



# 2020 – 2024 PERFORMANCE IMPROVEMENT PLAN

**Abuja Electricity Distribution Plc  
2019**

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## List of Abbreviates

<b>NEMSA</b>	<b>National Emergency Management Service Agency</b>
NEPA	National Electric Power Authority
NERC	Nigerian Electricity Regulatory Commission
NESI	Nigeria Electricity Supply Industry
NESREA	National Environmental Standards and Regulatory Enforcement Agency
NITDA	National Information Technology Development Agency
ODS	Operational Data Store
OMS	Outage Management System
OPEX	Operational Expenditure
PCBs	Polychlorinated biphenyls
PCC	Public Complaints Commission
PHCN	Power Holding Company of Nigeria
PIP	Performance Improvement Plan
PPE	Personal Protection Equipment
PPM	Prepaid Meter
PSRP	Power Sector Recovery Program
RMSHE	Risk Management, Safety, Health & Environment
RPU	Revenue Protection Unit
SCADA	Electrical Supervisory Control & Data Acquisition
SWOT	Strength Weakness Opportunity and Threats
TCN	Transmission Company of Nigeria
USTDA	United States Trade and Development Agency
VVO	Volt-var optimization
WMS	Work Management System

## Executive Summary

The Performance Improvement Plan (PIP) is essentially a Business Plan and Strategy Document detailing the necessary projects and initiatives required to meet set performance benchmarks as committed to by the Discos for the five (5) year period from 2020 through to 2024 and associated CAPEX and OPEX.

This document, the PIP has been prepared as an update to the Business Plan earlier submitted to the Bureau of Public Enterprises in 2012 as part of KANN Utility's successful bid for the acquisition of 60% equity stake in Abuja Electricity Distribution Plc (AEDC).

This PIP has been prepared with deeper insights to update the assumptions used in earlier versions of the Business Plan based on observed facts and realities given actual operations of the utility since November 2013 as a private sector led company.

In preparing the PIP, new assumptions have been made for key inputs while existing ones were revalidated. This is necessary given that the PIP is expected to guide management and operations of the utility for the next five (5) years starting from 2020 through to 2024. It is also important that a clear road map and resource requirement are developed and communicated as necessary for AEDC to achieve its goals and deliver on commitments entered at the time of privatisation of the utility.

As part of the development process for the PIP, several strategy sessions including external consultations were conducted engaging all echelons within the business for input and innovation. It is AEDC's philosophy for effective strategy implementation to adopt an all-involving bottom-up approach to strategy development.

### Business Overview and Highlights

AEDC has the Franchise to distribute electricity across four (4) states namely: Kogi, Niger, Nasarawa States and the Federal Capital Territory. To devolve responsibility from the Head Office to regional offices for quicker decision making, a regional structure was developed based on geographical placements of the field offices in addition to other business considerations. Even though central coordination is still provided from the Head Office located in Abuja, field offices are coordinated through established regional offices with direct responsibilities for the area offices under them.

The condition of the AEDC network is mixed. While on the one hand, the company inherited a well-planned electricity distribution network within Abuja capital city, the situation is not quite the same across other states within the franchise area. The network infrastructure is particularly challenging in the sprawling unplanned settlements around the capital city and in the largely rural areas across the distribution zone. AEDC operates across four states of the federation (Kogi, Abuja, Nasarawa and Niger) over a land mass of 133,000km Sq. comprising of 7907.5 km of 33kV and 5627.7 km of 11KV line making a total of 13,535.2km of medium voltage lines.

AEDC has 157 units of injection substations supplied from the Transmission Company of Nigeria (TCN) across 18 interface transmission stations. The total installed AEDC injection capacity is 2,481MVA interfacing TCN's installed capacity of 1,785MVA. Per the MYTO allocation and Vesting contract, AEDC is entitled to 11.5% of the total generated energy per time within the network.

The Demand Study forecasts conducted in the year 2019 indicate that total demand on the network is 1062.74MW, and subsequently 1,129.4MW, 1,200.63MW, 1,276.92MW, 1,353.21MW and 1,429.50MW for years 2020, 2021, 2022, 2023 and 2024 respectively. Given this growth in capacity, AEDC will require significant investment in the network to adequately plan for the increased demand within the network over the next 5 years to reduce losses in tandem with its Performance Agreement loss commitments.

Despite the challenges in the sector, AEDC has recorded improvements in a number of areas. For the past four years, AEDC has received on average 14.23% of total energy generated nationally. This is 2.73% more

than the MYTO energy allocation of 11.5%. Notwithstanding, the increased energy intake, AEDC has consistently reduced ATC&C loss year on year since 2015. Wholesale unit cost of energy in has increased by 77% since 2015. While retail tariffs have only improved by 23% in the same period. This mismatch in wholesale cost of energy versus the retail electricity tariff has played a significant role in compounding the liquidity challenge in the sector.

Following the MAP regulation issued by NERC, AEDC flagged-off the Meter Asset Provider (MAP) program in compliance to regulatory expectations. The Company was one of the first DISCO to implement the program with about 26,000 meters installed as at August 2019 from inception of the program. Implementing the initiative, the Company partners with three MAP vendors to deploy meters in Abuja and Kogi; Nasawara; and Niger respectively.

AEDC is embarking on its transformation plan to attain loss reduction commitments. The three (3) key stages from stabilization to normalization and then world class much in line with our vision to be a world-class utility to deliver power 24/7. The transformation of the utility will be staggered and implemented in phases given the huge resources required and financial constraints. This approach is also expedient given the tariff implication of implementing the world-class utility objective too quickly ahead of noticeable service improvement by the customer.

#### PIP Development Methodology

AEDC PIP Development Methodology involved the analysis of three (3) scenarios to render the loss reduction commitments per investments provisions:

1. Pessimistic: This scenario assumes the allowable CAPEX and OPEX per MR MYTO 2019. The analysis suggests that improvement in ATC&C loss reduction is limited at these levels.
2. Base case: Analysis of actual commercial and technical investment requirement, to realistically achieve significant loss reductions and keep tariff within a range as to avoid tariff shock for the customers.
3. Optimistic: Analysis of actual commercial and technical investment requirement, to loss reduction according to the Performance Agreement.

The base case scenario involved the identification of performance improvement Initiatives including technical, commercial and other relevant interventions to realise loss projections. To arrive at the qualifying projects, an Energy demand forecast and load flow analysis was carried out on AEDC feeders that interface with the TCN substation. Based on the above studies, projects were identified and an implementation program developed to address the additional capacity requirements with requisite investments.

#### Performance Improvement Plans and Initiatives

AEDC's performance improvement has been developed in detail along the following main themes:

- Technical Loss Reduction, AEDC is embarking on a number of projects over the next five years to improve the quality and reliability of power supply. The implementation of these projects will result to appreciable reduction of technical losses, improved operational performance and enhancement of customer service delivery across its franchise area.

The projects to be executed are grouped into the Network Expansion projects; Network reconfiguration/rehabilitation Network upgrade; Protection, Control & Communication and; Metering project to replace obsolete meters.

- The Commercial loss component in AEDC's overall system losses is about 15% on average. This is significant and must be addressed for the utility to be financially viable. Because of this, AEDC has incorporated into its commercial operations a number of initiatives aimed at mitigating Commercial



losses through effective commercial vigilance and revenue protection strategies. These initiatives include Revenue protection, replacement of obsolete meters, improving billing accuracy and deployment of Advanced Metering Infrastructure.

