

Accelerating Energy Transition in East Africa

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Abstract

Energy is a fundamental human right and a prerequisite for the attainment of almost all socio-economic rights. Access to energy can spur economic development and poverty eradication. However, despite the importance of energy access, most people especially in Sub-Saharan Africa lack access to affordable, reliable, and modern energy services. The energy sector is also the main cause of climate change due to burning of fossil fuels such as coal, oil and gas. Accelerating energy transition is crucial in addressing these challenges. This paper discusses the need to accelerate energy transition in East Africa. It conceptualizes energy transition and highlights its key components. The paper further examines the progress made towards achieving energy transition in East Africa. It also interrogates the prospects and challenges facing energy transition in East Africa and suggests measures towards accelerating this agenda.

1.0 Introduction

Energy is a fundamental human need and the driving force of human development¹. It is a basic human need that has been equated to food, air and water². Energy has the potential to spur economic development and poverty eradication³. It has correctly been noted that energy can accelerate the attainment of socioeconomic rights such as the right

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¹ Guruswamy. L, 'Energy Justice and Sustainable Development' *Colorado Journal of International Environmental Law & Policy*, Volume 21, No. 2.

² Goldthau. A & Sovacool. B., 'The Uniqueness of the Energy Security, Justice and Governance Problem' *Energy Policy*, 41 (2012) 232-240

³ Muigua. K., 'Access to Energy as a Constitutional Right in Kenya', available at <http://kmco.co.ke/wp-content/uploads/2018/08/Access-to-Energy-as-a-Constitutional-Right-inKenya-NOVEMBER-2013.pdf> (Accessed on 14/03/2024)

to food, the right to education, the right to health, the right to water among other fundamental human rights⁴. According to the International Energy Agency (IEA), modern energy services are crucial to human well-being and to a country's economic development⁵. IEA notes that access to modern energy is essential for the provision of clean water, sanitation and healthcare and for the provision of reliable and efficient lighting, heating, cooking, mechanical power, transport and telecommunications services which are vital elements of economic development⁶. Further, the United Nations asserts that our everyday life depends on reliable and affordable energy⁷. It further points out that a well-established energy system supports all sectors: from businesses, medicine and education to agriculture, infrastructure, communications and high technology⁸.

Due to its importance, access to energy has been described as a fundamental human right⁹. According to IEA, energy access entails a household having reliable and affordable access to both clean cooking facilities and to electricity, which is enough to supply a basic bundle of energy services initially, and then an increasing level of electricity over time to reach the regional average¹⁰. Energy access therefore entails the availability of affordable, reliable and modern energy services¹¹. Access to energy drives industrialization, boosts productivity and economic growth, spurs human development, and is crucial to achieve almost all of the United Nations Sustainable Development Goals (SDGs)¹². Further, access to energy has been described as a pre-condition for socio-economic development due to

⁴ The World Bank, 'Sustainable Development Goal on Energy (SDG7) and the World Bank Group', available at <https://www.worldbank.org/en/topic/energy/brief/sustainable-development-goal-on-energy-sdg7-and-the-world-bank-group> (Accessed on 14/03/2024)

⁵ International Energy Agency., 'Defining Energy Access: 2020 Methodology' Available at <https://www.iea.org/articles/defining-energy-access-2020-methodology> (Accessed on 14/03/2024)

⁶ Ibid

⁷ United Nations., 'Affordable and Clean Energy' Available at <https://www.un.org/sustainabledevelopment/energy/> (Accessed on 14/03/2024)

⁸ Ibid

⁹ Muigua. K., 'Access to Energy as a Constitutional Right in Kenya', Op Cit

¹⁰ International Energy Agency., 'Defining Energy Access: 2020 Methodology' Op Cit

¹¹ Ibid

¹² Muigua. K., 'Fostering Energy Justice in Africa' Available at <https://kmco.co.ke/wp-content/uploads/2023/11/Fostering-Energy-Justice-in-Africa.pdf> (Accessed on 14/03/2024)

its potential to spur economic development and poverty eradication¹³. On the other hand, lack of access to energy contributes to poverty and deprivation and can contribute to economic decline¹⁴. It has been argued that no country in the recent past has been able to spur economic development and substantially reduce poverty levels without ensuring access to energy¹⁵.

