Financing the Just Energy Transition in Africa

Technical Thinkpiece

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About JET

This Thinkpiece is an output of the Just Energy Transition (JET) programme, which is implemented by SouthSouthNorth (SSN). This project aims to support diplomatic efforts by African countries to build diplomatic momentum for establishing a Just Energy Transition (JET) Financing Facility to finance the transition to large-scale renewable energy markets and contribute to meeting the mitigation ambition of the Paris Agreement. The project seeks to define the contours of the JET and the form and quantum of finance required to support transition pathways and mobilise diplomatic support for the establishment of JET financing frameworks (JETFFs) to finance programmatic renewable energy at scale in the context of enhanced mitigation ambition in developing countries.

JUST ENERGY TRANSITION

CONTENTS

FIGURES

TABLES

ABBREVIATIONS & ACRONYMS

AFF	Aligning Financial Flows with the Paris Agreement in Africa
BAU	Business as Usual
BMU	The Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
CCEFCF	Canadian Clean Energy and Forest Climate Facility
COP	Conference of the Parties to the UNFCCC
COVID-19	Coronavirus disease 2019
ESMAP	Energy Sector Management Assistance Program
ETP	Energy Transition Plan
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GW	Gigawatt
IEA	International Energy Agency
IKI	International Climate Initiative
IRENA	International Renewable Energy Agency
ISS	Institute for Security Studies
JET	Just Energy Transition
JET IP	Just Energy Transition Investment Plan
JETPs	Just Energy Transition Partnerships
LPG	Liquefied Petroleum Gas
PA	Paris Agreement
SSN	SouthSouthNorth
TW	Terawatt
UNFCCC	United Nations Framework Convention on Climate Change
USD	United State Dollars
WACC	Weighted Average Cost of Capital

EXECUTIVE SUMMARY

The Paris Agreement aims to strengthen the global response to the threat of climate change in the context of sustainable development and eradicating poverty. The Agreement also explicitly recognises the imperative of a just transition, linking the achievement of socio-economic outcomes and nationally defined development priorities (such as job creation, industrialisation, social inclusion, and poverty eradication, as well as more specific goals such as energy access) to environmental sustainability and climate action[1].

For Africa - which experiences the highest levels of poverty and inequality in the world, low levels of energy access, has low historical and per capita emissions, a growing population, and high dependence on fossil fuel exports – sustainable energy sources are vital to achieving the continent's socioeconomic development goals, and will enable Africa to address its own needs while also contributing to global climate goals by avoiding future emissions. Effective financing of new sustainable energy infrastructure in Africa can catalyse a new development pathway for the continent. Current investment trends are not even delivering an energy transition, and energy and financing realities constrain and preclude a just energy transition. The status quo for Africa's energy transition is thus an unjust and unmanaged transition, where the continent bears stranded asset risks, struggles to finance new generation capacity and address energy security, is unable to address energy poverty and access rapidly, and is left behind as the world transitions towards clean energy and low-carbon value chains.

In its place, a managed and just energy transition offers an alternative pathway – one that is aligned with Africa's broad developmental priorities, including economic growth, poverty eradication, reducing inequality, economic diversification, and industrialisation in the context of climate change. While the specifics and varying needs of countries will define what a just transition looks like for each country, Africa's shared energy challenges, outlined below, highlight how crucial a just energy transition for the continent will be. However, new infrastructure alone will not deliver a just transition. Scaled-up, renewable energy financing should be supplemented by consideration of other key

[1] ILO, 2015, Guidelines for a just transition towards environmentally sustainable economies and societies for all. Available from https://www.ilo.org/global/topics/green-jobs/publications/WCMS_432859/lang--en/index.htm)

areas and criteria to build a just energy transition across the continent that not only addresses financing modalities for new energy investments but also addresses broader areas of risk and opportunity in the energy sector.

Africa has persistently elevated poverty levels – far higher than the global average - and the number of people living in poverty has increased since 2020. Poverty and low economic growth are linked to low absolute energy consumption levels, low electricity access and use, and a lack of household access to modern energy services. In 2021, 600 million people (43%) still lacked access to electricity, and 970 million (64%) lacked access to clean cooking. Lack of sustainable, clean, and reliable energy impacts productivity, economic growth, employment, food and water security, gender and educational attainment, and health. For example, 63% of Africa's 1.1 million premature deaths from air pollution per year are due to indoor air pollution, accounting for health costs equivalent to 6.5% of Africa's GDP. With 18% of the global population, the continent accounts for only 6% of global energy use but 30% of the global disease burden from indoor air pollution.

Total energy sector investment across Africa was slightly under USD100 billion in 2019 and fell to USD73 billion in 2020. Investments have in recent years been dominated by oil and gas (primarily supply), which accounted for 70% of all energy sector investment over the period 2015-2019. Electricity sector investments totalled only around USD30 billion per year on average between 2016-2020, of which only around USD5 billion per year on average flowed to renewable energy investments (excluding large hydropower). The result is that Africa accounts for only 3% of renewable energy installed capacity worldwide and generates 4.5% of its electricity from wind and solar, compared to a global average of 12%. Only three African countries (Kenya, Senegal, and Morocco) generate more than 10% of their electricity from wind and solar.

Africa's renewable financing trends reflect the continent being left behind in the energy transition. Africa has accounted for only USD55 billion in renewable energy investment over the period 2010-2020, compared to total global investment in new RE of USD2.25 trillion – a mere 2.4% of global renewable energy investment. In sub-Saharan Africa, which accounted for only 1.5% of RE investment between 2010-2020, investments have been on a downward trend, declining from USD5.3 billion in 2019 to less than USD3.6 billion in 2022.

The IEA has shown that for Africa to cost-effectively meet its own energy-related development goals, including universal access to modern energy services by 2030 and Nationally Determined Contributions (NDCs), in the context of growing population and demand, urbanisation, and industrial expansion, depends on doubling its current

installed electricity generation capacity, adding 290 GW by 2030. Of this, the major share (242 GW) is projected to be renewable, including new wind, solar, hydro, and geothermal[2].

This requires considerable scaling up of Africa's share of global energy investment, especially renewable energy investments. Global electricity investment trends have shown a rapid switch to renewable energy investments (notably wind and solar) away from fossil fuels in the power sector in both developing and developed countries. Despite exceptional renewable energy resources, Africa's energy investment flows have been i) extremely low and ii) concentrated in export-oriented fossil fuel extraction rather than domestically oriented clean energy supply.

To build 290 GW of new capacity this decade, significant investment scale-up is needed. Annual average Investments must double, from ~USD100billion in 2019 to USD190billion per year by the late 2020s, and switch from fossil fuel extraction towards the domestically oriented electricity supply, energy access investments, grids, and end-use investment (e.g.., energy efficiency and appliances, demand sector investment). Annual average power sector investment must triple. Overall clean energy investment, mainly in the power sector (generation, grids, and storage), needs to increase to USD90 billion per year, including ~ USD22 billion per year in grid and distribution networks to support energy access, grid reliability, and optimise supply.

These patterns demonstrate that a novel approach to financing is required to support Africa's just energy transition. Key factors limiting higher renewable energy deployment include the low availability and prohibitive cost of capital, under-developed domestic capital markets and instruments for financing renewables, the ability for consumers to pay, market design and access, the financial sustainability of utilities, perceived and actual risk profiles, and government indebtedness and macro-economic constraints. All of these are exacerbated by global physical climate risks across the continent and by climate action, which increases the transition risk for fossil-fuel or carbon-intensive exporters. This includes making new fossil fuel investments riskier, thereby reducing future revenues from exports or protectionist trade regimes that undermine carbon-intensive exports – both of which reduce government revenues, impact debt sustainability, and potentially further undermine country-level macroeconomic performance.

[2] IEA, 2022, Africa Energy Outlook.

Financial interventions must, therefore, drastically increase the availability of capital to double investment flows by 2030 and lower the cost of capital for new clean energy, grids, access, and industrial development, amongst other areas (Table I). This implies a critical role in scaling up international public finance – until now, concessional finance and grants have accounted for only 1% of investments in renewable energy globally, with unpredictable public investment flows to Africa.

Recommendations for financing a just energy transition in Africa: scaling up renewables

African nations need to be supported through international public climate finance to put in place mechanisms and instruments to scale up programmatic finance, lower financing costs, de-risk investments, and strengthen renewable energy markets and value chains to capture developmental benefits. Overcoming challenges posed by high financing costs, real or perceived risks, and under-developed financial systems in the region will require:

Scale up of favourable and low-cost financing instruments to increase the availability and lower the cost of capital to diverse countries

A just energy transition demands that favourable and low cost and finance, including innovative instruments, are rolled out (at scale and with fair terms) to deliver the necessary quantity and quality of finance. The weighted average cost of capital (WACC) is far higher in Africa than elsewhere due to actual and perceived risks. Growing public debt in the region, exacerbated by COVID-19 and the pandemic response, has had a ripple effect on equity risk and cost of capital, while public debt levels, in addition, reduce fiscal space and curtail the ability of governments to attract international and domestic investment. Finance interventions by international financial institutions targeting national fiscal and implementation spaces must reduce the cost of capital for renewable energy projects. Such would entail the use of higher levels of grants, concessional loans, and guarantees, other risk mitigation and transfer instruments, local currency financing and alternate models that do not rely on sovereign backing (which may not be possible considering indebtedness or due to macro-economic instability and borrowing costs for governments).

Develop domestic electricity policies to encourage renewable capacity additions

Parallel to innovative and targeted finance, comprehensive domestic policies should be developed to improve deployment rates. Importantly, international financial institutions should collaborate with African utilities to facilitate the design and adoption of contextually appropriate strategies for public and private sector participation and investments in electricity systems (for example, renewable policy targets, auctions or feed-in-tariffs, utility investments as well as grid and cross-regional investments, technical assistance). These efforts must centre instruments with more favourable terms for countries and are transformational for a sector seeking to attract finance at scale and overcome persistent barriers.

Catalyse finance, including enabling access to and uptake of renewable energy

Finance ought to be organised and delivered in a manner that focuses on responding to present and future costs and risks of a just energy transition. International climate finance must cover the incremental cost of delivering transformative renewable energy, account for present and future risks within a 1.5ºC pathway and facilitate social considerations for delivering a transformative energy paradigm. Subsidies, incentives, or direct capital injections in infrastructure and renewables value chains are key approaches to de-risk renewable energy and enhance the renewable energy business environment. The just energy transition would benefit from combining finance provision and mobilisation initiatives with risk management strategies to lower perceived risks and crowd-in investments.

Inadequate finance flows, and unfavourable financial products constrain Africa's renewable energy potential. Reforming national-level energy and financial policies must go together. This would provide a key opportunity to strengthen the nexus between the transition to renewables, finance mobilization and energy markets. Reforms are required at both macro and micro fiscal levels to catalyse households, and small and large businesses' investments in renewable energy, effectively manage risks and enhance the deployment of renewable energy solutions. A broad range of national-level energy policy instruments such as auctions or feed-in-tariffs as well as financial instruments such as subsidies, risk-capital grants and guarantees - which can be used to reduce perceived-risk reward profile, allowing investors to provide capital, equity that provides the capital base for operations and significantly reduce investment risks, should be

explored particularly by multilateral funds and other large investors to increase finance. Crucially, cross-sectoral cooperation between national energy and finance ministries of African countries in the context of domestic and international finance and energy market regulation is needed if national energy-related climate transition goals are to be capitalized at scale and an affordable accelerated and just energy transition is to be delivered. Such cooperation would foster the development of innovative approaches finance and market approaches that would lower renewable energy costs and accelerate production, supply and energy access.

Expand long-term, patient capital through international cooperation for generation capacity and value chain investments

Beyond de-risking investments, a pertinent concern around access to 'patient capital' or long-term capital needs to be addressed. Renewable energy returns do take considerable time before maturity, challenging short-term private capital markets. Renewable energy financing needs to be long-term. International cooperation for a just energy transition must be hinged on strategies that offer long-term finance and investments in renewables and catalyse infrastructure and supply chain resilience. International public finance can play a key role in financing modelling and scaling out of policy instruments such as subsidies and incentives and further leverage domestic and international public and private finance at scale to de-risk investment risks and close gaps.

Capital markets within the region remain small with insufficient liquidity. This hampers the provision of long-term financing. A characteristic of these markets is short-term lending, where 70% of capital can be borrowed for less than five years. (IEA 2022). Thus, there is a substantial need to adopt and scale out innovative finance mobilisation instruments such as green bonds to crowd in additional private investment. Additionally, broader transformative financial market policies that would enable leveraging of the capital markets for renewable energy financing are required. Institutional finance, such as pension funds, sovereign wealth funds and insurance companies, can provide a long-term finance opportunity, but mechanisms to promote access to these investors must be prioritised.

Finally, the global financial architecture structurally constrains enhancing financial flows for African investments in renewable energy and other investments necessary for delivering a just transition. Besides the direct interventions above, reform of the global financial architecture to support concessional capital flows is needed.

Recommendations for financing a just energy transition in Africa: additional criteria for delivering a just energy transition

In moving from an unjust energy transition to a just energy transition, effective financing of new renewable generation capacity is key. However, additional areas also require consideration and international financial support to deliver positive developmental outcomes for the continent. For example, attention and funding will also be needed to support the transition for existing fossil fuel workers and communities, to deliver broader economic development objectives in fossil fuel-dependent regions and export economies that depend on fossil fuel rents, to enhance capacity and capability for national planning to incorporate development and climate goals into long-term planning, and to ensure that the energy transition is inclusive and builds a prosperous future for all. Table 1 identifies criteria for consideration and develops a comparison of the status quo/unjust energy transition and a just energy transition pathway for the continent.

Table I: Criteria for consideration in delivering a just energy transition pathway for Africa (Source: Jesse Burton)*

Criteria	Unjust Energy Scenario	Just Energy Scenario
Technical assistance, energy planning, domestic policy development	• Lack of local planning and resources for modelling and policy development • Lack of international support for local institutional and capacity development • Lack of detailed national pathways that embed development goals in energy and economic planning, • Limited development of financial policy or application of financial instruments and products to increase investment • Low levels of stakeholder participation and procedural justice in energy, climate, finance and development planning and project implementation	• National ownership of planning and plans, with commitment and support from partner countries • Build on a pragmatic, nationally owned, and solutions-oriented dialogue based on data-led country assessments in partnership with relevant institutions • Support for local institutions and capacity and capability development • National plans that incorporate development goals within climate policy planning and energy pathways and develop/apply relevant financial instruments/tools/products

		• Procedural justice through stakeholder inclusion and participation in policy development and project implementation
Energy access	• Slow roll-out of only lighting or limited access to modern energy services that do not meet universal access by 2030 and where reliance on traditional fuels persists, or where access is achieved primarily through expensive and inefficient fuels (e.g., diesel gensets, high-cost centralised supply options)	• Access to modern energy services by 2030 through lowest cost on-grid, off-grid and microgrids and applicable, context-relevant options (USD25billion/year)
New generation capacity and storage	• Piecemeal and low overall levels of investment, • Prohibitive cost of capital leading to uncompetitive projects, unsustainable debt, and fiscal risks • Limited local benefits/no community benefit sharing, poor implementation of safeguards and protection of local community livelihoods	• Accelerate large-scale, predictable, and additional financial and technical resources through appropriate instruments, including concessional loans, guarantees, and grants to reduce the cost of the energy transition for populations and modernize power grids • Decent work and skills development in installation, manufacturing and operations of new renewable projects supported through consistent capacity additions and financing • Community benefit-sharing as appropriate for contexts (including ownership and control, access etc.), safeguarding, community consent • Power sector investment triples to ~USD90billion/year by 2030

RE deployment targets	• Current RE investment of ~USD5billion per year stagnates or falls, with the African share of global RE investments stalling	• 230 GW of wind and solar installed by 2030 or ~30GW/year across the continent • Consistent and predictable deployment to maximise employment and encourage local value chain development
New fossil fuel extraction	• Piecemeal, often subeconomic investments with risks pushed onto governments/public budgets • Poor local environmental and social practices and high and negative local environmental/social impacts, and limited benefit-sharing • Potentially stranded assets or carbon lock-in	• Aligned with 1.5ºC national development pathways with clear resource/country risk assessments • Appropriate risk models for any new development that does not unduly place risk on governments/public finances • Appropriate support for countries where resources are not developed in support of Paris Agreement temperature goals • Best practice social performance and process and benefit-sharing with local communities
Fossil revenues foregone/ economic development/ industrialisation	• Countries develop new fossil fuel resources without appropriate institutional strengthening and regulatory rules • New fossil fuel extraction and the resource curse crowd out alternate development pathways • Countries export fossil fuels for revenues/rents but do not develop related industries or address energy access challenges	• Fossil fuel-based industrialisation opportunities are used where appropriate with adequate support for institutional and capacity strengthening to maximise developmental outcomes • Fossil fuel export revenues foregone through undeveloped assets between BAU and 1.5ºC scenarios are replaced through appropriate international support for

	• High and/or continued reliance on fossil fuel exports for rents	energy systems and broader industrialisation opportunities • New fossil fuel development regulatory and fiscal rules do not unfairly shift risk onto public budgets or governments
CBAM and trade regime	• Countries with high exposure in key sectors are excluded from end markets without appropriate support and time to transition sectors/firms/economies	• Targeted allowances and support for energy supply and industrial transitions to enable access to markets in the short and long term, including transfers
Public debt and government budgets	• Budget reliance on fossil fuel rents continues without diversification or revenue replacements, leading to public finance volatility and public risk • Lack of international financial support for economic diversification or structural transformation • Unsustainable debt crowds out critical social needs	• Structural economic transformation supports revenue replacement of fossil fuel export revenues and a diversified tax base • International funding and financial support for broader economic development and structural transformation of economies for low-carbon competitiveness • Concessional finance and new instruments support energy security without incurring unsustainable debt or government guarantees/contingent liabilities, improved risk allocation models

* These criteria were solely conceptualised by Jesse Burton. Use of this table should acknowledge authorship.

