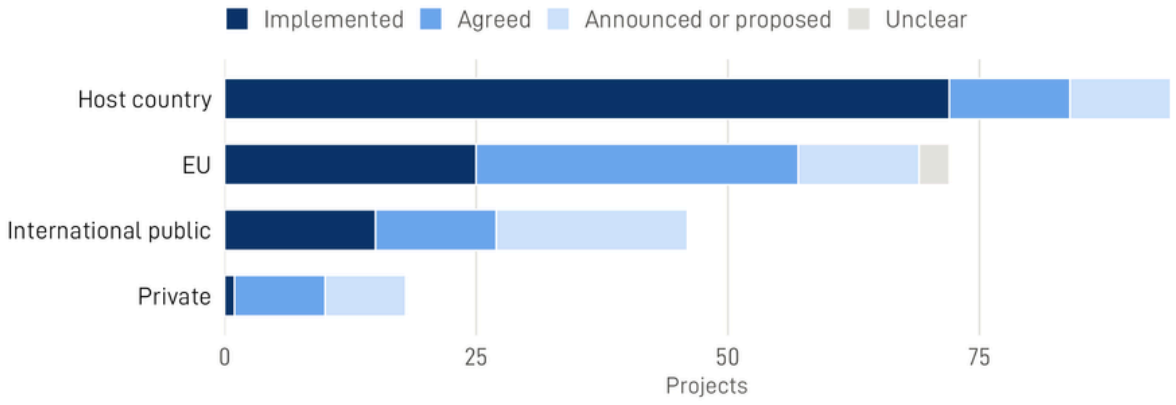
Should green hydrogen be largely abandoned or scaled back, host countries stand to lose what they have already spent, whereas the EU and especially the private sector will bear only limited losses.

This in turn creates unequal bargaining positions, where African host countries are reliant on continued hydrogen expansion to recoup their investment, while EU and other actors can relatively easily retreat if prospective technologies and international conditions fail to meet expectations. While criticism and caution are rare, this sentiment is slowly beginning to make its way into the discussion. As expressed by Paul Durrant, head of UK global green industries, during a UNIDO panel discussion in Johannesburg:

"Africa clearly has vast potential for clean hydrogen production but many of the projects that we've seen mooted in Africa have yet to reach final investment decision. There is clearly a risk that if producing countries and their institutions are consistently required to underwrite the earliest and riskiest stage of development, without the strength of those offtake agreements and other things in place, those countries are essentially derisking projects for others at their own cost." [10]

Figure 4: Who has already delivered

Projects each payer supports, by the most advanced status of that support



Source: 1,256 news articles, press releases, webpages, company and policy documents on all 111 current African hydrogen projects. Private commercial offtake contracts left out.



President of the European Commission Ursula von der Leyen and then-chairperson of the African Union Commission Moussa Faki Mahamat speaking at the 11th Commission-to-Commission meeting in 2022. The meeting revolved in part around energy partnerships.

Photo: © European Union, 2022, licensed under CC BY 4.0

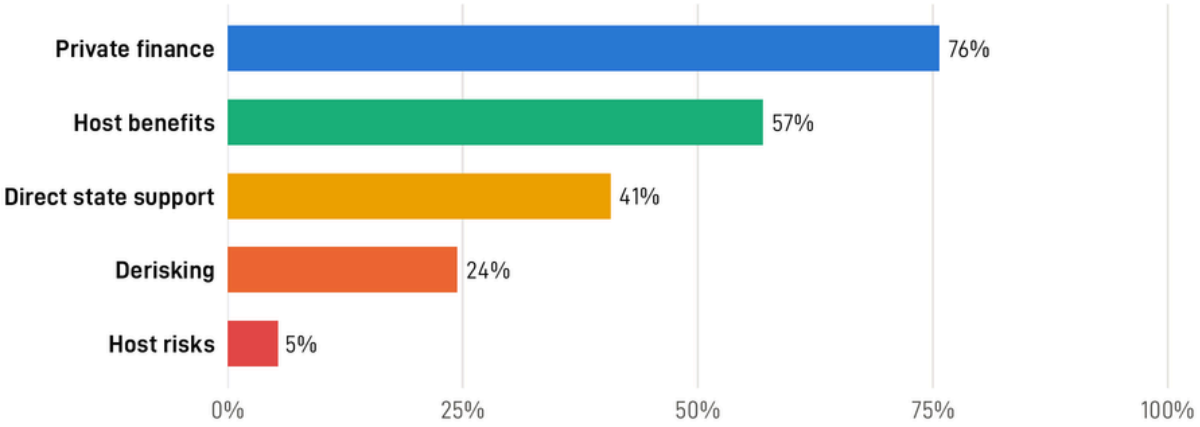
section 2 – who gets a say?

The data in this report is based on project documents, mainly trade press and news articles as well as company press releases, collected through targeted web searches for each project (see section 4). The data therefore reflects what is publicly reported about each project, much of which is shaped by the companies at the helm of the hydrogen push.

As such, the data should not be read as a list of facts regarding each project, but rather as an overview of what the public conversation is preoccupied with, who is leading that conversation, and how the discourse is being constructed around the future of African hydrogen. This section tackles these questions directly.

Figure 5: Selected themes in project documents

Average share of a project's documents mentioning each theme (each project weighs the same)



Source: 1,256 news articles, press releases, webpages, company and policy documents on all 111 current African hydrogen projects.

Private finance dominates

Across the 1,256 documents, private finance – which includes partnerships and agreements between firms and governments, foreign private investment, and discussions of country attractiveness to investors – is discussed on average in 76 % of a project's documents (figure 5). This far outpaces any other theme, with host benefits – how the host country can utilize hydrogen for climate transition, industrialization, domestic energy, and national prosperity – second, with mentions on average in 57 % of a project's documents.

