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COMMENT

A green hydrogen revolution in Africa remains elusive under current geopolitical realities

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ABSTRACT

Africa's abundant renewable energy resources and vast land areas present an unprecedented opportunity for the development of a green hydrogen economy. Several countries in Africa have already initiated ambitious projects to establish green hydrogen economies, mainly targeting export markets in Europe. This perspective article explores the potential of green hydrogen in Africa and examines the challenges and risks associated with green hydrogen development on the continent. We believe that the role of hydrogen in the transformation of Africa should go beyond energy export and aim to harness its competitive advantage for various industries that require low-cost green hydrogen. We argue that prevailing extractive and geopolitical realities pose a major barrier in Africa's path towards harnessing the full potential of green hydrogen for its development. To break this cycle, Africa must demand equitable partnerships, invest in technology transfer, and foster collaboration to drive a transformative green hydrogen revolution that is aligned with Agenda 2063s vision for a self-empowered and sustainable Africa.

Key Policy insights

- Green-hydrogen has the potential to provide affordable energy to transport and industry, accelerating sustainable development in Africa.
- The current resource development practice in Africa will constrain the continent's ability to chart an independent course towards a sustainable green hydrogen economy.
- There is a need for clear regulation, incentives, and financial support for the adoption of green hydrogen technology.
- It is important that national governments create local demand which can stimulate new and sustainable jobs, and bilateral and regional collaborations to build and operate hydrogen infrastructure.
- Despite the high technical potential, Africa's role in the global hydrogen market is hindered by limitation in access to finance, technology, infrastructure, and policy stability.
- Africa must assert itself on the global stage, demanding equitable partnerships and investments that foster technological transfer and knowledge sharing that benefit wider socio-economic development.

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Introduction

Several African nations place a high priority on ensuring that their rapidly expanding populations have access to clean and modern energy to support economic growth, secure energy sovereignty, and improve the well-being of the people. This calls for exploring and sustainably harnessing all available energy resources on the continent.

Hydrogen is increasingly at the forefront of the discussion for a reliable energy carrier to decarbonize energy-intensive industries and heavy transport, given its high energy density and clean combustion. The current global hydrogen market represents an annual sale of USD 174 billion. Its use is primarily limited to industrial processes; however, the potential across various sectors is enormous. The current hydrogen industry is dominated by 'grey hydrogen', which is produced through steam methane reformation (SMR) of natural gas. Sometimes the process is combined with Carbon Capture and Storage (CCS) technologies and is referred to as 'blue hydrogen'. But Africa has the potential to produce hydrogen through water electrolysis using renewable energy sources, also called 'green hydrogen', which offers great potential for climate change mitigation.

A recent report estimates that, under the commitment to keep global temperature to well below 2°C above pre-industrial levels, the global demand for green hydrogen could grow to 607Mt from 90Mt in 2021, potentially abating 75Gt of emissions by 2050 (AGHA, 2022b). The benefits of green hydrogen in Africa are big if coupled with industrial development, facilitating electricity access to homes and businesses by diversifying supply or reinvesting the earnings in energy access programmes, and local economic development throughout the value chain. However, questions also abound on whether Africa will be able to harness the potential benefits offered by green hydrogen in ways that are different from the 'resource course' associated with fossil fuel and other mineral resources in Africa and failure of the 'green revolution' in Africa's agriculture. We argue that a different resource development practice in Africa that is built around equitable partnership with advanced economies, access to technology and energy sovereignty of the continent is necessary to translate the opportunities in green hydrogen into real economic and development gains.

The current status of hydrogen in Africa

In Africa, several countries have initiated ambitious projects to establish green hydrogen economies, leveraging their abundant renewable energy resources to drive sustainable development and economic growth. The Africa Green Hydrogen Alliance (AGHA) is one of the coalitions that is setting the pathway for green hydrogen in Africa. It has an alliance of six countries, which include Egypt, Kenya, Mauritania, Morocco, Namibia, and South Africa. The alliance aims to facilitate public and regulatory policy, capacity building, financing, and certification needs (AGHA, 2022a). According to AGHA, by 2050, green hydrogen could increase the GDP of the six countries by USD 126 billion, which is equivalent to 12% of these countries' current GDP (AGHA, 2022b).

