Master's Thesis of International Studies

The Impact of Official Development Assistance (Energy Aid) on National Energy Policies of Recipient Countries:

Evidence from Sub-Sahara African Countries

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Abstract

The Impact of Official Development Assistance (Energy Aid) on National Energy Policies of Recipient Countries: Evidence from Sub-Sahara African Countries

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This thesis examines the impact of Official Development Assistance- Energy Aid through the lens of donor-recipient alignment in the energy sector of Sub-Saharan Africa (SSA) from 2010 to 2022. It focuses on how global donor priorities interact with national energy needs and influence resource allocation, particularly within the current context of global climate and sustainable development goals. By analyzing regional trends and three case studies—Kenya, Cameroon, and Nigeria—this study explores alignment in energy generation (renewable and non-renewable sources), distribution, and policy objectives.

Findings reveal that donor commitments emphasize renewable energy, policy reforms, and grid expansion, aligning strongly with global climate goals but often diverging from recipient countries' short-term energy security needs. Kenya, with its renewable-dominated energy mix, demonstrates strong alignment in geothermal and solar but faces misalignment in coal and nuclear ambitions. Cameroon, reliant on a hydro-fossil mix, exhibits partial alignment, as donors prioritize hydropower while domestic needs drive investments in emergency thermal plants. Nigeria, with its fossil-dominated profile, reflects alignment in gas-fired generation as a transitional fuel, though hydropower and other renewables remain underfunded. Lessons drawn from Kenya underscore strategies for Cameroon to enhance rural electrification, resource mobilization, energy mix diversification, and long-term planning in pursuit of sustainable energy development.

This thesis introduces the concept of *intra-sectoral fungibility* to explain how alignment and misalignment affect recipient governments' ability to reallocate domestic resources within the energy sector. It highlights both resource efficiencies, where donor support frees up funds for underfunded priorities, and inefficiencies, where misalignment exacerbates financial and operational vulnerabilities. The study further explores geopolitical dynamics, showcasing the role of emerging donors like China and South Africa and the implications of shifting global agendas.

The research contributes to existing literature by developing a **flexible alignment matrix**, a framework for assessing donor-recipient alignment across energy programs and proposing **hybrid energy aid programs** as a solution to reconcile donor priorities with recipient sovereignty. Recommendations emphasize leveraging the multiplicity of donors, enhancing long-term planning, and aligning energy aid to support resource diversification and locally grounded priorities.

The study concludes that effective energy aid requires balancing global sustainability goals with recipient countries' strategic priorities to achieve energy security, efficiency, and sovereignty in the SSA region.

Keywords: Energy Policy, Official Development Assistance (ODA), Energy Aid, Donor-Recipient Alignment, Intra-Sectoral Fungibility, Renewable Energy, Sub-Saharan Africa, Geopolitics, Resource Allocation.

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Chapter 1 Introduction

Over time, industrialized nations have shifted from traditional biomass to fossil fuels as their main energy source. This transition, driven by economic growth and rising income levels, has resulted in significant carbon emissions, particularly from industrial processes. Global concerns about these emissions led to the signing of the Kyoto Protocol in 1997, an early step in addressing climate change that achieved mixed results. Today, with the rising risks of climate change, the energy sector—responsible for over 70% of global carbon dioxide emissions—is under increasing pressure to transition to cleaner, low-carbon energy sources. The adoption of the Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change in 2015 has further highlighted the importance of energy in achieving global development and climate goals. Unlike the Millennium Development Goals (MDGs), the SDGs explicitly address energy through Goal 7, which focuses on ensuring access to affordable and clean energy for all. This global shift has driven rising investments in renewable energy, which now exceed investments in fossil fuels (IEA, 2024).

For developing countries, however, the energy transition presents distinct challenges. Africa, for example, contributes less than 3% of global energy-related carbon dioxide emissions but faces growing pressure from advanced economies to prioritize decarbonization in line with global climate goals (African Energy Chambers, 2022). Yet, the immediate priority for most African nations is to address energy poverty by providing reliable and affordable energy to meet basic needs and support economic growth. This is particularly important given that fossil fuels account for 89.79% of the region's primary energy consumption, with renewables and nuclear contributing only 9.83% and 0.38%, respectively (Our World in Data, 2022). In 2022, natural gas and coal together generated 68% of the region's electricity (IEA, 2022).

Despite these challenges, many African countries are signatories to the Paris Agreement and have set ambitious renewable energy targets in their Nationally Determined Contributions However, achieving these goals depends heavily on external support. According to IRENA (2023), Africa will need at least USD 104 billion to install 58 GW of renewable energy capacity by 2030, with USD 48 billion expected to come from international funding. Additional support is also needed in the form of technical expertise, capacity building, and technology transfer. Enhanced international cooperation and financial flows are therefore essential to helping African countries achieve their energy and development goals.

Foreign aid has played an important role in supporting development for decades. The post-World War II Marshall Plan, which successfully rebuilt Europe, inspired the use of aid in newly independent nations, including many in Africa. Over time, Official Development Assistance (ODA) has made significant contributions to development efforts, but its effectiveness remains widely debated. Critics argue that aid

often leads to inefficiencies or benefits elites, while supporters emphasize its potential to drive positive change when aligned with recipient priorities (Easterly, 2007; Sachs, 2005). South Korea provides a notable example of how aid, when effectively used, can contribute to sustainable development. Following the Korean War, South Korea utilized foreign aid to rebuild its economy, transitioning from an aid recipient to a donor country. Today, it serves as a model for successful aid-driven development.

In Sub-Saharan Africa, foreign aid has helped build infrastructure and productive sectors but has often fallen short of achieving broader development goals. Global efforts to improve aid effectiveness, such as the Paris Declaration on Aid Effectiveness, highlight the importance of aligning aid with the needs and priorities of recipient countries. The relationship between donors and recipients plays a central role in determining the success of aid programs, especially in the energy sector, where alignment between donor priorities, recipient needs, and global goals can shape the effectiveness of aid interventions. Examining this relationship provides insights into whether energy aid supports energy poverty alleviation and sustainable development or primarily serves donor-driven objectives and global goals.

This study uses a qualitative approach to examine how energy aid aligns with recipient countries' energy policies and influences resource allocation. Financial data from Official Development Assistance is analyzed to identify donor priorities, while qualitative analysis of policy documents, donor strategies, and case studies explores the donor-recipient relationship and its impact on energy outcomes. Case studies of Cameroon, Kenya, and Nigeria provide insights into how alignment—or misalignment—between donors and recipients affects energy sector priorities and resource allocation. The findings aim to offer actionable recommendations for strengthening donor-recipient partnerships, improving energy aid effectiveness, and supporting sustainable energy development in sub-Saharan Africa.

Chapter 2 : LITERATURE REVIEW

2.1. Research Background

Sub-Saharan Africa (SSA) faces critical energy challenges, with over 600 million people—75% of the global population without electricity—lacking reliable energy access (IEA, 2021). This energy poverty hinders economic growth, education, and healthcare, necessitating solutions that address immediate needs while supporting long-term sustainability (World Bank, 2022). Energy policy is central to this effort, guiding how the energy in a country is produced, distributed, and consumed. According to the OECD's *Policy Coherence for Sustainable Development* framework, effective policies must address local needs, align with global goals such as the Sustainable Development Goals, and ensure coherence across sectors and governance levels (OECD, 2021).

Policymakers in SSA face the "energy trilemma": balancing energy access, affordability, and sustainability. Limited resources, weak infrastructure, and competing priorities often push short-term needs ahead of long-term climate goals. While renewable energy offers sustainable solutions, high initial costs can make them challenging for resource-constrained countries to adopt.

Energy aid, a key subset of Official Development Assistance, supports energy policies by providing financial, technical, and institutional resources (OECD, 2021). Between 2002 and 2023, energy aid rose from 2.4% to 5.5% of total ODA, with $13.15 billion allocated to energy projects in 2023 (OECD DAC, 2023). About 30% of this funding went to SSA, with most directed toward renewable energy projects such as solar and wind, reflecting a global shift toward clean energy and rural electrification (Creditor Reporting System, 2023).

Despite progress, donor priorities often diverge from recipient needs, reducing the effectiveness of energy aid (Brown & Green, 2020). For instance, while Cameroon and Kenya emphasize renewables, Nigeria relies heavily on fossil fuels due to its natural gas reserves. Emerging donors like China and South Africa further complicate this landscape by prioritizing infrastructure and economic growth over sustainability.

Understanding how energy aid influences energy policies is essential for addressing energy poverty and aligning with global sustainability goals. This research aims to provide actionable recommendations for improving donor-recipient collaboration for effective partnerships and resource mobilization needed to overcome the energy trilemma in SSA.

2.2. Research Question and Assumptions

This study seeks to answer the primary research question:

Does energy aid align with the energy policy of recipient countries?

To address this primary question, the research is guided by the following sub questions:

1. Who are the key donors, and what types of energy programs do they fund? This question explores the range of donors involved in energy aid, including their motivations and purposes, whether geopolitical, economic, or environmental.
2. Do donor priorities align with recipient needs or prioritize global goals and donor interests? This question examines whether energy aid supports the energy strategies of recipient countries, meets global sustainability objectives, or primarily serves donor priorities.
3. How does alignment or misalignment influence recipient countries' allocation of their own resources? This question investigates whether energy aid affects how recipient governments prioritize their own financial or policy commitments to energy initiatives.

The research assumes that:

1. Energy aid is designed to support both local and global priorities: Donor contributions aim to address immediate energy needs in recipient countries while aligning with global goals such as the SDGs and the Paris Agreement.
2. Misalignments between donor priorities and recipient needs**:** It is assumed that donor priorities, focusing on renewable energy, often conflict with the energy needs and economic realities of recipient countries reliant on fossil fuels.
3. Energy aid stimulates private sector involvement: It is assumed that energy aid fosters private sector opportunities, particularly in renewable energy and infrastructure, driving economic growth and investment.

2.3. Prior empirical studies

Research on energy aid has extensively focused on its outcomes, such as improving electricity access, advancing renewable energy, and mitigating climate change. Bhattacharyya (2012) highlighted how donor-funded rural electrification programs in Sub-Saharan Africa have reduced energy poverty by expanding access in underserved areas. Similarly, Wang, Guo, and Dong (2019) found that official development assistance has significantly supported renewable energy infrastructure in SSA. Liu, Dong, and Taghizadeh-Hesary (2023) emphasized the role of energy aid in promoting renewable energy

adoption and reducing carbon emissions. While these studies demonstrate the benefits of energy aid, they often neglect its influence on recipient countries' energy policies.

Donor motivations are a major factor shaping energy aid programs and their alignment with recipient needs. Bilateral donors frequently pursue geopolitical or economic goals, such as securing energy markets or extending influence (Berthélemy, 2006). Multilateral donors, including the World Bank and African Development Bank, while focused on development objectives, also serve geopolitical interests. For example, multilateral aid can strengthen donor coalitions or promote economic liberalization through conditions tied to trade and structural reforms (Schneider & Tobin, 2013); (IMF, 2001). However, multilateral donors tend to prioritize global frameworks such as the Sustainable Development Goals and the Paris Agreement, favoring sustainability and poverty reduction.

Alignment between donor priorities and recipient energy policies is vital for effective aid. The OECD (2021) emphasizes that policy coherence is critical to ensure that donor-funded programs integrate seamlessly into national strategies, addressing both global goals and local energy needs. For instance, Kenya has successfully leveraged international support for geothermal energy, aligning donor priorities with its renewable energy policies (Singh & Inglesi-Lotz, 2021). Conversely, in Nigeria, donor priorities for renewables often conflict with the country's heavy reliance on fossil fuels (Hanif, 2018). In Cameroon, donor support for hydropower aligns with its energy policy, as seen in projects like the Lom Pangar Hydropower Project (IEA, 2022). However, achieving alignment for broader energy diversification goals, such as incorporating non-renewable energy sources, remains a challenge in many SSA countries, particularly within the current context of the sustainable development and global climate goals.

This lack of donor support has prompted recipient governments to reallocate their domestic resources to fill gaps in such underfunded energy priorities. Fungibility offers another perspective on the relationship between energy aid and recipient policies. Most research has focused on inter-sectoral fungibility, where aid allows governments to reallocate resources to other sectors (Feyzioglu, Swaroop, & Zhu, 1998; Pack & Pack, 1993). However, intra-sectoral fungibility, where aid influences resource allocation within the energy sector itself, remains underexplored. By addressing these gaps, this study contributes to a deeper understanding of how energy aid influences national policy implementation and resource prioritization, particularly in Sub-Saharan Africa. This focus enables the research to offer fresh perspectives on energy aid effectiveness, forming the basis for the next section on the contributions of this study to existing literature.

2.4. Contributions of the Study

This study makes significant contributions to the understanding energy aid-energy policy nexus in Sub-Saharan Africa (SSA) by addressing key gaps in the literature:

1. Shifting focus from Outcomes to Relationships: Most studies on energy aid focus on outcomes such as electricity access, renewable energy capacity, or carbon dioxide mitigation. This research shifts attention to the relational dynamics between donors and recipients**,** examining how alignment or misalignment of priorities shapes aid effectiveness and implementation.
2. Introducing Intra-Sectoral Fungibility: This study introduces the concept of intra-sectoral fungibility in the energy sector as well as in the broader foreign aid context. This concept has been rarely addressed in literature as compared to inter-sectoral fungibility. It examines how donor funding priorities in renewable energy influence resource allocation within the energy sector. Using Kenya and Cameroon as cases, it shows how fungibility can promote efficiency in aligned projects and cause inefficiencies in misaligned ones.
3. Expanding Research on Energy Aid in SSA: By comparing Kenya, Nigeria, and Cameroon, this study addresses the limited research on energy aid in SSA. It explores how diverse energy profiles and governance systems influence donor-recipient dynamics and the use of energy aid.
4. Policy Recommendations: The findings provide practical recommendations for improving energy aid partnerships. These include aligning donor priorities with recipient needs and integrating aid-funded projects into national strategies to enhance resource efficiency and promote long-term development goals.

2.5. Overview Of Sub-Saharan Africa's Energy Sector

Sub-Saharan Africa (SSA) has abundant energy resources, including fossil fuels, hydropower, solar, wind, and geothermal energy. The region holds over 60% of the world's best solar energy resources and significant hydropower and geothermal potential, particularly in Ethiopia, the Democratic Republic of Congo, and the East African Rift Valley (IRENA, 2022).

Despite this resource wealth, more than 600 million people lack access to electricity, making SSA the region with the largest energy deficit globally (IEA, 2022). Key challenges include underdeveloped infrastructure, unreliable grids, insufficient financing, and weak regulatory frameworks. Climate change further exacerbates energy insecurity by impacting hydropower and infrastructure.

Donors play a major role in addressing these challenges by funding electrification programs, supporting infrastructure development, and promoting renewable energy adoption.

Looking ahead, SSA has significant opportunities to close the energy access gap, particularly through renewable energy deployment, regional power trade under initiatives like the West African Power Pool (WAPP), and donor-supported programs. With effective policies and investment, the region can achieve universal access, transition to sustainable energy systems, and support long-term economic growth.

2.6. Structure of report

In Chapter 3, we discuss the research methodology and analytical framework. While in Chapter 4 we present results on recipient countries' needs by reviewing the energy policies of case study countries, and the donor interest at regional and country levels by analyzing ODA flow commitments to the energy sector. In Chapter 5 we present discussions, followed by Chapter 6 presenting the Conclusion and Policy Recommendations.

Chapter 3 RESEARCH METHOD

This chapter outlines the methodology used to evaluate whether energy aid from multilateral donors aligns with recipient countries' energy policies and how this alignment impacts resource allocation behavior. A qualitative approach, supported by Official Development Assistance (ODA) data, guides the study, with a focus on donor-recipient dynamics at both regional and country levels.

3.1. Research Design

The study employs a qualitative research design, integrating policy analysis and financial data. The analysis evaluates alignment across five criteria: renewable generation objectives, non-renewable generation objectives, transmission infrastructure, electricity access, and sector reforms. Additionally, the study examines how alignment or misalignment influences resource allocation behavior, particularly in the generation sub-sector.

This research design is guided by the theoretical frameworks of political economy and aid effectiveness**,** which help to explain how donor priorities and power dynamics shape recipient countries' energy strategies. This lens provides a foundation for exploring how energy aid influences resource allocation and long-term energy outcomes.

3.2. Data Sources

Two primary data sources are utilized in this study:

1. National Energy Policy Documents: Documents from Cameroon, Kenya, and Nigeria provide an understanding of the energy needs and priorities of recipient countries. These documents include national development plans and energy strategies, which outline objectives in renewable energy, fossil fuel use, electricity access, transmission, and sector reforms.
2. ODA Data from CRS OECD Database: The study focuses on energy aid provided by multilateral donors as their actions are primarily guided by collective global goals, such as the Paris Agreement and Sustainable Development Goals. Unlike bilateral donors, whose aid is often influenced by the geopolitical or economic interests of individual nations, multilateral donors are designed to address broader priorities like sustainability and energy access (Berthélemy, 2006).

The CRS database, accessed through the OECD Data Explorer (2024), provides detailed information on energy-related aid flows at sectoral and project levels, covering the period from 2010 to 2022.

- This timeframe captures trends before and after global milestones such as the SDGs (2015) and the Paris Agreement (2015), offering a baseline for assessing shifts in donor priorities.
- Aid commitments are prioritized as they better reflect donor intentions compared to disbursements, which are often influenced by external factors [(Neumayer, 2003; White & McGillivray, 1995, as cited in Kim, 2019)].

3.3. Case Study Approach

The study adopts a case study approach, focusing on Cameroon, Kenya, and Nigeria. These countries were selected for their distinct energy profiles, reliance on multilateral aid, and shared objectives of expanding electricity access, renewable energy integration, and sector reforms.

This comparative approach allows for an in-depth examination of:

- Nigeria's fossil-based energy system: A case where donor priorities for renewable energy may contrast with the country's heavy reliance on oil and gas.
- Kenya's renewable energy transition**:** A case where donor support aligns with national goals for geothermal and other renewable energy sources.
- Cameroon’s hydropower-dominated energy mix: A case exploring its reliance on hydropower, ambitions to expand modern renewables, and potential to emulate Kenya’s renewable energy leadership in Central Africa amidst shifting donor priorities.

By analyzing these case studies, the research provides a nuanced understanding of how donor priorities align or conflict with national energy policies and resource endowments, offering broader insights into energy aid dynamics in Sub-Saharan Africa (SSA).

3.4. Analytical Framework

The alignment analysis is based on five criteria:

- Renewable Generation Objectives: Alignment with goals for expanding renewable energy sources.
- Non-Renewable Generation Objectives: Alignment with fossil fuel-based energy priorities.

- Transmission Infrastructure: Support for grid expansion, modernization, and renewable integration.
- Electricity Access: Alignment with rural electrification and universal access goals.
- Sector Reforms: Support for regulatory and market improvements.

These criteria provide a structured approach to assessing how donor priorities align with recipient energy policies and strategies. The framework is adaptable to countries with diverse energy profiles, ensuring broader applicability beyond the selected case studies.

3.5. Alignment Framework

The alignment framework evaluates the degree to which donor interests align with recipient needs, based on the criteria outlined in Section 3.5. The analysis begins at the regional level, identifying overarching trends in donor priorities in SSA. It then transitions to country-specific evaluations, where alignment is examined in relation to generation mixes, such as Nigeria's fossil-based system and Cameroon and Kenya's renewable-focused systems.

The study also investigates how alignment or misalignment impacts resource allocation behavior in the generation sub-sector. Specifically, it explores:

- Alignment leading to efficient resource use: For example, mutual goals in renewable energy development can enhance resource allocation efficiency.
- Misalignment resulting in inefficiencies: For instance, donor priorities for renewables may conflict with recipient reliance on fossil fuels, creating underfunded priorities.

This dual-level analysis offers understanding into how donor funding strategies influence recipient energy policies and allocation behavior over time.

This chapter outlined the methodology for assessing the alignment of multilateral energy aid with recipient energy policies. The next chapter identifies recipient energy needs, and reports on donor interests in the various regional and national energy objectives.

Chapter 4 RESULTS

4.1. Energy Policy Needs of Case Study Countries

Energy policy needs in Sub-Saharan Africa are shaped by national development priorities, energy resource availability, and socio-economic contexts. For Kenya, Cameroon, and Nigeria, these needs focus on addressing low access rates, ensuring reliable supply, and transitioning to sustainable energy systems. This chapter examines the policy priorities of each country, reflecting their efforts to balance energy security, affordability, and sustainability within the framework of national and global objectives.

4.1.1. Energy Policy of Kenya

Kenya's energy policy focuses on achieving universal access, supporting economic growth, and promoting sustainability. These priorities are outlined in key frameworks, including Vision 2030, the Energy Policy 2018**,** the Least Cost Power Development Plan (LCPDP)**,** and the Kenya National Electrification Strategy (KNES)**.** This section explores Kenya's efforts to expand access, diversify energy sources, enhance grid reliability, and address climate resilience and affordability.

Kenya's energy resources include 10,000 MW of geothermal potential**,** 6,000 GWh of hydropower capacity**,** solar insolation of 4-6 kWh/m²/day, and wind speeds averaging 6-9 m/s in key areas like Marsabit and Turkana. The country also has 600 million barrels of oil in Turkana and 400 million metric tons of coal in Kitui (Kenya Ministry of Energy, 2023; International Renewable Energy Agency, 2020).

Generation Objectives

Kenya plans to expand electricity generation to support economic growth, industrialization, and universal access, prioritizing renewables, and energy security. As of 2023, installed capacity is 3,321 MW**,** with 84% renewables: geothermal (47%), hydropower (22%), wind (13%), and solar (2%). Thermal plants contribute 16% (EPRA, 2023).

By 2030, capacity is set to grow to 19,200 MW, with additions of 5,000 MW geothermal, 2,036 MW wind**,** 1,050 MW solar, and maintaining 1,200 MW hydropower. Gas plants will add 700–1,000 MW, nuclear 1,000 MW by 2035, and coal 1,920 MW**.** Additionally, small, and medium-scale renewables, including biogas, biomass, and small hydropower, will support rural electrification and off-grid systems (Ministry of Energy, 2020; EPRA, 2023; NuPEA, 2023). Beyond capacity expansion, Kenya's renewable energy targets aim to reduce greenhouse gas emissions by 32% by 2030, and improve energy efficiency by 2.8% annually, as outlined in its Updated Nationally Determine Contribution.

Transmission Objectives

Kenya aims to expand its transmission network to support demand growth, improve reliability, and enhance regional trade. Objectives include increasing transmission lines from 5,500 km to over 7,000 km by 2030, reducing system losses below 15%**,** and completing interconnectors like the Ethiopia-Kenya (500 kV) and Tanzania-Kenya Interconnectors to facilitate cross-border energy trade (Ministry of Energy, 2020; EPRA, 2023).

Electricity Access Objectives

Kenya aims to achieve universal electricity access by 2026, as outlined in the Kenya National Electrification Strategy (KNES, 2018), through grid expansion under the Last Mile Connectivity Project and off-grid solutions like solar systems and mini-grids via the Kenya Off-Grid Solar Access Project (KOSAP), while ensuring affordability for low-income households.

Sector Policy Reform Objectives

Kenya's energy sector reforms, as outlined in the Energy Policy 2018 and the Energy Act 2019, aim to improve efficiency, financial sustainability, and service quality. These reforms include unbundling the energy sector to enhance governance and competition, strengthening the regulatory role of the Energy and Petroleum Regulatory Authority (EPRA) in pricing and compliance, and aligning tariffs with operational costs to enhance utility viability (Ministry of Energy, 2018; Energy Act, 2019). Additionally, grid modernization and decentralized energy planning aim to improve reliability, while the Energy Efficiency and Conservation Strategy seeks to reduce energy intensity by 2.8% annually (Ministry of Energy, 2018).

4.1.2. Energy Policy of Cameroon

Cameroon does not have a standalone National Energy Policy like Kenya's Energy Policy 2018. Instead, energy priorities are integrated into broader frameworks, such as Vision 2035 (2009), which emphasizes energy as a key driver of industrialization and poverty reduction. The Electricity Sector Development Plan (PDSE 2030) (2014) outlines targets for generation and access, while the Rural Electrification Master Plan (2016) focuses on off-grid solutions. Furthermore, Cameroon's Updated Nationally Determined Contributions (NDCs, 2021) commit to a 35% reduction in emissions by 2030**,** with a strong emphasis on renewable energy. Additionally, Cameroon is in the process of developing a National Renewable Energy Master Plan with support from the International Renewable Energy Agency (IRENA)**,** aimed at enhancing energy planning and expanding renewable energy capacity.

