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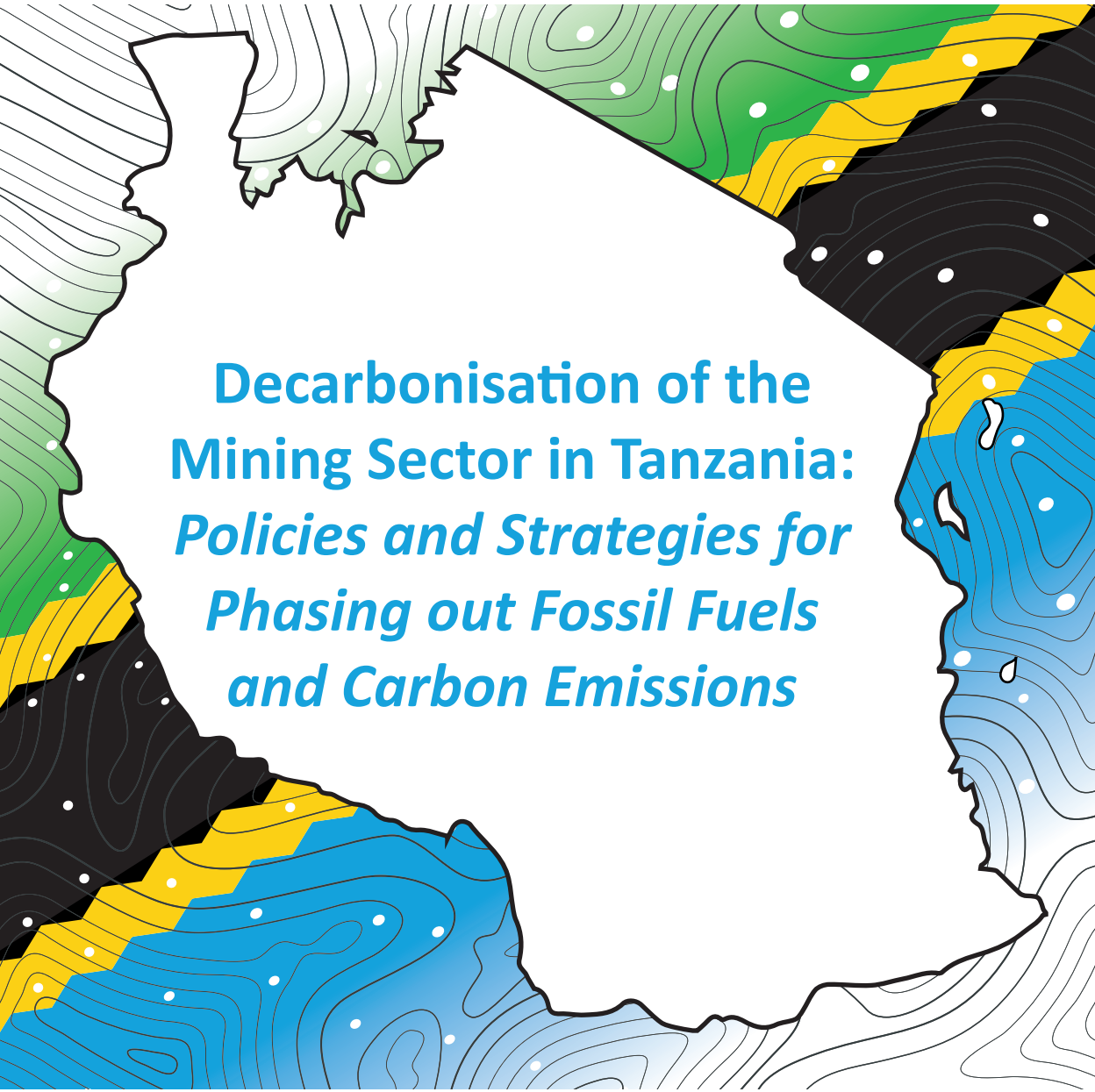

Decarbonisation of the Mining Sector in Tanzania: *Policies and Strategies for Phasing out Fossil Fuels and Carbon Emissions*

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Southern Africa Resource Watch

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Introduction

This policy paper examines the Tanzanian government's decarbonisation policy and options regarding the country's mining sector. Decarbonisation of the mining sector seeks to materialise and promote a just energy transition from using fossil fuels to cleaner energy sources in the mining industry. The examination involved reviewing available literature and interviews with key informants. The paper, therefore, concludes that no decarbonisation policy or legal framework is driving Tanzania's mining industry into a just energy transition. The situation is caused by a lack of technology, information, and skills regarding the relationship between the mining industry and climate change, poor coordination between key sectors, lack of a holistic policy approach, and lack of funding and political will. To address this situation, the paper proposes the implementation of decarbonisation policies specifically for the mining industry, harmonisation of international and national decarbonisation efforts and increased vertical integration between critical sectors of government.

