POLICY AND LEGAL FRAMEWORK ON RENEWABLE ENERGY TRANSITION FOR SUSTAINABLE INDUSTRIALIZATION IN AFRICA: AN APPRAISAL*

Abstract
Industrialization is an indispensable catalyst for the development of national economy. This is a globally acknowledged phenomenon. Energy security is a cardinal infrastructural requirement for sustainable industrialization. This is due to the fact that industrial operations are propelled by energy supply. Energy consumption produces enormous environmental and climate effects. This has formed the basis for the global agitation for energy transition to renewable (clean or green) energy, as against the non-renewable energy that is popularly known for its hazardous impact on the environment. Although, Africa is naturally endowed with colossal amount of renewable and non-renewable energy resources, however, the continent is plagued with energy poverty and deficiency. This has contributed substantially to the crippling of industrial activities in the region. The objective of this work, inter alia, is to examine how transition to renewable energy can stimulate industrialization in Africa. An essential question to be addressed here is: why is it challenging for African countries to achieve massive industrialization that is propelled by renewable energy. The fulcrum of this work is predicated on the fact that industrial revolution that is driven by renewable and sustainable energy infrastructure is indispensable to the economic prosperity of Africa. This work will be significant to the government, political leaders, economists, industrialists, investors, business owners, policy and opinion molders, scholars, researchers and members of the general public. The work adopts doctrinal approach of data collection and analysis including primary and secondary sources such as Statutes, policy documents, books, journals, relevant publications and materials from the internet source, etc. This research highlights African industrial trajectory and her renewable energy potentials. In order to achieve sustainable economic prosperity, African leaders must effectively exploit and deploy the continent's renewable energy resources to galvanize industrialization and the economic development of the continent.

Keywords: Renewable Energy, Transition, Sustainable Industrialization, Policy and Legal Framework, Africa.

1. Introduction

Energy is a property that catalyzes the doing of a work or performance of a task. Renewable Energy (RE) describes the form of energy that is inexhaustible as they replenish themselves naturally when used. The term 'Energy Transition' is used to describe the migration of energy consumption from fossil fuel such as oil, natural gas, coal, etc, which are non-renewable, to RE including solar, wind, hydro, geothermal, biomass, biofuel, etc.[1] RE consumption is becoming more popular.[2] This is due its relative advantages including its environmental sustainability, exploitation cost effectiveness, reduced technicality and infinite supply. Technological innovation is positively impacting RE consumption as it accelerates its utility. This is because RE development is incidental to technological advancement. RE infrastructure has become a major stimulator of industrial activities globally. Consequent upon the underdevelopment of industrial activities in Africa resulting from energy deficiency, the continent is economically crawling. Investment in energy sector by African countries is crucial. Although Africa comprises of 20% of the world's population, it presently garners a mere 3% share of global energy investment.[3] However, Africa can unleash its energy potentials to stimulate the continent's economic growth in an environmentally friendly and sustainable order. Africa has vast RE resources capable of placing her in a development track that is powered by clean energy. The RE sector today employs 10.3 million people worldwide. With strategic indusial policies and skill development, millions of jobs can be created in Africa.[4] International organizations, development banks and private investors play pivotal roles in financing projects targeted at promoting RE development and efficiency in Africa.[5] While countries like South Africa, Morocco and Egypt have significant portion of Africa's RE investment accounting for 60% of the total investment, other counties like Kenya and Ethiopia are equally increasing their share of investment in RE. At the end of 2020, the total solar and wind generation installed capacity in Africa amounted to 10.4GW and 6.5GW respectively. South Africa:57% solar, 41% wind; Egypt:17% solar, 21% wind; Morocco:7% solar, 22% wind.[6] Specialized funds like Sustainable Energy Funds administered by the African Development Bank is provided as catalytic financing to encourage private sector investments in RE and energy efficiency. In April 2024, the World Bank Group announced commitment to connect 50million Africans to electricity by 2030 through decentralized RE system or distribution networks.[7] The prospects of Africa's industrialization and economic growth lie in RE exploitation. Africa must capitalize on its RE potentials to galvanize its industrial foundation.

2. Renewable Energy Transition as a Sustainable Development Goal (SDG 7)

The global agitation for RE transition is predicated on its environmentally sustainable character. The Sustainable Development Goal on Energy (SDG7) is incorporated in the social, economic and sustainability goal of Africa's Agenda 2063. Sustainable energy transition is at the nucleus of the development plan of African nations, in recognition of its significance to the realization

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[1] CLEAN AIR TASK FORCE, *Unearthing the Reality of Zombie Energy System in Africa's Energy Transition.* 30/1/2025. *www.catf.us*

[2] M. Asghar, *et.al. Energy Transition in Newly Industrialized Countries: A Policy Paradigm in the Perspective of Technological Innovation and Urbanization. (Sustainable Future)* Volume 7. June 2024. *www.sciencedirect.com*

[3] CLEAN AIR TASK FORCE *Op cit*

[4] C. Ofafa & E. Zighah, *African School of Regulation; Policy Dialogue on Renewable Generation & Regional Power Trade in Africa.* February 2023. *https://africaschoolregulation.org*

