

NIGERIA'S ENERGY POLICY AND VISION 20:2020: ISSUES OF WIND AND OTHER RENEWABLE ENERGY TECHNOLOGIES

Ajayi, O.O

*Mechanical Engineering Department,
Covenant University, Ota, Nigeria
Tel: +234-8036208899,
Email: seyi_ajayi@yahoo.com.au*

Abstract

The study was used to assess and analyze the policy issues of Nigeria energy production and distribution in line with the current vision 20:2020 of the federal government with particular focus given to the development of wind and other renewable energy technologies. Initiatives of the government at ridding the nation out of her energy poverty and the proposals of the renewable energy master plan were surveyed. It found that, the proposed renewable electricity generation plan represent an underestimation of the renewable energy resources' potential of the nation and also the projected electricity demand supply plan was inadequate going by today's reality of population and 13% gross domestic growth rate of vision 20:2020. Indices which represent greater opportunities for production of renewable electricity were identified and discussed. The outcome showed that although Nigeria has potentials to employ renewable energy resources of wind, solar and biomass as well as available small hydropower potentials to produce electricity, the identified challenges hindering the development of these resources must be overcome and the proposed strategies and suggestions employed for the nation to be on her way to stronger sustainable development and adequate energy development.

Key words: Energy policy, Power generation, Renewable resources, Nigeria

1.0 Introduction

Nigeria is a country whose energy need is nourished by supplies from different hydropower stations and few thermal gas power stations within her. The hydropower stations take advantage of the topography of Niger and Benue Rivers and other water masses in other places within the country, representing huge prospect for meeting the energy needs of the nation through production of clean electricity. The country on the other hand, is endowed with rich energy resource base, having the ninth largest natural gas reserves in the world and associated to non-associated natural gas deposits in the ratio 53.5:46.5 (Ajayi and Ajanaku, 2009). Through this, she drives the various thermal power stations located within the southern parts of the country. However, her changing seasons between wet and dry makes the extent of water availability at the different power stations variable, leading to intermittent supply at times of low water levels, also according to a report, only 20% of the nation's hydro-power potential is tapped for use (ECN – UNDP, 2005) and the available thermal power stations in their installed capacity cannot produce sufficient amount of energy for the populace. These challenging power production situation coupled with the present and even increasing population side by side the total capacity of available power stations have placed the nation in a real situation of not being able to meet the energy need of the people (Olayande and Yusuf, 2003). This shortage in energy supply has prompted many of the industries to rely on alternative sources of diesel and petrol generators to keep their businesses running. However, a lack of energy in an economy or its inadequacy had led to social and economic poverty, underdevelopment, unemployment, underutilization of rural human resources, economic stagnation, underperformance of industries and industrial sectors, low turnover, high level of illiteracy and increased migration. More so, the various women right programmes, literacy programmes, birth control policies and the millennium development goals programmes will not do well if the current trend of energy shortages experienced in the country is not addressed adequately (Hermann, 2001). Citizens located in the rural areas still depend on traditional biomass for cooking and heating, increasing environmental pollution, because, their communities are not connected to the national grid. In 2003, the electricity availability per Nigerian derived from the ratio of total generation to population is estimated to be 127.0 kWh per person (EIA, 2003, 2008). This is very minimal when the data is compared to those of Ghana (255.8 kWh per person), Italy (4,654.5 kWh per

person), United Arab Emirate (11, 045.58 kWh per person), Egypt (1,127.6 kWh per person), Algeria (850.7 kWh per person) and South Africa (4,853.9 kWh per person) for the same reference year 2003 (EIA, 2003, 2008). Further comparing this amount of electricity made available to each Nigerian (127.0 kWh per person) by the federal utility to the total consumed in year 2003, revealed that only 0.72% of the energy consumed per person was provided by the federal utility, pointing to the fact that alternative energy sources of fossil fuel burning and biomass burning in the form of fuelwood have formed the main stay of Nigeria's economy. The effluents from these sources are subjects of several international debates on climate change and global warming.

Furthermore, comparing the trend of energy consumption per person for different years (Fig. 1) also reveal striking inferences. Fig. 1 clearly demonstrate that the energy consumption of Nigerians have been declining at a rapid rate. The reason may be partly due to the crises in the Niger Delta, the rising pump prices of fossil fuels, the inconsistency in power supply from the national power utility and the high losses in electricity transmission.

