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PROVIDING STABLE AND AFFORDABLE POWER TO DRIVE INDUSTRIALIZATION

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A POWER SECTOR THAT WORKS FOR ALL NIGERIANS

by Engr. Abubakar Aliyu

ENGR. ABUBAKAR ALIYU

Minister of power

In February 2021, the World Bank reported that 85 million Nigerians do not have access to grid electricity. According to the report, this number represents 43 percent of Nigeria's population and, in effect, makes Nigeria the country with the "largest energy access deficit in the world." While it is hard to fault data, especially if such data is collated by experts, we must also take other things that are parallel to these grim statistics into consideration, at least for the sake of balance.

History is witness to the many measures that have been taken to ensure that the power sector works for all stakeholders – users and producers - from establishing the Electricity Company of Nigeria (ECN) with its coal-powered turbines to creating the Niger Dams Authority (NDA) for hydro-power to the merging of both to create the National Electric Power Authority (NEPA) to the renaming of such to the Power Holding Company of Nigeria (PHCN), and currently, the privatization of electricity distribution; all of which have, unfortunately, not completely addressed the many shortcomings of the power sector. Yet, we must not despair. The change we seek is work in progress.

Nigeria's power sector has also witnessed critical changes over the past decade. Without meaning to sound off or boast, the federal government's power sector reform

program and the implementation of it has been reputed to be "one of the most ambitious privatization exercises in the global power industry with a transaction cost of over three billion dollars ($3.0bn)." Surely, this should count for something.

A power sector that works for all Nigerians will be one that ensures three key things for all: **accessibility**, **affordability**, and **stability**. This means that more communities have to be connected to the grid (whilst understanding that the grid has to be strengthened and overhauled), more opportunities for private sector participation must be created, more attention should be paid to alternative energy sources; electricity tariff plans should also be justifiable and implemented with an understanding of the economic considerations to both users and producers; and energy producers must work towards ensuring that outages become less frequent – with a view to making it a thing of the past across Nigeria.

From the 2020 World Bank Doing Business Report, Nigeria ranks 171 out of 190 countries in getting electricity, as electricity access remains one of the major constraints for the private sector. Fortunately, as is evidenced by the continued collaboration between the federal government and private sector operators, the problems facing the power sector are being continuously tackled and the goal is to improve the sector and optimize its capacity.

POWERING INDUSTRIALIZATION: A ROADMAP ON THE KIND OF POLICY CHOICES NIGERIA CAN MAKE TO SUPPORT INDUSTRIALIZATION

ODION OMONFOMAN
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HISTORY OF ELECTRICITY & INDUSTRIALIZATION IN NIGERIA

Electricity was first generated, transmitted, and distributed in Lagos in 1896 with the installation of two 30kw generating plants by the Public Works Department of the Colonial Government. Thereafter,

electricity supply was extended to major urban centres. Between 1923 and 1940, there were several electric power stations established by the colonial government in Port Harcourt, Jos, Kaduna, Kano, Abeokuta, Warri, Enugu, Calabar, Zaria, Katsina, Maiduguri, Yola, Makurdi and other railway towns.

These power stations were mostly coal-fired steam generators and were constructed by the Public Works Department, the Railway Corporation, the Native Authority, and a few were privately owned. Besides private and independent power stations such as NESCO in Jos, the PWD was primarily responsible for the generation, transmission, distribution, and sale of electricity in Nigeria. The Railway Corporation also provided electricity to many towns that were located on the railway terminus.

Electricity enhanced industrialization and urbanization in colonial Nigeria. Between 1928 and 1940, the colonial government set up electricity undertakings so as to organize and manage the extension of electricity schemes across Nigeria. Several electric power stations and electricity undertakings were built by the colonial administration to drive industrialization. For instance, the following industrial areas had their own power stations and electricity undertakings:

- Jos: NESCO, Nigeria's oldest power generation, transmission, and distribution company, was established in 1923 to provide electricity to the tin mines in Jos and residences in Vom.
- Enugu: Enugu Power Station was built in 1933 to provide power to the coal mines in Enugu and colonial quarters.
- Lagos: The Ijora Power Station provided electricity to the industrial areas in colonial Lagos.
- Kano: The Challawa Power Station and the Sharada Power Station were established in the 1930s to provide electricity to the tanneries in Kano.
- Kaduna: The Kaduna Power Station was established in 1929 to serve the Kaduna textile companies.
- Delta: Sapele Power Station was set up by African Timber and Plywood (AT&P).

Other stations such as the Nigerian

Eastern Railway Power Station and power stations owned by the Railway Corporation provided electricity to towns and commercial corporations such as UAC, John Holt, SCOA and others located on railway terminus. Many of these industrial areas are in existence today, even though without the power stations that provided them with reliable electricity in their heydays.

ELECTRICITY UNDERTAKINGS IN COLONIAL NIGERIA

The cost of providing electricity through the various schemes was recovered from taxes and revenue generated by the treasury department of the various Native Authorities. The Great Depression created a fiscal crisis that made the Colonial Administrators extend electric power supply to those who could afford to pay, as a strategy of generating revenue. The metering system was introduced during this period to meter electricity customers in Lagos, Kano, Kaduna, and Maiduguri and enhance revenue generated from electricity supply to customers.

