

LEGAL FRAMEWORK ON CLEAN AND RENEWABLE ENERGY TOWARDS SUSTAINABLE ENVIRONMENT IN NIGERIA

Abstract

Carbon dioxide emissions contribute to potential long term impacts on the environment with health challenges on humans. The objective of this paper is to seek ways to mitigate the impact of carbon dioxide on the environment¹ by resorting to non-fossil sources of energy, which include renewable energy and other forms of clean energy. There is need to sensitize industries and homes to burn less fossil to improve their clean energy ratings.² Nigeria as a country has to encourage the influx of new technology in the area of clean and renewable energy infrastructure. It is recommended that a trans-boundary solution is required³ through the use of international law to harmonise global reduction in rate of emissions.⁴

Keywords: Carbon Emissions, Clean Energy, Renewable Energy, Sustainable Environment

1. Introduction

In Nigeria, crude oil is refined and the process produces numerous end products. Refining is defined as the process whereby raw crude oil is converted into petroleum products such as diesel, petroleum and fuel.⁵ Refined crude products yield other basic end products which are gas and gasoline, diesel oils, kerosene, and other forms of heating oils.⁶ Others are domestic gases, aviation fuels, motor fuels and other raw materials which are used in the petrochemical industry as well as cosmetic industry such as baby jellies such as Vaseline.⁷ These end products are used largely by Nigerians for cooking, powering their generating sets to support government or Private Company generated power supply. Gas, kerosene, diesel and fuel add to the carbon content of the environment over time. Gas flaring in Nigeria is an extremely harmful activity. It is also a major contributor to greenhouse gases which greatly impact on the environment.⁸ That is why so many agencies in Nigeria have set emission standards for gas flaring. The National Environmental Standards and Regulation Enforcement Agency (Establishment) Act (NESREA)⁹ is in the fore front of this. The fact must be made that Nigeria has a massive reservoir of natural gas, and the challenge which most of the regulatory agencies emphasize is to have this exploited in a very environmentally friendly manner.¹⁰

The day to day management of a refinery definitely is not an easy task. In Nigeria, this is because of the deplorable state of the refining facilities, especially due to lack of maintenance ethics which are prerequisites for large facilities. The lack of a maintenance culture is inherent some would say in the Nigerian culture.¹¹

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¹ Science Daily, www.science daily.com/releases/2013/08/1308051 5152422.htm accessed on 15 February 2016; source - University of Hawaii at Manoa - fossil burning over past 250 years have raised co2 content by 40%.

² Environmental Protection Agency (EPA), 'Using fuels with lower carbon content 'source: NRC 'Advancing the Science of Climate Change' National Research Council, The National Academies Press Washington DC., US. www3.epa.gov/climatech, accessed on 15 February 2016.

³ John and Sharron Mc Eldowney *Environmental Law* (Pearson Educational Books 2010) 317-320.

⁴ The 1979 Geneva Convention on Long Range Trans boundary Air Pollution , being part of the U.N Economic Commission for Europe (UNECE) study.

⁵ Ayobami Olaniyan, 'Improving Petroleum Refining in Nigeria: An Appraisal of relevant laws' (2016) *Afe Babalola University Ado-Ekiti Law Journal* Vol.1, No.4 156-157; Hydrocarbon Oil Refineries Act, s.29 Laws of the Federation of Nigeria (LFN) CAP H5 2004

⁶ Yinka Omoregbe, *Oil and Gas Law in Nigeria* (Malthouse Law Books 2001) p. 9-10

⁷ Ibid.

⁸ Obioma Helen Onyi-Ogelle, 'The Legal Regime For Nigerian Gas'(2017) *Nnamdi Azikiwe University Journal Of International Law and Jurisprudence* Vol. 8 (2)156

⁹ The National Environmental Standards and Regulation Enforcement Agency (Establishment) Act (NESREA) No. 25 Of 2007

¹⁰ The Environmental Impact Assessment Act (EIA) Cap. E 12 LFN 2004; the Environmental Guidelines and Standards for the Petroleum Industry in Nigeria. (EGASPIN)

¹¹ Kayode Adeoye 'Modular Refineries and Nigeria's Economy' *The Guardian* , October 5, 2016)

The incursion of private individuals into the oil and gas sector is not automatic. The oil and gas industry in Nigeria is regulated by the Petroleum Act.¹² Any person who wishes to own or operate a refinery in Nigeria has to get a license granted by the Minister of Petroleum resources.¹³ The operation of a gas storage facility is also regulated by the Petroleum Act.¹⁴ Most refineries in Nigeria are owned by the government. As such the end products, when available, come to the market in a very expensive form despite the existing subsidies on them. The current foreign exchange regime and fall in oil prices has reduced the palliative impact of the subsidy on petroleum products. Importation of fuel has been a matter generating much discourse.