Cameroon's energy resources include 23,000 MW of hydropower potential**,** 4.8 trillion cubic feet of natural gas reserves, and 300 million metric tons of coal in the Mbalam region. The country also has significant biomass potential from its 21 million hectares of forest**,** wind energy in coastal and northern regions, small hydropower potential of 340 MW, and solar insolation of 5.8 kWh/m²/day in the northern regions as well as geothermal giving its location along the East African Rift System and the Cameroon Volcanic Line (IEA, 2022; Power Africa, 2019; IRENA, 2021).

Generation objectives

Cameroon seeks to expand its electricity generation capacity to address growing demand, achieve universal access, and establish itself as a regional power exporter. As of 2022, the country's electricity generation mix was dominated by hydropower (70.5%), with smaller contributions from natural gas (19.9%), oil (8.7%), and biofuels (0.04%) (International Energy Agency [IEA], 2022). By 2030, total installed capacity is projected to reach 5,000 MW, a target set by the National Development Strategy (SND 30). The targeted generation mix aims to comprise 85% hydropower, 10% natural gas, and 5% renewables, reflecting a shift from the 2022 energy profile (Cameroon Electricity Sector Reform Program, 2023). The anticipated capacity expansion is expected to surpass domestic demand, positioning Cameroon to export electricity to neighboring countries, including the Republic of Congo, Nigeria, and Chad.

Cameroon's climate commitments, articulated in its Updated Nationally Determined Contribution (NDC), aim to increase the share of renewables (excluding large hydropower) to 25% of the energy mix by 2035 while achieving a 32% reduction in greenhouse gas emissions. Specific renewable energy targets include 11% from small hydropower, 7% from biomass, 6% from solar, and 1% from wind. Although solar energy accounts for a small proportion of the energy mix, its share has increased modestly, from 1.4% in 2016 to 1.6% in 2023 (International Renewable Energy Agency [IRENA], 2023).

Transmission and Distribution Objectives

Cameroon's transmission and distribution objectives focus on improving electricity access, reliability, and regional interconnectivity. Managed by the state-owned transmission company, the grid experiences 18% technical losses due to overloading and inadequate reactive compensation. To address these challenges, the government aims to integrate the Southern, Northern, and Eastern networks by 2028, enhancing energy flow efficiency and reducing bottlenecks.

In the distribution network, efforts target reducing the combined technical and commercial losses of 30%, improving service quality, and expanding access to rural and underserved areas. Key initiatives

include upgrading urban distribution lines, deploying smart meters and prepaid systems, and enhancing network management by 2025.

Regionally, Cameroon seeks to establish itself as a power exporter by 2028, leveraging projects such as the Cameroon-Chad Interconnector and the 600 MW Chollet hydropower project with the Republic of the Congo. Plans for a 400 kV transmission line aim to strengthen regional integration and support Cameroon's role within the Central African Power Pool.

Electricity Access Objectives

In 2021, 65.5% of Cameroon's population had access to electricity, with stark contrasts between urban areas (94.7%) and rural areas (24.8%) and between the south (88%) and north (47%) (World Bank-Our World in Data, 2024). To bridge these gaps, the government aims to achieve universal electricity access (100%) by 2035.

This target is outlined in the Rural Electrification Master Plan (PDER), which combines grid expansion with off-grid solutions. By 2030, 1 million new connections are planned, including 250,000 on-grid connections every five years and 20,000 off-grid connections annually. Renewable-powered mini-grids will serve rural areas and integrate with the national grid as it expands.

The distribution utility aims to connect 2.6 million additional customers by 2035, focusing on urban and peri-urban areas. These efforts align with Cameroon's Updated Nationally Determined Contribution, emphasizing equitable energy access as key to sustainable development and poverty reduction.

Sector Reform objectives

The Government of Cameroon has pursued power sector reforms since 1998 to enhance institutional capacity, financial sustainability, operational efficiency, and private sector participation. In 2022, tariff compensation accounted for 1.7% of the national budget, compared to 0.3% for the social sector and 17% for fuel subsidies (Ministry of Water Resources and Energy [MINEE], 2023).

Key reforms include the gradual implementation of cost-reflective tariffs for industrial and commercial consumers while safeguarding low-income households. Efforts also target improving revenue collection, which reached 83% in 2019, and addressing liquidity challenges faced by the national utility. These reforms, under the Electricity Sector Recovery Plan (2023–2027), aim to strengthen financial performance, reduce fiscal pressures, and create a conducive environment for investment (World Bank, 2023).

4.1.3. Energy Policy of Nigeria

Nigeria's energy policies aim to address energy security, improve access, and advance sustainability. The *National Energy Policy (NEP)* focuses on energy diversification, renewable energy development, and private sector participation to attract investment and drive sectoral growth. The *National Renewable Energy and Energy Efficiency Policy (NREEEP)* supports rural electrification through decentralized renewable energy solutions, while the *Electric Power Sector Reform Act (EPSRA)* prioritizes privatization and strengthening regulatory efficiency. The *Energy Transition Plan (ETP)* targets net-zero emissions by 2060, balancing clean energy adoption with poverty reduction goals. Complementary frameworks, including the *Rural Electrification Strategy and Implementation Plan (RESIP)* and the *Decade of Gas Initiative*, prioritize extending electricity access to underserved communities and leveraging Nigeria's vast natural gas reserves to support economic development.

Nigeria possesses a vast potential of energy resources, including an estimated 37 billion barrels of oil and over 200 trillion cubic feet of natural gas, ranking it among the most resource-rich nations globally (Nigeria National Petroleum Corporation [NNPC], 2023). The country's renewable energy potential is equally significant, with daily solar radiation averaging 5.5 kWh/m², a hydropower capacity of 14,750 MW (only 2,000 MW currently utilized), and abundant untapped biomass, wind, and geothermal resources (International Renewable Energy Agency [IRENA], 2023). These resources provide Nigeria with a unique opportunity to diversify its energy mix, improve electricity access, and address growing domestic and regional energy demands.

Generation Objectives

Nigeria plans to expand electricity generation capacity to 30,000 MW by 2030, with 30% from renewable sources as part of the "30-30-30" initiative (Energy Commission of Nigeria, 2022; Federal Government of Nigeria, 2022). As of 2022, Nigeria generated 80% of its electricity from thermal sources, primarily natural gas, and 20% from hydropower, with available capacity averaging 4,500 MW and actual generation at 4,242 MWh (Nigerian Electricity Regulatory Commission [NERC], 2022).

The 2030 target includes 16,200 MW (54 %) from gas and 13,800 MW (46%) from renewables, leveraging solar, hydropower, wind, and biomass resources. This aligns with Nigeria's goal of achieving net-zero emissions by 2060 and diversifying its energy mix to enhance energy security and economic growth (Federal Government of Nigeria, 2022).

More precisely, the *Renewable Energy Master Plan (REMP)* targets 23% renewable energy by 2025 and 36% by 2030, with specific contributions from solar (500 MW), small hydropower (2,000 MW),

biomass (400 MW), and wind (40 MW) (Energy Commission of Nigeria, 2015). These efforts align with Nigeria's *Nationally Determined Contribution (NDC)* to reduce greenhouse gas emissions by 20% unconditionally and up to 47% with international support by 2030 (Federal Government of Nigeria, 2022).

Transmission and Distribution Objectives

Nigeria aims to modernize its T&D infrastructure to improve reliability, meet growing demand, and reduce losses. The *Transmission Rehabilitation and Expansion Program (TREP)* targets 20,000 MW wheeling capacity through grid upgrades and expansion (Transmission Company of Nigeria, 2021). The *Electricity Act 2023* empowers states to independently manage electricity, promoting localized solutions and private sector participation (Federal Ministry of Power, 2023). The *National Renewable Energy and Energy Efficiency Policy (NREEEP)* prioritizes integrating renewables into the grid to diversify the energy mix (Federal Ministry of Power, 2015). Regional interconnection is emphasized under WAPP to boost cross-border electricity trade and energy security (ECOWAS, 2023). Additionally, large-scale metering initiatives aim to reduce losses and improve revenue collection (World Bank, 2021).

Electricity Access Objectives

Nigeria aims to achieve 90% electricity access by 2030 through on-grid and off-grid solutions, targeting underserved and rural areas (*Rural Electrification Strategy and Implementation Plan*, REA, 2017). The *Nigeria Electrification Project (NEP)* seeks to provide electricity to 1 million households and 250,000 MSMEs using mini-grids and solar home systems, while the *Energizing Education Programme (EEP)* focuses on powering federal universities and teaching hospitals (REA, 2018). Additionally, the *Distributed Access through Renewable Energy Scale-up (DARES)* program aims to deliver clean energy to over 17.5 million Nigerians through solar-based solutions (World Bank, 2023).

Sector Reform Objectives

Nigeria's electricity sector has faced persistent challenges, including inadequate infrastructure, inefficiencies, and unreliable access. To address these issues, the *Electricity Act 2023* was enacted as part of broader reform efforts to decentralize the sector. The Act empowers states and private entities to independently generate, transmit, and distribute electricity, fostering competition and attracting private sector investment (Federal Ministry of Power, 2023). It also aligns with the *National Renewable Energy and Energy Efficiency Policy (NREEEP)* to integrate renewables and diversify the energy mix. These reforms aim to modernize the sector, enhance reliability, and support Nigeria's energy transition and economic growth.

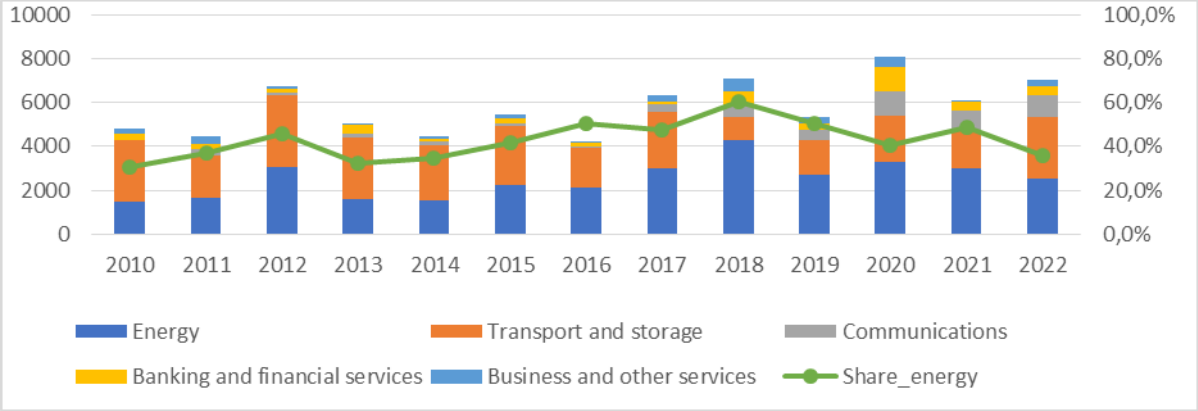
4.2. Donor Interest from Official Development Assistance to Energy Sector

4.2.1. Donor Interest in Energy Sector of Sub-Saharan Africa Region

Over the last decade since 2010, out of the approximately USD75.25 billion committed from multilateral donors towards economic infrastructure and services sector in the region, aid to energy represented roughly USD32.51billion- translating a cumulative share of 43.2% of the total aid to the said sector. While other sub-sectors like Transport and Storage got USD29.71 billion (39.48%), Communications USD521.10 billion (6.92%), Banking and financial services USD4.64 billion (6.16%) and

Business USD3.18 billion (4.22 percent).

Figure 1 : volume and share of energy aid in total ODA committed to Economic Infrastructure and Services in Sub Sahara Africa from Multilateral Organizations from 2010-2022



Source: author's computation with data from OECD Data Explorer 2024

- Share of ODA with energy objectives (right axis)
- Volume of ODA with energy as principal objective (left axis in thousands USD)

Looking closely at the energy sector, we observe that since the adoption of the SDGs and Paris Agreement, there has been a general upward trend in energy aid in Sub-Sahara Africa, with some fluctuations between years. The green line, representing the share of energy in total ODA committed to Economic Infrastructure and Services, shows a steady increase from around 40% in 2010 to over 60% in 2022. This suggests that while total aid committed to the region may have fluctuated, the proportion

dedicated to energy has steadily grown, indicating a growing focus on energy within the economic infrastructure aid sector in Sub-Sahara Africa.

Donor Landscape in SSA Energy Sector

Since 2010, a total commitment of close to USD32.51billion has been provided by multi-lateral donors to support energy objectives in the region. The analysis of multilateral donor commitments to energy aid in Sub-Saharan Africa between 2010 and 2022 reveals significant disparities in the volume and share of contributions across donors:

- World Bank Group (WBG): The World Bank Group emerged as the leading donor, committing USD 20.93 billion, which accounts for 65% of total energy aid flows to the region. This substantial contribution underscores its dominant role in shaping energy sector development in Sub-Saharan Africa.
- Regional Development Banks: Collectively, regional development banks, including the African Development Bank (AfDB), accounted for USD 4.36 billion, equivalent to 13% of total flows. These institutions also play an important role in addressing region-specific energy challenges.
- European Union Institutions (EU Inst): European Union Institutions committed USD 4.06 billion, representing 12% of total flows, positioning them as the third-largest contributor to energy aid in the region.
- Other Multilateral Organizations contributed USD 3.32 billion, making up 10% of total flows. This group includes smaller donors with more focused or diversified portfolios.
- United Nations Contributions amounted to USD 72.23 million, representing a negligible share in total flows.
- Several Other Organizations, such as the Adaptation Fund, Joint SDG Fund, WTO, UNIDO, and GCF, recorded minimal commitments during the period under review.

These findings illustrate a highly concentrated landscape of energy aid in sub-Saharan Africa, with most commitments coming from a few dominant donors, particularly the World Bank Group, European Union Institutions, and Regional Development Banks. Contributions from smaller donors, while present, remain relatively limited in both scale and scope.

Other Multilateral Organisations include:

- Adaptation Fund committed USD 1.63 million
- Arab Bank for Economic Development in Africa-BADEA committed USD 164.52 million (1%
- Arab Fund committed USD 1.70 billion (5%)
- Climate Investment Funds-CIF committed USD 763.12 million (2%)
- Global Environment Facility-GEF committed USD 204.50 million

- Global Green Growth Institute-GGGI committed USD 1.88 million
- Green Climate Fund-GCF committed USD 76.25 million
- Nordic Development Fund-NDF committed USD 8.68 million
- OPEC Fund for International Development-OPEC Fund committed USD 393.09 million (1%)

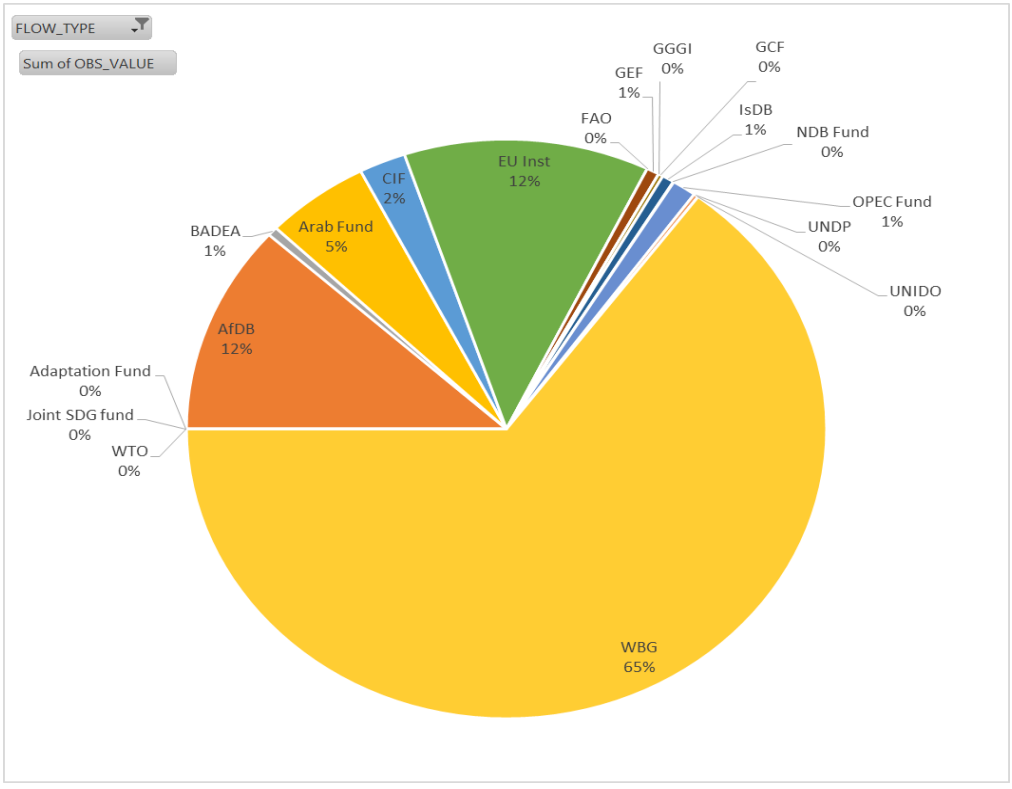
Regional Banks include:

- African Development Bank- AfDB committed USD 3.78 billion (12%)
- Islamic Development Bank- IsDB committed USD 196.74 billion (1%)

United Nations

- Joint SDG Fund committed USD 0.25 million
- UNDP committed USD 76.07 million
- United Nations Industrial Development Organization-UNIDO committed USD 0.0037million
- WTO- International Trade Centre (ITC) committed USD 0.0285 million
- Food and Agricultural Organization (FAO) committed USD 0.62 million

Figure 2: *Multilateral donor committed to SSA energy sector and share of each commitments, 2010-2022*



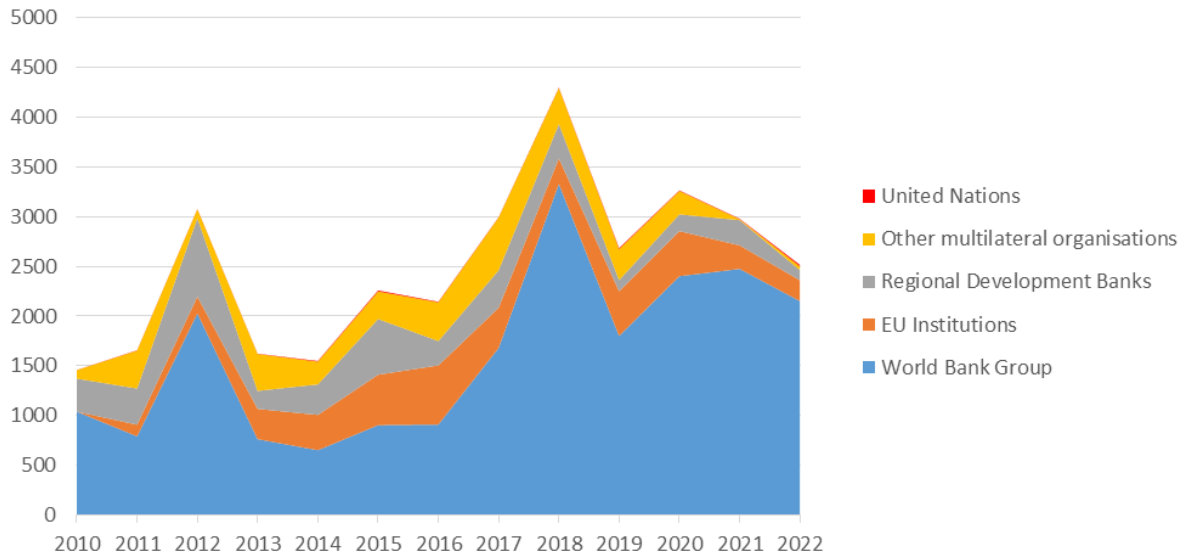
Source: author's computation with data from OECD Data Explorer 2024

Trend in the volume of commitments by donor

The trend observed in Figure 3 below reveals key shifts in funding contributions between 2010 and 2022 towards energy aid from multilateral donors to Sub-Saharan Africa (SSA). The data highlights significant peaks in 2017-2018, primarily from the World Bank Group and Other Multilateral Organizations, followed by a decline in aid levels in the following years, particularly in the years 2020-2022. Specifically:

- The World Bank Group consistently represents the largest share of energy aid to SSA throughout the period, with noticeable peaks, particularly in 2017 and 2018. Its volume is consistently higher than other donor categories.
- After the adoption of the SDGs onwards, Other Multilateral Organisations show an increasing trend, peaking around 2018-2019. This suggests a growing role for organizations outside the World Bank Group and EU Institutions in funding energy projects in SSA.
- The contributions from EU Institutions and Regional Development Banks exhibit significant fluctuations, with EU Institutions peaking around 2018, while Regional Development Banks show a gradual rise in support in recent years.
- The United Nations' contribution to energy aid is relatively modest in comparison to the others, with a noticeable increase in 2018. Its volume remains lower than the other categories, but there is still a visible upward trend during the mid-2010s.

Figure 3 : *Total volume of energy aid to SSA by Multilateral donor between 2010 and 2022*



Source: author's computation with data from OECD Data Explorer 2024

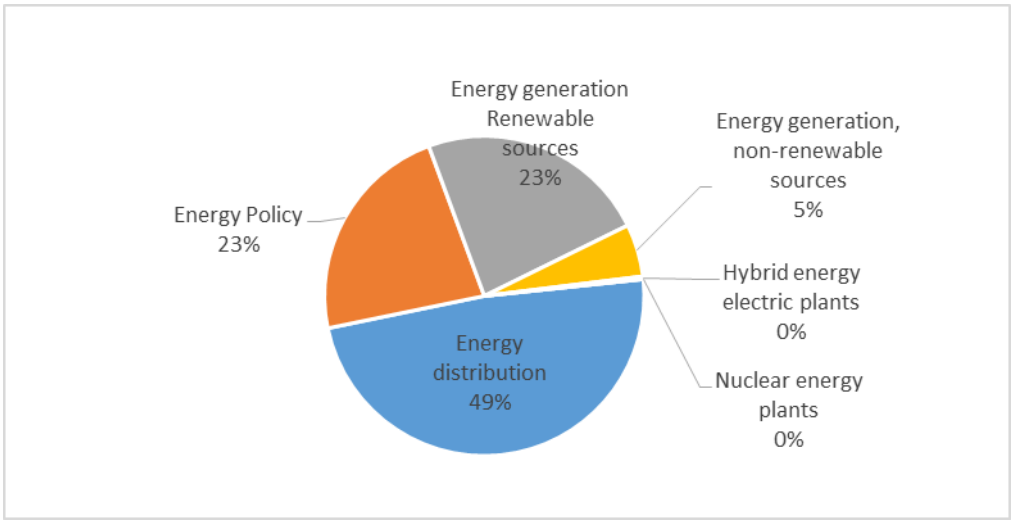
Energy Program Allocations (2010–2022)

In figure 4 below, the allocation of multilateral donor commitments to various energy programs in sub-Saharan Africa reveals clear prioritization patterns:

- Energy distribution programs received the largest share of donor commitments, amounting to over USD 1.56 billion and accounting for 49% of total energy aid to the region. This highlights a significant focus on improving electricity transmission and distribution infrastructure.
- The second-largest allocation was directed toward energy policy and administrative management, which attracted USD 7.29 billion, representing 23% of total energy aid. These commitments primarily support policy actions aimed at improving governance and enhancing the sector's overall performance.
- Renewable Energy Generation projects emerged as a major focus too within the generation subsector, receiving USD 7.55 billion, which constitutes approximately 23% of total aid flows.
- Commitments to Non-Renewable Energy Generation amounted to USD 1.72 billion, making up 15% of total energy aid, indicating some continued interest in conventional energy technologies.
- Hybrid Energy Electric Plants and Nuclear Energy projects received minimal commitments, amounting to USD 87.47 million and USD 6.29 million, respectively. These figures represent negligible shares in total energy aid, reflecting limited donor engagement in these areas.

These findings underscore the dominant focus of multilateral donors on energy distribution, policy development, and renewable energy generation, with comparatively lower allocations to non-renewable, hybrid, and nuclear energy projects.