Load allocation (%)		Existing load allocation in MYTO	Proposed new load allocation – non MDAs	Proposed new load allocation – MDAs	Proposed new load allocation – total
Residential					
	R1	1.03%	3.44%	0.00%	3.44%
	R2	35.76%	54.45%	0.21%	54.67%
	R3	0.21%	0.12%	0.38%	0.49%
	R4	0.92%	0.00%	0.00%	0.00%
Commercial					
	C1	22.17%	7.29%	0.25%	7.54%
	C2	8.93%	3.09%	0.62%	3.71%
	C3	0.02%	1.16%	0.25%	1.41%
Industrial					
	D1	0.83%	0.15%	0.00%	0.15%
	D2	2.10%	1.10%	0.02%	1.12%
	D3	3.37%	20.61%	0.15%	20.76%
Special					
	A1	0.81%	0.09%	0.04%	0.12%
	A2	3.35%	0.64%	0.66%	1.30%
	A3	20.14%	2.01%	3.13%	5.14%
Lighting					
	S1	0.37%	0.04%	0.08%	0.13%
TOTAL	#	**100.00%**	**94.20%**	**5.80%**	**100.00%**

With the electricity crisis after World War II, the colonial government created the Nigerian Electricity Undertakings (NGEU) out of the Public Works Department to manage electricity supply, in addition to electricity schemes run by private power stations like NESCO and the Railway Corporation. As the demand for electricity increased, and in a bid to integrate power into the country's development framework, the Colonial Government passed the Electricity Corporation of Nigeria Ordinance No. 15 of 1950. The Electricity Corporation of Nigeria (ECN) was established in 1951 and took over the management of all the electricity undertakings and most power stations previously under

the PWD, Railway Corporation and Native Authorities.

After independence in 1960, the Niger Dams Authority (NDA) was established for the construction and maintenance of electric power dams and other works on the River Niger and other rivers which had dams to produce electric power. In 1972, the National Electricity Power Authority (NEPA) was established, and it absorbed the activities of the ECN and the NDA. NEPA was solely and exclusively responsible for power generation, transmission, and distribution of electricity in Nigeria, with the exception of NESCO in Jos. This could be said

Table 1. Major Electricity Undertakings for both the Government and Native Authorities in Nigeria: (1928-1940)

Undertakings	Ownership by	Capital val.	Cap by (kw)	Units general	No. of consumers	Year
Lagos	Government	843, 066	14, 700	18. 94	13, 514	1896
Ibadan	NA	161, 038	1180	2. 56	2884	1940
Makurdi	Railway	*na	Na	na	na	1928*
Abeokuta	NA	78, 736	655	1. 33	2423	1935
Warri	Government	29, 142	100	25	463	1939
Enugu	Government	50, 518	3,328	5. 63	3800	1933
P. Harcourt	Government	114, 986	1,000	1. 51	2, 044	1928
Calabar	Government	46, 500	305	.55	1, 050	1939
Kaduna	Government	130, 702	725	1. 38	1500	1929
Kano	*NA	48, 732	865	2. 43	3424	1930
Zaria	Government	66, 192	705	1, 02	901	1938
Jos	Government	25, 226	700	*Purchased	1873	1939
Katsina	NA	19264	110	0. 6	320	1933
Maiduguri	Government	-	150	.23	60	1934
Vom	Government	11, 316	205	Purchased	176	1933
Yola	Government	12, 772	110	.12	176	1937
Victoria	*C. D. C	-	200	Purchased	191	1948

And Years After...

In 2005, the Electric Power Sector Reform Act (EPSRA) was passed by the National Assembly. The EPSRA wound up NEPA and created the Power Holding Company of Nigeria (PHCN). PHCN was a holding company made up of several companies spurn out from the business operations of NEPA that were now corporatized (PHCN Successor Companies).

In 2013, the Successor PHCN electricity generation companies (GenCos) and electricity distribution companies (DisCos) were privatized. There are now 11 electricity distribution companies, one transmission company and 25 on-grid power generation companies (six of these are PHCN Successor Companies). There are also multiple independent, off-grid power generation companies owned by states and other private companies. NESCO has been operational since 1923 and still provides reliable electricity to the residential and industrial customers in the Bukuru area of Jos from its hydro dams constructed in colonial-era Nigeria.

Nigeria has one of the lowest electricity tariffs in sub-Saharan Africa. But the impact of low electricity tariffs on the

competitiveness of our Industries is non-existent due to the unreliable nature of public electricity supply over the years. Industries rely on diesel generators and now gas turbines – this translates to an increase in additional capital, operational expenses, and other production overheads. There are also huge disruptions to production activities on account of power shortages or failures of alternative power supply. Electricity supply to industrial customers is not prioritized. The bulk of electricity supply goes to residential customers (as with any electricity utility).

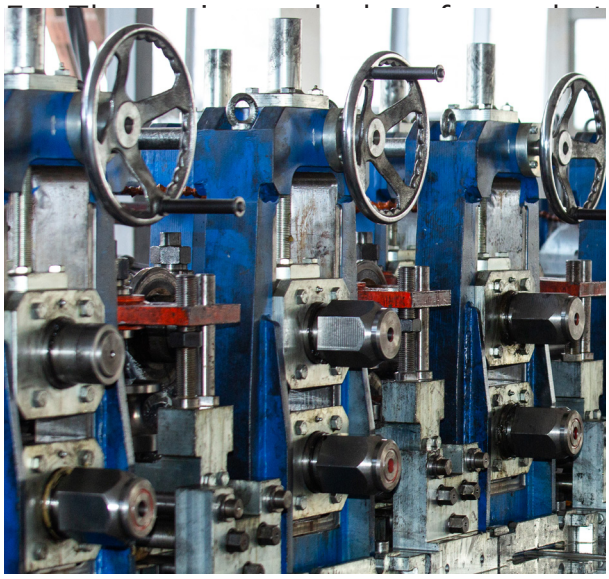
ELECTRICITY & INDUSTRIALIZATION IN NIGERIA TODAY: CHALLENGES WITH EXISTING POLICIES

1. For industries, grid power remains the cheapest source of electricity, but not for long. The impact of the instability of foreign exchange, huge debt profile, high operating costs and other inefficiencies across the entire power sector value chain are impacting tariffs, which are currently suppressed. Nonetheless, wholesale generation costs here remain lower than wholesale generation costs across sub-Saharan Africa. Nigeria is also blessed with an abundance of natural gas and renewable energy sources (rivers, the Sun, etc.) – sources that will ensure that Nigeria continues to remain a low-cost power producer.
2. Electricity policy formulation is centralized with ONLY the Federal Government. This is against the spirit of the Nigerian

Constitution which provides that the Federal Government and State Governments should be responsible for electricity. Since there are too many policy makers in the sector (Ministry of Power, Office of the Vice President, BPE, NCP, Ministry of Finance, CBN, Presidency, NERC, NEMSA, REA, etc.), policy implementation by the Federal government is disjointed and lacks coordination.

