



China-Africa Economic Bulletin 2024 EDITION

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ABBREVIATIONS

AfDB	African Development Bank
AFP	Agence France Presse
AFREC	African Energy Commission
BRI	Belt and Road Initiative
CDB	China Development Bank
CHEXIM	Export-Import Bank of China
CLA Database	Chinese Loans to Africa Database
CMOC	China Molybdenum Corporation
CNOOC	China National Offshore Oil Corporation
CNPC	China National Petroleum Corporation
CO2	Carbon Dioxide
DFI	Development Finance Institution
DSSI	Debt Service Suspension Initiative
EU	European Union
EV	Electric Vehicle
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
G20	Group of 20
ICT	Information and Communication Technology
IEA	International Energy Agency
IMF	International Monetary Fund
IRENA	International Renewable Energy Agency
ITS	Industry and Trade Services
LNG	Liquefied Natural Gas
M&A	Mergers and Acquisitions
ODF	Overseas Development Finance
PowerChina	Power Construction Corporation of China
PV	Photovoltaic
RFI	Resource-for-Infrastructure
SDG	United Nations 2030 Sustainable Development Goals
Sinopec	China Petrochemical Corporation
SOE	State-owned Enterprise
SPV	Special Purpose Vehicle
UNCTAD	United Nations Conference on Trade and Development

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Morocco. Photo by Mari Potter via Unsplash



EXECUTIVE SUMMARY

Over the past three decades, China-Africa economic engagement has deepened relations in several policy areas. Trade, overseas development finance (ODF) and foreign direct investment (FDI) flows have contributed to African countries' development and brought about benefits and risks, including economic growth via infrastructure and environmental risks to biodiversity and the climate.

Concurrently, African countries have shaped or are shaping development goals in alignment with the United Nations 2030 Sustainable Development Goals (SDGs) and the African Union Agenda 2063. Together, these policy documents emphasize aspirations for low-carbon development, which includes energy access and transition. Although many African countries face various economic challenges, such as changing levels of economic growth, unsustainable debt and increased cost of borrowing, the energy transition presents an opportunity to bolster African countries' goals for low-carbon development.

This bulletin analyzes China-Africa trade, finance and FDI from 2000-2022 to evaluate how past trends reveal gaps and future pathways that China could pursue to support Africa's energy access and transition amidst economic challenges and energy opportunities.

Past trends in China-Africa economic relations show that Chinese financiers, investors, companies and trade facilitators have engaged in two tracks of economic engagement for energy and transition materials. The first is the electrification track, which represents general support for electrification infrastructure, and has increased energy access on the continent. The second is the extraction track, a pipeline of the exploration, extraction and export of primary energy commodities and transition materials to China. Although this track has led to export revenues for African economies, African countries are not yet receiving the full benefits of renewable energy technologies using those primary commodity inputs.

Main findings:

- Africa-China trade (imports and exports of goods) has grown significantly from \$11.67 billion in 2000 to a peak of \$257.67 billion in total trade in 2022, as China has become many African countries' lead trading partner. However, the 2008 global financial crisis, commodity price crash of 2014-15 and the COVID-19 pandemic have led to a sustained trade deficit for Africa, widening to 2.6 percent of gross domestic product (GDP) in 2022.
- Africa-China trade is largely an exchange of primary commodities for finished goods. From 2000-2022, 89 percent of Africa's exports to China were in the extractives sector and were mostly oil, copper, iron ore and aluminum commodities. Imports on the other hand, were dominated by manufactured goods, such as telecommunications equipment and fabrics, which represent 94 percent of all imports from China during the same period. Africa's exports to China feed into the extraction track of China's economic support.
- Between 2000-2022, Chinese lenders supplied \$170.08 billion in loans to sovereign borrowers in Africa, \$134.01 of which was provided by China's two primary development finance institutions (DFIs), the Export-Import Bank of China (CHEXIM) and the China Development Bank (CDB). Though the amount of loan financing channeled to African sovereigns has transformed China into Africa's largest bilateral creditor, Chinese lenders'

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provision of loans has declined steadily since its peak in 2016. Existing debt burdens and the increased cost of borrowing leave little room to take on additional debt.

- Chinese DFIs supplied one-third of their loans to the energy (34 percent) sector. The DFIs' energy lending amounted to \$52.38 billion, of which 51 percent was for fossil fuels projects with oil, gas/liquified natural gas (LNG) and coal energy sources. Lending for renewables constituted a mere 2 percent, despite Africa's considerable untapped potential, especially in solar. These energy loans have targeted both electrification and extraction track projects.
- From 2000-2022, Chinese companies announced \$112.34 billion in greenfield FDI and completed \$24.60 billion in mergers and acquisitions (M&A) FDI deals for projects and ventures across Africa. Greenfield FDI was directed mainly toward industry and trade/services, energy and non-energy mining and processing sectors. M&A FDI was mainly distributed across non-energy mining and processing and energy sectors.
- The majority of both greenfield and M&A FDI for energy ventures supported fossil fuel projects (oil and gas/LNG), while greenfield FDI supported renewable energy at a higher percentage (8 percent) than DFI loans. FDI to copper, aluminum and iron ore largely dominated, showing the involvement of Chinese companies in all stages of the metals and minerals supply chain. Most of this financing across both streams of FDI aligned with the extraction track of China's support.

These trends underscore China's two-track engagement in Africa's energy access and transition. On the one hand, Chinese DFIs and investors are financing a push for electrification on the African continent. Chinese DFIs have focused largely on power generation via hydropower and transmission and distribution infrastructure, while investors have focused more narrowly on the introduction of renewables, specifically solar energy, to the African continent. On the other hand, Chinese DFIs and investors have also sought to develop an exploration-extraction-exports track, that begins with debt and equity financing for exploration and mining activities of primary commodities and concludes with the export of extracted resources to China. Past engagement helped African countries overcome infrastructure bottlenecks, yet it replicated trade patterns where Africa exchanged its natural resources for finished goods. If China and African countries intend to tackle current development objectives like energy access and transition, concessional loans, equity finance and trade aimed at renewables and value-added green industries are promising targets for future cooperation.

INTRODUCTION

In the past three decades, China-Africa economic relations has catalyzed engagement in various policy areas. China's economic engagement in Africa has ranged from extending overseas development finance (ODF), to supplying foreign direct investment (FDI) and increasing trade flows throughout various cycles of African countries' economic growth. Historically, China has contributed to development in African countries by supplying credit primarily for transport and energy infrastructure based on African countries' demand and Chinese supply. Research evaluating economic growth impacts and perceptions of African governments shows that such capital for infrastructure has come with a mixture of economic benefits and environmental risks (Gallagher et. al. 2023a, Horigoshi et. al. 2022). Specific risks pertaining to associated debt distress and increased carbon dioxide (CO₂) emissions from Chinese-financed energy projects have influenced the current set of challenges and opportunities African countries face as they formulate long-term development strategies.

African countries have shaped or are shaping development goals in alignment with the United Nations 2030 Sustainable Development Goals (SDGs) and the African Union Agenda 2063. Together, these policy documents emphasize aspirations for low-carbon development, which includes energy access and transition. Potential sources of financing for energy and transition materials have become increasingly important for devising strategies that will allow Africa to achieve these goals. China's historic economic relationship with Africa positions it to contribute financial resources, as one of many partners to African countries.

This bulletin analyzes China-Africa trade, finance and FDI from 2000-2022 to evaluate how past trends reveal gaps and future pathways that China could pursue to support Africa's energy access and transition amidst economic challenges and energy opportunities.

African economies face various economic headwinds as they gradually recover from the COVID-19 pandemic, the impacts of Russia's war in Ukraine and the intensifying climate crisis. In 2022, economic growth in Africa contracted from 4.8 percent in 2021 to 3.8 percent, a decline attributed to multiple shocks facing the African continent (AfDB 2023). Among other disruptions, the pandemic decimated current account balances, while the war disrupted global supply chains and exacerbated post-pandemic inflation, brought about by the rise in the price of energy products and essential commodities such as wheat, of which Africa is a net importer (AfDB 2023; Raga et al 2024). Additionally, the US dollar effective exchange rate was pushed to a 20-year high in 2022, increasing the value of dollar-denominated debt and dollar-denominated interest payments (IMF 2023). The increased cost of servicing debt has not only led to several defaults and a growing risk of debt distress, but it has also constrained the ability of African governments to implement proactive strategies to mitigate the effects of climate change and seize opportunities related to the green energy transition. A growing share of government revenue is being redirected to debt repayment rather than development needs (UNCTAD n.d.), and the cost of taking on new loans for endeavors with environmental and social benefits is more and more prohibitive. In fact, sub-Saharan Africa's external public and publicly guaranteed debt service equates to an average of 93 percent of climate financing needs (Gallagher et. al. 2023b). Meanwhile, the effects of climate change are causing water stress, reduced food production, increased frequency of extreme weather events and decreased economic growth.