1. Introduction

The ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC) is to achieve the stabilisation of greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.[3] In enhancing the implementation of the Convention, the Paris Agreement (PA) in Article 2.1(a) aims to strengthen the global response to the threat of climate change in the context of sustainable development and eradicating poverty.

Global decarbonisation, which is a requirement to meet the goals of both the Convention and the PA, inevitably involves socio-technical transitions in the energy sector. These energy transitions are already underway, driven by climate change response measures and increasingly favourable economics. The PA also explicitly recognises the imperative of a just transition, linking the achievement of socio-economic outcomes and nationally defined development priorities (such as job creation, industrialisation, social inclusion, and poverty eradication, as well as more specific goals such as energy access) to environmental sustainability and climate action[4]. A just transition involves maximising the social and economic opportunities of climate action while minimising and carefully managing challenges[5]. In supporting the implementation of both the Convention and the PA, the focus of both the COP 26 and COP 27 key outcomes on the just transition recognises the need to ensure that the implementation of decarbonization pathways promotes development, including eradicating poverty, creating decent work and quality jobs, and broader sustainable industrialisation opportunities.

Policymakers and other actors define just transitions in ways that are context-specific and responsive to national priorities and hence vary across countries and regions. The key underlying challenge that just transitions seek to address – development in the context of climate change – is a global challenge that cannot be addressed at a national level only. Therefore, not only is it useful to share national experiences and best practices between countries, but the way in which national efforts contribute to the

[3] FCCC/PA/CMA/2021/2/Add.3

[4] ILO, 2015 (https://www.ilo.org/global/topics/green-jobs/publications/WCMS_432859/lang--en/index.htm).

[5] https://www.ilo.org/empent/areas/social-finance/WCMS_825124/lang--en/index.htm#:~:text=A%20just%20transition%20involves%20maximizing,fundamental%20labour%20principles%20and%20rights.

global effort raises the key question of climate justice. Africa has very little responsibility for historical GHG emissions[6] but is the most vulnerable continent to climate impact, and is already

experiencing these[7]. Arguably most of the continent's historical emissions were incurred during the colonial era, and the historical legacy of which is also partially responsible for the continent's current vulnerability. The current design of the multilateral climate change regime recognises the different responsibilities of countries and the different capabilities that different countries have to respond to climate change, including providing support to developing countries.

Within a large existing literature, therefore, key pillars can be identified (Figure 1), including questions of equity at a multilateral level. These pillars are structured around environmental effectiveness (meeting the global decarbonisation challenge and other implicit environmental goals) and include social justice, procedural fairness and inclusive, sustainable development. The context of the multilateral climate regime (the UNFCCC and its Paris Agreement) means that a just transition thus also depends on making financial flows consistent with a pathway towards low GHG-emission and climate-resilient development, including through the provision of support to developing country Parties.

Meeting Africa's development priorities, including enabling universal access to modern energy services and promoting industrialisation, depend on the availability of affordable, accessible, and reliable energy, especially electricity. It is critical that within national just transitions and how these are supported multilaterally, there is a specific focus on the role of the energy sector and financing just energy transitions, thereby addressing the constraints on growth caused by energy insecurity and unreliable and expensive generation. Critical areas that require scaled-up, programmatic financing approaches and international support across the continent include:

1. Enabling energy security: scaled-up quantity and quality of finance for new generation capacity, transmission and distribution grids, and associated technical support, including regional and continental grids;

[6] IPCC (2022), Sixth Assessment Report, WG III available from https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_FullReport.pdf
[7] IPCC (2022) Sixth Assessment Report, WG II, available from https://report.ipcc.ch/ar6/wg2/IPCC_AR6_WGII_FullReport.pdf

2. Addressing energy poverty and promoting access to modern energy services, including clean cooking, on- and off-grid electricity, and associated network strengthening.
3. Supporting fossil fuel transitions for countries with existing fossil assets, including repowering and repurposing assets, supporting worker transitions and local livelihoods, and promoting regional economic development and broader low-carbon industrialisation opportunities.

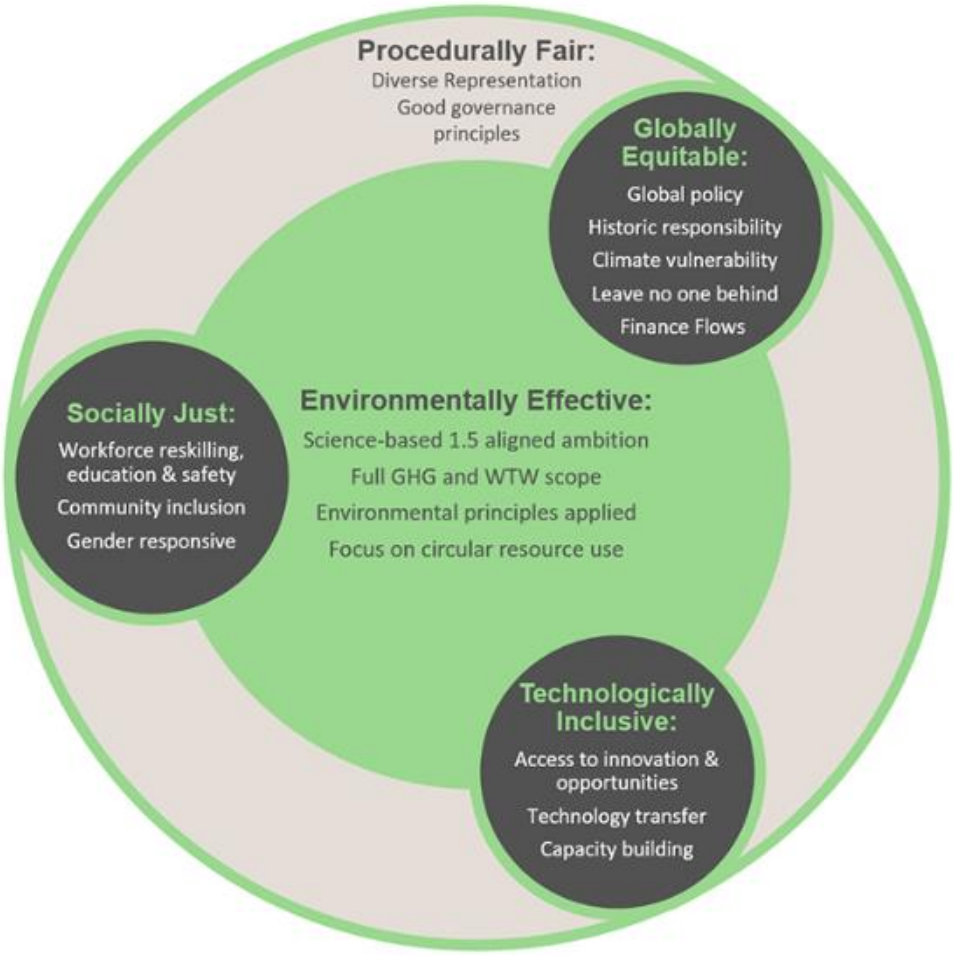


Figure 1: Elements to consider for just transition (UNCTAD)

Existing financing patterns have not delivered the required resources to deliver a clean, reliable, accessible, and affordable energy supply to support development priorities, let alone associated investments in low-carbon value chains. Persistent challenges with access to, and total cost of, financing have constrained Africa's rollout of clean generation capacity, limited integration across countries, and constrained critical expansion of Transmission, Distribution, and mini-/off-grid infrastructure. Over the past two decades, global investment in renewable energy has grown rapidly. Yet of the USD

2.8 trillion invested globally between 2000 and 2020, only 2% went to Africa, despite the continent's enormous potential to generate energy from renewable sources and its huge need to bring modern energy services to the billions of people still lacking access to electricity and clean cooking[8]. For Africa to fulfil its potential to leap towards an energy system based on renewable energy and energy efficiency, a systemic approach is required, building on innovative solutions to develop clean energy projects and extending beyond technology supply and infrastructure to address social and environmental aspects of new clean energy provision.

The investment needed to deliver Paris Agreement-compatible energy pathways while addressing energy poverty and lack of access are significant. The IEA has shown that for Africa to cost-effectively meet its own energy-related development goals, including universal access to modern energy services by 2030 and Nationally Determined Contributions (NDCs), in the context of growing population and demand, urbanisation, and industrial expansion, depends on doubling its current installed electricity generation capacity, adding 290 GW by 2030. Of this, the major share (242 GW) is projected to be renewable, including new wind, solar, hydro, and geothermal. Annual average Investments must double, from ~USD100billion in 2019 to USD190 billion per year by the late 2020s, and switch from fossil fuel extraction towards the domestically oriented electricity supply, energy access investments, grids, and end-use investment (e.g., energy efficiency, appliances, and end-use sectors). Annual average power sector investment must triple. Overall clean energy investment, mainly in the power sector (generation, grids, and storage), needs to increase to USD 90 billion per year, including ~ USD22 billion per year in grid and Distribution networks to support energy access, grid reliability, and optimal supply.

Yet Africa – like other emerging and developing countries – faces considerable challenges in accessing sufficient and appropriate finance. Historically, the continent had much higher shares of concessional loans as a share of total debt. At the same time, post-COVID, pre-existing challenges in mobilising finance have been exacerbated by additional obstacles to access financing, limited public and private investments and continuing debt service obligations. Generally, the average cost of capital for all developing countries is far higher than in developed countries. This makes clean energy

[8] https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2022/Jan/IRENA_Market_Africa_2022.pdf?rev=bb73e285a0974bc996a1f942635ca556

rollout especially challenging since financing costs account for around half the levelized cost of utility-scale wind and solar.

Advancing global climate action also implies a potential future loss in value of key energy resources that are no longer commercially or financially viable under 1.5oC-compatible pathways and will no longer find export markets due to the commercial realities of global supply curves. Countries may struggle to finance, develop, or gain expected value from these resources, requiring governments to take on more project risk and increasing potential future costs for public budgets. Growing stranded asset risks imply the need for careful assessment of the viability of new extraction in the context of highly uncertain and volatile markets and growing climate action that could reduce the overall demand for fossil fuels and their value. 1.5°C and well below 2°C compatible pathways imply the potential loss of revenues in the order of billions of dollars per year for current and emerging fossil fuel exporters in Africa, who may otherwise lack options for alternative sources of income to drive investment and economic diversification[9]. Therefore, current plans for developing novel resources require careful analyses of prices and regulations under future market and climate scenarios. The loss of these revenues implies the need for international support for broader industrial development and domestic energy replacements, especially in light of punitive carbon border taxes.

Finally, the closure of existing fossil fuel assets, be they plants, wells, or mines, will impact existing workforces, local communities, and companies in associated value chains, all of whom must be protected and supported in the closure and phase-down processes. This can happen through repowering and repurposing power plant assets, local investments in small businesses, new industrial sectors or firms, redeploying, retraining and reskilling workers, providing temporary income support, and supporting local livelihoods.[10] A key aspect will be to ensure that existing environmental impacts associated with fossil fuel use – including land degradation, water and air pollution – and future impacts are addressed as assets close, as part of holistic supporting for fossil fuel-intensive regions to transition, for example, mining communities[11]. This is a challenge, especially for those

[9] Smaller emerging gas producers have noted that they are not large enough emitters to attract the interest of climate finance/transition capital in the way that major emerging economies have, for example, even as policymakers recognize the risks associated with new extraction (Marcel, 2022).
[10] See RSA, 2022, Just Energy Transition Investment Plan (JET IP) for an outline of proposed interventions in South Africa
[11] See for example South Africa's Just Transition Framework and Just Energy Transition Investment Plan

countries with existing high dependence – often concentrated – in regional, highly concentrated fossil fuel industries, for example, South Africa or Nigeria.

This report outlines the growing number of people in poverty (section 2.1), the effects of low levels of energy supply on African economies (2.2), energy poverty effects and household access limitations and impacts (2.3), and investment trends in the energy sector and in renewable electricity supply (2.4). It summarises the continent-wide investment needs and trends in financing, as well as gaps in energy and climate financing over the next decade (2.5), based on continent-wide modelling from IRENA and the IEA. Section 2.6 discusses the risks of stranded assets in new fossil extraction and the risks to government budgets and revenues in future carbon-constrained scenarios. Section 3 outlines, based on extensive literature reviews and the challenges identified in Section 2, criteria and areas for consideration in a just energy transition for Africa and sketches the characteristics of an unjust status quo versus a just energy transition. Section 4 outlines the history of just transitions (and energy within that) in the UNFCCC process and its key role in mobilising finance in line with the areas identified in Section 3. Section 5 addresses the constraints to finance, debt trends, and the role of international public finance in supporting just energy transitions. Section 5 outlines the need for scaling up effective renewable energy financing, for supportive investments and broader industrialisation in low-carbon value chains, and for existing fossil fuel regions/countries to manage their transition for existing workers and communities.

2. Africa's Energy and Development Circumstances

2.1. Africa's progress on poverty has been undermined since 2020

The share of Africa's population living in poverty is high and far above the world average (Figure 2: People living in poverty are concentrated in the Sub-Saharan Africa region, where nearly 40% of the population still lived in extreme poverty in 2019, compared to a

global average below 10%.[12] Of the world's extremely poor, ~60% lived in Sub-Saharan Africa in 2019[13].