3. Existing policies and regulations do not recognize or prioritize the use of grid electricity to drive industrialization and more industrial activities. For instance, the EPSRA makes no provision for wholesale supply or prioritization of electricity to industries.

4. The Eligible Customer (EC) policy gave birth to the Eligible Customer Regulations passed in 2017. The EC policy was to provide industries and large power users with more reliable electricity that would have remained "stranded" due to low absorptive capacities of DisCos to utilize the power. However, the EC regulations have not solved the electricity problems of Industries, including those connected directly to TCN's network. Only one eligible customer has been approved to date, despite excess stranded generation of more than 2000MW.



6. The regulated tariff structure encourages and actually rewards the inefficiencies of TCN, DisCos and GenCos. Cross subsidies, capacity charges, take-or-pay obligations, fixed gas prices, high FX inputs, etc. are some of the built-in failures of a regulated tariff system.

POLICY CHOICES TO DRIVE INDUSTRIALIZATION IN NIGERIA

- Capitalize on Nigeria's status as a low-cost electric power producer to attract and retain industries into Nigeria. The abundance of natural

gas and renewable resources (water bodies and the Sun) makes this feasible.

- Designate Industrial Customers as "Must Serve" customers, e.g., mining operations, steel mills, manufacturing companies, etc. Such heavy users of electricity are the bedrock of any electricity market.

- As low-cost wholesale power producers, Hydro GenCos have a "must run" status to ensure that the power they generate is always dispatched by the TCN. There should be a policy to dedicate some of the available capacity of Hydros to the heavy industries connected to the TCN grid (330kV or 132kV). While this might lead to revenue shortfalls by DisCos, it presents a net positive benefit to Nigeria and will spur further industrialization.

- Allow more bilateral contracts between industries and power producers BUT with less regulatory requirements. This will ensure that embedded power producers (from 100MW and below) do not need to obtain a license from the government. In Nigeria, it is presently required to have a license

from NERC to generate 1MW of power, or to distribute above 100KW of electricity.

- Liberalize and further decentralize the power sector to introduce more competition, especially at the distribution segment of the value chain. Under colonial Nigeria, Native Authorities and private entities built and operated power stations and distribution infrastructure. NESCO, a private entity in Jos still operates one of the best distribution networks in Nigeria and operates in parallel with Jos Electricity Distribution Company.

- State Governments should get involved in electricity business, particularly from a policy and regulatory perspective. Section 14, Schedule 2 of the Legislative list of the Nigerian Constitution makes it the responsibility of state houses of assembly to make laws for electricity, inclusive of electricity generation, transmission, and distribution within their states. Rural electrification policies and implementation should be the ambit of State Governments, not the Federal Government.

- Wholesale privatization of TCN is not advisable. However, policies and regulations to stimulate investments in merchant transmission lines or promoting PPP arrangements between TCN and 3rd parties should be developed.

- The EPSRA is no longer fit-for-purpose. Wholesale amendment of the EPSRA to align it with the intention of the Constitution, the realities of a competitive market and Nigeria's unique challenges and development aspirations as enumerated above. In particular, Section 62 (1) of the EPSRA needs to be amended.

"Liberalize and further decentralize the power sector to introduce more competition, especially at the distribution segment of the value chain".

THE FUTURE OF POWER GENERATION AND DISTRIBUTION -

An exclusive interview with Engr Meyen Etukudo, Managing Director of Ibom Power.

MEYEN ETUKUDO
MD Ibom Power

How important is a well-thought-out power generation and distribution policy to the private sector?

Power is to the economy what food is to the body. You know without food, there is no energy to do work. Energy is the capacity to do work. Power is the same thing to the economy; you cannot manufacture, produce, store or preserve a lot of things without a steady and quality power supply. That is how important power is to the private sector. Talking about manufacturing whether it is cement, foodstuff, or whatever it is, we have to store it in the cold room. So, to the private sector, power is business because, without power, there is no business. The small and medium scale businesses, the vulcanizer, hairdressers, tailor, seamstress, and even in the movie industry. Everything is about power. So, power is to the private sector and to the economy itself what food is to the human body.

Ibom Power has once been named Africa's Most Innovative Quality Power Generation Service Provider at the African Quality Awards. What are you doing differently and how can those lessons be replicated across the country?

Well, that was some years before the covid took place in 2020, At Ibom power, if you look at our history there was a time, we ran for 198 days out of 365 days without shutting down, you know,

none stop. This means we were producing power to the grid none top even when other generating companies had one problem or the other. So, it means we were constantly feeding the grid with the power. Our unit 3 produces about 115 megawatts of power, and that is not a small amount of power, it can feed a whole state.

We were not having problems with our unit because we did the necessary inspections when due. In 2017, the year we won the award, we did Hot Gas Path Inspection of our Unit 3. Subsequently, we did the Combustion Inspection and this time we are doing a Major Inspection. So, what we are doing differently is that our plant is constantly being maintained to keep it running. Also, our workers are constantly on their toes. You can see that Ibom power has consistently remained the best safety power plant in Nigeria. Since the inception of the plant, there has never been an accident, nobody has died at the plant site, no epidemic, and we have been announced severally as the cleanest and safest power station so far in the country. Our Head of HSE is the chairman of the health safety code in the power industry. He was elected by his colleagues in all the power companies in Nigeria. So, Ibom power is doing well in terms of safety, maintenance of equipment, and good working relationship with staff. There is no grumbling, you know whenever staff grumbles, there would be a problem. So, some things have been amended, we have a good relationship with the community through our Corporate Social Responsibility efforts, so all these put together lead to the success story of Ibom power.

