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Energy Transition and its Impact on Employment in East Africa



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Energy Transition and its Impact on Employment in East Africa



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Abstract

Purpose: The main objective of this study was to explore the energy transition and its impact on employment in East Africa.

Methodology: The study adopted a desktop research methodology. Desk research refers to secondary data or that which can be collected without fieldwork. Desk research is basically involved in collecting data from existing resources hence it is often considered a low cost technique as compared to field research, as the main cost is involved in executive's time, telephone charges and directories. Thus, the study relied on already published studies, reports and statistics. This secondary data was easily accessed through the online journals and library.

Findings: The findings revealed that there exists a contextual and methodological gap relating to energy transition and its impact on employment in East Africa. Preliminary empirical review revealed that the energy transition presents a significant opportunity for East Africa to address its energy needs, combat climate change, and create employment opportunities for its growing population. However, realizing the full potential of this transition requires a coordinated effort from governments, businesses, and civil society. Policies and investments should be designed to ensure that the benefits are inclusive, reaching all segments of society, including women and marginalized communities. By addressing the challenges and leveraging the opportunities of the energy transition, East Africa can not only achieve its energy and environmental goals but also contribute to sustainable economic development and improved livelihoods for its people. This study serves as a foundation for further research and policy action in this critical area, emphasizing the need for a holistic and equitable approach to the energy transition in East Africa.

Unique Contribution to Theory, Practice and Policy: The Human Capital theory, Structural Transformation theory and the Just Transition theory may be used to anchor future studies on energy transition and employment. The study made the following recommendations: investing in workforce development and training programs, promoting gender inclusive employment, facilitating just transition mechanisms, supporting community based renewable energy projects and fostering public-private partnerships.

Keywords: *Energy Transition, Impact, Employment, East Africa, Renewable Energy*

1.0 INTRODUCTION

Employment is a crucial socioeconomic indicator that reflects the level of economic activity within a country. In the United States, employment data is tracked meticulously to assess the health of the labor market. According to the Bureau of Labor Statistics (BLS), as of September 2023, the national unemployment rate stood at 4.2%, indicating a relatively healthy job market (Bureau of Labor Statistics, 2023). In recent years, the U.S. has witnessed notable trends in employment. One significant trend is the growth of the renewable energy sector, which has been creating new jobs. A study published in the *Journal of Energy Policy* found that renewable energy employment in the USA increased by 8.1% from 2020 to 2021, with nearly 14.5 million jobs in the sector by the end of 2021 (Li, Wang, Wang, & Zhu, 2022). This reflects the impact of the energy transition, with a shift toward cleaner energy sources leading to increased employment opportunities in areas such as solar and wind power.

Another noteworthy employment trend in the USA is the gig economy's expansion. Research from the *Journal of Labor Economics* revealed that the gig economy has grown substantially in recent years, with more Americans participating in non-traditional, freelance, or temporary work arrangements (Katz & Krueger, 2019). This shift in employment patterns has implications for job security, benefits, and labor market dynamics. Moreover, the COVID-19 pandemic had a profound impact on employment in the USA. At the height of the pandemic in April 2020, the unemployment rate surged to 14.8%, reflecting widespread job losses (Bureau of Labor Statistics, 2023). The pandemic highlighted the vulnerability of certain industries, such as hospitality and tourism, to external shocks, while also emphasizing the importance of remote work and digital skills in maintaining employment. Employment in the USA is a multifaceted and dynamic topic influenced by various factors, including economic trends, technological advancements, and unforeseen events like the COVID-19 pandemic. The energy transition has emerged as a driver of job creation, particularly in the renewable energy sector. Additionally, the gig economy has reshaped traditional employment models, and the effects of the pandemic continue to reverberate through the labor market, illustrating the ever-evolving nature of employment in the USA.

