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Stranded Assets: The Nexus Between Extractives, Climate, & the Circular Economy Within the African Extractives Sectors

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African perspectives
Global insights

Executive summary

As the world moves towards a low-carbon energy transition, the potential risk of stranded assets within the extractives sectors in Africa is increasingly a reality for many fossil fuel dependent countries. The 2015 Paris Agreement aims to limit global warming to below 2°C above pre-industrial levels. Efforts to mitigate climate change are therefore a key driver of potential asset stranding, particularly the stranding of fossil fuels within the extractives industry. This potential asset stranding poses a significant risk for fossil fuel rich developing countries because of their dependence on fossil fuel revenues to build their economies and meet their developmental goals.

Yet, alongside the risks, asset stranding brings opportunities within the African extractives sectors that need to be unlocked. The demand for mineral energy materials, such as cobalt and copper, is expected to rise and thus exploration and mining will continue into the foreseeable future. As the global energy transition towards renewables gains momentum, premature de-industrialisation and increasing levels of energy poverty in Africa should be addressed by African governments. Fossil fuel dependent African countries should use resources at their disposal to meet energy demands and ensure that social and development goals are prioritised while actively pursuing low-carbon development.

Introduction

The risk of stranded assets is gaining prominence in the extractives, climate, and circular economy discourses.¹ For the purpose of this paper, stranded assets are defined as natural resources that have suffered from unanticipated or premature write-downs, devaluations, or conversion to liabilities. Efforts to mitigate climate change – through the adoption of the Sustainable Development Goals² and the Paris Agreement³ – have heightened this risk. At the same time, there is a growing recognition that a ‘just transition’ is required whereby climate change challenges are addressed through sustainable development without compromising the social and economic goals of developing countries. The concept of the ‘circular economy’, as an attempt to integrate economic activity and environmental wellbeing in a sustainable way, speaks directly to this ambition.⁴

1 Glada Lahn and Siân Bradley, ‘Left Stranded? Extractives-Led Growth in a Carbon-Constrained World’, (Research Paper, Energy, Environment and Resources Department, Chatham House, The Royal Institute of International Affairs, UK, 2016), <https://www.chathamhouse.org/sites/default/files/publications/research/2016-06-17-left-stranded-extractives-bradley-lahn-final.pdf>.

2 The Sustainable Development Goals are a collection of 17 interconnected global goals that are designed to be a blueprint for peace and prosperity for people and the planet, now and into the future, <https://sdgs.un.org/goals>.

3 The Paris Agreement is a legally binding international treaty on climate change and it was adopted by 196 Parties at COP 21 in December 2015, <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>.

4 Alan Murray, Keith Skene and Kathryn Haynes, ‘The Circular Economy: An Interdisciplinary Exploration of the Concept and Application in a Global Context’, *Journal of Business Ethics*, no. 140 (2017): 369-380.

The key drivers associated with a move away from fossil fuels include environmental challenges, shareholder activism, changing resource landscapes, new government regulations, falling clean technology costs, evolving social norms as well as litigation and changing statutory interpretations.⁵ This creates risks for fossil fuel extraction companies but also presents risks to countries dependent on fossil fuel revenues. For example, the oil and gas sector accounts for about 75% of government revenues in Nigeria and 65% in Angola. In 2018 there were 11 African countries that relied on the extractive sector for more than 40% of export revenues.⁶ Asset stranding poses a risk to African countries that are reliant on fossil fuel revenues to develop their economies. It has been estimated, for instance, that Africa will have to leave 26% of gas, 34% of oil, and 90% of coal reserves untouched if the world is to meet its Paris Agreement targets. This implies significant economic losses to fossil fuel dependent African countries.⁷

Asset stranding poses a risk to African countries that are reliant on fossil fuel revenues to develop their economies

While stranded assets pose significant risks for fossil fuel dependent African countries, there are opportunities to be unlocked. With growing urban populations and the advancement of technology, the demand for mineral energy materials, such as cobalt and copper, is expected to rise. Moreover, the rapid progression of the transport and energy revolution setting the world on a low-carbon growth path or a 'circular economy' will rely heavily on mineral energy materials. For instance, the US is heavily dependent on imported minerals such as rare earth elements and lithium, which are essential for electric vehicle batteries.⁸