Several challenges hinder access to energy at the global, regional, and national levels¹⁶. It has been noted that many people across the world lack access to clean energy sources such as electricity and use polluting, inefficient fuels such as firewood for household chores such as cooking¹⁷. This challenge is especially prevalent in Sub-Saharan Africa where majority of the population lack access to clean and affordable energy and depend on traditional fuels¹⁸. According to the IEA, Sub-Saharan Africa which includes the East African Region accounts for approximately 80 per cent of people lacking electricity access¹⁹. Access to energy therefore represents one of Africa's greatest obstacles to social and economic development²⁰. In addition, the energy sector is by far the main contributor to the global threat of climate change and accounts for approximately 73 percent of

¹³ United Nations Development Programme., 'Energy Access.' Available at <https://www.undp.org/energy/our-work-areas/energy-access> (Accessed on 14/03/2024)

¹⁴ Bradbrook. A., 'Access to Energy Services in a Human Rights Framework.' Available at https://www.un.org/esa/sustdev/sdissues/energy/op/parliamentarian_forum/bradbrook_hr.pdf (Accessed on 14/03/2024)

¹⁵ Yoshida. T., & Zusman. E., 'Achieving the Multiple Benefits of a Sustainable Development Goal for Energy' Available at https://iges.or.jp/en/publication_documents/pub/bookchapter/en/4934/08_Ch8_Achieving_the_SDG (Accessed on 14/03/2024)

¹⁶ Muigua. K., 'Muigua. K., 'Towards Energy Justice in Kenya.' Available at <http://kmco.co.ke/wpcontent/uploads/2020/02/Towards-Energy-Justice-in-Kenya-00000005.pdf> (Accessed on 14/03/2024)

¹⁷ Ibid

¹⁸ Bildirici. M & Ozaksoy.F., 'Woody Biomass Energy Consumption and Economic Growth in SubSaharan Africa' *Procedia Economics and Finance* 38 (2016) 287 – 293

¹⁹ International Energy Agency., 'Africa Energy Outlook 2022' Available at <https://iea.blob.core.windows.net/assets/220b2862-33a6-47bd-81e900e586f4d384/AfricaEnergyOutlook2022.pdf> (Accessed on 14/03/2024)

²⁰ Hafner. M., 'The Challenge of Energy Access in Africa.' Available at https://link.springer.com/chapter/10.1007/978-3-319-92219-5_1 (Accessed on 14/03/2024)

human caused greenhouse gases²¹. It has been noted that for many decades, fossil fuels such as coal, oil and gas have been major sources of electricity production, but burning these fuels produces large amounts of greenhouse gases which cause climate change and have harmful impacts on people's well-being and the environment²². In light of these concerns, it has been correctly noted that there is need accelerate energy transition at all levels²³.

This paper discusses the need to accelerate energy transition in East Africa. It conceptualizes energy transition and highlights its key components. The paper further examines the progress made towards achieving energy transition in East Africa. It also interrogates the prospects and challenges facing energy transition in East Africa and suggests measures towards accelerating this agenda.

2.0 Conceptualizing Energy Transition

Energy transition has been defined as the shift in the global energy sector from fossil-based systems of energy production and consumption including oil, natural gas and coal to renewable energy sources like wind and solar²⁴. In addition, it has been noted that the energy transition concerns the shift from fossil fuels to renewable energy sources in an effort to reduce carbon dioxide emissions²⁵. Energy transition therefore involves the long-term structural change to energy systems from fossil-fuel based systems to cleaner and sustainable systems such as renewable sources of energy²⁶. It is a continuing process

²¹ United Nations., 'Affordable and Clean Energy' Op Cit

²² Ibid

²³ Muigua. K., 'Accelerating Energy Transition in Kenya' Available at <https://kmco.co.ke/wp-content/uploads/2023/09/Accelerating-Energy-Transition-in-Kenya.pdf> (Accessed on 14/03/2024)

²⁴ S & P Global., 'What is Energy Transition?' Available at <https://www.spglobal.com/en/researchinsights/articles/what-is-energy-transition> (Accessed on 14/03/2024)

²⁵ Deloitte., 'The Energy Transition Explained.' Available at <https://www2.deloitte.com/nl/nl/pages/energy-resources-industrials/articles/future-of-energyfaq.html> (Accessed on 14/03/2024)

²⁶ Nalule. V., & Leal-Arcas. R., 'Energy Decentralization and Energy Transition in Poland.' *Electricity Decentralization in the European Union* 2nd Edition., 2023 pp 209-240

requiring long-term energy strategies and planning, with a country-tailored focus on applying appropriated energy technologies to reach net-zero emissions²⁷.

