

## **ENERGY CRISIS AND ITS EFFECTS ON NATIONAL DEVELOPMENT: THE NEED FOR ENVIRONMENTAL EDUCATION IN NIGERIA**

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**ABSTRACT:** *Studies before now have linked various environmental challenges to human activities. The human activities do not exclude efforts put forth by humans in the search for, production and utilization of various forms of energy resources. The value attached to a particular energy resource determines its rate of demand which determines its rate of production and consumption. The consumption of any form of energy resource commonly in use determines its cost which determines its rate of availability to its end-users. The cost of energy resources on which the availability depends defines the phenomenon of energy crisis. This paper x-rays the dynamics of energy crisis and reveals its effects on Nigeria's national development. It establishes that environmental education is a veritable tool for tackling the phenomenon of energy crisis in Nigeria. The paper recommends that environmental education shall be designed to educate and re-orientate its audiences on the implications of their activities on the environment and as well encourage and motivate them to participate actively in activities directed toward the protection, improvement, management, restoration and conservation of the Nigerian environment.*

**KEYWORDS:** Energy Crisis, Energy Poverty, Development, Environment, Environmental Education.

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### **INTRODUCTION**

The environment and its associated issues became subjects of concern which generated global discussions since the early 1970. The rate at which the health and quality of the environment was and is still deteriorating became a catalyst for international gatherings for discussions on the need to protect the environment. This need for discussion on how to protect the environment culminated into many conferences, workshops and seminars. The conferences include among others: The United Nations Conference on Human Environment of 1972 in Stockholm, Sweden; International Environmental Education workshop of 1975 in Belgrade, Serbia (formally in Yugoslavia); Intergovernmental Conference on Environmental education of 1977 in Tbilisi, Georgia; Congress on Environmental Education and Training of 1987 in

Moscow, Russia; United Nations Conference on Environment and development (UNCED) of 1992 in Rio de Janeiro, Brazil; World Summit on Sustainable Development of 2002 in Johannesburg, South Africa; United Nations conference on Sustainable Development (Rio+20) of 2012, in Rio de Janeiro, Brazil. The conferences came up with different documents which contain various recommendations and plans of action through which the environment could be protected. Such documents include: Stockholm Declaration, Belgrade Charter, Tbilisi Declaration, and International Strategy for Action in the Field of Environmental Education and Training for the 1990s, Agenda 21, Johannesburg Plan of Implementation, The Future We Want.

All the conferences commonly acknowledged in their documents that environmental degradation results from human activities on the environment which are usually unsustainable. The unsustainable human activities on the environment comprise all the ways and means environmental resources are being explored, exploited, transformed and utilized to satisfy human needs. These activities include agriculture (farming, fishing, hunting, fruit gathering, etc); industrial operations (manufacturing, mining, oil exploration and refining, quarrying, processing, etc); construction (dams, roads, bridges, stadia, houses, etc); trading (distribution of goods and services); transportation (movement of people, goods and services); knowledge transfer (teaching and learning, use of ICT and satellite launch); and consumerism (final utilization of the products made from environmental resources). These activities result into what is generally referred to as environmental problems, among which are pollution, climate change, biodiversity loss, improper waste disposal, deforestation, ozone layer depletion, global warming, desertification, erosion etc.

All the human activities are driven by one form of energy or the other. The problems arising from human activities may not be unconnected with the forms and sources of energy used in driving the activities. Most of these energy forms are made up of carbon and other compounds that generate gases that are referred to as green house gases which prevent the heat from the earth surface from escaping into the atmosphere resulting in green house effect. On the other hand, most of the energy forms emit gases that are inimical to the ozone layer and as a result, react and eat up the ozone layer, hence ozone layer depletion results. These two phenomena (green house effect and ozone layer depletion) result in the uncontrollable rise in the global temperature (otherwise known as global warming) which alters the general climate conditions of the earth's surface. This alteration, when continued over a long period of time, results in climate change. Sometimes, the cost of the popular energy resource (oil) may be high that many countries that depend on it for development may not be able to acquire it, hence crisis in their economy. On the other hand, the cost of this energy resource may be cheap that countries like Nigeria whose main source of revenue for development is dependent on it may need to produce more in order to raise more funds for her developmental activities, thereby degrading the environment, hence environmental problems and its associated issues result.

These uncertainties surrounding the generation and use of various forms of energy generate the concept and phenomenon known as energy crisis. It is against this background that this

paper is developed to expose the effects of energy crisis on Nigeria's national development and as well stresses the need for environmental education in addressing the effects.

### **The Concept of Energy**

Energy is generally defined as the ability or capacity to do work (Cunningham & Saigo, 2001; Sodhi, 2005; Owate, Nte & Nna, 2005). Sodhi (2005) identifies different forms in which energy exists as follows:

**Heat Energy:** energy of random motion of atoms and or molecules that constitute matter;

**Mechanical Energy:** energy of organized motion of matter. This exists in two forms-kinetic and potential energies. Kinetic energy is the energy due to the motion of a body while potential energy is the energy of a body at rest by virtue of its height above some reference level;

**Chemical Energy:** energy of chemical bonds in the molecules;

**Nuclear Energy:** energy that binds the nucleons within the atomic nuclei; and

**Electrical Energy:** energy of electromagnetic radiation.

### **Sources of Energy**

Energy resources according to Sodhi (2005) are explored from four major sources namely fossil fuel, solar, nuclear and geothermal sources.