The demand for alternate sources of energy is to counteract the daily rising prices of fuel and other oil products, as well as halt the impact on the environment. For most countries, the impact of regular energy sources such as fuel is heavy on their economies and this informs the need for an alternative. Honourable Yakubu Dogara, Speaker of the House of Representatives while speaking on a public hearing by the House Committee on Power, said that Nigerians spend ‘an estimated \$5 billion annually to power their generators...and this has been highly detrimental to economic growth.’¹⁵ The National Energy Policy (NEPP) of 2001 was put in place to make optimal use of Nigeria’s energy resources, not only to meet the nation’s sustainable energy needs, but also to be in line with sustainable development. As such, the policy direction is to broaden the country’s energy generation options outside of gas, fuel and other fossil sources.¹⁶ The rural areas in Nigeria can be linked to have more access to energy in the light of the fact that the energy available from the national grid is inadequate. First is to discourage reliance on wood and other fossil sources such as charcoal which have high carbon contents. With the introduction of clean energy which is not distributed via the national grid, there will be need to have policy outlines as to how to link these areas. Electricity generating facilities in Nigeria and the developed countries such as the United Kingdom (UK) and the United States (US) provide managerial reference on incentives to encourage our generating facilities to have a percentage of say 20% of energy from clean and renewal sources. The goal of United Nations (UN) Secretary General Ban Ki-moon is to ensure universal access to modern energy services, improve efficiency and increase use of renewable resources.¹⁷ Facts from UNDP are thus:

- one in five people still lack access to modern electricity
- 3 billion people rely on wood, coal, charcoal or animal waste for cooking and heating
- Energy is the dominant contributor to climate change, accounting for around 60% of total global greenhouse gas emissions
- Reducing the carbon intensity of energy is a key objective in long-term climate goals.¹⁸

2. Impact of Carbon Emissions on the Environment

The search for an alternative source of efficient energy is to reduce the impact of carbon emissions on the environment. The African Charter on Human and Rights (ACHPR) 1981 gives a great focus to the protection of the environment. Article 24 of the Charter imposes a duty on all members states to take reasonable steps and put in place suitable measures in dealing with oil pollution incidents, ecological degradation and to ensure people’s right to a ‘best attainable standard of health’ and also a ‘general satisfactory environment favourable to their development’. The African Charter has been ratified in Nigeria,

¹² The Petroleum Act CAP P10 LFN 2004

¹³ Ibid, s 3 (1)

¹⁴ Ibid.

¹⁵ Green uptown, <www.greenuptown.com/top-5-examples-of-alternate-energy-resources> accessed January 22 2017; Kemi Yesufu, ‘Nigerians spend \$5bn on generators’ *Daily Sun*, July 19 2017, p.4

¹⁶ Ibid

¹⁷ The UN Affordable And Clean Energy: Why It Matters Goal 7 (of 17 sustainable development goals) <www.un.org/sustainabledevelopment/energy> accessed on 2 February 2017

¹⁸ Ibid

and as such, has power of enforcement.¹⁹ Especially in Nigeria, the continued gas flaring in areas such as the Niger Delta as well as side emissions given off during oil refining contribute significantly to increased levels of carbon emissions in the atmosphere. The United Nations Framework Convention Climate Change (UNFCCC) 1992²⁰, seeks to have a framework to reduce the amount of carbon in the atmosphere to acceptable levels so that the order of the climatic system is not unduly interfered with.²¹ According to the US Environmental Protection Agency (EPA), ‘Carbon emissions in the form of carbon dioxide make up more than 80 percent of the greenhouse gases emitted in the United States.....The burning of fossil fuels releases carbon dioxide and other greenhouse gases. These carbon emissions raise global temperatures by trapping solar energy in the atmosphere’²²

Liquid hydrocarbon is also released into atmosphere each time there is an oil spill. Though the 1999 Constitution of the Federal Republic of Nigeria does not contain any express provisions on the regulation of the environment, Nigeria is a signatory to many international conventions which have been domesticated into law in Nigeria. The Act of domestication is important as section 12 (1) of the Constitution provides that ‘No treaty between the Federation and any other country shall have the force of law except to the extent to which any such treaty has been enacted into law by any law made by the National Assembly’ When it comes to safeguarding the environment from oil spills, Oil in Navigable Waters Act is in place. This was enacted as part of the International Action to domesticate the International Convention for the Prevention of Pollution of the Sea by Oil.²³ The National Oil Spill Detection and Response Agency Act 2006 was also enacted with a view to domesticate the International Convention on Oil Pollution Preparedness, Response and Co-operation, (OPRC). It is proposed that states and local government areas in oil producing areas should be given greater representation in the activities of National Oil Spill and Detection Agency as represented in the 2012 Bill before the National Assembly.²⁴ The effects of oil spills are numerous and the resulting damage can be quite enormous. In Bangladesh, a vessel carrying over 357,000 litres of oil recently crashed in the Sundabans Shela River. This crash and subsequent oil spill was injurious to rare dolphins, small fishes, trees, surrounding wetlands and other marine and aquatic organisms and plant species.²⁵ The following are the effects of Carbon Emissions:

Reduction in Water Supplies

The way this works is that climate change through global warming will increase the incidence of rainfall in some areas. The EPA²⁶ predicts that this will cause heavy sediments to wash into clean water sources and thereby decrease what is available for human use. Also rising sea levels will dump salt water into fresh water sources. Such water can only be used after much processing²⁷.