The European investment bank estimates Africa's green hydrogen potential at EUR 1 trillion and can produce 50 million tons of green hydrogen in 2035 (CVA, 2022; European Investment Bank, 2022). There is already a USD 30 billion investment announced in the hydrogen value chain in Africa and an additional USD 70 billion for renewable energy infrastructure required for green hydrogen production (Dagnachew et al., 2023). Egypt (AEP, 2022) and Zimbabwe (Matalucci, 2023) already have 100MW of installed electrolyzers for green hydrogen production, demonstrating early efforts to tap into this emerging energy source. Furthermore, Egypt recently announced a new 100MW project for green ammonia production (Voltalia, 2022), indicating a commitment to expanding the use of green hydrogen for other applications, such as fertilizer production. Mauritania has already signed a MoU to develop a 30GW green hydrogen project together with a 18GW wind and 12GW solar capacity that will produce an estimated 1.7 million tons of green hydrogen at a cost of USD 40 billion (Atchison, 2021), roughly four-times the country's current GDP. The project is located on a 8500 km^2 site and it has a water desalination capacity of more than 50 million m^3 that would also supply local communities and increase agricultural production (IEA, 2023c). Namibia is in the process of establishing a green hydrogen economy, aiming to build an electrolyzer capacity of 3GW coupled with 7GW of renewable generation capacity and a desalination plant (Sundar, 2023). The USD 10 billion HYPHEN Tsau Khaeb project (Hyphen Hydrogen Energy, 2022), established on a 4000 km^2 land, aims to produce 350,000Mt of green hydrogen once complete. These initiatives highlight the growing interest and

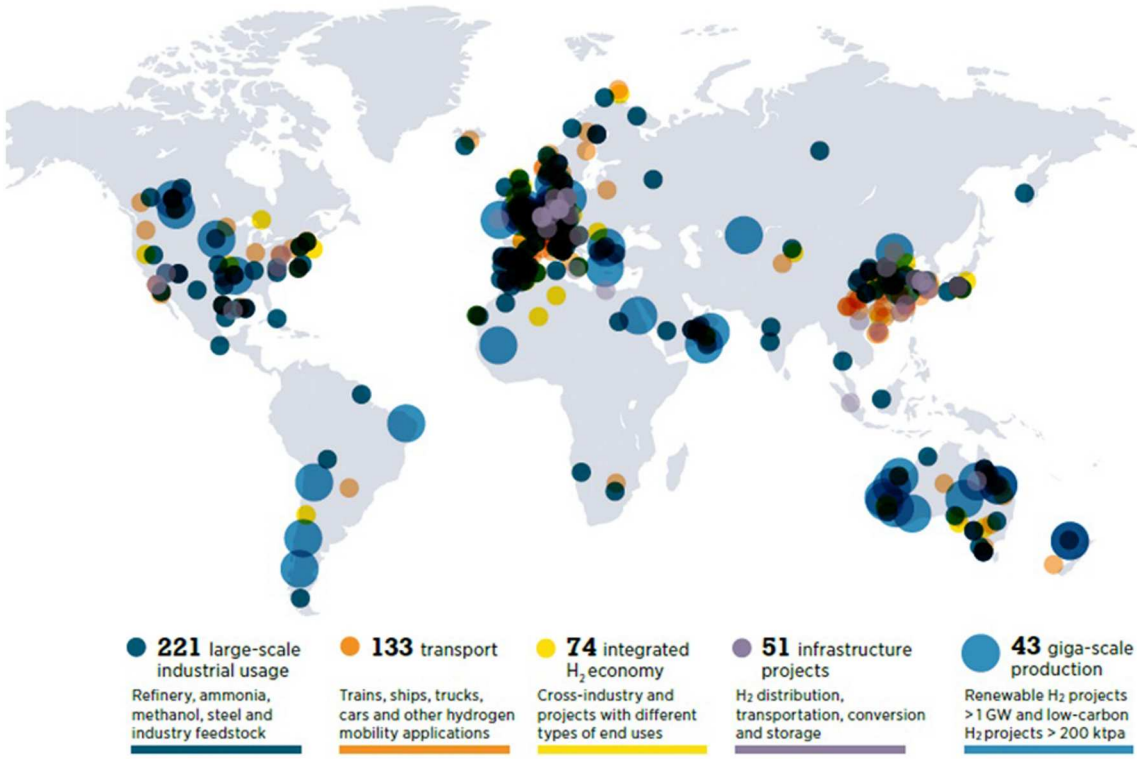

Figure 1. Large-scale clean hydrogen projects and investments as of November 2021 (IRENA, 2022a).

commitment of some African countries to clean energy development and their aspiration to become major players in the global green hydrogen market. Figure 1 presents the distribution of clean hydrogen projects worldwide announced as of November 2021, including those in South Africa, Namibia, Mauritania, Morocco, Algeria, and Egypt.

