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NIGERIA POWER SECTOR REVIEW

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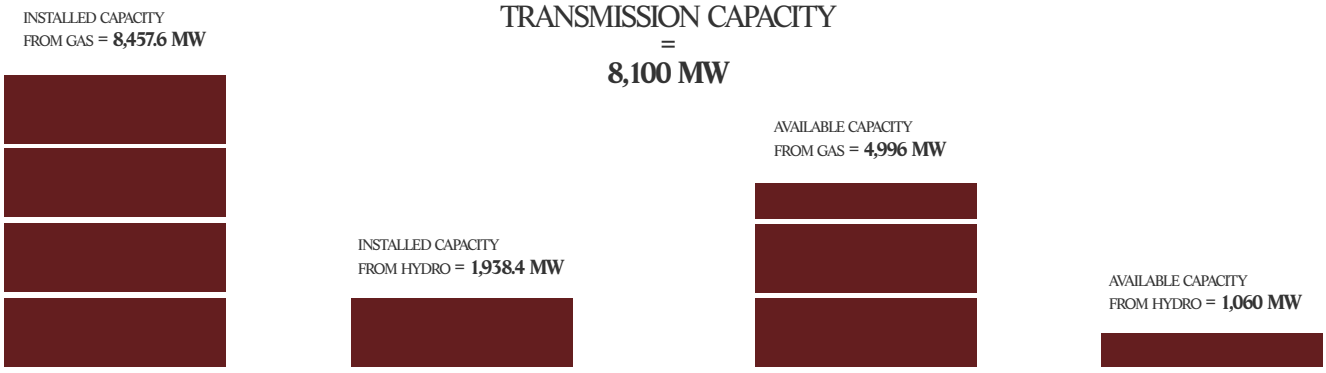
GLOSSARY

ATC&C	Aggregate Technical, Commercial and Collection
CBN	Central Bank of Nigeria
CTC	Competition Transition Charge
DisCos	Distribution Companies
ECN	Electricity Commission of Nigeria
EEI	Energising Economies Initiative
EEP	Energising Education Programme
EIA	Environment Impact Assessment
EPP	Export Parity Price
EPSRA	Electric Power Sector Reform Act
FIT	Feed-in Tariff
GACN	Gas Aggregation Company of Nigeria Limited
GPO	Gas Purchase Order
IEDN	Independent Electricity Distribution Network
IEDNOs	Independent Electricity Distribution Network Operators
LNG	Liquefied Natural Gas
LRMC	Long Run Marginal Cost
MAP	Meter Asset Provider
MBTU	Million British Thermal Unit
MW	Mega Watt
MYTO	Multi-Year Tariff Order
MYTO 2	Multi-Year Tariff Order for Generation, Transmission and Distribution, 2012
NBET	Nigerian Bulk Electricity Trader
NDA	Niger Dam Authority
NDPHC	Niger Delta Power Holding Company Limited
NEM	Nigerian Electricity Market
NEMSA	Nigerian Electricity Management Service Agency
NEP	Nigeria Electrification Project
NEPA	Nigerian Electric Power Authority
NERC	Nigerian Electricity Regulatory Commission
NESI	Nigerian Electricity Supply Industry
NIPP	National Integrated Power Project
NREEP	National Renewable Energy and Energy Efficiency Policy
OCGT	Open Cycle Gas Turbine
PPA	Power Purchase Agreement
REA	Rural Electrification Agency
SO	System Operator
STEM	Science, Technology, Engineering and Mathematics
TCN	Transmission Company of Nigeria
TEM	Transitional Stage Electricity Market
TUoS	Transmission Use of System

