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BLIND ALLEYS AND BRIGHT PROSPECTS:

Africa Navigating Stranded Assets and Just Transitions

Fatima Denton, Thelma Arko, Gerald Forkuor, Bruk Tekie, Simon Anderson, Stephen Yeboah, Qondi Moyo, Maria-Ancilla Bombande and Gifty Ampomah.

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ABBREVIATIONS

AfCFTA	African Continental Free Trade Area
AfDB	African Development Bank
AGN	African Group of Negotiators
AIDA	Accelerated Industrial Development for Africa
API	American Petroleum Institute
BP	British Petroleum
BRI	Belt and Road Initiative
CCS	Carbon Capture and Sequestration
CEO	Chief Executive Officer
CIF	Climate Investment Funds
CNOOC	China National Offshore Oil Corporation
CNPC	China National Petroleum Corporation
Covid-19	Coronavirus Disease 2019
CSIS	Center for Strategic and International Studies
CSP	Concentrated Solar Power
DRC	Democratic Republic of Congo
EACOP	East African Crude Oil Pipeline
EBRD	European Bank for Reconstruction and Development
EU	European Union
EV	Electric Vehicles
FDI	Foreign Direct Investment
FID	Final Investment Decision
G20	Group of Twenty
G7	Group of 7
GDC	Gaz du Cameroun
GDP	Gross Domestic Product
GEPetrol	Compania Nacional de Petroleos de Guinea Ecuatorial)
GHG	Greenhouse Gas
GW	Gigawatt
IEA	International Energy Agency
IFC	International Finance Corporation
IIASA	International Institute for Applied Systems Analysis
ILO	International Labour Organization
IMF	International Monetary Fund
IOC	International Oil Companies
IPC	International Petroleum Cooperation
IRP	Integrated Resource Plan (IRP)
LED	Light-Emitting Diodes
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MTCO2e	Metric tons of carbon dioxide equivalent
MW	Megawatt
N	Naira
NDC	Nationally Determined Contributions
NOC	African national oil companies
NUMSA	National Union of Mineworkers of South Africa
OPEC	Organization of the Petroleum Exporting Countries
PBL	Project- Based learning
PIDA	Programme for Infrastructure Development in Africa
PV	Photovoltaic
PVC	Polyvinyl chloride
SDG	Sustainable Development Goal
TWh	Terawatt-hour
UK	United Kingdom
UN	United Nations
UNECA	United Nations Economic Commission for Africa
UNFCCC	United Nations Framework Convention on Climate Change
UNU-INRA	United Nations University – Institute for Natural Resources in Africa
US	United States
USD	United States Dollar
WAGP	West African Gas Pipeline
WCGIDP	Western Corridor Gas Infrastructure Development Project
WTO	World Trade Organisation

KEY MESSAGES

African countries must remain steadfast in achieving developmental climate adaptation goals. Improving current resilience is good preparation for the now inevitable climate impacts of the future.

Global solidarity matters, but so do bold, consistent actions. The call for support for Africa in transitioning to a low-carbon pathway is not new. A renewed call to action can help, but not if it does not go beyond changes at the margins. Many African countries are leaders in mitigation action. What they need is joined-up action and consistent support to enable the transitional drivers – climate finance, capacity development, institutions and governance arrangements – to align with a transformational green development. **Africa needs a strategic masterplan to respond to hydrocarbon asset-stranding risks.** This collective action strategy has a basis in African states' Nationally Determined Contributions (NDCs).

Africa's role in the Fourth Industrial Revolution needs strategy and action. Strategic minerals need value addition. With the current arrangements, Africa may lose from the opportunities of the rising Fourth Industrial Revolution. Minerals such as cobalt, manganese, chromium, neodymium, lithium, uranium, copper, platinum, and rare earth metals are required for cleaner energy technologies such as batteries, hydrogen cells, solar photovoltaic cells, wind turbines, light-emitting diodes, electric vehicles, and batteries. They may offer great market opportunities for mineral-rich countries in Africa. But without strategic value addition, the continent risks being mere producers of these strategic minerals. The continent needs to build light manufacturing activities around these minerals, rather than export them in raw form.

Africa must fix its acute energy deficit. In the global discourse on the low-carbon development pathway, Africa must use its resources to boost energy sufficiency and security. The option should not be treated as binary. The continent has an opportunity to use its abundant renewable and non-renewable resources to provide a range of energy services to its people from electrification to industrialization. **Building forward better must be done as part of a massive energy transformation**. The criteria for deciding which fossil fuels should be left in the ground is not political economy-neutral. Natural gas is not a perfect formula, but many African countries see it as a 'bridging' fuel and part of their current energy menu, with perceived associated developmental benefits in industry, agriculture and energy.

Stranded assets risk putting Africa on the alert. Stranded assets provide a clear warning to Africa that it must diversify and use its hydrocarbon resources, especially in the face of climate change and increased disinvestment away from carbon-intensive industries. Fossil-fuel exploitation has not contributed significantly to Africa's prosperity story. The continent can seize the opportunity to direct its development away from exogenous shocks and short-term development prospects without value addition and the trappings of the primary product export pull.

Obstacles to climate finance are obstacles to just transitions. Context matters, and historical responsibility matters even more. The world is contending with a shrinking carbon budget. Africa and its small island states are exposed to increased climate impacts given their limited adaptive capacity to withstand the shocks and stressors of climate change. The burden and the responsibility of climate change cannot be borne by those who are least able to bear the burden. The absence of equity in the transition process constitutes huge risk factors for the quality of the transition. It undermines the efficacy of institutions at the global level that are charged with the stewardship of the transition. The world's leading polluters must accept their responsibilities and act based on the 'polluter pays principle and 'common but differentiated responsibilities' and must unlock climate finance. These principles are at the core of a justice-based transition and will make room for trust in the negotiation process. A revamp of global finances is critical to change the current dynamics and enable a steady flow of resources to developing countries in Africa whose fragility is increasingly exposed to ravaging and relentless surges of extreme and slow on-set events – floods, droughts, hurricanes, heatwaves, and storms. Thoughtful leadership and decisive action in climate finance can set the course for a just transition and a fairer world.

African leaders and policy-makers are needed at the geopolitical table. The continent needs representation at major forums, bodies and authorities, where the technologies, associated regulations and major decisions on just transitions are made.

Executive summary

Since the publication of the UNU-INRA discussion paper on stranded assets in 2019, the world has lurched first into an oil price war and now a human health pandemic, bringing threats of global economic recession. In light of the new context, this second report looks afresh at the key areas in the management of hydrocarbon assets in just transitions. It sets out the need to invest nationally and collectively in resilience, and the advantages of doing so.

We argue for managed transitions to reflect differentiated exposures, multiple vulnerabilities and variable response capacities. We believe that each African country must have a clear understanding of carbon market risks, the changes in the global hydrocarbon arena, and how these risks and changes might affect the demand for hydrocarbon assets. This understanding can enable policymakers to develop bespoke strategies with both sustainable development and climate action as goals.

The time has arrived to embrace the benefits of decarbonization. 'Building forward better' must start with the response to the Covid-19 pandemic. Economically marginal and carbon-intensive sectors and assets are not on a trajectory to sustainable development but are instead heading up a blind alley.

However, the fiscal space developing countries have left to address climate risks is shrinking and has been further squeezed by the pandemic. While oil-

producing countries in the Middle East were able to find ways to reduce their fiscal reliance on oil export revenues through diversification, hydrocarbon-rich African countries have had much less or no room for such economic manoeuvres and recovery adjustments.

The external context in which fossil fuel-dependent developing countries are considering their low-carbon transition is difficult. Countries are at high carbon market risk because of global commitments to the Paris Climate Agreement and are facing multiple significant market fluctuations that they have little power to influence. The cost of debt to these countries is increasing as climate risks escalate without adequate response measures being in place to mitigate these risks. And, despite economic analyses showing the value to all countries of transfers to developing countries for the low-carbon transition, the actual delivery of such transfers is proving very elusive.

In a keynote address to the UN Economic Commission for Africa on 25th October 2011, Meles Zenawi, Prime Minister of the Federal Democratic Republic of Ethiopia, was prescient in seeing investment in green technologies and infrastructure as key to Africa's economic transformation. Expressing exasperation with G20 efforts to mobilize finance, he warned that Africans 'cannot solve the gap in infrastructural investment by limiting ourselves to the neo-liberal thinking that created the problem in the first place' (UN-ECA, 2011). This analysis holds true today a decade later.

Meanwhile, the time for action risks being eaten up by Africa's current debt burden, especially given that debt servicing will require more foreign exchange, much of which flows from hydrocarbon resource proceeds. In addition, African countries could find that changes in a just transition policy leave them exposed to litigation and liability. Fossil fuels attract strategic climate cases due to the entrenched dependence of most economies on these energy sources and the possible gains in climate change mitigation if significant reductions in the sector can be achieved. Litigation exposure can come from both national systems and the international sphere.

Africa has vast untapped renewable energy resources, yet only 5% of the continent's energy requirement is met from them. Africa's rich solar resources could provide the continent with more than 660 000 TWh of electricity a year, far above its projected needs. The continent is also endowed with rich deposits of minerals and metals such as uranium, cobalt, copper, platinum, chromium, lithium and the rare earth metals required for clean-energy technologies such as batteries, hydrogen cells, solar photovoltaic cells, wind turbines, light-emitting diodes, electric vehicles and batteries.

Africa's Agenda 2063 sets out to ensure universal access to affordable, modern and clean energy services based on renewable energy. This is to be coupled with a strong localized manufacturing sector, highly qualified human resources and an integrated energy infrastructure for both centralized (electricity grid, hydrogen systems, etc.) and decentralized energy systems. However, Agenda 2063 does not address the explicit management of fossil-fuel stranded assets, and needs to be complemented with a continent-wide strategy for low-carbon and just transitions.

From the evidence generated and reviewed for this report, we have identified the following determining factors of just transitions. In summary:

- **Time:** The initiation and pace of just transitions need to be calibrated to national contexts. While multilateral commitments through the United Nations Framework Convention on Climate Change (UNFCCC) are helpful in encouraging prompt action, development-first principles that mean 'races to zero' and inflexibility on low-carbon development targets are not appropriate for some African countries.
- **Capacity:** Poor fiscal space, terms of trade and technical know-how combine to impair the just transitions capacity of African countries.
- **Agency:** The historical lack of agency afforded to some African countries (seen in the low local content in the extractive sectors) can be addressed through collaborative intracontinental arrangements.
- **Scope:** A step-change is within sight, but national and regional trend-setters need to come forward. Fourth-generation minerals provide an opportunity to improve scope.
- **Inclusion:** Requires a proactive civil society and a political system that requires decision-makers to look beyond the next election to the inter-generational horizon. The multilateral arena is failing to make restorative transfers.

The implications for African countries of hydrocarbon stranded assets are far too important to leave to individual responses in the absence of collective action. There is sense in the continent speaking with one voice: a fragmented approach would dilute any geopolitical power that Africa can leverage. An 'African position' needs to consider the following points:

- **Targeted use of hydrocarbon resources:** Exploitation of hydrocarbon resources must be purposeful, given the potentially short-term window of use and major movements towards divestment.
- **Early advantages of green development:** African countries are able to leapfrog polluting technologies and benefit from early investment in low-carbon development.
- **Covid-19 as an instrument to 'build forward better':** Fiscal deficits, chronic debt, high illicit financial outflows and degrading public-sector infrastructure, including weak and poorly equipped health systems, are all queuing up. If Africa is to move towards decarbonizing its continental economy, it must also perceive the current pandemic as a catalyst to invest in health and protect health services.
- **Building forward better must align with agricultural transformation:** Agriculture is of the highest priority for African countries. If a transitional industry is to be built as a place-holder for phasing out fossil fuels, then the goal must be to reinvigorate the agricultural sector and build infrastructure for storage, transport, irrigation and agri-processing systems as tools to insulate economies from post-harvest losses and keep productivity buoyant.
- **Enable a broad-based diversification of African economies:** Hydrocarbon-dependent economies must urgently explore radical ways to diversify their economies. Transitional industry must take into account contextual realities and retool to support the emergence of green infrastructure and green services.
- **Global solidarity is necessary to enable the transition to low-carbon development:** African countries will go through this transition phase at different speeds and in different ways. Consistency of action, strong leadership, transparent intentions and governance buttressed by strong institutional arrangements and capacity are important accelerators. Rethinking the articulation of power and exploitation of resources must come from a greater sense of solidarity than has been exhibited in the past three decades of climate negotiations and should be anchored on the principles of enlightened self-interest.

'Business as usual' solutions are redundant. Africa must collectively acknowledge the risk of asset stranding and seize this moment to address the lack of long-term planning and the governance and management deficits that have so far failed the continent and foregone the just distribution of benefits from its natural resource base. Recent months have re-emphasized that African countries need to invest, nationally and collectively, in resilience-building. Achieving resilience requires both the information and analytical capacity to respond to intersecting risks and vulnerabilities in a broad set of scenarios.

Each African country must have a clear understanding of carbon market risks and changes in the global arena and how these might affect the demand for hydrocarbon assets so that policymakers can develop bespoke strategies with both sustainable development and climate action goals. Hydrocarbon-rich countries require a managed transition to reflect differentiated exposures, intersecting vulnerabilities and variable response capacities and speeds.

Country- and sector-differentiated strategic decarbonization pathways should reflect both the relatively small scale of Africa's historic carbon footprint and the need for Africa to accelerate its socioeconomic development. Transition pathways need careful planning and must account for economic development as well as decarbonization imperatives.

Strategic leadership and deliberative positioning at the regional level is necessary now for a collective and pre-emptive response to the risks of asset stranding. This response should include greater economic diversification and shifts to sustainable energy options such as low-carbon hydrogen, carbon capture and storage, offshore wind and biofuels.

Based on the analysis in this report, we make the following recommendations:

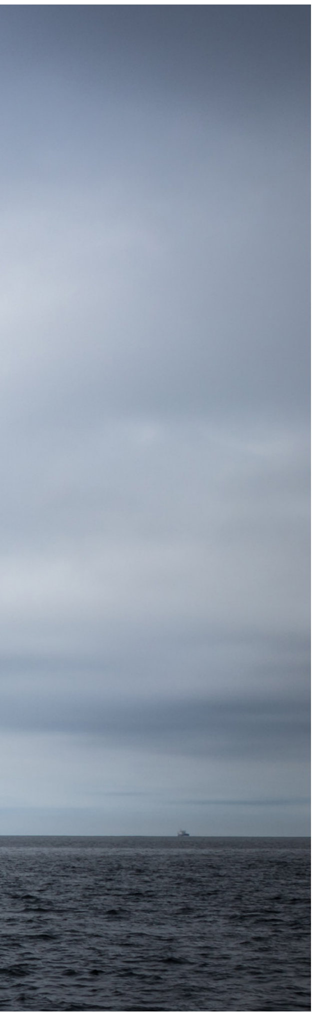
- **African countries should remain steadfast in pursuing their developmental climate adaptation goals.** Given the global failure in the scale and distribution of climate finance, the funds needed to improve resilience may have to be sourced from available fossil-fuel resources in the short and medium term. Moreover, improving current resilience can aid preparations for inevitable future impacts based on current and projected temperature trends.
- **Africa should re-engineer a pathway to energy sufficiency.** It is often said that energy is the lifeblood of modern societies. Africa's quest for economic diversification and transformation should be grounded in sufficient energy base. The continent has abundant energy resources that are capable of powering households and industries. Countries must focus on harnessing their resources to generate adequate electricity supplies needed for industrialization. While making attempts to utilize green resources, the continent must be supported to unleash its energy potential.
- **African policymakers should design a strategic regional masterplan to respond to the risks of stranded hydrocarbon assets.** A collective strategy needs to be based on contextual understanding of each country and sector and be aligned with African NDCs. A continental framework should also be developed in sync with regional programmes. Furthermore, the African Group of Negotiators should be involved in developing a regional strategy on stranded assets that provides visible, continent-wide political leadership in climate negotiations and highlights the necessary institutional measures, legal frameworks and financing mechanisms for a unified position on the future of Africa's hydrocarbon resources.
- **It is time for Africa to assume a geopolitical role.** The continent needs representation in major forums, bodies and authorities where these technologies, associated regulations and major decisions are made to ensure that Africa maintains a recognizable geopolitical role. The continent needs to take common and strategic decisions to secure a new geopolitical role in the current energy transition.
- **Climate finance is a necessary transitional imperative.** African NDCs need USD 2.4 trillion for implementation, with 82% and 73% external funding required to implement mitigation and adaptation targets respectively. Hydrocarbon-rich African countries stand to be worst impacted by revenue shortfalls as calls for diversification from fossil fuels heighten. At the same time, countries are saddled with the burden of recovering their economies post-Covid-19 amid huge debts, high debt servicing and limited fiscal space. Both the demand and supply sides of global climate finance need to take concerted action to increase flows into Africa to facilitate national just transition strategies.

1

Introduction

In 2018, Africa produced 9% of world crude oil output, of which three-quarters was exported. Africa imports nearly half of the secondary oil products it consumes (International Energy Agency, 2020). These data provide a high-level context for exploring how African countries could manage hydrocarbon resources and assets as part of just transitions towards a low-carbon development pathway.

In 2019, UNU-INRA published a first discussion paper, Africa's development in the age of stranded assets (UNU-INRA, 2019). It concluded that African countries were at a crossroads in terms of their development trajectories and that they faced a false dichotomy of either using their hydrocarbon resources to meet development agendas, or leaving those resources in the ground in order to contribute to global climate ambitions. The discussion paper argued that asset stranding – at the intersection of those crossroads – represented a risk, but also an opportunity to accelerate economic and social development while mitigating climate change through better resource management, the development of regional markets and economic diversification.



Since the publication of the first discussion paper, the world has lurched into an oil price war, and the Covid-19 pandemic has ushered in the threat of global economic recession. Given the upheaval of the past 18 months (G20 Saudi Arabia, 2020), this second report returns to the conclusions drawn by UNU-INRA in 2019 with the aim of positioning them in the current context and revising the assessments made of the risks and opportunities associated with hydrocarbon asset stranding in Africa. Key points for attention include:

- African policymakers' awareness: The first discussion paper identified that African policymakers were largely unsure of the significance of stranded asset liabilities and the severity of the carbon market risk. Covid-19 is now dominating policy bandwidth in terms of protecting both human health and the abilities of national economies to recover post-pandemic. The need to generate revenues from the fossil-fuel sector is now further heightened, and at a time when oil and gas prices remain volatile.
- Price-taking stakeholders at high carbon-market risk: The recent global moves to shore up oil markets were done with little or no consultation with African stakeholders. The historic 10% production cut agreed by the main OPEC+ players on 12 April 2020 is of great concern from two perspectives. First, it is insufficient to buffer the prices African national oil companies (NOCs) and others receive as the pandemic slump in demand unfolds. Second, the new hegemonic position of the US administration in being able to force through the deal means that African interests are even further down the pecking order.
- Cursed by historic precedents: The history of fossil-fuel exploitation across Africa is predicated on mercantilism and extraction under poor terms of trade, leaving very few opportunities for reinvestment in developmental outcomes. Oil and gas resources have long been a central element in the economic growth of hydrocarbon-endowed economies, with some notable examples such as Algeria, Egypt and Libya in North Africa (International Energy Agency, 2020). However, the exploitation of fossil fuels has not supported Africa's development to the extent anticipated (Mihalyi & Scurfeild, 2020). A glaring paradox is the fact that Africa produces 1.4 times the energy it needs but remains highly dependent upon imported goods, with the vast majority of its people living in energy poverty. It is very unlikely that, during a recession, multinational interests will be inclined to renegotiate terms of trade with African countries to allow greater revenue flows into African treasuries.
- African voices: In the absence of a global goal for climate adaptation, the perspectives of the African Group of Negotiators have been drowned out in the global climate negotiations under the United Nations Framework Convention on Climate Change (UNFCCC). In addition, across Africa calls for recovery through green transitions compete with voices in favour of further fossil-fuel exploitation, despite the heightened urgency for climate action.
- Fourth Industrial Revolution[1] opportunities: As energy transitions accelerate, the demand for some minerals is set to grow significantly. Minerals such as cobalt, manganese, chromium, neodymium, lithium, uranium, copper, platinum and rare earth metals are required for cleaner energy technologies such as batteries, hydrogen cells, solar photovoltaic cells, wind turbines, light-emitting diodes, electric vehicles and batteries, and may offer great market opportunities for mineral-rich countries in Africa (UNCTAD, 2019). However, the current and likely future indebtedness of some African countries, to China in particular, but also to other creditors, will mean that fair deals for the extraction and exploitation of these resources will be hard to come by.

The first discussion paper's conclusions did not go far enough. Rather than being at a crossroads, African countries face a series of blind alleys at a time when the need to find the right path forward is more urgent than ever. Those African countries which are both highly dependent on hydrocarbon assets and which have not yet seen the socioeconomic transformation enjoyed by other fossil fuel-rich countries have the most to lose from the stranding of hydrocarbon assets. But, if the transition to a low-carbon economy is carefully managed, they stand to gain from green growth opportunities. However, this will require strategic and calculated choices to be made. If the terrain is not well understood by African policymakers, these countries will be left open to new forms of resource predation, and Africa's agency to design its own transformation model could be compromised. Meanwhile, the time for action risks being eaten up by the current 'debt burden' that African countries find themselves saddled with, especially given that debt servicing will require more foreign exchange, much of which flows from hydrocarbon resource proceeds.

Business as usual solutions are redundant. Africa must collectively acknowledge the risk of asset stranding and seize this moment to address the lack of long-term planning and the governance and management deficits that have so far failed the continent and foregone the just distribution of benefits from its natural resource base. Through different forms of capital flight, under-pricing and other forms of tax avoidance, the continent continues to be short-changed in terms of resource exploitation and contributions from resource endowments to support strategic goals. In short, fossil-fuel wealth has not benefitted African people, and the shackles of the 'commodity trap' remain firmly in place more than five decades after independence.