The future cost of green hydrogen, which depends on various aspects of the supply chain, is an important determinant of its adoption in demand sectors. The studies by IRENA (2022b) and Dagnachew et al. (2023) show that this cost mainly depends on the cost of electricity, electrolyzer price, electrolyzer utilization factor, and the weighted average cost of capital. As the green hydrogen industry continues to gain momentum in Africa, it is critical to consider the scale of the opportunities, challenges, and barriers that countries may face in realizing their ambitious goals.

The green-hydrogen potentials and challenges in Africa

The green hydrogen potential in Africa is immense, given the continent's abundance of critical resources necessary for low-cost large-scale production. Key ingredients for green hydrogen production include renewable energy, land, and water, while the availability of infrastructure to transport hydrogen also plays an important role in determining the cost. Among these factors, electricity accounts for the single-largest cost component of producing green hydrogen at high operating hours (IRENA, 2020). Fortunately, Africa boasts one of the largest renewable energy potentials in the world, with vast untapped solar, hydro, wind, and geothermal resources (IRENA, 2022c). This abundant renewable energy capacity makes Africa one of the regions with the highest potential for low-cost green hydrogen production. Figure 2 shows the solar and wind potentials of Africa, particularly countries in north and south of the continent having high solar and wind potentials.

Africa also has an extensive land area that can be used for green hydrogen production in combination with renewable energy generation. The wind and solar farms required for green hydrogen production have low

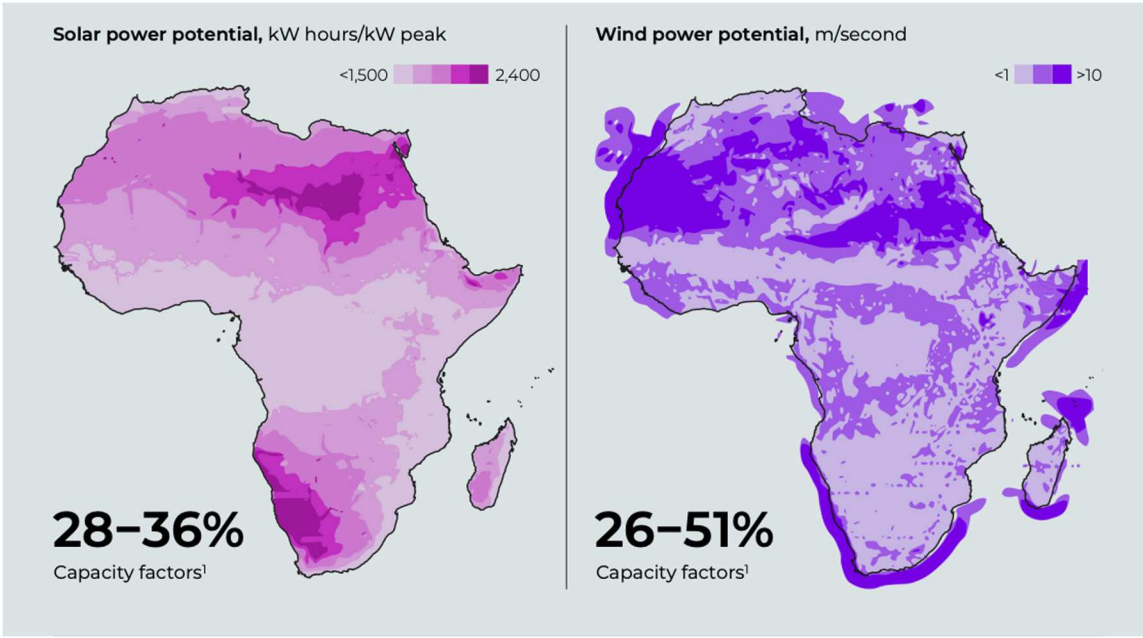

Figure 2. Solar and wind power potentials in Africa (AGHA, 2022b).

energy density per surface area and, together with desalination plants, need vast areas of land. To put this to perspective, Oman, a country with ambition to become amongst the biggest producers of green hydrogen in the world, has identified 50,000 km^2 of land with an estimated potential to produce 25Mt of hydrogen per year coupled with 500GW of renewable energy (IEA, 2023b). Several countries in North and South Africa have large non-arable land that is sparsely populated that could be exploited for the green-hydrogen economy. However, getting access to land for large-scale development might not be easy given the fact that ownership is guided by complicated socio-cultural customary user rights (Agyekum, 2024).