AEDC's has well-crafted Revenue Protection strategies for each of its customer categories – Large Power User Maximum Demand Customers, Un-metered Non-Maximum Demand Customers, Metered Non-maximum Demand Customers, Free riders (unregularized/undocumented energy consumers). Driven by business intelligence, revenue protection has the benefit of targeting localised loss generating segments of AEDC's network, observing customer activity from its database and the AMR platform.

- Collection Efficiency is within a range of 70% and 85%. The plan to improve this over the PIP horizon includes the implementation of the following key strategies over the PIP timeline. Some of the strategies include; robust Key Account management, full metering of MDAs including PPM installation in difficult and rigorous engagement of MAP scheme to close up the metering gap within two years in order to achieve zero % collection loss.
- Customer Care centricity is a cardinal philosophy within AEDC. In the last couple of years, AEDC invested significant resources to ensure superior customer service delivery. In our transition to becoming a world-class utility, AEDC deployed a world class contact centre with active listening capabilities. The contact centre is linked to our integrated customer management system (InCMS) – a single customer database with visible linkages for support units to work collaboratively in accelerating resolution of complaint leading to improved service delivery.

Furthermore, AEDC is exploring several innovative ideas to deliver significant improvement in its operations and ultimately loss reduction. Some initiatives including its Outsourcing Collection Strategy focused on improving collections in clusters with homogenous customer base that are fed from a common source; Minigrid Strategy facilitate the development of solutions/business models, which support the delivery of energy to augment grid supply and reduce AEDC losses in clustered underserved areas. I.e. markets, plazas, estates etc. and Abuja 24 focused on phased deployment of embedded generation and franchise model towards service improvement.

Only recently, the U.S. Trade and Development Agency (USTDA) nominated (AEDC) for a \$US1.06M grant to enable conduct studies for various grid augmentation solutions. This project will deliver business cases for pipeline projects with access to finance.

### **Outputs following PIP Interventions**

- AEDC has a projected CAPEX plan of ₦56bn over the next five years – ₦50Bn and ₦6Bn for technical and non-technical projects respectively. This CAPEX plan is expected to fund loss performance targets that have been reviewed to take into consideration the affordability of tariffs. Three (3) scenarios for setting the CAPEX limits were presented to determine realistic loss performance targets for the business.
- The projects in the CAPEX plan are expected to significantly reduce ATC&C losses in the business and boost AEDC's financial performance over the next 5 years. The business expects that a significant portion of the business proceeds will be reinvested into the business to drive further growth.
- Based on detailed financial analysis, the business has identified an optimal capital structure of 70% Debt and 30% Equity to fund the capex requirements under the PIP.
- The tariff impact of the capex requirement will result in an overall average tariff of N55.09/kwh in 2020.

- The impact of the part implementation of the Minor Review 2019, in particular, the treatment of market obligations attributable to tariff shortfalls, would significantly improve the revenue performance of the business in 2019 and restore the equity position to positive levels.
- The full implementation of AEDC's PIP would lead to significant loss reductions and improvements in power supply and reliability. Improvements in customer service delivery of
- Justification of the financial plan are detailed in section 6 - Financial Projection and Resources Mobilisation of this report.

DRAFT



# 1 Background and Introduction

## 1.1 The Nigerian Electricity Supply Industry (NESI) since 2015

In its bid to restore Macro-economic stability in the short-term, the Federal Government of Nigeria FGN launched a National Economic Recovery and Growth Plan (ERGP). The ERGP set to accomplish this objective by achieving agriculture and food security, improving transportation infrastructure, driving industrialization and ensuring energy sufficiency. Being a natural consequence of any endeavour to industrialize the economy, improving energy supply (and thus the Nigeria Electricity Supply Industry-NESI) became a focal point in the FGN's initiatives.

As a result, the FG with assistance from the World Bank created the Power Sector Recovery Programme (PSRP). The PSRP was approved by the Federal Executive Council in March 2017, with objective of:

1. Restoring the sector's financial viability;
2. Improving power supply reliability to meet growing demand;
3. Strengthening the sector's institutional framework and increasing transparency;
4. Implementing clear policies that promote and encourage investor confidence in the sector; and
5. Establishing a contract-based electricity market

It was admitted that key to ensuring viability of the NESI, market participants must respect contracts and approved electricity tariffs across the value chain must be reflective of efficient cost and allowed returns to encourage investment and sustainability. All input costs through the value chain from: generation; transmission; and distribution should be fully recovered through final end-user tariff or any other compensation mechanism. The adopted framework to guide the market by the Nigerian Electricity Regulatory Commission (NERC) is the Multi Year Tariff Order (MYTO) Methodology.

MYTO is a building block approach to tariff determination. Under this method, three (3) standard building blocks are used as basis for determining tariffs namely:

- i. **The Allowed Return on Capital Investments** – this is the return necessary to achieve a fair rate of return on investments in the business
- ii. **The Allowed Return of Capital** – this is associated with allowing investors recoup investments in assets over their useful lives (Depreciation); and
- iii. **Efficient Operating Costs and Overheads** – allowance is made for businesses to cover only efficient operating and overhead costs and as such, discourage waste.

The building block methodology is thought to create incentives for the regulated entities to out-perform the performance targets agreed with regulators at the time of setting given that the gains from efficiency improvements can be kept by the businesses before tariff review and vice versa.

Also, according to the Multi-Year Tariff Order (MYTO), once in every six-month period, limited minor reviews are permitted if there is a change greater than, or less than five percent (i.e.  $\pm 5\%$ ) in any of the following variables:

**Minor Tariff Review Input Variables:**

- i. Generation wholesale contract price
- ii. The Nigerian Inflation Rate
- iii. US Dollar (\$) to the Naira (N) exchange rate

- iv. Daily national electricity generation capacity
- v. Accompanying CAPEX and OPEX changing materially from those used in Tariff Calculation<sup>1</sup>

It is well known that there have been significant adverse changes in all the above variables in the past few years on account of the slowing down of the Nigerian economy given depressed global oil prices which ultimately led to a recession in 2016.

Despite the adverse movement in the Minor Tariff Review Input Variables, six (6) Minor Tariff Reviews were outstanding over the period 2016 to 2019. During this time, there was no adjustments to retail electricity tariffs.

The implication of not having tariffs reviewed for over three (3) years as necessary to cost reflective levels is that AEDC (and indeed all the other Distribution Companies) have carried on their business selling electricity at tariffs that do not cover business costs. This situation has unquestionably put the Discos through untold financial hardship.

As a result, the investors were not able to fund their business transformation plans as proposed to the government through the BPE at privatization. Also, non-acknowledgement of the financial implication of the non-cost reflective tariffs of Discos by the regulator through any formal channel led to impairment of AEDC's (and other Discos) Balance Sheet further constraining their ability to raise capital for their business or meet up with their obligations to the market.

It was therefore a much welcome development effective 1<sup>st</sup> July 2019 when NERC issued a minor tariff review order in line with its own rules. While this was a welcome development, given the operating landscape, a Minor Tariff Review at this time, does not go far enough to address the wider issues regarding non-cost reflective tariffs.

