

Just transition: measuring efficacy and adaptation in Africa in the context of the Euro-African partnership for a sustainable energy transition

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Abstract:

Transitioning from fossil fuels to sustainable energy sources has become the new set goal for the international community. As temperatures are on the rise, a call for the employment of best available techniques and technologies to address climate change has become dire to maintain global temperatures at 1,5°C. To this end, the European initiative for a just transition offers a new perspective on how clean energy can help reduce GHG emissions and attenuate the effects of global warming. Africa plays equally a pivotal role in this equation for the abundant mineral resources needed for the production of clean technologies and has significant renewable energy potential, especially in solar and wind power. Although faced with several risks and difficulties, these capacities strengthen the continent's contribution to global decarbonization while addressing its own development priorities, ensuring that this collaboration leverages structural change and equitable energy access. This article aims to study how the interregional collaboration between Europe and Africa can harness change for both continents by creating opportunities, protecting livelihoods and ensuring local benefits. Yet remains the central question if this transition is equitable and beneficial for both regions, especially in regard to the weak governance structures and insufficient financing in the African region. The exploitation of these resources without fair benefit sharing could lead to extractive patterns of dependency, while the decarbonization process may undermine societies still reliant on fossil fuels.

Keywords: Just transition, sustainable development, clean technologies, renewable energy

Résumé:

La transition des énergies fossiles vers les énergies durables et soutenables est devenue le but ultime de la communauté internationale afin de lutter contre les effets nocifs du réchauffement climatique. La nécessité de recourir aux meilleures techniques et technologies est désormais impérative pour stabiliser les températures globales. De ce fait, l'initiative européenne pour une transition juste offre une nouvelle perspective sur l'importance des énergies renouvelables et sur leurs rôles dans la réduction des émissions des gaz à effet de serre. L'Afrique joue également un rôle stratégique dans cette équation grâce à ses ressources minérales abondantes requises pour la production des technologies vertes et



dispose d'un important potentiel en énergies renouvelables, notamment solaire et éolienne. Ces atouts renforcent le rôle du continent dans la contribution au mouvement global de décarbonisation, tout en adressant en parallèle ses défis socio-économiques, afin d'assurer que cette collaboration valorise le changement structurel et l'accès équitable aux services énergétiques. Cet article a pour but d'analyser comment l'alliance inter-régionale peut apporter des transformations tant sur le continent africain que sur l'espace européen à travers la création d'emplois, la protection des communautés locales et vulnérables. Toutefois, cette transition doit demeurer équitable, en tenant compte de la fragilité gouvernementale en Afrique et du manque de financement climatique dans les régions en situation de fragilité. L'exploitation de ces ressources sans partage équitable des bénéfices pourrait engendrer des schémas extractifs de dépendance.

Mots-clés : énergie durable, développement durable, transition énergétique, technologies vertes,

Introduction:

The 2018 Intergovernmental Panel on Climate Change report (IPCC 2018) raised the question ,ever more urgently, how a sustainable reduction of greenhouse gas emissions can be achieved at a European level and worldwide.⁷²⁴

From the droughts in central Africa, to the decline of the Amazonian forest, the melting ice of the North Arctic and the growing risk of endangered species, to the rising sea levels, climate change is a global phenomenon that knows no barrier.

To avoid anthropogenic climate change and risks for ecosystems and human health, calls for a thorough transformation of the global energy system from fossil fuels towards a more sustainable pathway have become the primary focus. Sustainability criteria translate into multiple policy targets for the energy sector, such as climate change mitigation, reduction of local environmental damages, energy security, phase-out of nuclear power plants, "green" economic growth associated with green jobs and poverty reduction, as well as maintaining or achieving a sufficient food supply.

One of the first ever communities to be affected by this phenomenon are the Indigenous communities, small island developing states and the marginalized populations. They are at a higher risk of losing generations' worth of practices and history, and are at a higher level of urgency due to their inability to tackle climate change issues independently since their economies rely particularly on agriculture. This leaves communities in danger of total ruin, and others with a potential refugee crisis. North Africa currently faces escalating climate challenges with rising temperatures, declining rainfall threatening water and food security, while the European peninsula suffers from more frequent heatwaves, accelerated desertification, and rapid sea-level rise.⁷²⁵

⁷²⁴ DEL GRANADO, PEDRO CRESPO, et al. "Energy Transition Pathways to a Low-Carbon Europe in 2050: The Degree of Cooperation and the Level of Decentralization." *Economics of Energy & Environmental Policy*, vol. 9, no. 1, 2020, pp. 121–36. *JSTOR*, <https://www.jstor.org/stable/26900109>. Accessed 4 July 2025.

