An Assessment of the Strategies for Energy Transition in Kenya as a Climate Change Mitigation Strategy

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ABSTRACT

Climate change is a global issue affecting communities in different parts of the world. Climate change is associated with extreme weather and climate patterns that affect the general health of the environment and humanity. The causes of climate change are both natural and anthropogenic. The human induced climate change has accelerated the emission of greenhouse gases that in turn cause global warming and climate change. The international community have initiated various interventions to minimize emission of greenhouse gases in order to maintain a healthier environment for sustainable development. One such initiative and/or interventions is the energy transition strategy that involves transition from a purely fossil fuel based to renewable energy-based economy. This paper therefore looks at the energy transition in Kenya. Specifically, the paper covers energy demand and supply, Mt CO2 emission; energy transitions process; constraints and opportunities. Kenya is going through a transition period in the energy sector and at the same time the country is striving to industrialize by the year 2023 being guided by the Country's 2010 Constitution and the Vision 2030 which aims at transforming the country into a middle level economy. It is important that as the country strives to industrialize, the energy that drives the economy should be clean to enhance cleaner energy production. The country is a signatory to the landmark agreement of COP21 held in Paris, France in 2015. The country committed to observe the requirements of the Nationally Determined Contributions (NDCs) to ensure the reduction of emission of greenhouse gases and has put in place various institutional and legal frameworks towards this end. One of the most recent frameworks is the Climate Change Amendment Act, 2023. The main objective of the study is to assess the energy transition process and associated challenges. The study uses an exploratory design and employed descriptive statistics in data analysis. Data was presented in the form of tables, graphs, and themes. The result indicates that energy transition in Kenya is ongoing through specific processes and technologies. The results also confirm existing challenges and recommends sustained effort for sustainable development.

Key Words: Nationally Determined Contributions, Conference of Parties; Carbon Capture; Greenhouse Gases; Mitigation; Carbon Markets

INTRODUCTION

Climate change is a global phenomenon associated with emission of greenhouse gases. Anthropogenic climate change and global warming continues to drive the global temperature conditions beyond the levels associated with natural processes. Human induced change in the global temperature conditions have altered the natural conditions thereby initiating adverse weather patterns that have been witnessed globally. There is global effort towards inventions and innovations associated with technologies in climate change mitigation mechanisms in both developed and developing countries. Developed countries have invested heavily in manufacturing and other economic activities that for a long time have depended on non-renewable energy sources. The developed world has therefore contributed to a great extent to global warming and climate change. On the other hand, developing countries are striving to industrialize and as such have to weigh the options of using renewable and non-renewable sources, noting that manufacturing and/or industrialization require high quality and reliable energy for sustained production, (United Nations, 2023).

Energy transition is a major structural change in the energy sector. The international communities have initiated joint efforts to mitigate processes associated with global warming and climate change. In climate change mitigation, the transition from fossil fuel to clean energy is key in reducing emission levels of greenhouse gases. This is an uphill task due to the fact that almost three quarters of the world's energy needs are currently being met by the burning of fossil fuels. Burning of fossil fuels result in emission of greenhouse gases which are associated climate change and global warming. The parties to the 2015 Paris agreement (COP 21) which is a legally binding international treaty on climate change stressed on the need to reduce greenhouse gas emissions to pre-industrial level, preferably to 1.5 °C. This would in turn minimize adverse effects of climate change in line with the guideline from the United Nations Framework Convention on Climate Change (UNFCCC), (2016).

Investment in technologies for energy transition is significant for both developed and developing countries. This paper is exploring energy transition and associated technologies in the era of climate change. At the 2015 Paris agreement, different countries committed to Nationally Determined Contributions (NDC) to reduce greenhouse gas emission to mitigate climate change. Energy transition has taken place since time immemorial from the traditional society, through the preindustrial era, to the agrarian revolution and finally to the contemporary society. This process has seen the global community move from the use of fossil fuels such as coal, oil and natural gas to the use of more environmentally friendly renewable sources such as hydro-electric power, wind energy, geothermal power, nuclear power, solar energy, among others (Smil, 2010).