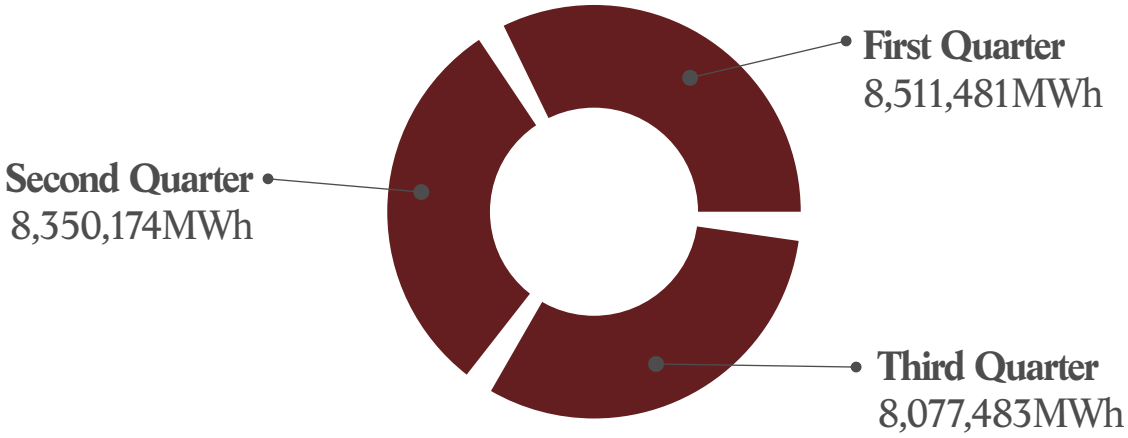
INDUSTRY STATISTICS



TOTAL INSTALLED CAPACITY = **10,396 MW**

TOTAL AVAILABLE CAPACITY = **6,056 MW**

TOTAL ELECTRICITY GENERATED IN 2018



MARKET REMITTANCE Q3 2018

Total Invoices Issued to DisCos
₦162,500,000,000

Total Invoices Paid by DisCos
₦55,100,000,000

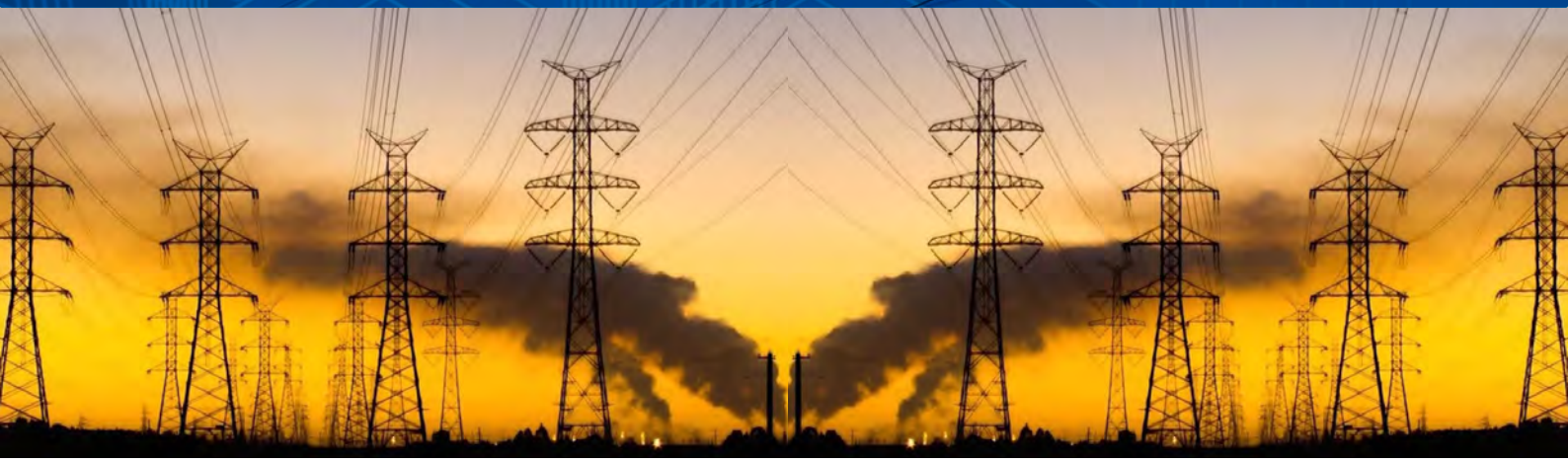
CONSUMER COMPLAINTS Q3 2018

Complaints Received
128,791

Complaints Resolved
97,343

Metering and billing accounted for about 53% of the total complaints received, while the remaining 47% related to load shedding, voltage, interruption, Disconnection, connection delay, etc.

BRIEF HISTORY



Electricity was first generated in Nigeria in 1866 when two generating sets were installed to serve the Colony of Lagos. In 1951, the government of Nigeria, through an Act of Parliament, established the Electricity Commission of Nigeria (ECN) to regulate and operate the power supply systems in Nigeria. Subsequently, the Niger Dam Authority (NDA) was established for the development of the Kainji Hydroelectric Dam. In 1972, the ECN and the NDA were merged to form the Nigerian Electric Power Authority (NEPA).

Until the enactment of the Electric Power Sector Reform Act (EPSRA), the Nigerian power sector (with the exception of a few generation plants owned by the international oil companies) operated by NEPA, was a vertically integrated, wholly owned, government monopoly. The EPSRA provided the legal framework that enabled the participation of privately owned enterprises in the Nigerian power sector. In 2005, after the enactment of the EPSRA, NEPA was unbundled into 18 companies consisting of six (6) generation companies, eleven (11) distribution companies and one (1) transmission company. In 2013, the majority shares (and in a few cases, all of the shares) in the six generation companies were sold to private entities. Also, the majority shares in the distribution companies were successfully sold to private entities. However, the government retained ownership of the Transmission Company of Nigeria.

While the NEPA unbundling and privatisation efforts were ongoing, the government of Nigeria in 2004 initiated the National Integrated Power Project (NIPP) to be implemented by the Niger Delta Power Holding Company Limited (NDPHC). The NIPP is described as a fast-track government funded initiative aimed at stabilising electricity supply in Nigeria. It has generation, transmission and distribution components. The NIPP projects were funded from the Excess Crude Oil Account, which, statutorily, belongs to the Federal, States and Local governments of Nigeria. It is the plan that, eventually, the assets under the NIPP would be privatised.

The generation component of the NIPP started with seven medium-sized power plants that are located in gas producing states. The number of power generation assets under the NIPP scheme has now increased to ten. Other generating plants are also being considered under the NIPP project. These would be hydro power plants that would be located in other parts of Nigeria. The transmission component of the NIPP consists mainly of transmission substations and lines required for power evacuation, grid expansion and grid enhancement. In this regard, NDPHC has completed 1,336.9KM of 330KV transmission line and 405.5KM 130KV transmission line, together with a number of substations. The distribution component of the NIPP is focused on the evacuation of power from the transmission stations to the various load centres and the distribution of power to the doorsteps of various consumers.

Flowing from the above, assets and utilities in the Nigerian electricity sector are partly owned and operated by the government and by private companies.

LEGAL FRAMEWORK

The electricity sector in Nigeria is governed by several laws and regulations. The key legislation are discussed below.

The Electric Power Sector Reforms Act (EPSRA)

This is the primary law that sets up the regulatory framework for the entire electricity sector. The Act establishes the Nigerian Electricity Regulatory Commission (NERC) which is the major regulator of the electricity sector. Other key provisions of the Act include the requirement that persons wishing to engage in the generation, transmission, distribution or trading of electricity must obtain licences from the NERC. The Act also establishes the Rural Electrification Agency which is responsible for promoting rural electrification programmes in the country.

The Nigerian Electricity Management Service Agency Act (NEMSA Act)

The Nigerian Electricity Management Service Agency Act establishes the Nigerian Electricity Management Services Agency which is responsible for ensuring compliance with the technical standards in the sector.

Environmental Impact Assessment (EIA) Act

Although it is not a sector-specific legislation, the Environmental Impact Assessment Act plays a crucial role in the development of power generation projects. Under the Act, projects involving the construction of a steam-generated power plant burning fossil fuels and with capacity exceeding 10 megawatts, dams or hydropower plants (with dams over 15 meters high and ancillary structures covering an area in excess of 40 hectares and/or reservoirs with a surface are in excess of 400 hectares), combined cycle power stations or nuclear power stations must first carry out an Environmental Impact Assessment test to ascertain the likely effect of the project on the environment. The conduct of an EIA is a requirement for obtaining a generation licence from the NERC.

Market Rules

The Market Rules were made pursuant to section 26(2) of the EPSRA. The purpose of the Market Rules is to establish an efficient, reliable and competitive electricity market. The Rules establish an electricity trading system with rights and responsibilities for all participants in the Nigerian electricity market at the different stages of the market. The Rules also provide for the office of the Market Operator which is responsible for administering the electricity market, implementing the Market Rules, admitting and registering market participants, collecting and managing information required to administer the market, etc.

Under the Rules, a Market Participant is a person who has signed a Market Participation Agreement with the Market Operator and has met the requirements contained in the Market Rules.