Reflecting on the issues raised by the first discussion paper from the perspective of the current context, this second report argues for the need to invest in resilience; to adopt strategic and differentiated decarbonization pathways for different African nations; and to manage transitions in ways that account for specific vulnerabilities and opportunities. Key requirements for designing decarbonization pathways include the following:

- Recent months have re-emphasized that African countries need to invest, nationally and collectively, in resilience-building. Achieving resilience requires both the knowledge and analytical capacity to respond to intersecting risks and vulnerabilities in a broad set of scenarios.
- Strategic and differentiated decarbonization[2] pathways for African countries should reflect both the relative scale of Africa's historic carbon footprint[3] and the need for Africa to accelerate its socioeconomic development. The analysis provided in this report suggests that transition pathways need careful planning and must account for economic development as well as decarbonization imperatives. It calls for strategic leadership and deliberative positioning at the regional level for a collective and pre-emptive response to the risks of asset stranding, which should include greater economic diversification and shifts to sustainable energy options such as low-carbon hydrogen, carbon capture and storage, offshore wind and biofuels.
- Each African country must have a clear understanding of carbon market risks and changes in the global arena, and how these might affect the demand for hydrocarbon assets, in order for policymakers to develop bespoke strategies with both sustainable development and climate action goals. Hydrocarbon-rich countries require a managed transition to reflect differentiated exposures, intersecting vulnerabilities and variable response capacities and speeds.

2

Shifts in the economic and financial context

Since the first discussion paper was published, the Covid-19 pandemic has forced people the world over to become much more accustomed to unexpected upheavals in life and work. The turbulence and inter-connectedness of external determinants and risk factors have seldom been so evident. These lessons are pertinent for the fossil fuels sector and just transitions across Africa. Here we set out the external factors that determine the most important risks and opportunities for African decision-making on just transitions: the economic impacts of the Covid-19 crisis on energy-sector investments; the role played by climate change in sovereign risk; and the political economy of low-carbon transitions in different contexts. These issues help contextualize the regional and country analyses that follow in latter sections of the report.

The Covid-19 crisis and energy sector investments

The International Monetary Fund (IMF) has warned that countries in Africa will bear lasting scars from the deep recession that is expected to result from the Covid-19 pandemic. This is likely to have devastating consequences for living standards, disproportionately affecting social groups who already experience higher incidence of poverty, such as women and youth in informal employment (IMF, 2020a).

The International Energy Agency (IEA)'s World Energy Investment 2020 (IEA, 2020e) report identifies trends in key determining factors. Energy-sector investments during 2020 to 2021 lurched from an expected modest increase to a historic decline. Developing countries with significant hydrocarbon industries have seen dramatic falls in revenue and lower funds available for investment. Oil and gas investments have fallen by half globally. The funds available to indebted and poorly performing NOCs have been hit, and governments are struggling to find the income to compensate for oil revenue shortfalls. The squeeze on developing economies' national budgets is even greater: state-owned energy enterprises account for more than 50% of energy investment in developing economies, compared to only 10% in the developed economies.

'For the first time, we are seeing the beginning of the end of fossil fuels.'

– Nicholas Stern

There is also growing uncertainty in the sector as hydrocarbon-rich countries (with the possible exception of Libya) try to mitigate the impacts of depressed local demand and downturns in global supply and demand (IEA, 2020d). These factors are likely to thwart the ambitions of newly arrived or aspiring oil producers in Africa. The sector, already weakened by the sheer weight of structural problems, has also had to contend with long delays, failed contracts and technical problems, further jeopardizing timelines for the start-up of new projects. This is the case in Uganda, where Total and China National Offshore Oil Corporation (CNOOC) were expected to make a final investment decision in 2020 for the Lake Albert project that includes the Tilenga and Kingfisher fields. This project has been plagued by delays related to financing for the export pipeline that is expected to be constructed through Tanzania, with a start now scheduled for mid-2021 (JPT, 2021).

Total energy investment as a proportion of global gross domestic product (GDP) fell to less than 2% in 2020. Given the current and projected decline in energy-sector investments, it is predicted that investment in clean energy technologies will not reach the level needed to arrest climate change. Time lags in energy-sector investments, as demand dips due to the pandemic, risk future market imbalances that could precipitate significant energy price volatility. Although many stakeholders pay lip service to the 'build back better' mantra, current capital flows do not match the required funding levels for low-carbon energy transitions. Indeed, the current scale of low-carbon investments through Covid-19 recovery programmes across the top greenhouse gas (GHG)-emitting countries is not enough to meet the Paris Agreement targets (The Guardian, 2020).

This lack of low-carbon investments is particularly troubling in developing countries where access to clean energy is not assured. Carbon-market volatility and uncertainty, plus the likely upsurge in conventional energy investments once the pandemic has been controlled in developed countries, could make low-carbon transition investments less likely in the medium term across Africa. Here, a lack of national fiscal flexibility as well as liquidity constraints are real risks to low-carbon transition investments that are longer-term and/or capital-intensive (see the next two sub-sections for greater detail). A particular problem arises where governments seek tax revenues from renewable energy and low-carbon innovations, such as with Kenya's new tax on green technology imports that had formerly been free of duties.

In conclusion, the Covid-19 crisis and related economic recession will challenge developing-country governments to use constrained budgets to invest in recovery, and this may squeeze out new low-carbon transition technologies. This could mean longer-term reliance on carbon-intensive stock for the energy sectors in these countries.

Climate change and sovereign risk

The risks posed by climate change are geophysical, social and economic in nature (Eckstein et al., 2021). As these risks increase, their impacts are being 'priced' in financial markets, and this is leading to declines in the value of national stocks of countries seen to be climate-vulnerable. In this way, climate vulnerability and sovereign credit profiles are negatively correlated. As climate change effects impose losses and damage on countries, financial markets impose rising borrowing costs on these same countries, increasing the fiscal burdens related to recovery.

The financial turmoil caused by the pandemic has triggered sharp currency devaluations in developing countries, added to which there are severely constrained public finances due to falls in incomes, GDP and trade flows (UNCTAD, 2020). These same climate-vulnerable developing countries now face significant climate risk-induced increases in the cost of debt (Volz et al., 2020), and additional debt interest payments due to climate vulnerability could be in the order of USD 146–168 billion before 2030. However, climate adaptation measures that increase social and economic resilience could mediate increases in sovereign borrowing rates. Tracking how rating agencies respond to different countries' climate vulnerability will help to anticipate how sovereign credit profiles might be affected.

There are financial risks to the development transitions that countries pursue. International climate policies, technological change and changing consumption patterns will all affect exports, trade and economies. The choice of development pathway will be constrained by these determinants of trade and patterns of growth. Perceptions of each country's development strategy will then shape the terms on which it is able to borrow and, as a consequence, its sovereign risk and financial stability.

In response to these challenges and to achieve a more climate-resilient status for borrowing and access to capital for just transition investments, African countries are advised to: assess sectoral and national short-, medium- and long-term climate vulnerability to better understand climate sovereign risk and develop financially effective national adaptation plans;[4] mainstream climate risk analysis into public financial management; address climate-related risks in their monetary and fiscal frameworks and operations; and implement financial-sector policies to scale up investment in climate adaptation and to develop insurance solutions.

African countries will need support to manage climate-related sovereign risks and macro-financial resilience. Recognition of the inequity of climate loss and damage should be expressed through transfers by developed countries and multilateral institutions of finance for adaptation and resilience investments, assistance for insurance solutions, and emergency lending and crisis support.

Political economy of low-carbon transitions

Investment in and divestment from fossil fuels both require political and economic decisions to be made. Vested interests in fossil-fuel exploitation support powerful lobby groups and economic and political forces that seek to suppress climate action. As hydrocarbon resources continue to hold a commanding place in the wider energy mix and in conventional economic models and growth patterns, the perception of such resources as 'development fixtures' and the attendant 'carbon entanglement' stand in the way of progressive climate action (P Newell & Johnstone, 2018).

Enabling just transitions is not simply a matter of intent – there is a governance axis that needs to be factored into the solution space. Often, and Africa is no exception, the production and commercialization of oil is controlled by multilateral oil companies. These companies and governments that legislate over their business transactions often make strange bedfellows, and the institutional, fiscal and governance boundaries between them remain blurred.

A working paper from the World Bank Climate Change Global Practice (Peszko et al., 2020) considers alternative scenarios for low-carbon transition. The analysis casts stranded fossil fuel assets as an 'opportunity to refresh and rebalance the wealth of nations'. General equilibrium macro-economic models are used to analyse the impacts of the low-carbon transition in terms of the shift in asset values across the extractive and other sectors. This approach expands the concept of stranded assets to illuminate changes in asset values and the associated redistribution of wealth between sectors and between countries. Macro-economic models can be used to simulate alternative low-carbon strategies, which can then inform a political economy analysis of who wins and who loses. Such analyses help us understand how fossil fuel-dependent countries could be incentivized to leave high-carbon assets and activities behind and over what timeframe.

The components of a global low-carbon transition incentive structure that can be leveraged by fossil fuel-importing countries include unilateral carbon taxes;[5] border taxes on the carbon content of imports from fossil fuel-dependent countries; cooperative wellhead carbon taxes; and broader trade sanctions. However, analysis indicates that these incentives to cooperate in the low-carbon transition can be misaligned between different fossil fuel-dependent countries and between the owners (national or private) of different fuels. While analysis shows that national asset diversification is worth pursuing, modelling reveals that this strategy exposes fossil fuel-dependent developing countries to the 'tragedy of the horizon', as identified in 2015 by Mark Carney (Carney, 2015).

The tragedy of the horizon, whereby climate change impacts fall beyond the traditional horizons of most actors (i.e., the business cycle, political cycle and the horizon of technocratic authorities and central banks),[6] results in fossil fuel-dependent countries moving late towards the diversification of energy sources, exports and economic assets, and not joining collective climate action.

The macro-economic modelling indicates (within the set of assumptions that frame the modelling) that diversification into heavy industry for fossil fuel-dependent countries can be more attractive than low-carbon transition asset diversification that requires upfront investments and results initially in relatively poorer economic output. For such countries, the simulations suggest that low-carbon transition policy choices reduce GDP growth. This might explain why fossil fuel-dependent developing countries have chosen more carbon-intensive diversification strategies to date. Lower-income fossil fuel-dependent countries with large underground reserves will need additional incentives to diversify into low-carbon assets and activities(Peszko et al., 2020).

Additionally, simulations show that reduced revenues from fossil-fuel exports can lead to industries in such countries maintaining more energy-intensive patterns of production (even with import taxes on carbon), generating greater use of national resources and increased GHG emissions as their global market share in these sectors increases. This is referred to as carbon leakage.[7] Carbon leakage is often associated with the Emissions Trading Systems of the European Union. However, the general perception is that the majority of carbon-intensive industries have already been transferred to developing countries (Yu et al., 2021). In fact, there is a sense that this relocation exercise of 'dirty' industries from the Global North to the Global South is still ongoing. Cement and steel industries have not been fully transferred, but the proportion of leakage in national economies is small. Many developing countries consider carbon-intensive industries important for achieving sustainable development. These countries remain susceptible to carbon market risk constraints.

Carbon taxes (applied cross-border) can also impose challenges to welfare and growth in these countries, which then incentivizes them to join global moves toward the low-carbon transition. However, coal-exporting nations and poorer countries with oil and gas reserves may be resistant to the low-carbon transition while they are still able to exploit their comparative advantage in fossil fuel-intensive production to meet domestic and wider demand.

The World Bank Climate Change Global Practice team estimates the scale of finance, technology and knowledge transfers necessary to incentivize cooperation among nations to achieve low-carbon transition to be USD 22 billion annually to 2050. Their analysis shows that transfers at this level would be sufficient to compensate fossil fuel-dependent developing countries for the forfeited consumption associated with the low-carbon transition. This relatively low level of transfers would enable recipients to invest in asset diversification and meet the socioeconomic development needs of a just transition (Peszko et al., 2020).

Emerging global political economic trends

The 2008 financial crash showed the frailty of the neoliberal development model. Over the last decade, regional blocks of nations have emerged with increased levels of state intervention and protectionism. Economic and, in some cases, military conflicts have increased. African and other middle-income and 'emerging' economies have been recruited into and have aligned themselves with rival dominant economic blocks.

The Covid-19 pandemic has made explicit the increasing profit and capital accumulation by business interests in key sectors: pharmaceuticals, artificial intelligence, digital security and surveillance, electronic media and entertainment, internet retail and associated physical logistics (Kerevan, 2020). This growth fuels the need for and consumption of fourth-generation mineral resources (Besada & Martin, 2015). At the same time, the pandemic has severely affected the profitability of airlines, travel, hospitality and related sectors, with large-scale unemployment ensuing in regions reliant on tourism. Global finance will respond to these major shifts in returns on capital.

As the global economy adjusts to life with Covid-19, countries will need to consider what constitutes better preparedness. The Global Preparedness Monitoring Board has identified areas of action to 'bring order out of the catastrophe and chaos currently facing the world'. These include responsible leadership, engaged citizenship and robust global governance. These areas of action are also important for low-carbon and just transitions (Global Preparedness Monitoring Board, 2021).

The political economy of low-carbon development is itself predicated on the political economy of just transitions. To go beyond requires changes in the current global system where the needs of the dominant core are not aligned with those countries and people on the periphery. There will inevitably be winners and losers if low-carbon development is chosen:(Newell & Mulvaney†, 2013) ignoring the injustices of energy access means seeking to reproduce asymmetries between the global elite and the world's poorest and most vulnerable. Understanding the depth of the political economy implications of low-carbon transitions is central to democratizing more inclusive green pathways.

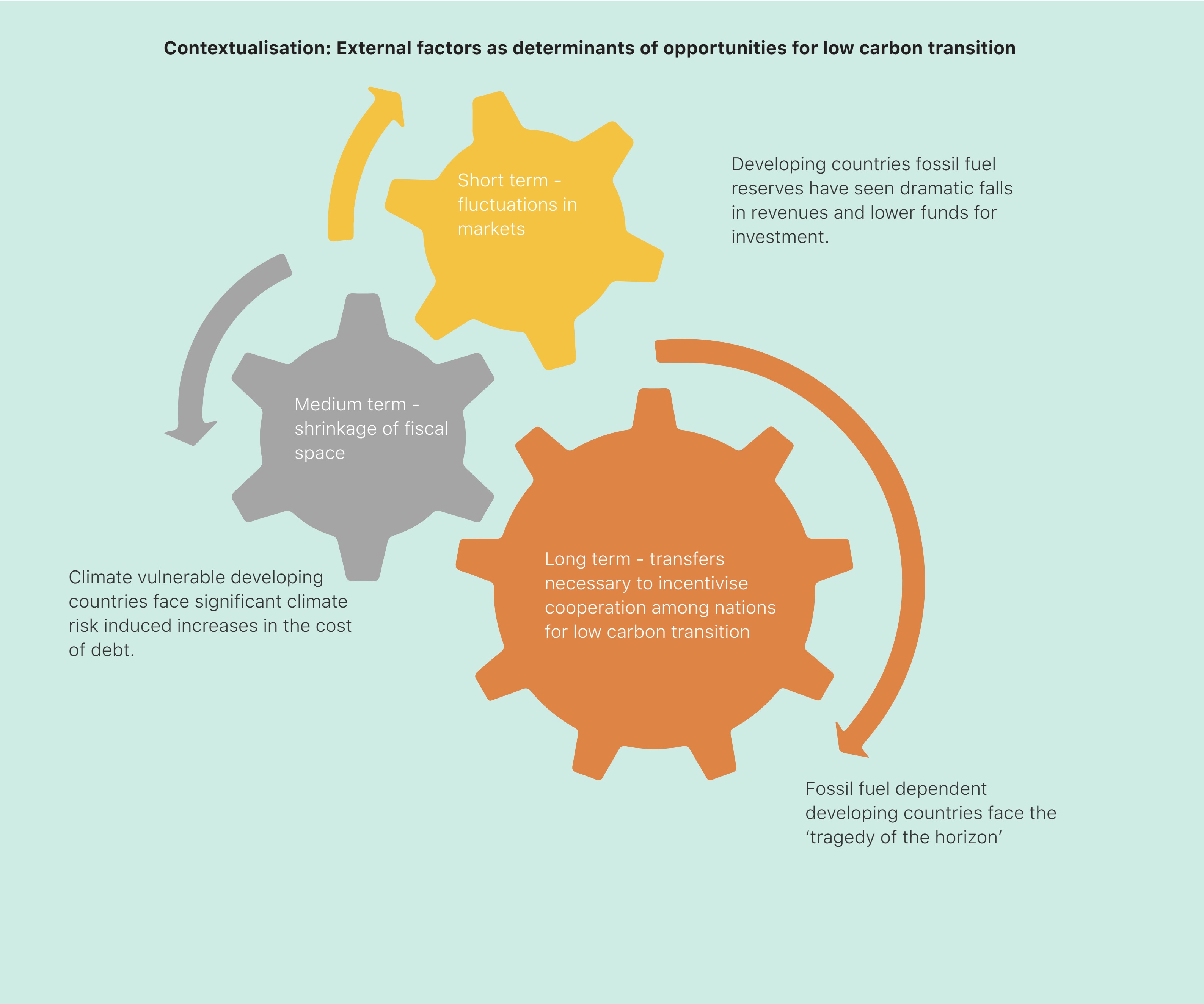
'Whatever we do have global implications – if we extract coal it will warm the climate – it is in Africa's interest to want a transition away from fossil fuels.'

– Wisdom Akpalu

Conclusions

Fossil fuel-dependent developing countries in Africa must consider the external factors that will determine the risks and opportunities associated with the low-carbon transition (see Figure 1). These countries have high carbon-market risks because of global commitments to the Paris Climate Agreement, and they face multiple and significant market fluctuations that they have little power to influence. The cost of their debt is increasing as climate risks escalate without adequate response measures in place to mitigate them. And, despite economic analyses showing the global value (in terms of avoided losses) of transfers to developing countries for low-carbon transitions, the actual delivery of such transfers is proving very elusive (Buchner et al., 2019).

Figure 1: External factors that determine opportunities for low-carbon transition



3

Justice in transitions

'If Africa is going to have a greener development pathway, it cannot come at the cost of reducing poverty and meeting the basic needs of people in Africa that is not negotiable.'

– Harald Winkler

The concept of the just transition is moving up national and regional political agendas. The European Bank for Reconstruction and Development states that 'a just transition seeks to ensure that the substantial benefits of a green economy transition are shared widely, while also supporting those who stand to lose economically – be they countries, regions, industries, communities, workers or consumers'(EBRD, 2021) (emphasis added). The European Green Deal[8] is a prime example of a policy mechanism for the just transition: launched in December 2019, it includes a €150 billion 'Just Transition Mechanism' for EU countries that are dependent on fossil fuels and carbon-intensive economies to move to renewable energy sources (BBC News, 2019; Tannenberg, 2015). The 2020 Production Gap Report considers that this mechanism 'could serve as a model for international just transition cooperation that is politically viable, effective, and equitable'(SEI et al., 2020).

Justice is a vital element of the transition and transformation towards sustainable development. However, Heffron and McCauley (2018) contend that governments commit themselves to low-carbon economic development (and more recently to 'build back better') knowing that such transitions will be slow, gradual processes that favour the interests of the status quo and thereby allow a continuation of current inequalities (Heffron & McCauley, 2018).

Parties to the UNFCCC Paris Agreement (UNFCCC, 2015) have acknowledged that climate change is a 'common concern of humankind' and that climate action must take into account the creation of decent work and quality jobs in accordance with nationally defined development priorities. Parties have agreed that they should, 'when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as gender equality, empowerment of women and intergenerational equity'. However, the UNFCCC emphasizes policies focused on the fast and low-cost mitigation of GHG concentrations, rather than combining these actions with building social and economic resilience. Forsyth (2014) criticizes the assumption that fast mitigation or carbon sequestration will benefit all, arguing that mitigating GHG concentrations with no attention to local social vulnerabilities to climate change, or indeed policy responses to climate change, creates additional risks for people and for the wider economy, especially in low-income countries (Forsyth, 2014).

'Africa should travel faster towards the transition, but based on our own understanding of the context and our conditions.'

– Ade Freeman

Historically, emissions have come overwhelmingly from the Global North, which was privileged to be the first beneficiary of cheap coal to drive industrialization and propel technological, social and economic transformation. Africa, on the other hand, has been on a relatively greener pathway. Despite being home to 13% of the global population, Africa accounts for only 4% of global energy demand (World Economic Forum, 2017), less than 4% of global electricity production and less than 4% of combined emissions (BP, 2019). Yet, Africa is paying a double penalty: it is one of the regions hardest hit by the adverse impacts of climate change and now bears the greatest burden of climate change mitigation actions.

'The contribution of Africa to the global CO2 doesn't justify heavy reforms right now. Others need to move first and demonstrate that they make progress before they put expectations towards Africa.'

– Christine Hackenesch.

The transition away from fossil fuels must be just and equitable. This requires a recognition that countries' transitional challenges differ widely depending on their level of dependence on fossil-fuel production and their capacity to support a transition. Countries that are less dependent on fossil-fuel production and that have higher financial and institutional capacity can transition most rapidly; in contrast, those with higher dependence and lower capacity require greater international support. Considering Africa's huge dependence on fossil fuels, a drastic transition will result in stranded assets and devastate fossil fuel-dependent economies that are already suffering the economic impact of the Covid-19 pandemic, especially among those in the vulnerable informal sector at the bottom of the fossil-fuel value chain.

'The drive for a green economy is good, but we must do it with a deep sense of ethics, fairness, equity and justice.'

– Yemi Akinbamijo

As technological, economic and social change are both inevitable and dialectical[9] the choice of which transition to follow has equity implications that make the direction of the transition a negotiated emergent outcome. Conventionally, transitions are discussed in terms of distributional and procedural equity. But climate change impacts and the inclusiveness of climate change policy need also to be assessed from a justice perspective. Climate change solutions should be part of processes that resolve development deficits; they should not delegitimize appropriate economic growth strategies, nor increase the risks to the poor.

BOX 1:
The informal sector

According to the International Labour Organization (ILO, 2018), the majority of Africans work in the informal sector, which accounts for 85.8% of employment on the continent. Critical steps must be taken to include the informal sector in any low-carbon transition; otherwise huge numbers of the population may be resigned to deepening poverty and the widening of existing inequalities.

However, African countries have historically found it very difficult to incorporate the needs of the informal sector into policy planning and implementation (Giroux et al., 2021), due in part to the sector's heterogeneous nature (Mbaye, 2015), the absence of appropriate frameworks for its integration and the lack of adequate data. The exclusion of the informal sector in policy planning often contributes to limiting access to basic services, social protection coverage and support mechanisms for those who work in it. As a result, informal workers and settlers are exposed to the risks of poverty, food insecurity and health challenges (ILO, 2020) should they lose their economic livelihoods.