⁷²⁵ Sabine Emran Hanne Knaepen Larabi Jaïdi, *Energy and Climate Finance in the Context of the EU–North Africa Partnership*, 2025

<https://www.policycenter.ma/publications/energy-and-climate-finance-context-eu-north-africa-partnership>



To attenuate the effect of fossil fuels, the engagement of regional organizations (ROs) has become the mechanism to embrace the governance of clean energy with the potential to promote the adoption of new energy technologies and policy change. In this context, the Africa-Eu Energy Partnership (AEEP) was launched as an inter-regional energy initiative to support energy governance capacity development across Africa. To achieve the goal of universal access to affordable, sustainable, and modern energy in Africa and most importantly Sub-Saharan Africa, an energy partnership between the EU and the head of states in the African Union (AU) was adopted to enhance collaborative decision making and develop a data-driven energy policy framework. Inter-regional energy partnership between Africa and the EU is said to provide fora for political dialogue and prepare an agenda for shared concerns on energy. This has influenced the avalanche of academic research in regional dialogue and integration. It should be noted that the institutionalization of Africa-EU relations with interregional dialogue is preceded by fragmented political and economic relationships. The duo regions have dwelled in decades of trade relations prior to the Joint Africa-EU Strategy (JAES) ⁷²⁶.

Therefore, the Africa-EU commitment to sustainable development has emerged into interregional partnerships to enhance collaborative efforts in achieving socio-economic transformation in Africa and the EU. Significantly, the promotion of renewable energy, among other drivers of sustainable development in the Africa-EU partnership, is explained in the context of its potential to solve rising energy demand and the environmental effects of fossil fuels. ⁷²⁷

It should be noted that the European Union currently has legally fixed climate targets for the year 2030 and are considered as the leading regions in renewable energy. They encompass an EU-wide greenhouse gas emission reduction target of 40 % (compared to 1990 emission levels), a greater importance of renewable energies with a share of at least 32% of gross final energy, and an improvement of energy efficiency with 32.5 % less energy consumption compared to a no-policy baseline. For several years now, European policy makers, stakeholders and academics have discussed 2050 targets and how to get there from 2030 onwards. It is essential to set long-term goals for 2050 and outline the path to achieve emission reductions compatible with the global 1.5°C climate target. ⁷²⁸

In this regard, North Africa plays a strategic role in this global energy transition, given the region's abundant renewable resources, with some of the world's highest solar irradiation and strong winds. Joint efforts could advance shared sustainable energy solutions and generate mutual benefits. In addition to interregional cooperation, international Climate finance also plays a crucial role in facilitating the renewable energy transition. Egypt, Tunisia,

⁷²⁶ Adiatu, Afeez, Energizing the Inter-regional Cooperation and Energy Governance: An Exploration of the Africa-EU Energy Partnership, *J.sustain. dev. energy water environ. syst.*, 12(4), 1120517, 2024, DOI: <https://doi.org/10.13044/j.sdewes.d12.0517>

⁷²⁷ Roehrkasten, Sybille, *Global Governance on Renewable Energy*. Wiesbaden: Springer Fachmedien Wiesbaden, 2015, <https://doi.org/10.1007/978-3-658-10480-1>.

⁷²⁸ DEL GRANADO, PEDRO CRESPO, et al. "Energy Transition Pathways to a Low-Carbon Europe in 2050: The Degree of Cooperation and the Level of Decentralization.", pp. 121–36. op cit



Morocco and Algeria are well-positioned to lead this transition, while advancing their own renewable energy sectors, green industrialization and the hydrogen economy. Through the EU's Global Gateway Africa Europe Investment Package, various flagship projects have been approved for North Africa since 2023. These include green energy projects in Algeria and Tunisia (MedLink) (Council of the European Union, 2024), a 1.7 GW renewable energy program in Tunisia in 2024 (Hellenic Aid, 2024) or the construction of a high-voltage undersea electrical interconnection between Egypt and Greece in 2023 (French Ministry of Europe and Foreign Affairs, 2023). However, realizing this potential requires significant investment and infrastructure development to ensure a just and sustainable transition that benefits both local economies and global partners.

Although Africa's share of global investments in renewable energy development and installed capacity remains relatively small, the continent's recent robust economic growth and rapid population growth will require more energy resources to drive future development.⁷²⁹

With this aim in mind, to what extent can application of the just transition strategy reshape Africa's energy future and reconcile the continent's needs with global climate goals ?

I) Reflections on the Just transition cooperation in the context of the EU-Africa green alliance:

1) The AFRICA-EU joint Renewable Energy Governance

The 2015 Paris Agreement mandates all parties to reduce emissions by setting targets and goals for 2050. The Agreement was adopted by 196 Parties at the UN Climate Change Conference (COP 21) in Paris, France, in 2015. It established a legally binding treaty to limit global warming by reducing greenhouse gas emissions. This includes limiting global temperature rise to 1.5 °C relative to preindustrial levels and reducing emissions of greenhouse gases to net zero by 2050. Reflecting this, the Paris Agreement encourages the development of low-emission technologies that improve resilience to climate change. These include renewable energy technologies, efficiency improvements, and climate adaptation measures. Decarbonization initiatives are, therefore, at the center of the Paris Agreement as a growing number of global, regional, and national initiatives drive actions to develop and deploy low-emission technologies across all sectors of the global economy. Although decarbonization is required across all sectors of the global economy, the energy sector is at the center of reducing global greenhouse gas emissions. This is because fossil-based energy sources, such as coal, oil, and gas, are the major contributors to global emissions, accounting for approximately 75 % of all greenhouse gas emissions and nearly 90 % of all carbon emissions. Decarbonizing the energy sector requires the adoption of renewable and clean energy applications. Renewable energy sources emit no greenhouse gases into the atmosphere and, by 2050, could decarbonise 90 % of the energy sector by drastically reducing emissions.⁷³⁰