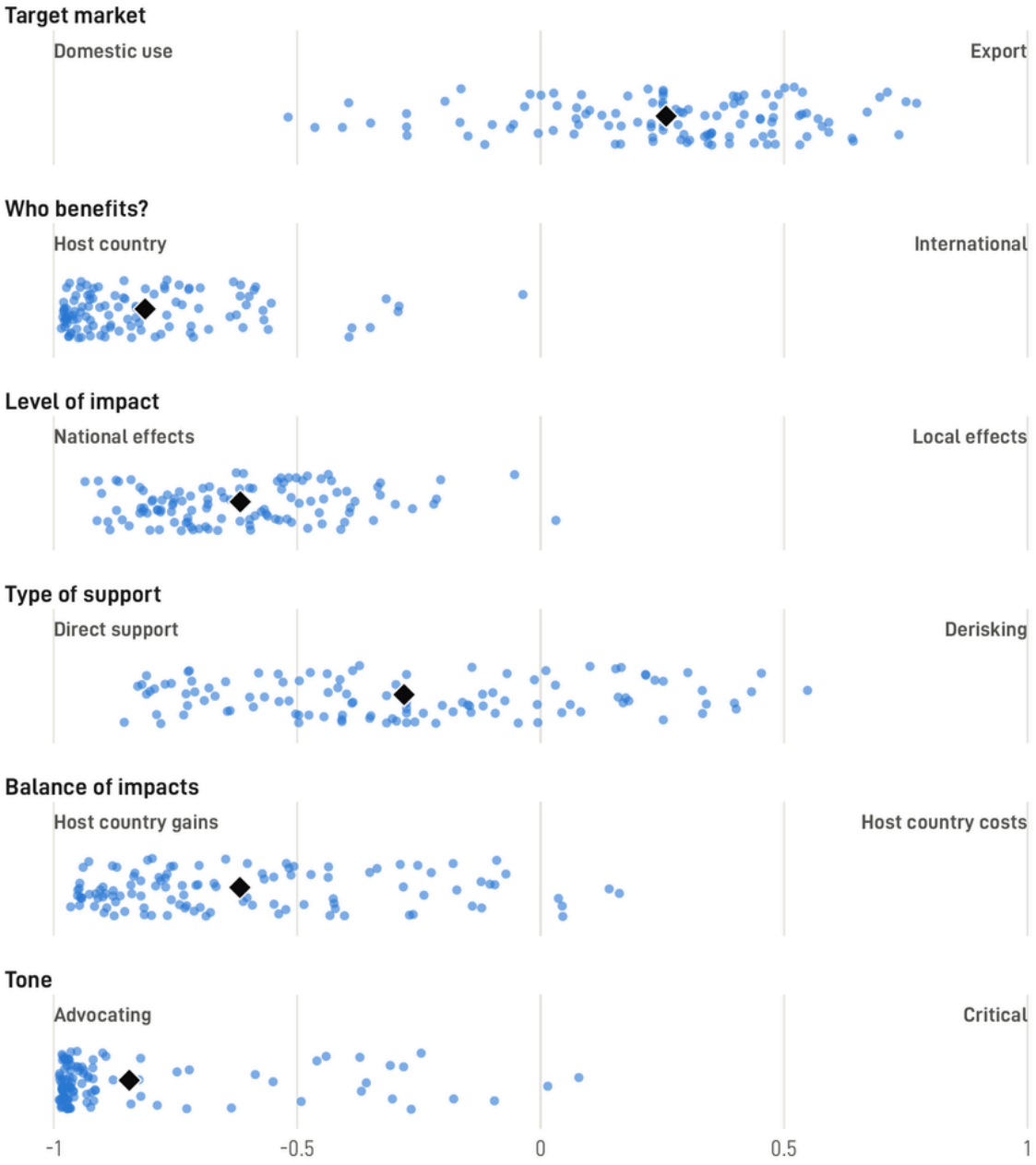
Furthermore, the disparity between host benefits and host risks is quite telling, highlighting a powerful interest in framing the hydrogen push in positive terms. This is contrasted by the scientific literature, burgeoning with papers criticizing African hydrogen projects as neocolonial, extractivist and highly risky for host countries and local populations[4, 11].

Positive spin

Figure 6 shows how consistently one-sided the coverage of hydrogen projects is. Most documents focus on exports, on benefits to the host country, and on national rather than local effects, and few adopt a critical tone (only 5 % of coded passages are critical, and 72 of the 111 projects have no critical passage at all).

The figure also reveals important contradictions within this discourse. Coverage emphasizes benefits to host countries over international ones (91 % vs. 9 % of passages) yet simultaneously leans clearly towards export markets (64 % vs. 36 % of passages). If most of the hydrogen is destined for export without local processing, much of its value will be captured abroad, which sits uneasily with the claimed focus on host country gains.

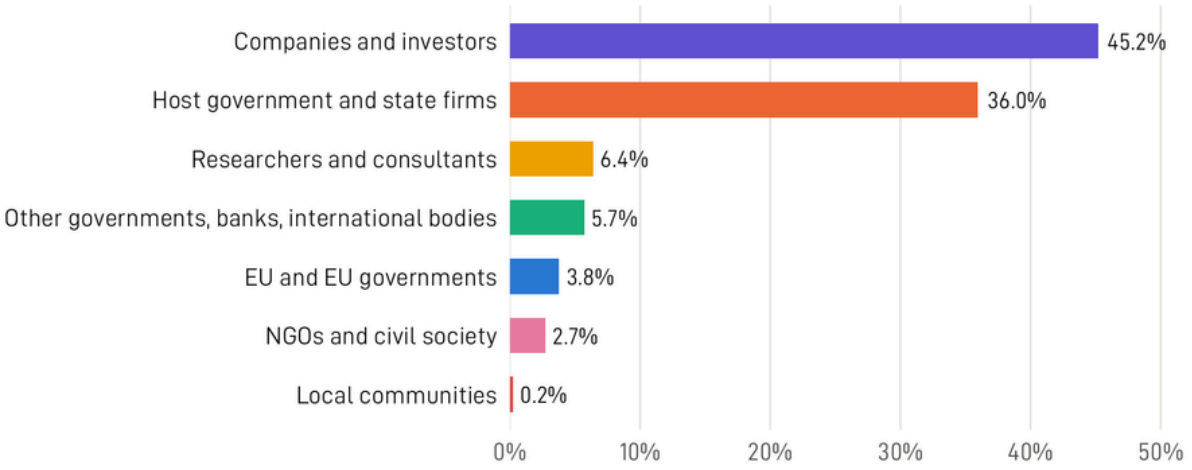
Figure 6: Thematic focus



Source: 1,256 news articles, press releases, webpages, company and policy documents on all 111 current African hydrogen projects. Each dot is a project; the diamond is the average. Position from -1 (sources discuss only the left pole) to +1 (only the right pole), from the passages on each pole per document of the project; projects with little material are pulled toward the average.

Figure 7: Who gets quoted

Share of quoted passages, by who is quoted



Source: 1,256 news articles, press releases, webpages, company and policy documents on all 111 current African hydrogen projects.