Figure 4: *energy projects and programs in SSA that received commitments from multilateral donors between 2010 and 2022.*

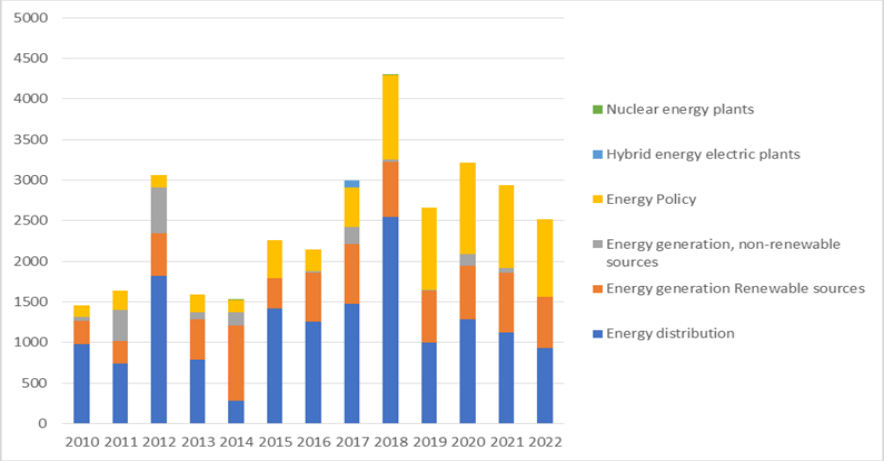


Source: author's computation with data from OECD Data Explorer 2024

Trends in aid commitments to Sub-Saharan Africa by energy program (2010–2022)

As depicted in Figure 5 below, the trends in multilateral donor aid commitments to the above mentioned six key areas of investments in Sub-Saharan Africa, reflect broader global priorities and regional dynamics in energy development after the adoption of the SDGs and the Paris Agreement. As observed, 2018 marks the peak in energy sector aid, driven largely by significant increases in energy distribution projects, energy policy, and renewable energy generation. Funding for non-renewable energy generation shows fluctuating patterns, with a noticeable decline after 2018. This reflects a possible shift away from fossil fuels in favor of greener alternatives, as observed through the stable and increasing support for renewable energy and policy reforms. More precisely, investments in energy policy consistently grew, peaking in 2018. This trend suggests a strategic focus on regulatory frameworks and governance to support sustainable energy development. While energy distribution remains a priority, with consistent funding which underscores its key role in expanding electricity access and achieving universal energy access goals across the region. Nuclear Energy Plants shows minimal investment, indicating that nuclear energy remains a marginal focus for donors in the region. Hybrid Energy Electric Plants has received little attention from donors, with commitments made only in 2017 throughout the last decade.

Figure 5 *:Trends in multilateral donor aid commitments to energy programs in SSA in 2010-2022*



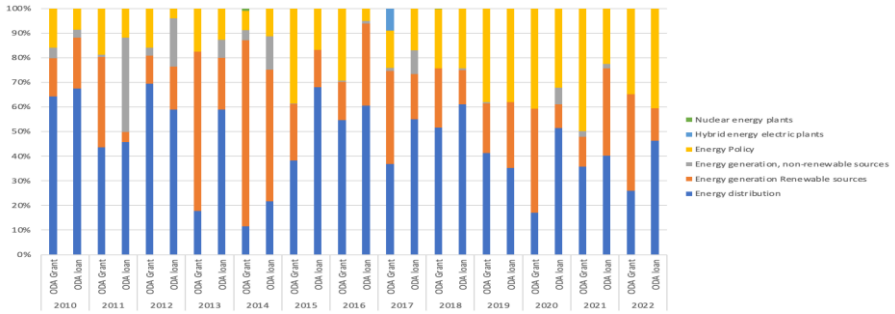
Source: author's computation with data from OECD Data Explorer 2024

Aid Structure: Loans and Grants to Sub-Saharan Africa from Donors (2010–2022)

This subsection presents the observed trends in the structure of energy ODA, highlighting shifts in donor strategies and funding allocations. Figures 6 and 7 show that approximately 70 percent of total energy aid to SSA under the review period was in the form of loans while grants accounted for the remainder. Further analysis and interpretation of these findings are provided in the discussion chapter.

Figure 6 below indicates that between 2010 and 2015, energy aid to Sub-Saharan Africa was dominated by loans for energy distribution and non-renewable energy generation, reflecting a focus on infrastructure expansion and fossil fuel-based projects. Grants were concentrated in energy policy and, to a lesser extent, renewable energy generation**.** Post-2015, there a clear shift toward renewable energy generation and energy policy, with grants rising significantly in these areas. Non-renewable energy generation funding decreased, reflecting the global move toward decarbonization. Energy distribution remains heavily loan-driven, emphasizing the ongoing need for capital investment in grid infrastructure. The increase in grants for renewable energy and energy policy aligns with international climate agreements and donor commitments to sustainable development. There is a visible rebalancing of funding from non-renewable to renewable energy projects post-2015. Loans continue to play a critical role in funding large-scale, capital-intensive projects like energy distribution.

Figure 6 : *ODA Loans and Grants by Energy programs Over Time (2010–2022)*

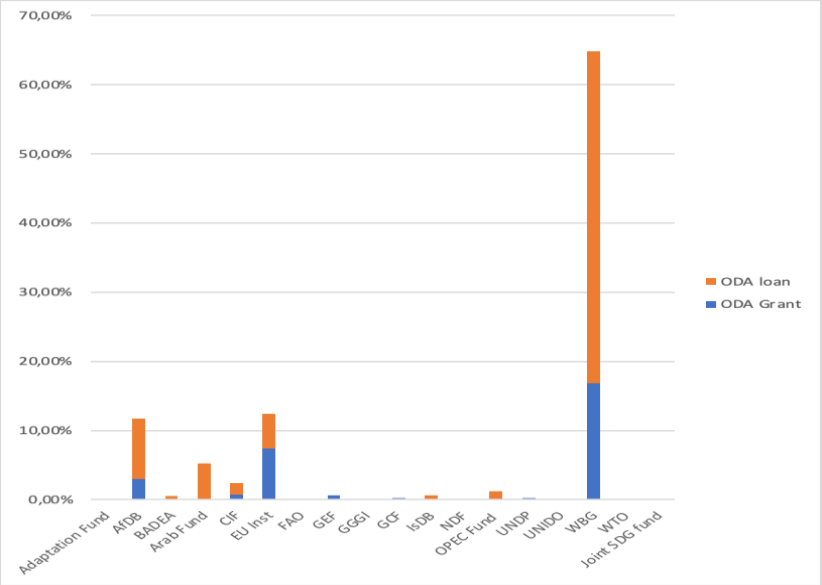


Source: author

Also, as shown in Figure 7 below, energy aid structure varied significantly across donor institutions:

- The World Bank Group (WBG) directed over 60% of its energy aid through loans.
- The African Development Bank (AfDB) maintained a relative balance between loans and grants.
- The Green Climate Fund (GCF) and Climate Investment Funds (CIF) relied exclusively on grants.
- The OPEC Fund directed 15–20% of its aid, primarily using loans.
- UNDP and the World Trade Organization (WTO) provided 100% of their aid as grants.

Figure 7 *: Aid Structure of commitments by institution to SSA, 2010-2022*



Source: author

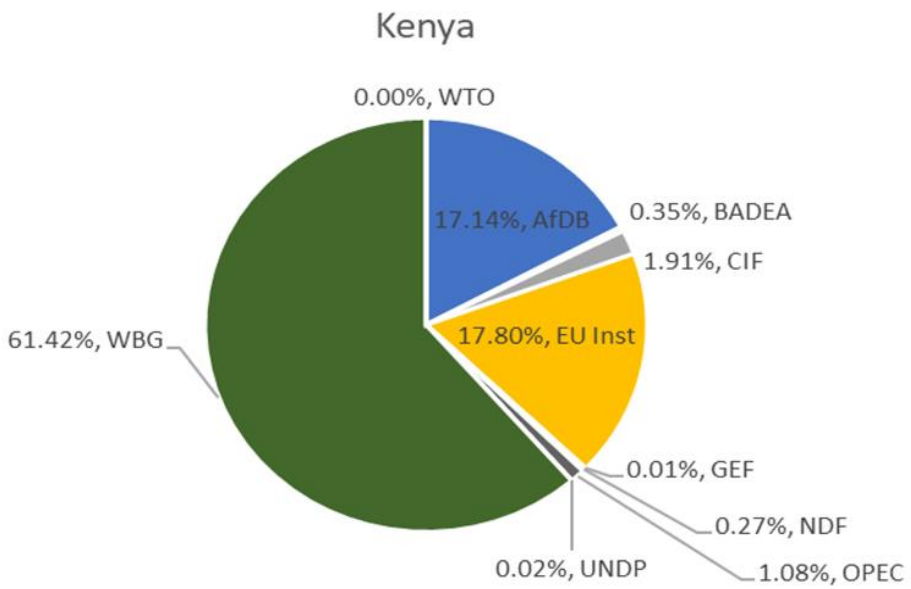
4.2.2. Donor Interest in Countries with predominantly low-carbon ("green") energy mix

The case of Kenya: who gives energy aid and to what energy programs?

Kenya mobilized the largest share and volume of total resources committed to SSA than Cameroon and Nigeria. Kenya received commitments worth approximately USD2.8 billion, which represents 8.54% of the total flows committed to SSA.

The top 3 donors to Kenya are the WBG, the EU and the AfDB. As shown in Figure 8 below, the leading donor is The World Bank Group (WBG) contributing close to USD 1.72 billion which represents 61.4% of total commitments to Kenya. The European Union (EU) committed USD 458.76 million which is 17.8% of total flows. While the African Development Bank (AfDB) provided USD 479.81 million which accounted for 17.1%. Other donors include United Nations (UNDP and WTO-International Trade Centre committed USD 0.62 million and USD 0.0015 million respectively); Arab Bank for Economic Development in Africa (BADEA) committed USD 9.84 million; Climate Investment Funds (CIF) committed USD 53.56 million; Global Environment Facility (GEF) committed USD 0.2 million; Nordic Development Fund (NDF) provided USD 7.42 million, and OPEC Funds pledged USD 30.01 million.

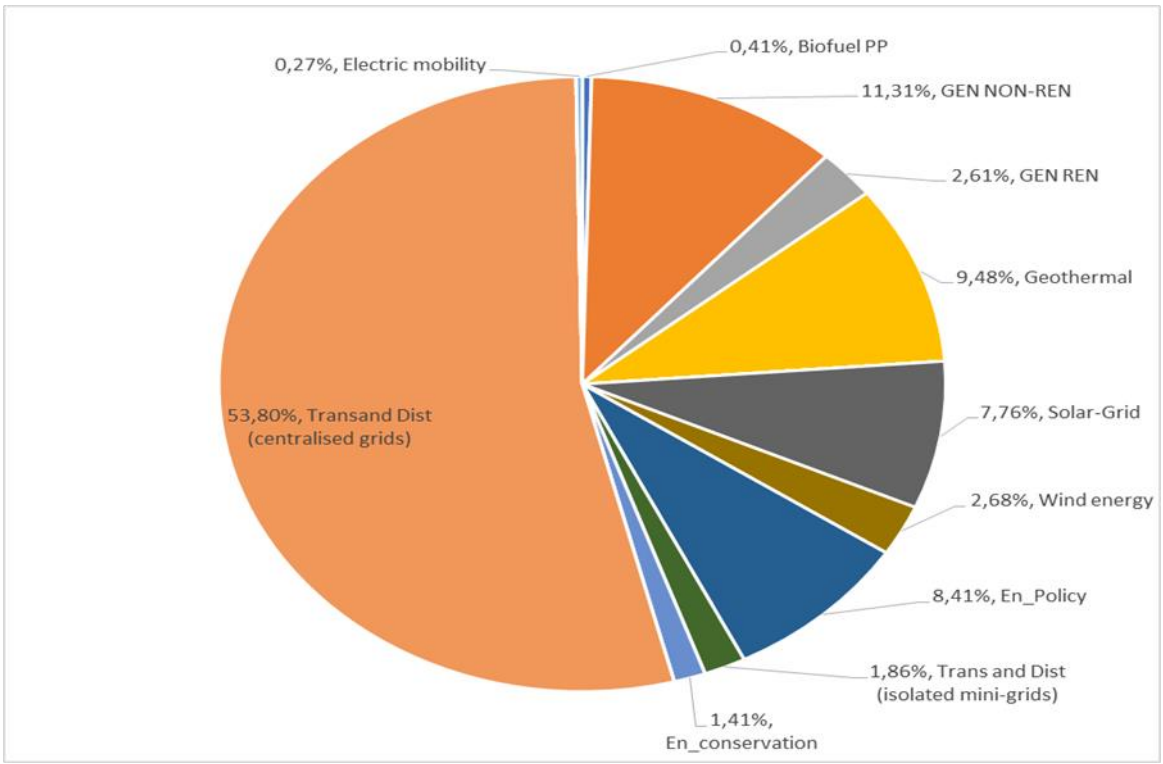
Figure 8 : *Donors committed to financing Kenya's Energy sector.*



Source: author's computation with data from OECD Data Explorer 2024

The volume of energy aid committed to Kenya has strongly targeted program of energy generation from renewable sources, grid-related and energy policy, and administrative management as shown in Figure 9 below.

Figure 9 : *Kenya Energy sector programs supported by donors between 2010 and 2022.*



Source: author's computation with data from OECD Data Explorer 2024

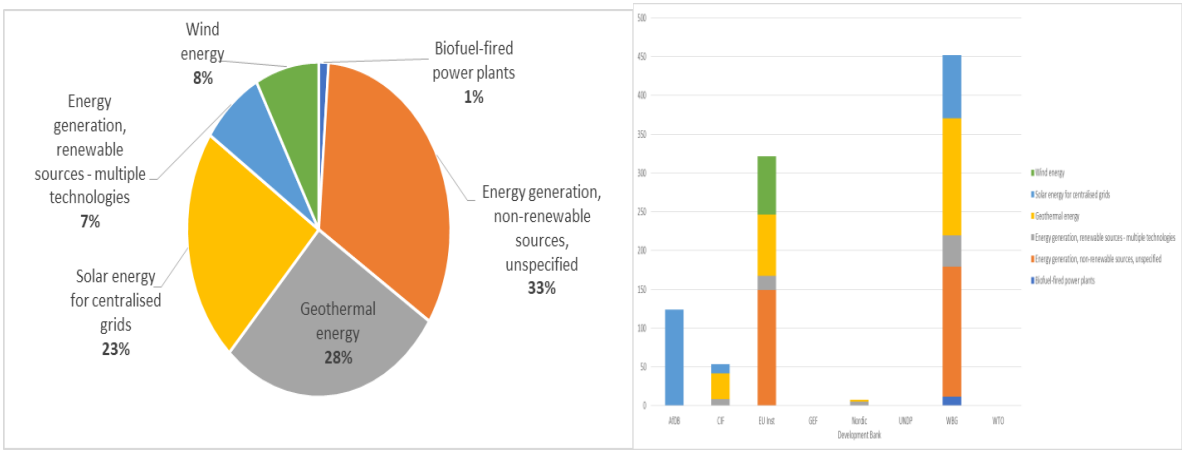
In details, Energy Distribution program (Transmission and distribution grids) received a total of close to USD1.57 billion, representing 55.93% share of total commitments to Kenya as follows:

- Transmission and Distribution (centralized grids) attracted approximately USD 1.5 billion representing 54.58% share of total flows to energy distribution program from The WBG, AfDB, EU, OPEC and BADEA.
- Transmission and distribution (isolated mini grid) received roughly USD 52 million, accounting for 1.88% from The WBG.
- Electric mobility infrastructures received relatively low donor attention with USD7.47 million, representing 0.27% share of total resources committed which was provided by the EU in 2022

Energy generation program received USD 958.57 million, representing a cumulative 34.09% share of total commitments to Kenya as split below by source/technology:

- Generation renewable energy (Non-Hydro Renewable)- USD 642.09 million; 22.78% :
  - Geothermal (USD 265.37 million)- 9.62% from The WBG, EU, CIF and NDF; Solar energy for centralized grid (USD 217.10 million) - 7.76% from AfDB, The WBG and CIF; Wind energy (USD 75.05 million)- 2.6% from EU; Generation renewable source (multiple technologies)- USD73.17 Million (2.61%) from The WBG, EU, CIF, NDF, UNDP and WTO. Biofuel-fired power plant received 0.41% share from The WBG and UNDP.
- Generation non-renewable energy sources (unspecified) attracted USD 316.48 million-11.47% share of total commitments from The WBG and EU in 2012.

Figure 10 : *Energy generation program in Kenya receiving donor commitment, 2010-2022*



Source: author

Energy Policy programs aimed at enhancing sector governance and performance received a total of 9.82% as split below:

- Energy Policy and administrative management USD 235.56 million, 8.41% of committed resources consistently.
- Energy conservation and demand-side efficiency received relatively low donor attention with resources covering just 1.41% share of total commitments made in only 2021.

Key Insights from energy generation program

- Strong Focus on Geothermal and Solar**:**
    - Geothermal (28%) and solar (23%) received substantial funding, aligning with Kenya's renewable energy goals and donor priorities for climate mitigation.
- Continued Support for Non-Renewable Generation**:**
    - Non-renewables (33%) reflect Kenya's reliance on baseload power, even as donors prioritize clean energy transitions.
- Donor Leadership**:** The World Bank Group and EU Institutions emerged as the dominant financiers, driving investments in both renewable and non-renewable energy generation.

- Limited Funding for Emerging Technologies**:**
    - Wind energy (8%) and biofuel projects (1%) received comparatively lower attention, suggesting gaps in exploring diverse renewable solutions.

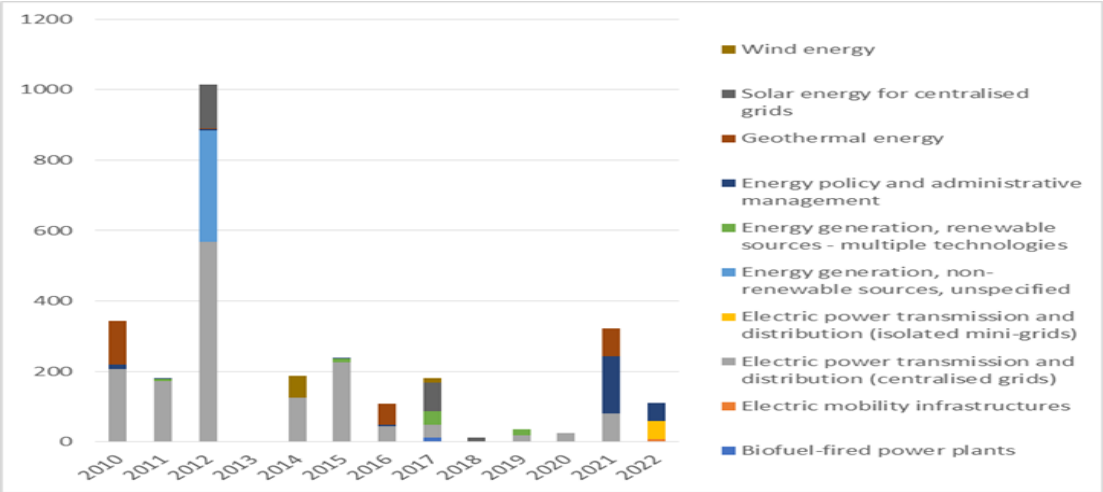
Donors, particularly the World Bank Group**,** EU Institutions**,** and AfDB, have played a central role in financing energy generation in Kenya. While geothermal and solar projects align well with national energy priorities, continued reliance on non-renewables highlights the challenge of balancing short-term energy security with long-term climate goals.

Trends in donor commitments by energy program over time (2010–2022)

Overview of Key Trends

- Donor commitments to Kenya's energy sector have fluctuated significantly between 2010 and 2022 as shown in Figure 11 below.
- Major peaks occurred in 2012 and 2021**,** reflecting significant investments in centralized grids, geothermal projects, and solar energy infrastructure.

Figure 11: *Trends in multilateral donor aid commitments to energy programs in Kenya in 2010-2022*



Source: author

Analysis of Energy Programs Over Time

- **Geothermal Energy**:
  - Geothermal projects saw a significant spike in 2012, indicating a major focus on the Olkaria Geothermal expansions.
  - Commitments resumed in 2021, reflecting renewed investments in geothermal energy as part of Kenya's renewable energy strategy.
- **Solar Energy for Centralized Grids**:
  - Solar energy investments peaked in 2013**,** with large donor commitments supporting Kenya's centralized grid solar projects.
  - Funding declined after 2013 but remained consistent, with smaller contributions continuing through 2016 and 2021.
- **Energy Policy and Administrative Management**:
  - Donors prioritized energy policy reforms in 2021, indicating a renewed focus on improving governance, institutional capacity, and regulatory frameworks.
  - Minimal commitments were made in earlier years.
- **Non-Renewable Energy Generation**:
  - A notable spike in 2012 highlights Kenya's reliance on non-renewable energy to meet short-term baseload needs.
  - Commitments declined in subsequent years as donors shifted toward renewable energy projects.
- **Electric Power Transmission and Distribution**:

- **Centralized Grids**:
  - Major investments occurred in 2012 and 2013**,** reflecting large-scale grid expansion initiatives like the *Last Mile Connectivity Project*.
  - Minimal commitments were recorded after 2013, with renewed interest appearing in 2021**.**
- **Isolated Mini-Grids**:
  - Small but consistent funding appeared in 2015 and 2022, targeting rural electrification solutions in remote areas.

- **Wind Energy**:
  - Wind energy funding appeared sporadically, with modest commitments recorded in **2011** and **2016**.
  - This trend highlights limited donor focus on wind energy compared to solar and geothermal programs.
- **Energy Generation from Renewable Sources – Multiple Technologies**:
  - Limited contributions began in **2015**, reflecting efforts to fund hybrid renewable energy systems, such as mini-grids.
  - Commitments remained low compared to centralized grid projects.
- **Electric Mobility Infrastructure** (Orange) and **Biofuel Power Plants** (Dark Blue):
  - Both categories received minimal attention, with minor commitments recorded in **2022**.

Key Observations

- **2012 and 2013 Peaks**:
  - Commitments in these years were driven by large-scale investments in geothermal energy, centralized grids, and non-renewable energy generation.
- **2021–2022 Renewed Commitments**:
  - A resurgence of donor funding occurred, particularly in geothermal energy, energy policy reforms, and isolated mini grids, signaling a renewed push for sustainable and decentralized energy solutions.
- **Shift from Non-Renewables to Renewables**:
  - Early commitments (2012) included significant funding for non-renewables. However, over time, donors shifted focus toward geothermal, solar, and hybrid renewable technologies.
- **Minimal Funding for Innovation**:
  - Electric mobility and biofuel power plants remain largely underfunded, indicating limited donor interest in emerging energy technologies.

