

Required: A Roadmap for the Achievement of a Successful and Sustainable Power Supply in Nigeria ¹

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Introduction

This is a roadmap that presents a path consisting of various power plants, transmission and distribution systems with suggested timelines for their establishment. It may contain fossil fuel powered plants, renewable energy sources for grid and minigrid operations. It should provide a guide to the country to achieve a successful and sustainable power supply. The timelines could stretch into years and decades. The capacities of the plants, transmission and distribution systems, including the minigrids shall be specified. This, I submit, is what the country needs to enable concerted and directed investments for the establishment of a successful and sustainable power supply over time. It should be developed by a team of independent experts on the power supply industry.

This suggestion was triggered by the contrasting messages received from information on two investigative panels in the UK and Nigeria respectively, set up by the two governments, which were in the news in August 2019. As one read the two accounts, one could see that the UK panel has been so constituted and briefed to achieve its defined and specified objective. In my assessment, the Nigerian power panel has not been structured or empowered to provide a solution to our perennial and intractable power supply problem. A short description of the panels will bear out these points.

The UK panel is to investigate the HS2 railway linking about 21 destinations which include Birmingham, Birmingham airport, Carlisle, Chesterfield, Crewe, East Midlands, Edinburgh, Glasgow, Leeds, Liverpool, London, Manchester, Manchester airport, Newcastle, Old Oak Common in London, Oxenholme, Penrith, Preston, Sheffield, Warrington and York on a mixture of existing and new high-speed track. It has been set up by the government and constituted by independent experts. Its terms of reference confirm that it will look at whether and how HS2 should proceed, using all existing evidence on the project to consider:

- its benefits and impacts
- affordability and efficiency
- deliverability and scope
- its phasing, including its relationship with Northern Powerhouse Rail

The second panel is on power projects set up by the government of President Buhari to probe the \$16 billion invested by former governments on the power projects. On 29th

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August, Nigeria's Economic and Financial Crimes Commission (EFCC), the Nigerian law enforcement agency that investigates financial crimes, arrested four officers of the Niger Delta Power Holding Company (NDPHC) on their probe of the \$16 billion invested by former governments on the power projects. From this development, it appears that the probe is being conducted by the EFCC [1].

In the absence of any other terms of reference, we would quote the President who reportedly stated: "The previous government mentioned on their own that they spent \$16bn on power but you are better witnesses than myself. Where is the power? Where is the money? We will follow them, eventually God willing, we will catch them and get our money back." [2]

What could be inferred from the quoted statement is that the president and some others expected the \$16 billion to be adequate to produce the national grid power supply. The resulting power should so serve the whole nation that everyone will "be witnesses" that the fund has been judiciously and properly invested.

In writing the foregoing statements, this writer has no moral right to question the president's decision to institute a probe. Given his much-publicised mantra on anticorruption, it is his prerogative to choose what he does. However, if the objective is to alleviate and resolve the nation's persistent grossly inadequate power problem which seems to defy solutions, we submit that producing a roadmap for achieving a successful and sustainable power supply should be the way forward.

In addition, we are not in any position to state whether the fund being investigated in the probe was judiciously used. It remains the submission of this writer that in spite of the probe, the country should not be distracted from the urgent task of finding solution to our power supply problem which has over the years, continuously crippled various developmental efforts for which steady and stable power supply is needed.

In this paper, an attempt will be made to define the power problem facing the nation. Recommendations will be made on the way forward, which in our view is the development of a roadmap for achieving successful and sustainable power supply in the country to which everyone can "witness", to quote the president.

Problem Definition

Our grid power supply is hardly existent. In the month of August 2019, I spent about a week in our village in the South East. For the greater part of everyday, there was no power supply from the grid, we had to resort to the use of standby power generator. Also, I spent about four days in Lagos. We were in darkness most of the time because of the absence of grid power supply. We had to use a standby generator. Both in the village and in Lagos, it was a case of being in the dark for three to four hours continuously. Then, there could be an interlude of power supply for about an hour before reverting to darkness for hours again.

The power supply problem could be defined in two sections as below:

1. The country has grossly inadequate installed electricity generating capacity.
2. Equipment for generation, transmission, and distribution are inadequate. Some are old and over-utilised equipment in dire need of replacement.

Problem definition: The grossly inadequate electricity generating capacity

The gross inadequacy of our generating capacity is demonstrated as we compare our installed electricity generating capacity with that of other countries, and also consider the populations of the various countries.