Grid Code

The Grid Code sets out the operating procedures for the development, maintenance and operation of the national grid. It applies to the Transmission Company of Nigeria (TCN) and all users of the national grid. This includes on-grid electricity generators and distribution licensees. Under the Grid Code, TCN acts as the Transmission Service Provider and System Operator

and performs several functions including managing connections to the grid, ensuring that grid connection points are properly metered, ensuring compliance with the Grid Code.

Metering Code

The Metering Code sets out the guidelines and technical specifications for metering within the Nigerian electricity industry. The Code comprises three sections; the first sets out general conditions for the whole code and covers issues relating to dispute resolution and the establishment of the Metering Code Review Panel. The second part deals with grid metering and covers the requirements for metering connection points in the transmission network and the distribution network. The third part covers metering of connection points on distribution networks where the connecting party is not a Market Participant.

Distribution Code

The Distribution Code comprises five codes relating to the rules and procedures for planning and development, daily operating principles for the operation and maintenance of distribution networks, guidelines for the construction and maintenance of the Distribution System and templates for the exchange of data among distribution licensees. The Code applies to all distribution companies and users or distribution networks within the country. It serves as a guide for distribution licensees in addition to the terms and conditions of their various licences.

It should be noted that the Market Rules, Grid Code, Metering Code and Distribution Code are to be read in conjunction with one another.

NERC Regulations

As the primary regulator, NERC has issued several regulations for the efficient running of the Nigerian electricity sector. One of the most important regulations is the Regulation for Application for Licences, 2010. The Regulations cover the application process for generation, distribution, transmission, transmission system operator and trading licences. Under the Regulations, the application procedure and timelines for the different licences are essentially the same. However, mandatory requirements for different type of licence are provided in the schedules. The Regulations also provide for appeal procedures where an applicant is dissatisfied with NERC's decision in respect of its application.

NERC also released the proposed Multi-Year Tariff Order (MYTO) Methodology in 2007. This document contained the building blocks for a regulated price at different stages of the electricity value chain. The three major building blocks under the Methodology are allowed return on capital, allowed return of capital and efficient operating costs and overheads. The Methodology envisaged a 15 year tariff path with yearly minor reviews and three major reviews every five years.

In addition to the laws and regulations mentioned above, the electricity sector is also governed by several other regulations, codes and guidelines which provide a comprehensive structure for the operation of the sector. These regulations include the Eligible Customers Regulations, the Mini-grid regulations, the Meter Asset Provider Regulations, the Independent Electricity Distribution Network Regulations, and several other regulations governing different aspects of the electricity sector.

Regulators

Nigerian Electricity Regulatory Commission (NERC)

NERC is the major regulator in the electricity market. It was established under the EPSRA to oversee the electricity supply industry in line with the Act. To this end, NERC is responsible for issuing and enforcing regulations for the development of the sector. It is also responsible for issuing licences and permits to persons/entities wishing to participate in certain activities in the electricity supply industry.

Nigerian Electricity Management Services Agency (NEMSA)

NEMSA is responsible for ensuring that electrical equipment used by operators in the industry complies with relevant technical standards. The Agency also carries out periodic inspections of power plants and other installations. Additionally, NEMSA collaborates with the Standards Organisation of Nigeria and other relevant agencies to ensure that electrical materials and equipment conform to industry standards. The Agency also monitors the installation of metering equipment, the construction of power plants, transmission systems, distribution networks and other electrical equipment are compliant with relevant safety requirements. They also test and certify electrical installations in potentially hazardous locations like filling stations floating production, storage and offloading vessels, etc. NEMSA

is involved in the testing and certification of electricity meters whether imported or locally manufactured before use in the industry. Another important function of the Agency is the certification of qualified electrical personnel in the industry.

Federal Ministry of Power, Works & Housing

Under the EPSRA, the Ministry has power to issues directives for the development of the industry. The Ministry's mandate includes the formulation and implementation of policy with respect to the generation, transmission and distribution of electricity in the country.

Energy Commission of Nigeria (ECN)

The Energy Commission of Nigeria is responsible for the planning and policy development for the power sector. It advises the Federal Government on aspects of energy and also has the responsibility for providing a database for energy related information.

Federal Ministry of Water Resources

Although the Ministry of Water Resources is not directly involved in the electricity supply sector, it plays a key role in hydro power projects. One of the Ministry's parastatals, the Nigerian Integrated Water Resources Management Commission, is responsible for ensuring efficient management of Nigeria's water resources. The Commission is responsible for granting Water Licences for hydropower generation projects.

STAGES OF ELECTRICITY MARKET

One of the objectives of the privatisation of the Nigerian electricity sector was the need to remove government monopoly in the sector, and to provide for private sector participation in the Nigerian Electricity Market (the "NEM"), with the aim of achieving a competitive electricity market governed by the principles of demand and supply.

In order to enable a proper transition of the electricity sector to a market driven sector, the Market Rules stipulates the stages of growth of the NEM.

The stages are Pre-transition stage, Transition stage, Medium-term stage and Long term stage.

Pre-transition stage

At this stage of the market, there was a physical unbundling and privatisation of the state owned utility held by PHCN. Other characteristics of this stage includes the establishment of performance incentives for generation and distribution activities and implementation of settlement procedures for the evaluation of existing metering arrangements.
This stage of the market ceased upon the declaration of the Transitional Stage Electricity Market (TEM) by NERC on 1st February, 2015 pursuant to an order dated 29th January, 2015.

Transition Stage

The Market Rules provides that certain conditions must be in existence before the electricity market can move to TEM. These conditions include the introduction of contracts for electricity trading arrangements, publication of the valid and current Transmission Use of System Charge (TUoS) by TCN, publication of initial settlement calendar by the Market Operator on its website and publication of a list of the names and addresses of all licensees, including interim licensees.
These conditions have been met, and it was as a result of this that NERC declared the start of TEM in 2015.

Medium-Term Stage

This refers to the period when NEM has attained sufficient level of competition. The conditions for the implementation of the medium-term stage of the market includes the introduction of bilateral contracts for the purchase and resale of energy; introduction of the balancing market - a spot market for electricity trading and contracts to cover and/or hedge electricity price risks; more competition in electricity generation; open entry to the wholesale electricity market and flexibility in electricity trading arrangements.

Long-Term Stage

The long-term stage refers to the stage in the Market where full competition has been achieved, both in generation and distribution.

INDUSTRY PARTICIPANTS

1. Generators

Electricity supplied to the grid in Nigeria is produced from two major sources: gas and hydro power plants with gas accounting for about 75.5% of Nigeria's total energy mix while hydro accounts for the other 24.5%.

