UKÀMÀ SYNTHESIS PAPER

ON GREEN INDUSTRIALIZATION:
developing a shared agenda between Africa and Europe

Synthesis prepared by
Circular Economy Innovation Partnership (CEIP) for Ukama

FEBRUARY 2024

Ukàmà
Solidarity for prosperity

UKÀMÀ SYNTHESIS PAPER ON GREEN INDUSTRIALIZATION: developing a shared agenda between Africa and Europe

Synthesis prepared by Circular Economy Innovation Partnership (CEIP) for Ukama
https://ceipafrica.org/

Citation
Circular Economy Innovation Partnership for Ukama (2024). Ukàmà Synthesis Paper on green industrialization: developing a shared agenda between Africa and Europe, Ukàmà.

This paper has received financial support from AFD (French Development Agency) and ADEME (French Agency for Ecological Transition).

Financé par RÉPUBLIQUE FRANÇAISE Liberté Égalité Fraternité ADEME AGENCE DE LA TRANSITION ÉCOLOGIQUE

Ukàmà
Solidarity for prosperity

The Ukama platform aims at building an informal dialogue process between a diversity of African and European experts bringing together perspectives of the Europe-Africa cooperation, including Climate, Sustainable Development, Economic transformation, International Cooperation, Finance and Trade to facilitate the emergence of such shared expectations. The main objective of the platform is to convene critical thinkers to help set out the themes and issues that are relevant for shared sense of prosperity for Africa and Europe.

UKÁMÁ SYNTHESIS PAPER ON GREEN INDUSTRIALIZATION: developing a shared agenda between Africa and Europe

INTRODUCTION 4

EVALUATING THE SECTORS AND TECHNOLOGIES 5
- Nigeria -Solar 5
- Nigeria - Hydrogen 5
- Kenya - Solar 6
- Kenya - Electric cooking 7
- Namibia - Hydrogen 8
- Crosscutting observations on the sectors 8

KEY ISSUES IN AFRICA-EUROPE RELATIONSHIP 9
- Differences in priorities and framing 9
- Colonial legacy, perception of hypocrisy and the depoliticization of green industrialization 9
- Clarifying divergent understanding of "just" transition 10
- Financing green industrialization 11
- The issue of value addition and supply chains 12
- The impact of Europe's industrial and trade policies 13
- Capacity and technology diffusion 13
- Governance issues 14

KEY RECOMMENDATIONS 16

CONCLUSION 17

INTRODUCTION

This paper provides key messages from three African country studies commissioned by the Ukámá platform to examine emerging green industrialization initiatives in Africa, how Africa-Europe relations shape policies and practice, as well as opportunities and barriers to more transformational partnerships. The studies focused on green hydrogen initiatives in Namibia, solar and green hydrogen in Nigeria, and solar and clean cooking in Kenya. Green industrialization is, of course, much broader than scaling up clean energy production. The choice to focus on clean energy for the three countries is informed by the fact that access to cheap and reliable decarbonised energy is at the core of any successful "new" industrialization effort in Africa and offers a critical window of opportunity for resource-rich Africa to build on its comparative advantages and leapfrog its industrialization pathways. Energy transition is also a common goal for Africa and Europe in the context of the global climate crisis and the imperative for a global, just transition to low-carbon futures.

Africa and Europe have markedly different industrial, economic, and political contexts, but they share a common interest in transitioning towards greener forms of industrialization. From the perspective of Africa, which has the lowest rates of access to electricity in the world[1], green industrialization is contingent on low-carbon energy system energy that can support economic growth and development. Green industrialization also offers Africa the opportunity to diversify their economies, upgrade their position in global value chains, and, ultimately, alleviate poverty. For Europe, green industrialization is vital to achieve decarbonization and the Paris Agreement objectives, as well as to meet the expectations of the majority of their citizens who continue to mobilize on climate change issues. Europe is also keen to show leadership in the green transition globally and mobilize the green economy to enhance supply chain security and gain industrial and economic competitiveness in the long run. At the same time, Africa, as highlighted in Agenda 2063, has the motivation and intention to contribute to the global climate goals by taking a cleaner pathway towards economic and industrial development. This is despite being responsible for only 4% of GHG emissions, and much of its population is disproportionately affected by the effects of climate change.

African countries are not only political allies to advance the international climate agenda, but the continent is also rich in renewable energy potentials as well as resources such as critical minerals needed to accelerate the energy transition globally. At the same time Europe is in a good position to provide the much needed finance, technology, and technical capacity that Africa needs to industrialize. The two regions, furthermore, share strong cultural and trade links. For example, the EU is Africa's largest trading partner, accounting for just over a quarter of the continent's imports and exports,[2] and is the largest holder of Foreign Development Investment (FDI) stock on the continent.[3]

However, while European and African countries share a common interest in reducing and/or avoiding carbon emissions by investing in green alternatives, the EU-Africa relationship faces important challenges and obstacles when it comes to putting these interests into practice. Despite the strategic importance of Africa-Europe relations, the quality of dialogue and relationship between Africa and Europe is currently not in the best of shape and has suffered from old and more recent tensions such as COVID-vaccine inequalities, a perception by African governments and experts that Europe has been hypocritical in its position on the use of gas as a transition fuel, the EU suspension of financial support and co-operation with some African countries in response to military coups, the looming food crisis related to geopolitical tensions and war in Europe, and development co-operation budgets being under attack in EU countries at a moment where an increasing number of African countries enter into debt distress. The situation is further complicated by the crisis-prone international context, which impacts the configuration of supply chains as well as China's economic and diplomatic strategies, which challenges Europe's economic competitiveness and dominance

1 https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/March/Renewable_Energy_Transition_Africa_2021.pdf

2 https://blogs.lse.ac.uk/europpblog/2023/05/26/muddled-priorities-continue-to-plague-eu-africa-trade-policy/

3 https://unctad.org/news/investment-flows-africa-dropped-45-billion-2022

in Africa. This volatile environment seriously challenges the establishment of a robust and sustainable development pathway and raises the importance of building resilience and adaptive management upfront in industrialization and investment approaches.