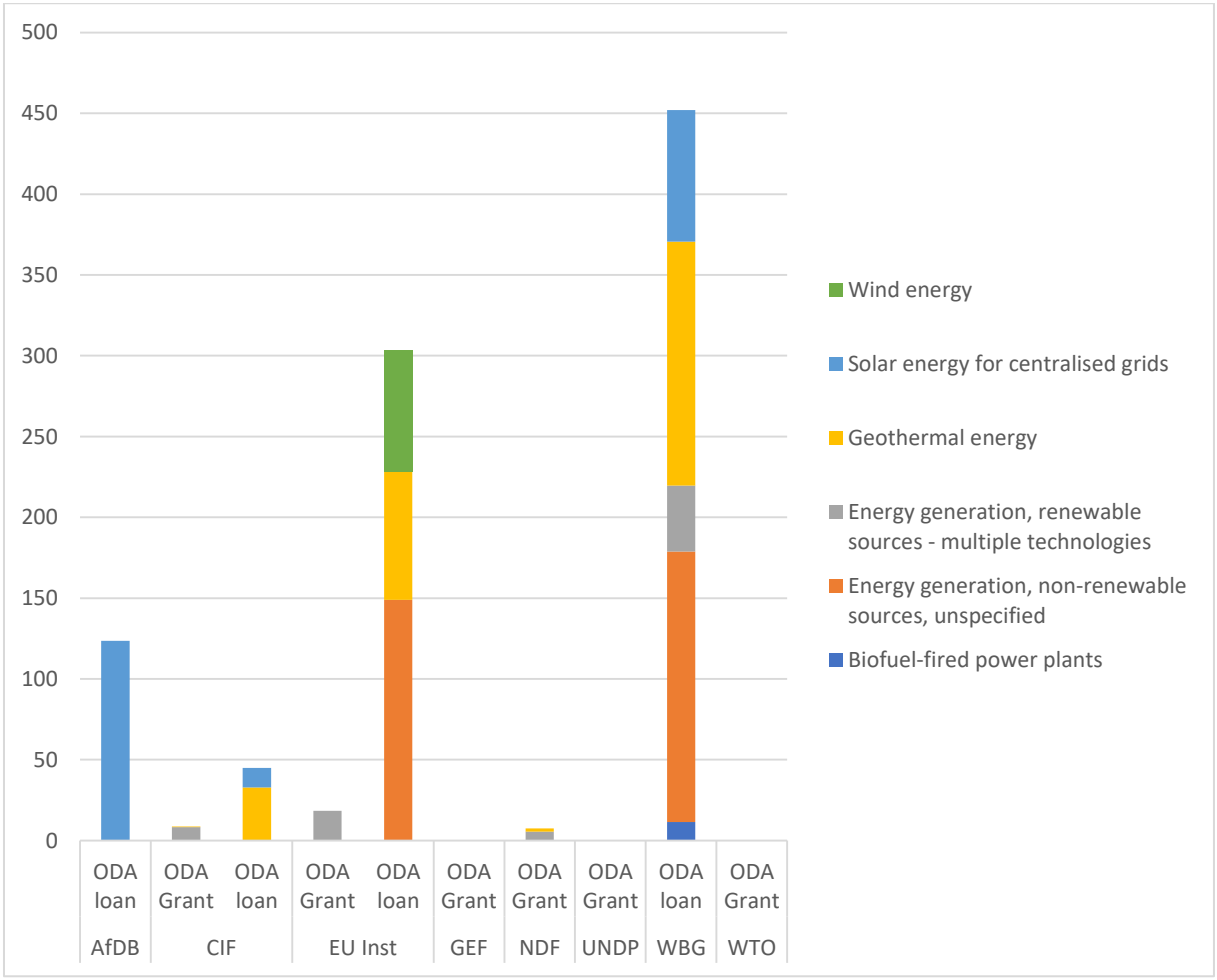
Conclusion on trend analysis

The trend analysis shows that donor commitments to Kenya's energy sector have evolved, with major funding directed toward centralized grids, geothermal energy, and solar projects. Peaks in 2012 and 2021 reflect large-scale interventions to expand energy infrastructure and support renewable energy transitions. However, limited funding for innovative solutions like electric mobility and biofuel plants highlights opportunities for future donor engagement.

Aid structure: Loan vs. Grant by Sector

The aid structure is predominantly loan with 96.84% and grants made up the balance of 3.16% of total committed resources as shown below. Figure 12 below illustrates the structure of energy aid—**ODA loans** and **ODA grants**—distributed across different energy sectors by various donors.

Figure 12 : *Total Aid structure by donor by sector, 2010-2022 to Kenya*



Source: author computation

Overview of Aid Structure

- ODA Loans: These dominate financing for large-scale infrastructure projects, especially renewable energy generation like geothermal and solar energy.
- ODA Grants: Primarily used for policy support, capacity building, and smaller renewable energy initiatives.

Donor Contributions by Aid Structure

- African Development Bank (AfDB)
    - 100% ODA Loan: Focused on large-scale projects, particularly solar energy for centralized grids.
    - This reflects AfDB's role in funding infrastructure-heavy programs that require significant upfront capital.
- Climate Investment Funds (CIF)
    - 100% ODA Grant: Supports renewable energy technologies and policy implementation.
    - Focus on grants aligns with CIF's mandate to promote climate-resilient, low-carbon energy systems.
- European Union Institutions (EU Inst)
    - Mixed Aid Structure:
        - ODA Loans primarily fund geothermal energy and solar projects.
        - ODA Grants focus on renewable energy technologies and policy support.
    - This balance indicates EU's dual approach—financing large infrastructure while promoting capacity-building.
- Global Environment Facility (GEF)
    - 100% ODA Grant: Focused on renewable energy technologies and environmental sustainability, with no loans provided.
- Nordic Development Bank
    - 100% ODA Grant: Directed toward multiple renewable energy technologies and climate initiatives.
    - The focus remains on small-scale sustainable energy programs.
- World Bank Group (WBG)
    - Primarily ODA Loans: Significant funding for non-renewable energy generation and solar energy for centralized grids.
    - Small contributions via grants focus on emerging areas like biofuel-fired power plants and off-grid solutions.
    - The World Bank's structure aligns with its strategy to balance infrastructure development with innovative clean energy solutions.

- United Nations Development Program (UNDP)
    - 100% ODA Grant: Targeted support for policy development and smaller renewable initiatives, such as solar mini-grids.
- WTO
    - 100% ODA Grant: Limited funding, focusing entirely on renewable energy technologies.

Sectoral Observations

- Geothermal Energy:
    - Dominantly funded through ODA loans, particularly by EU Institutions and the World Bank Group, reflecting the capital-intensive nature of geothermal projects.
- Solar Energy for Centralized Grids:
    - Both ODA loans (AfDB, WBG) and grants (CIF, EU Inst) contribute, showing a balanced financing structure for solar infrastructure.
- Non-Renewable Energy Generation :
    - Funded primarily through ODA loans (WBG), reflecting a focus on meeting Kenya's immediate baseload energy needs.
- Renewable Energy – Multiple Technologies :
    - Grants dominate this sector, indicating donor preference for small-scale, pilot renewable solutions.
- Wind Energy and Biofuel Projects:
    - Limited funding with a mix of loans and grants, highlighting emerging but underfunded areas.
- Policy and Administrative Management :
    - Supported entirely through grants, as seen with UNDP, reflecting a focus on institutional strengthening and governance.

Key Insights

- Loan-Grant Distribution :
    - Loans dominate large-scale infrastructure projects (e.g., geothermal, centralized solar grids).
    - Grants focus on policy reforms, capacity building, and emerging energy technologies.
- Donor Priorities:
    - AfDB and WBG favor ODA loans for infrastructure.
    - CIF, GEF, and Nordic Development Bank prefer grants for renewable technologies and climate programs.

- Sector-Specific Financing:
    - Geothermal and solar projects receive the bulk of loans.
    - Wind and biofuel projects remain underfunded, with minimal contributions through grants.

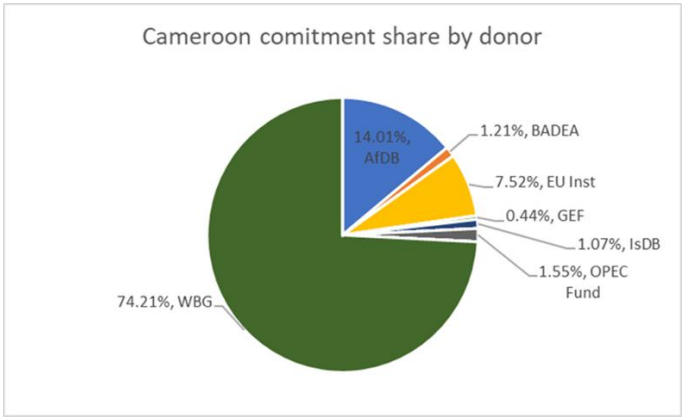
Conclusion on Aid Structure result

The aid structure reveals a clear divide: large-scale energy infrastructure projects are loan-driven, while grants target renewable pilot projects and policy support. Balancing this financing structure with Kenya's long-term sustainability goals will be crucial to ensuring effective resource allocation and donor alignment.

4.2.2.2 The Case of Cameroon: who gives energy aid and to what energy program?

Cameroon received USD 929.62 million, which represents approximately 2.88% of the volume of all energy aid committed to SSA during the period 2010-2022. The top three donors supporting Cameroon's energy sector objectives are The World Bank Group, the European Union, and African Development Bank. More precisely the European Union Institutions **(EU)** provided USD 51.21 million which represents 7.52%**;** African Development Bank **(AfDB)** pledged USD 69.44 million, accounting for 14.01%**;** The World Bank Group (WBG) supported with USD 271.42 million (74.21%). Other donors include Islamic Development Bank (IsDB) pledged USD 9.91 million (1.07%); Arab Bank for Economic Development in Africa (BADEA) committed USD 11.25 million (1.21%); Global Environment Facility (GEF), approximately USD 4.09 million (0.44%) and OPEC Funds, committed USD 14.40 million (1.55%).

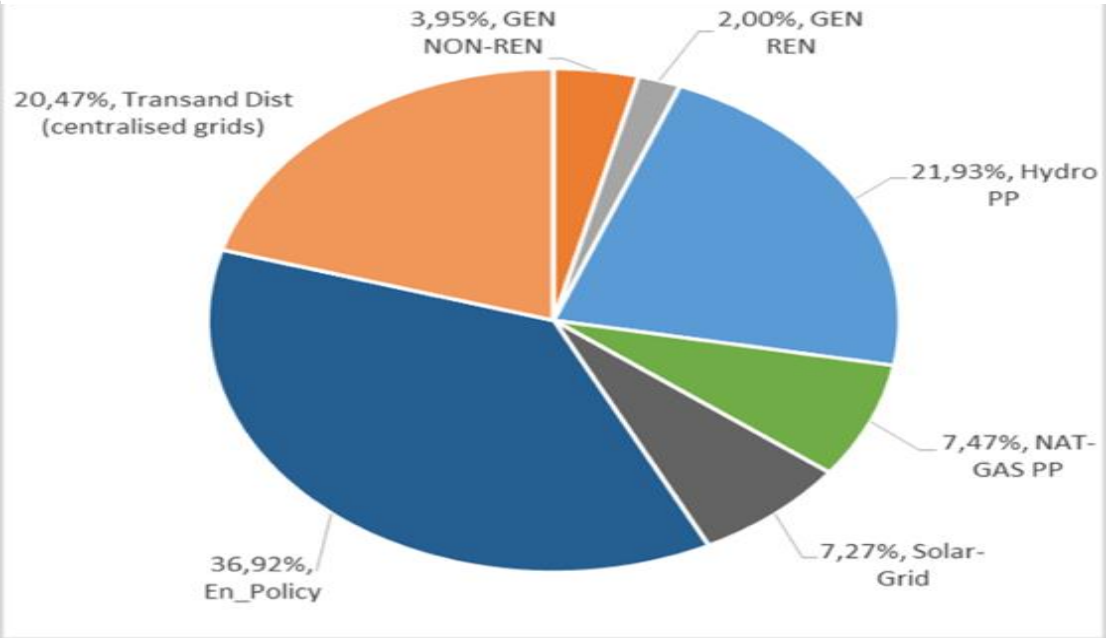
Figure 13*: Donors in Cameroon energy sector; 2010-2022*

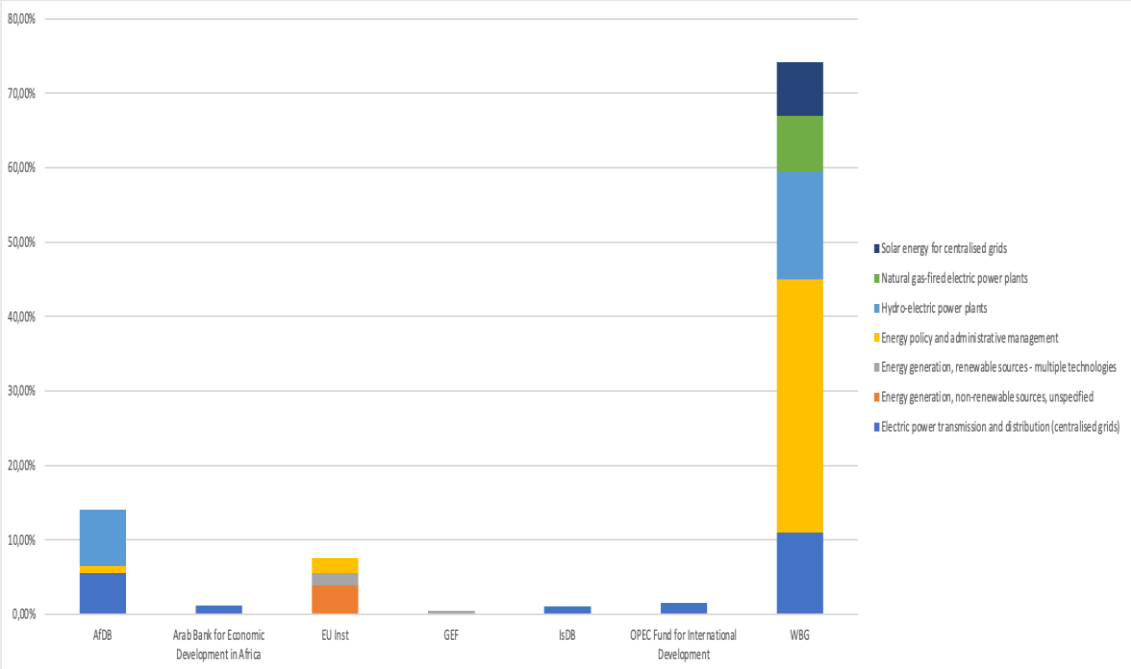


Source: author's computation with data from OEDC Explorer 2024

Over the last decade, the volume of energy aid committed to Cameroon has primarily targeted programs related to energy policy and sector reform. The centralized grid has equally attracted funding alongside renewable energy generation programs, as shown in Figure 14 below.

Figure 14 *: Energy programs supported by donors in Cameroon between 2010-2022*





In details, **Electric power transmission and distribution** programs received USD 190.28 million, which represents 20.47% of total flows to the energy sector.

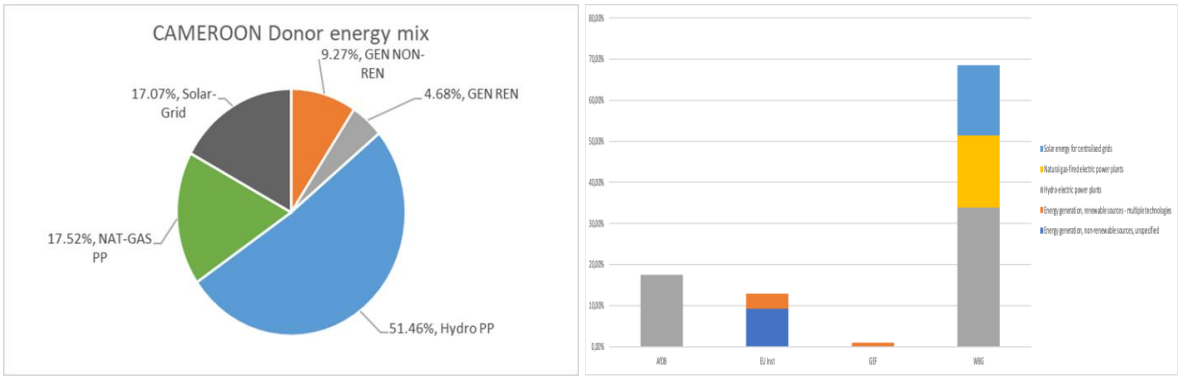
Energy policy and administrative management aimed at enhancing sector governance and performance received 36.92% of committed resources.

Generation non-renewable sources received USD 36.74 million which represents % of total flows, and targeted the following:

- natural gas-fired power plants USD 69.40 million (17.52%.) from the WBG
- Energy generation non renewable sources, unspecified received USD 36.74 million (9.27%) from the EU

Energy generation, renewable sources: **Hydro** receives USD 203.85 million (51.4%) from the WBG and AfDB; **solar** for centralized grid receiving USD 67.61 million (17.07%) from the WBG; and energy generation from renewable sources-multiple technologies received a total commitment of USD 18.56 million (4.68%) from the EU and GEF

Figure 15 : *Cameroon energy generation program from donor perspective, 2010-2022*



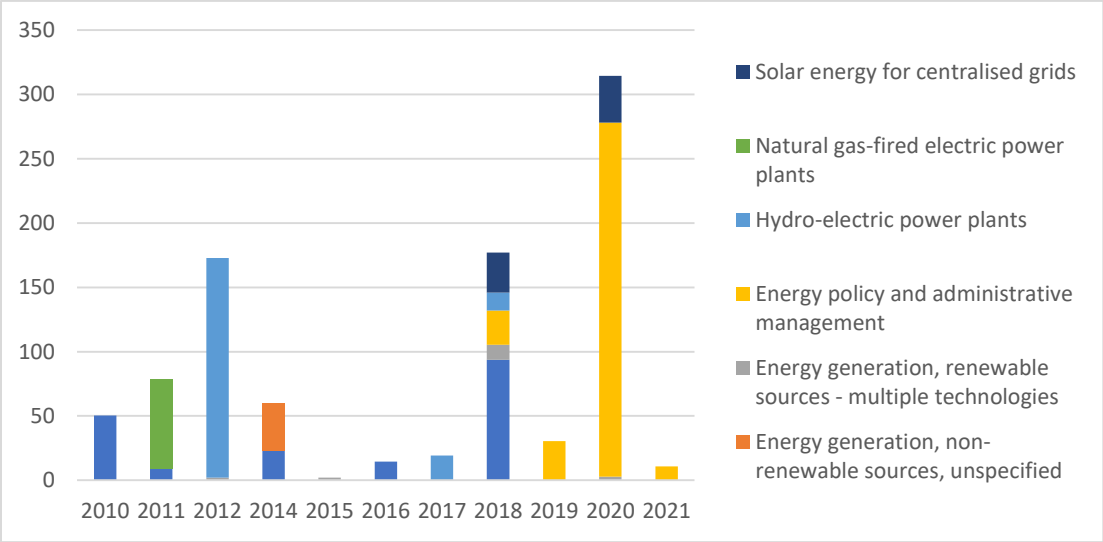
Source: author

Trends in donor commitment across 2010 to 2022

Figure 16 below reveals donor contributions segmented by year and sector, highlighting shifts in priorities over time. The analysis focuses on hydropower, non-renewable energy, solar energy, policy/governance, and transmission/distribution. Over time, there has an evolution from a hydropower and non-renewable focus in the early years toward greater emphasis on solar energy, renewable diversification, a*nd* policy reforms post-2015. Significant funding for transmission and distribution infrastructure in recent years reflects growing alignment with Cameroon's need for grid modernization

and energy access. While renewables remain a priority, natural gas-fired plants continue to play a transitional role in addressing short-term energy security.

Figure 16 : *Trend in commitment by sector Pre- and Post 2015*



Source: author

Table 1: Summary of Trends

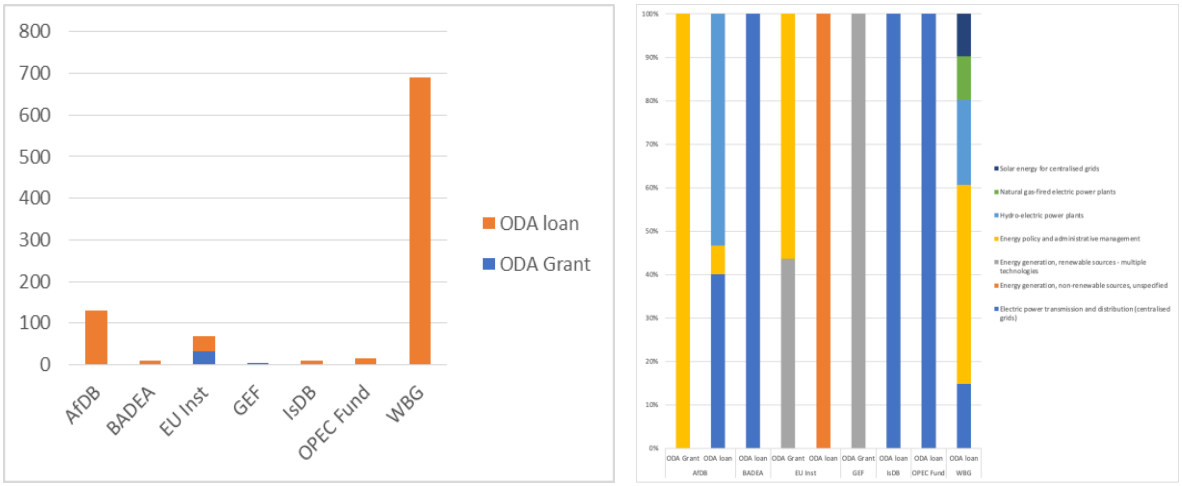
Time Period	Key Donor Priorities	Sectors of Focus
2010–2014	Immediate energy security and generation improvements	- Hydropower (2012) - Non-renewable generation (2011–2014) - Natural gas-fired plants
2015–2018	Diversification into grid infrastructure and emerging solar investments	- Transmission and distribution (2017–2018) - Solar energy (2018) - Policy reforms
2019–2021	Emphasis on policy reforms, hydropower expansion, and solar energy growth	- Energy policy/governance (2020) - Hydropower (2018, 2020) - Solar energy (2020)

Aid structure by Sector

Figure 17 below reveals that Cameroon's energy sector financing relies heavily on loans **(95.99 percent) f**or large-scale infrastructure (hydropower, grid expansion), while grants **(4.01 percent)** are targeted at policy reforms and decentralized renewable energy solutions. The AfDB**,** WBG, and EU Institutions emerge as key donors, aligning moderately with Cameroon's generation, grid, and energy transition priorities. The details are as follows:

- **Electric Power Transmission and Distribution (Centralized Grids)**:
    - Dominant focus of the AfDB and World Bank Group (WBG)**,** funded primarily through **loans**. This aligns with Cameroon's grid modernization and loss reduction objectives.
- **Hydropower Development**:
    - **WBG** leads investments in hydroelectric power plants, primarily via loans.
- **Non-Renewable Energy**:
    - **EU Institutions** funded **non-renewable energy generation** through **grants**.
- **Renewable Energy Technologies** :
    - **GEF** and **EU Institutions** supported **renewable energy** (multiple technologies) via **grants**.
- **Policy and Administrative Management** :
    - **BADEA** and **AfDB** allocated funding for **policy governance** reforms via grants.
- **Solar Energy for Centralized Grids**:
    - The **World Bank Group** contributed to **solar energy** projects through **loans**, promoting renewable diversification.

Figure 17: *Aid structure of donor commitments provided to Cameroon between 2010-2022*



Source: author

4.2.2. Donor Interest in countries with predominantly fossil-based energy mix

4.2.2.1 The Case of Nigeria: who gives energy aid and for what purpose?

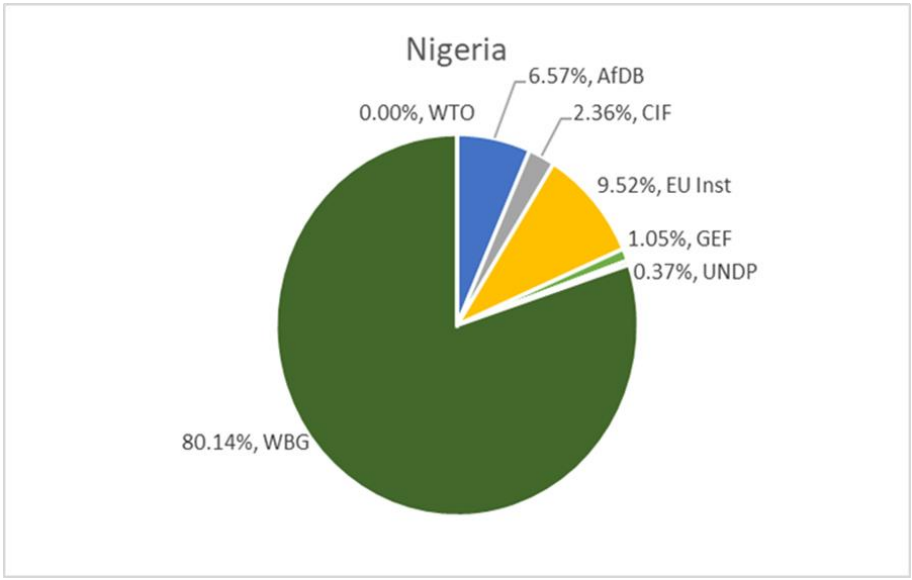
Donor Contributions to Nigeria's Energy Sector (2010–2022)

Between 2010 and 2022, Nigeria received a total of **USD 2.40 billion** in energy aid, which accounts for **7.42%** of all energy aid committed to Sub-Saharan Africa (SSA) during this period. This aid was channeled through various multilateral donors, with significant disparities in their contributions.