**Fossil Fuels:** These are energy resources which originated from the organisms that lived millions of years ago. After their death, they became covered with layers of sediments and were ultimately subjected to high temperatures and pressures in the depths of the earth's crust. In the absence of oxygen, their decomposition proceeded only partially. Under these conditions, the once living tissue became fossilized. When the fossilized materials are extracted and burnt, the energy stored in their chemical bonds is released as heat, hence the term fossil fuels. Examples are coal, petroleum oil, natural gas and shale oil.

**Solar Energy:** This is the energy from the sun and the largest pool of energy.

**Nuclear Energy:** This is the energy produced through either the fusion or fission of radioisotopes such as uranium-235, plutonium-239, deuterium and tritium (for fusion) with the help of a nuclear reactor.

**Geothermal Energy:** This refers to the energy available from natural underground reservoirs of steam and hot water.

On the other hand, Sharm (2009) groups energy sources into conventional and non-conventional energy sources.

**Conventional Energy Sources** are energy sources that have been explored, exploited and have been put to use maximally for the satisfaction of human needs. They are the common and popular sources of energy resources used by nations to drive their economy. Examples are the fuelwood (firewood), coal, petroleum oil, water and nuclear energy sources.

**Non-Conventional Energy Sources** are energy sources that are new and have not been harnessed and developed by nations to drive their economy. The reason behind the exploration and development of these sources of energy is to conserve the fast-declining non-renewable energy resources which are also major sources of environmental degradation. They are pollution-free, environmentally-clean and socially relevant. They include among others:

urban wastes, agricultural wastes, animal and human wastes, sun, wind, tide and geothermal sources.

### **Types of Energy Resources**

A resource is any material which can be transformed in a way that it becomes more valuable and useful for the satisfaction of human needs (Sharma, 2009). According to him, energy resources are categorized into renewable and non-renewable resources.

**Renewable Energy Resources** are energy resources that are available in unlimited amount in nature. They can reproduce themselves in nature over relatively short period of time and can be harvested continuously through a sustained proper planning and management. They include fuelwood (firewood), animal dung, solar energy, wind energy, water energy, geothermal energy etc.

**Non-Renewable Energy Resources** are energy resources that are available in limited amount in nature and develop over a long period of time. As a result of their limited nature, they are likely to be exhausted one day. These include coal, crude oil, natural gas, nuclear power etc. Coal, crude oil, natural gas, the common energy resources being organic (biotic) in their origin are also called fossil fuels.

### **Energy Uses**

Energy according to Sharma (2009) aims at meeting human welfare covering household, agriculture, transport and industrial complexes. Owate, Nte and Nna (2005) posit that “the success of any civilization and industrial development of a nation depends upon its ability to provide sufficient power (energy) for mechanical work, transportation, infrastructural development, commerce and information technology cum research”. They stressed that there will be no meaningful development in health, education and commerce without a good and continuous supply of energy. Cunningham and Saigo (2001) emphasize that a clear link between energy consumption and the comfort and convenience of human life exists.

The above postulations show that energy is needed in every sphere of human activity. Therefore, energy is used in the following spheres of human activities:

1. Industries for mining, milling, smelting, forging of primary metals, electricity generation, raw material transformation (into plastic, fertilizers, solvents, lubricants, and other chemicals for commercial uses), manufacture (of cement, glass, tiles, paper, bricks), processing of food etc;
2. Agriculture for powering of machines and equipment as well as for storage;
3. Construction for powering of machines and equipment;
4. Residential and commercial buildings for heating, air conditioning, lighting, powering of electronic equipment (such as computers, copy machines, CCTV, television and radios), refrigerating etc;
5. Transportation of humans, goods and services;
6. Schools for powering of electronic boards and conducting of research; and
7. Hospitals for powering of electrical and electronic equipment used for medical examination.

**Energy Crisis**

Energy has been identified as an indispensable resource for the satisfaction of human needs. It is the satisfaction of the daily human needs, which cannot be achieved without energy that brings comfort and convenience to human life. This is corroborated by Owate, Nte and Nna (2005) as they maintained that the comfort of daily life coupled with its demanding activities would have been drastically different without energy. This is in line with Cunningham and Saigo's (2001) linking of energy consumption and comfort and convenience of human life. This indicates that every human activity requires one form of energy or the other to be productive and successful. By implication, over seven billion people in the world today need energy to satisfy their needs in order to survive and live comfortably.

The puzzle here is that though various energy resources have been discovered, but some are renewable (unlimited and can reproduce themselves rapidly in nature) and some are non-renewable (limited and cannot rapidly reproduce themselves in nature). Another confusion associated with this puzzle is that technologies for the exploration, exploitation and transformation of energy resources in reasonable quantity are only available for non-renewable energy resources. For this reason, the energy resources available and are easily accessible to the world population (which is above seven billion) for the satisfaction of their needs are those developed and processed from non-renewable energy resources. These non-renewable energy resources had been tagged unclean because most of the crisis in the environment encountered and suffered today has been attributed to them due to their carbon content.