Given the above, to effectively promote green industrialization and development in both the European Union and Africa, it is crucial to have a nuanced understanding of the critical issues and differences with a view to establishing a common agenda to tackle them.

First, we provide key information on the state of the development of the sectors/technologies analysed in the three countries, touching on their maturity, business models, regulatory framework and potential for job creation. Second, we identify fundamental conflicts affecting the EU-Africa relationship. Based on this assessment, we propose five priority areas for dialogue to align the interests of African and European governments, civil society, and business sector organisations.

EVALUATING THE SECTORS AND TECHNOLOGIES

Nigeria - Solar

About 90 million out of Nigeria's 200 million population remain off-grid, marking Nigeria as having the largest unelectrified population globally. While the present power demand is estimated at 17,520 MW, the total generation capacity is 6,107 MW. To close this gap, Nigeria plans to develop 30,000 MW of new installed capacity by 2030. Electricity generation from fossil fuel is composed mainly of gas thermal power sources, (72.73%), hydro power sources, (12.82%), diesel/HFO sources (14.17%) and renewable sources (0.28%). Solar contributes a mere 0.2% of Nigeria's installed capacity, making its contribution to the country's energy mix almost insignificant. Meanwhile, Nigeria boasts significant solar potential, with daily irradiation equivalent to energy from over a million tons of oil, far surpassing its oil and gas outputs. According to a study by Boston Consulting Group and All On (a Shell-funded impact investment company) off-grid solar market in Nigeria had a compound annual growth rate of 22% between 2018 and 2022, making it one of the fastest growing in Africa over the same period but uptake is still hampered by high upfront costs, with only 1.25% of Nigerian households installing the system.[4] The same study finds that if 30% of Nigerian households installed solar by 2030, 5 million metric tons of carbon dioxide would be avoided, reducing emissions from households by 30%. The removal of a long-running fuel subsidy by the new government of President Ahmed Bola Tinubu, in May 2023 has increased interest in solar, but the adoption rate remains low. Nigeria plans to add 6.5 GW on-grid and 13 GW off-grid solar by 2030, which implies opportunity for massive growth. The growth opportunity can be increased with effective policy and coordination between national and international development partners such as the EU.

It is estimated that by 2030, off-grid solar PV will offer double the jobs in construction and installation (309,668 job-years/MW) compared to utility-scale Solar PV (154,834 job-years/MW). Similarly, off-grid solar PV's operation and maintenance will provide approximately double the jobs (25,844 jobs/MW) versus utility-scale (12,922 jobs/MW). When accounting for indirect and induced jobs, the total job numbers surge by around 50% across all categories.[5] This underscores the significance of power plant investments, especially in rooftop Solar PV technology, as a robust job creator for Nigeria in the coming decade.

Nigeria - Hydrogen

Hydrogen is produced in Nigeria on a modest scale, with Transcorp Ughelli Power using it to cool its large generators.[6] Companies like NewX are progressing with blue and green hydrogen projects. With cement production, ammonia production, and industrial heating accounting for 93% of the energy-related emissions from industry in Nigeria,[7] green hydrogen

4 https://www.all-on.com/media/publications/abridged-socio-economic-case-for-deploying-off-grid-solar-pv-in-nigeria.pdf

5 Analysis by authors of the Nigeria scoping paper

6 Aryee, A., Rehoboth, S., Anene, E. C., & Akomolafe, D. (2022). *Techno-Economic Feasibility Study: Green Hydrogen Production for Use in Off-Grid Applications, Lagos - Nigeria.*

7 Energy Transition Office. (2022). *Nigeria's pathway to achieve carbon neutrality by 2060.* https://energytransition.gov.ng/

presents a revolutionary pathway for energy efficiency and decarbonization. Thus, Nigeria's industrial decarbonization, according to its Energy Transition Plan (ETP) involves the replacement of grey hydrogen produced from fossil fuels with green and blue hydrogen in ammonia production and the adoption of zero emissions fuels such as clean electricity and hydrogen for heating instead of natural gas and biomass.[8] In 2021, Nigeria started designing engines running on natural gas, hinting at hydrogen's potential role in transportation. The German government's establishment of a "Hydrogen Office" in Nigeria highlights deepening international ties in green energy.

Kenya - Solar

From a meagre 25% access to electricity in 2010, Kenya has achieved more than 70% access as of 2019.[9] As of June 2022, the country's installed capacity was 3,074.34 MW with 837.58 MW being hydro; 949.13 MW geothermal; 435.5 MW wind, 170 MW solar and 646.32 MW supplied by thermal power plants. Kenya's installed solar power capacity is about 0.67% of the total annual solar potential in Kenya (solar potential is projected to be 15,000 MW).[10] With over 29% of Kenyans lacking connectivity to electricity, there are still opportunities for massive growth in renewable energy production and connection. Kenya, like many other African countries is in a position to meet its electricity needs almost entirely from green energy sources and achieve its commitment made in the COP 26 World Leaders' Summit in Glasgow in 2021 to achieve 100 percent renewable energy supply by 2030.[11]

Kenya is a leader in solar PV deployment in Africa with the success of its solar PV sector attributed to the support and active intervention of donors, even if many of these have been accused of fronting "self-serving prescriptions."[12] The market-oriented governance of the energy sector has attracted climate financiers like the World Bank which funded the Scaling up Renewable Energy Programmes (SREP). More recently the state has been instrumental in shaping the evolution of the solar PV sector by implementing an entirely state-funded programme to install PV systems in off-grid schools and other public service facilities. Already, the country sells between 25,000 and 30,000 photovoltaic modules each year to around 200,000 rural homes, making it the second most dynamic commercial solar marketplace in the world after India.[13]