The transition from fossil fuels to other environmentally friendly fuels has been gradual. Most developed countries have been able to adapt faster while developing countries still rely on fossil fuel to a large extent. Most countries looking for ways to achieve energy transition embrace the process of electrification of consumption and key sectors, digitalization of both industrial procedures and electricity grids as ways of improving energy efficiency and complete the energy transition, (World Economic Forum, 2019).

Kenya as a developing country has suffered from impacts of climate change with major extremes being floods and drought. Despite the country's negligible contribution to global GHGs emissions of about 1.8% by 2018, the country continues to experience climate change related losses of about 3-5% of Gross Domestic Product (GDP) annually. It has also been noted that Kenya's greenhouse gas emissions have increased from 86.8 MtCO2e in 1995 to 93.7 MtCO2e in 2015 and is likely to increase to 143 MtCO2e by 2030. Also, projections indicate that Kenya's mean annual temperatures are projected to increase by 1˚C to 1.5˚C by 2030, (GoK, 2020).

Kenya has joined the global community to pursue low carbon resilient development pathway to realize her Vision 2030. In order to follow this pathway, Kenya has developed a number of strategies, policies and guidelines for implementation of action plans, climate change mitigation and adaptation. Notable examples of such initiatives include: the National Climate Change Response Strategy (NCCRS), (2010); the National Adaptation Plan (NAP), (2015-2030); National Climate Change Action Plan (NCCAP), (2018-2022); the Third National Inventory Report (NIR 3), Climate Change Act (2016), Climate Change Policy 2016; Medium Term Plans (2013-2017; 2018-1822), Climate Change Amendment Act, 2023; National Climate Change Action Plan 2023-2027; Climate Change (Carbon Markets) Regulation - 2024 and long term Low Emissions Development Strategy 2022-2050, among others. All these are meant to guide low-carbon and climate resilient development in the Country.

In order to sustain the low energy carbon pathway, Kenya will have to employ low carbon transition technologies. Notable energy transition technologies are categorized as energy generation technologies; energy conversion technologies, energy storage technologies, energy transmission technologies as well as energy consumption technologies. This means, energy technologies generate, convert, store and distribute various forms of energy for use in safe and economically responsible and sustainable manner to improve the quality of life. This paper therefore assesses energy demand and supply in Kenya's; Kenya's Mt CO2 emission; as well as selected energy transition processes and technologies used in Kenya as a climate transition strategy towards low carbon emission. The paper also looks at the challenges and strategies to address the challenges as well as opportunities. Kenya Energy Transition and Investment Plan (ETIP)-2023 gives direction and guidelines on energy transition towards attaining Net Zero by 2050 as the economy grows.

Statement of the Problem

Climate change has disrupted natural ecosystems across the globe. Equally, climate change has resulted in adverse impacts on both natural and human ecosystems causing misery and sufferings globally. Human activities associated with the use of fossil fuels continue to emit greenhouse gases into the atmosphere that eventually compromise the health of natural ecosystems. The international community are encouraging energy transition mechanisms as a strategy to minimize emission of greenhouse gases thereby stabilizing the global temperatures. One of the interventions to mitigate climate change is through energy transition mechanisms employed at local, regional and international levels. This paper assesses energy transition interventions and challenges in Kenya for sustainable growth and development.

Objectives

i) To assess status of energy demand and supply in Kenya

ii) To assess Kenya's Mt CO2 Emission by sector based on energy demand and supply

iii) To establish energy transition processes and strategies in Kenya

iv) To establish the constraints and opportunities in energy transition process in Kenya

METHODOLOGY

The study employed qualitative approach involving desktop search that included scrutiny of secondary data and data mining from existing academic and non-academic peer reviewed papers and articles, published academic papers and documents from relevant government bodies and/or parastatals, Institutions and private organizations.

