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CHALLENGES TO ENERGY SUSTAINABILITY IN NIGERIA AS A DEVELOPING NATION AND THE WAY FORWARD

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ABSTRACT

Energy is the power drive of economic growth and industrial development of any society, there is a clear correlation between energy consumption and living standards. The availability and consumption of energy is an index of prosperity on any nation. Nigerian's energy need is on the increase, and her increasing population is not balanced by adequate energy development. Nigeria needs more energy to meet the rising in demand of energy, due to population increase, inevitable industrialization, more agriculture production and improving the standards. However, there are challenges due to economic, social, technical and political barriers. The challenges have to be overcome if energy development technologies are to be deployed to make a meaningful impact on the energy mix in the nation. This paper discussed the challenges confronting the energy sector and suggests solutions on how they can be managed.

1. INTRODUCTION

This is a time of unprecedented uncertainty for the energy sector. Secure, reliable, affordable, clean, and equitable energy supply is fundamental to global economic growth and human development and presents huge challenges for us all [1]. One significant factor that is generally recognized as the best indicator of any Nations level of development, industrial strength and wealth is the amount of energy that is available and used by that country. This is because, in most cases, there is strong statistical correlation between a country's energy consumption and its economic output. The reason for this relationship is the reliance of the majority of the world economic activities on the availability of energy [2].

Energy shortage may sound paradoxical in a major oil-producing nation such as Nigeria. However, acute energy shortage for many years in the country has led to perennial and irregular electric power with serious consequences for economic development, citizen safety and quality of life for its people. Since 1972 till early part of 2006, electricity production and supply in Nigeria has been a monopoly of the federal-owned electric utility body known as National Electric Power Authority (NEPA) now known as Power Holding Company of Nigeria (PHCN). This utility was charged with the responsibility for the generation, transmission, distribution and sale of electricity to customers. Today, Nigeria's power sector is marked by low generating capacity while much of the country's citizens lack access to uninterrupted supplies of electricity. Lack of adequate funding and managerial strategies has resulted in the steady decline in the performance of the utility [3].Nigerian's energy need is on the increase, and her increasing population is not balanced by adequate energy development availability urban-centred energy policy is deplorable, as cases of rural and sub-rural energy demand and supply does not get to the centre stage of the country's energy developers' ideologies. The sole dependence on hydro-power sources for energy supply has also not been adequate and this is controlled by factors such as the seasonality of the level of water at the different hydro-power stations. The

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present and the ever increasing population in comparison with the total capacity of available power stations has placed her in a real situation of not being able to meet the energy need of the people. Rural dwellers still, depend on charcoal and wood for cooking and heating [4].

Energy is the power drive of economic growth and industrial development of any society, also energy is central to economic development, there is a clear correlation between energy consumption and living standards; with all indication energy declination lead to low economic development, industrialization, and technology development, survival of living things and civilization or social aspect [5].

2. ENERGY CRISES IN NIGERIA

Currently, one of the issues confronting the world is the challenge of achieving a truly sustainable energy system [6]. Nigeria is located on the west coast of Africa. It is the continent's most populated country in Africa, with over 150 million people. According to the Nigerian energy policy report from 2003, it is estimated that the population connected to the grid system is short of power supply over 60% of the time [7]. Additionally, less than 40% of the population is even connected to the grid. On a fundamental level, there is simply not enough electricity generated to support the entire population [7].

The Main energy challenges that face Nigeria presently is how to increase energy supplies to meet the needs of its growing population. According to [8] electricity and oil production challenges slowed down the growth of Nigerian's Gross Domestic Product GDP; also significant is the need to repair and upgrade existing infrastructure especially for non-hydrocarbon energy sources. Meeting these challenges is very critical to improving the nations' economy and raising the standard of living in Nigeria [9].

Table 1 Nigerian's electricity sources

Source	% contribution
Gas	39.2
Hydropower	35.6
Oil	24.8
Coal	0.4

Source: World Bank (2002)

Record show that Nigeria is the largest oil producers in Africa and among the first six largest exporters of oil in the world .The country is also a key member of OPEC. With this back ground, it is indeed ironic that power shortages occur with such frequency in the country [10], the best description of the current situation was reiterated by [10]. Nenadi Usman, Nigerian former finance minister underscored the problem recently when she said, South Africa generates 40,000MW of electricity for her 45 million people. Meanwhile Nigeria, which has over 160million people, has barely 4,000MW of capacity, and her production costs are five times higher [10].

MTN the South African mobile phone company and the largest mobile supplier in Nigeria is estimated to "have installed 6,000 generators to supply it base stations for up to 19 hours per day. The company spend 5.5 million dollars a month on diesel fuel to run the generators" [10]. The effect of generator in Nigeria as nation has been very challenging due to its harmful impact on the environment, generator release some harmful substance such as sulphur IV oxide and carbon monoxide which have negative effect on socio-economic life of the people, healthy living, and imbalance in the ecosystem. The overall effect of generator is that the entire natural habitat and its component are adversely affected due to the discharge of harmful substance and emission of toxics from the generating source to the atmosphere which cause global warming.

3. CHALLENGES FACING THE DEVELOPMENT OF ENERGY IN NIGERIA

However, despite Nigeria's ever-growing profile and wealth, the country remains one of the poorest, and technologically backward, nations in the world. This is basically because the much-taunted wealth has not translated into improved welfare. One reason for this is that over 90 percent of the yearly industry expenditures escape the domestic economy as capital flight [11].