The rapid progression of the transport and energy revolution setting the world on a low-carbon growth path or a 'circular economy' will rely heavily on mineral energy materials

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- 5 Stranded Assets Programme, Smith School of Enterprise and Environment, University of Oxford. Discussion Paper (2014). [F'NOTE INCOMPLETE]
 - 6 Magnus Ericsson and Olof Löf, 'Extractive dependency in lower-income countries: Evolving trends during the transition to low-carbon future', UN University World Institute for Development Economic Research 2020/120, October 2020, <https://www.wider.unu.edu/sites/default/files/Publications/Working-paper/PDF/wp2020-120.pdf>.
 - 7 Christopher McGlade & Paul Ekins, 'The geographical distribution of fossil fuels unused when limiting global warming to 2°C', *Nature*, 517 (2015): 187-190.
 - 8 Jordy Lee and Morgan Bazilian, 'The US is worried about its critical minerals supply chain – essential for electric vehicles, wind power and the nation's defence', *The Conversation*, April 2, 2021, <https://theconversation.com/the-us-is-worried-about-its-critical-minerals-supply-chains-essential-for-electric-vehicles-wind-power-and-the-nations-defense-157465>.

Premature deindustrialisation

As the world embarks on the transition to a circular economy the implications of 'premature deindustrialisation' in developing countries need to be addressed appropriately, particularly in the case of fossil fuel dependent African countries. Premature deindustrialisation refers to the phenomenon of developing countries moving out of manufacturing into low-value service economies before undergoing labour-absorbing industrialisation.⁹ They are doing so sooner, and at lower median per capita income level, than their industrialised counterparts.¹⁰ The global transition to a lower-carbon economy presents opportunities to address these problems. One of the channels through which this can occur is for countries to adopt green industrialisation strategies. For instance, countries may choose to exploit opportunities in the global value chain for solar panel or battery production. However, to ensure the switch towards renewable energy does not harm short-term socio-economic development the risk of stranded fossil fuel assets should be carefully managed through a just transition.. Additionally, this would ensure that the negative impacts of losing fossil fuel revenues were staggered and minimised. A major risk is that economic inequality will continue to expand as the gains from technological advancement accrue to the already-industrialised world at the expense of developing countries.¹¹ Social and developmental goals in developing countries need to be prioritised, with the provision of high-quality jobs foremost among them. Connecting mineral and metal extraction to job-creating green industrialisation is therefore urgent.

The rise of the energy revolution: a response to climate change

Energy, growth and development

Beginning with the first industrial revolution in the 18th and early 19th centuries, global demand for energy has greatly increased. The average improvement in the quality of human life and economic development spurred further demand for transport and information.¹² The use of fossil fuels, specifically oil, coal and natural gas, became the primary energy sources underpinning industrial development, with demand for these fuels increasing in step with economic growth. However, the use of fossil fuels is an environmentally unsustainable way of sourcing energy. Such energy production results in a series of environmental challenges including but not limited to 'wastewater, water, gas

9 Dani Rodrick, 'Premature Deindustrialisation', *Journal of Economic Growth*, no. 21 (2015): 1-33.

10 Rodrik, Premature Deindustrialisation, 3.

11 Rodrik, Premature Deindustrialisation, 3.

12 Zou Caineng, Zhao Qun, Zhang Guosheng, Xiang Bo, 'Energy revolution: From fossil energy era to new energy era', *Natural Gas Industry B*, no. 3 (2016): 1-11.

and waste residue generated in the development and utilisation of high-carbon energy.¹³ More notably, carbon dioxide levels have increased 31% in the past 200 years.¹⁴ Greenhouse gas emissions, a large portion of which are produced by extracting and burning fossil fuels contribute to climate change, with wide-ranging societal, economic and environmental impacts. While fossil fuel-based energy has spurred development, it has also created a divergence between private returns and social costs. Fossil fuel companies reap the benefits while offloading the environmental and social costs onto those who can least afford it.¹⁵