However, notwithstanding the Minor Tariff Reviews, a **Major Review** to tariffs under MYTO is planned after every 5 years where all inputs into tariff setting are reviewed with stakeholders.<sup>2</sup>

The acknowledgement by the Regulator of the need for an Extraordinary Tariff Review from the Discos along with a preparation of a Performance Improvement Plan (PIP) is a most welcome development in the sector.

The PIP is essentially a Business Plan and Strategy Document detailing the necessary projects and initiatives required to meet set performance benchmarks as committed to by the Discos for the five (5) year period from 2020 through to 2024 and associated CAPEX and OPEX.

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<sup>1</sup> NERC Multi-Year Tariff Order **For the Determination of the Cost of Electricity Sold by Distribution Companies/retail Companies for the Period 1 June 2012 to 31 May 2017 – 1 June 2012**

<sup>2</sup> Federal Republic of Nigeria Official Gazette No.18 Vol.94 27<sup>th</sup> April 2007 – Nigeria Electricity Regulatory Commission's – Notice of Proposed Establishment of a Methodology for a Multi-Year Tariff Order pg. B125 s.1

## 1.2 The Performance Improvement Plan (PIP)

This document, the **PIP** has been prepared as an update to the Business Plan earlier submitted to the Bureau of Public Enterprises in 2012 as part of KANN Utility's successful bid for the acquisition of 60% equity stake in Abuja Electricity Distribution Plc (AEDC).

This PIP has been prepared with deeper insights to update the assumptions used in earlier versions of the Business Plan based on observed facts and realities given actual operations of the utility since November 2013 as a private sector led company.

In preparing the PIP, new assumptions have been made for key inputs while existing ones were revalidated. This is necessary given that the PIP is expected to guide management and operations of the utility for the next five (5) years starting from 2020 through to 2024. It is also important that a clear road map and resource requirement are developed and communicated as necessary for AEDC to achieve its goals and deliver on commitments entered at the time of privatisation of the utility.

As part of the development process for the PIP, several strategy sessions were conducted engaging all echelons within the business for input and innovation. It is AEDC's philosophy for effective strategy implementation to adopt an all-involving bottom-up approach to strategy development.

At several times, strategy sessions were facilitated sometimes inviting external facilitators to anchor the review sessions while some other sessions were internally coordinated depending on the objective and participants.

Outputs from the strategy review sessions involved carrying out the internal and external environmental assessments of the business, performing a Strength Weakness Opportunity and Threats (SWOT) analysis and developing strategic pillars and top business drivers. From the strategy session outputs, detailed action plans necessary to achieve the business strategies were formulated with timelines and KPIs for their implementation.

The PIP has been prepared in line with Nigeria Electricity Regulatory Commission guidelines that was issued to guide Distribution companies after several engagement and consultation with key stakeholders including customers; development finance institutions such as the World Bank, USAID; sector consultants and so on.

## 2 Our Current Operating Condition

### 2.1 Ownership Structure

KANN Utility Limited (KANN) made a bid for and acquired 60% equity stake in AEDC as the core investor, while the Federal Government of Nigeria (FGN) through the Bureau of Public Enterprises (BPE) retains 40% equity stake in the company.

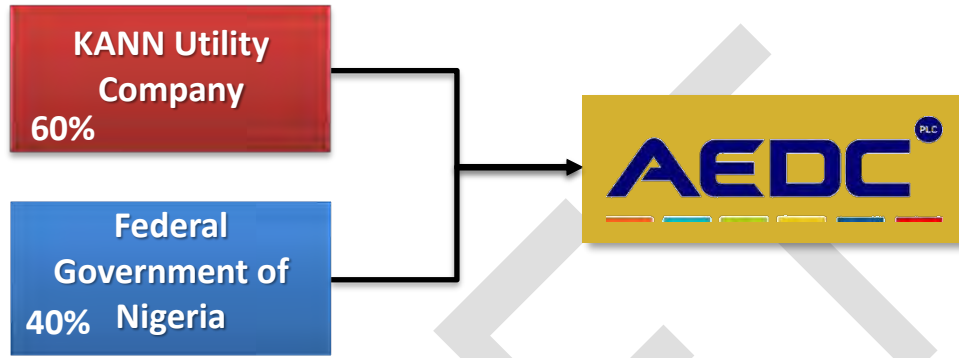


Figure 1: AEDC Share Ownership Structure

### 2.2 Vision and Mission Statements

In the first quarter of 2014, the board and management of AEDC held a joint workshop at which the company values, vision and mission statements were redefined to kick start the transformation process for the new AEDC.

To lead the transformation of AEDC from a public-sector utility to a private sector led efficient utility, the following vision and mission statements were developed along with the core values:

Vision	Mission	Values
To be a world class utility, delivering power 24/7	To make our customers happy, deliver power to every home & business	Honesty & Integrity Teamwork Innovation Community Relationship Customer Service

Figure 2: Our Vision, Mission and Values

## 2.3 Board Composition and Organisational Structure

### 2.3.1 Corporate Governance

In line with good corporate governance practices, AEDC has a properly constituted Board of Directors and Board committees that oversee management and direct key decisions of the company. The Board membership and Board Committees are as follows:

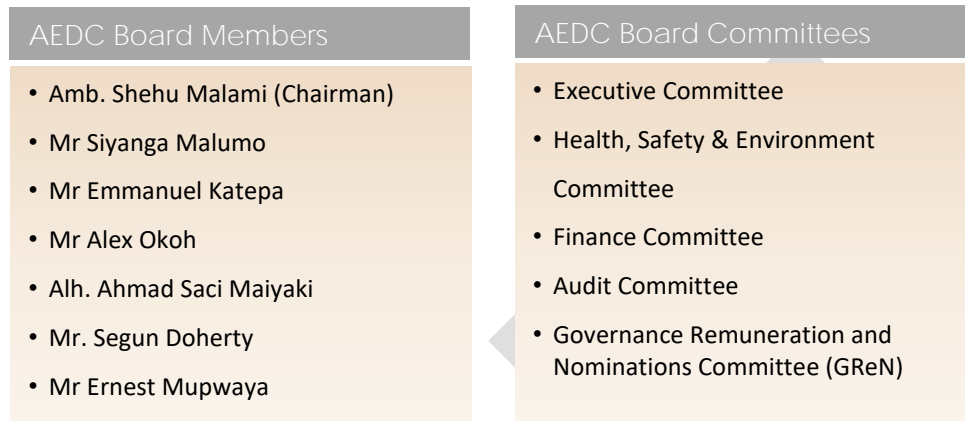


Figure 3: Corporate Governance

### 2.3.2 Organisational Structure

AEDC’s executive management comprises of an Executive Management Team led by the Managing-Director/CEO and nine (9) other “c-level” executives. Together they oversee all aspects of the business and are comprised as follows:

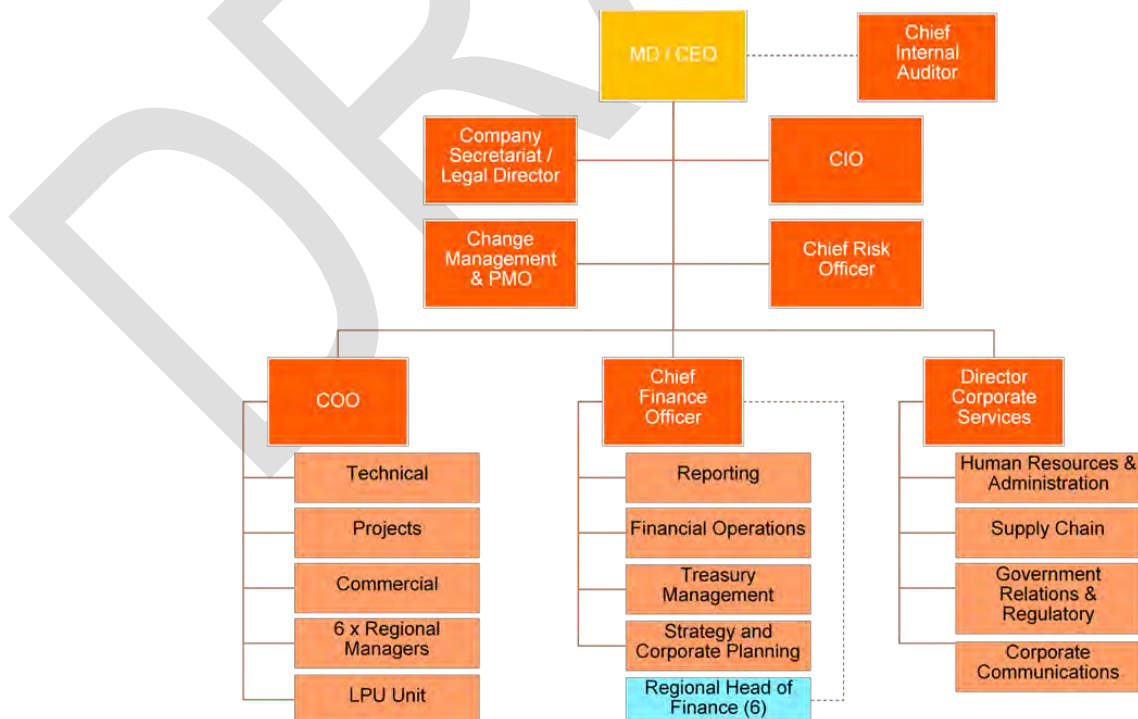


Figure 4: AEDC Organisational Chart

### 3 Business Overview and Highlights

#### 3.1 AEDC Franchise Area

AEDC has the Franchise to distribute electricity across four (4) states namely: Kogi, Niger, Nasarawa States and the Federal Capital Territory.

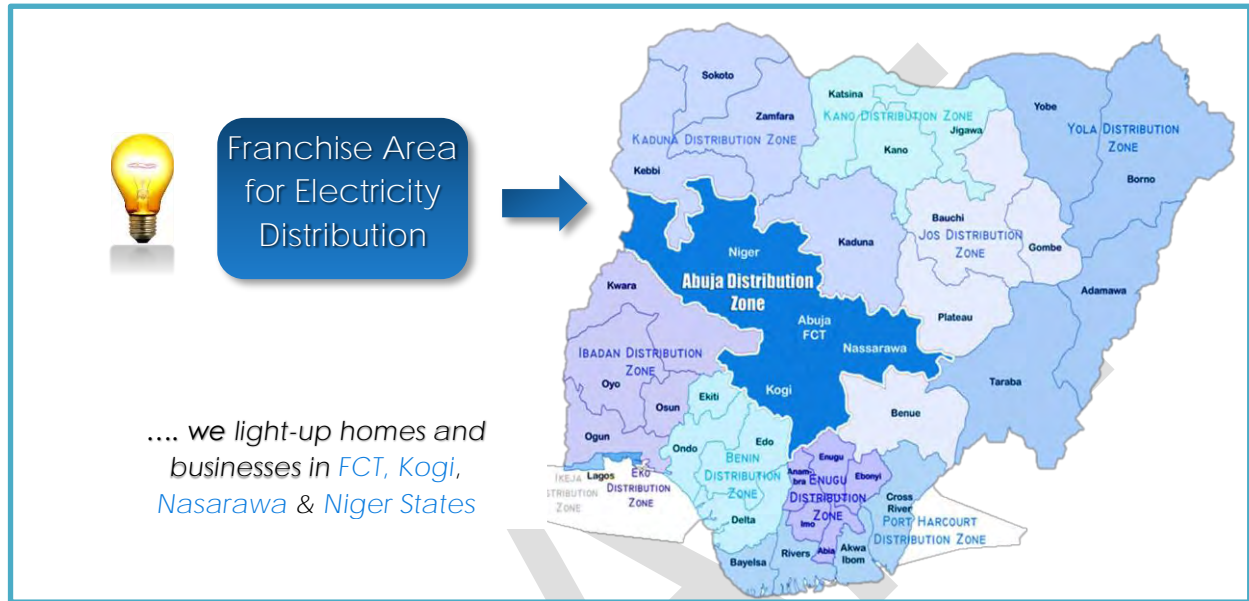


Figure 5: AEDC Franchise Area

#### 3.2 Business Operating Structure

To devolve responsibility from the Head Office to regional offices for quicker decision making, a regional structure was developed based on geographical placements of the field offices in addition to other business considerations.

Even though central coordination is still provided from the Head Office located in Abuja, field offices are coordinated through established regional offices with direct responsibilities for the area offices under them.

There are currently eight (8) regional offices coordinating the activities of thirty-four (34) area offices. The cluster of the Area offices are for administrative convenience and follows the network as best as possible and not entirely consistent with the geography of each of the states. AEDC Regional and Area Offices are as shown below:

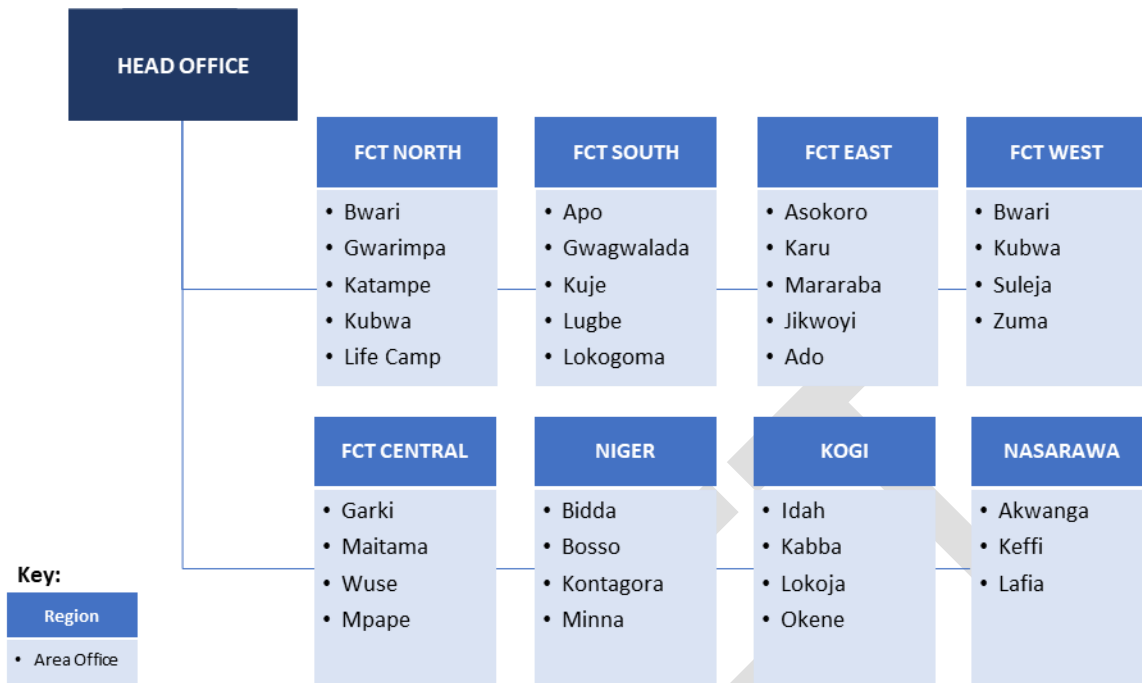


Figure 6: AEDC Business Offices Configuration

In addition to the above, further coordination is achieved through dedicated service centres attached to area offices. Service centres are created to take services closer to the customer. The Service Centre is the smallest administrative unit of the business and there are over **254** service centres attached to the **34** Area offices in AEDC.