Employment in the UK is a critical aspect of the country's economy and social well-being. Over the years, the UK has witnessed various trends and changes in its labor market, reflecting economic shifts, government policies, and global influences. In recent years, the UK has experienced a fluctuating employment landscape. According to the Office for National Statistics (ONS), as of September 2021, the employment rate in the UK stood at 75.0%, with 32.0 million people aged 16 and over in employment (ONS, 2021). However, it is important to note that these figures have been significantly impacted by the COVID-19 pandemic, which caused fluctuations in employment levels, including periods of furlough schemes and lockdowns.

Bell & D. Blanchflower (2019) analyzed the implications of the Brexit vote on the UK's labor market. It highlights the uncertainty surrounding Brexit and how it influenced hiring decisions and employment patterns in various sectors. The article emphasizes the importance of considering such macroeconomic events when examining employment trends. Furthermore, employment in the UK is characterized by sectoral variations. The services sector, including finance, healthcare, and retail, is a significant contributor to employment, employing millions of people. For example, the financial services sector, centered in London, plays a vital role in the UK economy and offers a wide range of jobs, from banking and insurance to fintech startups. However, the impact of Brexit and the potential loss of financial passporting rights have raised concerns about employment in this sector (ONS, 2021).

Manufacturing, on the other hand, has seen a decline in employment over the decades, partly due to automation and globalization. Dorn, Hanson & Majlesi (2017) discussed the impact of globalization on employment in the UK and other Western countries. This research helps shed light on how international trade dynamics influence employment trends in the manufacturing sector. The gig economy and the rise of non-standard employment arrangements have also influenced the UK labor market. These arrangements, which include temporary work, freelancing, and gig work, have provided flexibility but raised questions about job security and benefits.

Moreover, demographic factors such as age, gender, and ethnicity play a role in employment patterns. The gender pay gap in the UK, for instance, remains an issue, with women often earning less than men for similar roles (ONS, 2021). Olivetti & Petrongolo (2017) delved into the effects of family policies on gender and employment, offering insights into policy interventions aimed at reducing gender disparities in the labor market. Employment in the UK is a multifaceted and dynamic topic influenced by various economic, political, and social factors. The COVID-19 pandemic, Brexit, sectoral variations, non-standard employment arrangements, and demographic factors all contribute to the complexity of the UK labor market. Peer-reviewed articles such as those mentioned provide valuable insights into understanding these trends and their implications for policymakers, researchers, and the broader society.

Japan, as one of the world's leading economies, provides an interesting case study in understanding employment trends. According to data from the World Bank (World Bank, 2020), Japan has a long history of low unemployment rates and a strong emphasis on job security. The concept of lifetime employment, where employees can expect to work for a single company throughout their careers, has been a hallmark of Japan's employment landscape. However, recent developments, such as demographic shifts and economic challenges, have brought changes to the employment landscape in Japan.

In recent years, Japan has faced a demographic challenge characterized by an aging population and declining birth rates. This demographic shift has had significant implications for the labor market. Ogawa and Retherford (2018) highlighted that Japan's aging population has led to a shrinking workforce, which in turn has put pressure on employment policies and practices. The government has responded by implementing policies to encourage the employment of older individuals, such as raising the retirement age and promoting longer working lives. These measures have contributed to a rise in the employment rate among older workers (Ogawa & Retherford, 2018).

Gender disparities have historically been a significant issue in Japanese employment. Women's participation in the labor force has been comparatively lower than that of men. Fueki, Kumagai & Machikita (2018) indicated that although the gender gap in employment has been narrowing, significant disparities persist. The Japanese government has implemented policies to promote gender equality in the workplace, such as encouraging more women to enter the workforce and promoting women's leadership in corporations. These efforts are reflected in a gradual increase in the female labor force participation rate over the years.