The global energy transition

Collaborative efforts to address climate change challenges through processes such as the UN Framework Convention on Climate Change (UNFCCC) negotiations gained serious momentum in the early 1990s. Fundamentally, the objective of UNFCCC is to stabilise greenhouse gas emissions at a level that may prevent dangerous human-induced interference with the climate system.¹⁶

The Third Assessment Report of the UN's Intergovernmental Panel on Climate Change (IPCC) (2002) was produced by three working groups that focused on climate science, adaptation and mitigation. The report confirmed the earth's climate is changing due to human activities, energy use in particular. Carbon dioxide reductions will require 'increased conversion efficiencies of heat and electricity generation plants such as natural gas combined cycle and cogeneration systems, improved efficiency of end-use devices, improved energy management systems, physical and biological carbon sequestration and storage.'¹⁷

Carbon dioxide reductions also require a shift to low carbon emission technologies through switching to renewable and sustainable energy systems. A study by Acemoglu et al suggests that a combination of research subsidies and carbon taxes can successfully redirect technological change toward cleaner technology.¹⁸ The drastic reduction of carbon dioxide emissions needs the participation of hard-to-abate sectors such as oil, gas, aluminium, iron, steel, cement, and petrochemicals as well as heavy duty road transport, shipping, and aviation. According to the International Energy Agency (IEA), these sectors contribute a total of 37% of carbon dioxide emissions.¹⁹ Even with concerted collective action, the IPCC models indicate that reaching the 1.5°C or 2°C target – a goal set out in the Paris

13 Caineng et al., 'Energy revolution: From fossil energy era to new energy era', 3.

14 R.E.H. Sims, 'Renewable Energy: a response to climate change', *Solar Energy*, no. 76 (2004): 9-17.

15 For an exploration of how to reduce these 'negative externalities', see D Acemoglu and M.O. Jackson, 'Social norms and the enforcement of laws', *Journal of the European Economic Association*, no. 15 (2): 245-295.

16 UN Framework Convention on Climate Change. "What is the United Nations Framework Convention on Climate Change?" <https://unfccc.int/process-and-meetings/the-convention/what-is-the-united-nations-framework-convention-on-climate-change>.

17 R.E.H Sims, 'Renewable Energy: a response to climate change', *Solar Energy*, no. 76 (2004): 9-17.

18 Daron Acemoglu, Ufuk Akcigit, Douglas Hanley, William Kerr, 'Transition to Clean Technology', *Journal of Political Economy*, no. 124 (2016): 52-104

19 Monsouri, N.Y et al., "A carbon management system of innovation: Towards a circular carbon economy" (Policy Briefing, G20 Insights, 2020), A carbon management system of innovation: Towards a circular carbon economy – G20 Insights (g20-insights.org).

Agreement on Climate Change in 2015 – cannot be achieved without reaching emission neutrality alongside efforts to deploy and use negative emission technologies (NETs). NETs refer to technologies that capture previously emitted greenhouse gases, for example, using afforestation and reforestation to remove carbon dioxide in the atmosphere.²⁰

Consequently, investments into renewable energy technologies have led to the beginning of a global energy transformation to mitigate climate change challenges. Africa has a large endowment of renewable energy; the African Development Bank estimates the potential power generation in the continent at 350 GW for hydroelectric, 110 GW for wind, 15 GW for geothermal and 1000 GW for solar.²¹ In addition, prospects for renewable energy extend to bioenergy with wood supply from surplus forest²² estimated at 520 GWh/year.²³