With the increasing popularity of renewable energy sources such as hydropower, biomass, wind and solar power, the Federal Government of Nigeria approved the National Renewable Energy and Energy Efficiency Policy (NREEP) in 2015. One of the objectives of the Policy was to diversify Nigeria's energy mix, and to this end, the Policy set a target of 1,343 MW of total electricity generated from solar power plants, and 1,607MW and 631MW from hydropower and wind respectively by the year 2020.

Licensing

The EPSRA requires that any person wishing to engage in the generation of electricity exceeding 1 MW, should obtain a generation licence from NERC. As at June 2017, NERC had issued 122 generation licences to various generation companies since its establishment. Of this number, 93 are for on-grid generation and 29 are for off-grid power generation. Out of the total number of generation licensees, only five generation licensees have active power purchase agreements and only three out of twenty-one gas fired generation companies have active gas sale agreements.

Licensing Requirements

In order to obtain a generation licence from NERC, an applicant is required to be a company duly registered in Nigeria with audited financial statements and tax clearance certificates for the past three years (this requirement may be waived where the applicant is a newly incorporated Special Purpose Vehicle). Where the proposed generation capacity is 10 MW and above, the applicant is also required to conduct an Environmental Impact Assessment on the location where it intends to carry out the electricity generation.

The applicant is also required to provide a power purchase agreement either with the Nigerian Bulk Electricity Trader (NBET), or with another offtaker. Other documents required for the application include evidence of ownership of the project site (or long term lease agreement), gas supply and transportation agreements (for gas-fired plants), a Water Licence (for hydropower plants), engineering, procurement and construction agreements and operation and maintenance agreements (where applicable), finance agreements and a 10 year business plan.

An applicant is required to submit the duly completed application form, together with required documents and the application fee to NERC. Thereafter, NERC will notify the applicant of its decision within 6 months from receipt of the application. Generation licences are valid for an initial period of 10 years. It should be noted that an application for renewal should be made at least nine months before the expiration of the initial term.

2. Transmission

The electricity transmission system in Nigeria is operated and managed by the Transmission Company of Nigeria. TCN, is divided into three separate bodies

namely Transmission Service Provider, System Operator and Market Operator. The Market Operator is licensed by NERC to administer the wholesale electricity market, including settling payments among market participants, and administering and enforcing the Market Rules.

The Transmission Service Provider is the arm of the TCN which oversees the development and maintenance of the transmission infrastructure. It is responsible for the national inter-connected transmission system of substations and power lines. It is also responsible for providing open access transmission services. Its role is to maintain the physical infrastructure that make up the transmission grid and expand it to new areas.

The System Operator (SO) manages the flow of electricity throughout the power system from generation to distribution companies. It operates the Grid Code for the Nigerian Electricity Supply Industry (NESI). The SO has the responsibility of maintaining the technical stability of the grid through its operations of planning, dispatch, and control of the electricity on the grid.

Nigeria's grid system has a total (theoretic) transmission wheeling capacity of 8,100 MW over about 20,000km of transmission lines. This capacity is yet to be achieved. The highest capacity of power that has been wheeled from the grid is reported to be at 5375MW, a feat which was achieved on February 7, 2019. Prior to this, the last peak generation wheeled from the grid had been 5224 MW in December of 2017.

Licencing Requirements

Except for the supporting documentation which are peculiar to transmission related activities (such as information on the network configuration, line voltage level etc), the requirements for grant of a transmission licence are similar to the requirements for a generation licence.

3. Trading

NBET, a wholly-owned government entity, is currently the only entity licensed by NERC for bulk purchase and resale of power in the Nigerian Electricity Supply Industry (NESI). The trading licence which NBET holds is a temporary licence, and it is expected that between the Medium Term and Long Term stages of NEM, NBET will be phased out, and be replaced with other licencees for the bulk purchase and resale of power.

Licensing Requirements

Except for the supporting documentation which are peculiar to trading related activities (such as PPA with a Generation Licencee, Resale Agreement with Distribution Licencee and Network Agreement with Transmission Licencee), the requirements for the grant of a trading licence are similar to the requirements for generation licensing above.

4. Distribution

Successor Distribution Companies

Following the privatisation of the electricity supply industry, eleven successor distribution companies ("DisCos") were birthed to cover the entire 36 states.

These DisCos are **Abuja DisCo** (which covers the FCT, Kogi, Nasarawa and Niger states); Benin DisCo (which covers Edo, Delta, Ekiti and Ondo states); **Enugu DisCo** (which covers Enugu, Ebonyi, Abia, Imo and Anambra states); **Eko DisCo** (which covers the island area of Lagos state); **Ikeja DisCo** (which covers the mainland area of Lagos State); **Ibadan DisCo** (which covers Oyo, Kwara, Osun and Ogun states); **Jos DisCo** (which covers Plateau, Benue, Bauchi and Gombe states); **Kaduna DisCo** (which covers Kaduna, Kebbi, Zamfara and Sokoto states); **Kano DisCo** (which covers Kano, Jigawa and Katsina states); **Port Harcourt DisCo** (which covers Rivers, Cross Rivers, Bayelsa and Akwa Ibom states); and **Yola DisCo** (which covers Adamawa, Taraba, Borno and Yobe states).

Independent Electricity Distribution Network Companies

Although the successor Distribution Companies are responsible for providing electricity to the consumers within their franchise areas, NERC has since clarified that the DisCos do not have exclusivity over these areas and to this end, introduced the Independent Electricity Distribution Network ("IEDN") Regulations, 2012.

Under the IEDN Regulations, distribution licensees, other than the 11 successor DisCos who are not connected to the grid, can operate in unserved and underserved areas so as to increase delivery of power to consumers. The IEDN Regulations provides guidance on the procedure for obtaining an IEDN licence, the criteria for its issuance by NERC and operation of the distribution network and other ancillary matters. It

provides for three kinds of IEDN licencees, namely isolated off-grid rural IEDN, isolated off-grid urban IEDEN and embedded IEDN.

Isolated off-grid rural IEDN, refers to an IEDN in a rural area which is not connected to the distribution network of a DisCo. Isolated off-grid urban IEDN on the other hand, is an IEDN located in an urban area which is also not connected to the distribution network of a DisCo. In both instances, the IEDN will need to have its own embedded power supply from which it delivers power to its consumers.