The World Bank Group (WBG) is the dominant contributor, accounting for **80.14%** of the total energy aid received by Nigeria. The second-largest contributor, the European Union Institutions (EU), accounted for **9.52%**, while the African Development Bank (AfDB) ranked third with **6.57%** of the total commitments.

Other contributing donors include **Climate Investment Funds (CIF): 2.36%** of total aid; **Global Environment Facility (GEF): 1.05%** of total aid and **United Nations Development Programme (UNDP): 0.37%** of total aid. The **WTO-International Trade Centre** commitment share was relatively insignificant, reflecting **0.00%** involvement.

Figure 18*: Distribution of Multilateral Energy Aid to Nigeria (2010–2022)*



Source: author

Energy Programs and Donor Contributions in Nigeria (2010–2022)

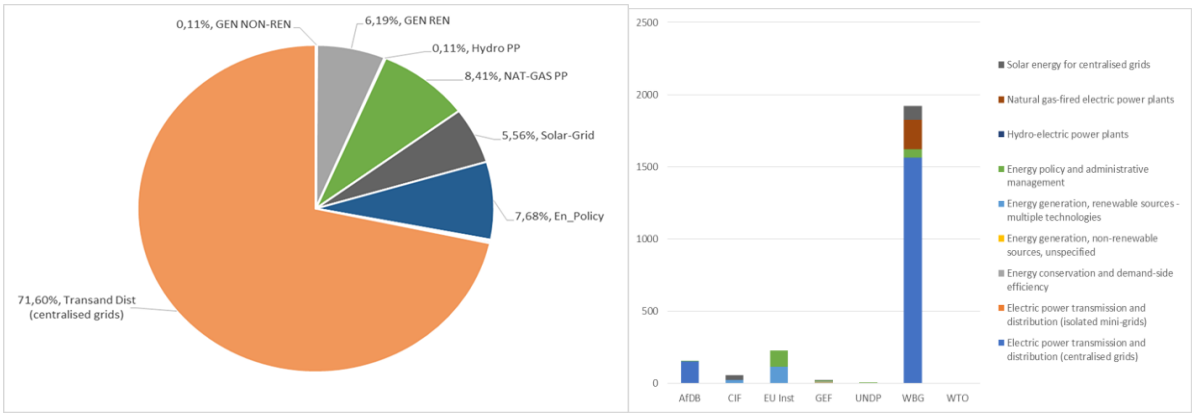
Between 2010 and 2022, energy aid in Nigeria was directed toward various programs, reflecting the country's priorities in expanding and modernizing its energy sector. The distribution of aid and the specific contributions of multilateral donors are presented in Figures 19 below.

As shown in Figure19, most of the energy aid (71.60**%**) was allocated to electric power transmission and distribution (centralized grids)**,** highlighting a primary focus on improving Nigeria's energy infrastructure. Other significant areas of support included**:** Natural gas-fired power plants: 8.41%; Energy policy and administrative management: 7.68%; Solar energy for centralized grids: 5.56%; Renewable energy generation (general): 6.19%**.** Minimal investments were made in non-renewable energy generation (0.11**%**) and hydroelectric power plants **(**0.11%**).**

Figure19 illustrates the contributions of various multilateral donors to these energy programs:

- The World Bank Group (WBG) emerged as the largest contributor, with significant investments in centralized grid transmission and distribution**,** as well as natural gas-fired power plants and energy policy and administrative management**.**
- The African Development Bank (AfDB) allocated resources across multiple programs, with a focus on renewable energy generation and solar energy for centralized grids**.**
- European Union Institutions (EU Inst) supported programs targeting solar energy and policy and administrative management**.**
- UNDP**,** GEF**,** and CIF focused their contributions on renewable energy generation**,** solar energy**,** and energy efficiency initiatives**.**
- The WTO-International Trade Centre commitment share was relatively insignificant but it flow targeted renewable generation, Multiple sources

Figure 19 : *Energy Programs and Donor Contributions to Nigeria (2010–2022)*



Source: author

Energy Generation Programs and Donor Contributions to Nigeria (2010–2022)

The energy generation sector in Nigeria received 20.38 percent of total aid committed to Nigeria between 2010 and 2022, with a focus on both renewable and non-renewable energy technologies. Figures 20 below present the distribution of energy generation programs supported during the review period and the contributions of individual donors to these programs. This reflects donors' perspective of the electricity mix of Nigeria by source and technology.

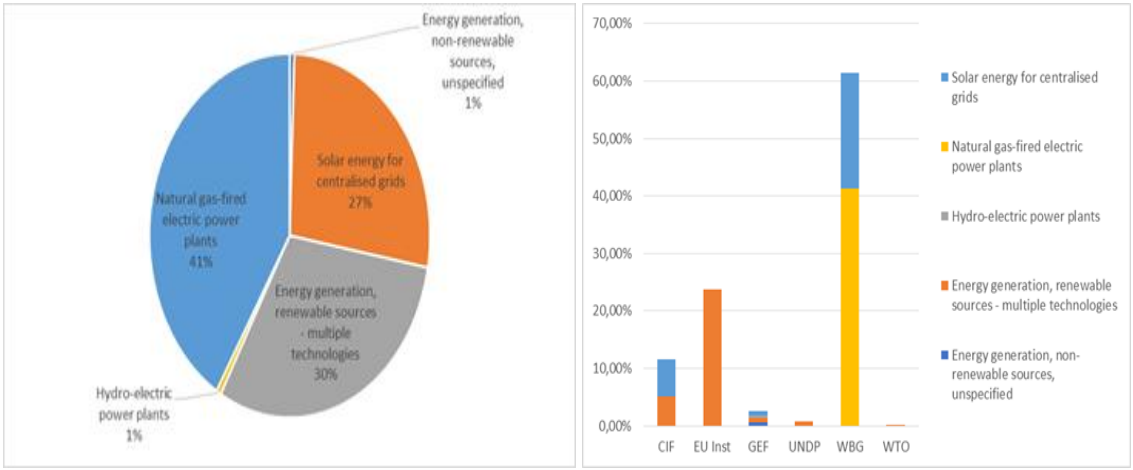
Distribution of Aid by Energy Generation Programs: As depicted in Figure 20 below, aid for energy generation programs in Nigeria was allocated across various technologies:

- Natural gas-fired electric power plants received the largest share of aid, accounting for 41% of total allocations to the generation program.
- Energy generation from renewable sources (multiple technologies) constituted 30% of total aid allocation to generation program.
- Solar energy for centralized grids accounted for 27% of the aid to generation program.
- Minimal shares were allocated to hydroelectric power plants (1%) and non-renewable energy generation (unspecified) (1%).

Donor Contributions to Energy Generation Programs came from:

- The World Bank Group (WBG) was the most prominent donor, with substantial investments in natural gas-fired electric power plants and renewable energy generation, specifically solar energy for centralized grids.
- European Union Institutions (EU Inst) focused on supporting renewable energy generation from multiple technologies.
- Climate Investment Funds (CIF) provided limited support, primarily targeting renewable energy generation and solar energy projects.
- Global Environment Facility (GEF) and UNDP contributed small shares to renewable energy generation from multiple technologies. GEF also specifically supported solar energy for centralized grid, including generation from non-renewable sources.
- The WTO-International Trade Centre contributed to renewable generation programs was during the review period.

Figure 20 : *Energy Generation Programs and Donor Contributions in Nigeria (2010–2022)*



Source: author

Commitment Trends in Nigeria by energy program (2010–2022)

Figure 21 below, represents the energy aid commitments to Nigeria between 2010 and 2022 reflect varying levels of funding across years, with notable peaks and declines corresponding to specific program focuses. The trends, as shown in the Figure 21 below, can be summarized as follows:

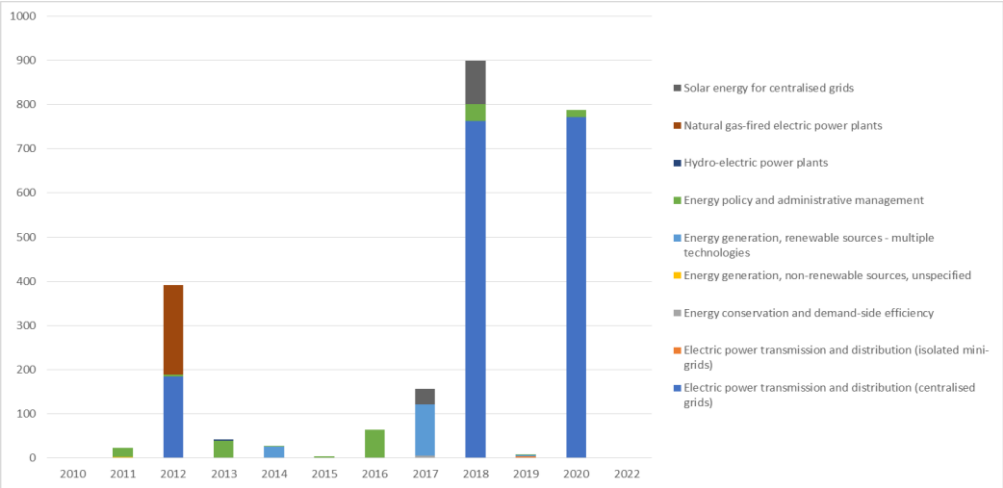
Key Observations:

1. Initial Low Commitments (2010–2014) :
    - Commitments during this period were relatively low, with minor allocations to programs such as electric power transmission and distribution (centralized grids) and renewable energy generation.
2. Significant Increase in Commitments (2015–2019) :
    - A substantial spike in commitments occurred in 2018, with over 900 units of funding primarily directed toward centralized grid transmission and distribution and solar energy for centralized grids. This peak likely reflects heightened investments in large-scale infrastructure projects and renewable energy programs.
    - Commitments in 2019 remained high, though slightly reduced compared to 2018, with continued emphasis on electric power transmission and distribution (centralized grids) and energy generation projects.
3. Decline in Commitments Post-2019 (2020–2022):
   A sharp decline in commitments is observed starting in 2020, with no allocations in 2021 and negligible allocations (USD0.2million) in 2022 directed towards renewable generation from multiple technologies.

Distribution of Commitments by Program Focus:

- Electric power transmission and distribution (centralized grids) dominated funding trends, receiving the highest share across most years, particularly during peak funding periods.
- Solar energy for centralized grids received significant allocations in peak years, notably 2018 and 2019.
- Natural gas-fired electric power plants had notable funding allocations in 2012, contributing to early infrastructure expansion.
- Energy policy and administrative management received consistent but relatively smaller allocations throughout the period.

Figure 21: *Commitment Trends in Nigeria by energy program (2010–2022)*



Source: author

Aid Structure Committed to Nigeria by Donor and Period (2010–2022)

The provided Figure 22 below illustrate the structure of official development assistance (ODA) committed to Nigeria during the review period, broken down by donor and funding type (loans and grants). Loans accounted for 89.07 percent, while grants covered the remainder 10.93 percent.

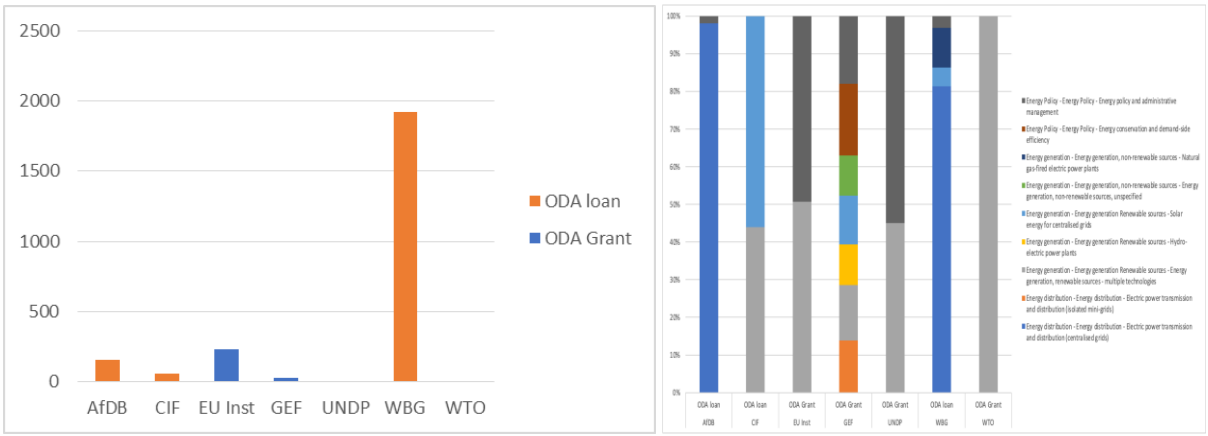
Overview of ODA Commitments by Donor

- World Bank Group (WBG):
    - The WBG provided the majority of ODA as loans, with commitments exceeding 2,000 units.

- Grants from the WBG were negligible compared to loans, highlighting its preference for loan-based funding.

- European Union Institutions (EU Inst):
  - The EU showed a balanced approach, with notable contributions through grants, making it one of the leading donors in grant-based aid.
  - Loans from the EU were minimal during the review period.
- African Development Bank (AfDB):
  - The AfDB primarily contributed through loans, though at a significantly smaller scale compared to the WBG.
- Climate Investment Funds (CIF) and Global Environment Facility (GEF):
  - Both donors contributed through a mix of loans and grants, with CIF showing a preference for loans and GEF leaning toward grants.
- United Nations Development Programme (UNDP):
  - UNDP contributions were entirely grant-based, focusing on capacity building and smaller-scale projects.
- WTO-International Trade Centre :
  - The WTO contributions were relatively insignificant during the review period.

Figure 22 : *Overview of ODA Commitments by Donor*



Source: author

Sectoral Allocation of ODA by Donor

- Loans: Predominantly allocated to infrastructure projects, particularly electric power transmission and distribution (centralized grids) and natural gas-fired power plants**.**

- Grants: Focused on renewable energy projects, such as solar energy for centralized grids and energy generation from renewable sources**,** as well as policy and administrative management initiatives.

Temporal Trends

- The commitment of loans peaked during key periods of large infrastructure projects (e.g., centralized grid expansion), with the WBG leading these efforts.
- Grants remained consistent across the period, with contributions aimed at diversifying Nigeria's energy mix and supporting renewable energy projects.

5. DISCUSSIONS

5.1. Donor Interest in Sub-Saharan Africa's Energy Sector (2010–2022)

The analysis of energy aid commitments in Sub-Saharan Africa (SSA) from 2010 to 2022 highlights significant trends in donor priorities and their alignment with regional energy needs. Donor investments were strongly concentrated in three areas: energy policy reforms (23%), renewable energy generation (23%), and energy distribution (49%). In contrast, minimal commitments were made toward non-renewable generation (5%), hybrid energy systems, and nuclear energy, which received virtually no funding during this period. These trends reflect donors' emphasis on global sustainability agendas, particularly the Paris Agreement and Sustainable Development Goal 7 (SDG 7), which prioritize clean energy transitions, policy governance, and improved access to electricity (OECD, 2021; IEA, 2022).

Donor alignment with **renewable energy generation** has been a critical focus, driven by SSA's vast untapped solar, wind, and geothermal potential. Programs such as the **Africa Renewable Energy Initiative (AREI)** and the **Scaling Solar Initiative** underscore this emphasis, fostering investments in grid-connected renewables and decentralized off-grid solutions to address both urban and rural electricity needs (World Bank, 2019; AfDB, 2020). These efforts aim to reduce SSA's reliance on fossil fuels, align with global climate goals, and promote energy security in a sustainable manner.

Similarly, investments in **energy policy** reflect donors' recognition of governance and institutional reforms as critical to sectoral performance and financial sustainability. Policy instruments like the World Bank's **Program-for-Results (PforR)** link funding disbursement to measurable reforms, enhancing energy sector transparency and regulatory efficiency (World Bank, 2021). For example, donor-supported governance frameworks have facilitated energy policy modernization, tariff adjustments, and rural electrification planning across the region (IEA, 2022).

Energy distribution remains the largest share of donor commitments, reflecting SSA's urgent need to bridge infrastructure gaps and expand electricity access for the 600 million people still living without power (IEA, 2022). Regional initiatives like the **West Africa Power Pool (WAPP)** and the **Cameroon-Chad Electricity Interconnection Project** highlight donor efforts to strengthen grid infrastructure, reduce system losses, and foster cross-border electricity trade (World Bank, 2018; AfDB, 2020).

The limited focus on **non-renewable generation** and the near absence of support for hybrid and nuclear technologies highlight a divergence between donor priorities and recipient countries' needs. These patterns set the stage for a deeper exploration at the country level, where alignment and misalignment can be examined in the context of varying energy mixes, resource endowments, and national priorities.

Underinvestment was observed in Hybrid and Nuclear Energy projects which accounted for less than 1% of total energy aid, reflecting donors' preference for renewable alternatives. High capital costs, technical complexity, and geopolitical concerns around nuclear non-proliferation deter donor investment in SSA (IAEA, 2021). The focus on renewables highlights donor alignment with global climate goals and a preference for less politically sensitive technologies.

Blended financing, which combines grants and loans, has emerged as a key tool in energy ODA to SSA. It balances development objectives, such as expanding access and addressing equity, with financial sustainability by leveraging private sector capital for large-scale projects. Prior to 2015, over 70% of energy ODA was provided as grants, focusing on non-revenue initiatives like policy reforms and rural electrification. Following the adoption of the SDGs and the Paris Agreement, loans became dominant, accounting for 50–60% of energy ODA. This shift reflects donors' priorities to fund large-scale renewable energy projects while maintaining grants for de-risking activities and policy support (World Bank, 2020; GCF, 2017). A Key example which highlights this approach is the Nachtigal Hydropower Project (Cameroon**)** received loans from the World Bank and private sector co-financing, with grants supporting environmental safeguards and resettlement efforts (World Bank, 2020). While loans enable large-scale investments, they raise concerns about debt sustainability in low-income countries. Grants remain essential for non-commercial activities, ensuring equitable energy access and alignment with global climate goals.

The 2018 spike in energy aid corresponds to commitments under the Paris Agreement and the launch of programs like the AfDB's Desert to Power initiative. The post-2018 decline reflects the reallocation of resources to address COVID-19 disruptions, which delayed projects like Kenya's Last Mile Connectivity Program (AfDB, 2022). Meanwhile, decentralized energy solutions, such as the Nigeria Electrification Project (NEP), gained prominence for their resilience during crises (World Bank, 2018).

However, these regional trends raise questions about alignment with recipient countries' priorities. While donors prioritize renewables and policy reforms, many countries in SSA remain heavily reliant on fossil fuels or hydropower for energy security. Limited donor engagement in non-renewable energy generation reflects global decarbonization pressures but does not fully address the energy security concerns of recipient countries, particularly those facing intermittent renewable supplies or climate variability risks (IEA, 2022).

5.2. Donor Interest in Countries with predominantly low-carbon ("green") electricity generation mix

5.2.1. The case of Cameroon

Donor interest in Cameroon's energy sector reflects evolving priorities that align with the country's generation, transmission, access, and reform objectives, as outlined in the *Electricity Sector Development Plan (PDSE 2030)*, *Rural Electrification Master Plan (PDER)*, and *Nationally Determined Contributions (NDCs)*.

Generation Objectives

Pre-2015: Dominance of Hydropower and Non-Renewables

Donors prioritized large-scale **hydropower** projects, aligning with Cameroon's hydropower potential of **23,000 MW** and its 2030 goal to achieve **85% hydropower** in the energy mix. For example The *Lom Pangar Hydropower Project*, financed by the **World Bank Group (WBG)** and **African Development Bank (AfDB)**, increased baseload capacity to meet rising demand and industrial growth (World Bank 2018). Also the **Natural gas-fired plants**, funded through **OPEC loans**, targeted baseload stability, contributing to the **19.9% share of natural gas** in the energy mix as of 2022 (OPEC 2020).

Post-2015 : Diversification into Renewables

Following the adoption of the **Paris Agreement** and Cameroon's NDCs, donors shifted focus toward **renewable diversification** beyond hydropower. For example, The *Rural Solar Electrification Project* funded by the **World Bank Group** promoted **solar energy for centralized grids**, supporting the modest increase in solar's share from **1.4% in 2016 to 1.6% in 2023** (IRENA 2023). The **EU Institutions** and **GEF** also small-scale **renewable energy technologies** (e.g., solar mini-grids), aligning with Cameroon's target of **25% renewables (excluding hydropower)** by 2035 (EU 2021; GEF 2020).

Regarding PPAs, IED-Invest recently finalized licensing agreements with the Electricity Sector Regulatory Agency (Agence de Régulation du Secteur de l'Electricité [ARSEL]) and purchase agreement with Eneo. The 1.4-MW Mbakaou Carriere mini-hydropower plant project (expandable to 2.8 MW) in the western Djerem Region is expected to be completed in 2020 as the first private, independent operator granted an IPP license. The project has mobilized €4.8 million ($5.4 million) from IED-Invest and a €2.5 million ($2.8 million) grant from the European Union (EU). These funds will finance the construction of the hydropower plant and a 70-km medium- and low-voltage distribution

network. Early plans call for IED-Invest to operate both the hydropower plant and the distribution of electricity to nearby villages.

Transmission and Distribution Objectives

Cameroon's grid suffers from **18% technical losses** due to overloading and fragmentation between the Southern, Northern, and Eastern networks. Donor funding addressed these gaps through grid modernization and regional interconnectivity. For example the *Central Africa Power Interconnection Project*, financed by **WBG loans**, aims to integrate regional grids and enhance Cameroon's role as a power exporter to **Nigeria, Chad, and the Republic of Congo** (World Bank 2020). Also the Transmission and distribution projects funded by **AfDB** targeted the reduction of system losses and expansion of urban distribution networks to meet Cameroon's target of **30% loss reduction** by 2028.

Post-2015: Increased donor focus on regional interconnectivity aligns with Cameroon's plans for the **400 kV Chollet transmission line** and grid integration.

Electricity Access Objectives

Cameroon's energy access disparities remain significant, with **94.7% urban access** compared to **24.8% in rural areas**. Donors supported Cameroon's universal electricity access target of **100% by 2035**: For example, The *Rural Electrification Master Plan (PDER)* received support from **GEF grants** and **EU Institutions** for decentralized mini-grid solutions to expand rural energy access.

Energy Sector Reform Objectives

Cameroon's power sector reforms aim to improve **financial sustainability** and attract private investment. Donor funding aligns with these efforts post-2015. The **EU Institutions** and **BADEA grants** supported policy and administrative reforms, including tariff rationalization and institutional strengthening. The **Electricity Sector Recovery Plan (2023–2027)**, backed by **WBG technical support**, targets liquidity challenges and revenue collection efficiency to reduce fiscal burdens (World Bank 2023).

Pre- and Post-2015 Trends in Donor Focus

Policy Area	Pre-2015 Focus	Post-2015 Focus
Generation	Hydropower (Lom Pangar) and natural gas-fired plants	Solar energy (WBG projects) and renewable mini-grids (GEF, EU).
Transmission/ Distribution	Limited investment	Grid modernization and regional interconnectors (WBG, AfDB).
Access	Minimal focus on rural access	Rural electrification via off-grid mini-grids (GEF, EU).

Policy Area	Pre-2015 Focus	Post-2015 Focus
Reforms	Limited donor interest	Policy governance and cost-reflective tariffs (EU, BADEA).

Conclusion

Donor interest in Cameroon's energy sector aligns with national energy objectives while evolving pre- and post-2015. Before 2015, investments were concentrated in **hydropower** and **natural gas-fired generation** to address energy security. Post-2015, donor focus shifted toward **solar energy**, **rural electrification**, and **policy reforms** to align with the **SDGs** and **Paris Agreement** commitments. Projects like the *Lom Pangar Hydropower Project* (pre-2015) and *Rural Solar Electrification Project* (post-2015) illustrate this transition, supporting Cameroon's dual goals of **sustainability** and **universal energy access**.

5.2.2. The case of Kenya- Donor Interest in Kenya's Energy Sector (2010–2022)

Kenya has attracted substantial donor interest in its energy sector between 2010 and 2022 due to its vast renewable energy potential, particularly in geothermal energy, and its commitment to universal electrification. Donors such as the World Bank Group, African Development Bank, and European Union Institutions prioritized renewable energy infrastructure, grid expansion, and institutional reforms, aligning with both Kenya's national priorities and global climate goals.