Background

The extractive sector plays a significant role in the economy of Tanzania. Proceeds from the extractive industry contribute to social services, poverty alleviation, employment provisions, foreign exchange, and foreign direct investments. Mining and quarrying activities substantially contributed substantially to Tanzania's Gross Domestic Product (GDP) growth in the first quarter of 2021. The sector recorded 10.2 percent of the GDP, equivalent to 1,473,804 million TZS. The vast investments in the extractive industry have not yet contributed to the achievement of anticipated fruitful results for the common Tanzanian[1]. This is mainly due to poor regulatory regimes, corruption, poor infrastructure, a lack of linkages between the extractive sector and other economic sectors, and the inability to add value to these minerals to avoid exporting raw materials.

Nevertheless, the Tanzanian mining sector also faces significant environmental impacts, and these include deforestation, the use of mercury and cyanide in gold

[1] Kinyondo, A. and Huggins, C., 2021. Promoting environmental sustainability in the artisanal and small-scale mining sector in Tanzania (No. 2021/119). WIDER Working Paper.

processing, dust, and noise pollution, generalised water pollution, soil contamination, and failure to adequately reclaim mining areas[2,3] . Despite the above-identified issues, the Tanzania mining industry remains attractive to investors, given the next few years of significant diversification to mining nickel, uranium, and coal. There is also the availability of investment incentives and supply chain opportunities in the mining sector[4].

The mining industry is a major catalyst towards climate change since the industry uses massive amounts of fossil fuels[5]. This calls for the decarbonisation of the industry to mitigate and adapt to climate crisis changes. 'Decarbonization refers to reducing 'carbon intensity', lowering the amount of greenhouse gas emissions produced by burning fossil fuels[6]. As much as decarbonisation of the mining industry leads to sustainable development and a low-carbon society. In resource-rich countries such as Tanzania, this leads to stranded assets. Stranded assets have suffered from unanticipated or premature write-downs, devaluations, or conversion to liabilities[7]. The risk of stranding assets can be caused by new government regulations limiting fossil fuel use (like carbon pricing), a change in demand (for example, a shift towards renewable energy because of lower energy costs), or even legal action against high emitters.

To prevent the situation of stranded assets and realise a just energy transition, decarbonising Tanzania's mining industry faces several legal and policy challenges. Considering the climate crisis, the government acknowledges the difficulty of monitoring and controlling the mining industry. Aligning decarbonisation efforts with national priorities, failing to establish channels of policy coherence between various pieces of legislation, a lack of coordination between levels of government, a lack of knowledge regarding the connection between the climate crisis and the mining industry, a lack of resources, and a lack of capacity have all been additional challenges. For instance, primary legislation conflicted with itself over the requirement for an Environmental Impact Assessment (EIA) and/or an Environmental Protection Plan (EPP), assigning the problem to various agencies[8].

[2] https://www.researchgate.net/publication/353219681_Promoting_environmental_sustainability_in_the_artisanal_and_small-scale_mining_sector_in_Tanzania
[3] Kitula, R. A., et al. "Climate vulnerability of biophysical systems in different forest types and coastal wetlands in Africa: a synthesis." International Forestry Review 17.3 (2015): 67-77.
[4] https://www.trade.gov/country-commercial-guides/tanzania-mining
[5] Albiman, M.M., Suleiman, N.N. and Baka, H.O., 2015. The relationship between energy consumption, CO2 emissions and economic growth in Tanzania. International Journal of Energy Sector Management, 9(3), pp.361-375.
[6] Papadis, E. and Tsatsaronis, G., 2020. Challenges in the decarbonization of the energy sector. Energy, 205, p.118025.
[7] Bos, K. and Gupta, J., 2019. Stranded assets and stranded resources: Implications for climate change mitigation and global sustainable development. Energy Research & Social Science,
[8] IPIS (2019). Mapping Artisanal and Small-Scale Mining in Northwest Tanzania. Brussels: IPIS.

Plausible attention has been placed on the mining industry's impacts on the environment, but little has been done about the industry's impact on the climate crisis. In this context, the paper presents a study that focuses on the interaction between the mining industry in Tanzania and the climate crisis. Considering this relationship, the paper analyses the probable policy avenues for decarbonisation to foster a just energy transition in Tanzania's mining sector for a low-carbon society.