### 3.3 Network Infrastructure Review

#### 3.3.1 Current Network Infrastructure

The condition of the AEDC network is mixed. While on the one hand, the company inherited a well-planned electricity distribution network within Abuja capital city, the situation is not quite the same across other states within the franchise area. The network infrastructure is particularly challenging in the sprawling unplanned settlements around the capital city and in the largely rural areas across the distribution zone.

AEDC operates across four states of the federation (Kogi, Abuja, Nasarawa and Niger) over a land mass of 133,000km Sq. comprising of 7907.5 km of 33kV and 5627.7 km of 11KV line making a total of 13,535.2km of medium voltage lines.

*AEDC has electricity distribution responsibility for 15% of the entire country by land area.*

AEDC has 157 units of injection substations supplied from the Transmission Company of Nigeria (TCN) across 18 interface transmission stations. The total installed AEDC injection capacity is 2,481MVA interfacing TCN's installed capacity of 1,785MVA. Per the MYTO allocation and Vesting contract, AEDC is entitled to 11.5% of the total generated energy per time within the network.

To enhance capacity, AEDC may need to make significant additional investment to upgrade 2,225.74km of lines and 260 nos. of relief distribution substations to reduce losses in tandem with its Performance Agreement loss commitments.

The Demand Study forecasts conducted in the year 2019 indicate that total demand on the network is **1062.74MW**, and subsequently **1,129.4MW**, **1,200.63MW**, **1,276.92MW**, **1,353.21MW** and **1,429.50MW** for years 2020, 2021, 2022, 2023 and 2024 respectively. Given this growth in capacity, AEDC will require significant investment in the network to adequately plan for the increased demand within the network over the next 5 years. Full details of the investment requirement and attendant projects are discussed on the technical section of this report in chapter 5.

While key metrics like interruption index are tracked, it is quite challenging to have a consensus around the veracity of these numbers given the absence of an Advanced Distribution Management System (ADMS), which includes an Outage Management System (OMS) or IRMS (Incident Reporting Management System (IRMS) as a sub module for fault recording.

It should also be noted that 80% of the faults within FCT and the urban centres are cleared in less than 8hrs on the average. 10% of the faults are cleared between 8 to 24hrs and only about 5% are cleared over 48hrs. The isolated instances where faults are cleared over 48hrs occur due to depletion of strategic stock or some supply logistics constraints.

State	No. of 33kV Feeders AEDC/TCN interface	Peak Load (MW)	Avg. Energy Consumption (MWh)	Nos of 11kV Transformers	Transformers Installed Capacity (MVA)	Network Length 33KV & 11KV (KMs)
1 FCT	43	610	2,307,063	10,374	3,160.8	3,938
2 Kogi	12	113	262,677	1,632	508.3	3,031
3 Niger	28	79	341,427	2,758	816.1	4,965
4 Nasarawa	8	261	655,860	1,882	500.6	1,603
<b>Total</b>	<b>91</b>	<b>1,063</b>	<b>3,567,027</b>	<b>16,646</b>	<b>4,985.8</b>	<b>13,536</b>

Table 1: Table Overview of AEDC Network Infrastructure

### 3.3.2 Technical Network Constraints

Current feeder loadings understate the true value of demand in the AEDC franchise as national power shortages mean AEDC is forced to ration power delivered to its customers. An analysis of feeder outages at the 33kV and 11kV level in 2019 revealed that feeders are unavailable due to load shedding. For a significant proportion of the time, at least 10% and a maximum of 42% over the period analysed. Hence, AEDC's ability to delivery power to customers is limited.

It is however pertinent to mention that not all load shedding are solely due to AEDC operations, there is 696MW mismatch between AEDC and TCN in terms of available capacity, therefore limiting the energy that can be delivered to AEDC network area. More so, about 40% of the time, the switching operations of TCN will often warrant AEDC to open their corresponding interface feeders, hence, resulting in outages which are not necessarily as a result of faults or planned outages.

Also, some TCN stations are located far from AEDC load centres resulting in higher than normal technical losses due to lengthy 33kV feeders. To mitigate this, part of the PIP projects involves upgrading the conductor size/construction of alternative feeders from the same TCN stations.

### 3.3.3 AEDC's Transformation Journey

The transformation of AEDC will span across three (3) key stages from stabilization to normalization and then world class much in line with our vision to be a World-class utility to deliver power 24/7.

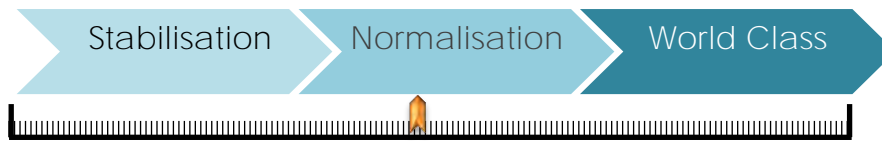


Figure 7: Three (3) Stages of AEDC's Business Evolution

Stage one is to **Stabilise** the business. AEDC at takeover in November 2013 was an unsustainable entity, with poor safety performance, high losses and a tariff that was not sufficient for the business to meet its obligations to its customers and suppliers, let alone provide a return to its shareholders. It was therefore imperative that the business is stabilised before meaningful transformation can commence.

The second stage after stabilisation, is **Normalization**. This is the stage that normal operations of a healthy and prudently run utility are established. The business must at least meet minimum performance and sustainability criteria at this stage.

The third stage is to become a **World-class utility**. At this stage, AEDC will deliver more value than just reliable electricity supply to its customers. It will lead innovation and sustainable partnership with the community in which it operates and create value for all stakeholders.

#### 3.3.3.1 Staggered Implementation of Transformation

The transformation of the utility will be staggered and implemented in phases given the huge resources required and financial constraints. This approach is also expedient given the tariff implication of implementing the world-class utility objective too quickly ahead of noticeable service improvement by the customer.

#### 3.3.4 Asset Management Philosophy

Critical to the sustainability of any utility is the effectiveness of its Asset Management practice. The utility can only achieve its objectives if its operating assets are in the right condition to deliver value. Asset Management in AEDC consists of translating the organisation's objectives into asset-related decisions, plans and activities, using a risk-based approach. Good Asset Management practice is not about managing asset but rather it is about:

- ensuring that assets deliver value
- achieving the organisation's objectives
- mitigating risks

The Asset Management challenge in AEDC is the delicate act of trying to find balance by trying to manage resource constraints to improve the performance of physical assets.