⁷²⁹ Nsafon BEK, Same NN, Yakub AO, Chaulagain D, Kumar NM and Huh J-S (2023), The justice and policy implications of clean energy transition in Africa. *Front. Environ. Sci.* 11:1089391. doi: 10.3389/fenvs.2023.1089391

⁷³⁰ James Boaf, Senyo Dotsey, Rochelle Spencer, Energy transition diplomacy: The EU's pursuit of Africa's critical minerals for renewable energy at whose expense?, *Energy Research & Social Science*, Volume 127, 2025, <https://doi.org/10.1016/j.erss.2025.104213>.



The energy transition is a transformative process that requires political and societal will, effective policies, investment in research, innovation, technologies and human capital, and—above all—collective efforts and collaboration among states and people. A just energy transition requires not only equitable, fair and just measures within countries, but also balanced regional collaboration. The European Union (EU) and North Africa are neighbors, each with visions, objectives and goals for a just energy transition, and ambitions to collaborate on many related issues—a case of countries from both the Global North and the Global South sharing ambitions to build a sustainable future. The EU is one of the leading regions in renewable energy, possessing extensive expertise and advanced technologies for developing large-scale projects and managing clean energy systems. Meanwhile, North Africa is rich in valuable natural resources for renewable energy, particularly solar and wind power. This provides a unique opportunity for both regions to benefit from collaboration in developing green and clean energy infrastructure and systems. The geopolitical landscape significantly shifted following Russia's invasion of Ukraine in 2022, pushing the EU to reassess its approach to energy policy. This led to introducing a new strategic focus on diversifying energy sources and reducing reliance on Russian energy imports.⁷³¹

To this end, Europe is funding clean energy projects in Africa through different initiatives and programmes. This includes the European Union's 'Global Gateway' initiative. In November 2024, the European Commission launched with South Africa the 'Scaling up Renewables in Africa' campaign with the objective of 'mobilizing investments in Africa'. In early March 2025, the European Commission (EC) and the World Bank announced their intention to align the EC's 'Scaling Up Renewables in Africa' campaign with Mission 300, an initiative launched by the World Bank and the African Development Bank to give access to electricity to 300 million people in Africa by 2030.⁷³²

This action marks a unique initiative that also brings together African governments for the development of their own strategies, the private sector, and development partners to deliver affordable power, expand electricity access, boost utility efficiency, attract private investment and improve regional energy integration that drives economic transformation through the Dar es Salaam Energy Declaration, urging important sector reforms via country-led Energy Compacts. To build on these reforms, the World Bank Group is increasing its support for energy projects in Africa, committing \$30 to \$40 billion in IDA resources between now and 2030, while using innovative tools to mobilize private sector investment..⁷³³

<https://www.sciencedirect.com/science/article/pii/S2214629625002944>

⁷³¹Laury Haytayan, U–North Africa Energy Partnerships: Is a Win-Win Formula

Possible? <https://resourcegovernance.org/publications/eu-north-africa-energy-partnerships-win-win-formula-possible>

⁷³²Mostefa Ouki, Africa's energy transition and recent geopolitical, political and policy turbulences, 2025, Oxford Institute for Energy Studies (OIES) Energy Comment. <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2025/04/Comment-Africas-energy-transition.pdf>

⁷³³World Bank Group. Mission 300: Powering Africa – Overview. 2025
<https://www.worldbank.org/en/programs/energizing-africa/overview>



Accordingly, North Africa is at the forefront of new utility-scale wind and solar deployment on the African continent. The region boasts nearly 50% of Africa's total wind power generation capacity and approximately 20% of its grid-based solar power generation capacity.⁷³⁴

Egypt, Tunisia, Morocco and Algeria are well-positioned to lead this transition, while advancing their own renewable energy sectors, green industrialization and the hydrogen economy.⁷³⁵