¹⁹ The African Charter on Human and People’s Rights (Ratification and Enforcement) Act, Cap. A 49 LFN 2004; The 1992 Agenda 21 as encapsulated in UN. Doc A/Conf. 151/26 (June 14 1992), see also the Supreme Court Decision in *Abacha v Fawehinmi* (200) FWLR (Part 4) 533

²⁰ The United Nations Framework Convention Climate Change (UNFCCC)1992

²¹ Ibid, Article 2

²² Sarah Cairoli, ‘Consequences of carbon emissions for humans’ <www.education.seattlepi.com/consequences-carbon-emission-humans-> accessed on 16 March 2017

²³ International Convention for the Prevention of Pollution of the Sea by Oil 1954 as amended in 1972; Oil in Navigable Waters Decree No. 34 of 1968

²⁴ Ted C Eze and Amaka G Eze ‘Control of Pollution Arising from Oil and Gas Industry: Appraising the scope of Provisions Under the 1999 Nigerian Constitution’ (2017) *Nnamdi Azikiwe University Journal of International Law and Jurisprudence*. Volume 8, No. 2 September p. 58-60; see also International Convention on Civil Liability for Bunker Oil Pollution Damage 2001, adopted in London on 23 March 2001, and entered into force on 21 November 2008

²⁵ Isaac O Babatunde , ‘Impediments to Enforcement of Environmental Treaties Against Oil Pollution’ *Nnamdi Azikiwe University Journal of International Law and Jurisprudence*, Ibid; see also ‘ Bangladesh Oil Spill Threatens Rare Dolphins’ *The Punch*, December 12, 2014

²⁶ Sarah Cairoli, (n 22)

²⁷ Ibid,

Severe Changes in Weather

Global warming has contributed significantly to desertification in some tropical countries. This has led sometimes to avoidable conflicts in the search for grazing grounds as well as water sources for livestock. In temperate countries, Hurricane Sandy of 2012 and Typhoon Haiyan of 2013 in the US are just some examples of the increasing incidences of storms caused by emission of CO₂ into the atmosphere. NASA²⁸ predicts that there will be more incidences of extreme weather changes leading to occurrences such as heavy storms, drought and wildfires. Debilitated infrastructure from such incidences may result in outbreak of disease conditions if not well managed.²⁹

Limited food supply

There are so many crops that do not fare well in humid weather such as tomato, wheat, rice, maize and sunflowers. In the same vein, many animals which are used as a food source may migrate to cooler altitude. All these will have the impact on food prices as well as all year availability of produce.³⁰

Geographical Changes

According to EPA, 'sea levels on the Mid-Atlantic and Gulf Coasts have risen over 20 centimetres (8 inches) in just 50 years after almost 2000 years of no observable change.'³¹ This shows that global warming is taking place at a rate that is quite unprecedented. It behoves on the present generation to find out the reasons for the manifold changes and put in place mitigating mechanisms.

3. Clean Energy as an Alternate Source of Energy

There is a difference between renewable energy and clean energy. Some forms of renewable energy such as biomass still contain some amount of carbon. Most clean energy sources do not contain carbon. Clean Energy is defined as electricity generated at a facility that captures and stores its own carbon dioxide emissions. In the US it is also defined as 'electricity generated at a facility placed in service after 1991 using renewal energy, qualified biomass, natural gas, hydropower, nuclear power, or qualified waste to energy.'³² Clean Energy can further be defined as: 'Electricity generated at a facility placed in service after enactment that uses qualified combined heat and power (CPH), generates electricity with a carbon intensity lower than 0.82 metric tonnes per megawatt-hour (the equivalent of new super critical coal), or as a result of qualified efficiency improvements or capacity additions at existing nuclear or Hydro power facilities.'³³

Different Sources of Clean Energy

There are different sources of clean energy and this includes biomass. It also includes all forms of renewable energy as well. Renewal energy is defined as 'solar, wind, ocean, current, wave, tidal, or geothermal energy.'³⁴ We must note that what really qualifies any form of energy as clean, rather than merely being in a renewable form is its carbon intensity or content after it has been processed. As such even renewable sources of energy with high carbon content such as biomass can be processed in such a way to reduce its carbon intensity. It is ironic that the earliest sources of energy were from wind, water, firewood, which was in a sense driven by the sun. Though these forms of energy were renewable around the 1700's, they had since been replaced by fossil. From around the 1940's fuel such as oil and natural gas from fossil became prevalent. These are formed from decayed remains of plants and animals. Though fossil fuel is being naturally replenished even today, but the rate of consumption far outstrips any such replenishment. The

²⁸ Ibid, from National Aeronautics and Space Administration: Global climate change Vital Signs of the planet.

²⁹ Ibid

³⁰ Ibid.

³¹ Ibid, EPA: climate impacts on water.

³² The Clean Energy standard Act of 2012 from the United States Senate Committee on Energy and Natural Resources. <www.energy.senate.gov/public/index.cfm/files> accessed on 23 January 2017

³³ Ibid

³⁴ Ibid.

bottom line being that fossil fuel cannot in real terms be considered as a resource that will last forever.³⁵ The different forms of energy which can be rated as clean energy include:

Biomass

Biomass is also part of renewable energy, but it has to be further processed to ‘to be considered qualified renewable biomass, the biomass must be produced and harvested in an ecologically sustainable manner.’³⁶

Qualified waste to energy

Also included is qualified waste -to -energy which is defined to mean ‘energy produced from the combustion of post-recycled municipal solid waste, animal waste or animal by-products, biogas, landfill methane, or other biomass that has been diverted from or separated from other waste out of a municipal waste stream.’ Existing waste to energy facilities must be in compliance with all applicable environmental regulations for new facilities within the ³⁷applicable source category under the Clean Air Act.