[5] CLEAN AIR TASK FORCE *Op. cit*

[6] C. Ofafa & E. Zighah *Op. cit.*

[7] M. Boucetta. *Towards a Just Energy Transition for Africa.* 10 /9/ 2024. *www.policycenter.ma*

of SDGs.[8] Energy transition encompasses initiatives to migrate economies from high carbon emitting sources particularly fossil fuels to low carbon and environmentally sustainable resources.[9] Energy transition will support the achievement of several SDGs simultaneously including: Affordable and Clean Energy (SDG7), Decent Work and Economic Growth (SDG8), Responsible Consumption and Production (SDG12) and Climate Action (SDG13).[10] The United Nations (UN) SDG7 seeks to ensure access to affordable, reliable, sustainable and clean energy for all. Access to modern energy is fundamental for economic development, health improvement and food security. Unfortunately, access to clean energy by many developing countries remains a privilege rather than a right.[11] Form Africa's perspective, energy transition is about lifting people out of poverty while navigating towards zero carbon emission in energy consumption.[12] It is anticipated that as countries continue to industrialize, their energy need and consumption will accelerate thereby escalating carbon emission. Energy consumption is inextricably intertwined with sustainable development. Energy poverty is lack of access to and consumption of clean energy in sufficient quantity at low cost.[13] Energy transition provides prospects for facilitating sustainable future by adopting green energy resources and enhancing energy efficiency.[14] Technological advancement has promoted RE transition for sustainable development.[15] According to the Intergovernmental Panel on Climate Change (IPCC) to have a chance of limiting global warming to 1.5 degree Celsius as proposed in the Paris Agreement of 2015, countries must cut their emissions by 43% by the end of the decade. Transition process must be accelerated as of necessity by all nations. At the 2023 UN Climate Change Conference (COP28) held in Dubai, nations accepted to accelerate energy transition. They explicitly affirmed the idea of gradually phasing out fossil fuel from energy systems and boosting RE production capacities and energy efficiency initiatives by 2030.[16]

3. Industrialization as Catalyst for Sustainable Economic Development in Africa

The socio-economic transformation of Africa will depend on the acceleration of infrastructural development and industrialization driven by modern and reliable energy. This will require sustainable investment[17] in RE industry. By capturing clean and sustainable energy value chain, Africa can chart a new course towards economic autonomy[18] because RE propels industrialization.[19] Africa needs to industrialize to grow its economy. It has the required potentials to compete in the global industrial economy. However, securing a reliable cost-effective and clean energy remains a challenge for manufacturers.[20] According to the World Manufacturing Production Report in 2010, Africa's share of global manufacturing value-added was 1.2% while Asia share increased to 26%. Africa's manufacturing sector currently underperforms despite political initiatives for industrialization. For instance, The New Partnership for Africa Development (NEPAD) adopted by African leaders in 2001 identified economic transformation through industrialization as a critical vehicle for growth and poverty reduction in the region. In February 2000, African Heads of State adopted a plan of action to accelerate industrial development of Africa.[21] Industrialization remains a catalyst for economic development. It has significantly proven to contribute to poverty alleviation, human capital improvement and economic diversification. It is a driving force for global value chain participation and development.[22] The industrial sector comprises manufacturing, mining and construction. The manufacturing industry is identified to have the greatest potentials for employment and poverty reduction in Africa. Africa's manufacturing sector's performance is disappointing.[23] Africa remains the least industrialized region in the world with acute energy deficiency. Viable industrial base is necessary for sustainable growth and productivity. Consequently, the 9th SDG emphasized the importance of building resilient infrastructure, promoting inclusive and sustainable industrialization and encouraging innovation.[24]

Africa's population is expected to reach 2.5billion by 2050 away from today's 1.5billion and its youth population, which is already the largest globally, is projected to double to over 830million. By then, its working age population (15-64 years old) will account for about a quarter of the global workforce.[25] Theoretically, the foundation is set for Africa to leapfrog into a sustainable industrial future with lucrative jobs. A new wave of African green industrial policies is emerging with a continental

[8] C. Ofafa & E. Zigah *Op. cit.*
[9] Z. Usman, *How African Countries Can Harness the Global Policy Reframe from Energy Transition to Energy Security.* 21/5/2025 *www.carnegieendowment.org*
[10] M. Boucetta *(Op cit)*
[11] A. Acheampong, *et.al. The Political Economy of Energy Transition: The Role of Globalization and Governance in the Adoption of Clean Cooking Fuels and Technologies. Technological Forecast and Social Change.* Vol.186, Part B. January 2023. 122156. *www.sciencedirect.com*
[12] CLEAN AIR TASK FORCE *Op cit*
[13] C. Candelise, *et.al. An Empirical Assessment of the Effects of Electricity Accession on Food Security. World Development.* Volume 141 May 2021. 105390. *www.sciencedirect.com*
[14] R. Baye, *et.al. RE Consumption in Africa. Evidence from a Bias Corrected Dynamic Panel. Scie. Total Enviro. 776 (2021) Article 142583*
[15] M. Murshed & M. Alam. *Estimating the Macro-Economic Determinants of Total, Renewable & Non-Renewable Energy Demands in Bangladesh. The Role of Technological Innovation (Culled from M. Asghar, Op cit)*
[16] M. Boucetta, *Op cit*
[17] ECA, *Gearing up Africa's Energy Transition by Conducive Policy and Legislative Framework.* 6/12/2023. *www.uneca.org*
[18] F. Akinrebiyo, *Energy Transition: How Africa's Green Opportunity Could Change it From Resource Exporter to Industrial Powerhouse* 26/3/2025. *www.weforum.org*
[19] B. Fagbemi, *Africa's Green Energy Transition.* 29/5/2025 *www.theafricacenter.org*
[20] F. Alloghe, *Crossboundry Energy* 17/10/2024 *www.crossboundryenergy.com*
[21] A. Mijiyawa. *Drivers of Structural Transformation: The Case of the Manufacturing Sector in Africa. (World Development).* Volume 99, November 2017 pp.141-159. *www.sciencedirect.com*
[22] B. Kamgula. e*t.al. Assessing the Nexus Between Industrialization and Inclusive Green Growth in Africa. The Critical Role of Energy Efficiency. (Ecology Economics),* Vol. 233. July 2025.108601 *Https://www.sciencedirect.com*
[23] A. Mijiyawa. *Op cit*
[24] R. Djeunakan. *Linking Energy Poverty & Industrialization: Empirical Evidence from African Countries Energy.* Volume 292, 1/4/2024. 130374 *www.sciencedirect.com*
[25] F. Akinrebiyo, *Op cit*

