

Scaling Off Grid Power In Nigeria

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Abstract

This article addresses the imperative growth of power as the key solution to issues around production, storage, digital revolution and especially, the current job deficit in Nigeria led by children and youth. It equates the high costs, and sometimes unavailability of electricity in rural areas to the production of low quality goods, leading to an uncompetitive economy. As a result, increasing power access beyond the national grid's current capacity has not only become a necessity, but also an important contribution to inclusive growth. Other forms of power generation, like renewables, must be developed and implemented to bridge gaps created by limited access to power.

Keywords: Off-grid, renewables, electricity, power

Introduction

'Young people need jobs' -- this was the emphatic statement of the World Bank Trade and Competitive Practice in early 2016¹. It goes on to state that ---'with a median age of fourteen years old, Nigeria's population of 180 million people will require an estimated 40 million new jobs by 2030 to absorb new labor market entrants. Nigeria's population pyramid remains dominated by children and youth, and with three percent annual growth of the population, the working-age population in Nigeria is growing disproportionately. While explicit unemployment in Nigeria - by the ILO definition - appears to be well under ten percent, low-productivity jobs in agriculture and services currently account for the majority of employment. Only 9 million out of 87 million working-age adults are indeed wage workers in either the private or the public sector, while the rest of the population works in agriculture or is self-employed. The shortage of

productive jobs is one of the most important current challenge in the country'.

This statement buttresses the absolute urgency underpinning economic growth especially for the young working group which is put at 62.5% or about 112m people aged between 15 and 24 years² registering an unemployment rate of over 49%³. However, at only 30w per capita⁴, poor access to electricity tops other growth limiting factors such as infrastructure and social exclusion. Furthermore, in the reality of a rising urbanization rate currently at over 53% urbanization⁵, access to power is put at 52.4% by the World Bank⁶ and this seems to cover only urban and peri-urban access as many rural areas are unserved. In fact, in 2016 the access to power has been more realistically calibrated by the Nigerian Energy Commission and the World Bank. Only 45%

¹World bank Trade and Competitiveness Practice 2016 ²World bank Global Findex data 2014 ³National Bureau of Statistics 2016

⁴NESG Chairman's Welcome Address at a Joint Workshop held by NESG and HBS to review Renewable Power Policy with Government MDAs in June 2016

⁵Africa's Huge Housing Deficit by Pan African Capital 2016 ⁶World Bank Index on Access to Power 2015

or 81million have access to the grid and of that number only 25% have 'regular supply' for the 13,000mw. 55% or 91million people are not connected to the grid.

This is a very dismal picture which underscores the fact that power is a critical gap that must be bridged if Nigeria would drive increased human productivity. The Sustainable Development Goals (SDGs) paradigms for growth recognize the role of quality of life in production --- so the SDGs define basic human productivity needs in terms of access to power as 1000w per capita, and this is more imperative under the realities of harsh living conditions in over-urbanization of cities like Lagos, where women, youths and most of the informal sector desperately seek better opportunities and quality of life. Lagos is expected to become a mega –city by 2025 with over 24million inhabitants.

Nigerian youths must catch up with trends of digital revolution gripping Africa just as their peers in the west and also in African countries like South Africa, Kenya, Senegal and Egypt are positioning to take advantage of the so called 4th Industrial Revolution. In a post Davos '2016 panel discussion on CNCBC, one of the panelists Syabong Gama, CEO of the Gordon Institute of Business Science in Pretoria, said that South Africa is collaborating with GE to drive a Digital Transformation in Africa through the transport system by optimizing fleet administration to make assets work better. For example, fuel efficiency alone could deliver about 10% savings, which would translate to billions of dollars, more jobs and higher GDP. The Global Chair of GE Jeff Immelt explained that with constant power such transformations could take center stage in Nigeria and re-stated GE's interest to support Nigeria to achieve 40GW by 2030, leveraging its

immense capabilities and capacities. While Africa is on the verge of a 4th industrial revolution – Nigeria with just one bulb per person (for a population of 180m) would be left behind if drastic and urgent measures to improve power access are not taken.

Power: Imperative for Growth and Development

As the rhetoric continues, the impact of power on poverty deepens causing significant losses in productivity and GDP. The prevailing low power in Nigeria contributes immensely to negative growth rates, and adds about 40% to 60% costs to production outputs. According Tokunbo Omisore CEO Top Services (Founder ShopRite market chains in Nigeria) such huge costs of power slows down growth. This is true of businesses, which drive power with diesel generators and thus significantly impacts competitiveness of goods and services. Many small businesses are unable to cope and have shut down. Vacancy rates of shopping, office and residential complexes in Lagos is over 69% indicating that people are adjusting to harsh claims by relocating to suburbs. High costs of electricity is also responsible for lower quality for finished products, making Africa less competitive than other developing countries in terms of packaging, storage and other electricity dependent services. So the much touted economic diversification and imports substitution need electricity access to become a reality.

