PwC's Annual Power & Utilities Roundtable

2016 Report

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Introduction

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Reliable power supply has proven to be unachievable years after the privatization of government owned power generation and distribution companies. The challenges militating against constant supply of electricity include disruptions to gas supply, weak transmission infrastructure, inappropriate pricing, power theft, poor revenue collection, slow grid extension and in recent time, access to foreign exchange among others. Hence, the need to explore other access to power supply especially the off-grid models (i.e. stand-alone power systems or mini-grids).

This formed the crux of the discussion at the 7th edition of our annual Power and Utilities Roundtable themed ***Looking beyond the Grid***, held in November 2016. Stakeholders in the power sector such as the regulator, operators, investors, financiers, government and the media gathered in Lagos to discuss the opportunities, the challenges, regulatory provisions and available financing models for off-grid power.

To ensure a robust conversation on the theme, four of the major stakeholders in the electricity value chain i.e. the regulator, the distribution companies, the financiers and the state governments, represented by The Nigeria Electricity Regulatory Commission (NERC); Ikeja Distribution Company (Ikeja disco); Africa Finance Corporation (AFC), and Lagos state government respectively made presentations and participated in a panel discussion on the opportunities, challenges and prospects of off-grid power.

For the millions of Nigerians who don't currently have access to electricity, the old assumption that they would have to wait for grid extension is being demystified by the new technological possibilities in the off-grid power space. With its adoption, we expect a significant improvement in power supply in the coming years. This will also have a major impact on the sustainability of incumbent generation, transmission and distribution utilities and provide the needed push to jump start the Nigerian economy.

The annual Power and Utilities Roundtable is part of PwC's contribution to the on-going reforms in the Nigerian power sector. It is a forum for key players to discuss the present and the future of a fully privatised Nigerian power sector.

This report presents details of the proceedings held including the thoughts and suggestions of various speakers and the robust conversations around the key issues. It also shares some current developments in the sector since the event.

We do hope you will find the report insightful.

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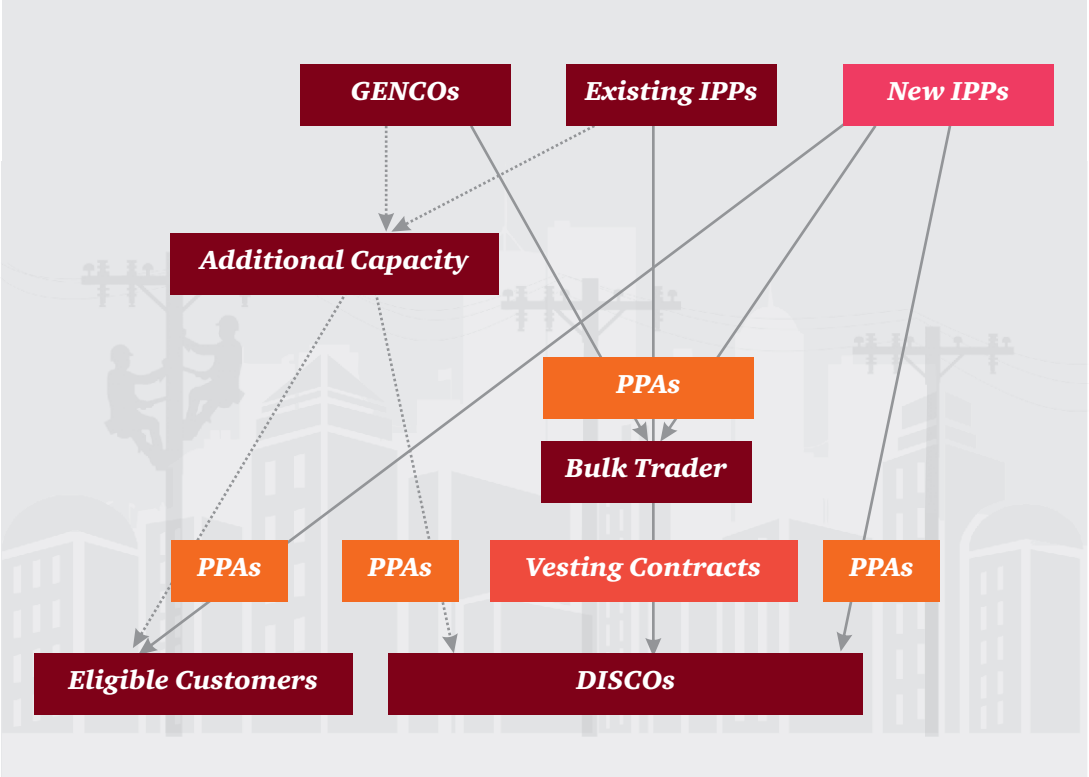
Understanding the Regulatory Environment

Dr. Haliru Dikko, Deputy General Manager of NERC, provided some context around the regulatory landscape for off-grid power generation.