call for climate friendly initiatives like the African Green Industrialization Initiative (AGII) spearheaded by Kenya. African experts are agitating for green and digital industrial revolution to safeguard the future of African economies and to unleash the potentials of African Continental Free Trade Area (AfCFTA). Such initiatives seek to leverage African RE and mineral assets not just for raw exports but to also initiate wider industrialization by producing green products and consolidating their position in clean technology value chains.[26]

4. Africa's Renewable Energy Potentials

Africa is endowed with abundant solar, wind, hydro, geothermal etc. resources. Africa has 60% of the global best solar resources but only 1% installed solar PV capacity. The continent's geothermal resources remain largely dormant apart from pioneering project in Kenya.[27] Platinum,[28] copper, lithium, cobalt, manganese, rare earth metals and graphite are essential ingredients for electric vehicle (EV) batteries. According to the International Renewable Energy Agency (IRENA), the annual average wind speed in North and South Africa could be as high as 7 meters *per* second with the potential of generating up to 461GW of wind energy. African solar PV potential could provide her with more than 660,000 TWh of electricity a year, far beyond its estimated needs.[29] Africa has nearly 70% of global cobalt reserves. Ghana's large scale Hydropower Plants include: Akosombo Dam (1,020MW); Bui Hydro Plant (400MW); Kpong Hydro Plant (160MW). Ghana's notable established Solar Energy include: the 20MW Solar Plant in Winneba and the 17MW Solar Plant in Kaleo. Her Wind Energy projects include the 225MW Ayitepa Wind Farm (under development) and the 160MW Knikablo Wind Farm (planned). Ghana's biomass projects are relatively small to medium scale, ranging from few hundred KWs to several MWs.[30]In Ghana, electricity is produced from hydro and thermal plants. This has the potential to supply cross-border electricity exchange across the West African Power Pool (WAPP) zones.[31] Egypt's target is to produce 42% of its electricity from renewables by 2035 through the Benban Solar Part (one of the largest in the world), the Gulf of Suez Wind Farms, the Emerging Green Hydrogen project in partnership with foreign investors.[32] Egypt's current wind energy capacity is about approximately 1,643 and is expanding with a growth of 220% since 2015.[33] Ethiopia's Grand Ethiopian Renaissance Dam (GERD) could significantly contribute to regional energy integration. These projects could assist the continent in closing electricity access gaps and propel economic activities.[34] Mauritania, Senegal and Mali are already exploring large scale solar projects and the African Development Bank has supported initiatives like the Desert to Power Program which aims to harness solar energy to electrify 250million people by 2030.

Kenya has geothermal potentials.[35] A recent report by the Climate Investment Fund (CIF) found that geothermal energy contributes the highest share of 45% to the Kenyan electricity grid while hydropower contributes 19%, solar 17% and wind 3%. The country's geothermal potentials in the Rift Valley has boosted Kenya's geothermal energy prospects with an installed capital of about 1,000MW. The Rift Valley also hosts Africa's largest wind farm which is the Lake Turkana Wind Power project. The project was funded by African Development Bank, the European Investment Bank and the Standard Bank. The power project now supplies approximately 15% of Kenya's electricity needs and cutting down carbon emission by approximately 700,000 tonnes annually.[36] Mozambique RE Atlas was published in 2014 to map out the RE potentials in the country including hydropower, solar, wind, biomass, wave energy and geothermal. The total electricity generating potentials from RE in Mozambique is over 23,000GW most of which is derived from solar energy.[37] The RE resources consumed in Zimbabwe include: hydropower stationed at Kariba c supplies 50% of the total power generated in Zimbabwe. Other RE generating companies and the resources they generate include: Guruve Solar Park (1.2MW); Solgas (Solar 5MW); Nyamingura Mini Hydro Station (1.1MW Hydro); Dura Power Station (2.2MW Hydro); Pungwe A Power Station (2.725MW Hydro); Pungwe B & C Power Stations (15MW Hydro and 3.7MW Hydro) respectively; Hauna Power Station (2.3MW Hydro).[38] Namibia's annual solar irradiation reaches 2200 to 2400 kwh/m. The Omburu Solar PV Park has installed capacity of 4.5MW generating 13,500,000kwh annually. The Otjozondjupa Solar Park has 5MW installed capacity containing 52,080 panels. It supplied 14,000,000 MWh of electricity annually to NamPower. The Ejuva Twin Solar PV Panels have installed capacity of 5MW and can feed 25.8GWh into NamPower grid annually. In 2023, NamPower signed a 25years agreement for the development of 50MW Wind Power Plant. Namibia's hydropower potential is estimated at 2,250MW. The Ruacana Hydropower station has installed capacity of 347MW. It accounted for 50% of Namibia's generation capacity in 2020.[39]