Despite the high potential for solar PV, the government of Kenya strongly favours geothermal electricity over off-grid PV in their discussion with international development partners, mainly because geothermal provides for a large increase in generating capacity for grid-connected users and the service of large industrial activities. In addition, geothermal has successfully been the backbone of KenGen, the government-owned Kenya Electricity Generation Company. UNESCO has observed that this preference for geothermal power could pose a risk for PV niche actors[14] noting that the gains so far made to develop the solar PV market could wane, especially if an enabling environment is primarily about creating profitable investment opportunities for private actors.[15] Like in Nigeria, a major obstacle is that the prices offered by most private-sector driven mini-grid developers for the target communities remain beyond the reach of the targeted population. Kenya's pledge to transition to 100% renewable energy by 2030 offers promise for the creation of green jobs in various sectors including the production, sales, installation, and servicing of devices such as solar panels and lanterns, wind turbines, biogas digesters, and cook stoves among others. The job landscape pans out in the form of established and opportunistic importers, technicians, and solar sales agents. Kenya, which is perhaps only second to South Africa in the whole of Africa in terms of technology, skills, and competence, is able to develop Solar PV systems and expand her on-grid industry however the market is still dominated by imported products. Recent statistics project

8 https://www.energytransition.gov.ng/industry-2-2-2/
9 International Energy Agency (IEA) (2023), Energy Efficiency for Affordability Improving people's lives through delivery of a modern, sustainable energy system in Kenya. https://iea.blob.core.windows.net/assets/e283fa7f-9c09-4248-a4da-6b14124ded93/EnergyEfficiencyforAffordability.pdf {Assessed 10 Jan, 2024}
10 Energy and Petroleum Regulatory Authority (ERPRA) (2022), *Viability Asessment of Solar Water Heating Industry in Kenya. https://www.epra.go.ke/wp-content/uploads/2022/06/FINAL-REPORT_VIABILITY-OF-SOLAR-WATER-HEATING-IN-KENYA.pdf* {Assessed 10 Jan, 2024}
11 ESMAP, (2022). *Expanding Mini Grids for Economic Growth: 7th Mini Grids Action Learning Event.* Nairobi: ESMAP
12 Newell, P., & Phillips, J. (2016). Neoliberal Energy Transitions in the South: Kenyan experiences. *Elsevier*, 39-48.
13 Rapid Transition Alliance. (2022). *Doing Development Differently: How Kenya is Rapidly Emerging as Africa's Renewable Energy Superpower.* Rapid Transition Alliance.
14 UNESCO. (2021). *UNESCO Science Report.* UNESCO
15 Ibid

that annual job growth rates within the industry will be at a percentage point of 26 points by the year 2024.[16] According to IRENA, the projection is that 48,300 jobs will be created by the end of the year 2024. An assessment by the Kenya Revenue Authority highlights statistics from the importation of Solar PV units at a staggering 2,561,000 units as of 2018.[17] Improving local manufacturing has the potential to unlock a myriad of locally tailored employment opportunities for women and youth. To explore such an opportunity, there is a need for massive investment in green technology skills & expertise able to compete effectively at the global stage. Already, over 350 companies in Kenya are involved in the Generation Kenya programme which offers training to young people and matches the trained youth with companies in search of employees supported by Sweden. Kenya and Germany have also worked together since 2016 to promote Youth Employment and Technical and Vocational Education and Training (TVET).

Kenya - Electric cooking

Although electricity is accessible to 75% of the Kenyan population, the adoption of e-cooking in Kenya remains limited. Over the past decade, electric cooking appliance ownership has increased to 23.9% nationally.[18] However, most households use e-cooking primarily for specific duties instead of preparing main meals. Studies have found that while electric cooking has potential, affordability and availability are among the factors limiting its use in both urban and rural households. The analysis of the e-cooking appliance supply chain in Kenya highlights promising prospects for expanding the distribution of such appliances while also exposing obstacles such as substantial up-front cost, insufficient import quantities, and substandard import quality. Various financing options are available to support e-cooking appliances in Kenya, such as cash and carry, asset financing loans, and PayGo models. The Kenya National Electric Cooking Study (KNeCS) Workshop, supported by UKAID and the Kenya-UK Pact, among other agencies, envisions a scenario in which cutting-edge technologies, including built-in appliance metres, are seamlessly incorporated into e-cooking, resulting in 100% adoption of e-cooking by 2050. In addition, they foresee a resilient supply chain that will facilitate the widespread implementation of electric cooking in Kenya, prioritising domestic production. To attain these goals, it will be necessary to implement various measures such as decreasing electricity tariffs, decreasing the price of e-cooking appliances, providing innovative financing models, implementing ambitious and comprehensive capacity building and skills acquisition schemes, reducing manufacturing expenses, allocating funds for local innovations, and devising strategies to stimulate demand for e-cooking appliances.

Currently, despite the existence of numerous policies and legislative frameworks by the government, only a limited number of policy frameworks explicitly address solar photovoltaic technology and electronic cooking. An all-encompassing national e-cooking strategy is currently being formulated; it incorporates electric cooking, biogas, bioethanol, enhanced cookstoves, and liquefied petroleum gas. Concurrently with the national e-cooking strategy, an additional approach has been implemented in response to the interest expressed by European development partners. In an effort to accelerate access to e-cooking, Kenya established the inaugural E-cooking Delivery Unit embedded in the Office of the President during the Africa Climate Summit 2023. Unlocking private sector capital and carbon finance is of paramount importance in order to achieve Kenya's ambitious climate targets and ensure access to renewable energy. EPRA has recently announced a new electricity tariff band in 2023 for households consuming between 30 and 100 kwh/month, which is conducive to the use of electric cooking by low-income households.[19]

Estimates of the job creation potential in Kenya's e-cooking sector indicate a potential of about 19,000 direct, formal jobs and 15,000 to 35,000 direct, informal jobs in 2019.[20] It is estimated that in 2019, 200 direct jobs were created from the importation, wholesale, retail sales, and distribution activities of Electric Pressure Cookers (EPC). Despite the large

16 https://ypckenya.org/wp_content/uploads/2021/06/Unlocking_the_Solar_Photovoltaic_Value_Chain_Potential_for_Enhanced_Job_Creation_in_Kenya_-_DP231.pdf
17 Kenya Revenue Authority. (2022). *Kenya' VAT Impact Study Report.* AMDA.
18 https://mecs.org.uk/wp-content/uploads/2023/11/eCAP-Consumer-Awareness-Report.pdf
19 https://research.hktdc.com/en/article/MTM2MDg3NTczMA
20 See The Kenyan Cooking Sector-opportunities for Climate Action and Sustainable Development, 2021.