It has been noted that the idea of energy transition addresses how humankind uses energy for its needs and reconciles it with environmental, social, environmental, and economic interests²⁸. Energy transition is not only concerned about the technology change from fossil fuels to renewables but also focuses on the social, economic, and environmental aspects of the development of clean energies²⁹. As a result, it has been posited that energy transition should entail an integrated, people-centred approach, in which all available energy technologies play their important role in transforming local and national energy systems³⁰. Further, there is need for a just energy transition which integrates increased action on governance, social protection and gender equality as nexus area to technological innovation and financial requirements³¹.

It has been noted that several factors may stimulate the transition from reliance on one major energy resource to another³². These factors include the depletion or shortage of local or regional energy supplies and resources³³; increase in costs of one energy source followed by a corresponding decrease in the cost of another energy sources³⁴; adverse environmental and health impacts of one energy source such as air and water pollution creating the desirability of alternative sources of energy³⁵; and technological change and

²⁷ United Nations Development Programme., 'Energy Transition' Available at <https://www.undp.org/energy/our-work-areas/energy-transition#:~:text=Annual%20energy%2Drelated%20CO2%20emissions,90%25%20of%20the%20necessar y%20reduction.> (Accessed on 14/03/2024)

²⁸ Ibid

²⁹ Ibid

³⁰ Ibid

³¹ Ibid

³² Solomon. B., & Krishna. K., 'The Coming Sustainable Energy Transition: History, Strategies, and Outlook.' Energy Policy 39 (2011) 7422-7431

³³ ibid

³⁴ ibid

³⁵ ibid

innovation resulting in more efficient sources of energy³⁶. Energy transition is therefore usually determined by factors such as the availability of energy resources, the costs of obtaining energy resources as well as their usefulness, and in recent years, by efforts to protect the climate³⁷.

The need for energy transition has in the recent past been necessitated by threat of climate change and increasing scarcity and expense of petroleum³⁸. As a result, the world community is compelled to transition to sustainable energy systems as well as to better manage energy demand and supply³⁹. According to IEA, energy transition offers many benefits including new industrial opportunities and jobs, greater energy security, cleaner air, universal energy access and a safer climate for everyone⁴⁰. It is therefore necessary to accelerate energy transition for prosperity and a safer planet.

3.0 Legal Framework on Energy Transition

The need for energy transition at the global level is enshrined under the *United Nations Framework Convention on Climate Change (UNFCCC)*⁴¹. According to UNFCCC, countries whose economies are highly dependent on income generated from the production, processing and export, and/or on consumption of fossil fuels and associated energy intensive products are highly vulnerable to climate change⁴². It urges all countries and especially developing countries which are still highly dependent on fossil fuels to explore the possibilities for achieving greater energy efficiency and for controlling greenhouse

³⁶ *ibid*

³⁷ Nalule. V., & Leal-Arcas. R., 'Energy Decentralization and Energy Transition in Poland.' *Op Cit*

³⁸ Solomon. B., & Krishna. K., 'The Coming Sustainable Energy Transition: History, Strategies, and Outlook.' *Op Cit*

³⁹ *ibid*

⁴⁰ International Energy Agency., 'The Energy World is Set to Change Significantly by 2030, Based on Today's Policy Settings Alone' Available at <https://www.iea.org/news/the-energy-world-is-set-to-change-significantly-by-2030-based-on-today-s-policy-settings-alone> (Accessed on 14/03/2024)

⁴¹ United Nations Framework Convention on Climate Change., United Nations 1992, Available at https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveg.pdf (Accessed on 14/03/2024)

⁴² *Ibid*, article 4

gas emissions in general, including through the application of new technologies in the energy sector such as *renewable energy* on terms which make such an application economically and socially beneficial⁴³. UNFCCC therefore sets the global agenda for energy transition as part of the efforts towards confronting climate change.

The *Paris Agreement*⁴⁴ also embraces the idea of energy transition. This Agreement seeks to strengthen the global response to the threat of climate change, in the context of Sustainable Development and efforts to eradicate poverty, including by holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change⁴⁵. In order to achieve its objectives, the Paris Agreement acknowledges the need to promote *universal access to sustainable energy* in developing countries, in particular in Africa, through the enhanced deployment of *renewable energy*⁴⁶. The Paris Agreement therefore envisages the transition from fossil fuels to clean energy sources including renewable energy in order to reduce global greenhouse gas emissions and strengthen the global response on climate change⁴⁷. Implementation of the Paris Agreement is necessary in accelerating global energy transition and shifting towards a net-zero emissions world⁴⁸.