Senegal has vast RE resources and one of the highest irradiation potentials in the world with average daily theoretical solar PV irradiation potential of 5,798Wh/m^2. In Senegal, the solar resources potentials measured as the annual PV output *per* unit of capacity (MWh/KWP/year) falls in the range of 1.6-1.8 for about 90% of its land area. In comparizm, only 20% of the world's land falls in classes with higher efficiency ranges, showing the strong potential of Senegal for this technology.[40] Senegal hosts

[26] A. Medinilla, *et.al. Green Industrialization in an Age of Disruption: Africa, Europe and the Global Economy.* 9/4/2025. *https://ecdpm.org*
[27] B. Fagbemi, *Op cit.*
[28] ECA, *Op cit*
[29] C. Ofafa & E. Zigah, *Op cit*
[30] G. Osabutey. *RE Laws & Regulations Report, Ghana 2025.* 19/9/2024 *https://iclg.com*
[31] WORLD BANK GROUP. *Trading Energy in West Africa to Benefit the Entire Region.* 7/7/2021. *www.worldbank.og*
[32] LAW GRATIS. *Energy Law at Egypt.* 24/5/2025. *www.lawgratis.com*
[33]J. Iskander. *RE in Egypt. Investment and Sustainability.* 21/1/2024. *https://eg.andersen.com*
[34] Z. Usman, *Op cit*
[35] *ibid*
[36] G. Nakweya. *Kenya's Big Bet on Renewables.* 26/3/25. *www.nature.com*
[37] CMS. *RE in Mozambique.* 22/2/2024 *https://cms.law*
[38] N. Madya & C. Sibandai. *RE Laws and Regulations, Zimbabwe 2025.* 19/9/2024 *https://iclg.com*
[39] S. Shefendi, *Renewables Policy and Practice: A Look at Namibia. (Accessed 21/10/2025) https://ippr.org.na*
[40] International Energy Agency (IEA) *Senegal 2023. Energy Policy Review.* 18/9/2025. *https://iea.blog.core.windows.net*

West Africa's largest Wind Farm (158mw). Senegal's potentials for biomass generation is about 2900GWh. Senegal has hydropower resources along the Gambia river and the Senegal River Basin. In 2022, Senegal's solar and wind power capacity rose up to 245MW and 159MW respectively. In same year, renewables represented 30% share of overall installed capacity including hydropower.[41] Rwanda's geothermal resources have estimated potential of 50 to 90mw. Lake Kivu's methane resources are substantial with estimated volume of 40billion cubic metres. Methane has been exploited for power since 2015, currently producing 82.4mw. Hydrogen accounts for 27% of Rwanda's total installed electricity capacity.[42] Morocco's solar irradiation varies from 3.86 to 7.85kh/m. Its annual average wind speed varies between 7, 5 and 11 m/s at 40 meters above sea level. Morocco has 140 dams including 26 hydropower stations. Morocco initially set the goal of reaching 42% in RE mix in 2020. This target was extended to 52% in 2030.[43]

In Nigeria, hydropower has been the major grid electricity production since 1960s. Until recently, the Kainji and Jebba Dams (1300MW) accounted for about 50% of Nigeria's power source but is recently overtaken by gas power stations.[44] According to the International Renewable Energy Agency, Nigeria's solar potential is among the highest in Africa. Sokoto, Katsina, Kano and Bornu states of Nigeria has solar irradiance ranging between 3.5-7.0KWh/M^2/day with annual sunshine hours exceeding 2,600. Unfortunately, solar accounts for less than 1% of total electricity production in Nigeria. Wind energy in northern Nigeria has an estimated potential of about 2,000MW while hydropower potentials stand at over 14,750MW with currently installed capacity at approximately 2,062MW.[45]

5. Legal Framework for Renewable Energy Development in Africa

Egypt enacted the Renewable Energy Law 203/2014 to encourage the private sector to produce electricity from renewable resources.[46] The law encourages investment in solar, wind, hydro and biomass. Egypt's Electricity Law No.87 of 2015 provides for the development and regulation of RE resources. Under this law, the Egyptian Electricity Regulatory Agency is to ensure stainable management of the sector. The Renewable Energy Law and the Investment Law No 72 of 2017 supplements these efforts by providing financial and operational incentives for RE investment.[47]