In agriculture, \$750bn post-harvest losses recorded annually⁷ due to inability to process and preserve crops and perishables such as onions, potatoes and tomatoes. Huge savings, new jobs and GDP growth could be derived from first stage processing capacity where farmers are able to deliver crops like corn, cassava or sorghum to processors within a 24 to 48 hour window. Livestock requires even quicker processing and the

absence of adequate cold- cool chains also means that goods get to markets in very low quality, costing billions of Naira losses to farmers. Dr. Bala Magaji and his colleagues at the Business Innovations Facility estimate that post –production milk can be improved threefold from 500,000litres daily to 1.5m liters to meet national daily needs --- if there are cool chains in the rural areas to preserve dairy products. The growth of jobs from such activities means that Fulani milk girls, for instance, can exponentially grow their incomes and expand their milk cows stock, reduce nomadic grazing and trigger ranching over time.

It is evident that the environmental impacts on health due to generator fumes and noise cuts across the spectrum. A typical example which should resonate is the small 1.5kva petrol generator aka 'I better pass my neighbor', an ubiquitous, affordable but necessary nuisance widely used by small income earners in congested one room apartments in overcrowded city-slums. The fumes are choking and the noise is deafening, sometimes exceeding 120 decibels– this is equivalent to the noise from a stadium during a football match. During an Environmental Impact Assessment for one of the telecommunications companies in Ibadan, a block of 32 one- room apartments in a compound had almost all the generators switched on, recorded almost 120dB. This automatically increased the level of noise pollution, causing discomfort in the neighborhood⁸.

The Reality of Increasing Power access

It is impossible to predict when power access would improve appreciably because of the cost of expanding and refurbishing the decadent power infrastructure for the national grid that served one third of today's

population three decades ago. In fact the Federal government announced that it would attain only 7000mw in 2017 once the ongoing works at several power stations were completed, but recently the Ministry of Power announced that it had attained power delivery of 7000mw in March 2017.

The Ministry of power has been very proactive to improve power delivery as the Honorable Minister stated that already 60% of the privatization process had been achieved and the Ministry was working assiduously to ensure better enabling environment for private sector investments⁹. Indeed several power policies including the Nigeria Energy Mix, which determines how much power is expected from different resources to chart the way for investors has been released. But even if more sub-stations drive embedded power – these infrastructure do not have the full capacity to deliver all of Nigeria's power needs of 115GW to drive 7% growth¹⁰.

Lagos State leads the country to drive embedded power and has forecasted a trajectory to attain 3000mw by 2022 thus delivering 24- hour power supply for the state.

Late in 2016, around November, the government stepped up its promise to create an enabling environment for the gas investments and held couple of public reviews for the National Gas Policy and Gas Commercialization Policy to guide investments into schemes for flare-out in the Niger Delta. Both policies were very well received and await completion and release. It is envisaged that the over 370 billion scf of gas in 2014 would soon be a source of new jobs, new GDP and boost the gas supplies locally. But there is need for the Federal government to derive domestic pricing for gas to drive down tariffs which are currently

⁷<http://agronigeria.com.ng/Nigeria-waste-at-750bn-yearly-danfoss>

⁸Environmental Impact Assessment Reports by CERASE Environmental Services limited 2015

⁹The Minister stated this at an Energy Access Seminar organized in Abuja on the 20th of January 2017

¹⁰Energy Commission of Nigeria Report on the Role of Energy in Achieving the MDGs 2008

pegged at N24 to N28/kwh, instead of benchmarking gas produced in Nigeria against the international Mont Bellvue index which should be used for export only. Other countries such as Saudi Arabia, have domestic pricing for gas so that the citizens can pay lower prices and drive industrial growth.

Therefore, in addition to steady gas supplies a domestic price is critical to electricity delivery and improving access in Nigeria because affordability is an imminent critical element because the purchasing power of Nigerians has been severely eroded with the recession. An off grid installation in Kowa, Gombe state that was installed by one of the NESG SPC members in 2013, had generated much expectations and hope for the future was recently dismantled and relocated to another peri-urban community with better ability to pay for the electricity because the provider was unable to meet up with the repayment plans due to very low demand of the electricity generated. So even though desired the electricity, they simply lacked the ability to pay and would often remove the cut outs to restrict use or not recharge the meters. This shows that livelihoods are important factor in power delivery for rural and peri-urban communities. So adding business activities to stimulate purchasing power especially in rural areas is essential for some very low income communities.

Driving growth for off grid power solutions

Even though ECN recommended 115,000mw power to attain 7% growth rate by 2020 as far back as 2008, that power projection is still valid as the new National Renewable Energy and Energy Efficient Policy released in 2016 estimates this capacity is needed to drive 6.7% growth by 2030. But it is clear that the national grid is not on track to attain these projections and so off grid embedded and renewable energy sources could bridge this gaps.

With unending interruptions to gas supplies and dwindling hydropower from Kainji dam, It is fortuitous that off grid power took center stage in 2016 with the revisions of the National Renewable Energy and Energy Efficiency Policy with its two action plans (NREEP and NREAP) plus the release of the National Electricity Regulatory Policy (NERP) and Rural Electrification Implementation Strategy Policy (RESIP), so from that perspective the legal and regulatory frameworks have gained much needed traction to assuage international and local investors about the seriousness of the country to create enabling environments for growth of off grid power.