Global energy transition is also envisioned under the United Nations *2030 agenda for Sustainable Development*⁴⁹. SDG 7 seeks to ensure access to *affordable, reliable, sustainable and*

⁴³ Ibid

⁴⁴ Paris Agreement., United Nations, 2015., Available at https://unfccc.int/sites/default/files/english_paris_agreement.pdf (Accessed on 14/03/2024)

⁴⁵ *ibid*, article 2 (1) (a)

⁴⁶ *ibid*, Preamble

⁴⁷ *ibid*

⁴⁸ United Nations., 'The Paris Agreement.' Available at <https://www.un.org/en/climatechange/parisagreement> (Accessed on 14/03/2024)

⁴⁹ United Nations General Assembly., 'Transforming Our World: the 2030 Agenda for Sustainable Development.' 21 October 2015, A/RES/70/1., Available at

modern energy for all⁵⁰. Among the targets under SDG 7 include ensuring universal access to affordable, reliable and modern energy services⁵¹; substantially increasing the share of renewable energy in the global energy mix⁵²; doubling the global rate of improvement in energy efficiency⁵³; and enhancing international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology⁵⁴. It has been noted that achieving the targets under SDG 7 means investing in clean energy sources such as solar, wind and thermal⁵⁵. It also calls for expanding infrastructure and upgrading technology to provide clean energy in all developing countries which is a crucial goal that can both encourage economic development and environmental sustainability⁵⁶. Realizing the targets under SDG 7 is therefore crucial in accelerating energy transition.

At the continental level, Africa Union's *Agenda 2063*⁵⁷ sets out the need for energy transition in Africa. According to Agenda 2063, the Continent faces enormous energy challenges which include low generation capacity and efficiency, high costs, unstable and unreliable energy supplies, low access to modern energy, insufficient energy infrastructure, and lack of institutional and technical capacity to harness huge resources partly due to dependence on fossil fuels for generation of electricity⁵⁸. Among the aspirations under Agenda 2063 is to create environmentally sustainable and climate resilient economies and communities in Africa through measures such as the adoption of

<https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf> (Accessed on 14/03/2024)

⁵⁰ ibid

⁵¹ ibid

⁵² ibid

⁵³ ibid

⁵⁴ Ibid

⁵⁵ United Nations., 'Affordable and Clean Energy' Op Cit

⁵⁶ Ibid

⁵⁷ Africa Union., 'Agenda 2063: The Africa we Want.' Available at https://au.int/sites/default/files/documents/33126-doc-framework_document_book.pdf (Accessed on 14/03/2024)

⁵⁸ Ibid

renewable sources of energy⁵⁹. Agenda 2063 portrays the vision of a Continent where renewable energy including wind, solar, hydro, bioenergy, ocean tidal waves, geothermal and other renewables will claim more than half of the energy consumption for households, businesses and organizations⁶⁰. It is necessary to implement the aspirations of Agenda 2063 in order to realize energy transition in Africa.

The *East African Community Climate Change Policy*⁶¹ also seeks to foster energy transition with the East African Community (EAC). The policy acknowledges that energy is the driver of social and economic development in the EAC region⁶². It also notes that most of the EAC partner states depend on imported fossil based fuel (oil)⁶³. The Policy further acknowledges that the use of fossil oil is unsustainable due to its high emission factor that is a major contributor to global warming and climate change⁶⁴. As a result, the Policy seeks to increase the *availability and accessibility of sustainable, reliable and affordable renewable energy resources* in the EAC and urges member states to embrace measures such as scaling up investment in renewable energy technologies to provide access to affordable cleaner energy; improving efficiency in use of biomass energy especially for rural communities; developing appropriate alternative energy sources, policies and measures to increase energy efficiency; devising a precautionary approach to the development of bio-fuels for mitigation and energy in view of food security issues; and improving energy efficiency and promoting clean energy technologies including hydropower, solar and wind⁶⁵. Implementing the vision of this policy can therefore accelerate energy transition in East Africa.