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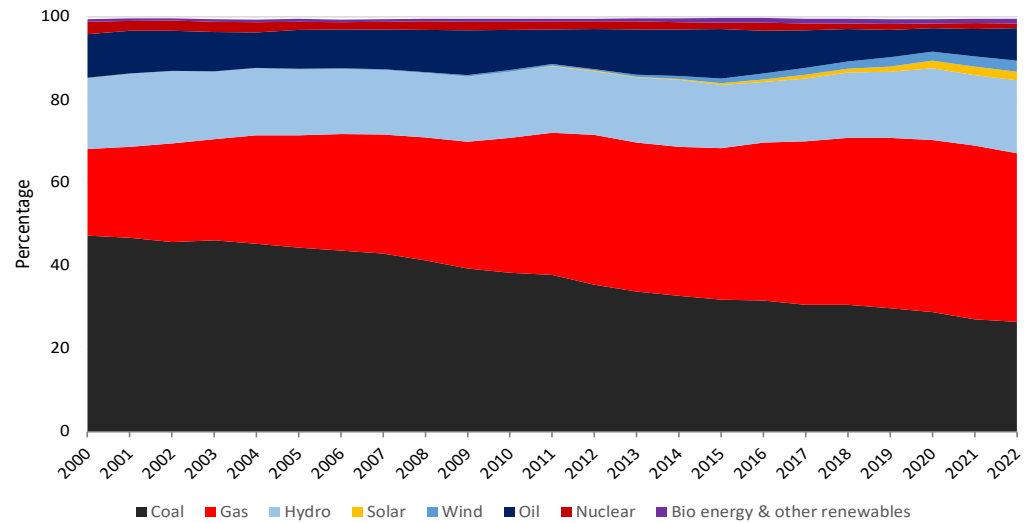
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Despite these challenges, the energy transition presents a unique opportunity for African countries to improve energy access and affordability, but this opening remains largely unexploited to date. Africa's green energy potential (wind, solar, hydroelectric and geothermal) is one of the highest in the world (AfDB 2023). However, the share of renewable energy (solar and wind) in the continent's total energy production is marginal, leaving African countries dependent on fossil fuels (coal, oil and gas), which in 2022, accounted for around 75 percent of total electricity generation and about 90 percent of energy consumption, as shown in Figures 1A and 1B.

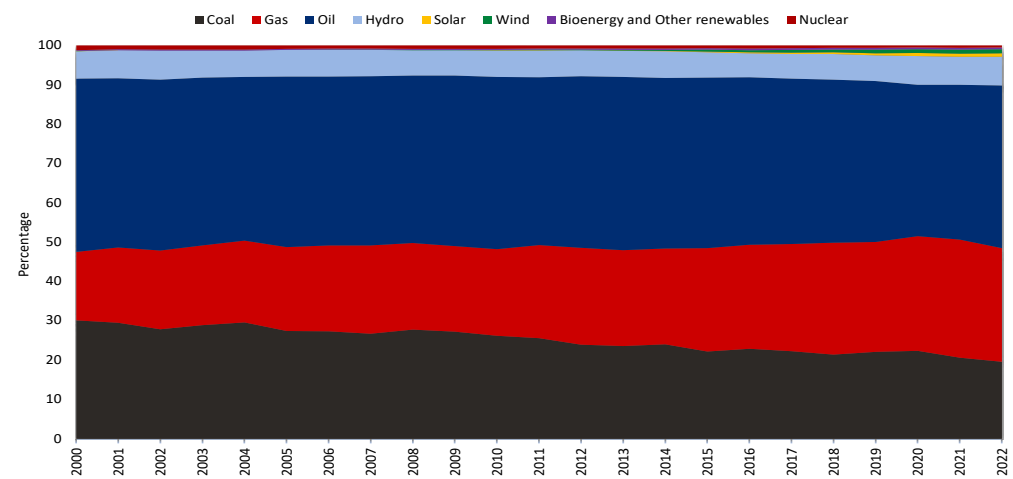
Africa's untapped renewables potential represents a remedy for low electrification rates on the continent. In 2021, 43 percent of the African population did not have access to electricity and 670 million of the population lacked access to a clean source of energy for cooking (IEA 2022).

Figure 1A Share of Electricity Generation in Africa by Source, 2000-2022



Source: Ember's Yearly Electricity Data; Ember's European Electricity Review; Energy Institute Statistical Review of World Energy (2023).

Figure 1B Share of Primary Energy Consumption in Africa by Source, 2000-2022



Source: Ember's Yearly Electricity Data; Ember's European Electricity Review; Energy Institute Statistical Review of World Energy (2023).

Affordability is an additional concern. Consumers in many African countries are paying twice what consumers in high-income countries pay per unit of electricity (Blimpo and Cosgrove-Davies 2019, IRENA 2022).

According to the International Energy Agency (2022), \$25 billion per year is needed to achieve universal access to modern energy in Africa. While external funds have been directed to Africa for various energy projects, the distribution of financial resources has been uneven across years and the region as a whole (Moses 2023). Furthermore, to accumulate the required resources for a just energy transition and the attainment of the SDGs, investment will have to increase from around 24 percent (average for Africa in 2022) to 37 percent of continent-wide gross domestic product (GDP) (Shimeles and Gallagher 2024). Initiatives like the African Union’s African Energy Transition Program show that African countries face the challenge of accessing the necessary and consistent capital to realize energy access and transition objectives (AFREC n.d.).

Given current economic challenges and future energy opportunities, China can play a role in contributing to Africa’s energy access and transition through trade, finance and FDI. Past trends in China-Africa economic relations show that Chinese financiers, investors, companies and trade facilitators have engaged in two tracks of economic engagement for energy and transition materials, as illustrated in Figure 2. The first track represents general support for electrification infrastructure, which has increased energy access on the continent. This track entails the financing of power plants, transmission and distribution infrastructure and solar and wind farms. The second track creates an extraction pipeline that begins with exploration and mining and concludes with the export of primary energy commodities and transition materials to China. By investigating past trends, this bulletin underscores that the future of China-Africa economic relations should prioritize balancing these dual tracks in order to align Chinese engagement with Africa’s energy access and transition goals.

Figure 2 China’s Two-tracked Economic Engagement for Energy and Transition Materials



Source: Authors’ compilation.

To elaborate on these findings, this bulletin contains four sections. The first, second and third sections analyze historical data on China-Africa trade, finance and FDI, respectively. Those sections hone in on support for energy and transition materials and highlight how each stream of economic engagement falls into China’s electrification and extraction tracks. The concluding section provides an overview of general trends, revisits how China could maintain and/or adjust aspects of the two tracks, and discusses challenges and opportunities that are likely to shape the future of China-Africa economic engagement.

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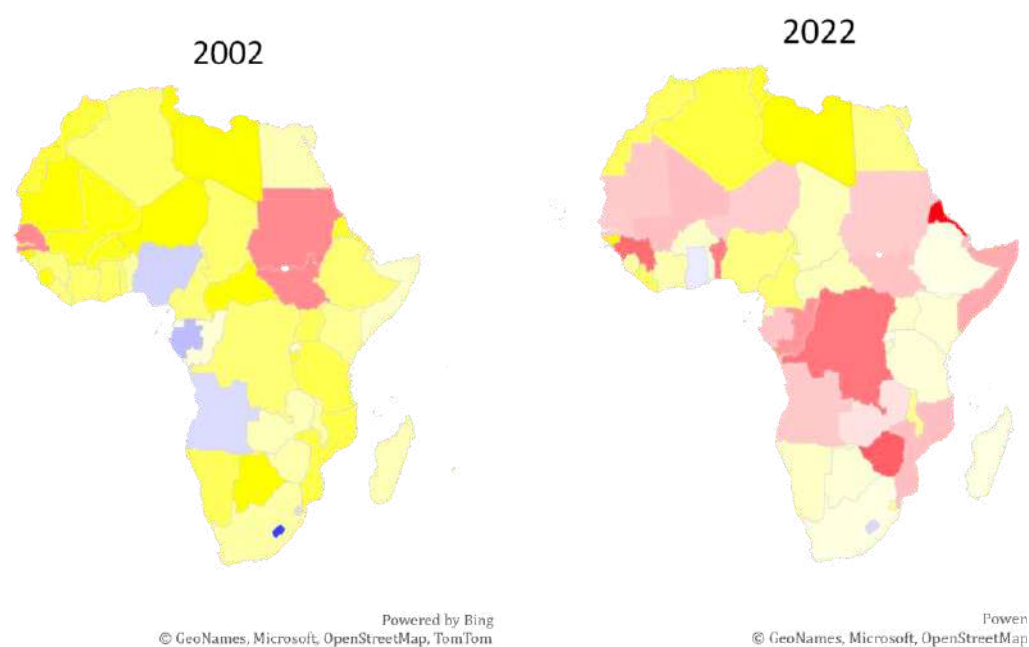
Algiers, Algeria. Photo by abderrahmane chablaoui via Unsplash



TRENDS IN CHINA-AFRICA TRADE, ENERGY ACCESS AND TRANSITION SUPPORT

Africa's total trade with China has grown significantly over the past two decades, surpassing that of the United Kingdom and the United States. In 2000, China-Africa trade (imports and exports of goods) amounted to \$11.67 billion and rose to a peak of \$257.67 billion in 2022. Although the European Union (EU) remains Africa's largest trading partner as an economic block, at least 15 African countries have gradually moved from top trade relations with the EU and US to a closer trade relationship with China, as shown in Figure 3. These countries include some of the strongest regional economies and resource rich countries, such as South Africa, Angola and the Democratic Republic of Congo. In 2022, the value of Africa's exports to China were estimated at around \$89.91 billion (4 percent of Africa's GDP), up from \$4.92 billion (0.7 percent of GDP) in 2000 and well above the previous peak of \$83.70 billion in 2012 (UNCTAD Comtrade 2023).