One lingering issue in the power sector is the issue of economics. The discos are complaining that they do not make a profit because they are not charging market rates, in turn, the government is paying a subsidy of close to N30 billion per month. How do we fix the problem of economics in the power sector?

Well, I think this issue of subsidy, petrol subsidy, energy subsidy, everything subsidy, I don't know whether they subsidize our food too (laughs). You know everybody is saying the money is not enough, money is not enough, when will

the money be enough? I think the issue of economics needs to be looked into carefully. How many of the eleven Distribution Companies (Discos) in this country have been able to collect 80% of their electricity bills? Inadequate metering everywhere, estimated billing but when customers transformers are faulty, they will have to wait for three weeks, three months, or more for it to be fixed, why then will the customers be happy to pay their bills? No single Disco in this country, out of eleven, has been able to collect 80% of their bills. How many domestic residences, small-scale businesses in the village, and so on have Discos collected electricity bills from? It's either they don't even put energy there, or they knock them off the grid or open their feeders and all that.

If electricity is distributed to all these people who need electricity and Discos can collect 80% of their bills, that is, if they invoice about N1billion, they can collect about N800million, people will have power and the Discos can use part of the collection for maintenance and other costs but everybody is complaining. Meanwhile, some distribution transformers are faulty for two to three months, they don't care to fix these transformers and give power to the people so that they will be happy to pay the bills. That is why in some places, people protest when Disco's personnel go to collect the bill. The people claim that Disco personnel only come twice a month, that's when they want to come and collect a bill, they are not taking it as a business. So, you can't be forcing everything and every time you are increasing electricity bills. The federal government can decide to do something about it through the regulatory body or the Minister of Power.

There are instances where Nigeria had to export excess power generated to other countries. What policy changes do we need

to do to ensure that excess power generated in one place can be redistributed to an area of need?

Nigeria has never exported excess power, so remove that word 'excess power' to other countries. What Nigeria does is that we supply power to Niger, Togo, and Benin. What happened is that River Niger

> *Nigeria has never exported excess power, so remove that word 'excess power' to other countries.*

is from Fouta Djallon that runs from Mali through Niger Republic and runs up to Kanji. If Niger republic dams Fouta Djallon, there will be no water at Kanji. Nigeria produces over 800 megawatts of power from Kanji. Then, the discharged water at Kanji goes to Jeba power station. Jeba has six turbines of 90 megawatts each, which is 540 megawatts, so Jeba can produce 540 megawatts. If added to the 800 megawatts from Kanji, that is about 1300 megawatts of power from 2 hydropower plants alone.

What do we give to Niger? Some

years ago, it was 70 megawatts. So, we sell 70 megawatts to Niger at that time, not free, they even pay in dollars and we asked them not to dam Fouta Djallon so that it will not cut off the water supply to Kainji and Jeba hydropower stations. Togo and Benin together receive about 205 megawatts through the transmission line from Ikeja west. These countries pay for the electricity in dollars. This is the ECOWAS relationship, the brotherhood between the 14 ECOWAS states. Now we are going to build a transmission line, 330kV double circuit line from Benin Kebbi

through Niger, to Benin to Togo to Ouagadougou that is in Burkina Faso. With this, we can catch most parts of the 14 ECOWAS states and we make money because power is money. It is not for people to cry that the power, which is supposed to be given to Nigeria, is given to other countries, it's not true. We can generate more power, even sell around and make so much money like South Africa is making money through MTN, DSTV, etc. We can sell power to the whole of the West African coast, and make a lot of money. Before we can sell power on this line, we proposed, when I was at TCN, that there should be another 330kV double circuit line from Kainji to Benin Kebbi because the present line is a single circuit; a double circuit line can more power. Assuming we are even exporting up to 10,000 megawatts of power outside the country, you know what that will be in dollars. We are talking of making dollars and this is the avenue to earn dollars. If the distribution companies in the country cannot take more power for Nigerians to use, then, let us send the power outside until the distribution companies are ready. All the injection substations are not in use, all the National Integrated Power Projects (NIPP) injection substations built in this country are not utilized to the maximum. For example, in this state, Akwa Ibom, out of seven injection substations, only one is being used. The distribution companies have not been using them and that is the situation across the whole country. These are projects that NIPP spent billions of dollars to do, but today, the Discos are not maximizing their use. The discos have claimed that they have challenges in the collection of bills

and other technical areas, the right things have to be done to solve these problems before complaining about exporting power to other countries.

if there is no power supply in your state, you know it's caused by your generating station, so they can quickly do something by importing power while repairing the fault.

Our national grid collapses now and then, is there an over-dependence on the national grid and why can't we have smaller grids in multiple states of the federation?

When you talk about the national grid collapsing, it is as a result of frequency instability. Assuming the national grid is on 4,500 megawatts, all of a sudden, some discos tell their TCN areas to drop the load, then the grid is suddenly dropped from 4500 megawatts to about 2000 megawatts, there will be a grid collapse. 2500 megawatts is out, maybe at a certain area, how will the grid stabilize? You know once an area goes off, the other areas try to stabilize. If for example Egbin, which is the biggest power station in Nigeria, is carrying about 600- 800 megawatts and it is asked to drop the load to about 400 megawatts or 500 at a time, that area of Lagos and Ogun will suffer a partial collapse. By the time that area is lost, the whole system will be affected across the country. I think things can be done and we have engineers who can work and do these things. It is not a new invention, it is to maintain, sustain, and stabilize the system. Honestly speaking, if we solve the problem of electricity by 70%, unemployment in this country will reduce by about 50%.