The key players in the electricity value chain for grid connected power were listed as generating companies (gencos), existing and new Independent Power Producers (IPPs), bulk traders, distribution companies (discos), and the 'Eligible Customers'. He noted that NERC had the powers to regulate off-grid and rural electrification and this is drawn from provisions of the Electric Power Sector Reform Act (EPSRA) of 2005. Section 88 subsection 13c of the Act provides the means by which rural electrification will be achieved. These are: grid extension, off-grid and standalone system.

The Act in Sections 62 (1) and 62 (2) also specifies market players who require a licence to generate or distribute electricity. By this provision, anyone who generates above 1MW, or distributes above 100KW at a site, requires a license. Those who generate less than 1MW, or distribute less than 100KW, are exempted from getting a license.

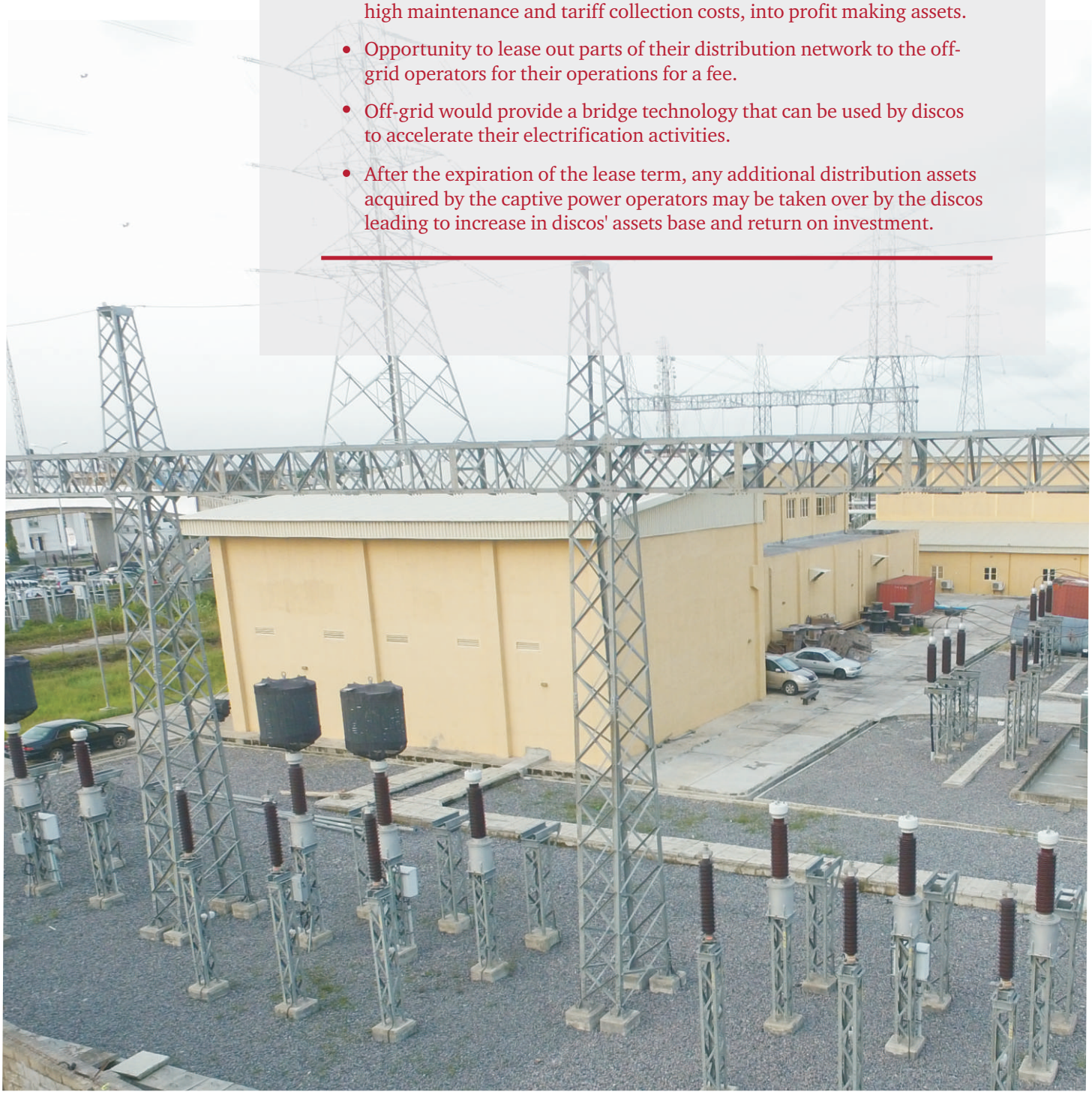
On the need for regulation in the sector, Dikko observed that monopoly, unlike market forces was an inefficient means of setting prices. The electricity market in Nigeria thus had to be regulated to protect it from the abuse of monopoly, noting that in the current electricity market, the discos were like a monopoly. Off-grid networks therefore provide competition which would in the long run reduce tariff, and increase the supply of electricity to consumers. He noted that regulation was not only about setting prices, it was also about setting standards.