Figure 3 Change in Africa's Lead Trading Partners from 2002-2022



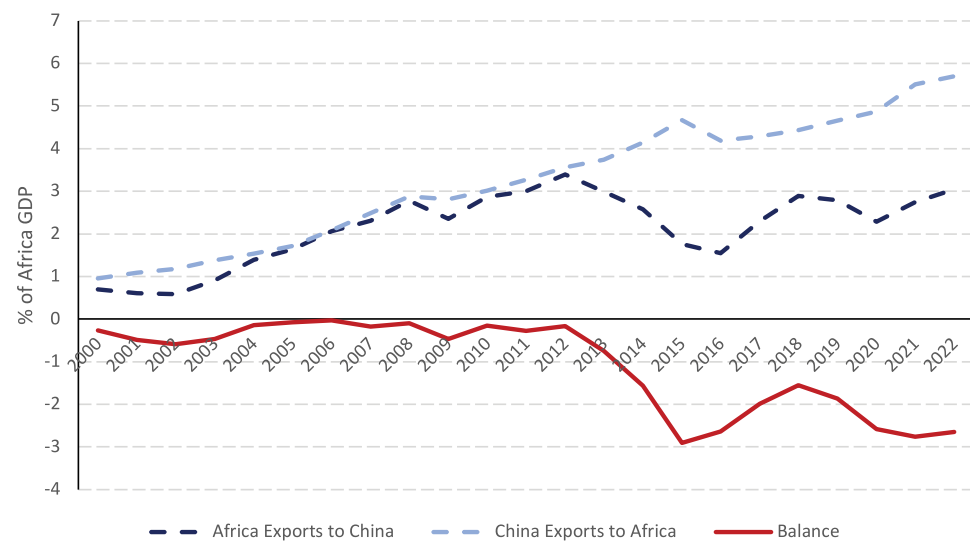
Source: UNCTAD Comtrade, 2023.

Note: Yellow - European Union, Blue - United States, Red - China.

Overall, China-Africa trade shows two main trends. First, the value of Africa's import trade from China is higher than export value to China, which has led to a sustained trade deficit. Second, Africa-China trade is largely an exchange of primary commodities for finished goods. These trends highlight that Africa-China trade supports the extraction track of Chinese economic engagement pertaining to support for energy and transition materials.

As shown in Figure 4, during the earlier stages of 2000-2022, China-Africa trade was almost balanced. Since 2012, increased engagement between China and Africa has been coupled with a growing trade deficit. The first major deficit occurred in 2009 in the wake of the global financial crisis. In addition, Africa experienced a further deficit of 0.8 percent to 2.9 percent of African countries' GDP from 2013-2015 following the decline in commodity prices in international markets, which affected the value of Africa's exports to China. Although export value recovered from 2016-2019, the COVID-19 pandemic coupled with Russia's war in Ukraine precipitated another cycle of deficit in China-Africa trade amounting to 1.9 percent of GDP in 2019 to 2.8 percent in 2021. Between 2021-2022, African exports to China increased by 19 percent. China's exports to Africa grew by 11 percent over the same period, but since China's export value to Africa remained higher than Africa's exports to China, a trade deficit of 2.6 percent of GDP persisted by the end of 2022.

Figure 4 Africa-China Trade Balance, 2000-2022



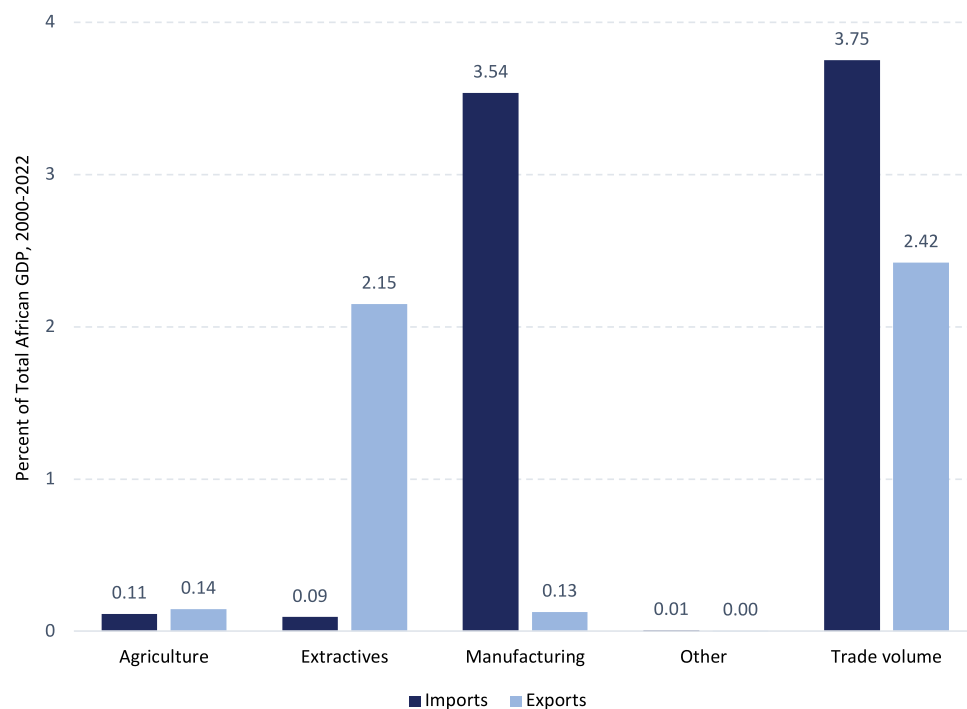
Source: UNCTAD Comtrade, 2023.

From 2000-2022, Africa's exports to China came mainly from the extractive sector, which comprises about 89 percent of the total exports, followed by agriculture (6 percent) and manufacturing (5 percent), as shown in Figure 5. In contrast, China's exports to Africa came from the manufacturing sector, comprising about 94 percent, followed by agriculture (3 percent) and extractives (2.5 percent). This implies that Africa mostly exports raw products and imports finished goods from China.

In recent years, the pattern of primary commodity exchange for finished goods has persisted. Table 1 shows that in 2022, the top five exports from African countries to China by trade value originated from the extractives sector. Notably, oil and transitional material commodities were the top exported products in 2022. While the top five exports from China to Africa came from both the manufacturing and extractive sectors.

In terms of exporting to China by country from 2000-2022, Angola leads through supply of crude oil primarily, followed by South Africa mostly by way of iron ore exports. The next three highest exporters, Sudan, Democratic Republic of Congo and Congo have mainly exported

Figure 5 Africa Exports and Imports to China by Sector, 2000-2022



Source: UNCTAD Comtrade, 2023.

Table 1 Top Five Exported and Imported Products in 2022

Africa Exports to China			China Exports to Africa		
Sector	Product	%	Sector	Product	%
Extractives	Petroleum oils and oils obtained from bituminous minerals, crude	41	Manufacturing	Telecommunications equipment, and parts, and accessories of apparatus falling within division 76	6
Extractives	Copper	15	Manufacturing	Fabrics, woven, of man-made textile materials (not including narrow or special fabrics)	3
Extractives	Ores and concentrates of base metals	8	Manufacturing	Footwear	3
Extractives	Iron ore and concentrates	5	Extractives	Petroleum oils and oils obtained from bituminous minerals other than crude oil.	3
Extractives	Aluminum ores and concentrates (including alumina)	5	Manufacturing	Electrical machinery and apparatus	2

Source: UNCTAD Comtrade.

Note: Percentage is of total exports.

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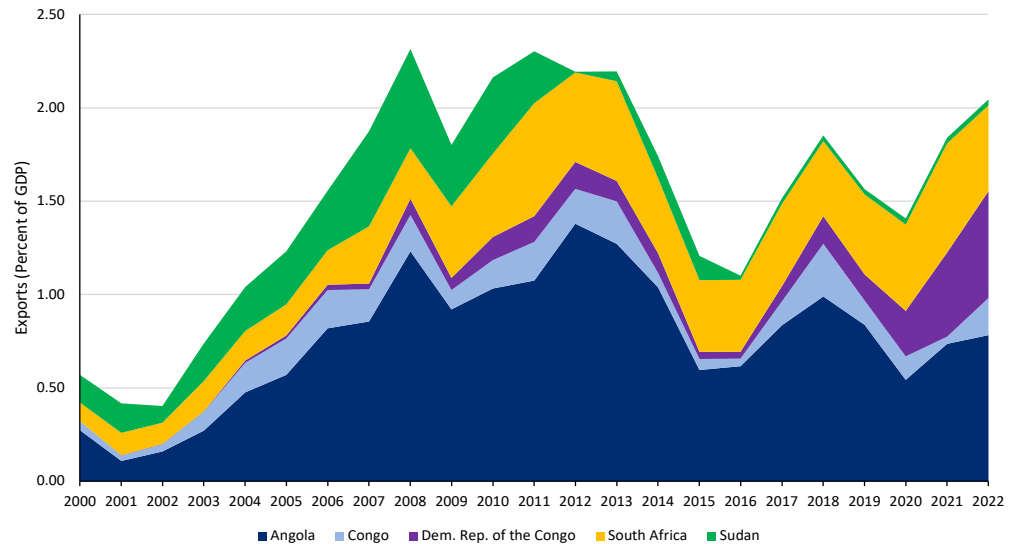
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crude oil, copper and crude oil, respectively. Together, exports from these countries alone amounted to about 2 percent of Africa's GDP in 2022 and 69 percent of total export value from 2000-2022, as seen in Figure 6. On the other hand, South Africa, Nigeria, Egypt, Algeria and Ghana lead in importing products from China, primarily telecommunications equipment and other finished goods such as footwear, fabrics and automobiles. Together, these countries' imports captured 51 percent of all imports from China, and their import value was above 2.5 percent of GDP in 2022.

