

CHINESE INVESTMENTS AMID THE ENERGY CRISES AND MINERAL TREASURES IN ZIMBABWE



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Policy Brief Series on China and
Africa's Energy Transition

Policy Brief 01

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The International Institute of Green Finance (IIGF) of Central University of Finance and Economics (CUFE) is an independent and non-profit think tank established in Beijing, China. It conducts research within a range of areas of green finance such as credit, bonds, insurance, carbon-trading, information disclosure, as well as risk assessment. The IIGF works with numerous stakeholders in green finance both within and outside China.

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This policy brief is the first of the series of two. Our second policy brief in the series is *China's Role in Egypt's Low-Carbon Energy Transition: from Renewable Energy to Green Hydrogen*.

Policy Brief Series on China and Africa's Energy Transition

The study of African energy transition requires more context-specific evidence on how suitable energy transition pathways can be identified among various African countries that face distinctive endowments, potentials, and obstacles (Mulugetta et al, 2022). Indeed, the negligence of the heterogeneity among African countries, particularly their specific social-political and social-economic conditions when discussing the proper transition strategies has long haunted the research and professional community. In addition, most analysis on African energy transition focus rather narrowly on the specific renewable energy sector, such as wind and solar energy activities, and failed to capture its symbiotic links with broader factors such as sectoral governance and reforms, or global market and value chain development. Such a rather 'tunnel vision' approach that treated renewable energy activities as isolated arena of energy transition forbids us to develop a comprehensive understanding of transition strategies in the given national or regional context.

A similar gap is also noted in the research on Chinese engagement in Africa's energy transition when both parties are viewed as monolithic groups with homogeneous interests and practices. The context-specific evidence is particularly scarce as most analysis have been focusing on the aggregated scale of these Chinese wind or solar activities. The current literature is either focusing on the landscape overview of Chinese activities at the macro (regional) level, or the specific impacts of individual projects at the micro (project) level (Shen, 2020; Lema et al, 2021). Yet the meso-level research that situates Chinese engagement within different national contexts is scarce.

We believe that national case studies are critical by providing the crucial insights on how Chinese renewable energy activities are embedded within different national energy systems and development strategies, and how they can help facilitating the integration of local industrial capacities into the global value chain around renewable energy industries. Such meso-level investigation can help illustrate the unique challenges and opportunities faced by individual African country for attracting Chinese investment or enhancing their current performance in various aspects.

In this policy brief series, we are exploring various cases in Zimbabwe, Egypt, Ethiopia, among other African countries, on how renewable energy activities are developed related to the exploitation of critical transitional minerals, nurturing an energy storage sector, or supporting the much-needed reforms in the power sector. We will identify the role of Chinese financiers and corporations in facilitating and shaping these crucial inter-linked activities and their impact on the transition pathways in the given country.



Chinese Investments Amid the Energy Crises and Mineral Treasures in Zimbabwe

Zimbabwe is simultaneously facing a substantial energy supply crisis and a historical window of opportunities in its lithium mineral resources that are critical to the global green energy transition. Such a predicament imposes crucial questions on how these two strategically important sectors should be developed in a coordinated way for nurturing a sustainable and modern energy system in the country. Meanwhile, since Chinese companies are the major players in both the power generation and lithium mining sectors, their influence and contribution to the national energy and development strategy have become increasingly critical. In this policy brief, the magnitude of Zimbabwe's energy crisis and the potential opportunities in the transitional mining resources are investigated, with a particular focus on how these two sectors should be interlinked with Chinese investments. Potential benefits of such interlinkages are discussed, such as providing a stable power supply around the mining communities, improving distributions of mining revenues, and enhancing sectoral governance in both sectors around the ESG guidelines. We argue that Chinese investment and engagement in both sectors have notable impacts on all these issues.

Zimbabwe's power sector in a nutshell

Zimbabwe's energy system is characterised by a chronic power shortage crisis, promising clean energy endowment, and an ambitious policy framework. The country is witnessing a severe energy supply crisis as it is in desperate need of additional power generation capacity to sustain its essential economic activities. Power outages are frequent since last winter, which can last up to 17 hours a day in major cities. The country's aging power plants are struggling to cope with the growing demand and often in maintenance-related time-off (Chingono, 2022). The country is highly dependent on petroleum and electricity imports due to a lack of hydrocarbon resources and its aging and inefficient electricity infrastructure. It imports power from Zambia, Mozambique, and South Africa, while managing a small export to Namibia. Its current transmission and distribution losses are estimated at 18% in 2020, which is higher than the average among Sub-Saharan countries (Government of Zimbabwe, 2021).