For instance, Algeria's solar potential is among the most abundant globally, and it also has promising wind energy potential. Similarly, Morocco has emerged as a key player in the region for developing and executing renewable energy projects, utilizing its solar and wind resources. Both Algeria and Morocco's wind, solar, and hydropower resources hold immense potential for producing green hydrogen. Pioneering efforts in Morocco and Egypt are already underway, including investment to support the development of a hydrogen industry. Moreover, through its "Projects of Common Interest" (PCIs) framework, the EU invests in energy infrastructure projects in North Africa, including electricity interconnections to promote energy security, renewable energy, and climate goals. Under this project, eligible companies can apply for grants under the Connecting Europe Facility for Energy. Since the inception of this project, only the ELMED 600 MW project has attracted interest. Under this project, Société Tunisienne de l'Electricité et du Gaz (STEG) is receiving a grant to finance the construction of a 600 MW high-voltage submarine cable connecting electricity transmission from Tunisia to Italy. Other notable renewable energy projects in North Africa benefiting from EU funding include Egypt's 240 MW wind farm on the western coast of the Gulf of Suez and Morocco's solar projects with the completed 580 MW Noor Ouarzazate complex and the ongoing 1600 MW Noor Midelt initiative. The EU funding intention is to leverage North Africa's abundant solar resources, contributing to its decarbonization goals while supporting North Africa's energy infrastructure development.⁷³⁶ Renewed solidarity could be the most valuable outcome of a commonly designed and implemented European energy transition.⁷³⁷

2) linking Energy transition to structural change and productivity growth in Africa:

The countries in Africa are by far the poorest countries in the world and thus stand to gain the most from structural transformation.⁷³⁸ And although Africa contributes less than 5% to

⁷³⁴James Boaf, Senyo Dotsey, Rochelle Spencer, Energy transition diplomacy: The EU's pursuit of Africa's critical minerals for renewable energy at whose expense?, Op cit

⁷³⁵Sabrina Emran Hanne Knaepen Larabi Jaïdi, *Energy and Climate Finance in the Context of the EU-North Africa Partnership*, Op cit

⁷³⁶ James Boaf, Senyo Dotsey, Rochelle Spencer, Energy transition diplomacy: The EU's pursuit of Africa's critical minerals for renewable energy at whose expense? ,Op cit

⁷³⁷ Felix Creutzig, Jan Christoph Goldschmidt, Paul Lehmann, Eva Schmid, Felix von Blücher, Christian Breyer, Blanca Fernandez, Michael Jakob, Brigitte Knopf, Steffen Lohrey, Tiziana Susca, Konstantin Wiegandt, Catching two European birds with one renewable stone: Mitigating climate change and Eurozone crisis by an energy transition, Renewable and Sustainable Energy Reviews, 2014, <https://doi.org/10.1016/j.rser.2014.07.028>, <https://www.sciencedirect.com/science/article/pii/S1364032114004808>

⁷³⁸ McMillan, M., Rodrik, D., & Verduzco-Gallo, *Globalization, structural change, and productivity growth, with an update on Africa*, world development, 2024, https://www.sciencedirect.com/science/article/abs/pii/S0305750X13002246?fr=RR-2&ref=pdf_download&rr=99876cfdcb644f8a



global greenhouse gas (GHG) emissions, its role in global climate action is pivotal. To date, 53 African countries have submitted their Nationally Determined Contributions (NDCs), and four have committed to a net-zero target.⁷³⁹

As many African states embrace renewable energy technologies and take advantage of growing support from global partners as well as the private sector, there will be a growing need to focus on ensuring progress on the green transition in fossil fuel-based economies.⁷⁴⁰

To this end, this energy transition must be based on leveraging the continent's tremendous renewable energy potential and its vast prospects for universal energy access, while creating more employment opportunities and advancing industrialization. Through the right technological and financial assistance, Africa can actually revolutionize its economies and become a global leader in inclusive green energy growth using its abundant energy resources.⁷⁴¹ By adopting sustainable practices and investing in renewable energy and green technologies, urban centers can reduce their reliance on fossil fuels, lower carbon intensity, and mitigate environmental degradation. This shift not only contributes to global climate targets but also positions cities to achieve broader sustainability goals. Achieving this transformation requires significant investments and the development of supportive policy frameworks.⁷⁴²

Green investment can stimulate local economic growth and deliver high-productivity job opportunities. Improved access to dependable sources of energy enhances the productivity of households and local firms, thereby boosting wider economic development. Specifically, investment in renewable energy facilities, such as hydroelectric power plants, solar arrays, and biomass installations, generates employment during construction, installation, and subsequent maintenance. These activities require a workforce equipped with newly developed technical skills, confirming the importance of targeted training programmes and capacity-building initiatives.

In addition, there is scope to expand local manufacturing sectors tasked with producing materials and components used in these renewable energy systems, further driving job creation . Transitioning to a 100% renewable electricity system could generate substantial employment across Africa, particularly in labour-intensive sectors such as solar photovoltaic and energy storage. The study estimates that the number of new jobs created in the renewable sector would outweigh those lost from the phase-out of fossil fuels, resulting in a net employment gain across the energy transition. These findings suggest that aligning

⁷³⁹ Environ. Sci. Technol. 2024, 58, 35, 15522–15538

⁷⁴⁰ ALEX BENKENSTEIN, ROMY CHEVALLIER, Partnership for a Green Transition and Energy Access: Strategic priorities for Africa and Europe, South African Institute of International Affairs, 2020 <https://www.jstor.org/stable/pdf/resrep28399.pdf>