Figure 6 Africa Exports to China by Country, 2000-2022



Source: UNCTAD Comtrade.

Notably, oil and mineral exports feature widely in Africa's exports to China, feeding into the extraction track of China's economic support. Oil exports to China have long been a remedy for China's desire to feed its growing economy and diversify its sources of oil, while the top metal ore exports (copper, iron, aluminum) are inputs for various types of green technologies dominated by China (Chen 2008). They have only recently become a focus in China's objectives to achieve resource security. In contrast, none of China's top exports to Africa are renewable energy technologies that use the primary commodities exported to China, suggesting that there is potential for boosting exports of renewable energy technologies that can benefit African countries' energy access and transition.

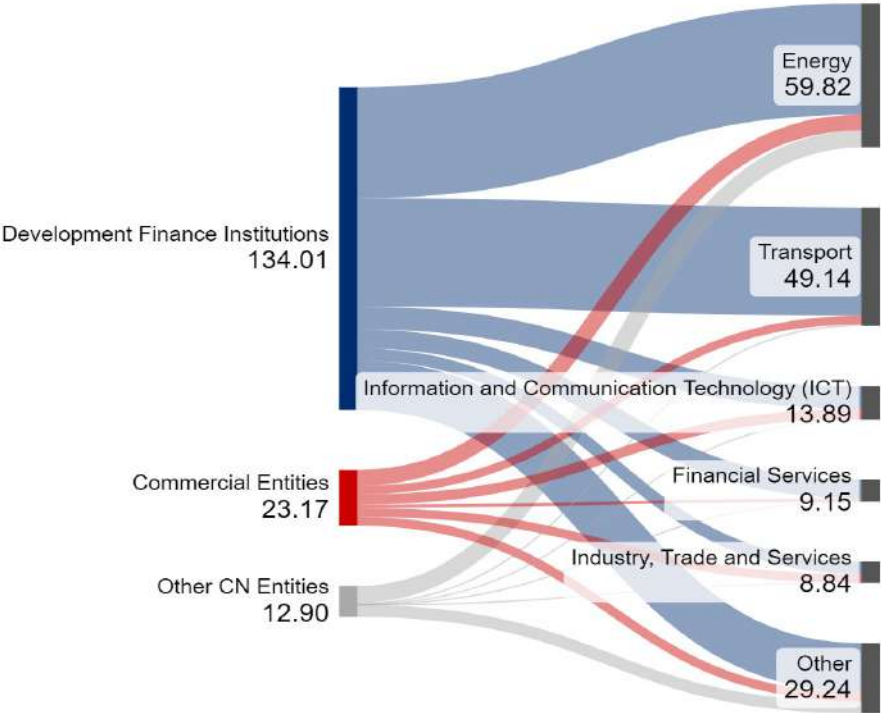
China-Africa trade shows upward potential, though the exchange of African primary natural resources for finished goods from China mirrors historical patterns of trade with African countries. However, other forms of engagement, loans in particular, have allowed Africa to narrow infrastructure gaps in the transportation and energy sectors that have been left unaddressed by Africa's traditional partners (Wang and Xu 2022).

The next section investigates China's general contribution to African infrastructure development more broadly and the energy sector specifically. It will also contextualize the impact of high borrowing on Africa's overall debt levels. Overlapping trends will show that while Chinese lending has targeted many of the same sectors that produce the primary commodities which flow back to China in the form of exports from Africa, a significant portion of Chinese loans have also contributed to electrification across the continent.

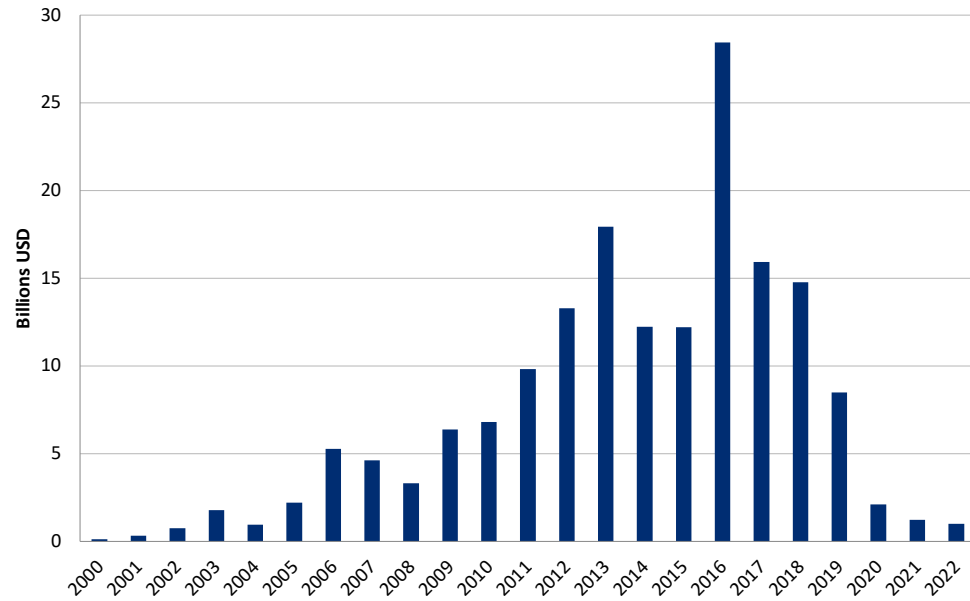
TRENDS IN CHINA'S OVERSEAS LENDING AND DEVELOPMENT FINANCE AND DEBT IN AFRICA, ENERGY ACCESS AND TRANSITION SUPPORT

Between 2000-2022, China's two primary DFIs, the Export-Import Bank of China (CHEXIM) and the China Development Bank (CDB), committed around \$134.01 billion in sovereign loans to 47 African countries and several regional institutions. Other Chinese financiers, including state-owned commercial banks, companies and China's foreign aid agency supplied an additional \$36.07 billion. The \$170.08 billion in estimated Chinese loans from DFIs and other lenders during this period flowed primarily to the energy sector (35 percent), followed by transport (29 percent), information and communication technology (ICT) (8 percent), financial services (5 percent) and industry and trade/services (5 percent) sectors, as shown in Figure 7a. Despite contributions to several sectors impacting development trajectories on the continent, in recent years, Chinese loans to Africa have declined since their peak in 2016, as shown in Figure 7b.

Figure 7a Chinese Loans to Africa by Sector in Billions USD, 2000-2022



Source: Chinese Loans to Africa Database, 2023. Boston University Global Development Policy Center.

Figure 7b Chinese Loans to Africa, 2000-2022

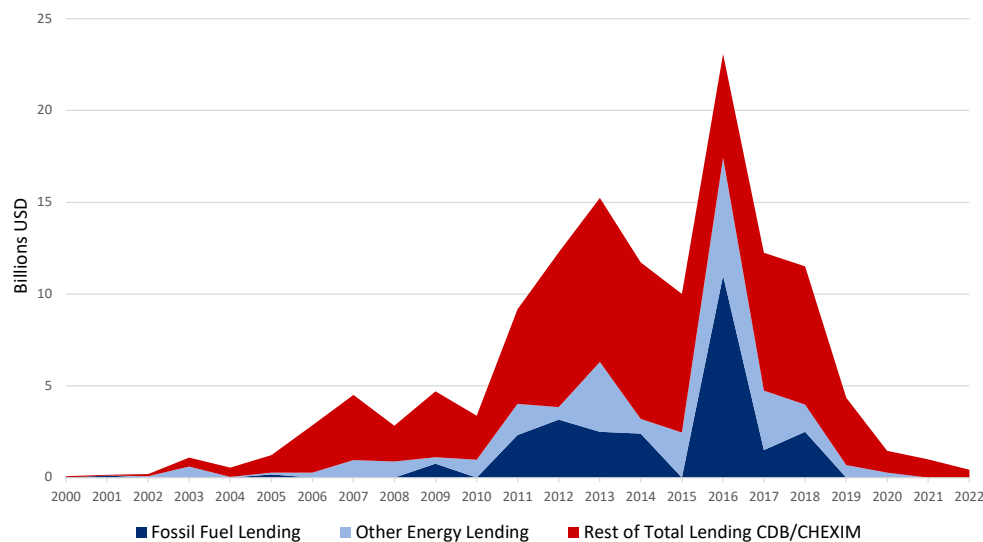
Source: Chinese Loans to Africa Database, 2023. Boston University Global Development Policy Center.

Overall, three trends pertaining to China's historical role in energy and transition material support in Africa are noteworthy. First, Chinese DFI energy lending in Africa is mainly for fossil fuel projects and have provided little support for the development of Africa's renewable energy potential. Second, energy loans target both electrification and extraction projects. Lastly, Chinese sovereign loans have not directly contributed to the exploitation of transition material commodities. An analysis of Chinese DFIs' energy lending portfolios indicates that Chinese DFIs are pursuing two distinct agendas in Africa, a push to respond to the demand for energy access on the continent primarily through hydropower infrastructure on the one hand, and the extraction of commodities such as oil on the other hand.