The impacts of this are gendered. Reviews by UNDP (2021) and others on efforts in various African countries to include the informal sector in social protection measures revealed significant challenges and gaps that could lead to further discrimination against women. The study recommended that countries pay more attention to financial solutions that do not compel informal workers to foot the bill of their own social protection. This recommendation is particularly critical to avoid pushing the most vulnerable further into poverty.

If better addressed in policy decisions, the informal sector could be an asset to Africa's low-carbon transition. Potential contributions by African informal sectors to the economic and social development include: technological advancement (Darbi et al., 2016); recovery from the Covid-19 pandemic; innovative and adaptive measures relating to climate change; waste management; innovative job creation; and a potential to drive green growth (Benson et al., 2014).

Blind spots in just transition

The transition away from fossil fuels has several implications for equity, fairness, vulnerability and justice, which differ according to a country's resource dependence, development status and where they are on their transition pathway. These must be navigated through the structure and design of transition processes to ensure justice is delivered, yet the prevalent just transition discourse has a series of blind spots on issues such as the status of fossil-fuel stranded assets, energy security and the political economy of support to transition. Moreover, in the global discourse, the urgency for climate change mitigation takes precedence over the adaptation imperative that remains an overriding priority for Africa.

Many developing countries that are reliant on hydrocarbons for export and tax revenues risk their resources becoming stranded by global moves to low-carbon development. Stranding will trigger losses in hydrocarbon rents, which could mean that such countries are no longer able to support their strategic developmental ambitions, including through social safety nets, public health provision, education and other sustainable development goals. Such countries assert their sovereign rights to exploit their resources and do not recognize the same urgency to transition to low-carbon development. Indeed, countries with very low historical responsibility for climate change have a right to development, which should be respected. There are the risks of cascading negative impacts from transition processes, including impacts on other sectors and new forms of injustices such as unequal access to land, energy and water, related to the resettlement of communities due to mine closures and hydropower dam construction. Such risks should be assessed, analysed and avoided.

We are witnessing different forms of predation of our natural resources. Land resources are prominent examples. When you take DRC – this is a country with more than 80 million hectares of land, but now a country that relies on the rest of the world to feed itself. It has lost a good part of its agricultural potential, and, today, it is importing food. DRC's main exports are in the extractive sector, and its food security is compromised. I see two forms of predation. First is the predation of land resources, where local communities are dispossessed and auctioned at give-away prices. The second form of predation is that we are not adding value even from land that has been appropriated from us, and as such, we are not even creating jobs from this initial land predation. In countries like Mali and Niger - land from gold and uranium exploitation is not rehabilitated.

– Kako Nubukpo

The transition to low-carbon development also has implications for energy security. Energy pathways that require intensive water use might have implications for water access, extraction, exploitation and distribution. For some developing countries, energy security is tied to inequitable histories of extraction, exploitation, illicit financial flows and other abuses of power. The capacity to transition is predicated on ensuring that new pathways do not produce new forms of dominance and new levers of control. Energy-poor communities should be prioritized rather than be 'cordoned off' from, cleaner energy resources. In addition, many African countries have huge energy needs in currently carbon-intensive sectors that are essential to development, such as steel, construction (cement) and infrastructure. In the transition to more sustainable energy generation, natural gas is seen as an essential bridging fuel with cross-border trade opportunities.

'I foresee more efforts to utilize these resources internally to address local needs' […] 'We can utilize our rich natural gas to boost fertilizer production.'

– Antonio Pedro

A political-economy framing of just transitions emphasizes the importance of the power dynamics, structural patterns and global inequalities at play in the relations between nations at different points on their transition pathways. In lower-income countries, transitions present major implications for informal economies and the possibility that, without social safety nets, those who are reliant on the informal sector will be left behind. Recognition is now emerging that just transitions require deep systemic change, combined with the resources to support countries, investors, international development institutions and civil society to access, finance and implement the right tools and strategies (CIF, 2020).

BOX 2:
Gendered dimensions of just transition

In developing countries, insufficient access to energy is a significant hindrance to women's and girls' well-being and economic opportunities, since women and girls are often more affected by a lack of energy access due to their household roles (OECD, 2020). Growing efforts to achieve a transition in sectors such as energy must account for poverty alleviation, especially for vulnerable groups such as women. Unfortunately, the gendered impacts of energy transitions are often implicit and unexplored: implementing gender-responsive or gender-transformative transitions is challenging due to the entrenched nature of gendered power dynamics, which can lead to exclusion and inequality in resource access and decision-making (Lieu et al., 2020). When considering climate action in sectors such as energy and extractives, women and girls should be at the centre of any transition efforts, and should be empowered to act as change agents, energy professionals, decision-makers and informed consumers (BSR, 2021).

A shift to green jobs offers an opportunity to further gender equality and enhance women's economic empowerment. It is crucial to understand how various stakeholders can bring women into traditional green jobs, such as renewable energy, environmental research and conservation, to close existing gender gaps and create more diverse green workforces. However, this can only be achieved through understanding the gendered dimensions of just transitions and the resulting impacts on local communities.

For example, while climate change mitigation and adaptation programmes could create employment and livelihood opportunities for women in the energy sector, structural barriers for gender equality need to be addressed to avoid exacerbating existing gender-based inequalities and intersectional forms of discrimination (CEDAW, 2018). Indeed, existing literature indicates that energy transitions sometimes merely shift inequalities rather than eliminate them, despite the apparent benefits. For example, while some studies suggest that solar and biofuel energy has had a positive effect on women's empowerment by decreasing the workloads (cooking, collecting firewood, etc.) of women in rural villages, other studies indicate that women's labour is simply transferred from one domain (e.g. cooking) to another (e.g. taking care of livestock) (Johnson et al., 2020). In other words, social norms and gendered divisions of labour remain entrenched despite the introduction of new energy sources (Johnson et al., 2020).

Preparedness for low-carbon transition

A recent World Bank report (Peszko et al., 2020) assessing low-carbon transition decisions for fossil fuel-dependent countries identified several external drivers of national-level decisions to diversify assets and cooperate on low-carbon transitions. These include financial and technology transfers, carbon border adjustment mechanisms, unilateral national policies, changes in social norms and institutions, new market opportunities and disruptive technologies. In addition to those external drivers, this report stresses the importance of internal determining factors that condition how countries can react to external forces. The World Bank report discusses preparedness for climate response measures at the national level in terms of exposure and resilience to carbon market risks and other outcomes of low-carbon transitions,[10] and then ranks countries in terms of their low-carbon transition preparedness using this formulation. This ranking is shown in Figure 2, which highlights where African countries fall.

Figure 2: African countries' preparedness for low-carbon transition. Source: Peszko et al. (2020)

African countries' preparedness for a low carbon transition.

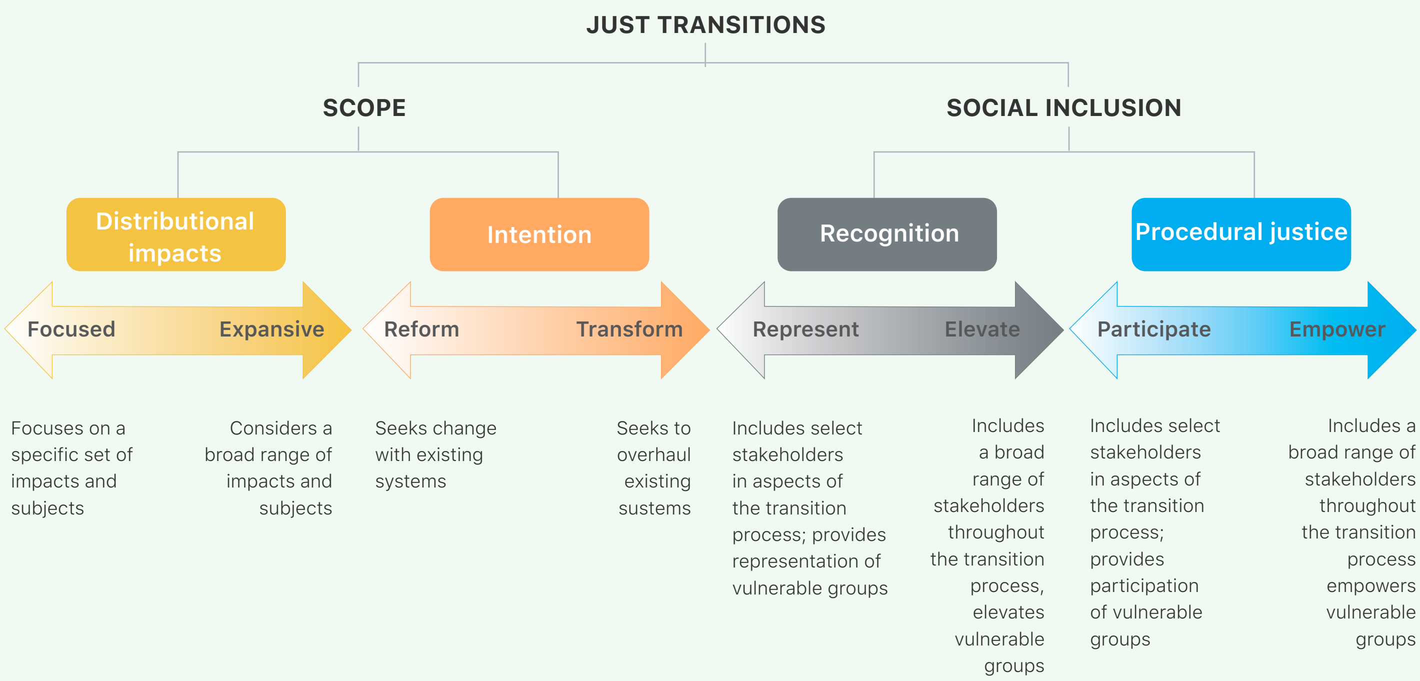
Adapted from Peszko, Grzegorz, Dominique van der Mensbrugghe, Alexander Golub, John Ward, Dimitri Zenghelis, Cor Marijs, Anne Schopp, John A. Rogers, and Amelia Midgley. 2020."Diversification and Cooperation in a Decarbonizing World: Climate Strategies for Fossil Fuel–Dependent Countries." Climate Change and Development. Executive summary booklet. World Bank, Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO. This is an adaptation of an original work by The World Bank. Views and opinions expressed in the adaptation are the sole responsibility of the author or authors of the adaptation and are not endorsed by The World Bank.

As can be seen in Figure 2, all African countries are estimated to be in the low-resilience quadrants. South Africa, Republic of Congo, Botswana, Algeria, Equatorial Guinea Nigeria and Libya also fall in the high-exposure group. Moderately prepared countries include lower- and middle-income countries across Africa, including Angola, Egypt, Ghana, Malawi and Mozambique.

4 Conceptual framework and analysis

Climate Investment Funds (CIF) has supported just transition dialogues in South Africa over the last few years (CIF, 2020) and recently drew out learning from these using a conceptual framework, developed with the Center for Strategic and International Studies (CSIS), and based on distributive and procedural justice elements. The framework identifies two key components of just transitions: scope and social inclusion. These can be disaggregated into distributional impacts and intentions; and recognition and procedural justice. Graduated levels can be further identified within these components. Figure 3 summarizes the framework.

Figure 3: Components of just transitions Source: CIF (2020)



Source: CIF (2020) Supporting just transitions in South Africa: just transition case study.

By assessing the South African case studies, CIF and CSIS arrived at the following key conclusions on how just transitions can be achieved:

- Cross-sectoral, multi-stakeholder, **socially inclusive and participatory** dialogues are vital at local, national and international levels of planning (a review of green-economy processes by the Green Economy Coalition concluded the same (Mohamed, 2020).
- Early **concessional finance** is critical to spread the risks associated with initial investments and to demonstrate the scalability of emerging technologies for just transitions.
- **A regional focus** is needed to repurpose and rehabilitate carbon-intensive energy assets (e.g. coal mines in the case of South Africa), encourage economic diversification, and generate investments in built and ecological infrastructure. These regional initiatives then constitute valuable just transition pilots.
- Just transitions need to be contextualized and must acknowledge that **restorative justice** is necessary to address past and current inequalities.
- For countries where inequality, unemployment and poverty are high, better alignment of broader **transformational changes** with climate change responses and sectoral transitions is needed.

Conceptual frameworks, such as the two-factor ‘capacity/dependence’ and ‘scope/inclusion’ models used in the 2020 Production Gap Report and the CIF/CSIS report respectively are useful in assessing just transition options for nations. However, as the 2020 Production Gap Report finds, countries’ ‘transitional challenges differ considerably’, and multi-factor models are required to understand and support national just transition choices. For fossil fuel-dependent African countries, just transitions and the associated asset diversification that is needed will be further enabled through processes that are regional, supported by concessional finance, and offer real redistributive benefits to local populations.

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The UNU-INRA conceptual framework

The conceptual framework underpinning this report draws on and seeks to contribute to the evolving concept of just transitions. It employs a series of dimensions to broaden the conventional focus of attention within the just transition discourse beyond individual sectors and near-future employment to encompass a wide range of social and economic sectors, nations and future generations.

The five dimensions of the framework are:

1. **Time:** the scheduling of steps in the transition pathway and pace of change.
2. **Capacity:** room to manoeuvre; the ability to overcome any inertia due to pathway dependency; and the capability for action, including financial resources and fiscal space.
3. **Agency:** at different levels, including sovereignty at the national level, to bring about changes necessary for transition.
4. **Scope:** the scale intended for the transitions; and the extent and distribution of impacts.
5. **Inclusion:** who is involved; and the transactional relations between stakeholders.

These dimensions are used in this assessment to help understand how African countries are addressing their needs and opportunities to improve the management of fossil-fuel assets in the context of low-carbon transitions.

Using the analysis by UNU-INRA of the different ways in which African countries are managing fossil-fuel assets, and taking the CIF/CSIS findings into account, UNU-INRA has drawn up a conceptual framework outlined in Table 1 intended to draw attention to the need for a lens on just transitions that goes beyond single-nation issues.

This conceptual framework is used in the following chapter to analyse the status of hydrocarbon assets and resources, energy sectors, development strategies and climate ambitions across different African countries. We also consider the risks and opportunities of hydrocarbon assets management in both the near term (pandemic recovery strategies, Nationally Determined Contributions (NDCs)) and the medium term (the African Continental Free Trade Area (AfCFTA), transition fuels, value addition, low-carbon technology minerals, litigation).

Table 1: Conceptual framework for assessing just transition pathways

Dimensions	Determining factors of just transitions	
	Internal	**External**
Time	Initiation and pace of transition	Multilateral agreements 'Windows' of support
Capacity	Degree of fossil fuel dependency in national/ sectoral development strategies National climate mitigation competence Domestic resources and fiscal space	Scientific and technical expertise available International cooperation Credit ratings and debt relief
Agency	Nationally determined plans of action Political will and policy coherence Awareness of carbon market risk	Recognition of common but differentiated responsibilities Cross-border collaboration International investment flows
Scope	Level of national ambition Interests in the status quo Recognition of inequalities of impacts	Global market shifts within and across sectors Technical support for transformational change
Inclusion	Political commitment to involve all citizens Strength of social contract	Integrity of multilateral system; Finance for restorative transfers

5

Resources, energy, development and climate ambition across Africa

In this chapter, we assess the state of hydrocarbon resources, energy generation and use, development trajectories (including new strategic resources) across Africa, and African ambitions for climate action.

Resources

Africa has large fossil-fuel resources, including 7% of global oil resources and 13% of global gas resources. Coal resources are relatively small and concentrated in South Africa and Mozambique. Over the last decade, significant new oil discoveries have been made in Angola, Nigeria, Republic of Congo, Ghana, Mozambique and Senegal, and over 40% of recent global gas discoveries have also been made in Africa, most notably in Mozambique and Tanzania, but also in Egypt, Mauritania, Senegal and South Africa (IEA, 2019a).

Despite Africa's energy generation potential, growth in energy supply has been relatively slow. In 2017, Africa produced only 8.1% of the world's energy – a similar share as in 1971 (IEA, 2019b). In 2017, Africa's crude oil production was 8.8% of global output, of which 78% was exported. This low level of energy production and consumption has meant that the continent is responsible for only 2% of total global energy-related CO_2 emissions (BP Statistics, 2019).

This also represents a challenge regarding domestic energy supply and value addition. In 2018, Africa exported 78% of its crude oil production, while importing more than 47% of the secondary oil products it consumed (IEA, 2020b). Even Equatorial Guinea, Africa's largest oil producer, lacks its own refinery and so relies on crude production and exports for all its oil-based revenue (African Union, 2020). Countries such as South Africa and Nigeria, despite being major hydrocarbon producers, continue to experience frequent power shortages requiring load shedding (Becqué et al., 2015).

Africa also has vast untapped renewable energy resources: for example, its solar resources could provide the continent with more than 660 000 TWh of electricity per year, far above its projected needs. Yet only 5% of the continent's energy needs are currently met using renewable resources (IEA, 2019b).

'Africa has not made use of its renewable energy potential – it has a huge reservoir of renewable energies that it can unleash, and these can support entire economies.'

– Nicholas Stern

The continent is also endowed with rich deposits of minerals and metals such as uranium, cobalt, copper, platinum, chromium, lithium, and the rare earth metals required for clean energy technologies such as batteries, hydrogen cells, solar photovoltaic cells, wind turbines, light-emitting diodes (LED), electric vehicles and batteries. The Democratic Republic of Congo (DRC) and Zambia account for 75% of global cobalt production, and South Africa produces 70% of the world's platinum. Africa has a fifth of global uranium resources, two-fifths of its manganese reserves and one-third of the world's proven bauxite resources (Moyer et al., 2019). Yet, while there is a growing interest in these deposits, a lack of access to geodata (Iyer, 2014) means this resource wealth is poorly understood across the continent.

DRC holds **67%** of the world's **cobalt** reserves

South Africa produces **70%** of the world's **platinum** needed to produce many computers, mobile phones, to catalytic converters

Figure 4a: Global fossil consumption based on (BP, 2020b)

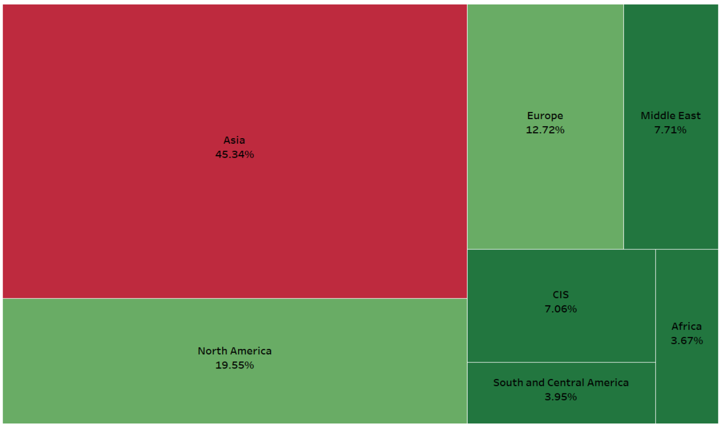


Figure 4b: Global coal consumption, (BP, 2020b)

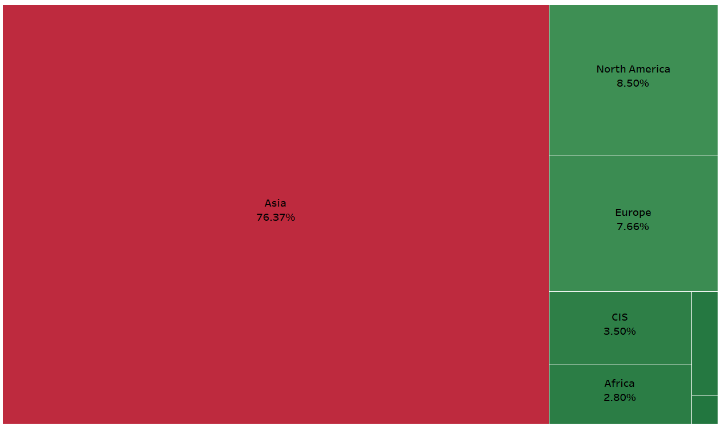
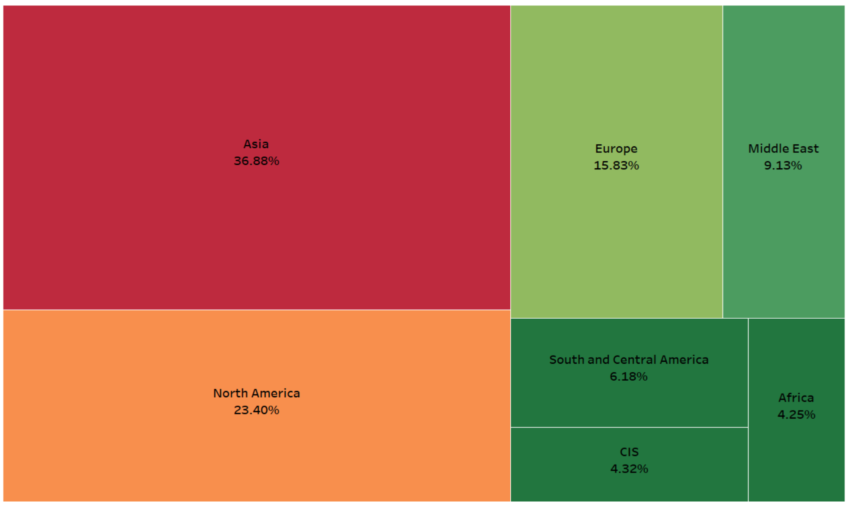


Figure 4c: Global oil consumption, (BP, 2020b)



Energy

Modern, secure and affordable energy is crucial for eradicating poverty, securing prosperous livelihoods, building vibrant industries to diversify national economies, and connecting the continent through trade and cooperation. Africa is the lowest consumer of all categories of fuels and has the lowest per capita energy consumption (BP, 2020b). Of the 840 million people worldwide without access to electrical energy (IEA IRENA UNSD WB and WHO, 2018), nearly 600 million live in Africa, 573 million of whom are in the sub-Saharan region. In thirty African countries, fewer than half of all households have access to electricity (World Bank Group, 2019). Most African countries lack grid capacity, and power outages are frequent. Africa continues to rely on traditional fuels, including biomass and waste, to meet its growing energy demand, and 900 million African people lack access to clean cooking facilities.