The tool used in secondary data collection was Desktop Search Guide that had columns for each objective and data generated. The data generated was analyzed objective wise. Specifically, data analysis employed the use of descriptive statistics and more so measures of central tendency where the main data features were established. Non-numerical data was presented in the form of themes. Numerical data was presented in the form of statistical tables, graphs and pie charts.

RESULTS AND DISCUSSION

Energy Supply and Consumption/Demand in Kenya

The main physical sources of energy in Kenya include Solar, Wind, Hydro; Geo-Thermal; Bagasse; and Biomass Wood, as shown in Table 1 and Figure 1. Kenya imports energy from different oil producing countries in different forms. These include Electricity, Coal and Coke; Motor Spirit Premium; Aviation Gasoline, Jet Fuel; Illuminating Kerosene, White spirit and Special Boiling Point Industrial Spirits. Others include Light and Heavy Diesel; Gas Oils, Fuel Oils, Lubricating Greases; Other Petroleum Oils; as well as other Liquefied Petroleum Gas (LPG). Energy products are derived from electricity Plants such as Kenya Electricity Generating Company (KenGen); Independent Power Producers (IPPs); Rural Electrification and Renewable Energy Corporation (REREC) and Off Grid Plants. Non-Plant contributions come from local communities in the form of Charcoal and Firewood, among others. The major contributions come from Firewood, Charcoal; KenGen; IPPs and REREC. Table 1 gives summary statistics for physical energy supply in Kenya in 2022 (GoK, 2023).

It is evident from Table 1 and Figure 1 that Biomass wood is dominant in supply of energy in Kenya. Burning of biomass results in the emission of CO^2 which is a significant greenhouse gas associated with global warming and climate change. Kenya is a signatory to the Paris agreement on climate change mitigation through reduction in emissions of greenhouse gases. Based on this trend, Kenya has engaged in processes associated with energy transition to reduce overreliance on fossil fuel, and hence minimize emission of

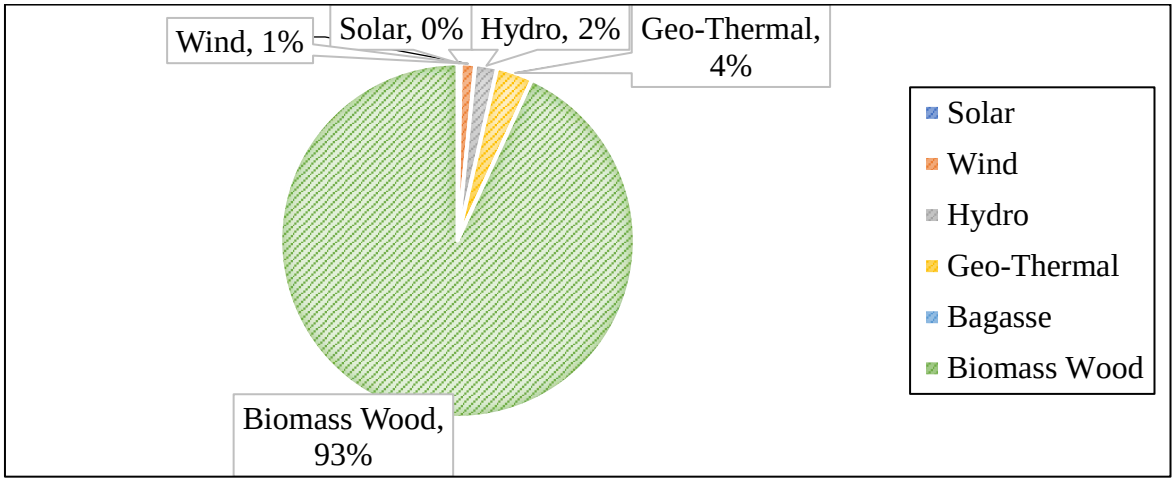
greenhouse gases as a climate change mitigation strategy. The world's average annual energy related carbon footprint is about 4.7 tonnes per person. Kenya's annual emissions growth of CO2 is 394,350.00t. Per Capita emissions for Kenya is at 0.5 tonnes**.** Kenya's global share of emissions is 0.07, (GoK, 2023).

