

Foreign Direct Investment (FDI) Impacts on Energy Poverty in African Countries

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Abstract

Most of the people lacking access to energy are mainly concentrated in Africa, representing serious challenges to its socio-economic development. FDI can help alleviate energy poverty in Africa through infrastructure development, technological advancement and economic growth channels. However, the complex economic system within which it operates requires increased attention.

1. Introduction

In today's technologically advanced world, energy represents the lifeblood that powers every single aspect of the life of human beings, starting from basic human needs such as heating and cooking to very advanced innovation and research. Despite the remarkable technological development, that the last century has witnessed, an important number of people around the world still live without access to energy and still suffer from energy poverty. Energy poverty is one of the serious challenges that the international energy system faces. It leads to poverty, hunger, poor health and low quality of education, and hinders innovation, industry and infrastructure development, spreading consequently inequality gaps. Hence, access to modern, reliable and affordable energy services offers more socio-economic opportunities by enhancing the use of basic and advanced electronic devices for example, which are necessary for extending daily activities during the night and improving the quality of education, health and work (Sambodo & Novandra, 2019).

However, enhancing economic growth, infrastructure and advanced technological levels is a key factor in mitigating energy poverty. Foreign direct investment (FDI) is known for being a main driver of these factors, thus FDI can represent an important opportunity to alleviate energy poverty through these three channels.

2. Energy poverty in developing countries: the case of Africa

Despite its relevance, access to basic energy is still lagging amid the international efforts to provide energy services for all. According to the Energy Progress Report 2023, despite that access to electricity raised globally between 2010 and 2021, there are still 675 million people around the world living without access to electricity in 2021. Most of these people are concen-

trated in the African continent with around 80% of this number is registered only in Sub-Saharan Africa. Due to its accelerating population growth, the sub-Saharan region is home to 567 million people lacking access to electricity, accounting for almost half of the regional population, with the highest numbers recorded in Nigeria, the Democratic Republic of the Congo and Ethiopia. On the other hand, North Africa has shown a significant decrease in its access deficit with a regional access rate of 94% (WorldBank, 2023).

Paradoxically, Africa is known for holding almost all types of natural and mineral resources, both renewables and non-renewables that are more than sufficient to meet its domestic needs. According to the United Nations Environment Programme, around 30% of the world's mineral reserves, 12% of the world's oil and 8% of the global natural gas are registered in the continent (UNEP, 2024). In addition, Africa is home to a high and diversified potential of renewable resources including solar, wind, hydropower and bio-energies which are fundamental to providing clean and modern energy for its population.

2.1 FDI in Africa

The natural resources sector not only can enable the continent to cover its needs for energy but also is one of the main drivers that can play a vital role in attracting foreign investors. In fact, like many developing regions, Africa has become recently one of the most attractive destinations for foreign investments due to its vast natural resources and also for being a growing consumer market (Gong, et al., 2023).

It is commonly understood that FDI is beneficial for host economies by boosting their economic growth, employment level (by creating new job opportunities), domestic investment, infrastructure, human capital development and productivity through technology and knowledge transfer (Zhang, 2021). In addition, FDI can contribute to ending poverty and its forms including energy poverty which can be reduced by increasing electricity generation access by investing directly in power generation and infrastructure (Aluko, et al., 2023). FDI can bring new technologies to local firms and transfer to them new knowledge. By imitating technologies and know-how from foreign firms and taking advantage of their expertise, local enterprises learn new ways to generate electricity and thus increase electricity access (Hu, et al., 2021; Aluko, et al., 2023). Accordingly, foreign capital has a strong influence on

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electricity access levels in hosting countries (Aluko, et al., 2023).

According to the United Nations Conference on Trade and Development UNCTAD statistics, the foreign direct investment inflows to Africa have seen a tremendous increase from nearly 5\$ billion between 1991 and 1995 to around 53.5\$ billion between 2018 and 2023. To date, an important part of these investments is mainly received from five countries namely France, the United Kingdom, the Netherlands, the United States and China. Despite that Western countries such as France and the United Kingdom have been for a long time the first investors in Africa, China has become its leading trading and investment partner, increasing its stock by more than 50% from 2013 to 2017 and surpassing some Western partners (Hu, et al., 2021).