A similar tension appears in how projects are financed. Documents stress what host countries stand to gain, but the instruments they describe consist mainly of direct support, which is largely provided by host countries themselves, rather than derisking instruments offered by international partners and the EU. In other words, the countries presented as the main beneficiaries are also the ones carrying much of the financial and practical risk.

Finally, coverage strongly favors national over local effects (79 % vs. 21 % of passages), which reinforces the positive framing. Large-scale hydrogen projects may raise national revenue, but their costs, including lost access to land and sea, fall mainly on local communities, while the projects are expected to create few jobs to compensate[8, 9]. By focusing on the national level, the discourse largely leaves these local costs out of view.

The positive focus is not only a product of framing, but also of which actors are being heard. As figure 7 shows, nearly all quoted sources are either representatives of private companies or of host governments. As such, actors with a vested interest in promoting the viability of the hydrogen sector are far more likely to be quoted than more critical voices.

In fact, across all documents, local people are quoted in only two projects: the Nama Traditional Leaders Association in Namibia, in two documents from a Berlin human-rights NGO, and two residents of Guelmim-Oued Noun in Morocco, in a single article. NGOs and civil society are the only other group whose quotes are overwhelmingly critical (56 of 58 passages), yet they make up less than 3 % of quoted voices.

This imbalance is not only a feature of our data, but of the information available about the sector as a whole. Much of what is publicly known about these projects is released by the companies themselves, through press releases, project websites and announcements republished by the trade press. Companies decide what to disclose and when: production targets and investment figures are announced loudly, while setbacks, delays and local conflicts rarely appear. The absence of critical voices in our material is therefore itself a finding. It shows who controls the conversation about Africa's hydrogen future.



EU Commissioner Jozef Síkela speaks at a ceremony for Cleanergy Solutions Namibia, a joint venture between Belgian CMB.TECH and the Namibian conglomerate O&L Group, 2025.
Photo: © European Union, 2025, licensed under CC BY 4.0

Unequal specifics

Another disparity in the documents relates to the specificity of different types of statements. While nearly all projects include some descriptions of host country benefits, those passages are much less likely to contain specific estimates than investment and capacity targets. As figure 8 shows, only 20 % of passages pertaining to local job creation state how many jobs are expected, while only 13 % are specific as to the effects on national industrialization.

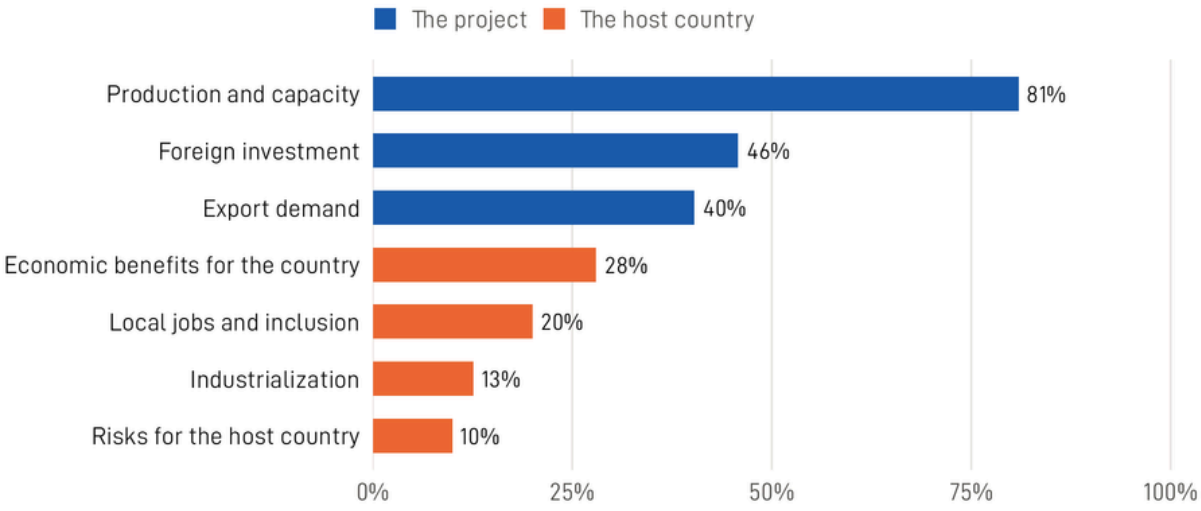
In contrast, demand expectations are specified in 40 % of cases, investment in 46 %, and production and capacity in 81 % of cases. Take an example from the Ras Shuqair hydrogen project in Egypt, where local benefits are briefly mentioned before moving on to specifics for production and investment:

"Additionally, indirect benefits include job creation in construction and operations, with the project set to produce over one million tons of green ammonia annually. The EDF Renewables and Zero Waste consortium will invest €2 billion in the first phase, with the total project cost across three phases estimated at €7 billion. A preliminary feasibility study has identified the required land: 420 km² for renewable energy generation in Ras Shuqair and 1.2 million m² for the production facility, along with a 7 km electricity transmission corridor." [12]

This disparity again underlines the risk that African hydrogen will become a fundamentally extractive sector: So long as local benefits (and costs) are discussed only as vague expectations, there is little chance for host countries to hold investors accountable if the promised benefits fail to materialize.

Figure 8: Specific targets

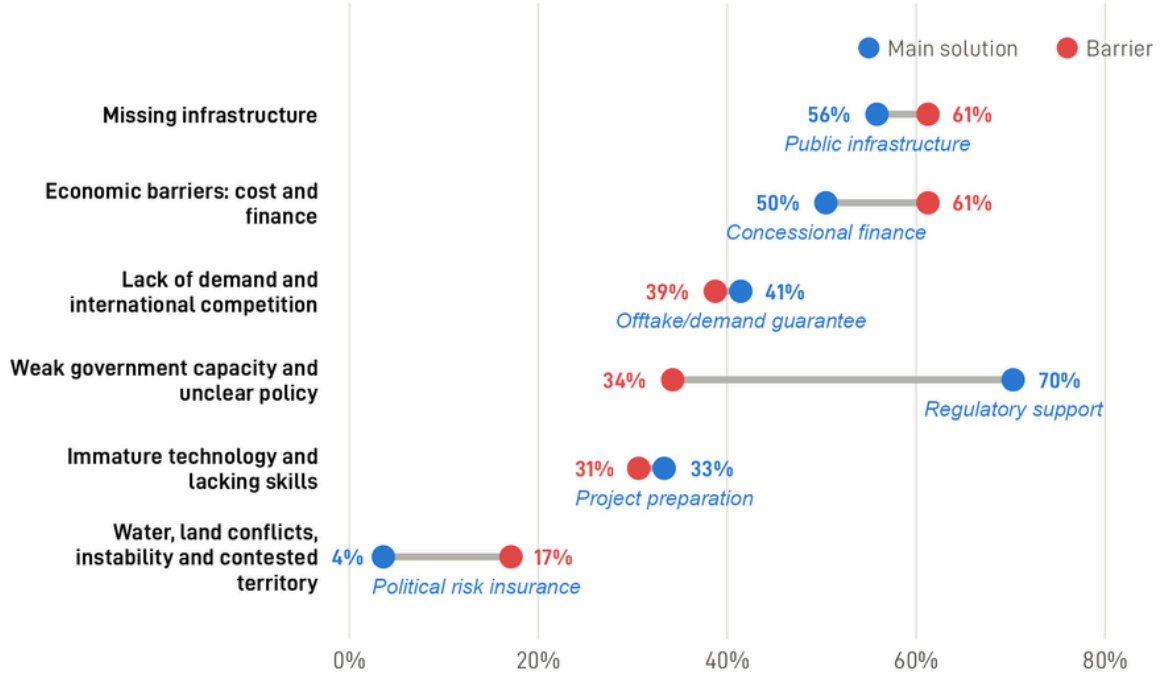
Share of passages on each topic that give a specific figure



