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The Importance of Energy Security in Africa: A Case Study of Ghana, Nigeria, Burkina Faso, and Côte d'Ivoire

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ABSTRACT

Using Ghana, Nigeria, Burkina Faso, and Côte d'Ivoire as four representative nations, this essay examines the vital role that energy security plays in Sub-Saharan Africa. These countries continue to struggle to provide sustainable, affordable, and dependable energy access—essential for national security, political stability, and economic growth—as global energy geopolitics changes. The study highlights the socio-economic impacts of energy insecurity, including disruptions to healthcare, education, agriculture, and industrial productivity, employing a cross-sectional methodology that incorporates structured questionnaires and interviews with selected communities and energy institutions. Nigeria and Burkina Faso still struggle with inconsistent supplies, ineffective systems, and a heavy reliance on fossil fuels and biomass, whereas Ghana and Côte d'Ivoire have made significant strides through sectoral reforms and infrastructure investments. To create resilient and inclusive energy systems in Africa, the paper emphasizes the close connection between energy security and broader development objectives, advocating for risk diversification strategies, regional integration, and investment in renewable energy sources.

Keywords: Energy Security, Ghana, Nigeria, Burkina Faso, Côte D'Ivoire, Energy Policy.

INTRODUCTION

More than two decades after making headlines, energy security has reemerged on the global political agenda. Instead of focusing on the Middle East as it had been in the 1970s and early 1980s, in recent times, international energy geopolitics has taken a broader aspect; one of the significant regions that have gained interest in terms of energy security is Sub-Saharan Africa. This has been attributed to the dramatic discoveries of oil during the latter part of the 1990s.

Energy is needed in every African nation as it contributes significantly to the development of every facet of the economy. Energy is required in homes, workplaces, and industries. People cook food at home because of energy, and companies rely on energy for manufacturing activities. Energy is required to operate turbines, plants, machines, vehicles, etc. This requires that a sufficient amount of energy is very important. Without a sufficient amount of energy, it would be difficult for these activities to be carried out. Ultimately, energy insecurity would mean that manufacturing activities would come to a halt, and this, by implication, would affect people's lives invariably as many facets of the economy will be affected, especially the food supply would be affected. The fact remains that retail outlets, supermarkets, distribution chains, malls, etc., depend on manufacturers for their supplies, and thus, an energy shortage, which affects manufacturers, would also affect this food supply chain, which would negatively impact people's lives. We cannot ignore the effect of energy insecurity on students, the health

sector, and the agricultural sector of economies, as these sectors rely heavily on energy supply. The critical role that energy plays in an economy makes the study of energy security and its characteristics very significant. This paper thus takes a critical look at energy security and its relevance to the national economies of Ghana, Nigeria, Burkina Faso, and Côte d'Ivoire.

This research applied a cross-sectional method to examine the importance of Energy security in Africa with a specific focus on Ghana, Nigeria, Burkina Faso, and Côte D'Ivoire. To achieve the study's objective, interviews were conducted with consumers in selected communities, power sector operators, and members of the Energy Commission in the various countries included in the study. A combination of structured questionnaires and interviews was used to study 600 respondents in five communities in six regions/states in Ghana, Nigeria, Burkina Faso, and Côte D' Ivoire, which was thoroughly cleaned and analyzed.

THE CONCEPT OF ENERGY SECURITY

Energy security can be defined as the continuous process of ensuring that people have the amount of energy they need to sustain their lives and their daily undertakings while ensuring that it is affordable. According to the International Energy Agency (IEA), energy security has two main dimensions. The first, which is long-term energy security, deals with investments in energy supply and how these relate to modern economic development and environmental requirements, and the second, which is short-term energy security, is mainly concerned with how the energy system can respond timely to unexpected changes in the supply and demand of the energy cycle (Safety culture, 2022).

The definition of energy security varies from country to country and depends on a number of factors, including location, natural resources, economic conditions, energy import and export activities and vulnerability to disruption of energy supply, political institutions as well as international relations. That said, it is important to note that no universally accepted definition of energy security will stand the test of time. Therefore, the importance of energy security always depends on energy security issues, threats and countermeasures.