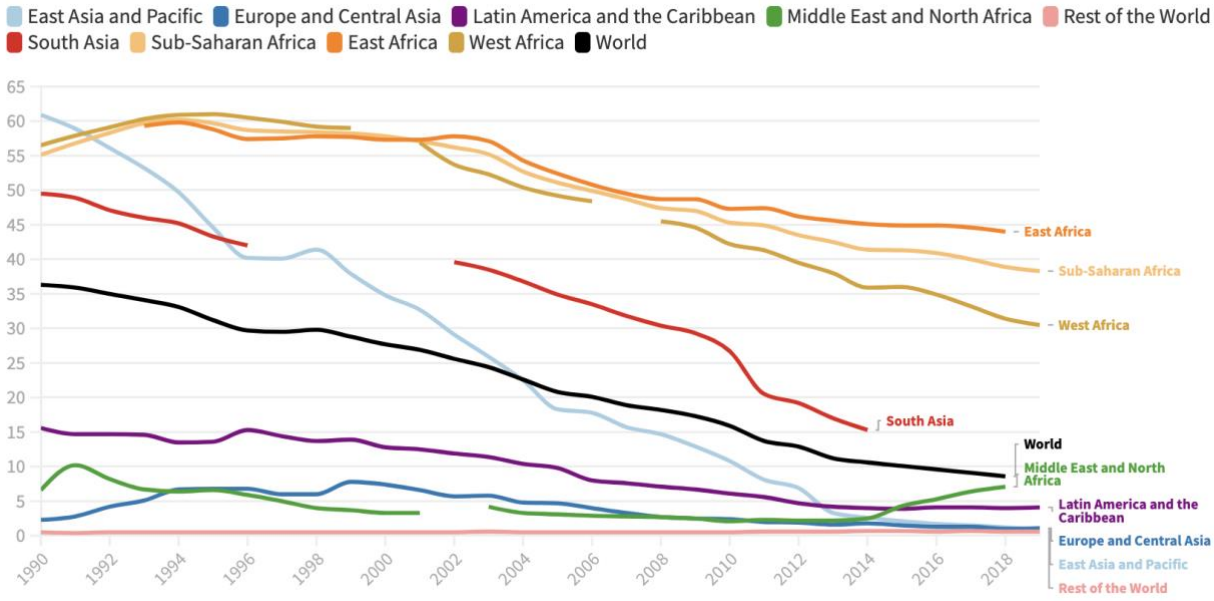


Figure 2: Global and regional poverty trends at lower poverty line, 1990-2019[14]

While African governments have made progress over the past three decades, reducing the share of people living in extreme poverty since the 1990s, the total number of people living in poverty was still growing in absolute terms even before the COVID-19 pandemic, reaching 424 million in 2019. Exacerbated by the pandemic and associated economic fallout, 30 million more Africans fell into extreme poverty in 2020[15], as Africa's gross domestic product (GDP) contracted by 2.3% and it entered its first economic recession in 25 years[16]. Central Africa now has the highest extreme poverty rate of 54.8%, followed by Southern Africa at 45.1%. In Western and Eastern Africa, rates are 36.8% and 33.8%, respectively[17].

The pandemic impacts, since worsened by Russia's invasion of Ukraine and related price inflation in fuel and food, were expected to push more than 25 million additional sub-

[12] Aguilar et al, 2022. Available from https://blogs.worldbank.org/opendata/april-2022-global-poverty-update-world-bank

[13] Baah et al, 2023. https://blogs.worldbank.org/opendata/march-2023-global-poverty-update-world-bank-challenge-estimating-poverty-pandemic?auHash=0pC7sGFz82gkH4TmALuZRazlaja4mX9kxlfYYh8i0zg

[14] Poverty and Inequality platform, in Aguilar et al.

[15] Aikins and McClachlan, 2022 https://issafrica.org/iss-today/africa-is-losing-the-battle-against-extreme-poverty#:~:text=Within%20Africa%2C%20most%20poverty%20is,36.8%25%20and%2033.8%25%20respectively.

[16] IEA, 2022, Africa Energy Outlook

[17] Aikins and McClachlan, 2022

Saharan Africans to extreme poverty by the end of 2022[18]. Mounting inequalities are adding to existing civil conflict, social unrest, and political instability in several countries. With current energy and food price increases and shortages, these inequities are likely to be exacerbated further by climate-related droughts and extreme weather events.

Overall, the pandemic led to a reversal of many positive development trends in Africa, notably in energy access and affordability (section 2.2). In contrast, energy investment flows - which already heavily favoured developed countries (EU and US) and China - leave Africa struggling to capture even minute shares of global electricity investment (section 2.3). Africa's development is thus hindered by a lack of access to secure, affordable, and reliable energy, which plays a critical role in improving health, education, communication, food and water security, employment, environmental, and gender outcomes (Figure 5).[19]

2.2. Africa lacks access to secure, affordable, reliable, and clean energy

Africa has the world's lowest per capita energy consumption: with nearly 18% of the world population, it accounts for less than 6% of global energy use and only 5% of energy investment[20]. Primary energy remains dominated by biomass (45%) and fossil fuels (52%).[21] According to IEA, proven oil reserves across Africa have grown by almost 150%, rising from 53.4 billion barrels in 1980 to 125 billion barrels at the end of 2017. It is home to 13% of the world's natural gas and 7% of the oil resources. Africa produces 9.1 % of total global oil production, accounting for 4.2 % of global oil consumption. Africa also has 7.5 % of the world's proven natural gas reserves; it produces about 6 % and consumes about 3.9 % of global reserves, respectively.

Electricity supply is dominated by fossil fuels, with coal, oil, and gas accounting for 77% of electricity generated in 2019 (Figure 3), notably due to concentrated reliance in a few major economies. The Delft University of Technology estimates the continent's unexploited hydropower potential to be 1 753 GW, with Angola, the Democratic Republic

[18] World Bank, 2022, Poverty and Inequality Platform, https://data.worldbank.org/indicator/SI.DST.10TH.10, (accessed 01 May 2022), in IEA, 2022.
[19] IRENA 2021https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/March/Renewable_Energy_Transition_Africa_2021.pdf?rev=6a9b2f3239be4031b3b074643ec58ca5
[20] IEA, 2022
[21] IRENA, 2022

of the Congo, Ethiopia, Madagascar, Mozambique, and Zambia leading [22]. IRENA estimates the continent's solar technical potential at 7 900 GW (assuming a 1% land-utilisation factor), indicating a vast potential for solar power generation and technical potential of wind power generation at an immense 461 GW (assuming a 1% land-utilisation factor), with Algeria, Ethiopia, Namibia, and Mauritania possessing the greatest potential.

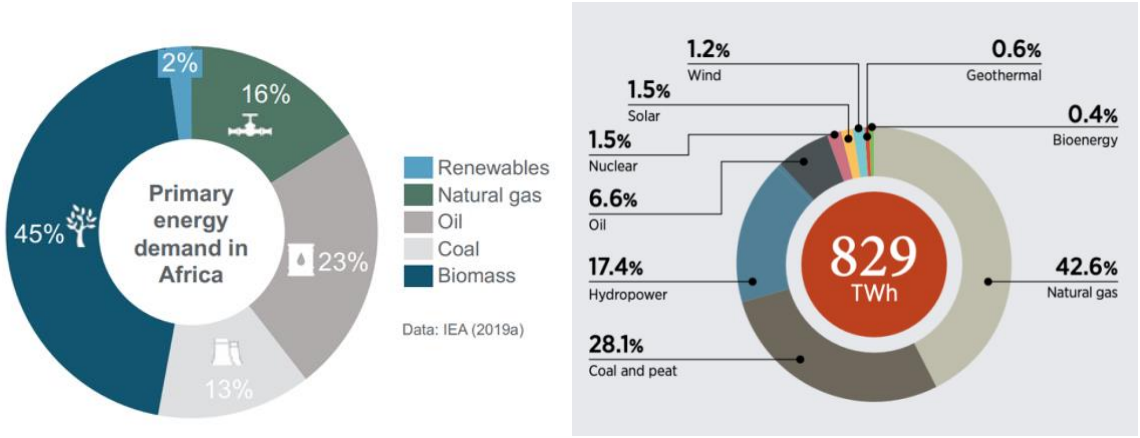


Figure 3: Primary energy and electricity generation by source for Africa, 2019 (IRENA, 2022)

Despite this potential, Africa accounts for a mere 3% of installed renewable capacity and has captured very little of global investment flows in new generation capacity, especially renewable, over the past decades, even as firms and households lack secure, reliable, and affordable supply. Even in 2022, wind and solar accounted for only 4.5% of electricity generated, compared to a global average of 12%, and only three countries in Africa (Kenya, Senegal, and Morocco) produce at least 10% of their electricity from wind and solar.[23]

Although Africa's total energy demand has been growing quickly, at 2.4% per year over 2010-19, electricity use is lagging, rising by just 2.3% over the same period – far below the average for other developing regions. Electrification levels are low, and electricity supply remains very unreliable in many parts of the continent, impeding economic and social

[22] https://pure.tudelft.nl/ws/files/11370584/hoes_article.pdf

[23] Ember (2023). *Electricity Data Explorer | Open Source Global Electricity Data*. https://ember-climate.org/data/data-tools/data-explorer/.

development and driving businesses and households to rely on costly diesel generators and traditional fuels.

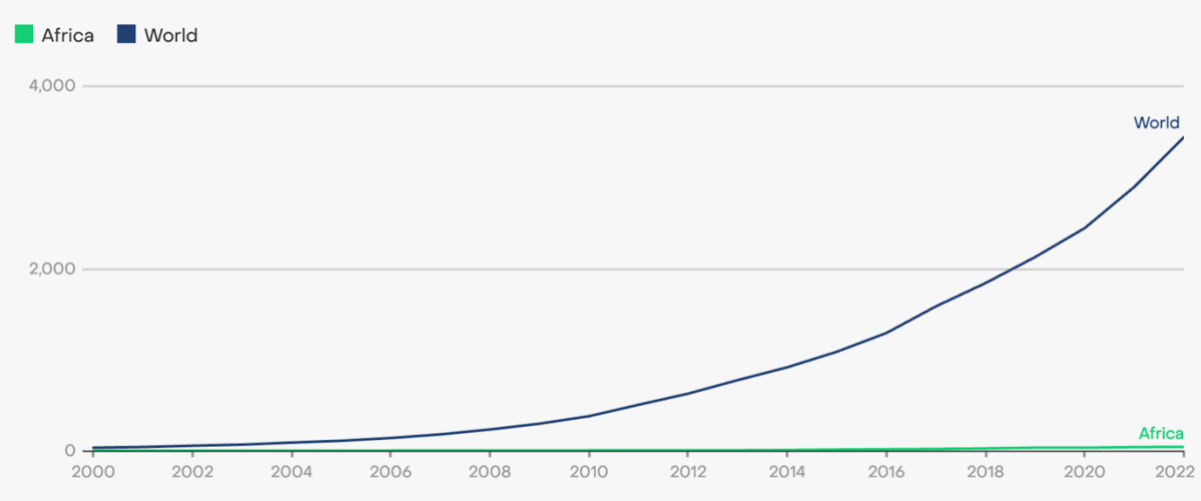


Figure 4: Wind and solar generation, World and Africa (TWh, 2000-2022) (Ember, 2023)

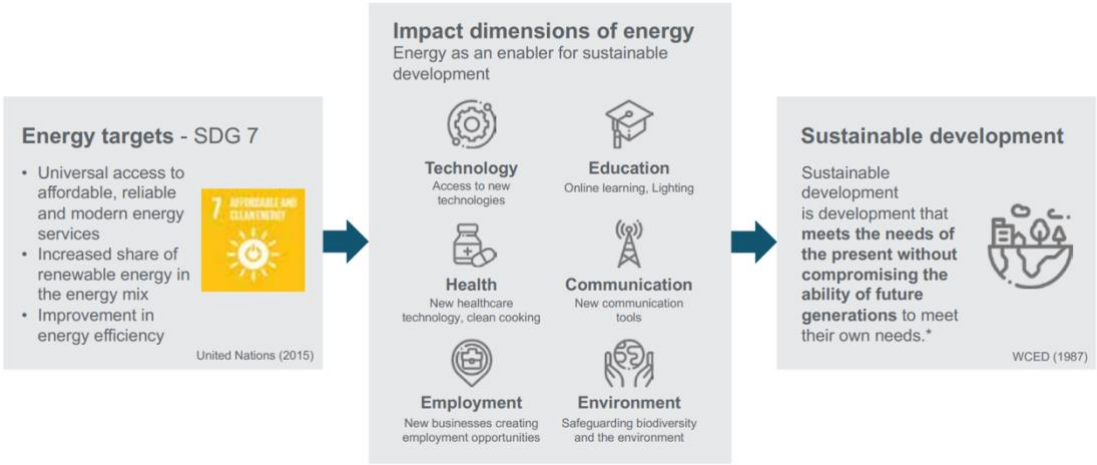


Figure 5: The importance of access to modern energy services for sustainable development (IRENA, 2021)

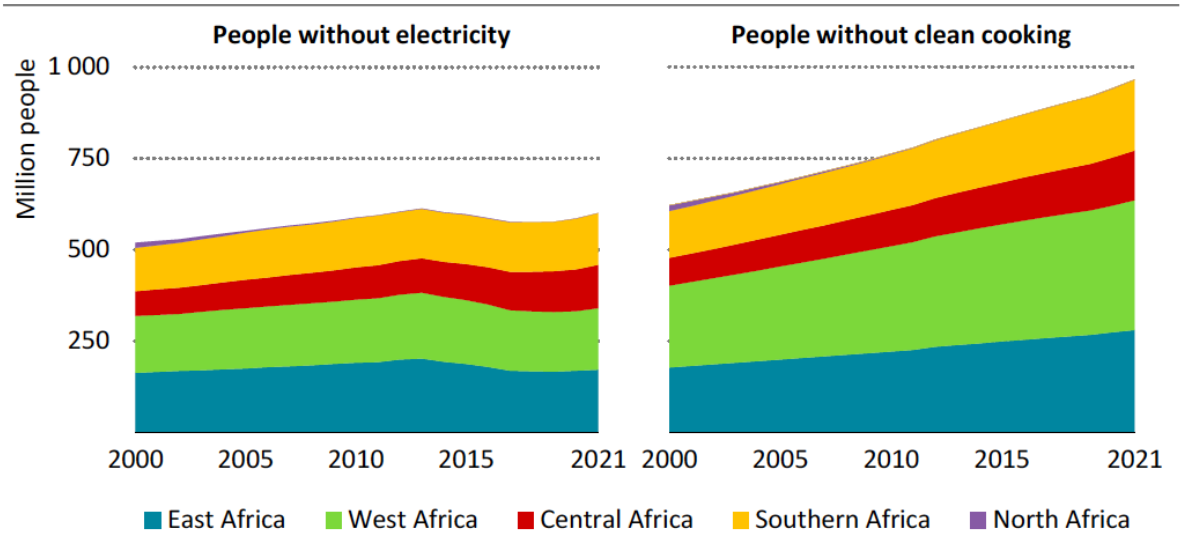
This lack of access has severe consequences for Africa, with impacts on firms, households, human health, productivity, and employment. For example, more than 25% of businesses surveyed in some of Africa's biggest economies cited losing double-digit sales due to power outages[24]. Fewer than one-third of firms reported reliable electricity

[24] Ramachandran et al, 2018

access in the major share of sampled countries (25 out of 29).[25] Power inaccessibility, unreliability and under-consumption are linked to low productivity, increased business costs, unemployment, and consequently, Africa's low GDP per capita. Research from 23 African countries revealed a more than 2.3% reduction in the total factor productivity of firms due to electricity shortages. Electricity shortages additionally reduce the probability of individual employment by 35 to 41 percentage points. At the same time, productivity losses and high production costs underpin the reduced trade and competitiveness of firms in the region[26].

2.3. Africa lacks clean, secure and affordable energy for households

Access to clean, secure, affordable modern household energy services has not kept pace with the continent's expanding needs. In 2021, 43% of the population of Africa, around 600 million people, still lacked access to electricity, with 590 million in sub-Saharan Africa. Access levels have fallen between 2019 and 2021 due to the pandemic, population growth, slower rollout of new connections and declining affordability. In total, 4% more Africans lack electricity in 2021 than in 2019. This has serious effects on educational attainment, gender dynamics, and food security and affects the achievement of both energy-related and other SDGs.