Solar energy

Most writers on the environment such as Rinkesh³⁸ support alternate energy from sources that do not consume fossil, such as solar energy because of the merits of such alternate sources. The most prevalent reason being that solar energy is mostly untapped. Solar energy is used to generate light and heat. On earth we use up about 30 per cent of the sunlight generated by the sun, while 70 per cent gets reflected back to space. Solar energy is commonly used by humans for drying cloths and by plants during photosynthesis. The amount of energy that is available via solar can be attested to in the fact that solar energy is responsible for breaking of ice during the ice age³⁹.

Hydrogen energy

Hydrogen energy hardly ever exists alone. It is in water, before it becomes available for use. It is expensive to store, and is highly inflammable. Then again, it still needs to be extracted from a fossil base after other elements in it has been separated. One disadvantage is that it may be expensive to detach hydrogen and make it available for use. Unlike older sources of energy, it does not leave a waste residue. It is renewable and even used to produce bombs⁴⁰

Geothermal energy

The heat from below the earth can be used in heating or cooling our homes. This is because the temperature below the ground is often stable. It can be adjusted between the seasons through the use of a geothermal heat pump, either as a cooling agent or as a heater. It is a clean energy source because no surface combustion is involved. All generation is done between the home and underground. They have been proven to have a higher level of efficiency than some other systems in the market.⁴¹

Wind energy

The energy in wind is used to generate electricity. This can be utilised for pumping water or grinding grain. They are cheaper to use, as the infrastructure required for their functioning is simple, and do not necessarily

³⁵Virginia, Renewal Energy and other alternative energy sources <www.dmme.virginia.gov> accessed on 24 January 2017

³⁶ Ibid.

³⁷International Renewable Energy Agency (IRENA), United nations sustainable dev. solutions network...<unsdsn.org/where-we-work/mer> accessed on 04 February 2017

³⁸ Rinkesh, www.conserve-energy-future.com/alternativeenergysources.phb.....alternative accessed 23 January 2017

³⁹ Ibid

⁴⁰ ibid

⁴¹Virginia (n 35)

have to be connected to a national grid for transmission.⁴² The advantage of wind power is that it consists of relatively clean energy. All that is required is turbines, which do not really consume much land space. Wind power is an alternative to burning of fossils which emit very high levels of carbon dioxide. Water impute is zero, and no greenhouse gases which can be dangerous to the environment are produced.⁴³ However, these days, wind turbine is being built on larger and more efficient scale, and so may be expensive to construct.⁴⁴

Oceans current: Some forms of energy can also be generated from ocean currents as well as tidal waves.

4. International Clean and Renewable Energy Affiliations

Carbon dioxide (CO₂) is a colourless odourless and non-poisonous gas formed by combustion of carbon and in the respiration of living organisms and is considered a greenhouse gas.⁴⁵ Carbon dioxide gives out emissions which mean ‘the release of greenhouse gases and/ or their precursors into the atmosphere over a specified period of time.’⁴⁶ If human beings do not change their way of doing things, the greenhouse effect might spiral to an end to earth this century through an increase of levels of CO₂ and its environmental impact, as we have already crossed our limits for acceptable levels of CO₂ in the atmosphere.⁴⁷ There is serious concern that greenhouse gas accumulation in the atmosphere will seriously affect climate change, so there is an immediate need for mitigation.⁴⁸ A good line of action would be ‘stabilization of greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.’⁴⁹ Some manner of action has been outlined by the International Energy Agency (IEA) to reduce CO₂ emissions per year: **Coal:** replace 300 conventional 500- mw coal power plants with zero emission power plants ; **Wind:** replace un- sequestered coal with 200 x current wind generation, US wind generation; **Solar:** Install 1300 x current US solar generation in lieu of unsequestered coal.

The international energy commission commends the mitigation goals being adopted globally especially within the Kyoto Protocol. This international cooperation’s are necessary because many countries lack the adequate technology to be in use in R&D programmes. The technologies involved are varied, and each one needs to be backed up by adequate infrastructure. The attendant markets for their output also have to be determined along with the purchasing capacity of such regions. These implementations need to be backed up by IEA implementing agreements But they recommend more private public partnership and market transformation activities, especially within regions by engaging the different stakeholders such as energy generators, suppliers as a well as the consuming public. Some erudite scholars such as Ajayi Oluseyi give their views on how sustainable energy can be utilised at the international level. For reasons of sustainable development, the European Union has ratified the Kyoto Protocol as this is key to reducing ‘greenhouse gas emissions level of 1990 by 20% and make renewable energy account for 20% of total energy consumption by 2020’.⁵⁰ He also gives solutions as to ways to tackle the issues that may deter efficient incorporation of clean and renewable energy in Nigeria, such as constraints from the Land Use Act, as well as lack of fiscal incentives for investors.⁵¹

⁴²Energy basics , <<http://energy.gov.energybasics> >accessed on March 16 2017

⁴³ Wikipedia, .<en.wikipedia.org> accessed on March 16 2017

⁴⁴< www.wwindea.org.technology>

⁴⁵ <www.starts.oecd.org >glossary > detail accessed 9 February 2017

⁴⁶ Ibid.