The power shortage in Zimbabwe is, however, a chronic problem, as the growth of power demand in the past decade (from 1.4 to 1.9 GW) far exceeds the growth of power supply capacity (from 1.05 to 1.2 GW) (AfDB 2011; Se4all, 2012). Zimbabwe has a total installed power generation capacity of 2.3GW currently, which is largely owned by Zimbabwe Power Company (ZPC), a state-owned power generation subsidiary of the Zimbabwe Electricity Supply Authority (ZESA). More than 50% of electricity is generated from hydropower power while the remainder is from thermal power plants (See Table 1). Complementary facilities such as bagasse, mini-hydropower, and small-sized grid-connected solar systems have an installed capacity of about 130MW.

Besides severe power shortages in urban areas due to the appalling insufficiency of utility-scale baseload plants, most of the population living in rural areas does not have access to electricity. The electricity access rate of 13.0% in rural areas and the overall electrification rate stays at 40% in Zimbabwe, with over sixty-five percent (65%) of households depending on firewood for cooking and heating (MoEPD, 2019). As a result, in achieving the SDG7 of universal energy access by 2030, Zimbabwe faces dual challenges of both providing utility-scale baseload capacities and essential energy supply (tier 1 or tier 2) via off-grid or mini-grid renewable energy systems.

Table 1. The list of ZPC power plants in Zimbabwe

Plants	Type	Year Completion	Year Expansion	Installed Capacity
Hwange	Coal	From 1983	Under construction	920MW + 600MW
Kariba South Bank I & II	Hydro	From 1959-1962	2018	666MW + 300MW
Harare	Coal	1957	Station 1 is not in use	80MW
Bulawayo	Coal	1947-1957	1999	90MW
Munyati	Coal	1946-1957	n/a	100MW

Source: ZPC website

Given all the challenges mentioned above, Zimbabwe is endowed with proven coal resources of 12 billion metric tonnes, situated mainly in the northern/north-western part of the country. Yet as international finance is withdrawing from the coal power sector, these resources are likely to remain untouched. The hydropower potential concentrates along the Zambezi River where most large dams are planned. There is additional potential in the Eastern Highlands for mini-hydro projects. Zimbabwe has high solar radiation averaging 20MJ per square meter and 3000 hours of sunshine per year, and the average electricity potential for solar PV of 359 kWh/m²/year (van Kuijk, 2012), making solar energy the most promising RE resource in the country. On the contrary, wind energy resource is limited in the country.