[25] Blimpo & Cosgrove-Davies, 2019
[26] Mensah, 2018

Figure 6: Population without access to energy services in Africa, 2000-2021 (IEA, 2022)

Today, a shocking 64% of Africans rely predominantly on gathered wood and agricultural and animal wastes as fuel for cooking. Overall, around 970 million people in total lacked access to clean cooking fuels in 2021 (Figure 6).[27]

This reliance on unsustainable traditional fuels has severe health impacts, impeding human development. Overall, 1.1 million people died from air pollution in Africa in 2019, and 63% of these deaths were due to household air pollution – a direct outcome of a lack of access to modern energy. In addition to the devastating health impacts and deaths caused by air pollution, the economic cost is substantial: the annual cost of health damages due to disease related to air pollution equates to an average of 6.5% of GDP across Africa. In Egypt, Ghana, the Democratic Republic of the Congo, Kenya, and South Africa, the combined annual cost of health damages from PM2.5 exposure is more than USD 5.4 billion U.S.[28] Overall, the rate of deaths linked to air pollution (155 deaths/per 100,000 people) is much higher than the global average (85.6/per 100,000), with Africa accounting for 30% of the disease burden of household air pollution globally[29]. Reliance on solid fuels for cooking is especially high in Eastern, Central, and West Africa, where 76% or more of the population lacks access to clean cooking (Figure 7).

Providing universal access and reducing reliance on traditional fuels across Africa by 2030 – in support of national development objectives and achieving the Sustainable Development Goals, will depend on significantly growing access to modern energy services and reducing traditional primary energy. Achieving this will depend critically on doubling the continent's installed generation capacity, from 260GW in 2020 to over 500GW by 2030. Of the 290GW of new generation capacity needed this decade (offsetting retirements as well as meeting demand growth), 80% is projected to be renewable energy (wind, solar, hydro, and geothermal). By 2030, solar PV and wind will account for 27% of electricity generation across Africa, an 8x increase from a negligible base in 2020[30].

However, as the following section outlines, energy sector investment on the continent has been far too low, fell significantly in 2020, and has not always addressed energy

[27] IEA. 2022
[28] State of Global Air Report, 2022. Available from https://www.stateofglobalair.org/sites/default/files/documents/2022-10/soga-africa-report.pdf
[29] State of global air, 2022
[30] IEA, 2022

access priorities. Investment needs to be massively scaled up to address growing demand.

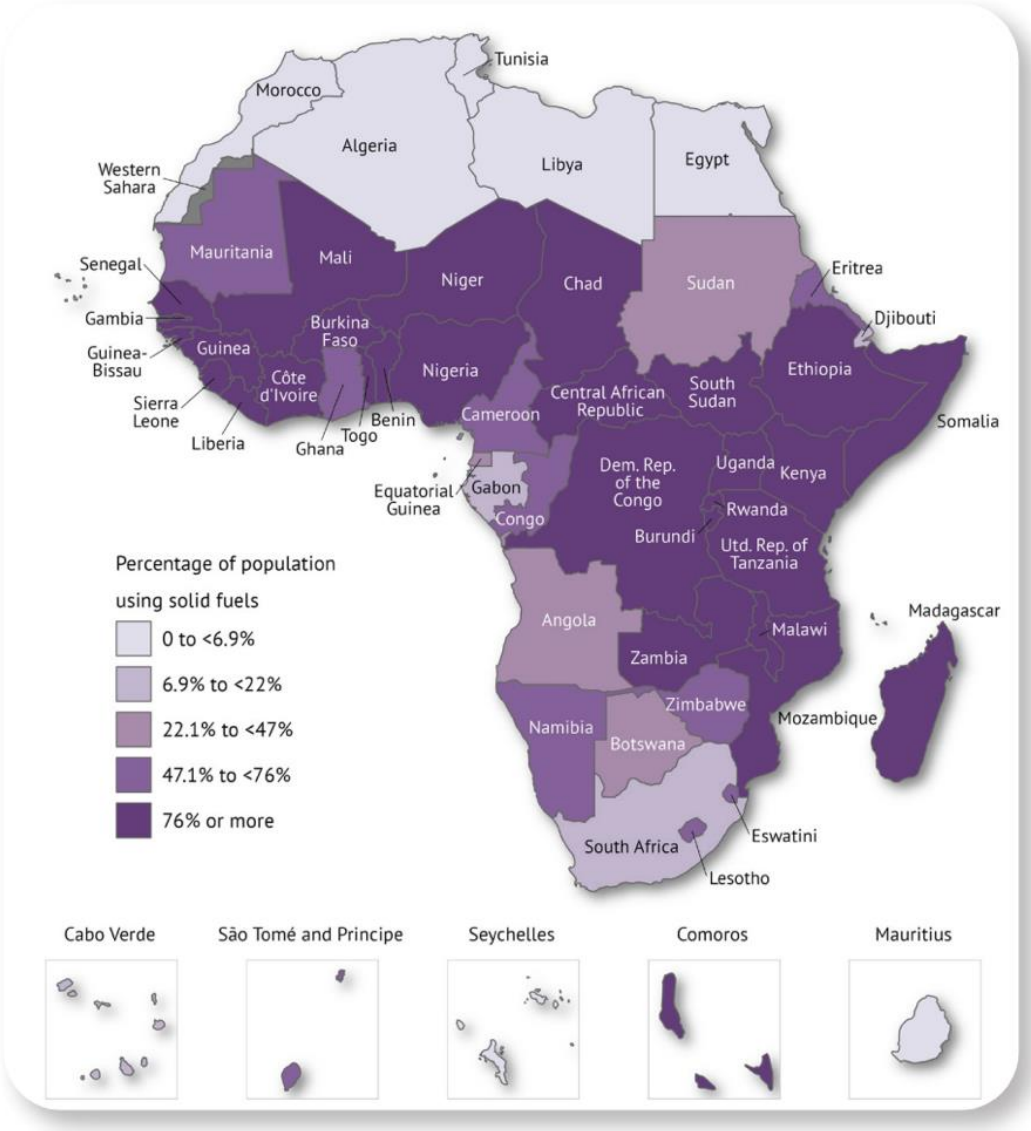


Figure 7: The percentage of the population using solid fuels for cooking in countries across Africa in 2019 (State of Global Air Report 2022)

2.4. Energy sector investment trends show that Africa is being left behind

Total energy sector investment across Africa was slightly under USD 100 billion in 2019 and fell dramatically to USD 73 billion in 2020. Investments have in recent years been dominated by oil and gas, which accounted for 70% of all energy sector investment over

the period 2015-2019, primarily in supply (Figure 8).[31] Electricity sector investments totalled ~USD 30 billion per year on average between 2016-2020, of which only around USD 5 billion per year on average flowed to renewable energy investments, excluding large hydropower[32].

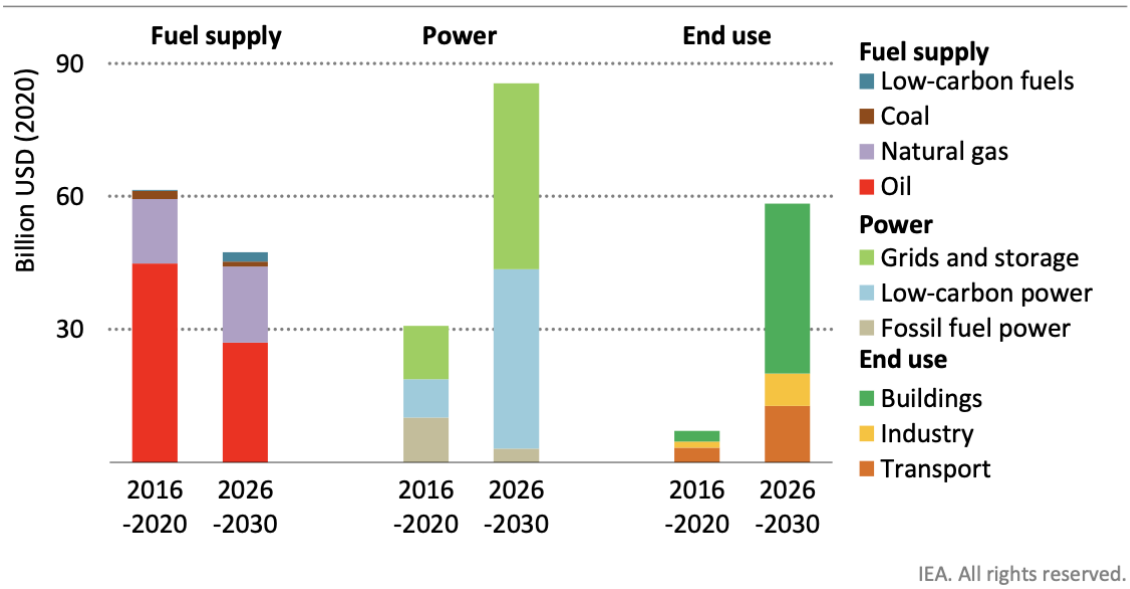


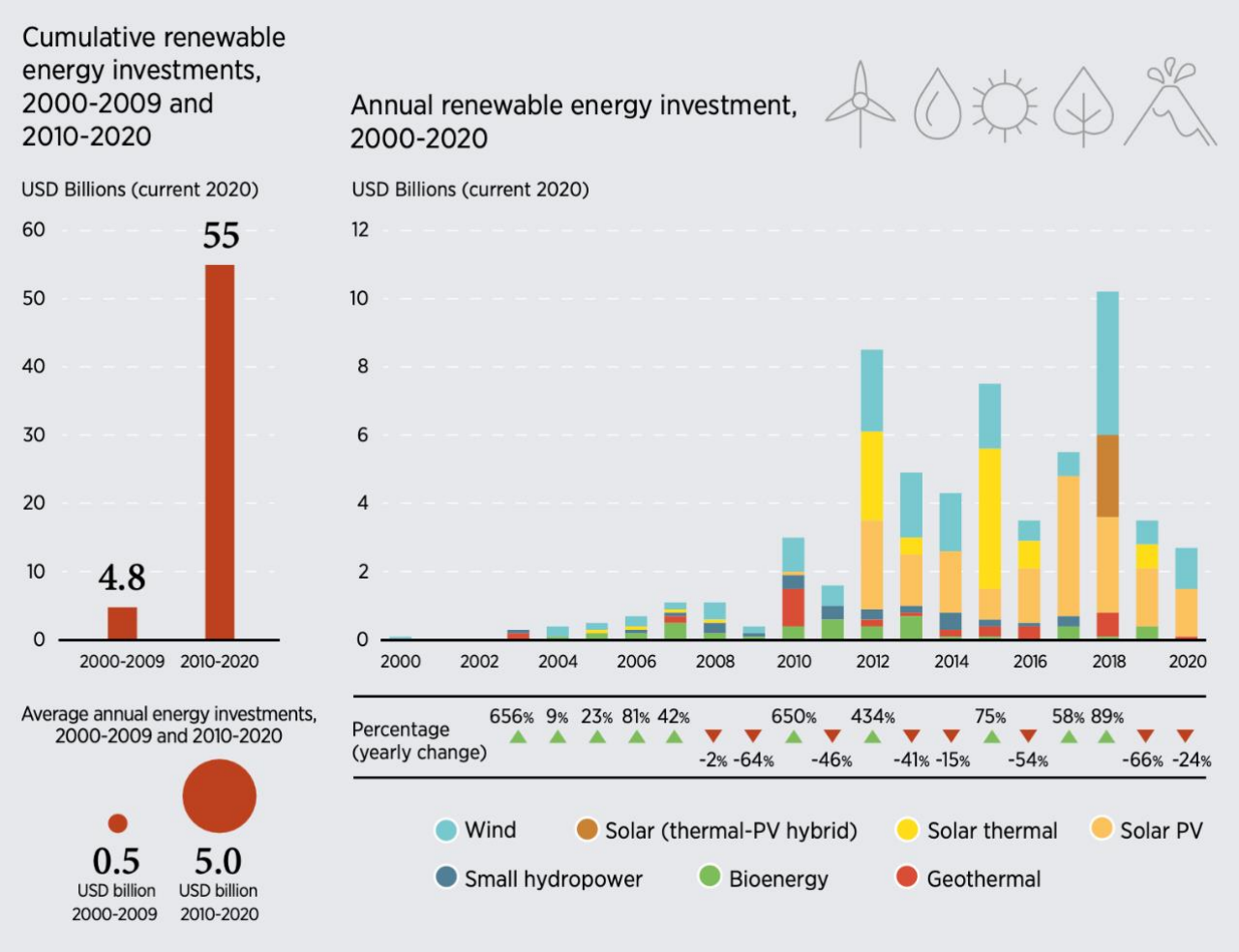
Figure 8: Historical and projected 'Sustainable Africa' annual average investment in fuel supply, power and end uses (IEA, 2022)

Global investment in new electricity generation capacity has shifted dramatically over the past decade as the costs of solar (-81%), onshore (-46%), and offshore wind (-44%) have declined. This has resulted in renewable energy capacity additions overtaking fossil fuels in the power sector since 2015 (in GW), accounting for 72% of new capacity additions in 2019 and 80% of new capacity additions in 2020[33] – a total of USD 366 billion investment in 2021. The sharply decreasing costs of renewables over the past decade are a result of multiple factors. These include lower capital cost, manufacturing economies of scale, wholesale market innovations such as the introduction of auctions, enhanced supply chain competitiveness, improved developer experience and improvements in efficiencies of power-generating technologies. Aggregately, these

[31] IEA, 2022
[32] IRENA, 2022
[33] IRENA. 2021. Renewable Capacity Statistics 2021. International Renewable Energy Agency, Abu Dhabi. https://www.irena.org/publications/2021/March/Renewable- Capacity-Statistics-2021

factors have led to declining levelised costs of renewables and the growing uptake mentioned above[34].

Yet, as outlined above, energy consumption and investment in Africa have not kept pace with global trends that see renewable energy deployment overtaking traditional generation options. This is despite Africa's economic growth constraints caused by the current insufficient, unreliable, and expensive supply. While investment in renewable energy across the continent has grown over the past decade, totalling USD 55 billion over 2010-2020 (



), total global RE investment over the decade was USD 2254 billion.

[34] Levelised cost or LCOE is a measure of the lifetime cost of a given project, divided by the lifetime generation.

Figure 9: Cumulative and annual renewable energy investments in Africa by technology (excluding large hydro) (IRENA, 2022a)

Africa thus accounted for only 2.4% of global investment in RE over the past two decades. This translates into only 3% of global RE installed capacity and into less than 3% of global employment in RE.[35] is also concentrated in Southern (38%), North (32%), and East Africa (20%) (Figure 10 and section 2.5).

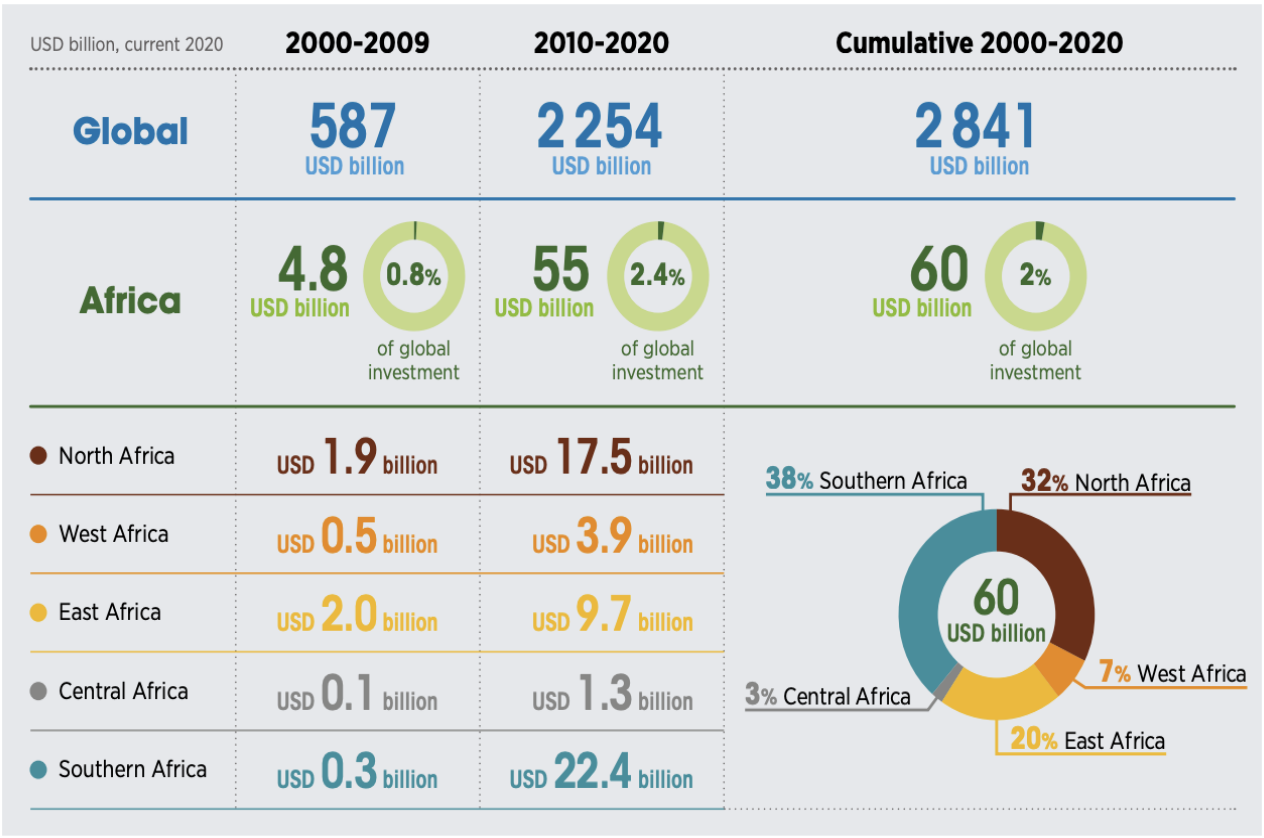


Figure 10: Renewable energy investment globally versus in Africa (2000-2020) (IRENA, 2023)

The lack of clean generation capacity and low access levels are echoed by far lower transmission capacity levels in Africa compared to other geographies. African transmission levels are far below peer countries per capita (Figure 11)[36], even though the

[35] IRENA, 2022a Africa market

[36] USAID, 2018 "Understanding Power Transmission Financing".

size of the continent and population densities would imply the need for a greater level of transmission[37].