2.2 Chinese FDI in Africa

In 2016, China topped the list of all foreign investors in the continent, which highlights the Chinese interest in investing in Africa. According to the China Statistical

Yearbook, the Chinese FDI stock in Africa reached \$40.9 billion in 2022 and almost 90% of total Chinese outwards were destined to Sub-Saharan Africa between 2003 and 2022. Like its Western partners, China's focus has been for a long time on the natural resource extractions sector, which has been the top recipient sector for years and in 2015, it accounted for 27.5% of the total Chinese FDI in the continent. After 2015, the construction sector has gained more importance and has topped all recipient sectors. In 2022, the construction for infrastructure sector received the highest share of Chinese FDI, representing 33.3% of total China's investment stock (CARI, 2024). In recent years, Chinese firms have heavily invested in electricity and transport sectors mainly in ports and roads construction and maintenance, hydropower stations, power grids, hospitals and other activities such as the nuclear power project in Kenya, the first modern tramway in Sub-Saharan Africa, in addition to Tazara railways linking Zambia with the Dar es Salam port in Tanzania (Akinshipe & Aigbavboa, 2022).

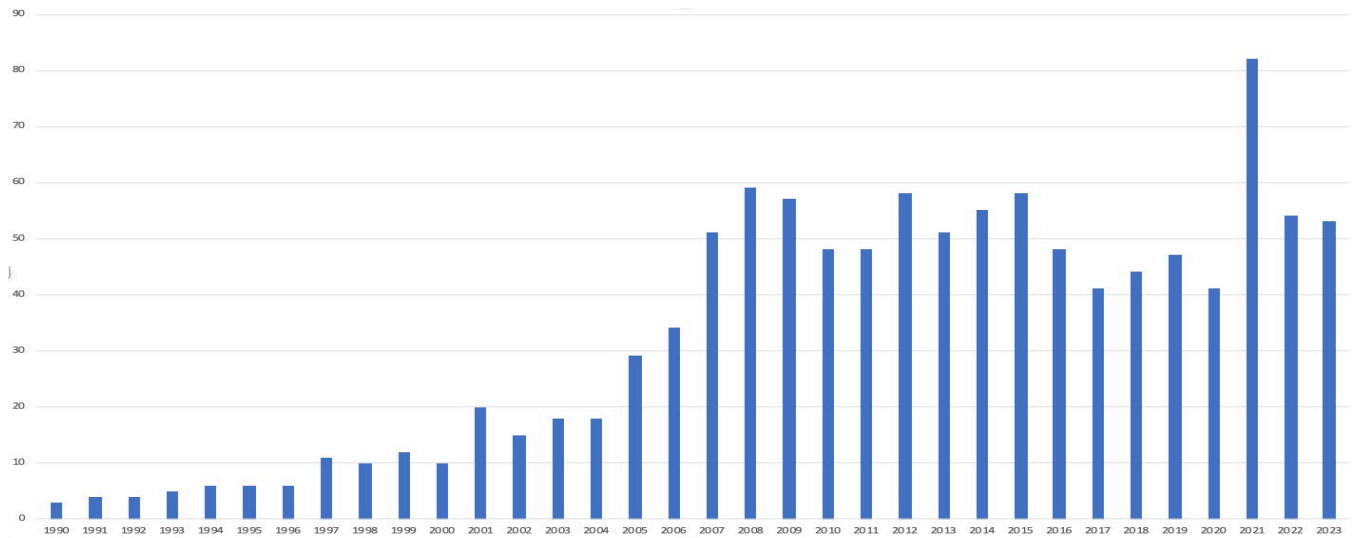
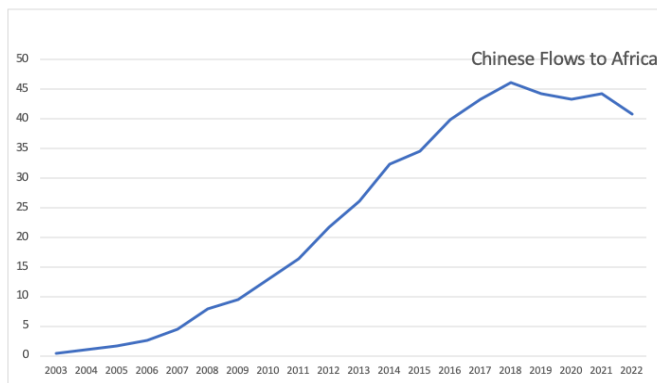
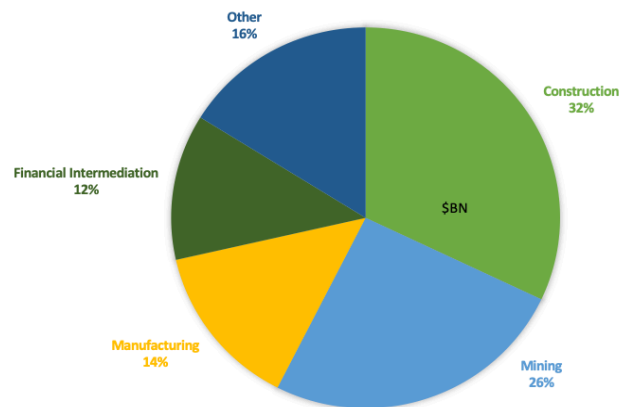


Figure 1: FDI flows to Africa (1990-2023, in billions of USD)
Source: The authors, based on data from UNCTAD statistics.