Access to energy impacts the supply and sustainability of people's basic needs. Aside from that, it contributes significantly to political stability and economic growth. Generally, it impacts the development and security of sectors like agriculture and manufacturing. In addition to energy accessibility, affordability and sustainability, energy security forms an important factor in determining sustainable energy plans. Energy security is related to food security and food transport, making the agricultural sector both an energy consumer and an energy producer. Energy security is a pressing issue as the demand for energy is rapidly increasing due to economic expansion, population growth, the use of new energy sources, and rising incomes. For this reason, countries have set goals to keep their economies functioning with uninterrupted energy supplies and to provide their people with adequate, reliable, affordable, modern, and clean energy.

ENERGY SECURITY IN GHANA

According to the World Bank, 84% of Ghana's population was connected to electricity in 2017, a high access rate that ranks Ghana as the second largest country in sub-Saharan Africa after South Africa, but rural areas and urban access inequality. However, some 759 million people worldwide have no access to electricity, and most of these people live in sub-Saharan Africa.

Ghana's electricity supply is primarily based on hydroelectric power generation. Hydropower is a form of energy that uses the movement of water to generate electricity. For more than half a century, hydropower has been the world's largest source of renewable energy and an important low-carbon energy technology for many countries. The Ministry of Energy indicated that Ghana's existing power plants have a total installed capacity of 4,132 megawatts (MW) with 38% hydropower, 61% thermal power, and less than 1% solar power (Sani, 2022).

Ghana's energy sector is primarily controlled by the public and state-owned enterprises, with few private sector actors in its value chain. Volta River Authority (VRA) and Bui Power Authority (BPA) manage the hydropower component of the generation phase; however, VRA is also involved in some aspects of thermal power generation in collaboration with Independent Power Producers (IPPs). Ghana Electricity Company (GRIDCO) is fully responsible for transmission throughout the country; Ghana Electricity Company (ECG) and Northern Electricity Company (NEDCO) are responsible for distribution. The 1980 reforms in the power sector created a level playing field for independent power producers to participate in a field previously reserved only for the public sector. In annual hydropower generation in 2021, Ghana projects a total of 7,001 GWh from three major power plants; Akosombo, Kpong GS and Bui GS. Historically, after gaining independence in 1957, Ghana decided to make significant investments in infrastructure, including building roads, schools, hospitals and factories that needed reliable power supplies. In 1961, the Government of Ghana established the Volta River Authority (VRA) through a loan facility from the World Bank to produce hydroelectric power on the Volta River. This led to the construction of a power plant at a cost of $200 million at the Akosombo Dam and near Akosombo in 1962-1965 (Sani, 2022).

In 1968, power demand got to 540 GWh because of increased power demand after the completion of the Akosombo Dam. By 1972, the installation of two additional generating units increased the total generating capacity of the Akosombo Dam to 3321.23 GWh. In 1972, after the total generating capacity of the Akosombo Dam increased to 3321.23 GWh, from Akosombo to Lome the 205 km of 161 kV transmission line was built, making Ghana an electricity exporter to Togo and Benin. According to the Volta River Authority annual report from 1966 to 1990, Ghana's domestic electricity consumption surged from 540 GWh in 1968 to 3917 GWh in 1976, at a CAGR of 10%.

However, as a result of the deterioration of Ghana's economy, electricity consumption further decreased from 3917 GWh in 1976 to 3429 GWh in 1978 to 1151 GWh in 1984. In 1982, the Kupong Hydroelectric Project was commissioned to provide an additional 160 MW to meet the increasing power demand. In the same year, electricity supply fell from 5,180 GWh in 1981 to 1,670 GWh, and consumption fell to 4,652 GWh over the same period after the 1983 economic stimulus package called for increased electricity demand from emerging industries and urbanization in 1985. Electricity consumption increased from 2083 GWh in 1985 to 4780 GWh in 1990. In, 1998 Ghana suffered another power crisis primarily because of reduced rainfall and runoff into Lake Volta. This led to a rationing of electricity, and consumer electricity supply dropped significantly to 4942 GWh in 1998. In 2004-2005 Ghana experienced short-term load shedding and repeated actions in 2009-2011 (Sani, 2022).

