SUMMARY FOR POLICY MAKERS

JULY 2024

AFRICAN PERSPECTIVES OF A JUST TRANSITION TO LOW-CARBON ECONOMIES

ECA

ACPC
African Climate Policy Centre

THE AFRICAN CLIMATE FOUNDATION

Acknowledgements

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Headline Messages

● Chapter 1: Just Transition Framework

The structural challenges of African development, viz. lack of food sovereignty, lack of energy sovereignty, low value-added content of exports relative to imports are perpetuated by the global trade and finance architecture. In their current form, the associated structural inequalities will not deliver a 'just transition'.

The energy transition should be cognisant of the different starting points of countries, where the priority for African countries is advancing economic development through increased access to energy and basic services, as such the transition should follow differentiated pathways.

For African countries, a more comprehensive understanding of the transition is imperative, where it includes low carbon development whilst recognising the primary objective is avoided emissions for African countries; climate resilient development where impacts of climate do not erode the continents development gains or the dignity of its people; finance pathways that are based on needs and which are liberating, rather than oppressing of Africa's capabilities.

As a minimum, a just transition for African countries requires restorative justice where developed countries deliver on their obligations, distributive justice where the transition translates to shared prosperity, and procedural justice where African countries are at the table on decisions that affect their development.

● Chapter 2: Trade Implications of the energy transition

The current positioning of African economies in global trade is that, they primarily supply low value-added products, and do not own the technologies required to make the transition to low carbon development, is likely to further undermine the foreign exchange reserves and fiscal stability of African countries, making it difficult for African governments to finance the transition. Similarly some measures such as the EU Deforestation Regulations and Carbon Border Adjustment Measures could adversely affect the ability of African economies to continue their existing exports and foreign exchange generation.

With most African economies not having a diverse export basket, fossil fuel exporting countries that do not have a diverse export basket face particularly dire consequences of climate-based trade restrictions, and ability to drive economic development. However fossil-fuel importing countries could derive a better position if there is a beneficial social, economic and cost differential between renewable energy and fossil fuels.

As much as renewable energy technologies with local content requirements, and the beneficiation of critical minerals can address shared prosperity in the transition for African economies, the current trade regime - WTO/GATT - could be a hindrance for the African energy transition. A new Global Compact that is supra UNFCCC and the WTO could serve as a platform that supports African countries in the transition towards the Paris Agreement goals.

● Chapter 3: Economic Implications of the energy transition

Africa needs a new narrative to exploit economic development opportunities offered by the global energy and climate transition. The required narrative should transcend both the 'economic development before climate responsibility' and the 'leapfrog to economic competitiveness in a carbon constrained world' tropes that are naive to the political economic reality of the global transition, and unlikely to prove tenable.

Africa has an opportunity to increase its bargaining power during the global transition despite contributing just 5% to global GDP (adjusted for purchasing power). It can achieve this by 'playing smart' and leveraging the continent's critical minerals, carbon sinks, rapidly expanding cities, circular flow of resources and the demographic dividend, to offer the global economy key components of the global transition. This leverage, however, calls for an unambiguous economic narrative that hinges on Agenda 2063, and the potential role of the African Continental Free Trade Agreement.

Different typologies of African economies have different pathways to 'play smart'. LDCs and conflict-affected countries with low emissions should prioritise receipt of loss and damage payments and confront no constraints in energy provision; countries with significant carbon sinks such as the six Congo Basin countries could explore debt-for-carbon and debt-for-nature swaps; countries with critical minerals have the opportunity to develop mining value chains that contribute to local economic development and domestic energy provision; countries with natural gas and oil reserves using the associated revenues for economic diversification whilst avoiding stranded assets by transitioning to renewable energy.

SPM: African Perspectives of a Just Transition to low-carbon economies

● Chapter 4: Mitigation Implications of the energy transition

The support of African countries in their energy transition through finance, technology transfer and capacity building is a legal and historical responsibility; furthermore, an equitable transition should provide for regions with the lowest historical responsibility and emissions per capita like Africa to explore, exploit and make use of natural resources, within the constraint of a global 1.5°C pathway.

The contribution of land-based emissions from agriculture and LULUCF in the African emissions profile is not always related to energy provision, as such a just transition paradigm that is only limited to the energy transition has the potential of underplaying the importance of non-energy emissions, and the required investments.

Modelled emissions in the African continent, whether from 2030 Universal Access to Electricity or the IEA Sustainable Africa Scenario are set to almost double by 2050 from 2020 levels. Such increases can be seen within the development rights of African economies, and send clear signals on the priority of early investments in avoided emissions, including by the global community compared to emission reductions for most of the continent.

The significance of African carbon sinks, especially forests is both under-resourced and under compensated where funding does not match the price of climate service at $55 billion, or $30 billion after taking account of deforestation, as funding for forestry in Africa only reached $170 million on average over the last decade; with the current mechanisms that are market-based showing some limitations, as such an increased public grant financing of forest conservation is an area that African countries should prioritise in the transition.

● Chapter 5: Jobs implications of the energy transition

In comparing the various technologies in terms of their job creation potential, increased local content requirements (LCRs) are likely to provide higher job and socio-economic returns, notwithstanding the associated transition's economic and social benefits from renewable energy.

The LCR requirement is central to maximising socio-economic benefits which include jobs, earnings and economic value add, noting the constraint of the WTO trade rules. The LCR is a key enabler to drive and optimise industrialisation on the back of increased mineral beneficiation, regional cooperation to supply the growing energy demand through the ACFTA amongst others.

Renewable energy technologies predominantly offer sizable opportunities in construction jobs, this is a significant limitation when compared to coal, oil and gas driven technologies. Moreover, O&M jobs account for less than 20% of jobs created when renewable energy projects are developed. Based on these case studies geothermal provides the highest number of direct jobs per MW at 95, with natural gas generating the least number at 8 jobs/MW, whereas coal, utility scale PV, distributed PV and bioenergy create a comparable amount of jobs at ± 16 jobs/MW[1].

Opportunities exist for African countries through policy adjustments for incentivising smaller scale renewable energy projects that can be domestically funded compared to utility scale renewable projects that are highly dependent on external funding. Focusing on small scale projects is an interim solution that could potentially optimise jobs and economic benefits in the energy transition process. However, LCR policies have a significant role to play in directing how large scale renewable energy projects could be leveraged to drive the African continent's industrialisation goals.

● Chapter 6: Finance implications of the energy transition

Africa's climate ambition is constrained and limited by the continent's position as a "taker" of terms and conditions for funding, due to the current structure of the global financial architecture and how it limits access, affordability and sufficiency of finance for climate action. A reform of the global financial architecture is central to a fair transition for African economies.

Equitable finance flows for a just transition in African economies should be guided by principles of; follow UNFCCC obligations, additional to development aid, needs-based, mainstream justice, significant concessionality, predictable and consistent, accessibility through effective institutions, increased risk-sharing with private sector, effective governance and transparency.

The mobilisation of internal capital markets could play a significant role in access to finance for African economies providing a channel through which local investments can occur, by facilitating interactions between investors and investment opportunities. For this mechanism to operate effectively, there needs to be a level of development of capital markets, through both the capital markets themselves, as well as creating a level of investor trust.

1 - These estimates are based on a 60% LCR, and it's worth noting that additional employment opportunities are possible through indirect and induced jobs, with such additional jobs varying depending on local content policy frameworks, capacity of the local value chains, amongst others.

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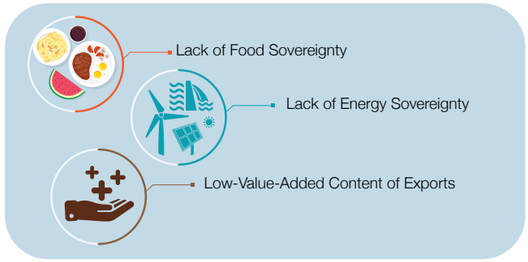
African Economies' Structural Deficiencies
(Source: Independent Expert Group on Just Transition and Development, Sokona et al., 2023)



Climate Impacts on African Development (UNDP, 2022)

Resource Diversion:
Immediate climate impacts divert resources from health, education, and infrastructure.

GDP Loss:
Natural resource-dependent sectors suffer significant GDP losses.

Increasing Risks:
A changing climate system heightens overall risk.

Climate Impacts in Africa 2022 (WMO, 2023)

Affected Population:
Over **110 million** people

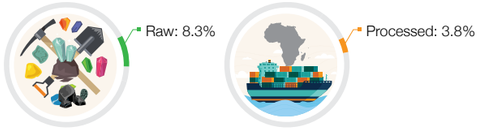
Economic Damages:
More than **$8.5 billion**

EU Regulation 2023/1115 aims to prevent deforestation and forest degradation.

Affected Products:
Cattle, cocoa, coffee, oil palm, rubber, soya, and wood.

Developing countries Exports of these products to the EU may decline sharply due to non-compliance with new requirements.

Africa's Share in Global Critical Minerals Exports (ITC 2023)



Key Electricity and Cooking Access Statistics in Africa (IRENA, 2023)

Electricity Access:
As of 2021, **600 million** people (43%) in Africa lacked access to electricity.

Clean Cooking Access:
970 million people (64%) lacked access to clean cooking.

Installed Capacity:
Africa has **147 GW** of installed capacity.

Per Capita Electricity Consumption:
In sub-Saharan Africa (excluding South Africa), average per capita electricity consumption is just **153 kWh/year.**

Africa's Renewable Energy Market
(Benjamin Boakye and Charles Gyamfi Ofori. 2022)

Import-Driven:
Most renewable energy technologies, like solar PVs, are imported.

Business Focus:
Renewable energy businesses primarily focus on imports, sales, and service

Africa's Priorities:

CHAPTER 1:
Just Transition Framework

By Xolisa Ngwadla

The transition pathways have a direct bearing on the continent's ability to pursue sustainable development, as well as enhancing its mitigative and adaptive capacity. Therefore, 'justness' should advance not only environmental outcomes, but also economic and social benefits for the African continent. The question is always how equity manifests in the implementation of climate outcomes?

What is the starting point for Africa?

The African continent is a region with the greatest development challenges in the world. As of 2021, only Seychelles and Mauritius had a Human Development Index (HDI) above the world average of 0.732, at 0.785 and 0.802 respectively, (UNDP, 2023). The low performance on development indicators is further compounded by inequality across and within nations of the world, as an example, a number of Southern African countries have a Gini coefficient that is in the high 50s.

The challenges African countries face in pursuit of their development objectives has a historical and structural context. According to the Independent Expert Group on Just Transition and Development (Sokona, *et al,* 2023), African economies suffer at least three structural deficiencies, viz. a lack of food sovereignty; a lack of energy sovereignty; and low-value-added content of exports relative to imports. These deficiencies in turn contribute to structural trade deficits, weakened African currencies and pressure to issue debt denominated in foreign currencies, resulting in indebtedness which limits options for climate action.

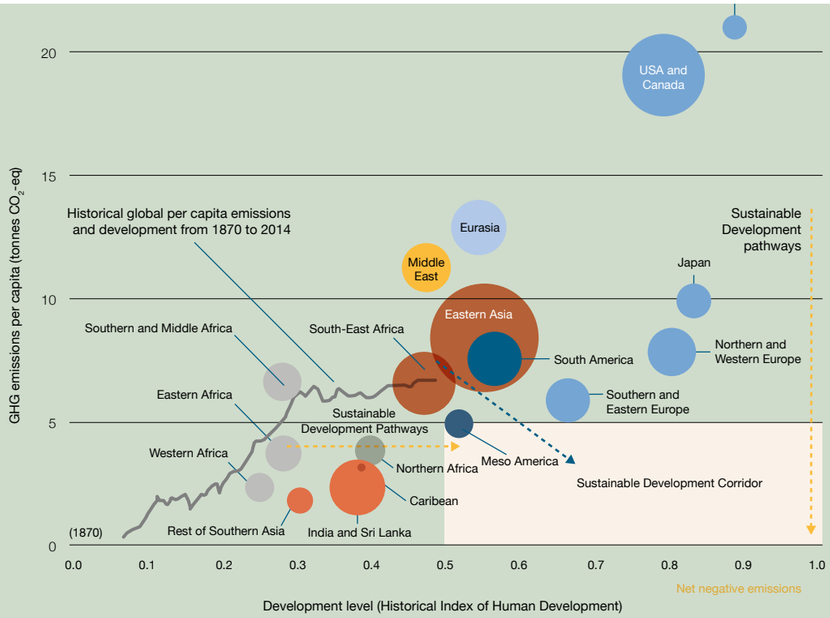
These structural challenges extend to the global economic trade and financial architecture that translates to excessively high costs to access climate and development finance compared with other emerging economies and developed countries. The global trade regime further places African countries in commodity dependence, and provision of goods at the lowest end of value addition in the global value chains, leading to volatile financial flows (UNCTAD, 2023).

The sustainable development context for Africa suggests that, the transitions to low-emission, and climate-resilient development, finance flows consistent with 1.5°C, should contribute to the reduction of structural, socio-economic, and technological inequalities between developed and developing countries as the present day structural inequalities cannot deliver a 'just transition'.

What should underpin the transition?

Climate action is underpinned by several Articles of the Convention, and its Paris Agreement, which affirm the development imperative in climate action, and that climate action should take full account of the legitimate priority of developing countries to sustain economic growth and eradicate poverty; and that economic development is central to a climate change response. The transition should therefore recognise that different countries face different challenges as aptly shown by the IPCC in Figure 1.1 below.

Figure 1.1: Sustainable development pathways towards fulfilling the Sustainable Development Goals. Pathak, et al (2022)



The figure shows the different challenges countries face in the transition towards low carbon further showing that, in respect of emissions and development, a global sustainable development corridor is where per capita emissions are below 5 tons per capita, with a HDI of 0.5 and above.

With the exception of Southern and Middle (Central) Africa, African countries have always been within range of sustainable emissions per capita, with the common challenge across all African countries being how to close the development gap.

It is therefore unsurprising that the majority of African countries prioritise increasing the availability of modern energy, and addressing the impacts of climate change, which are central to advancing human development and dignity. This is a strong rationale for differentiated pathways in the energy transition, noting that developing countries (particularly Africa) have a wider development gap than developed countries, with the latter's challenge being a reduction in consumption, rather than advancing development objectives.

Secondly, the transition to the sustainable development corridor suggest that African countries must achieve the reduction of poverty in some sectors of the population, while simultaneously exiting fossil-fuel-intensive activities and responding to climate impacts, hence the fundamental nature of the African engagement should be towards avoided emissions.

The three transition pathways!

The concept of the 'just transition' has its origins in the labour movement, however, the concept has evolved in a number of important aspects. The International Labour Organisation (ILO) has been advancing the concept to include a response to environmental challenges, and define it as … greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind (ILO, 2023).

In the context of the UNFCCC, particularly in implementing decision 1/CMA.4, the decision itself and, views espoused by developing countries, advance a comprehensive rather than the scope limited to jobs. According to UNCTAD (2023), the developing country view is informed by the recognition of different starting points, different development needs and differing capabilities, in line with the UNFCCC principle of equity and CBDR-RC. The scope therefore should include the three pathways in Article 2 of the Paris Agreement, mitigation, adaptation, and finance, in the context of the temperature goal.

Poverty and low economic development are linked to low absolute **energy consumption** levels, and a lack of household access to modern energy services. As of 2021, 600 million people (43%) in Africa still lacked access to electricity, and 970 million (64%) lacked access to clean cooking (IEA, 2023a). If universal access to affordable electricity is to be achieved by 2030 in the Sustainable Africa Scenario, it requires bringing connections to 90 million people a year, triple the rate of recent years, whereas achieving universal access to clean cooking fuels and technologies by 2030 requires shifting 130 million people away from dirty cooking fuels each year (IEA, 2023b).

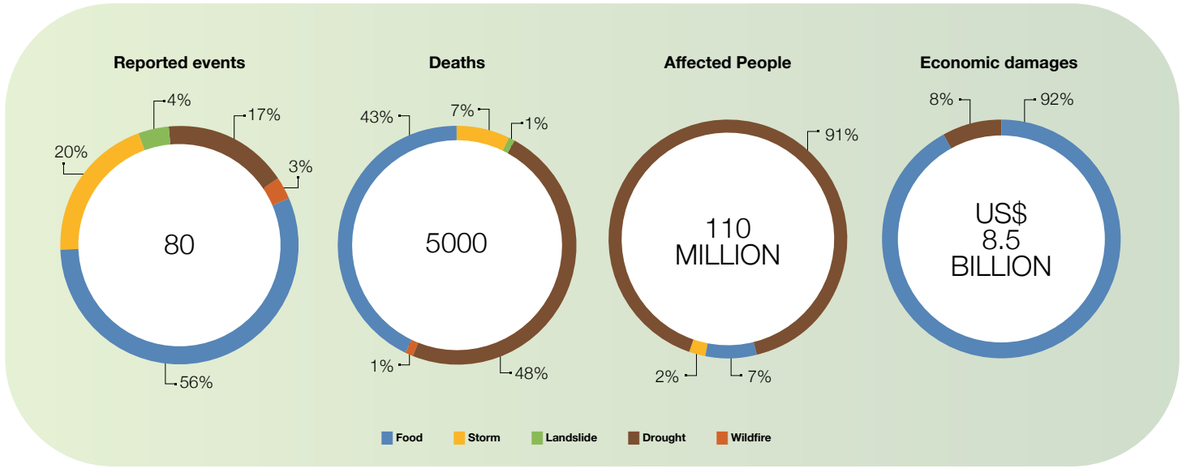
The reality is however that, Africa currently has 147 GW of installed capacity, average per capita electricity consumption in sub-Saharan Africa (excluding South Africa) is just 153 kWh/year (IRENA, 2023). In illustrating the disparities, the installed capacity in OECD countries is just shy of 11 million Gigawatt-hours (OECD, 2023). The primary consumption per capita of energy has remained stagnant at about 14-15 Gigajoule per capita in Africa for the period between 1982-2022 (Das, and Sharma, 2024). Furthermore, aggregated primary energy data fuel type suggests Africa has a 90% reliance on fossil fuels for electricity generation (Energy Institute, 2023).

This suggests that the primary focus of African countries should be accelerated energy access to realise the economic development potential, which in turn increases the continent's mitigative and adaptive capacity as such sovereignty in policy space. This should however take into account, the potential to decouple energy consumption with economic development, and decoupling energy consumption from GHG emissions.

Despite being the least significant contributor to historical greenhouse gas emissions, the African continent is amongst the most vulnerable regions. Climate impacts risk reversing development achievements through (i) a diversion of resources from health, education, infrastructure to address immediate impacts, (ii) GDP loss for natural resource dependent economic sectors, (iii) increasing physical risk due to a changing climate system (UNDP, 2022).

As an example, as shown in Figure 1.2, more than 110 million people on the continent were directly affected by weather, climate and water-related hazards in 2022, causing more than US$ 8.5 billion in economic damages. There were a reported 5 000 fatalities, of which 48% were associated with drought and 43% were associated with flooding, but the true toll is likely to be much higher because of under-reporting (WMO, 2023).

Figure 1.2: Weather, Climate, Water related disasters in Africa in 2022 (WMO, 2023)



Closely linked with the physical losses, African economies, which are highly dependent on natural resource based economic sectors, are projected to lose 5 to 15% of GDP per capita growth according to the AfDB (2022) by 20230 in a high warming scenario. These losses do not factor in the social impacts which speak to the core of African dignity.

Climate change impacts suggest that the immediate priority for African countries would be the protection of people, livelihoods and the economy, hence a prioritisation of adaptation and loss & damage. In that context, the work under the Global Goal on Adaptation (GGA) should be guided by a vision of not only achieving material parity with mitigation, but also a needs-based narrative, that is premised on adaptation priorities and sustainable development and poverty eradication. The engagement on adaptation should further recognise the global responsibility for adaptation, particularly on means of implementation and finance, as such not shifting the responsibility to African countries through lost income and insufficient international public grant finance.

The development gap and inequality within and across countries of the world pose a threat to the ability of many developing countries to vigorously **invest in the transition to low-carbon and climate resilient economies.** The global economic, trade and financial structure, as argued earlier, translates to indebtedness, and a low fiscal capacity, small capital markets to drive climate action investments.

These structural challenges lead to a state where in 2022, the Bloomberg's Sovereign Debt Vulnerability Ranking[2] identified countries at risk of debt default in 2023 to be developing countries with the exception of Turkey and Mexico, with half being African states. The African countries with the highest mitigation potential, are incidentally highly ranked in their debt vulnerability[3].

2 - Available at: https://www.visualcapitalist.com/countries-with-the-highest-default-risk-in-2022/

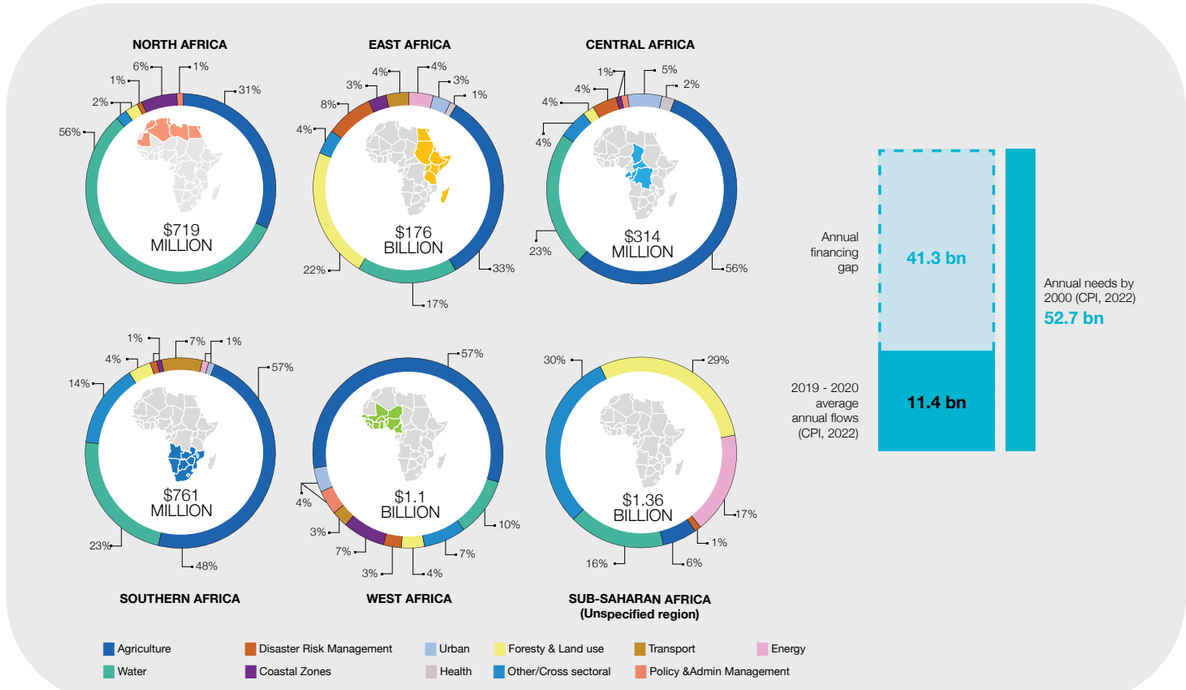
3 - African economies at risk of debt default, (emission-debt) ranking, Ghana (11th - 2nd); Tunisia (7th - 3rd); Egypt (2nd - 5th); Kenya (12th - 6th); South Africa (1st - 15th); Nigeria (5th - 24th).

The higher cost of capital for African countries, which is largely driven by perception, further drives indebtedness. African sovereign entities issue bonds at high discount rates, and borrow at high interest rates as they are considered riskier. However, a look at objective facts show that even African countries with less than the IMF benchmark of 60% debt-to-GDP ratios are classified as sub-investment grade. Bonds from African countries such as Ethiopia, Nigeria, Zambia trade at 6.6%, 9.1%, 38% compared to the global average of 0.74%. On the other hand, Italy with a debt-to-GDP ratio of 134.8% pays less than 0.9% on its 10-year sovereign bond at the height of the pandemic downturn. Even for countries with a similar credit rating, e.g. Namibia and Greece (Ba3) the former's 10-year dollar denominated bond has a 481.6 spread vis a vis the latter at 222.6 basis point spread (Fofack, 2021).

The implications of these global finance conditions are captured in Mbatia, *et al* 2023. These authors suggest that total energy sector investment across Africa was slightly under $100 billion in 2019 and fell to $73 billion in 2020. A closer look shows that 70% of the investments were in oil and gas; electricity sector investments totalled only around $30 billion per year on average between 2016-2020, of which only around $5 billion per year on average flowed to renewable energy investments. This would suggest that Africa is falling behind in the energy transition and increasing energy access and consumption towards economic development.

Whereas on adaptation, adaptation finance flows in Africa only reached $11 billion annually in 2019-2020 (GCA, CPI, 2023). At the current growth rate of adaptation finance, Africa will receive only about USD 180 billion by 2035, with doubling of adaptation finance by 2025, translating to $40 billion. The type of finance also matters as more than half (54%) of the adaptation finance commitments in 2019-2020 to Africa were channelled through debt, suggesting that Africa is paying back the majority of adaptation finance flows.

Figure 1.3: Tracked adaptation finance by regions and sectors (dollars, 2017-2018 average) (CPI, 2023)



The needs of African countries from a quantum of finance perspective are considerable at $52bn per annum compared to the flows at $11.4 as shown in Figure 1.3, while the conditions of raising finance and borrowing risk lead to a transition that deepens indebtedness. Hence at the center of fair transitions, effective interventions should include the restructuring of the global finance system to deliver a quantum and quality of finance that is responsive to realities on the ground.

African response to what is equitable and fair!