⁷⁴¹ Nsafon BEK, Same NN, Yakub AO, Chaulagain D, Kumar NM and Huh J-S (2023), The justice and policy implications of clean energy transition in Africa. Front. Environ, Op cit

⁷⁴² Ouattara, Bazoumana (2025) : Building net-zero African cities: Decarbonization and structural transformation, WIDER Working Paper, No. 43/25, ISBN 978-92-9256-602-9, The United Nations University World Institute for Development Economics Research (UNU-WIDER), Helsinki, <https://doi.org/10.35188/UNU-WIDER/2025/602-5>



national energy strategies with workforce development is vital to ensure African economies fully capitalize on the employment and development opportunities linked to decarbonization. Hence, structural transformation, underpinned by green investment, can serve as an effective means of reducing energy poverty while simultaneously advancing decarbonization in African cities. By integrating cleaner energy solutions with enhanced economic opportunities, this approach fosters sustainable growth and strengthens urban resilience against the escalating impacts of climate change.⁷⁴³

Many countries' experiences have been successful in showing that targeted investments in renewable energy sectors can reduce energy poverty, create more job opportunities and advance decarbonization goals. Case studies from across Africa highlight how structural transformation can address these challenges. In South Africa for instance, the Renewable Energy Independent Power Producer Procurement Programme fosters investment in solar and wind, significantly diversifying the country's energy mix away from coal. Similarly, Morocco's Noor Ouarzazate Solar Complex demonstrates how large-scale solar ventures can stimulate job creation and support decarbonization. Senegal's Senergy 2 solar power plant enhances rural electrification and reduces reliance on diesel generators, while off-grid solar initiatives in Nigeria lower operational costs and expand electricity access in remote areas. Kenya's renewable energy efforts, including solar mini-grids and geothermal projects, broaden electricity access and cut emissions, as exemplified by the Lake Turkana Wind Power Project. Hydropower developments also play an important role: in Ethiopia, investments such as the Grand Ethiopian Renaissance Dam create new jobs in construction and engineering while helping to meet the energy demands of a growing population. Together, these examples illustrate that structural transformation through renewable energy investment not only addresses energy poverty but also drives broader decarbonization and inclusive economic growth across African cities and regions.⁷⁴⁴

As for the governments in sub-Saharan Africa, they are keen to develop all their resources and raw materials (natural gas, oil, wood, even coal, and minerals), both for export and for local use. Increasingly, they are seeking to make use of carbon credits, like from primary forests that absorb gigantic quantities of CO₂, benefiting the whole planet, while also developing agricultural projects, notably those that can produce biochar. Encouraging green hydrogen has also become an objective. They are striving: to develop or strengthen infrastructure, particularly for landlocked countries (such as Uganda, Niger, Rwanda, etc.) or semi-landlocked countries (such as the Democratic Republic of Congo), which face high additional costs to lift their populations out of poverty and access global markets; to improve access to energy and clean cooking.⁷⁴⁵

⁷⁴³ Ouattara, Bazoumana : Building net-zero African cities: Decarbonization and structural transformation, WIDER Working Paper, No. 43/25, ISBN 978-92-9256-602-9, The United Nations University World Institute for Development Economics Research (UNU-WIDER), Helsinki, Op cit

⁷⁴⁴ Idem

⁷⁴⁵ Swetha Ravi Kumar Bhagwat, Maria Olczak, Pradyumna Bhagwat, Andris Piebalgs and Ilaria Conti, *Green Hydrogen: Bridging the Energy Transition in Africa and Europe*. Florence School of Regulation, European University Institute, 2025 DOI: 10.2870/126402. ISBN: 978-92-9084-931-5.



In the same vein, it is globally recognised that Africa's abundant sun exposure also presents it with enormous potential to become a reliable source of renewable energy. This fact has been recognised in a detailed mapping study, H2ATLAS AFRICA, currently underway in a partnership between the German federal government, the SADC Centre for Renewable Energy and Energy Efficiency and the ECOWAS Centre for Renewable Energy and Energy Efficiency. This work shows that Africa has the potential to produce green hydrogen in a sustainable and cost-effective fashion. With an appropriate enabling policy environment, the decreasing cost of electrolyzers and supportive technology, it should be able to exploit its vast renewable energy potential.⁷⁴⁶

While transitioning brings several challenges, including environmental pressures, it also creates opportunities to use resources more efficiently and safeguard biodiversity and ecosystems. More importantly, this transformation can serve as a catalyst for structural transformation in Africa. In the context of African cities, it is argued that structural transformation would help in the decarbonization process and therefore in the achievement of sustainable cities. 'Structural transformation' in the decarbonization discourse describes the profound, enduring changes necessary to drastically reduce carbon emissions and fundamentally reconfigure our economic and social systems. Broadly defined, it is the process of shifting labour from low-productivity to high productivity sectors, a change that not only drives economic growth but also underpins efforts to decarbonize energy systems.