Population growth currently outpaces the growth in electricity supply and access (IEA, 2019a). Africa's increasingly urban population needs a reliable and sustainable energy supply to drive its economic and social development. Four-fifths of sub-Saharan African companies suffer frequent electricity disruptions, leading to economic losses. Africa's urban population is expected to grow by more than half a billion people by 2040, exceeding the growth seen in China's urban population between 1990 and 2010(IEA, 2008). The rapid expansion of the energy supply is urgently required to meet the industrial production, transport, air-conditioning and energy-access needs of this growing population (IEA, 2019a).

However, despite having large reserves of hydrocarbon resources, the continent continues to suffer from an unreliable and increasingly expensive energy supply (IEA, 2020e). Additionally, its renewable energy capacity and current generation remains insufficient to meet these growing energy demands. While there has been growth in renewable energy and natural gas use across the continent – with South Africa, Egypt and Ethiopia leading the way in renewable energy deployment – much of it is being deployed alongside fossil-fuel energy generation, rather than replacing it (Le Quéré et al., 2020). The average share of renewable electricity generation in Africa's energy mix is only 7.7%.

ENERGY NEED

Energy poverty, which has left about **600 million** people across the continent **without access to electricity.**

In **30 African countries**, fewer than half of households have access to electricity.

Sub-Saharan Africa remains the world region with the **largest access deficit,** accounting for three-quarters of the global deficit.

In sub-Saharan Africa, **only 28% of healthcare facilities** benefit from reliable electricity.

Development

A decade ago, Meles Zenawi, then Prime Minister of Ethiopia, gave a keynote address at the United Nations Economic Commission for Africa (UN-ECA) African Economic Conference on the green economy and structural transformation (UN-ECA, 2011). He set out three reasons why green growth was essential for Africa's structural economic transformation, none of which had 'much to do with what we as Africans can or should do to mitigate global warming':

1. Rectifying soil and water mismanagement and supporting conservation and reforestation through the transformation of the agricultural sector.

2. Coming close to zero opportunity cost for electricity generation through harnessing African countries' rich endowment of green and renewable sources of energy.

3. Achieving much-needed structural economic transformation through leapfrogging to green technologies.

In summary, Prime Minister Meles Zenawi saw investment in green technologies and infrastructure as the key to economic transformation. Two years later, in 2013, Agenda 2063 (African Union Commission, 2015) was drawn up. The 50-year, pan-African strategic framework for inclusive growth and sustainable development was adopted in January 2015 as the basis for Africa's long-term socioeconomic and integrative transformation.

Energy-related targets in Agenda 2063 include increasing access to electricity by at least 50% above 2013 levels and increasing the efficiency of household energy use by at least 30%. It aims to ensure universal access to affordable, modern and clean energy services, anticipating that Africa's energy supply will be based on renewable energy by 2063. This is to be coupled with a strong localized manufacturing sector, highly qualified human resources and an integrated energy infrastructure for both centralized (electricity grid, hydrogen systems, etc.) and decentralized energy systems (mini- and smart grids, distributed power, etc.)(African Energy Commission, 2019).

Agenda 2063 cites implementation of the Grand Inga Dam Project in DRC as a key development priority to support regional power pools and help transform the continent from traditional to modern sources of energy. However, the Agenda does not address the management of fossil-fuel stranded assets and therefore needs to be complemented with a continent-wide strategy for just transitions to low-carbon development.

Industrialisation: Africa's elusive mission

Addressing the current industrialization deficit is central to both Agenda 2063 and African countries' national development plans. Although the continent is well endowed in natural resources, it is still heavily dependent on commodity exports and has not been able to leverage its manufacturing potential and add value by processing raw materials. Two-thirds of African value-added manufacturing takes place in only five countries: South Africa, Nigeria, Morocco, Egypt and Algeria (AFDB, 2020). However, in line with many national development plans across the continent, some important strides have been made in manufacturing growth; indeed, the region's industrial GDP has risen to a value of USD 731 billion, with value-added manufacturing representing 39% of this total (AfDB, 2020).

If African countries are to avoid losing ground in the drive towards increasing manufacturing production, they face a choice between greening industrialization processes[11] or continuing to rely on fossil fuels. Choosing green development pathways through low-carbon industrialization could trigger several benefits. For example, many countries in Africa devote a huge amount of their budget to energy bills. Green industrialization could improve trade balances by reducing energy import costs and enabling the export of green goods and services (AFDB, 2020). Other factors at play include currency depreciation, which affects oil-rich countries already impacted by falling oil prices and declining fiscal revenues. These exogenous shocks and attendant inflationary pressures will continue if African countries do not take the relevant steps to reduce their dependence on carbon-intensive energy.

New strategic resources

As energy transitions accelerate, demand is set to grow significantly for minerals that support clean-energy technologies, constituting a great market opportunity for mineral-rich countries in Africa (UNCTAD, 2019). Table 2 shows where these so-called 'fourth industrial revolution' minerals and metals can be found across Africa.

Table 2: 'Fourth industrial revolution' minerals and metals in Africa - Source: UNU-INRA, using data from British Geological Survey, (2017);U.S. Geological Survey, (2019) ; World Bank, (2017) and Global Business Reports,(2016)

MINERAL/ METAL	USES	DEPOSITS IN AFRICA
Arsenic	Lead alloy batteries, semi-conductors	Namibia, Morocco
Bauxite (Al)	Wind turbines, solar PV, CSP, CCS, LEDs	Mozambique, Tanzania, Ghana, Egypt, Nigeria, Guinea, Mali, Sierra Leone, Cameroon, South Africa
Beryllium	Alloying agent used in aircraft and space vehicles	Rwanda, Madagascar
Copper	Wind turbines, solar PV, CCS, LEDs, EVs	Botswana, Zambia, Zimbabwe, DRC, Morocco, Madagascar, Uganda, Mozambique, Namibia, Ang ola, Mali, Tanzania, Burkina Faso, South Africa
Fluorspar	Used in enamels and casting	Egypt, Kenya, Morocco, Namibia, South Africa
Lead	Solar PV, LEDs, EVs	Mozambique, Namibia, Zambia, Angola, DRC, Mali, Nigeria, Morocco, Burkina Faso, South Africa
Nickel	EVs, wind turbines, solar PV, LEDs, CCS	Botswana, Zambia, Zimbabwe, Angola, Niger, Mali, Morocco, Madagascar, Tanzania, Ivory Coast, South Africa
Tin	Solar PV	Angola, DRC, Tanzania, Niger, Egypt, Nigeria, Rwanda, Uganda, Burundi, Nigeria
Zinc	Wind turbines, solar PV, LEDs	Namibia, Sudan, Algeria, Eritrea, Tunisia, South Africa, DRC, Nigeria, Morocco, Zambia, Angola, Burkina Faso
Antimony	LEDs	South Africa
Chromium	Wind turbines, LEDs, CCS	Botswana, Zimbabwe, Mali, South Africa, Sudan, Madagascar
Cobalt	EVs, CCS	Botswana, Zambia, Zimbabwe, DRC, Morocco, Madagascar, Uganda, South Africa, South Africa
Cesium	Drilling fluid, catalyst promoter	Namibia, Zimbabwe
Graphite	EVs	Botswana, Mozambique, Namibia, Zimbabwe, Tanzania, Madagascar
Gold	Electronics	Botswana, Mozambique, Zambia, Zimbabwe, Angola, Namibia, DRC, Congo, Tanzania, Niger, Burkina Faso, Mali, Kenya, Senegal, Ghana, Egypt, Togo, Morocco, Ethiopia, Nigeria, Rwanda, Burundi, Sierra Leone, Guinea, Madagascar, Cameroon, Sudan, Gabon, Uganda, Benin, Central African Republic, Equatorial Guinea, Ivory Coast, Liberia, South Sudan, Algeria, Burundi, Eritrea, Mauritania, South Africa
Indium	Solar PV, LEDs, EVs	

Iron	Solar Panels	Botswana, Mozambique, Namibia, Zambia, Angola, Senegal, Egypt, Morocco, Nigeria, Sierra Leone, Egypt, Sudan, Uganda, Algeria, Mauritania, Malawi, Swaziland, Tunisia, Mali, Guinea, Liberia, South Africa
Lithium	EVs	Namibia, Zimbabwe, DRC, Mali, Ghana
Manganese	Wind turbines, CCS, EVs	Namibia, Burkina Faso, Mali, Kenya, Ghana, Gabon, Egypt, Morocco, Sudan, Zambia, Ivory Coast, South Africa
Molybdenum	Wind turbines, thin-film solar, LEDs, CCS	Burkina Faso
Niobium	CCS	Nigeria, Ethiopia, DRC, Mozambique, Burundi, Rwanda
Palladium	EVs	Botswana, Zimbabwe, South Africa
Platinum	Fuel cell	Botswana, Zimbabwe, South Africa, Ethiopia
Silicon	Solar PV	South Africa
Silver	Solar PV, LEDs, EVs, CSP	Botswana, Namibia, Sudan, Tanzania, Nigeria, Ivory Coast, Algeria, Eritrea, Burkina Faso, Mali, Senegal, Ghana, Morocco, Ethiopia, South Africa, Zimbabwe, DRC, Niger
Tellurium	Solar PV	South Africa
Titanium	EVs	Mozambique, Mali, Kenya, Senegal, Sierra Leone, Madagascar, Tanzania, South Africa
Tantalum	High strength alloys	Mozambique, DRC, Ethiopia, Nigeria, Rwanda, Uganda, Burundi
Vanadium	CCS	Mozambique, South Africa, Angola
Uranium	Nuclear fuel	Botswana, Namibia, Angola, Niger, Mali, Tanzania, Malawi, South Africa
Zirconium	Ultra-strong ceramics	Mozambique, Kenya, Nigeria, Sierra Leone, Madagascar, Senegal, South Africa
Rhodium	Fibre optics, thermocouples	Zimbabwe, South Africa
Phosphate	Fertilisers	Zimbabwe, Tanzania, Mali, Senegal, Egypt, Togo, Morocco, Tunisia, South Africa
Tungsten	Light bulb filaments	Zimbabwe, DRC, Mali, Rwanda, Uganda, Burundi, Nigeria
Rubidium	Vacuum tubes	Namibia, Zimbabwe
Platinum group metals	Catalytic converters	Zimbabwe, South Africa
Rare Earths	Magnets used in wind turbines, hybrid electric vehicles, e-bikes, maglev trains and robots, Catalytic convertors, Phosphors, Computers	South Africa

Source: UNU-INRA, using data from British Geological Survey (2017); U.S. Geological Survey (2019); World Bank (2017b) and Global Business Reports (2016)

Climate ambition

The Paris Agreement affirms the commitment of countries across the world to limit the rise in the global average temperature to 2°C, and preferably 1.5°C, above pre-industrial levels by 2100. Despite the fact that African countries contributed least to the drivers of climate change, they all signed the Paris Agreement in 2015.

By June 2019, most African countries had submitted their first NDCs to the UNFCCC secretariat. To highlight one, South Africa is keen to decarbonize by shifting to renewables and has a national Integrated Resource Plan (IRP) to guide this transition. However, if not properly managed, the shift to renewables could lead to a loss of R1.8 trillion (USD 125 billion)(Huxham et al., 2019). Similarly, most African governments have made ambitious commitments in their NDCs built on assumptions such as the availability of domestic budget resources, borrowing headroom, access to international climate finance and economic growth. However, Covid-19 has eroded most of these assumptions and could therefore delay implementation of African countries' NDCs.

'The transition has to be part of a process – we cannot keep importing diesel cars when the West is producing electric vehicles.'

– Wisdom Akpalu

African Nationally Determined Contributions

From Namibia's ambitious plan to cut emissions by 89% to Zambia's more modest 25% reduction, African countries have set worthy emission targets in their NDCs. However, they face significant financial, technical and institutional barriers to the successful realization of these targets, especially once the costs of stranded assets are accounted for. In addition, other African countries' plans for continued investment in hydrocarbons signal poor cross-continental alignment of development pathways.

Carbon market risks and stranded assets could have significant impacts on the energy sectors of some African countries. For instance, Niger plans to focus on climate mitigation in the energy sector through increased use of natural gas. However, the country is highly dependent on imports to meet more than 75% of its electricity needs,(Republic of Niger, 2015) with five interconnection lines from Nigeria currently ensuring Niger's power supply. The synchrony between changes in the Nigerian electricity generation sector and Niger's plan to increase electricity generation from gas will be crucial.

Similarly, while key policy actions in Ghana's NDC propose reduced fossil-fuel consumption for power and electricity, the country plans to replace crude oil with natural gas as a cleaner way to generate electricity in thermal plants.

In Nigeria, electric vehicles are planned to replace internal combustion engines. Although oil and gas are critical foreign-exchange earners for the country, the share of revenue from non-oil sectors is rising. However, hydrocarbon stranding due to a decline in global prices may, in the short term, induce a reduction in domestic pump prices and therefore greater demand in the domestic market. Indeed, on 18 March 2020, in response to the sharp fall in global oil prices, the Government of Nigeria announced a reduction in the pump price of petroleum from N145 to N125, and from 1 April 2020 a further reduction to N123.5 (allAfrica, 2020). In terms of Nigeria's industrialization agenda, gas is considered an essential fuel, with gas flare being commercialized to address the energy deficit and earn revenue.

Although Tanzania is a negligible contributor to global emissions, the net economic costs of the country addressing climate change impacts are estimated to reach 1–2% of GDP per year by 2030. Tanzania submitted a modest NDC pledging to reduce emissions by 10–20% by 2030 relative to a business-as-usual approach, at the cost of USD 60 billion (Republic of Tanzania, 2015). Currently, Tanzania's total installed power capacity is 1,602 MW, with 244 MW added in the past four years. Tanzania's electricity generation comes mostly from natural gas (48%), followed by hydro (31%), petrol (18%), solar and biofuels (1% each). Tanzania also imports power from Uganda (10 MW), Zambia (5 MW) and Kenya (1 MW)(TanzaniaInvest, 2021). Tanzania's NDC sets out the country's plans for building adaptive capacities and enhancing long-term resilience to climate change impacts. It aims to invest in energy diversification systems and enhance renewable energy (hydro, solar, wind, biomass and geothermal) across the country, as well as promote the use of energy-efficient technologies. These plans to invest in renewable energy mean that stranding of hydrocarbon assets is likely to have a minimal effect on the implementation of its NDC.

South Africa aims to decommission 35 GW of 42 GW currently operating coal-generation capacity by 2050, and increase renewables-based power generation capacity by an additional 8.1 GW for wind and 5.7 GW for solar by 2030. The South African Parliament also approved a carbon tax in February 2019, after two years of consultations. South Africa's NDC commits to achieving a 'peak, plateau and decline' of GHG emissions at a level between 398 and 614 MtCO2e per year between 2025 and 2030, but the latest assessments by the New Climate Institute, PBL and IIASA indicate that South Africa's current policies mean the country will fall short of its NDC target (South Africa, 2019). The IRP, approved in October 2019, aims to reduce the role of coal compared to previous plans and to increase the adoption of renewables and gas. It also proposes extending the operational lifetime of the country's sole nuclear power plant by twenty years, up to 2044 (Climate Action Tracker, 2018).

6 Climate-induced stranded assets: risks and opportunities

Status and near-term shifts

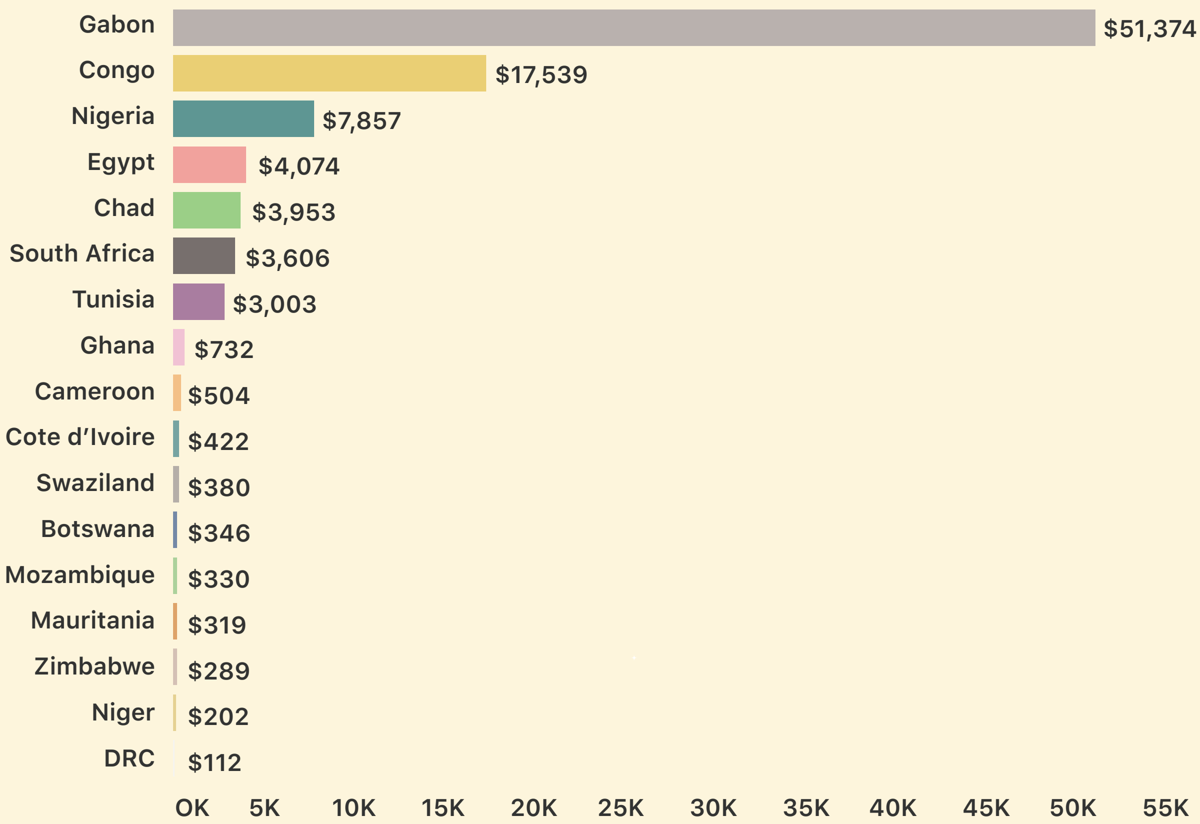
Fossil fuels have been an important motor of development for many African economies, to the extent that there is now a structural dependence on fossil-fuel revenues for growth and prosperity (see Figures 5 and 6) (Manley et al., 2018;IEA, 2019a) In many oil-exporting African countries, including Equatorial Guinea, the Republic of Congo and Algeria, oil revenues contribute more than 40% of total export earnings (African Union, 2020). For example, for Equatorial Guinea in 2018, oil revenue contributed more than 50% of GDP, 80% of government revenue and more than 94% of exports. Petroleum revenue accounts for about 60% of the Republic of Congo's state budget; and in Algeria 95% of exports, 52% of budget revenues and 25% of GDP derive from hydrocarbons. Regarding exports, there is also significant dependence on specific markets: Angola's oil exports to China in 2017 represented 47% of its total export revenues, while in the same year Algeria's oil and natural gas exports to the European Union accounted for 56% of its total export revenues (UNCTAD, 2019).

Figure 5: Fuel exports as a percentage of total merchandise exports ,based on data from World Bank Development Indicators (2020)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Algeria	97.22	96.61	96.11	97.27	97.38				97.58	97.70	97.35	97.20	97.14	96.72	95.76	94.33	93.99	94.52		
Angola								95.72		96.61	96.53	96.56	97.18	96.68	96.19	93.81	92.37	94.32	92.14	
Cameroon	54.15	51.90	49.19	48.81	46.69	56.87	61.61	58.68			49.55		55.61	54.65	54.38	44.65		42.93		
Congo								87.02	84.09	70.66	67.72	77.67	78.90	75.71	46.19			44.58	82.24	83.98
Egypt	41.91	40.48		43.80	43.03	51.28	56.39	52.48	44.42											
Gabon	83.33	82.95	83.82	88.37	76.18	84.04	85.61	83.41	89.17	83.13										
Ghana												55.11	52.69	43.11	42.63			42.81	47.55	50.30
Libya								96.62	96.74		97.72									
Mozambique																		51.98	47.02	
Nigeria			94.04					93.67	91.74	90.36	87.13	89.13	84.04	87.62	90.85		96.30	95.84	94.01	
Sudan	69.33	83.93	72.44	81.21	83.59	87.26	91.11		94.37	92.10	94.41	90.86			67.48	61.23				
Zimbabwe							43.32													

Source: UNU-INRA, based on data from World Bank Development Indicators (2020)

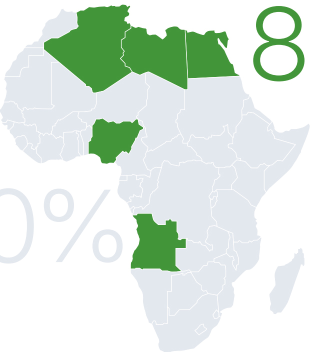
Figure 6: Fossil fuel wealth per capita for African countries in 2014. Source: UNU-INRA analysis, using World Bank data



Source: UNU-INRA, using World Bank data

In recent years, there has been an increase in oil and gas exploration on the continent (United Nations, 2020). Côte d'Ivoire, Ghana, Kenya, Mozambique, Senegal, Tanzania and Uganda have all recently discovered new fossil fuel resources with expectations that they will generate significant additional government revenues over the next ten years (AfDB, 2019). Mozambique is expecting these revenues to supply about half of its health-system financing and Ghana about a third of its health and education budget (Moyer et al., 2019). However, the prospects for Africa's hydrocarbon sectors are under threat due to changing global energy dynamics, including higher shale oil production in the United States and the reduction in demand for fossil fuels, which has been accelerated by the pandemic. China – the world's largest importer of commodities – has pledged to substantially increase the share of non-fossil fuels in its primary energy consumption as a climate-change mitigation strategy, meaning that exporters of traditional energy resources to China may lose an important share of their export markets and revenues.