Embedded IEDN, refers to an IEDN which is connected to the distribution network of a DisCo. In such circumstance, the IEDN may or may not have an embedded power supply. Where it does not have an embedded generator, from which it can supply power to its consumers, the IEDN will enter into a service agreement with the DisCo. The service agreement will govern the relationship between the DisCo and the IEDN, and the terms on which power will be supplied by the DisCo to the embedded IEDN.

The IEDN Regulations provides that NERC will grant an IEDN licence, where the area proposed to be served does not have an existing distribution system, or where there is an existing distribution system, but its infrastructure is unable to meet the demand of the customers in the area. IEDN licencees are subject to the same rules of operation as DisCos, and are expected to abide by all technical codes and standards which the successor DisCos are required to comply with.

Licensing Requirements for IEDNs

Other than supporting documents which are peculiar to distribution activities (such as the existence of a Resale Agreement with a Trading Licencee or PPA with an Embedded Generation Licencee, line voltage level, transformer type and data and Network Agreement with a Transmission Licencee), the requirements for the grant of a distribution licence is similar to the requirements for a generation licence above. In the case of an IEDN, an additional requirement of 5,000kW distribution capacity is required.

5. Meter Asset Providers (MAPs)

As part of its plans to ensure adequate metering of customers within the electricity supply industry, the NERC issued the Meter Asset Provider Regulations in late 2018. The Regulations introduce Meter Asset Providers as new participants in the electricity industry with the aim of closing the existing metering gap, reducing the collection losses recorded by distribution companies and, ultimately, eliminating the estimated billing practice.

Meter Asset Providers are expected to take responsibility for the financing, procurement, installation and maintenance of meters which used to be the sole responsibility of the DisCos. Prospective MAPs are required to apply to NERC for a “no objection” to enable them participate in the procurement process to provide metering services to DisCos. Upon conclusion of the DisCo's procurement process, the successful bidder may apply to NERC for a Meter Asset Provider Permit relating to the specific DisCo. Once NERC grants the Permit, the MAP may enter into a Metering Service Agreement with the DisCo.

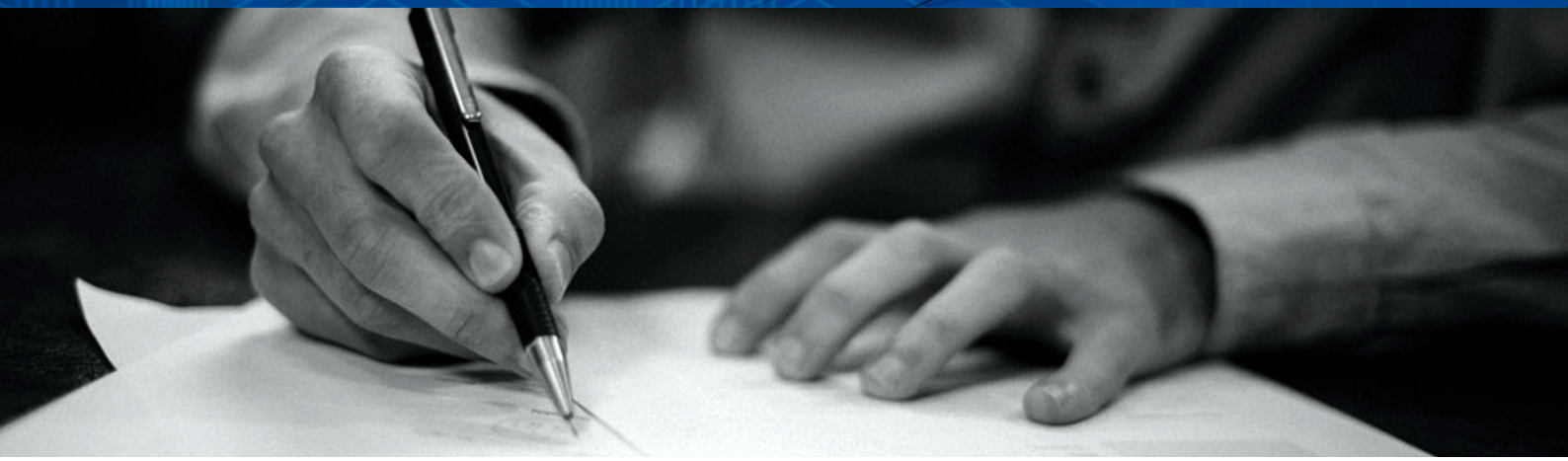
Under the Metering Service Agreement, the MAP is responsible for the procurement and installation of meters in accordance with industry standards as specified in the Metering Code and other relevant guidelines. MAPs are also responsible for repair of faulty meters within two weeks of being notified of such faults. MAPs are entitled to be paid a metering service charge which is included in the bills sent to the consumers. Additionally, MAPs retain ownership of the meters they have installed until the cost is fully amortised through the metering service charge.

Licensing Requirements

In order to obtain a Meter Asset Provider Permit, applicants are required to submit a duly completed application form, tax clearance certificates and audited financial statements for the three years prior to the date of the application, certificates of incorporation, memorandum and articles of association, resumes of the members of the applicant's board of directors, a ten year business plan and evidence of relevant experience. Once granted, the MAP permit is valid for 15 years.

Since the introduction of the MAP Regulations, NERC has granted about 34 permits to MAPs to provide metering services to Distribution Companies.

POWER PROCUREMENT



Power procurement in Nigeria is affected by the stages of the NEM. The market is currently in the transitional stage. During the transitional stage, the key offtakers of power are NBET, the DisCos and the Eligible Customers.

NBET, in line with its statutory mandate has executed PPAs to purchase all available capacity generated by the generation companies that were producing power to the grid prior to the privatisation of the power sector. It, in turn, sells the power to the DisCos under vesting contracts. Apart from the PPAs signed with the existing generation companies, NBET has entered into no less than 26 PPAs. Under the Market Rules, at the start of the Medium Term Market, NBET's vesting contracts with the DIsCos would be novated and transformed into bilateral contracts.

The DisCos are an important group of power offtakers. Currently, they procure the bulk of their power through vesting contracts which each DisCo signed with NBET.

The power procured by NBET via its many PPAs is allocated proportionally to the DisCos on the basis of their respective energy requirements. DisCos can also enter into PPAs to purchase power directly from embedded generators and evacuate through their distribution networks.

Further to the directive of the Minister on Eligible Customers and the release of the Eligible Customers Regulations, Eligible Customers may now procure power supply from sources other than the DisCos. There are 4 groups of Eligible Customers. Each eligible customer's PPA would differ depending on whether the power they purchase would be delivered through distribution networks, or transmission lines or whether they would be connected directly to the generation plant. The means of power delivery would also determine whether an eligible customer would need to sign transmission agreements and be considered a market participant under the Market Rules.