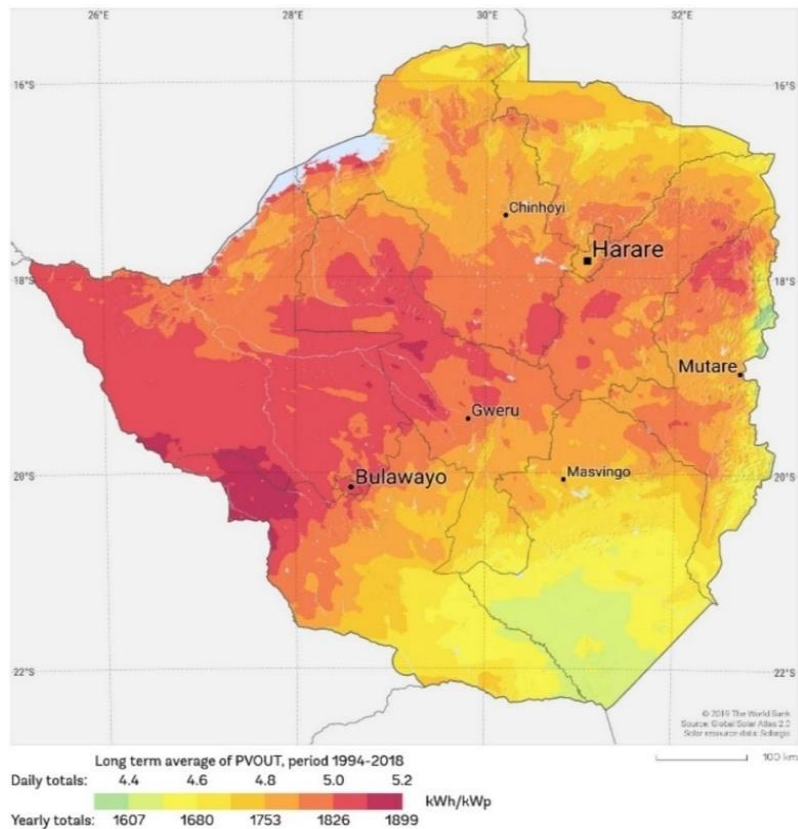


Figure 1. Solar energy potential in Zimbabwe

Source: Global Solar Atlas

Zimbabwe's energy transition strategy was dictated by a series of national and international policy commitments. Zimbabwe submitted its revised NDC in 2021 under the Paris Agreement, with a target of achieving GHG emissions of 40 percent below the projected 'Business as Usual' level conditional to international support. Under such a scenario, economy-wide emissions per capita are projected to be 2.3 tCO₂eq in 2030 (Government of Zimbabwe, 2021). The energy sector (including transportation) is currently the second biggest contributor to total national GHG emissions in Zimbabwe after the agricultural sector, accounting for 33% of total GHG emissions in 2017 with the main source of emissions coming from thermal power generation (37.71%). Zimbabwe aims to increase power generation from cleaner energy sources to around 2,400 GWh by 2025 and 4,600 GWh by 2030. To reach that target, it is estimated that 1.1GW of installed capacity is needed by 2025 from non-hydro renewable energy sources, which would then need to increase to 2.1GW by 2030 (MoEPD, 2019).

Domestically, Zimbabwe's long-term development strategy is enshrined in its Vision 2030 with the overall goal to strive 'towards a prosperous and empowered upper-middle income society by 2030' (Government of Zimbabwe, 2018), which is largely in line with African Union's visionary Agenda 2063. However, the high energy poverty level is one of the major impediments to achieving this development goal.

Zimbabwe's energy sector is overseen by the Ministry of Energy and Power Development (MoEPD), which is responsible for formulating and implementing effective policies and regulatory frameworks in the country. MoEPD issued the National Energy Policy (NEP) in 2012 as an overall policy framework for the long-term development of the energy sector. The MoEPD has established a technical department, known as Energy Conservation and Renewable Energy, or DECRE to promote the deployment of renewable energy resources (Makonese, 2016). In addition, the National Renewable Energy Policy (NREP) was developed in 2019 as complementary guidelines to the NEP. The NREP aims to enhance the share of RE in the overall energy mix with a focus on obtaining cost-effective deployment of renewable energy sources, achieving social economic development in the local communities, and boosting gender equality and employment as endorsed by other Acts and Policies. The NREP also prescribed a mix of policy instruments with specific incentives to promote investment in the renewable energy sector, and many of these policy instruments were designed under the supervision of the Zimbabwe Energy Regulatory Authority (ZERA), which is largely in charge of micro-governance of specific infrastructure activities and energy markets (see Figure 2).

According to the NREP, all renewable energy projects will be awarded National Project Status to be exempted from the customs regulations, which allows the developers to import certain renewable energy equipment at a lower cost. Renewable energy developers are also allowed access to the pension fund, insurance funding, and bond market, given the approval of the Ministry of Finance on a case-by-case basis. Meanwhile, license fees, entry requirements, and local taxes are all deducted to encourage the development of RE projects. In addition to these standard incentives that apply to all RE projects, various procurement mechanisms were also tailored to different renewable energy resources, including Feed-in Tariffs (FiT) for small hydropower, biomass, and geothermal projects, and a competitive bidding program for solar photovoltaics (PV) and CSP projects. As for the wind energy projects, NREP also prescribed FiT at the initial stage followed by competitive bidding based on the review of the performance of FiT. These tailored mechanisms indicate careful consideration from the government agencies regarding the specifications of developing various policy instruments in supporting RE deployment in the country. Yet such a diversification strategy certainly requires more skill sets and capacities from different government departments to manage multiple policy instruments simultaneously.