Energy emissions increased by 10.2 million tons of CO2 from 1990 to 2011. Transportation accounted for the largest share (40%) of this increase. This is due to the increase in the number

of passenger cars and the expansion of the domestic aviation industry due to the increase in stationary energy. From power plants and industrial resources, mining and quarrying. According to the USAID Ghana Greenhouse Gas Emissions Report, Ghana has registered a total of 59 MtCO2e of greenhouse gases; i.e. 0.13% of global emissions of 46,906 MtCO2e. According to the World Resources Institute Climate Analysis Indicators Tool (WRI CAIT), Ghana's greenhouse gas emissions are primarily dominated by land use change and forestry (LUCF) at about 53%, while electricity and heat account for 19% (Sani, 2022).

Most recently, Ghana experienced a major power crisis from 2012 to 2016, which brought the famous name "Dumsor". The term has been publicly used by Ghanaians since 2012 to express anger, ridicule, concern and disappointment with government power management. Unstable power supplies, rationing and constant blackouts in 2015 have resulted in declining socio-economic activity, unproductive state institutions, the collapse of businesses, layoffs of workers, rising unemployment, collapsing health care systems, and insecurity. As a result, both the mother and newborn baby died at the Bawku Presby hospital due to a power outage in February 2016. The Institute of Statistics and Social Economy (ISSER) estimated in 2014 that the electricity crisis at the time would cost Ghana between US$320 million and US$924 million in lost productivity and economic growth annually. The Wholesale Power Reliability Assessment Report (2010) also estimated that Ghana is losing between 2 to 6% of gross domestic product (GDP) due to inadequate and unreliable electricity supply. A reliable and adequate power supply is, therefore, even urgent given the economic costs of inadequate power supply (Sani, 2022).

In 2019, 15.7% of the world's primary energy will come from low-carbon sources, i.e. the sum of nuclear and renewable energies such as hydropower, wind power, solar power, bioenergy, geothermal power, and wave power. Hydropower and nuclear power account for the majority of low-carbon energy, together accounting for 10.7%. Wind power is only 2.2% and solar power is 1.1%, however, both plants are growing rapidly. Although more energy is produced yearly from renewable sources, the global energy mix is still dominated by coal, oil and gas. 84% of our energy comes from fossil fuels, but we continue to use more energy each year. Over the last decade, total production increased from 116,214 TWh to 136,761 TWh. In 2021, Ghana had a small power rationing and load shedding because of scheduled maintenance from March to June.

Ghana has not met its commitment to universal access to electricity by 2020 to ensure supply reliability and sufficiency. Governments are also failing to prepare to build sustainable and resilient energy hubs to meet constant electricity demand. Especially in low-middle-income countries like Ghana, it is important to link industrial growth and population growth to increased electricity demand. Ghana's first power crisis in 1984 was exacerbated by a major drought that began in 1983, disrupting the generating capacity of the Akosombo Dam. The total inflow to the dam between 1982 and 1984 was less than 15% of the expected total, resulting in power rationing and reduced supplies to neighboring Togo and Benin (Sani, 2022).

Recently, the International Energy Agency (IEA) published World Energy Outlook 2018 and expressed concern over a looming oil supply shortage that will lead to a 25% increase in energy demand by 2040. This dramatic increase in electricity demand is a global challenge to combat greenhouse gas emissions, with the stark observation that the share of electricity generation

from diesel increased from 0% in 1990 to 32.9% in 2012. It is a foreseeable reality to attribute to collective failure. Diesel and natural gas increased as Ghana diversified supply to meet growing demand and improve energy security. As a continuing trend, Ghana is looking to increase domestic natural gas production, natural gas imports and potential coal imports (Sani, 2022).

In 2010, the transport sector accounted for 14% of the global greenhouse gas budget, contributing to climate change through long-lived carbon dioxide and short-lived soot from diesel vehicles. Transportation emissions are a major problem for cities around the world, especially in developing countries that are experiencing rapid urbanization. Automobile growth is the fastest-growing driver of climate change emissions and energy consumption. On 24 March 2021, the World Health Organization's Urban Health Initiative report found that sustainable transport in Accra, the capital of Ghana, could reduce up to 5,500 premature deaths over 35 years due to improved air quality and increased physical activity. We have shown that we can save another 33,000 lives (Sani, 2022).