Source: 1,256 news articles, press releases, webpages, company and policy documents on all 111 current African hydrogen projects.

Figure 9: Barriers and offered solutions

Share of projects whose sources name each barrier, and that mention its main solution



Source: 1,256 news articles, press releases, webpages, company and policy documents on all 111 current African hydrogen projects. Main solution is the instrument addressing the barrier that is mentioned in most projects, as determined by the authors. Barriers and instruments are not necessarily linked in the sources.

Incomplete solutions

Taken together, the lack of certain specifics and the overall promotional tone of the documents amount to a failure within the discussion to adequately meet the challenges faced by host countries and the tentative nature of the hydrogen market at large. While certain issues are discussed at length, others are downplayed or neglected.

Furthermore, the solutions offered can reasonably be characterized more as solutions that are available than solutions that are sufficient. Figure 9 reports the percentage of projects in which different barriers for hydrogen expansion are discussed, alongside the most common solutions offered for that type of barrier. Missing infrastructure and economic barriers are widely discussed, and for both, the solution discussed relies on public expenditures (infrastructure and concessional finance).

Likewise, lack of demand is addressed through offtake guarantees, with EU entities and host states making up the difference between green and gray hydrogen prices. These solutions may be viable to get some projects off the ground in the short term, but they provide no clear path to cost-competitiveness within the sector. Rather, they simply assume that technological advances will increase efficiency or that aggressive carbon pricing will make fossil fuels less competitive, but without making any political commitments towards these goals.

In fact, while immature technology and lacking skills is discussed in 31 % of projects, the main offered solution is project preparation, which is a solution that reduces the risk of individual projects relying on unrealistic expectations, but which is unlikely to have any impact on the broader technological frontier.

Advocates argue that a larger hydrogen market will itself drive the technology forward: As production scales up, learning and economies of scale are expected to cut electrolyzer costs and raise efficiency. The African Development Bank, for instance, expects electrolyzers *"[...] to see significant technological improvements in the coming years due to the anticipated ramp up of the global market for green hydrogen."* [13]

So far, however, progress on costs and efficiency has been minimal, with the International Energy Agency now acknowledging that *"Rapid cost reductions were expected this decade, particularly in the case of electrolysis-based production, but these have not materialised [...]"* [6]

Worse yet, for several barriers, there is a clear gap between the level of attention paid to the barrier and the solution. Weak government capacity and unclear policy is discussed in 34 % of projects, while the solution, regulatory support, appears in 70 %, highlighting the bias towards easy solutions over effective ones. On the other hand, water use, land conflicts, instability, and contested territory are discussed in 17 % of the projects (a clear blind spot in the remaining 83 %), but have no real solution offered. Political risk insurance is the closest to a solution, but again this solution is a way to reduce risk for the investor, not a way to avoid or overcome the central issues on a general level.

A critical reader may object that the biases shown here are merely the result of the document types in the data, as short project-specific press releases are unlikely to delve deeper into challenges and solutions. Therefore, we have conducted a similar investigation using African and multinational hydrogen strategies as well as international hydrogen reports, with remarkably similar results. This will be briefly discussed at the end of section 4.



The Noor Ouarzazate solar complex in Morocco, seen from space in 2015. Today it supplies Morocco's national grid with a capacity of around 580 MW.
Photo: NASA Earth Observatory, Jesse Allen, using Landsat data from the U.S. Geological Survey

section 3 – what can be done?

As the previous sections have shown, the present state of the African green hydrogen agenda is a speculative and uncertain market, entirely reliant on EU and international public support, and with dubious prospects to create transformative opportunities for the host countries currently bearing the brunt of the financial and social burden.

Adding to these economic issues, using hydrogen as a store of wind and solar power is incredibly inefficient: With current technology, converting electricity to hydrogen and back to electricity returns only about 30 % of the original energy[14, 15]. On its own, this does not mean that hydrogen has no place within an agenda of green transformation – smaller facilities are useful for storing excess green energy in the high season, while hydrogen-based fuels may become key to the future of shipping and possibly air travel. It does, however, mean that building large-scale solar and wind farms exclusively to produce hydrogen is a massively wasteful, ultimately indefensible endeavor from the perspective of a global transition to green energy.

If hydrogen projects in Africa are to be a reasonable use of resources, then, they must do double duty: Contributing to phasing out the use of fossil fuels globally and catalyzing a green industrialization on the African continent, lifting millions out of poverty without increasing the strain on the climate. Under these parameters, we see only two just paths forward. Neither is possible without a concerted EU effort.

If the hydrogen boom materializes

While we have shown that there are serious roadblocks to the hydrogen boom continuing, we do recognize the possibility that sufficient support, combined with technological advances, has the potential to make hydrogen production an important part of global green transformation.

In that eventuality, current EU policy is unfortunately geared heavily towards an exploitative approach to African hydrogen production, which challenges and in some cases directly undercuts host states' ambitions to leverage hydrogen for green industrialization.

Because renewable hydrogen is chemically identical to hydrogen made from fossil fuels, the EU sets rules for the electricity used in production, if the producer wants to export to the EU as green hydrogen.