Another puzzle is a divide that exist between nations that own energy resources and those that do not have. The irony is that the nations that do not have energy resources own the technologies for the exploration, exploitation and transformation of energy resources while nations that have energy resources do not have the technologies for the exploration, exploitation and transformation of energy resources. Almost all the nations that own energy resources belong to the category of nations classified as developing nations while the owners of technologies belong to the category of nations classified as developed nations. While some nations are categorized as developed due to their level of industrialization; high, improved and stabilized economic growth; use of advanced technologies; improved living standard, adherence to human right provisions, other nations with poor living standard; poor and fluctuating economy; low level of industrialization, lack of and/or poor technology infrastructure and low adherence to human rights provisions are categorized as developing nations.

The preceding scenario indicates that developed nations have increased infrastructural facilities and home appliances that require large amount of energy to be powered and maintained compared to those of developing nations. This deduction shows that demand for energy is higher in developed nations than in developing nations. Since the demand for the use of energy resources is high in the developed nations of the world and they are the owners of the technologies for the exploration, exploitation and transformation of energy resources, they therefore determine the prices they will buy energy resources. When they (especially the

United States of America) want the price of energy resource especially oil to be high, they will manipulate it to be high. When they want it to be low, they will manipulate it to fall, just as it is being experienced now (period of this write-up) in the world. It is this crises associated with the mode of production, sales and use of energy resources that is referred to as energy crisis.

Energy crisis is therefore any great shortfall in the supply of energy (Ziagos & Wedel, 2007). It is the struggle to maintain a steady and continuous supply of energy resources without cutting short of their supply and or even completely exhausting them in the process of exploring, exploiting, transforming and utilizing them for the achievement of socio-economic goals. Brown (2010) sees energy crisis as “the problem of decreasing oil production and increasing oil prices”. This definition only reflects how the west (developed nations), suffer economically due to scarcity of energy resources to power their economy. This is because they spend huge amount of money to buy little amount of energy resource from the producers who mainly are from the developing nations of the world. This situation favours the producers like Nigeria whose major source of revenue is oil (most demanded energy resource in the world). In this situation, the producers raise huge amount of money from a small volume of energy resource. They do not only raise huge amount of money to run their economy, their environment is almost kept intact because not so much pressure is mounted on it in a bid to produce more oil for the world market.

These puzzles call for a balanced definition of energy crisis that takes care of situations in both developed and developing nations of the world. It is in this regard that energy crisis could be seen as alteration of energy balance in the general circulatory system arising from decrease or increase in energy demand with attendant economic and environmental impact. This alteration could lead to either rise or fall in energy price. When a rise in energy price results, the developed nations suffer some form of setbacks in their economic development while developing nations especially the energy producers enjoy a boom in their economy. When a fall in energy price results, the developed nations enjoy a boom in their economy because they have access to a large amount of energy resource required to power their economy while the producers (mainly from developing nations) suffer economic setbacks and environmental degradation because they would produce more energy resource which would only earn them a little amount of money that may not be enough to run their economy. This also mounts pressure on the environment because they would want to produce more energy resources and thus degrading the environment. This situation can summarily see energy crisis as a crisis of interest between the owners of energy resources and owners of technologies used for the exploration, exploitation and transformation of energy resources.

There is also a dimension of fear of exhaustion of conventional energy resources (especially the oil which is a major world’s energy resource) due to their non-renewable nature to energy crisis. This fear was explicitly expressed by Brown (2010:7) when he notes that: Since the energy crisis of the 1970s, we have witnessed the US demand for oil increasing at an alarming rate, the price of oil steadily escalating and an increasingly unstable world’s economy, prompted to some degrees by the world’s demand for oil, a product which will, at some point in time, cease to be available at any price.

From this perspective, energy crisis could be seen as a fear expressed in connection with the dwindling or liquidation rate of world's conventional energy resources arising from their level of demand and usage. This fear has resulted into increased clamour for the development of technologies for harnessing clean, environmentally friendly renewable energy resources, because if oil finishes and there is no other source of energy resource for sustainable living, there will be crisis in human race which will result in loss of lives. Many developed nations have made advanced efforts in this regard.

A point worth noting is that energy crisis is not synonymous to poor electric power generation as scholars and commentators/analysts posit, but energy crisis can result into poor electric power generation. In other words, shortage or lack of access to electricity supply characterises energy crisis. This affects every gamut of national development.

### **Effects of Energy Crisis on National Development**

Development according to Okeke in Okorosaye-Orubite (2005) refers to “growth plus change”. Okorosaye-Orubite (2005) understands development as “change in a desirable direction”. National development therefore means desirable growth evidenced in a positive change in various dimensions of national life. Indabawa and Mpofu (2006), Fagerlind and Saha (1989), Okediji (1981), Okorosaye-Orubite (2005), Akinpelu (2002), Tugbiyele (1974) and Nyerere (1979) agree that development take the economic, social, political and ecological/environmental dimensions.