ENERGY SECURITY IN NIGERIA

Energy security and sustainable development remain key elements of Nigeria's myriad of burning national issues. Londoño (2018) argues that one of Nigeria's most significant problems today is energy insecurity. Orazulike (2012) told that sustainable access to affordable energy in all forms is essential for all developed countries to improve employment, food, health services, education, housing, clean water and good sanitation. It claims to be built on the recognition that it is fundamental to the offering (Adisianya 2010).

Power systems of Nigeria have several challenges at various supply levels including the lack of maintenance and repairs, leaks in transmission and distribution, power thefts and vandalism. Poor lighting system conditions threaten personal safety, and exposed wiring, unsafe light poles, and a lack of safety guards can lead to accidents and deaths (Ewepu, 2018).

Privatization of the energy sector, which began in 2005, was initially outlined as a solution to Nigeria's challenges. Attracting foreign investment and breaking the monopoly of the National Electricity Authority (NEPA) was claimed as a means of improving services and removing political barriers to modernization (Obadan, 2000). Unfortunately, the reform did not bring the expected results (Okoro, 2007). Instead, the privatization course increased nepotism and corruption. Utility costs rose, but electricity supplies did not improve significantly, layoffs of civil servants increased, and dissatisfaction and public dissatisfaction arose. People in the northern part of Nigeria are affected mainly by the energy challenges (UNDP Nigeria, 2015). The national network does not cover all these areas. Additionally, since 2009, northern Nigeria has been on the scene of violent riots by the terrorist group Boko Haram. By benefiting from the poverty environment and underserved services, Boko Haram has expanded its operations. Energy shortages and the lack of a developed public lighting system hamper government’s ability to fight the activities of Boko Haram.

Oyedepo (2012) pointed out that Nigeria's Renewable Energy Council estimates that blackouts cost the country N126 billion ($984.38 million) annually. Not only will incomes be significantly reduced, but the carbon footprint of the constant use of “backyard generators” in a wide range of homes and businesses will lead to health risks, unemployment, and a higher cost of living.

Orazulike (2012) highlights Nigeria's energy security challenges, stating that despite Nigeria being an oil exporter, there is a severe lack of major crude oil derivatives needed to support both industrial and personal consumption. It has widely demonstrated that it faces shortages. A look at some derivatives reveals the dire state of Nigeria's energy index. Regarding aviation fuel, he argues that the major problem facing Nigeria's aviation sector is the great energy insecurity caused by shortages of aviation turbine kerosene.

In terms of kerosene for households, which has almost the same composition as aviation turbine kerosene, Orazulike has indicated that the sole importer of household kerosene, the Nigerian National Petroleum Corporation (NNPC), sells its products to brokers and other unlicensed traders. We emphasize that we prefer to supply Petroleum products that are sold to retailers at a huge cost that is passed on to the consumer. Most operators within the industry believe the system was invented to make room for devious machinations and large-scale profit-making by a few well-connected individuals at the expense of ordinary consumers. Allegedly, part of the betrayal is diverting household kerosene to the aviation sector and trading it as jet fuel.

Regarding automatic gasoline (AGO), also known as diesel, Orazulike (2012) reported that Nigeria's Power Holding Company (PHCN) and its predecessor, the National Electricity Authority (NEPA), are not meeting the electricity demand. To meet the needs of businesses as well as individuals, they have resorted to self-help in diesel-powering heavy machinery and equipment to generate the electricity they need. Diesel is thus in high demand in sectors like banking, construction, manufacturing, transport, transportation and tourism. Regrettably, although diesel is important for economic growth, the challenge in Nigeria lies in its affordability and availability. Premium Motor Spirits (PMS), commonly known as Gasoline, probably holds all the oil in the country, as PMS security is still in the iron grip of this group, which Nigerians have come to call the "Secret Society".

Moreover, Orazulike has been out of reach for most Nigerians ever since liquefied natural gas (LPG), also known as cooking gas, has remained an exclusive reserve for the wealthy few (the elite). On electricity, Orazulike (2012) described Nigeria's power problem as legendary, even addressing the notorious toga of a problem that ignored all solutions.