EU rules for renewable hydrogen

Under Commission Delegated Regulation (EU) 2023/1184, producers can either:

a) draw power from the grid, but only if the local grid was more than 90 % renewable the previous year; if its emissions are very low and the producer has a power purchase agreement with a renewable plant; if the power would otherwise have been curtailed; or if the producer contracts new, unsubsidized renewable plants in the same area and matches its consumption to their output in time; or

b) connect the hydrogen plant directly to its own, newly built renewable plant, which either has no grid connection at all or uses smart meters to show that no grid power went into the hydrogen. In the latter case, surplus power can still be sold to the grid.

In the countries with the largest planned export projects, from Egypt and Morocco to Namibia and South Africa, grids are still largely fossil-fueled, so the grid route (option a) is costly, complex and highly unlikely. The simplest path to compliance therefore is a dedicated plant, often fully off-grid. Nothing prevents such plants from supplying the national grid, but nothing requires it either, and the extra cost of a grid connection and smart meters means that the large wind and solar farms built for hydrogen production will rarely be used to strengthen local power supply. In some cases, keeping the project off-grid is even discussed as a strength:

"One of the project's most notable features is that it will operate independently from Egypt's national electricity grid, reducing pressure on domestic power infrastructure while ensuring sustainable production." [16]

Other project documents (present in about 27 % of projects) do explicitly discuss plans to inject surplus energy into the local power grid. However, no specific targets are attached to such assurances, leading again to lack of accountability and uncertain realization of such promises (as discussed in figure 8).

It must be stressed that individual African countries are in a weak position to make demands on private investors. Efforts have been made to coordinate across the continent, through the African Hydrogen Partnership and the Africa Green Hydrogen Alliance, but the countries are ultimately competing for scarce investment, and their main bargaining chip is lowering costs and requirements. Tunisia's government, for instance, looks to Egypt's tax exemptions and simplified approvals as a model to copy. The result risks becoming a race to the bottom in which tax breaks, regulatory concessions and cheap land erode the benefits for host countries, even if the projects succeed.

In this situation, the public actor best positioned to make sector-wide demands is the EU. EU institutions are involved in or support 48 % of current projects, and EU member states and companies in a further 35 %, so EU regulations would already cover the vast majority of current projects. Furthermore, the EU is the intended buyer for most African hydrogen projects. It has already defined which hydrogen counts as renewable on its market, and developers design their projects around those rules. The same leverage could be used for development. The EU and its member states could make derisking, financing and market access conditional on projects sufficiently supplying the local grid, training local workers for skilled and managerial jobs, giving host governments a share of ownership, and setting out clear pathways for host countries to move up the hydrogen value chain.

Critics will argue that such conditions would slow the hydrogen boom or drive investors toward other buyers. Neither objection holds up. Europe is not one buyer among many: it is the market most African projects are built for, and the EU and its member states already provide most of the public guarantees and cheap finance that make the projects viable. Investors who walk away from European conditions walk away from European money and European customers. Asking for something in return for that support is a modest demand; and Namibia's 24 % stake in the Hyphen project shows that such terms can be negotiated. Additionally, there is no guarantee that fewer announcements would mean less hydrogen production. Only a small fraction of announced projects ever reach construction, so the projects that conditions would deter are likely to be ones that were never going to be built. Clear conditions would not slow a real boom; they would separate serious projects from speculative ones and make sure that those projects that do get built accomplish the real goals.

Our argument is simple: the challenge is not to secure investment at any cost, but to ensure that investment actually supports both host-country prosperity and climate concerns. Both goals are better served by expanding Africa's power grids with renewable energy and enabling green industrialization on the continent than by a singular focus on hydrogen for export. Any just hydrogen expansion must balance investment needs with supporting local energy grids, and the EU should condition support and access on this factor.

If the boom becomes a bust

As stated above, we recognize it as a possibility that the green hydrogen push may continue and eventually mature on the African continent. We consider the more likely outcome, however, to be a gradual and then sudden abandonment of the sector.

Projections of technology, demand and price have consistently proven too optimistic. In Morocco, earlier projections of hydrogen production costs at 1 dollar per kilogram have given way to realistic costs of between 2.8 and 3.8 dollars per kilogram[17], and only 7 % of the global green hydrogen capacity announced for completion by 2023 was delivered on time[18]. Now, the EU's own auditors conclude that its 2030 hydrogen targets
"[...] were driven by political will rather than being based on robust analyses." [19]

There have already been projects canceled because costs ran higher than expected and public support could not close the gap[6]. Yet many actors have a stake in keeping the projections high. For fossil-fuel companies, hydrogen offers a future for their gas networks and refineries; for European governments, it underpins climate and energy-security strategies they have staked their credibility on; for electrolyzer producers and industry associations, it is the market itself. Optimistic forecasts attract subsidies, justify public guarantees and keep investors interested – whether or not the forecasts come true.

Shell, TotalEnergies, BP, ExxonMobil, Equinor and Hydrogen Europe are among the 25 hydrogen players that together spent more than €75 million lobbying EU institutions in 2023[20]. Together, they have positioned hydrogen as a key solution to the climate crisis, regardless of how realistic the estimates behind it are.

Given this level of uncertainty, we strongly recommend that contingency plans be put in place to salvage the green agenda should hydrogen fail to live up to expectations. As we showed in figure 4, African governments have already invested heavily in preparing land, in some cases displacing local populations, and in rewriting their legislation to attract private investment. Only 31 projects report the size of the land acquired, and often with some uncertainty, but even using the lowest reported numbers these total at least 20,000 km², roughly half the size of Denmark. Crucially, the vast majority of the land secured for hydrogen production is intended not for electrolyzers but for the wind and solar farms that power them. This creates an opening.

As new projects are approved, the EU could require project plans to include fallback options in case of underperformance. Projects could, for instance, be required to build their renewable capacity first and to allow for connection to local grids, so that they can be converted into more conventional renewable energy projects if necessary. Likewise, where feasibility studies have shown strong potential for renewable power production but no final investment decision follows, the EU could redirect its derisking instruments towards wind and solar at those sites.

Moving from renewables for hydrogen exports to renewables for local consumption is not without effort: it requires transmission lines, creditworthy buyers and protection against currency risk. But it is a far smaller step than starting from scratch: the land, permits and legal frameworks would already be in place, and feasibility studies would already have measured how much wind and solar power each site can produce. What it requires above all is continued EU support even when projects no longer contribute directly to the EU's own renewables targets.



A solar farm near De Aar, South Africa. The same land, sun and investments that could produce hydrogen for export could instead power homes and industry locally. Photo: Charl Durand (via Pexels)

Transforming hydrogen projects towards local renewables should be championed for two reasons.