The NREP also prescribed some de-risking tools with specific goals to reduce transactional costs and potential frictions from land acquisition. It recommends a dedicated agency be established to facilitate the bureaucratic processes of project approvals from different government departments. The same agency will be managing the land auctions fairly and transparently, particularly in association with the development of wind and solar energy projects. The policy recommends at least 1% of the revenue be spent on the affected communities for local development. As for the sovereign guarantee, which is often viewed as the most important de-risking tool for foreign investors, MoEPD agrees to coordinate with the Ministry of Finance for the issuance of such a guarantee to enhance investor confidence, particularly around different legal issues for the approval of the guarantee.

As for the specific procurement mechanism, MoEPD aims to prescribe standard and bankable PPAs with reference to Common Market for Eastern and Southern Africa (COMESA) PPA guidelines. Zimbabwe Electricity Supply Authority (ZESA) is a state-owned company responsible for generating, transmitting, and distributing electricity in Zimbabwe, which has two subsidiaries responsible for energy generating (Zimbabwe Power Company, or ZPC), and transmission and distribution services (the Zimbabwe Electricity Transmission and Distribution Company, or ZETDC). The PPA should contain risk sharing mechanism on tax or policy changes between the power producer and the off-taker (ZETDC). In principle, the PPA shall also consider tariff adjustment based on market dynamics, so that the tariff should be adequate to cover the cost of operating the facility, repaying the debt, and providing a reasonable return on equity. Other risks such as curtailment, grid connections, and political risks are also considered in designing the standard PPAs. In addition, to enhance transparency and private investment in the sector, the maximum government-procured RE capacity based on bilateral negotiations is up to 50% of total RE capacities. The procurement also includes a 30% national content requirement to encourage domestic manufacturing capacity in renewable energy equipment.