Figure 8: Asset Management Reality

### Network Asset Maturity Level

Given the appropriate resources, AEDC seeks to further improve on its level of maturity with regard to Asset Management practices migrating from the Stabilisation stage to Preventing stage and ultimately Optimising.

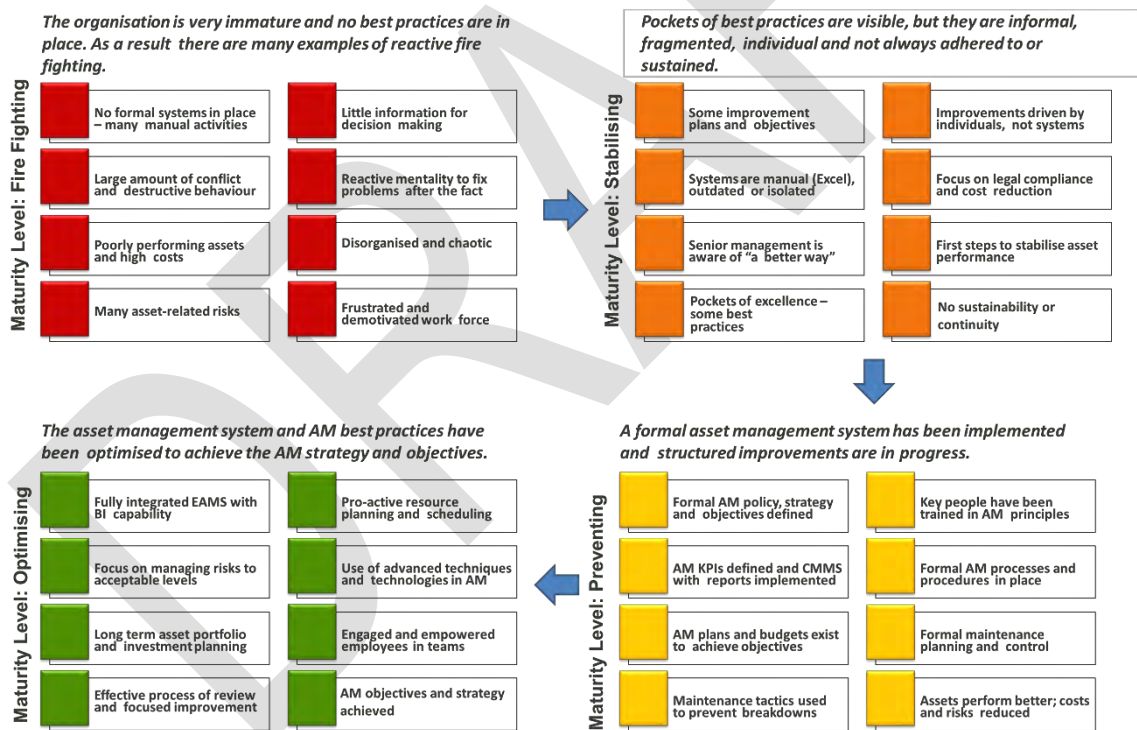


Figure 9: Four Stages of Network Asset Management Maturity

<sup>3</sup> Source: Aurecon Asset Management

## 3.4 Other Key Business Highlights

### 3.4.1 AEDC Franchise Area Demography

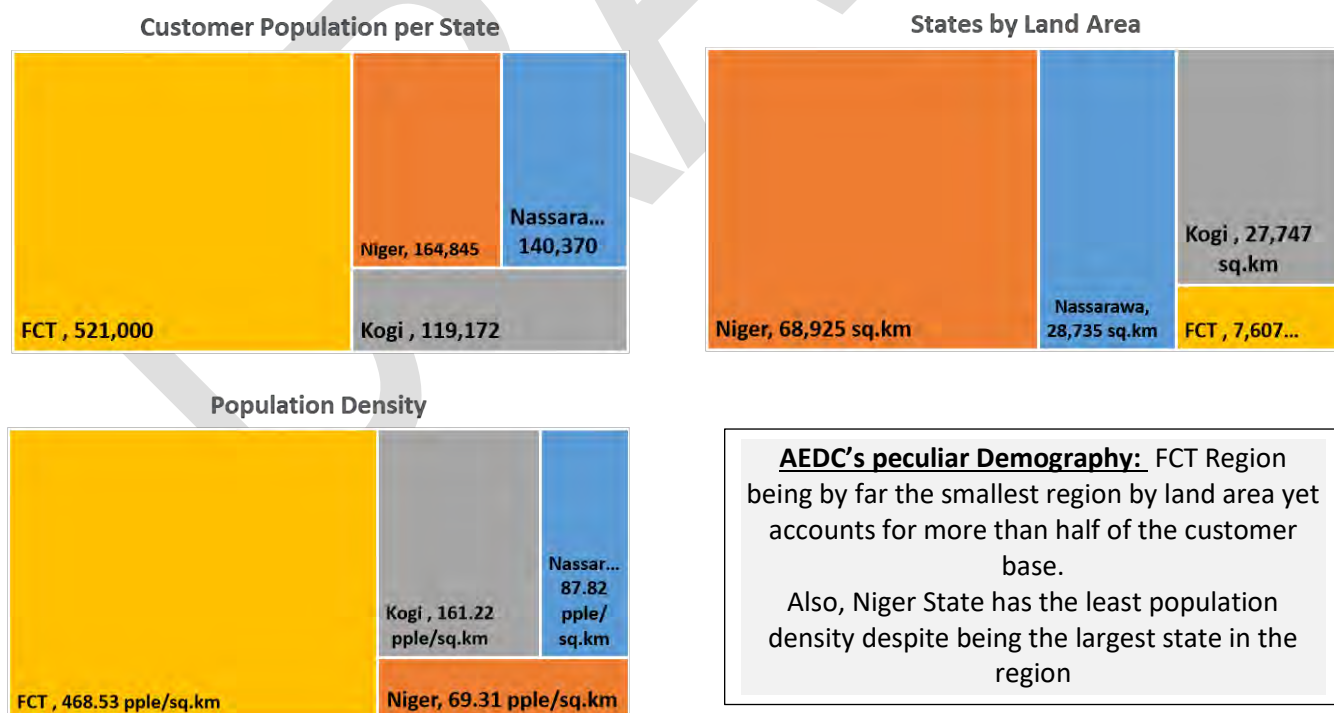
AEDC's distribution area covers four states and below are highlights of some demographic features within the AEDC distribution area.