It should be noted that the procurement of energy by NBET and DisCos is to be done through an open, transparent and competitive process and in accordance with a procedure established by NERC. The procedure established by NERC is published in the Regulations for the Procurement of Generation Capacity 2014.

Apart from the procurement of power through the grid and the distribution lines, buyers who are not connected to the grid or the distribution system may procure power through a range of off-grid options.

The off-grid options include:

01 Captive Generation
[See **NERC Captive Power Generation Regulation, 2012**]

DESCRIPTION	FORMALITIES	BUSINESS OPPORTUNITIES
Generation of electricity exceeding 1MW for the purpose of consumption by the generator and not for sale to third parties.	Requires issuance of a permit by NERC. The application process after NERC acknowledges an application as 'duly made', may take approximately 3 months.	• Industries that require uninterrupted and heavy electrical energy consumption may utilise this option. • Captive power generation permit holders may also sell surplus power not exceeding 1MW to an off-taker without applying for a generation licence.

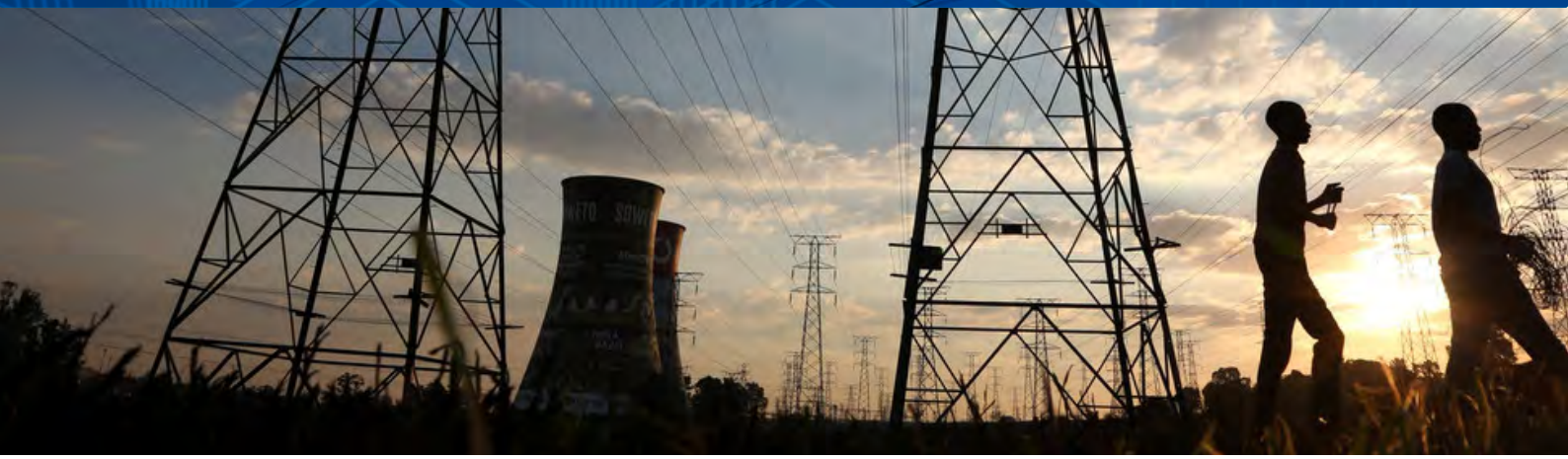
02 Mini-Grids
[See **NERC Regulation for Mini-Grids 2016**]

DESCRIPTION	FORMALITIES	BUSINESS OPPORTUNITIES
A system of connected generation and distribution facilities developed to serve no less than two customers. It may be completely independent of the main grid (isolated) or linked to the grid through a connection with a distribution licensee (interconnected).	• Mini-grids with > 100kW of distributed power and up to 1MW generation capacity require a Permit issued by NERC. [Application process takes about 30 days] • Mini-grids with distribution capacity of 100kW and below require simple registration with NERC. They may also obtain a mini-grid permit from NERC, but this is optional.	• Small electricity generators can liaise with mini-grid operators for the supply of electricity, provided the generation capacity does not exceed 1MW. A generation licence will be required for this purpose. • End users in unserved and underserved communities have the option of entering into agreements with mini-grid developers for the supply of electricity. • Mini-Grid developers are not required to obtain licences for their activities. They may also receive assistance from the REA in the form of financing, access to data and assistance with obtaining permits.

03 Independent Electricity Distribution Network (IEDN). [See **Independent Electricity Distribution Networks Regulations 2012**]

DESCRIPTION	FORMALITIES	BUSINESS OPPORTUNITIES
A distribution network that is not connected to the transmission system and is licensed by NERC to operate in a geographical location that is either not served by an existing distribution company, or is inadequately served by the distribution company within that location. IEDNs are classified into isolated off-grid rural IEDNs, isolated urban off-grid IEDNs and embedded IEDNs. Embedded IEDNs are connected to the transmission network through a Distribution Company.	Requires issuance of a distribution licence by NERC (application process takes approximately 6 months)	• Industries located in rural areas can connect to isolated off-grid rural IEDNs instead of either developing their own power plants, or moving their businesses to urban areas (incurring higher costs for property and transportation of materials) in order to be connected to power supply. • Generation companies currently supplying DisCos can evacuate excess electricity through independent distribution networks. • Independent Power Producers can also increase their revenue by selling power to IEDNs. • The deficit in electricity supply provides an opportunity for Independent Electricity Distribution Network Operators (IEDNOs) to establish distribution networks in unserved areas.

RURAL ELECTRIFICATION AGENCY (REA)



The Rural Electrification Agency has also introduced initiatives aimed at providing electricity to rural areas using off-grid power solutions.

PROJECT	SUMMARY	FUNDING
Nigeria Electrification Project (NEP)	The NEP is a Federal Government Initiative being implemented by the REA. The purpose of the Project is to provide access to electricity to homes, Micro Small and Medium Enterprises (MSMEs) in rural areas across the country using renewable energy sources.	The Africa Growing Together Fund.
Energising Education Programme (EEP)	This Programme aims to provide clean electricity to 37 Federal Universities and & University Teaching Hospitals. It includes the development of independent power plants, provision of street lighting and training centres on renewable energy in each university. The Programme is to be implemented in phases; the first phase aims to provide electricity to 9 universities and 1 teaching hospital using solar or gas-fired captive power plants.	The first phase of the Programme is to be wholly government funded while subsequent phases will receive funding under the Nigeria Electrification Project.
Energising Economies Initiative (EEI)	This initiative is aimed at supporting the provision of off-grid solutions to small businesses in the private sector, particularly in markets and shopping complexes	The Initiative is funded by the Rural Electrification Fund.