The risk of drastic reductions in fossil-fuel revenues due to the global drive towards clean energy sources has been recognized for some time (Climate Policy Initiative, 2014). Crude oil prices have declined by almost 64% since early 2019;(Fox-Penner, 2020) coal is being priced out as an energy source (Figueres, 2018), and record numbers of coal-fired power plants are being retired. This is due to cheap gas prices and the continued growth of renewables. In October 2020, the World Bank declined to finance a 500-megawatt coal-fired power plant in Kosovo because it did not qualify as the lowest cost option.



80%

20%

Crude oil currently produced by 20 African countries with output concentrated in **Algeria**, **Angola**, **Nigeria**, **Egypt**, and **Libya**, contributing **80%** of Africa's oil production.

The price of renewables is now competitive against coal-fired and oil-based electricity generation (Henbest, 2020). For example, over the past decade, the costs of generating solar energy have plummeted by 80%. Solar PV and onshore wind are now the cheapest sources of new-build generation for at least two-thirds of the global population (BloombergNEF, 2020), and more than half of new capacity for electricity generation is renewable, with the use of wind and solar generation doubling every four years (Climate Action Tracker, 2018).

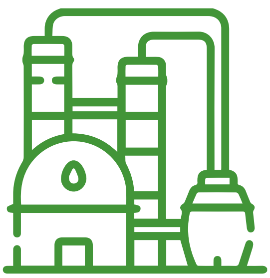
In developing countries, renewables now account for the majority of all new power generation, a remarkable turnaround from just a decade ago. Data indicate that Morocco,[12] Mexico, Chile and Egypt are producing solar power for 3 US cents or less per kilowatt hour. This is cheaper than the current costs of production from natural gas. It is expected that, by 2030, batteries will be a cost-competitive technology to manage peak generation and demand fluctuations.

However, Africa's policymakers perceive that there is still a place for natural gas as a bridging fuel, as it emits about 40% less CO2 than coal per unit of energy generated, and the technological advances made in carbon capture, utilisation and storage make it an even lower-cost energy resource (Peters et al., 2020). The use of clean hydrogen as a substitute for coal in industrial applications is also being explored (Cheung, 2020).

Africa currently has a reserve to production ratio* of about **41 years** and hopes to be able to optimize these resources to drive its economic transformation.

41 years

2.5%



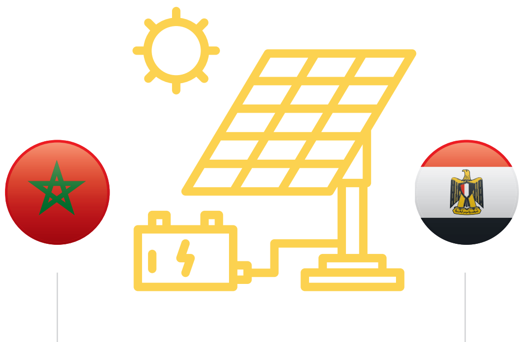
Africa's oil refinery throughput is **2.5%** of global. Africa has the lowest refining capacity

* Reserves-to-production (R/P) ratio – It is the length of time the remaining reserves of a country would last. It is calculated by dividing the reserves remaining at the end of any year by the production in that year [BP, 2020].

Over the past decade, the costs of generating ***solar energy*** *have plummeted by* ***80%****.*

Solar PV *and onshore wind are now the cheapest sources of new-build generation for at least two-thirds of the global population*

In 2019 renewable energy installation accounted for ***52%*** *of total capacity expansion for Africa.*



Morocco*, and* ***Egypt*** *are producing* ***solar power*** *for 3 US cents or less per kilowatt hour —* ***cheaper than natural gas****.*

'In Africa, perhaps because a lot of exports are dependent on this resources [fossil fuels]… I would not easily see governments moving away from oil and gas, which is more predominant in their country strategy…they would see it [fossil fuels] as being part of a transition phase where they would need the resource for bridging the gap.'

– Ligia Noronha

Policymakers' perceptions

The stranding of hydrocarbon assets presents significant risks to the economic development of fossil fuel-rich African countries. Carbon Tracker estimates that 60–80% of the coal, oil and gas reserves of publicly listed companies could be classified 'unburnable' if the world is to avoid disastrous climate change(Carbon Tracker & Grantham Institute, 2013). However, UNU-INRA's 2019 survey of African policymakers revealed limited knowledge and appreciation of the imminence and severity of the risk of stranding (UNU-INRA, 2019).

Despite being signatories to the Paris Agreement and having made commitments through NDCs, most of the policymakers we surveyed believed that Africa's energy poverty meant that climate targets did not warrant an immediate or near-future (ca. 30 years) stranding of hydrocarbon assets. The question of equity was consistently raised with regard to Africa's meagre contribution to global emissions and its requirement for these resources to power its much-needed industrialization (Kruse et al., 2021).

'If there is a continent that needs development and that needs these resources more than any other continent, it is the African continent. This is the continent that needs shelter for its people. This is the continent that needs bridges. This is the continent that needs chairs, schools and everything.'

– Claude Kabemba

Policymakers pointed to the potential for regional trade as one means of reducing the impact of fossil-fuel divestment by the Global North and other regions. African policymakers believe that the continent's hydrocarbon resources will be needed for many years to come to scale up electrification in sub-Saharan Africa (just 45% in 2018). The West African Gas Pipeline Project and the recently launched AfCFTA were mentioned as enablers of regional trade in hydrocarbon resources.

Lack of adequate technical and financial capacity to develop alternative energy sources was another reason cited by policymakers for downplaying the risk of hydrocarbon asset-stranding on the continent. Poor technology transfer, low technological innovation, a lack of technical skills and poor financing mechanisms make an immediate or even near-future transition to clean energy difficult for Africa, despite its abundance of potential renewable resources.

Policymakers were aware of the economic and environmental benefits of clean and renewable energy and outlined advances made by their respective governments to scale up its penetration. However, most of them projected that African countries will continue to rely on their hydrocarbon wealth for economic development, especially industrialization, until either resources become depleted or global low-carbon diversification is achieved.

'We may still need fossil fuels to power our industrialisation.'

– Adeyemi Dipeoli

The surveyed policymakers did acknowledge the risk and impact of market dynamics, such as significant reductions in the prices of oil and gas, on the economies of their respective countries.

The survey revealed that African policymakers also believed that the risk of asset-stranding varied according to different hydrocarbon resources. Many policymakers considered uranium, oil and natural gas as much cleaner compared to coal, and therefore at virtually no risk of being stranded in the next 30–50 years. In Tanzania, for example, natural gas has replaced coal and oil as the preferred source of fuel for electricity generation due to the high costs of oil and coal extraction, and the government also supplies natural gas to small and medium industries to drive its industrialization agenda. Furthermore, the Tanzania government promotes the use of gas for domestic purposes (e.g., cooking, transport) and has consequently banned the use of firewood in Dar es Salaam.

Due to the cost efficiency of natural gas in electricity generation compared to coal, the surveyed policymakers acknowledged the possibility of coal assets being stranded, but also described it as 'temporary', since it is believed that coal will be used again once new technologies are available to enhance the economic viability of extraction and/or reduction of carbon emissions from use.

The concept of temporary stranding was shared by many policymakers we surveyed. This is based on the perception that carbon market risks are not the main driver of hydrocarbon asset-stranding; other factors are at play, including a lack of strategic planning and an inability to manage insecurity and conflict. It is believed, however, that resources will be available for use once solutions to these other factors are found. The maritime dispute between Ghana and Côte d'Ivoire, which disrupted explorations and extraction in the Tano license area, is a case in point. The resolution of this dispute in favour of Ghana allowed the resumption of exploration and the discovery of more fields.

The global moves to limit the use of coal (BBC News, 2021) and to minimize carbon-intensive sectors through the enhanced NDCs (Fransen et al., 2019) could change the perceptions of African policymakers and increase interest in just transitions. Alternatively, with multilateral divestment from fossil fuels and investment in renewables, the threat of asset-stranding in the short term could actually prompt government investments in fossil-fuel assets. For instance, in August this year, the Ghanaian parliament voted in favour of spending USD 1.1 billion on the acquisition of large parts of the Deepwater Tano-Cape Three Points and the South Deepwater Tano. Energy Minister Hon. Matthew Opoku Prempeh stated that, without new foreign investment, Ghana had two choices: leave the oil and gas in the ground, or invest in production itself to create jobs and revenue (The Economist, 2021a).

'Re-skilling becomes key to a just transition because if you do not re-skill, people do not find alternatives and then they go back to the same old assets that they have.'

– Ligia Noronha

Emerging economic recovery and other strategies

The Covid-19 pandemic has forced governments to respond with radical steps to ensure the well-being and safety of their citizens (IEA, 2020a). This has included fiscal, monetary and regulatory measures to provide emergency financial and economic relief (IEA, 2020c) to the financial system in order to prevent an even deeper crisis and to support health systems and impoverished workers and businesses (IMF, 2020b). According to the IMF, countries have so far taken fiscal actions amounting to about USD 9 trillion to contain the pandemic and its wide-ranging impacts. This spending has put enormous stress on government budgets and pushed many economies into huge (further) debts.

Beyond the pandemic, governments will need recovery strategies to reinvigorate their economies. African economies that rely on the exploitation of natural resources have already been hit hard by the collapse in oil prices due to Covid-19. This has resulted in large losses in export revenues for fossil fuel-dependent countries such as Algeria, Nigeria and Angola, which are now having to either make cuts to public spending or accrue more debt. In some instances, capital budgets planned for climate change have been diverted to address the pandemic (Climate Action Tracker, 2020). This could derail efforts by middle- and low-income economies to decarbonize.

On the flip side, countries that are not firmly committed to scaling up renewable energy may be tempted to take advantage of low-cost oil for development and industrialization. Governments need to be mindful of exacerbating global carbon emissions through increased fossil-fuel production as a means of economic recovery (Helen Mountford, 2020).

Prospects, cycles and medium-term trends for fossil fuel assets across Africa

The global landscape

Six years into the implementation of the Paris Agreement, there is some evidence of a strong push to realize its ambition of net-zero carbon emissions by 2050 on the part of major stakeholders, including countries, international oil companies (IOCs), shareholders, investment banks and other private-sector actors. Major oil and gas companies, including Total, BP, Equinor and Royal Dutch Shell, are now expanding their portfolios to include renewable resources (Larson, 2021), while abandoning oil exploration and drilling projects worth billions of dollars in countries like Australia, Canada, Angola, Mexico and Kazakhstan (The Times, 2020; Gizitdinov, 2021; Taylor & Hunter, 2021). This is partly due to pressure from investors and shareholders calling for more ambitious emissions reductions (Bradford, 2021; Cholteeva, 2021). Meanwhile, investment and commercial banks, including the European Investment Bank, have announced reductions and even imminent bans to fossil-fuel funding (BBC News, 2019b; Clifford, 2021). In addition, technological advances are increasingly enabling the transition: for example, electric cars are set to become cheaper to produce than traditional vehicles by 2027 (The Guardian, 2021), while solar is already said to be the cheapest source of electricity generation in history (Delbert, 2020).

Despite these positive advances, other developments suggest a stark discrepancy – even, in some cases, hypocrisy – between stakeholders' zero-carbon commitments and their actions. A recent report revealed that the world's sixty largest banks, mostly headquartered in developed countries (e.g. US, Canada, Europe, China and Japan), have invested nearly USD 4 trillion in the fossil-fuel industry in the last five years (Budryk, 2021).

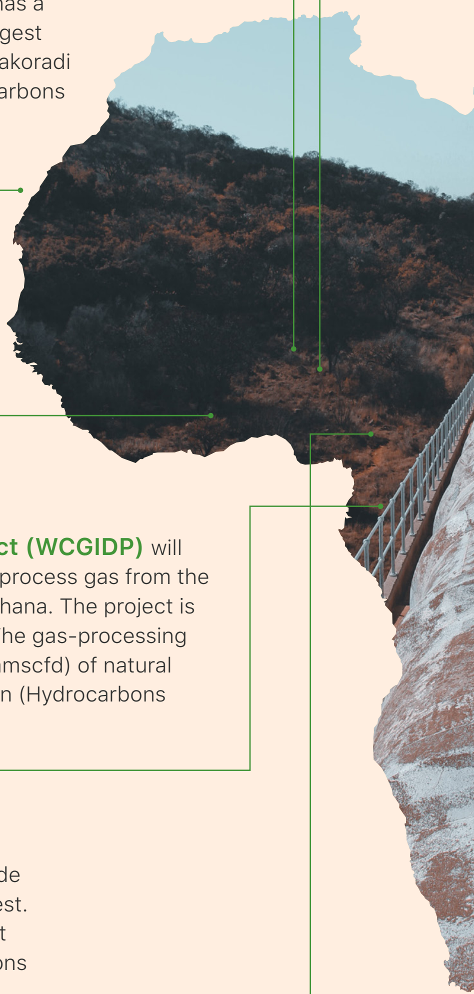
Indeed, investment banks reportedly invested more money in fossil fuels in 2020 than in 2016 – even at the peak of the Covid-19 pandemic, when oil prices plummeted to an all-time low. It has also been shown that, despite their commitments to green post-Covid-19 recovery, the G7 nations (US, UK, Canada, Italy, France, Germany and Japan) invested USD 189 billion in oil, coal and gas between January 2020 and March 2021, compared to USD 147 billion in clean energy (Laville, 2021). It is estimated that only one in every ten dollars committed to the Covid-19 response by the G7 targets clean energy and energy efficiency measures. Furthermore, funding from these nations to emissions-heavy sectors such as the aviation and car industries is not conditional on these sectors committing to more ambitious emissions reduction targets.

Such discrepancies cast doubt on global commitments to the decarbonization agenda and suggest that the transition is not on track. This compounds the dilemma faced by African countries as to whether or not to invest in their abundant hydrocarbon resources. Currently, oil and gas projects over the next few decades are expected to expand on the continent (see Box 3).

BOX 3:

New oil and gas pipelines

Between 2019 and 2025 alone a total of seventy crude and natural gas projects are expected to start in sub-Saharan Africa.



1. West African Gas Pipeline (WAGP) is a **421-mile-long** regional high-pressure gas transmission system, built to export Niger Delta gas from the Lagos Beach terminal in Nigeria to Ghana via Benin and Togo. Chevron has a working interest of 36.7%. Nigerian National Petroleum is the second largest shareholder with a 25% working interest. Shell Overseas Holdings and Takoradi Power respectively have 18% and 16.3% shares in the company (Hydrocarbons Technology, 2019d).

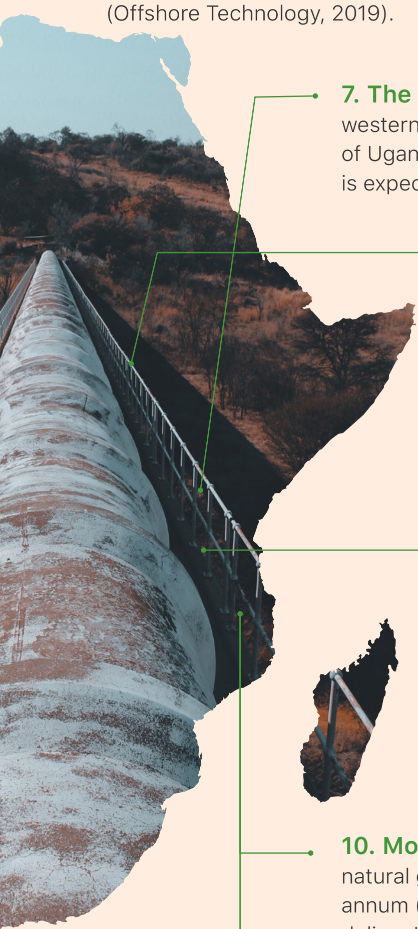
2. Greater Tortue Ahmeyim LNG project is based on upstream gas production in 2km-deep waters on the maritime border of Mauritania and Senegal. It is the deepest offshore project in Africa. Spread over **33,000km²**, the Greater Tortue Ahmeyim field is estimated to contain approximately **15 trillion cubic meters**, enough to support production for thirty years or more. BP is to begin gas production in 2023. The governments of Mauritania and Senegal signed an inter-government co-operation agreement to develop the cross-border offshore gas field in February 2018 (BP, 2020a).

3. Western Corridor Gas Infrastructure Development Project (WCGIDP) will integrate both offshore and onshore elements, and will evacuate and process gas from the Jubilee offshore gas field and recently discovered offshore fields in Ghana. The project is being developed by the Ghana National Gas Company (Ghana Gas). The gas-processing plant is designed for a capacity of **150m** standard cubic feet a day (mmscfd) of natural gas and will also process liquefied petroleum gas (LPG) and isopethain (Hydrocarbons Technology, 2019e).

4. Equatorial Guinea LNG project, with a natural estimate of **4.5 trillion cubic feet**, started delivery in 2007. Marathon Oil controls 60% of the project, with Compania Nacional de Petroleos de Guinea Ecuatorial (GEPetrol), the National Oil Company of Equatorial Guinea, holding a 25% interest. The project, which has earned the distinction of being the fastest LNG project from initial concept to final investment decision, will have a total project cost that is estimated at **$1.4bn** (Hydrocarbons Technology, 2019a).

5. Logbaba Gas and Condensate Field, supplies natural gas to various industries in the Douala region. Production from the onshore field started in December 2011. Logbaba's original proven and probable reserves were estimated at **209.6 billion cubic feet** (bcf) of gas and **2.93 million barrels (Mmbbl)** of condensate. The field is operated by Victoria Oil & Gas subsidiary Gaz du Cameroun (GDC), which holds a 57% interest, while RSM Production Company and Societe Nationale des Hydrocarbures hold 38% and 5% interests respectively. Gaz du Cameroun (GDC) is expanding the project by conducting a **$40m two-well drilling programme** at Logbaba in order to meet the growing demand for gas in Douala (Hydrocarbons Technology, 2019b).

6. Zabazaba and Etan Integrated Development project has been granted an oil-prospecting lease, (OPL) **245, offshore** from Nigeria in the Niger Delta of the Gulf of Guinea. First production from the **$13.5bn** integrated development project is expected in 2020. The **300,000-km2** delta is the world's twelfth-largest oil and gas resource, estimated to contain **34.5 billion barrels** of oil and **93.8 trillion cubic feet** of proven natural gas reserves. Together, the Zabazaba and Etan Fields are estimated to contain a combined **560 million** barrels of oil equivalent. The project is being undertaken by the Shell Nigeria Exploration and Production Company, Eni and Nigerian Agip Exploration, the last-named serving as the project operator (Offshore Technology, 2019).



7. The East African Crude Oil Pipeline (Eacop) will stretch **900 miles** from Lake Albert in western Uganda to the Tanzanian port of Tanga on the Indian Ocean. In May 2017 the governments of Uganda and Tanzania signed a **$3.5bn** inter-governmental agreement for the development, which is expected to have an export flow rate of **216,000 barrels a day** (Pearce, 2020).

8. Melut Basin Oil project that has been operational since 2006 with an output in excess of **500,000bpd** and has the potential to increase to **800,000bpd.** The pipelines travel **1,380 km** from Palogue to Port Sudan on to the Red Sea. The primary field has estimated recoverable reserves of over **900 million barrels of good-quality light crude (61.5° API) oil.** The China National Petroleum Corporation (CNPC) is now the largest shareholder (41% stake) in the Greater Nile Petroleum Operating Company, which dominates Sudan's oil production through the PetroDar Operating Co (PetroDar) (Hydrocarbons Technology, 2019c).

9. Tanzania Liquefied Natural Gas (LNG) Liquefaction/ Likong'o-Mchinga LNG project, is expected to commence construction in 2023, with completion aimed for 2028. It will be led by Shell and cost **$30 billion**. The LNG export terminal will be built at Lindi, in the south of the country, and will have the capacity to produce 1**0 million tons of LNG** per year (Goosen, 2021).

10. Mozambique LNG aims to deliver approximately **65 trillion cubic feet** of recoverable natural gas, including a two-train project with the ability to expand up to **43 million** tonnes per annum (MTPA). A two-train liquefaction plant with a capacity of **12.9 million tons per year** to deliver LNG will start production by 2024 (TOTAL, 2021).

11. Mozambique Rovuma LNG project is based on three gas reservoirs in the Area 4 Block of the Rovuma Basin, which contain an estimated **85 trillion cubic feet** of natural gas. ExxonMobil is leading the construction and operation of the facility. With FID on the project expected by 2023, the **$30-billion** Rovuma LNG Terminal is set to begin production in 2025. As one of the largest projects in Africa, the Rovuma LNG facility has a planned capacity of **15.2 million** tons of LNG per year and is expected to transform the country's natural gas industry over the next decade (ExxonMobil, 2021).

Value addition

Africa benefits very little from its natural-resource wealth, as it largely exports these minerals, whether raw or minimally processed, without value addition. This means that global value chains bypass the continent, there is a lack of export diversification (United Nations, 2020), and Africa continues to import significant crude-oil products (Lieu et al., 2020). The costs of importing oil products constitute a large proportion of African countries' budgets (International Monetary Fund, 2015) and are a major drain on their economies (Marbuah, 2018). A shift to cheaper renewable energy would therefore be a major boost to Africa's economic growth in the long-term.

BOX 4:

Petrochemical value chains in Africa

As an oil producer, the African continent is set to increase activity considerably in the coming years. Recent oil discoveries have impacted many African countries, including Senegal, Côte d'Ivoire, Ghana, Kenya, Uganda, Namibia, Angola and Gabon. With declining reserves in Egypt, a larger share of oil extraction on the African continent will come from Sub-Saharan Africa. In each of these countries, oil development has become a key element of its industrialization strategy, with strong international investment driving growth figures often above 5%.

The African continent is expected to have the largest growth in oil demand at an annualized rate of 1.7% to 2026, with transportation comprising the majority of the increased demand (International Energy Agency, 2018). Many countries are contemplating building new power plants to address the long-standing power deficits that have been holding back productivity in the manufacturing, IT and service sectors. The expansion of fossil fuel-based electricity generation can be seen as a step towards environmental sustainability and as a way to replace woodfuel as the primary household energy source.