CHEXIM and CDB supplied about one-third of their loans to the energy sector in Africa, which was around \$52.38 billion between 2000-2022, as seen in Figure 8. In terms of energy sources, CHEXIM and CDB focused principally on oil, hydropower and coal. Oil projects attracted around \$18.24 billion (35 percent) in financing from Chinese DFIs over the last two decades, with the vast majority (\$17.50 billion) going to exploration/extraction activities. Adding commitments to coal projects (\$5.30 billion) and gas/LNG (\$2.93 billion) projects, CHEXIM and CDB's total combined support for fossil fuel projects between 2000-2022 was \$26.47 billion. This represents 51 percent of CHEXIM and CDB funds dedicated to energy projects in Africa and 20 percent of their entire lending portfolio on the continent. The \$16.35 billion allocated to hydropower represents a more modest, yet significant, 31 percent of CHEXIM's and CDB's overall energy lending (Boston University Global Development Policy Center 2023a).

Available data suggests that China is honoring its 2021 pledge not to provide funds for the construction of new coal-fired power plants abroad, but its other promise of increased support for renewable energy in developing countries has yet to become a reality (Springer et al. 2023). Prior to 2021, CHEXIM and CDB contributed a combined \$5.30 billion to coal projects in Africa. From 2021-2022, Chinese DFIs not only halted funding for coal projects, but they also committed no new funds to the African energy sector (Springer et al. 2023, Moses et.

Figure 8 Chinese Loans to Africa: Energy Lending and Total Lending, 2000-2022



Source: Chinese Loans to Africa Database, 2023. Boston University Global Development Policy Center.

al. 2023). Given China’s dominant position in green technologies, as well as its past interest in Africa’s energy sector, it is likely that the low lending volume in recent years represents an effort to reorient financial flows to greener projects, rather than a cessation of lending to the continent’s energy sector. To date, the \$975.11 million in DFI sovereign loans channeled to renewable energy projects came from CHEXIM, and this amount is modest when compared to Chinese DFI funds directed to projects with fossil fuel energy sources (Boston University Global Development Policy Center 2023a).

The meager share of CHEXIM’s and CDB’s lending portfolios dedicated to renewables may be traced to international DFIs’ general reservations about financing renewables, as well as dynamics that are specific to Chinese DFIs. The absence of long-term project-level data and DFIs’ general lack of expertise on renewable technologies represent knowledge gaps that will take time to fill (Peimani 2018; Munoz Cabre 2020). The risks associated with novel technologies leave inherently conservative DFIs that are concerned with their credit ratings hesitant to finance renewable energy projects. In addition, the favoritism Chinese DFIs have shown toward SOEs in the past may have inadvertently influenced their allocation of funding away from overseas projects involving the types of green technologies that are dominated by ostensibly private Chinese companies (Lund Larsen and Ohler 2021).

Energy projects supported by CHEXIM and CDB were concentrated in the power generation (36 percent) and exploration/extraction (35 percent) sub-sectors, with significant contributions to transmission and distribution projects (18 percent). Overall, 54 percent of energy lending has supported electrification (power generation and transmission and distribution infrastructure). However, it should be noted that exploration and extraction projects are often linked to and supported by Chinese DFI funded power generation projects and hydropower power generation projects, in particular. Financing for hydropower projects was highly concentrated in the power generation sub-sector (68 percent). The Chinese Loans to Africa (CLA) Database managed by the Boston University Global Development Policy Center records at least eight hydropower projects financed by CHEXIM to the tune of \$4.25 billion (26 percent of all hydropower lending), which are intended to support the extraction of various metals.

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Chinese DFIs' support for other aspects of the energy transition in Africa have been similarly modest to date. Data from the CLA Database shows no evidence of African sovereign borrowers' receipt of Chinese overseas development finance aimed at advancing midstream or downstream activities associated with the production of batteries, an area of growth that various African governments have identified as an opportunity to move up the value chain and have been seeking to exploit with the support of external partners (AfDB 2023). China's forays into transition minerals mining and minerals refining/processing projects in Africa have been driven in large part by FDI and ostensibly private firms rather than the combination of DFIs and SOEs that spearheaded earlier efforts to secure fossil fuel resources in Africa, as the next section will show.

Nevertheless, Chinese loans have played a key role in China's pursuit of transition minerals in Africa, though the data suggests that loans deployed to that end do not take the shape of sovereign loans. Instead, Chinese loans targeting transition material mining and refining/processing follow three patterns. First, loans may flow directly to Chinese mining companies looking to acquire or develop mining/processing assets. For example, the 15 Chinese mining companies active in cobalt projects in the Democratic Republic of Congo have received at least \$12 billion in loans from Chinese financial institutions (Searcey et al. 2021). Second, Chinese lenders may direct funds to Sino-African joint ventures or special purpose vehicles (SPVs) with African government minority ownership. Examples include CDB's 2014 and 2015 loans amounting to \$59 million to the Zambia-China Economic and Trade Cooperation Zone SPV, which hosts minerals processing facilities (*Global Times* 2015). Lastly, Chinese loans are used as elements of deals that allow Chinese companies to exploit resource assets in exchange for infrastructure loans provided by Chinese banks. A \$20 billion bauxite-backed loan supplied to Guinea by the Industrial and Commercial Bank of China in 2017 is an example of such resource-for-infrastructure (RFI) deals (Boston University Global Development Policy Center 2023b). These agreements allow Chinese companies direct access and (partial) control of resource assets, but also expose them to the risks inherent in developing mining projects. This distinguishes them from the resource-backed loans used predominantly in Angola, which were repaid with the revenue of oil exports to China but did not involve Chinese access to specific assets.

Over the past two decades, Chinese DFIs have provided considerable financial support for hard infrastructure in Africa, especially for energy power generation and extraction projects, yet loan amounts have decreased in recent years (Moses et al. 2023). Though lending has declined, the debt remains, constraining the potential for future borrowing.

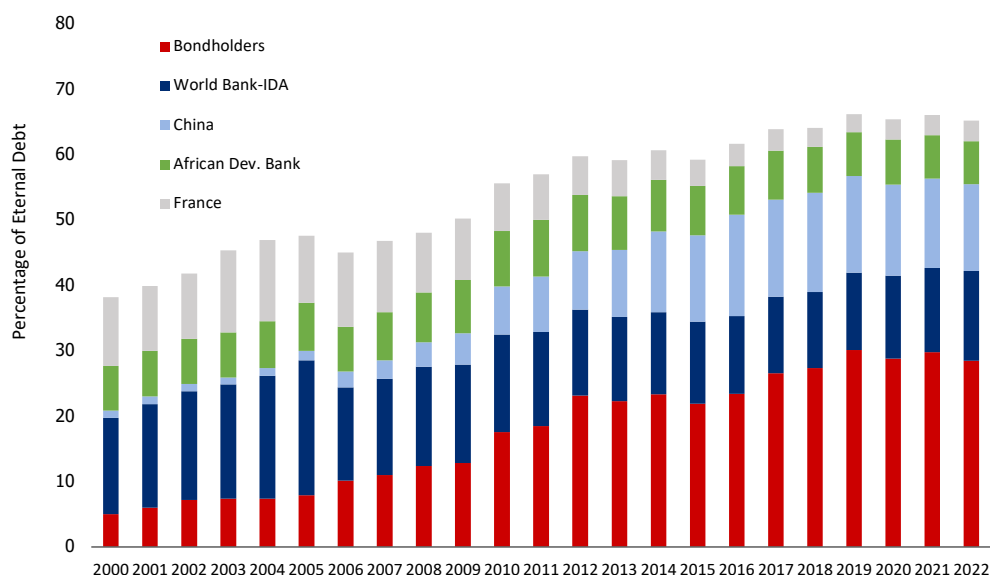
AFRICAN COUNTRIES' DEBT AND THE ROLE OF CHINA

Africa's total public debt (internal and external) has been on an upward trajectory since 2000, with a significant increase in debt due to the considerable budgetary expenditure incurred during the COVID-19 pandemic. According to the International Monetary Fund (IMF) (2023), the median public debt-to-GDP ratio increased by about 30 percentage points, from 28.8 percent of GDP in 2021 to 59.1 percent in 2022 in sub-Saharan Africa. Specifically, external debt as a share of GDP in Africa has increased by 13 percent from 2010-2021, more than increases in Latin America and the Caribbean (10 percent) and Europe and Central Asia (3 percent) (Gallagher et al. 2023b). As several countries in Africa remain susceptible to high levels of debt distress (Kedir et al 2023), debt-to-GDP ratios are expected to stabilize at around 65 percent in 2024 due to growing financing needs hampered by rising food and energy import bills, high

debt service costs due to interest rate hikes, exchange rate depreciations and rollover risks (AfDB 2023).

China's share in Africa's external debt has also grown considerably over time from 1 percent of external debt in 2000 to 13 percent in 2022, roughly equal to that of the World Bank. Undoubtedly, this debt is associated with Africa's borrowing for infrastructure, as a 2016 peak in China's share of Africa's external debt (16 percent) overlaps with the apex year of Chinese loans to Africa. Nevertheless, China is not the sole or main actor in Africa's evolving external debt. Currently, Africa's largest creditors also include bondholders, the World Bank, the African Development Bank and France. Together with China, these creditors held 65 percent of external debt in 2022, compared to 38 percent in 2000, as seen in Figure 9. Bondholders account for the lion's share of Africa's external debt. Their role increased dramatically after the 2008 global financial crisis led to sustained low interest rates that directed investors to look for greater returns in emerging markets. This dynamic led bondholders to capture 28 percent of Africa's external debt in 2022.