However, analysis provided by Oil Change International, a research and advocacy organisation, reported that between 2014 and 2016, nearly 60% of public finance for energy in Africa went to fossil fuels, an annual average of \$11.7 billion, while only 18% went into renewable energy.²⁴ China provided the largest volumes of public finance, averaging \$5.1 billion per year out of \$19.8 billion per year in total public energy finance in Africa. Most of this financing went toward oil and gas infrastructure, while 13% went toward coal-fired power generation.²⁵ Volumes of public finance for energy in Africa are unevenly distributed. The top recipients include Angola, Egypt, and South Africa; these countries have received nearly half of the public finance. Furthermore, a recent study found that coal and gas will continue to account for up to two thirds of the continent's electricity generation beyond 2030, with renewable energy making up less than 10% of the energy mix.²⁶ The report highlights that the huge demand for new generation capacity is causing many African governments to opt for short-term, carbon-intensive solutions to the energy problem. However, what appear to be short-term solutions often take longer to construct than more sustainable options such as wind and solar power, which are increasingly less expensive to install at scale.

Since 2014, the oil price has been driven down significantly due to the increase of supply in non-traditional sources of fossil fuel.²⁷ Following on closely from the discovery of shale gas

20 Felix Creutzig, Christian Breyer, Jerome Hilaire, Jan Minx, Glen P. Peters and Robert Socolow, 'The mutual dependence of negative emission technologies and energy systems'.

21 African Development Bank, *The New Deal on Energy for Africa: A transformative partnership to light up and power Africa by 2025: Update on Implementation*, 2017, https://www.afdb.org/fileadmin/uploads/afdb/Documents/Generic-Documents/Brochure_New_Deal_2_red.pdf.

22 In this context, the term 'surplus forest' refers to the excess amount of forest (trees) left beyond what is needed for non-energy purposes.

23 International Renewable Energy Agency, *Africa 2030: Roadmap for a renewable energy future*. (Abu Dhabi: International Renewable Energy Agency).

24 Oil Change International, *Assessing International Public Finance for Energy in Africa: Where Do Development and Climate Priorities Stand?* (Washington, DC: Oil Change International, 2000).

25 Oil Change International, *Assessing International Public Finance*.

26 Galina Alova, Philipp A. Trotter and Alex Money, 'A machine-learning approach to predicting Africa's electricity mix based on planned power plants and their chances of success', *Nature Energy* no. 6 (2021): 168–166.

27 Prebleen Bajpai, Top Factors That Affect the Price of Oil, Investopedia, January 21, 2020, <https://www.investopedia.com/articles/investing/072515/top-factors-reports-affect-price-oil.asp#:~:text=Since%202014%2C%20oil%20prices%20have,drop%20in%20demand%20for%20oil>.

in the US, OPEC (the Organization of the Petroleum Exporting Countries) an international intergovernmental body established to manage global oil supplies (and thus keep prices stable) has had limited success in fulfilling its mandate.²⁸ The value of the potentially stranded assets cannot be estimated with any precision because such quantification depends on investors having more clarity about climate policy interventions and their effectiveness.²⁹

Moreover, the uncertain response of financial markets and underlying macro-economic trends make it difficult to estimate the value of potentially stranded assets. However, the extent of verifiable conformity to Environmental, Social and Governance (ESG) standards will increasingly determine where investors allocate capital; this is unlikely to be towards fossil fuels. Over the last decade, there has been a rise in coal financing costs due to the risk associated with high-polluting projects potentially being left stranded as governments focus on meeting their climate action goals.³⁰ In light of the high risk associated with high-polluting projects, investors expect returns of 40%, which is four times higher than the returns expected for low risk renewable projects.³¹

Developing countries are undergoing the transition out of manufacturing and into low-value services much earlier than has historically been the case with their industrialised counterparts, who used manufacturing growth to accumulate wealth through which to transition to high-value service economies. Late industrialisers have been unable to build manufacturing sectors as large or wealthy as their industrialised counterparts and are starting to deindustrialise at considerably lower levels of income per capita in comparison with early industrialisers. Early deindustrialisation may have detrimental effects on economic growth, as the services sector in developing countries is typically not of a high value.³² Since the 1980s, developing countries have experienced falling manufacturing shares both in employment and real-added value. Manufacturing in developing countries has significantly shrunk at levels of income that are a fraction of those at which developed countries started to deindustrialise.³³