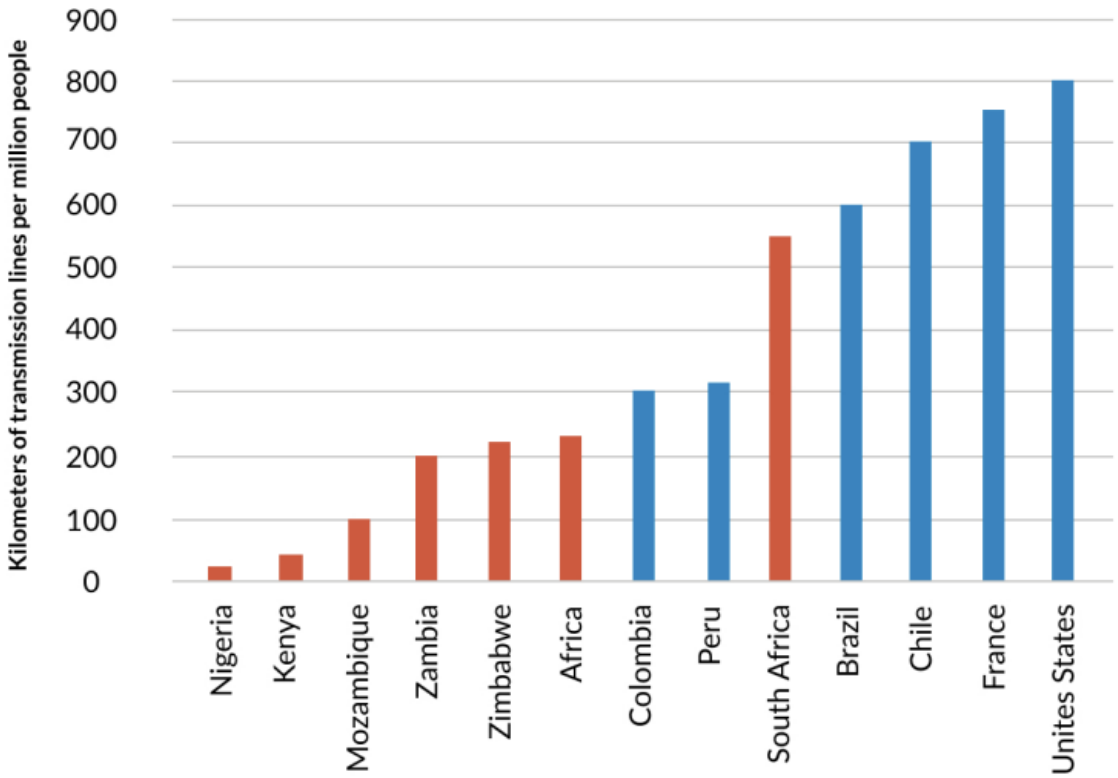


Figure 11: Transmission lines per capita, 2017

2.5. With a large energy and climate financing gap

Rapid systems transition in energy, land, urban and infrastructure, and industrial systems are required at an unprecedented scale in the context of limiting warming to 1.5°C. Significantly scaled-up investments will be needed to enable these diverse transitions. Finance is a prerequisite for transitioning the energy sector in a manner ambitious enough to limit warming in line with the PA temperature goal, to cover transitional costs and investment needs, social inclusion, equity, and deliver a sustainable energy paradigm. Therefore, the finance required to facilitate the transition must be at scale to

[37] Foster, et al " The evolution of electricity sectors in Africa: ongoing obstacles and emerging opportunities to reach universal targets".

respond to the full scope of energy transition elements considering national circumstances.

The IEA's Africa Energy Outlook in 2022 assessed how the continent could meet its own energy-related development goals, including universal access to modern energy services by 2030 and Nationally Determined Contributions (NDCs). It announced net zero emissions pledges in the context of growing population and demand, urbanisation, and industrial expansion. In the 'Sustainable Africa Scenario' (SAS), the IEA finds that significant investment growth is needed and estimates investments will need to rise to USD190billion per year by the late 2020s, switching from export-oriented fossil fuels towards the domestically oriented electricity supply, energy access investments, grids, and end-uses. Overall clean energy investment, mainly in the power sector (generation, grids, and storage), increases sixfold, taking its share of total investment to 70% of the total and almost USD 90billion per year, including ~USD22billion per year in grid and Distribution networks to support energy access[38].

It is critical to note that Africa is a minor contributor to global climate change. It accounts for less than 4% of global energy-related carbon dioxide (CO2) emissions and has the lowest emissions per capita in the world. Of the 1.2 gigatonnes (Gt) emitted in 2020, 40% came from electricity and heat generation, a quarter from transport and another 17% from productive uses. Scaling up investments in line with the IEA estimates implies that overall GHG emissions will remain stable until 2030, but cleaner electricity offsets growth in infrastructure and the industrial and transport sectors. The investments thereof support access, industrial development, and enhanced access to energy and transport services across the continent. Much of the investment outlined above will support Africa to avoid a high emission growth path while also ensuring the continent has sufficient GHG emissions space for crucial development needs in the short and medium term. For example, in the IEA's Sustainable Africa Scenario (SAS), GHG emissions will rise marginally to just over 1.2 Gt in 2030, about 3% above 2020. Emissions from electricity generation, however, will fall by more than 20% by 2030 as coal-fired generation is phased down and most incremental electricity demand is met by renewables, almost entirely offsetting increases in emissions from transport, productive uses, and energy production. Africa's

[38] IEA, 2022

non-CO2 GHG emissions also fall rapidly due to reductions in the traditional use of biomass.[39]

Specific country estimates are also available from national exercises to assess investment needs and priorities, outlined in energy transition or just energy transition investment plans. For example, South Africa's JET Investment Plan estimates that the country will need approximately R1.5 trillion (USD 98 billion) over the next five years (2023-2027) for the full gamut of just energy transition investments. This includes investment in new generation capacity, grids and storage, energy efficiency, just transition interventions in new sectors (e.g., social ownership and local manufacturing, skills development) and in existing fossil value chains such coal and liquid fuels (retraining, income support, economic diversification and infrastructure, sustainable livelihoods), industrial development in transport and green hydrogen. Overall, a climate-resilient, just transition to net zero by 2050 for South Africa is estimated to need investments totalling R8.5 trillion (~ USD 470 billion)[40] 2050 for mitigation, adaptation and just transition. Nigeria's Energy Transition Plan (ETP) estimates that achieving net zero by 2060 will require an investment of USD 1.9 trillion in total and requires additional investments above 'BAU' of around USD 410 billion, or USD10 billion per year. Achieving universal access by 2030 requires around USD25 billion for mini-grids, solar home systems, grid connections etc., addressing electrification access, productive uses, as well as clean cooking opportunities. The latter includes LPG, biogas, and e-cooking options (with considerable benefits to health, forests, and time savings)

Yet a few African economies already capture the major share of clean energy finance flows on the continent (notably Southern and North Africa, see Figure 10). South Africa, Morocco, Kenya, and Egypt accounted for 75% of renewable energy investment for the continent between 2010-2020, highlighting the important need for accessible, predictable finance for diverse countries to sustainably meet their energy demand and access goals. The major share of African countries has accounted for less than 1.7% of African investments, and many 0,5% or less – implying most African countries each receive 0,01% of global renewables investment.

Despite this pressing need, according to IRENA analysis, public investment flows to renewable energy in Africa have been small and uneven. In contrast, climate finance

[39] IEA, 2022

[40] See RSA (2022) and World Bank Country Climate and Development Report 2022.

flows to Africa have been both inadequate as a share of total climate finance flows and have stagnated in recent years (Figure 13), increasing only marginally even as developed countries have failed to meet their stated commitments. For comparison, Africa's support requests for NDC implementation will require around USD 1.2 trillion by 2030, the major share of which (~60%) is for mitigation activities.

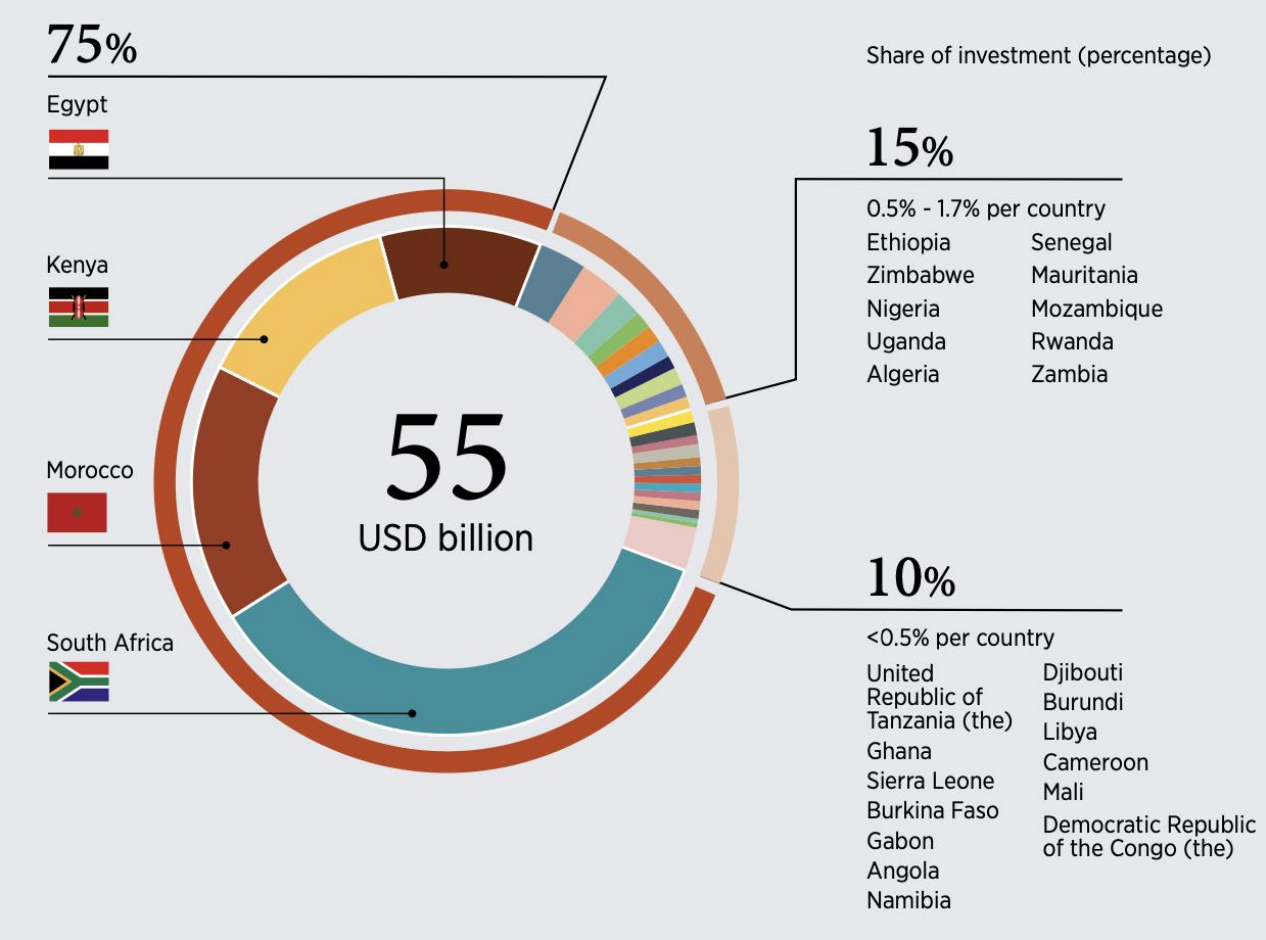


Figure 12: Share of renewable energy investment across African countries, 2010-2020) (IRENA, 2022)

Just energy transition must encompass all energy production, supply and demand elements and include social, economic, and institutional energy-related transitional costs to leapfrog to low-carbon, resilient and sustainable economies. Financing such a transition must be modelled around the realities of the African energy content with the ambition to overcome existing barriers to scaled-up investments and catalyse a sustainable energy paradigm.

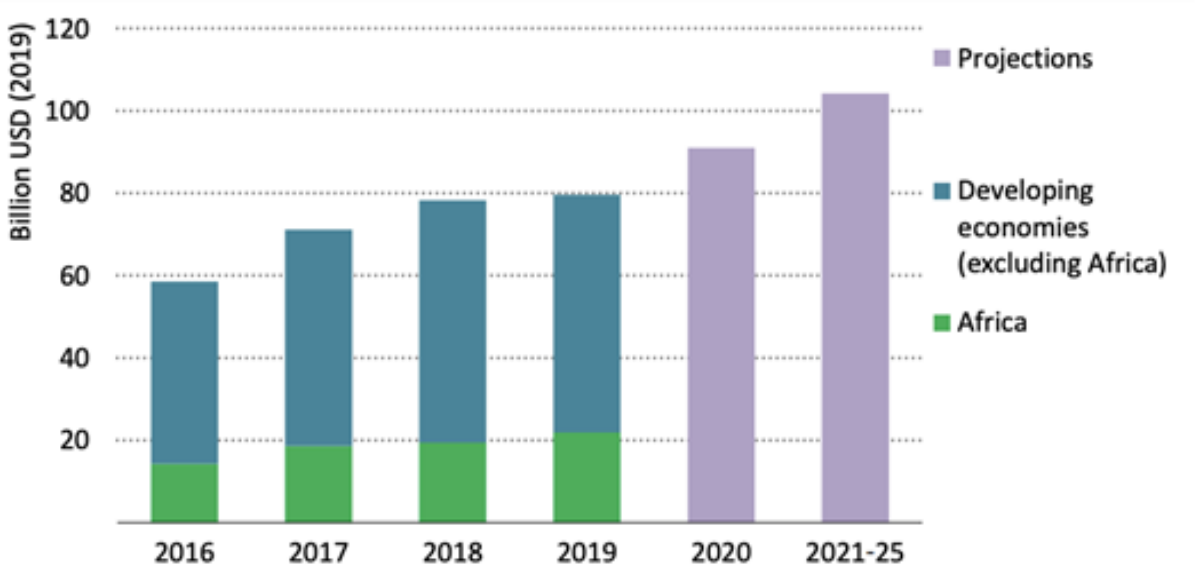


Figure 13: Climate finance flows to developing countries and Africa, 2016-2019 (IEA)

2.6. Africa faces stranded assets and stranded value in fossil fuels

Increasing attention is being given internationally to the risks associated with 'unburnable carbon' and stranded assets[41]. Stranded assets are assets that "have suffered from unanticipated or premature write-downs, devaluations or conversion to liabilities"[42]. UNU-INRA defines them as assets that become devalued before the end of their economic life or can no longer be monetised due to changes in policy and regulatory frameworks, market forces, societal or environmental conditions, disruptive innovation, or security issues[43]. Much of the research on stranded assets globally has been to understand the quantum of fossil fuel resources that cannot be developed or used in future if the temperature goals of the Paris Agreement are to be achieved. For example, an early piece by McGlade & Ekins (2015) estimated that a third of oil, half of gas and over 80% of coal reserves could not be burned in future emission scenarios consistent with limiting temperature rise to below 2°C. While many of these analyses consider the market, commercial and efficient use of resources, they have not typically examined in depth the equity implications of these narrow limits on fossil fuel extraction

[41] UNEP 2015, IEA, 2014; Citi, 2015

[42] DIscussion-paper-Africas-Development-in-the-age-of-stranded-Assets_INRAReport2019.pdf (unu.edu)

[43] Ibid.

implied by ambitious climate action. This section will outline some of these stranded asset risks and considerations in future scenarios, including addressing the economic diversification challenge for fossil fuel-dependent countries/regions through financial support.