⁵⁹ Ibid

⁶⁰ Ibid

⁶¹ East African Community., 'EAC Climate Change Policy Framework.' Available at <https://www.eac.int/environment/climate-change/eac-climate-change-policy-framework> (Accessed on 14/03/2024)

⁶² Ibid

⁶³ Ibid

⁶⁴ Ibid

⁶⁵ Ibid

At a national level, the *Energy Act*⁶⁶ of Kenya embraces the transition from fossil fuels to clean energy sources including renewable energy. The Act defines renewable energy as non-fossil energy generated from natural non-depleting resources including but not limited to solar energy, wind energy, biomass energy, biological waste energy, hydro energy, geothermal energy and ocean and tidal energy⁶⁷. The Energy Act urges the state to develop, promote and manage the use of renewable sources of energy in Kenya and to this end it establishes the Rural Electrification and Renewable Energy Corporation which is tasked to fulfill that mandate⁶⁸. In addition, the *National Energy Policy*⁶⁹ identifies key challenges in the energy sector in Kenya including reliance on fossil fuels which results in high electricity costs and environmental degradation as exemplified by increased local air pollution and acid precipitation from ever growing fossil fuel combustion⁷⁰. The Policy also acknowledges that depletion of energy resources including fossil fuels is a major concern in the energy sector in Kenya⁷¹. It urges the country to transition towards renewable sources of energy⁷². The Policy correctly notes that renewable energy which derived from the naturally occurring resources including geothermal, hydro, solar, wind, ocean energy, biomass, biofuels, biogas and municipal waste can supply the country's energy needs and those of future generations in a sustainable way if effectively harnessed through careful planning and advanced technology⁷³. Further, the Policy asserts that renewable energy has potential to enhance energy security, mitigate climate change, generate income, create employment and generate foreign exchange savings⁷⁴. The *Climate Change Act*⁷⁵ of Kenya also requires the state to embrace climate change response

⁶⁶ Energy Act., No. 1 of 2019., Laws of Kenya., Government Printer, Nairobi

⁶⁷ Ibid, S 2

⁶⁸ Ibid, S 43 & 44

⁶⁹ Ministry of Energy., 'National Energy Policy.' Available at https://kplc.co.ke/img/full/BL4PdOqKtxFT_National%20Energy%20Policy%20October%20%202018.pdf (Accessed on 14/03/2024)

⁷⁰ Ibid

⁷¹ Ibid

⁷² Ibid

⁷³ Ibid

⁷⁴ Ibid

⁷⁵ Climate Change Act., No. 11 of 2016., Laws of Kenya., Government Printer, Nairobi

measures and actions such as enhancing energy conservation, efficiency and use of renewable energy in industrial, commercial, transport, domestic and other uses in order to strengthen the country's response to climate change⁷⁶. There is need to accelerate energy transition in Kenya in order to reap from the immense opportunities offered by clean sources of energy including renewable energy.

4.0 Energy Transition in East Africa: Progress and Challenges

There has been some progress towards energy transition in East Africa. It has been noted that the greater Horn of Africa's region's power sector has doubled its output over the past decade, and is one of the world's most renewable systems today, with over eight five per cent of generation coming from renewables⁷⁷. Further, large hydropower projects in countries including Ethiopia, Sudan, and Kenya dominate the power mix today⁷⁸. According to IEA, rates of access to electricity in the greater Horn of Africa have improved considerably since 2000⁷⁹. It points out that then, one in ten people had access to electricity, whereas today, it is one in two, which is comparable to the sub-Saharan Africa average (excluding South Africa)⁸⁰. It has also been observed that East African countries including Kenya and Rwanda are on track to achieve full universal access to affordable electricity by 2030, offering success stories other countries can follow⁸¹.

East African Countries are also undertaking to transition their energy sectors in their climate change commitments. For example, Kenya in its updated Nationally Determined Contribution (NDC) aims to foster a low carbon, climate resilient development pathway through measures such as enhancing access to clean, efficient and sustainable energy

⁷⁶ Ibid, S 13 (3) (j)

⁷⁷ International Energy Agency., 'Clean Energy Transitions in the Greater Horn of Africa' Available at <https://www.iea.org/reports/clean-energy-transitions-in-the-greater-horn-of-africa/executive-summary> (Accessed on 15/03/2024)