⁴⁷The UN, Affordable And Clean Energy: Goal 7 (n.17)

⁴⁸ Richard A Bradley and Cedric Philbert, Energy Efficiency and Environment Division International Energy Agency. Carbon dioxide mitigation: The technology challenge < unfccc.int > accessed February 2 2017

⁴⁹ Ibid.

⁵⁰ www.starts.oecd.org >glossary > detail

⁵¹ Oluseyi Ajayi, P A Aderonmu and O Oluwatoyin ‘Nigeria’s Energy Policy: Issues of sustainable energy development. in Nigeria’ < <http://eprints.covenantuniversity.edu.ng/3124/1>>. accessed on 24 January 2017

The United nations 'International Renewable Energy Agency (IRENA) 'promotes the widespread adoption and sustainable use of all forms of renewable energy in the pursuit of sustainable development such as hydropower, ocean, solar and wind energy including bioenergy, geothermal.'⁵² The United Nations, through some of its outlets such as the International Renewable Energy Agency (IRENA) have goals such as to encourage 'governments to adopt enabling policies for renewable energy investments, provides practical tools and policy advice to accelerate renewable energy deployment and facilitates knowledge sharing and technology transfer to provide clean sustainable energy for the worlds growing population.'⁵³ For instance, 'the regulatory framework for renewable energy in the UK is driven by the 2009 EU Renewable Energy Directive and 2008 Climate Change Act. The EU renewable energy directive (EU RED) requires the UK to source 15% or more of its energy from renewable sources.'⁵⁴ Some goals are: to ensure security of supply; to meet decarbonisation targets; and to provide energy affordability for consumers.⁵⁵

Implementation of Clean Energy in the UK and US

United States (US): Incentives to mitigate carbon emissions and encourage clean energy alternatives.

Biomass is used in the US as a form of renewable energy. However biomass may have carbon intensity which contributes to atmospheric pollution and global warming. So it is necessary to determine the carbon intensity of various forms of biomass. That is why the secretary of state monitors generating plants to ensure that 'the net greenhouse gas emissions associated with generated electricity from each significant source of qualified renewable biomass' All these findings assist in giving out current guidelines for level of acceptable gas emissions from such plants.⁵⁶ It is significant that not all forms of renewable energy generate electricity. For example those in use are biomass that is used for thermal energy, geothermal heat pump, district heat as well as waste energy heat recovery.⁵⁷ 'The *mitigation strategy* is made up of three main required components: mitigation goals, mitigation action and an action plan for implementation. These provide the framework to identify, prioritize and implement actions to reduce risk to hazards'⁵⁸

Clean Energy Credits

These are incentives given to facilities generating energy to make sure that at least 20% of energy generated is from renewable sources. Consumers also get rebates when they purchase and use clean and renewable energy to a set percentage: 'The secretary of energy has put in place a program whereby utilities submit clean energy credits. This is as a demonstration of the compliance of energy generators of the standard of energy they put on the grid.'⁵⁹ 'Generators with zero carbon emissions, such as wind, hydropower and nuclear are entitled to 1 full credit per MWh generated. A generator emitting 0.41metric tons of carbon per MWh would receive 0.5 credits per MWh generated.'⁶⁰ There are penalties imposed for not complying with alternate compliance...these are diverted to the state efficiency funding program under section 362 of the Energy policy and conservation Act.⁶¹

⁵² International Renewable Energy Agency (IRENA) (n.37)

⁵³Ibid

⁵⁴Taylor Wessing, 'UK legislative framework for renewal energy' from <[https://united - kingdom.taylorwessing.com/fileadmin/](https://united-kingdom.taylorwessing.com/fileadmin/)> accessed on 2 February 2017.

⁵⁵Ibid

⁵⁶ The Clean Energy standard Act of 2012 (n.32)

⁵⁷Ibid.

⁵⁸ Ibid.

⁵⁹ Ibid.

⁶⁰ The Clean Energy standard Act of 2012 (n32)

⁶⁰ Ibid

⁶⁰ Ibid

⁶¹Ibid

United Kingdom (UK): Incentives to Mitigate Carbon Emissions and Encourage Clean Energy Use

In the UK, the way forward for decarbonisation is to encourage energy suppliers to source an increasing amount of energy from renewable sources. Through the Renewable Obligation (RO) scheme, 'ROC'S (RO certificates) are sold by the generator to an electricity supplier as evidence that they have been supplied with the requisite percentage of renewal energy to meet their obligations under the RO for that obligation period in which they are issued or against preceding obligation period.' Suppliers endeavour to meet their obligations, for if they undersupply on RO they will be compelled to pay a buyout price for the shortfall.⁶²

Climate Change Levy (CCL)