number of jobs created in the e-cooking sector, the level of compensation and retention is low. Sales and distribution constitute the biggest proportion of the workforce.[21] The e-cooking sector reports short employee retention periods of 20 months on average which is generally lower than the decentralised renewable energy sector in Kenya, where an average of 30 months has been recorded.[22] Women participate more in managerial than non-managerial positions in the e-cooking sector, a trend attributed to the labour intensity required for direct formal, non-managerial, and informal jobs.[23]

Namibia - Hydrogen

The Namibian government aims to become a leading green hydrogen producer and exporter. According to the Harambee Prosperity Plan, investment in hydrogen is supposed to help promote energy security, a low-carbon economy, generating more foreign investments and an increase in foreign financial inflows. In addition, a hydrogen economy is anticipated to produce more skilled jobs for the domestic workforce and reduce unemployment. In Namibia, green hydrogen is anticipated to be produced at US$1.5/kg by 2030, which is cheaper than the proposed global range of US$5/kg.[24] This makes Namibia hydrogen comparable to that of Chile, which has the cheapest in terms of cost.[25] The demand for hydrogen is expected to increase to about 660 Mtpa in 2050 from a 2030 figure of 140 Mtpa. The rising global demand means Europe, but also Japan, South Korea, China, and North America will be expected to import to decarbonise certain sectors. Namibia envisions taking advantage of its abundant resources to produce 10-15 Mtpa of hydrogen by 2050.[26] This ambition has yielded important collaborations between Namibian and foreign research institutions to research on hydrogen technologies. Germany is supporting this agenda just like other interested European countries including Belgium and the Netherlands.

A hydrogen and derivative strategy has since been executed with a hydrogen commission formerly institutionalised. Preliminary estimates by the plan suggested that annual revenues of $800M+ could be realised. According to the *Green Hydrogen and Derivatives Strategy*, the hydrogen industry is expected to contribute up to US$6 billion to GDP by 2030, 30% more than 2030 GDP estimates, with no hydrogen industry development. To realise this, the country has lined up some pipeline projects that are at various preparation stages. These include a US$18 million pilot hydrogen and ammonia production plant in the Erongo region; a US$181.25 million green hydrogen project (by the French company HDF Energy) in Swakopmund on the coast in the administrative region of Erongo (with funding from the European Investment Bank (EIB)),[27] and a flagship Hyphen Hydrogen Energy project is estimated at US$9.4 billion. The project has already acquired a 40-year concession for four thousand km^2 of land. Itis expected to produce up to 300,000 metric tons of green hydrogen per annum powered by 5-7 GW of renewable energy generation. Project shareholders include Nicholas Holdings Limited, a UK-registered company incorporated in 1985 and ENERTRAG[28] (a German company with a registered address in Dauerthal, Germany and with offices across various German cities and other countries (such as Ghana, Uruguay, Vietnam, South Africa, and Spain).[29] Estimates by the Namibian Government in the Green Hydrogen and Derivatives Strategy show that by the year 2030, the green hydrogen sector will generate as many as 80,000 jobs. This number is expected to shoot up sharply to 600,000 by 2040 as the project reaches scale. Meanwhile, Hyphen Hydrogen Energy alone has been assessed as having the potential to employ 3,000 people with temporary jobs during construction, reaching 15,000 (over four years from 2023).

Crosscutting observations on the sectors

While all clean technologies reviewed demonstrate growth potential, the sectors are, broadly speaking, at early stages of industrial development. As a result, they have not, as yet, made significant contributions

21 Lee, C. J., Shirley, R., Otieno, M., & Nyambura, H. (2021). Powering jobs: the employment footprint of clean cooking solutions in Kenya. *Energy, Sustainability and Society*, *11*, 1-22.
22 Ibid.
23 Shankar, V; Onyura A; Alderman, J. (2020). *Understanding Impacts of Women's Engagement in the Improved Cookstove Value Chain in Kenya.* Nairobi: Global Alliance for Clean Cookstoves
24 https://www.dlapiper.com/en/insights/publications/2022/04/projects-global-insight-issue-5/green-hydrogen-in-chile
25 https://gh2.org/countries/namibia
26 https://www.ensafrica.com/uploads/newsarticles/0_namibia-gh2-strategy-rev2.pdf
27 https://ec.europa.eu/commission/presscorner/detail/en/IP_22_6683
28 https://hyphenafrica.com/shareholders/
29 https://enertrag.com/en/portal

to GDP or job creation in absolute terms, even though they may constitute some of the fastest-growing sectors for employment. The market, in broad terms, is still nascent and policy remains highly fragmented. Green hydrogen is yet to be produced at a commercial scale in both Nigeria and Namibia, as is indeed in other countries of the world. Despite over two decades of solar activity in Nigeria and Kenya, most of the activity is spurred by imports from China. While electricity cooking has made massive penetration especially in Kenya, uptake is still significantly hampered by the perceived high cost of appliances and electricity tariffs. While a variety of business models exist for promoting the uptake of solar and e-clean from the consumer perspective, these models are still not viable for low-income consumers that dominate the population. While there are some important differences, for example solar is primarily for local generation and use while hydrogen is structured like traditional exploration with concession offered by government to traditional sectors to build and operate, the three sectors analysed have comparatively high capital requirements, risks, and policy challenges. Another point of distinction is that solar and clean cooking products are generally produced for domestic consumption, while green hydrogen is a part of an international export strategy. These differences shape skills development and employment opportunities.

KEY ISSUES IN AFRICA-EUROPE RELATIONSHIP

The scoping paper and the analysis of Ukámá Steering Committee identifies 8 issues in the Africa-Europe relationship with regards to partnering to pursue green industrialization in Africa. These issues are summarised below.

