

# Enlight — Series —

**Nextier**

The Enlightenment publication is a series of weekly articles on the Nigeria Electricity Supply Industry (NESI) that focuses on capacity building and increased access to sector information

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## The Electricity Act 2023 and Public-Private Models for Nigeria's Transmission Sub-Sector

### Introduction

When electricity is produced, value is only created when transmitted and consumed. The transmission network serves as the vehicle through which generated electricity travels from the generating station to the distribution networks before being dispersed to end-users. The Nigerian transmission network is wholly owned by the Federal Government of Nigeria and is managed by the Transmission Company of Nigeria (TCN). The TCN had developed a 5-year Transmission System Expansion Plan covering 2016 – 2022, which intended to increase the wheeling capacity from 5,300MW to 20,000MW by 2022. The TCN also proposed to have a 765KV Super grid. A colossal investment of \$5 Billion was estimated to implement this plan. Unfortunately, the objectives of these plans have eluded the TCN and have not been achieved.

Despite significant investments in the transmission sub-sector, grid constraints and system collapses are typical in the Nigerian Electricity Supply Industry (NESI). In 2022 alone, the national grid system collapsed six (6) times. To accentuate this point, the national grid collapsed as recently as last week, 13<sup>th</sup> September 2023. The challenges above cause many Generation Companies (GenCos) to continually lose billions of Naira daily as they cannot generate up to their declared installed capacities. This implies a shortage in electricity supply to the Distribution Companies (DisCos), International Customers, and last-mile end-users, under-utilization of generation capacities and depravity of revenues for the GenCos.

### Background

The national peak demand for Nigeria is 19,798MW, according to the TCN Operational Report for October 19, 2022. As a result, Nigeria's installed capacity for electricity-generating facilities is roughly 13,014MW. However, most of these power plants have stranded power that cannot be removed because of the TCN's 8,100MW wheeling capacity. The highest maximum daily energy now obtained is approximately 4,977MW, resulting in a differential of approximately 3,000MW, which is currently underutilized in the on-grid power market and not accessible for distribution to customers by the DisCos. In addition, the grid network lacks adequate redundancy, which creates instability and frequent outages.

In line with this, the Federal Ministry of Power published an Investors' Guideline in May 2016, highlighting potential investment areas in the electricity value chain, including the transmission sub-sector. Consequently, the Electricity Act (EA) 2023 in sections 109 (1) and (2) provides for private sector investments in the transmission sub-sector. Section 109 (2) explicitly allows the Nigerian Electricity Regulatory Commission (NERC) to approve applications by non-licensees for:

- long-term concession of old or new transmission lines under any concession or commercial arrangement with the Transmission Service Provider (TSP);
- concession or commercial arrangements between concessioners and successor transmission licensee for expansion of the transmission; and
- project finance by private investors where investors finance, build, own and maintain (BOO) parts of the transmission network.

The Act, in section 112, further allows State Governments to enter into public-private partnership (PPP) arrangements with private companies for investment in transmission networks with relevant infrastructure concessions and PPP frameworks.



### Public-Private Models for Power Transmission

Several business models have been used to attract private sector investments in transmission. Private finance has brought substantive investments into transmission in some countries using these models. The four private finance models are discussed below:

#### a. Indefinite Privatization Model

Under this model, a private company owns the transmission company through a trade sale or public floatation of a government-owned transmission business. Development of the transmission is at the discretion of the private company. The investments cover all existing and new lines within a country or region. The Regulator sets the annual revenues to ensure a reasonable return on and of capital and is subject to periodic regulatory review. The incentive is related to the whole-of-grid performance, and the model allows open access to all transmission users equally.

#### b. Whole-of-Grid Concession (WoGC) Model

This model is similar to the indefinite privatization model in all aspects except for the duration of the model. Unlike the indefinite privatization model, which is indefinite, the duration for a WoGC is long-term, often 25 years or more.

#### c. Independent Power Transmission (IPT) Model

The IPT model is also long-term, lasting 25 years or more. It covers only investments in new individual or packages of lines. The winning bid largely or entirely sets annual revenues, and the availability sets incentives for the line (typically 98%).

#### d. Merchant Investment Model

The Merchant Investor builds and operates a single transmission line ("merchant line"). This is often a single high-voltage direct current (HVDC) line. The Merchant Investor builds the convertor station at either end of the line, which converts the current from alternating to direct current and back again. In most cases, the private sector initiates the HVDC merchant lines. The term for Merchant investments

depends on the lifespan of the merchant line and any associated agreements. Under a pure merchant model, the line-owner sets the price and terms and conditions for its access. This model is used in the United States of America (Neptune Transmission Line, a 104km undersea and underground transmission link between Long Island and Sayreville, New Jersey (with an estimated cost of over US\$60 Million), Australia (Basslink, a 370km HVDC interconnection connecting Tasmania to the NEM), etc.

### Nigeria's Attempt at Transmission PPP in the Past

Recognizing the need for PPP investments in the transmission sub-sector, the TCN invited bids to prequalify projects under the IPT business model in November 2014. The bids were to rehabilitate, repair, replace and expand 330kV and 132kV lines and the 330/132kV substations and 132/33kV transformers. A Canadian firm, Manitoba Hydro International (MHI), recommended the projects. A total of 73 applications were received for prequalification by TCN. 29 were pre-qualified and moved to the next stage (commercial stage). Respondents to the request for prequalification were from Nigeria, Australia, China, France, Switzerland, the United States of America etc. However, the TCN truncated the bidding process due to the weak financial viability of the Nigerian power sector and the lack of clarity over the transmission business model.

### Recommendation and Conclusion

Resources are sparse, and massive investments are needed from the private sector to refurbish existing facilities, restore the network to optimum capacity, complete ongoing projects, construct many new lines and substations, and expand the transmission network. Due to its merits over the other models and Nigeria's power sector peculiarities, the Whole-of-Grid Concession model is recommended to attract PPP investments in Nigeria's transmission sub-sector to achieve section 109 (2) of the EA 2023. The importance of PPP investments in Nigeria's transmission sub-sector cannot be overemphasized. Implementing the recommended model by the TSP will attract and drive massive investments into the transmission sub-sector. Its benefits include improving grid stability, grid network rehabilitation and expansion and eliminating stranded power generation and revenue losses by GenCos.

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