⁷⁸ Ibid

⁷⁹ Ibid

⁸⁰ Ibid

⁸¹ International Energy Agency., 'Africa Energy Outlook 2022' Available at <https://iea.blob.core.windows.net/assets/220b2862-33a6-47bd-81e900e586f4d384/AfricaEnergyOutlook2022.pdf> (Accessed on 15/03/2024)

technologies to reduce over-reliance on fossil and non-sustainable biomass fuels⁸². The NDC acknowledges that Kenya has abundant renewable energy resources such as geothermal, solar, wind and hydro for electricity generation which need to be developed in order to strengthen the country's response to climate change⁸³. Further, Uganda in its updated NDC seeks to develop and promote a clean and resilient energy system⁸⁴. Under the updated NDC, Uganda commits to achieve a climate-resilient energy sector through measures such as improving access and utilization of electricity from sustainable sources; promoting use of renewable energy sources and energy efficient technologies; and increasing access to clean energy cooking technologies⁸⁵. It is necessary to achieve such targets in order to accelerate energy transition in East Africa.

Despite the foregoing efforts, it has been noted that there is still a long way to go to achieve universal electricity access in the greater Horn of Africa, with half its population still lacking access⁸⁶. Further, disparities among countries in electricity access are wide⁸⁷. For example, Kenya has an access rate of nearly eighty per cent, Eritrea and Ethiopia have access rates of fifty per cent, while South Sudan has an access rate of only ten per cent⁸⁸. Further, most people in East Africa and the greater Horn of Africa region rely on traditional cooking fuels, with few countries having national clean cooking rates exceeding ten per cent⁸⁹. In addition, it has been noted that frequent price spikes in liquefied petroleum gas (LPG) are pushing many households to return to cooking with polluting fuels like charcoal or other gathered traditional biomass⁹⁰.

⁸² Republic of Kenya., 'Updated Nationally Determined Contribution' Available at <https://unfccc.int/sites/default/files/NDC/2022-06/Kenya%27s%20First%20NDC%20%28updated%20version%29.pdf> (Accessed on 15/03/2024)

⁸³ Ibid

⁸⁴ Republic of Uganda., 'Updated Nationally Determined Contribution' Available at <https://unfccc.int/sites/default/files/NDC/2022-09/Updated%20NDC%20Uganda%202022%20Final.pdf> (Accessed on 15/03/2024)

⁸⁵ Ibid

⁸⁶ International Energy Agency., 'Clean Energy Transitions in the Greater Horn of Africa' Op Cit

⁸⁷ Ibid

⁸⁸ Ibid

⁸⁹ International Energy Agency., 'Africa Energy Outlook 2022' Op Cit

⁹⁰ Ibid

Despite these challenges, there are immense opportunities for energy transition in East Africa. The region has massive yet under-utilised potential for solar, wind, and geothermal energy⁹¹. Further, it has been pointed out that in East Africa, solar irradiation levels are high due to proximity to the equator, wind speeds are some of the strongest on the continent, hydropower resources are plentiful and the Great Rift Valley is a promising source for geothermal power⁹². It is therefore necessary to effectively harness these sources of energy in order to accelerate energy transition in East Africa.

5.0 Way Forward

In order to accelerate energy transition in East Africa, there is need for continuous adoption and investments in renewable sources of energy such as wind, solar, hydropower, geothermal and tidal energy⁹³. The region has an abundance of renewable sources of energy including solar, wind, hydropower, and geothermal energy⁹⁴. The economic, societal and environmental benefits of renewable sources of energy are numerous⁹⁵. These sources of energy are available in abundance, cheaper and are a healthier option for people and the planet⁹⁶. In addition, generating renewable energy creates far lower emissions than burning fossil fuels which is very vital in confronting climate change⁹⁷. Transitioning from fossil fuels, which currently account for the lion's share of global greenhouse gas emissions, to renewable energy is key to addressing the climate crisis in East Africa and across the globe⁹⁸. It is therefore necessary to embrace

⁹¹ International Energy Agency., 'Clean Energy Transitions in the Greater Horn of Africa' Op Cit

⁹² Gordon. E., 'The Politics of Renewable Energy in East Africa' Available at <https://www.oxfordenergy.org/publications/politics-renewable-energy-east-africa/> (Accessed on 15/03/2024)

⁹³ Muigua. K., 'Accelerating Energy Transition in Kenya' Op Cit

⁹⁴ Ibid

⁹⁵ Ibid

⁹⁶ United Nations., 'Climate Action.' Available at <https://www.un.org/en/climatechange/howcommunities-are-embracing-renewable-energy> (Accessed on 15/03/2024)

⁹⁷ United Nations., 'What is Renewable Energy?.' Available at <https://www.un.org/en/climatechange/what-is-renewable-energy> (Accessed on 15/03/2024)

⁹⁸ Ibid

renewable energy in East Africa. Despite the vast potential of renewable energy in East Africa, it has been noted that current investments are insufficient to meet the region's energy access needs⁹⁹. It is therefore necessary to enhance public and private investments in renewable energy in order to accelerate energy transition in East Africa¹⁰⁰. Further, it is important to strengthen local financial institutions and instruments in order to catalyse resources for renewable energy projects¹⁰¹.