Differences in priorities and framing

The scoping papers highlight that although there is mutual interest in achieving a low-carbon economy for both Africa and the EU, their key motivations, priorities, and framing could differ. Africa tends to prioritise the economic diversification and social development needs of its citizens as prime whereas Europe seems to place a commitment to reducing greenhouse gas emissions to meet their national and continental targets at the forefront. These differences have many implications. First, it sometimes manifests in a perception that the EU is putting too much focus on phasing out fossil fuel in ways that dilute and possibly contradicts Africa's interests in industrialization and economic development. Alongside this is a perception that the EU stresses the climate goal objective for Africa even before a precise analysis of the energy needs of the various countries. This divergence in priorities also leads to a situation where the focus of the debate is often narrowed down to renewables versus fossil fuel instead of analysing how different technologies and innovations in the production, distribution, and use of energy can best meet the short-, medium-, and long-term needs of countries' sustainable development pathways. There is also a risk that the co-operation is framed mainly in terms of climate action or climate mitigation goals rather than the broader objectives of sustainable economic development.

Colonial legacy, perception of hypocrisy and the depoliticization of green industrialization

Differences in emphasis, priorities, and motivation between Africa and the EU are compounded by the shadows of colonial legacy, creating a lack of trust between the two parties. It is, therefore, not unfair to say that the shadows of colonial legacy hang over the desire of Africa and the EU to strengthen their collaboration in the pursuit of green industrialization. There is a perception among some African experts and parties that the current agenda for green industrialization is more or less driven by and centred on the EU's need for energy transition and critical minerals, which will enable it to compete more favourably with China and that Africa is no more than a source for cheap green minerals. The scoping papers highlight apprehension over the EU's "tendency to "de-politicise" green hydrogen and other clean technology agreements as

a technoscientific and economic stimulus" without proper attention to legacies, imbalance of power, and the extractive nature of previous agreements and operations which have benefited Europe at the expense of Africa. The depoliticised and technocratic approach, it is argued, does not explicitly and sufficiently address the historical responsibility of developed nations, including those in the EU, for the disproportionate emissions that have driven global warming and tends to mask "the deep-seated political and economic power imbalances that underlie prevailing agreements". This lack of trust has been heightened in the wake of the energy crisis occasioned by the Russian war in Ukraine, which saw the EU seeking to increase their gas import even from Africa at a time they were shutting down funding for oil and gas exploration in Africa–a situation that has led some African leaders to accuse the EU of hypocrisy. While the pursuit of green industrialization is a common goal for the EU and Africa, there are concerns over the potential repetition of extractive practices that have historically benefited external actors more than the local population. One significant development involves the awarding of a substantial tender to Hyphen Hydrogen Energy, a German-linked company, for $9.4 billion almost close to the gross domestic product (GDP) of the country at the time. While this partnership may ostensibly promote renewable energy, the concerns of extractive undertones emerge. Although the EU and African governments now frequently talk about a commitment to equal partnership, there remains a strong feeling that the EU parties tend to dictate the scope, terms of much of the agreement between the two parties.

Clarifying divergent understanding of "just" transition

Just transition is the paradigmatic concept within which the EU and Africa collaborate to pursue green industrialization. Just transition is the framework that ostensibly allows the objective of rapid decarbonization and climate ambition (Europe's priority) to be reconciled with the objective of economic diversification and social justice (Africa's priority). Just transition is supposed to provide the framework for a common goal that bridges the differences in the priorities and expectations of EU and Africa. However, the scoping papers reveal important differences in understanding how just transition is conceptualised in the two continents. The core objectives of a just transition (in a broad sense) seem to differ across countries–with a stronger focus on displaced workers in EU countries and on lifting millions of people out of poverty in African countries. There is, therefore, a risk that what should be a shared agenda (to ensure its success) is torn apart by conflicting interests and inadequate consideration of a just transition. Nevertheless, there is a joint imperative that decarbonization "leaves no one behind"–it is a critical condition of success behind the transition at play. However, the notion and implications of "Just Transition" for the two continents in their co-operations on green industrialization require unpacking. Questions relate not just to issues of historical responsibility and who pays, but encompass complex distributive, procedural and reparative justice questions.

Procedural justice prompts an examination of whose voices are heard and how decisions are made across critical players of the industrialization and investment processes–including financiers, standard setters, civil society and community organisations, among others. Ensuring inclusiveness and equitable representation has become paramount. Distributive justice encompasses multifaceted aspects, from value distribution in supply chains to job allocation and the recognition of capacity for innovation. The analysis should extend to the root causes of structural imbalances in global supply chains, and the (more) active role that global taxes should play to bring justice. This broader perspective acknowledges that just transitions involve rectifying historical and systemic imbalances, moving beyond distributional considerations. The concept of reparative justice introduces another layer to the narrative. It urges a comprehensive examination of historical injustices and the formulation of policies that address and rectify the impacts of past injustices. Against the backdrop of global green transitions and potential risks to Africa's industrialization, a commitment to justice has become indispensable.

At the same time, there is a need for more coordinated analysis to understand the kind of jobs in a pre-transition phase is expected to vary significantly from the jobs of the future. To enable a just transition it is important to have insights about what jobs will be created or lost, where the jobs will be created/

lost, who lose or gain employment, and the net gain in terms of jobs. These insights are important when pursuing a just transition leading to targeted interventions that enable inclusivity and equity. Therefore, pursuing a just transition must hinge on equity and the actions/strategies/policies should be designed based on evidence. Furthermore, for Africa, a just transition is more than jobs; it is also about land and livelihood. It involves analysing what renewable energy expansion (like solar farms, wind farms and bioenergy) mean in terms of land grabbing, livelihood loss and the spatial distribution of harm. Also, a just transition should explore the acceptance of big energy projects in the vicinity of where people live, work and raise their families: sense of place and place attachment of the people needs to be given priority as well as labour rights, health and safety standards.

Financing green industrialization

While not the only issue, the disagreement over how to define just transition often comes down to who will pay for the transition or how to finance the transition. Finance is a significant issue for two key reasons. Firstly, the estimated costs of the energy transition for African countries are very high and outside of the capabilities of African governments to finance independently. For example, the cost of financing Nigeria's Energy Transition Plan is approximately 125% of the country's annual budget. This is at a time when Nigeria's debt servicing ratio is over 80%. Access to finance is a central theme, all the more so because the funding environment has become more adverse in recent years. In Europe, it is widely recognised that no public institution can finance the energy transition. If Africa cannot pay and Europeans will not, then how can the development of less profitable clean energy sectors be financed?