**Economic Dimension** comprises increase in per capita and family income, gross national product, gross domestic product, income distribution, the labour force and job opportunities, shift in the labour force from agricultural to industrial and service sectors, rise in energy consumption, expanded use of high technology such as automobile, telephones, television and public transportation.

Development in the economic dimension of national development is triggered by the presence of some infrastructure in the power (electricity), roads, railway, aviation, agricultural and oil and gas sectors. These infrastructure activate a boost in the domestic earning and as well strengthen the nation's foreign exchange reserves. With other factors (such as corruption, bad governance, etc) put at a constant, energy crisis makes impossible the provision of these infrastructure. Even when there is increase in the oil price, it is expected that Nigeria as a producer nation should have more income to execute her budgetary plans especially in providing these infrastructure. But the reverse is the case, because whatever income earned through sale of crude oil energy resource is ploughed back in the importation of the refined products of the same crude oil such as petrol, kerosene, diesel etc. This situation makes it impossible to install more oil and gas infrastructure such as refineries. Even the three refineries already existing cannot be maintained to enable them refine to their full capacities. Drop in the crude oil price as Nigeria is experiencing now completely makes the country broke thereby making the country to find it difficult to pay even workers' salaries talk less of thinking of which infrastructure to install.

The same scenario plays out in the power sector where Nigeria finds it difficult to generate the amount of electricity that could illuminate every part of the country. This condition has been blamed for scarcity of gas (in a country that produces crude oil of which gas is one its by-products), dilapidated power generating facilities as well as sabotage from power generator dealers in collaboration with generator producing countries. This according to Obadote (2009) led to the description of Nigeria's economy as "Diesel Generator Economy". But government has complained of lack of funds and hence came with public-private-partnership initiative in the construction of power plants in order to solve the problem of power generation in the country. As at the time of this writing, no power plant has been commissioned for operation since 1999 the initiative took effect. Power (electricity) is the bedrock of every nation's economy. When there is no power, every other sector of the economy suffers and the economy invariably suffers. This situation puts the manufacturing sector under a severe strain, occasioned by high cost of production (Guardian, December 18, 2014). Linking the situation with a fall in crude oil price and highlighting the effects on the manufacturing sector, The Guardian (December 18, 2014) laments thus:

What is playing out now is reminiscent of the events of 1986 when the Naira was devalued by the then military government, which resulted in the steep rise in prices and caused collateral damage to manufacturers of consumer products, ...what is happening currently will lead to the lowering of the purchasing power of the local currency, increase in cost of inputs and the result would be that goods emanating from Nigeria will command higher prices, as against imported ones.

The Guardian feared that this will sound a death knell to the indigenous manufacturers, or whatever is left of that sector. Obadote (2009) corroborated The Guardian account by noting that small and medium scale businesses incur extremely high overhead cost to maintain their expensive fossil fuel powered generators. Indeed, no local business will survive in this type of situation because there will be decreased productivity, poor quality output and increased production cost. These problems lead to decreased gross domestic product, per capita income etc which indicates poor economic growth.

**Social Dimension** comprises provision of human needs such as food, shelter, quality health delivery system, potable water, safety and security, quality education. It also comprises the non-materialistic values such as respect for the human person and his dignity, social justice, equity, tolerance, respect for the basic rights and needs of others, freedom of self expression and participation, commitment to purpose and meaning in human existence, fairness, loyalty and commitment to human, personal and societal ideals, tolerance and acceptance of individual differences, and ideal of being each other's brother's keeper. Okeem (1987) sees it as a change in the structure and ideology of a given society.

A relationship between energy consumption and comfort and convenience of human life has been identified by Cunningham and Saigo (2001). This implies that the amount of energy available for consumption determines the quality of standard of living of humans. It is evident here in the reason why standard of living in Nigeria is generally poor. The reason is not far from lack of energy from the reach of majority of the Nigeria's population required to



improve their living standard. This evidence was buttressed by the Nigerian Energy Policy Report of (2003) referred to by Kennedy-Darling, Hoyt, Murao and Ross (2008). The report states that “less than 40% of the Nigeria’s population is connected to electricity grid”. The report went ahead to reveal that the less than 40% of the population that is connected to electricity grid system is short of power supply by over 60% of the time. This phenomenon is referred to as energy poverty.

Energy poverty according to Practical Action (n.d) is defined as the lack of adequate modern energy for the basic needs of cooking, warmth and lighting, and essential energy services for schools, health centers and income generation. Practical Action decried the exclusion of the right to energy from the list of recognized number of basic human rights and yet everyone needs energy to cook food, to heat the home, to earn a living, to benefit from good health and education services. They blamed poor standard of living to lack of access to reliable, efficient, affordable and environmentally-friendly modern energy services. Obafemi and Ifere (2014) view the energy poverty phenomenon from a different perspective when they identified three factors that can give rise to energy poverty, namely income, energy prices and efficiency. It is from this background that they view energy poverty from the perspective of the amount of personal monthly income one commits towards energy consumption. From this point, energy poverty according to them includes payment for fuel for driving cars and powering generating sets and other heating regimes. It is from this direction they view one who is energy poor as one who spends more than 10% of his/her monthly income in satisfying energy needs and when there are no sustainable, modern, affordable and reliable energy services. They also view one who still uses firewood as a source of energy rather than modern and clean energy services as being energy poor.