Climate justice should be at the center of 'just' transitions, informed by the principles of, restorative, distributive, and procedural justice (PCC, 2022). These principles are understood as follows;

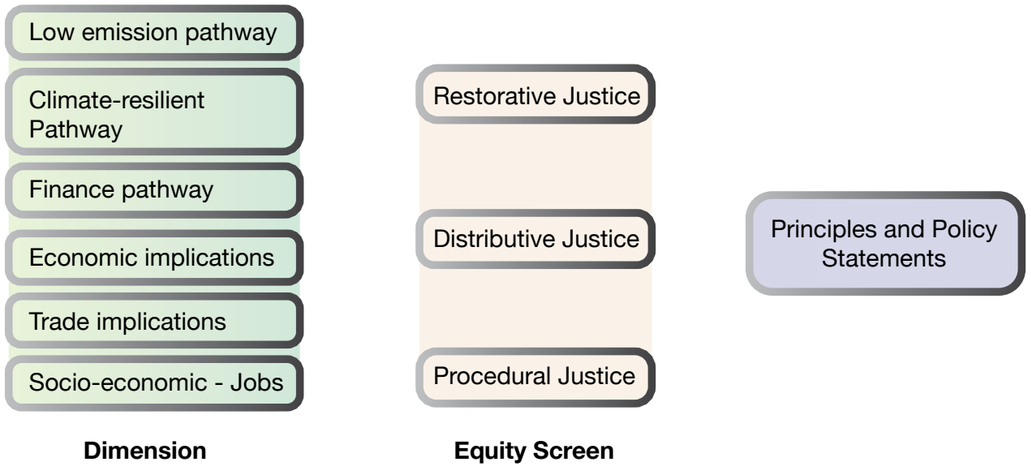
- **Destorative justice,** which is the responsibility for the breakdown in the climate system, as well as repair of the damage caused/being caused by historical emissions. This is primarily driven by industrialisation of developed countries, which however results in climate impacts that disproportionately affect developing countries.

- **Distributive justice** which recognises the importance of a transition distributes benefits fairly across the globe. This would include how the remaining carbon space is utilised, as well positive opportunities in the energy transition and addressing lost opportunities from climate impacts.

- **Procedural justice,** addressing responses to the climate challenge that have fair, transparent processes, opportunity for developing countries to be part of decision making processes. This would apply to multilateral vs minilateral/unilateral responses to the challenge.

For each of the pathways, e.g. low carbon, trade, etc; these need to be assessed from an equity lenses, such as restorative justice - how are the responsibilities shared, distributive justice - ability of Africa to achieve development objectives; procedural - how the multilateral system employs fair tools and instruments, as shown in Figure 1.4.

Figure 1.4: Just Transition Assessment Matrix



For low-emissions pathways, the key issues in the transition pertain to depth and rate of emission reductions, particularly level of ambition in NDCs, as well as the pursuit of Net Zero and Fossil-Fuel Phaseout.

Table 1.1: Low emission pathway policy statements

Low Emission Pathways	
Restorative Justice	Developed countries should take the lead in emission reduction, achieving Net Zero and Phaseout of fossil fuels and subsidies by 2035 - Differentiated pathways that allow the policy and fiscal space for developing countries to achieve sustainable development.
Distributive Justice	The transition should offer opportunities for high-end manufacturing in developing countries, through instruments such as local content requirements, and not reduce African countries to suppliers of raw materials, particularly critical minerals for the transition; noting the overriding priority of increasing access to modern energy.
Procedural Justice	International cooperation in the deployment of low-carbon technologies should be pursued in multilateral and minilateral fora on equal partnership, and decision-making that takes into account needs and interest of African countries in pursuit of sustainable development.

In respect of energy and mitigation, the priority for African countries is universal access to modern energy and to increase installed capacity to drive economic development. Whereas, emissions from the land sector, which are significant for several African countries, have another dimension that countries with high emissions from the land sector have a significant sink capacity. The current model for land-use based carbon markets does not compensate for existing sink capacity, rather rehabilitation of degraded land. The degraded land focus can be a perverse incentive for land degradation, whilst not compensating African countries for pursuing more sustainable development paths.

Whereas for adaptation, the key issues are the adequacy of adaptation action and support, the unfair transfer of the adaptation burden to developing countries.

Table 1.2 Climate resilient pathways policy statements

Climate Resilient Pathways	
Restorative Justice	Developed countries should take the lead in providing climate finance for adaptation action on a public grant basis to support adaptation action in developing countries. This is informed by their primarily responsibility in the breakdown of the climate system.
Distributive Justice	The transition to climate resilient development should take into account the economic and livelihood role of nature based resources of African economies and people; the action should not translate to undermining the socio-economic role of those sectors.
Procedural Justice	International cooperation on climate resilience should be pursued in multilateral and minilateral fora on equal partnership, and decision-making that takes into account needs and interest of African countries in pursuit of sustainable development.

The investment in adaptation should also be understood in the context of the role of climate impacts in eroding development gains, noting that inadequate support of African countries internalises the costs of impact, whereas the driver is external.

On finance flows and climate finance, the key issues pertain to inadequate finance to meet expressed needs of developing countries, as well as sources, types and quality of finance.

Table 1.3 Finance flows and MoI pathways

Finance Flows Pathways	
Restorative Justice	The quantum of finance available to developing countries should be commensurate with adaptation-mitigation needs of developing countries in line with the temperature goal; climate finance is delivered primarily through public sources.
Distributive Justice	The finance arrangements for climate action should take into account the development context of African countries; climate finance should not lead to further indebtedness by virtue of instruments and finance terms; no net incidence of developing countries on global taxation and levies.
Procedural Justice	Reform of the multilateral finance system, including representation, and decision-making processes in the provision of climate finance towards transformational climate flows.

The Intergovernmental Panel on Climate Change (IPCC) in its 1.5 Special Report estimates that to adequately finance climate change measures in line with 1.5°C, US$ 1.6 trillion to US$ 3.8 trillion is required annually, until 2030, whereas the OECD suggests as of 2020, climate finance 'provided and mobilised' amounted to US$ 83 billion dollars. The discourse should therefore be moving from billions to trillions.

Innovative sources of finance for Africa could include closing loopholes on tax regimes, e.g a 2%, 3%, 5% wealth tax of millionaires below $50m, +$50m, and billionaires respectively could raise over $2.52 trillion per year. Reducing illicit financial flows from Africa could help, where the current state of illicit financial flows are estimated upwards of $89bn as of 2013-2015, with Africa losing about $17bn from corporate tax abuse (Oxfam, 2022).

On the social, economic, and trade aspects of the transition, the global economic and financial governance can potentially undermine developing countries' adaptive and mitigative capacity. The fairness of climate action inadvertently requires some reforms in global governance beyond the UNFCCC processes if structural limitations are to be addressed. In the current configuration of the global governance system (e.g. global trade, global financial arrangements) the starting point is from a biased and prejudicial to development aspirations of many developing countries, especially African countries.

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Table 1.4 Economic, Social, Trade dimensions

Economic, Social and Trade Dimensions	
Restorative Justice	The transition should translate into shared prosperity where African countries are not trapped in the structural role of providing raw materials to patent owners of green technologies, rather included in advanced manufacturing to enhance the countries' mitigative and adaptive capacity.
Distributive Justice	Upward mobility of citizens of African countries is a priority, as such the transition should not lead to a net reduction in decent employment OR global value chains that export high-end jobs outside of the continent, leaving only low-paying jobs as an option.
Procedural Justice	Global climate action should be based on multilateral agreed rules; avoid unilateral measures that prejudice and distort the competitive landscape.

The developmental needs of African countries should be taken into account as the region transitions to cleaner energy sources. For example, some African countries have a high dependence on revenues from fossil fuel exports. Other African states have new fossil fuel finds and are exploring options for exploitation to support the global market whilst investing in future energy sources for domestic consumption, within a reconfigured context where such extraction delivers social and economic benefits rather than the historical under-development associated with their extraction in Africa. The stability of global supplies could therefore come from African countries in the context where there is an immediate and complete phaseout of fossil fuel exploration in developed countries.

Lastly, African states, being rich in critical minerals for the energy transition lack national policies to ensure maximum gains (economic, social, political) that could accrue from processing mineral wealth. This risks exploitative trade and investment regimes that perpetuate structural injustices of the past. Furthermore, other measures such as the Carbon Border Adjustment Mechanism (CBAM) and EU Forestry Regulations, and environmental standards have the potential of undermining the ability of African economies to grow and earn the required foreign exchange to drive the transitions.

CHAPTER 2:

Trade Implications of the energy transition

By Abhijit Das and Sachin Sharma

The transition away from fossil fuels (coal, oil and gas) to clean energy sources (wind, solar, geothermal, hydro, ocean, biomass and nuclear) has become a key consideration in the pursuit of a sustainable future and for meeting climate change objectives. International trade has been viewed as an important channel for climate mitigation. Phasing out exports of fossil fuel products, imposition of carbon border taxes and restricting trade of products based on deforestation are some of the options being contemplated by many countries for reducing green-house gas emissions through measures related to international trade.

Contemplated rules in international trade agreements for supporting low carbon transition on the other hand, amongst others include: lowering/eliminating customs duties on environmental products; liberalising services involved in waste management; mandating that countries adopt high standards of environmental protection and mining; harmonising product standards; non-discriminatory treatment in government procurement of products and equipment relevant for renewable energy.

An understanding of what these mean is central to an African perspective on the implications of the energy transition on African economies, and what could constitute a just transition.

Green technologies and the transition

It is a reality that new environmental products are more likely to emerge and get commercialised by business entities in countries with a strong ecosystem for innovation - mostly the developed countries. To illustrate this point, in the period 2012-2017, based on the OECD Statistical Database, 90,762 patents were filed by applicants from OECD countries out of 105,110 patent applications worldwide (86.35%)[4] for patents in environment-related technologies.

The implication for Africa is clear - it will have to **pay high royalties for importing technologies** required for the transition to a low carbon emission economy. This will require Africa to have adequate foreign exchange to purchase these technologies, hence the various transition technologies need to be assessed on their impact on foreign exchange reserves as one lens. This state of affairs could however be addressed through a number of options, including leveraging access to critical minerals for entering into licensing agreements to transfer technology on terms favourable to the African economies. Another option being to explore additional sources of financing for generating the foreign exchange that might be required for importing technology related to renewable energy. The rules at the WTO do not prohibit countries from mandating transfer of technology as a condition for allowing investment.

African economies could consider negotiating with the developed countries for the latter to provide incentives to IPR holders in their territories to transfer green technology to the African economies. Second, in respect of patents required for energy transition the following options should be considered for enhancing the access of green technologies for the African economies: access to green technologies without patents; term of patent protection for green technologies to be limited to 5 years; cap on royalty payment for imported green technologies; and less complex mechanism for compulsory licensing of green technologies by developing countries.

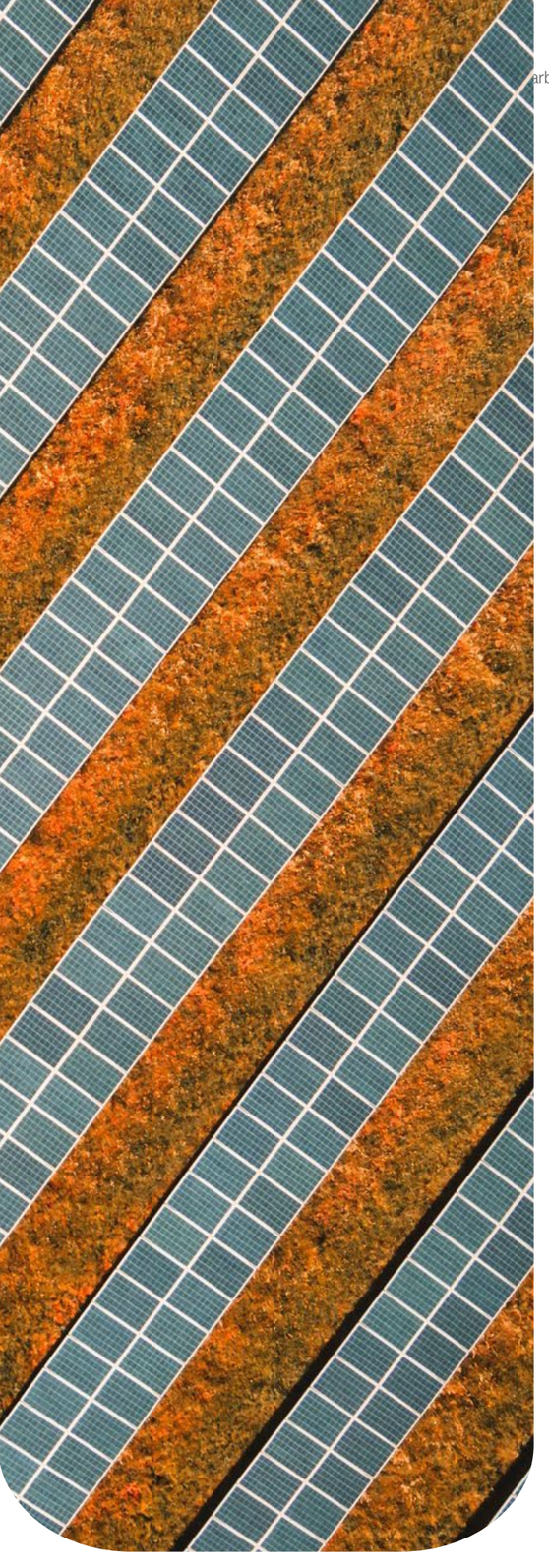
Solar Energy and the Transition

The shift away from non-fossil fuel category of energy towards renewable energy sources can **create economic opportunities** for African economies. Solar power can help Africa "reduce emissions and widen access to electricity, but the continent is only in the early stages of building its solar resources"[5], as such a lot of the potential remains untapped. Solar power accounts for less than 1% of Africa's energy mix (PWC, 2021: Africa Energy Review). While solar additions in Africa still only represent 1% of the global additions, Africa is now home to more than 16 GW of solar. The distribution of these additions are also unevenly distributed, where by the end of 2023, South Africa was home to at least 7,781 MW of solar, representing almost 47% of all installed capacity in the continent[6]. African economies that are set to join the 1 GW mark include Algeria, Morocco, Zimbabwe, Zambia, DRC, Angola, Namibia, Ethiopia and Botswana (Africa Solar Outlook 2021).

4 - www.stats.oecd.org

5 - https://www.weforum.org/agenda/2022/09/africa-solar-power-potential

6 - https://www.afsiasolar.com/wp-content/uploads/2024/01/AFSIA-Annual-Solar-Outlook-2024-Part-1-final-2.pdf



To understand the implications of the transition to solar energy from a trade perspective, the **solar PV value chain** is important. This value chain comprises of five main segments, (i) quartz or silica extraction; (ii) manufacture of solar grade silicon (polysilicon); (iii) polysilicon moulded into ingots and sliced into wafers; (iv) manufacture of solar cells; and (v) assembly of solar cells for creating solar modules. At this juncture the participation of African economies in the solar PV value chain is rather limited. Africa imports most of its renewable energy technologies, such as solar PVs, with renewable energy businesses being primarily involved in imports, sales, and services of renewable energy technologies (Benjamin Boakye and Charles Gyamfi Ofori. 2022). African economies do not have any significant presence in stages (ii) - (iv) of the PV value chain, some entities exist in the final stage of the value chain. The ENF Solar Directory indicates that 20 solar module-producing companies are active in Africa – Egypt (5), Nigeria (4), South Africa (4) and the rest in Ghana, Algeria and Tunisia showing an uneven distribution of across the continent.

Most African economies have retained the **policy space to impose customs duties** on PV modules, as well as mandating purchases from domestic suppliers in government procurement. However, it should be noted that under the rules of GATT/WTO, procurement from domestic suppliers can be mandated only in respect of those products that are procured by the government for its own use and not for commercial purposes. It is also relevant to point out that some rules emerging in free trade agreements that have been recently negotiated by the developed countries curtail the flexibility in respect of government procurement, by mandating non-discriminatory procurement of renewal energy products and the equipment required in their manufacture.

From an intra-Africa perspective, African economies under the ACFTA could consider an open trade regime for PV modules and after sales service, whilst implementing skills development programmes. This can nurture a continent-wide market and economies of scale. This demand can be further driven by local/regional supply mandates for projects involving government procurement.

From the perspective of international trade negotiations, African economies should seek to retain the **policy space in respect of government procurement.** Further, with the objective of enhancing upstream and downstream linkages, they should seek changes in trade and investment rules to permit them to mandate performance requirements and local content subsidies.

Transition implications of fossil fuel export dependence

In the context of transition to renewable energy sources, the following two important questions need to be addressed: what is the share of fossil fuel products in the export basket of countries in African economies; and what is the contribution of exports of fossil fuel products to the overall foreign exchange reserve of these countries?

Most countries in **Africa do not have a diversified export basket.** Countries that are substantially dependent on fossil fuels for their export earnings would be adversely impacted by the shift to renewable energy sources. Fossil fuel producing countries in Central, Western and Northern Africa overall export basket exceeds 40%, whereas it is not significant for Eastern and Southern Africa. Analysing the export data at a more disaggregated level, Table 2.1 provides details of countries in which fossil fuels comprise at least 25% of the export basket by value. As the demand for fossil fuel products are likely to decline, these countries are likely to be more severely impacted by the transition from fossil fuels to renewable energy sources through the trade channel.

Table 2.1 Countries with share of fossil fuel products in total export basket exceeding 25%

Country	Share of fossil fuel exports in total merchandise goods (%)					
	2017	2018	2019	2020	2021	2022
South Sudan	99.3	94.7	94.4	82.8	95.3	99.3
Angola	95.5	92.8	93.9	93.1	91.5	96.7
Chad	94.1	88.6	76.2	80.9	69.0	95.2
Libya	96.9	95.7	94.5	76.4	95.8	92.9
Nigeria	92.6	92.5	92.9	91.6	91.0	89.7
Equatorial Guinea	85.9	87.6	89.2	90.2	90.0	88.9
Algeria	95.6	94.1	93.1	89.0	88.1	85.8
Congo, Rep.	73.1	70.4	68.5	56.2	59.6	84.7
Cameroon	44.3	45.1	50.4	47.9	56.0	71.7
Gabon	67.2	64.1	67.9	53.1	63.6	61.2
Mozambique	44.0	45.8	41.7	29.5	30.8	42.4
Ghana	24.1	29.2	29.5	24.0	28.7	36.6
Egypt, Arab Rep.	26.0	30.6	30.0	22.3	31.5	33.8
Togo	19.7	51.8	54.4	36.4	47.4	30.3
Sudan	41.2	34.3	24.9	9.1	8.0	24.9

Source: Based on WITS[7] database using HS 2017 version.

Note: Mirror data has been used to capture export data for African Country with the World for fossil fuel trade and merchandise trade. For Fossil fuel all 4-digit product codes are captured and for merchandise goods all chapters are captured.

7 - World Integrated Trade Solutions, https://wits.worldbank.org/

With the foreign demand for fossil fuel products likely to decline on account of the transition to renewable energy sources, this is likely to result in **the erosion of foreign exchange reserves** of many countries in Africa. Unless new sources of foreign exchange inflows are found, these countries would find it extremely difficult, if not totally impossible, to have the foreign exchange to import green technologies and green products for facilitating their transition to a low carbon emission economy. This is a paradox that impacts directly on the mitigative and adaptive capacity of these economies, suggesting a need for a policy intervention to address it.

The other side of the equation is however that phasing out of fossil fuel products could **ease the forex exchange position** of African countries where these imports constitute a substantial share of the foreign exchange. However, this argument makes the following assumption: the renewable energy sources to replace fossil fuel products would be either substantially obtained from domestic sources or the imports of renewable products would be at prices lower than those of fossil fuels. Such countries, a selection of those who had a negative trade balance in respect of fossil fuel products is reflected in Table 2.2.

African economies dependent substantially on exports of fossil fuel products could consider negotiating a **longer transition period** of 10-15+ years for phasing out exports of fossil fuel products. Further, economies that face balance of payment problems on account of phasing out of exports of fossil fuel products should be allowed by the WTO to take either price-based measures or quantitative restrictions for a limited duration, noting the minimal contribution of African economies to carbon emissions and climate change, which is a restorative justice imperative. The alternative for fossil fuel import dependent economies focusing on scaled up investments for renewable energy, firstly to address the required increase in energy supply, and secondly options for the reduction of renewable energy costs compared to fossil fuels.

Table 2.2 Contribution of imports of fossil fuel products to total foreign exchange reserves

	2020	2021	2022
Country	**Imports of Total Fossil Fuels as % of Forex Reserve**	**Imports of Total Fossil Fuels as % of Forex Reserve**	**Imports of Total Fossil Fuels as % of Forex Reserve**
Botswana	12.48	16.70	31.96
Burundi	17.91	4.81	5.08
Cape Verde	15.31	12.35	21.37
Central African Republic	2.03	0.78	na
Comoros	3.16	3.64	2.90
Djibouti	61.68	358.81	29.76
Eswatini	30.53	40.60	64.59
Ethiopia	4.28	na	na
Gambia, The	5.02	4.52	2.39
Guinea	9.42	na	na
Kenya	20.47	29.43	25.00
Liberia	439.29	na	na
Madagascar	9.42	6.28	16.13
Malawi	4.50	na	na
Mauritania	3.82	4.61	na
Mauritius	1.80	5.36	4.59
Morocco	9.96	17.89	23.50
Mozambique	47.51	72.47	126.54
Namibia	15.14	14.62	25.77
Rwanda	2.35	1.27	1.10
Sao Tome and Principe	2.54	2.61	na
Sierra Leone	3.02	7.64	8.87
Tunisia	14.92	31.52	32.52
Zambia	8.19	4.46	8.58
Zimbabwe	854.99	46.26	71.15

Source: Data on imports of fossil fuel products is based on WITS database. Data on foreign exchange reserves has been taken from World Bank Development Indicators. Total reserves comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities.

Impact of Unilateral Measures: EU Deforestation Regulations case

Other than instruments such as carbon border adjustments mechanisms which have been studied to some degree, including by the African Climate Foundation and the London School of Economics (ACF, LSE. 2023), the case considered in this Chapter looks at a similar emerging mechanism. More recently, the European Union (EU) has introduced a regulation for identified products associated with **deforestation and forest degradation 2023/1115.** The regulation seeks to ensure that cattle, cocoa, coffee, oil palm, rubber, soya, and wood do not contribute to deforestation in the EU and elsewhere in the world. It is apprehended that most developing countries will not be able to comply with these requirements, hence their exports to the EU of the listed products is likely to decline sharply, with a significant impact on West African countries.

It is relevant to examine the contribution of exports of deforestation products to total foreign exchange reserves of the African economies, where their contribution exceeded 15% in at least one year during the period 2017-2022 and shown in Table 2.3.

Table 2.3 Contribution of exports to the EU of De-forestation products to total foreign exchange reserves

Country Name	Contribution of exports to the EU of De-forestation products in Total foreign exchange reserve (%)					
	2017	2018	2019	2020	2021	2022
Cameroon	23.48	21.55	na	na	na	na
Gabon	19.49	13.43	12.10	na	na	na
Liberia	9.30	12.38	17.36	19.86	na	na
Sao Tome and Principe	15.01	17.03	13.96	8.77	19.34	na
Ghana	18.05	22.30	17.15	14.97	13.44	na
Equatorial Guinea	29.78	21.98	21.94	12.89	12.74	na
Congo, Rep.	19.66	20.49	8.49	6.54	11.78	na
Burundi	23.89	39.96	26.21	21.04	9.28	10.07

Source: Data on exports of fossil fuel products is based on WITS database. Data on foreign exchange reserves has been taken from World Bank Development Indicators. Total reserves comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities.

SPM: African Perspectives of a Just Transition to low-carbon economies

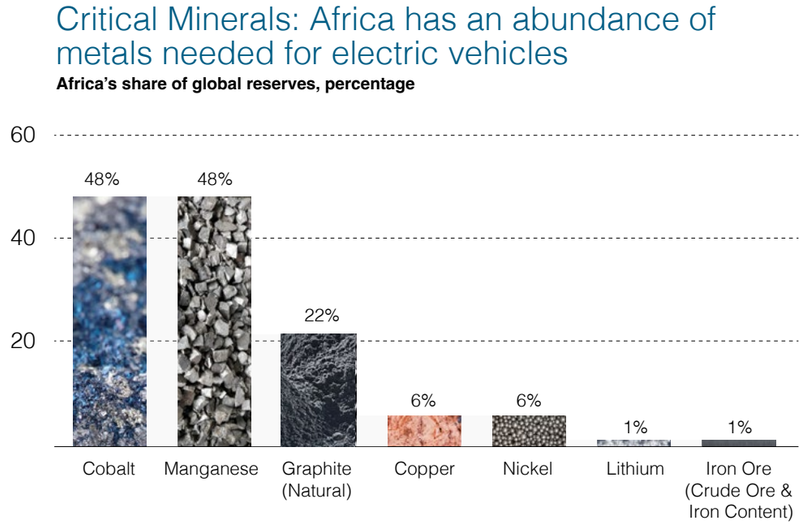
Assuming that the exports of deforestation products from Africa was not based on deforestation in the first place, the main constraint for African countries would be to comply with the due diligence certification requirements. This additional cost could erode the cost competitiveness of Africa's exports to the EU. African economies may be required to institute a mechanism that makes it less costly for its exporters to comply with the conditionalities. It is relevant to mention that whether the Deforestation Regulation **complies with the existing trade rules** at GATT/WTO, is unclear. There are considerable grounds to raise questions on it, in particular, whether it discriminates on the basis of the method of production of a product. WTO rules need to be clarified so that countries cannot discriminate on the basis of the method of production of a product to achieve greater certainty to GATT/WTO rules and allow for a predictable trading regime.

African economies need to institute suitable mechanisms for complying with the conditions mandated by trade actions, such as the EU's Deforestation Regulation. Second, as part of international collaboration, African economies should negotiate with other countries to secure a long transition period of 10-15+ years for complying with the requirements of measures such as the EU's Deforestation Regulation.

Critical minerals and the energy transition

The African continent has substantial shares in the world production of some critical minerals. In 2021, the global reserves of cobalt was estimated at 7.1 Mt, with more than 50 % (3.6 Mt) concentrated in the Democratic Republic of Congo (USGS. 2021)[8]. Africa hosts 6 % of copper, 53 % of cobalt, 25 % of bauxite, 21 % of graphite, 46 % of manganese, 35 % of chromite, 79 % of phosphate rock, and 91 % of platinum group metals (USGS, 2022). These estimates are broadly in line with the figures contained in a recent report of UNCTAD, as shown in Figure 2.1.

Figure 2.2: Africa's share of global reserves of some critical minerals



Source: UNCTAD April 2024. Critical minerals boom: Global energy shift brings opportunities and risks for developing countries. Available on the following link https://unctad.org/news/critical-minerals-boom-global-energy-shift-brings-opportunities-and-risks-developing-countries.

8 - https://pubs.usgs.gov/periodicals/mcs2021/mcs2021.pdf

Despite its vast resources, Africa's share in the global exports of critical minerals remains low with 8.3% for raw, and 3.8% for processed critical minerals, respectively[9]. This is unsurprising noting Africa's global value chains for green and transition minerals being largely confined to their start through exploration, extraction, and some processing. The relatively low degree of processing relegates the African countries to being price takers in global trade, which can however be mitigated learning from the DRC through policies that **promote local processing**, where by refining and processing cobalt locally, the country boosted "the mineral's unit price from $5.8 per kilogram at extraction to $16.2 per kilogram after processing. With this initial move up the value chain, the African nation's exports of processed cobalt reached $6 billion in 2022, compared to just $167 million in exports of unprocessed cobalt" (UNCTAD, 2024)[10] .