This paper provides a snapshot of the current regulatory, institutional, and mining corporate context towards the decarbonization of Tanzania's mining industry. Specifically, the report aims to answer the following questions:

a) How do Tanzania's current regulatory, policy and institutional context promote and enable the decarbonization of the mining sector?
b) What are the roles of crucial decarbonisation stakeholders in monitoring and regulating the climate crisis in the mining sector?
c) How efficient are the efforts to mitigate the exacerbated impacts of climate change in Tanzania's mining sector?
d) What are some recommendations to materialise and promote the just energy transition in Tanzania's mining sector?

Overview of the Taniania mining sector

The extractive industry is Tanzania's most prominent and among the most lucrative sectors, contributing over 10 per cent to the country's GDP in 2021[9]. Metals (Gold, iron ore, nickel, copper, cobalt, and silver), industrial minerals (tanzanite, ruby, garnet, limestone, soda ash, gypsum, salt, and phosphate), and fuel minerals are all mined in Tanzania (coal, uranium). Furthermore, Tanzania is also a source of several critical minerals, such as rare earth metals, manganese, nickel, and graphite, that are significant to the global energy transition. In 2019, Tanzania exported minerals valued at over 2.4 billion dollars, significantly increasing from 1.6 billion dollars in 2018. Gold is the most significant contributor to the value of mineral exports in Tanzania[10].

[9] https://www.google.com/search?q=Tanzania+Mining%2C+2022&rlz=1C1GCEU_enZA1044ZA1044&oq=Tanzania+-+Mining%2C+2022&aqs=chrome.69i57j33i160l3j33i22i29i30.1066j0j15&sourceid=chrome&ie=UTF-8

[10] https://www.google.com/search?q=Tanzania+Mining%2C+2022&rlz=1C1GCEU_enZA1044ZA1044&oq=Tanzania+-+Mining%2C+2022&aqs=chrome.69i57j33i160l3j33i22i29i30.1066j0j15&sourceid=chrome&ie=UTF-8

The following are some of the mining companies operating in Tanzania; Bulyanhulu Gold Mine, Buzwagi Gold Mine, Acacia Mining Tanzania, Strandline Resources Limited, Gypsum Plus Mines Ltd, Geita Gold Mine, Tanzania Chamber of Mines and Golden Pride Gold Mine. Recent mining in Tanzania has seen the country become Africa's third largest gold producer (after South Africa and Ghana), producing around 48 tonnes in 2003. Gold mining in Tanzania was responsible for around 62% of the nation's total exports – generating around US$504 million in revenue in the same year. Gold mining in Tanzania is dominated mainly by Resolute Ltd, Ashanti Goldfields, AngloGold, Barrick Gold Corp, and Placer Dome Inc[11] . There are both underground and open-cast mining operations in Tanzania.

Mining activities, including prospecting, exploration, construction, operation, maintenance, expansion, abandonment, decommissioning and repurposing of a mine, can impact social and environmental systems in a range of positive and negative, direct and indirect ways. Mining can yield various benefits to societies but may also cause conflict, not least regarding above-ground and sub-surface land use. Similarly, mining can alter environments, but remediation and mitigation can restore systems. Boreal and Arctic regions are sensitive to impacts from development, both on social and environmental systems. Native ecosystems and aboriginal human communities are typically affected by multiple stressors, including climate change and pollution[12]. Mining operations generally do have diverse impacts, both positive and negative; these operations move materials into river bodies, especially during periods of intense storms and rainfall, which causes sedimentation, siltation, and turbidity of the rivers, in line with the finding made by Kitula (2006) in small-scale gold mining sites in Tanzania.

Tanzania's climate strongly reflects the more significant trends in global climate change. Climate change-related risks like deteriorating water quality and quantity, biodiversity loss, and declining agricultural output are no longer just looming dangers but an existing reality dictating the way of life in this developing East African country (Lyimo and Kangalawe, 2010). According to recent studies on climate change in Tanzania, it has been projected that there will be an increase in extreme weather events (Nyembo, 2022). Tropical storms, flooding, droughts, cyclones, and other extreme weather events are all expected to become more

[11] https://projectsiq.co.za/mining-in-tanzania.htm

[12] https://environmentalevidencejournal.biomedcentral.com/articles/10.1186/s13750-019-0152-8

common, violent, and unpredictable in Tanzania. The incidents led to widespread power outages, rationing, food shortages, skyrocketing food costs, and enormous losses of animals and agricultural products.

Government's policy on decarbonization of the mining sector in Tanzania

In Tanzania, like any other developing country, decarbonisation refers to all measures through which a business sector or an entity – a government, an organisation – reduces its carbon footprint, primarily its greenhouse gas emissions, carbon dioxide (CO2) and methane (CH4), to reduce its impact on the climate.