In Morocco, the regulatory framework comprising Law 57-09, 37-16, 13-09 and 48-15 has facilitated the development of renewables but requires implementation to attract investment of 1-2billion USD.[48] Law 13-19 promulgated in 2010 allows individuals or legal entity to produce electricity from renewable sources. In 2015, Law 58-15 which amends and supplemented Law 13-09 introduced a net metering scheme for solar and wind power plants. It increased the hydropower threshold from 12 to 30MW and allows private investors to sell the excess electricity produced from renewables to the National Network of High Voltage (HV), Very High Voltage (VHV) and Low Voltage (LV). Law 57-09 created the Morocco Agency for Solar Energy (MASEN). The Law was supplemented by Law 37-16 to expand the prerogative of MASEN which became the Moroccan Agency for Sustainable Energy, responsible for the RE sector in Morocco.[49] Tunisia has implemented key regimes including authorization, concession and self-production to promote solar, wind and other RE projects, with the aid of Law 2015-12.[50] Mozambique created an Energy Regulatory Authority (ERA) in 2017 to facilitate an enabling environment to attract private investment in RE and off-grid projects. ERA has power for supervision, regulation, inspection and sanctions in the field of production, transmission, distribution and commercialization of electricity. In 2022 a new law was enacted (Law 12/2022 on 11 July) to adapt the legal framework of the electricity sector to the current social, technical and financial dynamics of Mozambique as well as endeavor to maximize all RE resources and minimize fossil consumption.[51]

In Zimbabwe, Section 42 of the Electricity Act (Chapter 13:19), and the Electricity Licensing Regulations 2008 as amended by S1 55/2015 and S1 101/2021 are the principal laws that regulates construction and operation facilities. Section 42(1) of the Electricity Act authorizes licensees to construct, own, operate and maintain generation stations for the generation and supply of electricity. By Section 42(2), the holder of generation license may supply electricity to any transmitter or distributor or licensee for resale.[52] In South Africa, the Electricity Regulation Act No.4 of 2006 is primarily targeted at establishing a framework for the supply of electricity. The law also empowers the National Energy Regulator of South Africa (NERSA) to serve as custodian and enforcer of the framework.[53] In Kenya, the principal energy legislation is the Energy Act 2019. It provides for the establishment of the RE Feed-in-Tariff system to catalyze the generation of RE. Sections 77- 90 specifically provides for the exploitation, recovery and commercial utilization of geothermal energy. It provides a legal pathway for acquiring

[41] International Energy Agency (IEA) *Op cit*
[42] AFRICAN ENERGY PORTAL. *A Breakdown of Rwanda's New Policy on Sustainable Energy Generation.* 22/2/2025. *https://africa-energy-portal.org*
[43] S. Sebbahi. *Legislative Framework for RE in Morocco.* 10/3/2019 *https://www.renewableenergyworld.com*
[44] U. Nkalo. *Nigeria RE Sector: Analysis of the Present and Future Prospects.* Solar Compass. Vol. 14. June 2025. 100123. *https://www.sciencedirect.com*
[45] CLIMATE PARLIAMENT. *Green Energy Zones in Nigeria: Unlocking Renewable Potentials through Legislative Actions.* 26/9/2025 *Https://www.climateparl.net*
[46] CLIMATE CHANGE LAWS OF THE WORLD. *Egypt RE Law (Decree No. 203/2014). https://climate-law.org*
[47] J. Iskander. *Op cit*
[48] H. Hafdaoi, *et.al. RE in Morocco: A Comprehensive Review and Analysis of Current Status, Policy Framework and Prospective Potentials.* March 2025 *www.researchgate.net*
[49] S. Sebbahi. *Op cit*
[50] Y. Beccar. *The Rise of RE in Tunisia: Legal Framework and Opportunities.* 23/12/2024. *www.dlapiperafrica.com*
[51] CMS. *Renewable Energy in Mozambique. Op cit*
[52] N. Madya & C. Sibandai. *Op cit*
[53] H. Kekana, *et.al. South Africa–Policy, legal and Regulatory Framework in Energy Sector* (Accessed 15/9/2025) *www.energypedia.info*

geothermal resource license. Under the Energy (Solar Photovoltaic System) Regulations 2012, the licensing of Solar Photovoltaic Systems and its market operations is carried out by the Energy and Petroleum Regulation Authority (EPRA). In May 2024, the EPRA issued a Guideline on Green Hydrogen and its derivatives. The Guideline provides for a stepwise guide on the sustainability criteria for green hydrogen and its derivatives.[54] In Senegal, the RE Law (No.2010-21) regulates the RE sector. It provides for the Fit-in-Tariff scheme and tax incentives. The goals outlined in the law include: reduction of fossil dependence, diversification of energy mix, reduction of GHG emission and facilitating of domestic energy production. The law was however revoked by the Electricity Code 2021 which contains RE provisions.[55] In Ghana, the Renewable Energy Act 2011 (Act 832) is the primary legislation governing RE. It provides for the development, management and utilization of RE resources.[56] In 1997, Ghana established the Energy Commission by Act 541 to *inter alia* develop RE legislative and regulatory framework and issue licenses for renewables.[57] The RE Act 2011 (Act 832) was subsequently amended by the Renewable Energy (Amendment) Act 2020, (Act 1045) which *inter alia* promotes the development, management, supply and utilization of RE.[58]

6. Policy Framework for Renewable Development in Africa

The African Energy Transition Programme (AETP) is the main umbrella under which all African energy programmes and policies are developed and implemented. It aims to fully mobilize Africa's energy resources and potentials to set Africa on the path of innovation, low-carbon energy development and avoidance of fossil fuel conundrum plaguing many industrialized and emerging economies today. AETP is designed to accelerate the African Energy Transition and transformation required in the continent to foster joint inclusive economic growth, wealth creation and poverty eradication in a sustainable climate compatible manner. The programme is envisioned to transform energy development in Africa driven by AU Agenda 2063, SDGs and Paris Agreement on Climate Change.[59] The strategic objectives of the AETP include: to build energy infrastructure for socio-economic development; to develop the RE potentials for solar, wind, hydropower and other renewable sources in alignment with the Paris Agreement; to develop energy efficiency programmes for construction, industries and transport.[60] In the Inaugural Africa Climate Summit of 2023, convened by Kenya and the AU Commission, African leaders committed to developing and implementing policies, regulations and incentives aimed at attracting local, regional and global investment in green and inclusive growth.[61]