Item	Unit	Nassarawa	Niger	Kogi	FCT	Total
Population <sup>1</sup>	Nos.	2,523,395	4,777,488	4,473,490	3,564,126	<b>15,338,499</b>
Land area, sq. km <sup>1</sup>	sq.km	28,735	68,925	27,747	7,607	<b>133,014</b>
Population density, people per sq. km <sup>1</sup>	ppl/sq.km	87.82	69.31	161.22	468.53	
Unemployment rate <sup>1</sup>	%	27.4	11.7	19.7	24.4	
Literacy rate <sup>1</sup>	%	52.9	60.1	62.8	67.0	
Infant mortality <sup>1</sup>	%	68.21	47.45	44.39	59.07	
Household size <sup>1</sup>	persons	5.5	5.9	3.1	4.5	
No. of Households <sup>2</sup>	Nos.	458,799	809,744	1,443,061	792,028	<b>3,503,632</b>
Customer population <sup>2</sup>	Nos.	140,370	164,845	119,172	521,000	<b>945,387</b>
Electrification Rate Estimate <sup>2</sup>	%	30.60%	20.36%	8.26%	65.78%	<b>26.98%</b>

Source: <sup>1</sup>National Bureau of Statistics <sup>2</sup>Company estimates and adjustments

Table 2: Demographic features of AEDC Supply Areas

A snap shot of the customer and related commercial services data are as follows:



**AEDC Franchise Area is a Mix of Densely Populated Urban Area and Sparsely Populated Rural Communities**

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### 3.4.2 Commercial Performance and Operating Highlight

Despite the challenges in the sector, AEDC has recorded improvements in a number of areas. Some of these achievements are highlighted in the charts below:

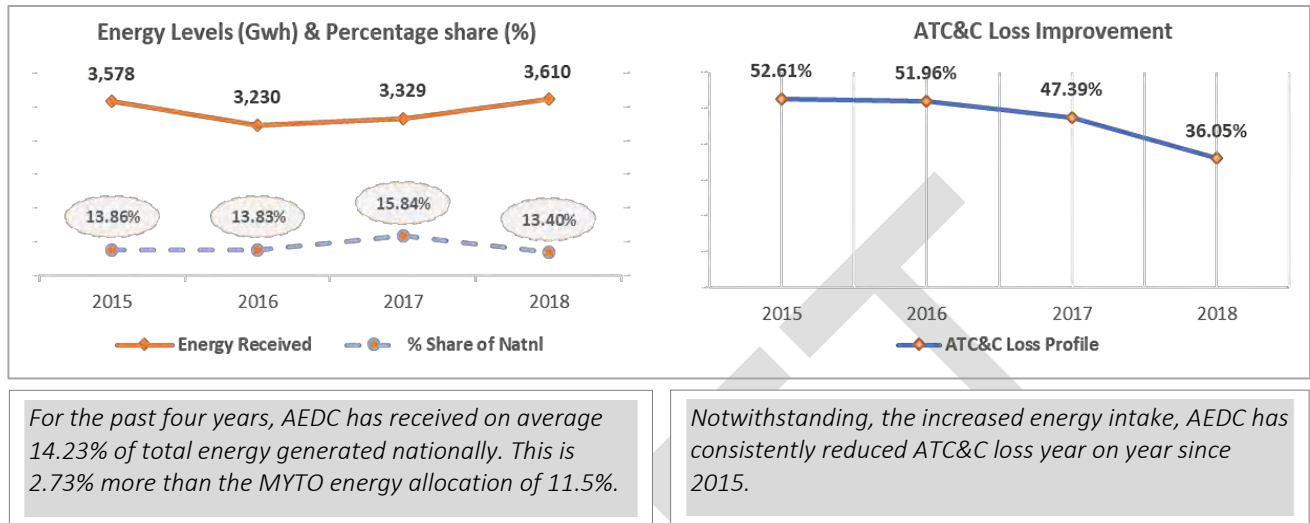


Figure 11: Years Overview of Energy Intake and ATC&C Loss Improvement

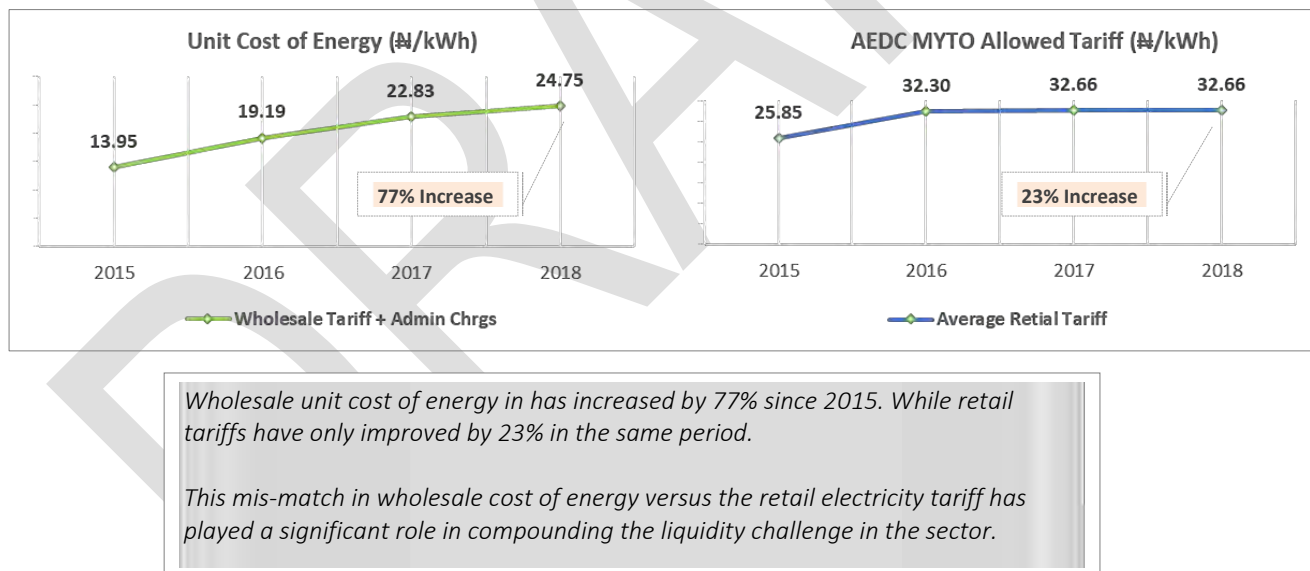


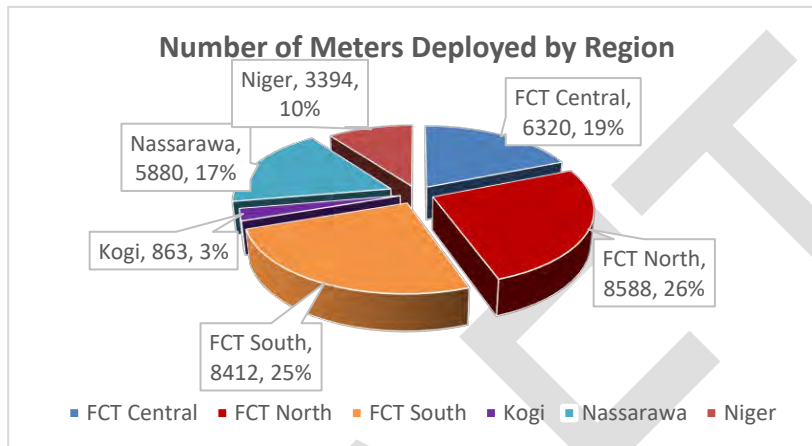
Figure 12: 2015 - 2018 Years Overview – Wholesale unit cost of Energy vs Retail tariff



### 3.4.3 Implementation of the Meter Asset Provider (MAP) Regulation.

Following the MAP regulation issued by NERC, AEDC flagged-off the MAP in compliance to regulatory expectations. The Company was one of the first DISCO to implement the program with about 33,457 meters installed as at September 2019 from inception of the program.

Implementing the initiative, the Company partners with three MAP vendors to deploy meters in Abuja and Kogi; Nasawara; and Niger respectively.



