

Introduction

Electricity is very important in many activities carried out by the people, societies, communities and the nations globally. Developments of economics and infrastructures of the country rely heavily on the availability and reliability of electricity supply. If electricity supply is not of required quantity and quality these developments suffer great setbacks. Electricity supply is therefore at the center stage of economic and social developments of a nation. According to (Ladan, 2014), electric power sector represents the most strategic and important infrastructural requirement for moving the economy of a nation forward. Electricity is not readily available in nature but available through the transformation and conversion of other forms of energy. Sources of electricity include hydro plants, gas-fired, solar, wind and other sources such as diesel and Heavy Fuel Oil (HFO). The important roles played by electricity in social and economic developments has made some countries to take its productions, transmissions and distributions out of public sector to private sector for better performance, efficiency, increase output and improve service delivery.

Globally, nations ensure the availability and reliability of electricity supply because of its importance in economic and infrastructural developments. Access to electricity by the citizens determine how well the economic security of the country would be. The need to address the insufficient availability and reliability of the electricity power supply in Nigeria made the government to start the process of privatization of the sector in 2005. The Electricity Power Sector Reform Act (EPSRA) was enacted by the parliament in that year. The National Electric Power Authority (NEPA) was renamed Power Holding Company of Nigeria (PHCN) and unbundled into 18 companies. The companies were 6 generation companies, one transmission company and 11 distribution companies. These were called the Generation Companies of Nigeria (GenCos), the Transmission Company of Nigeria (TCN) and the Distribution Companies of Nigeria (DisCos).

The 6 GenCos and the 11 DisCos were sold to private sectors while the government held on to the TCN. The active participation of private sectors was expected to improve the availability and the reliability of electricity supply in Nigeria to enhance economic security. However, this has not been achieved.

The privatization of electricity sector has become a landmark policy initiative in Nigeria. It was carried out to improve efficiency of the power sector, increase productivity, bolster economic security and national development in general. Despite this electricity reform policy, the expected result has not been achieved. There is inadequate or insufficient availability of electricity supply needed for national development. When available, it is not reliable as there are frequent outages and supply disruptions hampering industrious growth, national economic development, business operations and general standard of living. Many manufacturing companies have relocated to other countries due to poor electricity availability and reliability. Many micro, small and medium enterprises have closed down operations for the same reason.

Objectives

The main objective of this paper is to discuss the impact of privatization of electricity sector on power supply and economic security in Nigeria and proffer solution for improvement. The specific objectives are to:

- i. Discuss the impact of privatization of the electricity sector on the availability of electricity supply.
- ii. Evaluate the effect of privatization of electricity sector on the reliability of electricity supply for economic security in Nigeria.

Conceptual Framework

Privatization

Privatization opens ways for private sectors participation in public owned enterprises (POE). It is a market-oriented policy which allows efficiency, greater performance and effectiveness in institutions and business outfits. Privatization reduces governments participation in state own enterprises and gives private institutions the opportunity to participate maximally in them. It is a method which makes the people depend more on private sector than on government. There is the wide belief that public enterprises are not efficiently run and the performances are low. According to (Savas, 2000) privatization therefore means greater reliance on the private institutions of society and less depend on government to satisfy peoples' need. Privatization therefore is a way of transferring public sector responsibility to private sector for efficiency, effectiveness and better management. Privatization is a process which allows government divesting of its controlling interests in the public sector of the economy and allowing significant participation in the place with the intention of creating a more competitive climate and profit orientation with the sector (Hassan, 2014). The bureau of public enterprise (PBE) according to (Gbadebo, 2014) defined privatization as the transfer of government owned shareholding in designated enterprises to private shareholders, comprising individuals and cooperate bodies. Montes said, privatization means many things and better understood when the difference between who owns a good or service and who supplies or lends it is established (Montes, 2004). (Aktan, 1995) said, privatization in broad sense means the transfer of functions previously performed only by the public sector, to the private sector. In this paper, privatization is a market-oriented policy that transfers ownerships of a public own enterprise to private sector for better management, improved performance, increased productivity, good service delivery and improvement of economic security.