Geothermal energy emerged as a leading area of donor investment. Projects such as the *Olkaria Geothermal Expansion*, financed through a mix of loans from the World Bank and AfDB, as well as grants from JICA, significantly expanded Kenya's geothermal capacity to contribute 28% of the energy mix by 2022 (World Bank, 2019). Similarly, solar energy for centralized grids received major support, with the *Kenya Electricity Modernization Project* funded through grants from the European Union and a loan from WBG (EU, 2021).

Wind energy investments, though smaller, were notable for the Lake Turkana Wind Power Project**.** Financed primarily through loans from AfDB and EU Institutions, the project added 310 MW of clean energy to Kenya's grid, reflecting alignment with global climate targets (AfDB, 2017). At the same time, the *Last Mile Connectivity Project*, focused on rural electrification and grid expansion, was supported through loans from the WBG and AfDB, underscoring donor commitment to Kenya's Vision 2030 universal access goals (World Bank, 2020).

Donors also prioritized energy policy reforms. Programs such as USAID's *Power Africa* and the World Bank's *Energy Sector Reform Project* were financed through grants**,** targeting regulatory improvements and institutional capacity building to attract private-sector investment (USAID, 2020). These initiatives reinforced Kenya's institutional frameworks, ensuring long-term sustainability.

Evolution of Project Financing Before and After SDGs and the Paris Agreement

The adoption of the Sustainable Development Goals in 2015 and the Paris Agreement has significantly influenced project financing structures in Kenya's energy sector. Prior to 2015, financing largely comprised loans for centralized grid expansion and non-renewable baseload energy projects. For example, the early 2010s saw heavy reliance on ODA loans from the World Bank and AfDB for large-scale infrastructure like geothermal and non-renewable generation.

Post-2015, the global emphasis on climate resilience and clean energy accelerated the shift toward grant-based financing for renewable energy solutions. Donors such as the EU Institutions, Climate Investment Funds, and Global Environment Facility increased funding through grants, targeting hybrid renewable technologies, isolated mini-grids, and policy reforms. The prioritization of grants over loans reflects a growing alignment with SDG 7 (Affordable and Clean Energy) and global decarbonization goals under the Paris Agreement.

In Kenya, this shift led to a stronger emphasis on geothermal, wind, and solar projects, with financial mechanisms increasingly balancing grants for policy support and technical assistance with loans for capital-intensive infrastructure. For instance, while large projects like *Lake Turkana Wind Power* and *Olkaria Geothermal* relied on loan financing, donor-funded solar mini-grids and policy reform programs relied predominantly on grants.

5.3. Donor Interest in countries with predominantly fossil based electricity mix: The case of Nigeria

Donor Interest in Nigeria's Energy Sector: Trends and Analysis (2010–2022)

Donor interest in Nigeria's energy sector between 2010 and 2022 reveals a strong focus on **energy security**, **grid modernization**, and an emerging emphasis on **renewable energy diversification** following the adoption of the **Sustainable Development Goals (SDGs)** and the **Paris Agreement (PA)** in 2015. These global frameworks drove increased funding toward clean energy, rural electrification, and policy reforms while maintaining substantial investments in traditional infrastructure, such as natural gas-fired power plants and centralized grids.

Pre-SDG and Paris Agreement Trends (2010–2015)

Focus on Energy Security and Grid Infrastructure: Between 2010 and 2015, donor funding prioritized addressing Nigeria's acute energy deficits and stabilizing the grid infrastructure. Investments were heavily concentrated on **natural gas-fired power plants** and centralized transmission and distribution systems. For example, **Natural Gas-Fired Projects**: The World Bank Group (WBG) and the African Development Bank (AfDB) financed large-scale natural gas plants, leveraging Nigeria's vast gas reserves of over **200 trillion cubic feet** to stabilize generation and address short-term energy security (World Bank 2012; AfDB 2013). Also **Grid Infrastructure**: Significant funding was directed toward Nigeria's *Transmission Rehabilitation and Expansion Program (TREP)* to modernize the grid and expand wheeling capacity to meet rising demand (Federal Ministry of Power 2015).

Limited Focus on Renewables: During this period, renewable energy projects received minimal attention. The bulk of donor funding focused on centralized solutions, with small-scale contributions toward policy development and renewable pilots, including solar mini-grids funded by the Global Environment Facility (GEF) and Climate Investment Funds (CIF).

Post-SDG and Paris Agreement Trends (2016–2022)

Shift Toward Renewable Energy Diversification and Policy Reforms: Following the adoption of the SDGs and PA in 2015, donor priorities increasingly aligned with Nigeria's clean energy goals under the *30-30-30 Initiative*, which targets **30% renewable energy** by 2030.

Solar Energy for Centralized Grids: The *Nigeria Electrification Project (NEP)*, funded by the World Bank Group, promoted solar-based grid solutions and decentralized renewable projects, targeting 1 million households and 250,000 MSMEs (World Bank 2019). Also Solar grid infrastructure received 27% of donor investments post-2015, with key contributions from the EU Institutions and CIF**.**

Energy Generation – Renewable Technologies: Donors like the **GEF** and **EU Institutions** supported decentralized renewable energy solutions, including solar mini-grids and hybrid systems, aligning with Nigeria's *Rural Electrification Strategy (RESIP)* and the *Energy Transition Plan (ETP)* to improve rural access (GEF 2020; EU 2021). For example **Natural Gas as a Transitional Energy Source**. Despite the emphasis on renewables, natural gas continued to attract substantial investments, representing 41% of donor funding between 2016–2022. Projects were aligned with Nigeria's *Decade of Gas Initiative*, which leverages gas for energy security while supporting economic growth (OPEC Fund 2018).

Policy and Administrative Reforms: Donor funding post-2015 increasingly supported **policy and governance reforms**, such as the *Electric Power Sector Reform Act* and the *Electricity Act 2023*, which decentralized electricity management and promoted private sector participation. Grants from **BADEA**,

EU Institutions, and the **UNDP** contributed to institutional strengthening and sector efficiency (EU 2021; UNDP 2020).

Transmission and Distribution Infrastructure: Grid modernization remained a critical focus, with substantial investments under the WBG-led *TREP* to expand wheeling capacity to **20,000 MW** and reduce technical losses (World Bank 2018). In 2018 and 2019, centralized grids accounted for **71.6%** of donor commitments.

Comparative Trends: Pre- and Post-2015

Focus Area	Pre-2015	Post-2015
Energy Security	Emphasis on **natural gas-fired power plants**.	Continued gas investment as a transitional source.
Grid Infrastructure	Large-scale funding for centralized grids.	Grid modernization, loss reduction, TREP expansion.
Renewable Energy	Minimal focus, small-scale pilots.	Significant funding for **solar grids** and mini-grids.
Policy and Reforms	Limited investments in governance.	Strong focus on policy, decentralization, and reforms.
Rural Electrification	Negligible progress.	Funding for decentralized mini-grids and off-grid systems.

Conclusion

Donor interest in Nigeria's energy sector has transitioned significantly post-2015, aligning more closely with renewable energy diversification**,** policy reforms, and rural electrification goals while maintaining investments in natural gas as a transitional source. Projects such as the *Nigeria Electrification Project (NEP)* and the *Transmission Rehabilitation and Expansion Program (TREP)* illustrate donor alignment with Nigeria's *30-30-30 Initiative* and its net-zero emissions target by 2060**.** The World Bank Group (WBG) remains the largest donor, driving infrastructure investments, while the EU Institutions**,** GEF**,** and CIF have prioritized clean energy solutions and governance reforms to support Nigeria's sustainable energy transition.

5.3 Alignment Between Donor Priorities and Recipient Needs in Energy Aid

Alignment in energy aid reflects the extent to which donor priorities correspond with recipient countries' energy policies and development goals. According to the OECD (2021), alignment is a cornerstone of

policy coherence for sustainable development, ensuring that donor interventions complement and reinforce national strategies without creating policy fragmentation or inefficiencies.

In the context of the energy sector, alignment can be examined through three key dimensions:

- Policy Objectives: The degree to which donor programs align with recipient countries' stated energy goals, such as renewable energy adoption, fossil fuel development, or rural electrification targets.
- Funding Commitments: Whether donor financial flows reflect recipient priorities across sub-sectors or demonstrate biases toward specific technologies or initiatives.
- Outcomes and Results: The extent to which donor-funded initiatives contribute to measurable achievements in recipient-defined energy objectives, such as increased electricity access, energy diversification, and infrastructure resilience.

This study adopts a multidimensional approach to evaluate alignment in the energy sectors of Kenya, Nigeria, and Cameroon. By analyzing donor commitments and recipient priorities through the lens of five criteria, it identifies patterns of convergence and divergence across different energy sub-sectors, namely Renewable Generation; Non-Renewable Generation; Transmission and Distribution; Electricity Access and Policy Reform. This analysis serves as a foundation for understanding how alignment—or misalignment—impacts energy policy coherence, resource allocation, and overall aid effectiveness.

5.3.1 Donor Priorities and Alignment in SSA Energy Aid (2010-2022)

This section examines donor-recipient alignment in Sub-Saharan Africa's energy sector, focusing on how donor commitments align—or misalign—with recipient countries' energy priorities. Donor preferences, driven largely by global climate goals and sustainability agendas, have concentrated on three key areas: renewable energy generation, energy policy reforms, and energy distribution.

The limited focus on non-renewable generation and the near absence of support for hybrid and nuclear technologies highlight a divergence between donor priorities and recipient countries' needs. However, these regional trends do not necessarily reflect the diverse realities of individual recipient countries, whose energy priorities are shaped by resource endowments, energy security needs, and development objectives.

To explore these dynamics, the analysis first identifies regional trends in energy aid allocation from 2010 to 2022, offering a broader perspective on donor priorities. This is followed by an in-depth examination of three case study countries—Kenya, Cameroon, and Nigeria—each representing distinct energy profiles:

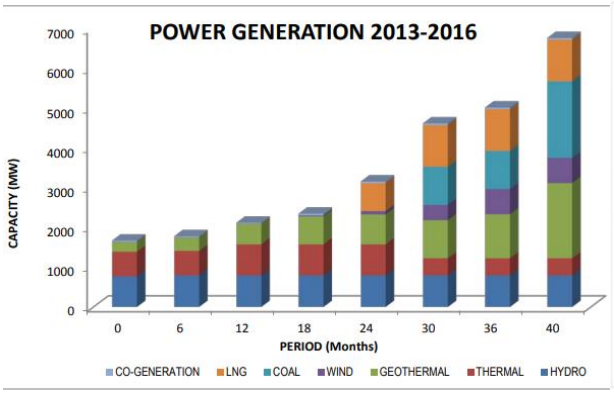
- **Kenya**: A renewable energy-dominated mix where national priorities emphasize geothermal, solar, wind, and hydropower alongside emerging interests in coal and nuclear energy.
- **Cameroon**: A hydro-fossil energy mix with significant hydropower resources complemented by short-term reliance on fossil-based solutions, such as emergency thermal plants, to mitigate seasonal energy deficits.
- **Nigeria**: A fossil-dominated energy mix driven by abundant natural gas resources, where national priorities center on energy security, industrialization, and gradual renewable integration.

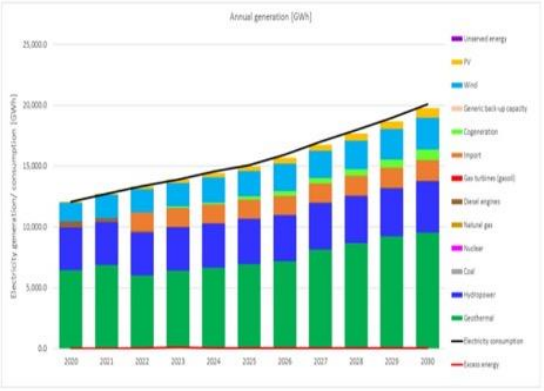
By analyzing these contexts, this section highlights the interplay between donor priorities and recipient needs, shedding light on areas of alignment and misalignment. The findings contribute to a broader understanding of resource allocation outcomes within the energy sector, forming the foundation for subsequent discussions on their implications for energy policy effectiveness.

5.3.1.1 Donor-Recipient Alignment in Kenya's Energy Sector

Kenya's energy policy, guided by *Vision 2030*, the *Energy Policy 2018*, and the *Least Cost Power Development Plan (LCPDP)*, focuses on expanding renewable energy generation, improving grid infrastructure, achieving universal access, and implementing sector reforms. Donor-funded projects between 2010 and 2022 show significant alignment with these priorities.

Figure 23 *: Planned Power generation 2013-2016 (left and Optimised Case-Annual generation balance (right).*

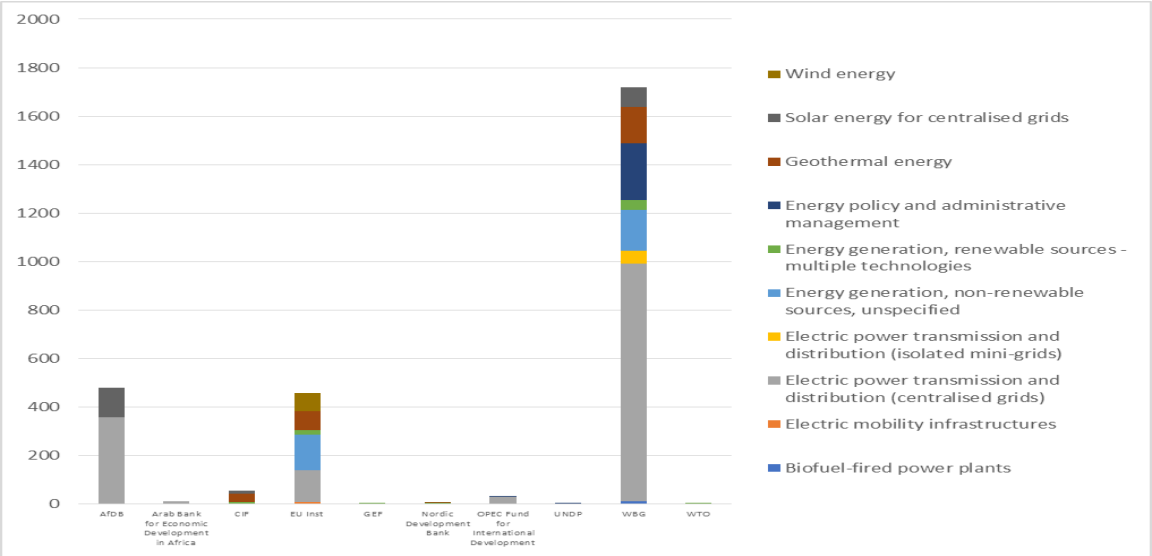




Source: Ministry of Energy and Petroleum (2015). Final Draft National Energy and Petroleum Policy

Source: Kenya Least Cost Power Development Plan 2021-2030

Figure 24 : *Volume of aid committed (y-axis) by various donors (x-axis) over the period, 2010-2022*



Source: authors computation with data from OECD data Explorer 2024

Generation - Renewable Energy Objective

Kenya prioritizes expanding geothermal, wind, and solar energy to meet 84% renewables by 2030 (EPRA, 2023). **Donor alignment is evident**:

- Geothermal: The *Olkaria Geothermal Expansion* received loans from the World Bank and AfDB, contributing 47% of installed capacity (World Bank, 2019).
- Wind: The *Lake Turkana Wind Power Project* (310 MW), funded through AfDB loans and EU grants, aligns with national wind energy targets (AfDB, 2017).
- Solar: The *Kenya Electricity Modernization Project* and *KOSAP* were supported by EU grants and World Bank loans, promoting grid-connected and off-grid solar solutions (World Bank, 2020).

Generation - Non-Renewable Energy Objective

Kenya plans to add 1,000 MW gas and 1,920 MW coal and nuclear by 2030 for baseload power (EPRA, 2023). Donors, prioritizing climate goals, provide limited support. However, the World Bank funded select non-renewable projects to ensure short-term energy stability (World Bank, 2017). There was obviously no donor support for Kenya's coal, natural gas and nuclear long-term ambitions, (see Figure 22 above). implying **strong misalignment.**

Transmission and Distribution Objective

Kenya aims to expand transmission lines to 7,000 km by 2030 and reduce system losses below 15% (Ministry of Energy 2020). **Donor support** includes the Last Mile Connectivity Project: Funded through World Bank and AfDB loans, enhancing rural grid access. The Regional Interconnectors: Projects like the Ethiopia-Kenya (500 kV) interconnector align with Kenya's goal to facilitate cross-border energy trade (World Bank, 2020)

Electricity Access Objective

Kenya targets universal access by 2026 through grid expansion and off-grid solutions. Donor initiatives such as the Last Mile Connectivity Project and KOSAP, funded by World Bank loans and CIF grants, support both rural electrification and affordability for low-income households (CIF, 2022; World Bank, 2020); implying **strong alignment.**

Energy Sector Policy

Kenya's *Energy Policy 2018* and *Energy Act 2019* emphasize sector reforms, cost-reflective tariffs, and improved governance. Programs such as USAID's *Power Africa* and the World Bank's energy reforms, supported through grants, align well with these goals by enhancing institutional capacity and private sector participation (USAID, 2020; Ministry of Energy, 2018); implying **strong alignment.**

Donor funding **aligns strongly** with Kenya's renewable energy targets, grid expansion, electricity access goals, and sector reforms. However, limited support for non-renewables reflects a gap between donor climate priorities and Kenya's short and long-term baseload needs.

5.3.1.2 Donor-Recipient Alignment in Cameroon Energy Sector

Cameroon's energy policy targets 5,000 MW capacity by 2030 (85% hydropower, 10% natural gas, 5% renewables) and 100% electricity access by 2035 through grid expansion, off-grid solutions, and sector reforms to improve financial sustainability. Donor-funded projects between 2010 and 2022 show significant alignment with these priorities.

Generation Objectives

Cameroon's energy policy targets a generation mix of 85% hydropower**,** 10% natural gas**,** and 5% renewables by 2030. Hydropower remains the dominant focus of both national and donor priorities. Example *Lom Pangar Hydropower Project*, funded by the World Bank Group (WBG) and the African Development Bank, exemplifies donor alignment with Cameroon's hydropower goal.

However, limited donor support for natural gas contrasts with Cameroon's objective to integrate 10% gas-fired capacity into the energy mix for grid reliability.

Transmission and Distribution Objective

Cameroon aims to expand its transmission network to reduce 18% technical losses and integrate regional grids by 2028. Donor support is strong through projects like RIS-RIN-CHAD supported by WBG and AfDB loans and enhances regional trade and grid efficiency.

Electricity Access Alignment

Cameroon's **universal electricity access** target of 100% by 2035 prioritizes grid expansion and off-grid solutions. Strong donor support through projects like PERACE funded by WBG, EU. PRERETD supported by AfDB, targeting peri urban and rural electrification.

Energy Sector Policy Alignment

Cameroon's sector reforms focus on **financial sustainability**, **tariff rationalization**, and **institutional strengthening** to attract private investment. Supported by WB through it PforR program

5.3.1.3 Donor-Recipient Alignment in Nigeria Energy Sector

Nigeria's energy sector priorities reflect a balance between renewable energy expansion, natural gas reliance for energy security, and improving grid infrastructure and access. Donor commitments from 2010 to 2022 highlight areas of both alignment and misalignment across key energy objectives.

Generation – Renewable Energy

Nigeria's "30-30-30 Initiative" aims to achieve 30% renewable energy in its generation mix by 2030. Donors, including the EU Institutions, GEF, and CIF, strongly supported decentralized solar energy projects, such as the Nigeria Electrification Project (NEP), aligning with Nigeria's rural electrification goals. However, hydropower—despite Nigeria's vast potential of 14,750 MW—received minimal donor attention, with only **1% of total energy aid** allocated to this resource. This partial alignment reflects donor preferences for solar technologies over large-scale hydro, likely due to environmental and social considerations.

Generation – Non-Renewable Energy

Nigeria's Decade of Gas Initiative prioritizes natural gas as a transitional fuel to support energy security and industrialization. The World Bank Group (WBG), as the largest donor, allocated **41% of its energy**

funding to natural gas-fired power plants, aligning with Nigeria's target of achieving 54% gas-based generation by 2030. However, this focus partially conflicts with global donor priorities, which emphasize renewable energy under the Paris Agreement. This tension highlights the challenge of balancing Nigeria's domestic energy needs with international climate goals.

Transmission and Distribution

Donor support for Nigeria's grid modernization aligns strongly with the government's Transmission Rehabilitation and Expansion Program (TREP). The World Bank led investments, directing **71.6% of donor commitments** toward centralized grid infrastructure. These investments are critical for achieving Nigeria's target of 20,000 MW wheeling capacity, reducing transmission losses, and improving system reliability.

Electricity Access

Nigeria aims to achieve **90% electricity access by 2030**, focusing on decentralized solutions to bridge rural energy gaps. Donors aligned strongly with this priority, funding initiatives like the NEP, which provided solar home systems and mini-grids to underserved areas. These efforts directly support Nigeria's Rural Electrification Strategy, promoting equitable energy access and poverty reduction.

Policy and Sector Reform

Donors have prioritized policy and governance reforms to enhance efficiency and attract private sector investment. Grants from the EU Institutions and UNDP supported initiatives culminating in the **Electricity Act 2023**, which decentralized power management and promoted competition. This strong alignment strengthens Nigeria's institutional capacity and supports long-term sector sustainability.

In summary, donor-recipient alignment in Nigeria demonstrates significant convergence in grid infrastructure, rural electrification, and policy reforms. However, partial misalignment persists in renewable and non-renewable energy generation, reflecting tensions between donor climate objectives and Nigeria's energy security priorities.

5.3.2 Donor-Recipient Alignment Matrix

This alignment matrix provides a structured analysis of donor-recipient alignment across Sub-Saharan Africa's energy sector, focusing on three case study countries—Kenya, Nigeria, and Cameroon. Alignment outcomes are categorized as Strong (✓), Moderate (~), and Misalignment (✗), reflecting donor support for recipient priorities in energy policy, renewable and non-renewable generation, and energy distribution.

Recipient Priorities	Kenya	Nigeria	Cameroon
Energy Policy	✓ Strong alignment - donor support for policy reforms.	✓ Strong alignment - governance reforms (Electricity Act).	✓ Strong alignment - donor-backed policy initiatives.
Renewable Generation	✓ Strong alignment - geothermal & solar projects.	Partial alignment - solar projects; hydropower underfunded	Partial alignment - emphasis on hydro; solar underfunded.
Non-Renewable Generation	✗ Misalignment - coal & nuclear funding gaps.	✓ Strong alignment - natural gas investments.	✗ Misalignment - emergency thermal plants unsupported.
Energy Distribution	✓ Strong alignment - Last Mile Connectivity program.	✓ Strong alignment - grid rehabilitation (TREP).	✓ Strong alignment - transmission grid expansion.
Energy Policy	✓ Strong alignment -	✓ Strong alignment -	✓ Strong alignment -

Key Notes:

1. Alignment outcomes are categorized as Strong (✓), Partial (~), and Misalignment (✗).
2. Timeframe impacts: Short-term (e.g., Cameroon thermal plants) vs Long-term (e.g., Kenya nuclear program).
3. Geopolitical dimensions: Notable in Kenya (Lamu project), reflecting donor retreat under climate pressures.

5.4 Key Lessons for Cameroon from Kenya's Energy Diversification and Policy Frameworks

Cameroon's energy sector, predominantly reliant on hydropower, faces significant challenges stemming from climate variability and resource overdependence. This has constrained energy security and resilience, particularly during periods of hydrological stress. By benchmarking Kenya's success in energy diversification and long-term planning, Cameroon can adopt strategic approaches to enhance its energy mix, improve donor alignment, and meet its electrification targets.

Energy Resource Diversification

Kenya's diversification from heavy reliance on hydropower to integrating geothermal, wind, and solar energy offers valuable lesson for Cameroon. With Kenya harnessing over 47% of its electricity from geothermal sources, the country has significantly reduced its vulnerability to climate shocks (IRENA, 2020). Cameroon's untapped geothermal potential—linked to its location along the East African Rift System and Cameroon Volcanic Line—remains underexplored despite over 100 thermal springs identified in key regions like Adamawa (Kana et al., 2017; Kidmo et al., 2021). In effect, IRENA's Renewable Energy Master Plan (REMP) for Cameroon presents a range of energy development scenarios highlighting the significant contribution of geothermal. Under stress conditions such as **"**no gas availability**"** or **"**high demand + no gas + dry hydro conditions**,"** geothermal energy becomes a

critical alternative for sustainable power generation. In the most ambitious scenario (high demand + no gas + dry hydro), geothermal contributes up to **345 MW** by **2025**. This reinforces its strategic importance as a reliable energy source to complement hydropower and mitigate energy deficits. Therefore targeted resource mapping and feasibility studies can unlock this potential, providing a path toward energy diversification and resilience (IRENA, 2021). Also, similarly to Kenya, Cameroon should integrate geothermal objectives into its national energy strategies, by establishing a geothermal development program, to signal long-term commitment and attract funding.