In an attempt to address this challenge, European development money is increasingly linked to market-oriented catalytic funding approaches that can stimulate private sector investment. However, the scoping papers show areas, such as e-cooking, where significant volumes of resources must be deployed before there is a scaled market. In addition, the borrowing costs for African states are spiralling as governments increasingly lean on private markets for lending. The case of Namibian green hydrogen suggests that it is not completely outside of the realm of reality to structure large ticket investments using blended finance approaches that protect the balance sheets of African countries. In the Nambian example, European development funding, including grants and concessional loans, are being deployed at the pre-feasibility and feasibility stages, with a longer-term investment pipeline that incorporates institutional investors. If successful, green hydrogen deals may count as some of the largest, but there are other examples of successful renewable energy transactions across the continent, such as Kenya's Lake Turkana Wind Power Station, which is the largest single private investment project in the country's history. As with the Harambee Project, European development funds played a key role to catalyze commercial finance. What these examples illustrate is that where large-scale investment cases can be made, European development funds are enthusiastic partners.

The scoping papers show that Europe's strong preference for market-based finance to support green industrialization in Africa poses challenges with African Parties arguing that the types of financing they need are outside of the scope of private sector investors. The limited viability of some types of clean cooking and solar business models illustrates that sustained levels of investment are needed to support market development. The analysis shows significant challenges in using established ways to subsidize market development, such as statutory Emissions Trading Schemes (ETS), voluntary carbon credits, and carbon taxes as a market-building mechanism in Sub-Saharan Africa. Firstly, there are not yet statutory schemes that are operational in Africa, although several countries have begun work to set them up.[30] Secondly, it is often not cost-effective to subsidize small-scale projects that are associated with off-grid energy and clean cooking due to the high administrative costs of verification and the difficulties of scaling such projects. Historically, less than 2% of projects financed by the CDM are in Africa, of which more than half are in South Africa.[31] The price of carbon credits in the voluntary carbon markets, on the other hand, is generally lower than

30 Belianska, A., et al., (2022). Climate change and select financial instruments: an overview of opportunities and challenges for Sub-Saharan Africa.

31 Lo, A. Y., & Cong, R. (2022). Emission reduction targets and outcomes of the Clean Development Mechanism (2005–2020). *PLOS Climate*, *1*(8), e0000046.

the regulated market, with renewable energy projects typically priced between $1-4 USD per ton of carbon that is offset, where the "ideal" price of carbon is between $40-100 USD per ton. The low price of offsets, combined with the issues of administration and scale have limited the growth of the voluntary carbon credit market across Africa.[32]

Africa-focused programmes, such as the African Carbon Markets Initiative (ACMI), may also help to structure trading schemes to benefit projects in Africa directly and could be large enough to attract sufficient capital to finance and price them appropriately.[33] Except South Africa, carbon taxes have not been deployed as a tool to facilitate green industrial development. There are very enthusiastic proponents for carbon taxes in Africa, including the African Development Bank.[34] However, others are more cautious, arguing that carbon taxes unfairly constrain economic growth and industrialization in the least developed countries.[35] Developing a programme to finance the green transition in African countries, is in short, an exceptionally difficult task because much of it depends upon public financing, which many African states still need to have and will struggle to raise for the foreseeable future. Furthermore, at this time African governments are turning increasingly to commercial markets to borrow, which increases their costs of debt servicing.[36] Where there is a shared interest between African and European countries to invest in market development, more work can be done to define this and to build an agenda which recognizes that development assistance is the primary short to medium term tool that can be deployed. The question of how a market-based development finance approach is legitimate in the context of escalating economic nationalism and the context of just transition remains to be fully addressed. While European countries may defend their approach towards economic development based upon the principle of efficiency, African leaders question the increasing turn of the EU, along with other developed countries, towards deploying protectionist policies to support their local industries.

The issue of value addition and supply chains

There is a growing view in Africa that Africa should not just be a supplier of cheap green minerals or renewable energy to Europe but rather that the quest for global decarbonization and green industrial transition should be ceased as a potential window of opportunities for Africa to add value to its minerals and improve its position in the global value chain. The desire for Africa to leverage its abundant natural resources and initiate a new industrialization co-exists with Europe's need to access critical raw materials to feed its greening agenda and shore up its competitiveness, especially against China.

Africa desires to transform from supplying raw materials to the developing manufacturing capacities for green minerals. However, Africa confronts several difficulties in harnessing its green mineral wealth to foster economic development and sustainable growth. One of the foremost challenges in Africa's quest for green mineral development is the complex issue of resource management and ownership. Foreign companies often dominate the extraction and exportation of these minerals, leading to a significant portion of the profits leaving the continent. Weak governance structures, corruption, and lack of transparency further exacerbate this issue, making it difficult for African nations to assert control over their mineral resources and receive their fair share of the revenues.

Developing a green mineral manufacturing industry requires substantial infrastructure, including transportation networks, energy facilities, and processing plants. Many African countries need more infrastructure to support large-scale mineral extraction and processing operations. The cost of building and maintaining this infrastructure can be prohibitive, and the absence of reliable electricity grids and transportation networks hampers industrialization efforts. In addition, there are significant technological gaps in green mineral processing and manufacturing. Advanced processing techniques and technologies are essential for maximising the value added to these minerals. Many African nations need more expertise and infrastructure to

32 Dahlstrøm, R. (2022). A Review of Benefits, Constraints, and Research Opportunities in the Markets for Voluntary Offset Investments.
33 Bedair, H., et al., (2023). Funding African-led climate initiatives. *Nature Climate Change*, 1-2.
34 Holtz, L., & Heitzig, C. (2021). Figures of the week: Carbon taxes can fuel green economic recovery and reduce income inequality.
35 Tchapchet Tchouto, JE., Njoya, L., Nchofoung, T. et al. Investigating the effects of environmental tax regulations on industrialization in African countries. Environ Dev Sustain (2022). https://doi.org/10.1007/s10668-022-02808-3
36 Comelli, et al. (2023). "Navigating Fiscal Challenges in Sub-Saharan Africa: Resilient Strategies and Credible Anchors in Turbulent Waters." Departmental Papers 2023.007.

employ cutting-edge techniques, leading to the exportation of raw minerals at a fraction of their potential value. The absence of local research and development efforts further perpetuates this problem. Meanwhile, there is no indication that the EU is willing to pursue a radical partnership that will allow the significant manufacturing capacities in Africa at the expense of the EU's competitive interest. Equally important are the high political instability, regulatory uncertainties, and perceived risks. The lack of access to affordable financing options further hampers the development of manufacturing capacities.