Electricity

Electricity is the flow of electrons in a conductor. Electrons are small charged particles which are separated or detached by force from atoms. The movement of these electrons through a conductor becomes electric current. Electricity is made up of electric charges, their motions and their effects. It can be generated through renewable and non-renewable sources. Electricity is indispensable to the social-economic and industrial development of a nation. When available in the right quantity, reliable and sustainable, there will be improvement in productivities through industrialization and small and medium scale enterprises (SME). Electricity is a very crucial and indispensable factor to a country that aspires a greater social and economic development, as its levels of output and stability largely determine the degree of other sectors' economic efficiency because it is instrumental to their optimal performance (Idowu et al, 2019). Electricity in this study is the flow of electrons through a conductor which can be harnessed through generation, transmission and distribution for national development and economic security.

Economic Security

Humans need basic requirements that can make them live good lives. In line with this assertion, the International Committee of Red Cross (ICRC) defines economic security (ECOSRC) as the ability of individuals, households or communities to cover their essential needs sustainably and with dignity. It states further that the essential needs that an individual must be able to have and sustain with dignity are shelter, food, clothing, hygiene and access to health care facilities. Economic security is therefore a function of general security. For example, how easy could it be to produce food in an area occupied by bandits? According to Joshua, security refers to the desire for safety or protection (Joshua, 2019). In this paper the definition by the International Committee of Red Cross is adopted.

Methodology

This study adopts textual analysis as its research design, where existing literature were studied to examine the impact of privatization of electricity sector on power supply and economic security in Nigeria. Secondary Data were mostly used for the study.

Theoretical Framework

The New Public Management (NPM) theory is adopted in this study as a framework for analysis. Hood and Jackson were two scholars who first studied the failures and inadequacies of public sector performance and developed the NPM Theory in 1991. The new public management theory states that Privatization of a firm promotes a market-oriented structure for improved productivity and performance and subsequently makes the organization more customer-centric (Walker et al, 2011). Privatization, therefore, brings about competitive spirit among the players involved. It leads to efficient performance, good service delivery, increased productivity, and customer satisfaction. Governments all over the world are attracted to privatization because of the productive efficiency associated with it. (Savas, 2000) said, privatization is now commonplace throughout the world, in developed and developing countries and in democracies and dictatorships. Privatization encourages higher dependence and reliance on private institutions of the society with reduced same on government. It allows efficiency, effectiveness and equality in the delivery services. Those who support the theory believe that privatization can lead to reduction in price over time and increase performance in the activities of the firm.

According to (Mishra & Bekuretsion, 2020), privatization creates a competition culture among various players in the market and establishes strong foundation for economy, efficiency and effectiveness. Those against the theory believe that privatization does not consider the welfare of the citizens and that profit motives may be given higher consideration than social objectives. Some

people also believe that processes leading to privatization may not be transparent which make incompetent people and companies to acquire the public institutions which they cannot manage effectively. Some people also oppose the theory because they believe it allows public properties to be sold to private sector or companies at very cheap prices. However, this theory is suitable for this paper because privatization of the electricity power sector in Nigeria, was aimed at increasing the availability and reliability of electricity supply for economic security.

Empirical Review

Impact of Privatization of the Electricity Sector on the Availability of Electricity Supply

Ladan (2014) stated that the role of electricity in promoting sustainable development was very significant. He believed no nation could develop economically and with reasonable industrialization without very good and efficient electricity energy. He stated further that electricity energy was required for most basic human and social needs which included adequate healthcare, shelter, employment, communication, food and many other social services required for economic security. According to Ladan, electricity is very necessary to promote high standard of living. He believed availability of electricity supply in required quantity is still a great problem in Nigeria. Olalere (2014) investigated privatization of electricity industry in Nigeria: lesson from Europe and United States of America. He observed that electricity energy plays vital and dominant role in global economic development and developing countries have insufficient electricity supply as against the developed countries with adequate supply. His study revealed that inadequate supply of electricity in Nigeria prevented necessary adequate development.

Eseyin and Ogunjobi (2021) conducted a study on sustainable electricity supply and poverty reduction in Nigeria. The study revealed that the majority of the poor citizens live in rural areas. In addition, observed that industrialization, well-being or high standard of living would be difficult

to achieve in Nigeria unless there was adequate, sufficient, reliable and stable electricity supply. The study concluded that good and sustainable electricity supply would boost the work of traders, artisans, improve storage facilities for farmers, encourage industrialization, stop or reduce rural-urban migration and improve the general standard of living of the average rural dweller. In exploring the relationship that exist between electricity supply and economic development in Nigeria, Samuel and Lionel (2013) investigated the dynamic analysis of electricity supply and economic development: Lessons from Nigeria using time series data. The study revealed that electricity had very low and small impact on economic development in Nigeria, irrespective of its poor state. It was recommended that attention should be directed towards improving technology and ensuring that power projects already started are successfully completed to reduce power loss and increase electricity supply for economic development.