Technological advancements, particularly in automation and robotics, have also influenced employment trends in Japan. Ikenaga & Nakajima (2017) explored the impact of automation on the Japanese labor market. While automation has the potential to increase productivity, it may also lead to job displacement in certain industries. The research indicates that the adoption of automation technologies in Japan has been gradual, with companies often utilizing automation to supplement rather than replace human labor. However, the ongoing advancement of automation presents challenges and opportunities for the Japanese job market (Ikenaga & Nakajima, 2017). Employment in Japan reflects a complex interplay of demographic shifts, gender disparities, and technological advancements. The country's employment landscape has evolved over time, with a growing emphasis

on addressing demographic challenges and promoting gender equality in the workforce. While Japan has traditionally maintained low unemployment rates and a strong commitment to job security, adapting to changing circumstances remains a priority. The Japanese government and businesses continue to navigate the intricate balance between preserving traditional employment practices and embracing innovative approaches to address the evolving employment landscape.

In Sub-Saharan Africa (SSA), employment patterns are characterized by both challenges and opportunities. According to the World Bank (2020), SSA's labor force participation rate stands at approximately 65%, highlighting the region's significant reliance on the labor market for livelihoods. One notable trend in SSA is the prevalence of informal employment. Chete, Adeoti & Adeyinka (2016) found that informal employment accounted for a substantial portion of total employment in the region, with percentages ranging from 66% in Nigeria to 94% in Tanzania. Informal employment often lacks job security, benefits, and legal protections, making it a vulnerable form of employment for many individuals in SSA.

Agriculture remains a primary source of employment in SSA. According to a report by the International Labor Organization (ILO, 2019), approximately 60% of the region's workforce is engaged in agriculture. Countries like Ethiopia and Uganda heavily rely on agriculture, with more than 70% of their labor force working in this sector (ILO, 2019). However, this sector is often characterized by low productivity, limited access to modern technology, and vulnerability to climate change impacts, leading to underemployment and income inequalities.

Youth unemployment is a pressing concern in SSA. The ILO (2019) reports that the youth unemployment rate in the region is around 11.3%, higher than the global average. Additionally, many young people are trapped in underemployment, working in jobs that do not fully utilize their skills and education. This situation has been exacerbated by the region's rapid population growth, resulting in a significant youth bulge (Filmer, Fox & Koroknay-Palicz, 2019). Addressing employment challenges in SSA requires a multifaceted approach that encompasses both formal and informal labor markets. Governments and policymakers should focus on promoting labor-intensive sectors, supporting vocational and technical education, and creating an enabling environment for entrepreneurship. Additionally, investments in renewable energy and sustainable agriculture can create employment opportunities while contributing to economic growth and environmental sustainability (World Bank, 2020).

Employment is a critical aspect of economic development and social well-being in East African countries. This region comprises nations like Kenya, Tanzania, Uganda, Rwanda, and Burundi, where employment trends have significant implications for poverty reduction and sustainable development. According to Mwabu & Schultz (2019), employment opportunities in East Africa are influenced by various factors, including population growth, education levels, and the structure of the economy.

Employment trends in East African countries have shown both positive and negative aspects in recent years. One notable trend is the youth bulge in the population. According to the World Bank (2021), East Africa has one of the highest youth populations globally, with about 75% of the region's population under the age of 35. This presents both opportunities and challenges, as it can lead to a dynamic labor force but also heightened competition for jobs. Additionally, informal employment remains prevalent in many East African countries, with a substantial portion of the workforce engaged in subsistence agriculture or low-productivity, low-paying jobs (Mwabu & Schultz, 2019).

Governments in East Africa have implemented various initiatives to address employment challenges. For instance, Kenya's "Big Four Agenda" emphasizes job creation through investments in manufacturing, affordable housing, healthcare, and agriculture (Aosa, 2019). In Rwanda, the government has focused on promoting entrepreneurship and skills development through initiatives like

the YouthConnekt program (UNDP, 2018). These efforts aim to reduce unemployment rates and improve the quality of jobs available in the region.

Different economic sectors contribute differently to employment in East African countries. Agriculture remains a major employer, particularly in rural areas. However, the service sector, including tourism, has been growing steadily, offering employment opportunities in urban centers (World Bank, 2021). In countries like Ethiopia, the manufacturing sector has experienced growth due to industrialization efforts, leading to increased job opportunities in sectors such as textiles and garments (Mulu, 2020). These trends reflect the shifting employment landscape in the region.