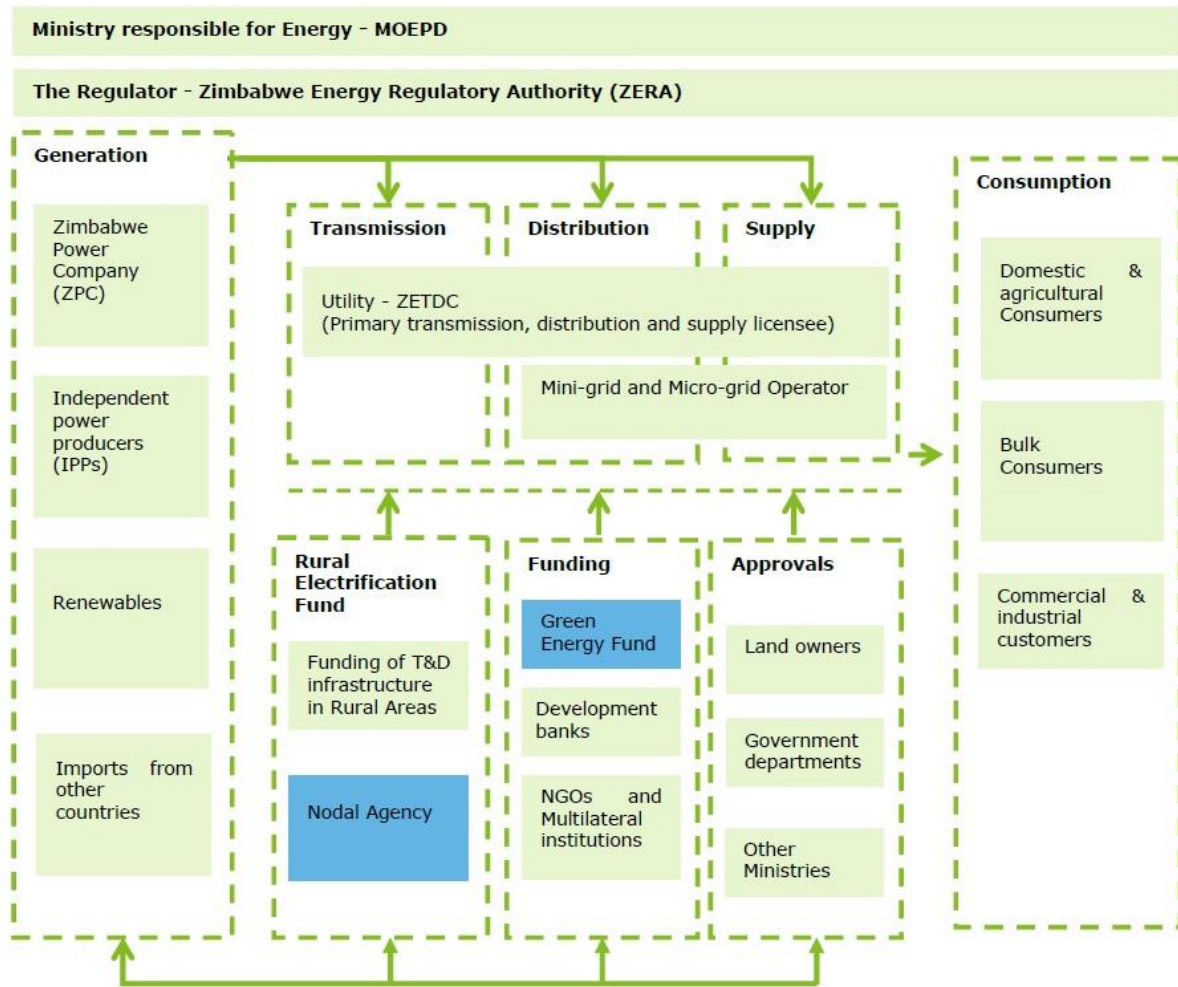


Figure 2. Governing RE sector in Zimbabwe

Source: The NREP, 2019

Chinese involvement in Zimbabwe's RE market

The majority of renewable energy projects in Zimbabwe are planned or implemented via the IPP model. However, there is a notable inconsistency regarding the data on the actual number of potential deals in the project pipeline. According to ZERA, there are altogether 30 licensed IPPs projects in the energy sector, with a total capacity of 194MW. The majority of IPPs are RE projects, including solar PV, bagasse, and mini-hydro facilities. There is only one thermal power station (ZZEE) of 50MW developed by a joint venture between Qualisave Mineral Resources of Zimbabwe, and a private Chinese company Yuxia Zhongxin. This is a multi-phase project, and it is currently unclear if phase II and III (270MW total) would proceed given China's announcement of quitting financing coal power plants overseas in 2021. Meanwhile, Chinese SOE PowerChina announced the completion of constructing a 2MW solar park in 2019, developed by the local company Centragrid as the first awarded solar IPP in the country. Phase II (23MW) of this project is now under construction with the aim to complete it by 2022 (PowerChina, 2020).

Besides PowerChina, several Chinese SOE companies are engaging Zimbabwe's solar energy market actively. The Gezhoubu group has signed five solar projects EPCs according to the Chinese media, among which three of them are now revealed with a total capacity of 278MW, notably with different local developers. In addition, the China National Electric Engineering Company (CNEEC) also signed a 50MW EPC with the local developer Zororo Energy. As a result, it is estimated that Chinese SOEs are contracted to deliver at least 350MW of solar energy capacities in the coming years if all these signed agreements were eventually implemented successfully.

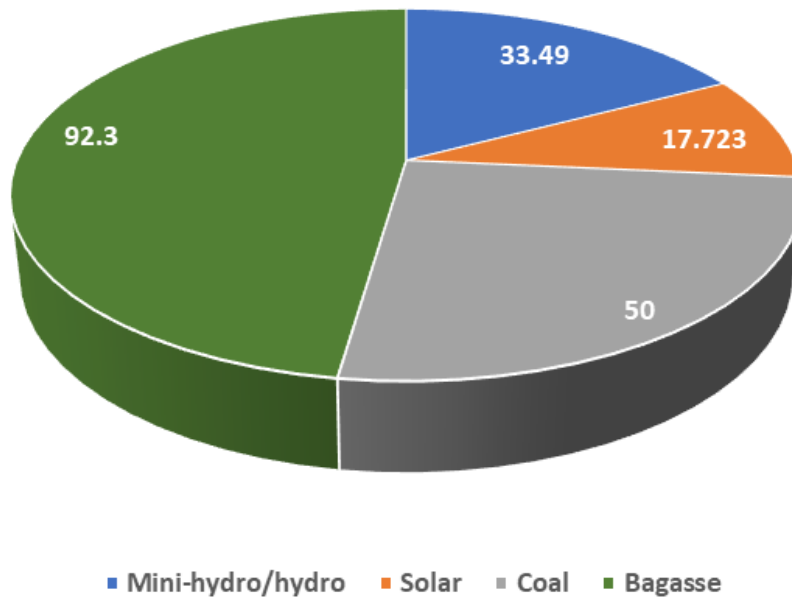


Figure 3. The energy mix of licensed IPPs in Zimbabwe (in MW)