In India, they have what is called state grids, you know the year that the government, or National Assembly or Federal Government will come out to enable any state that can generate, transmit and distribute their power to do so, everybody will be on their toes to achieve it. Recently, you see Akwa Ibom acquired some aircraft, today Cross River has brought two aircraft and so on. Soon, other states will follow suit because the

business opportunity has been opened to all. The year that the Federal Government will allow states, to generate and distribute power, maybe TCN can still be there for transmission, there will be tremendous improvements.

When the National Electric Power Authority (NEPA) was established in 1972, NEPA came up, to generate, transmit, distribute, and sale of power to Nigerians and aliens living in Nigeria. NEPA was doing well, people criticized that NEPA was corrupt, it was this, it was that, by 31st of March 2004, NEPA ceased to exist and eighteen companies emerged under the Power Holding Company of Nigeria (PHCN). One TCN, 11 discos, and six legacies generation companies. By the 1st of November 2013, the Federal Government privatized the power assets leaving only TCN under the government's control. Today, the generation companies, since licenses were given to independent power producers, the 6 legacy generation companies have grown to 25 generation companies, in which Ibom Power is one. Then we have 1 TCN, which is the Transmission Company of Nigeria to wheel the power, and the 11 discos to distribute and sell power. The regulatory body is the Nigerian Electricity Regulatory Commission (NERC) and the off-taker, Nigerian Bulk Electricity Trading Company (NBET). All these come together to form The Nigerian Electricity Supply Industry (NESI).

Things can be much better if Federal Government puts generation and distribution in the hands of states. We have thirty-six states, it doesn't mean one state must build a power station, three states can combine to operate power generation and distribution within their region. For instance, in Akwa Ibom, we have Ibom Power with an installed capacity of 191 megawatts, we have even collected a license from NERC for 685 megawatts, which means our second phase is about 500 megawatts. The whole of Akwa Ibom and Abia cannot use 685 megawatts of power. When states are allowed to manage their power, if there is no power supply in your state, you know it's caused by your generating station, so they can quickly do something by importing power while repairing the fault.

It's high time the Federal Government thinks in that direction. Even if it is on a regional basis. After all, TCN runs within six regions headed by General Managers (GMs). In every state, TCN has work centers, sub-regions and all these help to facilitate competence in electricity transmission. I think the federal government should begin to think in that direction, and they will make more money, they will pay tax, employ more people, and the country will be better off. Also, they will be able to give people more electricity, that is, 24 hours of electricity to the whole populace of Nigeria. 80% of Nigerians will be employed. I may not be an economist but I know there will be ripple effects that will reduce unemployment if there is a steady and quality power supply.

> *"Things can be much better if Federal Government puts generation and distribution in the hands of states."*

A lot of businesses and industries rely on the power sector, how do we build a power sector that is affordable and reliable to the point that it can drive local manufacturing and attract global manufacturing?

What I have said is that, there is a need to deregulate power distribution completely. Although, it seems deregulated when you consider that, today we have 25 power stations. We need to build more transmission infrastructure, that is, sub-stations, both at 330kV and 132kV, build substations, and encourage private sector participation.

I think apart from injecting money into the sector, the government should look into regulation. There should be punishment for violation. Also, there is a need for customer awareness, as soon as people know their rights, they will begin to take electricity companies to court for violation. This will make service providers sit up. If a transformer is out for three weeks and has been reported to the disco but nothing is done about it, the customer can go to court to claim damages. For instance, if goods were refrigerated and got spoiled because the discos refused to respond to the report of a damaged transformer. Once people begin to do that and numerous cases against discos are filed in court, I think the discos will get serious.

Let us do serious business with power, and let us bring those who know the power and the business of power to be at the helm of the sector. Let's check these people, what is their experience, what have they done? Why people are so proud of NEPA is because of the training they gave NEPA staff. Once you finish your NYSC, you go for two years of pupillage training in generation, transmission, distribution, and engineering. Let us groom people to know power because power is to the economy what food is to the body. You know if there is no food, the body does not have the energy to do work, similarly, without power, there is no economy. Let's recruit and train people to manage the power industry by putting square pegs in square holes; let's bring industry experts together to manage the sector. Period.

THE FUTURE OF ENERGY IS RENEWABLE.

An Exclusive Interview with Olaedo Osoka - CEO of Daystar Power

OLAEDO OSOKA

Chief Executive Officer of Daystar Power,

Let us begin by seeking your perspective on the importance of the role of the power sector in driving the economy forward and generally supporting industrialization, especially in West Africa.

In a global sense, the power sector is critical to economic growth and industrialization. However, in West Africa, there is still a lot of room for industry players to build a robust sector that offers equitable access to more reliable, affordable, and efficient energy. Energy is critical to sustainable development. There are many aspects of the value chain to latch on to in order to contribute positively and promote human development.

For example, with energy, people can read, charge their phones, learn, and leverage the internet for knowledge. If you also think about enhancing productivity, energy can improve the turnaround time for the production of goods and facilitation of services. This way, people can make more money, and companies can employ more people.

Ultimately, it trickles down to poverty reduction and boosting economic growth. If you think about how we live, our standard of living and economic activity, these things are directly or indirectly determined by how much energy we have. Yet, six hundred million people in Africa don't have access to electricity and this is really a problem that we should try and solve in our lifetime.

Is there any correlation between how much affordable power a country is able to generate and distribute, with how much of global manufacturing that they can attract or they can enable locally?

Yes, there is. Extensive research showing a strong correlation between electricity consumption and GDP growth exists. An increase in energy consumption also has a positive impact on economic growth. For example, let's examine data from Turkey. Research carried out there has it that a one percent increase in renewable energy consumption increased economic growth by 0.4 percent. In same manner, when there was a decrease in consumption by 1 percent, economic growth dropped by 0.7 percent.