The image above shows the energy insecurity in Nigeria's socio-economic environment. In addition, it significantly undermines opportunities for sustainable development. According to Oyedepo (2012), Nigeria's energy demand is increasing and population growth is not sufficiently considered in energy development programmes. The current urban-centric energy policy is unfortunate because the case of local and peripheral energy demand and supply has not been put at the center of the national energy development policy. Orazulike (2012) stated that Nigeria has everything it takes to build a great nation. However, the quest to accelerate the country's development could be quicker if the tripod of politics, law and private sector investment were used correctly in the national plan to ensure the country's energy security. In this tripartite challenge, the political segment is most important. The nature of Nigerian politics is a concern in this regard. Indeed, nearly 55 years after independence, Nigeria's politics must still be rooted in sustainable national development; however, it continues to be ruled by ethnic opinions.

In a purely empirical sense, the political-administrative dichotomy scenario continues to play out in the Nigerian environment. While loyal bureaucrats formulate a national policy on each issue, coordinating politicians consider only personal interests. Contracts must be made to implement these national policies, where politicians can either act as contractors with a direct interest or as a regulatory agency with hitherto hidden but now unequivocal personal interests. To this effect, Scharmer (2009) indicated that the success of an intervention depends on the inner state of the intervener.

ENERGY SECURITY IN BURKINA FASO

In Burkina Faso, over 80% of the energy supply comes from biomass. In rural areas, almost all the energy consumed is based on biomass. The national average of firewood consumption is 0.69 kg per person per day. This ratio can exceed 1 kg in some regions. Without incentives to save fuel or save moisture in wood fuel, efficiency will decrease and fuel consumption will increase. Charcoal is preferred over wood in urban homes because it is perceived as cleaner and more modern. However, the use of charcoal in cities leads to higher wood consumption in rural areas due to the application of inefficient technology in charcoal production. Recognizing this effect, charcoal production was reorganized in 2005 and concentrated in five production areas. Nevertheless, we see the effects of inefficient charcoal production. Notwithstanding the population growth, no real woodfuel shortage is currently being felt in most parts of the country. Rural families can pick up firewood from fields on their way home without requiring special logging trips to distant forests. The situation is different in the north. The shortage of firewood is felt even in the countryside. In cities where charcoal and wood are highly regarded as commodities, scarcity is reflected in higher fuel prices, affecting most households' poverty levels (Energypedia, n.d.).

Burkina Faso's electrification rate is not up to expectation yet. The significant investment by the government of Burkina Faso, as well as, the international supporters is not sufficient enough to satisfy the high level of demand in the two main cities in Burkina Faso; Ouagadougou and Bobo Dioulasso. As a result, the average connection rate remained the same for years. These cities have an electrification rate of about 20%, while the connection rate in small towns is about 5% and in rural areas, it is 'nearly zero' (UNDP and Department of Energy report 2012). In much the same way, lower than 5% of the population in rural areas has access to electricity (Energypedia, n.d). Relative to electricity, it strongly relies on fossil fuels and hydropower. It also comprises 28 fossil power plants and 4 hydropower plants. The key electricity supply strategy is to create connectivity with neighboring nations and to expand and rehabilitate existing grids (Moner-Girona et al., 2016).

In 2014, solar energy accounted for only 0.1% of total domestic energy consumption (Moner-Girona et al., 2016). In November 2017, the 33 MW Zaguturi solar power plant near Ouagadougou was connected to the grid contributing about 5% of the country's electricity generation at a production cost of 6 cents/kWh (Energypedia, n.d.). In January 2018, the Department of Energy did announce plans to build eight more solar parks constituting 100 MW (Moner-Girona et al., 2016). Wind energy is the most disadvantaged energy in Burkina Faso due to the low wind speed. Hydropower provides 10% of the total energy produced with an average production of 80 GWh, however, also limited possibility due to unsteady and adverse hydro-meteorological conditions (Moner-Girona et al., 2016).