Among many reasons for energy poverty in Nigeria are declining output in fuel refining or the death of the Nigeria’s refineries, sabotage and the system of neo-liberal capitalism that encourage the ruling cabals to import fuel into the country in order to make profits. This practice leads to increase in the price of energy hence a few percentage of the population has access to it. The effects of energy poverty according to Obafemi and Ifere (2014) include: health risk, low socio-economic status of the Nigerian population. Other effects are poor research with the resultant slow pace in knowledge production, unemployment, low purchasing power parity, general poverty etc. Energy poverty portrays energy crises as a social issue as already revealed by Kennedy-Darling, Hoyt, Murao and Ross (2008) and with its resultant effects constitutes a cog in the wheel of social development in Nigeria.

**Political Dimension** comprises government services and resources, system of government, political representation and decision-making, international relations, national security, creation of national identity, creation of unity and solidarity among the people, mobilization for increased participation in voting, reading and analysis of political matters.

Nigeria in the pre-independence era was structured into three geo-political regions of Northern, Western and Eastern Nigeria. The regions had their sources of revenues peculiar to them with which the leaders used to drive development in their respective regions. For instance, Ike Ekweremadu, the Nigeria’s Deputy Senate President notes that Chief Obafemi

Awolowo was able to effortlessly erect some of the institutions in the Western region such as Liberty Stadium, Premier Hotel, Western Nigeria Television etc using the revenue derived from cocoa. In the Eastern region Dr Nnamdi Azikiwe was able to build presidential Hotels in Enugu and Port Harcourt, University of Nigeria Nsukka etc with the revenue derived from palm kernel and Alhaji Ahmadu Bello was able to build Ahmadu bello University, School of Agriculture Kabba etc with the revenue generated from groundnut. Based on these feats, Ekweremadu referred to this era (1954-1966) as a golden era when the virtues of hardwork, self-reliance, enterprise, resourcefulness and ingenuity that catalysed development were enthroned. These sources of revenues in different parts of the country then are today among the non-oil sources of revenue which have been seriously neglected.

But the irony is that with the discovery of crude oil and the resultant oil boom, these sources of revenue were neglected and abandoned rather than being further developed and enhanced. The worst of it all is that the powers of the regions (or the states today) to develop and control their resources were stripped off them and are handed over to the federal government by the Constitution published in 1979 by the military administration. This created a situation whereby the states are being funded by the federal government. This is evidenced in the monthly meeting of the Federation Account Allocation Committee (FAAC) with the Commissioners of Finance of the 36 States of the Federation where the federal revenue for the month is shared. It is this phenomenon that Ike Ekweremadu tagged “feeding bottle” federalism which is characterised by indolence, corruption, poverty and underdevelopment occasioned by bad governance.

These unaccepted virtues gave rise to allocation of oil blocks to individuals, boundary adjustments (resulting to communal crisis among the oil producing communities), deep-sea off-shore illegal oil bunkering (with oil theft and water pollution as the results), pipeline vandalism (resulting to oil theft and land pollution), emergence of illegal cottage and makeshift refineries in the creeks (resulting to land pollution and fire outbreaks), neglect of non-oil sector (resulting to unproductive, consumer and mono economy). The multiplier effects of the stated problems include increased agitations for more state creations, self-determination, resource control by existing states, emergence of militant groups with their associated crimes such as illegal oil bunkering, kidnapping, armed robbery, formation of local cult groups (such as “dey gban”, “dey well” egbesu boys etc), indiscriminate killings of individuals.

The bad governance traced back to the period of discovery of oil and its associated oil boom also led to the emergence of groups in different parts of the country agitating for the sovereignty of their respective regions. For instance, militant groups ( such as Niger Delta Volunteer Peoples Force (NDVPP), Movement for the Emancipation of Niger Delta (MEND), etc) and non-militant groups (such as Movement for the Survival of Ogoni People (MOSOP)) arose in the Niger Delta region to advance the course of resource control and self-determination. In the south east region of the Nigeria, there are two groups agitating for the sovereignty of the region. They are the Movement for the Actualization of Sovereign State of Biafra and the Indigenous People of Biafra. In the south west of Nigeria, Odua Peoples

Congress (OPC) agitates for the sovereignty of Oduduwa nation. In the northern part of Nigeria, Boko Haram, now declared a terrorist group recently declared some parts of the north a Republic of Islamic State under their control. This attempt was immediately foiled by the Nigerian military. The overall effect of these developments is insecurity in virtually every region of the country.

It will take a strong courage and political will on the part of our leaders to move away from the current “feeding bottle” federalism to the true fiscal federalism as suggested by Ike Ekweremadu. It is only the entrenchment of the true fiscal federalism that will ensure the return of good governance with its associated gains to the country. It is only then, all the social ills associated with bad governance will be tackled and stopped, thus the development of the political dimension of the nation will result.