In Ghana, there are similarities between 2007 and 2008. What we had in Ghana was low energy rationing. With that, we saw the manufacturing sector's contribution to GDP drop from 9.5 percent to 7.4 percent. So, what this proves, in a fundamental sense, is that the more you consume, the more your economy grows, but it isn't enough to just consume electricity, the cost of that electricity is more important.

If we look at Nigeria, there is data from the International Finance Corporation showing that an estimated $17bn is spent every year on diesel generators and the diesel value chain. This raises the cost of electricity in Nigeria to a level that is 500 percent more than that of Norway. Businesses in Norway spend around 5 dollar/cent for electricity per kilo an hour. If you compare that to Ghana, it is about 25 dollar/cent per kilo an hour.

So, if a country has lower electricity cost, businesses there incur less production cost on electricity. Naturally, this will affect the cost of the goods being produced and the cost of services being offered. Another example worth considering is this: if businesses in Norway are able to produce goods cheaper because of cheap electricity there, their Ghanaian counterparts producing the same goods at a higher electricity cost will have challenges getting Ghanaians to adopt and buy. This scenario does not boost productivity locally because even people in Ghana will

rather import these goods from where they can be gotten cheaper. In the end, it destroys competition and on a global level, it impedes us from being competitive.

It is fitting that you have dwelt extensively on Ghana. There is no doubt, it seems, that Ghana has fared a lot better than Nigeria in the power sector. What important lessons can Nigeria borrow from Ghana and what industry skills can be replicated in Nigeria?

The idea of success in the power sector is a largely relative issue. If we look closely at some other countries within the region, we can also affirm that they are making commendable strides in energy. Still, each country has its shortcomings. In Ghana, about 80% percent of the population has access to electricity and that is laudable. The country has more than doubled capacity in the last decade. It has also moved quickly from having little generation capacity to having more than it needs – a positive development

that comes with huge financial implications.

As far as lessons go, I think it is important for us to look far and wide within the continent because Ghana's approach is likely not a one-size-fits-all. That said, the first lesson is that it is very important for government to have a least cost approach and take advantage of the technologies that are available now.

If you look at many countries, what you will find is that there are state-owned utilities providing power. A lot of those utilities are in debt and need financial support. Yet, just to keep operations going, finances are still channelled to these utilities, instead of using that same financing to increase energy options. This is a lesson we need to quickly learn and move away from.

We have seen an increase in decentralized solar by more than 100% in sub-Saharan Africa. What lessons can we learn from this if we say that our grids are debt-ridden and unsustainable? How can we learn the lesson from the fact that solar is increasingly more commercially viable? The second lesson will be how we can plan better in reference to data. What we have seen some countries do is just adopt what another country has done and that clearly doesn't work. We need to think of solutions that take into consideration the local context.

Each country has to carefully consider its natural resource and how to further tap into the exploration opportunities that abound therein. We must also think of incorporating clean energy sources sooner than later. If we continue to only think of grid expansion or purchasing

more diesel generators, we will be left with stranded assets as the population keeps growing.

We need to think about decentralizing power and making it more accessible (cheaper and faster) to people that currently don't have enough energy. We need to build better based on the lessons that we have learnt and we need to look towards economies who have being more sustainable in their approach and incorporate best practices. Lastly, in terms of lessons, we need to think more about innovating through collaboration. The future is for those who can innovate and are also willing to collaborate.

What is the potential of the renewable energy sub-sector in Africa in terms of powering private sector operations? Are there truly real potentials in Africa or is it all just buzzwords from fancy panels at the World Economic Forum and other platforms and fora?

With Daystar Power being a major player in this field, we are still at it and can only say that we have just scratched the surface of renewable energy in Africa. Earlier,

> *"That said, the first lesson is that it is very important for government to have a least cost approach and take advantage of the technologies that are available now."*

I mentioned how we have seen growth in renewables increase by a hundred percent in Sub-Saharan Africa, outside of South Africa. This happened over the last ten years and there's a reason for that.

Firstly, we have the resources. Africa has so much sunlight that is not being harnessed. Over time, in the last ten years as well, we have seen the cost of renewables drop by about seventy percent. In terms of skill and how much it can power the private sector, it really is limitless.

At Daystar Power, we have designed and installed about 250 solar plants across West Africa (Nigeria, Ghana, Togo, and Senegal).

Our clients are typically businesses and industries, ranging between medium-sized bank branches and petrol stations, hospitals, humanitarian centers. But we also power large-scale industries. We have breweries across West Africa that we serve and there are also manufacturers of cosmetics.

There really is no limit to what we can power. It is just a question of how much space do we have available and if we have that space available, we will be able to produce power at a cost that is typically 30 percent cheaper than the traditional sources. In summary, what we have going for us include; the resources available, the commercials that fundamentally make sense and are attractive and also the team and talents that are able to roll out these solutions.

This edition of the Avalon Policy Report is about how the power sector can drive industrialization. Do you think that renewable energy can meet the demands that are required to drive the industrialization policy of a given country? Is that possible or will it remain a solution for a cluster of certain private enterprises?

If you look towards Europe or the United States, you will see how their economies are paying attention to the transition towards renewable energy. This is because renewable energy can power economies. If you also even consider the status quo, how well has our reliance on grids and expensive pollution-prone diesel generators worked out for us and the environment?

So, we need to forge ahead and look further around to see what works. From a cost and operational perspective, renewables have demonstrated over the last few decades that they work. If you look at installations for example, admittedly there may be high upfront costs but companies like Daystar Power are able to finance these plants and offer them in a model where there is no upfront

cost for our clients. We finance the systems and ultimately, our clients are paying a fee that is 30 percent cheaper than what they would have been paying when they were on the grid or when they were using diesel generators. From an operations and maintenance perspective as well, it is less prohibitive than diesel generators.