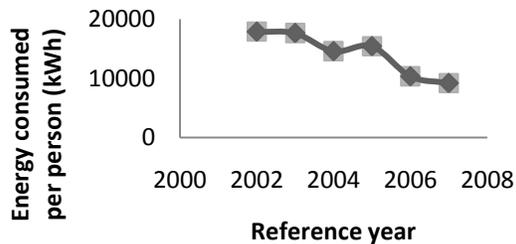


Fig. 1: Energy consumed per person per reference year (Ohunakin, 2010)

Moreover, considering the prevailing sources of energy production revealed that production is wholly based on two major sources of hydro and thermal. While these sources are capable of producing enormous energy, sole dependence on them have led to insufficient power production. This is because of the seasonal dependence of hydropower and the rising cost of natural gas and other fossil fuels. The majority of the power stations are operating below installed capacity. Nigeria power sector for example, operates below its estimated capacity. In 2004, total installed electricity capacity was 5900 MW, but, total production during the year was put at 2169MW (or 19 TWh) and the amount consumed was 2055 MW (or 18 TWh), with only 40% Nigerians, mostly urban dwellers having access to it (EIA, 2007; Ajayi and Ajanaku, 2009). In 2008, the difference between installed capacity and production capacity amounted to 40.8% losses, with electricity penetration rate in Nigeria put at around 50 – 60% of total population (EIA, 2007; UNDP-WHO, 2009). As at 2001, about 25% of the 774 local government areas of Nigeria were not connected to the national grid and today, more than 75% of these areas are still not connected. Worst still is the reports on Nigeria showing discernable evidence of climate shifts and suggesting tendency towards climate change. According to Obioh and Fagbenle (2009), it was initially established that most parts of Nigeria had what could be termed normal or above normal onset of rainfall dates during the mid-20th century (1941-1970) except for Sokoto, Calabar and environs where rains were usually late. Then as the century progresses (1971-2000), late onset of rains spread to more areas with only a narrow band in the middle belt and southwest regions remaining normal. In consequence, Annual rainfall amounts in most parts of the country showed a decrease of two to eight mm/year with only few places (Lokoja, Kano, Ibadan and Ondo) showing an increase ranging from two to four mm/year of rainfall for the period 1941-2000. Much more significant decreases were observed in Port Harcourt (on the coast) and Katsina (on the arid and semi arid zones of the north). The outcome of this is in the fact that, hydroelectricity generation might suffer some setbacks in the future if quick attention is not focused on sustaining its continuous production. Be it as it may, the challenge grows daily and the need to produce sufficient amount of energy heightens. With the total amount of energy produced run into the national grid, the rural dwellers still stand only in hope of future brighter life, as the majority of the rural and sub-rural places are not linked to the grid. This therefore means, the country need to look for alternative sources of energy to meet her growing energy demand.

The realization of the need to have adequate energy development programme for power generation in the country over these few years had prompted some government initiatives. Based on this, the government recently has been making frantic efforts at seeing the energy state of Nigeria improve beyond the present level

and thereby committing great resources to develop modules and increase generating capacities. A landmark achievement by the government is the development of the national energy policy and the energy statement of vision 20:2020. This paper is therefore used to critically analyze the policy issues of energy development in Nigeria giving particular focus to the development of alternative energy sources. It surveys the various initiatives of government at improving the nation's energy supply and identifies the challenges which the development of alternative sources of energies has over the years gone through. It also proposed some strategies which can help improve the development of renewable sources of energy and also discussed some suggestions that could alleviate the problem of energy scarcity.