African countries rely heavily on exports of fossil fuels. Overall, fossil fuels comprise more than 25% of the continent's total exports (Figure 14), as well as a large share of government revenues (for example, in Nigeria, this is 65%). At the same time, the social and environmental costs of fossil fuel extraction are very high and often not adequately accounted for, while there is evidence that, on average, government revenues from fossil fuels are far lower (2.6 times) than they should be - implying that government fiscal terms have not captured the value of the resources and hence that "citizens are missing out on significant untapped revenues consistent with the same levels of investment, resulting in a substantial subsidy to production".[44]

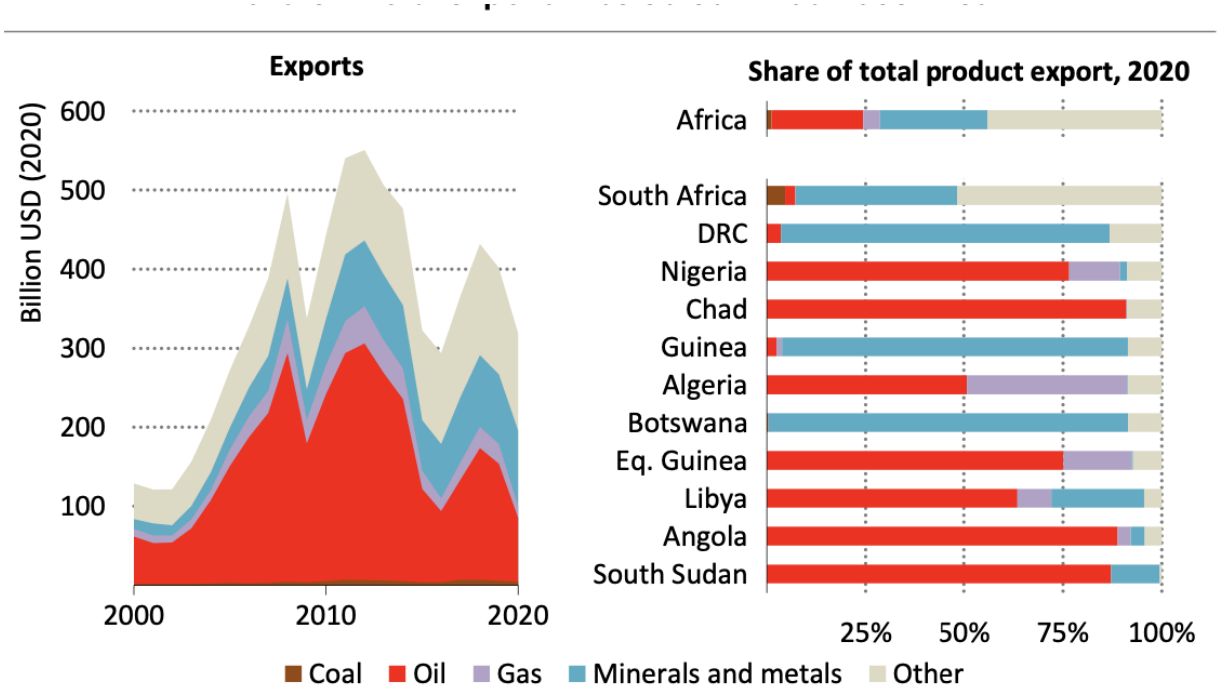
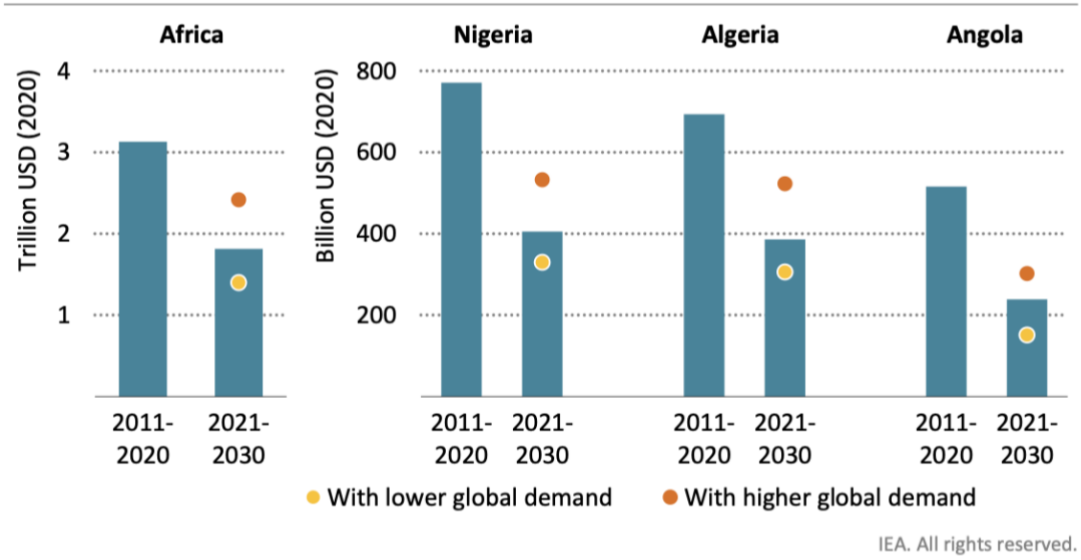


Figure 14: Value of fossil fuel and minerals exports across Africa (2000-2020) and share of total exports by country in 2020 (IEA, 2022)

[44]Cust and Zeufack, 2023. " Africa's Resource Future: Harnessing Natural Resources for Economic Transformation during the Low-Carbon Transition"

Energy system transition and global climate action imply a potential future loss in value of key (fossil) energy resources that are no longer commercially or financially viable. This can be due to the commercial realities of the energy transition and global supply curves (i.e., the competitiveness of particular resources in a declining market, or because extraction and use are incompatible with the goals of the Paris Agreement (which to meet implies an even faster and steeper decline in such markets). This means that current or new producer countries may no longer find export markets for their fossil resources if global multilateral ambitions on climate action are met, while on the other hand, if such ambitions are not met, Africa will bear high costs due to climate change. Uncertainties in future values can impact government budgets and planning. For example, Figure 15 shows the declining revenues facing existing producers this decade and the implications of different demand scenarios for 2030[45]. Demand uncertainty



Without rapid economic diversification, global energy transitions could take a heavy toll on the revenue of major oil and gas producers

indicates oil and gas revenues could differ by around USD1 trillion this decade across the continent, demonstrating the importance of diversifying economies and exports and managing risks to government revenues given the uncertainties in global markets.

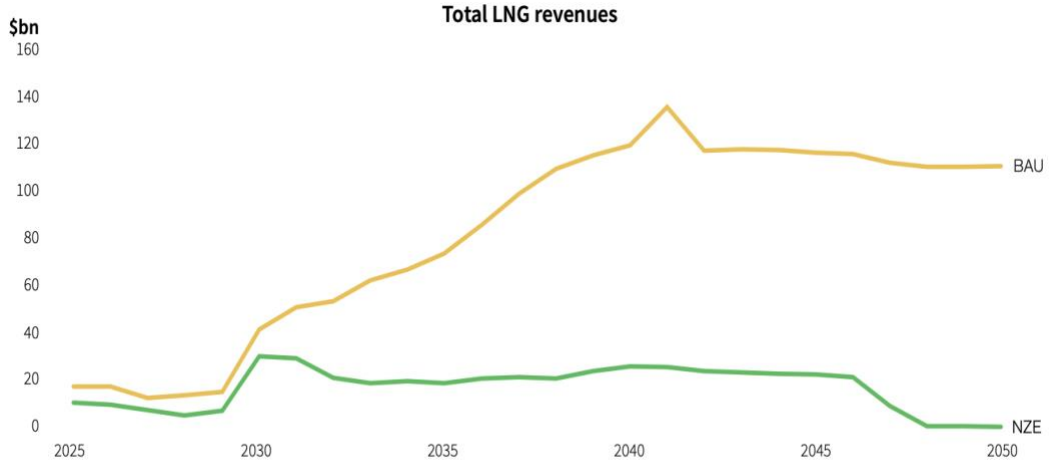
Figure 15: Cumulative oil and gas revenues for Africa and selected countries, 2011-2020 and 2021-2030 under future demand scenarios

While energy investment in Africa has fallen since 2014, oil and gas have remained the major sector for new investment across the continent, even in fossil fuel extraction.

[45] IEA, 2022

Nonetheless, countries may now start to struggle to finance, develop, or gain expected value from fossil resources, requiring governments to take on more project risk and increasing potential future costs for public budgets. Growing stranded asset risks imply the need for careful assessment of the viability of new extraction in the context of highly uncertain and volatile markets and growing climate action that could reduce both overall demands for fossil fuels and their value. A related challenge is that infrastructure investments made to enable the extraction and use of fossil fuels may also become stranded as and when resources are no longer viable (e.g., pipelines, terminals etc.).

The future viability of new fossil fuel resources and their future value is highly context and resource-specific, and risks and potential benefits will have varying outcomes across countries in different energy/climate pathways, as the following examples will show. For example, the revenues accruing to African gas exporters could look vastly different in a business-as-usual (BAU)46 world vs a 1.5oC world, both overall across Africa (Figure 16) and between existing and emerging producers (Figure 17), where the value of revenues differs by 56% and 73% respectively in BAU vs 1.5oC pathways. Hence, there is a strong need for governments to assess public investment and spending based on "well-informed and stress-tested estimates of future revenues – taking all the risks into consideration", as otherwise, projected development gains could fall well short of expectations and/or public debt could rise sharply, "potentially destabilising countries' economies"[47].



[46] In the analysis cited here, "BAU" reflects announced policy intentions and targets, insofar as they are backed up by detailed measures for their realisation, and not 1.5 or 2C compatible pathways.
[47] Anwar et al, 2022a

Figure 16: Total annual LNG revenues across Africa in Business as Usual and Net Zero Energy scenarios (Anwar et al, 2022a)[48]

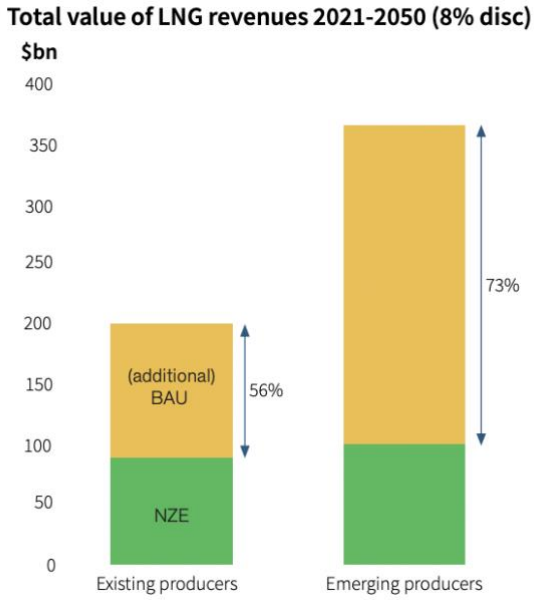


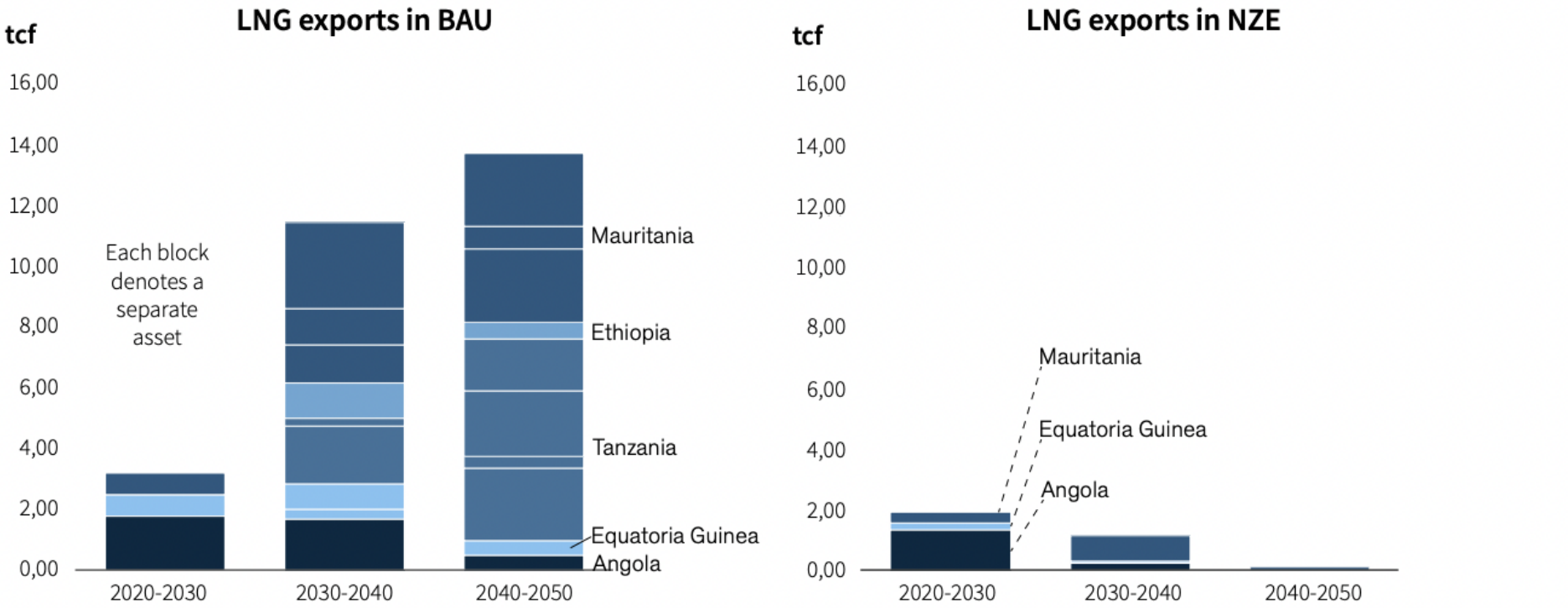
Figure 17: Total present value of LNG revenue (2021-2050) for existing and emerging producers in Africa in BAU vs NZ scenario (Anwar et al, 2022a)

Drilling down, these overall potential revenue losses from oil and gas exports look vastly different in alternative futures for specific countries and assets. Figures Figure 18 and Figure 19 show the export potential for a selection of countries and resources in a BAU versus NZ scenario. In a BAU scenario, the LNG export potential is much higher, with emerging producers such as Mauritanian and Tanzanian capacity dwarfing the current exports of established export-orientated producers within two decades. In a net zero scenario, limited investments remain viable in the countries shown, and viable exports from existing producers also decline. With limited domestic opportunities to commercialise these investments, especially with cheaper options for power supply often available, most new LNG investments (particularly in infrastructure) in these countries would be stranded (i.e., not viable) in a net zero scenario. This stranding is notable because it is driven by circumstances beyond the control of exporters and may lead to "unmanageable transition risks that will impact public finances". Furthermore,

[48] Anwar, M, Neary, P, Huxham, M. 2022a"Natural Gas In Africa Amid A Global Low-Carbon Energy Transition" Willis Towers Watson report, available https://africanclimatefoundation.org/wp-content/uploads/2022/10/ACF-GAS-REPORT-2.0-African-Landscape-Final-Web.pdf

evidence suggests that domestic energy pricing may be impacted by changing oil and gas market dynamics in existing producers, as exports and domestic prices are linked[49].