S/No.	Country	Generating capacity	Population*
1	Nigeria	12,522 MW**	201,803,703
2	South Africa	51,309 MW**	58,678,802
3	Spain	106,700 MW+	47,007,367

*The current population of Nigeria is 201,803,703 as of Friday, August 30, 2019.

The current population of South Africa is 58,678,802 as of Thursday, August 29, 2019.

As of 1 January 2019, Spain had a total population of 47,007,367.

All these are based on UN estimates

** Installed capacities by [POWER AFRICA FACT SHEET](#), By USAID, March 12, 2019. The installed generating capacity in Spain is 106,700 MW as given by 2015 estimate given by The World Factbook by the US Central Intelligence Agency (CIA)

Analysis

- Nigeria, with a population which is almost twice of South Africa, has an electricity installed capacity that is less than 25% of South Africa.
- Nigeria, with a population of over four times of Spain, has an electricity installed capacity of 12% that of Spain.

Deductions

For our grid electricity supply to be so developed for everyone in the country to bear “witness” to the effective electricity supply, we have to build our installed capacity to at least four times the present capacity of Spain, that is to over 420,000 MW. This is over 30 times our current installed capacity.

Problem Definition: Inadequate Transmission and Distribution Capacities

One of the problems that we grapple with in our power supply is that in spite of the paltry generating capacity, which is grossly inadequate when compared with the developed countries, our transmission and distribution capacities are even worse.

We live with the fact that their capacities are so inadequate that the country cannot transmit and distribute even the paltry power that is generated. To expatiate, the following examples could suffice.

1. **Vice President laments the poor distribution capacity:** It was reported by the Punch newspaper that the Vice President, Professor Yemi Osinbajo, on Thursday, August 15, lamented the nation's inability to distribute available grid power to consumers. He reportedly stated:

"Despite the availability of about 8,000MW of generation and about 7,000MW of transmission capacity, lack of Disco infrastructure to absorb and deliver grid power to end users has largely restricted generation to an average of about 4,000MW," he said.[3]

2. Past reports on the need for Increased Investment in the Power Industry

In our PM World Journal December 2014, with the title: "An Analysis of the Electricity Industry in Nigeria One Year after Privatisation", we discussed the need for increased investment in the power industry. Some of the statements include the following:

- "It is suggested that the country needs to make "a yearly investment of \$4 billion within the next 10 years in the energy sector" in order to "move the sector from the doldrums and make it globally competitive". This was the view of the Managing Director, Eko Electricity Distribution Company, Ramesh Narayanan He explained that the investment will cover the following: Generation, distribution and transmission would gulp about 70 per cent investment into plant machinery while the other 30 per cent will be into construction". He pointed out that Nigeria, with a population of about 170 million people has such little power supply that, only five per cent of the population has access to electricity available in the 11 Distribution Companies in the country.
- He also observed that the transmission lines are inadequate, providing inadequate transmission capacity. He said: "Even today at 4000 Megawatts, the transmission lines are not able to absorb the capacity", this means that they need to be overhauled and expanded. In this situation, a lot of work needs to be done to develop the necessary capacity that will provide Nigerians with adequate capacity for power transmission. He added that this has to be done not only by the federal government but also by the private sectors making their contributions.

3. Low investment in infrastructure

Also, in an earlier paper, PM World Today, February 2012, with the title: "Resolving the Seemingly Intractable Nigerian National Infrastructural Deficiencies", we quoted the then Managing Director of the International Monetary Fund (IMF), Christine Lagarde. She blamed infrastructural gaps, particularly in the power sector as the factor holding Nigeria back from its full growth potentials. According to her, Nigeria's electricity generation capacity, currently about 3,800MW, for example, is just 10 per cent that of South Africa's (39,149.3MW), while Nigeria's population is more than three times greater. She made this statement at the Eko Hotel and Suites, Victoria Island, Lagos during a round-table discussion with stakeholders on the second day of her visit to Africa.

Recommendations

1. Over the years, the power supply problem has been with the country, one would suggest that it was since the days that the country discovered and started exporting oil in commercial quantities, probably since 1971.
2. It needs to be admitted that successive federal governments have made efforts to develop the power supply sector.