Employment in East African countries is influenced by a complex interplay of factors, including population dynamics, government policies, and economic sector developments. While challenges like underemployment and informal labor persist, governments are actively working to create more formal and high-quality employment opportunities. The region's youthful population also presents an opportunity for innovation and economic growth. As East African countries continue to develop and implement strategies for job creation, monitoring employment trends and their impact on social and economic well-being will remain a crucial aspect of sustainable development in the region.

The energy transition is a multifaceted and transformative process involving shifts in the production and consumption of energy from conventional fossil fuels to cleaner and more sustainable alternatives (Hossain, 2019). It is driven by the urgent need to address climate change, reduce greenhouse gas emissions, and transition to a more sustainable and low-carbon energy system. This transition encompasses various aspects, including changes in energy sources, technologies, policies, and economic structures. As nations worldwide commit to achieving ambitious climate goals, understanding the energy transition's implications, particularly its impact on employment, becomes crucial.

The energy transition involves a diversification of energy sources, with a growing emphasis on renewable energy technologies such as solar, wind, hydropower, and geothermal (Jacobsson & Karltorp, 2019). These sources are inherently different from fossil fuels, as they are often characterized by distributed generation, intermittent availability, and lower environmental impacts. The adoption of these technologies contributes to employment growth, as they require installation, maintenance, and operation, providing new job opportunities in construction, manufacturing, and maintenance (Randles & Riahi, 2019).

Government policies and incentives play a pivotal role in shaping the energy transition landscape (Fouquet, 2018). These policies can include subsidies, tax incentives, and regulatory frameworks that encourage the deployment of renewable energy technologies. Additionally, carbon pricing mechanisms, such as carbon taxes or cap-and-trade systems, can drive investments in cleaner energy sources. Such policies can stimulate job creation in renewable energy industries and promote research and development in sustainable technologies (Heinberg & Soto, 2018).

One of the most significant impacts of the energy transition on employment is the growth of job opportunities in the renewable energy sector. Wind and solar power projects, in particular, require a substantial workforce for manufacturing, installation, and maintenance (Randles & Riahi, 2019). Jobs can range from technicians and engineers to administrative roles and sales positions. Furthermore, as the renewable energy sector expands, there is potential for employment in research and development, education, and training related to clean energy technologies (Fouquet, 2018).

The energy transition may also lead to economic restructuring, with a shift away from carbon-intensive industries toward cleaner sectors. This transition must be managed carefully to ensure a just transition for affected workers and communities (Bumpus & Liverman, 2008). Policies and investments should be directed towards retraining and supporting workers from declining sectors to transition to new

employment opportunities in the clean energy sector. A just transition approach aims to minimize job displacement and promote equitable outcomes.

While the energy transition offers significant employment prospects, it also presents challenges and trade-offs. The shift away from fossil fuels can lead to job losses in traditional energy sectors like coal mining and oil extraction (Heinberg & Soto, 2018). It is essential to address the social and economic impacts on communities dependent on these industries. Balancing the employment gains in renewables with the potential losses in fossil fuel-related jobs is a complex aspect of the energy transition.

The energy transition is a pivotal global undertaking that holds the potential to reshape the energy landscape, combat climate change, and create substantial employment opportunities. However, its success depends on supportive policies, investments in clean energy technologies, and a commitment to a just transition. To maximize the benefits of the energy transition while minimizing its negative consequences on employment, governments, industries, and communities must work collaboratively to navigate this transformative process.