Effects of Privatization of Electricity Sector on the Reliability of Electricity Supply.

Oseueke, et al (2013) carried out a study on electricity stability in Nigeria through increase Hydro power Generation. The study revealed that electricity generation in Nigeria was too small for the development of the country. The investigation equally indicated that generators were widely used as alternative sources of electricity supply in the industries, residential area and other uses in the country. The study recommended the construction of more dams in Nigeria to increase hydro power plants as sources of renewable energy to boost electricity supply in the country and make it more reliable.

Adamu (2015) conducted a study on electricity generation, transmission and distribution for sustainable economic development in Nigeria. He identified many causes of inadequate power supply in Nigeria and said the unstable and unreliable power supply situation has huge negative effect on the economic development sustainability of the country. It was therefore recommended

that government investment at any level of play in the electricity market should not be based on politics or quota system but on integrity, competence and professionalism. He stated that sustainable energy development in Nigeria was the key to the stability of the country in terms of viable economy, social order and political stability.

Gbadebo (2014) undertook a research project on privatization of the power sector and national development in Nigeria: An Evaluation. It was observed that lack of sufficient management was the result of underdevelopment of power sector with the resultant negative effects on the economics of Nigeria. He said the inability to adequately generate, transmit and distribute electricity power in Nigeria was the obstacle to national development. The study recommended the review of Electricity Power Sector Reform (EPSR) Act 2005, completion of National Integrated Power Project (NIPP) and provision of gas infrastructure.

Availability of Electricity

Electricity availability or accessibility in Nigeria after the privatization of the electricity supply chain has not been up to the standard expected. In 2019, Nigeria was ranked the 14th African Countries in sub-Sahara Africa with access to electricity with only 61 percent of her population having access to stable electricity (Sasu, 2022). While South Africa with a population of 64,701,000 generated 244,383 GWH of electricity in 2024, Nigeria with a population of 228,181,000 (Mckenna, 2024) generated 26,037 GWH of electricity in the same period (Mosadioluwa, 2024). In 2023 First Quarter, there were twenty-seven (27) grid-connected power plants. Their average daily available capacity was 4,544.13 MV. During the year, their total generation was 36,710.36GWH which was an average generation of 4,190.68MWh/h. According to Nigeria Electricity Regulation Commission (NERC) the overall availability factor for all grid-

connected plants was 35.90% making more than 64% of installed capacity in the Nigerian Electricity Supply Industry (NESI) not available for the year 2023

(NERC, 2023). In the First Quarter of 2024, the twenty-seven (27) grid connected power plants produced the average available generation capacity across all the plants of 4,249.10MW. This was a decrease of 673.16MW representing 13.68% compared to 4,922.26MW recorded during 2023 Fourth Quarter. See Figure A.

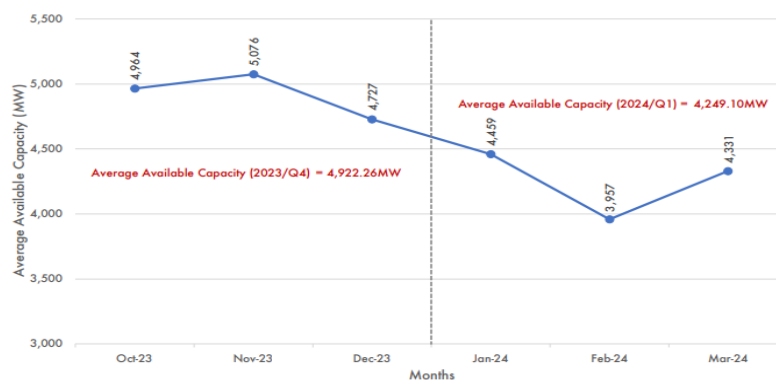
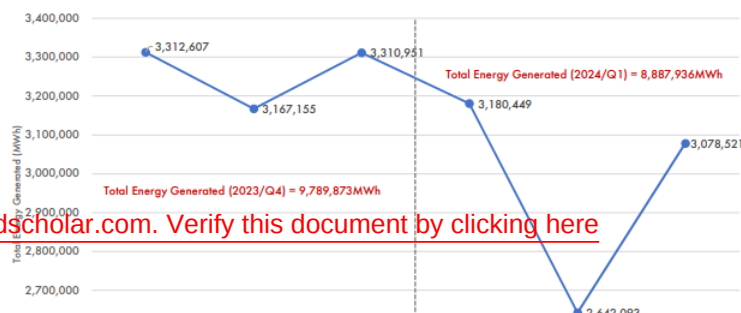