However, while many developing countries are dependent on the continued availability of fossil fuel to meet energy and transport requirements, falling renewable energy costs have made renewable energy attainable.³⁴ It is nonetheless clear that a transition in that direction must be just and fair. Policy formation should ensure that the benefits of new technologies accrue broadly and not only to the already-wealthy. Similarly, policymakers in developed countries should assist with financing to support developing countries as they

28 Prableen Baijpai, Price of Oil.

29 Richard Baron and David Fischer, 'Divestment and Stranded Assets in the Low-carbon Transition', (Background Paper, Organisation for Economic Co-operation and Development, Paris, 2015), <https://www.oecd.org/sd-roundtable/papersandpublications/Divestment%20and%20Stranded%20Assets%20in%20the%20Low-carbon%20Economy%2032nd%20OECD%20RTSD.pdf>.

30 Jillian Ambrose, 'Coal financing costs surge as investors opt for renewable energy', *The Guardian*, April 19, 2021, <https://www.theguardian.com/environment/2021/apr/19/coal-financing-costs-surge-as-investors-opt-for-renewable-energy>.

31 Ambrose, 'Coal financing'.

32 Rodrik, Premature Deindustrialisation, 3.

33 Rodrik, Premature Deindustrialisation, 3.

34 Rodrik, Premature Deindustrialisation, 4.

reduce their dependence on fossil fuel use and revenues. As the risk of stranded fossil fuel assets grows, these questions need to be addressed as a matter of some urgency.

Implications of stranded assets in the African extractives industry

As contextualised in the above section, climate change challenges have encouraged the transition to renewable energy across the world, which has the potential for negative impact on fossil fuel resource-rich African countries. These countries have received substantial investments in developing fossil fuel reserves in recent decades, and many became oil-addicted as the oil price soared (prior to 2014) to above \$100/barrel. As noted earlier, Africa will have to leave a substantial volume of its fossil fuel endowments untapped if the world is to meet its climate targets. Yet, even while the damaging impacts of climate change are becoming ever clearer, developing countries such as Mozambique, Kenya, Tanzania, Ghana, Uganda, Senegal, South Africa and Cote d'Ivoire have discovered fossil fuel resources and are moving ahead with plans to develop these resources.³⁵

The impact of stranded assets on governments will be manifold and not all countries rich in fossil fuels will be affected equally. Impacts may include a decline in export revenue, a fall in domestic consumption, job losses and difficulties in reducing economic dependency on fossil fuels. For instance, the reduced oil demand due to the COVID-19 pandemic has led to a significant drop in oil price, pushing it below \$25 per barrel.³⁶ This drop has had a direct impact on oil revenue-dependent countries. For example, Algeria, Nigeria and Libya have been impacted significantly. This demonstrates that not all countries reliant on fossil fuels will be impacted in the same way. The oil-dependent economies have been more severely affected due to the significant oil price drop exacerbated by the COVID-19 pandemic.

The fossil fuel divestment movement and its impact

Fossil fuel divestment campaigns have been used as a contentious strategy for change and continue to be debated regarding its financial consequences and effect on decarbonising the economy. Several institutional investors have reduced their investment in fossil fuel companies significantly because of both ethical and financial considerations.

As an example of the divestment movement, the Rockefeller Foundation, an American private philanthropic foundation, announced its commitment to divesting its \$5 billion endowment from existing fossil fuel interests while refraining from investing in future fossil

35 Menas Associates, *Key Countries and Opportunities in Africa's Oil and Gas Industry*, (2017), [Africa-Oil-Report.Pdf \(africa-independentsforum.com\)](#).