It should be established that Gas (LPG) is the most commonly used alternative energy for home cooking. Almost 35% of households in large cities and about 10-25% of households in small towns still use liquid gas systems. The government of Burkina Faso formally supports his increased use of LPG in home cooking. However, this is rarely the case. Due to the lack of LPG supply, LPG already accounts for only 0.4% of urban consumption. The government has not provided additional funding for the subsidies needed to keep LPG affordable. In addition to the unreliability of LPG supply, the cost of investment in equipment is another obstacle for new customers. So, while some official government documents envisage switching to LPG, the same government is starting to phase out subsidies on LPG so a massive shift is unlikely. LPG has therefore become more expensive and less accessible to large segments of the population. When switching fuels is impractical, a “modern energy for cooking” alternative is to provide a more efficient wood stove. A basic stove for wood or charcoal is very cheap. Therefore, "new" technology must compete with expectations of lower product prices (Energypedia, n.d).

There are several improved rice cookers introduced to Burkina Faso in the late 1970s and early 1980s. They considered these aspects and today it takes about 30 years. In present times, we also have factory-made wood and charcoal stoves from China. Many of them are not adapted to local cookware and cooking methods. Additionally, the investment cost is too high to contest with the very cheap simple ovens in use today. The challenge, therefore, is to develop a high level of consciousness of the need to conserve firewood in and around large cities, and for manufacturers to bring stable, efficient, durable, and inexpensive stoves to poorer areas of the population (Energypedia, n.d).

ENERGY SECURITY IN COTE D’IVOIRE

The Côte d'Ivoire government has had to take important steps to sustain the country's energy sector. It all started in 1993 when the then government decided to open up the energy market to the private sector to avoid a repeat of his 1984 major load-shedding crisis. The driving force behind this decision, a first for Africa, was the desire to improve access to electricity to meet growing demand while reducing the impact on public finances. Two international consortia have decided to take the risk and invest. First, the CIPREL power plant was built, which started generating electricity in 1995. Then, in 1999, a second investor built and commissioned an eponymous thermal power plant in the village of Ajit, on the outskirts of the Youpugon commune known for its shops and restaurants. The plant initially produced 140 MW, but over the last 20 years it has expanded and now has tripled its capacity to 480 MW. The Ivory Coast authorities were far-sighted when deciding to privatize parts of the sector but ensuring the confidence of private investors was significant to achieve this vision (World Bank, 2020).

Various institutions of the World Bank Group have supported the country from the beginning. Between 2010 and 2019, the World Bank Group invested over $400 million in the construction and expansion of the Azito and CIPREL facilities by IFC, the private arm of the World Bank Group. The World Bank Group renewed its support after the post-election crisis in 2011 when it had to increase production capacity at its Ajito factory to sustain economic recovery. At that time, the World Bank's Multilateral Investment Guarantee Agency (MIGA) stepped in to provide $116 million in guarantees to protect investors from political risk (World Bank, 2020).

For many years, the World Bank Group has contributed significantly to the energy sector of Côte d'Ivoire to overcome numerous challenges. In 2018, a partial guarantee of $240 million

from IDA allowed utility CI-Energies to deal with several issues, including falling global gas prices and the need for government bailouts that would strain finances (World Bank, 2020).

World Bank support for expanding power generation capacity has also facilitated the transition to clean energy. It should be established that Côte d'Ivoire became the first country in Africa to have installed a combined cycle power plant due to the significant investment in the new steam turbines in 2013. This clean technology recycles waste gas to produce much cheaper electricity. We are also responding to the declining power generation capacity of hydroelectric power plants in the country, where water resources have been declining since 2010 due to climate change (World Bank, 2020).

Also, in 2013, Côte d'Ivoire decided to invest in the expansion of its natural gas fields to meet its growing energy demand (8% per annum) and replace its fuel with natural gas. This work was carried out by Foxtrot with the support of $60 million in IDA funding and his MIGA guarantee of $437 million. Most recently, as part of the World Bank Group's Scaling Solar Initiative, IFC helped develop two public-private partnerships to power 60MW solar power. In recent times, private operators in Côte d'Ivoire are accountable for 70% of the production of energy and 100% of its distribution (World Bank, 2020).