Strategic Long-term Planning

Kenya's Least Cost Power Development Plan (LCPDP) and Vision 2030 offer solid frameworks for aligning short- and long-term energy priorities with evolving national goals (Ministry of Energy, 2020). The LCPDP undergoes annual reviews, ensuring adaptability to energy sector dynamics. In contrast, Cameroon lacks a centralized, standalone energy strategy, relying instead on fragmented plans like the Electricity Sector Development Plan (PDSE 2030). Developing a similar long-term strategy, supported by continuous monitoring and stakeholder engagement, will provide a clear roadmap for energy diversification, attract donor alignment, and promote private-sector investment.

Resource Mobilization and Donor Alignment

Kenya's ability to secure significant funding for renewable projects, including geothermal and solar energy, demonstrates the importance of aligning national policies with global donor goals under the SDGs and Paris Agreement (World Bank, 2020; IRENA, 2021). In contrast, Cameroon's donor support has remained concentrated in hydropower and sparingly on gas projects, neglecting its geothermal potential. By strategically positioning geothermal energy as a key renewable alternative, Cameroon can align with donor priorities, ensuring targeted funding for resource mapping, capacity-building, and infrastructure development (IRENA, 2021; Kidmo et al., 2021).

Rural Electrification and Energy Access

Kenya's rural electrification achievements through initiatives like the Last Mile Connectivity Project and the Kenya Off-Grid Solar Access Project (KOSAP) offer replicable models for Cameroon (Ministry of Energy, 2018). These programs combine grid expansion with decentralized renewable solutions such as solar mini grids, enabling electricity access to remote areas. Cameroon's current rural electrification strategy relies primarily on grid expansion, which may not address accessibility challenges in underserved regions. By incorporating decentralized renewable technologies, Cameroon can accelerate progress toward its universal electrification target of 100% by 2035, as outlined in its Rural Electrification Master Plan (PDER) (World Bank, 2023).

In summary, the analysis of donor-recipient dynamics across Cameroon, Nigeria, and Kenya highlights varying degrees of alignment and misalignment in generation objectives. Kenya demonstrates strong donor alignment in renewable energy programs such as geothermal, while sub-sectors like coal and nuclear reveal notable misalignment. In Nigeria**,** heavy reliance on fossil fuels reflects donor challenges in aligning with the country's economic dependence on non-renewables. Similarly, Cameroon's energy sector presents partial alignment, with donor commitments primarily supporting hydropower projects but falling short of addressing the country's need for energy diversification and emergency solutions. For instance, Cameroon's thermal power initiatives relied heavily on domestic resources due to limited donor support for short-term energy priorities, revealing further misalignment in addressing immediate supply deficits.

These alignment patterns not only shape the effectiveness of energy aid but also influence how recipient governments allocate their domestic resources within the energy sector. While previous studies have predominantly focused on inter-sectoral fungibility, where aid impacts resource allocation across sectors, the concept of intra-sectoral fungibility—how aid drives resource shifts within the same sector—remains underexplored. By examining both Kenya and Cameroon, this analysis explores how donor alignment with renewable sub-sectors and misalignment with non-renewables, such as coal and thermal energy, drive resource reallocation. These cases provide valuable insights into how alignment and misalignment influence resource efficiency, government priorities, and the broader dynamics of intra-sectoral fungibility**.**

5.5 Intra-Sectoral Fungibility and Resource Allocation in Energy Aid

This section introduces intra-sectoral fungibility as a framework for understanding how alignment and misalignment between donor priorities and recipient energy needs influence resource allocation within the energy sector. Unlike inter-sectoral fungibility, which shifts resources across sectors, intra-sectoral fungibility focuses on how investments in specific energy sub-sectors—renewables or non-renewables—reshape priorities and resource distribution within the same sector. By analyzing both short-term and long-term energy goals, this section demonstrates how fungibility can produce both resource efficiency and inefficiency regardless of the timeframe.

The alignment analysis revealed significant influences of donor alignment on intra-sectoral fungibility. In addressing short-term energy priorities, Cameroon's emergency thermal interventions demonstrate the consequences of misalignment. Unable to secure donor support, the government funded diesel-based thermal plants using domestic resources. Initially intended as temporary measures, these plants became long-term dependencies, straining state finances due to high generation costs and subsidies.

For long-term goals, Kenya highlights both the advantages and challenges of fungibility. Donor support for geothermal energy, aligned with global climate goals, allowed the government to redirect domestic funds toward underfunded priorities like coal and nuclear energy. While this reflects recipient sovereignty, misalignment in coal and nuclear projects led to inefficiencies. The Lamu coal project stalled under global geopolitical pressures, including China's withdrawal of financial support tied to climate commitments. Similarly, Kenya's nuclear program, despite domestic investments and institutional progress, faces slow advancements due to limited external support.

By examining these cases, this section shows how intra-sectoral fungibility enables recipient governments to balance short-term needs with long-term energy ambitions while exposing vulnerabilities created by donor alignment or misalignment. Kenya's case also highlights the interplay of geopolitics and shifting global agendas, which further shape resource allocation outcomes within the energy sector.

5.5.1. *Short-Term Fungibility*: Emergency Energy Needs in Cameroon

This section examines *short-term fungibility* as it relates to resource allocation within the energy sector, where governments reallocate domestic funds to address immediate or emergency energy priorities in the absence of donor support. Cameroon's case highlights how misalignment between donor funding preferences and national needs compelled the government to invest heavily in emergency thermal power solutions to mitigate electricity deficits exacerbated by hydro-reliant generation.

Between 2010 and 2013, the government funded the construction of a combined 100MW diesel-powered plants under the Government Emergency Thermal Program, using domestic resources after donors showed no interest in supporting oil-based energy solutions. While these plants provided short-term relief, their prolonged use as baseload solutions—caused by persistent hydro shortfalls—led to resource inefficiencies. High operational costs, coupled with fuel subsidies, placed significant fiscal pressure on the government, diverting funds away from long-term energy investments and other social sectors. For example in 2022, tariff compensation accounted for 1.7% of the national budget, compared to 0.3% for the social sector and 17% for fuel subsidies (Ministry of Water Resources and Energy [MINEE], 2023).

By contrast, donor alignment with natural gas infrastructure, such as the Kribi Gas Plant commissioned in 2013, enabled Cameroon to secure external support from the World Bank Group (WBG) and African Development Bank in 2011 (as shown in figure 16). This alignment facilitated resource mobilization for gas-fired generation but underscored the limitations of addressing immediate priorities without consistent donor engagement.

Cameroon's experience demonstrates how *short-term fungibility*—driven by donor misalignment—can address immediate energy challenges but at the cost of long-term financial sustainability and resource efficiency.

5.5.2 Long-Term Fungibility: Strategic Energy Ambitions in Kenya

The Lamu Coal Plant exemplifies how donor misalignment with national energy goals can influence intra-sectoral fungibility and resource allocation outcomes. Part of Kenya's 5,000 MW+ energy plan launched in 2013, the coal project aimed to diversify the country's energy mix. However, the project faced significant environmental, social, and geopolitical challenges that ultimately led to its suspension.

Environmental advocacy groups, such as *Save Lamu* and *deCOALonize*, strongly opposed the project, raising concerns over pollution and threats to Lamu's UNESCO World Heritage sites (Save Lamu, 2020). Donor disengagement also played a crucial role. Traditional donors, like the World Bank Group, prioritized renewable energy investments in line with global climate goals, leaving Kenya to seek financing from emerging donors, including China and South Africa (World Bank, 2020; Amu Power, 2015). While China initially committed to the project, its 2021 announcement to halt coal financing abroad, driven by international climate pressures, left the Lamu project without critical external support (Xi, 2021).

The Lamu case highlights the vulnerabilities associated with long-term intra-sectoral fungibility. While donor support for renewable projects like geothermal freed up Kenya's domestic resources to pursue coal and nuclear initiatives, the withdrawal of emerging donors exposed the fragility of these partnerships. This dynamic underscore how geopolitical pressures and shifting donor priorities shape resource allocation, creating inefficiencies when misalignment occurs.

5.4.1 **Resource Efficiency and Inefficiency in Intra-Sectoral Fungibility**

The outcomes of intra-sectoral fungibility in the energy sector highlight both resource efficiency and inefficiency, depending on the degree of donor-recipient alignment.

Resource Efficiency: Alignment with donor priorities often leads to resource efficiency, as investments can address critical national goals while benefiting from external financial and technical support. For instance, Kenya's geothermal energy development, strongly supported by multilateral donors, not only strengthened its renewable energy mix but also allowed the government to reallocate domestic resources toward other priorities. This alignment reflects optimal resource utilization, advancing both national and global energy objectives.

Resource Inefficiency: In contrast, misalignment creates inefficiencies that strain recipient governments' fiscal capacities. Cameroon's emergency thermal plants, funded solely with domestic resources due to a lack of donor alignment, illustrate this inefficiency. Initially intended as short-term solutions, these plants have become long-term dependencies, burdening the government with high generation costs and

persistent subsidies. Similarly, Kenya's Lamu coal project stalled due to geopolitical shifts and environmental concerns, showcasing how misalignment can render projects unsustainable despite significant resource commitments.

These contrasting outcomes underscore the critical role of alignment in promoting resource efficiency while mitigating inefficiencies that hinder energy sector development.

5.4.2 Geopolitical Dynamics and Emerging Donor Behavior

The Case of LAMU Coal fired power project

The Lamu Coal Plant further exposes the geopolitical complexities surrounding energy aid, particularly as recipient countries like Kenya turn to emerging donors to finance projects that lack support from traditional donors. While traditional donors prioritize renewable energy in alignment with global climate goals, emerging donors like China and South Africa initially appeared as alternative partners, offering financing aligned with Kenya's national ambitions to diversify its energy mix.

China's involvement in the Lamu project through its Belt and Road Initiative reflected both economic and strategic motivations. The financing arrangement, led by the Industrial and Commercial Bank of China (ICBC), demonstrated China's role in supporting large-scale infrastructure projects in Africa as part of its broader geopolitical outreach (Amu Power, 2015). Similarly, South Africa's participation, through Standard Bank, aligned with its regional economic interests, particularly in energy cooperation.

However, shifting global priorities reshaped these dynamics. In 2021, China's announcement to halt overseas coal financing under its climate commitments underscored the increasing influence of global climate agendas on donor behavior (Xi, 2021). This withdrawal not only stalled the Lamu project but also highlighted the fragility of emerging donor partnerships, which remain vulnerable to geopolitical and economic pressures. Similarly, South Africa's withdrawal, driven by project bankability risks and environmental concerns, further compounded the challenges, leaving Kenya without critical external financing (deCOALonize, 2021).

The Lamu case reflects the delicate balance that recipient countries must navigate between achieving national energy priorities and responding to shifting geopolitical realities. While emerging donors from the rising global south offer alternatives, their commitments are not immune to global pressures, creating uncertainties for long-term energy planning. These dynamics raise broader questions about the reliability of emerging donors and the extent to which recipient countries can assert sovereignty over their energy policies in an increasingly interconnected and climate-conscious world.

Donor Retrenchment in Nigeria's Energy Sector (2021–2022)

The lack of significant donor commitments in **2021** and minimal renewable energy grants in **2022** reflects a convergence of policy, geopolitical, and economic dynamics. This section integrates key hypotheses to provide a possible grounded explanation of this retrenchment, contextualized within Nigeria's energy landscape and global trends.

The absence of significant donor commitments to Nigeria in **2021** and minimal grants in **2022** can be attributed to a combination of global and domestic factors. First, the global shift toward clean energy financing under the Paris Agreement and SDGs created a misalignment with Nigeria's reliance on natural gas as a transitional energy source, despite its importance to national energy security (IEA 2022; UNEP 2021). Second, regulatory uncertainty and governance challenges, such as delays in implementing sector reforms, discouraged donors from committing large-scale financing until the enactment of the Electricity Act 2023, which decentralized power management and improved investor confidence (World Bank 2022; Federal Ministry of Power 2023). Economic constraints, exacerbated by the COVID-19 pandemic, further weakened Nigeria's ability to absorb concessional loans, leading donors to prioritize fragile economies with greater energy access deficits (IMF 2022). Additionally, geopolitical shifts, including the Russia-Ukraine energy crisis, redirected donor focus to renewable energy transitions and immediate energy security needs elsewhere (EU 2022). Donors instead concentrated on smaller grants for policy support and decentralized renewable solutions to align Nigeria with future clean energy goals.

5.6 Conclusion

This chapter analyzed the interplay between donor interests, alignment, and intra-sectoral fungibility in shaping energy resource allocation within SSA. At the regional level, donor interests were shown to prioritize renewable energy, energy access and energy policy, aligning closely with global climate goals but often overlooking recipient countries' diverse needs, such as support for non-renewable projects. At the country level, varying degrees of alignment and misalignment emerged across Kenya, Cameroon and Nigeria, highlighting how donor priorities interact with recipient energy goals.

Kenya's case demonstrated both the opportunities and challenges of donor alignment. Strong alignment in renewable energy, particularly geothermal, enabled the government to reallocate domestic resources toward unfunded priorities like coal and nuclear projects, illustrating the concept of intra-sectoral fungibility. However, misalignment with coal and nuclear projects—shaped by geopolitical dynamics and environmental concerns—exposed vulnerabilities in resource allocation and highlighted the fragility of emerging donor partnerships. Similarly, Cameroon's reliance on donor-supported gas-fired projects

and domestic funding for emergency thermal plants reflected short-term misalignment, which led to inefficiencies and financial strain within the energy sector.

These findings provide a novel understanding of intra-sectoral fungibility as a critical outcome of donor-recipient interactions. By demonstrating how fungibility occurs regardless of short-term or long-term energy goals, this analysis underscores the importance of alignment in achieving resource efficiency while revealing the risks of misalignment, such as stalled projects and fiscal pressures.

Extending these insights to other SSA countries, the discussion highlights the broader implications for energy policy coherence and aid effectiveness. Addressing alignment gaps and fostering more participatory donor-recipient engagements are essential for enhancing energy aid outcomes and ensuring recipient sovereignty in energy policy planning.

The next chapter builds on these findings to propose actionable recommendations for strengthening energy policy coherence and improving donor-recipient dynamics in SSA's energy sector.

5.7. Strategic Recommendations for Aligning Donor-Recipient Energy Priorities

This study highlights two key recommendations to address misalignment challenges and enhance the efficiency of energy aid in Sub-Saharan Africa.

1. Leveraging the Multiplicity of Donors to Address Immediate Needs

The multiplicity of donors active in Sub-Saharan Africa's energy sector presents an opportunity to balance immediate energy needs with long-term sustainability goals. Recognizing that resource misalignment often arises from donors prioritizing global sustainability agendas while recipient governments address urgent short-term challenges, governments can strategically engage diverse donor actors to close priority funding gaps. For instance, organizations like the World Bank Group (WBG) and African Development Bank (AfDB) have historically supported short-term non-renewable energy projects, such as Kenya's thermal generation in 2012 and Cameroon's gas-fired plants in 2014. These interventions addressed immediate baseload deficits but declined following the adoption of the Sustainable Development Goals (SDGs). To optimize this diversity, recipient governments should adopt coordinated frameworks that align funding requests with sectoral priorities, ensuring immediate challenges—such as energy access deficits—are not overlooked in favor of long-term renewable transitions.

2. Implementing Hybrid Programs to Bridge Alignment Gaps

To resolve donor-recipient misalignment, this study proposes a hybrid program approach, inspired by blended finance, hybrid power systems and environmental offset mechanisms. Hybrid programming integrate donor priorities—typically renewables—with recipient governments' short-term needs, such as fossil fuel-based energy for baseload stability. For instance, countries reliant on fossil fuels, like Nigeria and Cameroon, can attract donor support by coupling natural gas or thermal plants with renewable energy components. The "dirtier" the primary energy source, the greater the renewable component required to offset environmental impacts, mirroring compensation practices in hydropower projects. This innovative model ensures donor priorities for global sustainability are respected while upholding recipient sovereignty and addressing their economic realities. Such flexibility fosters collaborative energy programs tailored to local contexts, aligning short-term needs with long-term global goals.

By leveraging diverse donor partnerships and implementing hybrid programs, recipient countries can achieve a balanced, strategic approach to energy development. These recommendations offer pathways to enhance energy aid effectiveness, address immediate needs, and support sustainable transitions, thereby fostering resilient, inclusive energy systems across the region.

6. CONCLUSION

This thesis examined the impact of Official Development Assistance (ODA) for energy on the energy policies of recipient countries in Sub-Saharan Africa (SSA), focusing on donor-recipient alignment and its influence on resource allocation. By analyzing regional trends and case studies of Kenya, Cameroon, and Nigeria, the study provides a nuanced understanding of how energy aid aligns with—or diverges from—recipient countries' priorities, and the implications of this alignment for resource efficiency, energy sovereignty, and long-term development goals. This research offers novel insights into intra-sectoral fungibility, a concept that explains how alignment or misalignment shapes recipient governments' domestic energy strategies.

6.1 Key Findings

The findings of this study underscore that donor priorities in SSA's energy sector are heavily influenced by global climate goals and sustainability agendas. This has led to significant commitments toward renewable energy, energy policy reforms, and distribution infrastructure, with a reduced focus on non-renewable energy sources, particularly after the adoption of the Sustainable Development Goals (SDGs) and the Paris Agreement. While this trend supports global decarbonization efforts, it has resulted in varying degrees of alignment with recipient countries' immediate and long-term energy needs.

1. **Regional Trends:** The analysis of energy aid from 2010 to 2022 revealed strong donor alignment in three key areas: renewable energy generation, energy distribution, and energy policy. However, donor commitments to non-renewable generation sources, such as natural gas and oil, declined significantly post-2015, reflecting the global shift toward clean energy. This trend often conflicts with the energy security needs of countries reliant on fossil fuels, such as Nigeria and Cameroon.
2. **Case Studies:**

    - **Kenya:** Strong donor alignment with renewable energy, particularly geothermal and solar, enabled the country to diversify its energy mix and advance its sustainability goals. However, misalignment in coal and nuclear energy projects limited progress in these areas, exposing Kenya's reliance on emerging donors like China and South Africa.
    - **Cameroon:** Donor support primarily focused on hydropower, aligning with Cameroon's vast hydro resources while domestic needs drive investments in oil-fired thermal plants constructed for emergency needs. This misalignment left the country dependent on emergency thermal solutions, leading to resource inefficiency and fiscal strain.

- **Nigeria:** Donor emphasis on renewable energy and policy reforms partially aligned with Nigeria's goals but overlooked its reliance on natural gas to drive energy security and industrialization. This misalignment highlights the tension between global sustainability priorities and local economic realities.

3. **Intra-Sectoral Fungibility:** A key contribution of this research is the identification of intra-sectoral fungibility—how energy aid influences resource reallocation within the same sector. The study demonstrated that strong donor alignment with renewable energy freed up domestic resources, enabling governments to pursue underfunded priorities such as fossil-based energy projects. However, misalignment led to inefficiencies, as seen in Kenya's stalled Lamu coal project and Cameroon's reliance on costly emergency thermal plants.
4. **Geopolitical Dimensions:** The Lamu case in Kenya highlighted the role of shifting geopolitical pressures and emerging donor behavior in shaping energy aid outcomes. The withdrawal of financial support from China, driven by its climate commitments, exposed the fragility of emerging donor partnerships and underscored the challenges of balancing global agendas with national priorities.

6.2 Policy Recommendations

1. **Leverage the Multiplicity of Donors:** Recipient countries should strategically engage with multiple donors to address both short-term and long-term energy needs. By fostering complementary partnerships, governments can align donor resources with urgent priorities, such as energy security, while advancing long-term sustainability goals.
2. **Hybrid Programs for Alignment:** Donors and recipient countries should design hybrid energy programs that integrate both renewable and non-renewable sources. Inspired by blended finance, hybrid power plants and environmental offset concepts, such programs can balance global sustainability goals with local energy realities, particularly in countries with significant fossil-based energy needs. For instance, coupling natural gas or coal projects with renewable components can mitigate environmental impacts while meeting immediate energy demands.
3. **Support Long-Term Planning and Diversification:** Countries like Cameroon can learn from Kenya's success in developing long-term energy plans, such as the Least Cost Power Development Plan (LCPDP). Strategic resource diversification, including the exploration of geothermal energy, can enhance energy security and attract targeted donor support for underutilized resources.
4. **Strengthen Recipient Sovereignty:** Recipient governments should assert their sovereignty by aligning donor support with national energy strategies. Joint needs assessments that emphasize

recipient priorities can foster equitable partnerships, ensuring that aid enhances local ownership and long-term development outcomes.

6.3. Limitations and Further Research

This study acknowledges certain limitations. First, while it provides a strong analysis of donor-recipient dynamics, the impact of emerging donors, such as China and South Africa, was not explored in depth. Future research could conduct comparative analyses of traditional and emerging donors to understand their influence on energy policies. Second, the study primarily relied on quantitative aid data on commitments, which may not fully capture the qualitative dimensions of donor-recipient negotiations and policy decisions. Further research could employ mixed methods to provide deeper insights.

Additionally, the concept of intra-sectoral fungibility introduced in this study offers a foundation for future research. For instance, how does fungibility interact with global sustainability goals in the context of rising energy demand? Would a BRICS membership for Kenya had given it leverage to advance the Lamu coal project? Exploring these questions could further enrich the discourse on energy aid and policy alignment.

6.4. Closing Reflections

This research highlights the complex interplay between donor priorities, recipient needs, and geopolitical dynamics in shaping energy aid outcomes. By introducing the concept of intra-sectoral fungibility and developing a flexible alignment matrix, this study contributes to a deeper understanding of energy policy coherence and resource allocation in SSA. Ultimately, achieving sustainable energy transitions requires equitable partnerships that balance global agendas with local development goals, fostering a future where energy aid aligns with the aspirations and sovereignty of recipient countries.