**Ecological Dimension** comprises use of resources as commodities, requirements for energy and resources, waste disposal methods and techniques, causes, effects and control of pollution and environmental degradation, issues of space use, environmental beautification, protection and conservation.

Energy resources are part of environmental resources that are explored, exploited, transformed and utilized for the satisfaction of human needs. Each of these stages of energy (oil) resource processing has its gruesome effects on the environment which in turn gravely affects the quality of human life, since the quality of life is inextricably linked to the quality of the environment.

For instance, the production stage (exploration, exploitation and transformation or refining) is associated with gas flaring and spillages which pollute and degrade the environment and by implication destroy the sources of livelihood of people inhabiting the environment. The underground water is sometimes polluted to the extent that it is difficult to access a safe drinking water from the environment. This situation is the case of Ogoni environment in Rivers State and in other Niger Delta environments. This process subjects the people inhabiting these environments into abject poverty and hunger. Bond (2013) blames this situation on the inordinate romance between Western and African leaders in which Western leaders use African tyrants (military or civilian) to tame the people and rub them of their resources, while multinational corporations are allowed to devastate the environment in their mindless search for profits to the detriment of the people.

In terms of energy utilization, ignorance of the availability of reliable, affordable, sustainable, efficient and environmentally-friendly and clean energy resource triggers a wrong choice of energy resource which may not be efficient and clean and hence leads to environmental degradation. On the other hand, ignorance of the impact of various energy resources also triggers wrong choice of energy resource which may not be efficient and clean that may also degrade the environment. Energy poverty also affects choice of energy resource one makes. One may be aware of the availability of efficient, clean and environmentally friendly energy resource but may not be able to afford it. This condition is evident in Practical Action (n.d) complaint that “despite the regular supply of kerosene, natural gas and liquefied petroleum

gas (LPG), people continue to use wood or biomass residues or charcoal. Affluence has its role in determining choice and use of an energy resource. Wealthy people have household appliances that require energy to power. The essence of acquiring the appliances is to make life convenient and comfortable for them, which is one of the reasons for the discovery of energy resources. These appliances due to affluence consume a lot of energy, mounting pressure on them (especially non-renewable energy resources), leading to their over-exploitation with the consequent environmental degradation, hence making their exhaustion inevitable. This fact is buttressed by Cortese (1991) discovery that high rate of per capita resource use of persons in the industrialized countries of the north and resulting high levels of pollution and environmental degradation per person are key factors determining overall environmental impacts.

With this trend, it is not only that the exhaustion of non-renewable energy resources which are on vogue now will be inevitable, prevailing environmental degradation linked to production and utilization of non-renewable energy resources will worsen, hence the growth, development and well-being of living organisms including humans will be in serious jeopardy.

### **General Effects of Energy Crisis on National Development**

Following the preceding discussions, general effects of energy crisis in Nigeria could be deduced to include among others:

1. inflation
2. economic uncertainty
3. increase in prices of domestic goods
4. retrenchment with the resultant increase in unemployment level
5. energy poverty
6. increased general poverty
7. poor health delivery system resulting to deaths
8. absence/poor quality research with resultant low knowledge production
9. depletion of foreign reserve
10. devaluation of local currency
11. increase in lending rate
12. slow pace of economic activities
13. slow pace of infrastructural development
14. resource depletion resulting to environmental degradation
15. ineffective implementation of budgetary plan due to insufficient funds.

### **Need for Environmental Education in Resolving Energy Crisis in Nigeria**

Environmental education according to Environmental Education and Training Partnership (EETAP) in Mbalisi (2010) rose out of a reaction to the pressure of 1960s by the leaders in both outdoor and conservation education triggered by increased public awareness of the problems of air, water, noise and landscape pollution and excess energy demand. Environmental education is a learning process that increases people's knowledge and awareness about the environment and its associated challenges, develop the necessary skills

and expertise to address the challenges and fosters attitudes, motivations and commitments to make informed decisions and take responsible actions (United States Federal Register, 1996). This definition reflects in its wholesomeness the goal of environmental education as contained in the 1977 Tbilisi Declaration. According to this Declaration, the goal of environmental education is to aid citizens in becoming environmentally knowledgeable and above all, skilled and dedicated human beings, willing to work individually and collectively toward achieving and maintaining a dynamic equilibrium between quality of life and quality of the environment (UNESCO, 1994). On the other hand, the Belgrade Charter of 1975 identifies the general public as the principal audience to environmental education. According to the Charter, the general public is made up of two sectors thus:

1. the formal education sector including pre-school, primary, secondary, and higher education students as well as teachers and environmental professionals in training and retraining; and
2. the non-formal education sector including youth and adults, individually or collectively from all segments of the population, such as the family, workers, managers and decision makers, in environmental as well as non-environmental fields.

The Belgrade Charter adopted and modified Recommendation 96 of the 1972 United Nations Conference on Human Environment which defines the context for the delivery of environmental education to include in-school and out-of-school encompassing all levels of education. The Recommendation also defines the audience of environmental education to be the general public, including the ordinary citizens living in rural and urban areas, young people and adults who are to be educated on the simple steps they might take to manage and control their environment (Amemiya & Macer, 1999; Sato, 2006; UNESCO, 2007).