Water is another necessary input for green hydrogen production, and, if not managed properly, it could increase the local competition for water. The water withdrawal and consumption of green hydrogen depends on the energy technology and production process used and can vary by over a factor and the impact should be clearly considered in national energy planning (Kaandorp et al., 2021). For example, while a theoretical minimum of 9 kg of water for every kg of hydrogen produced is stated by Beswick et al. (2021), a recent report (IEA, 2023b) shows that, if sea water is used for green hydrogen production, 40–90 kg of water is required per kilogram of hydrogen. As demonstrated by the use of hydrogen for the decarbonization of heating in the Netherlands (Kaandorp et al., 2021), decarbonization policy scenarios in the EU, driven by an international energy market and by European taxes on CO_2 emissions, are likely to lead to more import of hydrogen. This could transfer the water footprint of EU energy transitions to hydrogen exporting countries in Africa and elsewhere (Kaandorp et al., 2021). The challenge could be amplified by the fact that the regions with the highest renewable energy potential are also the regions that are water stressed the most (Woods et al., 2022). The impact on the water can be location specific (Dagnachew et al., 2023) and there is a need to identify sustainable sources of water and improve the water efficiency of hydrogen projects to avoid exacerbating water security concerns in some countries. There are already technological innovations for using sea water and tertiary effluent water for hydrogen production (Dagnachew et al., 2023). Figure 3 shows the impact of hydrogen production on country level water availability for different renewable energy technologies.

Europe is among the regions betting heavily on hydrogen for its net-zero ambitions. Given the limited capacity of several European countries to produce green hydrogen, and most of the renewable energy potential likely being used to produce clean electricity, there is a growing interest in Africa's clean hydrogen potential. This has led to steady increase in international (trade) agreements for hydrogen between European countries