Figure A: Available Generation Capacity (October 2023 - March 2024)

Source: First Quarter 2024 NERC Quarterly Reports

In 2024 fourth quarter, the average hourly generation available units decreased by (364.25MWh/h) representing 8.22% from 4,433.82 MWh/h in 2023 Fourth Quarter, to 4,069.57 MWh/h. There was a decrease of total electricity generated within the quarter by 9.21% (901.94 GWh) from 9,789.87GWh in 2023 Fourth Quarter to 8,887.93Gwh. See Figure B.



Source: First Quarter 2024 NERC Quarterly Reports

The Situation of electricity available shows a declining feature instead of increasing. This cannot provide economic security, especially with 61% only of urban populations and 27% of rural population having access to electricity supply (Sasu, 2022). The amount of electricity required in 2023 to ensure reasonable availability was 40,000,000,000,000 watts/hours while supply was 35,000,000,000 watts/hours. This was far lower down the demand. The electricity consumption per capital was around 120Kwh, which was 2.8 times lower than the average for sub-Sahara Africa at 336 KWh.

Reliability of Electricity

The reliability of electricity supply in Nigeria can be said to be very low. It is not possible to predict when electricity will be available for its customers. There are too many outages of electricity on daily basis. Electricity supply situations in Nigeria cannot be classified as being reliable. There are only five (5) states in Nigeria with a small part of them having reliable electricity supply. Hence out of thirty-seven (37) states, including the Federal Capital Territory (FCT) it can be said that in general, electricity supply is not reliable in Nigeria. The states which parts of them enjoy reliable electricity include; Lagos State, Ogun State, Rivers State, Akwa Ibom State and FCT Abuja (Odeyemi, 2024).

The areas that enjoy 22 to 24 hours nonstop electricity daily can be said to have reliable electricity supply. (Mate, 2024) stated these areas and reasons for the possibilities as follows:

- Ahmadiya, Lagos connected to 33KV line, an industrial power line.
- 1004 Estate, Victoria Island Lagos, a substation fed from 33KV line.
- Ijede, Lagos Power Outages not more than 15-30mins because of its closeness to Egbin Power Plant.
- Redemption Camp, Ogun State. It has 10MW turbine that generates electricity.
- Powerline, Osogbo. First landing point after electricity power leaves Egbin in Ikorodu before moving up North and Eastern Nigeria.
- Christland, Ondo Town enjoys 23 hours and 30 minutes of light daily. Outages not more than 5 minutes
- Bonny Island, Rivers connected to NLNG Power Line, 24 hours of Light, nonstop.
- Ihovbor Community, Edo State. The state built a powerful electricity generating turbine that serves their source.
- Aboh/Okpa Ndokwa in Delta State. They are connected to AGIP turbines which supply steady electricity up to 22 hours daily to their host communities and surrounding villages.

These few areas are so small when compared with the size of the country. A close observation shows that most of the areas are under off-grid connections. From the Band Areas created by NERC, only B and A customers representing 15% of the 12 million electricity customers in Nigeria enjoy 20 hours of electricity daily. Band B enjoys 16 hours, Band C 12 hours, Band D 8 hours and Band E 4 hours (Udeme, 2024). Apart from Bands A and B which enjoy from 16 – 20 hours of electricity daily, other Band Areas have no reliable electricity supply. Hence majority of Nigerians have no reliable electricity supply.