In addition, it is important to support capacity building and technology transfer in Africa in order to fully transition to clean energy. Many countries on the continent lack the technical expertise and infrastructure needed to embrace clean energy technologies fully. Supporting capacity building and technology transfer can help build the necessary skills and infrastructure needed to support the clean energy sector's growth.⁷⁴⁷

II) Measuring disparities and the structural barriers: challenges and limitations in African climate governance

1) Revisiting the framework for a win-win Europe-Africa Energy and Climate Partnership in a time of changing global context

The recent climate policy and regulatory challenges and new political and geopolitical realities could render Africa's already difficult attempts to achieve a 'fair' energy transition even more problematic. Europe's urgent need to significantly boost its defence spending, as the United States takes an isolationist position, will affect Europe's ability to provide public funding for the continent's clean energy projects. This Energy Comment outlines the potential impact of these multi-dimensional challenges on Africa's energy transition, namely the overall funding

⁷⁴⁶ NEUMA GROBBELAAR & LWAZI NGUBEVANA, Ensuring a Just Energy Transition through Hydrogen: How the G20 can Support Africa, South African Institute of International Affairs South African Institute of International Affairs, 2022 <https://www.jstor.org/stable/pdf/resrep40064.pdf>

⁷⁴⁷ Nsafon BEK, Same NN, Yakub AO, Chaulagain D, Kumar NM and Huh J-S (2023), The justice and policy implications of clean energy transition in Africa. Front. Environ. Sci, Op cit



of its clean energy projects; the changing funding structure of these projects; and the continent's decarbonization and methane emission reduction commitments.⁷⁴⁸

The economic argument for renewables in North Africa is compelling due to the significant decrease in solar and wind technology costs. The prospect of generating renewable energy in the Sahara Desert and exporting it to EU Member States has gained increasing attention, primarily due to their limited solar and wind potential, as well as the scarcity of available land for large-scale energy infrastructure. The idea of exporting electricity from North Africa to EU Member States is not new; it gained widespread attention in July 2008, when the newly established Union for the Mediterranean identified the Mediterranean Solar Plan (MSP) as one of its six main priorities. The vision received significant media and political attention in July 2009 when a private business group launched the Desertec Industrial Initiative (DII). The goal of the Solar Plan was to establish 20 gigawatts (GW) of renewable energy generation capacity in the Mediterranean region by 2020. The DII aims to supply 15 % of the EU's electricity consumption and a substantial portion of domestic demand in North Africa by 2050. Both initiatives focus on solar power and aim to export some of the generated electricity to the EU. North Africa's renewable energy potential could significantly contribute to the EU's energy diversification and sustainability goals. As a result, the region has the potential to be an essential ally in the EU's energy transition over the medium and long term.

Moreover, through its "Projects of Common Interest" (PCIs) framework, the EU invests in energy infrastructure projects in North Africa, including electricity interconnections to promote energy security, renewable energy, and climate goals. Under this project, eligible companies can apply for grants under the Connecting Europe Facility for Energy. The evolving dynamics of foreign investment in African nations have been a subject of longstanding interest and concern. The contrasting approaches of the EU and China have been central to recent discussions, while the EU emphasises investment dialogues, China provides financing with fewer political or ethical conditions. Over the years, the EU has opposed China's dominance in Africa, driven by concerns over geopolitical sway, access to critical resources, and emerging economic opportunities in the continent's energy sector.

The global transition to renewable energy sources seems to offer hopeful environmental sustainability and social well-being. Yet, as recent research shows, if not properly managed, this shift could exacerbate inequalities, resulting in winners and losers during the transition process.⁷⁴⁹

There remains a growing concern across the North African region is whether the benefits of the green transition will be equitably distributed, particularly given disparities in market readiness and industrial competitiveness. The EU's Carbon Border Adjustment Mechanism is widely perceived as a policy that primarily serves European interests, raising concerns over its impact on North African economies that rely on energy-intensive exports. While leading

⁷⁴⁸ostefa Ouki, Africa's energy transition and recent geopolitical, political and policy turbulences, 2025, Op cit

⁷⁴⁹ James Boafo, Senyo Dotsey, Rochelle Spencer, Energy transition diplomacy: The EU's pursuit of Africa's critical minerals for renewable energy at whose expense?, Op cit



nations in the energy transition capitalize on job creation and technological advancement, North Africa continues to lag in renewable energy integration, missing out on the economic spillovers associated with clean energy investment.⁷⁵⁰

Regarding social impacts, transitioning from fossil fuels directly affects communities whose livelihoods depend on extractive industries. Intrinsically, job losses in these sectors would aggravate poverty and inequality, particularly in communities where alternative employment opportunities are limited. Displaced workers and their communities may struggle to adapt to the changing economic landscape without adequate support or retraining programmes. On a global scale, some argue that African nations bear an unfair burden of addressing climate change, considering their historically low contribution to global greenhouse gas emissions. This inequity raises questions about the responsibility of developed nations to provide financial and technological support to facilitate the transition in Africa. Governance challenges, including corruption, political instability, and weak regulatory frameworks, further complicate the implementation of the just transition.⁷⁵¹

