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Economic Benefit of Gen Cos Using Photo voltaicin the Niger Delta Region of Nigeria

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ABSTRACT--The challenges encountered by Gencos, TranCos and Discos in delivering electric power in significant ratio to the Niger delta has being a topic of debate in Nigeria. Lots of challengers are mostly used as an excusable reasons by government institutions in Nigeria not to deliver electric power to this region. This paper seek to reviews the Nigeria power electric deregulation model, its challenges and attempt also to highlight solar photovoltaic energy sources and the economic benefit accruable to the national grid for the GenCos to use it for energy generation in a modernized grid system meant for the Niger delta regions of Nigeria

Index Terms—DisCos, GenCos, NERT Act 2005, Nigeria Government, Niger Delta Region, Nigeria, Solar Photovoltaic, TranCos, VIMs, NIPPs.

I. INTRODUCTION

Electrical power is the rate, per unit time, at which electrical energy is transferred by an electric circuit. Electric power is usually produced by three categories of electric generation procedural methods.Which are fossil fuels (coal, natural gas, and petroleum), nuclear energy, and renewable energy sources [9]. Electrical power in the production value chain is called vertically integrated module (VIM) where power generation, power transmission and power distribution are managed under one product brand. Countries around the world have being able by different act of parliament to manage VIM. This paper seeks to highlight the economics importance of adding photovoltaic cells in VIM in the Niger Delta regions of Nigeria

i. The Nigeria electric Power VIMs perspectives

By an Act of Parliament in 1951, the Electricity Corporation of Nigeria (ECN) was established, and in 1962, the Niger Dams Authority (NDA) was also established for the development of hydroelectric power. A merger of the two organizations in 1972 resulted in the formation of the National Electric Power Authority (NEPA) which was saddled with the responsibility of managing the VIMs. In 2005, NEPA was unbundled and renamed Power Holding Company of Nigeria (PHCN). Though the reasons for the unbundling NEPA are many but the main motivation stems from the desire of Nigeria policy makers to foster competition among investors in the power sector.

Under the 2005 Electric Power Sector Reform Act, all regulations concerning electricity are made centrally for the 36 states and their 774 local government areas. But the central regulator cannot monitor all the players effectively. Though the reason is farfetched because the main issue remain around the high demand growth that is not proportional with the investment in electric power VIM. Mostly because of fraudulent capital flight of the common wealth of the Nigerian People by Key personals in the Nigeria system which has reduced confidence among required capital intensive financiers required for financing investments in the VIMs in Nigeria.

Due the complexity of managing the electric power VIM based issued, the Then President Goodluck Ebele Jonathans government approved that electric power VIMs be deregulated in accordance with laws of Nigeria [1] with the hope of achieving efficiency. The government unbundled the Nigeria electric power VIMs into eleven electricity distribution companies (DisCos), six generating companies (GenCos), and a transmission company (TCN). The Act also created the Nigerian Electricity Regulatory Commission (NERC) as an independent regulator for the sector.

This capitalism approach was believed to be the way forward in the deregulation of the electric power VIMs motivated by profit as opposed to an implied sense of patriotism which seemed to be severely lacking by NEPA/PHCN. At present the deregulated electric power VIMs chain in Nigeria comprises of generating companies (Gencos), Transmission companies (TranCos) and Distribution Companies (DisCos) and these entities are independent. The GenCos are the ones in charge of the actual generation of the electricity.

The TranCos are natural monopolies and

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operate under the authority of a regulator. While the DisCos are the only part of the value chain that interfaces with power consumers (customers) and generates the income that serves the financial needs of the value chain – generation, transmission and distribution.

Presently according to Nigerian Integrated Power Project [2] Gencos installed generating capacity is at 10,396 MW and installed available capacity is 6,056 MW, with thermal based generation at 4,996 MW and hydro generation at 1,938.4 MW. However, average actual generation ranges around 3,000 MW provided from the top six GenCos namely Egbin Power Limited, Transcorp Power, Shiroro, Kainji/Jebba, Sapele, and Geregu. [Africa Oil+Gas Report].

Thus since the deregulation, the government has drastically reduced its financial intervention in the sector even though it still has 40 per cent equity in the 11 Discos. Therefor planning for generation capacity investment and location of the same is therefore market driven. There may not be any coordination between transmission and generation investment.