You also need to consider time. For instance, if you want to go to my village in Abia State to provide electricity to everybody and you are relying on the grid, you will need to build transmission networks and that takes time. You would also need to invest a lot of capital and that also takes time to raise. So, from a time perspective, renewable energy solutions that are decentralized are faster in addition to cost and operation benefits.

> *"From a cost and operational perspective, renewables have demonstrated over the last few decades that they work"*

Who should take the lead in this initiative? Should it be the government or a collaboration between the private sector and the government? What leading role can the government play in making renewable energy some sort of center stage in driving the industrialization policy of certain countries in Africa, particularly Nigeria?

Already, the private sector operators are already in the trenches where we have our sleeves rolled up and contributing our quota. Ultimately, the nature of the problem requires collaboration and support from the government. It is important for our government to be introspective. If you are in a government official, hopefully at the end of your tenure you would want things to be better than how you met them.

We have to ask and answer certain key questions. Do we want to have reliable electricity? Do we want to have clean energy? If any government wants these things to become a reality, then that place of introspection becomes a starting point of having policies that are transparent, coherent and give comfort and encouragement to

private sector players.

There is also the matter of encouraging competition. In many countries, what we still see is the state-owned utilities having monopolies and because of that, it is difficult for private sector renewable energy participants to come in and generate electricity. If this is really something we are serious about doing, we need to see a shift in how we operate there. We also need to rethink policies in terms of coherence and implementation. In many countries in West Africa, there are policies towards accelerating the transition to renewables but it is one thing to have a policy and another thing to implement an existing policy. In some countries, there is no custom duty on paper but in reality, the customs service is either unaware or choose to ignore that, and they know the consequences.

So, how can we make sure that if something is a policy, we are following up to see the implementation, tracking the data to see how it is actually being used? We also need to have friendly policies that attract financing.

Nobody wants to invest money in a place where there is no certainty, where there is no government in the trenches also playing a role for growth. In summary, what we require from the government are policies that enable growth, policies that help us attract investments into this sector because we really want to change things for good.

> *"There really is no limit to what we can power. It is just a question of how much space do we have available and if we have that space available, we will be able to produce power at a cost that is typically 30 percent cheaper than the traditional sources."*

IDEAS : HOW LAGOS STATE IS TRANSFORMING IT'S POWER SECTOR BY

ENGR HAFEEZ MOMOH -
Head of Power, Lagos State Ministry of Energy and mineral resources

Lagos state is widely regarded as the financial nerve centre of Nigeria. It is also one of Africa's few mega cities. It is also home to the continental and regional headquarters of many financial services providers, non-profit organizations, industries, amongst others. With an estimated population of 27 million and, going by a 2014 estimate, a GDP of $91bn, it is no surprise that power consumption and electricity supply are hot topics.

Since about 53% of Nigeria's manufacturing companies are domiciled in Lagos state, it is also not a surprise that the Manufacturers Association of Nigeria (MAN), in its economic review, reported nothing less than six power outages in a day. The report also aggregates that these manufacturers enjoy about four hours of electricity – a situation that affects production, curtails commercial and industrial activities, and increases final cost of goods and services.

While industries in the state have been forced to resort to expensive alternative power supply over the last few decades, it is also important to mention that the massive market for the goods and services exist because of the growth in economic activities and population size over the last two decades. It is the realization of this that has made the Lagos State governmen

focused on enabling residents and businesses to thrive and innovate through policies and programs that can raise the standard of living and reduce cost of doing businesses in the state.

A key element of this strategic focus is the continuous improvement of critical infrastructure within the state, particularly those dealing with the supply of electricity. The Lagos state government has made several attempts at tackling the challenge of poor power supply over the years.

First, over ten years ago, the Lagos state government promoted the installation of independent power plants that could generate about 50 megawatts, at least for the use of state government agencies and offices. In addition to that, in 2018, the Lagos State Power Sector Reform law was enacted with the intention to serve as the basis for significant private sector investments into the fledging Lagos electricity generation market.

The legislation also provided for the Lagos State Electricity Board to take responsibility for driving rural electrification. The entire population of Lagos state, to varying degrees, lacks reliable public power supply. In the course of time, it was also realized that the 2018 law did not adequately address other vital strategic goals. Ultimately, in spite of well-intentioned efforts, some parts of the state remained underserved and others not served at all.

The current growth trends also predict that there will even be enhanced demand for more power in Lagos state. The soon-to-be-completed Dangote refinery and other developments in the Lekki Free Trade Zone represent commercial and industrial ventures that will require adequate power supply. In addition, there is the Eko Atlantic City project which would also demand for more power.

> *"I am optimistic that with the policies and laws that are being developed, the dream of having constant, reliable electricity in Lagos state would be achieved*

The strategic objective of the Lagos State government, through its Ministry of Energy and Mineral Resources, is to build an electricity system that will enable collective prosperity and customer satisfaction in an environment that fosters innovation and easy adoption of current and future technologies. The Lagos state government is not resting on its oars. Recently, it unveiled a collaboration with the United States Agency for International Development and it has also been able to come up with integrated energy resource plants which has predicted the low demand for Lagos state for the next 20 years.

Riding on the aforementioned inadequate 2018 legislation, new policies are currently being developed with the intention to accommodate a more robust power sector in the state. Furthermore, the ministry has invited stakeholders to a consultative assembly that has been designed to mine contributions. It goes without saying that the government cannot do it alone.

I am optimistic that with the policies and laws that are being developed, the dream of having constant,

reliable electricity in Lagos state would be achieved. We have also deployed renewable energy infrastructure in underserved areas because it is cheaper than having such areas connected to the national grid.