No doubt policymakers and other stakeholders are cognisant of the need to create conditions to use Africa's **green minerals to industrialise and achieve economic diversification.** It is also relevant to note that, the African Union Commodity Strategy (AUCS) adopted by the Ministers of Industry and Trade in September 2021 envisages harnessing Africa's natural resource endowment for resource-based industrialisation and comprehensive development. Another important document titled African Green Minerals Development Strategy Approach Paper, has been prepared by the African Development Bank in 2022, as the precursor study for a fully-fledged African Green Mineral Strategy.

Given the imperative of enhancing domestic availability of critical minerals, creating upstream linkages relevant for mineral exploration, mining and processing (inputs required, such as capital equipment, services, utilities, and consumables) and stimulating downstream value-added processing, **some of the existing rules at the WTO impose constraints** on countries that seek to enhance downstream processing and domestic sourcing. Gains from energy transition based on critical minerals must not be skewed against the African economies, who may be compelled to remain exporters of the primary commodities and without progressing into value-added and processed products. A 'just' transition must translate to gains from trade-related mitigation measures being distributed more evenly among countries, and developing countries must preserve policy space so that the transition to renewable energy does not make Africa overwhelmingly dependent on imports.

From the perspective of **domestic and intra-Africa action,** African economies could consider the following;

- leverage foreign investment policies to facilitate the importation of advanced technology and machinery, managerial skills and expertise needed for domestic manufacturing of value-added products based on critical minerals;
- create a robust financial support for critical minerals industry by focusing on research and development to enhance technological capabilities in the processing and commercial application of critical minerals;
- develop new critical minerals-based supply chains in domestic, regional and global markets;
- leverage the African Continental Free Trade Agreement to overcome the limitations of small domestic markets for exports of products and equipment relevant for renewable energy.

From the perspective of international collaboration, many recommendations are key to the African economies being able to benefit from their reserves of critical minerals,

- In trade negotiations, African countries should seek to retain the right to take WTO-consistent policy measures for enhancing downstream processing of critical minerals - export taxes.
- Active participation in the Panel on Critical Energy Transition Minerals, established at the COP28 climate summit by UN Secretary-General António Guterres highlighting the problems in the existing and emerging trade agreements and the need to make changes to the rules of the international trading system.
- Changes in trade and investment rules for promoting downstream value-addition based on critical minerals and permit countries to mandate local content, with a view of foreign exchange balancing between outflows for imports and inflows attributable to exports.
- Both at the WTO and in their bilateral trade engagements, African economies should seek policy space to mandate the availability of critical minerals for downstream processing at prices that are lower than the export price in their economies.

9 - https://tradebriefs.intracen.org/2023/9/spotlight

10 - https://unctad.org/news/critical-minerals-boom-global-energy-shift-brings-opportunities-and-risks-developing-countries)

Conclusion

Having explored the implication of the energy transition from different perspectives of green technology, solar energy potential, fossil fuel exports and imports, climate change measures of others, and the role of critical minerals as they relate to trade, a deeper understanding of the implications is necessary.

As the adverse impacts of existing international agreements on trade and investment arise from a network of agreements at the WTO, FTAs, EPAs etc., a comprehensive solution to the problem is required that would override the specific rules in different platforms. Thus, a global compact is required to address challenges and present opportunities for shared prosperity in the transition. Measures taken under the compact should be exempt from action under the dispute settlement mechanism of the WTO, FTA, Investment Agreement, EPA etc.

The need for a new global compact on trade and investment rules, addressing these recommendations, is a pressing imperative for African economies. As most of the African economies were not signatory to the original GATT legal text of 1947 which forms the basis of much of WTO and FTA rules, they did not participate or play any role in the formulation of these rules. Procedural justice demands that these iniquitous, asymmetric, imbalanced and unfair rules be amended to address the concerns of the African economies.

CHAPTER 3:

Economic Implications of the energy transition

By Anton Cartwright

Energy is critical for all human development and the quest of African countries to advance their economies is contingent upon their ability to secure more energy. African countries are undertaking this quest at a time of growing climate change impacts and an associated energy revolution. More than 70% of global greenhouse gas emissions come from the energy sector and limiting warming to 2°C above the 1850-1900 baseline requires “rapid and far-reaching change” in the world’s energy systems (IPCC, 2023).

The 2°C threshold, requires one-third of the existing oil reserves, half the gas reserves and over 80% of known global coal reserves to remain in the ground. It also requires emissions from existing fossil fuel activities to be captured and stored using as-yet-unproven and expensive technologies. Under the less-damaging 1.5°C threshold there is a greater urgency, more dependence on carbon capture and storage and no accommodation of coal-fired power in the global energy mix beyond 2050 (IPCC, 2018).

The same temperature targets require a ramping-up of investment in clean energy, new construction materials, circular material flows and climate resilient agriculture, not to mention heightened need for disaster risk management. However, the current energy sector trends are not aligned with the temperature targets. Energy landscapes have always influenced economic and development landscapes and it will be no different during the global energy transition (Castan Broto, 2017). This chapter maps the economic implications and options for the energy transition in African economies.

The African challenge in the global energy transition

African countries were quick to sign the Paris Agreement in the hope of attracting finance and funding. Within United Nations Framework Convention on Climate Change (UNFCCC) negotiations, the same African countries have supported the idea of a ‘just climate transition’ emphasising that the three pillars of Article 2 of the Paris Agreement (‘mitigation’, ‘adaptation’ and ‘means of implementation’) only cohere under a transition that is underpinned by social justice and financial transfers to low and middle-income countries (UNFCCC, 2023).

The contingency of the United Nations’ climate goals on **poverty alleviation and socio-economic progress** is intuitive to most Africans. If a family does not know how to feed their children tonight, they will not (and should not) refrain from chopping down forests, making charcoal or burning paraffin. The farmer protests to proposed cuts in fuel subsidies in Germany, early 2024, and the *mouvement des gilets jaunes* in France 2018 suggest that the centrality of livelihoods and people applies equally, albeit in different ways, in high income countries.

However, in 2023, wind and solar energy contributed more new energy to the global energy mix than any other source (Energy Institute, 2024). The need to ensure that the global energy transition translates into more and better energy services, is critical in African countries. Global energy consumption continues to increase, and reached 29.925 TWh in 2023 (Energy Institute, 2024). Despite this, most African countries engage in the energy transition from a position of acute energy poverty, and energy demand from African countries dropped by 0.4% in 2023, relative to 2022 (Energy Institute, 2023). Mean per capita energy consumption in Africa is 14-15 gigajoules per person, in contrast to the global mean of 75 gigajoules, whereas the mean consumption in the United States of America (USA) of 300 gigajoules (Jackson et al., 2022).

Globally, 775 million people lack access to reliable electricity and 600 million of these people live in Africa. Largely as a result of the continent’s energy poverty, Africa was responsible for just 8.8% of global greenhouse gas emissions in 2022 (CAIT, 2023) and just 3.9% of the CO_2 emissions from fossil fuels (up from 3.5% in 2000), despite being home to 19% of the global population (World Bank Data, 2023). Meeting the ‘net zero by 2050’ target requires per capita emissions to be 1.4tCO_2e - 2.0tCO_2e per annum in 2050, assuming a population of 9.7 billion and retention of major global carbon sinks in the ocean and forests. Estimates of Africa’s emissions vary greatly (Mostefaoui et al. 2024); Sub-Saharan African emissions were reported at 1.88tCO_2e per capita per annum by 2022 if AFOLU emissions are included, but only half of these were from fossil fuels. Perversely, poverty is associated with slash and burn agriculture, charcoal and wood burning, that accounts for half of Africa’s emissions, even though these emissions are very low. Estimates as high as 3.47tCO_2e per capita are reported (see Letete and Manzini, 2024, Chapter 4).

Within the continent, **emissions are correlated with multi-dimensional poverty and economic progress:** Niger, Burkina Faso, Chad and Mozambique in which per capita emissions are lowest, are also those in which multidimensional poverty is highest (Alkire et al., 2021). The same poverty and weak institutional capacity in many African countries means these countries experience disproportionate damage from climate change. In 2022, African countries lost an estimated $7bn–$15bn from climate change, and this is projected to climb to $50bn by 2030 (Adesina, 2023).

The climate challenge for OECD countries involves cutting greenhouse gas emissions while maintaining productivity and GDP. For African countries, the challenge involves finding ways to significantly increase GDP (employment, household income and energy access) without major increases in greenhouse gas emissions. The very different starting points and pathways in the global energy transition between African countries and the rest of the world cannot be dismissed. The question for African countries is how they might engage in the global energy and climate transitions to boost energy supply, enhance their economic growth. For Sub-Saharan Africa, this involves increasing GDP per capita above the prevailing mean of $1,690 in 2022, raising the region’s share of global trade to above 3%, and attracting more than the 5% of global foreign direct investment (FDI) reported in 2022 (just 2.5% of global FDI without South Africa).

A key requirement for all African countries involves stronger economic narratives that take the unavoidable reality of climate change and the energy transition into account and seize on the opportunity for climate resilient development. Converting these narratives into economic reality requires financial, regulatory and political support. It is non-negotiable that Africa’s energy and climate transition must support economic diversification and electricity to the 600 million Africans that do not currently have a secure electricity supply and are exposed to both energy poverty and indoor air pollution. Similarly, the continent’s response to climate change has to improve food security for the 278 million Africans that are under-nourished or the 55 million children under the age of 5 that are stunted due to malnutrition, if it is to be just (Oxfam, 2023).

The global context of Africa's transition

African countries confront the global energy transition in a context where economic growth in the world's major economies remains modest, as the rate of growth in China drops below 5% and fiscal policy swings into contraction in the US, Canada, Eurozone and the United Kingdom.

Multilateral free trade ambition is under threat with increasing protectionism, and likely to be justified on grounds of carbon pricing and the need to protect domestic industries and their workers from emerging economy exports.

Technological innovation will continue to attract more economic value than commodities. The global energy transition - a shift from a commodity based sector to a technology and innovation based sector - is just one part of a broader economic trend that rewards technology innovators.

The changes in the climate system driven by increasing temperatures could spark a radical shift to dump fossil fuel assets and price greenhouse gas emissions into all transactions where climate change is a central political economy issue in all major economies and 'carbon credits' and 'decarbonisation' emerge as new economic sectors.

The reach of the financial sector will continue to expand as the Global North's debt, combined with increasing ownership of this debt by emerging economies with an export surplus, which will reconfigure the global financial architecture, creating new risks and opportunities. The shift away from a dollar-based global economy will be slow and disruptive.

Despite increasingly enclaved flows of trade and finance, economic growth opportunities will continue to move East (and slightly South) within the global economy. This is driven by ageing populations in the Global North, a youth dividend in the Global South and rapid rates of urbanisation in Asia-Pacific and Africa. The African continent will become 50% urban in the mid-2030s.

Given this context, current climate and energy strategies in Africa coalesce around one of two stylised narratives, neither of which offer sustainable economic opportunity.

The two prolific, but flawed narratives

The **economic development before climate responsibility** narrative primarily rests on the moral right of African countries to extract the hydrocarbon energy feedstocks they have, and increase their greenhouse gas emissions as part of their pursuit of socio-economic progress. This thinking draws on Africa's historically small contribution to GHG accumulation in the atmosphere to assert the right to economic development ahead of any responsibility for emissions reductions. The proponents highlight that it was the economic advance of high-income countries during the industrial revolution that initiated anthropogenic warming, and that low- and middle-income countries should not be denied the same opportunity. This position is often combined with the insistence on loss and damage compensation (IPCC, 2023; UNFCCC, 2023).

While there is no moral or climate change case for African countries to forgo the burning of fossil fuels, continued reliance on hydrocarbon extraction is unlikely to provide African countries with viable economic development pathways. The choice between economic development and the burning of fossil fuels is likely to prove a false one, and insisting on the right to keep mining and burning fossil fuels would expose African countries to limits and challenges which include,

- Loss of low carbon competitiveness, where most African countries are still building their energy and manufacturing systems, and have the opportunity to do this while retaining their low-carbon status and their globally significant carbon sinks and attracting investment. At stake is a share of the $5.0 - 9.2 trillion that will be invested annually to ensure liveable global climates by 2050 (McKinsey, 2022; Black et al., 2023)

- Higher long-term costs of energy as the dependence on fossil fuels will forego the cost and time savings offered by renewable energy as African countries invest in energy security, noting that the levelized costs of solar and wind energy are lower relative to coal and nuclear, and the speed with which this form of energy can be installed relative to fossil fuel and nuclear alternatives.

- Locked into commodity exports and excluded from the types of finance that Africa needs. African countries account for a fifth of the global population, but attract only 2%-3% of global energy investment (AfDB/ IEA, 2023). The continent requires $2.8 trillion between 2020-2030 ($277 billion per annum) to implement its Nationally Determined Contributions under the Paris Agreement (CPI, 2022). Without unambiguous climate resilient development strategies, African countries will struggle to raise the scale or type of finance they need (CPI, 2022).

- Entrenched economic dependence and high costs of capital. An African economic development strategy that depends on the benevolence of high-income countries or China, is not secure. Dependence on the UNFCCC Finance mechanism or donor aid, and multinational company investment not only undermines sovereign decision-making and economic diversification, but condemns the continent to laggard status and higher costs for capital (Swilling et al., 2021).

- Relies on untenable development pathways. Most importantly, this strategy rests on the assumption that the development pathways used by European, American and Asian countries, in which workers progress through "stages of development" from farm to factory to offices, remain available to African countries (Cohen, 2024). This is simply not the case for market and climate reasons as the traditional export-led manufacturing that African countries have tried, largely unsuccessfully, to secure represents a shrinking part of the global economy.

African countries, such as South Africa and Ghana, that have tried to drive industry off the back of fossil-fuel powered energy now face more precarious access to capital and restrictions on trade in carbon intensive goods. Increasing damage from storms, floods, health crises and crop failure will see the global political economy, and consumers, turn against emitters at some stage in the next two decades, regardless of where they are located or the development consequences. African countries should avoid the inevitability of the associated developmental cul-de-sac.

At the other end of the spectrum is the idea that African countries will take advantage of their laggard status to **'leap-frog' to economic competitiveness in a carbon constrained global economy.** It is this thinking that informs the NDC clauses that condition most African country's climate strategies on financial and technology transfers (IPCC, 2023; UNFCCC, 2023). In the process African countries would secure their share of the "new climate economy" generating an estimated $26 trillion in global economic benefits (2018-2030) (GCEC, 2014). Whilst a compelling idea, the assumption that a full economic leap-frog will happen automatically or easily faces its own challenges:

- Economic 'leap-frogs' require investment, political stability and coordinated multi-level governance. The African continent has experienced nine coup de'tads since 2020, but even where governance is sufficient to prevent civil conflicts, institutional deficits remain an impediment to structural reform of the economy.

- Economic leap-frogs require cohesion and political support. Political power has co-evolved with fossil fuel extraction in countries such as South Africa, Ghana, Nigeria, Algeria and Angola (Niranjan, 2023; Schücking et al., 2023). Ethiopia has presented a set of climate resilient development projects and has embraced renewable energy, but this is the exception on the continent. The result is a set of mixed messages to investors and a failure to mobilise the type of "country platforms'' necessary for the leap-frogs (Hadley et al., 2022).

- Economic leap-frogs are risky. African countries have struggled to diversify, even where they have embraced digital technologies. Structural reform and diversification of African economies and the breaking of commodity dependencies remain risky in themselves, particularly where countries have high levels of debt.

- Economic leap-frogs require bargaining power, whereas for historic reasons, most African countries do not have the trade or financial power to influence the global economic "rules of the game" in their favour (Iyoha, 2005; Edeme and Mumuni, 2023). In the interim, African countries have limited, and expensive, access to financial resources and many of the clean technologies required to affect an economic leap-frog (Das and Sharma, 2024, Chapter 2,).

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Insisting on the right to continue emitting for the sake of development, on the one hand and leap-frogging to a thriving low-carbon economy on the other - hold limited economic potential for African countries. A third way is possible - **playing smart** - based on African countries anticipating, and supplying, the needs of the global economy over the next two decades on their own terms. This strategy offers African countries the chance to attract a greater share of the $5 - $9.2 trillion that will be invested every year to ensure "liveable climates" by 2050 (World Bank 2023; McKinsey, 2023).

Under this strategy, the issue for African countries is not so much what they can do to reduce emissions but how they can harness the global decarbonisation effort and associated fast-growing industries as part of their socio-economic development (Hausman, 2022). This would see African countries switching from commodity-led (and debt-laden) growth strategies that have delivered so little over the past three decades, to deploying their renewable energy resources, carbon sinks, rare earth minerals, low-carbon manufacturing and youthful labour force and innate resilience to support the global energy transition and advance their domestic priorities.

Such an approach would require political, financial, educational, environmental, agricultural, industrial, and trade reforms to deliver employment intensive climate resilient development (Kaboub 2007, 2013; Pickard and Schweitzer 2012). The specific reforms will be bespoke to each African country, and should be curated under "country platforms'' that represent domestic priorities (Hadley et al., 2022), but continent-wide features of this approach include:

- New economic narratives. African countries advancing economic narratives that transcend the "jobs versus environment" dichotomy and instead target the jobs and investment offered by climate resilient development (Kleemann et al., 2017). These narratives will build on Agenda 2063 to profile Africa as a place of youthful innovation, expanding consumer power and hard-won resilience that is a worthwhile investment destination.

- Implementation of Global Stocktake commitments as a platform for Just Transition Transactions. The 2023 Global Stocktake (GST) provides a comprehensive summary of conditions for the global transition (UNFCCC, 2023). It is reasonable that African countries insist on climate finance pledges, greater transparency around the allocation of climate finance, disbursements of the UNFCCC Finance Mechanism, complemented by debt for carbon swaps and concessionary finance for renewable energy options.

- Attention to multilateralism, where African countries insist on application of WTO rules and processes in the application of a Carbon Border Adjustment Measures, and push for greater coherence between trade and climate policies.

- Mobilising finance while upholding the GST and Paris Agreement pledges is necessary to retain trust, the needs of African countries exceed, and are more urgent, than what is likely to emerge from the GCF or L&D funds. In the context of tight global monetary policy, the most effective way for African countries to attract international investment to the right types of projects is through the mobilisation of domestic and regional finance, however meagre this is. Local institutions, lending in domestic currencies and allocating capital in line with local knowledge and needs, are able to overcome incorrect perceptions of risks and highlight opportunities for international capital (Haas et al., 2023).

- Linking urbanisation with low-carbon industrialisation and manufacturing. Between 25-35 million people will be added to Africa's towns and cities every year for the next two decades. In the absence of global trade reform, African countries will encounter critical foreign exchange pressures if they import the clean technologies and low-carbon building materials required by climate resilient development (Das and Sharma, 2024). Instead, African countries could draw on domestically produced materials and services to make the energy and climate transition, supporting economic diversification in the process.

- Electrify with renewable energy. The levelized cost of renewable energy, and the growing number of private sector companies able to supply quality renewable energy infrastructure on the African continent, make it possible to extend electricity to many of the 600 million Africans that lack secure supply, in quick time and at low cost. Extending access to safe and renewable electricity will unlock latent economic potential and free up some of the fiscal resources currently allocated to Emergency Power Producers.

- Adapt through domestic resilience. A UNEP report published in late 2023 indicated that "Developing countries required 10-18 times more adaptation funding than they were receiving" (UNEP, 2023). African countries are unlikely to receive this quantum of investment in the current economic context. Instead, they should build economic narratives around the resilience they have developed through a century of economic, governance and environmental disasters.

- Take advantage of the geoeconomic interregnum. In geoeconomic terms, power is shifting East and South, offering new opportunities to African countries (Quah, 2021). Historically, economic influence has been difficult for Africa's small, open economies. Economic bargaining power will be hard won, but African countries have the opportunity to use the geo-economic transition to improve their bargaining power by collaborating eclectically and strategically with both traditional and emerging economic powers on trade and finance (UNGA, 2022).

- This bargaining power is a prerequisite for ensuring the continent's rare earth minerals and in-tact carbon sinks (most obviously the Congo Basin's forests and peatlands) deliver reasonable benefits for the countries that house them. Focussing on how the benefits of these "resources" are valued and shared, offers an opportunity to boost Africa's economic significance.

  Africa's rapidly evolving cities will, similarly, provide some of the few sites of expanding population and economic demand ahead of 2050, and will gain economic prominence as places where consumer numbers are increasing not decreasing. 113 million consumers are expected to be added to the global economy in 2024 and only 4% of these will be in the West, while an estimated 35 million will be in Africa. The same demographic trends will see African countries able to provide 477 million people between the ages of 15 and 35 (and 1.7 billion working age people in total) to economies in which the workforce is shrinking. Markers of Africa's bargaining power will include not just flows of trade and investment, but voting (and veto) rights in the IMF and World Trade Organisation and the UN Security Council, and the share of US debt that is held by China and other Global South countries.

- **Leverage the continent's 'carbon credit' through Article 6 rulebooks.** Under Article 6 of the Paris Agreement, African countries have the opportunity to place their carbon sinks on their national accounts and develop carbon markets that secure full value for the protection of the continent's forest, grassland and soil carbon sinks, while also providing finance for the clean energy and energy efficiency services that African countries desperately need. Failure to deliver these rulebooks will see carbon market revenues accrue to the various standards, project developers and consultants that emerged under the "voluntary carbon market" in the post-Kyoto Protocol (post-2012) period, an outcome that African countries should seek to avoid at all costs. Article 6 rulebooks offer African countries rare agency and an opportunity to develop "rules of the game" in ways that meet the respective needs of African countries.

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Enabling conditions for 'Playing Smart'

Behind the 'playing smart' option is the assumption that, despite the SDGs and the UNFCCC, the global development effort is unlikely to provide the type or the scale of development that African countries require. This sobering reality foregrounds the steps that African countries need to take to 'play smart' and draw down economic benefit from the global energy transition. This is a perspective that places agency back in the hands of African leaders. What is it that African leaders can do in the short term, and independently of global leaders, to support 'playing smart' and enable benefits?

The obvious precondition includes **unambiguous economic narratives,** aligned to Agenda 2063, that place 20-year timelines on the phasing out of fossil fuels, and commit to investments in renewable energy, circular economies, nature enhancing infrastructure and liveable cities. In the context of global economic uncertainty, there are rewards for any country that can signal clear intent and the direction of economic growth. In support of these narratives, African countries will be required to clamp down on the $80-$100bn a year in **illicit capital flows** between Africans and multinational corporations (Adesina, 2023) and to use the allocation of their domestic public and private resources (however meagre) to support the narrative and signpost the opportunities to international investors. This use of domestic finances to crowd-in international investment and donor support, offers significant advantages over the current dependence on international financiers and their expensive and misplaced capital allocations.

While looking to domestic options in navigating the global energy transition, African countries would do well to **strengthen the ACFTA** both in terms of governance and volumes of trade. The region offers growing and urbanising populations, and trade within the region would strengthen bargaining power prior to African countries negotiating trade opportunities elsewhere in the world (such as AGOA). The ACFTA can be strengthened by developing the value chains required to feed urban demand on the continent. Similarly, integrating the continent's five power pools would not only smooth the supply from Africa's growing renewable energy plants, but also all the continent's considerable hydropower resources to serve as pumped-storage assets.

In terms of attracting finance, African countries must work harder at **mobilising domestic fiscal and financial resources** through enhanced revenue collection and the closing of loopholes that currently enable 'illicit capital flows' from African countries, most obviously through inaccurate trade invoices. A country's fiscal strategy - how it raises and allocates revenue - is still the best indicator of what it hopes to become, and Africa's fiscal strategy should support and shed light on its respective narratives around climate resilient development.

The bankability of urban climate resilient development projects would be enhanced by *African countries applying the 2014, African Charter on Values and Principles for Decentralisation, Local Governance and Local* to develop National Urban Policies that support sustainable cities and urbanisation, and provide clarity on fiscal transfers and which tier of government is responsible for the respective components of climate resilient development. Innovative approaches to attracting finance should not detract from the need for Africa's Central Banks to undertake the fiduciary steps that will allow them to borrow in their domestic currencies.

The same Central Banks should support African credit rating agencies capable of more accurate calibrations of risk and opportunities. Country platforms should seek out partnerships with those existing service delivery innovators in the energy, water and sanitation and mobility sectors that are enabling climate resilient development. African countries hold the rare advantage of being able to draw eclectically from innovations. The growing range of low-carbon bio-materials, for example, offer new ways to construct the cities that the continent needs (UNEP, 2023). There are similar technologies available to the farming sector that could support the continent-wide effort to improve food security. The challenge for African countries in seeking 'playing smart' economic advantage, involves combining international and local innovations in ways that are affordable and appropriate to the local context (Das and Sharma, Chapter 2, 2024).

Sectoral perspectives for ‘Playing Smart’

As exploration for **fossil fuel reserves** has increased in Africa, significant new resources have been discovered, including at least 115.34 billion barrels of oil and 21.05 trillion cubic metres of technically recoverable liquified natural gas (LNG) (UNEP, 2017). Between 2011 and 2018, 41% of new LNG discoveries were in Africa and in 2022, 48 African countries were either exploring for or extracting fossil fuels (UNU-IRA, 2019; Ganswindt et al., 2023). New finds of liquified natural gas (LNG) in Tanzania, Mozambique, Algeria, Egypt, Equatorial Guinea and Nigeria, coupled with Europe’s demand for new sources of gas due to the war in Ukraine, generated $281 billion in profits for the ‘big-five’ fossil fuel companies in 2022/23 (Global Witness, 2024).

However, with Botswana being an exception (diamonds), “Overall the economies of resource rich countries are in a surprisingly poor state” (AfDB, 2007; Adesina, 2023). In an attempt to avoid the “commodity curse”, African countries have the opportunity to create sovereign wealth funds, use fossil fuel revenues to diversify their economies into services and banking, and boost the national economy and local economic development. African countries have more than 60% of the most viable solar (10TW), hydropower (35GW), wind (110GW) and geothermal (15GW) resources on the planet, providing the continent with comparative advantage in the global transition (IEA, 2022). Instead of capitalising on this comparative advantage and competing for the $2.4tn per annum that will be invested in renewable every year by 2030 under existing climate pledges (Songwe et al., 2022), African countries are celebrating the “planned” $245bn in oil and gas infrastructure that will lead these countries into an economic *cul de sac* within 10 years.