Table 1: Summary Statistics of Physical Energy Supply in Kenya in Terajoule (TJ)

S/No.	Source of Energy	Total Flows from the Environment	Percentage (%) Contribution
1.	Solar	1,381.4	0.3
2.	Wind	7,714.9	1.3
3.	Hydro	10,943.6	2.0
4.	Geo-Thermal	19,863.2	3.3
5.	Bagasse	1.0	0.0002
6.	Biomass Wood	562,953.4	93
Total Natural Inputs		602,857.4	
Total Imports		25,963.53	
Energy Products		590,584.70	
Other		17,978.4	
TOTAL		1,237,384.0	

Source: Updated from Government of Kenya (GoK), Economic Survey, 2023

Figure 1: Summary Statistics of Physical Energy Supply in Kenya in Terajoule (TJ)

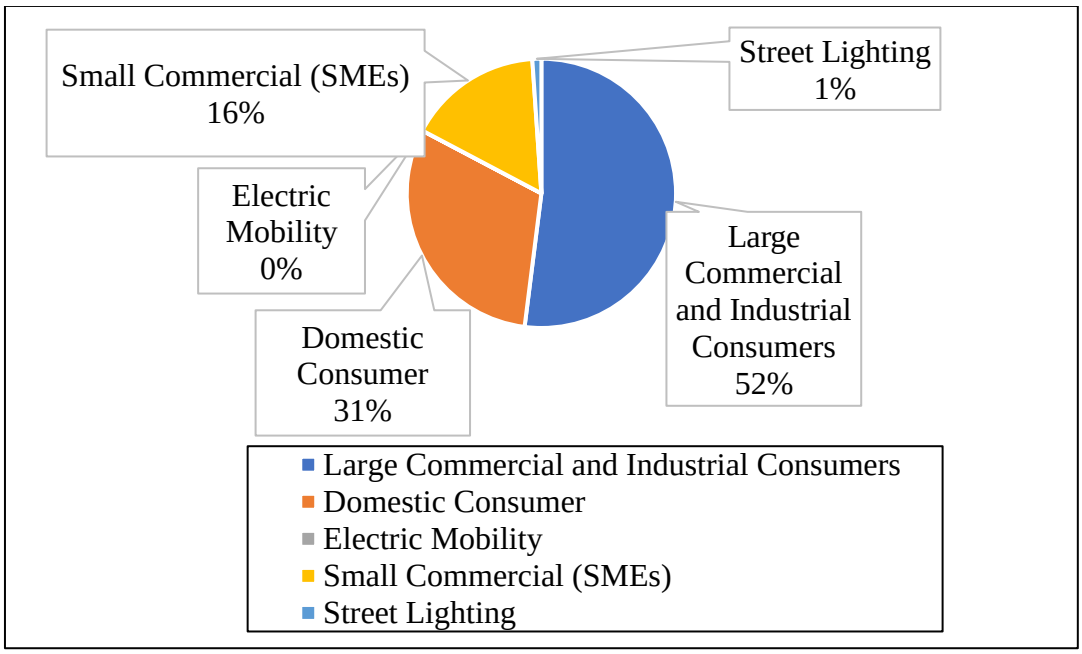


Source: Updated from Government of Kenya (GoK), Economic Survey, 2023

In summary, in 2022, a total of 1,237,384.0TJ of energy was supplied, with 48.7% being extracted from the environment while 2.1% were imported mainly in the form of petroleum fuels. Households and industries transformed 501,616.1TJ of biomass wood to firewood, while KenGen transformed 29.148.5TJ of energy to electricity. In terms of utilization, households utilized 90.0% of all energy mainly in the form of firewood. Overall, 544,975.0TJ of biomass and 36,106.9TJ of electricity were utilized in 2022. In the period 2023/2024, 2,706.62GWh of electrical energy was consumed by large commercial and industrial establishments