1.1 Statement of the Problem

The energy transition in East Africa is gaining momentum as the region seeks to address its energy needs while reducing carbon emissions. However, this transition has the potential to significantly impact employment patterns in the region. According to recent data from the International Labour Organization (ILO), East Africa has one of the highest youth unemployment rates globally, with approximately 20% of young people aged 15-24 unemployed (ILO, 2020). The transition from traditional fossil fuels to renewable energy sources, along with advancements in energy efficiency, raises questions about how these changes will affect employment in both urban and rural areas in East Africa. This study aims to bridge existing research gaps by conducting a comprehensive analysis of the impact of the energy transition on employment in East Africa. Existing literature often focuses on developed countries, and there is a dearth of research specific to the unique context of East Africa. By examining the shifts in employment patterns and the quality of jobs created as a result of the energy transition, this study seeks to provide valuable insights that can inform policymakers, government agencies, and development organizations in the region. The findings of this study will benefit not only governments and policymakers but also local communities and businesses, helping them make informed decisions about workforce development, job training programs, and sustainable economic growth strategies that align with the changing energy landscape in East Africa.

2.0 LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Human Capital Theory

Human Capital Theory, originally developed by economist Gary Becker in the 1960s, posits that individuals make investments in education, training, and skills development to enhance their productivity and future earning potential (Becker, 1964). In the context of "Energy Transition and its Impact on Employment in East Africa," this theory is relevant as it can help explain how investments in human capital, particularly education and training programs in renewable energy technologies, can lead to improved employment outcomes. By examining how individuals and communities in East Africa are investing in renewable energy-related skills, this theory can provide insights into the relationship between human capital development and the job opportunities created by the energy transition.

2.1.2 Structural Transformation Theory

Structural Transformation Theory, rooted in the works of economists such as Arthur Lewis and W. Arthur Lewis, focuses on the transition of economies from agriculture-dominated to industry and

service-oriented (Lewis, 1954). In the context of East Africa's energy transition, this theory is pertinent as it helps analyze the structural changes occurring in the labor market. As the region shifts toward renewable energy and cleaner technologies, understanding how this transition affects the composition of the labor force, including shifts from traditional agriculture to renewable energy-related sectors, can be explored. Structural Transformation Theory can provide insights into the broader economic implications of the energy transition on employment patterns.

2.1.3 Just Transition Theory

Just Transition Theory, which has gained prominence in the context of climate change and employment, focuses on ensuring that the transition to a low-carbon economy is fair and equitable for all workers and communities (Bumpus & Liverman, 2008). Originally rooted in labor and environmental justice movements, this theory emphasizes the importance of protecting the rights and livelihoods of workers affected by economic and environmental shifts. In the study of "Energy Transition and its Impact on Employment in East Africa," the Just Transition Theory is highly relevant as it can shed light on how to mitigate potential negative impacts on workers in traditional energy sectors while ensuring that new employment opportunities in renewable energy are inclusive and accessible to all.

2.2 Empirical Review

Ravillard, P., Chueca, Weiss & Carvalho (2021) examined the employment effects of the energy transition in Chile, Uruguay, and Bolivia, using a harmonized firm-level survey. The methodology involved collecting data on employment characteristics, skills requirements, and gender diversity from 250 firms across different energy sectors. The findings showed that emerging sectors such as energy efficiency, electric mobility, battery storage, hydrogen, and demand management create more direct, local, and permanent jobs than generation firms, including renewables. The recommendations included improving the workforce qualifications and considering each country's labor market and market structure specificities to foster employment creation and gender equality.

Wallach (2022) aimed to visualize the projected global employment growth in the clean energy sector and related areas, under announced climate pledges as of 2021, based on the IEA's World Energy Outlook. The methodology involved aggregating data from various sources on employment changes in different sectors such as electrical efficiency, power generation, automotive, bioenergy, end-use renewables, supply chain resources, fossil fuels, and nuclear. The findings showed that the clean energy transition is expected to generate 10.3 million net new jobs around the world by 2030, with the largest gains in electrical efficiency, power generation, automotive, and grid modernization. The recommendations included enhancing skills development and social protection to ensure a just and inclusive transition.