African countries are home to 73% of the cobalt, 83% of the platinum, 76% of the manganese and 32% of the bauxite, that are **critical to the generation of renewable energy,** green hydrogen and battery storage that the global energy transition requires (UNU-INRA, 2019). The key for African countries involves utilising these reserves in ways that build in-country processing capacity and support Africa’s renewable energy and electric vehicles sectors, while exporting more refined versions of these minerals. It need not be the case that strategic mineral mining has to damage forest resources and aquifers that feed the continent’s cities.

New discoveries of strategic minerals offer the opportunity for new technologies and business models, but this is only possible where African countries have the governance in place to enforce not just new mining models, but also new ownership and beneficiation processes.

Africa’s growing population will require feeding if it is to contribute to economic development and climate resilience. Providing this **food is expected to become more difficult under climate change.** Without deliberate programmes, weather related losses, which accounted for 5% of agricultural output between 1991-2021 (the equivalent of $123 billion per annum) are set to undermine food security (FAO, 2023). In the context of global decarbonisation, African farmers will attract investment in agriculture that sequestrates soil carbon and avoids the destruction of ecological infrastructure through excessive use of chemicals. The same soil carbon holds the key to doubling yields through the prevention of erosion and improved uptake of nutrients (fertilisers) (Thomas, 2020).

Conversely, the European Green Deal, including carbon border adjustment measures (C-BAMS) and the EU-Deforestation Regulations (2023/1115) that ensure any beef, cocoa, coffee, palm oil, rubber, soya or wood products entering the European Union do not contribute to deforestation, will make it difficult for African farmers to trade in products whose production is either carbon intensive or associated with deforestation. As much as C-BAMS are likely to be adverse for industrial farming, they will reward those farmers that have begun adopting renewable energy and soil carbon sequestrating practices (PCC, 2023).

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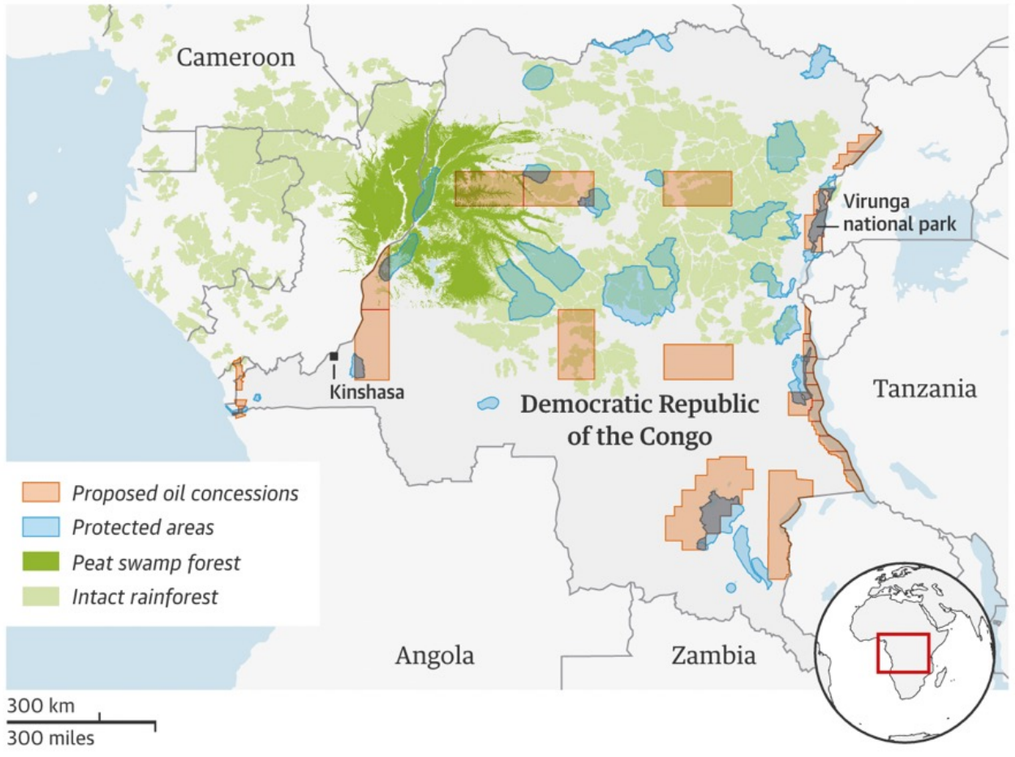
Given the abundance of land, and the constraint of under-investment, there is a strong case for producing biofuels in countries that have adequate rainfall. Unlike Europe where almost all arable land is utilised, biofuel investment in Africa could increase productivity and food security, rather than usher-in “food-vs fuel” trade-offs (Prasad and Ingle, 2019; Sparkman et al., 2023).

Similar programmes are required in the **forest sector.** The estimates vary, but the 269 million hectare Congo Basin stores roughly 30.6bn tonnes of carbon (mostly in peatlands), distributed equally above and below ground. This is the equivalent of 224.6bn tCO_2e, or roughly 10 years of net emissions by the global economy (Lewis, 2009; CAFI, 2022). Whilst there are pockets of intense deforestation, in general the rates of deforestation across the forest are 0.3%, an order of magnitude lower than deforestation rates experienced in the Amazon Basin in recent years. The forest is a globally significant carbon asset, but it is also a source of valuable timber, agricultural real estate and beneath the forest lie oil, natural gas and rare earth deposits.

Figure 3.1 below, illustrates what has been framed as a ‘zero-sum’ trade-off between the revenues and jobs that could be created by mining oil reserves in the DRC and the greenhouse gas sequestration in the Congo Basin peat forests. What this depiction misses, is the possibility to create value and jobs in new, and globally important ways, through more innovative mining, forestry and agricultural practices, in the basin.

Figure 3 1: Identified carbon and forest sinks in relation to existing oil concessions in the Congo Basin



A ‘playing smart’ strategy for the Congo Basin involves high-income countries **incentivising the six countries in the Basin to steward the forest in ways that support forest** livelihoods without threatening the underlying carbon sink. Similarly, sustainable forestry, complete with timber certification and higher prices for timber, can be combined with agriculture and biofuel production without destroying the role of forests and grasslands in flood buffering or carbon sequestration. In the process these countries could integrate their financial and natural capital accounting and planning systems. As UNECA asserts, “Investing in environmental standards should be seen not as an obstacle to competitive manufacturing, but as underpinning competitiveness, making more efficient use of energy, and decoupling resource use from output growth” (UNECA, 2016).

Cities are where the majority of the African population will live by 2050, and **cities have the potential to offer economic growth.** Cities also concentrate climate change risks and opportunities. How African cities are built in the next two decades will set the template for economic progress (or otherwise) for the remainder of the century. With notable exceptions, most national governments have been slow to devolve power and budgets to urban authorities, and insufficient and inappropriate investment in Africa’s cities has seen them unable to keep up with the influx of people (Cartwright et al., 2018). Currently, the majority of the 25-35 million people being added to Africa’s urban spaces every year, settle on unplanned and unserviced sites. They adopt a hybrid mix of formal and informal services and energy feedstocks, many of which contribute to negative externalities (Cirolia, 2021).

Where governments anticipate the urbanisation megatrend and invest proactively in urban infrastructure and services, they will harness the aggregation of young, economically ambitious urban dwellers as both an economic and a climate adaptation force. Planned and funded African cities will provide the markets that could drive value-addition of existing value chains on the continent, with an advantage of adopting low-cost renewable energy, the latest transport technologies and low-carbon (or in some instances carbon absorbing) and bio-based building materials (UNEP, 2023). In this way, Africa’s cities will be transformed from extractive bases for multinational companies, into places of inclusive and sustainable living that generate the knowledge and the industry to export low-carbon goods and services around the world.

Responses that factor different country typologies

There is no single strategy that can be advocated or applied to all African countries, however for ‘playing smart’ the typologies, whilst noting that some countries would in more than one typology, can be disaggregated as follows:

The **least developed and conflict-affected countries,** together with the land abundant agricultural economies, have per capita emissions well below 1tCO_2e per annum. There should be no carbon constraints on energy policy or development in these countries, but every effort to draw in Loss and Damage Funding and build new social compacts around the investment opportunities that are available to countries pursuing climate resilient development.

For the 6 **Congo Basin countries** a large part of the challenge involves securing full value for the forest and peatland carbon sinks in the basin to support forest livelihoods and sustainable timber offtakes while preventing deforestation rates in excess of 0.5% per annum. These countries should be offered ‘debt-for-carbon’ and ‘debt-for-nature’ swaps in which their debt servicing obligations are cut in exchange for retaining their globally significant carbon sinks.

Countries with **strategic mineral** (‘rare earth’) deposits face the challenge of accessing these minerals without damaging their forest sinks and in ways that support local value chains, inclusive low-carbon development and access to domestic energy. Whereas for countries whose economies are **dependent on oil and coal exports,** the task requires avoiding stranded assets and labour while using recent fossil fuel windfalls to finance the transition away from coal to renewable energy over the next 20 years (UNU-INRA, 2019).

The countries with newly discovered **natural gas and oil resources** confront, perhaps, the most difficult challenge. It involves using their oil and natural gas reserves as a transition fuel, to diversify their local economies and usher in renewable energy while using natural gas to reverse the damage being done to forest and soil carbon by the current dependence on wood, charcoal and slash and burn agriculture. South Africa, Morocco, Egypt, Tunisia, all of which have diverse urbanising economies, confront the challenge of low-carbon economic development and their respective energy mixes. To a large degree this will play out in the countries’ cities, where a Just Urban Transition, offers the opportunity for new technologies, partnerships and finance to support much-needed service delivery infrastructure (Cartwright et al., 2022).

Conclusion

The transition will, unavoidably, be disruptive and create a new set of economic winners and losers in the global economy. The question for African countries is whether they can exploit the disruption to alter their status as laggards in the global economy. Given the global disparity and the structural disadvantages with which African countries enter the global transition, the default - and difficult to avoid - economic impact is for the global energy transition to be economically damaging to African countries. This default is likely despite calls for a 'just transition'.

There are positive economic prospects from the global energy transition hinge on African countries anticipating the needs of the global economy and using this transition as the basis for industrial strategies that forges their own 'just transition pathways'. These pathways would transcend the false 'economy versus climate' or 'climate versus jobs' trade-offs and develop employment intensive local value chains in support of the sustainable cities, globally significant carbon sinks and abundance of renewable energy for households and industries that both the world and African countries need (Hausman, 2022). The disruptions created by geo-economic shifts and climate change, offer precisely the type of context in which advancing the right economic narrative can provide much needed certainty and economic benefits.

While African countries should insist that the principles of common but differentiated responsibilities and respective capabilities for climate change are upheld, and that pledges around the Green Climate Fund and the Loss and Damage Fund are fulfilled, this money will not be enough, and high-income countries have proven unreliable when it comes to the interests of African countries in the energy transition. Economic development strategies based on 'admissions of guilt' or the benevolence of those countries responsible for historical greenhouse gas emissions are unlikely to succeed.

'Playing smart' for African countries involves drawing on what respective African countries can offer the global economy as it grapples with the climate transition. In documenting the risks, opportunities and options available to African countries, this chapter goes beyond the tropes of 'Africa is vulnerable to climate change' and 'Africa needs investment'. It also seeks to avoid a situation, where, in 2035 Africa points to known economic injustices in the global economy but sits with the consequences of these injustices and little agency to correct them. Rather it outlines how African countries might, in the context of the energy transition, draw on their existing knowledge and assets to mobilise domestic and regional finances and crowd-in international finance around the climate resilient infrastructures and services that African countries need.

That all human endeavour is ultimately enabled by energy and the functioning of the natural world, is something that many African people recognise and appreciate. African countries are well-placed to translate this understanding into economic development strategies that provide their domestic economies and the global economy with what they desperately need in the next decade to make the required climate transition: the sustainably mined rare earth minerals, the forest sinks and the sustainable forest products and foods, bio-based construction materials, expanding markets for renewable energy and cities in which materials are upcycled and recycled, and a young and economically active labour force.

Where African countries can position their development pathways as valuable to the global climate and energy transition, they will attract investment on their own terms (Williams et al., 2023). Notwithstanding the challenge for African countries confronting the global energy transition as, 'finding ways to significantly increase GDP (employment, household income and energy access) without major increases in greenhouse gas emissions.' In the case of African countries, actively harnessing the global energy transition for the purpose of domestic development, could shift the default outcome of this transition from an additional burden on socio-economic progress to a rare opportunity to gain economic bargaining power and accelerate progress. This is not only the best, and least risk, 'low-regrets', development pathway available to African countries, but it may be the only durable pathway ahead of 2050.

CHAPTER 4:

Mitigation Implications of the energy transition

By Thapelo Letete (PhD) and Lungile Manzini

According to the special report on 1.5°C by Intergovernmental Panel on Climate Change (IPCC), global net anthropogenic emissions must reach net zero by 2050 if exceedance of a 1.5°C temperature increase above pre-industrial levels is to be avoided. As of March 2022, more than 80 countries had committed to reach net zero by 2050 at the latest; 53 African countries had submitted their Nationally Determined Contributions (NDCs) under the Paris Agreement, 12 of which had either reached net zero already or pledged to do so by 2070 at the latest. While African NDCs are mostly dependent on financial, capacity building and technology transfer support, if fully implemented, they collectively have the potential to mitigate annual GHG emissions by ±550 million tCO_2e by 2030, compared to their respective business-as-usual baseline scenarios.

According to the African Development Bank (2023) and the United Nations Development Program (2022), a just transition must affirm Africa's right to development and industrialisation based on the Paris Agreement-negotiated language of equity and the principle of common but differentiated responsibilities (CBDR) and respective capabilities (RC), in light of different national circumstances, which means making the right transition choices, managing the trade-offs and achieving both the continent's development and social objectives.

Africa's current and historical emissions

Africa's total GHG emissions, including emissions from Land Use, Land Use Change and Forestry (LULUCF), are estimated at 258 $MtCO_2$-equivalent ($MtCO_2e$) in 1850, after which they remained fairly constant until the early 1900s, only growing by 37$MtCO_2e$ (14%) over the 50 years between 1850 and 1900. By 1990 Africa's emissions had reached 2 688 $MtCO_2e$, while in 2020 they were estimated at 4 395 $MtCO_2e$. Africa's contribution to global emissions has also remained fairly low throughout the timeseries, starting off at 6.11% in 1850 and reaching 8.54% in 2020. In total the results show that Africa has cumulatively contributed about 7.5% to global GHG emissions since 1850. As such, viewing this from the UNFCCC's "common but differentiated responsibilities

and respective capacities" principle, Africa's historical responsibility for the observed and a future climate change resulting from historical emissions is relatively low compared to the developed regions and the likes of China.

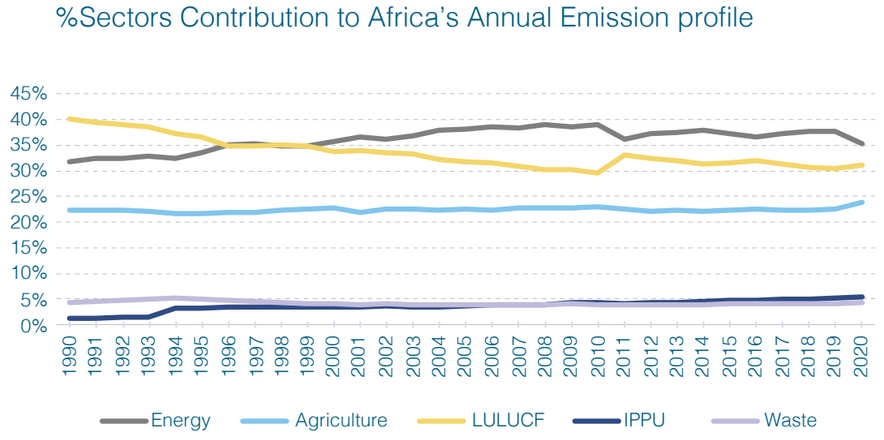
Another useful indicator of the scale of Africa's emissions in comparison with other continents as well as the world is that of emissions per capita, where in 2020 Africa's emissions per capita were the lowest among all continents at 3.47 tCO_2e/capita, compared to the global average of 6.6 tCO_2e/capita and North America at 20.57tCO_2e/capita.

This suggests that supporting Africa's efforts to respond to climate change through finance, technology transfer and capacity building by developing countries or regions is a critical historical responsibility issue, and should not be viewed as a favour done by those countries and regions for the African continent. It can be argued that, an equitable transition should provide for regions with the lowest historical responsibility and emissions per capita like Africa to explore, exploit and make use of natural resources, within the constraint of a global 1.5°C pathway.

Africa's Emissions Profile

As shown in Figure 4.1, from 1990 to 1999 the Land Use, Land Use Change and Forestry sector (LULUCF) were the highest contributing categories to the continent's emission profile, accounting for between 35% and 40% of the emissions. However, since 2000 the energy sector has taken had a higher share of the emissions, averaging 37.5%. As of 2020, LULUCF remained the second largest contributor at 31%, followed by the agriculture sector with a contribution of 23.9%. Waste sector emissions have remained relatively constant over the years, averaging 148 million tCO_2e per annum and 4.2% contribution, while emissions from Industrial Process and Product Use (IPPU) have grown slowly from a mere 34.3 $MtCO_2e$ in 1990, surpassing waste sector emissions and reaching 233.7 $MtCO_2e$ by 2020.

Figure 4.1: Sector contribution to Africa's emissions



Source: Author generated, based on data from Climate Watch (World Resources Institute, 2022).

That land-based emissions from agriculture and LULUCF account for about 55% of the continent's annual GHG emissions, which shows that, while there is often some link between the energy sector and the Agriculture, Forestry and Land Use sectors (AFOLU) in Africa due to the cutting of trees for energy purposes, **equating Africa's just transition to only energy transition" (JET) is not accurate,** and can potentially underplay the importance of non-energy emission sources in Africa's Just Transition.

Box 4.1 | Deforestation

Context

Deforestation is one of the most pressing global problems, as its impact on climate change, rural livelihoods, biodiversity loss and other environmental services provided by forests has been on the spotlight lately.

What is causing deforestation?

The most significant driver of forest loss in Africa is industrial activities such as subsistence agriculture rather than human activities. If the continent had to tackle deforestation, then it would need to solve the issue of commercial logging, charcoal production, effective government policies and the expansion of agricultural land. Indirect causes include socio-economic, environmental and trade conditions. The absence of clear rules on land tenure, weak sustainability provisions in trade agreements, or failure to support or incentivise forest conservation and sustainable agriculture, may ultimately increase deforestation.

Why is deforestation a problem in Africa?

Continuous deforestation in Africa can result into damage to habitats, biodiversity and ecosystem services that are essential for planetary health and human wellbeing. Deforestation is a particularly complex challenge in Africa due to land ownership rights, as in many countries, there is little privately owned land, with most land owned by the state. Given the lack of clear rights and documentation, there's little clarity on the type and location of the landuse change.

What is the solution?

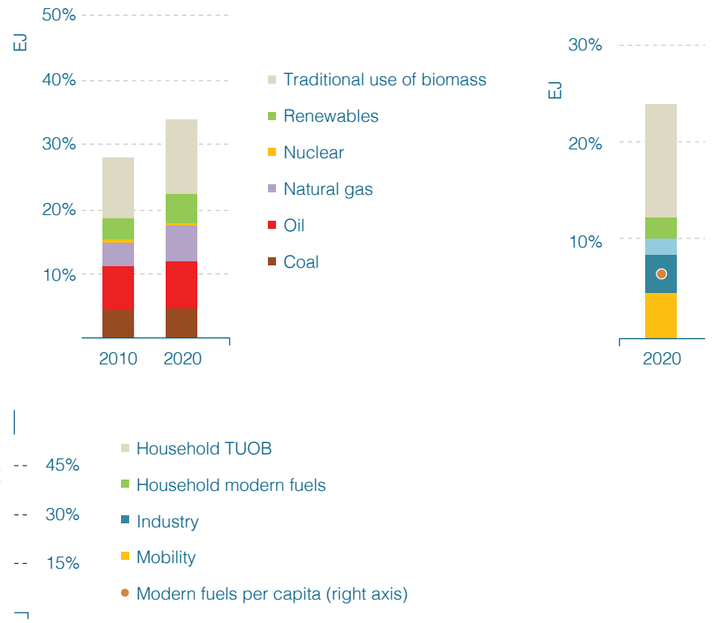
Improved farming methods and agroforestry technologies could help ease the pressure on land use. Investment to drive food security and move away from inefficient, inequitable, and unsustainable land-use models is key. Local specific policies and strategies that considers diversity, culture, and local conditions. A blended approach in finance by both public, and private funding. Continued international climate negotiations that aim to create effective mechanisms to address deforestation while ensuring food security, economic development, which considers the seven safeguard principles and creates jobs.

In fact, evidence has shown that the main driver of deforestation and land degradation in Africa is the clearing of land for agricultural purposes and not so much for energy purposes. As such, for Africa implementing smart agriculture interventions, reducing emissions from deforestation and land degradation, and restoring forests are just as important to the continent's just transition as is the deployment of low emission fuels and technologies.

Understanding the associated Energy System

As shown in Figure 4.2, traditional use of biomass dominates Africa's energy supply and consumption, particularly the residential sector in sub-Saharan Africa, with more than 80% of the population relying on this energy source. Over the 10-year period between 2010 and 2020 the consumption of traditional use of biomass increased from about 10 EJ to about 13 EJ.

Figure 4.2: Africa's current primary energy supply by energy type (a) and consumption by sector.



Source: IEA's Africa Energy Outlook 2022

Oil is the second largest source of energy in Africa and is mostly used for transportation. Coal, and natural gas are the third and fourth largest sources of energy in the continent respectively, with coal concentrated in Southern Africa and natural gas in North Africa. Currently many African countries rely on domestic oil, gas or coal resources to generate electricity, while others depend on imported fuels, leaving them vulnerable to volatile international markets (IEA, 2023). In 2020, natural gas was the largest source of electricity generation, contributing about 40% of total power generation, followed by coal at 30%.

Hydropower is the largest source of renewable electricity generation in Africa, making up about 20% of the total power generation in the continent in 2020. Overall, reducing reliance on fossil fuels, which currently provide over three quarters of all the electricity generated in Africa, will be central to cutting CO_2 emissions and improving energy security (IEA, 2023).

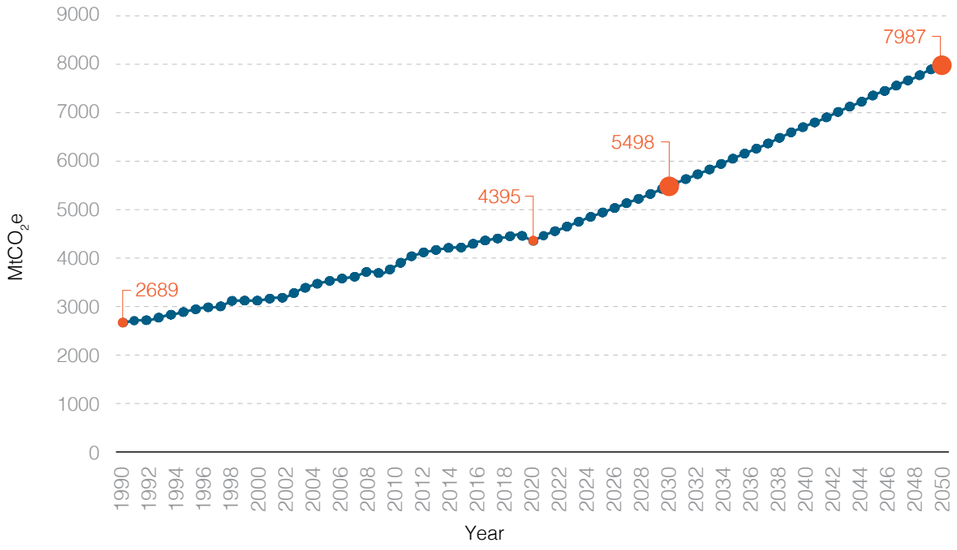
Emissions Scenario: Baseline

Of the 300 million households in Africa in 2020, 120 million of them lacked access to electricity. To achieve universal access to electricity by 2030, **growth in levels of access to electricity needs to outpace population growth in the decade from 2020 to 2030.** As such, household electricity demand is expected to increase threefold between 2020 and 2030 in the absence of energy efficiency, with demand for industrial products projected to rise by at least a third between 2020 and 2030 due to increase in construction and increased industrial activity. Equipment stock is projected to increase by between 40% and 100%, while value added services like agriculture are projected to increase by about 50% on average. A rapid expansion in the vehicle fleet, especially cars and trucks, would be expected to take place in the baseline scenario, increasing transport energy demand which will continue to be dominated by oil-based fuels.

With all these increases in household energy access and use as well as economic activities, total baseline electricity demand within the continent is expected to increase by more than 100% from 680 TWh in 2020 to 1,410 TWh in 2030 in the absence of energy efficiency (alternatively to 1,180TWh if energy efficiency increases). The electricity demand is expected to increase mostly in Sub-Saharan Africa where access to electricity is currently the lowest in the world. In this baseline scenario, the total per capita electricity demand is expected to grow from 500 kilowatt-hours (KWh) in 2020 to 824 kWh in 2030 but remains far below that of other developing regions around the world.

Based on all these projected energy and economic demands for Africa under the baseline scenario, GHG emissions under this scenario are projected to increase from 4,395 $MtCO_2e$ in 2020 to 5,498 $MtCO_2e$ in 2030 and reach 7,987 $MtCO_2e$ by 2050. This is an 82% increase over 30 years. Figure 4.3 below shows the projected baseline emission scenario for Africa.

Figure 4.3: Africa's projected GHG emissions baseline to 2050



Source: Authors own analysis

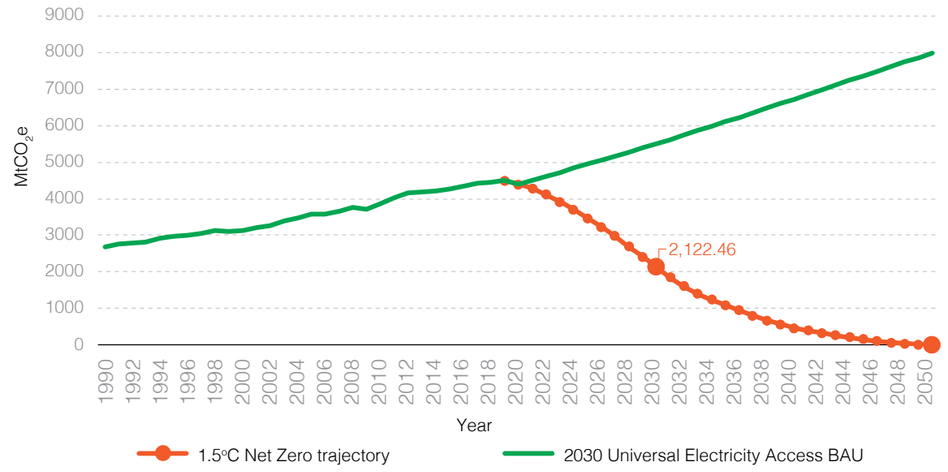
The baseline scenario was modelled to achieve Africa's goals of universal access to electricity, economic and social development by 2030 and maintaining that achievement up to 2050.