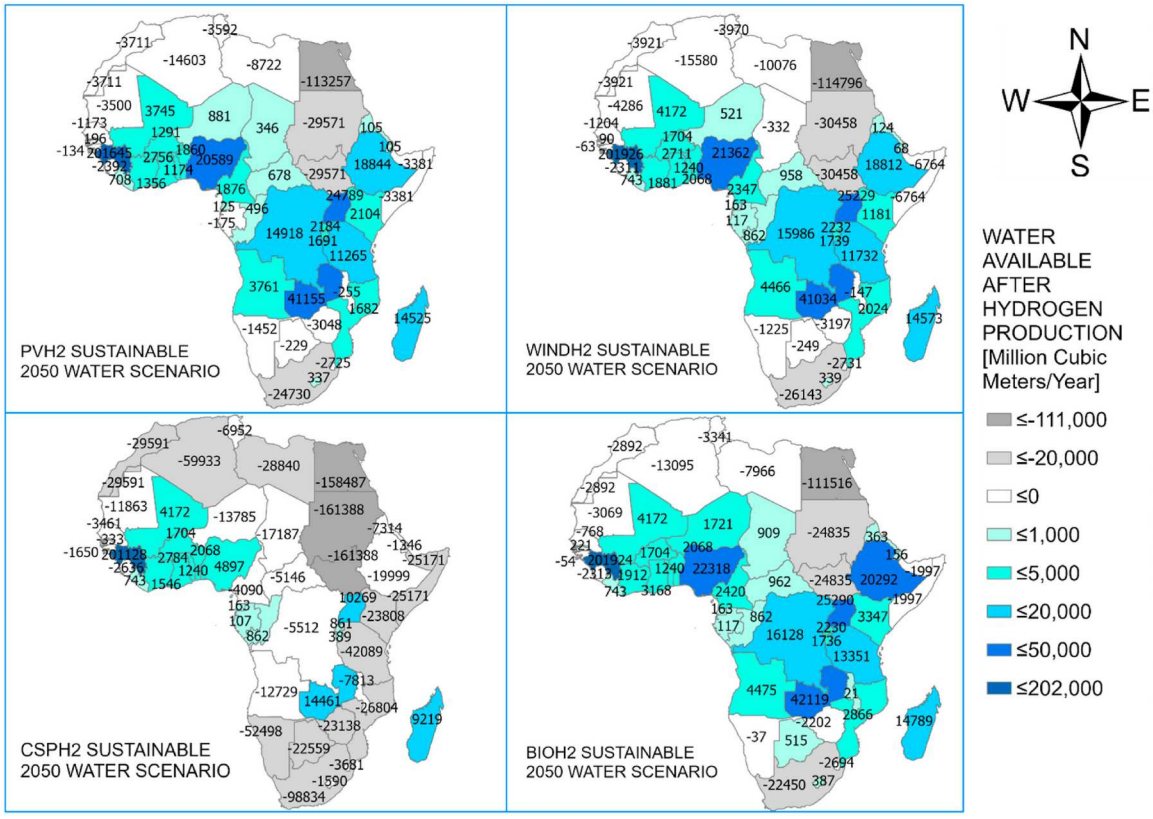

Figure 3. Country water availability scenario after hydrogen production with solar photovoltaic, concentrated solar power, wind, and bioenergy (Mukelabai et al., 2022). Disclaimer: This map is provided for illustration purposes only. Boundaries shown on this map do not imply any endorsement or acceptance by the authors.

and other regions including North Africa (Dagnachew et al., 2023). However, the role of hydrogen in the transformation of Africa should go beyond energy export. Several countries in the region, such as South Africa, Guinea, and Sierra Leone, have large deposits of natural resources, including iron ore, bauxite, and mineral sands (U.S. Geological Survey, 2021). The availability of these resources, coupled with the renewable energy potential of these countries and their neighbours, could provide a competitive advantage for various industries that require low-cost green hydrogen (Fuel Cells and Hydrogen 2 Joint Undertaking, 2019).

For instance, the steel industry, which is responsible for a significant portion of global carbon emissions, could benefit from green hydrogen as a clean alternative to traditional fossil fuel-based production methods. By leveraging their natural resources and renewable energy potential, African countries could foster the growth of a sustainable, low-emission steel industry that relies on green hydrogen as the main energy source (Hydrogen Europe, 2022).

Additionally, green hydrogen could play a pivotal role in the development of clean transportation infrastructure to meet the growing demand for efficient and sustainable public transport systems in rapidly expanding urban centres across the continent. Green hydrogen could serve as the fuel for hydrogen-powered buses, trains, and even maritime transport (Hydrogen Council, 2022). The integration of green hydrogen into Africa's transportation sector would not only reduce carbon emissions but also improve air quality in major cities (IEA, 2019).

Moreover, green hydrogen can be utilized for energy storage, offering a flexible solution to address the intermittency of renewable energy sources (van Renssen, 2020). By converting excess renewable energy into green hydrogen, African countries can store energy for later use and ensure a reliable power supply during periods of low solar or wind generation. This capability could enhance the resilience of Africa's

energy grid and promote the widespread adoption of renewable energy across the continent (IRENA, 2018). Similarly, since a large share of industry hydrogen demand is used for fertilizer production, cheap green hydrogen could enable local fertilizer production, lower fertilizer costs thereby enhancing food security, decouple fertilizer prices from natural gas price fluctuation, and reduce emissions from fertilizer production (Dagnachew et al., 2023).

There are, however, several challenges to establishing a hydrogen economy for shared benefits related to cost-competitiveness, technological advancement, market and legislative settings, affordable finance, and infrastructure development (Dagnachew et al., 2023). Substantial finance is needed to develop infrastructure for the production, conversion, storage and transport of hydrogen. This calls for bilateral and multilateral agreements between producers and off-takers to reduce the risk and therefore cost of capital (IPHE, 2022). Some Non-Governmental organizations also argue for a deliberate setting of priorities by governments to address the competition for vital resources such as water and land by the food and energy sectors.

A critical reflection

The shifting geopolitics of energy

The potential of green hydrogen as a clean and versatile energy carrier has gained significant attention as a means to address climate change and transition to a low-carbon economy. Several countries around the world are establishing national hydrogen strategies to accelerate the development of this technology and its value chain. This is highly likely to affect or even reshape the global geopolitics of energy (Pflugmann & Blasio, 2020; Scita et al., 2020; Van de Graaf, 2021) and uncover new risks and vulnerabilities related to future energy alliances (Research Network Sustainable Global Supply Chains, 2023).