Source: ZERA, 2022

Although such a rapid transition towards solar is encouraging, adequate finance remains the biggest challenge. The macroeconomic stability in Zimbabwe has been wrecked by chronic hyperinflation and a huge sovereign debt overhang with international creditors, and there is no foreseeable solution in the near term. It should be noted that this is not the first time the Zimbabwe government to engage with the solar energy sector as an alternative solution for its energy poverty. Back in 2015, three 100MW solar energy projects were contracted with different Chinese companies including ZTE and MCC, yet none of them eventually took off due to a lack of available funding. This time the rush toward solar energy is the second attempt yet amid even more austere global and national economic constraints. The other challenge is rather technical, as even if these newly contracted solar projects can be commissioned as planned, the impacts of this intermittent power on the country's fragile transmission system can be a great concern. Large curtailment may occur, which would affect the enforcement of the PPAs even if such risks have been taken into consideration when signing the contract. Given the financial and technical challenges, it seems that the Zimbabwe government should prioritize a handful of projects with the most promising prospect of reaching financial closure. A close monitoring system should be in place for the RE IPPs, to avoid further dispersion of limited financial and institutional resources on projects that are less likely to be commissioned.

Lithium mining as a rescue?

Mining is one of the important economic pillars of Zimbabwe. Even before the pandemic, metallic minerals and coal production constitute 17% of the national GDP (ICMM, 2022). In Zimbabwe, more than half of the FDI went to the mining sector, and mineral exports take up three-quarters of the total exports. In 2021 the total outputs reached a record high of \$5.2 billion largely due to the sharp rise in international commodity prices. Zimbabwe President Mnangagwa declared his ambitious goal to achieve a milestone of \$12 billion in revenue from mining activities in 2023. The key source of such ambition is Zimbabwe's untapped lithium reserves, which are the largest on the continent. Zimbabwe is already the largest producer of lithium ores in Africa. According to USGS statistics, Zimbabwe produced 1,200 tons of lithium in 2021, accounting for 1% of the world's total but with significant potential to scale up its production.

Zimbabwe government has removed the requirement of at least 51% local ownership in the mining entities as a major signal to attract foreign investment. In addition, regulations on underutilized mining concessions and royalties are also revised (from 2.5% to 5%) to shore up the country's public spending. The Zimbabwe government's ambition is to meet 20% of the world's total demand for lithium as several major lithium projects are currently under development.

Chinese companies are playing a big role in Zimbabwe's lithium mining sector. Most Chinese investments are private companies with one exception for Sinomine as the only SOE investor in this sector (Table 2). In 2022, Sinomine purchased a 99.05% share of Zimbabwe's largest Bikita Lithium mine with USD 180 million and invested an additional USD 200 million in expanding its annual processing capacities to 3.2 million tons by 2023. Some 20,000 tons of petalite mill from the Bikita mine were exported to China in 2022 (see Table 2).

Table 2. Chinese investments in Zimbabwe’s lithium mining sector

Company	Project Name	Project location	Investment Amount (\$million)	Share Proportion	Contractual time	Reserve (tons)	Progress
Huayou Cobalt	Arcadia	Mashonaland East	722	100%	2021.12.22	770,000	Operational by 2023 Q2
Sinomine	Bikita	Masvingo	380	99.05%	2022.2.8	344,000	In operation. Expansion in progress
Chengxin	The Sabi Star	Mashonaland East	77	51%	2021.11.3	88,000	Operational by 2022
Suzhou TA&A (Canmax)	Zulu	Matabeleland	34.6	13.38%	2021.3.8.	526,000	1st shipping expected in March 2023

Source: Authors’ own compilation based on various open resources

In April 2022, Zhejiang-based Huayou Cobalt also purchased Arcadia Lithium Mine Project from Prospect Resource Ltd from Australia with USD 420 million. Arcadia lithium mine will start delivering spodumene and petalite by 2023 at the latest, according to the local manager of the company. To achieve that goal, it is reported that USD 300 million are to be invested in expanding the annual process capacity of Arcadia mine to 4.5 million tons.