Emissions Scenario: Required by Science

This scenario portrays a situation where Africa and the rest of the world demonstrate the highest mitigation ambition. According to the IPCC's 2018 Special Report on 1.5°C, global net anthropogenic CO_2 emissions need to decline by about 45% from 2010 levels by 2030 (40–60% interquartile range) and reach net zero around 2050 (2045–2055 interquartile range). Most countries have interpreted this to mean that each country, and indeed region, needs to achieve net zero by 2050 at the latest and have therefore set long-term net zero strategies accordingly.

However, it could also be interpreted to mean that in accordance with the UNFCCC's principles of Common But Differentiated Responsibilities and Respective Capabilities (CBDR and RC) in light of different capacities, some countries and regions should be allowed to continue increasing their emissions, especially those with low historical emissions, while those that have historically emitted large quantities of GHGs are the ones that need to reduce their emissions and enhance their sinks such that the net global effect of the activities of these two groups result in net zero by 2050.

Figure 4.4: Projected Net Zero scenario for Africa, as required by science.



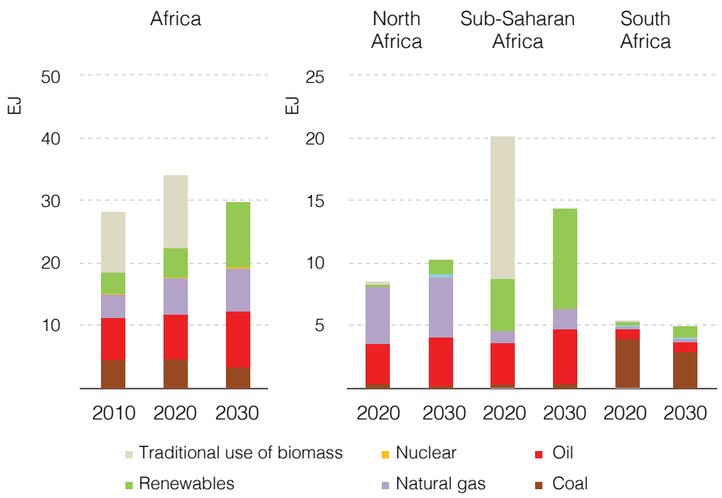
Source: Authors own analysis

In line with the concept of equitable access to sustainable development put forward by Winkler, Marquard and Letete (2013) which operationalises equity based on equitable access to sustainable development mostly through consideration of the human development index instead on simply using carbon space, this analysis has adopted the former interpretation of the IPCC's 2018 report findings. For Africa, a pathway consistent with 1.5°C means that emissions should reach 2,122 tCO_2e by 2030 and net Zero by 2050 as shown in Figure 4.4.

Emissions Scenario: Sustainable Africa Scenario

In its 2022 Africa Energy Outlook, the International Energy Agency (IEA) has modelled a Sustainable Africa Scenario (SAS) which achieves all of Africa's developmental goals as defined in the baseline scenario, including universal access to electricity and clean energy by 2030, economic and social goals. The SAS prioritises the most cost-effective solutions that are readily available and applicable to the African context and those that are able to attract the required means of implementation, especially finance. In this study, this scenario was adopted as one most representative of Africa's just transition. Similar to the baseline scenario, it was modelled such that it achieves Africa's goals by 2030 and then those achievements are simply maintained up to 2050.

Figure 4.5 Energy System in the SAS

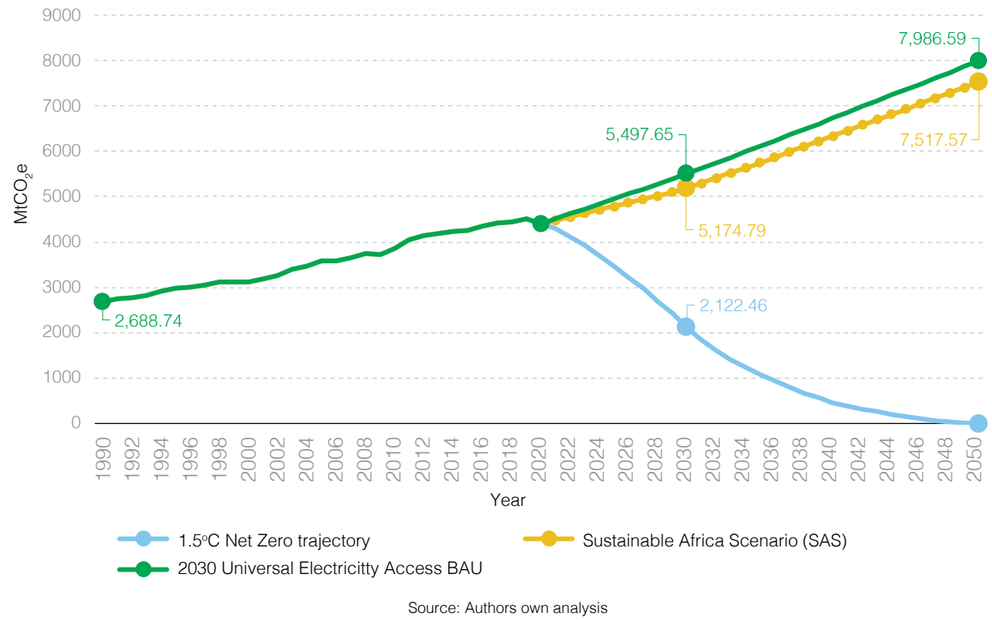


Under the Sustainable Africa Scenario, economic and population growth drive an increase in the consumption of all primary fuels, with the exception of traditional use of biomass and coal (IEA, 2023). Modern primary energy supply increases at an average annual rate of 3% between 2020 and 2030, while total primary energy supply (including the traditional use of solid biomass) falls by 13% by 2030. Renewables meet more than three-quarters of the increase in modern energy supply and become the leading fuel category by 2030 (ibid).

In terms of installed capacity, the capacity in the continent doubles in the Sustainable Africa Scenario, from 260 gigawatts (GW) in 2020 to 510 GW in 2030, with a profound shift in the type of power plants built across the continent. Renewables account for 80% of the 290 GW of capacity additions to 2030, while the commissioning of new fossil fuel plants is halved relative to the previous decade (IEA, 2023).

Under the SAS, by 2050, emissions are expected to reach 7,517 $MtCO_2e$, which is only 5.9% below the baseline emissions and still far from the net zero required by science.

Figure 4.6: Africa's projected emissions Sustainable Africa Scenario



Source: Authors own analysis

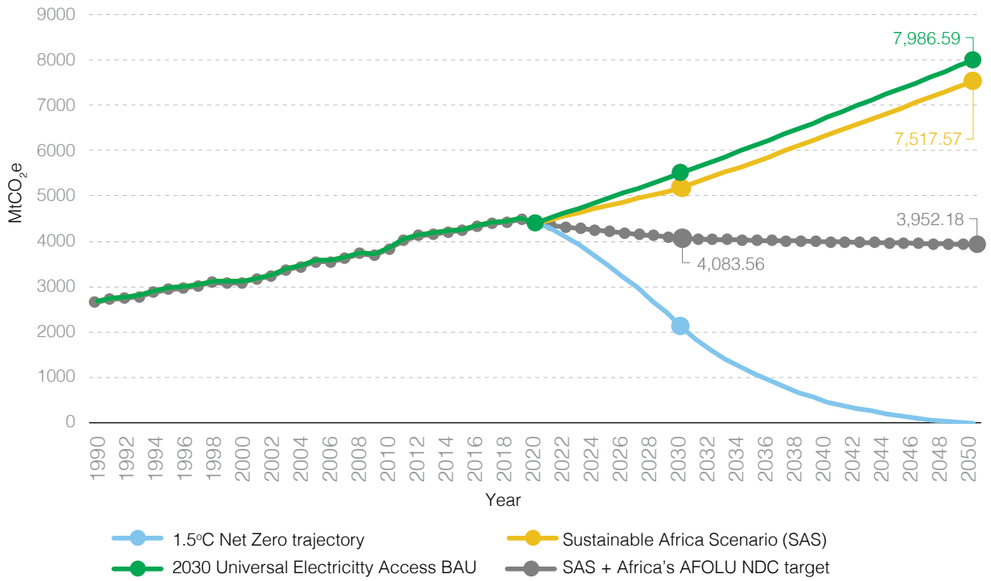
Some of the reasons the SAS does show significant differences from the BAU Scenario is because the scenario focuses primarily on electricity and heat, where it achieves large emissions reductions, but these reductions are almost entirely offset by rapidly increasing and unabated emissions in the transport sector. This shows that while transport emissions are currently lower than those from electricity and heat, they are an immense potential problem for the future for which solutions need to be implemented immediately.

Secondly, because of its primary focus on electricity and heat, which only makes up 12.55% of Africa's current emissions, it has left most of the emissions untouched. Of particular interest are the emissions from Agriculture and LULUCF which make up 55% of the continent's emission profile.

Emission Scenario: Sustainable Africa Scenario+

In this scenario the GHG reduction potential of the main mitigation measures in the agriculture, forestry and land sectors pledged by African countries in their latest NDCs are added to the SAS to come up with a SAS+ scenario. In this scenario, while the mitigation measures of the largest countries contributing to Africa's agriculture and LULUCF emissions have been included, there were a few countries for which inclusion was not possible.

Figure 4.7: Africa's projected emissions under Sustainable Africa Scenario-plus



While the SAS scenario had only reduced annual emissions from the baseline by 5.9% by 2050, the results show that just the inclusion of pledged agriculture and LULUCF **mitigation measures reduced the emissions by a further 44.6%** resulting in a 50% overall reduction of emissions from the baseline.

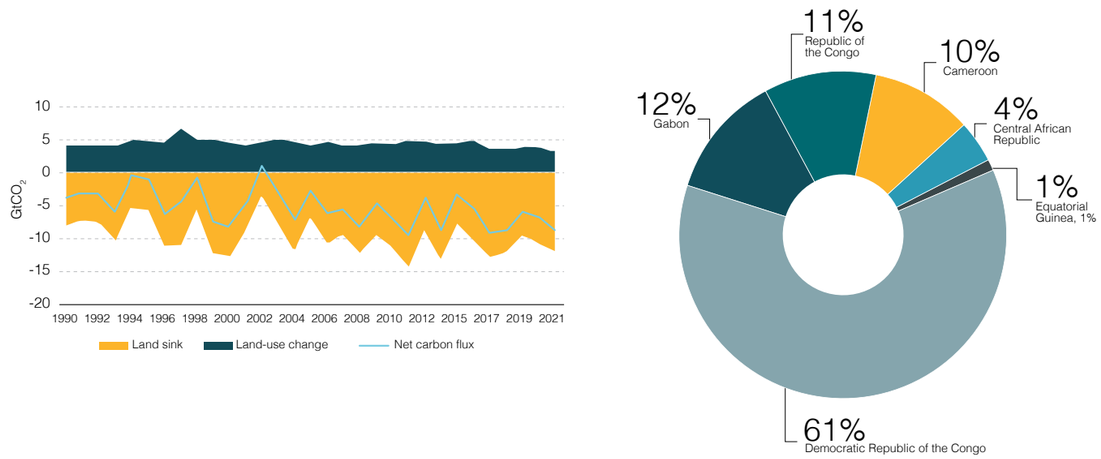
The next section discusses how land sector emissions can further contribute to Africa's GHG mitigation just transition agenda, and how the sector can be converted into carbon sinks that offset the emissions from other sectors, and hopefully close that 50% mitigation gap by 2050.

Carbon Sinks Role in the Transition

Global GHG emissions including land-use change were at ±50 $GtCO_2e$ in 2020, and to put this into perspective, forests store ±485 $GtCO_2e$, which is about 10 years' worth of global emissions. The three largest tropical forests; the Amazon River Basin, the Congo River Basin, and Southeast Asia collectively account for 44% of annual sequestration by forests. The Southeast Asia forest is emitting more than it removes due to deforestation and a net contributor of carbon - while the Amazon River Basin and the Congo River Basin are still net carbon sinks, removing more carbon than they emit.

According to Galal (2024), Africa's forest area is 674 million hectares accounting for ±23% of Africa's land area. The continent lost ±39 million hectares of forest area in comparison to 2010. Humid forests are particularly important in Central Africa, with the Congo Basin being the second largest tropical forest in the world. These forests remove ±1.1 Gigatonnes of CO_2 from the atmosphere annually.

Figure 4.8: Annual average carbon fluxes of the three main tropical rainforests, 2001-2019 (Harris et al. 2021)



Spanning over six countries, the Congo Basin is Africa's largest carbon sink. The forest conservation of the Congo Basin forests is not only vital for Africa, but also the world. The Congo basin plays an important role in storing GHG emissions that are already in the atmosphere and preserving these forests comes at a cost for the ±575 000 indigenous people that are depending on these forests for survival. Global efforts to tackle the effects of climate change and biodiversity loss will depend on preserving this rich ecosystem, raising a dilemma in respect of the right to development for these communities, and how developed countries within the context of common but differentiated responsibility fund the preservation of these forests.

The value of forest conservation as a carbon sink in Africa

Carbon removal as an asset is distinct in that it is a global public good, one which all benefit from. Quantifying a cost or benefit of an ecosystem service ensures that it is properly valued. A paper by the US Interagency Working Group on Social Cost of GHG emissions suggests, with assumptions about when climate damage peaks and how much we discount, the future emissions had a social cost of just over $50/tonne in 2020. Applying a social benefit of carbon of US$50/tonne to the global forest carbon gross removal calculated by Harris et al. (2021) suggests that the annual value of gross global carbon removal is ±US$770 billion, or ±1% of the world's GDP. Between 2001 and 2019, the average annual emissions resulting from deforestation amounted to 8.1 Gt, worth ±$400 billion per year, leaving a net removal value of ±US$370 billion. Still, it's perhaps misleading to consider only the value of net removals, as this would substantially understate the total value provided by forests.

The forests in Central Africa store more than 50 000 tonnes of carbon per km2. The Congo River Basin Forest has contributed more net carbon removal than any other tropical forest in the decade. With an annual gross removal of ±1.1 Gt between 2001 and 2019, the ecosystem service the Congo River Basin provides to the world is immense. At a price of US$50/tonne of carbon in 2020, this represents a service with an annual value of some ±US$55 billion (Harris, et al., 2021). Deforestation not only destroys a forest's ability to remove carbon, but also releases significant quantities of stored carbon into the atmosphere. In the Congo Basin Forest, the value of carbon removal is significantly offset by deforestation worth ±US$25 billion per year, with the net removal valued at ±US$30 billion per year (Harris, et al., 2021). Deforesting a relatively small proportion of the forest can have carbon impacts that outweigh the value of the forest's carbon removal.

One of the main mechanisms for supporting the Congo Basin is CAFI. The funding for CAFI totals just over US$230 million since 2015, and therefore is well-short of even one year's value of the climate service provided, which is estimated at US$55 billion per year. Total funding then is less than half of 1% of the annual value. If we analyse the finance provided to African countries for the forest, it shows that the support reached its peak at US$321 million in 2020 for the past decade or so. The value of the carbon removal service the Congo Basin Forest provides is ±150 times the average level of international public finance for Africa's forests (US$170 million in the 10 years to 2020), even after taking account of deforestation. With these limited incentives and these ecosystem services largely unfunded, it is perhaps not surprising that African countries are pursuing deforestation.

GHG net emissions/removals by LULUCF / LUCF

According to the 2021 Africa Energy Review, Africa's annual CO_2 emissions are estimated at 1.62 billion (4% of global emissions) of CO_2e. Most of the African countries have published their net GHG emissions/removals by LULUCF / LUCF emissions apart from a few countries. The table below gives an overview of GHG emissions/removals by LULUCF/LUCF in $GgCO_2e$:

	Algeria	Angola	Benin	Botswana	Burkina Faso	Burundi	Cabo Verde	Cameroon	Central African Rep	Chad	Comoros
Year 1	8 586	- 3 048	- 47 523	- 38 734	- 1 390	- 2 998	- 70	22 186	- 39 315	-46 441	- 895
Year 2	- 7 880	1 908	- 11 333	- 22 680	47 115	- 1 285	22	- 76 581	- 1 745 925	7	- 3 174
	-192%	-163%	-76%	-41%	-3491%	-57%	-131%	-445%	1153%	-100%	255%

	Congo	Cote d Ivoire	DRC	Djibouti	Egypt	Equatorial Guinea	Eritrea	Eswatini	Ethiopia	Gabon	Gambia
Year 1	-69 861	- 19 847	-176 840	- 604	-9 900	-	1 676	- 3 253	- 31 810	-	-49 983
Year 2	-82 066	- 18 377	-178 779	- 2 454	-	-	-	-	25 505	71 453	389
	17%	-7%	1%	306%	-100%	#DIV/0!	-100%	-100%	-180%	#DIV/0!	-101%

	Ghana	Guinea	Guinea-Bissau	Kenya	Lesotho	Liberia	Libya	Madagascar	Malawi	Gabon	Gambia
Year 1	-26 052	- 17 597	- 11 288 401	-28 000	1 261	-96 811	-	- 238 971	19 901	-	-49 983
Year 2	5 566	-443 971	- 10 718	21 156	- 1 378	-20 407	-	- 96 191	17 516	71 453	389
	-121%	2423%	-100%	-176%	-209%	-79%	#DIV/0!	-60%	-12%	#DIV/0!	-101%

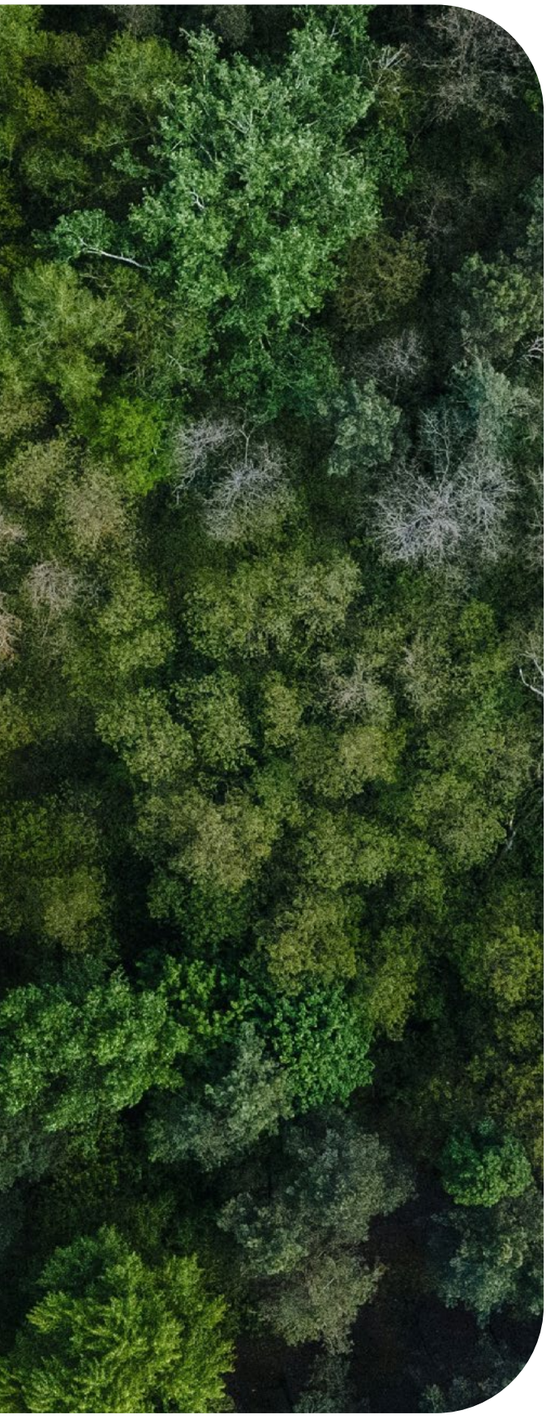
	Sierra Leone	Somalia	South Africa	South Sudan	Sudan	Tanzania	Togo	Tunisia	Uganda	Zambia	Zimbabwe
Year 1	-	-	- 16 982	2 761	17 776	-	14 076	- 1 773	8 253	3 458	- 62 239
Year 2	-	-	- 18 616	2 761	9 381	-	18 139	- 2 142	10 494	-	- 83 000
	#DIV/0!	#DIV/0!	10%	0%	-47%	#DIV/0!	29%	21%	27%	-100%	33%

	Mali	Mauritania	Mauritius	Morocco	Mozam-bique	Namibia	Niger	Nigeria	Rwanda	Sao Tome & Principe	Senegal	Seychelles
Year 1	- 9748	- 749	- 221	- 4 511	- 61 054	- 5 708	6 106	105 010	- 7 010	- 358	-10 522	- 833
Year 2	- 244 799	- 1 319	- 407	4 360	33 721	10 572	-34 571	98 003	- 8 545	- 321	-11 401	- 825
	2411%	76%	84%	-197%	-155%	-285%	-666%	-7%	22%	-10%	8%	-1%

Total Year 1 = - 12 309 004 $GgCO_2e$
Total Year 2 = - 2 751 079 $GgCO_2e$

Note:

- Year 1 data is based on the first GHG inventories publicly published by African countries, therefore the years vary between 1990s to 2000s.
- Year 2 data is based on the 2nd GHG inventories published by the various African countries; therefore, the years vary between 2004 to 2016.
- The data is sourced from the UNFCCC database.
- The GHG emissions/removals data availability varies by country.
- This is the best source of data thus far, and therefore it is assumed that it has been calculated/estimates correctly, or rather the closest data that can be used to estimate the carbon sinks in Africa.
- The data is based on 5bis. Land-Use Change and Forestry category: 5bis.A. Changes in Forest and Other Woody Biomass Stocks; 5bis.B. Forest and Grassland Conversion; 5bis.C. Abandonment of Managed Lands; 5bis.D. CO_2 Emissions and Removals from Soil and 5bis.E. Other



A high-level analysis of the inventory shows that most of the African countries have published their net GHG emissions/removals by LULUCF / LUCF emissions apart from a few countries such as the Equatorial Guinea, Libya, Gabon, Sierra Leone and Somalia. This does not mean that these countries did not submit or publish their GHG emissions, it means that when it came to the assessment of the LULUCF / LUCF emissions category, the emissions/removals were either not estimated or reported. Based on the inventory's information, earlier GHG emissions and removal inventories shows that Africa has a carbon sinks potential of 12 309 004 $GgCO_2e$. However, over the years, the carbon sinks have significantly declined to an alarming 2 751 078 $GgCO_2e$.

Mechanisms to protect carbon sinks in Africa

The global approach to protect carbon sinks in Africa can be broadly categorised into those that have a **market component,** and those that are direct **public funding,** which have different pros and cons. The mechanism with a market based component include REDD+, Clean Development Mechanism (CDM), Voluntary Carbon Markets, Lowering Emissions by Accelerating Forest Finance; whereas the direct public funding includes initiatives such as UN-REDD Programme (targeted at readiness), Forest Investment Programme, Forest Carbon Partnership Facility, Central African Forest Initiative, amongst others.

In respect of the market oriented mechanisms, some of the concerns include permanence (forest carbon savings are permanent) to leakage (when carbon conservation in one area drives deforestation in another) to baseline data establishment (measure historic deforestation to establish a baseline for calculating reduction). Common to all mechanisms is also land rights as well as how local communities will benefit, noting that the cost of registering and establishing market projects such as REDD+ project may top US$50,000.

There are general concerns that forest protection is an attempt to limit economic development in countries with rainforests, where some forest-rich countries that have low deforestation rates have expressed concern they are left out of the process since their forests are not under immediate threat; the latter being a serious concern as there is no compensation for protection, as such the market initiatives become a perverse incentive to encourage deforestation.

SPM: African Perspectives of a Just Transition to low-carbon economies

Carbon Sinks: Key takeaways

In the Congo River Basin Forest, one of the few tropical rainforests still acting as a significant net carbon remover, funding does not match the price of climate service at $55 billion, or $30 billion after taking account of deforestation, while a total ODA for forestry in Africa only reached $170 million on average over the last decade. While the total annual funding for forest protection barely reaches US$1billion, the carbon removal service provided by forests would be close to 300 times this amount. With valuable and long-term incentives, the countries that are home to the Congo River Basin Forest can get the opportunity to not only be incentivised for maintaining the world's largest carbon sink but would be less likely to contribute to further deforestation.

The international community has attempted to create a carbon market for forests. However, without concrete success so far, leaders should take this reality into consideration to design a clear market mechanism to enable a fair price to incentivise developing countries to preserve forests and their carbon absorption capacity. The protracted debates on climate financing at the annual COP meetings, the non-fulfilment of pledges made by developed country Parties as well as impediments on access to the available climate finance, which makes a case for an increase of public grant finance for forest protection.

There are various mechanisms that serve as instruments to drive the protection of forests. However, there are implementation challenges that prevent the flow of funds into African countries for this purpose. The very nature of carbon sinks is that they are characterised by inherent issues that include permanence, leakage, baseline data and land rights issues among others. An independent assessment of these funding mechanisms has indicated that most of these do not take into consideration the safeguard principles and ignore the requirements of a formalised stakeholder engagement process.

CDM generally does not include forestry projects and as a result has been limited in the African continent. An alternative could be the voluntary carbon market mechanism however there needs to be standardised and uniform processes to assess forestry-based carbon credits.

CHAPTER 5:

Jobs Implications of the energy transition

By Stanley Semelane and Emily Olifant

Climate change risk is a key driver of low carbon technology adoption worldwide, it is however important to note that the African continent still has a significant amount of fossil minerals that are not exploited due to individual African countries underdevelopment and the perceived potential environmental impact. Moreover, low carbon technologies such as solar, wind, electrolysers and low carbon feedstock boilers are generally not manufactured in the African continent. Also, the renewable energy resources are not dependent on traditional energy feedstocks that creates employment opportunities in the upstream value chain.