The government has developed relevant legislation to address the exacerbated impacts caused by climate change. The National Adaptation Programme of Action (NAPA 2007), the National Climate Change Strategy (2012), the Zanzibar Climate Change Strategy (2014), the National REDD+ Strategy and Action Plan (2013), the Environmental Management Act of 2004, the Disaster Management Act of 1990, the National Energy Policy of 2003, the National Environmental Policy of 1997, and the Intended Nationally Determined Contribution (INDC) of 2015 are the primary policy and regulatory framework addressing climate change. There are also sector-specific strategies and recommendations for addressing climate change, such as the Tanzania Agriculture Climate Resilience Plan, 2014-2019, and Guidelines for Integrating Climate Change into National Sector Policies, Plans, and Guidelines (2013).

The policy and regulatory framework need to exhaustively address the challenges of the impacts of climate change in Tanzania. For example, the Department of Environment (DoE) in the Vice President's Office (VPO) is the coordinating agency for climate change and the National Focal Point for the UNFCCC. The powers vested in the DoE originate from the Environmental Management Act (EMA) 2004 since there is no climate change policy (Smucker et al., 2015). The Act provides for the establishment of various committees at national and local levels. However, there is no guiding framework between these local and national committees and the international climate change agenda. The functionaries under the DoE are yet to create relationship avenues between different levels of government and industries to address the climate crisis.

The operationalisation, coordination, and financing of the policy and strategy aims to continue to provide problems for the policies and strategy framework. Due to the National Climate Change Focal Point's lack of support, the created committees do not regularly convene (NCCFP)[13]. The appropriate ministries responsible for combating climate change have also set up "desks" to address the issue in their respective fields. The lack of capacity is brought on by limited awareness of climate change and the insignificant financial resources allotted to the desks. The 2012 National Climate Change Strategy has put in place strategies to address institutional capacity strengthening at all levels, acknowledging that national efforts towards climate change adaptation and mitigation need to be addressed across a range of sectors in a coordinated manner. The National Climate Change Strategy recognizes the limited institutional capacity to address the impacts of climate change in Tanzania.

Although critical interventions have been identified, the strategy needs a thorough financial plan that outlines projected expenses and anticipated funding sources for its climate change agenda[14]. Coordinating local and national efforts to combat climate change is still difficult. It will be difficult to effectively include climate change in development planning across sectors and Local Governments since there is a divide between national and local governments. The Tanzanian planning commission is delinked from the integration process since it plays a small part in the mechanisms for institutional coordination surrounding the coordination and implementation of climate change policies[15]. Using environmental measures presents a challenge for integrating climate change into other industries. It runs the risk of being classified as an environmental concern even when the impacts go beyond the environment.

Multinational companies, governments and civil society need to develop policy options to mitigate climate risks in the mining sector due to their high level of uncertainty, to create avenues that breed skill sets, technology, linkages and knowledge on the nature and probable impact of climate risks[16].

[13] https://www.researchgate.net/publication/353219681_Promoting_environmental_sustainability_in_the_artisanal_and_small-scale_mining_sector_in_Tanzania

[14] Watkiss, P., Downing, T., Dyszynski, J., Pye, S., Savage, M., Goodwin, J., Longanecker, M. and Lynn, S., 2011. The economics of climate change in the United Republic of Tanzania. Global Climate Adaptation Partnership (GCAP).

[15] Nachmany, M., 2018. [online] Lse.ac.uk. Available at: <https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2018/10/Climate-change-governance-in-Tanzania-challenges-and-opportunities.pdf> [Accessed 15 September 2022].

[16] Kolde, L. and Wagner, O., 2022. Governance Policies for a "Just Transition"–A Case Study in the Rhineland Lignite Mining District. Journal of Sustainable Development of Energy, Water and Environment Systems, 10(1), pp.1-16.

Pathways towards a Just Transition by Government:

Tanzania's government has implemented short-term, medium, and long-term strategies for promoting the energy transition. The National Rural Electrification program from 2013-2022 aims to increase the country's electricity access from 36% in 2014 to 50% by 2025 and at least 75% by 2033 (World future council, 2017). For Tanzania to materialise the energy transition, the government implemented two energy plans, a long-term perspective plan (LTPP) and a short National Five-year development Plan (FYDPII). The LTPP was established in June 2012 to push Tanzania into a middle-income country by incorporating issues such as climate change and environmental protection into the national development agenda[17]. The FYDPII includes renewable energy with specific proportions; 50% by 2021 and 70% by 2026.