African Clean Energy Corridor (ACEC) is an initiative aimed at accelerating the development of the RE potentials and cross-border trade of renewable resources. In July 2013, the Authority of Heads of States and Government of ECOWAS adopted the ECOWAS Renewable Energy Policy (EREP) aimed at increasing the share of RE in the region's overall electricity mix to 33% in 2020 and 48% in 2030.[62] Complementing the EREP is the ECOWAS Energy Efficiency Policy (EEEP) which aims to make 2000 Megawatts of power generation capacity available through efficiency gains and ultimately double the rate of improvement in energy efficiency. To support the creation of a regional power market, IRENA in collaboration with the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), the West African Power Pool (WAPP) and the ECOWAS Regional Electricity Regulation Authority (ERERA) has initiated the West African Clean Energy Corridor (WACEC) initiative aimed at promoting the development and integration of utility-scale renewable power in West Africa.[63]

The objective of Ghana's Energy Transition Framework (2022-2070) is *inter alia* to evaluate the impact of energy transition on the economy.[64] RE Supply Policy is expected to increase access to RE technologies. RE Investment Policy aims at creating conducive environment to promote private sector participation both domestic and foreign. The Policy on Market Development is to accelerate the development of sustainable market for RE. The main goal of Ghanaian Government Policy on RE is to promote access to modern energy.[65] Other RE Policies of Ghana include: the National Energy Policy (2010); the Energy Sector Strategy and Development Plan (2010); the Sustainable Energy for all Action Plan (2012) and the Renewable Energy Master Plan (2019).[66] Incentives offered by Ghanaian government for RE development include duty and VAT exemption for solar panels, industrial and energy plants, machinery and equipment imported for RE.[67]

South Africa's Energy Efficiency Initiative Scheme has achieved energy savings above 3GW over a decade. Fiscal policy such as tariff reduction to promote EV adoption is also introduced.[68] The South African Government Whitepaper on RE Policy is based on the principle of ensuring that national resources are channeled to renewable technologies. The objectives include achieving energy economy where RE increases in consumption and the provision of affordable access to energy thereby

[54] D. Gagnon. *5 Types of RE and their Impact on the Environment.* 22/2/2024. *www.snhu.edu*
[55] CLIMATE CHANGE LAWS OF THE WORLD. *RE Law. (No. 2010-21).* 18/9/2025 *https://climate-laws.org*
[56] G. Osabutey, *Op cit*
[57] W. Ghoney. *Policy and Regulatory Framework for RE and Energy Efficiency Development in Ghana.* 25/11/2008 *https://iclg.com*
[58] S. Owusu-Mante. *The Case for Ghana's RE Transition: A Path to Sustainable and Economic Resilience.*7/3/2025 *www.climatepolicylab.org*
[59] African Energy Commission (AFREC). *African Energy Transition Programme (Accessed 13/9/2025) https://au.afrec.org*
[60] African Energy Commission (ARFEC) *Op cit*
[61] G. Gagnon, *Op.sit*
[62] C. Ofafa & E. Zigah, *Op cit*
[63] *ibid*
[64] Ministry of Energy, Ghana. *National Energy Transition Framework (2022-2070) https://www.energymin.gov.gh*
[65] W. Ggoney, *Op cit*
[66] G. Osabutey, *Op cit*
[67] D. Darkwah. *Et.ai. Q & A: The Legal Framework for RE in Ghana.* 1/8/2023. *www.lexology.com*
[68] CLEAN ENERGY TASK FORCE, *Op cit*

supporting sustainable development and environmental conservation.[69] The Kenyan Ministry of Energy and Petroleum (MOEP) has developed a Feed-in-Tariffs Policy that allows independent power producers to sell electricity generated from renewable sources. The MOEP also developed a Renewable Energy Action Policy for the procurement of solar, wind and other RE project.[70] The Kenyan National Energy Policy 2025-2034 is designed to spearhead the country's vision of energy transition, innovation, resilience and sustainability. The policy seeks to address challenges of energy access, affordability and security while promoting clean energy and green industrialization. The policy seeks to expand energy infrastructure and leverage RE resources including solar, wind, geothermal and biomass to provide reliable and affordable energy in the country.[71] Kenya has become the third highest ranking African country in the World Economic Forum's Global Energy Transition Index (ETI), after Morocco and Namibia.[72]