In addition, it is vital to enhance access to electricity in East Africa¹⁰². It has been noted that nearly half of the population in the region lacks access to electricity¹⁰³. Lack of electricity can have serious consequences for people's health and livelihoods in East Africa¹⁰⁴. For example, food cannot be kept fresh in refrigerators while hospitals that lack electricity cannot power medical devices and to refrigerate vaccines¹⁰⁵. It also impacts learning¹⁰⁶. Lack of access to electricity often results in households and institutions relying on generators which pollute the environment and can be costly to run¹⁰⁷. It is therefore necessary to enhance access to electricity in the region through measures such as rural electrification programmes since a large majority of the population in East Africa lives in rural areas¹⁰⁸.

⁹⁹ Organisation for Economic Co-operation and Development., 'Investing in Renewable Energies for East Africa's Sustainable Development' Available at <https://www.oecd-ilibrary.org/sites/4479950d-en/index.html?itemId=/content/component/4479950d-en#:~:text=In%202021%2C%20renewable%20energy%20thus,bioenergy%2C%20wind%20and%20solar%20power.> (Accessed on 15/03/2024)

¹⁰⁰ Ibid

¹⁰¹ Ibid

¹⁰² International Energy Agency., 'Clean Energy Transitions in the Greater Horn of Africa' Op Cit

¹⁰³ Ibid

¹⁰⁴ AFD., 'Boosting Access to Renewable Energy Across East Africa' Available at <https://www.afd.fr/en/actualites/boosting-access-renewable-energy-across-east-africa> (Accessed on 15/03/2024)

¹⁰⁵ Ibid

¹⁰⁶ Ibid

¹⁰⁷ Ibid

¹⁰⁸ Hansen. J.M., & Xydis. G., 'Rural Electrification in Kenya: A Useful Case for Remote Areas in Sub-Saharan Africa' *Energy Efficiency*, Volume 13, pp 257-272, (2020)

Further, in order to realize energy transition in East Africa, there is need to enhance energy efficiency and reliability¹⁰⁹. The energy sector in the region is crippled with unreliable electricity supply that often results in frequent power cuts which last for days in some areas¹¹⁰. Such a situation forces most people to resort to alternative sources of energy including bioenergy and generators that are powered by oil products therefore polluting the environment and contributing to the threat of climate change¹¹¹. According to IEA, providing access to electricity is essential, but access has to bring with it a reliable supply of electricity if households, businesses and public services are to reap the full benefits¹¹². Therefore in order to fully realize energy transition in East Africa, it is vital to ensure efficiency and reliability.

It has also been noted that energy transition in East Africa can only be realized with enhanced access to clean cooking facilities¹¹³. Access to clean cooking remains a major problem in the region with a majority of the population especially that in rural areas relying on traditional fuels¹¹⁴. It has been noted that while some East African countries such as Kenya and Rwanda have made notable progress towards enhancing access to electricity, progress remains slow in promoting clean cooking facilities with bio-energy sources such as charcoal and wood fuel still being the most common source of energy for cooking especially among the rural population¹¹⁵. The environmental concerns raised by these sources of energy calls for the adoption of clean sources of energy for cooking¹¹⁶. Access to clean cooking in East Africa is also hindered by high costs of Liquefied

¹⁰⁹ Muigua. K., 'Delivering Clean and Affordable Energy for All' Available at <https://kmco.co.ke/wp-content/uploads/2021/05/Delivering-Clean-and-Affordable-Energy-for-All-Kariuki-Muigua-Ph.D-24th-April-2021-1.pdf> (Accessed on 15/03/2024)

¹¹⁰ Mutiso. R., & Taneja. J., 'The Seven Major Threats to Kenya's Power Sector.' Available at <https://energyforgrowth.org/article/the-seven-major-threats-to-kenyas-power-sector/> (Accessed on 15/03/2024)

¹¹¹ Ibid

¹¹² Ibid

¹¹³ International Energy Agency., 'Clean Energy Transitions in the Greater Horn of Africa' Op Cit

¹¹⁴ Ibid

¹¹⁵ Ibid

¹¹⁶ Muigua. K., 'Muigua. K., 'Towards Energy Justice in Kenya.'