Furthermore, Tanzania implemented the National Strategy for Growth and Reduction of Poverty (MKUKUTA). The MKUKUTA plan facilitates Tanzania's national poverty reduction strategy to meet sustainable development goals through improving quality of life and living standards, governance and accountability and accelerating economic growth. However, MKUKUTA, FYDPI &II and LTPP have not emphasised the decarbonization of the mining industry.

The Tanzanian government has largely emphasised on environmental impacts of the mining industry rather than the industry's role in exacerbating the impacts of climate change. Eng. Joseph Kumburu of the Ministry of Mines in Tanzania states that "the most significant measure to decarbonise Tanzania's mines has been the switch from the use of generators to the national grid that reduces the amount of GHG emitted". An employee by GGM states that "the priority of the government and authorities does not look to investigate emissions. However, multinational mining companies create strategies to control emissions due to regulatory compliance; they develop Environmental Impact Assessments and Environmental Management Programs that track the impact of emissions onto the climate and environment". He further states that "multinational mining companies undertake the conservative strategy on energy and biodiversity. Still, the priority and emphasis is on energy efficiency. This is done by developing energy-efficient technology, thus reducing emissions". He stated that "authorities do not have the sophisticated technology to detect greenhouse gas emissions, so they concentrate on particulate matters that could lead to an increase in acidic rain. To achieve sustainability, the authorities must concentrate beyond particulate matters to GHG such as nitrate and carbon emissions".

[17] Kida, T. and Mushi, D., 2016. Implementation of SDGs in Tanzania: The Way Forward. [ebook] Available at: <http://southernvoice.org/implementation-of-sdgs-in-tanzania-the-way-forward/> [Accessed 16 September 2022].

Tanzania has made strides in the environmental management of its mineral resources and the mining industry with several legislative pieces in place. The Environmental Management Act and the regulations promulgated under it (such as the Environmental Impact Assessment and Audit Regulations of 2005) are the primary environmental laws, rules and regulations that apply to mining projects in Tanzania. Other notable laws include the Mining (Safety, Occupational Health, and Environment Protection) Regulations of 2010 and the Mining (Environmental Protection for Small Scale Mining) Regulations of 2010, which apply specifically to primary mining licence holders. These do not apply to prospecting or medium and large-scale mining activities. According to the Environmental Management Act, everyone working in the mining industry—including quarrying and open-cast extraction—must conduct an environmental and social impact assessment (ESIA) at their own expense. Regardless of whether the proponent has the necessary permit or license for carrying out the project, the ESIA must be completed before any funding or undertaking of the mining project. The ESIA Regulations also prescribe the environmental impact assessment and audit procedure. When all the conditions are satisfied, the Minister is mandated to issue an environmental impact assessment certificate.

Table 1: Table Showing a Summary of Tanzania's Policy and Regulatory Approaches

Policy/Regulation	Overall Objective	Nature of Provisions
Mineral Policy, 2009	To provide for an effective mineral sector…through the sustainable development and utilisation of mineral resources	Prescriptive standards
Mining Act of 2010	Provides for the regulation of mining activities (exploration and exploitation)	Prescriptive standards
Environmental Impact Assessment and Audit Regulations of 2005	Provide rules regarding the procedures for and carrying out environmental impact studies and environmental audits	Prescriptive standards, information and reporting requirements, Enforcement standards

Table 1: Table Showing a Summary of Tanzania's Policy and Regulatory Approaches (cont.)t

Policy/Regulation	Overall Objective	Nature of Provisions
Mining Act of 2010	Provides for the regulation of mining activities (exploration and exploitation)	Prescriptive standards
Mining (Safety, Occupational Health, and Environment Protection) Regulations of 2010	Provide rules for occupational health and environmental protection	Prescriptive standards
Mining (Environmental Protection for Small Scale Mining) Regulations of 2010	Provide rules for conducting mining activities safely and healthily while protecting the environment.	Prescriptive standards

The above analysis shows Tanzania does not have a robust policy approach to decarbonising the mining industry than Tanzania. The country uses mainly prescriptive standards but could adopt more performance-based standards, such as establishing air quality standards and GHG reporting, measurement, and monitoring approaches nationally and sectoral. Countries can adopt different policy pathways in dealing with the decarbonisation of the mining sector. Some notable approaches include prescriptive approaches, which, according to the IEA report [18], involve command-based approaches that focus on setting procedural, e.g., environmental and impact assessments and technological or equipment requirements. They are easier to administer and can work where there is no baseline knowledge of the emissions or a continuous monitoring programme.