As far as the community electrification program is concerned, we are commencing with residential areas as a form of test run. This will be extended to industrial clusters as well. The project is a collaboration between the Lagos State government, the Distribution Companies (DISCOs), and it is funded by the African Development Bank. Subsequently, private sector players can come in after success might have been achieved in the first six locations that have been selected. For strategic reasons, economically disadvantaged areas such as two communities in Alimosho LGA, one in Agege LGA, one in Surulere LGA, one in Mushin LGA, and one in Ibeju-Lekki LGA were selected and work has already commenced in that direction.

"I am optimistic that with the policies and laws that are being developed, the dream of having constant, reliable electricity in Lagos state would be achieved."

THE LEGAL FRAMEWORK OF NIGERIA'S POWER SECTOR: THE NEED FOR A REVIEW

CHINENYE AJAYI
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INTRODUCTION

A good legal and institutional framework is of critical importance to the realization of an efficient power sector. This framework defines the roles and responsibilities of all stakeholders and sets guidelines, rules and penalties whilst guaranteeing permanence, continuity, universality.

In simple terms, a legal framework determines the rules of the game for all players without which, there will be chaos and disorder. Consequently, the relevance of an appropriate legal framework for Nigeria's electricity sector cannot be overemphasized.

SOME PITFALLS OF THE EXISTING LEGAL FRAMEWORK AND RECOMMENDATIONS

There has been a number of legal and regulatory reforms within the power sector over the last 15 years and this is in response to the crucial role of power supply in national development. The reforms commenced with the privatization of the National Electric Power Authority (the state-owned monopoly responsible for the generation, transmission, and distribution of electricity in Nigeria). It continued with the unbundling and privatization of the Nigerian Electricity Supply Industry (NESI) to create semi-autonomous commercial subsectors.

Currently, there is an abundance of laws, regulations, guidelines, policies, and regulatory authorities policing the sector. However, the NESI is still far from satisfying the power demand of the Nigerians due to the numerous challenges plaguing the existing framework.

1. A good legal framework should be consistent and clear. Nigeria's power sector has witnessed various changes in policy and regulations which have impacted negatively on investors' confidence. Stakeholders are often caught unawares by ill-advised and ill-thought policies. Other times, they are kept in the dark on what to expect from the sector.

A good example of this is the several policy and regulatory changes in the metering value chain of the sector. It started out with the obligation of the Distribution Companies (DISCOs) to provide meters to customers. It was followed by the CAPMI Scheme where customers were to pay for meters and a refund will be made by the DISCOs. The CAPMI scheme was scrapped in 2016 after three years with little or no result.

Then, the MAP Regulation was introduced in 2018. Here, no provisions were made for refunds to customers after supply of meters. Again, three years down the line, the MAP and NMMP Regulation have now been introduced. Whilst it is important that a legal framework is flexible enough to accommodate changes, it should not be so malleable as to rob it of its predictability.

2. Effectiveness and workability are also ideal features of a good legal framework. Most laws, regulations, and policies within the power sector are largely redundant for various reasons. These reasons range from inherent inconsistencies in the policies/regulations, absence of appropriate institutions or personnel to implement, the unsuitability of the policies to the Nigerian situation amongst others.

A legal framework capable of guiding the power sector should be well researched, drafted and tailored to meet the peculiarities of the sector or country to which it is to be applied. By way of illustration, the Eligible Customer Regulation was issued sometime in 2017 and it is disturbing to note that not one approval has been granted after four years. Recently, it was rumored that the Eligible Customer Regulation has been suspended due to illegal connections that were not approved by Nigerian Electricity Regulatory Commission (NERC). NERC, however denied this via a circular uploaded on its website.

The sad reality is that a regulation that has produced little or no result after four years may not be workable and should be reviewed. In the same vein, more can be done to generate traction on the embedded generation arrangement which allows independent generators to sell power through the network of existing distribution companies to customers.

3. An effective legal framework should be implemented and enforced. The Federal Government and its agencies must have the political will to see policies and regulations through without bias. Penalties should be imposed for breaches and incentives granted

for compliance.

A major function of any regulatory agency is to monitor businesses under its purview and ensure compliance with regulations, policies, and relevant laws. Thus, where a regulatory agency has cause to believe that there has been an infraction, the appropriate step is to commence an investigation. Where an entity is found liable, the regulator is expected to demand a corrective action and if necessary, impose applicable penalties. This approach should be strategically adopted by NERC in order to facilitate a thriving market for the electricity sector. Thus, a scenario where stakeholders are treated with kid gloves when in breach will further rob the sector of its credibility.

> *"A legal framework capable of guiding the power sector should be well researched, drafted and tailored to meet the peculiarities of the sector or country to which it is to be applied."*

Furthermore, the legal framework of associated sectors such as gas, security, finance play a major role in determining the success of the power sector. For instance, the heightened spate of insecurity, inflation, inadequacy of gas infrastructures amongst others have negatively impacted the power sector. Destruction of gas pipelines directly affects the quantity of gas available to power plants. Whilst efforts are being made to improve the legal framework of the power sector, adequate considerations should be given to associated sectors in order to ensure a holistic reform.

CONCLUSION

There is no gainsaying that a well-structured and effective legal framework is fundamental to providing sustainable clean power to meet Nigeria's energy needs. However, the attainment of these goals is greatly determined by the political will of the government to go all the way to effect the relevant changes.

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EDITORS NOTE

The Avalon Policy Report is a thoroughly researched and ideas-driven digital publication that echoes the thoughts of policy makers, industry leaders, practitioners, thought leaders, entrepreneurs, and academia across key sectors of Nigeria's economy.

The publishers believe that these thoughts can help shape Nigeria's present and future policies if the relevant authorities tap into them as a knowledge resource. Government policies that reflect the pressing economic realities of all stakeholders are those that result in innovation, growth, stability, and prosperity.

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