Figure 9 Top Five Creditors to African Economies, 2000-2022



Source: World Bank International Debt Statistics, 2023.

China's role in the debt of African countries most vulnerable to debt distress deserves mention. In terms of debt stock, Figure 10 shows that in 2022, China's largest debtors in Africa were Angola (\$20.98 billion), Ethiopia (\$6.82 billion), Kenya (\$6.69 billion), Zambia (\$5.73 billion) and Egypt (\$5.21 billion). Angola's external debt stock and service markedly declined from 2020-2022 due to the country's debt restructuring in 2020 (World Bank 2023). In particular, deals struck with Chinese creditors under the Group of 20 (G20) Debt Service Suspension Initiative (DSSI) and an IMF program bolstered Angola's debt and growth outlook. The IMF program provided financial and technical support to help oil-producing countries emerge from recession to economic recovery. Though Angola and Kenya narrowly avoided default recently and look well poised to refinance existing debt, the three African countries that defaulted in

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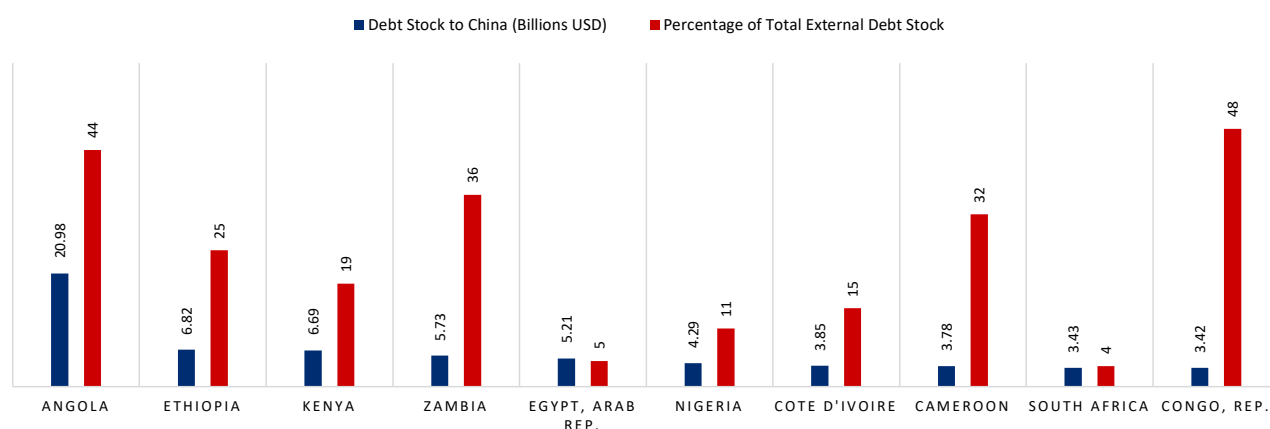
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the last three years, Zambia, Ghana and Ethiopia, were all among China's top 10 borrowers in Africa.

In terms of debt relief, China has chosen to prioritize debt restructuring and forgiveness of overdue zero-interest loans (Hwang and Moses 2022), rather than blanket debt forgiveness. However, past and ongoing negotiations may be impacting the amount of new loans borrowed. Africa's recovery from the current debt crisis will take time given rising global interest rates, waning confidence among investors and lenders and future debt service costs. African governments have committed about 10 percent of the total cost of implementing Africa's climate response, while the remaining 90 percent is expected largely from international public sources and domestic and international private actors (Guzman et. al. 2022). Existing debt burdens and the increased cost of borrowing leave little room to take on additional debt (AfDB 2023). If China wishes to preserve the economic ties it has built with African countries over the past two decades, a rebalancing to other forms of economic engagement such as equity financing will be necessary.

Figure 10 Top 10 African Countries Debt Stock to China in 2022

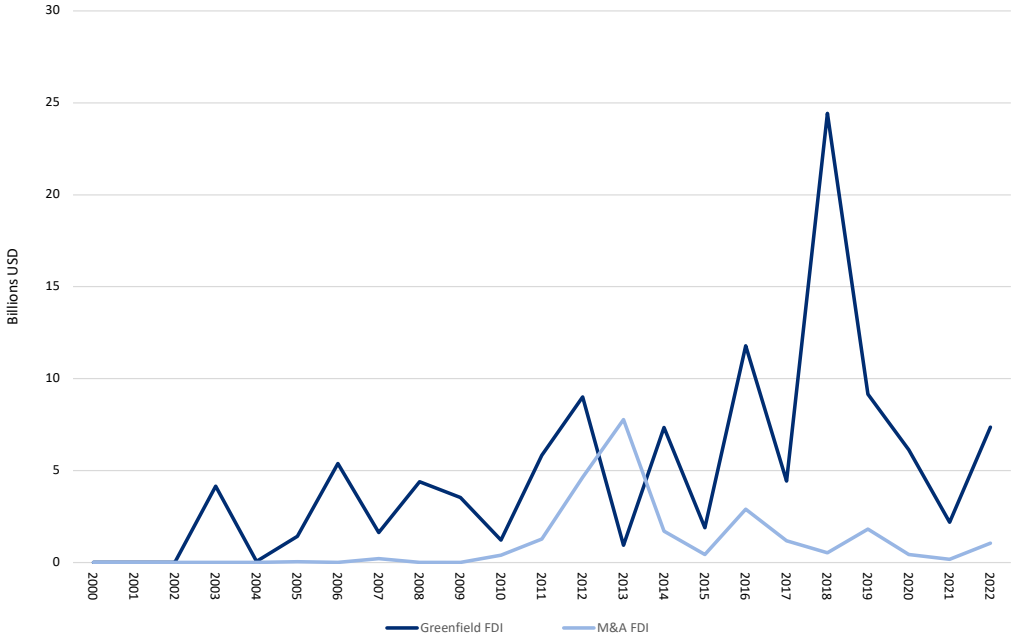


Source: World Bank International Debt Statistics, 2023.

TRENDS IN CHINA'S FOREIGN DIRECT INVESTMENT TO AFRICA, ENERGY ACCESS AND TRANSITION SUPPORT

FDI presents a means for African countries to utilize capital for their development goals without worsening debt levels. A decline in Chinese loans to Africa, in part due to concerns about debt distress and non-repayment, have amplified Chinese FDI as a viable option for new capital. Past FDI trends show that Chinese investors have viewed the African continent as a destination for varied types of profitable investments. From 2000-2022, Chinese companies announced \$112.34 billion in greenfield FDI and completed \$24.60 billion in mergers and acquisitions (M&A) FDI deals for projects and ventures across Africa, as seen in Figure 11. At least two-thirds of this FDI were for resource-rich countries such as Algeria, the Democratic Republic of Congo, Egypt, Ghana, Guinea, Morocco, Nigeria, Niger, Zambia and Zimbabwe. Announcements of greenfield investments have remained generally steady since the early 2000s, and M&A deals have picked up after the 2008 global financial crisis. Since the tapering of the pandemic, both streams of FDI appear to be increasing, showing opportunities for further growth.

Figure 11 Trend in China's Greenfield and M&A FDI to Africa, 2000-2022



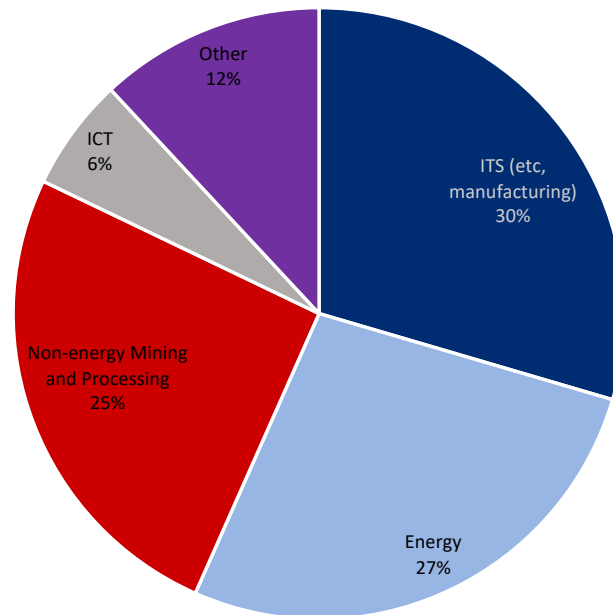
Source: FDI Markets and Dealogic.

Note: Data on greenfield FDI Announcements is not available before 2003.

Several trends are notable in Chinese equity investments for energy and transition materials. First, greenfield and M&A FDI follow the extraction track by supporting the exploration, extraction and refining of energy commodities and transition materials, particularly oil, copper, aluminum and iron. Second, China's largest SOEs are at the forefront of these investments. Third, while FDI for renewables is still limited, equity for transition materials shows Africa plays a significant role in the supply chain for green technologies and renewable energy infrastructure.