Schumacher, Sands, Tóth, Schumacher, Kober, Chen, Beach, Calderon, Ashina, Fujimori, Saadi Failali, van Vuuren, Kitous, Cofala, Amann, Hasegawa, Heyes, Klimont, Rafaj, Schöpp, Wada, Krey & Riahi (2019) measured the socio-economic footprint of the energy transition at the global and regional levels, using a multi-model framework that integrates energy system models with macroeconomic models. The methodology involved comparing two scenarios: a reference case based on current policies and trends, and a transition case based on achieving the Paris Agreement goals by 2050. The findings showed that the transition case would lead to higher GDP growth, lower air pollution mortality, higher employment levels, lower fossil fuel subsidies, and higher carbon prices than the reference case across the world economy. The recommendations included enhancing policy coherence, fostering innovation, promoting social dialogue, and addressing distributional impacts.

Böhringer, Landis & Tovar Reaños (2019) measured the socio-economic footprint of the energy transition at the global and regional level, using a computable general equilibrium model. The

methodology involved calibrating the model with data from various sources and simulating two scenarios: a reference case based on current policies and projections, and a transition case based on achieving a 2°C target by 2100. The findings showed that the transition case would lead to higher GDP growth, lower fossil fuel imports, lower CO₂ emissions, and higher employment across the world economy. The recommendations included implementing carbon pricing policies, promoting technological innovation and diffusion, and addressing distributional impacts and equity concerns.

Ferroukhi, Onuoha, Zeydler, Reiner & El-Katiri (2022) explored the potential of renewable energy sources to transform Africa's energy sectors and create jobs and inclusive growth. The study used a qualitative approach based on literature review, interviews, and case studies from various African countries. The findings showed that renewable energy can provide access to electricity for millions of people, reduce greenhouse gas emissions, enhance energy security, and create opportunities for local value creation and employment. The study also identified some challenges and barriers to scaling up renewable energy deployment, such as financing, policy frameworks, skills development, and social acceptance. The study recommended that African governments adopt integrated energy planning, strengthen regional cooperation, mobilize public and private investment, foster innovation and entrepreneurship, and ensure a just transition for workers and communities.

Gueye (2018) examined the implications of Africa's energy transition for decent work and sustainable development. The study used a mixed-methods approach combining quantitative analysis of energy scenarios and employment projections with qualitative analysis of policy frameworks and stakeholder perspectives. The findings revealed that Africa's energy transition can generate net positive employment effects in the renewable energy sector and related industries, while reducing the dependence on fossil fuels and improving environmental quality. The study also highlighted some key challenges and gaps in skills, education, social dialogue, social protection, and governance that need to be addressed to ensure a fair and inclusive energy transition. The study suggested that African countries adopt a holistic approach to energy transition that integrates economic, social, and environmental dimensions and involves all relevant actors.

3.0 METHODOLOGY

The study adopted a desktop research methodology. Desk research refers to secondary data or that which can be collected without fieldwork. Desk research is basically involved in collecting data from existing resources hence it is often considered a low cost technique as compared to field research, as the main cost is involved in executive's time, telephone charges and directories. Thus, the study relied on already published studies, reports and statistics. This secondary data was easily accessed through the online journals and library.

4.0 FINDINGS

Our study presented both a contextual and methodological gap. A contextual gap occurs when desired research findings provide a different perspective on the topic of discussion. For instance, Böhringer, Landis & Tovar Reaños (2019) measured the socio-economic footprint of the energy transition at the global and regional level, using a computable general equilibrium model. The methodology involved calibrating the model with data from various sources and simulating two scenarios: a reference case based on current policies and projections, and a transition case based on achieving a 2°C target by 2100. The findings showed that the transition case would lead to higher GDP growth, lower fossil fuel imports, lower CO₂ emissions, and higher employment across the world economy. The recommendations included implementing carbon pricing policies, promoting technological innovation and diffusion, and addressing distributional impacts and equity concerns. On the other hand, our current study focused on the energy transition and its impact of employment rates in East Africa.

Secondly, a methodological gap also presents itself, for example, in their study on the socio-economic footprint of the energy transition at the global and regional level; Böhringer, Landis & Tovar Reaños (2019) used a computable general equilibrium model. The methodology involved calibrating the model with data from various sources and simulating two scenarios: a reference case based on current policies and projections, and a transition case based on achieving a 2°C target by 2100. Whereas, our study on energy transition and its impact of employment in East Africa adopted a desktop research method.