This is a levy on suppliers of various forms of electricity to UK Businesses. The idea is to encourage generation of electricity from renewal resources to qualify for a levy exemption. They are then issued with LECS (Levy Exemption Certificates) as a proof of their CCL status. The beauty of this whole scheme is that the final customer realises the exemption from the tax. This is because such tax incentives were already budgeted for. Thus the end users are encouraged to buy more of renewable energy.⁶³

Green Deal and Energy Companies' Incentives

The deal 'allows consumers to contract with approved providers to carry out energy efficient improvements and to pay for these works through an adjustment to their electricity bill.' This therefore allows vulnerable and low income consumers to make the switch to renewable energy sources without incurring a lot of cost or in the alternative to have the initial cost outlay spread through their tariffs over a long period. This is in consonance with their energy objective to minimise impact. That is to ensure that the Department of Energy and Climate change (DECC) achieves its fuel poverty, energy and climate change goals in such a way that it is consistent with economic recovery and minimising the impact on consumer bills.

5. Institutional and Legal Framework for Clean Energy Initiative in Nigeria

Nigeria's energy sector is being diversified to promote efficiency, and this will include looking for alternate energy sources with the goal of being sustainable and less harmful to the environment. According to a 2011 report of the United Nations (UN) as confirmed from UNEP assessment of Ogoniland, the damage done from fossil based energy products such as oil may be irreversible.⁶⁴ 'Power is arguably the single most important driver of the national economy. Indeed, it is difficult, if not impossible to imagine modern life without power.' Nigeria is richly endowed with renewable and non-renewable sources such as biogas, fuel which is gotten from fossil sources. As at 2012, Nigeria was the world's largest producer of liquefied natural gas NLG Though Nigeria produces about 2.5 million barrels per day as at 2012, less than 17% is allocated to the country's three refineries. As such energy from renewable sources like fuel is basically expensive for the lower income group. Gas dominated electricity grids are not very functional due to obsolete equipment. The elite class therefore continue to depend on generators for their power supply needs while the not so well to do and rural citizens rely on wood. It estimated that as much as 62% of citizens rely on wood which leads to fast deforestation. So though most of the nation, especially in the south is connected to the national grid, there has not been much more improvement in utility as generation continues to be epileptic with figures of per capita consumption of 12 watts per person circa 2012.⁶⁵ Brazil has per capita of about 268 watts per person, while it is much higher in other developed nations. Clearly then our per day barrel production does not match our final output.

The National Energy Policy (NEPP) of 2001 was put in place to make optimal use of Nigeria's energy resources, not only to meet the nation's sustainable energy needs, but also to be in line with sustainable

⁶²Taylor Wessing, (n 54)

⁶³ *ibid*, (n.54); Kemi Yesufu,(n.15)

⁶⁴ UNEP, 'Environmental Assessment of Ogoni Land' in Damilola S Olawuyi *The Principles of Nigerian Environmental Law* (Ukraine: Publishing Company Business Perspectives 2013) p.178

⁶⁵*Ibid*

development.⁶⁶ Of concern to this writer as regards clean and renewable energy is one of the policy decisions to broaden the country's energy generation options outside of gas, fuel and other fossil sources. Inculcating clean energy alternatives into our energy mix is of uttermost importance if we truly want to have a carbon free environment. The National Environmental Standards and regulation Enforcement Agency (NESREA) has a lot to contribute in this area.⁶⁷ According to one of our esteemed Nigerian institutional insiders on renewable energy development in Nigeria Prof A.S Gambo, of the Energy Commission of Nigeria, basically, there is a renewable energy policy in place. The nation is encouraged with the world wide advances in solar and this is reflected in the National energy policy.⁶⁸ There is also encouragement of 'efficient biomass conversion technologies'; wind also has to be harnessed in a manner that makes it accessible in the rural area and to all category of consumers. There is also the renewable energy master plan.⁶⁹ The commencement of the Energy Commission of Nigeria Act of 14th September, 1979 reads as follows: 'An Act to establish the Energy Commission of Nigeria and to charge it with responsibility for coordinating and general surveillance over the systematic development of the various energy resources of Nigeria'. The power of the commission in section 1(2) (b) extends over 'Energy planning and analysis (including Energy Efficiency Demand Management and Conservation, Rural Energy, Alternative and New and Renewable Energy Sources)';⁷⁰

Section 5 of the Act lists the functions of the commission:

- 5b) 'serve as a centre for solving any inter related technical problems that may arise in the implementation of any policy relating to the field of energy;'
- 5d) 'develop periodic master plans for the balanced and coordinated development of energy in Nigeria and such plans shall include:
 - 5d (i) 'recommendations for the exploitation of new sources of energy....'
- 5h) 'monitor the performance of the energy sector in the execution of government policies on energy;'
- 5j) 'promote training and manpower development in the energy sector...'

The nation's energy sources needs to be extended to include renewable energy sources such as wind, biomass and solar. The benefits of renewable energy (RE) are that it may not necessarily be connected to the national grid and can be generated independently and will easily be available to rural areas. The Nigerian energy policy document of 2003 developed the Renewable Energy Master plan Of 2005 REMP. The document REMP was developed in collaboration with UNDP and energy commission...to proffer solutions to Nigeria's energy needs. These needs are also outlined in vision 20/20 policy directives on energy.⁷¹

Our present sources of energy such as gas, which is presently being flared in large quantities, can be channelled more into domestic consumption. The Federal government has already put in place policies that are meant to encourage domestic utilization would guide the implementation of such domestic use. It is hoped that the introduction of the Nigerian Gas Master Plan (NGMP), these laudable goals would be in place.⁷² Above all, the most important aspect of use of gas would be to process it in such a way that its carbon intensity is reduced to acceptable limits. This is the only way that it can be made to be utilized in a sustainable manner.