accounting for 51.99% of total consumption. Domestic consumption was 1,599.33GWh which also accounted for 30.72% of total energy consumption, small commercial (SMEs) consumers was at 843.04 GWh (16/19%); Electric mobility at 0.32 (0.01%); and street lighting at 56.48 (1.08%). Consumption of energy per sector in the period 2023/2024 is illustrated in Figure 2.

Figure 2: Energy Consumption by Sector in Kenya – 2023/2024 Financial Year;



Source: EPRA, 2024

Through collaboration with USAID, Kenya has embarked on sustained clean energy production by developing and commissioning 691 megawatts (MW) of clean power generation that include: i) 310 MW Lake Turkana Wind Power Project; ii) the 158 MW Olkaria V Geothermal Power Plant; the 83 MW Olkaria 1 Unit 6 Geothermal Power Plant; the 100 MW Kipeto Wind Power Project; as well as the 40 MW Malindi Solar Photovoltaic Power Project. USAID has also created partnerships in climate change intervention financing (EPRA, 2024)

Kenya's Mt Co2 Emission by Sector and Per Capita

Million Tonnes of Carbon Dioxide Equivalent (Mt CO_2) emission in Kenya is based on the various sectors that consume different amounts of energy annually. Table 2 gives a summary of Mt CO_2 emission per sector in Kenya between 2017 to 2022, where Mt CO_2 is an abbreviation of Million Tonnes of carbon dioxide equivalent.

Table 2: Summary of Mt CO_2 Emission Per Sector in Kenya Between 2017 to 2022

S/N	Sector	2017	2018	2019	2020	2021	2022
1.	Agriculture	20	19	19	18	21	23
2.	Processes	17	16	16	17	18	19
3.	Industrial Combustion	5	4	3	2	3	3
4.	Buildings	19	18	18	18	19	20
5.	Transport	14	13	13	12	13	14

Source: GoK, 2023

Energy Transition

Energy transition was coined after the 1973 oil crisis by politicians and the media. The term was globalized after the 1979 second oil shock and specifically during the 1981 United Nations Conference on New and Renewable Sources of Energy (Basosi, 2020; Rogeli, et al, 2019). It has been observed that since 1990s, climate change mitigation has featured prominently in energy transition discourse globally. There is therefore urgent need for energy transition in order to reduce net carbon emissions to enhance the quality of the environment and the people as well as for improving economy of nations across the globe through sustainable growth. The international community through COP21) advocates for limiting global warming associated with climate change to below 2°C. Energy transition should therefore take into consideration limiting carbon emissions through adoption of renewable sources of energy and hence minimizing the use of fossil fuels that have hitherto resulted in the alteration of gaseous composition of the atmosphere resulting in global warming and climate change (UNFCC, 2015; Rogeli, et al., 2019; Jimmy Carter, 1977).

As the world embraces mechanisms associated with energy transition, the call for reorientation of energy policy cannot be ignored. Policy reorientation considers energy production and distribution guidelines and energy saving measures with more emphasis on efficiency (Louis & Fahad, 2020). Historical energy transitions have seen a shift from the use of burning wood to fossil fuels, nuclear, hydroelectric power and other renewable energy sources. However, there has not been a complete overhaul from one system to another as various generations have used a mixture of energy types though with varying percentages. It has been observed that there is need for rapid transition to very low or zero-carbon sources to mitigate the effects of climate change (UN Energy, 2021; Olivier, et al, 2017; Rogelj, 2017).