A just transition to clean energy requires that opportunities and costs are distributed equitably, while meaningfully engaging all stakeholders in the decision-making process. Emerging evidence suggests that various forms of injustice exist in the energy transition process in the global South, including distributive, procedural, recognition, and restorative injustices. Injustices in the transition process frequently perpetuate pre-existing inequalities, the dispossession of resources, and lock-in/path dependency.⁷⁵² Overall, the region faces a significant mismatch between the financial needs of its energy sector and the actual funds received to support its energy transition, with climate finance in Africa overwhelmingly dominated by debt instruments that often come with restrictive terms and high borrowing costs. This financial asymmetry exacerbates the continent's difficulties in accelerating its energy transition, reinforcing structural barriers to low-carbon growth.⁷⁵³ A just and equitable transition to clean energy involves carefully balancing the shift towards clean energy with advancements in human development. The EU's capital and technical investments in renewable energy in North Africa should create opportunities for a win-win outcome, including ensuring that such mega solar and wind energy projects have minimal ecological impacts on local communities and people.⁷⁵⁴

⁷⁵⁰ Sabrine Emran Hanne Knaepen Larabi Jaïdi, *Energy and Climate Finance in the Context of the EU–North Africa Partnership*, 2025, Op cit,

⁷⁵¹ Abbass, K., Qasim, M. Z., Song, H., Murshed, M., Mahmood, H., & Younis, I.. A review of the global climate change impact adaptation and sustainable mitigation measures. *Environmental Science and Pollution Research*, 2022, 42539–42559. <https://link.springer.com/article/10.1007/s10784-025-09684-y>

⁷⁵² James Boafo, Senyo Dotsey, Rochelle Spencer, Energy transition diplomacy: The EU's pursuit of Africa's critical minerals for renewable energy at whose expense?, Op cit,

⁷⁵³ Sabrine Emran Hanne Knaepen Larabi Jaïdi, *Energy and Climate Finance in the Context of the EU–North Africa Partnership*, 2025, Op cit

⁷⁵⁴ James Boafo, Senyo Dotsey, Rochelle Spencer, Energy transition diplomacy: The EU's pursuit of Africa's critical minerals for renewable energy at whose expense?, Op cit



For a true win-win cooperation scenario, the EU's approach must be based on mutual benefit, shared interest and a balanced exchange. There must be equilibrium between Europe's increasing demand for clean energy and North Africa's development needs. This includes addressing Europe's energy security, while fostering economic and social development in North African countries.⁷⁵⁵

2) Addressing research and capacity deficits in African Climate Governance:

The current understanding of GHG emissions in SSA (sub Saharan Africa) is notably limited, despite the continent's significant potential to both absorb and produce GHGs (Kim et al. 2016a, b; Boateng et al. 2017). This lack of understanding is due to various factors, such as incomplete data, inadequate monitoring systems, and the complexity of emission sources and absorbers in the region. Sub-Saharan Africa faces challenges in collecting and analysing GHG emissions data because many countries in the region lack the necessary financial and technical resources to set up effective monitoring systems. As a result, the data is often sporadic and outdated, making accurate assessment of current emissions levels difficult. Additionally, the diverse ecosystems in SSA, from dense tropical forests to expansive savannas, require specific monitoring approaches, further complicating data collection efforts⁷⁵⁶

It should also be noted that the realization of full potential is still heavily dependent on foreign financial and technical intervention. Many scholars, commentators and policymakers believe that the whole concept is more theoretical than a practical strategy for alleviating poverty and boosting economic growth on the continent. These authors are of the view that the relationship between climate action and sustainable development is not as straightforward in Africa. Karkare concurred that since most of the world's least-developed countries are located on the continent, Africans should prioritize development first, even if it means continuing to use fossil energy sources. Similarly, the continent's debt now stands at more than 70% of GDP and is growing. It is projected that the continent will lose 2–5% of GDP per year should it succumb to the pressure of switching to the just transition without adequate planning. Supporting this argument, Frankel argued that some countries such as Malawi, Uganda, Seychelles and Zambia are yet to exploit the potential of natural fossil energy reserves for their economic growth. Countries such as Mozambique, Tanzania, South Sudan, and Ghana aim to take advantage of their gas reserves for both export revenues and domestic industrialization. These reserves are estimated to increase GDPs by 10–15% annually. Similarly, other countries, such as South Africa, Nigeria, Angola, and Libya, rely heavily on the revenue generated from exporting fossil fuels such as oil, gas, and coal. Therefore, transitioning from these industries could disrupt established economic structures, leading to instability and exacerbating unemployment and livelihoods. Furthermore, the high costs

⁷⁵⁵Laury Haytayan, U–North Africa Energy Partnerships: Is a Win-Win Formula Possible?