In Senegal, by virtue of the Interministerial Decree No. 010158 of 28 May 2020, RE production equipment are exempted from VAT. In 2023, along with its partners from Canada, European Union, France, Germany and the U.K., Senegal signed an agreement to facilitate up to EUR2.5billion in finance under the Senegal Just Energy Transition Partnership (JETP). This can help to increase the installed RE capacity to 40% by 2030.[73] The Rwandan government has unveiled a new energy policy benchmarked against the SDG7 to ensure affordable, reliable, sustainable and modern energy for all people by 2030. The policy focuses on utilizing hydro, solar, wind, geothermal, biofuel, peat, methane, nuclear and hydrogen to meet energy demand and reduce imports.[74] In Zimbabwe, the RE policies and regulations are contained in the National Energy Policy (NEP) 2012 and the National Renewable Energy Policy (NREP) 2019. The Zim-Asset Policy document of Zimbabwe calls for the completion of hydro projects, solar and wind energy initiatives. The National Energy Policy (NEP) of Zimbabwe seeks to promote optimal supply and utilization of energy for socio-economic development in a safe, sustainable and environmentally sustainable manner.[75] The NREP sets out the government's target in RE development and its contribution to electricity supply in Zimbabwe. Egypt hosted COP 27 (2022) and launched its National Climate Strategy 2020 targeting energy efficiency, emissions reduction and clean energy integration as priorities. The policy's objectives include promoting RE resource development and utilization; developing, modernizing and optimizing energy infrastructure and supporting green industrialization, etc.[76] The Inga project along the Congo river in the DRC could generate 40GW of hydropower, potentially making it one of the largest power stations in the world.[77]

Nigeria's first meaningful foray into RE is the Nigerian Energy Policy of April 2003 which outlines the framework for the development, exploitation and supply of all Nigeria's energy resources. The policy itemized renewable and clean energy sources to include hydropower, biomass, wind, solar, ocean waves, tidal energy, ocean thermal gradients and geothermal energy. Some RE policies and plans have been developed in Nigeria including The Renewable Energy Policy Guideline (2006), The Nigerian Biofuels Policy and Incentives (2007), The National Renewable Energy Action Plan (2015) and the Nigeria Solar Independent Power Producer Support Program. The National Renewable Energy and Energy Efficiency Policy (NREEEP) 2015 is *inter alia* designed to address Nigeria's challenge of access to modern and clean energy and to enhance energy security.[78] The National Renewable Energy Action Plan (NREAP) sets out the implementation of the NREEEP to achieve sustainable energy for all.[79]

7. Achieving Industrial Revolution in Africa Propelled by Renewable Energy

The goal of the African Energy Efficiency Strategy (AEES) under the African Energy Commission (AFREC) is *inter alia* to promote sustainable energy system for economic growth.[80] Connecting energy transition to industrialization could achieve economic objectives.[81] Africa's energy poverty is partially responsible for its poor industrialization. The human capital training required to establish a formidable industrial structure will depend on sufficient energy for computers, internet services and laboratories-based training. Availability of reliable energy is indispensable to the stimulation of industrialization.[82] Infrastructure is the bedrock of industrialization and energy is a critical infrastructure for industrialization. Industrialization suffers without reliable electricity.[83] RE can be developed to leverage opportunities for growth and economic development in emerging green industries in Africa.[84] Industrialization is a critical imperative for sustainable development. The benefits of industrialization include job creation, poverty eradication, growth and economic acceleration.[85] Industrialization guarantees job creation, curtails inequality and promotes development. African energy transition must be expedited leveraging on its enormous

[69] J. Glazewski. *The Legal Framework for RE in South Africa.* (Accessed 17/9/2025) *https://www.un.org*
[70] D. Gagnon. *Op cit*
[71] J. Kangwana, *et.al. The Legal Landscape for RE in Kenya: Opportunities and Challenges for Global Investors.* 24/7/2024 *www.clydeco.com*
[72] G. Nakweya, *Op cit*
[73] INTERNATIONAL ENERGY AGENCY. *Op cit*
[74] AFRICA ENERGY PORTAL. *Op cit*
[75] FONCR ENERGY, *The State of the Policy and Legal Framework on Clean, RE Production in Zimbabwe.* 19/9/2025 *https://library.fes.de*
[76] LAW GRATIS, *Op cit*
[77] M. Barasa (The Breakthrough Institute) *How Might Africa Transition to RE* 1/9/2021 *https://thebreakthrough.org*
[78] STREAMSOWERS & KOHN. *Legal Regime for RE in Nigeria.* 5/6/2023 *https://sskohn.com*
[79] NREAP 2015-2030. Adopted by Inter-Ministerial Committee on RE and Energy Efficiency (ICREEE) and approved by the National Council on Power (NACOP) 14/7/2016
[80] CLEAN AIR TASK FORCE, *Op cit*
[81] B. Nkoa % A. Ngoh. *Industrialization in Africa: The Role of Energy Transition. Energy Policy.* Vol. 193, Oct. 2024. *www.sciencedirect.com*
[82] R. Djeunankan. *Et.al. Op cit*
[83] F. Akinrebiyo. *Op cit*
[84] M. Boucetta, *Op cit*
[85] B. Nkoa & A. Ngoh, A. *Industrialization in Africa: The Role of Energy Transition. Energy Policy.* Vol. 193, Oct. 2024. *www.sciencedirect.com*

RE potentials. Energy transition will generate 'Green Jobs' and new business ventures will be established. Green jobs include jobs that minimize waste, reduce GHG emissions, sensitive to ecosystem protection, support recycling processes, etc.[86] To attract global manufacturers, Africa must develop reliable and clean energy. As global clean energy revolution unfolds, Africa has the opportunity to actualize industrialization and economic transformation devoid of environmental hazards. By prioritizing RE and energy efficiency technologies, African countries can develop green and environmentally compatible industries for economic revolution.