First, climate policy measured against national or EU targets is self-defeating: a fully renewable Europe means little if this is achieved by exporting the problem elsewhere, and the atmosphere does not care where the emissions occur.

Second, the hydrogen agenda has never been a genuine development agenda. While the projects in our material put precise figures on their own production in 81 % of passages on the subject, only 13 % of passages on industrialization and 20 % on local jobs offer any measurable commitment at all.

Redirecting these projects towards local grids would deliver the development that has so far only been used as a selling point for the hydrogen agenda – and which the EU itself has committed to. In its external energy strategy, the Commission set out a clear priority:

"Fair and reciprocal energy cooperation with Africa is an important priority, both to ensure energy access to 570 million people currently without electricity in sub-Saharan Africa, but also to support investments in sustainable energy systems and renewable hydrogen trade, once local needs are covered." [21]

Our recommendation, in other words, is not that the EU abandon its strategy, but that it finally follow it.

Development in Africa should not hinge on whether hydrogen becomes profitable for European firms. Green industrialization on the continent should be a goal in itself, and it remains within reach if the EU is willing to take its responsibility seriously.



Wind power in Tunisia
Photo: Anastasia Palagutina (via Unsplash)



Green iron facility in Arandis, Namibia
Photo: © European Union, 2025, licensed under CC BY 4.0

section 4 – Data and methodology

Because of the highly speculative nature of the African hydrogen market, the available data is incredibly sparse. Most of the scientific literature, therefore, is based on individual cases, with an outsized focus on the most prominent and publicized cases such as the Hyphen project in Namibia[7, 8, 9]. For an overview of the entire African hydrogen sector, the strongest source is the IEA's Hydrogen Production and Infrastructure Projects Database, which

"[...] covers all projects commissioned worldwide since 2000 to produce hydrogen for energy or climate change-mitigation purposes." [22]

Restricting to projects located in African countries, the production database contains 143 projects (some of which are the same project at different stages) with data regarding project name, date online, development status, announced size, capacity, location, and main product type.

There are two issues with this database. First, the sourcing for the database is sparse and inconsistent, with some projects sourced by a single reference (in the case of the Emoru Hydrogen project in Kenya, that source is a landing page with nearly no information whose security certificate expired in September 2026). Second, the information available on each project is limited to a cursory overview, lacking announced investments, actors involved in the project, and – important for our purposes – what type of public support projects are receiving.

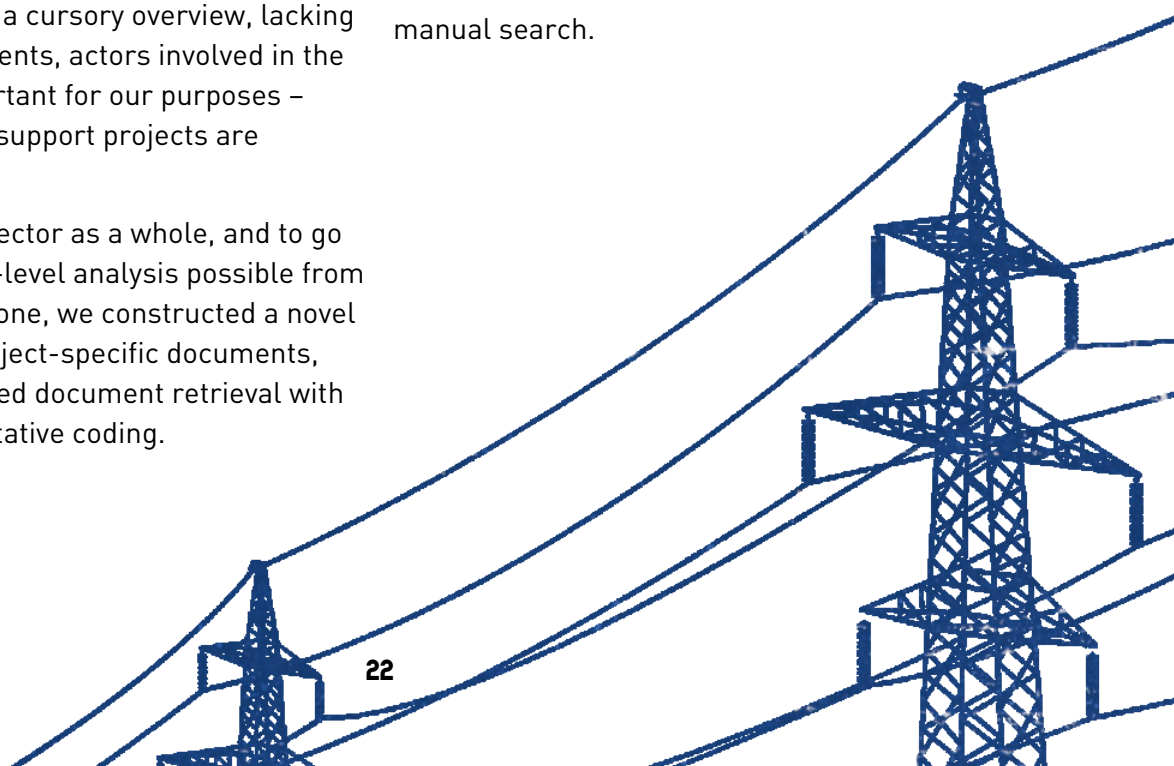
To investigate the sector as a whole, and to go beyond the surface-level analysis possible from the IEA database alone, we constructed a novel dataset of 1,256 project-specific documents, combining automated document retrieval with LLM-assisted qualitative coding.

Data sources

Starting from the IEA's Hydrogen Production Projects Database, we merged the different phases of each project into a single unit, reducing the number of projects from 143 to 121. For each project, we collected the sources referenced in the IEA database and used an automated Python script to search for further documents through the Brave Search API. Up to four queries were run per project, combining the project name (in quotation marks and without) with the word "hydrogen", the host country and, where available, the location.

The results of all queries were pooled, and each result was scored on its title and summary: results had to name the project, and scored higher if they mentioned hydrogen and the host country, and lower if they were generic pages such as company homepages.

Working down this ranking, the script made up to 30 attempts per project to collect 15 pages with extractable text, skipping pages that were inaccessible or paywalled; for 21 projects, fewer than 15 usable pages were available. Documents embedded in the scraped pages were downloaded as additional sources. The script was tested against manual searches for five projects and revised until its coverage and relevance choices were consistent with the manual search.