Conclusion

This study has been used to discuss the issues generated in the Nigeria's national energy policy and the energy statement of vision 20:2020 of the federal government with particular focus given to wind and other renewable energy resources and technologies. It surveyed the nation's energy policy statement and the energy statement of vision 20:2020 as well as the Renewable Energy Master Plan (REMP) developed by the joint collaborative effort of Energy Commission of Nigeria and United Nations Development Programme. The energy intentions of the government as contained in the policy and vision 20:2020 documents were analyzed in comparison with today's reality. The outcome showed that although the energy policy and vision 20:2020 were well laid out, it however contain some pointers to challenging future if more efforts are not jeered towards adequate energy production. Also, the energy demand and supply projections as contained in REMP document were outside the present day reality and the proposed RE plan represents and underestimation of the resources' potential available in the country. Some challenges hindering rapid development of renewable energy resources for power generation were identified. These challenges include economic barriers, low electricity tariff, nonexistent legal, institutional and regulatory framework, poor government motivation, insufficient resource assessment, and non existing resource map to mention a few. Some suggestions which could help pull the nation out of her energy poverty were also raised and discussed. This include focus of government on quality proposals of the energy policy and renewable energy master plan that meets today's reality, provision of funds to aid RET research and development, collaboration between governments at all levels with private sectors to forward the national development of renewable energy resources and introduction of subsidies on purchases of RETs to mention a few. .

References

- Ajayi, O.O. Assessment of utilization of wind energy resources in Nigeria, Energy Policy, 37, 750-753, 2009
- Ajayi, Oluseyi O. The Potential for Wind Energy in Nigeria, Wind Engineering, 34 (3), 303 -312, 2010
- Ajayi, O.O and Ajanaku, K.O. Nigeria's energy challenge and power development: the way forward, Energy and Environment, 20(3), 411-413, 2009
- Energy Commission of Nigeria and United Nations Development Programme (ECN-UNDP). Renewable energy master plan: final draft report Available online [<http://www.iceednigeria.org/REMP%20Final%20Report.pdf>, accessed 17 June 2007], 2005
- e-parliament. The Akosombo Declaration. Available on the web [www.e-parl.net, accessed May 13, 2009], 2008
- Federal Ministry of Power and Steel (FMPS). Renewable Electricity Action Programme, available online [<http://www.iceednigeria.org/REAP-postconference.pdf>, accessed August 11, 2010], 2006
- Hermann, S. A solar manifesto, James and James Ltd, London, 1-22, 2001
- Obioh, I.B and Fagbenle, R.O. Energy systems: Vulnerability – Adaptation – Resilience (VAR) Report on Nigeria, Helio International, 2009
- Olayande, J.S. and Yusuf, A.O. Nigeria electric power sector, workshop on the use of SIMPACTS model for estimating environmental and human health damage from power generation, International center for theoretical physics, Italy, 2003.
- Sambo, A.S. Matching Electricity with demand in Nigeria, International Association for energy economics, Fourth Quarter, 2008, available online

[www.iaee.org/en/publications/newsletterdl.aspx?id=56, accessed August 11, 2010], 32-36, 2008

Sambo, A.S., Strategic Developments in Renewable Energy in Nigeria, International Association for energy economics, Third Quarter, 2009, available online [www.iaee.org/en/publications/new_sletterdl.aspx?id=75, accessed August 11, 2010], 15-19, 2009

United Nations Development Programme and World Health organization (UNDP – WHO). The energy access situation in developing countries: A review focusing on the least developed countries and Sub-Saharan Africa, 2009

United State Energy Information Administration (EIA). 2003. World Energy and mineral statistics, available on the web [<http://www.eia.doe.gov/>], retrieve from Microsoft Encarta, 2007.

United State Energy Information Administration (EIA). Nigeria energy data, statistics and analysis - Electricity. Available on the web [[http://www.eia.doe.gov/emeu/cabs/Nigeria/Electri city.html](http://www.eia.doe.gov/emeu/cabs/Nigeria/Electri%20city.html), accessed 5/12/2009], 2007

United State Energy Information Administration (EIA). World population, most recent annual estimates, 1980-2007. Available on the web [[http://www.eia.doe.gov/oiaf/ieo/pdf/0484 \(2008\).pdf](http://www.eia.doe.gov/oiaf/ieo/pdf/0484%20(2008).pdf), accessed on May 11, 2009], 2008

Vision 2020 National Technical Working Group (VNTWG). Report of the vision 2020 national technical working group on energy sector, Nigeria Vision 2020 program, available online [<http://nobodycanstop.us/.php/mRGcuQncvBXZSBjMlc0VU5EMyUSenJXZuVOLzRWYvxmb39GZvcmbuY3bn5yYw5mL3d3dv8iO730b9704a34b72df/>, accessed 16 November 2009], 2009