ELECTRICITY PRICING

The EPSRA requires NERC to regulate the tariffs chargeable for transmission, distribution and system operation activities. NERC may also regulate the tariffs for electricity generation and trading if NERC considers the regulation of such tariffs necessary in order to prevent the abuse of market power.

In the exercise of its power, in 2008, NERC developed a pricing model for the electricity industry. The model is the Multi-Year Tariff Order (MYTO), which is to be used for the determination of tariffs for electricity generation, transmission and retail for 15 years, with minor and major review bi-annually and every 5 years respectively. MYTO is based on the revenue requirement of existing operators and new entrants. At the heart of MYTO is the calculation of electricity prices on the basis of the revenue requirements of the Nigerian Electricity Supply Industry (NESI).

In 2012, a year earlier than required for a major review, NERC replaced the 2008 MYTO with the 2012 MYTO (MYTO 2) and split it into MYTO for Generation, MYTO for Transmission and MYTO for Distribution/Retailing. The rationale for MYTO 2 was to aid the transition of the industry from wholly owned government utilities to privatised utilities and, ultimately, to move the electricity industry to a market based system where electricity generators and retailers will be free to contract on a bi-lateral basis.

MYTO 2 was designed to incentivise new investment inflow and to enable investors earn an appropriate return on capital invested.

MYTO for Generation

MYTO 2 for Generation determined that the generation price to be paid to all generators would be benchmarked on the life cycle costs of an efficient new entrant generator who sells to the grid. The new entrant will be an Open Cycle Gas Turbine (OCGT) Plant. The OCGT plant was chosen because of the abundance of gas and the relatively low cost of gas in Nigeria. In order to enable a healthy energy mix, MYTO 2 for Generation allows coal fired-plants and renewable energy plants. The tariff model developed wholesale prices calculated through separate LRMCs for Successor Gas Power Plants, New Entrant Gas Power Plants, New Entrant Coal Plants, Successor Large Hydro Plants, Feed-in Tarifff for Small Hydro Plant, Feed-in Tariff for Land Mounted Wind Power Plant, Feed-in Tariff for Solar Power Plant and Feed-in Tariff for Biomass Power Plant. Feed-in Tariff (FIT) will only apply to energy generated by qualifying renewable energy sources. Qualifying renewable energy sources are biomass, onshore wind power, ground mounted solar PV with no tracking and small hydro producing less than 30MW. MYTO 2 for Generation has capped the application of FIT to energy from qualifying renewable sources not exceeding, in aggregate, 10% of total energy sent to the grid. The cap will remain until the Federal Government policy on energy mix is established.

MYTO for Transmission

MYTO 2 for Transmission requires those using transmission services to be subject to a connection charge (applicable only to new generators), a transmission use of system (TUOS) charge which is payable by distributors/retailers, and a loss factor

applied to generation. New generators who site their plant at distances above 1km from TCN main line are required to invest in the provision of transmission infrastructure for purposes of connecting to the grid. Such generator will recover the construction cost from the connection charge. TUOS charge is structured to cover the transmission system's fixed charges including existing and forecast capital costs, allowance for a return on capital, depreciation and efficient operating costs. The TUOS charge is uniform throughout Nigeria. Transmission losses will vary based on the location of each generator relative to load centres and, annually, depending on load growth and location of new generation.

MYTO for Distribution

MYTO 2 for Distribution consolidates the 19 consumer classes obtainable under the 2008 MYTO to 5 consumer classes namely – residential, commercial, industrial, special and street lighting. The key inputs into the distribution tariff calculation are:

i. the valuation of distributors' assets using the Gross Replacement Cost Method;
ii. the projected generation capacity to the national grid;
iii. the various losses at various stages of the electricity value chain including transmission loss and the aggregate technical, commercial and collection (ATCC) loss;
iv. the capacity allocation factors to be used to determine the percentage of energy that each distribution company is obliged to take from the total energy available on the national grid;
v. the estimated share of power generation, transmission and distribution to be borne by each distribution company;
vi. institutional charges to be paid to the system operator, the market operator, NBET, NERC and other regulatory panels established under the Market Rules, Grid Code, metering Code, etc.;
vii. generation allocation balancing mechanism; and
viii. the tariff subsidy by the Federal Government of Nigeria.

There are certain key assumptions that underpin the MYTO 2. These include assumptions related to gas price, generation load projections, inflation rate which is assumed not to exceed 13%, Naira/US$ exchange rate which is assumed not to exceed N198 to $1 by 2016. It should be noted that a number of these key assumptions and the generation load projections which constitute important input in the MYTO 2 models do not match with current realities.

MYTO 2.1

On January 1, 2015 significant amendments were made to MYTO 2 through a minor amendment to MYTO 2 and published as MYTO 2.1. The amendments were made to reset the ATCC loss obligations of the distribution companies and to adjust some of the assumptions that underpin MYTO 2 to reflect the then present realities.

MYTO Implementation Challenges

Exchange rates – the cost of electricity supply in Nigeria is, largely, in dollars because the equipment and expertise required for electricity generation and supply are mostly sourced from outside Nigeria. Thus, under the MYTO model, electricity is priced in dollars while payments are made in Naira. In order to address the exchange rate risks, MYTO 2 requires that the Naira conversion of electricity price be made at 1% premium above the Central Bank of Nigeria (CBN) rates. MYTO 2 exchange rate forecasts for years 2012 to 2016 range from N161/$1 to N196/$1. It should be noted that by virtue of the minor review of MYTO 2 published in MYTO 2.1, the exchange rate that was used to calculate the existing consumer tariffs is N166.15/$1.

While N166.15/$1 was reflective of the CBN rate in 2014, the CBN exchange rate has since increased by almost 100%. Yet, consumer tariffs chargeable by the distribution companies remain unchanged. The exchange rate distortion is further worsened by the fact that while NBET, under its PPAs, pay generators on the basis of the current CBN rate, distribution companies who collect the tariffs that are shared down the entire power sector value chain, are only allowed to charge tariffs calculated on the basis of N166/1$ approved under MYTO2.1. Another exchange rate related issue, is that power generators who are paid for power generation based on the CBN rates, are unable to purchase dollars at the CBN rate (due to the multiple exchange rates in Nigeria) to settle their dollar obligations.