On the other hand, performance-based approaches require emission reductions by an absolute or relative amount compared to a baseline or threshold. They establish an absolute or relative performance target according to a specific metric. They can apply at the national level through economy-wide targets or at the company, facility, or equipment level. Other approaches include permitting, measurement, reporting, verification, information, enforcement and policy coordination requirements, and economic instruments such as carbon taxes, emission performance credits and offsets[19]. As shown in the table above, some of these approaches can be seen in Tanzania's regulations. To ensure that the above-listed

[18] IEA 2021, Driving Down Methane Leaks from the Oil and Gas Industry, IEA, Paris
[19] IEA 2021, Driving Down Methane Leaks from the Oil and Gas Industry, IEA, Paris

policies are actualised, the government of Tanzania just completed negotiations with Shell, Equinor on $30 bln LNG project[20]. The LNG Project is driven by the discovery of a significant amount of gas off the coast of Lindi and Mtwara. These gas deposits are called "deepwater gas" because the gas fields are over 100km from the shoreline at a water depth of up to 2.5km. This volume of discovered gas would take 500 years for Tanzania to consume at the current consumption rates. This means there is more than enough gas for own consumption in the country for current and future power generation, expansion of current industrial use of gas in industries such as cement, breweries, plastics, ceramics, glass, steel, and other energy-intensive industries as well as selling gas potentially to neighbouring countries, developing Tanzania as a regional energy hub. Given these large quantities of gas, Tanzania has an enormous opportunity to export gas globally to generate income that can be used for other development needs in Tanzania[21]. The project is driven by population growth, demand for clean air through reduced emitted particles as well as CO2 emissions and declining domestically produced gas in most countries. The Asian markets, which offer the highest price for gas will account for over 70% of new demand. Tanzania's proximity to these markets puts its gas at an advantage against competitors.

Pathways towards a Just Transition by Mining Multinational Companies:

The multinational mining companies in Tanzania are yet to establish a clear and explicit decarbonisation framework toward a just energy transition. This is attributed to the emphasis on environmental rather than climate change policy and mechanisms in the mining industry in Tanzania. The case studies of the Geita Gold Mine, and the Bulyanhulu gold mine in Shinyanga, northern Tanzania, show the drive towards decarbonisation in Tanzania. In 2015, the government shifted from a sustainable development model toward an aggressive nationalistic resource model of natural resource governance[22]. This emphasised economic growth rather than sustainability. Hence, mining companies in Tanzania are yet to place just transition roadmaps and mechanisms due to lenient regulatory tools regarding the mining industry's role in the exacerbated impacts of climate change.

[20] https://www.reuters.com/business/energy/tanzania-completes-negotiations-with-shell-equinor-30-bln-lng-project-2023-03-07/
[21] https://www.shell.co.tz/about-us/what-we-do/_jcr_content/par/relatedtopics_4b07_c.stream/1647327326382/58f9b5a965fdf3f4f6aab31dfeaa00dffef16a5e/tanzania-gas-and-lng-project.pdf
[22] Huggins, C. and Kinyondo, A., 2019. Resource nationalism and formalization of artisanal and small-scale mining in Tanzania: evidence from the tanzanite sector. Resources Policy, 63(C),

Mining companies policies and intervention to decarbonise their operations

The case studies provide insight into the decarbonisation measures undertaken by multinational mining companies to mitigate and adapt to the exacerbated impacts of climate change in Tanzania. The case studies are the Geita Gold Mine and the Bulyanhulu gold mine in Shinyanga, northern Tanzania.

Box I: Bulyanhulu Case Study

Bulyanhulu is in northwest Tanzania, in the Kahama district of the Shinyanga region, approximately 55 kilometres south of Lake Victoria and 150 kilometres southwest of Mwanza. Bulyanhulu is a narrow-vein gold mine containing gold, silver, and copper mineralisation in sulphides.

Barrick Gold has set a timeline to materialise the strategies toward Net Zero emissions. Barrick Gold has set a target of at least 30% of greenhouse gas emissions by 2030 against the 2018 baseline of 7,541kt CO2 per annum, with a defined interim emissions reduction target of 15%. The mine has a Net Zero emissions target by 2050 established.

2020-2030

The mine's goal is to decarbonise its energy sources by 2030. This entails replacing coal and other heavy fuels with cleaner ones like natural gas and incorporating renewable energy into the grids.

Post-2025

Barrick Gold plans to change the vehicles it uses by introducing electric vehicles (EVs) into its fleet. Due to technological advancements, this can only be achievable later in the decade. The EVs are expected to work underground rather than in open pits and surface haulage operations.

Post-2030

The company aims to integrate renewables into its grids fully. The mine has plans to engage the government on green transitions using renewables to reduce emissions.