Most African countries have ratified the Paris Agreement and subsequently developed Nationally Determined Contributions (NDCs) aimed at driving climate change mitigation and adaptation initiatives in individual countries. The global carbon constraint is driving African nations to adopt more cleaner and sustainable economic growth policies. This involves changing the way energy is produced and used on a global scale. However, there is a significant policy gap to address the lack of local manufacturing of low carbon technologies in the African continent while the adoption of these technologies is on the increase.

The energy transition concept has driven various nations to develop extensive low carbon planning frameworks to accommodate the economic and socio-economic changes associated with the transition. These planning frameworks mitigate a situation where economic and socio-economic benefits associated with the energy transition accruing to where manufacturing happens elsewhere. It is crucial to ensure that African countries achieve a just transition, and this Chapter consider five countries[11] with different energy provision typologies, as shown in Figure 5.1.

11 - eSwatini, Equatorial Guinea, Ghana, Democratic Republic of Congo (DRC) and Botswana

Figure 5.1: Countries considered in this study

The African continent requires extensive research to understand the socio-economic development impacts of the implementation of NDCs. In anticipation of the negative and /or low economic impact that African countries would experience as they responds to climate change, there is a need to understand the job implications associated with the adoption of low carbon technologies towards NDCs commitments.

Sector job resilience plans for African country's value chains and priorities for piloting (coal, metals, petroleum-based transport, agriculture, and tourism) that would either be adopted or phased down between now and 2030 need to be understood and quantified. As a result, jobs created through the value chains of the technologies that each country adopts need to be evaluated. The three principles that a just transition needs to recognise are: decent jobs, poverty alleviation and a path towards environmental sustainability. For this reason, it is important to optimise jobs created from green technologies.

Approach to the study: JEDI modelling

The study assessed traditional and non-traditional job creation from electricity industries in the case study countries. This task entails jobs created in baseline assessment in order to determine whether the LCR scenarios and pathways that the study adopted would have positive or negative impacts. The Jobs and Economic Impact Development Impact Modelling (for electricity sector jobs only) is deployed to assess energy job losses (fossil fuels) and job gains (cleaner energy technologies), based on the broader value chain for each technology considered.

The approach models the real representation of the actual number of MWs installed to date on both utility and embedded generation scales, and job acceleration scenarios informed increasing local manufacturing scenarios, irrespective of whether the capability exists to realise the potential in an individual country. According to (Goldberg & Milligan, 2004), the JEDI model is a user-friendly tool that evaluates the economic impacts of constructing and operating power plants. The JEDI model can analyse the energy impacts of wind, biofuels, concentrating solar power, geothermal, marine and hydrokinetic power, coal, and natural gas power plants. JEDI is an Input-out (IO) model based on a set of simultaneous equations that measure the sectoral linkages within an economy, producing the Leontief inverse matrix (Allan et al., 2020).

In these analyses, we projected using energy technologies that would be deployed in the sampled African countries. The project sizes are directly sourced from the country's energy plans or the NDC commitments. The local share calculated for the base case assumed a 30% LCRs scenario, this is followed by a 60% LCRs scenario that this study simulates except for hydropower and geothermal.

The assumptions used for each country can be found in the technical report for this project (Ngwadla, et al. 2024).

Just Transition challenges for African countries

Overall, the energy transition in Africa has the potential to drive sustainable economic growth and job creation while addressing energy access challenges and contributing to global efforts to mitigate climate change. However, careful planning, stakeholder engagement, and a focus on just transition principles are essential to maximise the positive impacts on jobs and communities. To maximise the benefits of energy transition in Africa, governments, communities, and stakeholders need to adopt a holistic approach that combines economic growth, social equity, environmental sustainability, and technological innovation.

In several African countries, a fair transition may involve enhancing access to clean and dependable energy sources. This could result in the creation of jobs in the renewable energy sector. Additionally, a significant portion of African economies operate within the informal sector, where workers lack job security and social protections. When striving for a just transition, it is crucial to consider the needs of these informal workers. Furthermore, given the significance of agriculture in many African countries, it is essential to promote sustainable and climate-resilient farming practices in order to facilitate a just transition and safeguard the limited natural resources in the region.

A Just Transition requires a combination of policy measures, social support systems, education and training programs, and strong stakeholder engagement. The specific strategies will depend on each country's unique circumstances and development priorities. Collaboration between governments, industries, civil society, and regional partners will play a crucial role in achieving a fair and sustainable transition that benefits all segments of society.

Collaboration and partnerships between developed and developing countries could lead to technology transfer and capacity-building initiatives, potentially enhancing skills and expertise among local populations. There is a need to negotiate for shared benefits and manage the risk of an "unjust energy transition" where African countries would lose jobs and export raw material and mineral resources that will be used to develop sustainable energy technologies.

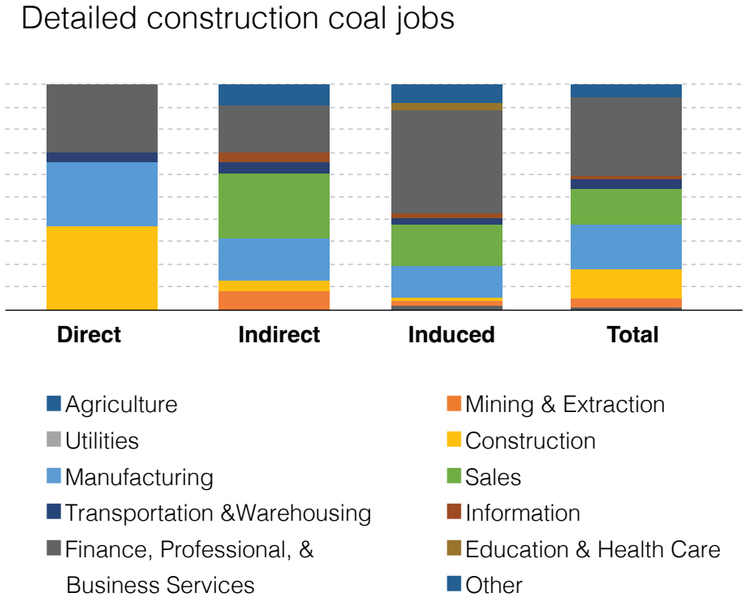
Botswana Results

In the case of Botswana, where the IRP 2021 identifies 50MW of wind, 200MW of solar, 10MW natural gas, 300MW of coal going to 2030(Government of Botswana, 2020), the results show that coal[12] will generate the most job opportunities as shown in Figure 5.2 below. The base case relating to Botswana coal jobs as 1500 MW is deployed shows that 30% LCR creates a total of 71 467 construction jobs which constitute 31% of direct jobs, 34% indirect jobs, and 35% induced jobs across various sectors. Similarly to the solar PV jobs, the finance, professional and business services sectors, the manufacturing sector and the sales sector would produce more construction coal jobs respectively as shown in Figure 5.2. As a country that is currently dependent on coal power, Botswana has planned to maintain some coal despite its global transition toward cleaner sources of energy. Therefore, more coal jobs would be produced compared to all other energy sources.

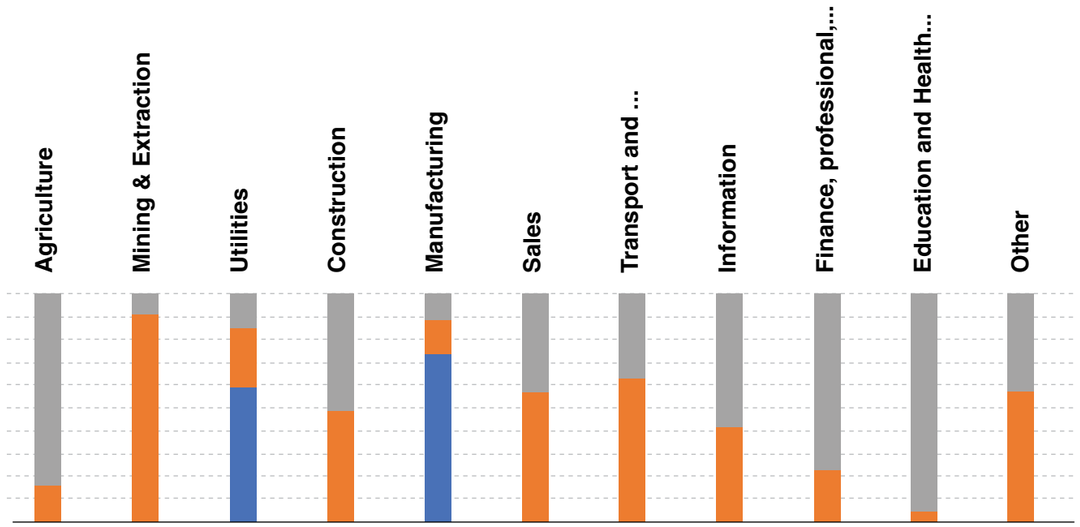
Figure 5.2: Detailed coal construction and O&M jobs estimates for Botswana

Detailed Impacts Construction				
	Jobs			
	Direct	**Indirect**	**Induced**	**Total**
Agriculture	-	100	474	574
Mining & Extraction	-	1582	372	1954
Utilities	-	301	300	602
Construction	8215	840	201	9256
Manufacturing	6149	4918	3360	14427
Sales	-	6851	4696	11547
Transportation & Warehousing	968	1183	862	3013
Information	-	536	354	890
Finance, professional, & Business	6811	5232	11843	23887
Education and Health Care	-	85	676	761
Other	-	2453	2103	4556
Total	**22143**	**24080**	**25243**	**71467**

Detailed Impacts O&M				
	Jobs			
	Direct	**Indirect**	**Induced**	**Total**
Agriculture	-	1	4	4
Mining & Extraction	-	29	3	32
Utilities	9	4	2	15
Construction	-	1	2	3
Manufacturing	158	32	26	215
Sales	-	47	36	84
Transportation & Warehousing	-	12	7	18
Information	-	2	3	5
Finance, professional, & Business	-	27	91	118
Education and Health Care	-	0	5	5
Other	-	22	16	38
Total	**167**	**177**	**194**	**538**



12 - Please note the MW to be deployed during the period are different for the various technologies.



The economic benefits derived from coal construction jobs are projected to result in significant growth when comparing the 30% and 60% LCR scenarios. Total earnings are expected to increase by 30%, increasing from USD111 million to USD158 million. Similarly, output is anticipated to grow by 29%, from USD633 million to USD899 million. Additionally, the value-added component is projected to encounter a 29% increase, from USD211 million to USD296 million. Both scenarios collectively show immense economic benefits for the labour force and Botswana's economy over the adoption period of 2021-2030.

Even though the deployment of 60 MW of natural gas would generate a total of 1 433 jobs, which is significantly less than coal, the 30% LCR for natural gas economic impact generates total earnings of USD1.3 billion in earnings, USD7.4 and 2 billion in outputs and value added respectively, across the investment. The 60% LCR for natural gas total earnings are estimated at USD1.8 billion, while the output and value-added account for USD10.1 billion and USD2.7 respectively which is the highest of all technologies.

Ghana results

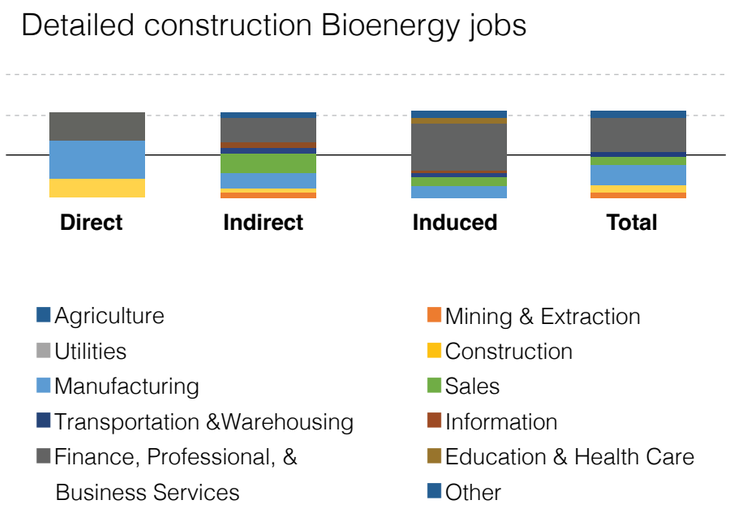
According to the Ministry of Energy (2019), Ghana has committed to deploy 1353,63 MWp of renewable energy between 2015 and 2023. As such, the analysis conducted for Ghana focuses on the transition jobs for the period 2021 - 2030. The electricity capacity that Ghana will deploy for various energy technologies in this analysis considers solar PV utility scale is estimated to be 295 MW while distributed solar is projected to be 968 MW. Wind power is estimated to be 327 MW and Hydropower that would be deployed is 203 MW.

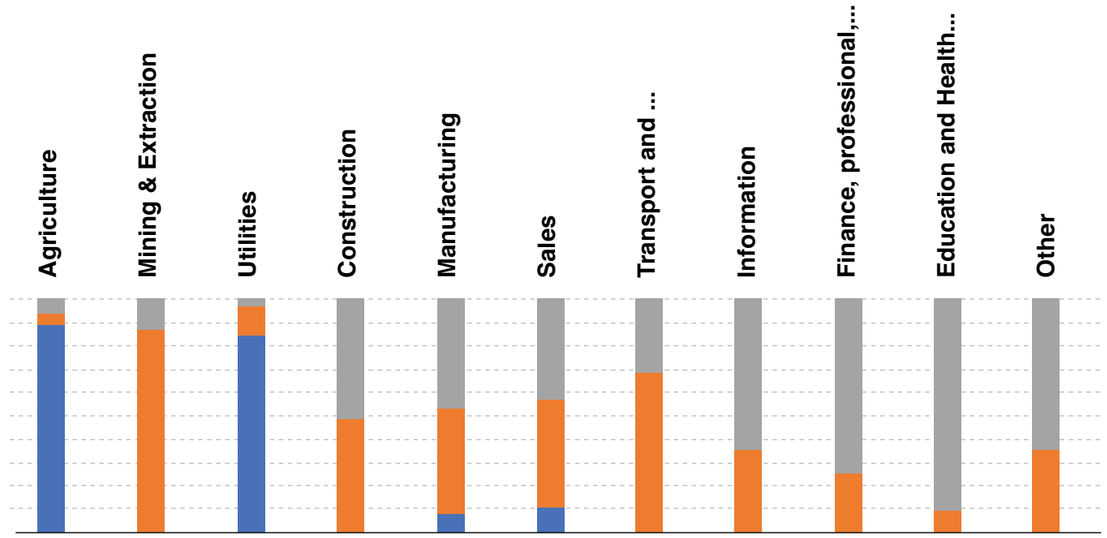
In the Ghana case, distributed and standalone solar PV will be separate projects that would create the highest number of jobs 12 276 jobs at 30% LCR of which the manufacturing sector, finance, professional, and business sector, and sales sector would account for 77% of the total jobs while the rest of the sectors would account for 33% of the total jobs as shown in Figure 5-4. Wind is however competitive noting that 11 677 jobs for both construction and O&M, noting that deployed MW for distributed solar is almost 3 times that of wind. As seen throughout the assumptions of various countries, the manufacturing sector, finance, professional, business sector, and sales sectors consistently generate the highest number of jobs in both construction and O&M.

Figure 5.3: Detailed bioenergy construction and O&M jobs estimate in Ghana

Detailed Impacts Construction				
	Jobs			
	Direct	**Indirect**	**Induced**	**Total**
Agriculture	-	11	54	65
Mining & Extraction	-	64	14	78
Utilities	-	26	26	51
Construction	684	143	47	873
Manufacturing	1544	386	308	2238
Sales	-	494	361	855
Transportation & Warehousing	-	200	156	356
Information	-	84	59	143
Finance, professional, & Business	1068	588	1887	3543
Education and Health Care	-	31	258	289
Other	-	121	108	229
Total	**3295**	**2149**	**3277**	**8722**

Detailed Impacts O&M				
	Jobs			
	Direct	**Indirect**	**Induced**	**Total**
Agriculture	49	2	4	55
Mining & Extraction	-	19	3	22
Utilities	63	10	2	75
Construction	4	1	2	7
Manufacturing	9	25	26	60
Sales	-	39	36	75
Transportation & Warehousing	-	14	7	21
Information	-	1	3	4
Finance, professional, & Business	-	30	92	122
Education and Health Care	-	1	5	6
Other	-	9	16	25
Total	**124**	**152**	**195**	**472**





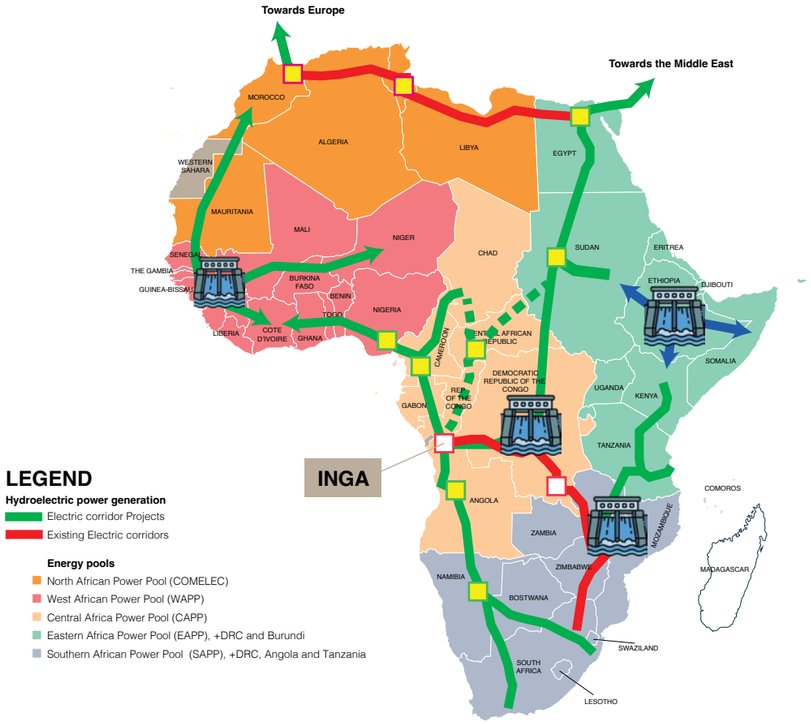
Even though Ghana's deployment of bioenergy would generate 124 direct jobs, it will have the most significant impact on the economy of Ghana. Under a 30% LCR, earnings are expected to reach USD154 million, with the 60% LCR scenario contributing an additional USD36 million. In terms of output and value-added, the 30% LCR scenario is projected to generate USD930 million and USD398 million, respectively, while the 60% LCR scenario is expected to add an extra USD213 million in output and USD89 million in value-added. This denotes that waste-to-energy remains significantly relevant to the African economy despite its heavy dependence on biotechnology and other pertinent new technologies which would require financial investments, a skilled labour force as well as the active participation of policy makers (Kalogiannidis et al., 2023).

DRC results

According to the Global Energy Alliance for People and Planet (2023), DRC is the second largest unelectrified country in the world. The DRC crosses approximately 2.35 million square kilometres and has a population record of 102 million persons, however, the country's transmission and distribution network only covers 6,975km, mainly in the south east of DRC. As a result, the DRC government has set a target to electrify 20 million citizens by 2024 through the installation and adoption of microgrids.

This target requires a funding of at least 1 billion USD. DRC is endowed with water resources and holds the potential to generate 40,000 MW of hydropower. Moreover, the country has the potential to develop other forms of renewable energy in the areas of bioenergy, solar and wind (Ministry of Planning, 2024). The Grand Inga project has the potential to generate 100 GW of hydropower, this means that if this project could be implemented, most of the electrification challenges in DRC would be resolved as shown in Figure 5.4.

Figure 5.4: Potential of the Grand Inga project (Ministry of Planning, 2024)



Additionally, the DRC NDC report updated in 2021 shows planned power installation for the period 2021 - 2023 (Ministry of Environment and Sustainable Development, 2021) of an increase the 3GW of hydropower to 4GW by 2030; wind, solar and geothermal increase from 2 900 MW to 42 700 MW by 2030. As a result, modelled are the commitments made on the updated NDC report where wind and solar PV are estimated to generate 10 000 MW respectively, with an assumption that the remaining 18 900 MW would be from geothermal.

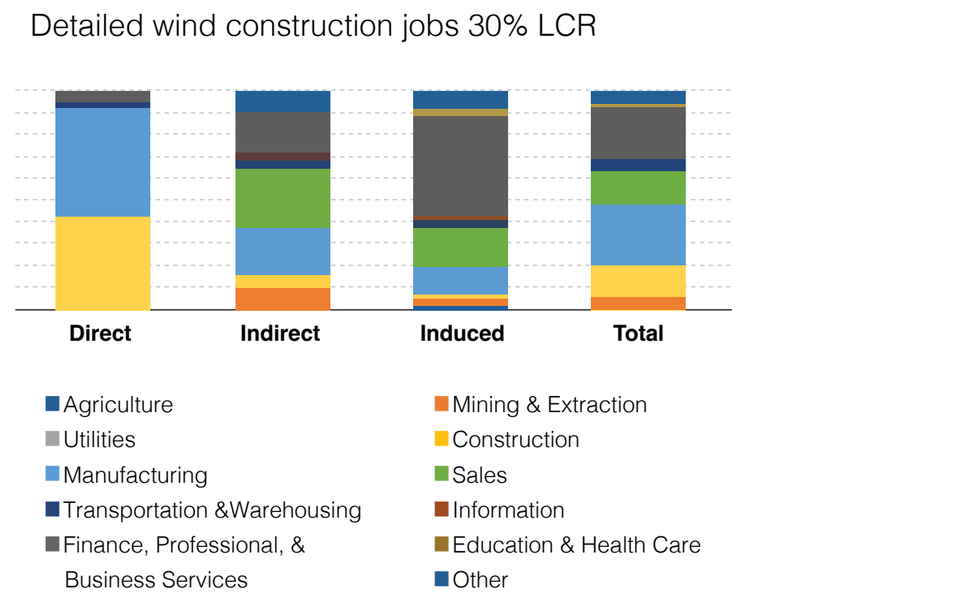
Although the is a massive potential that the Grand Inga project holds, as the DRC updated NDC of 2021 shows, the country has only committed to implementing 1 000 MW of hydropower for the period 2021 - 2030 (Ministry of Environment and Sustainable Development, 2021).

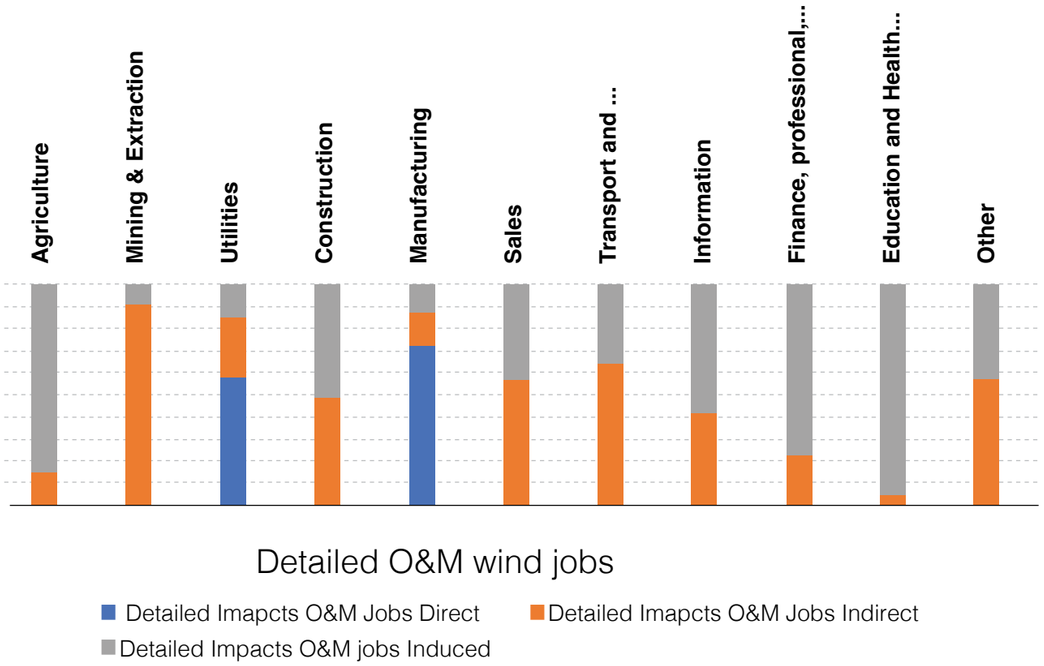
The country's planned wind energy generation going to 2030 is estimated to generate 330 194 construction jobs at 30% LCR to propel reaching its carbon mitigation targets as shown in Figure 5-5. The DRC job outputs for wind construction jobs are relatively high compared to those of Botswana and Ghana. Furthermore, 100 224 direct construction would be generated, of which 93% would be generated in the construction and manufacturing sector while 2% of the jobs would be distributed across the transport and warehousing sector and finance, professional, and business sectors. Although direct jobs would not be generated in other sectors, indirect and direct jobs will be distributed across all sectors.

Figure 5.5: Detailed wind construction and O&M jobs estimate DRC

Detailed Impacts Construction				
	Jobs			
	Direct	**Indirect**	**Induced**	**Total**
Agriculture	-	428	2140	2569
Mining & Extraction	-	11 178	1680	12 858
Utilities	-	1414	1355	2769
Construction	43 288	3725	908	47 921
Manufacturing	49 429	25 425	15 159	90 013
Sales	-	32 140	21 189	53 329
Transportation & Warehousing	3274	5766	3890	12 930
Information	-	1889	1598	3487
Finance, professional, & Business	4233	22 685	53 433	80 351
Education and Health Care	-	212	3051	3263
Other	-	11 217	9487	20 704
Total	**100 224**	**116 080**	**113 890**	**330 194**

Detailed Impacts O&M				
	Jobs			
	Direct	**Indirect**	**Induced**	**Total**
Agriculture	-	33	182	215
Mining & Extraction	-	1466	143	1609
Utilities	450	207	115	772
Construction	-	73	77	150
Manufacturing	7886	1589	1291	10766
Sales	-	2372	1804	4176
Transportation & Warehousing	-	581	331	913
Information	-	99	136	235
Finance, professional, & Business	-	1352	4549	5901
Education and Health Care	-	13	260	273
Other	-	1075	808	1883
Total	**8336**	**8860**	**9696**	**26 893**





The total O&M jobs would be generated would be significantly smaller compared to construction, exhibiting 26 893 which is equivalent to 8% of the total construction jobs. Interestingly, direct jobs would only be generated in the manufacturing sector and utilities sector as shown in Figure 15.6. On the contrary, no direct construction jobs in the utilities sector would be generated. Furthermore, the manufacturing sector would generate 40% of the total O&M jobs, thus exhibiting the highest number of jobs generated among other sectors. The DRC's ambitions towards the deployment of wind energy should be of more priority as the country possesses good wind energy potential with various hotspots around the country reaching wind speeds between 6 to 6.6 m/s (Kusakana, 2016).