Countries rich in renewable energy resources could become major exporters, altering traditional energy market dynamics (Muttitt et al., 2021). Namibia, a country with little prior experience in the oil and gas industry, recently announced a USD 9.4 billion green hydrogen project with the ambition to become a major player in the energy market. At the moment, hydrocarbon imports account for 90% of the energy supply in Morocco (Weko et al., 2023), a country now leading renewable energy and green hydrogen investments in Africa. Morocco has an ambitious target to export 10 TWh of green hydrogen by 2030, increasing to 115 TWh by 2050 (Caillard et al., 2024). There are also several other countries coming in as players in the energy arena forcing a new pattern of relationships.

The transition will be disruptive and potentially has redistributive effects on geopolitical power as the influence of oil and gas exporting nations declines, and new trade relationships emerge. With the possibility of declining revenues and a shrinking overall market, some oil and gas producers are already seeing their sovereign credit ratings downgraded (IRENA, 2022a). Most fossil fuel exporting countries, including those in Africa, are investing in pivoting to hydrogen production. However, there is also potential for new patterns of trade and investment interdependencies between countries, thereby disrupting the over 200 years of hydrocarbon-based global energy market structure. As countries establish bilateral energy relations centred on hydrogen-related technologies, new economic relations will not only impact their political relations but also potentially reshape foreign policy (Thompson, 2022).

Driving local socio-economic development

The current status of hydrogen in Africa showcases the continent's enormous potential to capitalize on its abundant renewable energy resources and establish itself as a global leader in green hydrogen production. By developing large-scale green-hydrogen projects, countries like Egypt, Zimbabwe, Mauritania, Morocco, and Namibia are laying the groundwork for a sustainable low-carbon future. If properly implemented, green hydrogen has the potential to deliver affordable energy for long-haul transport and (heavy) industry in these countries. Low-cost green hydrogen could also help attract energy intensive industries and facilitate the integration of large amounts of renewables in the energy system (Dagnachew et al., 2023). This is especially true if African countries aim to maximize the gains from the large reserve of critical minerals that are crucial for the global energy transition through resource-based industrialization, as suggested by Ouedraogo and Kilolo (2024).

However, African countries and their partners elsewhere also have another important responsibility. In Africa, countries that aspire to become hydrogen exporters face pervasive energy poverty and energy insecurity challenges, as well as rising domestic demand for electric power. Sub-Saharan Africa is home to four out of five people on the globe without access to electricity, and access rates in 24 out of the 54 countries are below 50%. To address these local development challenges and energy insecurity, African governments must take steps to align their export ambitions in the global energy market with national policies and development priorities. Given the significant influence they have in shaping the advancements in technology as well as its governance, high-income nations would also need to play an active role in mitigating any potential risks associated with such investments and support positive spill over effects by helping African countries pursue strategies such as diversifying their economies, building local capacity and expertise in green hydrogen technologies, fostering regional cooperation, and ensuring sustainable and inclusive development (Matambalya, 2014).

Realizing the full potential of green hydrogen in Africa requires addressing the associated challenges and fostering an enabling environment for investment, innovation, and collaboration. Building a strong green hydrogen economy requires policy makers to carefully consider the allocation of scarce public resources and ensure that the risks of investment are well understood. Considering these complex domestic and international dynamics, government policies and regulations will heavily influence the political economy of developing green hydrogen. Governments can support the development of green hydrogen industries through incentives and supportive regulatory frameworks related to exports, standards, and other trade arrangements. To effectively navigate the political economy of exporting green hydrogen, African countries must develop a comprehensive approach that combines supportive policies, robust regulations, and international collaboration.

Limited technical and financial capabilities

The biggest hydrogen consumers are China, the United States, India, Russia, and Europe (IRENA, 2022a). However, production will be most economically viable in locations that have an optimal combination of abundant renewable resources, available land, access to water, and the ability to transport and export energy to large demand centres (IRENA, 2022a). These conditions put many countries in Africa and the Middle East within the supplier or producer zone, particularly to large demand centres in Europe and Asia, and they are at the top of Europe's list for strategic partners (Research Network Sustainable Global Supply Chains, 2023). But the ability to which many African countries can actually fulfil this role is contingent on technical capacity and the wider geopolitics of global energy trade, access and control of technology, and competition over scarce resources such as water. Despite all the advantages of renewable energy, vast land availability and other natural resources, the continent lacks local demand, and human and financial capacity to scale production.