A: Chinese FDI to Africa (2003-2022, in billions of USD)



B: Chinese FDI to Africa by sector (2013-2022, in billions of USD)

Figure 2: Chinese FDI flows to Africa
Source: The authors, based on data from UNCTAD statistics.

3. FDI: a key factor to reduce energy poverty

Multinational firms can increase electricity connectivity through different channels. Firstly, they can raise energy access by developing and modernising electricity infrastructure since it is necessary for the investors' activities and thus expand energy generation. Foreign investors can directly develop infrastructure and new grids to provide the energy needed to facilitate their business activities (D'Amelio, et al., 2016). In addition, FDI can bring new technologies to local firms and transfer to them new knowledge. By imitating technologies and know-how from foreign firms and taking advantage of their expertise, local enterprises learn new ways to generate electricity and thus increase electricity access (Hu, et al., 2021; Aluko, et al., 2023). Accordingly, foreign capital has a strong influence on electricity access levels in hosting countries (Aluko, et al., 2023).

(D'Amelio, et al., 2016) has investigated how FDI and multinational firms from 83 countries could promote electricity access in 15 host countries in Sub-Saharan Africa between 2005 and 2011. Relying on different econometric techniques mainly the system Generalised Method of Moments GMM and Least Square Dummy Variable, they concluded that the presence of FDI increases electricity access, in particular, in countries characterised by weak institutional quality. According to their analyses, FDI is associated with the development of electricity infrastructure that is necessary for their operations which also helps them gain legitimacy with the stockholders in the local economies. Similar conclusions were found by (Garrone, et al., 2019) in their study on the effects of multinational enterprises on energy poverty in developing countries, specifically in Sub-Saharan Africa. The authors applied the system GMM to a sample of 73 investing countries and 15 host Sub-Saharan countries over the period 2005-2011. Their empirical results pointed out that the host countries affected by poor institutional framework have seen their electrification levels positively impacted by FDI coming from countries that are institutionally closer to them. (Nguea, et al., 2022) have extended the analyses on the relationship between foreign capital and electricity access of the local population to more African countries and a longer period (2000-2017), using the same technique, the system GMM which is suitable for panel data analyses. The findings reveal that while foreign aid decreases electricity access in Africa, FDI increases the share of the population that has access to electrification. However, these inflows do not seem to have a positive impact on reducing the urban-rural disparities in electricity access. More recent work on the same relationship conducted by (Aluko, et al., 2023) emphasised the importance of FDI in lighting up African countries between 2000 and 2017. Not only that, but they also highlighted how the interaction between governance and FDI could influence electricity access in the studied countries. Mainly, FDI has a higher effect on the level of electrification in countries with lower levels of governance.

In an attempt to study the drivers of energy poverty reduction and specifically the role of natural resources

in Sub-Saharan Africa, (Nkoa, et al., 2023) employed the pooled Ordinary Least Squares (OLS) and the difference GMM on a sample of 45 African countries between 1997 and 2018. Their conclusions showed that natural resources do not increase electricity access, while per capita income, secondary education and employment help in reducing energy poverty by increasing electricity access to the local people. FDI also plays a vital role in providing electricity in Africa, particularly in rural areas. Employing different determinants including FDI in their analyses, (Khan & Majeed, 2023) focused on the financial sector development impact on energy poverty in developing countries. To empirically investigate the relationship between the different variables, they used several econometric methods such as pooled OLS, fixed and random effects and GMM. They concluded that financial development is important to alleviate energy poverty in the 110 studied economies between 1990 and 2020. The same positive impact was also found between FDI inflows and electricity access. According to the authors, foreign capitals are accompanied by advanced technology transfer that may reduce energy intensity and thus decrease energy poverty. Considering a more comprehensive financial framework, (Ajebe, 2024) examined the nexus between financial resources, energy poverty and CO2 emissions in 54 African countries. The study contributes to the literature on the relationship between FDI and energy poverty and found out that FDI, together with financial development and official development assistance, plays a significant role in the energy landscape in Africa and has a strong connection between them, energy poverty and GHG emissions.