⁶⁶ Ibid.

⁶⁷David I. Schwartz (ed.), The energy regulations and market review reproduced with permission from the Law Business Research Nigeria; <www.banwoighodalo.com> accessed January 24 2017; also available at <www.TheLawReview.co.uk> ;see also the Nigerian electric power policy 2001/2002 (the NEPP) AND The Electric Power Sector Reform Act 2005 (the EPSRA); NESREA Act (n.9)

⁶⁸ A.S. Gambo 'Renewable energy development in Nigeria, being a paper presented at the world future Council/Strategy workshop on Renewable Energy, Accra Ghana, 21-24 June, 2010.

⁶⁹ Ibid.

⁷⁰ Energy Commission of Nigeria Act, <www.lawyerd.ng/wp-content/uploads/2016/01/energy-commission-of-Nigeria> accessed on 24 January 2017.

⁷¹ Oluseyi Ajayi, P A Aderonmu and O Oluwatoyin (n51)

⁷² Obioma Helen Onyi-Ogelle, (n 8) p. 157

6. Challenges to the Implementation of Clean and Renewable Energy in Nigeria

The electricity sector in Nigeria is divided into generation, transmission and distribution. Until recently, this was managed exclusively by the Power Holding Company of Nigeria. (PHCN) But now the sector has been opened up to private participants. Though the government retains its hold over transmission,⁷³ the National Office for Technology Acquisition and Promotion Act, through the NOTAP Act, encourages transfer of technology.

Access to Foreign Exchange

But the caveat is that in order to access foreign exchange, and remit funds legitimately, such contracts involving technology transfer must be registered. Also, it is within the powers of NOTAP to decide the rates and charges that are reasonably acceptable for such technology transfer, management training, and other indexes under the technology transfer agreements.⁷⁴ With the recent fluctuation in pricing of foreign exchange, it may not be out of place for some projects that are considered of utmost benefit such as with transfer of technology to be safeguarded from such fluctuations in order to keep costs within projected limits, as it is the final consumer that will have to bear the brunt of the cost differentials.

Regulation of Prices

The National Electricity Regulatory Commission (NERC) involved in regulating prices to ensure fair pricing for consumers of electricity. Through the Multi –Year tariff Order, (MYOTO) NERC inculcates all cost elements to arrive at tariffs that should favour all stakeholders such as the investors, market participants and consumers. But such tariffs may not ensure profit for foreign market participants in view of the high cost of technology transfer. This may be a factor that will inhibit transfer as foreign firms will only be encouraged to enter agreements if they can be assured of returns on their equity. In view of the dilapidated state of infrastructure of the old generating plants a lot of capital will go into bringing the industry up to par.⁷⁵

Monopolist Tendencies of Newly Licenced Electricity Distributors

Inculcating clean energy alternatives into our energy mix is of uttermost importance if we truly want to have a carbon free environment. The National Environmental Standards and regulation Enforcement Agency (NESREA) Act has a lot to contribute in this area.⁷⁶ Though various generation companies have been licensed, the field is hardly oversaturated. Some licensed generators still exert some form of monopoly in the sense that that their areas of distribution may cover up to about five states. This now means that the same bottlenecks being previously experienced with Power Holding Company of Nigeria (PHCN) in terms of distribution is hardly ameliorated under the new laissez faire regime. This situation is further escalated by the fact that the licensed electricity companies lack power of transmission and have to supply to the national grid to carry out this function. This is to preserve the nation’s security position. To subvert the national grid, many licensed operators may choose to play small, and supply directly to companies or other manufacturing concerns. This will not be cost efficient for them in the long run.⁷⁷

Inability to Distribute Clean and Renewable Energy via the National Grid System

The obvious challenges to the implementation of wind, solar and biomass energy when in force are the issue of distribution in view of the fact that there exists no grid for these areas. Better results were generated from fossil based power plants. REMP remains a directive only and yet to have assent to law. Beside some form of infrastructure needed for wind energy, for example might take up a reasonable expanse of land. This will be needed to set up wind turbines or wind farms. The land tenor in the country is a bit rigid in

⁷³David I. Schwartz (ed.) (n.67)

⁷⁴Ibid.

⁷⁵ David I. Schwartz (Ed.) (n.67)

⁷⁶ Ibid

⁷⁷ Ibid

terms of grant of land to investors for diverse purposes, especially as the federal government exerts control over most of it through the Land Use Act.⁷⁸

Lack of Fiscal and Associated Incentives to Attract Investors

Generally, the Nigeria Investment Promotion Commission (NIPC), established by decree no.16 of 1995 has in place a lot of incentive to attract investors.⁷⁹ These include low custom duties, VAT exemption and pioneer status, a lot more can be done. There are challenges to transfer of technology. These are issues that might have to do with capacity building, the manner and form of incentives, the socio, political and cultural environment. All these go to show that ‘national circumstances differ widely, opportunities exist for facilitating technology transfer through the appropriate enabling environment in transferring and recipient countries’⁸⁰ International partnerships are really working as can be seen in WBCSD sector projects and Swiss Agency for Development Cooperation assistance in adaptive R&D.