The goal, objectives and avalanche of definitions of environmental education point that, environmental education programmes target to achieve three broad outcomes in the lives of their recipients. That is, environmental education is expected to aid the recipients in becoming environmentally literate, energy literate and responsible citizens.

Environmental literacy is the ability to acquire knowledge and understanding of a wide range of environmental concepts, problems, and issues, a set of cognitive and affective dispositions, a set of cognitive skills and abilities, and appropriate behavioural strategies to apply such knowledge and understanding in order to make sound and effective decisions in a range of environmental context. These attributes empowers environmentally literate persons to understand how their activities and actions and that of illegal oil bunkerers, government and multinational companies degrade their environment and how environmental degradation affect their health and impede their growth and development. This understanding motivates them to resist and reject such activities and actions, hence are committed to champion any course directed towards the protection and conservation of environmental resources and maintaining environmental sustainability.

Energy literacy is the understanding of complexities related to energy use. It is a baseline fluency and knowledge of complexities related to energy use. Topics in energy literacy courses include differences between fossil fuels, renewable energy alternatives, and the link

between consumption decisions and environmental impact. It supports an understanding of the impact of energy use on sustainability. An energy literate citizen can utilize vocabulary necessary to discuss matters of power, energy and climate change (Barrow, in Demeo, Feldman & Peterson, 2013; Dwyer, 2011). According to Dwyer (2011) energy literacy is a construct that combines conceptual fluency with economic and social components of energy use, along with the belief that an increase in energy literacy will result in more sustainable energy practices. Dwyer (2011) also identifies consumers' surface level understanding of energy dynamics as a cause of complacency about the intense impact of burning fossil fuel on the global environment despite abundance evidence proven by different scientific researches of the link between climate change and carbon emissions resulting from the use of fossil fuels as energy sources. It is this complacency about changing consumption behaviour according to Dwyer that makes necessary energy literacy to increase the awareness of the complexities and underlying components of energy use in order to encourage more sustainable energy consumption patterns.

Responsible citizenship in relation to issues of and concern for the environment culminates from the development of responsible environmental behaviours through environmental education programmes. Responsible environmental behaviours engender active participation of citizens in activities aimed at solving environmental problems and resolving environmental issues. Citizenship actions which reflect responsible environmental behaviours include environmentally sound consumer purchasing, resources conservation, assisting with the enforcement of environmental regulations, using personal and interpersonal means to encourage environmentally sound practices, and encouraging environmentally sound policies and legislative initiatives (North American Association for Environmental Education, 2004). These actions are taken through the acquisition of some of the citizenship action skills such as persuasion, consumerism, political action, legal action and ecomanagement action (UNESCO, 1994). One of the major contributions of environmental education in developing responsible citizenship which spurs up responsible environmental behaviours in them is the conviction to accept personal responsibilities for negative environmental effects of their actions alongside a strong belief and commitment that they have a role in helping to resolve environmental impacts and issues.

## CONCLUSION

Energy crisis as a situation particularly in Nigeria, caused by either a rise in the price of the common energy resource (oil) as well as a fall in the price of oil. Since the three refineries Nigeria has do not refine to their full capacities, a large amount of revenue generated from the sale of oil is used to import refined petroleum products in order to make the products available to the Nigerian populace. On the other hand, a fall in oil price, makes the situation worse in the sense that little revenue generated from little sales made will be used to import refined petroleum products. This phenomenon forces Nigeria to spend a large proportion of her foreign exchange earnings to secure refined crude oil products for her citizens, hence slowing down development. This fact is evident in the present struggle of Nigeria to make the

refined crude oil products available to her citizens as well as generate revenue required to implement her budgetary plans.

In the present situation of drop in the sales of crude oil occasioned by a fall in the price of crude oil, most states and government parastatals find it difficult to even pay their workers' salaries among other effects. Other social vices have also erupted and escalated as a result of the inability of Nigeria to execute successfully some socio-economic development programmes and projects as well as entrench true fiscal federalism that will better the lots of Nigerian citizens. Energy crisis also has its negative tolls on the health and quality of the environment with its attendant impact on the Nigerian populace. These negative tolls result from the processes involved in the production and consumption of crude oil energy resource and its by-products.

The paper recommends environmental education which shall target the young, adults, rich, poor, educated and illiterates as its audiences and which shall also be in-school and out-of-school in context, as a veritable tool to tackle the phenomenon of energy crisis in Nigeria. Environmental education shall be designed to educate and re-orientate its audiences on the implications of their activities on the environment and as well encourage and motivate them to participate actively in activities (either individually or collectively) directed towards the protection, improvement, management, restoration and conservation of the Nigerian environment.