<https://resourcegovernance.org/publications/eu-north-africa-energy-partnerships-win-win-formula-possible>

⁷⁵⁶Akpensuen, Tersur Theophilus, & Rivero, María José. Achieving net-zero agriculture in Africa: perspective on policies, challenges, and opportunities. *Sustain Sci* 20, 1117–1137, 2025. <https://doi.org/10.1007/s11625-025-01666-y>



associated with just transition through renewable energy infrastructure development strain already limited government budgets and debts, further hampering the transition process.⁷⁵⁷

Moreover, a number of countries still rely significantly on mining and fossil industries such as oil, coal, and natural gas for revenue generation and employment. Seven African countries, namely Nigeria, Angola, Equatorial Guinea, Algeria, Gabon, Libya and the Republic of Congo, depend on oil and gas sources for revenue, ranging between 35 and 82%. A similar scenario exists in Ghana, (Democratic Republic of Congo), Chad, Uganda, Sudan, and South Sudan, whose dependency on natural gas also ranges from 10 to 64%. Shifting from gas extraction to renewable sources will seriously affect the revenues and GDP of these countries, which might lead to debt burden, austerity, and social and economic crises. The significance of coal in South Africa's economy, including alleviating poverty and reducing unemployment and inequality. Owing to its historical significance, these authors argued that South Africa's economy relies heavily on coal; 92% of the country's energy is derived from coal. The sector contributed over R51 billion compared to gold, which contributed R31 billion in 2013. The total income from the coal mining industry in the country between 2015 and 2021 is R419,5 billion. Therefore, transitioning away from coal will lead to job losses in the coal mining sector, significantly affecting local communities and regional economies that rely on coal-related employment and livelihoods. For Africa to shift to green growth by 2030, the continent will require approximately \$213.4 billion annually from the private sector, international institutions and developed countries to complement constrained public resources.⁷⁵⁸

Another issue facing the continent lies in the continent's unique socioeconomic, environmental, and technological landscape, especially in the food and agriculture sector. The just transition strategy raises the important critical concerns over food sovereignty as global climate agendas risk exacerbating existing vulnerabilities and hindering local autonomy. In many African countries, traditional farming practices dominate, and modern agricultural technologies are often limited. This technology gap affects various aspects of agriculture, from crop production and soil management to water use and livestock management. Modern technologies such as precision farming, advanced irrigation systems, and data-driven decision-making tools can significantly increase productivity and sustainability. However, their adoption in Africa has been slow due to several interrelated factors. Modern agricultural technologies require high costs of initial investment. This is a significant hurdle as smallholder farmers, who form the backbone of African agriculture, often lack the financial resources to invest in these technologies. The costs associated with purchasing, installing, and maintaining new technologies can be prohibitive. Effective technology adoption requires robust infrastructure, including reliable energy sources, transportation networks, and communication systems. Many regions in Africa suffer from inadequate infrastructure, which hampers the implementation and efficient use of advanced agricultural technologies

⁷⁵⁷Abbass, K., Qasim, M. Z., Song, H., Murshed, M., Mahmood, H., & Younis, I.. A review of the global climate change impact adaptation and sustainable mitigation measures, op cit

⁷⁵⁸ Idem



In addition, Africa faces a low investment in research. Innovative technologies and practices are essential for reducing greenhouse gas emissions and improving resource efficiency in agriculture. Low investment in research restricts the development and dissemination of such technologies. Without adequate funding, research institutions struggle to explore and implement cutting-edge solutions such as precision farming, climate resilient crops, and efficient irrigation systems. Insufficient funding hampers the ability to study and develop mechanisms to withstand extreme weather conditions and prevent diseases. Insufficient investment in research can also lead to ineffective or misguided policies that do not address the fundamental issues affecting the continent.⁷⁵⁹

Conclusion:

The transition to clean and renewable energy in Africa has many important implications in justice and policy that should be carefully studied to ensure that this transformation's benefits and advantages are fairly distributed. The African continent calls for a just and equitable shift that enhances inclusion, cooperation and synergy while also reducing inequality and encouraging the empowerment of the African population through clean energy access. A cost effective, sustainable and dependable energy system presents a substantial opportunity not only for helping millions of people out of poverty but is also essential for creating and unleashing the youth's potentials to enhance climate resilience, enhance climate awareness and preparedness as well minimize climate vulnerabilities. A just energy transition in Africa must accordingly address equity implications of energy poverty and access, measure and evaluate consumption levels as well as help bridge the gap between energy demand and economic transformation. Maintaining fairness in this transition necessitates the integration of the needs and perspectives of the vulnerable and marginalized communities into the planification and implementation of clean energy initiatives, in order to not disproportionately affect them in this shift towards a low carbon system. Environmental justice and equity should be placed at heart of this transition as it aims to ensure that all people, regardless of their status, race or religion, have the inherent right to live in a healthy and safe environment.

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⁷⁵⁹Akpensuen, Tersur Theophilus, & Rivero, María José.. Achieving net-zero agriculture in Africa: perspective on policies, challenges, and opportunities. *Sustain Sci* 20,op cit



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