Need for Nigeria to Come Up with other Viable Sources of Revenue

Our mono crop economy which is built around oil and other refined petro chemical products need to be urgently diversified. A lot is being done now to give agricultural products and other mineral resources the pride of place. This will reduce ecological impact and devastation on the environment that is witnessed with processing of fossil based products.

7. Conclusion and Recommendations

Nigeria needs to invest more in renewable energy and clean energy as fossil is a diminishing asset. In order to organise the energy sector in Nigeria, there is the need for an appropriate legal framework. In furtherance of the commitment of the 8th House to put in place a vibrant energy sector, there is right now a bill being considered by the House ‘...for an Act to provide for the utilisation, sustainability and adequate supply of renewable energy for electricity and heat generation and for other related matters..’ This bill when passed will change the dynamics with regard to power supply in Nigeria, by utilising renewable energy and other forms of clean energy.⁸¹ Senator Ben Murray - Bruce⁸² has severally advocated for Nigerians to embrace electric cars. These vehicles do not need energy produced from fossil sources, but relies on renewable energy such as solar powered rechargeable batteries which last for very longhouses. In a recent interview, the Managing Director of Daimler Benz (Mercedes Benz) said that their competitors are no longer other car companies but Telsa, Google, Apple Amazon. This is because software will disrupt most traditional industries.

The company Telsa has pioneered a range of these electric vehicles. According to him, solar technology has been on the exponential curve for 30 years, and we are now privileged to witness the burgeoning impact as more solar technology was installed worldwide than fossil. This has led to availability of cheap electricity. They are even cheaper and some have described them as computer on wheels. If they are introduced as a matter of policy in Nigeria, this will significantly reduce the Co2 gases in the atmosphere, as well as keep in check level of noise emissions generated from fossil powered vehicles, which are also injurious to humans. Some futuristic projections even exist whereby people may not need cars at all by 2030, but can call for electric cars from the comfort of their homes to transact their daily businesses. Other benefits of introduction of cheap solar energy is that water can be desalinated faster and safer, hence making available more drinking water at a cheaper rate.⁸³

⁷⁸ Oluseyi Ajayi, PA. Aderonmu and O Oluwatoyin (n.51)

⁷⁹ Ibid

⁸⁰ Richard A. Bradley and Cedric Philbert (n.48)

⁸¹ Kemi Yesufu (n.15)

⁸² Ben Murray-Bruce, Senator of the Federal Republic of Nigeria, as propagated on his ‘Common Sense’ series on Silverbird Television. ;

⁸³ Managing Director of Daimler Benz (Mercedes Benz)

Clean energy is environmentally friendly and reduces the main children's respiratory diseases. It helps to preserve fossil resources which are not renewable and so ensures adequate and continuous supply. This reduces undue dependence on countries producing fuel as well as the international yoyo in fuel pricing⁸⁴ Winds plants may distract animals nearby and hydropower ventures may affect aquatic life in some instances. Even biomass emits dangerous fuels; but these effects are not as damaging as fuel or oil sources. The initial equipment for the implementation of other alternate energy sources may be more expensive to put in place.⁸⁵ In implementing new changes the government should improve the living conditions of people so that they can better absorb and cushion the financial outlay involved in implementing changes. The citizenry should also adapt in view of the limited availability of fossil sources.⁸⁶

There exist many international donor agencies that are willing to supplement the compensation paid by ship owners for accidental spills to the environment, and other damage from transportation of fossil energy. Despite this, it is not an option for the government to consider compensation paid out to environment damaged by fossil energy sources such as oil spills from tankers and cleans up campaigns as adequate. To mop up the effects of years of environmental degradation; such as is being commenced in Ogoni land in the Niger Delta area of Nigeria is very capital intensive, and the expected positive results are not guaranteed. In the long run, the most viable solution to environmental issues will be the introduction of alternate sources of energy such as can be gotten from renewable and clean energy sources.⁸⁷

We need to leave our carbon footprints. Nigerian homes should consider energy sources that produce clean and non- polluting energy. Though the cost may initially be on the high side, but this can transmute into mega savings in the long run. These include geothermal pumps, which are about thrice as efficient as regular heaters. Solar panels can also be mounted on the roof tops to provide non- polluting electricity to the home. People are also encouraged to conserve energy as a habit. This leads to reduction in cost. Also awareness programs should be put in place whereby the government can assist clusters of community to benefit from a shared renewable source such as wind mill. Agricultural associations and other entrepreneurs in industry involved in milling and processing can use the lease or rent option of such clean energy locations to offset costs. Nigeria should also implement incentive such as rebates for use of clean energy.

⁸⁴ Green uptown (n 15)

⁸⁷ See the International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (IMO FUND); see also the Internal Oil Pollution Compensation Fund 2001; Damilola S. Olawuyi (n 64)