36 'Coronavirus: Oil price collapses to lowest level for 18 years', *BBC*, 30 March, 2020, <https://www.bbc.com/news/business-52089127>.

fuel projects.³⁷ This divestment was symbolic because the Rockefeller Foundation was largely built on the proceeds of Standard Oil, a company that, at its peak, controlled more than 90% of all petroleum products in the US.³⁸ Fossil Fuel Divestment, an international fossil fuel divestment movement, records that more than 1300 institutions controlling \$14.5 trillion have divested from fossil fuel projects.³⁹ Such divestment has significant economic impact and illustrates the effort that has been made to encourage a move away from use of fossil fuels. Nevertheless, since the adoption of the Paris Climate Agreement in December 2015, 60 global banks have financed fossil fuel projects worth more than \$3.8 trillion.⁴⁰ In addition, the IEA has warned that carbon emissions are set to rise an estimated 1.5 billion tonnes⁴¹ as the global economy undergoes a recovery from the COVID-19 recession. Notably, this would be the second biggest annual rise in history, following the 2007–2008 financial crisis.⁴²

The impacts on fossil fuel companies of the recent divestment drive, combined with lower oil prices, have been significant. In 2016, the UK bank, HSBC, calculated that key industry players such as Shell, BP, Eni, Total and Equinor stand to lose between 40% and 60% of their market value as they will not be able to exploit their reserves as planned due to negative environmental impacts.⁴³ The coal industry is subject to even greater impact from divestment trends. Certain fossil fuel companies such as Shell, BP and Rio Tinto have been involved in broader climate initiatives. These companies are members of the Energy Transition Commission, a cross-sector initiative of energy corporations, banks, research, and international organisations exploring the actions required to achieve a global transition to low-emission pathways⁴⁴. At country level, on the one hand, the Danish government announced that it would end new oil and gas exploration in the Danish North Sea as part of its plan to phase out fossil fuel extraction by 2050.⁴⁵ On the other hand, the very same government announced plans to develop the Arctic for drilling of oil, gas, and rare earth minerals.⁴⁶ Thus, the real impact of apparent fossil fuel divestment remains questionable. The Energy Policy Tracker has shown that there is at least \$151 billion worth of funding from G20 governments in support of fossil fuels, in line with ensuring economic recovery post the COVID-19 pandemic but only \$89 billion has been committed to clean energy.⁴⁷

37 Rockefeller Foundation, 'The Rockefeller Foundation Commits to Divesting from Fossil Fuels', press release, December 18, 2020, <https://www.rockefellerfoundation.org/news/the-rockefeller-foundation-commits-to-divesting-from-fossil-fuels/>.

38 Matt Egan, 'A \$5 billion foundation literally founded on oil money is saying goodbye to fossil fuels', *CNN Business*, December 18, 2020, <https://edition.cnn.com/2020/12/18/investing/rockefeller-foundation-divest-fossil-fuels-oil/index.html>.

39 Fossil Fuel Divestment, 'What is divestment', <https://gofossilfree.org/divestment/what-is-fossil-fuel-divestment/>.

40 Rainforest Action Network, 'Banking on Climate Chaos: Fossil Fuel Finance Report 2021', March 2021. <https://www.ran.org/wp-content/uploads/2021/03/Banking-on-Climate-Chaos-2021.pdf>.

41 Julia Horowitz, 'Dire warning' for the planet: Coal is powering the economic recovery', *CNN Business*, April 20, 2021.

42 Fiona Harvey, 'Carbon emissions to soar in 2021 by second highest rate in history', *The Guardian*, April 20, 2021.

43 Tim Schlösser et al., *From Riches to Rags*, 37.

44 Energy Transition Commission, <https://www.energy-transitions.org/who/>.

45 Jillian Ambrose, 'Denmark to end new oil and gas exploration in North Sea', *The Guardian*, December 4, 2020, <https://www.theguardian.com/business/2020/dec/04/denmark-to-end-new-oil-and-gas-exploration-in-north-sea>.

46 Diane Pham, 'Denmark Announces Plans to Develop the Arctic for Oil and Gas Drilling', *In Habitat*, December 1, 2020, <https://inhabitat.com/denmark-is-trying-to-develop-the-arctic-for-its-oil-and-gas-reserves/>.

47 Theresa Smith, 'Fossil Fuels still get more investment than renewable energy', *ESI*, September 1, 2020, <https://www.esi-africa.com/industry-sectors/generation/fossil-fuels-still-get-more-investment-than-renewable-energy/>.