[49] Anwar et al, 2022



[1] In a BAU scenario, emerging export-orientated producers can grow their exports significantly as they bring new LNG capacity online, while existing producers are able to maintain exports for the next two decades before declining profiles start to take effect.

[2] In a NZE scenario, all new assets would be unviable, apart from the initial Mauritanian FLNG development, with existing producers also seeing exports beginning to fall before the end of the current decade.

Figure 18: Total LNG exports in each decade in a BAU and NZE scenario for selected countries/resources (Anwar et al 2022a)

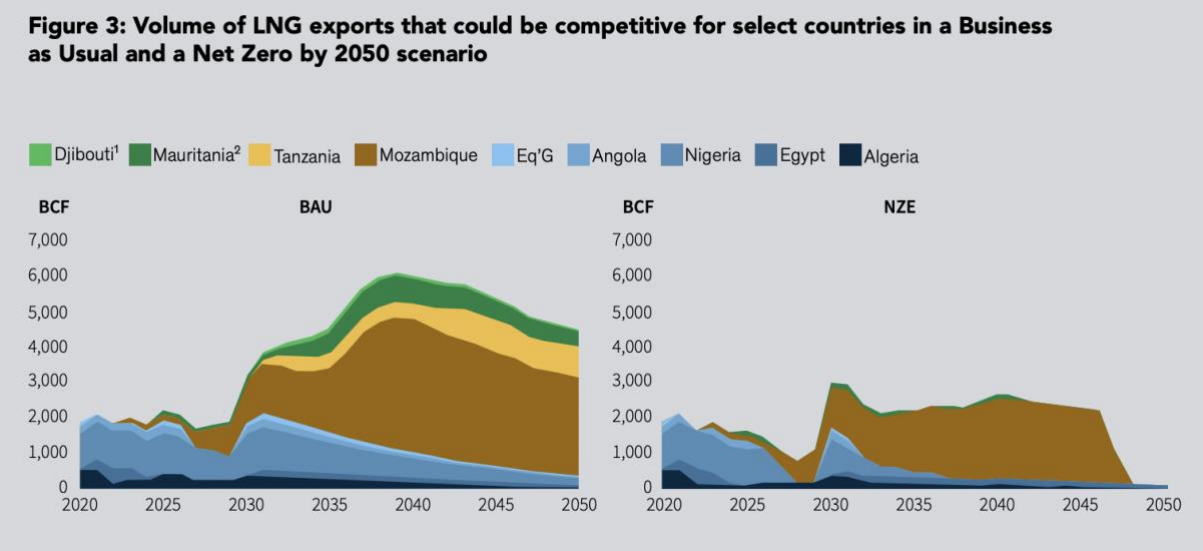


Figure 19: Competitive LNG export volumes in BAU vs NZ scenarios for selected countries, 2020-2050

Both 1.5°C and well below 2°C compatible pathways imply the potential loss of revenues in the order of billions of dollars per year for current and emerging fossil fuel exporters in Africa, who may otherwise lack options for alternative sources of income to drive investment and economic diversification. [50] As Figure 17 indicates, the total lost revenues/stranded value risk between BAU and NZE scenarios for the existing producers is around USD100 billion and for emerging producers, around USD 250 billion in present value terms. In Mozambique, the value at risk is around USD 70 billion and for Tanzania, around USD30 billion (although whether future value materialises in NZE futures depends critically on pricing and regulatory reforms that protect government profits). [51]

Therefore, any plans for developing new resources require careful analysis of prices and regulations under future market and climate scenarios. The loss of revenues and risk to government budgets indicates a strong imperative for national efforts towards

[50] Smaller emerging gas producers have noted that they are not large enough emitters to attract the interest of climate finance/transition capital in the way that major emerging economies have, for example, even as policymakers recognise the risks associated with new extraction (Marcel, 2022). A similar point has been made by Mulugetta et al (2022) regarding Mozambique's focus on gas-based industrialisation.

[51] Anwar, M, Neary, P, Huxham, M. 2022b Natural gas in Africa amid a low-carbon energy transition: a case study of Mozambique and Tanzania https://africanclimatefoundation.org/wp-content/uploads/2022/10/Natural-gas-in-Africa-amidst-a-global-low-carbon-energy-transition-A-case-study-of-Mozambique-and-Tanzania-Final-Web.pdf

economic diversification and international support for broader industrial development alongside domestic energy replacement.

3. Just Energy Transitions: Considerations and Areas Requiring Support

There are many drivers of energy transition globally and in specific regions; inter alia, renewable energy outperforms fossil fuels on aspects such as cost; the environmental impact during extraction and use of fossil fuel resources; contribution to climate change via high GHG emissions; human health effects; and suitability for manufacturing or social ownership and other measures to encourage inclusive growth and address inequality. However, an energy transition that is just and fair is not inevitable and must be actively managed, articulated, implemented, and financed.

3.1. Just and Managed Transition

A just energy transition involves a purposeful and organised movement from fossil fuels to renewable energy sources that maximise opportunity and minimise risk. A just energy transition needs to be comprehensive, anchored on a long-term strategy that aims to balance the economic, social, and environmental impacts of the transition away from fossil fuels. This may involve policies encouraging investment in renewable energy, including targets, feed-in-tariffs, or auctions, investing in renewable energy infrastructure, promoting energy efficiency and conservation, and supporting research and development of new clean energy technologies. Additionally, the strategy includes measures to mitigate the negative impacts of the transition, such as providing retraining and employment opportunities for workers who may be affected by the shift. Typically, this requires a collective effort by governments, businesses, and other stakeholders to encourage the adoption of clean energy technologies and gradually phase out fossil fuel infrastructure.

Some of the shared principles of Just Energy Transition that underpin this scenario are:

- Promote national ownership and commitment from partner countries
- Accelerate financial and technical resources through appropriate instruments, including concessional loans, guarantees, and grants to reduce the cost of the energy transition for populations and modernise power grids

- Build on a pragmatic, nationally owned, and solutions-oriented dialogue based on data-led country-by-country assessments in partnership with relevant institutions
- Focus more widely on achieving the Sustainable Development Goals, based on access to energy and job opportunities (including for youth and women) and on attracting new industries and low-carbon value chains.

This is the preferred option for the low-emission, climate-resilient development pathway that seeks to keep the global temperature increase below 1.5^0C.

3.2. Unjust and Unmanaged Transition

An unmanaged energy transition is an abrupt and unplanned departure from fossil fuels that can occur due to market or regulatory changes. This type of transition can result in job losses and economic disruptions, particularly in regions heavily reliant on fossil fuel industries. It also poses challenges for governments seeking to ensure energy security and stability.

When an energy transition is unmanaged, it can result in chaos and unpredictability, causing economic and social instability. Sudden policy changes or market disruptions can lead to the closure of coal mines or oil refineries, leaving workers and communities without a source of income or economic support.

Considering the scenarios above, Table 2 proposes 11 (non-exhaustive) criteria that should be considered in implementing Africa's just energy transition pathway to move from the unjust, unmanaged status quo towards a just energy transition pathway. Noting that Just Transition visions and principles typically cover economy-wide transitions, this table outlines a subset of interventions to consider intergenerational, international and energy-specific aspects of Just Transition. There will need to be core interventions such as social protection, labour laws and the like to achieve the overarching visions of eradicating poverty, creation of decent work and sustainable livelihoods, and economic transformation. This is not, therefore, a continent-wide approach to JT but teases out core areas that could require consideration in a just energy transition across the continent and areas for potential support. Along these criteria, we sketch out an unmanaged and unjust transition and how a just energy transition could be achieved.

Table 1: Criteria for consideration in delivering a just energy transition pathway for Africa (Source: Jesse Burton)*

Criteria	Unjust Energy Scenario	Just Energy Scenario
Technical assistance, energy planning, domestic policy development	• Lack of local planning and resources for modelling and policy development • Lack of international support for local institutional and capacity development • Lack of detailed national pathways that embed development goals in energy and economic planning, • Limited development of financial policy or application of financial instruments and products to increase investment • Low levels of stakeholder participation and procedural justice in energy, climate, finance and development planning and project implementation	• National ownership of planning and plans, with commitment and support from partner countries • Build on a pragmatic, nationally owned, and solutions-oriented dialogue based on data-led country assessments in partnership with relevant institutions • Support for local institutions and capacity and capability development • National plans that incorporate development goals within climate policy planning and energy pathways and develop/apply relevant financial instruments/tools/products • Procedural justice through stakeholder inclusion and participation in policy development and project implementation
Energy access	• Slow roll-out of only lighting or limited access to modern energy services that do not meet universal access by 2030 and where reliance on traditional fuels persists, or where access is achieved primarily through expensive and inefficient fuels (e.g., diesel gensets, high-cost centralised supply options)	• Access to modern energy services by 2030 through lowest cost on-grid, off-grid and microgrids and applicable, context-relevant options (USD25billion/year)
New generation capacity and storage	• Piecemeal and low overall levels of investment, • Prohibitive cost of capital leading to uncompetitive projects, unsustainable debt, and fiscal risks • Limited local benefits/no community benefit sharing, poor implementation of safeguards and protection of local community livelihoods	• Accelerate large-scale, predictable, and additional financial and technical resources through appropriate instruments, including concessional loans, guarantees, and grants to reduce the cost of the energy transition for populations and modernize power grids • Decent work and skills development in installation, manufacturing and operations of new renewable projects supported through consistent capacity additions and financing • Community benefit-sharing as appropriate for contexts (including ownership and control, access etc.), safeguarding, community consent

		• Power sector investment triples to ~USD90billion/year by 2030
RE deployment targets	• Current RE investment of ~USD5billion per year stagnates or falls, with the African share of global RE investments stalling	• 230 GW of wind and solar installed by 2030 or ~30GW/year across the continent • Consistent and predictable deployment to maximise employment and encourage local value chain development
New fossil fuel extraction	• Piecemeal, often subeconomic investments with risks pushed onto governments/public budgets • Poor local environmental and social practices and high and negative local environmental/social impacts, and limited benefit-sharing • Potentially stranded assets or carbon lock-in	• Aligned with 1.5oC national development pathways with clear resource/country risk assessments • Appropriate risk models for any new development that does not unduly place risk on governments/public finances • Appropriate support for countries where resources are not developed in support of Paris Agreement temperature goals • Best practice social performance and process and benefit-sharing with local communities
Fossil revenues foregone/ economic development/ industrialisation	• Countries develop new fossil fuel resources without appropriate institutional strengthening and regulatory rules • New fossil fuel extraction and the resource crowd out alternate development pathways • Countries export fossil fuels for revenues/rents but do not develop related industries or address energy access challenges • High and/or continued reliance on fossil fuel exports for rents	• Fossil fuel-based industrialisation opportunities are used where appropriate with adequate support for institutional and capacity strengthening to maximise developmental outcomes • Fossil fuel export revenues foregone through undeveloped assets between BAU and 1.5°C scenarios are replaced through appropriate international support for energy systems and broader industrialisation opportunities • New fossil fuel development regulatory and fiscal rules do not

		unfairly shift risk onto public budgets or governments
CBAM and trade regime	• Countries with high exposure in key sectors are excluded from end markets without appropriate support and time to transition sectors/firms/economies	• Targeted allowances and support for energy supply and industrial transitions to enable access to markets in the short and long term, including transfers
Public debt and government budgets	• Budget reliance on fossil fuel rents continues without diversification or revenue replacements, leading to public finance volatility and public risk • Lack of international financial support for economic diversification or structural transformation • Unsustainable debt crowds out critical social needs	• Structural economic transformation supports revenue replacement of fossil fuel export revenues and a diversified tax base • International funding and financial support for broader economic development and structural transformation of economies for low-carbon competitiveness • Concessional finance and new instruments support energy security without incurring unsustainable debt or government guarantees/contingent liabilities, improved risk allocation models

* These criteria were solely conceptualised by Jesse Burton. Use of this table should acknowledge authorship.

4. Just Transition in the UNFCCC

The concept of a just transition, emerging from the labour movement to address concerns about the distributional impact of mitigation measures, has over the last decade grown from these roots to its recognition in the Paris Agreement[52], a key focus in the Glasgow Climate Pact, and the initiation of a specific work programme in the outcome of COP 27. The concept has mostly been discussed in the UNFCCC process in relation to the adverse impact of response measures but is increasingly considered in relation to long-term low-emissions development strategies and how these will be supported. While there is no controversy concerning the provision of climate finance for developing low- or zero-emissions infrastructure, funding just transitions in developing countries implies a broader set of support requirements, including the funding of the decommissioning of existing fossil fuel infrastructure, associated socio-economic interventions to ensure that no-one is left behind, and the funding of new fossil fuel infrastructure within the context of a long-term decarbonization trajectory[53].

COP 26 called for the acceleration of decarbonization in the light of national circumstances in relation to the achievement of the Agreement's long-term temperature goal and, most significantly, "recognizing the need for support towards a just transition". This not only reaffirmed the importance of the just transition in the design and implementation of long-term decarbonization pathways but also explicitly recognized the need to support just transitions multilaterally, i.e., within the framework of the Paris Agreement[54]. Additionally, an initial agreement was realised on the need to provide finance to developing countries and make finance flows consistent with a pathway towards low carbon climate resilient development as avenues to support just transitions. Principally, just transitions should promote sustainable development, poverty eradication and decent-quality jobs[55]

[52] UN Paris Agreement, 2015

[53] This applies primarily to the funding of mid-merit and peaking plants in the electricity sector, fuelled by liquid fuels or natural gas, to enable an increasing share of renewable energy in national electricity systems in the short and medium term (to support the grid) until further technology development renders this unnecessary (in the longer term). It is important to distinguish the supporting role that this infrastructure will play in decarbonization pathways (limited to a support role) from the use of new fossil-fuelled infrastructure to provide a more central role in electricity systems.

[54] 1CMA 3

[55] 1CMA 3/ 1CP26

The outcome of COP 27 (CMA 4) placed the concept of a just transition at the centre of outcomes on decarbonization pathways and established a just transition work programme to discuss pathways to achieve Article 2 paragraph 1 of the Paris Agreement in the context of Article 2 paragraph 2, and an annual Ministerial round table at each COP on the just transition[56]. The decision also referred to the Just Energy Transition Partnerships between developed and developing countries as potential cooperative arrangements to scale up the provision of support for decarbonization in developing countries. So far there are only three of these arrangements in existence, and it is yet not clear whether these partnerships will further the implementation of the Paris Agreement.

Parties will define the terms of reference for the work programme on just transitions at COP 28, and discussions on this will begin at SB58 in Bonn. The mandate requires Parties to develop the terms of reference in a manner "that builds on and complements the relevant workstreams under the Convention and the Paris Agreement," including the mitigation work programme. The most important linkages to the just transition work programme will be those to the mitigation work programme (on the nexus between scaling up mitigation ambition and the just transition) and to the provision of support. In practical terms, as outlined in section 3 above, and specifically in Table 1, for Africa, this means a focus on a) rapid investment in the grid (transmission and distribution) and renewable energy generation and other investments required for stable and reliable grids, and b) in energy access, both to tackle the current massive backlog in Africa in accessible and affordable electricity for business, communities, and households and also to underpin the decarbonisation of other sectors such as transport. Innovative approaches to integrate the outcomes of the GST, mitigation and just transition work programmes, finance deliberations and other forms of support, such as technical assistance and capacity-building in the required institutional and policy areas for a rapid expansion, will need to be explored and fully utilised, with due consideration for the debt challenges outlined below.