3.1. Technical challenges

Lack of technical competence remained and may continue to be a major challenge towards the development of energy systems in Nigeria. The technical failures of energy development systems can be traced to lack of understanding of local energy requirements, lack of research and development to adapt technologies to local conditions, resources and requirements; lack of local skilled labour to install, operate

and maintain the equipment properly and lack of access to spare parts [12]. It is on record that most of the pilot programmes are carried out in rural communities. These communities are quite remote that most initial installers will not be willing to get back there to render maintenance services. Even when they do the professional charges are beyond the capabilities of beneficiary rural dwellers. The concept, design, application and use of most energy devices are conceived without any local input, and there is little or no effort to the system to various usage requirements. The result is that anytime it becomes difficult to get assistance in terms of component or intellectual property, as may be needed to maintain the energy systems, the systems will simply face redundancy and finally abandonment by the user [13].

3.2. Economic and financial challenges

Couple with low income per capita stigma of most Africa countries, it is observed that economic and financial barriers might be another major issue to content with the development of energy systems in Nigeria. These challenges arise from lack of access to capital, lack of means of life support, lack of information by appropriate financial institution, lack of investment, scale of energy system, inappropriate subsidies by the government or other agencies and size of organization [14]. The result of this is that both the potential installer and the end user are starved of funds for either initial procurement or upgrade of existing systems. Investments in new technologies are very expensive. The cost for energy development system in Africa may continue to be high because of high financial input and low profit margin in the course of manufacturing the component parts caused by low patronage and high cost of research and development [13].

3.3. National Policies Problems

Activities of the government are highly instrumental to the success or failure of any matters of national interest including the programmes that will end to enhance the very life status by introduction of new ways of living, introduction of energy production and developmental program in most African countries. The rate of growth of the program can only increase or decrease within the context of the government interest [15]. The co-ordination of energy development activities in Nigeria was largely depended on individual societies and few corporate interest and activities. Absence of functional government fiscal policies and integrated planning on energy review in Nigeria was trace to government instability and inconsistency in policies formulation, with personal interest at decision making level having priority over national goals. The resultant effects of all these are that of growth in the deployment of energy development in Nigeria, may be slow with the systems cost remaining comparatively at high side and large percentage of Nigerians not being aware of gains of the energy review systems [15].

3.4. Social, Cultural and Environmental Problems

Social acceptance of energy development is very important, as its absences can be a major challenge. If the local community does not accept the technology, there will be no demand for its services. For example, it may not make much sense to install solar cookers in communities which forbid women to cook in the middle of the day. Most energy development installations failed because the beneficiaries are not carried along during the decision making to deploy the energy systems to them. Involving the end users may generate more interest as they tend to benefit more, having been given the chance to express their very need or convinced on what is being provided. Mostly fossil fuels cause major environmental problem, it is generally accepted that the emission of greenhouse gases from fossil fuels causes global warming and declining air quality.

3.5. Political, Institutional and Legislative Barriers

Massive deployment of energy review system in Nigeria has great future if only the right political and legislative framework can be put in place. Since the technology is foreign. There is need to put proper legislative on place, to prevent turning the country into a dumping ground by the technologically advanced nations. Proper legislative may see Nigeria imposing zero taxes to and large subsidy, the poorest of the poor is the target. Also the important of substandard good will be adversely reduced [16].

3.6. Challenges Based on the Security of the Installation

Insecurity of installation is not only African problem. Globally, the security of the installation is paramount in the decision as to how and where to install the systems in most cases, the security provisions

will simply make the cost grows unreasonably high. Most known major projects have suffered one level of vandalism or the other. Installed equipment in one site can be found in the market within 24 hours after its commissioning. This barrier cuts all nature of installations from personal solar home stations to community mini solar street lights [17].

3.7. Wrong Focus and misplacement of priorities

Generally, the focus has been on technologies rather than outcomes, technical and financial issues are taken into consideration, but social issues such as land rights and cultural issues are not [14].

3.8. Lack of Applicability and competent personalities

Often the technology used may not be appropriate due to improper expatriate and trained personnel to installed and maintain equipment at appropriate time. The focus has traditionally been on hydro power when other solutions may be more applicable; for example solar power and micro-hydropower is appropriate for many parts of the African countries [5].

3.9. The Way Forward

Energy could be improved upon if appropriate practical measures are rightfully adopted, with reference to the challenges confronting energy development in Nigeria, the following steps would help to improve energy in Nigeria.

Reinvestment of capital funding in energy development would help to establish stable and viable structure in renewing energy. Government expenditure is never a waste but an investment toward industrial growth and development, adequate funding would help to mobilize other conditions that has positive impact on renewing energy especially on the part of government policy, the constitution should be reviewed such that only technocrat on energy development should be allowed to map out policy plan frame work for energy development and energy agencies should be managed by reputable personnel, it should not be politicized.

Also, facilities and material resources need for energy development in Nigeria especially for that of hydro power, solar energy installation, biogas and biomass technology should be up-graded to generate stable power drove for energy development, the government should alternatively import facilities to complement the existing domestic facilities so that efficiency and effectiveness can be justified optimally.

Nigeria must switch to alternative sources of power rather than just relying on gas and hydro plants for any hope towards meeting the target of 40,000MW by the year 2020. Hence, Exploitation of renewable energy sources such as: wind, biomass and solar should also be a priority at this point. Without the augmentation of capacity through other alternatives, the economy may suffer more in the coming years.

In addition, human resources should be re-focused by establishing human resource development centre and sending trainees to advance centre like China, France, Japan, U.S.A. to acquire technical skills on energy development; it is by this measure, technical application on research and discovery of energy sources can be optimally accomplished.

4. CONCLUSION

The nexus between energy and socio-economic development of any nation is strong. Although Nigeria is blessed with abundant energy resources but the challenges due to economic, social, technical and political barrier are abound. The challenges have to be overcome if energy technologies are to be deployed to make a meaningful impact on the energy mix in the nation.

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