The deployment of wind energy in the DRC is projected to generate remarkable economic benefits, which are slightly higher than solar PV deployment. Under a 30% LCR scenario, earnings are expected to reach USD5.6 billion, with output and value-added projected at USD31.7 billion and USD10.6 billion, respectively. The 60% LCR scenario would result in a 30% increase in earnings and a 29% increase in both output and value-added.

Kingdom of eSwatini results

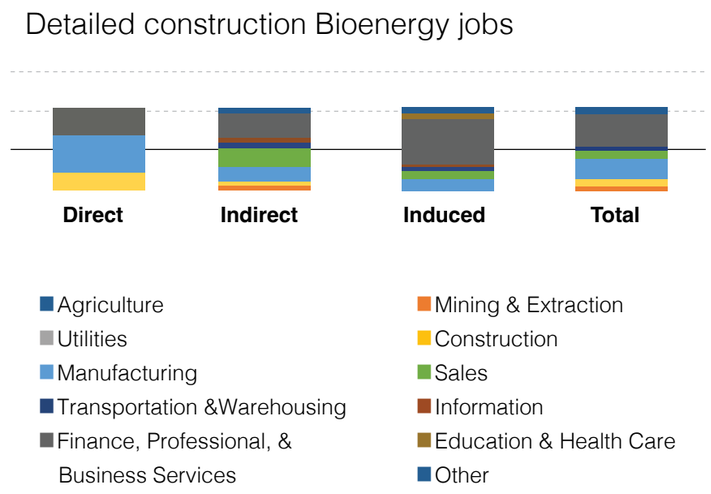
The (NDC Partnership, 2024) shows that the Kingdom of eSwatini has committed to installing 55.85 MW of solar PV, 80 MW of hydropower and 95 MW of bioenergy. As such, for the Kingdom of eSwatini, we analysed the job implications for implementing the country's NDC commitments. For this country, it is important to note that the population size is approximately 1.2 million (World Meter, 2024a).

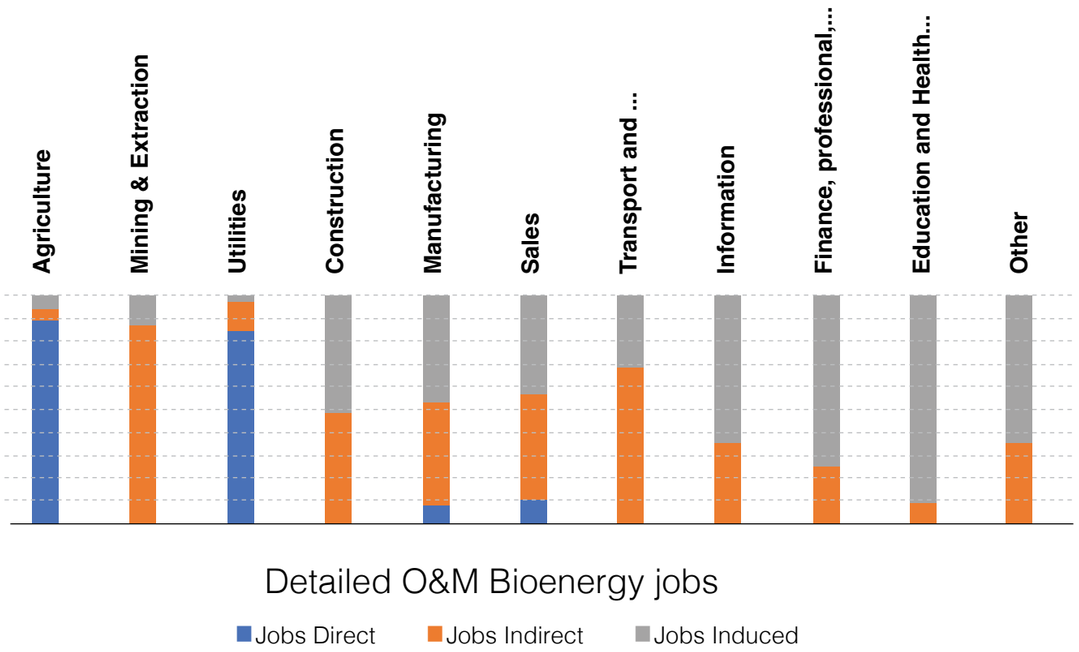
The Kingdom of eSwatini plans to deploy 95 MW of bioenergy which is more than the planned MW of solar PV and hydro power. Expectedly, more bioenergy related jobs would be generated compared to other energy technologies. A total of 6 791 construction jobs would be generated with the utilities sector generating a low number of 40 jobs equivalent to less than 1% of the total jobs while the finance, professional and business services sector generates 2 759 jobs which equates to 41% of the total jobs.

Figure 5.6: Detailed utility bioenergy construction and O&M jobs eSwatini

Detailed Impacts Construction				
	Jobs			
	Direct	**Indirect**	**Induced**	**Total**
Agriculture	-	9	42	51
Mining & Extraction	-	50	11	61
Utilities	-	20	20	40
Construction	532	111	36	680
Manufacturing	1202	301	240	1742
Sales	-	385	281	666
Transportation & Warehousing	-	156	121	277
Information	-	66	46	111
Finance, professional, & Business	831	458	1470	2759
Education and Health Care	-	24	201	225
Other	-	94	84	178
Total	**2566**	**1674**	**2552**	**6791**

Detailed Impacts O&M				
	Jobs			
	Direct	**Indirect**	**Induced**	**Total**
Agriculture	38	2	3	43
Mining & Extraction	-	15	2	17
Utilities	49	8	2	58
Construction	-	1	1	2
Manufacturing	3	19	20	43
Sales	7	31	28	66
Transportation & Warehousing	-	11	5	16
Information	-	1	2	3
Finance, professional, & Business	-	24	71	95
Education and Health Care	-	0	4	4
Other	-	7	13	20
Total	**97**	**118**	**152**	**367**





The O&M bioenergy jobs are projected to generate 38 direct jobs in the agricultural sector. Intriguingly, no direct jobs would be generated in the finance, professional and business services sector although this sector usually generates higher quantities of direct jobs across various energy technologies in studied countries. Moreover, only 3 direct O&M jobs in the manufacturing sector would be generated. eSwatini's energy adoption plans are notably less ambitious compared to countries like Ghana. This is largely due to eSwatini's smaller size, which impacts its capacity for energy development. Consequently, the expected number of bioenergy jobs in eSwatini will be lower. In contrast, Ghana, with its greater capacity, energy demands, and larger population, is projected to generate significantly more bioenergy jobs.

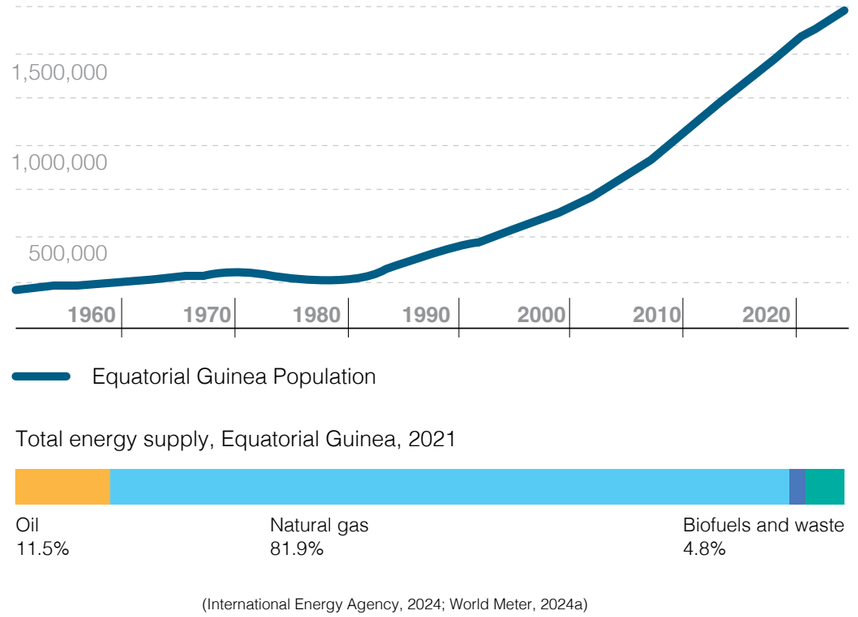
Similarly, the highest value added of the different technologies is highest for bio-energy. The addition of bioenergy to the national energy mix would generate a total of USD101 billion across earnings, output and value added at a 30% LCR scenario. The economic projections highlight the potential of the country's energy mix, showing a promising view to the government of eSwatini. African countries are likely to adopt diverse energy technologies if they prove beneficial to economic growth, and address challenges such as poverty, unemployment, and energy crises. This approach will also enhance electrification rates, especially in underdeveloped African nations. An additional USD24 billion is generated for 60% of LCR. Earing increased by 21% while output and value-added increases by 19% and 18% respectively.

Equatorial Guinea results

According to the International Energy Agency (2024), Equatorial Guinea's Total Energy Supply (TES) includes all the energy produced in or imported to a country and the exported energy or stored energy is removed from the TES. TES accounts for all the energy requirements for the country. Several of the energy sources are utilised directly; a certain portion is transformed into other energy carriers such as fuel and electricity that are consumed by end users.

Figure 5.7 shows the energy contribution per technology. The total installed power capacity in Equatorial Guinea is 154 MW, diesel accounts for 24 MW and natural gas generates about 129 MW (Energy Capital & Power, 2021; International Energy Agency, 2024).

Figure 5.7: Equatorial Guinea's total energy supply and the population size



(International Energy Agency, 2024; World Meter, 2024a)

The Equatorial Guinea energy demand is forecasted to grow at approximately 10% per annum, not creating headroom for an aggressive adoption of low carbon technologies. This is mainly due to a limited population size of approximately 1.7 million citizens (World Meter, 2024b).

Lessons drawn from the 5 case studies

The modelling scenario covered five countries with diverse energy technologies that would be implemented from 2021 to 2030. The key lesson that should be drawn from the modelling exercise is that increasing the local content requirements for each technology that would be implemented will yield increased job creation and increased economic impact, particularly, in earning, economic output and value add.

In these analyses, it's important to note that the number of jobs generated for each type of renewable energy technology varies significantly. The jobs estimated in this study are specific to the countries under consideration; and they represent potential rather than actual jobs, as the latter depends on the necessary policy frameworks for local content requirements, capacity of the value chains, amongst others. Without the value chain capacity and policy frameworks, the jobs associated with these technologies are likely to be created elsewhere in spite of actual deployment.

When we assess the breakdown of direct jobs created per megawatt (MW) for different technologies, we find that coal and natural gas create 15 and 8 jobs per MW respectively. Whereas utility scale Solar PV and Distributed Solar PV create 17 and 13 jobs per MW respectively. Bioenergy, Geothermal, and Hydropower create 19, 95, and 49 jobs per MW respectively[13].

Additional employment opportunities are created through indirect and induced jobs across the value chain sectors. The value chain sectors include agriculture, utilities, construction, manufacturing, sales, transportation, warehousing, information technology, finance, professional, business services, education, health care and mining and extraction, see Table 5.1 for jobs/MW.

Table 5-1: Jobs/ MW from the analyses

	Direct	Indirect	Induced	Total/MW
Coal	15	17	17	49
Natural Gas	8	8	11	27
Utility scale Solar PV	17	16	18	52
Distributed Solar PV	13	12	14	38
Bioenergy	19	14	20	54
Geothermal	95	62	97	254
Hydropower	49	1	0	50

There is a need to drive a value-add for African minerals and limit the export of raw materials to countries that would in turn export finished products to the African continent. Low carbon investments should have clear conditions that would contribute to resolving the climate change problem, increase the African continent's electrification rate and accelerate economic development. Africa needs to safeguard against electricity provision or energy access that disregards the continent's industrialisation potential.

The African continent needs to define its local content policy framework to allow the region to have a uniform position on how local content could be used as an instrument to drive economic development. The acceleration of the AfCFTA agreement needs to be utilised to create the African continental market towards meeting the required demand. Moreover, there is a need to develop policy mechanisms that would advance the implementation of AfCFTA and promote the industrialisation agenda in Africa.

13 - These estimates are based on a 60% LCR, and it's worth noting that additional employment opportunities are possible through indirect and induced jobs

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Accordingly, there may be investment policy adjustment requirements to manage the dynamics of the transition. For example, there could be a dedicated effort towards greenfield projects and more on smaller, essential upgrades given refiners' limited cash flow and working capital instead of accelerating the adoption of utility scale low carbon projects that are dependent on external funding and component manufacturing.

As Africa's population and energy demands grow, reliance on financial, skill, and resource support from the Global North is expected to increase. This dynamic will economically benefit Global North countries more than local markets. African electricity demand is expected to increase by approximately 75%, from 680 TWh to 1,180 TWh, by 2030. Over half of the surge is accounted to households due to the increased use of appliances and new household technologies. Industry accounts for the majority of the remaining increase. Per capita electricity demand is projected to increase from 500 kWh in 2020 to 700 kWh in 2030, however, within sub-Saharan Africa per capita demand will grow from 170 kWh to 390 kWh (International Energy Agency, 2023).

While numerous African nations currently depend on fossil fuels such as gas and coal for generating electricity, some still rely on fuel imports, which subjects them to unpredictable market conditions. Therefore, countries reliant on fuel imports should implement measures to reduce import dependence and transition to renewable energy. Moreover, this shift should not result in an unjust transition process where African countries would not manufacture low carbon technologies.

The shift should not only remove unpredictable market conditions but also contribute to decarbonising their economy which will benefit local regions. As the African capacity has begun to rise from 260 GW in 2020 to 510 GW by 2030. This growth highlights a significant change in the types of power plants that are planned and being built across the continent. As various projects are underway, coal and hydropower are predicted to lose their prominence to solar power before 2030.

Finally, the analysis shows that the O&M jobs do not account for more than 20% of the jobs created, this means that approximately 80% of the employment that will be created is temporal in nature. This drawback in renewable energy technology means that policy adjustment needs to consider strategic ways to optimise economic benefits and impact of the energy transition in the African continent.

CHAPTER 6:

Finance Implications of the energy transition

By Chantal Naidoo (PhD), Patrick Lehman-Grube, Yasmin Meerholz, Ailly Sheehama, Penny Winton

Transitions are inherently pluralistic processes, socially contested, experimental, disruptive, and generally have system-wide impacts. Such impacts are evident in the economy, environment, and the socio-economic welfare of communities. For the African continent to transition to low-carbon resilient economies in a just and equitable manner, appropriate financing and financing processes will be needed to build the adaptive capacity and social resilience to these disruptive effects.

It will cost around USD 2.8 trillion between 2020 and 2030 to implement Africa's NDCs, with the additional finance needed to meet this goal being USD 2.5 trillion (USD 250 billion annually). National governments have committed to providing USD 264 billion for the period 2020 – 2030 (CPI: Guzmán *et al.,* 2022. However, there is currently a shortfall of 88%, with Africa only receiving USD 30 billion or 12% of the additional finance it needs (CPI: Guzmán *et al.*, 2022). Furthermore, there is documented evidence that the quality of finance the continent requires is not forthcoming and there is geographic imbalance across the region of how funds are distributed.

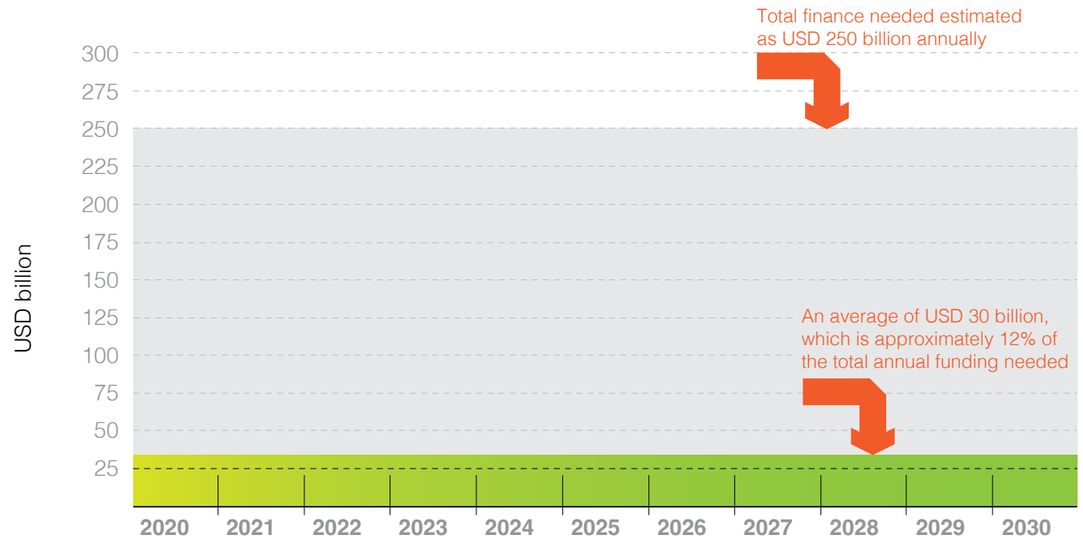
In recent years, the UNFCCC processes and narratives aim for "greater ambitions" among countries to respond to climate change. In reality, independently setting ambition levels for most African countries is not possible. The current structure of the global financial architecture, particularly the sources and instruments of finance available has left much of the continent with unsustainable debt levels, high costs of finance, and dependent on their counterparts in developed countries and China for their financing needs, especially because 90% of finance for climate action comes from abroad (AFD, 2024). This hinders its ability to independently establish and achieve its development and climate response ambitions.

African countries are largely reliant on international counterparts for capital to pursue their transition objectives. This gives these international counterparts an implicit influence in determining the quality and quantity of finance that the continent receives, which has a direct impact on ambition. The other side of this message is that Africa's ambition is not yet coupled with its strategic assets and demographic endowments: a youthful continent with about 30% of the green minerals the rest of the world seeks to advance their own transitions. Much is wanted and expected of the continent, e.g. the imposition of carbon border adjustment mechanisms which would see African exports impacted, and the strategic green minerals global partners are extracting not for the continent's benefit.

The landscape of financing needs in Africa for climate action

The financing landscape of African countries is characterised by **funding shortfalls and vulnerability on the continent.** Based on data from Nationally Determined Contributions (NDCs), it will cost around USD 2.8 trillion between 2020 and 2030 to implement Africa's NDCs (CPI: Guzmán *et al.*, 2022; AfDB, 2023a). According to CPI's assessment, approximately 10% (USD 264 billion) of this has been committed by national governments for the period 2020 – 2030, meaning USD 2.5 trillion (i.e. USD 250 billion annually) must come from external international public sources and the domestic and international private sectors (Khamala, 2022). From a sector-specific perspective, Africa requires around USD 133 billion annually in energy investments between 2026 and 2030 (Meattle *et al.*, 2022). The current levels of finance for climate action being made available to African countries fall far short of their needs (IPCC, 2023 and CPI, 2022).

Figure 6.1: Current finance flow shortfall for Africa



Source: (CPI: Guzmán et al., 2022)

Using the NDCs as a guide, for the period in question 66% of the total finance needed is for mitigation, 24%for adaptation, and the remaining 10% for "dual benefit actions" (CPI: Guzmán et al., 2022). However, this imbalance between mitigation and adaptation needs is not necessarily a true reflection of the actual finance that is required but instead indicates the inability of policymakers to adequately determine what their true adaptation needs are (CPI: Guzmán et al., 2022). This lack of data on adaptation financing needs is particularly concerning given the significant vulnerability of African countries to climate change.

The predominant **sources of finance for the transition in Africa** are instructive in understanding the challenges and options for its financing. MDBs made up 74% of the finance flows in Africa compared to DAC members (15%), private donors (about 2%) and other multilaterals (8%) (OECD, 2021), with loans (61%) being the most used instrument compared to grants (10%) used to finance climate in low- and middle-income economies (IDB et al., 2023)[14]. The top 5 MDBs being the World Bank (WB), AFDB (African Development Bank), EBRD (European Bank for Reconstruction and Development), EIB (European Investment Bank) and the ISDB (Islamic Development Bank).

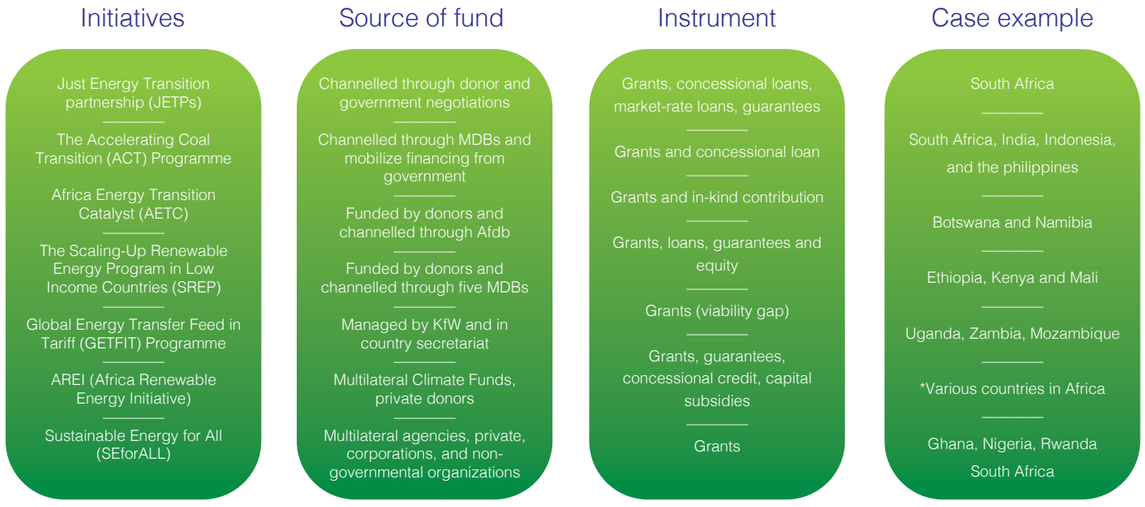
It is important to note that multilateral DFIs invested 40% of their funding in five African countries namely Egypt, Morocco, Nigeria, Ethiopia, and Kenya. Multilateral DFIs **financing instruments are mostly debt-based** (47% at the market rate and 30% at a concessional rate) compared to grants (20%), with equity financing only accounting for 3% (Meattle *et al.*, 2022). The common messaging in scaling finance for climate action in developing countries is no different to what it has been in the years preceding the focus on climate change, i.e. the need to leverage MDB finance to scale private sector finance to address developing countries' needs. (The billions to trillions narrative). The OECD statistics have not been verified for context however the lack of scale in quoted statistics indicates that scaling finance from private sector resources requires a deeper dive given the **ineffective leveraging** impact thus far.

Given that MDBs account for 74% of flows in Africa, the catalysing billions to trillions narrative is all the more important, especially on the impact of the fiscal framework of African countries which are hard-pressed to service current debt. This is because **MDBs have the potential to evolve and strengthen their roles,** mitigate financial risks, lower investment costs, enhance access to finance, and address debt sustainability. However, the proposed changes are largely only tinkering on the edges, without addressing long-standing issues around terms and conditions, cost of finance, access to finance, debt-based options, and collateral requirements from developing countries.

Inorder to understand existing **initiatives and economic typologies** across the continent, an initial mapping of different energy transition initiatives rolled out across the African region (See, Figure 6.2) shows the source, the type of finance instrument used, and the countries where these are in play. These initiatives can be linked to the first frame of the "typology of African countries" and their relationship to fossil fuels. Most recent initiatives (2021 onwards) such as JETPs, and ACT focus on African countries highly dependent on coal or other fossil fuels are primary energy sources. However, the continent has a heterogeneous set of needs, not all are dependent on fossil fuels like Nigeria, South Africa, and Botswana for energy security. For some countries, the challenge is a trade-off between fossil fuel discoveries, strategic green mineral assets, and the energy choices to be made in the future.

14 - This analysis included the regions of Middle East and North Africa, Sub-Saharan Africa, South Asia, Latin America and the Caribbean amongst others.

Figure 6.2: Examples of Energy Transition Initiatives in Africa



***AREI,** has projects in various countries such as Cameroon, Ghana, Namibia, Morocco, Tunisia, Nigeria, Tanzania, Senegal.

Source: Author's own analysis.

The analysis of the energy transition initiatives in Africa illustrates the following:

- The spectrum of funding is multi-layered and is accessed from various sources such as bilateral, government, MDBs, and private sector, with some of the initiatives channelling and/or leveraging MDB involvement.

- The geographic distribution of these initiatives shows the heterogeneity of energy transition finance flows in the region, as it relates to the different pathways being explored by certain countries (AfDB, 2022a).

- The analysis also highlights that most of the initiatives and instruments deployed are heavily debt-dependent. This makes a number of the aforementioned instruments not fit for the purpose of enabling economic development and potentially mitigating indebtedness.

The heterogeneous nature of Africa calls for a detailed analysis of the needs and contexts of different African countries and regions. It has been highlighted that, across developing countries, the needs and focuses of NDCs and climate transition plans can differ greatly (UNFCCC, 2022). The *first frame* which highlights the unique heterogeneous nature of Africa with regards to the transition, is based on the **typology of African economies.** An important component of African heterogeneity is the varied dependencies and endowments of fossil fuels either as an energy source or raw material export. McKinsey (Krishnan et al., 2022) offers a useful archetype model on the different exposures of countries to fossil fuels that recognises such heterogeneity, and the implications of net-zero policies on these archetypes. Table 6-1 below provides an adaptation of this framework, better tailored to an African context, and describes the different archetypes, their prominent sectors and the transition implication of the archetype.