A great dilemma in energy transition is that fossil fuels such as coal, oil and gas provide 78% of primary energy but at the same time account for 89% of CO^2 emission (Olivier, et al, 2017)). The need for policy shift and strengthening of energy production and climate change governance is therefore very urgent. Incomplete regulations on clean energy and electricity outages are seen as barriers to energy transition (Do, Thang Nam & Burke, 2023). Best practices from countries that have managed to reduce overreliance on fossil fuels and at the same time achieved a stable economic growth could offer benchmarking opportunities across the globe.

Existing literature identifies the benefits arising from energy transition to include creation of green jobs, energy security, enhanced economic activities; cost competitiveness of renewable energy energies as well as climate change mitigation (IPCC, 2022). The major factors affecting energy transition include economic growth, population growth as well as energy imports.

Energy Transition in Kenya

Energy Transition

Fundamental pillars of energy transition include energy access and energy efficiency and sustainability. Kenya's energy transition and investment path has outlined specific or guiding principles to include; environmental sustainability; energy system costs; economic impact; employment impact; as well as energy security and trade balance (GoK, 2023).

Kenya's economy still relies heavily on the use of fossil fuels and biomass. These fuels are associated with accelerated increase and accumulation of greenhouse gases that have compromised our environment, especially the atmosphere. Kenya therefore contributes towards emissions of harmful gases into the atmosphere that result in global warming and climate change, even though to a small extent.

Kenya has joined the international community in initiating strategies to mitigate climate change. One of the efforts towards this end is through the development of Energy Transition and Investment Plan 2023-2050. The plan is expected to support investment in the sector and as well support economic development. The plan was

deliberated during the 2023 UNCCC, COP28 that initiated a global discourse on global investment and climate finance community.

Kenya's energy transition pathway aims for net zero emissions by 2050 through renewable energy adoption. The energy transition in Kenya has a multisectoral approach targeting sectors that are earmarked for green energy solutions. These include the industrial sectors, manufacturing; agricultural sector; transport sector, building and construction; housing sector, among others. Energy transition in Kenya focuses on reducing greenhouse gas emissions, creation of green jobs, fostering innovation in clean technologies and in building resilient and sustainable economy.

Development in the energy sector in Kenya involves rural electrification, electricity generation and transmission, oil exploration; and LPG uptake projects. In terms of rural electrification, there has been a 9.9% growth in the sector in 2021/2022 period. This growth has been mainly from domestic and small commercial categories. Also, revenue apportioned to Rural Electrification Scheme increased from Kshs. 1.28 Billion in 2020/2021 to Kshs. 1.29 Billion in 2021/2022

Electricity generation has been enhanced by tapping into the renewable sources such as geothermal, solar and wind. The government has continued to carry out hydrological and social surveys as efforts towards further exploration of petroleum. Other local programmes in Kenya aimed at reducing overreliance on fossil fuels include reducing emission of greenhouse gases include: Fuel Subsidy Scheme, (2022); Reduction of Electricity Tarif, (2022); Cooking Gas Consumer Support, (2022), Off-Grid Solar Access Project, (2020); and Non-Ducted Air Conditioners Testing and Rating Performance, (2019), among others. In the 2023/2024 financial year, renewable energy contributed 84.93% to the energy generation mix. There was an increase of 8% in the demand for LPG. There was also 98.6% fuel quality compliance in retail stations, EPRA, (2024).

Despite efforts to embrace clean energy uptake, the government of Kenya realizes that there is need to industrialize according to the Vision 2030 flagship project. Industrialization requires high quality fuel with greater consistency for industrial production processes. This poses dilemma in the energy transition in Kenya as the government is exploring ways of exploiting coal deposits and mining in Kitui and Lamu areas and at the same time is in the process of initiating discourse on nuclear power production with local, regional and the international investment partners.

Technologies in Energy Transition in Kenya

Kenya is employing various technologies in energy transition. These technologies are grouped into: i) Energy Generation Technologies; ii) Energy Storage Technologies; iii) Energy Distribution Technologies and; iv) Energy Conversion Technologies as well as v) Energy Adoption or Utilization Technologies.