Fragility in African mining jurisdictions

While fossil fuel divestment may pose a risk to the stability of political equilibrium in African countries, it may equally be the case that sudden disruption – away from fossil fuels – may facilitate longer-term stability and broad-based development. The political, social, and economic fragility in most African mining jurisdictions has been strongly attributed to the dynamics of the ‘resource curse’. Rent-seeking, corruption and patronage associated with resource wealth has undermined institutional quality,⁴⁸ and has served as both a cause and consequence of weak governance. Divestment from fossil fuels may have positive long-term consequences, but its negative impact on weakly institutionalised countries may produce serious short-term instability, as these countries lack the governance mechanisms required to mitigate risk and invest in alternatives.

If unproductive rent-seeking dominates any given political settlement, incentives to pursue transparency and accountability are strongly diminished.⁴⁹ In turn, this heightens bureaucratic corruption and leads to weak protection of property and citizens’ rights.⁵⁰ The development of robust political institutions is, therefore, a critical component of supporting accountability and ensuring that resource-rich countries benefit more broadly and sustainably from their mineral wealth,⁵¹ especially as divestment momentum accelerates away from fossil fuels and towards a lower-carbon future. For example, Nigeria is one of the largest oil producers in the world. Between 2015 and 2019 it produced 2.5 million barrels per day.⁵² Despite this significant oil wealth and production, 86.9 million Nigerians live below the poverty line of \$381 per year.⁵³ This illustrates that the resource curse remains prevalent in the country. Similar trends are observable in other resource rich African countries such as South Africa, Zimbabwe, Zambia, Democratic Republic of Congo, Angola, Tanzania and Mozambique where there is a significant disconnect between the abundance of natural resources and positive economic growth outcomes.

48 Andrew David Williams, ‘On the release of information by governments: Causes and consequences’, *Journal of Development Economics*, no. 89 (2009): 124–138.

49 Ivar Kolstad and Arne Wigg, ‘It’s the rents, stupid! The political economy of the resource curse’, *Energy Policy*, no. 37 (2009): 5317–5325.

50 H Mehlum, K Moene and R Torvik, ‘Institutions and the resource curse’, *The Economic Journal*, no. 116 (2006): 1–20.

51 James A Robinson, Ragnar Torvik and Thierry Verdier, ‘Political foundations of the resource curse’, *Journal of Development Economics* 79 (2006): 447–468.

52 Herman, K, ‘Top 5 Oil Producing Countries in Africa’, *Pumps Africa*, July 10, 2020, <http://pumps-africa.com/top-5-oil-producing-countries-in-africa/>.

53 World Bank, ‘Nigeria releases new report on poverty and inequality in country’, *The World Bank*, May 28, 2020, <https://www.worldbank.org/en/programs/lsm/brief/nigeria-releases-new-report-on-poverty-and-inequality-in-country>.

Towards a low-carbon circular economy – the role of economic diversification

For the creation of a sustainable set of national assets, states can invest in profitable diversification and consider savings via a sovereign wealth fund, for example. Investing in profitable diversification can increase financial and material assets and build up sound economic institutions, a competitive educational system and a healthcare system that can withstand the impact of a growing disease burden. A sovereign wealth fund may allow for saving revenue from the fossil fuel sector for future use and facilitate diversified investments with a step-by-step reduction of fossil fuel sector dependence.⁵⁴

Undoubtedly, the impact of stranded assets will vary from country to country, depending on their respective levels of fossil fuel dependence and institutional quality. The variation will primarily be driven by each country's socio-economic development position and capabilities to transition to a low-carbon or circular economy. Successful economic strategies in fossil fuel dependent African countries will need to balance managing traditional carbon-intensive assets (and their volatility) and the transition to a low-carbon growth model.