In the EU, important energy transition needs, encompassing energy and hydrogen, as well as critical raw materials, present both opportunities and risks for a balanced green industrialization across continents. While there is potential for significant economic growth, there is also the looming danger of a contradiction or zero-sum game in the distribution of value and industrial jobs between Europe and Africa. Putting the risk in the open, committing to a balanced industrialization pathway, and fostering collaboration at all stages (design and in the organisations that underpin industrialization) will be needed to mitigate these risks. In this context, the concept of "net-zero strategic supply chains" adds a strategic dimension to green industrialization. This involves analysing comparative advantages and internal market perspectives to determine the specific characteristics and locations for key energy production. Developing energy supply systems is seen as a lead market driven by industry demand, justifying future profitability. The co-investment in green industries and energy transition is emphasised, recognising the mutual reinforcement between the two.

The impact of Europe's industrial and trade policies

To achieve its desire for climate leadership, radical decarbonization, energy security, and economic competitiveness, especially in relation to China, the US and the UK; the EU is seemingly abandoning liberalist trade agendas and moving back to an era of industrial policy to develop local industry. The European Green Deal Industrial Plan, launched in early 2023, makes it easier for member countries to provide subsidies and draw from European funds to support green industrial development, and more difficult to import from countries that have unfair trading practices. The Green Deal Industrial Plan is complemented by the Critical Raw Materials Act (CRMA), which aims to ensure European access to raw materials that are necessary for the green economy, and the Carbon Border Adjustment Mechanism (CBAM), which will tax the embedded carbon emissions of products imported into Europe. One scoping paper that Europe's reorientation towards industrial policy evokes "the scars of Structural Adjustment Programmes (SAP)" and is seen as an affront threatening Africa's fragile trade relationships. Another paper points out that African countries make up those whose exports are most exposed to tariffs under the regime.

The development of industrial policy in the EU is happening at a time when industrial development in many African countries has stalled or declined. This is the case in both Kenya and Nigeria, where the capital and labour costs of manufacturing are much higher than global averages, while productivity is lower.[37] With the CRMA, there is a window for African countries, who have 30% of the world's mineral deposits which are essential for manufacturing green technologies, to use it as an opportunity to build a shared agenda around the green development of the continents' mining sectors. There are some obstacles regardless, a key one being whether it is feasible to learn from previous rushes towards resource extraction so that African countries can achieve more broad-based economic development. Investment in a DRC-Zambian joint venture to manufacture batteries locally indicates that African governments are actively working on adding value to raw materials before export. However, chances of success would seem to remain low without access to transformational finance and technology partnership, the sort of which Europe may view as potentially compromising its own competitiveness.

Capacity and technology diffusion

Africa and Europe both recognise the existence of a significant skills gap that needs to be addressed for greater participation by Africa and African firms in the value chain. In the case of Namibia, this need is recognised in the *Green Hydrogen and Derivatives Strategy*

37 https://iap.unido.org/articles/can-sub-saharan-africa-break-global-manufacturing

and also in the report of the *Task Force on the Fourth Industrial Revolution,*[38] where in both instances, there is an expressed commitment to extensive capacity building programme to produce the workforce and skills necessary guide the green industrialization. The Namibian Government's intention to pursue Green Diplomacy as one of its strategic approaches creates an opportunity for dialogue with the EU around the skills needed to drive the energy transition and jobs in the hydrogen sector. The scoping paper identifies Namibia's challenge in terms of negotiating terms that ensure technology transfer, knowledge sharing, and investment without sacrificing its sovereign control over its resources or locking itself into exploitative arrangements. Without substantial efforts to enhance the skills and capacities of the local workforce, it is likely that job opportunities for Namibians will primarily revolve around construction and maintenance roles rather than the higher-paid, secure positions which demand specialised training and expertise.

The capacity-building aspect emerges as an essential enabler. Building local capacity for regulating the new hydrogen sector and technology transfer becomes a strategic approach for ensuring Namibia's long-term sovereignty. Skill development, knowledge exchange, and technology localisation can enhance the overall sustainability of the hydrogen industry. A more beneficial relationship between Namibia and the EU involves not only technology transfer but also focused investment in human capital, thereby ensuring mutual benefits. The Federal Ministry of Education and Research in Germany is set to allocate up to 40 million euros in funding from the Economic Stimulus and Future Package to support collaborative efforts within the context of this partnership.[39] This substantial financial commitment illustrates the government's keenness to promote cooperation in addressing vital human capital challenges and advancing mutual objectives. Namibian scientists will benefit from funding for research and acquiring skills in German universities. The allocation of 40 million euros represents a strong commitment to foster research, innovation, and development activities that align with the partnership's goals. The current dependency on both technical and financial investment in human capital puts Namibia in a precarious position in terms of enjoying the full benefits of the hydrogen transition. The skills gap and needs analysis commissioned by GIZ in August 2023 noted a mismatch between Namibia's education sector and the technical capacity needed in the hydrogen sector.[40]

The realisation of Namibia's green hydrogen potential is projected to generate a substantial number of jobs, with an estimated 85,000 direct employment opportunities by 2030, expanding to 185,000 by 2040.[41] These positions would primarily span construction, business services, transportation, and durable manufacturing sectors, alongside the creation of about 60,000 indirect jobs due to heightened economic activity. However, an underlying skills gap could impede the full harnessing of this potential. Current projections suggest that Namibia's available workforce by 2030, if left unaddressed, would comprise around 25,000 to 30,000 unskilled workers, 5,000 to 10,000 low-skilled workers, and a similar number of skilled workers, including fresh STEM graduates. This leaves a considerable talent gap of 55,000 to 60,000 workers, a number that could surge to 120,000 to 130,000 by 2040. Addressing the skills gap is crucial to unlocking the transformative potential of the green hydrogen industry in Namibia while ensuring that the workforce is equipped to contribute effectively to the country's energy transition and economic growth.