Regulatory issues – one of the major challenge that has plagued the power sector has been the difficulty of

faithful implementation of the MYTO 2 model. For instance, the decision to remove fixed charges that electricity consumers were required to pay under the MYTO 2 model (the fixed charges recover the capital cost and fixed operations cost such as maintenance of poles, cables, transformers, etc). In 2014 NERC, first, reduced the fixed charges and, eventually, in December 2015, completely removed fixed charges from the electricity consumer charges and, instead, energy charges were increased. There was another instance when NERC removed collection losses as part of the items used in calculating electricity tariff. This regulatory action, before it was reversed in February 2016, resulted in a significant increase of debts accumulated across the electricity supply chain.

Ineffective contracts throughout the power chain: Different types of contracts have been signed by different participants in the power sector to give effect to different transactions in the sector. Such contracts include, gas offtake and transportation agreements, grid connection agreements and power sale agreements. Currently, gas is being supplied to power plants which, in turn, supply power to the grid and distribution networks. However, many of the contracts, signed across the electricity chain, remain ineffective.
Because the contracts are not effective, it has been difficult to keep parties accountable to their contractual obligations. Also, it has made it difficult for the government to enforce the performance commitments of the privatised generation companies and distribution companies. Contract effectiveness would instil discipline in the sector, enable existing contractual dispute to proceed to arbitration for settlement, and boost confidence.

Insufficient generation: a key assumption in the MYTO 2 financial model is the generation load projections projected to be supplied to the national grid between 2012 to 2016. The figures range from 30,715GwH in 2012 to 59,034GwH in 2016. The 2018 NERC quarterly report for Q3 2018 indicates that the load generated for Q3 2018 is about 8.07GwH. This indicates that the load generation capacity is far below the projections for year 2016. The generation and dispatch of insufficient load to the National Grid will affect a proper implementation of the MYTO model.

GAS TO POWER

Gas is the major fuel utilised for large scale power generation in Nigeria. It is estimated that power generation utilises 70% of gas supplied to the local market in Nigeria. Under the Domestic Gas Supply and Pricing Regulations 2008, the price of gas sold for power generation generated to the national grid is regulated and is as specified by the Minister of Petroleum.

The price has ranged from $0.5/mmbtu in 2008 to the current price of $2.50/mmbtu. Amendments are currently being proposed for the Domestic Gas Supply and Pricing Regulations 2008. A key part of the amendment is capping the price of gas to power at the Export Parity Price (EPP). The EPP price is the price at which upstream producers sell gas for export. If the amendment is implemented, it may lead to a reduction of the price of gas for power generation, and may bring an end to the power of the Minister of Petroleum to set the prices at which gas is supplied for power generation.

A generator that wishes to procure gas for power generation is required to apply to the Gas Aggregation Company of Nigeria Ltd (GACN). GACN will assess the gas requirement of the applicant and, if GACN is satisfied, it will issue a Gas Purchase Order (GPO) to the generator. The generator will on the basis of the GPO commence negotiation for gas supply with the gas supplier mentioned under the GPO.

RECENT DEVELOPMENTS

Regulatory Developments

NERC, as the chief regulator of the power sector, is responsible for promoting a more efficient and competitive electricity market. To this end, NERC has taken steps to introduce measures geared towards achieving a healthier, more competitive and reliable market. Some notable measures that were introduced this year include the proposed Distribution Franchising Regulations.

The Consultation Paper on Distribution Franchising introduces a concept whereby unserved or underserved communities within a DisCo's franchise area are served by a franchisee operating under the DisCo's distribution licence. This arrangement is structured such that a DisCo can engage the services of a franchisee that would be responsible for providing distribution infrastructure to customers who are currently underserved. The franchisee may supply power purchased from the DisCo, or purchase power from an embedded generator and sell to the customers at a premium. The franchisee would be responsible for providing meters to the customers within its sub-franchise area. NERC has called for comments on the proposed Regulations and has held a public consultation in this regard, but is yet to issue the final Regulations.

Another initiative from NERC is the proposed cap on estimated billing. The Consultation Paper on Capping of Estimated Billing aims at discouraging the use of estimated bills by ensuring that customers without working meters are not charged beyond a specified amount. This initiative is aimed at encouraging DisCos to meter their customers so that the bills are based on verifiable information. The Consultation presented three different methods of arriving at the cap to be applied to different classes of customers in different locations. NERC is yet to issue the final Regulations.

Finally, NERC has issued a Consultation Paper on Competition Transition Charges (CTC). Under the EPSRA, after the declaration of Eligible Customers, the Minister of Power may direct NERC to impose competition transition charges on eligible customers. The purpose of the charge is to compensate DisCos for loss of revenue occasioned by the exit of eligible customers from its distribution network. The EPSRA further provides that the decision on Competition Transition Charges shall be subject to public consultation by NERC. The Charge is to be subject to proof that the DisCos are unable to get alternative offtakers within the same tariff class as the existing eligible customers. Under the proposed guidelines, the Charge is to be calculated on the basis of costs that may no longer be recoverable within the earlier projected timeframe. The Consultation Paper also provides for the procedure for filing a claim for CTC by the DisCos. NERC is yet to hold a public consultation on this Paper.

Industry Developments

There has been some developments and initiatives within the Nigerian electricity supply industry. These include the Rural Electrification Agency's (REA) Energising Economies and Energising Education initiatives aimed at deploying off-grid power plants in universities, teaching hospitals and MSMEs.

With respect to the Energising Economies Scheme, the Sura market complex, Ariaria market and Sabon Gari market are the pilot projects which are under the auspices of the scheme. With regards to the Energising Education Programme (EEP), nine universities are included in the pilot phase of the project, and solar hybrids and gas fired power plants will be deployed to increase electricity in these universities. In addition, the REA has introduced the STEM program, under the auspices of the EEP, which is aimed at promoting gender main streaming in the energy sector. The STEM program is an internship program for Nigerian female STEM students, and currently includes 180 STEM students across nine federal universities in Nigeria.

Other developments in terms of new generation is expected to be implemented in 2019, such as the inclusion of an additional 240 MW capacity to the Afam power plant, the 40MW Kashimbilla Hydroelectric Plant, the implementation of the N9.8 billion Mambilla hydro power project and the 215 Kaduna Gas LNG project under the auspices of the Nigerian Electricity and Gas Improvement Project of the Federal Ministry of Power.

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