For off-grid networks, two regulations are key: the Independent Electricity Distribution Network (IEDN) for embedded power generation and the mini-grid regulation. The regulatory system should however be flexible so as not to impose an unnecessary and costly burden on rural electricity providers as high regulatory burden could easily destroy the financial viability of such projects.

The overall purpose of off-grid regulation is to promote competition, reduce monopoly and accelerate electrification of underserved areas. It also promotes the engagement of the communities, NGOs and other stakeholders in achieving nationwide electrification while minimizing major risks associated with off-grid investments such as sudden tariff changes and possible stranded mini grid investments due to extension of the grid to areas serviced by off-grid operators.

While discos may consider off-grid power companies as competitors, there are a number of potential benefits that discos stand to gain in the relationship, such as:

- The development of unexploited disco licensing areas at no-cost to the discos pending when they are ready to extend their operations to such areas.
- Opportunity of turning loss-making assets in underserved areas with high maintenance and tariff collection costs, into profit making assets.
- Opportunity to lease out parts of their distribution network to the off-grid operators for their operations for a fee.
- Off-grid would provide a bridge technology that can be used by discos to accelerate their electrification activities.
- After the expiration of the lease term, any additional distribution assets acquired by the captive power operators may be taken over by the discos leading to increase in discos' assets base and return on investment.



The Distribution Companies' Perspective

Mr. Aigbe Olotu, Chief Financial Officer (CFO) of Ikeja disco, highlighted some of the issues with embedded power generation.

Discos will face a number of technical and commercial issues when partnering with embedded power generators on off-grid power. Some of the expected technical issues include network voltage changes; incessant breakdown of network facilities; power quality; power protection; power stability; and network protection.

The commercial issues include pricing; cost recovery; customer's ability to pay; service level agreements and service guarantees; tenor of contracts; eligible customer sensitivities to long duration contract terms; service guarantee; and the operating tariff order.

Other issues of commercial importance include:

- Managing the existing captive power producers
- Grid power improvement and supply - Increase in power generation, reduced grid power tariff and impact on embedded generation pricing
- Partnerships: Discos - Embedded power companies
- Regulatory challenges

He was of the opinion that under the current operating tariff, there was a huge difference between the least paying customers and premium customers. Premium customers currently pay the premium price which creates the subsidy for the least paying customers. Therefore, for a disco, embedded power will alter the load distribution of available grid power, which would involve the removal of premium customers from the grid tariff structure into the embedded power structure. He wondered if the residential customers, who make up 93-95% of the customers base, would be willing to accept the resulting increase in tariff.

Issues with Financing of Off-grid Power Projects

Mr. Batchi Baldeh, Senior Vice President & Head of Power, Africa Finance Corporation (AFC) confirmed that the AFC has been active in the Nigeria power space. The bank participated in the first power privatisation round, investing in one of the discos and providing finance for the acquisition of thermal genco and one hydro genco. Their involvement in the sector led to their appointment as technical advisors to CBN on Power and Aviation Intervention Fund.

The AFC has not really invested in off-grid electricity projects. His presentation focused on Solar Home Systems (SHS) as a means of achieving embedded power generation. SHS are typically anchored on telco infrastructure, in a Pay-as-You-Go model. It has been proven in East Africa, and is becoming popular in Nigeria.