Meanwhile, Shenzhen-based Chengxin Lithium acquired the Sabi Star lithium and tantalum project in the Eastern Mashonaland Province of Zimbabwe, which has 40 mining rights licenses for rare metal blocks with a total area of 2,637 hectares. Five mining rights blocks with an average grade of Li₂O of 1.98% have been proven. The other 35 mining rights are planned to be explored simultaneously. The Sabi Star Lithium tantalum project is designed to produce 900,000 tons of raw ore per year, equivalent to about 200,000 tons of lithium concentrate, which is expected to be completed and operationalized by 2022.

Lastly, Suzhou TA&A Ultra Clean Technology (Canmax) will pre-funding about USD 34.6 million to enable the construction and commissioning of a pilot plant at the Zulu lithium project to produce 50,000 tons of spodumene concentrate from the first quarter of 2023. Canmax also purchased 13.38% shares of Zulu Lithium from Premier African Minerals, plus 50% of the prior acquisition right. Chinese private companies' enthusiasm of lithium resources is clearly driven by the lithium price boom since 2021, and their obvious crave for realising short term profits imposes significant question of how such activities can be properly managed to ensure its long-term benefits to the local and national economy.

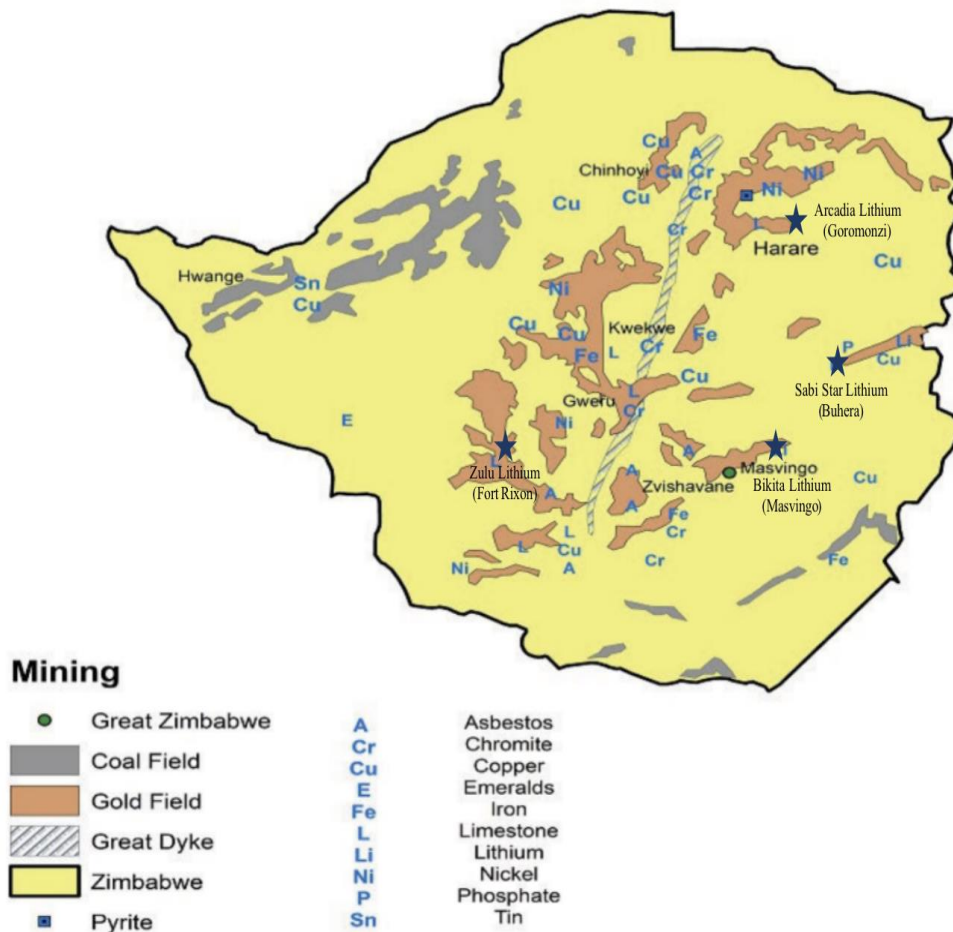


Figure 4. The location of Chinese investment on lithium mines in Zimbabwe

Source: Mtetwa 2018 and authors' own compilation

Zimbabwe government has exhibited intentions to utilise these investments for advancing its own industrial ambition. It is increasingly clear that Zimbabwe's leaders are eager to seize the opportunity of the global mad rush of lithium resources and to achieve its own industrialization ambition and integration into the global value chain of the lithium battery sector. For example, it requires Huayou to produce battery-grade lithium in Zimbabwe within five years, which was rejected by the company as 'not feasible', indicating the contrasted view between investors and the host government on the long-term impacts of the investment. The Zimbabwe government also approved the development of a battery metals industrial park in relation to lithium, platinum, and nickel production in the country, with a total expected investment of USD 2.8 billion.