Screening

Boilerplate (menus, cookie notices and text repeated across sites) was removed, after which documents were screened in two steps. First, Python scripts removed documents with no extractable text, near-duplicates within each project (keeping the most complete copy), and documents not in English. Second, a language model assessed whether each remaining document discussed hydrogen, mentioned Africa or an African country, was about the target project, and contained substantive content rather than a short stub or paywall notice.

Documents longer than 10,000 words – typically national strategies and institutional reports – were set aside for a separate in-depth analysis (see "Comparing to stategies and reports" below). Screening decisions were reviewed manually and overridden where incorrect. Five projects had no relevant documents, which a manual search confirmed, and five were duplicates recorded under different names in the IEA database; their documents were reassigned to the retained project. The final corpus consists of 1,256 documents covering 111 projects, with 3 to 23 documents per project (median 11).

Qualitative coding

To develop the codebook, we manually coded two national strategies (Morocco and Namibia) and the documents of two projects (ORNX Green Ammonia Laayoune in Morocco and H2 Global Energy in Tunisia). Coding was abductive: we used no pre-established theoretical codes but approached the material with a prior interest in investment, government support, and derisking. This produced nine thematic codes with associated sub-codes (box 2). The codebook was then piloted on five projects, with manual review and revision over three rounds.

For the full corpus, documents were split into numbered sentences and, where necessary, chunks of up to 3,000 words. Each chunk was processed twice by Claude Sonnet 5.5, with the complete codebook as instructions: once to assign thematic codes and record document metadata, and once to record actors and project facts. Rather than reproducing text, the model referenced sentence numbers, and every quote in the dataset was reconstructed verbatim from the source document. All output was validated against the codebook's permitted values, and invalid codings were excluded.

Document type overview

Originating author	Documents	Share	Main formats
News media and trade press	764	61%	Trade press articles (485), news articles (264)
Companies (developers, investors, technology firms)	181	14%	Press releases (127), company and project web pages (37)
Market analysts, consultancies, law firms and business associations	106	8%	Market news and briefings (55), analyses (18)
NGOs, researchers and academics	101	8%	Reports (34), web pages (30), analyses (20)
Governments and public institutions	59	5%	Press releases (22), reports and strategies (16)
Author unclear	45	4%	Mostly web pages and database entries
Total	**1,256**	**100%**	

Note: Author and document type were recorded for each document during coding. Documents are attributed to the organization that wrote the text, not the website that published it.

BOX 2 – Thematic codes

T1 Barriers to hydrogen production

The document describes challenges or barriers to expanding hydrogen production in Africa or to delivering the target project.

T1.1 Economic barrier; T1.2 Infrastructure barrier; T1.3 Government capacity barrier; T1.4 Labor skill barrier; T1.5 Demand barrier; T1.6 Other barrier.

T2 Direct support

A public or non-commercial actor directly provides, finances or enacts support for hydrogen expansion.

T2.1 Infrastructure; T2.2 Tax advantages and tariff exemptions; T2.3 Low-cost loans; T2.4 Regulatory and administrative support; T2.5 Land; T2.6 Special economic zones.

T3 Derisking measures

Measures that absorb, disperse or lower the risks private investors and lenders face, or pay for project stages they would otherwise fund, in order to attract private finance.

T3.1 Explicit mention of derisking; T3.2 Blended finance; T3.3 Concessional finance; T3.4 Offtake and demand guarantees; T3.5 Contracts for difference and price support; T3.6 Export credit guarantee; T3.7 Untied loan and credit guarantees; T3.8 Political risk insurance; T3.9 Foreign currency risk mitigation; T3.10 Technology and performance insurance; T3.11 Project preparation and feasibility funding.

T4 Expectations and projections

The document lays out projections or predictions about the future hydrogen market, production capacity, costs, technology or economic effects.

T4.1 Future demand (4.1.1 Domestic; 4.1.2 International; 4.1.3 EU); T4.2 Projected production; T4.3 Future technologies; T4.4 Economic impact projections.

T5 Host country benefits

The document discusses benefits of hydrogen expansion to the host country, both aggregate national benefits and promises made to particular constituencies.

T5.1 Climate transition; T5.2 Structural transformation; T5.3 Domestic energy availability; T5.4 National prosperity; T5.5 Environmental protection; T5.6 Regional integration; T5.7 Local inclusion.

T6 Host country risks

The document discusses risks to the host country from measures taken to attract investment, or from hydrogen projects themselves, and local opposition to them.

T6.1 Economic risks; T6.2 Social risks; T6.3 Environmental risks; T6.4 Local contestation.

T7 Seeking foreign private finance

The document discusses how the host country or project seeks, attracts or receives foreign private investment, or how the country makes itself attractive to it.

T7.1 Partnerships with public actors; T7.2 Foreign private investment; T7.3 Making the country attractive.

T8 Investor and importer country benefits

The document discusses benefits of the project or of African hydrogen expansion for countries other than the host: Investors' home countries or importing countries.

T8.1 Energy security; T8.2 Importer decarbonization; T8.3 Commercial gains for the investor country.

T9 Geopolitical framing

The project or hydrogen expansion is framed in terms of relations between states.

T9.1 Strategic partnership; T9.2 Strategic competition; T9.3 Territorial sovereignty.

For actors – companies, joint ventures, governments, multilateral organizations, development banks, NGOs, and others – the model recorded name, category, home country, project role, and state participation. For project facts, it recorded the project's location, product, renewable and electrolyzer capacity, expected output, announced investment, land area, water source, target market, ownership structure, expected completion, and status. These facts were then reconciled in Python: values were converted to standard units, near-identical reprints were grouped so that a press release republished many times counted only once, the most common value across independent sources was used, and conflicting or implausible values were flagged for manual review.

Example of a coded passage

"In July 2024, Germany awarded a supply contract for 259,000 tons of green ammonia to Egypt-based Fertiglobe. This contract, spanning 2027 to 2033, guaranteed a price of €811 per tonne[…]" [23]

→ Code: T3.4 Offtake/demand guarantee and T3.5 Price support · Provider: Germany · Status: agreed · Offtake form: binding · Tone: neutral

The resulting dataset contains 8,597 thematic codings (0 to 72 per document, median 5), 964 distinct actors, and 10,536 recorded project facts.

Analysis

The coded data was analyzed in R, with all figures and tables produced from a single, reproducible set of scripts. Three choices especially shape the results.