Off-grid network is usually associated with rural electrification or peri-urban electrification projects; lately residential estates and government establishments. Traditionally, off-grid projects are donor or state-funded. The projects could be financed with a mix asset-based lending, subsidies and grants. The project can be based on end-user financing with options like small scale lending, micro-credit, fee-for-service, leasing arrangements or revolving funds. Government can also provide fiscal instruments and incentives in terms of tax exemptions, duty waivers, quotas, green certificates, etc.

While off-grid networks are retail type businesses usually located in rural areas, from a financing perspective, it has potential for growth. Prospective off-grid network operators must understand the risks and measures to mitigate them.

Some of the risks that must be considered for such projects include:

1. Regulatory & policy risk: These include permits and regulations.
2. Grid extension risk: Service territory must be well defined.
3. Technology risk: The type of technology used.
4. Operational risk: Retail channels, supply chain logistics, maintenance, issues of theft and vandalism, etc.
5. Market/Offtake/Payment risk – Service niche and payment structure must be clearly defined.
6. Financing risk: Ability to raise equity, debt, working capital and foreign exchange.
7. Environmental risk: Environmental Social Impact Assessment (ESIA) issues such as the disposal of batteries is a key consideration.

To mitigate market risks, a feasibility study, niche market study and a study of the proposed market segment are required. Operational risk can be mitigated by leveraging existing telco infrastructure and payment platforms. For financing risk, return on investment must cover capital expenditure and operating expenditure. Getting the right support from equipment manufacturer (OEM) will greatly help in managing technology risk. Local currency financing will assist in addressing foreign exchange risk.
Traditional sources of funding for off-grid projects include donor organisations and governments. Off-grid projects could be financed on a level, or end-user basis. Level-based financing entails asset-based lending, subsidies, and grants. End-user financing refers to small scale lending, micro-credit, fee-for-service, leasing arrangements, and revolving funds.

Attracting capital for off-grid projects occurs in three different stage:
Concept stage (<$2m).
At this stage, there is a need to show proof of concept. Grants and early stage investment are largely limited to network of donors and angel investors e.g.USAID DIV, OPIC Africa Challenge Enterprise Fund, DFID, Power Africa (USTDA), Rockefeller Foundation, Bill & Melinda Gates Foundation etc.

Start-up & growth stage (<$10m)
After the pilot or proof of concept, there is a need to start the project. Seed funding remains a challenge, limiting the ability of locally owned SMEs to develop and flourish. Some sources of funding for this stage of development include AFDB, BOI, local banks, Acumen etc.

Expansion stage (>$10m)
Working capital is one of the most significant financing gaps particularly for Pay As You Go solution as providers need to maintain adequate inventory to service customers. This is where AFC, IFC, AFDB etc. come in. Other sources include Afrexim bank, SunFunder, Global Environmental fund, ABSA, Old Mutual fund, etc.

Challenges of Running a Megacity without Constant Supply of Electricity — The Lagos Experience

Lagos as the commercial nerve centre of Nigeria and home to millions of families and businesses has a huge demand for electricity. The current demand for electricity in Lagos is about 5,000MW, this exceeds the electricity supply it receives from the national grid.

Lagos had to develop its own captive power initiative to make-up for the power deficit from the national grid. With 5 IPPs providing a total capacity of 47.5MW to the state, power is being made available to public facilities including offices, hospitals, schools, street lights, and water works. This has helped Lagos deliver better social services and reduced the state's dependence on the national grid.

The current administration is leveraging the extensive knowledge and experience in the sector to deliver constant, safe, and reliable energy for Lagos residents. In this regard, the government developed an energy development policy, Light-Up Lagos, and set-up a senior level committee of gencos, discos, gas suppliers and other stakeholders, called *Light-Up Lagos Power Advisory Committee.*

The components of Light-Up Lagos energy development policy include:

- Embedded power -Working with the major players in electricity value chain to ensure 24hour power supply in Lagos.
- Community Electrification Intervention - Upgrading and installing new on and off-grid infrastructures in Lagos communities
- Street lighting - Improving night time economic activities, illumination and security across the state.

Panel Discussion

Moderator: Pedro Omontuemhen, Partner & Head, Power and Utilities, PwC West Africa,

The panellists were:

- Mr. Kunle Falola, CFO, Synergy Capital Managers
- Dr. Haliru Dikko, Deputy General Manager, NERC
- Mr. Aigbe Olotu, CFO Ikeja disco
- Mr. Batchi Baldeh, Head of Power, AFC
- Mr. Olawale Oluwo, Commissioner for Energy and Mineral Resources, Lagos State.