This has resulted in a marked increase in the level of risk and uncertainty associated with transmission operation and investment. Therefore this paper seek to highlight the benefit of the GenCos investing in Solar Photovoltaic Technology as an alternative means of power generation for the deprived people of the Niger Delta who are presently not reached by the TranCos and DisCos

II. SOLAR PHOTOVOLTAIC TECHNOLOGY AND THE NIGER DELTA ENVIRONS IN NIGERIA

Solar photovoltaic (SPV) technology is based on semiconductor materials designed to directly convert sunlight into electricity, thus; the electricity produced is delivered in the form of direct current (DC), which is suitable for several applications [3]. The IEA (2014b) highlight two components of solar radiation which are direct radiation coming directly from the sun and diffuse radiation reaching the earth indirectly once dispersed by the atmosphere, which are both relevant for solar photovoltaic power.

The development of solar photovoltaic technology as a premium method of harnessing energy from the sun dates back to the 1950s. When high efficiency solar cells were developed by a group of scientists at Bell Labs in the United States. Since then, tremendous progress has been made in regard to increase efficiency, reduction in cost of production and price, and market expansion of solar energy systems (REN21) over the decades.

The recent improvement in the technology has coincided with continuous decline in the costs of owning and installing solar energy systems [4]. For example, land-based applications built on silicon materials for photovoltaic cells have a lifespan of 20 to 25 years operational warranty by manufacturers, though useful life is likely to last longer (Bradford, 2006).

This trend has made it more attractive for developing countries to implement the technology as steps to poverty alleviation, improvement in the lives of rural people, and a definitive climate change mitigation strategy [5]. Which is significant for the densely populated people of the Niger delta region of Nigeria sitting directly on the Gulf of Guinea on the Atlantic Ocean in Nigeria. [6].

This petroleum-rich region has been the center of international controversy over pollution. Pollution a product of oil in the fragile Niger Delta communities and environment have been enormous. Local indigenous people have seen little if any improvement in their standard of living while suffering serious damage to their natural environment. According to Nigerian federal government figures, there were more than 7,000 oil spills between 1970 and 2000. [7].

Has been estimated that a clean-up of the region, including full restoration of swamps, creeks, fishing grounds and mangroves, could take 25 years. [8].presently is of interest to note that the region of the spills and the complex terrain of the Niger delta have made the Niger delta inaccessible for institutional implementation of the electrical power developmental plan by the TranCos and DisCos.

III. ECONOMIC BENEFIT OF PHOTOVOLTAIC SYSTEM TO THE NIGER DELTA DWELLERS

Photovoltaic systems have an anticipated 25-year lifetime after a complete life cycle installation. 25-years of uninterrupted of a steady and reliable power supply using solar photovoltaic system will reduce the running cost of small scale business owner presently totally depending on private source of power generation thereby improving their saving for a better life a step away from pains of the delta region dwellers whose original source of livelihood are now destroyed by oil pollution from industry oil and gas drilling activities.

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Solar Photovoltaic System will total remove dependency on the main energy grid and improve solar Photovoltaic power penetration into the national grid. In fact, panels can produce more energy than required by the local dwellers of the Niger delta region. There's no waste, though — when that happens, the excess electricity is sent back into the power grid. In many states, the GenCos are allowed to sell this extra power back to the TranCos in a process called net metering.

Other benefit of using Solar Photovoltaic system by GenCos for powering the Niger Delta are the affordable cost of solar photovoltaic, low cost of electricity and noise free energy generated. The life cycle installation of a photovoltaic system is a complete module that covers the cost for site preparation, system design, engineering, installation labor, permits, operation and maintenance.

Being an economic spinner, investment into renewable source of energy will create more jobs for the Niger delta rural dwellers by the GenCos, the TranCos and Discos during the implementation process of local grid system employing Photovoltaic by the GenCos which is an economics related activity .

IV. COSTING A SOLAR PHOTOVOLTAIC SYSTEM

The cost of a solar Photovoltaic system is measured in price-per-peak-watt. Photovoltaic system costs encompass both module and BOS costs. Module costs typically represents only 40-60 % of total solar Photovoltaic system costs. Typically the cost of installing a photovoltaic system having a power of 10 kW was cheaper compared to the amount of power sold by the Discos.

In year 2009 for instance typically the cost of installing a photovoltaic system having a power of 1 kW ranges from hundred thousand whilst in 2010 average investment decreased to little more than fifty thousand Approximately about half of this investment would be for the PV modules, and the inverter, PV array support structures, electrical cabling, equipment and installation would account for the rest

V. SUMMARY

Today Photovoltaic power is reaching higher and higher penetration level. Its appropriateness is excellent for the GenCos for solar photovoltaic mini-grid applications in a modified grid development plan for the Niger Delta people.

The Fact remains that employing Photovoltaic solution by the GenCos as a solution to the Niger delta electric power challenges will give high gradation of location independence, noise exclusion, fuel neutrality, zero emissions, modularity, and high degree of equipment durability.

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