Source: Barrick Sustainability Report 2021

Box II: Geita Gold Mine Case Study:

Geita Gold Mine (GGM) is one of AngloGold Ashanti's flagship mines. The mine is in north-western Tanzania, in the Lake Victoria goldfields of the Mwanza region, about 120 kilometers from Mwanza and 4 kilometers west of the town of Geita. In 2008 the mine accounted for 6% of the company's annual gold output. AngloGold Ashanti has implemented climate change adaptation, mitigation measures, and timelines to bring sustainability to fruition.

Year	Decarbonization Milestone
2006	AngloGold Ashanti developed the first ever plans to reduce GHG emissions
2008	Company committed to a long-term target of 30% reduction in GHG intensity
2009	Completed company-wide carbon footprint, regulatory and physical climate risk assessments for each operation as part of the first Climate Change Strategy
2010	Installed heat pumps in mining machinery (South Africa)
2011	Refinement of underground cooling systems (South Africa)
2012	Implementation of thermal ice storage (South Africa) Optimization of auxiliary cooling and mine water systems (South Africa)
2014	Installation of real time energy consumption monitoring
2015	Adoption of ISO 50001 standard (South Africa and Brazil)
2016	Achieved 20% reduction in GHG intensity per tone treated
2017	Heat recovery from compressor after-cooler systems
2018	Introduction of GHG emissions targets in senior management discretionary pay Compressed air project sees continued efficiency gains
2019	Revision and optimization of air pressure set-points. Automatic water isolation valves in deep underground stopes
2020	Improved electrical power generation efficiency in Tanzania and Guinea
2021	Refreshed Climate Change Strategy approved by AngloGold Ashanti executive

Source: AngloGold Climate Change Report 2022

Just Transition Policy Analysis:

Tanzania is a resource-rich country navigating through a labyrinth of interests between providing universal access to energy to the general population against environmental conservation. Nevertheless, Tanzania is a party to international conventions and agreements that recognise the importance of reducing greenhouse gas emissions, such as the Paris Agreement, the Kyoto Protocol, and the United Nations Framework Convention for Climate Change. However, Tanzania must address the competing interests of developing fossil fuels for export and domestic utilisation against mitigating the exacerbated impacts of climate change. The debate boils down to sustainability and economic growth.

The critical climate change policies and priority sectors in Tanzania do not address the decarbonisation of the mining industry. The Tanzania National Development Plan (2016/17-2020/21) mentions the impact of climate change on food security and nutrition. The National Environment Policy echoes sustainability by protecting future generations from the natural resource utility of today's society. Tanzania's nationally determined contribution (NDC) provides a set of interventions on adaptation and mitigation, which are expected to build country resilience to the impacts of climate change and contribute to the global effort of reducing greenhouse gases (GHG) emission. This NDC is in line with Article 4 of the Paris Agreement, which establishesa2oC above pre-industrial levels and pursuing efforts to limit the temperatureto1.5 oC. Also, it builds on the National Climate Change Response Strategy (2021)[23], the Zanzibar Climate Change Strategy (2014), and other national climate change and development frameworks. The Zanzibar Climate Change Strategy of 2014 also mentions the mining industry. The National Adaptation Programme of Action of 2007 also highlights other sectors besides the mining sectors regarding climate change adaptation and mitigation. The Environmental Management Act and National Energy Policy also do not stress and acknowledge the importance of the energy transition in the mining sector.

It should be noted that the frequent policy changes and ongoing debates that have been made regarding the mining sector have been fiscal policies (Butler, 2004). This is because the mining sector is a source of revenue and a tool to channel economic growth and aggregate development for Tanzania's economy. The mining sector's role in increasing the impacts of climate change and the decarbonization process of the mining industry towards a more sustainable extractive

industry are unchartered waters that are yet to instigate policy and regulatory frameworks. However, the existing policies and strategies address interconnected risks across health, gender, tourism, fisheries, marine resources, livestock, forestry, energy, and agriculture. Still, these risks do not have a holistic policy intervention. Their existence misleads regulation and monitoring of decarbonization in Tanzania's mining sector.

The climate change policies in Tanzania assume that all parts of the population are equally affected by climate change. Hence, leaving out the peculiarities of gendered implications and the marginalization of women and other vulnerable communities. The mining sector has pre-existing injustices through the enclave nature of the industry[24]. The whole population cannot play a part and have a stake in the mining industry due to corruption, nepotism, and maladministration . However, the existing mining laws and policies only mention the mining industry's health and safety, environmental implications, and efficiency of the mining industry. These laws and policies do not advocate for existing vulnerabilities and injustices exacerbated by the climate crisis and the mining industry.