8. Challenges to Renewable Energy Development and Transition in Africa

Obsession with non-renewable energy for consumption and commercial purposes is a major factor militating against RE development in Africa. Fossil fuel accounts for over 80% of Africa's energy supply. South Africa, Nigeria, DRC, and Angola rely substantially on fossil fuel for government revenue, foreign exchange and extractive industries.[87] Morocco is mostly powered by fossils and coal makes up 37% of electricity production.[88] Refusal to implement RE policies by some African countries is a mitigating factor. Inability to secure financial assistance from developed nations for investment in RE[89] is also adversely affecting RE infrastructure. Climate change has distorted weather circle resulting in unpredictability and inability to determine anticipated rainfall density or degree of sun rays. This has hindered investment in RE. Poor development of critical infrastructures required to stimulate RE sector is a major challenge. Corruption, impunity, lack of transparency, accountability and misappropriation of funds allocated for RE development has impeded the growth of this energy sector in Africa. Private and foreign investors are discouraged by factors like regulatory mutability, political instability, diseconomies of scale, lack of incentives, infrastructural decay, failure of policy framework and insecurity. Financial constraint is a major formidable barrier. The cost of sustainable investment in RE is very high and most African countries are challenged by fiscal limitations like budget deficit and debts. This is a monumental impediment to sustainable energy infrastructure for Africa. The huge subsidy paid by many African countries on petroleum products, which reduces its consumption costs by industries, undermines the motivation for investment in RE and clean energy transition. Deficiency in the requisite technical knowhow and skilled manpower requirement needed to develop the RE sector is a major setback. The lack of political will and refusal to appropriate reasonable sum of money by some African countries towards developing RE infrastructure has equally frustrated the progress of the sector.

9. Effects of Energy Poverty on African Economic Development

Energy deficiency has hindered productivity, efficiency and human capital development in Africa.[90] Energy poverty in Africa has stifled industrial growth, business productivity and agricultural output.[91] Africa has experienced deindustrialization, underinvestment and escalating degree of joblessness over the decades due to energy poverty. Africa's industrial sector's share to GDP fell from about 14% in 2000 to about 11.24% in 2022.[92]

10. Conclusion and Recommendations

The adverse effects of energy transition include: loss of employment by workers in the fossil reliant industries in industries like mining, extraction, drilling, refining, distribution, logistics[93] and construction, etc. This will further exacerbate national GDP index and economic welfare of the nation. On the positive note, RE is relatively cheaper mainly because when setup, its equipment and machinery remain functional in the absence of standard maintenance and servicing, and the resources replenishes itself naturally.[94] This is in addition to its environmental sustainability. Africa's persistent energy deficiency is unjustifiable. African leaders must become visionary by recognizing RE as the solution to its energy poverty and the continent's economic stagnation. National budgetary allocation earmarked for RE development must be increased to promote investment in the sector. Dynamic RE acceleration policies must be adopted to promote notable development of the infrastructure. Bureaucratic bottlenecks and barriers hindering accelerated acquisition of licenses, permits and approvals must be eliminated. Foreign Direct Investment (FDI) portfolio in the RE industry must be encouraged by creating enabling and business friendly environment. Collaborative partnership initiatives with foreign national and sub-national institutions must be solicited to leverage on RE development technology transfer and acquisition. Africa must capitalize on its huge population as a strategic advantage for foreign and domestic skill acquisition in RE infrastructure to boost the manpower requirement in the industry. The trainings organized by International Organizations like the IEA on clean energy must be capitalized on. Outstanding debts and loans must be paid to incentivize foreign borrowing to support RE development. Domestic revenue base must be improved by exploring more revenue potentials to generate more income. This will enhance financial capacity to stimulate RE development. Misappropriation of funds allocated for RE development must be confronted headlong. Intergovernmental collaborations targeted at RE improvement must be encouraged in the region. The appetite for non-renewable energy products consumption must be discouraged by removing subsidy and increasing tariffs on the products. African institutions of learning must also engage in collaborative research on RE development. Academic curriculum must be redesigned to accommodate RE technology development. Insecurity must be tackled in Africa. The development of critical infrastructure like good road networks must be prioritized to facilitate investment in the RE industry. Local manufacturing industries and factories where machineries and equipment required for RE technology development can be produced, must be supported. These recommendations can launch Africa into a new era of sustainable energy security as a global clean energy hub thereby stimulating economic revolution in the continent.

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[86] Z. Usman. *Op cit*

[87] O. Abe & V. Azubuike. *Green Energy Transition Must Start With 600 Million Africans Who Do Not Have Electricity.* 5/2/2025 *https://allianceforscience.org*

[88] CLIMATECH, MEA. *Morocco Energy Challenges Despite Large Scale Renewable Projects.* 28/1/2023 *https://climatechmea.com*

[89] O. Abe &V. Azubuike, *Op cit*

[90] K. Cai, *et.al. Harnessing RE in sub-Saharan Africa-Barriers, Reforms & Economic Prospects.* 9/10/2024 *https://www.elibrary.org*

[91] O. Abe &V. Azubuike, *Op cit*

[92] R. Djeunankan, *et.al. Op cit*

[93] A. Lui, *What does Energy Transition mean for Africa? 14/11/2024 www.clyeco.com*

[94] *ibid*