POWER AND ENERGY AS IMPERATIVE FOR ACHIEVING NATIONAL DEVELOPMENT IN NIGERIA: THE ROLE OF SCIENCE AND TECHNOLOGY

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Abstract

While we look forward for clean water, good health care, food production, functional industries, effective transport system as well as heating and lightening devices, we should be conscious of the fact that energy is central to achieving all these. In fact, whatever standard of living enjoyed by citizens of the developed nations is an outcome of the energy they produce. Similarly, if the people in the developing countries should hope for better living, there should be a corresponding hope for sufficient production of energy. This paper therefore examines the concepts of power and energy, its influence on national development and the role science and technology could play in achieving the power and energy agendum of the Seven-Point-Agenda in Nigeria.

Introduction

It was on 29th May, 2007, that the President Musa Umaru Yar'Adua ascended the throne as Nigerian leader. Most of infrastructures in the country according to him and as cited by Ochiama (2008) were in comatose state and key sectors of the economy floundering. In response to these, he enumerated an agenda that will help the administration concentrate on rebuilding physical infrastructure and human capital. The agenda tagged seven-point-agenda has power and energy, food security and agriculture; wealth creation and employment, mass-transportation; land reforms; security; qualitative and functional education and pursuance of the rule of law as items (Ochiama,2008).

The above desire of government is a good ambition and can be described as most reasonable. This is because every other nation of the world has desires towards these and consequently, yearns for growth and development in all facets of human life. This explains why there is increasing emphasis on technological advancements.

The question about power and energy seems to be very crucial for the achievement of economic upliftment. In Nigeria, a lay observer can easily give account of the power produced. The conclusions have probably been that the power produced and supplied is epileptic and inadequate to sustain the nation's economic progress. Against this background, the presenter is poised to examine power and energy as imperative for national development with science and technology as the instrument for achieving it.

Power and Energy

Scientifically, power is the time rate for doing work or delivering energy expressible as the amount of work done, on energy transferred divided by the time interval. It is expressible also as the product of the force applied to move an object and the speed of the object in the direction of the force. (Encyclopedia Britannica, 2005; Rama Raju and Arora, 2006; Butani, 2008;).

To the Nigerian state man, power may refer to the facilities available from which electrical energy can be generated and used. For example, Yimusa, cited by Ochiama (2008) said; the President of the country, Alhaji Yar'Adua on assumption of office promised to declare a state of emergency in the power sector which he described as a failed sector that is fundamentally slowing down the nation's economic progress. He further identified epileptic power supply as one of the strongest variables in the factors militating against the manufacturing sector. The use of 'power' in this context does not imply time rate for doing work, rather it signifies that which delivers electrical energy for carrying out different works.

While power concerns time rate for doing work, energy is the equivalent of or capacity for doing work (Encyclopedia, Britannica, 2005). Energy can either be associated with a material body, as in coiled spring or a moving object, or it can be independent of matter, as light and other electro-magnetic radiation transversing a vacuum. The possible forms of energy within a system include potential, chemical, nuclear, kinetic, heat, electrical and sound energy (Poplé, 1989; Lewis and Fox Croft, 1991). It is interesting to remember that these forms of energy in theory can be transformed completely from one form to another.

It is this energy transformation or change that is responsible for work. Work is done whenever energy changes, from one form to another. This makes it essential for the development of the manufacturing sector. That energy is essential for the development of the manufacturing sector is not a new development. From time immemorial, humans have discovered how to use fire. They burnt dried plant (wood) and animal waste and used this for heating and cooking. The generation of mechanical energy to supplant human and animal power followed much later. This started with simple devices such as harnessing of energy of flowing water and wind using energy converters like water wheels, wind mills to replace animal muscle as the source of power (Encyclopedia Britannica, 2005).

The development of steam engine, combustion engines, electric generators and motors as energy converters independent of geographic location and weather conditions were consequent upon the development of industrial revolution. These efforts at finding suitable prime movers to replace animal muscles for different works were aimed to improving productivity and quality of life. How much of these efforts are being realized and utilized for the development of Nigeria as a nation is still better imagined than told?

The only crucial source of energy or form of energy in achieving every developmental stride at present is electrical energy that is produced in a limited amount. This explains why the Dunlop boss quoted in Ochiama (2008) said:

> 'government must focus not only on power generation but also on distribution. Hydro, thermal and solar sources of energy generated should be exploited, communal policing of power lines, grids and equipment to prevent theft and vandalization should be exploited' .