Energy Generation and Conversion Technologies

Kenya employs various technologies in energy generation. These include hydro-electric power generation technologies; wind turbines, solar panels and geothermal power production. Energy generated from various sources are converted for end user consumption using various technologies. For example, photovoltaic (PV) cells convert sunlight into electricity. Concentrating solar power concentrates sunlight to a receiver which is then used to generate heat known as thermal energy that can be used to generate electricity. The solar hot water systems generate heat that heat up water for domestic use.

Energy Storage Technologies

Kenya working with World Bank has appointed Kenya Electricity Generating Company (KenGen) as the Agency to implement the Kenyan Battery Energy Storage System (BESS). This is part of the Kenya Green and Resilient Expansion of Energy (GREEN) program. KenGen is the leading electric power generating company in Kenya with a market share of 65%. BESS is expected to store excess energy and help in stabilizing energy consumption by providing load balancing power grid. In the e-mobility sector, the energy sector is introducing batteries for electric cars and motorbikes to enhance storage capacity. Options for energy storage include

batteries, thermal and mechanical systems.

Energy Distribution Technologies

Kenya has put in place mechanisms for energy distribution. The country has a national network of electricity grid with Kenya Power and Lighting Company (KPLC) overseeing electricity distribution. The Kenya Off-Grid Solar Access Project (KOSAP) project provides electricity and clean cooking solutions in the remote low density and traditionally marginalized areas in the country. A network of road and railway lines provide services to transport various energy related products

Energy Technologies Adoption and Use

Kenya's priorities in the fight against climate change include climate change adaptation and climate change mitigation. Kenya has embarked on ambitious plans aimed at reducing emissions through the creation of carbon sinks and especially extension of the forest cover, adoption of climate smart agriculture, energy efficiency and landscape restoration. Sectoral energy efficiency technologies have been developed to reduce sectoral emissions. Kenya is adopting decentralized power systems such as mini-grids and solar home systems that provide renewable electricity to individuals not covered by the main national grid. The key sector technologies are discussed between the lines:

In the domestic sector, Kenya is championing Clean Cooking Technologies for a cleaner environment. The Clean Cooking of Kenya (CCSK) organization is spearheading this technological advancement. The main aim is to develop and promote adoption of clean energy cooking stoves across the board. In the building sector, Kenya is employing various strategies to minimize emissions. These include developing appropriate building codes, ensuring efficiency in lighting; and establishing green buildings in general. In the Manufacturing and Agriculture, Kenya is encouraging energy efficiency in the industrial sector through carrying out energy audits; verifying savings, capacity building; enforcement and compliance and promoting off grid energy solutions in Agriculture. Transport sector efficiency is being encouraged through adoption of e-mobility; import restriction on old vehicles; better traffic management to reduce fuel consumption; encouraging and enhancing public transport.

Other measures include development of fuel economy standards and proper labeling of products. Kenya is investing in the green economy, the digital economy and green mobility to minimize emission of greenhouse gases. One of the e-mobility projects is the development and operationalization of the Nairobi Clean Bus Rapid Transit Line 3(BRT 3) as part of the strategic Corridor to boost trade, create jobs and enhance prosperity. The Investments estimated to cost 350 Million Euros will pioneer the establishment of the first dedicated electric bus line in East Africa. In the utilities sector, a number of energy efficiency institutions collaborate to provide services to the public. These include KPLC, KenGen; KETRACO; REREC; and PPPs, among others. These institutions aim at ensuring that savings from energy benefits the county; improves system efficiency and achieves reduction in losses and enhance grid and system efficiency through establishment of energy storage for stability of system operations and customer satisfaction. The government of Kenya encourages the signing of MOUs to enhance the capacity of efficiency and conservation. Notable areas include research, development of county development plans; capacity building of county staff; enhancing energy efficiency professional competence; mainstreaming energy efficiency in the education sector, among others, (GoK, 2022).