The current policy and regulatory framework lack a holistic approach leaving out significant sectors such as the mining industry. The policies have failed to highlight the relationship between the political and social ecology of mining communities, sustainability transitions of mining industries and just implications thereof. Furthermore, the laws and policies attempt to drive decarbonization of the mining industry to a lower carbon society have failed to reveal the political, social, economic, and environmental factors that create winners and losers in host communities and the country at large. The policies fail to highlight the lack of skills, knowledge, information, and sophisticated technology that can merge the globalisation sustainability efforts and the decarbonisation of Tanzania's mining industry. Developing decarbonisation energy systems must not be an alternative to "the ends justify the means". Instead, there must be an analysis of the costs and benefits of the change in energy systems in the mining industry.

Conclusion and Recommendations

The mining industry in Tanzania has been among the most crucial sectors in the country's economy over the years. However, the mining sector is yet to yield results that can drive Tanzania out of poverty. Tanzania's mining industry's contribution to greenhouse gas emissions has not been quantified. Nevertheless, the sector uses fossil fuels and is associated with massive environmental degradation within the host mining communities. Thus, impacting the social, political, and ecological well-being of mining host communities and the country. Due to the sector's lucrative nature, the government has taken a step back in decarbonising the mining sector in Tanzania. Instead, the government highlights the mining industry's role in driving economic growth and environmental degradation, turning a blind eye to the mining industry's contribution to increased greenhouse gas emissions.

Furthermore, the climate-related policies do not mention the mining industry, leaving room for multinational companies to manoeuvre through lenient climate laws and regulations. The decarbonisation process in Tanzania is still lagging. The country's commitments to different international climate change conventions and agreements are yet to promote the decarbonisation of the mining industry. The failures of Tanzania's climate change laws and policy goes beyond policy and regulatory mechanisms and encompass a lack of finances, skills, lack of political will, lack of adequate coordination between climate change regulatory authorities, poor carbon tracking, lack of sophisticated technology and lack of public awareness regarding the mining industry's role on exacerbating climate change impacts. Tanzania must implement explicit laws and regulations that advocate for a just energy transition within the mining sector. The laws and regulations must follow an approach to avoid violating the benefits of host communities and mining multinational companies while meeting the government's demands. Tanzania's mining sector can lead to a low-carbon society promoting sustainable development through a change in energy systems, the efficient conservation of the environment and carbon emission transparency.

Recommendations:

- The Tanzanian government must implement innovative mining policies and regulations for mining companies to have the will to switch to low carbon emissions. The switch to mining companies' low-carbon-emitting energy systems leads to green growth, enhancing Tanzania's resilient, low-carbon society.
- The government must implement a just energy transition towards low-carbon energy systems. Adopting a just energy transition will merge the income inequality gap, protect employment provisions that might be affected by the energy transition, and address volatile economic growth trends for host communities.
- The government must intertwine a moral injunction when addressing environmental and climate-related challenges to avoid aggravating social and ecological problems related to disempowerment, inequality, poverty, and exploitation.
- The different functionalities addressing climate change must create a solid vertical integration to facilitate local and national integration and a swift flow of information, to enhance the legitimacy of decarbonisation policies in the mining industry.
- The government must harmonise national and international decarbonisation efforts to facilitate climate change financing, regulation and monitoring using comparative mechanisms between Tanzania and other developed mining countries.
- The mining companies must re-assess their investment portfolio towards the exploitation mechanisms that do not hasten the climate crisis in Tanzania.
- The mining companies can independently report on sustainability measures by employing carbon counting tools and techniques to create a metric for their greenhouse gas emissions.
- The Tanzanian government must implement just transition skills by developing local content policies compatible with the global energy transition.
- The Tanzanian government can establish air quality standards and GHG reporting, measurement, and monitoring approaches.

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SARW
Southern Africa Resource Watch

SARW Objectives

Monitor corporate and state conduct in the extraction and beneficiation of natural resources in Southern Africa, and assess to what extent these activities uplift the economic conditions of the region's communities.

- Generate and consolidate research and advocacy on natural resource extraction in Southern Africa.
- Create informed awareness of the specific dynamics of natural resources in Southern Africa, building a distinctive understanding of the regional geo-political dynamics of resource economics.
- Provide a platform of action, coordination and organisation for communities, activists, researchers, policy-makers, corporations, regional and global governing bodies in the watching and strengthening of corporate and state accountability in extractive industries.
- Engage with and support government on building accountable and transparent management of extractive resources.
- Build capacity for communities, civil society, parliaments, and media to hold governments and corporations to account, and to participate in decisions about resource management.
- Advocate and promote human rights and environmental protection in resource extraction activities.
- Support efforts to legislate mandatory public disclosure of and access to financial, social, environmental and regulatory compliance information in the extractives industry.
- Promote extractive industries that create wealth for local communities.

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