The other channel through which FDI can contribute to energy poverty reduction is economic growth. It is agreed that FDI is an important driver for economic development through the transmission of capital and funds, access to new markets, expansion of production and technology transfer (Sunde, 2017). Moreover, higher economic growth is generally associated with higher government spending on energy infrastructure in different areas. In addition, economic growth may result in an improvement in income levels, and thus householders are likely to choose cleaner and sustainable sources of energy. Hence, FDI can promote access to energy through its effect on economic growth (Nguyen & Su, 2022; Nguea, et al., 2022).

4. Challenges

Considering the previous affirmations, FDI, being an importer of new technologies, able to create new job opportunities and a contributor to the host economy, represents a key driver in promoting energy access and reducing energy poverty. However, it is extremely crucial to join the debate on the FDI and energy poverty relationship, including a comprehensive empirical model to help policymakers, particularly in Africa.

The goal is to explore how African countries should structure their policies regards FDI regulations to reduce the number of people living without access to energy. This requires to carefully balance the timing of

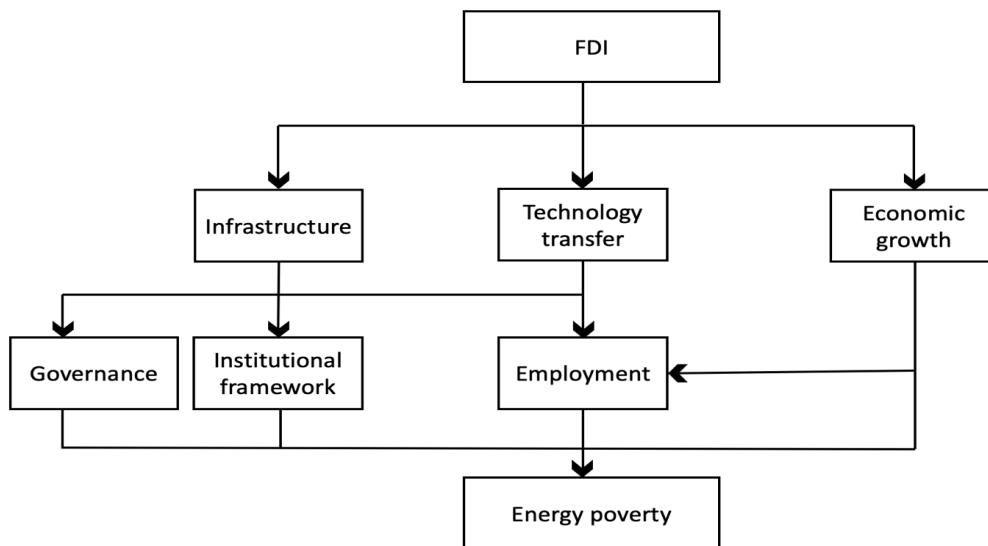


Figure 3: FDI and energy poverty nexus
 Source: The authors, based on the literature review.

these interventions with their efficiency. Specifically, it is important to clarify the priority between addressing energy poverty in the short term or pursuing a longer-term strategy that achieves a higher percentage of people lifted out of poverty.

Moreover, policymakers must assess the relative impact of various channels through which FDI can alleviate energy poverty. Some channels may offer quicker solutions with immediate benefits, while others could require more substantial, long-term improvements. Therefore, finding an effective balance between short-term gains and long-term sustainability is essential to ensure both immediate relief and long-term progress in reducing energy poverty across Africa.

It becomes highly important to deepen the understanding of the economic processes that deeply connect different dynamics. Accordingly, further econometric analysis is needed to explore the conditions and the relations allowing to identify the balance between long-term and short-term investments. Also, it is required a deep understanding of the priorities of each territory, in order to better direct FDI.

5. Conclusion and Proposition

Understanding the relationship between foreign investments and the reduction of energy poverty in developing countries is crucial for driving sustainable progress. Foreign investments, particularly in energy infrastructure, have the potential to transform economies by providing access to clean, affordable, and reliable energy sources. This access can empower communities, improve living standards, and foster economic growth. However, the complexity of this relationship demands a deep, interdisciplinary exploration to assess both the positive impacts and the challenges that may arise.

A **call for research** is being proposed to establish a network of complementary studies aimed at collectively addressing the multifaceted connections between

foreign investments and the reduction of energy poverty. By gathering diverse perspectives—spanning fields such as economics, environmental science, policy analysis, and social justice—this initiative seeks to create a comprehensive body of work.

The proposed goal is to compile these studies into a unified framework that, like pieces of a puzzle, will offer a clear and holistic understanding of how international funding can effectively mitigate energy poverty. This initiative will invite scholars and experts to contribute their research

and insights, fostering collaboration across disciplines. The outcome of this collective effort is envisioned to inform and guide future policy-making and investment strategies, ultimately promoting equitable and sustainable development in regions most affected by energy poverty.

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