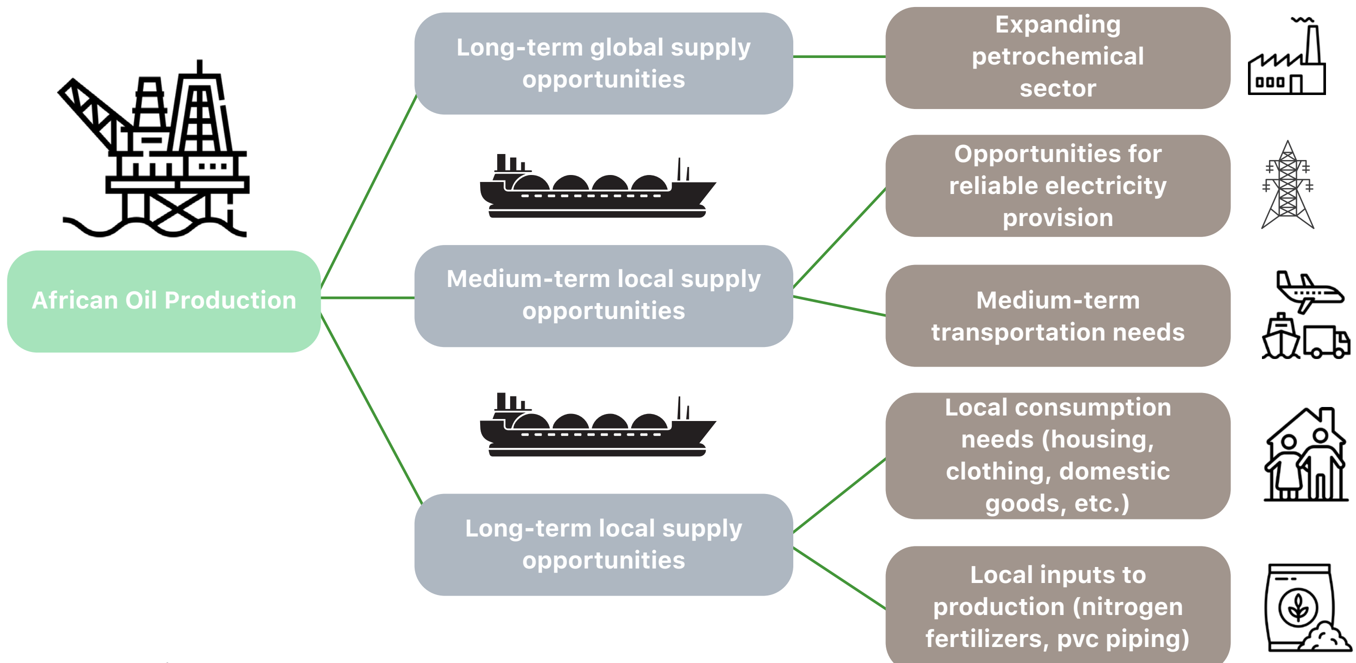


Figure 9: Petrochemical value chains in africa

While the green-energy transition will likely lead to a longer-term price drop in fossil-fuel energy, in the short- to medium term the potential for continued local exploitation could provide some opportunities for a cleaner transition.

In countries with relatively new infrastructure around the development of hydrocarbons, such opportunities may arise in the development of petrochemicals. These enter the sector as feedstock, not as combusted energy. According to the International Energy Agency, petrochemicals and their derivatives account for 14% of oil and 8% of gas production respectively. The demand is expected to grow to account for roughly 70% of increases in the demand for oil by 2026% (International Energy Agency, 2018). However, downstream processing, such as cracking, requires industrial expansion and specialty skills which would need to be developed.

One of the key drivers of the demand for petrochemicals is the plastics industry. While demand for plastics is expected to shift away from single-use applications, the overall plastics industry will be a key part of the global value chain moving forward due to a wide range of applications, including for use in the transition to a low-carbon economy. In addition, other uses for petrochemicals, such as agrochemicals, pharmaceuticals, lubricants, wax and asphalt, serve specific uses with relatively stable demand growth.

Increases in consumption demand in African countries and the low starting point of income per capita make petrochemicals attractive solutions for many applications, due to their relative affordability compared with alternative materials such as metals or organic materials.

As consumer demand grows, specific industries will require strong expansion beyond what other materials provide. Items such as fittings and sides for housing construction, polyester for clothing, and durable plastics for home goods and furniture can reduce the stress on the limited supplies of more expensive alternatives.

Furthermore, demand for productive uses is also potentially strong on the African continent. For example, nitrogen fertilizers derived from oil and irrigation using PVC pipes can aid in improving agricultural productivity, a key element of the structural shift from agriculture to services and manufacturing required for economic development.[13]

Ultimately, the benefits from transitioning away from fossil fuels in the short term should be weighed against the continent's development goals. The environmental strains from poor development outcomes can often outweigh any marginal benefits from localized reduction in hydrocarbon uses. As demographic trends on the continent are heavily driven by poverty rates and other development goals, longer-term environmental objectives are better met through improvements in areas such as agricultural sustainability, access to electricity, gender relations and transportation. In this context, targeted expansion of the industry in underserved communities for the purposes of poverty reduction and economic empowerment can contribute to meeting global emissions targets.

'Africa should not be having a conversation on transitioning, it should be having a conversation on optimizing its resources while they are still useful.'

– Senyo Hosi

Transition fuels

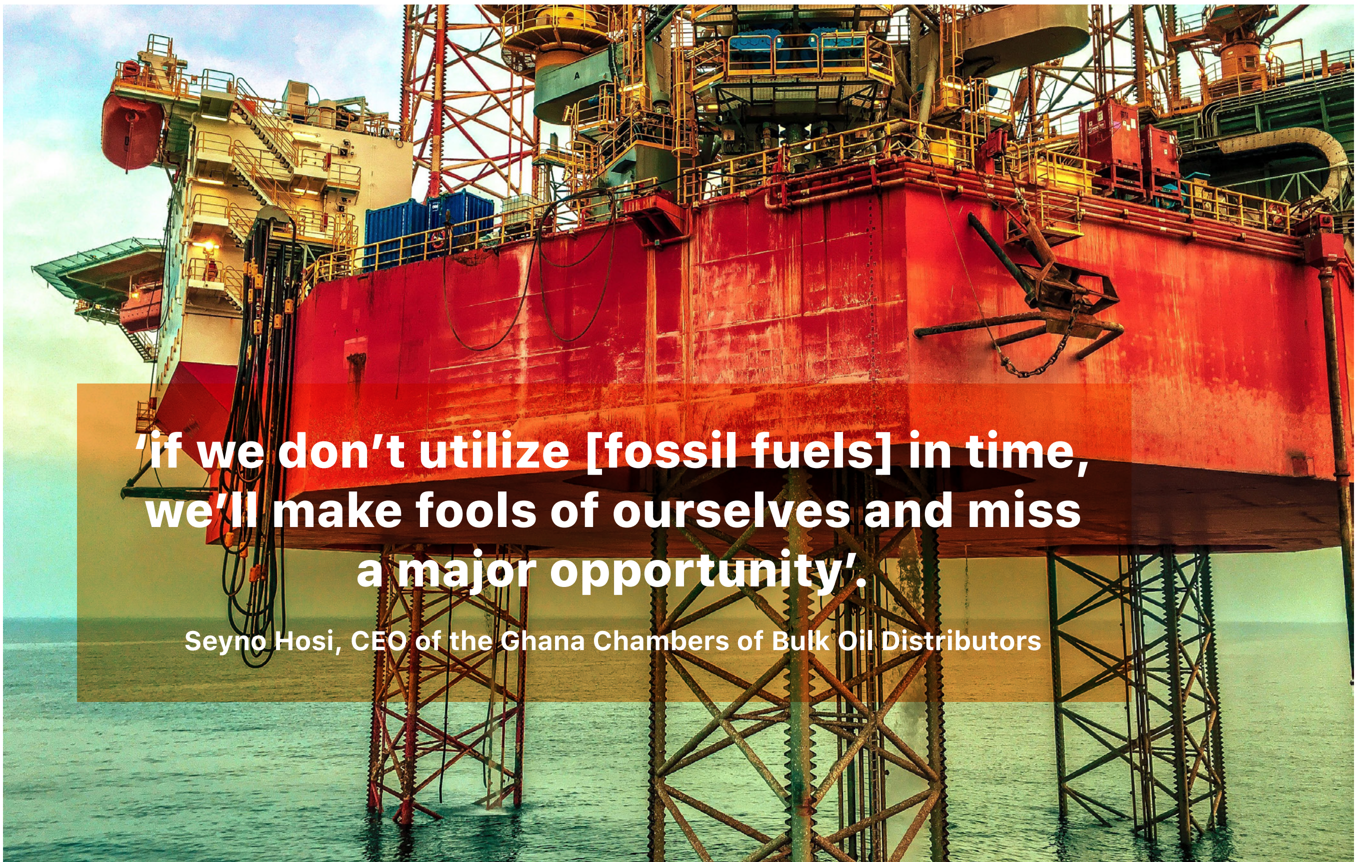
Gas could provide Africa with additional electricity for baseload and flexibility needs, provide energy for industrial growth and be a sizeable source of revenue to invest in, thus addressing development deficits (African Energy Commission, 2019). However, achieving the climate change mitigation goals of the Paris Agreement requires a 10% reduction in the use of natural gas (Equinor, 2019).

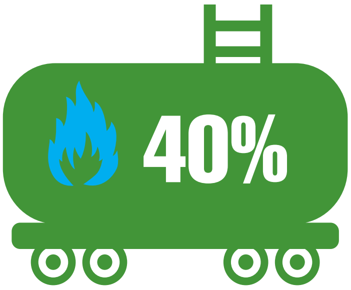
The global gas market is growing in part due to the lower carbon footprint of gas compared to other hydrocarbons (Exxon Mobil, 2019), with natural gas plants replacing coal- and oil-fired power plants in many parts of the world. From 1990 to 2018, natural gas consumption grew from 66 to 130 qBtu globally (Terreson et al., 2020).

'Africa's energy transition would have a certain duality of trying to optimize what we can do, so long as there is a demand for fossil fuels while also planning in order to exit. Natural gas and the different products to be derived from it can support Africa's industrialization and agrarian transformation.'

– Yao Graham

While natural gas is 40% cleaner than coal, it remains a fossil fuel, and its extraction and processing releases methane, a potent greenhouse gas. It is estimated that, over a period of twenty years, a methane molecule can trap 90 times more heat in the atmosphere than a carbon dioxide molecule. New research suggests that methane leakage rates have been under-reported, and there is a general sense that using natural gas to meet climate targets will be challenging (The Economist, 2021b).





More than **40%** of **global gas** discoveries between **2011 and 2018** were in **Africa**.

As mentioned above, more than 40% of global gas discoveries between 2011 and 2018 were made in Africa (IEA, 2019a), potentially offering new opportunities for Africa's energy mix and industrial development. In North Africa, gas is already used to meet around half of the region's energy needs, whereas sub-Saharan Africa has one of the lowest rates of gas usage in the world, at 5% of the energy mix. According to the IEA, increasing access to clean cooking will require increased used of liquid petroleum gas (LPG).

There are strong arguments for using natural gas as a bridging fuel to further Africa's industrialization agenda. Seyno Hosi, CEO of the Ghana Chambers of Bulk Oil Distributors, is not a lone voice when he says, 'if we don't utilize [fossil fuels] in time, we'll make fools of ourselves and miss a major opportunity' (Goering, 2020). Although Africa has a considerable endowment of renewable energy resources with rapidly falling costs, mass deployment of renewables in all forms – solar, wind, geothermal, hydro – has not yet demonstrated industrialization potential at a scale that will incentivize African countries to ditch gas for good.

However, there are concerns that gas may not remain a transition fuel and may instead become embedded as a permanent fuel resource. Given the risk of methane emissions (highlighted in the IPCC sixth assessment report (Gerretsen, 2021)), those countries in Africa that want to continue gas extraction face stranding risks if refinery capacity and the many processes required for the production of natural gas, including liquefaction, shipping and regasification, are not covered (UNU-INRA, 2021). African countries face trade-offs when deciding whether to use natural gas-generated power to accelerate the growth of manufacturing industries. To do so with carbon capture and storage would reduce emissions risks but entail large costs. Offsetting current and future emissions through wider deployments of renewables is an alternative option, and one that fossil-fuel corporations are advocating.

'If they [countries] are using oil and gas assets, then they must reduce the environmental footprint (e.g. by reducing methane), because otherwise you are going to have a huge problem on your hands. But that is for what is currently in place, not for new investments. New investments should be in renewable energy.'

– Ligia Norohna

The African Continental Free Trade Area

The AfCFTA, initiated in January 2021, will create the world's largest single market, comprising 1.3 billion people with a combined GDP of USD 3.4 trillion. It offers the potential to advance intra-African trade by eliminating import duties and non-tariff barriers, improving inclusive economic development and reducing poverty and inequality. It is predicted that 30 million Africans could be lifted out of extreme poverty and that incomes could rise by USD 450 billion by 2035 (World Bank, 2020). In addition, exports could potentially rise by USD 560 million and wages by 10.3% for unskilled workers and 9.8% for skilled workers.

Of significance to the issue of stranded assets, opportunities offered by the AfCFTA include the potential to develop regional value chains and supply networks serving Africa's industrialization agenda and economic development and diversification. Africa has long been a supplier of raw materials and an importer of processed goods, to the detriment of the continent. For example, the EU–Africa partnership agreements provide tax exemptions on the importation of African raw materials into Europe while heavily taxing processed African exports. The AfCFTA offers the opportunity to fundamentally change these unequal trade relationships; cross-continent coordination and sound governance will be essential to achieve this.

'We need to redefine the narrative in order to move things in the right direction and take advantage of the resources that exist. We need to set the agenda because we only follow the agenda that has been set by the others.'

– Youba Sokona

Furthermore, the AfCFTA could help to scale up energy access and improve electricity supply to all sectors across the continent through strengthening integration, collaboration and exchange of African expertise. It also offers the potential to accelerate green energy transitions and develop green value chains. The development of the African renewables sector is currently constrained by finance and human and technological capacity; the AfCFTA can help to facilitate coordination between countries to improve domestic resource mobilisation.

BOX 5:

China's rising influence in Africa

China has become one of Africa's most important economic partners, with trade in 2019 worth USD 200 million and foreign direct investment (USD) worth 49.1 billion (Ze Yu, 2021). China's ageing population and growing middle class have led it to seek cheaper labour elsewhere in Asia and Africa; it has also become the world's largest food importer (Ze Yu, 2021). Africa's large youthful population, on the other hand, represents both a huge potential consumer market and a labour force, generating an increasing demand for energy, housing, health and consumer goods. Chinese companies have stepped into these sectors.

Foreign direct investment

China's outward FDI focuses largely on the energy, transport, mining and land sectors. Chinese state-owned enterprises have financed and constructed one-third of Africa's energy infrastructure since 2010 (Ze Yu, 2021).

Loans and debt

China is the largest lender of bilateral public loans to Africa (Usman, 2021), constituting 62% of Africa's debt – or USD 148 billion in 2019 (Stein, 2021), mostly related to infrastructure, energy and extractives. Although these loans have supported large-scale investments in growth and economic development, they have also led to increased debt-servicing problems. There has been criticism of Chinese loans being offered to poor countries with a high risk of defaulting while interest rates are high. Many of the loans are linked to collateral, which allows China to seize land assets. For example, Ghana signed a bauxite-backed loan agreement in 2011 for USD 550 million for the construction of roads, and Guinea entered a bauxite-backed loan in 2017 of USD 587 million, also for the construction of roads. This model of resource-backed loans that commit future revenues from natural resources can have terrible consequences in the event of commodity price collapse and market volatility (Usman, 2021).

The Chinese Belt and Road Initiative (BRI), launched in 2013 to deliver infrastructure-directed loans to developing countries, has also been criticized as expansionist.

Energy investments

China's share in global energy has more than doubled over the last two decades, and its demand is projected to rise further, from 3.0 billion tonnes in 2010 to 3.8 billion tonnes by 2040 (Grimoux, 2018). Much of the demand is to sustain core sectors such as steel, chemicals manufacturing, electronics and transport. Coal remains the dominant fuel, accounting for 58% of China's energy mix.

The immense growth in China's energy needs has completely shifted global energy demand and supply levels. A limited supply of locally produced oil and gas means that China relies on imports, with Africa being the second largest supplier – at 3.2 million barrels a day – after the Middle East (NDRC, 2016).

In contrast, China's production of renewables infrastructure (solar panels and wind turbines) surpasses local grid capacity, and the country therefore has to find external markets to absorb this supply. This paradox of underproduction and overproduction forms the basis for an external strategy with multiple interests in Africa's energy markets.

The China Global Energy Finance database (Boston University) estimates that China provided USD 41.6 billion of finance to Africa's energy sector between 2000 and 2018 (Shen, 2020). However, China's future energy mix is planned to include higher shares of renewable energy sources, a rise in gas, and a phasing out of oil and coal by 2040. Therefore, if Africa is to lock in fossil-fuel technology now, it may face a lack of demand in the future.

Climate litigation and stranded assets

Hydrocarbon asset-stranding may leave stakeholders open to the risk of exposure to litigation and liability created by expected policy changes. Fossil fuels attract strategic climate cases due to the entrenched dependence of most economies on these energy sources, as well as the possible gains in climate change mitigation if significant reductions in the sector can be achieved. Litigation exposure can be found in both national systems and the international sphere. Climate change-related litigation can be divided into two major categories: routine cases and strategic cases. Routine cases mostly deal with the application of existing laws, such as planning permission for certain activities. These cases are increasingly being used to deploy climate change arguments in areas where traditionally they did not have much relevance. Strategic cases, by contrast, are related mostly to experimental applications of legal manoeuvres to introduce or influence broader climate-related policies. These cases tend to be widely discussed and controversial, and so garner more public attention.

Litigation in the field of climate change is mostly concentrated in developed countries, with the US, Australia, New Zealand, the UK and the EU accounting for most cases. Although the number of climate-related cases in the African context is very limited, they offer some indicative perspectives that may help predict possible scenarios for the target countries in this report.

This section addresses cases that have been brought in African countries, and then examines exposure to climate litigation for companies and from international treaties. Annex 1 provides more detail on other aspects of climate litigation relevant to the stranding of hydrocarbon assets.

Cases of climate litigation across Africa

Among African countries, South Africa has seen the most climate-related cases. These have mostly addressed the inadequacy of impact assessments carried out prior to permitting activities – the major projects challenged being an urban development project and coal-fired power plants. In two of these cases the court ruled that decisions to grant permissions were unlawful, since the government should have taken climate change concerns into consideration when assessing the projects' impacts before approval (High Court of South Africa, 2016).

In Nigeria, a case was brought against the government and Shell Nigeria to challenge the practice of gas flaring in the Niger Delta by oil and gas companies (Gbemre, 2005). The court found that the practice was unconstitutional and ordered the companies to stop.

In the Save Lamu case in Kenya, the National Environmental Tribunal of Kenya set aside a license granted to the Lamu coal-fired power plant by the Environmental Management Authority on the grounds that the environmental impact assessment was not conducted in a participatory manner and did not take into account climate change and the Climate Change Act (Lamu, 2012).

In a Ugandan case still pending at the time of writing, the High Court of Kampala, on behalf of four minors, is being asked to grant declaratory and injunctive relief on the failure of the government to uphold its constitutional duty by not mitigating the impacts of climate change as the public trustee of natural resources, including the atmosphere (Mbabazi, 2012).

Unions and other organized worker groups impacted by transitions towards low-carbon activities can also pose litigation risks to governments and companies. An example of this is the court order obtained by the National Union of Mineworkers of South Africa (NUMSA) to block Eskom from giving renewable energy contracts to independent power producers (United Nations Research Institute for Social Development (UNRISD), 2018). By committing to transitions to low-carbon futures, countries are pledging structural changes to their economies that will impact a large number of people who are dependent on fossil fuels for their livelihoods. Rights-based cases related to the loss of incomes and opportunities can come from individuals or organized efforts through trade bodies and associations.

Litigation exposure for companies

In the past, prominent cases against companies based on climate change claims have mostly been liability claims for pollution and environmental damage using tort law in the US. For the most part, these cases have not been successful due to the lack of legally provable duty and breach of such duty attributable to the party in question. Although abstract cases can be made that fossil-fuel companies contribute to climate change, it has not been possible to prove individual responsibility in any legally significant way. However, when it comes to localized incidents of pollution or spills, the litigation exposure becomes more pronounced. Developments in the precision of attribution sciences mean that the number of cases brought against companies might increase in the foreseeable future. Local companies that extract and process fossil fuels in Africa might find themselves particularly subject to more litigation.

It is also reasonable to anticipate cases related to companies' accountability to their shareholders if they fail to predict the climate impacts on their businesses and to act accordingly. In the Sarah Von Colditz v ExxonMobil case, board members were accused of misrepresenting the climate risk to the company's assets in order to manipulate its value. A lack of disclosure by companies regarding climate risks can also expose them to litigation initiated by shareholders.

The emergence of conscious and green investing movements has also given rise to a distinct issue related to investment funds with stakes in the fossil-fuel industry. Divestment as a result of cultural shifts and growing environmental consciousness in the market place can present significant risks to these companies. For example, in the Harvard Climate Justice Coalition v. President & Fellows of Harvard College case, a coalition of students tried to compel the Harvard corporation to divest from fossil-fuel companies, the case was dismissed on the grounds that the students did not have a standing in the matter.

Litigation exposure resulting from international treaties

In the international arena, litigation exposure related to investment treaties and the treatment of foreign investors in the fossil-fuels sector should be expected. Investment treaties usually agree bilaterally or regionally to protect foreign investment by the parties to the treaties in the other country or countries. Any treatment less than what is stipulated in these agreements can result in litigation in international arbitration tribunals and sometimes national courts.

State–state disputes, as they are known in investment law, are disputes between two states on the treatment of investors in the corresponding country. These cases emanate from reciprocal treaties that dictate the treatment of investors in the territory of the parties to the agreement. Relatedly, investor–state disputes allow the investor to bring a case against the government of the state it is investing in, based on the rules of the treaty and other legal rules applicable to its treatment in the country in question. With a large number of multinational fossil-fuel companies covered under these treaties, and with investment disputes being common, there is significant exposure to litigation in this area (Tienhaara & Cotula, 2020).

Further complexities in legal arrangements should also be anticipated, given the involvement of investment-guaranteeing entities such as the Multilateral Investment Guarantee Agency of the World Bank, national investment guarantee mechanisms and private-sector insurance providers that cover risk related to changes in national policies. The level of litigation exposure might be different for different countries – with varying levels of commitment to the climate change cause observed by governments – but it is nonetheless apparent.