1. Scope

The IEA maintains separate databases for hydrogen production and for hydrogen infrastructure. We based our dataset on the production database only, since production projects are the units around which investment, ownership and offtake are organized, while infrastructure projects often serve several production projects at once and involve different actors. This choice has a consequence for the analysis. Infrastructure is one of the most important forms of public support for the sector, and the line between such support and derisking is fuzzy: a state-built port or pipeline both lowers a project's costs and removes risks an investor would otherwise carry. In our dataset, infrastructure appears only when it is mentioned in documents about production projects. Even so, public infrastructure support is discussed in 62 of the 111 projects, in two-thirds of those cases provided by the host state. The true scale of public infrastructure spending is therefore likely to be larger than our data shows. Because this spending falls mainly on host governments and public lenders, its omission makes our findings on who pays conservative.

2. Units of analysis

Because some projects are covered by twenty-three documents and others by three, counting documents or passages directly would let a few heavily publicized projects dominate the results. We therefore use two units. For questions about what happens in a project – who pays, which instruments are used, which actors are involved – each project counts once, and results are shown as a share of the 111 projects. For questions about what the sources say – which themes they emphasize, how they frame risks and benefits – we calculate, for each project, the share of its documents that mention a theme, and then average across projects, so that every project carries the same weight.

3. Classifications

Support instruments were grouped into four mechanisms by how they shift costs and risks: cost socialization, return enhancement, risk transfer, and regulatory or administrative support. Payers and actors were grouped by origin (the EU and its member states, the host country, other international actors, or not stated). EU involvement was classified by its most direct form: an EU institution, an EU member state government or public agency, an EU-based company, an EU mention without an active role, or no EU link. Where the automated coding misclassified an actor or recipient, or recorded a passage that did not concern an African project, this was corrected by hand, and every correction is documented in the scripts. Finally, a caveat applies throughout: the data records what is publicly reported. That something is not mentioned in the sources does not prove it is absent. Projects with better coverage show more of almost everything, and we checked that our main findings on EU involvement do not simply reflect differences in coverage.

Comparing to strategies and reports

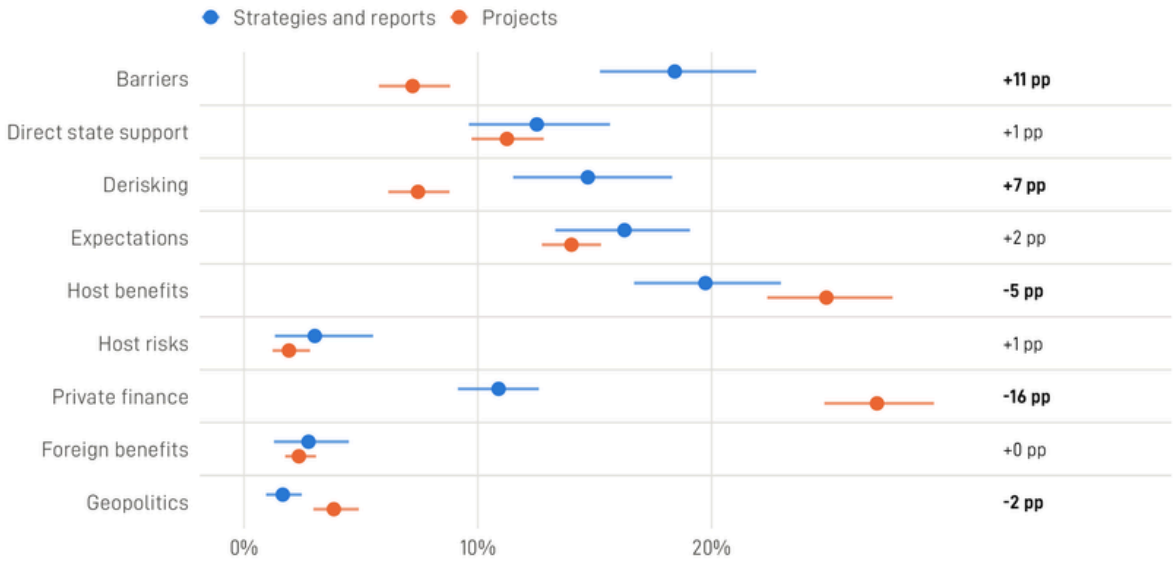
As discussed in section 2, the project documents might be expected to focus on specifics, and so to systematically underrepresent broader considerations – especially the more critical ones. To test this, and to get a better understanding of the wider field, we conducted a second analysis of 40 national hydrogen strategies and international reports, using the same codebook and coding procedure to allow direct comparison.

Because a 30,000-word strategy mentions almost everything, we compared the composition of coded passages – for example, the share of passages concerning barriers – rather than whether a theme is mentioned at all. Each project and each strategy counts once (111 projects and 40 strategies had enough coded passages to be included). To check that differences are not just down to which documents happened to be included, we recalculated each result 2,000 times on randomly resampled versions of the corpora (bootstrapping), and only describe differences as clear where they held up consistently (95 % confidence interval). Figure 10 shows the results.

Most importantly, the concern that motivated this comparison is not borne out. Host risks make up a similar small share of passages in both corpora (2-3 %), and the share of critical passages shows no clear difference either. If anything, the strategies and reports are the more promotional of the two: 69 % of their passages advocate for hydrogen, against 46 % in the project documents.

Figure 10: Differences in focus

Share of coded passages in each theme (mean over projects or documents, with 95% interval)



Projects: 1,256 press releases, news articles and other documents on 111 hydrogen projects in Africa; each project counts once. Strategies and reports: 40 national strategies, EU documents and reports by development banks, international organizations and others; each document counts once.

The differences that do exist reflect the scope of each document type. Private finance takes up a far larger share of the project documents (16 percentage points more), almost entirely because of passages on foreign private investment: many project documents announce Memorandums of Understanding and other agreements between international companies and host governments. The strategies and reports discuss private investment too, but in general terms, and more often in connection with how derisking can attract it. Conversely, barriers and derisking take up a larger share of the strategies and reports (11 and 7 percentage points more respectively), which survey a country's hydrogen prospects as a whole. They typically set out barriers before proposing solutions, while project documents describe agreements already made.

The coding confirms this: 49 % of support passages in the strategies propose or recommend an instrument, against 16 % in the project documents, while 50 % of the project passages describe support that has been agreed or implemented, against 13 % in the strategies. The project documents also give slightly more attention to host benefits and geopolitics.

Overall, the two corpora are broadly similar, differing only slightly in what they describe, not in how critically they describe it, which gives us confidence that the project documents offer a representative basis for the analysis in the main report.

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THE HYDROGEN MIRAGE

Europe's push for green hydrogen in Africa, and what can be built as it fades.



Researched and written by Johannes Ford Holmberg

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