REFERENCES

- Africa Energy Portal. *The State of Energy in Africa: Trends and Challenges*. 2019. Available at: https://africa-energy-portal.org.
- Africa Renewable Energy Initiative (AREI). *Progress Report: Africa Renewable Energy Initiative*. 2018. Available at: https://www.arei.org/progress-report.
- African Development Bank (AfDB). *Cameroon Country Electricity Sector Report and Diagnostic*. 2021. Available at: https://www.afdb.org.
- African Development Bank (AfDB). *Desert to Power Initiative: Transforming the Sahel Through Solar Energy*. 2018. Available at: https://www.afdb.org.
- African Development Bank (AfDB). *Energy Sector in Africa: Opportunities and Challenges*. 2022. Available at: https://www.afdb.org.
- African Development Bank (AfDB). *Geothermal Development and Renewable Energy*. 2018. Available at: https://www.afdb.org/geothermal2018.
- African Development Bank (AfDB). *Kenya Last Mile Connectivity Project: Project Overview*. 2018. Available at: https://www.afdb.org.
- African Development Bank (AfDB). *Lake Turkana Wind Power Project*. 2017. Available at: https://www.afdb.org.
- African Development Bank Group. *Country Priority Plan and Diagnostic of the Electricity Sector: Cameroon*. Abidjan: African Development Bank Group, 2021. Available at: https://www.afdb.org.
- African Energy Chamber. *The State of African Energy 2022*. 2022. Available at: https://www.africanenergychamber.org.
- Amu Power. *Lamu Coal Project Documentation*. 2015. Available at: https://www.amupower.com.
- BankTrack. "Standard Bank Has Confirmed That It Will Not Fund the Proposed Lamu Coal-Fired Power Plant." *BankTrack*, October 2017. Accessed December 6, 2024. https://www.banktrack.org.
- Berthélemy, Jean-Claude. "Geopolitical Goals in Bilateral Aid." 2006. Available at: https://www.example.com.
- Bhattacharyya, Subhes. *Rural Electrification Programs in SSA*. 2012. Available at: https://www.example.com.
- Bowmans. (2021). *Kenya: The 2021-2030 least cost power development plan, introduction of the 2021 renewable energy auction policy and the 2021 FIT policy*. Retrieved from https://www.bowmanslaw.com/insights/

- Business in Cameroon. *Cameroon-Chad Electricity Interconnection Project: CFA557 Billion Financing Secured*. 2020.
- Clean Technology Fund. *Scaling Up Renewable Energy Program for Low Income Countries (SREP)*. 2015. Available at: https://www.climateinvestmentfunds.org.
- deCOALonize Campaign. *The Case Against the Lamu Coal Plant*. *deCOALonize Kenya*, 2021. Accessed December 6, 2024. https://decoalonize.org.
- Easterly, William. *The White Man's Burden: Why the West's Efforts to Aid the Rest Have Done So Much Ill and So Little Good*. New York: Penguin Press, 2007.
- ECOWAS. 2023. *West African Power Pool Initiatives*. Retrieved from https://www.ecowapp.org.
- Energsustainsoc. 2022. "Energy Policy Reforms in Sub-Saharan Africa." *Energy Sustainability and Society*. Available at: https://energsustainsoc.biomedcentral.com.
- Energy Commission of Nigeria. 2015. *National Renewable Energy and Energy Efficiency Policy (NREEEP)*. Retrieved from https://energypedia.info/wiki/Policy_and_Regulatory_Framework_for_Energy_in_Nigeria.
- Energy Commission of Nigeria. 2015. *Renewable Energy Master Plan (REMP)*. Retrieved from https://www.energy.gov.ng/policy_planning.php.
- Energy Commission of Nigeria. 2022. *National Energy Policy (Revised 2022)*. Retrieved from https://energy.gov.ng/Energy_Policies_Plan/APPROVED_REVISED_NEP_2022.pdf.
- European Union. 2021. *Kenya Electricity Modernization Project: Impact Assessment*. Brussels: European Commission.
- European Union. 2021. *Renewable Energy Investments in Nigeria: EU Support Report*. Brussels: European Commission. Available at: https://ec.europa.eu/energy/publications.
- European Union. 2022. *Renewable Energy Priorities and Climate Financing*. Brussels: European Commission. Available at: https://ec.europa.eu/energy/publications.
- Federal Ministry of Power, Nigeria. *Electricity Act 2023*. Retrieved from: https://www.power.gov.ng/download/electricity-act-2023/.
- Federal Government of Nigeria. (2022). *Energy Transition Plan*. Retrieved from https://www.energytransition.gov.ng/
- Federal Government of Nigeria. (2022). *Nationally Determined Contribution (NDC)*. Retrieved from https://ndcpartnership.org/country/nga
- Federal Ministry of Power, Nigeria. (2015). *National Renewable Energy and Energy Efficiency Policy (NREEEP)*. Retrieved from https://www.power.gov.ng
- Feyzioglu, Tarhan, Vinaya Swaroop, and Min Zhu. 1998. "A Panel Data Analysis of the Fungibility of Foreign Aid." *World Bank Economic Review* 12 (1): 29–58. https://doi.org/10.1093/wber/12.1.29.

- Global Environment Facility (GEF). *Derisking Sustainable Off-Grid Lighting Solutions in Nigeria*. 2017. Available at: https://www.thegef.org.
- Global Environment Facility. *Sustainability and Renewable Energy Initiatives*. Washington, DC: GEF, 2021.
- Global Environment Facility (GEF). 2020. *Promoting Solar and Renewable Energy Solutions in Nigeria*. Washington, DC: GEF. Available at: https://www.thegef.org/projects
- Government of Kenya. (2007). *Vision 2030: The development blueprint for Kenya*. Nairobi, Kenya: Ministry of Planning and National Development. Retrieved from https://vision2030.go.ke
- Hanif, Imran. 2018. "Impact of Fossil Fuels Energy Consumption, Energy Policies, and Urban Sprawl on Carbon Emissions in East Asia and the Pacific Region." *Energy Policy* 119: 412–419. Available at: https://doi.org/10.1016/j.enpol.2018.03.051.
- Hannah Ritchie, Pablo Rosado and Max Roser (2019) - "Access to Energy" Published online at OurWorldinData.org. Retrieved from: 'https://ourworldindata.org/energy-access' [Online Resource]
- Kim, Jung Eun. 2019. "Sustainable Energy Transition in Developing Countries: The Role of Energy Aid Donors." Climate Policy 19 (1): 16–30. https://doi.org/10.1080/14693062.2018.1444576.
- International Energy Agency (IEA). *Africa Energy Outlook 2022*. Paris: IEA, 2022. Available at: https://www.iea.org.
- International Energy Agency (IEA). 2022. *Cameroon Energy Profile*. Retrieved from: https://www.iea.org.
- International Energy Agency (IEA). (2024). *Tracking SDG 7: The energy progress report 2024*. Retrieved from https://www.iea.org/reports/tracking-sdg7
- IMF. *The Economic Implications of the COVID-19 Pandemic*. 2022. Washington, DC: IMF.
- International Energy Agency (IEA). 2021. *Africa Energy Outlook 2021: Clean Energy Transitions in Sub-Saharan Africa.* Paris: IEA Publishing. Accessed December 13, 2024. https://www.iea.org/reports/africa-energy-outlook-2021.
- International Energy Agency (IEA). 2023. *Cameroon: Countries & Regions.* Available at: https://www.iea.org.
- International Renewable Energy Agency (IRENA). 2020. *Renewable Energy Statistics 2020.* Abu Dhabi: IRENA. Available at: https://www.irena.org.
- International Atomic Energy Agency (IAEA). 2021. *Nuclear Power and Sustainable Energy Development in Africa.* Vienna: IAEA. Accessed December 15, 2024. https://www.iaea.org.

- International Atomic Energy Agency (IAEA). 2021. “Milestone Approach to Nuclear Infrastructure Development.” *IAEA Publications*. Accessed December 2024. https://www.iaea.org.
- International Finance Corporation (IFC). 2020. *Scaling Solar Initiative: Project Overview.* Washington, DC: IFC. Accessed December 15, 2024. https://www.ifc.org.
- International Renewable Energy Agency (IRENA). 2023. *Global Renewables Outlook: Energy Transformation 2023*. Abu Dhabi: IRENA.
- International Renewable Energy Agency (IRENA). *Renewable Energy in Cameroon: Potential and Development*. 2021. Retrieved from: https://www.irena.org.
- International Renewable Energy Agency (IRENA). *Renewable Energy Roadmap for Nigeria*. 2023. Retrieved from: https://www.irena.org.
- International Renewable Energy Agency (IRENA). 2023. *Renewable Energy Statistics 2023*. Retrieved from https://www.irena.org/Publications/2024/Jul/Renewable-energy-statistics-2024
- International Renewable Energy Agency (IRENA). *Cameroon: Summary Renewable Energy Master Plan.* Abu Dhabi: International Renewable Energy Agency, 2015. Retrieved from: https://www.irena.org
- Kenya Ministry of Energy. *Energy Policy and Resources Overview*. 2023. Available at: http://energy.go.ke
- Kana, J., M. Kamga, and A. Wouatong. "Geothermal Energy Potential in Cameroon: An Overview." *Renewable Energy Journal* 42, no. 4 (2017): 1–10.
- Kidmo, D.K., F.D. Kana, and A. Djongyang. 2021. “Geothermal Resource Assessment in Cameroon Along the Cameroon Volcanic Line.” *Renewable Energy* 163: 1188–99. https://doi.org/10.1016/j.renene.2020.09.036.
- Kenya Ministry of Energy. *Least Cost Power Development Plan (LCPDP)*. 2020. Available at: http://energy.go.ke.
- Kariuki, Muigua. 2021. “The Legal and Institutional Framework for Nuclear Energy in Kenya: Are We Getting It Right?” *The Lawyer Africa*. November. Accessed December 2024. http://kmco.co.ke/wp-content/uploads/2020/10/Exploring-Alternative-Alternative-Sources-of-Energy-in-Kenya-Kariuki-Muigua-PhD.pdf.
- Liu, Yang, Kangyin Dong, and Farhad Taghizadeh-Hesary. "How Does Energy Aid Mitigate the Recipient Countries’ Carbon Emissions?" *Economic Analysis and Policy*. 2023. Available at: https://doi.org/10.1016/j.eap.2023.104763.
- Law Nigeria. (2024). *Electricity Act 2023: Liberalizing Nigeria's power sector*. Retrieved from https://lawnigeria.com

- Ministry of Water Resources and Energy. 2014. *Least Cost Power Sector Expansion Development Plan (PDSE 2030)*. Yaoundé, Cameroon: Government of Cameroon.
- Ministry of Water Resources and Energy. 2023. *Electricity Sector Reform Program (2023–2030)*. Yaoundé, Cameroon: Government of Cameroon.
- Ministry of Water Resources and Energy (MINEE). (2016). *Rural Electrification Master Plan (PDER)*. Yaoundé, Cameroon: Government of Cameroon. Retrieved from https://www.investiraucameroun.com/electricite/0604-8756-le-gouvernement-camerounais-dispose-d-un-plan-d-electrification-rurale-de-10-000-localites-a-l-horizon-2035
- Ministry of Environment, Protection of Nature and Sustainable Development (MINEPDED). (2021). *Cameroon's Updated Nationally Determined Contribution (NDC)*. Yaoundé, Cameroon: Government of Cameroon. Retrieved from https://unfccc.int/sites/default/files/NDC/2022-06/CDN%20r%C3%A9vis%C3%A9e%20CMR%20finale%20sept%202021.pdf
- Muigua, Kariuki. "The Legal and Institutional Framework for Nuclear Energy in Kenya: Are We Getting It Right?" The Lawyer Africa, November 2021. https://thelawyer.africa/tag/nuclear-energy/.
- Ministry of Energy. (2018). *Kenya national energy policy*. Nairobi, Kenya: Government of Kenya. Retrieved from https://www.energy.go.ke
- Ministry of Energy and Petroleum. (2015). *Draft national energy and petroleum policy*. Nairobi, Kenya: Government of Kenya. Retrieved from https://www.energy.go.ke
- Neumayer, Eric. "Is the Allocation of Food Aid Free from Donor Interest Bias?" *The Journal of Development Studies* 39, no. 3 (2003): 19–44.
- Nigerian Electricity Regulatory Commission. (2022). *2022 Fourth Quarter Report*. Retrieved from https://nerc.gov.ng/wp content/uploads/2023/07/2022_Q4%20Report_Updated_310723.pdf
- Nigeria Electricity System Operator. (2018). *Transmission Network Development Plan*. Retrieved from https://openjicareport.jica.go.jp/pdf/12339586_03.pdf
- Nuclear Power and Energy Agency (NuPEA).. 2024. *Strategic Plan 2023–2027: Nuclear Power and Energy Agency*. Nairobi, Kenya: Government of Kenya.
- Nuclear Power and Energy Agency (NuPEA). "Kenya's Nuclear Power Program: Achievements and Challenges." Accessed December 6, 2024. https://www.nuclear.co.ke.
- Nuclear Power and Energy Agency (NuPEA). "IAEA Reviews Kenya's Nuclear Power Infrastructure Development." Accessed December 6, 2024. https://www.nuclear.co.ke.
- National Renewable Energy and Energy Efficiency Policy (NREEEP). 2015. *Policy Framework for Renewable Energy Development in Nigeria*. Retrieved from https://nerc.gov.ng/wp-

content/uploads/2017/05/National%20Renewable%20Energy%20and%20Energy%20Efficiency%20Policy%202015.pdf

- Nigerian Energy Transition Plan. 2021. *Roadmap to Net-Zero Emissions by 2060*. Government of Nigeria.
- Nuclear Power and Energy Agency (NuPEA). "Kenya's Nuclear Power Program: Achievements and Challenges." Accessed December 6, 2024. https://www.nuclear.co.ke.
- Nuclear Power and Energy Agency (NuPEA). "IAEA Reviews Kenya's Nuclear Power Infrastructure Development." Accessed December 6, 2024. https://www.nuclear.co.ke.
- Nuclear Power and Energy Agency (NuPEA). "Strategic Plan 2023-2027." Accessed December 6, 2024. https://www.nuclear.co.ke.
- Organisation for Economic Co-operation and Development (OECD). 2023. *Creditor Reporting System: Energy Aid Data 2002-2023.* Paris: OECD Publishing. Accessed December 13, 2024. https://stats.oecd.org
- Organisation for Economic Co-operation and Development (OECD). 2021. *Policy Coherence for Sustainable Development.* Paris: OECD Publishing. Accessed December 13, 2024. https://legalinstruments.oecd.org/public/doc/260/260.en.pdf.
- OECD. *Aid Flows in Sub-Saharan Africa Energy Sector (2010–2022)*. Available at: https://data.oecd.org.
- Our World in Data. *Energy Consumption in Africa*. 2022. Available at: https://ourworldindata.org.
- Pack, Howard, and Janet R. Pack. 1993. "Foreign Aid and the Question of Fungibility." *Review of Economics and Statistics* 75 (2): 258–265. https://doi.org/10.2307/2109431.
- Power Africa Off-grid Project. Off-Grid Solar Market Assessment – Cameroon. Washington, DC: U.S. Agency for International Development, 2019. https://pdf.usaid.gov/pdf_docs/PA00TZV4.pdf.
- Power Africa. 2019. *Cameroon: Energy Sector Overview*. Retrieved from https://www.powerafrica.gov.
- Presidential Taskforce on the Review of Power Purchase Agreements. *Final Report on the Review of Power Purchase Agreements in Kenya.* The Republic of Kenya, September 2021. Accessed December 6, 2024. https://repository.kippra.or.ke.
- Republic of Kenya. 2022. *Kenya National Electrification Strategy: Key Highlights 2022*. Ministry of Energy and Petroleum. Accessed December 6, 2024. Retrieved from https://energy.go.ke.
- Republic of Kenya. *Budget Speech for the Fiscal Year 2010/2011*. Available at: https://repository.kippra.or.ke.

- Rural Electrification Agency (REA). (2017). *Rural Electrification Strategy and Implementation Plan (RESIP)*. Retrieved from https://rea.gov.ng
- Rural Electrification Agency (REA). (2018). *Nigeria Electrification Project Overview*. Retrieved from https://rea.gov.ng
- Sachs, Jeffrey. *The End of Poverty: Economic Possibilities for Our Time*. New York: Penguin Books, 2005.
- Save Lamu and deCOALonize. 2017. *Environmental Impact Assessment for Lamu Coal Project*. Accessed December 2024. https://www.decoalonize.org.
- Singh, Rajinder P., and Roula Inglesi-Lotz. "Renewable Energy Deployment and Energy Security in Africa: The Case of Kenya's Geothermal Development." *Renewable Energy* 177 (2021): 305–316.
- Smith, Daniel, Jane Brown, and Alice Green. 2020. "The Impact of Energy Aid on Renewable Energy Development in Kenya." *Energy Policy Journal* 46 (2): 78–96. https://doi.org/10.1016/j.enpol.2020.104763.
- Schneider, Christina, and Jennifer Tobin. 2013. "Interest Coalitions and Multilateral Aid Allocation in the International Monetary Fund." *International Organization* 67 (1): 127–61. https://doi.org/10.1017/S0020818312000397.
- Sovacool, Benjamin K., Morgan Bazilian, and Marianne Behrens. 2015. "Nuclear Energy in Africa: Perspectives and Prospects." *Energy Research and Social Science 8*: 123–137. Accessed December 15, 2024. https://doi.org/10.1016/j.erss.2015.06.004.
- Transmission Company of Nigeria. (2021). *Transmission Rehabilitation and Expansion Program (TREP)*. Retrieved from https://tcn.org.ng/repository/projectdocuments/Transmission%20Rehabilitation%20and%20Expansion%20Program%20%28TREP%29.pdf
- U.S. Energy Information Administration (EIA). *Cameroon: Energy Resources and Production*. 2015. Retrieved from: https://www.eia.gov.
- U.S. Energy Information Administration (EIA). (2020). *Cameroon: Energy Profile*. Retrieved from https://www.eia.gov
- UNCTAD Investment Policy Hub. (2023, June 9). *Nigeria - Electricity Act 2023 liberalizes the sector and promotes renewables*. Retrieved from https://investmentpolicy.unctad.org/investment-policy-monitor/measures/4339/nigeria-electricity-act-2023-liberalizes-the-sector-and-promotes-renewables
- United Nations Development Programme (UNDP). 2020. *Nigeria Rural Electrification Strategy Support*. New York: UNDP. Available at: https://www.undp.org/publications.

- United Nations Environment Programme (UNEP). "Lamu Coal Plant Case Reveals Tips for Other Community-Led Campaigns." UNEP, August 22, 2019. Accessed December 6, 2024. https://www.unep.org.
- United Nations Conference on Trade and Development (UNCTAD). (2023). *Nigeria Electricity Act 2023: Liberalizing the sector and promoting renewables*. Retrieved from https://investmentpolicy.unctad.org
- UUBO. (2023). *The Nigerian Electricity Act 2023: Illuminating the path to sector transformation in Nigeria*. Retrieved from https://uubo.org
- USAID (United States Agency for International Development). 2020. *Power Africa: Kenya Energy Sector Reform Updates*. Washington, DC: USAID.
- Wang, Qiang, Jiaqi Guo, and Zequn Dong. "The Positive Impact of Official Development Assistance (ODA) on Renewable Energy Development: Evidence from 34 Sub-Saharan Africa Countries." *Renewable Energy*. Available at: https://doi.org/10.1016/j.renene.2019.104763.
- World Bank. (2015). Olkaria Geothermal Expansion Project Review. Retrieved from https://www.worldbank.org
- World Bank. (2020). Nachtigal Hydropower Project Overview. Retrieved from https://www.worldbank.org
- World Bank. *Cameroon Energy Sector Recovery Plan*. 2023. Retrieved from: https://www.worldbank.org.
- World Bank. *Nachtigal Hydropower Project in Cameroon*. 2020. Retrieved from: https://www.worldbank.org.
- World Bank. *Scaling Solar: Building Solar Markets in Emerging Economies*. 2019. Retrieved from: https://www.worldbank.org.
- World Bank. 2019. *Cameroon: Mining Sector Development*. Retrieved from https://www.worldbank.org.
- World Bank. (2024). *Our World in Data: Cameroon Electricity Access*. Retrieved from https://ourworldindata.org/energy/access
- World Bank. (2020). *World Bank supports regional electricity trade in Central Africa with $385 million in financing for Cameroon and Chad*. Retrieved from https://www.worldbank.org/en/news/press-release/2020/06/16/world-bank-supports-regional-electricity-trade-in-central-africa
- World Bank. (n.d.). *Program-for-Results: An overview*. Retrieved from https://www.worldbank.org/en/programs/program-for-results
- World Bank. *Cameroon Energy Sector Recovery Plan*. 2023. Available at: https://www.worldbank.org.
- World Bank. *Kenya Energy Access Project*. 2020. Available at: https://www.worldbank.org.

- World Bank. *Nachtigal Hydropower Project in Cameroon*. 2020. Available at: https://www.worldbank.org.
- World Bank. 2021. “Kenya Energy Sector Recovery Project.” *World Bank Reports*. Accessed December 2024. https://www.worldbank.org.
- World Bank. (2021). *Nigeria to improve electricity access and services to citizens through $500 million electricity distribution sector recovery program*. Retrieved from https://www.worldbank.org/en/news/press-release/2021/02/05/nigeria-to-improve-electricity-access-and-services-to-citizens
- World Bank. (2021). *Project Appraisal Document for the Nigeria Distribution Sector Recovery Program (DISREP)*. Retrieved from https://documents1.worldbank.org/curated/en/886051612753240219/pdf/Nigeria-Distribution-Sector-Recovery-Program.pdf
- World Bank. (2023). *Nigeria to expand access to clean energy for 17.5 million people*. Retrieved from https://www.worldbank.org
- World Bank. 2022. *Renewable Energy Development in Sub-Saharan Africa: Progress and Challenges.* Washington, DC: World Bank. Accessed December 13, 2024. https://www.worldbank.org.
- World Bank. 2018. *The West Africa Power Pool Initiative: Regional Integration for Energy Security*. Washington, DC: World Bank. Accessed December 15, 2024. https://www.worldbank.org.
- World Bank. 2019. *Scaling Solar: Building Solar Markets in Emerging Economies.* Washington, DC: World Bank. Accessed December 15, 2024. https://www.worldbank.org.
- World Bank. 2019. *Scaling Solar: Addressing Africa’s Energy Challenges*. Washington, DC: World Bank Group.
- World Bank. 2020. *Kenya Geothermal Energy Projects Overview*. Washington, DC: World Bank. Accessed December 15, 2024. https://www.worldbank.org.
- World Bank. *Kenya Energy Security: Balancing Renewables and Baseload Needs*. Washington, DC: World Bank, 2017.
- Xi, Jinping. *China Will End Overseas Coal Financing*. Beijing: Government of China, 2021.

초록

공적 개발 원조(에너지 원조)가 수혜국의 국가 에너지 정책에 미치는 영향: 사하라 이남 아프리카 국가들의 사례

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이 논문은 2010년부터 2022년까지 사하라 사막 이남 아프리카(SSA) 에너지 부문에서 공적개발원조(ODA) 에너지 지원이 기부국과 수원국의 정렬 관점에서 미친 영향을 분석합니다. 특히, 글로벌 기부국의 우선순위가 국가 에너지 수요와 어떻게 상호작용하며 자원 배분에 영향을 미치는지, 그리고 이러한 상호작용이 현재의 글로벌 기후 및 지속가능발전 목표(SDG) 맥락에서 어떤 의미를 가지는지에 초점을 맞추고 있습니다. 본 연구는 지역 동향 분석과 케냐, 카메룬, 나이지리아의 세 가지 사례 연구를 통해 에너지 생성(재생 가능 및 비재생 자원), 분배, 정책 목표에서의 정렬 상태를 탐구합니다.

연구 결과, 기부국의 약속은 재생 가능 에너지, 정책 개혁, 전력망 확장에 중점을 두며, 이는 글로벌 기후 목표와 강하게 정렬되지만 수원국의 단기 에너지 안보 요구와는 종종 괴리됩니다. 재생 가능 에너지 중심의 에너지 믹스를 보유한 케냐는 지열 및 태양광 분야에서 강한 정렬을 보이나, 석탄 및 원자력 계획에서는 괴리가 나타납니다. 수력-화석 연료 믹스에 의존하는 카메룬은 기부국이 수력을 우선시하는 반면, 국내적으로는 응급 열발전소에 대한 투자가 필요하여 부분적인 정렬을 보여줍니다. 화석 연료 중심의 나이지리아는 전환 연료로서 가스 발전에서 정렬을 보이나, 수력 및 기타 재생 가능 에너지는 여전히 자금 부족 문제를 겪고 있습니다. 케냐의 사례는 카메룬이 농촌 전기화, 자원 동원, 에너지 믹스 다각화, 지속 가능한 에너지 개발을 위한 장기 계획을 개선하기 위한 전략을 강조합니다.

이 논문은 에너지 부문 내 자원 재배치를 수원국 정부가 어떻게 수행하는지 설명하기 위해 "부문 내 자금 유연성(intra-sectoral fungibility)" 개념을 도입합니다. 기부국 지원이 부족한 우선순위에 자금을 투입할 수 있도록 재원을 확보하는 자원 효율성과, 정렬 부족이 재정 및 운영 취약성을 악화시키는 비효율성을 모두 강조합니다. 연구는 또한 중국 및 남아프리카와 같은 신흥 기부국의 역할과 글로벌 의제 변화의 영향을 보여주는 지정학적 역학을 탐구합니다.

이 연구는 에너지 프로그램 전반에서 기부국-수원국 정렬을 평가하는 유연한 정렬 매트릭스를 개발하고, 기부국 우선순위와 수원국 주권을 조화시키기 위한 하이브리드 에너지 지원 프로그램을 제안함으로써 기존 문헌에 기여합니다. 다중 기부국을 활용하고, 장기 계획을 강화하며, 에너지 지원을 통해 자원 다각화와 현지화된 우선순위를 지원하도록 정렬할 것을 권고합니다.

연구는 효과적인 에너지 지원이 글로벌 지속 가능성 목표와 수원국의 전략적 우선순위를 균형 있게 맞추어 SSA 지역에서 에너지 안보, 효율성, 주권을 달성해야 한다고 결론지었습니다.

키워드: 에너지 정책, 공적개발원조(ODA), 에너지 지원, 기부국-수원국 정렬, 부문 내 자금 유연성, 재생 가능 에너지, 사하라 사막 이남 아프리카, 지정학, 자원 배분

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