The government of Côte d'Ivoire, which has the third largest power grid in West Africa, is working to make the country a power hub in West Africa. As of 2021, Côte d'Ivoire has an installed capacity of 2,269 MW, of which about 61% (1,390 MW) is generated by heat and the remaining 39% (879 MW) is generated by hydroelectric power plants. The reputation of US companies and their quality products and services will drive strong interest in exports such as smart energy monitoring devices and renewable energy-related services. According to the National Development Plan, increasing electrification to other parts of the country is a topmost priority of the government. While close to 92% of urban residents can boast of access to electricity, progress in rural electrification is lagging. The Ivory Coast government aims to close the gap by expanding the grid. The government is also actively undertaking a project to expand and diversify the energy mix, with a target of 42% of electricity coming from renewable sources by 2030 (International Trade Administration, 2022).

UNDERSTANDING AFRICA'S ENERGY NEED

Africa hung for energy. In the sub-Saharan African region, only 24% is said to have access to electricity, and Africa (excluding South Africa) has only 28 gigawatts of generating capacity, the equivalent of only Argentina. Demand increases with population growth, urbanization, and economic productivity growth. Smaller installed capacity means less energy usage and access. Even people who are connected to the power grid are faced with 54 days of power outages per year on average, constituting 15% of darkness per year (Nganga, 2016). African economies are forced to rely on the use of expensive generators to fill this gap in energy supply. However, generator power is very expensive, averaging four times as much as grid power. Companies operating in Africa operate at much higher operating costs than companies in other regions. This applies not only to companies in energy-intensive sectors, however, also to companies in general such as banks and supermarkets.

As part of the 17 Sustainable Development Goals, affordability and clean energy cannot be ignored. Energy is essential for economic development. Nations that have low electrification

charges have low GDP per capita and are underdeveloped. The underlying logic is that improved access to energy will lead to improved education, life expectancy, health care and economic growth. Light continues to provide clinics to women who give birth late at night. This allows students to study and businesses to stay open after dark. All these factors lead to increased productivity in a country, a precursor to economic development. The African energy sector offers great opportunities, but seizing these opportunities is costly and requires structures in place to encourage sector development. Government policies should make the market viable for private investors and promote integration across the region to facilitate capital investment savings (Nganga, 2023)

THE IMPORTANCE OF ENERGY SECURITY IN AFRICA

An important aspect of energy security is that it is the foundation and pillar upon which an advanced global economy is built. Energy security is the most important catalyst for job creation. All industries, factories, schools, markets, hospitals, service companies, hotels and tourism require constant energy to function effectively (Adisianya 2010). According to Oyedepo (2012), energy contributes significantly to economic growth, progress and development. It also reduces poverty and impacts security in every nation. Uninterruptible power supplies are an important issue for all countries today. Future economic growth depends on the availability of energy relative to its affordability, accessibility, and environmental friendliness (Oyedepo, 2012).

From a security perspective, the armed forces are equipped with ships, boats, aircraft, armoured vehicles, communication systems, and land, air, and sea operations to maintain the peace, security, stability, and territorial integrity of the country. Police and other security agencies also need a regular supply of fuel to maintain law and order. Armed robberies, carjackings, and other serious security problems would arise if the police were unable to fuel the vehicles they used to patrol the country. More importantly, most modern equipment used by the military and other security services is designed to be challenging to operate without a reliable power source (Oyedepo, 2012

Similarly, firefighters are irrelevant in a fire incident if their vehicles are without fuel. Ghana's military, police, immigration, prison barracks and military bases housing men and women all need fuel to keep them functioning at all times. This suggests that energy security is closely linked to physical and national security. Without an adequate and reliable energy supply for the military, it would be challenging, if not impossible, to patrol coastal waters and stop drug cartels, pirates and illegal fishing vessels from violating the territorial integrity of Africa.

From an economic point of view, critical and strategic economic infrastructure such as seaports and airports are highly dependent on energy. Telecommunications equipment in these locations must have a constant supply of energy (power) to maintain operation. Oil, gas and mining operations such as are also heavily dependent on energy. Industries like bauxite and cement manufacturing and real estate companies also require a sufficient amount of energy to run their business operations fully.