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During the panel discussion, the following salient issues were discussed:

1 Market reflective pricing

Stakeholders at the roundtable were of the view that pricing rather than generation, transmission or distribution was the real problem of Nigeria's power challenge. The current pricing model is not cost reflective. They argued that if the pricing of electricity were cost reflective, it would attract investors. Currently, discos claim to be operating at a loss at the current tariff rate. In addition, generation capacities assumed in the pricing models are often not attained due to issues around gas supply. The solution is a review of the current electricity tariff.

2 Collection challenges

A significant portion of the power generated is lost to power theft. For a long time power was generated by government and there is a feeling that anything from government should not be paid for. This mentality is still very prevalent among Nigerians even in the current dispensation, hence, where prepaid meters have been installed, customers still find ways to by-pass them. Efforts are being made by discos to curb this through the introduction of smart meters, which can detect and report tampering. On its part, the Lagos state government has drafted a power theft bill with provisions to prosecution power thieves.

3 Metering of power consumed

Metering is an ongoing programme. The major challenge with metering every power consumer is funding and this has been further compounded by scarcity of foreign exchange. The challenges faced by the discos make them unattractive to the financial institutions.

4 Reversal power sector privatization

The NERC is not in support of reversing the privatization despite the current challenges because a lot of effort has gone into it and it was done in good faith with the support of international organisations and development partners. The new owners have the mandate to continue to improve on what the institutions were established to achieve. There are rules & regulations and means of checking the privatised companies. There are also performance agreements, licensing terms and conditions entered into with the BPE, Ministry of Finance etc. It is therefore not advisable to truncate the entire process.

5 Prospects and challenges of captive power

The captive power business is fraught with a lot of challenges and opportunities. It is an emerging market in an emerging economy and it is quite capital intensive. The regulatory environment can also be very challenging. However, the prospects are huge particularly in Lagos, with a population of over 22m. Nigerians are willing to pay for electricity provided the service is available. Captive power companies do not have issues with collections. While the service is not prepaid, there are guarantees in place under the willing buyer-willing seller kind of arrangement.

Current Developments in the Power Sector

Since the Roundtable, the "Eligible Customers" have been defined by the Minister of Power. Effective May 15, 2017, gencos are now free to generate and sell electricity directly to end-users across the country. This is legally backed by the provisions of Section 27 of the Electric Power Sector Reform Act 2005 (EPSRA) and represents a major policy directive which now grants electricity consumers under this category the right to buy power directly from gencos almost unhindered. Effectively, four categories of eligible customers are to become operative in the Nigerian Electricity Supply Industry (NESI), these are:

- A group of end-users registered with the NERC and whose consumption is not less than 2 megawatts (MW) and connected to a metered 11kV or 33kV delivery point on the distribution network and subject to a distribution use of system agreement for the delivery of electrical energy.
- Users connected to a metered 132kV or 330kV delivery point on the transmission network under a transmission use of system agreement for connection and delivery of energy.
- Users with consumption in excess of 2MW on monthly basis and connected directly to a metered 33kV delivery point on the transmission network under a transmission use of system agreement. Such eligible customers must have entered into a bilateral agreement with the distribution licensee licensed to operate in the location, for the construction, installation and operation of a distribution system for connection to the 33kV delivery point.
- Customers whose minimum consumption is more than 2MW over a period of one month and directly connected to the metering facility of a generation company, and has entered into a bilateral agreement for the construction and operation of a distribution line with the distribution licensee licensed to operate in the location.

The declaration further provides that at least 20% of the generation capacity added by the existing or prospective generation licensee to supply eligible customer must be above the requirement of the eligible customer and is supplied under a contract with a distribution or trading licensee at a price not exceeding the average wholesale price being charged electricity distribution companies by the Nigerian Bulk Electricity Trader Ltd. The conditions for the declaration of eligible customer is subject to review by the NERC from time to time.

This development permits these four categories of customers to buy power directly from a licensee other than electricity distribution companies. It creates an enabling environment for off-grid power and should boost investment in the sector.

Conclusion

Nigeria power sector is still evolving, in order to ensure regular power supply, off-grip power will continue to play a significant role in our energy mix especially with limited capacity of the transmission infrastructure.

Therefore, the industry stakeholders need to continue to collaborate and work together in providing enabling environment for off –grid power investment.

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