As already mentioned, climate change concerns have made their way into human rights cases in recent years, cases that are argued in front of domestic courts as well as international dispute settlement mechanisms and tribunals. Examples of regional venues where these cases have been entertained include the European Court of Human Rights, the Inter-American Commission on Human Rights and the Human Rights Court, the Special Rapporteurs of different UN bodies, the UN Human Rights Committee and the UN Committee on the Rights of the Child. Cases brought to these bodies might relate to investments in African fossil-fuel reserves. Therefore, the human rights dimension of climate change also poses litigation risk in the international context.

The transition to low-carbon economies and the issue of stranded assets opens up an additional area of exposure: the application of international trade rules, and cases that might be instituted in different mechanisms, such as the World Trade Organization and regional trade agreements.

Niger:

Over the **40 years** of operation, the Somair and Cominak mines used, through the end of 2012, almost **320 million m3 of water,** equivalent to about **25 percent** of the reserves **in the Tarat aquifer,** estimated at **1.3 billion m3**.

Operating Imouraren for **35 years** will require about **500 million m3 of water**, or less than **7 percent** of local reserves.

Niger Delta is one of the most polluted places on Earth, and it could take **$1 billion and 30 years** to clean up- UN

Environmental

Health

Babies in Nigeria have a double risk of dying before they reach a month old for mothers who live near the scene of an oil spill before conceiving

According to a recent estimate, air pollution from coal fired generation causes **2,200 deaths annually in South Africa** and costs the government **2.37 billion dollars** per year.


subsea 7
MACGREGOR

7

Towards an 'African' position

In developing an African position on the just transition, and by implication the management of hydrocarbon assets, this report references the just transition principles set out in the ILO's guidelines,(ILO, 2015) published the same year as the Paris Agreement. These emphasise social consensus through dialogue, gender responsiveness, policy coherence, decent jobs, sustainable social protection, skills development, country-driven processes and international cooperation.[14]

African experts' perspectives

This report was fundamentally informed by interviews with leading African experts and policymakers in the areas of development and resource management. This section summarizes their perspectives.

Fossil fuels have a role in future energy transitions

The dominant view from interviewees is that fossil fuels, particularly gas, will have to play a role in Africa's energy transition. The existing renewable-energy infrastructure cannot support energy-intensive sectors such as transport, nor industrialization. A mix of strategies will be required to enable transitions. African countries may need to pursue a dual approach, using their existing fossil-fuel resources while planning a managed exit for the longer term.

Ecological space permitting, developed countries should push ahead with their transition to zero carbon, while allowing African countries to take advantage of their own hydrocarbon reserves for development in the short to medium term. However, the revenues from fossil fuels in Africa should be carefully managed to enable the economic diversification, infrastructure development and human capital development of a (re) trained African workforce. Informed political leadership is required to deliver the long-term vision and sound public management essential for positive outcomes.

It will be impossible for Africa to generate the reliable, affordable electricity it needs to develop and prosper with renewables alone. For the time being, therefore, Africa cannot wholly omit fossil fuels. However, through innovation, strategic thinking and careful planning, Africa can leverage the declining cost of solar and wind to accelerate renewable energy deployment on the continent. Combining clean-energy efforts with emerging technologies for cleaner fossil fuel-generated energy, such as low-emission natural gas and 'clean coal', would enable Africa to reduce energy-related carbon emissions while driving structural transformation and ending energy poverty.

'There are no clear signals that Africa will be compensated for a transition away from fossil fuels – while diversification is essential to Africa's growth, we do not know how to move out of poverty without our natural resources. We need our oil and gas resources – crude oil has a future in our energy mix.'

– Claude Kabemba

These principles can be paraphrased as follows: strong social consensus through dialogue is an integral part of the institutional framework for policymaking and implementation at all levels; policies must respect, promote and realize fundamental principles and rights at work; specific gender-responsive policies should be considered in order to promote equitable outcomes; coherent policies (economic, environmental, social, education/training and labour) can provide an enabling environment for enterprises, workers, investors and consumers to embrace and drive the transition towards environmentally sustainable and inclusive economies and societies; a just transition framework promotes the creation of more decent jobs, sustainable social protection, skills development and social dialogue (including the right to organize and bargain collectively); policies and programmes need to be designed in line with the specific conditions of countries, including their stage of development, economic sectors and types and sizes of enterprises; and in implementing sustainable development strategies, it is important to foster international cooperation among countries.

Strategic thinking and economic diversification

Africa has been hampered by a lack of vision for structural transformation and industrialization. Strategic planning will require policy coherence and coordination to mobilize the resources needed to enable transitions.

Subsidizing the oil sector has not been beneficial and has instead eaten into government funds; better ways of using revenues should be explored. In Europe and the US, there has been significant rethinking on investment returns. Analysing portfolios with heavy fossil-fuel investments to identify potential risks will be important in mitigating the vulnerability to external shocks.

The Covid-19 pandemic has intensified the urgency of economic diversification – both within and beyond the fossil-fuel sector. It has also presented an opportunity to ‘think outside the box’ on how to use mineral resources to resuscitate economies and create economic growth. Furthermore, focusing on producing more domestically, rather than relying on imports, is crucial: the AfCFTA will be a key driver of regional economic diversification.

The right to development argument merits deeper reflection. First, we can decide not to add value to crude oil and export it as it is. We can then adopt the Norwegian strategy of a sovereign wealth fund where the benefits of the oil resources are part of the long-term management of revenue and are redistributed to its population to benefit current and future generations. However, our redistributive capacity and fiscal policies are not optimal. So, we may struggle. The other option is to adopt a business-as-usual scenario and continue with our fossil fuel production, claiming the right to development and the need to catch up with other economies. However, in my view, there is wisdom in avoiding this route because we need to adopt the logic of a low carbon development trajectory now.

– Kako Nubukpo

Revenue management and governance

Revenue management within Africa's fossil-fuel industries is very poor, and is part of the larger crisis of governance. Benefit-sharing between host countries and foreign companies has been lopsided, and institutional mechanisms have been ineffective in minimizing leakages through illicit financial flows and various forms of tax avoidance and evasion.

A sound plan for, and enforcement of, the management of resource revenues is critical. This should include much greater coordination between various sector ministries (electricity, energy, oil, gas, natural resources) and more transparent and effective mineral resource governance, with regard to the negotiation of contracts in particular.

'If a government can't guarantee sound and effective revenue management, then, it will be better to just leave those fossil fuels in the ground right now because it's just going to waste money and it's going to generate carbon emissions.'

– Camilla Toulmin

Skills development for increased value addition

Value addition requires research and development. Technical capacity is lacking, and there may be a need to train people abroad in order to bridge the skills gap. Alternatively, skills exchange could be encouraged by inviting companies prepared to investment in domestic capacity to set up in African countries. Research and development collaboration between African and international universities is also important.

Looking inward

Covid-19 has prompted many African countries to appraise an inward-looking development model, and there have been increased efforts to utilize mineral and other resources domestically to address local needs. The AfCFTA also presents an opportunity to feed commodities into the development of regional and sub-regional value chains. The natural-gas sector has good potential for regional development, but forward-planning for stranding risks should be included.

Private sector and local resource mobilisation

In order to create independent economies to finance development, African governments must strengthen the accumulation processes of domestic private and public entities. A lack of trust in domestic institutions means that investments are currently being diverted internationally, while illicit financial flows further reduce local financial capacity. In addition, fiscal capacity is restricted by a lack of efficient and comprehensive taxation policy.

Governments must gain a better understanding of the private sector's challenges and needs, and incorporate these into economic strategy. Governments should create clear, credible and stable regulatory frameworks to give private investors confidence in gaining returns on investment. Incentive structures should be used to develop private equity on the continent.

Beyond this, both domestic capital and FDI can be encouraged through arrangements such as industrial parks, independent power purchase agreements, better tariff structures and public assurance to allow funding from domestic sources such as pension funds, banks and local entrepreneurs.

The private sector need to ensure that they can go where there is no risk and that they will make money. So, they need to see incentives from the government—similar incentives or better incentives than are given to attracting FDI whereby we are even losing more through illicit financial flows.'

– Frank Mugyenyi

Competitive politics and elite capture

Much of the export revenue from oil and gas has been used for consumption rather than transforming activities. This is in part due to competitive politics and governments' unwillingness to move toward just transitions because of fears of losing voters' support. Additionally, cultural acceptance of dominant elites leads to resources being used to serve personal rather than national interests.

Illicit financial flows are one of the reasons why fossil-fuel revenue has not brought wider developmental impacts. The continent is currently losing billions of dollars a year in illicit capital flows and under-pricing. According to a recent IMF report, African countries are losing USD 470–730 million a year in corporate income tax due to tax avoidance by multinational enterprises.

Just transition and civil society

Low-carbon transitions will not be inclusive unless both governments and civil society play central roles in their design. There is a risk that economic and political power-holders design transitions that simply uphold the status quo; therefore a combination of government, civil society and other actors working together is needed to bring greater scrutiny to the transition process.

Geopolitics

Despite the significant role they play in production, African countries were not well placed in the strategic manoeuvres prompted by the recent fall in global oil prices. The big GHG emitters (Annex I & II countries under the UNFCCC) have refused to pay for the costs of African countries' response measures, and there has been very limited African presence in discussions on just transitions. This has meant that the recovery agenda does not represent African perspectives or priorities.

'We are not at the table where all of these issues are discussed.'

– Antonio Pedro

Loss in Revenues and Investments

Eni and Total, the two largest international oil and gas majors in Africa, have already signaled **25% cuts** to their investment in exploration and production projects in 2020, representing a **€4bn** reduction for Total, **$2bn** reduction for Eni, and **$22bn** for shell.

Kosmos announced a one year delay in Senegal's offshore liquefied natural gas project.

Government revenues for new oil producers including Ghana, Niger and Mauritania has drastically fallen, estimated to be as much as **80%** 2019-2020.

Angola and Nigeria are expected to have a long-term decline in **GDP** due to shelfing of new projects and permanent shut down of high cost fields.

2019-2020 sharp decline in oil prices, the government of Ghana has slashed its oil revenue forecast from **$1.6bn** to **$0.6 bn**.

An African position

There is currently no common African position on stranded assets and the low-carbon transition. While each African country's responses must be calibrated to account for international, regional and national dynamics and plans, collective strategy and action is required for an issue of such importance and urgency. A fragmented approach risks diluting any geopolitical power that Africa can leverage.

The African position needs to consider the following points of transition:

- **Targeted use of hydrocarbon resources:** Given the potentially short-term window for exploitation and global movements towards divestment, use of hydrocarbon resources must be intentional. In essence, if hydrocarbon-led growth is pursued, the proceeds should still be ploughed back into climate-resilient, resource-efficient activities, including scaling up renewables and enabling adaptation in climate-sensitive sectors such as agriculture and water. Further resources should be used to build human capital and scale up small and medium enterprises in the energy sector using digital technologies, particularly to harness the talent of African youth. Such investments in green infrastructure and green skills will substantially boost Africa's growth trajectory.
- **Advantages of early green development:** African countries are able to leapfrog technologies and benefit from early investment in low-carbon development. In the process, the region can scale up energy efficiency projects, meet urban energy demands through the widescale use of renewables, promote the sustainable use of forests and enable economic diversification to counter current vulnerabilities. By greening ahead of schedule, Africa can maximize its returns on green investments to support critical development sectors.

‘Those African countries practising green economy now, are becoming real green leaders on the African continent, and they are likely to do better than those who have not in 10 to 15 years.’ time.’

– Camilla Toulmin

- **‘Build forward better’ after Covid-19:** The pandemic has highlighted existing economic problems, such as fiscal deficits, chronic debt, high illicit financial outflows and degrading public-sector infrastructure, including weak and poorly equipped health systems. In this sense it serves as a pressing call to incorporate investment in health and health services into the decarbonization agenda. In a continent that is home to 16% of the world’s population, yet accounts for 26% of the global disease burden, proceeds from timebound extractive exploration should be used in part to redesign and resource health infrastructure. In a wider sense, Covid-19 should also renew the impetus for long-term resilience-building and economic diversification to mitigate future exogenous shocks such as pandemics.
- **Post-Covid-19 stimulus must align with agricultural transformation:** Covid-19 has exposed the centrality of food security to development. Agriculture is the highest priority for African countries and could be reinvigorated as a transitional industry during the phasing out of fossil fuels. This should include building infrastructure for storage, transport, irrigation and agri-processing systems to help insulate economies from post-harvest losses and keep productivity buoyant. In addition, Africa’s resilience is predicated on climate-proofing agriculture.
- **Enable broad-based economic diversification:** The fall in the demand for oil due to the pandemic signals the beginning of the end of fossil fuel-related wealth. Hydrocarbon-dependent economies must urgently explore radical ways to diversify their economies over the long term, a process that has been underway for decades in countries such as Saudi Arabia and the United Arab Emirates. While some countries may move at a slower pace, they should all be able to draw on strong leadership, international solidarity, governance arrangements and technological innovation. Any transitional industry must take into account contextual realities and use existing knowledge and capacity to retool and support the emergence of green infrastructure and green services.
- **Global solidarity is necessary for transition towards low-carbon development:** Transitions are not linear processes, and African countries will transition at different speeds and in different ways. While speed is often the focus in global conversations, consistency of action, strong leadership, transparent intentions, good governance and strong institutional arrangements and capacity are equally important in achieving zero carbon targets. If prematurely stranded resources[15] are to be sacrificed for the greater good, then mature economies must not ‘delegate’ their mitigation action to Africa and other developing countries, but should instead support leaders and populations in the Global South to pursue their green development goals.

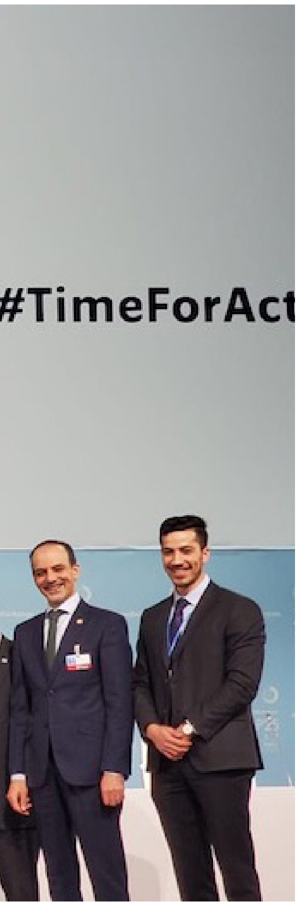
8

Conclusions and recommendations

Political economy of African just transitions

Transitioning to low-carbon development, particularly in the context of the post-pandemic recovery, requires understanding and managing the political economy. Post-pandemic, energy justice is likely to come to the fore, particularly in terms of who decides on the nature of transitions, the sectors that benefit from them, the actors who influence them, and the geographical and institutional scope for them. These issues are laden with political as well as socioeconomic implications.

Countries emerging from the pandemic with haemorrhaging economies will have little leeway to design the direction and pace of their own recoveries, and any recovery and stimulus packages will come with conditions. Huge levels of hydrocarbon-related indebtedness will also force many hydrocarbon-rich countries into the position of price-takers on the costs of borrowing. This political economy has historical antecedents for African countries, and there are risks that past injustices will be superimposed onto the new dynamics of low-carbon transitions triggered by market realities and Covid-19-related stressors. Furthermore, with reduced demand for energy and oil prices dipping during the pandemic, the heightened risk of hydrocarbon asset-stranding will likely create new vested interests and power dynamics, leading to new forms of inequality.



While there has been steady growth in renewable energy across many African countries, the scale and rate of adoption of off-grid technologies has not translated into anything close to universal access to electricity. People in rural parts of Africa who, due to elite capture, currently do not have grid access are likely to be served last in transition processes, thus creating a tiered system in which those on the lowest rungs of the energy ladder remain energy-poor for much longer. Meanwhile, prioritized access to new forms of energy will likely be decided by a small, powerful cabal. Job-shedding in some strategic sectors such as coal will mean loss of jobs and incomes. Instead, plans for low-carbon development should be careful to rectify, rather than reify, such pre-existing injustices (Golubchikov & O'Sullivan, 2015).

Equally, political economy factors in a capitalist economy are inherently linked to the current carbon budget, much of which has been designed by those whose economies have profited and prospered on the back of cheap energy. Conversely, climate change impacts disproportionately affect those on the periphery of energy distribution and access, while energy subsidies have created reckless consumption by societies without their being held accountable for such climate-related impacts. Principles such as 'the polluter pays' have been lost in favour of a global collectivism in which accounting for the current carbon budget is considered irrelevant. Instead, the international focus is on collective mitigation through adhering to temperature guardrails and decoupling economic growth from fossil fuels at all costs. This is the global capitalist logic that has been called the 'climate leviathan (Mann & Wainwright, 2020).

Political economy dynamics mean that the very stakeholders who have kept the energy sector booming will most likely seek big profits in countries where knowledge of and capacity for the transition are weakest. Although the cost of renewable energy technologies has been decreasing over the last decade, creating the infrastructure that will deliver access on a transformational scale still faces high upfront costs.

Indeed, the enclave economy that is often associated with the exploitation of hydrocarbon resources, particularly in Africa, could shrink further to a small cartel of stakeholders who are already ahead of the curve and able to corner the low-carbon transition market, rather than expanding and democratizing energy production. For this group of stakeholders, quick profits may trump justice and solidarity. Energy sovereignty – the ability of a nation to determine and frame its own energy decisions itself – may be out of reach for countries with limited knowledge of transition dynamics and without a sufficiently strong monopoly of investments or markets to direct the agenda.

This loss of autonomy, particularly in the context of reduced fiscal space and increased vulnerability, will have implications for countries that have already made important strides towards increasing electrification rates. Moving from trusted energy sources, known markets and secured investments will necessitate different technical capacities, ways of working and support mechanisms to enable control over their low-carbon development trajectories.

It is important to note that Africa has a climate adaptation imperative, and transition planning must not ignore adaptation considerations or social concerns. For example, human rights issues have often been discounted in the shift to hydropower-based energy production, with the forced resettlement of communities and the loss of traditional productive homelands. Equally, transition policy must not discount gender-related inequalities, for example, where mine closures force women to take on several jobs to make up for lost household income.

Determining factors of just transitions

Most African countries depend on natural resources and primary commodities for export earnings(UNCTAD, 2019) and are therefore prone to market shifts that can strand these assets (United Nations, 2020). Climate change also poses risks to the sustainability of commodity sectors across Africa (UNCTAD, 2020). These factors are likely to be compounded, especially without economic diversification. For example, Zambia derives 70% of its export earnings from copper and 95% of its electricity from hydropower. When the country suffered prolonged droughts in 2016, historically low water levels disrupted agricultural production, electricity generation and mining. The resulting inconsistencies in power supply increased the costs of copper production and led to job losses (Jales, 2017).

The need for economic diversification has been emphasized by the recent volatility in the hydrocarbon markets, but global financial conditions (IMF, 2020b) and heightened pressures on public budgets will make financing diversification even more challenging (IEA, 2020c). However, governments should still seek to decouple carbon emissions from economic growth (Allan et al., 2020). Yet trading fossil fuel for renewable energy rents will remain unattractive to African countries as long as the latter does not offer the same level of revenue as hydrocarbon-based resources. Even with market volatility from carbon exports, the perception endures that fossil-fuel assets offer greater prosperity.

The aftermath of the 2008 financial crisis saw many countries resort to stimulus packages that included investments in heavy industries, coal and other fossil-fuel power plants and upgrading roads. Similar responses to the pandemic-driven recession risk locking in decades of inefficient, high-carbon, unsustainable development (Mountford, 2020). Instead, positive lessons can be learnt from South Korea, where high investment in a green stimulus package post-2008 not only helped the country to bounce back faster and stronger than most other economies, but also resulted in a much more resilient economy. Strategic investment in green fiscal-recovery packages has the potential to boost rapid recovery and resilience, while ensuring climate targets are met.

Indeed, NDCs and other climate commitments could play a critical role in resuscitating economies, creating jobs and boosting incomes while delivering longer-term decarbonization objectives. African governments should explore ways to leverage existing climate adaptation programmes and NDCs to serve the needs of post-Covid-19 stimulus packages and lay the groundwork for just transitions.

Table 3 summarizes UNU-INRA's analysis of the evidence generated for this report. The analysis uses the conceptual framework put forward in Chapter X. Table 3 indicates the evidence found for each dimension of the internal and external determinants of just transitions.

Regarding the time dimension, the evidence shows that countries are at very different starting points for just transitions. Although most African countries have put forward ambitious NDCs, wider governmental commitments and transitional policy coherence across sectors vary considerably. While currently a lot of global attention is being paid to 'racing to zero' the UNFCCC commitment to common but differentiated responsibilities and respective capabilities better capture the reality of how African countries should move toward just transitions. A proactive civil society and better-informed political systems are needed to make decision-makers look beyond the next election to the inter-generational horizon. These internal dimensions can be leveraged to support just transitions by raising the profile of UNFCCC commitments to planning and progress reporting, and importantly the realization of multilateral funding for climate action.

Capacity for just transitions at national and sectoral levels is evidently crucial. This includes the availability of less carbon-intensive assets; the technical capacity to plot and follow transition pathways that fit national circumstances and to do this in ways that are monitored and managed adaptively; and the fiscal and financial flexibility and competence to be able to direct resources for just transitions and reinvest the resulting revenues in further progress. Importing and installing domestic expertise will be vital in some cases. Externally, it is crucial to resolve the paradox of the most climate-vulnerable countries having the least access to the capital necessary to address vulnerability and invest in climate action. The cost of doing so is small compared to the loss and damage faced by these countries from the impacts of climate risks.

Agency and capacity are interwoven. Awareness of risk and the willingness to act vary – but recent signals suggest that greater collective action across Africa may precipitate greater momentum towards just transitions.

The scope for just transitions reflects how wedded political elites are to carbon-intensive and economic growth-centric development models. There are a handful of examples across Africa where arguments for just transitions are being won in the corridors of power. Moves towards just transitions where workers' rights to decent jobs (UNFCCC, 2016) are paramount are evident in some African countries, including South Africa, Egypt, Nigeria, and Ghana (Zinecker et al., 2018). Developments in the fourth-generation minerals sectors could provide greater scope for African countries to move toward just transitions.