From the China end, most Chinese investments in the lithium mining sector are mainly financed via private capital market rather than state-backed Chinese DFIs, largely due to the simmering prospect of lithium resources in the global market. It is also noted that most of these investments are not insured against the political risks with China's official export credit agency Sinosure. However, Chinese investors in Zimbabwe have developed strategic partnerships with leading Chinese EV or battery manufacturers such as BYD and CATL, indicating that most of the deals are strongly backed by the logic of capital markets rather than Chinese state strategy at least at the current stage.

Resolving the power generation crisis amid the mining boom?

The above analysis indicates a significant contrast between a struggling power generation sector and a booming extractive sector around the critical minerals (particularly lithium) in Zimbabwe. Both sectors face distinctive challenges as the investment in renewable power generation and transmission infrastructures requires urgent upscaling, whereas the massive revenue expected from the mining activities needs to be properly managed to avoid the possible resource curse often observed in less developed countries. But besides these challenges, there are complementarities between these two sectors.

At the outset, it is increasingly clear that the magnitude of energy poverty in Zimbabwe, particularly in the rural areas where most mines are located, is impacting the operation of most mining activities. Therefore, a stable and sufficient power supply is one of the crucial pre-conditions to realize the promised mining outputs. In this regard, investments in local power supply around mining sites should be carefully planned and coordinated. The Zimbabwe energy regulator needs to upgrade the current planning of its rural electrification programs, by taking into consideration of the newly invested mining facilities. Prioritizing the energy supply of these mining operations could be a good opportunity to resolve the local energy access and poverty for the neighbour communities, which is potentially a win-win situation for both investors and local communities.

The other issue is around the distributive effect of the expected income generated from mining activities. One of the key barriers to attracting investment in Zimbabwe's renewable energy sector is the existing sovereign debt and arrears that deter further borrowing from major bilateral and multilateral DFIs, including Chinese ones. If the royalties and tax revenue from the lithium mining activities can be utilised properly in addressing some of the debt burdens, then the private investment and development financing to the urgently needed power sector can be re-opened gradually. Yet again such endeavours require cross-ministerial cooperation from both ends. The Zimbabwe government has developed a debt resolution strategy and started token payments to international creditors in 2021 as a gesture to reengage with the international lending community (IMF, 2022). Although a comprehensive debt solution may take years if not decades to achieve, the contingent income from the booming mining sector can help tremendously.

From the China end, there are two notable challenges ahead. First, efforts should be made to support the contracted projects in the power generation and transmission sectors, as these projects are crucial to prevent Zimbabwe's crumbling energy and economic system from complete collapse. Second, the environmental and social impacts of the mining projects require careful scrutiny. The pursuit of short-term profit may exacerbate the impulse to overlook the long-term environmental/social/economic impacts at the local level. This is particularly acute as these projects are basically commercial-driven and funded, which consequently have not been assessed by the Chinese DFIs during the approval process. In recent years, the Chinese government and China quasi-state industrial associations (MEE and MOFCOM, 2022; CCCMC, 2017) have been tightening the environmental and social impact assessment (ESIA) guidelines and yet the Chinese private companies tend to be less submissive to the government guidelines compared to the SOEs. The lithium mining activities in Zimbabwe can be a testing ground on whether these new guidelines can be implemented properly.

In conclusion, Zimbabwe's situation requires tremendous coordination among Chinese agencies addressing various issues ranging from sovereign debt rescheduling, further export finance and credit support, and additional foreign aid. It requires a comprehensive package without which the successful energy transition in Zimbabwe would appear to be difficult. In theory, a certain level of debt relief would open new lending space for critical power infrastructure critical for both mining and other revenue generation activities, whereas aid projects could enhance the welfare and satisfaction of local communities most affected by these large infrastructure projects. In reality, however, tremendous institutional barriers need to be overcome within China to achieve such integrated solutions.

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