Some fossil fuel dependent countries have taken key steps to ensure that long-term benefits from natural resources are maximised. For instance, in Ghana, fossil fuel wealth is being used to support the government's flagship development programmes and support economic diversification. The Ghanaian government launched an industrialisation agenda titled One District, One Factory (1D1F), which proposed to build one factory in each of the 260 districts of the country in order to make Ghana export-orientated to minimise the country's dependence on foreign aid as well as natural resources.⁵⁵ In addition, this programme is designed to increase agricultural production, enhance food security, create jobs, and reduce Ghana's dependence on food imports.⁵⁶ Undoubtedly, the 1D1F initiative requires a substantial energy base and Ghana's excess electricity generation capacity provides a significant opportunity in this regard. The 1D1F initiative can also serve as means to further diversify the Ghanaian economy by investing in follow-up low-carbon technologies to power the factories with clean energy.⁵⁷

Fundamentally, implementation of good governance practices by governments will be required to ensure that they invest in structural economic reforms to sustainably move away from fossil fuel extraction, and this will further require political will and collaborative effort from all relevant stakeholders. Moreover, as varying economic diversification options are

54 UN Framework Convention on Climate Change, "The concept of economic diversification in the context of response measures Technical paper by the secretariat" UN FCC, Geneva, 2016), <https://unfccc.int/resource/docs/2016/tp/03.pdf>.

55 UN University Institute for Natural Resources in Africa (UNU-INRA), Africa's Development in the Age of Stranded Assets. Discussion Paper 2019. [Discussion-paper-Africas-Development-in-the-age-of-stranded-Assets_INRAReport2019-.pdf](https://www.unu.edu/publications/discussion-paper-africas-development-in-the-age-of-stranded-assets) (unu.edu).

56 UNU-INRA. 'Africa's Development in the Age'

57 UNU-INRA. 'Africa's Development in the Age'

explored, consideration will need to include a full range of possible national assets and of human development benefits of low-emission diversification.

African countries are well positioned to take advantage of the market for minerals and metals needed to produce electric vehicle batteries, stainless steel, wind-turbines and satellites. Low-carbon technologies will also need minerals such as aluminium, cobalt, copper, iron, lead, lithium, nickel, manganese, the platinum group of metals rare earth elements including cadmium, molybdenum neodymium, and indium–silver, steel, titanium, and zinc. According to the World Bank, these minerals could potentially see a growing market and ultimately, these minerals are crucial in aiding resource diversification on the African continent.⁵⁸

Due to the significant move toward fossil fuel divestment, the demand for ‘clean’ minerals and metals to meet the demands of a circular economy will continue to grow. While the demand for minerals and metals will feed into low-carbon technologies, it will require sustainable, strategic, and reliable value chains.

Conclusion

The increasing probability of stranded assets within the extractives industries has presented significant risks for many stakeholders. Addressing the challenges posed requires a collaborative effort from all relevant stakeholders. Industrialised economies will have to provide substantial financial and technical support to the fossil fuel-rich developing countries if the world is to achieve sustainable and transformative development through reducing carbon emissions in line with the Paris Agreement.

In addition, there is a requirement for development cooperation among governments of developed countries and international climate change bodies to use their capacities in the areas of economic and development planning, fossil fuel governance and climate policy to tackle stranded assets-related risks in fossil fuel reliant African countries. More importantly, African governments that are fossil fuel reliant need to ensure that economic diversification is enabled through fossil fuel revenues. As the world embarks on the trajectory to a low-carbon or circular economy, fossil fuel rich countries have a responsibility to ensure that they are abreast with the key risks associated with stranded assets while ensuring that their social and economic development goals are prioritised.

58 World Bank, The Growing Role of Minerals and Metals for a Low Carbon Future, 2017, <http://documents1.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf>.

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About SAIIA

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SAIIA's policy insights are situation analysis papers intended for policymakers, whether in government or business. They are designed to bridge the space between policy briefings and occasional papers.

Cover image

General view of the Schonland coal mine in eMalahleni, South Africa, part of the Highveld region turned over to mines and power plants. South Africa has placed a heavy bet on coal for its development – a fuel that is plentiful, cheap and locally sourced. But campaign groups say health and climate costs are high. eMalahleni, which means 'the place of coal', is among the worst places in the world for nitrogen dioxide and sulphur dioxide pollution, according to Greenpeace, June 13, 2019 (Wikus De Wet/AFP via Getty Images)

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