Significantly, with intervention of the private sector through the NESG, renewable power space was upgraded from less than 10% of the Nigeria energy Mix to 30%. The energy mix is a policy scale that determines how much investments are expected from the various sources of power including natural gas LPG, solar hydro, biomass and wind. Before June 2016 when the new energy mix was approved at the 10th NACOP, only hydro and natural gas were in the mix especially for the national grid.

As it is today, expansion of the national grid to meet Nigeria's power needs has severe limitations especially with funding and supply of natural gas, the latter being a direct result of the challenges posed by the Niger Delta militants, and incompleteness of the Gas Policy to chart a way for investments. Therefore the role of off grid power to bridge the gaps is imminent and crucial. But this also seems to be bogged with a set of other challenges that should be resolved if Nigeria is serious about moving forward.

The Nigerian constitution places the oversight for off grid solutions under the state's governments¹¹, but despite this investors seem confused about the role of the NERC in off grid power. But the Hon Minister tried to

¹¹Second schedule Part II, Concurrent legislative List, Constitution of the Federal Republic of Nigeria 1999

clarify this at the NEXTIER seminar and later in an interview on Power Access in Africa on CNBC in Feb 28th 2017 that irrespective of the source power the state government and investors can deliver power on the basis of agreements with consumers of captive, embedded power or mini-grids. He stated that if consumers were willing to pay higher than the government rates of N24 – N28 per kWh, then government would not interfere. Though he noted that government would intervene if such power exceeds the current production of diesel power at N68perkWh.

Apart from the unclear policies, and the uncertainties about opening up the environment to improve gas supplies – the other very serious challenge lies with the slow pace of credit risk analysis for renewable power solutions by banks. This is a major gap that has become evident as the next major barrier to scale renewable power solutions and more especially the import dependent solar and wind power solutions.

To understand this better, NESG delegates attended a Winrock /USAID workshop for the Financial Sector and it was evident that delegates were overwhelmed by the numerous risks and how to mitigate them for the benefit of protecting the investments. Top on the list was the cost of solar power per kilowatt hour meant that the payback period would extend beyond 3years for assets that could have a 4year shelf life (eg the batteries). Another main concern was the currency risks which could be mitigated if the FOREX policy stabilizes. But then there is the risk of the robustness of the installations, which is significant in the absence (for now) of government regulations for equipment and installations. Concerns include the responsibility to ensure that investors and consumers would get value for money in a solar installation and in the case of mini-grids

and solar home systems or stand- alone grids -- who bears responsibility of collecting the tariffs and ensures repayment of loans.

Clearly, mechanisms to build capacities of consumers and financiers is the next important step to unravel this barrier and enable scaling of solar in Nigeria. Low awareness is perhaps the most crippling of all the limitations as most consumers are not even aware of these power options or how to get them. Germany is now able to drive more than 60% of its power needs from renewable sources, and in March 2016, Germany and the United Kingdom were able to deliver 100% power from renewable power sources for one day. This is a tall order for Nigeria though it has be understood that 60% of their baseload is derived from other sources.

Bridging the gap for awareness is a very challenging time and resources consuming endeavor that must happen and to trigger this the Sustainability Policy Commission of the Nigerian Economic Summit Group has entered into a 3 year collaboration with All On¹² (the renewable power delivery subsidiary of Shell International) to improve awareness by tackling the gaps of financing, risk analysis and knowledge transfer for innovations and creative ideas. The latter is especially targeted towards young graduates to build enabling environments that supports their creativity, protects their innovations through proprietary Intellectual Property rights and support start-up for RE business.

In collaboration with *Power4All*¹³ (an international NGO supporting renewable energy growth through awareness) NESG also assisted the emergence of the Renewable Energy Association of Nigeria, which is a fusion of all other RE associations and power providers in the decentralized RE space. The idea is to build capacity for

¹²www.All-On.com

¹³www.Power4All.org

startups, assist existing companies and have a one stop shop for information about RE in Nigeria. REAN is also driving self-regulatory efforts by ensuring that members use world renowned manufacturers especially for batteries and that back up support and maintenance is available in Nigeria, as REAN continues to strive to ensure investments for local manufacturing of solar products and equipment. This would be extremely helpful to scale solar power that is up to 90% of imported materials.

Conclusion

Significant support is still needed for the Renewable Power sector and there are encouraging responses such as the \$900,000 sponsorship from USTDA for

market intelligence in about 30 sites which was developed under support of the NESG Sustainability Policy Commission.

With such support the Renewable Energy power providers working in this consortium would access funding much easier as the risk elements would have been fully addressed. However, in today's context of scaling back – the Trump Administration has announced that it would apply significant scale back of funding globally. The onus rests with the Nigerian private sector to seek ways to trigger in-country funding and investments by showcasing attractive returns on investments that are possible from this sector.

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