[56] 1CMA 4/ 1CP27

5. Financing the Just Energy Transition

5.1. Africa's renewable energy future is constrained by high debt and low-quality finance

Government debt was rising in Africa before the pandemic, but many countries now face the risk of default due to high indebtedness and low growth. In sub-Saharan Africa, debt levels rose from around 30% of GDP in 2014 to 50% in 2019 and more than 57% in 2020 – the highest level in almost two decades. In North Africa, debt rose by 12 percentage points over the same period to 88% of GDP[57].

Not only have overall debt-to-GDP ratios increased, but the quality of finance flowing to countries has declined. In 2000, 78% of sub-Saharan Africa's debt was concessional, i.e., below market rates, from bilateral (47%) or multilateral (31%) sources; in 2020, only 25% is multilateral concessional and 20% bilateral, with private creditors accounting for 56% of the total[58]. The overall increase in debt in recent years and increased reliance on non-concessional sources has driven up the burden of debt service as a share of GDP. Concerns over debt sustainability and credit-worthiness impact African countries' access to capital markets and raise risk premia for projects[59], with the overall macro-economic context a key driver of the cost of capital for renewable energy projects,[60] along with regulatory factors, political-, and off-taker risk[61]. Reductions in the value of fossil fuel exports or trade protectionism that undermines carbon-intensive assets will further undermine the macroeconomic stability of African countries and make existing and future borrowing more challenging. All these pressures are exacerbated by the lack of a common framework for dealing with debt relief.

[57] IEA, 2022

[58] IEA, 2022

[59] Although evidence suggests that credit ratings for African countries are often lower than countries with similar macro-economic fundamentals (see Fofack, 2021), implying higher levels of perceived rather than actual risk amongst credit ratings agencies.

[60] IRENA (2023), The cost of financing for renewable power, International Renewable Energy Agency, Abu Dhabi. Available https://mc-cd8320d4-36a1-40ac-83cc-3389-cdn-endpoint.azureedge.net/-/media/Files/IRENA/Agency/Publication/2023/May/IRENA_Cost_of_financing_renewable_power_2023.pdf?rev=6b95edc23fa5468190745975681a71cc

[61] IEA Cost of Capital Observatory. https://www.iea.org/data-and-statistics/data-tools/cost-of-capital-observatory-data-explorer

These general macroeconomic and country risk factors will curtail efforts to finance the just energy transition through debt instruments. Alternative solutions and financing sources for JET have been proposed considering the debt situation: the need for debt relief/restructuring; innovative financial instruments such as debt-swaps-for-climate; increases in the allocation of Special Drawing Rights (SDRs) to Africa through, for example, the Sustainability and Resilience Trust [62]; and Extending the Debt Service Suspension Initiative (DSSI) to finance the JET.[63] Countries are still evaluating the viability of these options within the African context and circumstances.

5.2. Africa requires international public finance to scale up investments in renewable energy

Just energy transition offers a unique opportunity to re-imagine how the African economy will be powered by renewable energy. Delivering this will be transformational as the continent will rely on reliable, clean, and sustainable power to harness productivity and expand business and economy. At the centre of this aspiration lies the need to address existing barriers to renewable energy investments to significantly scale up deployment to reach 230 GW of new wind and solar this decade (alongside ~60 GW of hydro, storage, and other flexible supply options). However, a variety of financial and non-financial risks hinder investments within Sub-Saharan Africa.

Firstly, the region is characterised by inadequate working capital and affordable finance to cover start-up and up-front costs, affecting on- and off-grid renewable energy power. Consumers often lack or have limited access to finance that would enable large-scale adoption of renewable energy. Many African countries register uncompetitive risk-reward profiles for renewable energy projects[64]. The availability of capital for renewable energy projects is intricately linked to the costs and revenues of renewables. For instance, a set of perceived risks by the private sector influences capital availability. An underdeveloped capital market exists and limits access to local financing instruments for renewable energy projects in many countries (Gabriel, 2016). This market features a relatively small size of local stock markets, which do not attract large financial investment flow and largely influence the accrual of high-interest rates on domestic

[62] Re-channeling Special Drawing Rights for a Climate Resilient and Just Transition PROSPECTS FOR A RESILIENCE AND SUSTAINABILITY TRUST https://www.bu.edu/gdp/files/2021/10/TF_Policy-Brief_FIN.pdf and https://twn.my/title2/resurgence/2021/349/cover03.htm

[63] See also the Bridgetown Initiative proposals

[64] Baumli & Jamasb, 2020.

loans. High-interest rates are also a result of dominating oligopolistic competition within some banking markets that make the capital market highly unfavourable for investments.

Secondly, markets are prone to price distortions and subsequent uncertainty. As shown through analysis, fossil fuel project subsidies happen to be at the centre of such distortions as they largely contribute to negative market externalities that affect renewable energy competitiveness, running over investor confidence.[65] The nature of existing policies is majorly characterised by inadequate or difficult access to markets or the grid and/or unfair or lack of competition within electricity markets and financial unsustainability that are aggregately detrimental to private investors (UNEP FI, 2012). Private actors such as independent power producers and distributors with the capacity to drive renewable energy technologies and deployment are normally disadvantaged.

Third, state-owned national power utilities characterise Sub-Saharan Africa's energy markets undergirded by monopolistic policies and vertically integrated supply chains. These arrangements marginalise third-party and independent actors from easy access to the market and grid on fair terms. Consequently, risks associated with this model are high. Beyond unreliability, its financial sustainability is normally compromised by possible political interference in power cost regulations, adding to off-taker risks in new projects.

Settling the cost and revenues barrier in Africa requires offset either via subsidies or direct boosting of returns[66] - options that demand government intervention. However, in the Sub-Saharan region, Government subsidies, which would reduce such costs and ease investment, are normally poorly targeted[67]. Only a well-functioning and fair market-based mechanism, complimented by additional international investments and supported by progressive governance, can tackle the duo compounding challenges and enhance capital flows, including through private sector participation.

5.2.1. Recommendations for financing a just energy transition in Africa: scaling up renewables

African nations need to be supported through international public climate finance to put in place mechanisms and instruments to scale up programmatic finance, lower financing costs, de-risk investments, and strengthen renewable energy markets and

[65] Al-mulali et.al, 2014
[66] Griffith-Jones. et.al, 2011
[67] IMF 2013

value chains to capture developmental benefits. Overcoming challenges posed by high financing costs, real or perceived risks, and under-developed financial systems in the region will require:

5.2.1.1. Scale up of favourable and low-cost financing instruments to increase the availability and lower the cost of capital to diverse countries

A just energy transition demands that favourable and low cost and finance, including innovative instruments, are rolled out (at scale and with fair terms) to deliver the necessary quantity and quality of finance. The weighted average cost of capital (WACC) is far higher in Africa than elsewhere due to actual and perceived risks. Growing public debt in the region, exacerbated by COVID-19 and the pandemic response, has had a ripple effect on equity risk and cost of capital, while public debt levels, in addition, reduce fiscal space and curtail the ability of governments to attract international and domestic investment. Finance interventions by international and regional financial institutions targeting national fiscal and implementation spaces must reduce the cost of capital for renewable energy projects. Such would entail the deployment of higher levels of grants, concessional loans, and guarantees and the need for instruments that explicitly address currency volatility that affects macroeconomic stability and raises borrowing costs for governments.

5.2.1.2. Develop domestic electricity policies to encourage renewable capacity additions

Parallel to innovative and targeted finance, comprehensive domestic policies should be developed to improve deployment rates. Importantly, international financial institutions should collaborate with African utilities to facilitate the design and adoption of contextually appropriate strategies for public and private sector participation and investments in electricity systems (for example, renewable policy targets, auctions or feed-in-tariffs, utility investments as well as grid and cross-regional investments). These efforts must centre instruments that have more favourable terms for countries and are transformational for a sector seeking to attract finance at scale and overcome persistent barriers. Additionally, policy actions that target reforming electricity markets in Africa for optimal and efficient functioning to crowd in private investment would accelerate electrification in the region.

5.2.1.3. Develop innovative financial products to enable access to and uptake of renewable energy

Finance ought to be organised and delivered in a manner that focuses on responding to present and future costs and risks of a just energy transition. International climate finance must cover the incremental cost of delivering transformative renewable energy, account for present and future risks within a 1.5ºC pathway and facilitate social considerations for the delivery of a transformative energy paradigm. Subsidies, incentives, or direct capital injections in infrastructure and renewables value chains are key approaches to de-risk renewable energy and enhance the renewable energy business environment. The just energy transition would benefit from combining finance provision and mobilisation initiatives with risk management strategies. Such would lower perceived risks and crowd-in investments.

Inadequate finance flows, and unfavourable financial products constrain Africa's renewable energy potential. Reforming national-level energy and financial policies must go together. This would provide a key opportunity to strengthen the nexus between the transition to renewables, finance mobilization and energy markets. Reforms are required at both macro and micro fiscal levels to catalyse households, and small and large businesses' investments in renewable energy, effectively manage risks and enhance the deployment of renewable energy solutions. A broad range of national-level energy policy instruments such as auctions or feed-in-tariffs as well as financial instruments such as subsidies, risk-capital grants and guarantees - which can be used to reduce perceived-risk reward profile, allowing investors to provide capital, equity that provides the capital base for operations and significantly reduce investment risks, should be explored particularly by multilateral finance institutions, climate funds and other large investors to increase finance. Crucially, cross-sectoral cooperation between national energy and finance ministries of African nations in the context of domestic and international finance and energy market regulation is needed if national energy-related climate transition goals are to be capitalized at scale and an affordable accelerated and just energy transition is to be delivered. Such cooperation would foster the development of innovative approaches finance and market approaches that would lower renewable energy costs and accelerate production, supply, and energy access.

5.2.1.4. Expand long-term, patient capital through international cooperation for generation capacity and value chain investments

Beyond de-risking investments, a pertinent concern around access to 'patient capital' or long-term capital needs to be addressed. Renewable energy returns do take

considerable time before maturity, challenging short-term private capital markets. Renewable energy financing needs to be long-term. International cooperation for a just energy transition must be hinged on strategies that would offer long-term finance and investments in renewables and catalyse infrastructure and supply chain resilience. International public finance can play a key role in financing modelling and scaling out of policy instruments such as subsidies and incentives and further leverage domestic and international public and private finance at scale to de-risk investment risks and close gaps.

Capital markets within the region remain small with insufficient liquidity. This hampers the provision of long-term financing. Short-term lending, where 70% is less than five years, therefore characterises these markets (IEA 2022). A substantial need exists to adopt and scale out innovative finance mobilisation instruments, such as green bonds, to crowd in additional private investment. Broader transformative financial market policies that would enable leveraging of the capital markets for renewable energy financing are required. Institutional finance, such as pension funds, sovereign wealth funds and insurance companies, can provide a long-term finance opportunity, but mechanisms to promote access to these investors must be prioritised.

Finally, the global financial architecture structurally constrains enhanced financial flows for African investments in renewable energy and other needed investment to deliver a just transition. Besides the direct interventions above, **reform of the global financial architecture to support concessional capital flows is needed.**

5.3. Africa requires finance for supportive energy infrastructure and value chains

Tackling the energy access and poverty gap demands rethinking the current energy regime in Sub-Saharan Africa. Gaps relating to increasing renewable energy capacity and infrastructure, inhibiting energy policy regimes and growing renewable energy technologies in the region must be addressed. Scaling up renewable energy production to maximise the enormous potential in Africa and service much-needed energy demands for business, cooking and heating in Africa should also be cognizant of the 1.5°C global goal that demands transformative and urgent action.

Designing, building, and developing domestic renewable energy technologies are essential in providing additional capacity and safeguarding local energy value chains

from external shocks. A case in point is the prohibitive costs incurred in the wind industry stemming from COVID-19. Freight costs grew sixfold, with that of copper and steel increasing by 50-60% between 2020 and 2022[68]. As part of the Just Transition, support is required at scale to facilitate technology development, localise supply chains, and promote sustainable management of mineral resources that serve as raw materials in the manufacturing of some renewables.

International public finance is required to facilitate the ratcheting up of efforts in formulating and enacting ambitious and equity-centred energy policies with the potential to deliver access to reliable and affordable renewable energy by the entire population. These policies should, in addition, play a catalytic role in unlocking grid access challenges and supply of energy to last-mile communities through on-grid and off-grid solutions. Therefore, policy modelling must be incorporated into policy processes to anchor the just energy transition's transformative vision holistically.

Investing in energy infrastructure is central to delivering renewable energy at scale. A transformation of the energy grid is needed to make it efficient and reliable, to optimise new generation (including regionally), and to manage higher penetrations of renewables. Additionally, efforts to modernise energy distribution networks in a bid to reduce network losses and expand access are key. These elements would require improvements in dispatch protocols and scaled-up public finance in infrastructure.

5.4. Africa requires finance to transition existing fossil fuel assets and replace their role in local and national economies

In existing fossil fuel-intensive African countries, the discussion is, in some cases, already shifting towards the sustainable and fair phase-down of these assets as they reach the end of their lives in support of NDC targets and net zero aspirations. Closure processes and local economic dependencies are highly context-specific, but the closure of existing fossil fuel assets, be they plants, wells, or mines, will impact existing workforces, local communities, and companies in associated value chains, all of whom must be protected and supported in the closure and phase down processes. This can happen through repowering and repurposing power plant assets, remediating mines and wells, local investments in small businesses, new industrial sectors or firms, redeploying,

[68] Hook 2022

retraining and reskilling workers, providing temporary income support, and supporting local livelihoods.[69] A key aspect will be to ensure that existing environmental impacts associated with fossil fuel use – including land degradation, water and air pollution – and future impacts are addressed as assets close, as part of holistic support for fossil fuel-intensive regions to transition, for example, mining and oil and gas communities[70].

As outlined in section 1.6, there are also significant revenue losses facing existing and emerging fossil fuel producers due to energy transition and climate ambition. Without such revenues, macroeconomic fundamentals can worsen considerably, government debt may worsen, and revenues cannot be used for domestic clean energy and economic development investment. Support for clean energy and structural economic transformation will thus be critical for fossil fuel exporters, alongside the kinds of interventions to explicitly address regional economies, workers, and communities as assets close.

6. Conclusion

It is impossible to separate Africa's mitigation and adaptation response to climate change from its sustainable development imperatives. Long-term low-emissions and climate-resilient development pathways require addressing the multi-faceted energy challenges outlined above - Africa's development and prosperity hinge on addressing the continent's lack of clean, reliable, and secure energy for industry and households. Current financing modalities have not attracted the necessary investments in generation, grid, or household access, leaving Africa behind in the unfolding global energy transition and making it challenging for the continent to address its pressing developmental priorities.

At the same time, and despite the continent's limited responsibility, climate change impacts are having and will have, at a much greater scale in the future, a negative impact on Africa's capability to address its sustainable development challenges and will also create more challenges which need to be addressed. A just energy transition will strengthen the continent's capability to adapt to climate change, avoid future GHG

[69] See RSA, 2022, Just Energy Transition Investment Plan (JET IP) for an outline of proposed interventions in South Africa, available from https://www.thepresidency.gov.za/content/south-africa's-just-energy-transition-investment-plan-jet-ip-2023-2027

[70] See for example South Africa's Just Transition Framework and Just Energy Transition Investment Plan

emissions, and address any negative impacts resulting from climate response measures.

Achieving this will require a combination of effective multilateral cooperation within the framework of the UNFCCC and its Paris Agreement to provide financial and technical support and efforts by African states to overcome domestic hurdles to rapid investment in renewable energy and the network. Regional cooperation also offers some clear advantages in further integrating the continent's electricity systems.

The very large scale of investment required will require innovating financing solutions which do not result in unsustainable debt for an already highly-indebted continent and serve to de-risk the necessary investments. Scaled-up international public finance is thus critical to the achievement of Africa's just energy transition pathway.

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