Investors have a great deal of confidence in Ghana's economy, according to a recent survey, with many looking to invest in West Africa's growing oil and gas sector using Ghana as a base for doing business but the problem is if a reliable and affordable energy supply is not

guaranteed, they would not invest in the economy. Large financial and banking institutions, including the Stock Exchange, Central Banks in Africa, and their ATM systems all depend on regular electricity supplies to operate. Dams and thermal power stations in African countries (Ghana, Nigeria, Burkina Faso and Côte D'Ivoire) all require energy to generate electricity. If the transport sector cannot get adequate diesel and gasoline at affordable prices, it will be impossible to transport people and to produce, distribute and market food, medicine and other commodities.

It should be stated that national ministries such as defense, energy, finance, foreign affairs, and domestic affairs cannot run smoothly without a guaranteed supply of energy. Again, the operations of key government agencies depend on a reliable power supply. Medical institutions such as teaching hospitals, regional and district hospitals, and polyclinics depend on energy. Their equipment such as X-rays, incubators, and other life-saving equipment rely on energy. To function effectively and save lives, hospitals need safe, reliable and resilient power. Hospitals have backup generators that run on natural gas and diesel in the event of a power outage. Hospitals use energy for their operations and the many people who use them, including medical staff, patients, and visitors. Hospitals operate 24/7 daily. Thousands of staff, patients and visitors occupy the building every day. Sophisticated heating, ventilation, and air conditioning systems control temperature and airflow. In addition, many energy-intensive activities take place in these buildings. These include laundry activities, usage of medical and laboratory equipment, sterilization, computer and server operations, catering and refrigeration (Institute of energy research, 2020). Universities, colleges of technology, secondary schools, nursing schools, teacher training schools, libraries, and other educational institutions cannot operate satisfactorily if their supply is disrupted.

CONCLUSION

Per the conversations so far, one can critically conclude that the countries (Ghana, Nigeria, Burkina Faso and Côte D'Ivoire) in question are not sufficient in terms of energy. That is though these countries have made significant strive toward achieving energy security, there is still more to be done. It is expected that these countries beef up plans to be fully sufficient in terms of energy. This is mainly due to the significant contribution of energy to the economies of these countries. It has been established that energy security plays a key role in every facet of the economy of Africa; from education, agriculture, industry, service and health. One cannot imagine what will happen to our hospitals if there are power outages for several days; patients scheduled for Caesarean section would have to battle for their lives as there would be no light to carry out the operations. Generally, medical services would not effectively be carried out. The use of machines such as MRI, X-ray scanners, CT scanners, sterilizers, Electrocardiogram (EKG/ECG) machines, surgical tables and laser machines all depend on power.

Again, what happens to pregnant women who do not have access to power at night? The answer is quite obvious; they will lose their lives as energy is required to take care of these women. In the recent covid-19 surge, power played a key role; most people would have lost their lives should there have been no power in most African countries in 2021 when the pandemic got to its peak. Large-scale agriculture relies on power for the production of crops; irrigation of farmlands and harvesting of crops rely on energy. We cannot forget the fact that energy insecurity poses a threat to security. “Bad” people mostly operate in the dark (though also high in the day) and this suggests that energy insecurity has a higher potential of making these

people promote their hostile intentions. Education is an important aspect of our lives, and this sector relies heavily on energy. Students cannot feel comfortable at school without energy; apart from the fact that energy facilitates learning, it also facilitates the domestic activities of students. Energy shortages affect people's daily lives in many ways. Without electricity, food cannot be refrigerated, medicine storage would be compromised and running water would be unavailable. In summary, energy security is very significant as it affects every aspect of the economy.

RECOMMENDATIONS

To improve the energy security situation, risk management is key. This process involves eliminating risks by diversifying energy sources, absorbing risks by creating a reserve margin of power generation capacities, and preparing for inevitable supply disruptions by creating strategic reserves.

Reducing exclusive dependence on just a few energy sources or providers leads to diversification and the introduction of sustainable alternatives. This strategy gives way for regions, countries, and states to shield themselves from energy disruptions and further reinforce energy security. They can also consider switching suppliers to lessen their dependence on imports. The exploitation of their resources and using alternative energy sources are some ways to achieve complete self-sufficiency.

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