Greenfield FDI occurs when a company establishes a new venture or purchases new shares of a project. This data is tracked by collecting announcements about intentions to invest in specific countries. Chinese companies have announced \$112.34 billion in greenfield FDI across the industry and trade/services (ITS) (30 percent), energy (27 percent), non-energy mining and processing (25 percent), and information and communication technology (ICT) (6 percent) sectors. Transportation, water/sanitation/waste, agriculture, health, financial services and other sectors capture 12 percent of greenfield investment announcements, as shown in Figure 12.

Figure 12 Chinese Greenfield FDI Distribution in Africa by Sector, 2000-2022



Source: FDI Markets and Dealogic.

Note: The industry, trade and services sector is majority manufacturing.

The predominance of these sectors is primarily due to large investments by Chinese SOEs motivated to expand their market presence in concert with China's Belt and Road Initiative (BRI) policies. For the largest deals, supported projects hinged on partnering with governments to exploit resources and prepare them for export, as shown in Table 2. In 2018, CITIC Group and the Algerian government announced a cooperation agreement to jointly develop a phosphate mine in the Tebessa municipality to increase fertilizer production and exports. China's largest national oil company, China National Petroleum Corporation (CNPC), has heavily invested in the upstream, midstream and some downstream development of Niger's national oil production. In 2008, CNPC announced investment deals for the development of oil fields in Agdem, Niger and a 2,000 kilometer (1,243 mile) Niger-Benin crude oil pipeline linking those

oilfields to Port Seme in Benin (NS Energy n.d., AFP 2023), enabling Niger to double crude oil production and sell it to global markets for the first time (AFP 2023). Macrolink’s capital to develop the Mwekera copper mine in Ndola, Zambia exemplifies Chinese-financed mineral investment in countries rich with these materials.

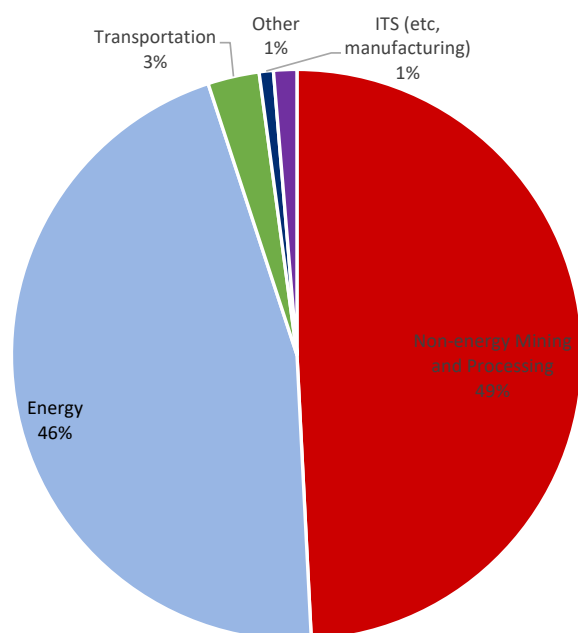
Table 2 Top Three Greenfield FDI Announcements from Chinese Companies in Africa

Year	Company Announced	Country	Sector	Billions USD	Project Name
2018	CITIC Group	Algeria	Industry and Trade/ Services	6	Construction of phosphate plant
2003, 2008, 2021	China National Petroleum (CNPC)	Niger	Energy, Oil	5	Agadem Oil Fields, Niger-Benin Oil Pipeline and Refinery
2012	Macrolink Group	Zambia	Non-energy mining and processing, Copper	5	Mwekera Copper Mine

Source: FDI Markets, Lopez 2023, AFP 2023, NS Energy n.d., MRA 2013.

M&A FDI takes place when a company purchases or consolidates a portion or full shares of a venture, and this data is tracked through compiling deal completion information from companies and advisors. The \$24.60 billion of M&A FDI Chinese companies invested in Africa was spread primarily between non-energy mining and processing (49 percent) and energy (46 percent), showing the extraction focus of M&A FDI, as seen in Figure 13. The rest of Chinese M&A investment was directed to transportation (3 percent), industry and trade/services (1 percent) and other sectors (1 percent) such as ICT, agriculture, financial services, water/sanitation/waste and health.

Figure 13 Chinese M&A FDI Distribution in Africa by Sector, 2000-2022



Source: FDI Markets and Dealogic.

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CNPC tops the list of leading companies in large M&A investments, along with China's other largest national oil companies, China Petrochemical Corporation (Sinopec) and China National Offshore Oil Corporation (CNOOC), as seen in Table 3. Combined, these three companies supplied at least 45 percent of Chinese M&A FDI to Africa and are active across the oil and gas supply chain in various regions of the world, including Africa. China Molybdenum Corporation (CMOC) is considered the largest cobalt developing company in the world (Liu 2024). In the Democratic Republic of Congo, it is currently developing the Tenke Fungurume copper-cobalt mine. Other major commodity producing Chinese companies involved in M&A deals include Aluminum Corporation of China Limited and Shandong Iron and Steel Group Corporation Limited.

Table 3 Top Three Greenfield FDI Announcements from Chinese Companies in Africa

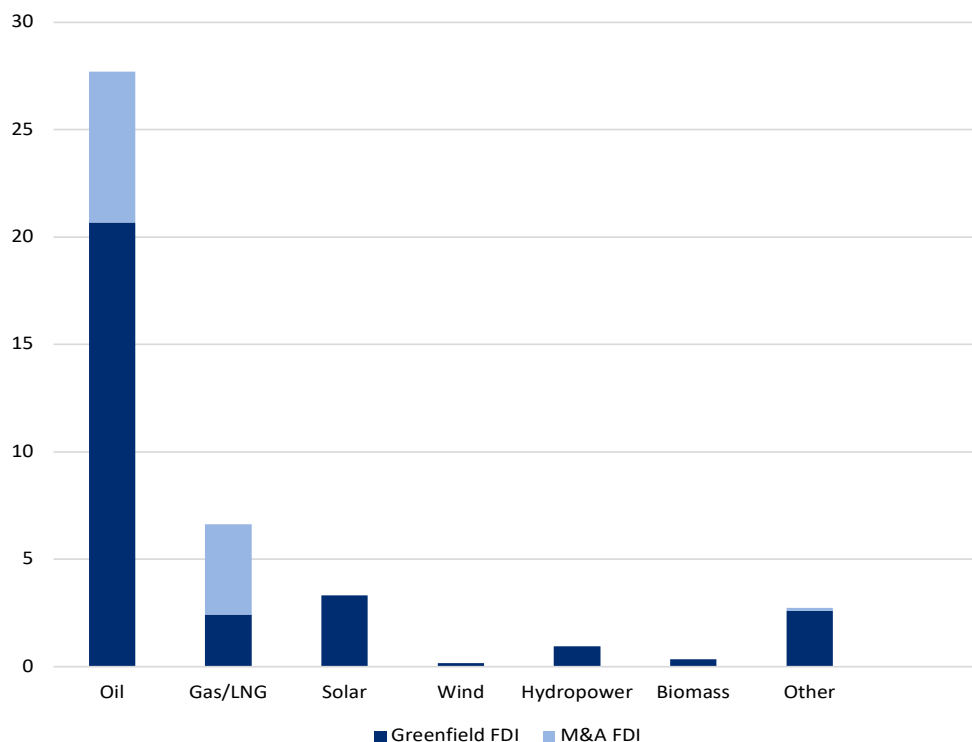
Year	Acquiror	Country	Sector	Billions USD	Project Name
2013	China National Petroleum Corp (CNPC)	Mozambique	Energy, Gas	4.21	Oil & Gas Assets (Area 4 Gas Block in Mozambique)
2013	China Petrochemical Corporation (Sinopec)	Egypt	Energy, Oil	3.10	Apache Corp (Egyptian oil and gas business)
2016	China Molybdenum Co Ltd (CMOC)	Congo, Democratic Republic of	Non-energy Mining and Processing, Copper-Cobalt	2.77	Tenke Fungurume Mining SA

Source: Dealogic, Eni 2013, Apache Corp 2016, SEC 2016.

The significance of FDI to the energy sector is unsurprising given Africa's abundance of fossil fuel and renewable energy natural resources. The majority of both greenfield and M&A FDI for energy ventures supported fossil fuel projects, while only greenfield FDI supported renewable energy, as shown in Figure 14. About 8 percent of all energy related greenfield FDI were for solar and wind projects, which is high compared to 2 percent of DFI energy lending. FDI to hydropower, biomass and other energy sources accounted for 13 percent of the rest of greenfield FDI for energy projects. Unlike companies from other G20 countries who have largely fixated on gas and mixed fossil fuel investments in Africa (Moses 2023), oil ventures have attracted 81 percent of Chinese overall fossil fuel energy FDI.

Compared to the distribution of China's development finance, Chinese FDI has a relatively higher concentration in renewable energy investments, particularly through greenfield FDI in solar energy. About \$3.31 billion in Chinese greenfield FDI was announced for solar energy projects ranging from small to large scale megawatt generating solar photovoltaic panels and parks. A diverse set of multinational Chinese firms that are private, state-owned and mixed with Chinese and international ownership supply solar FDI: primarily Shanghai Electric, Power Construction Corporation of China (PowerChina) and Hanergy Holdings Group. Only one greenfield investment announcement for a wind project was identified, which came from a Hong Kong based company for a small-scale wind farm. Meager investments in renewables,

Figure 14 Chinese FDI for Energy in Africa by Source, 2000-2022



Source: FDI Markets and Dealogic.

compared to that of fossil fuels, is surprising given China's role as the leading supplier and manufacturer of renewable energy technologies (IEA 2023). However, the relatively low amounts of renewable energy FDI in Africa may point to future opportunities for the type of expansion that is already underway in the area of exploration, extraction and processing of the minerals and metals that are crucial inputs for renewable energy equipment.