Inclusion – particularly the extent to which citizens are engaged in the decision-making process – will be key to the justice of transitions. This social dialogue requires adequate and regular consultation between stakeholders (UNFCCC, 2016). African countries need the technical capacity and information to understand the effects of climate change and how they impact on employment and incomes, businesses and the wider economy. While the SDG commitment to 'leave no one behind' is a worthy aspiration, mechanisms for restorative justice will be required to embed and achieve just transitions across Africa.

Table 3: Analysis of the determining factors of just transitions in Africa

Dimensions	Determining factors of just transitions	
	Internal	External
Time	Initiation and pace of transition *Staggered start line for just transitions* *Not a race, but a set of individual, national challenges* *Perceptions of the 'tragedy of the horizon'*	Multilateral agreements *UNFCCC timeline – enhanced NDCs, global stocktake, etc.* 'Windows' of international support *Access to global climate finance* *Access to private finance*
Capacity	Fossil fuel dependency in national/sectoral development strategies *Gas as a transition fuel* National climate mitigation competence *Planning, implementing and monitoring* Domestic resources and fiscal space *Debt squeeze, tax system* Governance of revenue management *Strength of social contract*	Scientific and technical expertise available *Import expertise to build local capacity* International cooperation Focus on Africa, conflict and security risks Credit ratings and debt relief *Climate vulnerability factored into credit worthiness*
Agency	Nationally determined plans of action *Integration into wider development policies* *Interest of finance ministries and executive* Political will and policy coherence *Policymaker awareness* *Competing shorter-term priorities* Awareness of carbon market risk *Uncertain and complex*	Recognition of common but differentiated responsibilities *Receding importance in global negotiations* Cross-border collaboration *Now more possible at a continental level due to AfFTCA* International investment flows *Tide is against countries with high climate vulnerability and high carbon market risk*
Scope	National ambition levels *Few* front-runner countries across Africa Interests of the status quo *Elites dominate political economy* Recognition of inequalities of impacts *Some recognition of impacts on energy sector workers*	Global market shifts within and across sectors *'Fourth generation' minerals upswing* Technical support of transformational change *Very little available*
Inclusion	Political commitment to involve the citizenry *Incipient where civil society is stronger* Strength of social contract *Ebbs and flows with political cycles*	Integrity of multilateral system *SDG commitments to 'leave no one behind' and just transition principles* Finance for restorative transfers *Not on the agenda*

Current narratives on just transitions offer few options or solutions regarding transitional capacity, the associated implications for infrastructure, and how changing demand patterns for oil and gas might affect the cost of products and even domestic and global markets. Preparation for a non-fossil fuel economy will be a critical litmus test for African countries that do not bear the burden of transition, i.e. those countries starting with a relatively clean slate in terms of their current ecological footprint. The transition is not simply about shifting from brown to green energy; it is instead a question of relevance: what is the new role for fossil fuels, and the institutions and ancillary industries that rely on their production and continued survival? The transition is also about revenue management: how can new revenues be managed in ways that support the SDGs and the ambitions and goals of the NDCs? Entire economies and systems have been designed to feed on fossil fuels; the transition can only be made possible through new forms of behaviours, new norms and renewed political will.

Recommendations

From the evidence presented in this report, UNU-INRA makes the following recommendations to African policymakers for charting a low-carbon transition and navigating stranded assets.

Remain steadfast in pursuing the adaptation goal

The adverse effects of climate change on Africa (floods, droughts, temperature increases and sea-level rises) are approaching critical thresholds. African countries need to prioritize their response actions, focusing on the most urgent areas for adaptation. However, inadequate financial resources, coupled with technological needs, are significant challenges that undermine resilience-building efforts and contribute to adaptation deficits (IPCC, 2014) within the continent. The finance needed to improve resilience may be sourced from available fossil-fuel resources in the short and medium term. Moreover, improving current resilience can aid preparations for inevitable future impacts based on current and projected temperature trends (Alan Buis, 2019).

Design a regional strategic masterplan to respond to stranded assets risks

African countries have set ambitious emission targets in their NDCs, including plans to move away from hydrocarbons by 2030, even while other countries continue to invest. This is likely to leave several resources stranded and have a tremendous impact on African economies. Despite Africa's increasing interest and investment in renewable energy, the issue of stranded assets is not receiving enough attention in the region. Given the triple crisis of climate change, Covid-19 and economic downturn, the continent needs a coordinated strategic masterplan for an Africa-wide response to stranded assets and the green recovery.

This collective strategy should be based on a contextual understanding of each country and sector, and should be aligned with African NDCs. The African Group of Negotiators should be involved in developing a regional strategy on stranded assets that provides visible, continent-wide political leadership in climate negotiations and highlights the necessary institutional measures, legal frameworks and financing mechanisms for a unified position on the future of Africa's hydrocarbon resources. A continental framework should also be developed in conformity with regional programmes for strategic infrastructure development, such as the Programme for Infrastructure Development in Africa (PIDA) and Accelerated Industrial Development for Africa (AIDA).

The strategy should also take advantage of the opportunity presented by the fourth industrial revolution for Africa to play a major role in global technological innovation. Resource endowments (Garside M, 2019) in high demand for renewable technologies can give the continent a geopolitical edge. However, there is a high risk that extraction and appropriation could be led by outside powers and leave Africa on the sidelines. Already countries such as China are expressing an interest in and gaining increasing control of minerals, for instance, cobalt in the DRC. The danger is that profits and production benefits as well as economic diversification will not be realized on the continent.

Assume a geopolitical role

The continent needs representation in major forums, bodies and authorities where these renewable technologies, associated regulations and major decisions are made to ensure that Africa maintains a recognizable geopolitical role. One key example is the ongoing discussions at the International Seabed Authority (International Seabed Authority, 2021) on regulating seabed mining in accordance with the UN Convention on the Law of the Sea and mitigating environmental harms (Hall, 2021). The continent also needs to take common and strategic decisions to secure a new geopolitical role in the current energy transition.

Climate finance – a transitional imperative

An analysis of African NDCs has revealed that implementation will require about USD 2.4 trillion (African Development Bank, 2018). Yet a large financing gap persists, with African mitigation and adaptation targets still requiring 82% and 73% external funding respectively. When combined, the ration of external to domestic finance stands at 70% to 30%.

However, the financing gap may widen further. Hydrocarbon-rich African countries have had their revenues reduced by the Covid-19-prompted drop in fuel prices. Although prices are gradually recovering, commodity-exporting countries have been badly hit, the effect of which will be felt in the coming years. International oil companies and investment banks are reconsidering their interest in oil and gas exploration, and a vivid picture of hydrocarbon assets stranding is emerging. Hydrocarbon-rich African countries stand to be the worst impacted by revenue shortfalls as calls for diversification from fossil fuels intensify. At the same time, countries are saddled with the burden of recovering their economies post-Covid-19 amid huge debts, high debt servicing and limited fiscal space. In this regard, the IMF projects a significant financing gap of up to USD 290 billion (Selassie, 2020) for sub-Saharan Africa, even taking into account commitments from international financial institutions and official bilateral creditors.

In the midst of these challenges, African countries are expected to honour their ambitious adaptation and mitigation targets and commitments under the Paris Agreement. However, a great deal of financial and technical capacity is required to realize these commitments. For example, diversification from fossil fuels to renewable energies requires significant upfront investments.

Although access to international climate financing by African countries has not been at the expected level, a review by the African Development Bank revealed an improvement in recent years: the number of approved projects in the Green Climate Funds portfolio almost doubled from 35 projects in 2018 to 68 projects in 2021(GCF, 2019). These improvements notwithstanding, the need remains for increased financing, especially to address mitigation targets, since current international climate finance flowing into Africa is projected to be insufficient to implement the region's ambitious climate actions.

Climate financing from the private sector, though currently well below expected contributions (Begashaw, 2020), could be an important external source of financing for addressing mitigation concerns. The seven industry sectors identified by the International Finance Corporation (IFC) as capable of catalysing private-sector investment in combating climate change lean heavily towards mitigation – i.e. renewable energy, off-grid solar and energy storage, agribusiness, green buildings, urban transportation, water, and urban waste management (IFC, 2017). As recommended by the IFC, African countries should work to create the right business environment to enable the active participation of the private sector in these industries.

Annex: Climate litigation

The use of climate litigation and legalistic tools applied through courts and other quasi-adjudicatory institutions has become an important aspect of the fight against climate change. Numerous cases have been instituted in different jurisdictions, with varied results in recent times. Cases range from those brought against governments for failing to protect the environment and the interests of future generations to those seeking compensation for damages allegedly caused by climate change.

The places where these cases are being brought are as disparate as the nature of the claims. Some jurisdictions entertain such cases in specialized judicial bodies such as green tribunals and others in regular courts following regular procedures. Yet others respond to these issues in administrative tribunals for claims that deal with decisions by the executive, and use constitutional adjudication mechanisms for cases that invoke constitutionality.

The rate of success in these cases also varies: some have resulted in laws being struck down for unconstitutionality, while others have been rejected out of hand for a lack of standing and a lack of proof that those who brought the case were subjectively impacted by the alleged damage.

Litigation scenarios in national legal systems

Transitions to low-carbon economies can potentially expose countries to litigation from different parties. As the nature of the transition assumes some shift away from traditional energy sources such as fossil fuels in the forms of policy changes, divestment and stricter regulations that can extend to total bans, pushback in the form of legal action is expected from both affected parties and those interested in pushing the transition along faster. The impact of the transition also extends to other economic activities and interests, such as employment and local development opportunities presented by the availability of natural resources. Decisions by governments to modify or terminate concessions that allow the exploration and exploitation of fossil-fuel reserves will also attract litigation from rights holders.

The nature of investments in the fossil-fuel sector is the primary cause of the potential litigation. As the investments need to be long-term to make economic sense, companies who currently hold the appropriate rights might resort to litigation in the event of a change in policy or a shift away from these energy sources. An example of such as a scenario was litigated in the IPC Petroleum France SA v. France case, where the French Administrative Supreme Court ruled that the inclusion of an expiration date in a fossil-fuel mining permit was lawful (Administrative Supreme Court of France, 2017). The complainant claimed that such a limitation was an undue restriction on the company's right to enjoyment of its property. The decision of the court determined that, in light of France's obligation in accordance with the Paris Agreement and the allowance of more than twenty years for the enjoyment of the property afforded to the company in the new permit, it was appropriate to include a time limit.

Litigation exposure from progressive climate policy proponents

Litigation brought by private individuals, NGOs and indigenous communities are highly likely now that climate change concerns are gaining traction in the legal analysis of courts and their decisions. Several scenarios of possible exposure to litigation can be anticipated.

The role of science and the attribution of the country share in global emissions played a significant role in the late-2019 decision of the Dutch Supreme Court in the Urgenda case, which is considered a prototype of a successful case against a government in the European context in particular, and the rest of the world in general (Supreme Court of the Netherlands, 2019). The obligations of the government were established based on new developments in attribution science and have created a legally determinable duty of care. The implications of this case for the just transition are very far reaching, as they set a precedent for litigation to push governments into phasing out fossil-fuel production and other similarly carbon-intensive activities.

While similar cases claiming more action from governments can be foreseen in more developed countries, more pertinent scenarios for developing countries could be cases pushing for more government accountability on pre-existing laws and policies. An example of this from Colombia is the Future Generations v. Ministry of the Environment and Others case, the decision in which recognizing that the 'fundamental rights of life, health, the minimum subsistence, freedom, and human dignity are substantially linked and determined by the environment and the ecosystem'(Supreme Court of Colombia, 2018).

Potential litigation based on human rights claims

Cases based on human rights instruments are another potential area of exposure, for example, alleging that a failure to protect the environment is a violation of an obligation to protect one or more human rights. For instance, in Neubauer, et al. v. Germany (2020, pending) (Federal Consitutional Court of Germany, 2019) the claimants argue that Germany's commitments to reduce GHG emissions are insufficient and that this is a violation of human rights to life and physical integrity. Several similar cases are pending before national courts, regional bodies and international bodies, including the United Nations Human Rights Committee.[16] The Mexican Supreme Court considered the proposal of the government to increase the ethanol content in gasoline justified on the grounds of the economic advantages of reduced fuel prices in the Ruling on Modification to Ethanol Fuel Rule case (Supreme Court Mexico, 2019). However, while recognizing the economic benefits, it decided that this should not be achieved at the expense of the right to a healthy environment.

Cases based on investment in/divestment from fossil fuels

Decisions taken by governments to (continue to) invest in the fossil-fuel industry through state enterprises or sovereign wealth funds constitute another area of potential exposure to litigation. The Queen's Bench division of the England and Wales Administrative Court dismissed a case that was brought against the Treasury of the United Kingdom for failing to take into account the climate change duties of the government when it invested in RBS bank, which had projects that were not in line with these duties. Similarly, in the PUSH Sweden, Nature and Youth Sweden and Others v. Government of Sweden case, the sale of a controlling stake held by the Swedish government was challenged on the grounds that, by selling the assets, the government was still allowing the exploitation of coal against its duties in the constitution and international agreements to which Sweden is a party (Stockholm District Court, 2016). The court dismissed this case due to the failure of the plaintiffs to show that they had been injured by the government's decision.

Personal Interviews

Akinbamijo, Yemi. Executive Director of the Forum for Agricultural Research in Africa (FARA). Personal interview. 27 November 2020.

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BLIND ALLEYS AND BRIGHT PROSPECTS:

Africa Navigating Stranded Assets and Just Transitions

Endnotes

1. The Fourth Industrial Revolution represents a fundamental change in the way we live, work and relate to one another. It is a new chapter in human development, enabled by extraordinary technology advances commensurate with those of the first, second and third industrial revolutions. These advances are merging the physical, digital and biological worlds in ways that create both huge promise and potential peril.
2. The process by which countries or other entities aim to achieve a low-carbon economy, or by which individuals aim to reduce their consumption of carbon.
3. A carbon footprint measures the total greenhouse gas emissions caused directly and indirectly by a person, organization, event or products.
4. The National Adaptation Plan 'enables Parties to formulate and implement national adaptation plans (NAPs) as a means of identifying medium- and long-term adaptation needs and developing and implementing strategies and programmes to address those needs'.
5. An international carbon tax, payable to an international agency, or domestic carbon taxes harmonized across countries, offer potentially cost-effective means of obtaining CO2 reductions
6. The monetary policy cycle is 2-3 years. Financial stability is bound by the credit cycle of about a decade.
7. Carbon leakage is when emissions move from a region with climate policies to regions with no or relaxed emissions regulations. GHG emissions are considered global externalities. As climate action becomes tougher, some companies might be tempted to escape environmental regulations in countries with strict carbon emissions rules by relocating their carbon-intensive industries to countries where enforcement is less stringent. Carbon leakage can be channelled through energy pricing, investments, competitiveness and offshore emissions.
8. The European Green Deal is about '' making Europe climate neutral by 2050, boosting the economy through green technology, creating sustainable industry and transport, cutting pollution'.
9. Whereby contradictory social conditions set in motion forces to overcome the unsatisfactory social situation and the induced social processes (normally) lead to the overcoming of the underlying conflict and (hopefully) to social betterment, whereby the new situation ironically will breed new contradictions. Thus, dialectical processes are a motor of action and progress (Martin, 2009).
10. Parameters in the exposure index include: carbon intensity of manufacturing exports, committed power emissions as a proportion of current power generation, and fossil fuel exports and expected resource rents as a proportion of GDP. Resilience is estimated from parameters related to macro-economic stability, adjusted net savings, financial market development, GDP per capita, economic complexity, technology adoption, ease of doing business, quality of infrastructure, human capital, institutional quality and governance, and position on the global supply curve (oil extraction costs).
11. Green industrialization implies 'economies striving for a more sustainable pathway of growth, by undertaking green public investments and implementing public policy initiatives that encourage environmentally responsible private investments.'
12. Three photo-voltaic solar plants on sites in Ouarzazate IV (70 MW), Laayoune (80 MW) and Boujdour (20 MW). The two latter sites are situated in the areas of Western Sahara that Morocco has held under military occupation since 1975, and the construction of these installations has just begun.
13. Despite strong reliance on the agricultural sector, many African countries continue to have low fertilizer usage.
14. These principles can be paraphrased as follows: strong social consensus through dialogue is an integral part of the institutional framework for policymaking and implementation at all levels; policies must respect, promote and realize fundamental principles and rights at work; specific gender-responsive policies should be considered in order to promote equitable outcomes; coherent policies (economic, environmental, social, education/training and labour) can provide an enabling environment for enterprises, workers, investors and consumers to embrace and drive the transition towards environmentally sustainable and inclusive economies and societies; a just transition framework promotes the creation of more decent jobs, sustainable social protection, skills development and social dialogue (including the right to organize and bargain collectively); policies and programmes need to be designed in line with the specific conditions of countries, including their stage of development, economic sectors and types and sizes of enterprises; and in implementing sustainable development strategies, it is important to foster international cooperation among countries.
15. These are resources which are considered uneconomic or cannot be developed or extracted as a result of technological, spatial, regulatory, political or market limitations, or changes in social and environmental norms.
16. Some examples of cases include Greenpeace et al. v. Austria (pending before the Austrian Constitutional Court); Lho'imggin et al. v. Her Majesty the Queen (pending before the Federal Court of Canada); Sacchi et al. v. Argentina et al. (pending before the United Nations Committee on the Rights of the Child); Maria Khan et al. v. Federation of Pakistan et al. (Pending before the Lahore High Court, Pakistan).

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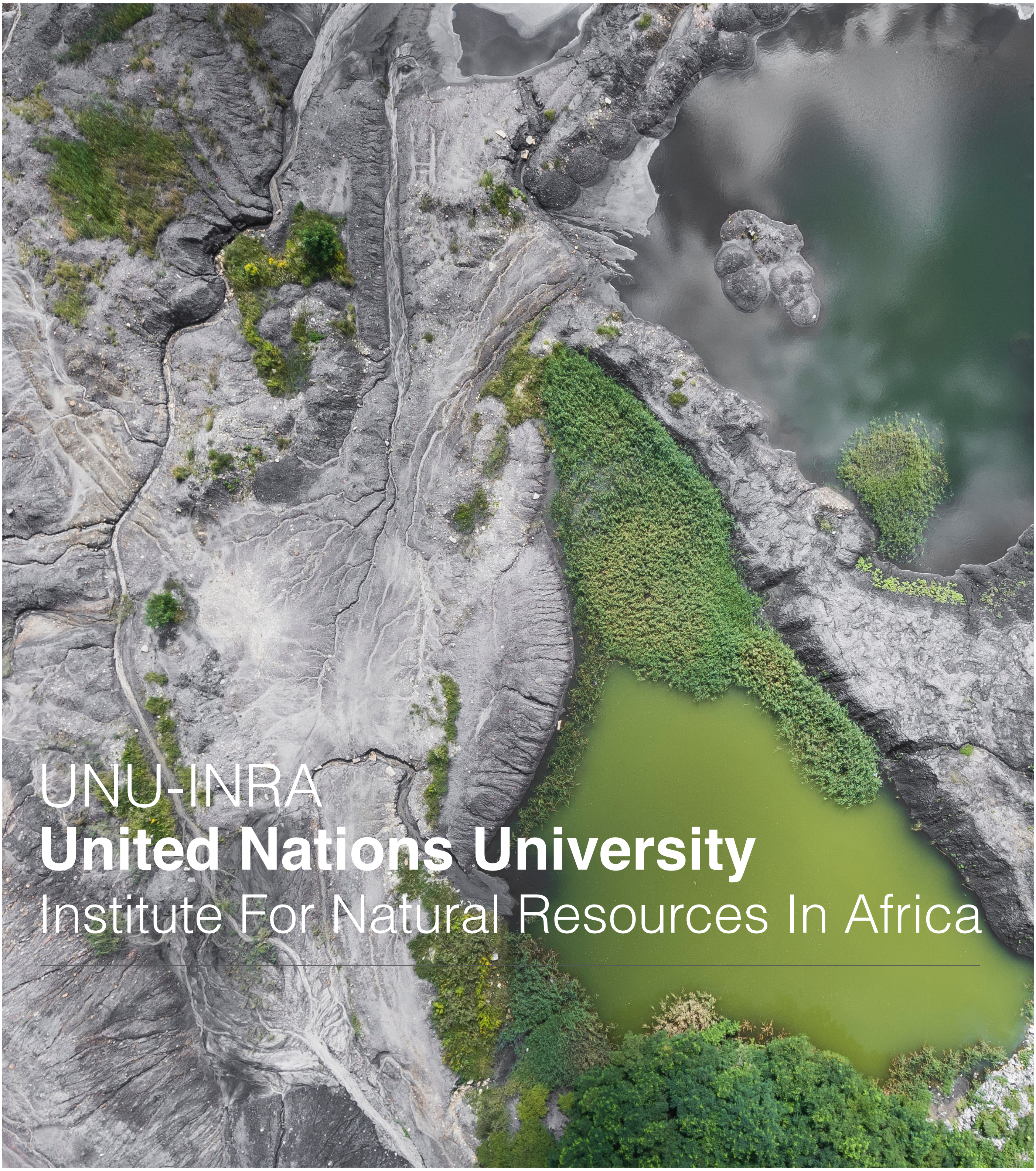
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The United Nations University Institute for Natural Resources in Africa (UNU-INRA) is one of the 15 research and training centres of the United Nations University (UNU) and is the only one focusing predominantly on Africa. We provide cutting-edge solutions and knowledge outlets for natural resource planning and management from an African perspective.

UNU-INRA serves as a platform to amplify African voices and showcase made-in-Africa solutions. We harness the incredible talent on the continent and also strengthen and develop capabilities by equipping African researchers, entrepreneurs and policy actors with the requisite knowledge to sustainably manage natural resources. We deliver research, capacity development and policy advice, and we convene spaces for knowledge sharing.

Our operating units across 5 countries in Africa (Senegal, Ivory Coast, Cameroon, Zambia and Namibia) give us on-the-ground knowledge, while our global network of experts and the wider UNU group give us a comparative advantage in the production and export of knowledge.

It is our vision for Africa to realise the transformational potential of natural resources in the context of sustainable development and deliver a prosperous, fair and resilient future.

For more information contact:

International House
Annie Jiagge Road
University of Ghana, Legon Campus
Accra, Ghana.

T: +233-302-500396
F: +233-302- 500792
email: inra@unu.edu

@UNUINRA

https://inra.unu.edu

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