## REFERENCES

- Akinpelu, J.A. (2002). *Philosophy & adult education*. Ibadan, Nigeria: Stirling-Horden Publishers.
- Amemiya, K. & Macer, D. (1999). Environmental education and environmental behaviour in Japanese students. *Eubios Journal of Asian and International Bioethics*, 9, 109-115.
- Bond, P. (2013, March 25-April 1). Measures against climate change. *UNIPOINT Weekly* 13(4)1-2
- Brown, B. (2010). The present energy crisis: Is it Deja-Vu, all over again? *The Electrochemical Society Interface*.
- Cortese, A.D. (1992). Education for an environmentally sustainable future. *Journal of environmental Science and Technology*, 26 (6), 1108-1114.
- Cunningham, W.P. & Saigo, B.W (2001). *Environmental science: A global concern* (6<sup>th</sup> edition). New York, USA: McGraw Hill.
- Demeo, A.E.; Feldman, D.P. & Peterson, M.L. (2013). A human ecological approach to energy literacy through hands-on-projects: An essential component of effectively addressing climate change. *Journal of Sustainability Education*, 4.
- Dwyer, C. (2014). The relationship between energy literacy and environmental sustainability. *Low carbon Economy*, 2, 123-137.
- Ekweremadu, I. (2013). *Strategies for evolving the people's Constitution*. A paper presented at a Retreat for Civil Society Organizations and Professional Associations at the Presidential Villa, Abuja, Nigeria.

- Fagerlind, I & Saha, L.J. (1989). *Education and national development: A comparative perspective*. Oxford, Britain: Pergamon Press.
- Guardian newspaper (2014, December 18). See Nigeria as non-oil country, Okonjo-Iwela urges Nigerians. *The Guardian* 31 (13,129),6
- Indabawa, S. & Mporu, S. (2006). *African perspective on adult learning: The social context of adult learning in Africa*. UNESCO Institute for Education.
- Kennedy-Darling, J.; Hoyt, H.; Murao, K. & Ross, A. (2008). *The energy crisis of Nigeria: An overview and implications for the future*. Unpublished Manuscript.
- Mbalisi, O.F. (2010). *Effectiveness of environmental education in the development of responsible environmental behaviours among adult learners in Rivers State* (Unpublished doctoral dissertation) University of Port Harcourt, Port Harcourt, Nigeria.
- North American Association for Environmental Education (NAAEE) (2004). *Excellence in environmental education-Guidelines for learning* (Pre-K12). NAAEE.
- Nyerere, J.K. (1979). Adult education and development. In H. Hinzen & H. Hundsdorfer (Eds) *Education for Liberation and development: The Tanzanian experience* (pp 49-55). Hamburge, Germany: UNESCO Institute for Education.
- Obadote, D.J. (2009) *Energy crisis in Nigeria: Technical issues and solutions*. A paper presented at the Power Sector prayer Conference from June25-27, 2009.
- Obafemi, F.N. & Ifere, E.O. (2014). Incidence of energy poverty in Nigeria: A critical assessment. *Advances in Social Sciences Research Journal*, 1(4),1-18.
- Okediji, F.O. (1981). Sociology, demography and adult education. In L. Bown & J.T. Okedara (Eds) *An introduction to the study of adult education: A multi-disciplinary and cross-cultural approach for developing countries* (pp 114-120). Ibadan, Nigeria: University Press.
- Okeem, E.O. (1987). Social structure, ideology and adult education. In F.C. Okafor, E.O. Okeem & J.I. Mereni (Eds) *Foundations of adult education* (49-54). Obosi-Anambra, Nigeria: Pacific Publishers
- Okorosaye-Orubite, A.K. (2005). Education and development. In O.G.Agabi, A.K. Orubite, J. Ezekiel-Hart & D.E. Egbezor (Eds) *School & society*, (pp 18-51). Port Harcourt, Nigeria: Davidstones.
- Owate, I.S; Nte, F.U & Nna, J. (2005). *Energy resources and environmental crisis*. Port Harcourt, Nigeria: Pearl Publishers.
- Practical Action (n.d). *Energy poverty: The hidden energy crisis*. Practical Action.
- Sato, M. (2006). *Evolving environmental education and its relation to EPD and ESD*. A paper presented at the UNESCO expert meeting on education for sustainable development held at Kanchanaburi, Thailand from May 1-3, 2006.
- Sharma, P.D. (2009). *Ecology and environment* (10<sup>th</sup> edition). New Delhi, India: Rastogi Publications.
- Sodhi, G.S. (2005). *Fundamental concepts of environmental chemistry* (second edition). New Delhi, India: Narosa Publishing House.
- Tugbiyele, E.A. (1974). Presidential address. Nigeria. In J.T. Okedara & R. Stanford (Eds) *The role of adult education in Community development*, (pp 12-19). Ibadan, Nigeria: Nigerian National council for adult Education.



- UNESCO (1975). *The Belgrade Charter: A global framework for environmental education*. UNESCO.
- UNESCO (1994). *A prototype environmental education curriculum for the middle school (revised)*. A Discussion Guide for UNESCO Training Seminars on Environmental Education. Environmental Education Series 29. UNESCO.
- UNESCO (2007). Environmental education towards a sustainable future: Partners for the decade of education for sustainable development. Accessed on January 10, 2009 from <http://www.tbilisiplus30.org/background.html>
- United States Federal Register (1996). *Fiscal year 1997 environmental education grants programme: Solicitation notice, 65106-65117*.
- Ziagos, J & Wedel, K (2007, March 24). Energy crisis: Will technology save us? *Science on Saturday*