Governance issues

Industrial development has been hampered in several African countries due to approaches that undermine the ease of doing business such as corruption, high taxation, under investment and regulatory uncertainty. Even where there is a proclaimed common interest in promoting good governance, there are often differences in emphasis and priorities. In the European context, these interests may centre around issues that reinforce ease of doing business, good governance, consumer, employee, and investment protection, which will enable European investment, whereas, in the African context, these interests may centre on issues such as skills development, technology transfer

38 hppii.gov.na/storage/2023/04/4IRTF-Final-Report_2022-10-19_final.pdf

39 https://hydrogen-central.com/namibia-germany-hydrogen-deal/

40 Enhancing Employability: Skills Needs and Gap Analysis in Namibia's PtX Sector and Recommendations for a Skills Development Programme (2023). GIZ

41 Green Hydrogen and Derivatives Strategy, (2022). The Ministry of Mines and Energy, Republic of Namibia. pp.38-39

and processing of raw materials that will contribute to their long-term competitiveness in regional and global markets. European institutions often struggle to successfully promote a pro-market agenda that underscores good governance in a way that also avoids them being accused of meddlesomeness. This is more so when there is a rise in nationalism in some EU countries and when European governments are increasingly adopting more nationalist economic policy. One important area of opportunity for further work to promote the success of green industrialization is the openness, transparency, and effectiveness of contracts, particularly on establishing clear terms for lead markets and off-takers, ensuring foreseeability and managing financial risks, and promoting equitable value sharing. For example, the transition to hydrogen in Namibia is poised to generate multifaceted tensions among multilateral companies, the government, pressure groups, and locals. Multilateral companies, often driven by profit motives, may press for favourable investment conditions and market access, potentially clashing with the government's efforts to safeguard national interests, including resource management and economic equity. Meanwhile, pressure groups advocating for environmental and social justice may exert influence to ensure that the transition aligns with sustainability principles, potentially challenging government policies and corporate interests. Balancing these diverse interests while facilitating a just energy transition will be a complex endeavour for Namibia. Collaborative frameworks should emphasise transparent governance, community involvement, and capacity-building to ensure that the benefits of green hydrogen production extend to local communities and contribute to sustainable development. By navigating this delicate balance, Namibia and the EU can reshape their relationship from one tinged with extractive undertones to a partnership founded on mutual respect, shared benefits, and a commitment to rectifying past imbalances.

KEY RECOMMENDATIONS

1. **Recognize and Address Differences in Priorities, Framings and Understanding of Just Transition:**
   European and African countries should explicitly recognise and discuss the differences in their priorities, framings and understanding of key concepts such as climate justice, green industrialization, and just transition, as well as what such differences might mean for how they design and implement effective partnership sustainable green industrialization in both continents. Deliberations on the just transition should consider trade-offs and whether they align with the interests of African states. A coordinated approach to the just transition is essential, focusing on transition fuels, the Carbon Border Adjustment Mechanism (CBAM), economic development, and governance. African countries should actively participate in discussions to ensure that decisions by the European Union consider the competitiveness of Africa-based businesses, emphasising skills, capacity development, and technology transfer.

2. **Encourage the formation of transformative financial partnerships:**
   There is a need for radical, paradigm-shifting financial co-operation to fund green transition in Africa. Such a co-operation should strike a balance between public and private finance and between long-term and short-term financing needs. At the same time, while securing financial support is crucial, the focus should also shift towards capturing added value and industrial jobs in reconfigured supply chains. This entails reevaluating norms and standards in finance and trade, transforming barriers into enablers for sustainable practices. Regulation of Foreign Direct Investment (FDI) and fiscal incentives should be disciplined on both sides to ensure equitable and mutually beneficial partnerships.

3. **Prioritise Green Skills Development and Technology Partnership Invest significantly in education and skills development programs tailored to the green hydrogen sector and its value chain.**
   Collaborate with institutions locally, regionally, and internationally in an equitable fashion that fosters a win-win situation to nurture a skilled workforce capable of driving the hydrogen economy. It is recommended that a green skills gap audit be conducted around which a comprehensive green skills development programme will be developed to ensure inclusivity, particularly for women and the youth.

4. **Improve Governance and Coordination**
   This includes through bilateral investment treaties, and domestic regulation in African countries. Capacity building at the individual, organisational and crucially institutional levels can play a pivotal role in improving good governance and concerted efforts to combat corruption. Both European and African states should identify and invest in strategically important sectors without expecting immediate private sector participation. The focus should be on long-term goals, improving tax collection rates, and creating conditions conducive to investor participation. Leveraging Productive Use of Energy (PUE) approaches can align green investment with economic development goals. African states can coordinate to communicate development interests effectively with Europe, particularly in managing the extraction of new energy and material resources. Coordination relies on shared interests, African institutional capacity, and European confidence in credible partnerships. The African Union, representing fifty-five states, could play a key role in coordinating such efforts.

5. **Involve Local Communities and Non-State Actors in Policy Discussions**
   Formalising the role of non-state actors, including businesses and civil society, in agenda-setting and policy formulation is crucial. Understanding their interests and capacity is vital for effective government support in developing the green industry.

CONCLUSION

European and African countries can and do work productively together to mobilize for green industrialization. The cases summarised in this synthesis paper outlines several areas of cooperation and investment by European development institutions to support the growth of a green economy in Africa. However, they also raise important issues of conflict which should be addressed for both parties to achieve the most out of the partnership and for African countries, in particular, to meet economic development goals in tandem with their green industrialization goals. The way that European and African countries choose to answer these questions will impact their co-operation to achieve a just transition. While each question is a source of conflict, it is not necessary that they are intractable. Rather, by addressing these questions together, European and African countries can have more direct conversations about their interests and capacity to deliver on the goals of a green transition.

Ukàmà

Solidarity for prosperity