Developing a green hydrogen industry requires substantial investments in infrastructure, even more so if coupled with addressing other development challenges, such as lack of drinking water and lack of access to clean energy. Countries with the necessary resources and capabilities are already gaining a competitive advantage. Most cost reductions in hydrogen production are attributed to advancements in electrolyzer technology, driven by factors such as improved efficiency, longer lifetimes, and lower operational costs. Patent data is used to gauge innovative activities, with China leading in hydrogen patent developments, followed by Japan, the US, Korea, and Germany, with private enterprises being the major recipients (Delaval et al., 2022). In contrast, international patent families show the EU, Japan, and the US leading in overall hydrogen patent development, while Europe and Japan stand out for patents across the entire hydrogen value chain (IEA, 2023a). There is a need for increased global investment in hydrogen R&D, particularly for emerging technologies. In Africa, South Africa, Morocco, and Egypt have initiated hydrogen-related R&D and innovation projects, although public financing in the region is limited compared to other countries like China and the EU (Dagnachew et al., 2023).

This concentration of intellectual property and know-how means not only domestic value-added but also translates into institutional power, meaning an advantage in setting the global green hydrogen governance agenda and prominence where decisions are made. For instance, it gives power for shaping the rules and standards, a process that determines the technologies that dominate future markets and reward those who master them (Grinschgl et al., 2021). Though we believe that there should be a balance between protection and sharing of property rights, it should not be a burden to the energy transition. The process should rather facilitate the

green hydrogen economy development where the potentials are by allowing technology transfer to African countries in the short-term, and building of local technological capabilities in the long run.

The competition for limited local resource

The production of green hydrogen requires significant amounts of water, land, and renewable energy sources, which could give rise to local and regional competition over scarce resources and will have interrelated impacts. Water is essential for agriculture, industry, and households, and the demand for green hydrogen production may intensify competition at the local level. Locations with excellent renewable energy potential on the continent often face severe water stress, posing challenges for green hydrogen production and exacerbating water scarcity issues. The renewable energy production and infrastructure construction for green hydrogen also requires large amounts of land. As demand for farming, climate change mitigation, and other essential uses grows, competition for land and its resources will intensify in the coming decades (King et al., 2023).

In parts of the continent where there is a scarcity of these resources, it could lead to tensions and conflicts within and across communities. Besides disputes and potential unrest, competition over such resources will have implications for food and water security, as well as the migration or displacement of communities (Bazilian et al., 2019). Conflicts over rights are becoming increasingly common across the continent (Ugwueze et al., 2022). Overall, such competitions over resources expose countries to the risk of disrupting lives and livelihoods, potentially triggering a renewable energy-related 'resource curse'. This curse could lead to detrimental social, environmental, and economic consequences that paradoxically impede growth. A renewable energy resource is particularly at risk, as Leonard et al. (2022) caution when institutions and regulatory frameworks are weak. Without adequate safeguards and regulatory measures, large-scale clean hydrogen energy investments could trigger socio-ecological and political crises, including food insecurity, damage to local biodiversity, and internal conflicts.

Cost – and institution-related barriers

The cost of green hydrogen production compared to grey and blue hydrogen is a major barrier in realizing the full potential. Currently, green hydrogen production costs USD 4–9 per kg, which is high compared to blue hydrogen (USD 1.5–3.0 per kg) and grey hydrogen (USD 1.0–2.5 per kg). Model projections show that, with declining renewable energy and electrolyzer prices driven by learning, coupled with stringent climate mitigation policies, green hydrogen can become increasingly competitive with fossil fuel based hydrogen and so the cheapest option by 2050 (Dagnachew et al., 2023). Political instability, weak regulatory frameworks, bureaucracy, and the lack of equitable offtake agreements are also other challenges that limit the growth potential of green hydrogen as a clean and renewable energy carrier (UNIDO, IRENA, and IDOS, 2023). Raising the required investment for green hydrogen requires offtake agreements to support the business case and enable access to affordable finance. However, these offtake agreements should avoid reproducing the historic dependencies on energy resource rents but rather incentivise the development of local industrial demand or higher value-add products and allow a shift to domestic consumption.