Effects of Electricity Supply on Economic Security

Electricity supply is an important part of economic security especially in Nigeria. Its availability, reliability and stability will have great implication for economic security. In the production process electricity is an important component without which many productive activities will come to a halt. When productive activities are disrupted, employment and incomes for the large number of the employable population are equally disrupted. Electricity supply affects manufacturing, agriculture and health sectors. Food storage and drug manufacturing and preservation require electricity for proper handling. According to Stoyrnor (2016), the risks for the economic security are potentials threats for the economic system which may cause economic crisis. Insufficient electricity supply in Nigeria is a potential risk for economic security. Also, only about 61 percent of Nigerian have access to electricity as at 2022, Sasu (2022). The manufacturers spent at least 60.4billion naira on alternative energy sources within the first half of 2023 Ikpot (2023). Many manufacturing firms have closed down due to unreliable electricity supply. The number of such companies ranged from hundreds to over a thousand. The Manufacturing Association of Nigeria (MAN) reported 196 closures between 2015 and 2017. Many businesses are shutting down due to poor supply of electricity. Many of the micro, small and medium business enterprises are closing down in Nigeria due to insufficient and unreliable electricity power supplies.

Challenges of Availability and Reliability of Electricity Supply

According to (Saturday 2021), the challenges of the privatized electricity power sector in Nigeria started with the ownership structure. The buyers had no sufficient knowledge in the management especially the maintenance of the electrical power sector facilities. They could not provide the high cost of generation, transmission and distribution of electricity. They could not purchase new equipment to replace the old and dilapidated ones after acquiring the ownership of the generation,

transmission and distribution companies. Maintenance of the old facilities was not as regular as it should be. There were no modern transmission lines and equipment, the equipment available were grossly mismanaged, poor maintenance of available infrastructure and inefficient grid design characterized the Nigerian electricity supply chain. According to Akpabio, privatization has failed. The companies are not adding value. What was expected of them was for the companies to bring in more equipment for electricity which they have failed to do (Akpabio 2024). Old and dilapidated equipment bring about many times of grid collapses. This year, from January till date there had been 11 times of grid collapses. Specifically, on November 11, 2024 there was a grid collapse. The 12th time occurred on 11th December 2024 (Pundi, 2024). On October 19, 2024 there was an explosion of current transformer at the Jebba Transmission Station which was said to be as a result of poor maintenance. The exploded current transformer had not been maintained for 47 years (NERC, 2024). According to Izuka, the reasons for grid collapse is the drastic drop in generation. She said there had been 105 collapses recorded from 2015 to April 2024 (Izuka, 2024).

Regulatory laws constitute another obstacle towards having availability and reliability of electricity supply in the country. The law for a long time required only a national grid system which concentrated every generation, transmission and distribution in the federal governments. States, local governments and other interested private enterprises could not produce electricity for their various entities. Added to this is large scale corruption in the electricity supply chain. Recently the national assembly started the probe of 2 billion dollars renewable energy grant. The probe is ongoing. Also it was alleged that about 16 billion dollars was released in the recent past for maintenance of electricity infrastructures, with no concrete evidence to show what the money was used for.

Technical issues resulting from great differences between the installed capacity and generation capacity due to insufficient gas supply constitute another source of loss of electricity energy. According to (Samuel et al, 2014) there are great losses during the transmission to the many distribution points and various locations of the end users. Another great challenge are the activities of the vandals. A total of one hundred and eight (108) power transmission towers were destroyed by vandals in many parts of the country. Between January 2022 and September 2024, 132KV double circuit power transmission lines and 330KV double circuit lines were destroyed by vandals. The vandalization occurred in Abuja, Lagos, Kano, Enugu and Benin Regions. According to (Punch, 2023) TCN recorded ten (10) cases of vandalism at various points across its region mainly on the transmission towers. With all these losses and vandalization of electricity infrastructures, availability and reliability of electricity supply for economic security may be a huge task.

Strategies for Improving Electricity Supply Availability and Reliability

The national grid system in which all generated electricity energy power from all sources must be connected has been a major problem to availability and reliability of electricity supply in the country. The Electricity Act (EA) which was enacted in 2023 had now removed the national grid centralized system. It has empowered states, companies and individuals to generate, transmit and distribute electricity in Nigeria (Aduloju, 2023). The monopoly enjoyed by the Federal Government of Nigeria (FGN) in the industry has been substantially removed. The decision is expected to attract both foreign and local investors into the electricity energy supply sector. States like Abia, Enugu and Lagos are already taking advantage of this law to establish their electricity supply chain. Other states need to do the same to improve on the availability and reliability of electricity supply in the country. Lagos and Ogun States have recently been given certificate by

NERC to regulate their electricity industry. There is also the need for energy mix in the country. Over reliance on hydro, gas and fossil fuel sources of electricity energy needs to be stopped. Sources of renewable energy and energy efficiency program has to be included in the Nigeria's National Electricity Supply Chain. Also the generation of 36,037 GWh which provides only 61 percent (61%) of Nigerians with electricity requires improvement.