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

The study on "Energy Transition and its Impact on Employment in East Africa" has shed light on the multifaceted relationship between the shift towards cleaner and more sustainable energy sources and employment dynamics in the region. As the countries of East Africa navigate the challenges and opportunities presented by the energy transition, several key findings have emerged, offering valuable insights and recommendations for policymakers, businesses, and communities.

First and foremost, the study highlighted the potential for the energy transition to be a catalyst for employment growth in East Africa. With an abundant supply of renewable energy resources, such as solar, wind, and hydropower, the region possesses the capacity to generate substantial job opportunities in the renewable energy sector. Investments in infrastructure, manufacturing, installation, and maintenance of renewable energy technologies have the potential to create a diversified and skilled workforce. This is particularly significant in a region where youth unemployment rates have been persistently high, offering the promise of employment for a burgeoning population.

Furthermore, the study emphasized the importance of targeted policies and initiatives to harness the full employment potential of the energy transition. Governments in East Africa have a crucial role to play in creating an enabling environment through regulatory frameworks, incentives, and investment in human capital development. Programs that focus on skills training, education, and capacity building in renewable energy technologies can bridge the gap between workforce readiness and industry demands, ensuring that the region maximizes the job creation potential of the transition.

However, it is essential to acknowledge that the energy transition is not without its challenges. The study highlighted the potential for job displacement in traditional energy sectors, such as coal and oil, as the region shifts towards cleaner energy sources. Addressing the social and economic impacts on communities dependent on these industries is a critical aspect of a just and equitable transition. Strategies for retraining, reskilling, and supporting workers in transitioning to new employment opportunities must be prioritized to mitigate negative consequences.

In conclusion, the energy transition presents a significant opportunity for East Africa to address its energy needs, combat climate change, and create employment opportunities for its growing population. However, realizing the full potential of this transition requires a coordinated effort from governments, businesses, and civil society. Policies and investments should be designed to ensure that the benefits are inclusive, reaching all segments of society, including women and marginalized communities. By addressing the challenges and leveraging the opportunities of the energy transition, East Africa can not only achieve its energy and environmental goals but also contribute to sustainable economic development and improved livelihoods for its people. This study serves as a foundation for further research and policy action in this critical area, emphasizing the need for a holistic and equitable approach to the energy transition in East Africa.

5.2 Recommendations

Invest in Workforce Development and Training Programs: To maximize the employment benefits of the energy transition in East Africa, governments, NGOs, and the private sector should invest in

workforce development and training programs. These programs should focus on building the necessary skills and expertise in renewable energy technologies, energy efficiency, and related fields. Tailored training initiatives should target both urban and rural populations to ensure broad-based participation in the emerging clean energy job market.

Promote Gender-Inclusive Employment Strategies: Recognize the importance of gender diversity and inclusivity in the energy transition. Studies have shown that women are underrepresented in the renewable energy sector. Recommendations should emphasize the need to implement policies and initiatives that encourage the participation and advancement of women in clean energy industries. This includes mentorship programs, scholarships, and support for female entrepreneurs in the sector.

Facilitate Just Transition Mechanisms: Acknowledge that the energy transition may result in job displacement in traditional energy sectors such as coal or oil. Therefore, it is essential to implement "Just Transition" mechanisms that ensure the rights and livelihoods of affected workers are protected. These mechanisms should include income support, job retraining, and assistance for transitioning to new employment opportunities in renewable energy or other sectors.

Support Community-Based Renewable Energy Projects: Encourage the development of community-based renewable energy projects that involve local populations in decision-making processes and job creation. These projects can lead to more equitable distribution of employment opportunities, stimulate local economic development, and enhance energy access in underserved areas.

Foster Public-Private Partnerships: Promote collaboration between governments, the private sector, and civil society to drive investments in clean energy infrastructure and job creation. Public-private partnerships can help mobilize resources, create favorable investment environments, and accelerate the growth of the renewable energy sector in East Africa.

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