Petroleum Gas which makes this source of energy out for reach for majority of citizens especially the poor rural population¹¹⁷. It has been noted that LPG is able to meet East Africa's clean cooking needs reliably and to scale¹¹⁸. It is therefore necessary for the region to unlock opportunities in driving the uptake of LPG through measures such as expanding the current distribution network, particularly in rural areas; and developing new financing schemes to offset high upfront costs for LPG equipment¹¹⁹.

Finally, there is need to strengthen regional integration in the energy sector in order to accelerate energy transition in East Africa¹²⁰. It has been posited that regional market and infrastructure reforms, coupled with industrial policies and innovative advancements, are preparatory to an increase in the deployment of renewable energy sources in East Africa, and for a subsequent stronger resilience and adaptation to climate change¹²¹. Regional energy systems integration has been identified as a key factor in accelerated development¹²². Energy integration across the borders can be a channel for accelerating progress towards meeting the targets of SDG 7¹²³. It can also be a major step towards relieving a number of the trans-border constraints on the energy sector development and further expand energy trade¹²⁴. It is therefore necessary to deepen regional integration including through regional energy infrastructure projects in order to accelerate energy transition in East Africa¹²⁵.

¹¹⁷ The Exchange., 'East Africa Sets Sights on Becoming a Liquefied Petroleum Gas Hub from 2025' Available at <https://theexchange.africa/investing/liquefied-petroleum-gas-hub/#:~:text=The%20role%20of%20LPG%20in,LPG%20uptake%20across%20East%20Africa>. (Accessed on 15/03/2024)

¹¹⁸ Ibid

¹¹⁹ Ibid

¹²⁰ Organisation for Economic Co-operation and Development., 'Investing in Renewable Energies for East Africa's Sustainable Development' Op Cit

¹²¹ Ibid

¹²² Opeyemi. A et al., 'Regional Integration and Energy Sustainability in Africa: Exploring the Challenges and Prospects for ECOWAS' Available at <https://www.econstor.eu/bitstream/10419/227959/1/1682193527.pdf> (Accessed on 15/03/2024)

¹²³ Ibid

¹²⁴ Ibid

¹²⁵ Organisation for Economic Co-operation and Development., 'Investing in Renewable Energies for East Africa's Sustainable Development' Op Cit

6.0 Conclusion

Energy transition entails the shift in the global energy sector from fossil-based systems of energy production and consumption including oil, natural gas and coal to renewable energy sources like wind and solar¹²⁶. Energy transition presents many benefits including new industrial opportunities and jobs, greater energy security, cleaner air, universal energy access and a safer climate for everyone¹²⁷. There has been progress towards energy transition in East Africa with majority of the region's power generation coming from renewables¹²⁸. However, the region is yet to fully realize the ideal of energy transition with half its population still lacking access to electricity and clean cooking facilities¹²⁹. It is therefore necessary to accelerate energy transition in East Africa. This can be achieved through continuous adoption and investments in renewable sources of energy such as wind, solar, hydropower, geothermal and tidal energy¹³⁰; enhancing access to electricity in East Africa¹³¹; fostering energy efficiency and reliability¹³²; promoting access to clean cooking facilities¹³³; and strengthening regional integration in the energy sector¹³⁴. Accelerating energy transition in East Africa is an ideal we must achieve for Sustainable Development.

¹²⁶ S & P Global., 'What is Energy Transition?' Op Cit

¹²⁷ International Energy Agency., 'The Energy World is Set to Change Significantly by 2030, Based on Today's Policy Settings Alone' Op Cit

¹²⁸ International Energy Agency., 'Clean Energy Transitions in the Greater Horn of Africa' Op Cit

¹²⁹ Ibid

¹³⁰ Muigua. K., 'Accelerating Energy Transition in Kenya' Op Cit

¹³¹ International Energy Agency., 'Clean Energy Transitions in the Greater Horn of Africa' Op Cit

¹³² Muigua. K., 'Delivering Clean and Affordable Energy for All' Op Cit

¹³³ International Energy Agency., 'Clean Energy Transitions in the Greater Horn of Africa' Op Cit

¹³⁴ Organisation for Economic Co-operation and Development., 'Investing in Renewable Energies for East Africa's Sustainable Development' Op Cit

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