The non-energy mining and processing sector has received \$28.62 billion in Chinese greenfield FDI and \$12.10 billion in M&A FDI, as seen in Figure 15. Copper mining investments accounted for about one-third of capital for metals and minerals and were concentrated in the Democratic Republic of Congo, Zambia and Uganda. Cobalt and lithium were also among the top minerals financed, and, in combination with copper, they are essential commodities for creating lithium-ion batteries for electric vehicle (EV) batteries and other renewable energy technologies. The material receiving the second highest amount of investment is aluminum, a material with one of the highest demands when building solar photovoltaic (PV) panels (Aluminum Association n.d., Moreira et. al. 2023). Demand for this mineral could expand in coming years as pressure for solar power mounts. Investments in iron ore extraction and steel processing plants also accounted for a significant slice of FDI. Iron, which can also be converted to steel, plays a primary role in the infrastructure of wind, solar and hydropower infrastructure. Remaining FDI for transition materials is spread across uranium, chromium, silver and gold, nickel, limestone and other mixed material ventures.

When it comes to the purpose and use of Chinese FDI, extraction, refining and distribution projects with fossil fuel source origins largely dominate. For example, Chinese investors have

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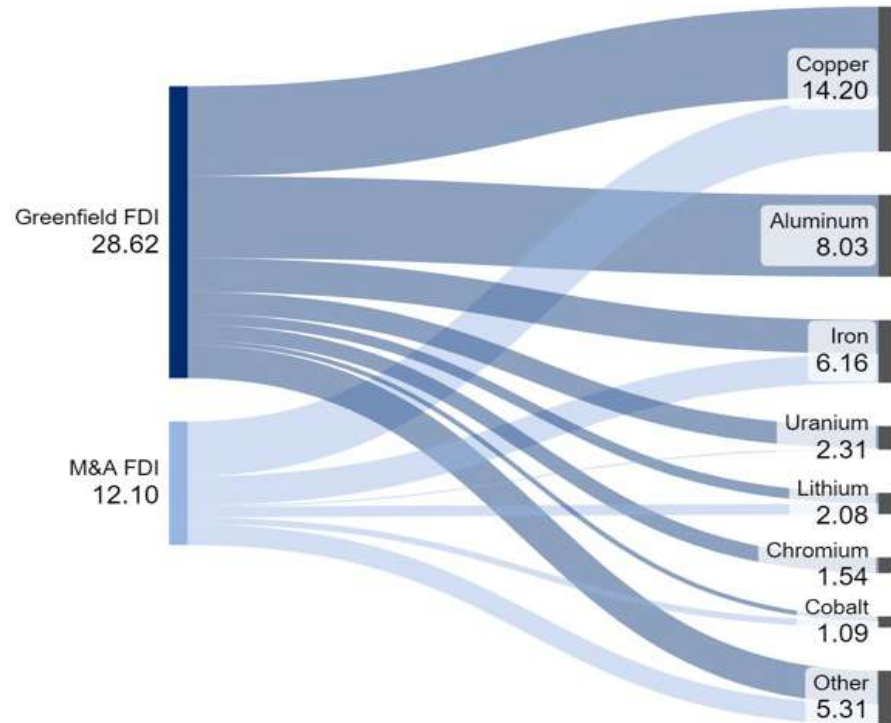
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Figure 15 Chinese FDI for Non-energy Mining and Processing in Africa by Metal or Mineral in Billions USD, 2000-2022



Source: FDI Markets and Dealogic.

Note: Materials in this figure includes their ores, concentrates and processed versions.

invested in oilfield projects in Nigeria, pipelines in Mozambique and refineries in Algeria. FDI-financed electrification projects are limited, but existing projects have renewable energy and hydropower energy sources. Some of these electrification projects still serve to support extraction. For example, while the FE2 hydroelectric power in Gabon is financed for the purpose of domestic electrification, the Amaria hydropower dam in Guinea is financed to power bauxite mining operations (African Energy 2019, Ministry of Energy Gabon 2018). Regarding FDI support to non-energy mining and processing, 99 percent of this financing supports the extraction and processing of minerals and metals.

Overall, these trends highlight that Chinese FDI is more inclined to support the extraction track of both energy resources and transition materials, echoing several goals of Chinese industrial policy. The need to secure oil abroad to fuel China's growing economy was a cornerstone of the BRI's precursor, the "Going Out" policy that was initiated around 2000 (Kobayashi 2008). More recently, China's attempts to foster the development of its EV sector have included generous financial support for companies attempting to acquire essential primary resource inputs, often in the form of loans for overseas acquisitions, as outlined in the previous section.

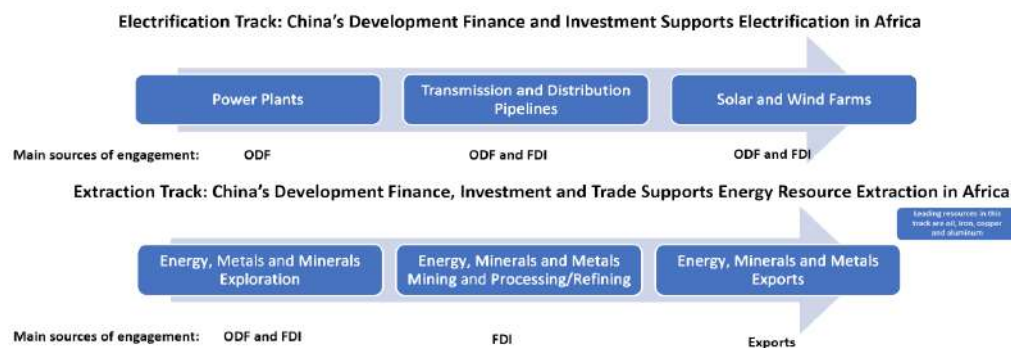
China-Africa trade data shows that many of these extracted and processed primary commodities are then exported to China. African countries ultimately benefit from this trade through the receipt of export revenue, benefiting economies. However, since FDI support for fossil fuels runs counter to global energy transition goals, this type of financial support requires a delicate balance. Although investments in essential transition materials shows the primary upstream role African countries play in the supply-chain for renewable energy technologies, the extraction of these commodities does not align with increased energy access.

CONCLUSION: FUTURE PROSPECTS OF CHINA-AFRICA ECONOMIC ENGAGEMENT FOR ENERGY ACCESS AND TRANSITION

An overview of China-Africa economic engagement depicts major trends and the historical role Chinese finance and trade have played in Africa’s energy and transition materials sectors. This engagement has largely followed divergent and complementary tracks of electrification and extraction, as seen in Figure 16. While China is financing electrification infrastructure such as power plants, transmission and distribution lines and solar and wind farms through overseas development finance and some FDI, China is also heavily investing in exploring, extracting and exporting oil, copper, iron ore and aluminum from Africa through finance, FDI and trade. However, African countries are not yet receiving the full benefits of renewable energy technologies using those inputs.

Within this context, there are opportunities for China to increase renewable energy support via the financing of renewable energy technology, as well as through exporting renewable energy technologies back to African countries. There is also an important need to align Chinese economic engagement with Africa’s energy access needs and ambitions to move up the value chain in industries that are using primary inputs from Africa. Other analysis of China-Africa economic engagement trends draw conclusions of how African countries can approach their future economic relations with China (Chen et. al. 2024). For African countries, there is a need to hone economic diversification to promote sustainable growth, capitalize on the green transition and increase processing capacity for resources as they engage with country partners, including China (Chen et.al. 2024).

Figure 16 China’s Two-tracked Economic Engagement for Energy and Transition Materials



Source: Authors’ compilation.

The future of China-Africa economic engagement will be shaped by challenges and opportunities. In terms of challenges, some African countries face existing debt burdens that prove more and more difficult to service and lead to limitations on attracting affordable debt finance.

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In recent years, Chinese DFIs are increasingly reluctant to issue loans for the large hard infrastructure projects that marked its earlier engagement with Africa (Moses et. al. 2023). Yet, African agency in the green transition accompanied with the demand for transition materials and regional integration on the continent presents opportunities for new forms of engagement.

On the Chinese side, a heightened awareness of environmental concerns in partner countries is leading DFIs to look for greener projects, and Chinese dominance in green technologies may cause Chinese companies and investors to seek out projects abroad that can absorb excess domestic supply. On the African side, suppliers of the primary inputs for green technologies are increasingly leveraging their strengths to strike better deals and step up in the value chain. Ongoing regional integration efforts, like the African Continental Free Trade Agreement, can also boost African countries bargaining power vis-à-vis Beijing and have the potential to improve terms of trade with China.

For China-Africa economic engagement to retain consistent significance, a shift from debt to equity finance is unavoidable. Past engagement helped African countries overcome bottlenecks in infrastructure finance, yet it replicated patterns of trade where Africa exchanged its natural resources for finished goods. If China and African countries intend to escape past patterns and tackle current development objectives like energy access and transition, then concessional loans, equity finance and trade aimed at renewables and value-added green industries are promising targets for future cooperation.

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