There is the need to have adequate replacement and maintenance programs for the electricity infrastructures. For example, replacement and maintenance program could be monthly, quarterly, twice a year and annually depending on the equipment type and the specifications of the manufacturing companies. To improve availability and reliability of electricity in Nigeria, the security of electricity supply infrastructures is very paramount. Stealing, destruction and outright vandalization of equipment of the electricity supply chain is becoming very rampant. There is the need to provide surveillance using technology alongside human physical presence to secure them. Drones and close circuit television (CCTV) can be deployed for adequate monitoring of the equipment. Physical patrols covering ground and air can lead to arrest of vandals and those engaged in cable and transformers theft. These electronic gadgets have to be incorporated with high power communications equipment for situation report and call for assistance or reinforcement when necessary. Corruption in the electricity supply chain in Nigeria has to be reduced if it cannot be totally stopped. Appointment into the electricity supply industry have to be based principally on merit and not political considerations. People who are to work in the industry must have the technical knowledge required to work competently. They should be people with good character and integrity. The electricity supply industry needs lot of money for proper revitalization.

Government can grant loans to the industry for massive infrastructural development to aid it for better performance.

Discussions/ Findings

Ladan (2014) believed in the important role electricity power supply play in national development. He said no nation could develop economically with industrialization without the availability of efficient electricity energy. He observed that most of the domestics, agricultural, health and micro, small and medium business activities rely on electricity in reasonable quantity and quality to thrive. He was of the opinion that Nigeria lacked efficient, consisted, reliable and affordable electricity energy supply. Olalere (2014) investigated the privatization of electricity industry in Nigeria and drew lessons from Europe and United State of American. He found out that the developed countries had more reliable and sufficient electricity energy supply than developing countries. He said there was no sufficient electricity energy supply in Nigeria. He concluded that the country should improve on the privatization of electricity sector for sufficient electricity energy to be available for industrial development and economic security. Eseyin and Ogunjobi (2021) investigated sustainable electricity supply in Nigeria and observed there was no sustainable electricity supply in Nigeria good enough for economic security and industrialization. Samuel and Lionel (2014) in their study, the dynamic analysis of electricity supply and economic development; Lessons from Nigeria. They observed that electricity was low in Nigeria. They recommended government should make more efforts to improve on generation, transmission and distribution of electricity in Nigeria to boost industrial and economic development.

Osueke, et al (2013) in their study observed that electricity generated in Nigeria was too small. They discovered that generator was widely used as alternatives electricity energy sources to drive

economic activities. The authors recommended the construction of more dams in Nigeria to improve hydro power plants as sources of renewable energy to obtain reliable electricity energy supply. Adamu (2015) in his study believed that for a nation to grow economically stable and reliable electricity power supply was needed. He recommended that government should improve on the electricity sector to be able to achieve viable economy, social order and political stability. Gbadebo (2014) in his research observed that inadequate, transmission and distribution of electricity in Nigeria, constituted a huge problem to economic development. He said government needed to review the EPRA Act 2005 to achieve high electricity supply in Nigeria.

Conclusion and Recommendations

This paper investigated the impact of the privatization of the electricity sector on economic security in Nigeria. The state of electricity supply, availability, reliability and economic security in Nigeria were reviewed, the problem of availability and reliability of electricity and strategies to improve them were studied. The opinion of the authors of most of the works reviewed and the states of the availability and reliability of electricity in Nigeria revealed that Nigeria must improve on electricity supply sector. The need to inject funds into the electricity supply industry to achieve adequate supply is very important. There is the need to improve on the security of electricity supply infrastructures to achieved reasonable level of reliability of electricity supply for economic activities to improve and lead to increased economic security.

The study therefore, recommended that;

- i. More funds should be made available to the nation's electricity energy sector by the government and other sources through loans or grants to improve the generation, transmission and distribution of electricity.

- ii. The electricity energy infrastructures should be more secure to achieve stable electricity energy supply for economic activities to improve in the country and boost economic security.