To enhance the economic competitiveness, there is the need for technological advancement, clear regulation, incentives, and financial support for the adoption of green hydrogen technology. Furthermore, it is strategic to embrace and encourage small scale green-hydrogen projects (for instance captive hydrogen projects aimed at meeting domestic demand) that serve as pilots to explore and improve generation, storage and distribution infrastructure. Finally, it is important to create demands that can stimulate new and sustainable jobs, and bilateral and regional collaborations to build and operate hydrogen infrastructure. The new initiatives and projects are encouraging but more must be done.

A new path of cooperation for progress and broadly shared benefits

Africa's struggle to achieve a green hydrogen economy, akin to the historical failure of the green revolution in African agriculture, is intrinsically linked to complex geopolitical dimensions and imbalanced power relations

with advanced economies. Historically, a few countries including the US and some European countries have perpetuated a dependency on fossil fuels, exploiting Africa's vast natural resources for their own economic gains, while relegating the continent to a mere supplier of raw materials (Custers & Matthysen, 2009). In recent times, Sino-African partnerships have also been contested as extractive (Freitas, 2023; Kamoche et al., 2021). Currently, there is much attention focused on developing the green hydrogen economy in Africa for export. This is influenced by European interests (Amouzai & Haddioui, 2023), with most of the capital investment flowing from European countries and multiple cooperation agreements already signed between African nations and European partners.

While there is nothing intrinsically wrong with targeting the export market, the current resource development practice in Africa with characteristics of neo-colonial practices (Odijie, 2022; Udegbunam, 2020), will constrain Africa's ability to chart a course towards sustainable energy solutions that also broadly benefits the citizens of exporting nations. The contestation on neo-colonial practices broadly refers to patterns of relations, where external powers exert control or influence over resource extraction, often to the detriment of local communities and the environment. This may include exploitative agreements at the expense of fair compensation for local communities, resulting in limited revenues created locally. In other cases, the lack of environmental protections and insufficient local participation limit benefits such as jobs and revenue from reaching local communities, leading to or exacerbating economic disparities and social tensions.

A myopic focus on exporting to the European market should be avoided, given that the concerns associated with energy access challenges, water scarcity, land use and inequalities in access locally need to be addressed. We, therefore, argue for embedding hydrogen dilemmas within the national integrated development plans for the water-energy-food-environment sectors by African countries. We also argue that hydrogen policy development by the EU and other importing partners should develop clear guidelines on the assessment of impacts on water, environment and community in the exporting countries. For example, ongoing capacity building activities should also target these integrated dimensions, and not merely technological assistance.

For a green-hydrogen economy to support a wider socio-economic development on the continent, Africa must assert itself on the global stage, demanding equitable partnerships and investments that foster technological transfer and knowledge sharing. As has been contested through the Covid Pandemic vaccine technology sharing process, more productive international cooperative efforts for sustainable development require 'innovation cooperation' that go well beyond current practices to address developmental needs (Pandey et al., 2022). At the moment, the OECD countries are far ahead in building the necessary capabilities as demonstrated by technological innovations and trademark ownership in hydrogen production, storage and fuel cells (Cammeraat et al., 2022), and so will likely determine the winning technologies and the market rules – if institutional power relations stay the same.

The cost of capital to develop hydrogen and other energy infrastructure remains high for Africa (Mulugetta et al., 2022). If the rules of the game do not change, the continent would remain at a disadvantage and the development of a green-hydrogen economy will be an extension of the extractive economic relationship that kept Africa underdeveloped and exacerbated poor governance at a massive scale. Although there is no single path that all African nations should follow, development should be guided by local markets and conditions that may target export, import substitution, or expanding the development of green industries. Green hydrogen strategies in Africa must therefore be embedded in national industrial strategies, development plans and programmes including Agenda 2063, Nationally Determined Contributions, and other national energy and climate change mitigation strategies. This could motivate more knowledge production locally and provide strategic guidance on whether and how green hydrogen is financed and developed. The participation of various stakeholders and civil society is useful to ensure societal acceptance, to create ownership and to prevent local development from being driven by external interest (Adow et al., 2022). Strengthening bilateral – and regional-collaborations and South-South cooperation in science, technology and innovation can enable African nations to pool resources, expertise, and negotiate collectively for a greener and sustainable future. By addressing the geopolitical dimensions and power imbalances head-on, Africa can pave the way for a truly transformative green hydrogen revolution, empowering its people and building the Africa we want as envisioned in Agenda 2063.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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