Science and Technology for Achieving Power and Energy for National Development in Nigeria

Have we ever wondered why there is consistent epileptic power supply in the country? Do we even care about the importance of electricity in the application of information technology? How many institutions of learning especially at the primary and secondary level enjoy electricity supply? Do we even wonder why we still import goods from the West to Nigeria?. Fiase (2008) responded to these when he attributed these to the nation's inability to pay serious attention to the development of science and technology. He emphasized that until there is enough research to warrant development of patents and a collaboration is forged between industries and patent developers resulting to commercialization of such patents, no meaningful development could be achieved in the country. In line with the above, it is not inappropriate to say that Nigeria has not paid enough attention to research in power and energy sector.

An undisputable fact is that the power supplied is inadequate to maintain the existing production and service capacity of the various sector of the economy. This affects the achievement of all the items on the 7-point agenda. Aer (2009) while considering the challenges of utilizing ICT in schools science teaching in Nigeria found that the use of these facilities depend on electricity supply. He noted that these facilities were never used in schools for lack of or inadequate power supply. One would ask how qualitative and functional education could be at the present era where ICT is a world affair if it is neither used as a teaching tool nor as an information processing tool; talk about food security and agriculture. There is need for power to process and preserve food items; there is need for energy to move machines such as cultivators and harvesters, etc.

To achieve effective and sufficient supply of power and energy in the country, considerable attention must be paid to the area of science and technology. This also agrees with what the Federal Minister of Education on Monday 28th April, 2009 and as cited by Umoren (2009) stated, that the desire of Nigeria to emerge as a global economic player would require a science based investment to drive the industrialization process to function. This is true for no socio-economic development can take place without science and science education as the bedrock. Great nations today have achieved their greatness through the development of their science and technology. Therefore, research in science and technology education in Nigeria should be geared towards finding among other things, the alternative sources of energy supply in the country so that more energy could be harvested for industrialization.

Alternative Sources of Energy

By alternative energy sources, we mean other sources of energy apart from coal, oil and natural gas. According to Pople (1989); Lewis and Foxcroft (1991), some of these are:

- **Wind Energy** in which giant windmills are used to turn electrical generators.
- **Hydro Electric Energy** in which rivers fill a lake behind a dam and fast flowing water from the lake turns generators. In Nigeria, this source of energy is in use for long. However, there is need for improvement as energy supply in the country has always been chaotic.
- **Tidal Energy** in which a dam is built across an estuary. A lake behind the dam fills up at high tide and empties at low tide. Fast flowing water turns generators.
- **Solar Energy** where mirrors and panels are used to capture the sun's radiant energy as heat. Research is already going on in this aspect of energy generation. What is needed is full commitment to the project. Remember we are in a country where even for things that are beneficial, lip service is always paid to them.
- **Nuclear Energy –** where radioactive materials, naturally release heat speeded by a nuclear reactor. This heat is used to generate electricity.
- **Geothermal Energy** in which water is heated by the hot rocks which lie many kilometres beneath the earth's surface. The heat in the rock comes from radioactive materials naturally present in the rock.
- **Biomass Energy** where fast growing plants or biomass are used to make alcohol which in turn, is used as a fuel like petrol.

Each of the above described, has its merits and demerits. The demerits are mostly the expensive nature of such a source or its effect on the environment. Science and Technology in Nigeria should seek to provide safer ways of harnessing such energy sources; the techniques for harvesting them and the manpower needed for these. Much of what we have known about these in documented literature are efforts made by scientists and technologist in western countries. These efforts made by countries of the west should be a key factor spurring us into action so that with commitment, we can also achieve same.

Recommendations

Based on the discussions above, the following recommendations are hereby made for improving Science and Technology in the country as a strategy towards improving the quality and quantity of power and energy needed in the country:

1. Institutions of learning (Colleges and Universities) and research institutes should intensify efforts in carrying out research aimed at improving the supply of power and energy in Nigeria.
2. Governments (States and Federal) should show commitment in financing science and technology-based research for better results and motivation.
3. States of the federation should set up science and technology foundation, which will be charged with the responsibility of making the young interested in science and technology as well as sponsoring those that distinguish themselves as talented in science and technology.
4. Individuals and organizations should make efforts at complimenting government role in promoting science and technology research by way of funding and moral support.

5. The concepts of power and energy should be practically introduced to students in schools so that youths could be educated on the importance of energy for national development, hence be warned against vandalization of facilities available for energy supply.

Conclusion

In this paper it has been shown that the power and energy available for a country determines the quality of life and the development of socio-economic activities. It is also clear that science and technology is a vital instrument for achieving power and energy. Supply in a quantity that would sustain economic and social development. Consequently, there is need for Nigerian government, educational and research institutions as well as individuals and organization to see that serious attention is paid to the development of research in science and technology geared towards improving energy and power supply in the country.

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