Table 6.1: Typology of African Just Energy Transition

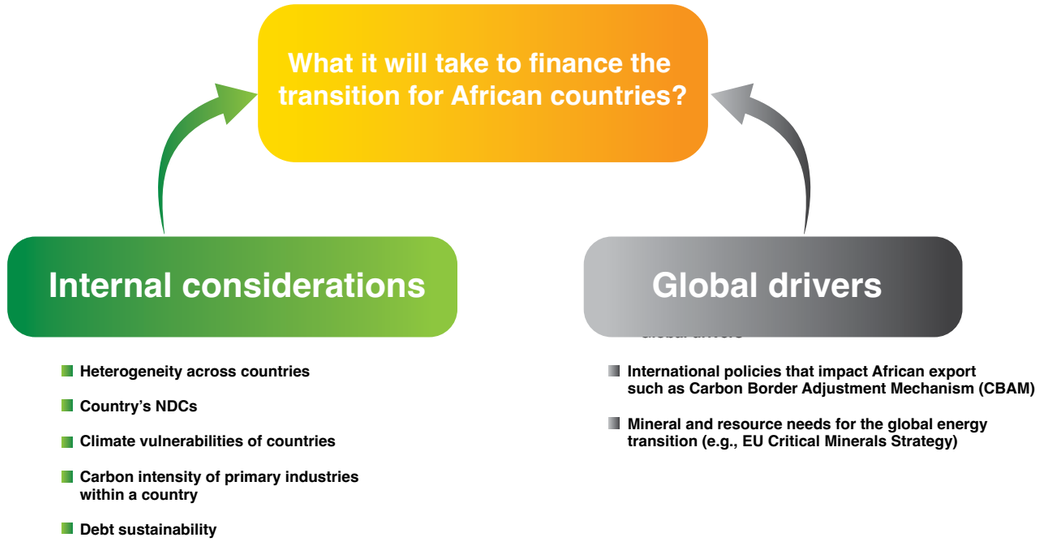
Type	Prominent Sector	Examples	Implication
1. Emission intensive producers	Emission heavy industries	South Africa, Egypt, Morocco	High economic impact of transition policies on key industries
2. Fossil fuel resource producers and exporters	Production and exporter of fossil fuels	Nigeria, Libya, Algeria, Angola, South Africa	Greater economic impact of energy transition on the economy
3. Mining-based economies	Mining	Zambia, Namibia, DRC, Niger, South Africa	Highly vulnerable to climate change, high technology need to meet transition requirements
4. Countries with high levels of strategic minerals	Mining (specifically of strategic minerals: copper, graphite, lithium, nickel, cobalt and rare earth elements etc.)	DRC, Mozambique, Madagascar, Zambia, Zimbabwe, Tanzania, Burundi	Domestic extractive industry critical to global energy transition
5. Agriculture-based economies	Agriculture	Ghana, Kenya, Senegal, Eritrea, Mali, Ivory Coast, Uganda	Highly vulnerable to climate change, high technology need to meet transition requirements
6. Land-use-intensive countries	Forestry	Cameroon, Gabon, Côte d'Ivoire, Eq. Guinea	Similar experience to agriculture-based economies
7. Service-based economies	Service and tourism	Mauritius, Zimbabwe, Kenya, Tanzania	The sector least impacted by transition policies, but highly impacted by climate change

Source: Adapted from McKinsey (Krishnan et al., 2022)

Energy transition initiatives financing will most likely be funnelled towards certain countries. For example, countries in Archetypes 1 and 2 have much greater financing needs as transitioning will fundamentally alter their economic structure, compared to agriculture-based economies where new technology and farming practices would need to be developed, but the primary industry, agriculture, would not change (Naidoo et al, 2024a). Hence, in as much as there are energy transition initiatives, targeting certain typologies the international flows coming to the continent are unsuited (i.e. for example high interest on loans and only a small portion in grants, which means countries may face problems in implementing those deals) for the different types of transitions that are happening on the continent, in terms of quantity and quality of finance for climate action.

Understanding the financing needed to achieve a just energy transition across Africa is a multifaceted question, one that requires an analysis not only of the internal heterogeneity of countries across the continent but also of how those heterogeneities interact with international policies (See, Figure 6.3).

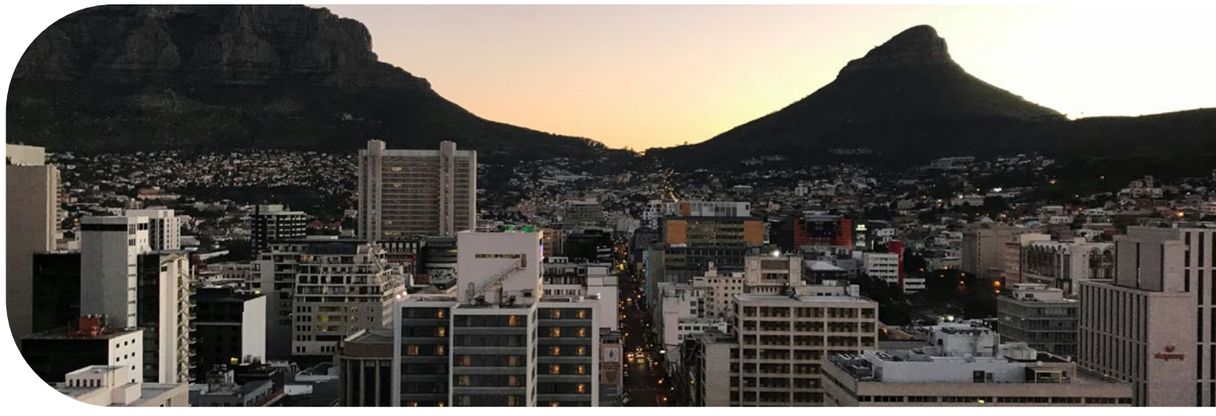
Figure 6.3: What will it take to finance the transition in Africa



Source: Author's own analysis

In terms of heterogeneity in current finance flows, it is evident that transition funding in Africa is not evenly distributed across the continent, (Nakhooda, Caravani and Bird, 2011; Watson, Schalatek and Evéquoz, 2022), with ten countries (out of 54 African countries – mostly middle-income African countries) absorbing more than half of all climate finance investment (Africa NDC Hub, 2021). Egypt, Morocco, Nigeria, Kenya, Ethiopia, South Africa, Mozambique, Cote d'Ivoire, Tunisia and Ghana (ranked from highest to lowest).

The distribution of finance flows in Africa is influenced by challenging conditions, including issues like currency instability, regulatory and governance issues, a shortage of viable projects, risks related to business partners, limited technical expertise, and gaps in transparency and accountability. These factors diminish investor interest in expanding their investments in the region (Africa NDC Hub, 2021; Meattle *et al.*, 2022).



Factors informing Africa's access to climate and transition finance flows

The principle of CBDR-RC is central to **equity and justice in the context of finance flows,** and has two distinct points of emphasis: firstly, there is a common responsibility amongst the nations of the world to share the burden of environmental protection as climate change will affect all. Secondly, despite this common responsibility, the degrees to which countries are responsible are not equal, with an acknowledgement that national circumstances play a deciding role in the capacity of countries to respond to climate concerns (UN, 2015).

Building on this understanding Ngwadla et al. (2023: 4) have identified four areas of consideration when determining equity in the context of finance: "The quantum of finance, the development context, reforms to global finance systems and the indispensability of international cooperation and trust building for meaningful outcomes of the process". All of these are significant in that they are underpinned by a needs-based lens, which is based on five key principles (Ngwadla et al, 2023): New, additional and predictable sources of finance; Cognisant of development needs and equity; Does not deepen indebtedness and inequality; Informed by the temperature goal; Common definitions and accounting.

Three distinct indicators have been identified and detailed to determine what financing the just transition in Africa in the context of equity would entail (Naidoo et al., 2024a). These are, the source and quality of funding, how funding is used, and the channels through which funding flows. The source and quality of funding refers to where the finance for the transition in Africa originates, and the instruments through which it is provided. The just and equitable elements of the transition can only be realised if funding is allocated towards efforts that are needs-based, country-led, and address the socio-economic consequences of the transition.

With most important justice elements are continued economic development and electrification (including industrialisation), reskilling of workers in fossil fuel industries, and social protection for workers and communities negatively affected by the transition (Naidoo et al., 2024a). Finally, analysing the channels of funding is useful in determining the justice element within finance for climate action, particularly as it relates to transparency and dignity.

With a clear understanding of what a just and equitable finance flows entail, nine principles have been identified to guide the financing of the just transition in Africa in an equitable and just manner (see Table 6-2). These principles are based on an analysis of the foundational prerequisites for equitable and just finance flows and draw on existing initiatives and guiding documents that have already been developed, particularly the South African JET IP (PCC, 2022a). If correctly applied, these principles are a useful tool to ensure that equity and justice are placed at the centre of all transition strategies (and the associated financing); that equity and justice are reflected in the source, use, and channels of funding; and that all partners adhere to their collective and differentiated responsibilities in the global energy transition.

Table 6.2: Just Transition Financing Principles for Africa

Guiding Principle	Description
Follow UNFCCC obligations.	Adhere to the UNFCCC principle of CBDR-RC. Which outlines the financial obligations of developed countries to developing countries.
Additional to current development aid.	All finance flows to support climate action in Africa should be additional to existing development funding.
Needs-based funding	Finance flows should be needs-based, accounting for the fiscal and financial constraints of the African country in question.
Mainstream justice	Funding should only be allocated towards projects or initiatives that centralise justice considerations.
Significant concessional finance	The funding terms should be more attractive than what governments can receive in capital markets.
Predictable and consistent financing	Funding should be predictable and consistent to allow for effective timing and planning so as to avoid any delays.
Accessibility through effective institutions	The best-placed and most suitably equipped institutions should manage funds and ensure that funding is allocated to where it is needed.
Risk-sharing	Instead of focussing on public de-risking of private finance, there should be risk-sharing between the private and public sectors.
Effective governance and transparency	Effective governance and transparency mechanisms need to be established and maintained to ensure that funding is allocated for the intended purposes.

Source: Adapted from PCC, 2022a

The **level of indebtedness** informs African countries' access to climate and transition finance. African countries owe about US$655.6 billion to external creditors as of 2022 (Harcourt, and Robertson, 2023). This includes bilateral, multilateral, and private creditors. Hence, financing needs come at a time when African countries are already facing various macroeconomic challenges. These include exchange rate depreciation and commodity price shocks, which were further exacerbated by the COVID-19 pandemic, where- Low and Middle-Income Countries (LMICs) faced heavy debt burdens due to debt incurred to fund pandemic responses.

This increase in external debt has resulted in an increasing debt-to-GDP ratio across Africa, with an estimated 65% debt-to-GDP ratio for the continent in 2022 (AfDB, 2023e). As a result of this **worsening debt situation,** some African countries are now listed by the International Monetary Fund (IMF) as either being at high risk of debt distress (Thibault Lemaire et al., 2023). African countries in high risk of debt distress were listed as Burundi, Cameroon, Central African Republic, Comoros, Djibouti, Ethiopia, The Gambia, Guinea Bissau, Kenya, and Sierra Leone, or being in debt distress (IMF, 2023) which drives up the cost of accessing capital as investors price in the additional risk (IEA, 2023) and potentially impairing country's credit ratings. African countries in debt distress are Ghana, Malawi, Zambia, Congo Republic, Somalia, and Zimbabwe. Perception of increased default risk also leads to other issues such as raising insurance premiums, which can shut out less-resourced investors (AfDB, 2022g).

The consequence of a high debt-to-GDP ratio means that debt servicing crowds out other government spending (Federspiel et. al, 2022). This brings to light the impact of debt serviceability on government expenditure. Looking at data on debt serviceability as a percentage of government debt, debt services make up 10% of government debt expenditure in several African countries' debt repayments. It is uncertain whether or not government debt plays a significant role in determining the ability of countries to incur more finance and take on greater amounts of debt. Hence, a critical factor in deducing what it will take to finance the energy transition in Africa is figuring out if countries can afford to repay the debts they are expected to incur.

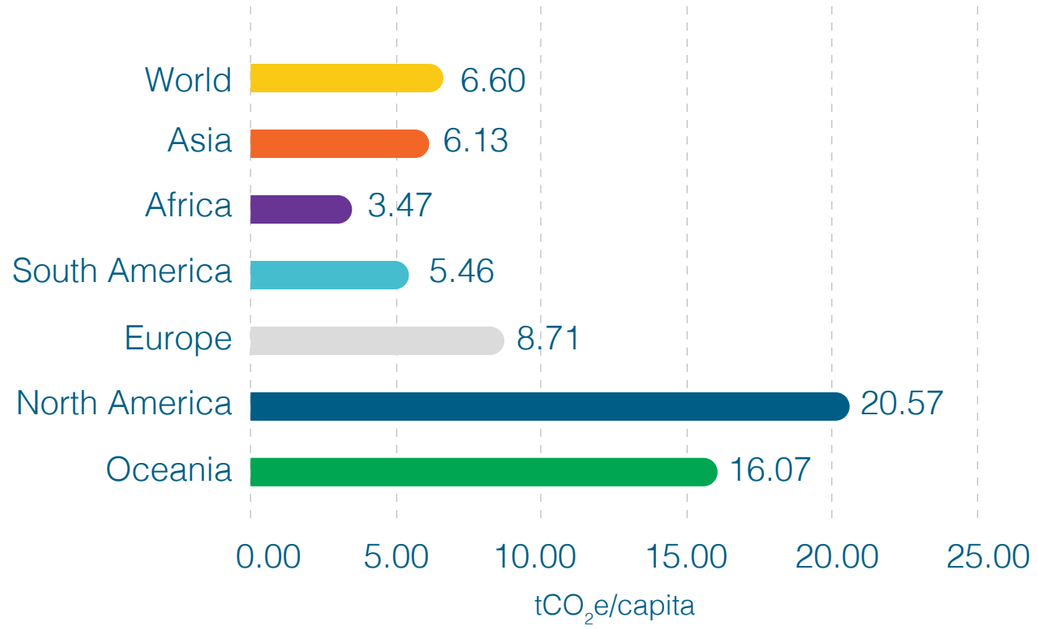
Choosing the **right financing instrument** is essential in ensuring economic development and potentially mitigating indebtedness (Naidoo et al., 2014), therefore finance flow commitments should not replace existing commitments to finance other Sustainable Development Goals (SDGs) (Afdb, 2022g). This means de-risking aspects also need to be considered, i.e. what de-risking would cost, to keep financing costs low and affordable (IEA, 2023). For example government guarantees as de-risking instruments adds to the cost i.e. maybe charging a premium to the guarantee if risks related to collateral and currency fluctuations are considered, as these guarantees often depend on market conditions and external ratings, which can be influenced by economic cycles.

Regarding de-risking, the (OECD, 2021) report which highlighted the lack of private sector investment as part of risk-sharing despite existing de-risking instruments is a red flag. De-risking and risk sharing are not the same concepts per se. Underpinning the difference is that the private sector anticipates significant risk absorption by the public sector, however the private sector itself has enlightened self interest in the nature of investments to advance climate resilient and low emission developments such as clean energy. Therefore, there is a need to move away from a focus on de-risking to appropriate risk-sharing between both developed and developing countries and between the private and public sectors. Without exit or scale-down strategies, and excessive support that is not just or inclusive and places a burden on the public sector for longer than is necessary.

The history of how global financial flows interact with African countries, the role of **internal capital markets** could play a significant role in access to finance. This mobilisation of capital provides a channel through which local investments can occur, by facilitating interactions between investors and investment opportunities. For this mechanism to operate effectively, there needs to be a level of development of capital markets, through both the capital markets themselves, as well as creating a level of investor trust.

Figure 6.4 below looks at the market capitalization of listed domestic companies as a % of GDP, this indicates total domestic market value and acts as a proxy for the size of internal capital markets in Africa. It shows that South Africa has a significantly more developed capital market than the rest of the continent. For context, the market capitalization of listed domestic companies as a % of GDP in the US is 208%, and the global average is 131%. This indicates that Africa has generally small internal capital markets, creating a barrier when it comes to accessing internal capital for investment in green transition activities.

Figure 6.4: Market capitalization of listed domestic companies (% of GDP) for 2022



Source: Author's own using World Bank data

Deepening and development of African capital markets is already the core focus of several institutions including the African Union (AU) in their Agenda 2063, and the IFC's Joint Capital Market Program (J-CAP), who have identified capital markets as a key driver for the financing and achievement of development goals through domestic resource mobilisation (FSD, n.d). For increased development of African capital markets there needs to be a focus on the development of policy and governance structures that facilitate these capital markets (IFC, 2020), as well as creating more integrated regional and continental markets, for example: African Continental Free Trade Area (AfCFTA) Capital market integration (African Investment Forum, 2023). An example of regional capital market integration as a way to further develop internal capital markets is in the East Africa Community (EAC) capital market regime, which creates capital market depth through the integration of capital markets across Kenya, Rwanda, Tanzania and Uganda (EAC, n.d).

Evidence exists that Africa is capable of significant financial contributions towards its development (Igbatayo, 2019; UNCTAD, 2020; AU, 2021). However, African countries lose on average $50 billion annually through **illicit financial flows (IFFs) and capital flight** (Mbeki, 2016). Thus, there is potential for intrinsic rechannelling of funds to achieve development objectives including a just energy transition through addressing some of the items listed in Table 6.3. Such IFFs represent a source of revenue to build Africa's independent ability to establish and achieve its development and transition-related needs.

Table 6.3: Where is Africa susceptible to high levels of illicit financial flows?

Illicit financial flows	Reasons
1. Capital account liberalization	Facilitating a lot of LFFs through moving tax, dividends, and assets out of a country.
2. Extractives sector exploitation	50% of African IFFs are from trade mispricing, with the Sub-Saharan Africa region having the highest level of trade misinvoicing.
3. Weak institutions, weak governance, and corruption	Caused by a lack of transparency, policy gaps when addressing reporting and causes of IFFS and corrupt institutions.

Source: (UNCTAD, 2020)

It is estimated that at least USD40 billion in IFFs are directly linked to extractive commodities, (UNCTAD, 2020). It was also found that IFFs have been increasing across the continent, up from USD20 billion in 2001 to USD60 billion in 2010, with another estimate predicting IFF growth at 20.2% per annum (AU, 2021). In summary, it has been shown that Africa loses more through IFFs than it gains through foreign aid and Foreign Direct Investment (FDI) (Igbatayo, 2019) which has a detrimental impact on the capital stock available for funding development outcomes in Africa. Better trade deals and stemming of IFF losses can also contribute to closing the current financing gaps linked to overall financing needs between 2020 and 2030 of USD 70 billion.

It is evident that the most significant constraint and limitation of Africa's climate ambition is the current position of the continent as a "taker" of ambition. This is due to the current structure of the **global financial architecture** and how it limits the access of affordable and sufficient finance flows to African countries, which are needed to realise mitigation and adaptation objectives. It also relates to the climate finance architecture, which is designed in a controlled access manner, poorly designed to fulfil obligations of global north countries to the global south.

Another significant feature of the current global financial architecture, which potentially limits access to and affordability of finance, is the denomination of debt issued. With the majority of debt issued being in funder currencies (i.e. dollars, euros, pounds, yuan). This leaves the total value that needs to be paid back subject to exchange rate fluctuations, which on the African continent are most extreme relative to the rest of the globe.

The current global financial architecture is not designed in a manner that allows African countries to access the finance they need to realise their sovereign mitigation and adaptation targets. With existing finance flows and structures not reflecting the equity that is needed for a just transition on the continent.

Characterisation and analysis based on scenarios

Using the typology of African economies, one can determine the intensity of the impact a transition will have on an economy based on its reliance on fossil fuels. More specifically their level of dependence on fossil fuels and other emissions-intensive industries for energy generation and economic output. The scale of the disruption and change caused by a transition in turn dictates the financing needs of the country in question.

Given the unique transition context African countries will have different vulnerabilities, given the heterogeneity in Africa. These vulnerabilities, some of which are highlighted in the ND-GAIN Index can provide a basis for understanding the exposure, sensitivity, adaptive capacity, and readiness, of a country transitioning which provides useful information on the country's economic, social and governance readiness, to help understand where finance flows can have the greatest impact.

Table 6.5: Typologies of the intensity of environmental and social responses

		Intensity of environmental response	
		Low	**High**
Intensity if social response	**Low**	**Light Green** Restructure of economic systems e.g. energy with zero/low interst in social issues — with green growth as a solution.	**Dark Green** Precutionary approach prioritizing human quality of life, with low interst in social issues.
	High	**Light Green & Red** Dominant approach to sustainable development in terms of income inequality and poverty with concern for environment.	**Dark Green & Red** Precautionary approach combined with interest in distribution and wealth.

Source: (Naidoo, 2019;93)

The location of a country within a particular quadrant informs the financial needs of the transition, including the instruments, and the overall quality and quantity of finance needed (Naidoo et al, 2024b). Quality here refers to the financing instruments and the extent to which they account for a country's fiscal limitations, debt burdens, ability to take on risk and need for predictable and consistent finance. This is essential when considering and determining the ambition of African countries as the reality is that African countries are largely dependent on external finance. This means their ambition is directly tied to the quantity of finance they can access, and the terms and conditions under which it is provided (quality of finance).

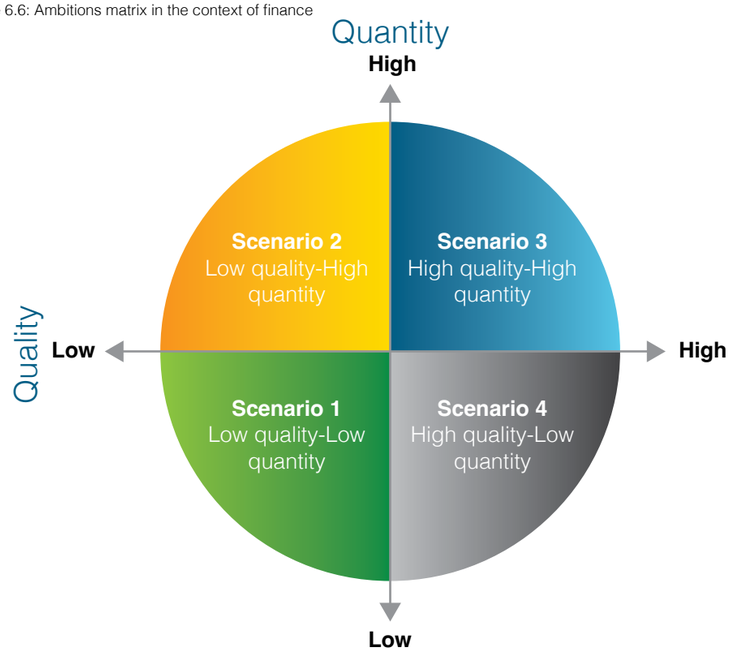
The diversity of the economies of countries on the continent, as well as in their endowment of **resources that are of value to the global transition.** Therefore, the third question that African countries need to be asking themselves in the context of the transition is what do we have that is of value to both the global and local transition? This can be in the form of resources and capital. Two of the most significant resources that African countries have available to them are critical minerals which are essential to the production of components needed for clean energy generation, and natural gas which is often viewed as an intermediate energy source for transitioning countries. In addition to critical minerals and natural gas, an often-overlooked resource that Africa has in the context of global efforts to mitigate climate change is carbon sinks, with the Congo River Basin Forest being the most prominent. The value of carbon sinks should not be ignored, and they are a resource that Africa can leverage for access to finance.

The reason why these resource endowments are important in understanding Africa's ambition is that the majority of African countries are dependent on international financing for their transition, with the existing evidence suggesting that they are therefore often unable to directly determine or influence the quality of finance that is provided, and how it is used (i.e. their ambition and transition pathways according to needs). Yet by having resources that many developed countries want, there is significant bargaining power that African countries can utilise to their advantage to access a quality and quantity of finance that is in line with their needs, thereby allowing them to have a greater say in setting their own ambition.

An often-overlooked aspect in negotiations and discussions around finance flows is the fact that IFFs deprive the continent of a significant quantity of finance that it could use for its transition efforts. African countries need to hold the global north to account for these IFFs and use available bargaining power to ensure that efforts are made to combat IFFs. If done effectively, this would make a substantial amount of capital available for African countries to invest in transition efforts.

An ambition matrix has been developed as a basis to position the desired outcomes for African countries in terms of finance flows. This matrix aims to outline how Africa's financing ambition for a transition can be understood within the context of the quality and quantity of finance flows as shown in Figure 6.6. The quantity and quality of finance needed are dictated by the environmental, development and social needs and priorities of respective countries, which in turn are informed by a multitude of factors including the economic typology.

Figure 6.6: Ambitions matrix in the context of finance



Source: Author's own analysis

The status quo places Africa i**n Scenario 1** with both a low quantity and quality of finance available for climate and transition efforts. This is seen in Africa's 88% climate financing deficit for 2020 (Guzmán *et al.*, 2022), and the predominance of non-concessional debt as a financing instrument. Which only further adds to debt pressures across the continent (see section, 3.1). However, it can be argued that some African countries are currently in **Scenario 2,** where there is a relatively high or growing quantity of finance that is available, but it is not a quality of finance that is sustainable and reflects the financial limitations of the country in question. An example of this is the South African JETP, which has a significant amount of initial funding promised (USD8.5 billion), but the majority of this funding is in the form of loans and places significant risks on the fiscal position of South Africa. This means the quantity of finance may be considered high, but the quality is low.

Conclusion

To conclude, Africa's climate ambition is constrained and limited by the continent's position as a "taker" of ambition. This is due to the current structure of the global financial architecture and how it limits the access of affordable and sufficient finance flows to African countries, which are needed to realise mitigation and adaptation objectives. Linked to this is the continent's increasing debt burden and the power imbalance this creates between African countries and their creditors. This puts them in a position to dictate where the funding flows, when it flows, and the associated terms and conditions of the funding. This leaves African countries highly dependent, with limited leverage to determine the scale, quality, and allocation of funding. The result of all of this is that African countries are increasingly finding it difficult to pay off current debts, and are also unable to access new loans at a scale and interest rate that they can afford. Despite calls for increased concessional finance and grants for the continent's climate mitigation and adaptation efforts, this has not been forthcoming on the scale needed.

To navigate this difficult context and better determine what is needed to finance a just and equitable transition on the continent, four conceptual financing frames have been introduced. The first is a typology of African economies. The second frame allows for an analysis of the nexus of environmental and social intensity of the transition. The third frame relates to the understanding of ambition scenarios for finance, through the lens of the quality and quantity of finance needed, and this is a lens through which to understand the existing factors that inform the financing options of African policymakers, and how they could potentially respond. The frames can be applied to answer four associated questions, which African policymakers should consider:

1. What is our unique transition context and what do we need to meet such needs?
2. What are the environmental and social ambitions for the country's transition?
3. How do we leverage what we have to get what we need?
4. What quality and quantity of finance is needed for Africa to realise a just and equitable transition?

Though this chapter does not provide all the answers to these questions it does offer initial insights that can be built on and developed. This includes the potential leverage Africa has in using its access to critical minerals and other resources to improve the current quality and quantity of finance flows and features of the global financial architecture that can be reformed so that it is more favourable to the needs and unique challenges facing African countries.

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