Table 2: Major Power Projects

S/No	Name of Power Station	Type and Installed Capacity	Location and Description	Dates Commissioned
1	Afam Power Station	Gas Thermal Power Station, 704 MW	Afam, Rivers State	1965, 76, 78, and 82.
2	Egbin Thermal Power Station	Gas Thermal Power Station, 1320 MW	Egbin, Ikorodu, Lagos State 6x220MW	First unit was commissioned in 1985 and the last in 1986
3	Kainji Power Station	Hydroelectric power station, 800 MW	By River Niger and Kainji Lake in Niger State	Completed 1968
4	Jebba Power Station	Hydroelectric power station, 540 MW	By River Niger and Jebba Lake in Niger State	Completed in 1985
5	Shiroro Power Station	Hydroelectric power station, 600 MW	By Kaduna River and Shiroro Lake in Kaduna State	Completed in 1990
6	Delta Power Station	Gas Thermal Power Station, 912 MW	Ugheli, Delta State	1966, 75, 78, 89 and 1990
7	Sapele Thermal Power	Steam Thermal	Sapele, Delta State	Steam Thermal

	Station	Power Station, 6x120 MW; Gas Thermal Power: 4x75MW 1981		Power Station, 1978 and Gas Thermal Power: 1991
8	Okitipupa Power Plant	335 MW comprised of 8 GE gas turbines	Ondo State	Built by the Chinese, Sepco III Electric Power Construction corporation, etc. It was commissioned in 2002

Total installed capacity: 6231MW

National Integrated Power Project (NIPP)				
9	Olorunsogo Power Station	750 MW	Ondo State	Commissioned but not all the units are operational
10	Alaoji Power Station	1074 MW	Ugwanagbo, Abia State	Not Commissioned
11	Ihovbor Power Station	450 MW	Benin, Edo State	Not Commissioned
12	Calabar Power Plant	625 MW	Calabar, Cross River State	Not Commissioned
13	Egbema Power Station,	375 MW	Egbema, Imo State	Not Commissioned
14	Gbarain Power Station	250 MW	Yenagoa, Bayesian State	Not Commissioned
15	Sapele Power Station	450MW	Sapele, Delta State	Work reportedly completed but not commissioned
Total planned capacity: 3974 MW				
Total Installed plus Planned Capacity: 10,185 MW				

Despite these efforts, it is doubtful whether there is a nationally agreed, accepted and approved Roadmap for the development of a successful and sustainable power supply. Features of the Roadmap could include the following:

- It should be approved by the National Assembly such that it is a blueprint for our power supply development.

- It should be apolitical. That is, it should not be linked to any political party. It should be a national document to be used by all national governments.
- All future developments in the power supply industry should be based on it. No government should seek to make any investment on the power supply industry that is not based on the Roadmap.
- The National Assembly should not approve any investment not based on the Roadmap.
- The Roadmap should be produced by a team of experts consisting of Nigerians and foreigners including those in Diaspora. Each member of the team should have expertise in power supply.

Conclusion

The power supply problem really should be a responsibility of Nigerian engineers to resolve. Leaving it, as it has been over the years, as a tool for political discord and shenanigans is a disservice to the nation.

Our government and politicians should take up the challenge of resolving this intransigent problem by setting up a panel of experts who will provide the Roadmap that will constitute a blueprint and a compass for further investments in the power supply industry, going forward.

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About the Author



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Dr. O. Chima Okereke, Ph.D., MBA, PMP is the Managing Director and CEO of Total Technology Consultants, Ltd., a project management consulting company working in West Africa and the UK. He is a visiting professor, an industrial educator, a multidisciplinary project management professional, with over 25 years' experience in oil and gas, steel and power generation industries. For example, On December 26th 2013, he completed an assignment as a visiting professor in project management; teaching a class of students on Master's degree in project management in the Far Eastern Federal University, Vladivostok, Russia. In August and September 2013, he conducted an innovative, and personally developed training programme for seventy six well engineers of Shell Nigeria to enhance the efficiency of their operations using project and operations management processes.

Before embarking on a career in consulting, he worked for thirteen years in industry rising to the position of a chief engineer with specialisation in industrial controls and instrumentation, electronics, electrical engineering and automation. During those 13 years, he worked on every aspect of projects of new industrial plants including design, construction and installation, commissioning, and engineering operation and maintenance in process industries. Chima sponsored and founded the potential chapter of the Project Management Institute (PMI®) in Port Harcourt, Nigeria, acting as president from 2004 to 2010.

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