Evaluation of Energy Transition Process in Kenya

Strengths

Kenya has invested heavily in the energy sector to transition from fossil fuel-based economy to one that follows a low carbon pathway. Through other investment partners, the country strives to secure funds to promote cleaner energy production. However, energy transition mechanisms would bring a mixed bag of gains and losses in different sectors. While the country will strive to invest in low carbon emission transition strategy, the other sectors could register losses in terms of loss of jobs and low investment in manufacturing

and industrial growth. Kenya carries out sectorial environmental impact assessments to ensure compliance with environmental regulations and laws. This would promote sustainable transition from fossil fuel to renewable energy while at the same time minimize losses in various sectors.

Constraints and Opportunities in Energy Transition in Kenya

The two main technical challenges associated with energy transition include efficient energy storage and grid reliability. For example, integrating intermittent renewable energy sources like solar and wind into the existing grid requires advanced energy storage solutions to ensure a stable and consistent energy supply. Sectoral limitations and challenges have been identified in energy transition in Kenya. In the industrial sector, the adoption of hydrogen could be hampered by the cost premium of hydrogen DRI process as the country shifts from gas to hydrogen as a reducing agent. High costs could be incurred in the application of Carbon Capture and Credit (CCs) in cement production and high temperature heat processes.

In the transport sector, challenges could be associated with high cost of sustainable aviation and low carbon shipping fuels. As the country transitions to electric and hydrogen vehicles, major challenges include initial high capital costs. The infrastructure for transition to electric vehicles is still not well developed as there is still limited charging and fueling infrastructure. It has been observed that this scenario could slow down the growth of passenger and freight low emission vehicle market. In buildings and cooking the major challenge in energy transition could be the high cost of modern and low carbon cooking solutions such as LPG, sustainable biomass and electricity. Transition to high volumes of solar Photo Voltaic (PV) cells, wind and Gas CCS will require storage for balancing of the system. All these will therefore have a cost premium.

Kenya has a great potential to transition to cleaner energy production. The government, through various agencies are striving to ensure a smooth transition to cleaner energy production. The Government works together with investment partners to empower both County and National Government agencies as well as non-state actors to enhance cleaner production processes. Legal and institutional frameworks have been put in place guide the transition to cleaner production systems. A lot of research is going on to inform policy on energy transition. Research institutes, Climate Change Adaptation Centers and Institutes exist to offer guidance towards a lower emission pathway. The 2010 Constitution of Kenya and the Vision 20230 provide further guidance on the move towards cleaner production systems. The country is optimistic that the World Bank, the Global North, together with other donor and funding agencies will continue providing the much-needed funds, technical and skills enhancement programmes as well as supporting infrastructural development to enable the country meet her obligations towards the NDCs as Kenya is a signatory to the 2015 Paris Agreement. The Paris Agreement (COP21) gave clear guidelines and roadmap on strategies to enhance climate change adaptation, mitigation and funding.

CONCLUSION

Energy transition has captured global attention due to its role in climate change mitigation. Most countries continue to embrace strategies aimed at energy transition to collectively reduce the rate of greenhouse emissions and eventually address problems associated with climate change. Through the UNCCC, the global North is expected to release funds to enable developing countries mitigate and adapt to climate change. Energy transition has accompanying cost implications as well as socio-cultural components that act as challenges to the process. Also, most developing countries are investing in manufacturing as they strive to industrialize. This also poses a greater challenge as industrial investment require high quality and efficient energy sources, which are mostly characteristic of non-renewable sources. Some developing countries like Kenya are exploring options for nuclear energy considered to have the qualities of energy required in manufacturing, despite the inherent risks.

RECOMMENDATIONS

Energy transition as a climate change mitigation will continue to dominate academic and non-academic discourse for quite some time. It is hoped that the momentum will be sustained by the global community to strategize and adopt best practices for a safer world.

Ethical Considerations

No ethical issues raised

Conflict of Interest

No conflict of Interest Registered

Data Availability

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