MAP OPERATION INFORMATION GATHERING FOR STRATEGIC PLANNING											
DISCO	SERVICE AREA	MAP VENDOR	YEARLY	ROLL-OUT IN PHASE (YES OR NO)	SINGLE PHASE PPM	SINGLE PHASE CREDIT	THREE PHASE PPM	THREE PHASE CREDIT	YEARLY TOTAL	TOTAL TO BE DEPLOYED BY DISCO	REMARK
AEDC	Asokoro,Garki,Karu,Maitama,wuse,Jikwoyi,Mpape,Bwari,Gwarimpa,Katampe,Kubwa,LifeCamp, Apo, Gwagwalada, Jabi, Kuje, Lugbe,Lokogoma,Idah,Kabba,Lokoja,Okene,	MAP VENDOR #1	2019	YES	82,593		11,669		94,262	867,291	
			2020	YES	141,588		20,004	161,592			
			2021	YES	141,588		20,004	161,592			
			2022	YES	47,155		6,734	53,889			
	Ado,Akwanga,Keffi,Lafia, Mararaba	MAP VENDOR #2	2019	YES	26,776		8,497		35,273		
			2020	YES	81,626		26,103	107,729			
			2021	YES	26,282		8,443	34,725			
			2022	YES	26,776		8,497	35,273			
	Bida,Bosso,Kontagora,Minna,Suleja,Zuma	MAP VENDOR #3	2019	YES	34,584		6,120		40,704		
			2020	YES	51,876		9,180	61,056			
			2021	YES	51,876		9,180	61,056			
			2022	YES	17,185		2,955	20,140			

Table 3 AEDC MAP METER DEPLOYMENT PLAN

### 3.4.4 Other Strategic Innovations within AEDC

AEDC is exploring several innovative ideas to deliver significant improvement in its operations and ultimately loss reduction. Some initiatives are briefly highlighted below:

- **Outsourced Collection Strategy:** this is focused on improving collections in clusters with homogenous customer base that are fed from a common source. This would take service delivery and commercial vigilance closer to the customer.
- **Rural Collection Strategy:** There is a dedicated strategy to deal with introduces payment discipline among customers (especially in the rural areas)
- **Human Resource Capacity:** Improving Technical Skills, Soft Skills and Cultural Re-Orientation are Crucial to Accomplishing AEDC's Strategic Objectives
- **Minigrid Strategy:** AEDC minigrid strategy is to facilitate the development of solutions/business models, which support the delivery of energy to augment grid supply and reduce ATC&C loss in clustered underserved areas such as markets, plazas, estates etc. AEDC is working with developers and development partners including the Rural Electrification Agency to pilot various interconnected minigrid models that will deliver improved service to customers.
- Abuja 24/7

Recently, U.S. Trade and Development Agency (USTDA) has empowered (AEDC) with a US\$1.06 million dollars grant to fund studies for grid augmentation solutions using renewable energy solutions. This project will provide the business case for identified project portfolios and support with access to finance.

## 4 Review of Top Business Strategies

AEDC holds periodic strategy review sessions to scan the internal and external business environments and align its strategies accordingly. At the most recent strategy review session with AEDC's top 50 staff, an analysis of the utility's internal and external environments was carried out leading to identification of the company's strengths, weaknesses, opportunities and threats (SWOT). Details of the SWOT analysis are as follows:

### 4.1 SWOT Analysis

<p><b><i>STRENGTHS OF THE DISCO</i></b></p> <ul style="list-style-type: none"> <li>• Technical expertise</li> <li>• Strong corporate governance</li> <li>• Robust ICT infrastructure</li> <li>• Good sector experience</li> <li>• Good understanding of business by core investors</li> <li>• Empowered, strong and committed executive and senior management team</li> <li>• Good understanding of the market</li> <li>• Good relationship with labour union</li> </ul>	<p><b><i>Weakness of the DISCO</i></b></p> <ul style="list-style-type: none"> <li>• Low metering level</li> <li>• Financing and liquidity risk</li> <li>• Poor network maintenance</li> <li>• Low revenue collections</li> <li>• Poor safety awareness</li> <li>• Negative public branding (NEPA/PHCN Legacy)</li> <li>• High incidence of corruption involving the workforce</li> <li>• Poor customer service at operational level</li> <li>• Resistance to change</li> <li>• Low ICT skills of operational personnel</li> <li>• Lack of commercial awareness (public sector mentality of staff)</li> <li>• Unsafe network in peri-urban area</li> <li>• Poor compliance with standard operating procedures</li> </ul>
<p><b><i>Opportunities Offered by External Factors</i></b></p> <ul style="list-style-type: none"> <li>• Large customer base</li> <li>• Good power allocation</li> <li>• Untapped demand for power</li> <li>• Opportunity to leverage technology and automate processes</li> <li>• Grid power monopoly</li> <li>• Inherited good network assets</li> <li>• Relatively well planned network especially in the FCT</li> <li>• Opportunity to receive financial support</li> <li>• Enlightened customer base</li> <li>• Building good relationship with the regulator</li> <li>• Some customers have high willingness to pay</li> <li>• Renewable energy and microgrid</li> </ul>	<p><b><i>THREATS TO THE BUSINESS (EXTERNALLY IMPOSED)</i></b></p> <ul style="list-style-type: none"> <li>• Low power generation profile from the grid</li> <li>• Regulatory uncertainty</li> <li>• Unstable macro-economic environment</li> <li>• AEDC staff impersonation (NEPA II)</li> <li>• Competition from other energy sources</li> <li>• Culture of non-payment by customers</li> <li>• Adverse effect of litigation against AEDC</li> <li>• Vandalism and sabotage</li> </ul>

## 4.2 Strategic Pillars & Drivers

The analysis of the SWOT identified several strategic issues which assisted to develop Strategic Pillars to guide AEDC’s business and set direction for policy, investment and other organisational activities.

The Strategic Pillars were also developed so that they each spoke to the a “Strategic Focus” in alignment with the Balance Score Card (BSC) Methodology to ensure strategy implementation.

The balance score card provides a representation of the organization’s shared vision. It also brings a balance between the traditional financial perspective and other non-financial elements such as customers, internal business processes and innovations/improvement. This alignment of AEDC strategic pillars and the Balance Score Card Methodology is illustrated in the diagram below:



Figure 13: AEDC Balanced Strategy

## 5 Performance Improvement Plans and Initiatives

### 5.1 Reliability and Quality of Supply Improvement (Technical Loss Reduction) Projects

AEDC is embarking on a number of projects over the next five years to improve the quality and reliability of power supply. The implementation of these projects will result to appreciable reduction of technical losses, improved operational performance and enhancement of customer service delivery across its franchise area.

The projects to be executed are grouped into the following:

1. Network Expansion projects
2. Network reconfiguration/rehabilitation
3. Network upgrade
4. Protection, Control & Communication

To arrive at the qualifying projects, an Energy demand forecast and load flow analysis was carried out on AEDC feeders that interface with the 132/33kV and 132/11kV TCN substation. The outputs reveal that despite AEDC transformation capacity being larger than TCN's at the interface, there are line capacity constraints including injection substation bottlenecks that inhibit efficient delivery of power to customers. Based on the above studies projects were identified and implementation program developed to address the additional capacity requirements.

In addition, a further analysis was done to prioritize projects based on their technical loss impact within the AEDC franchise distribution network. For emphasis, the two major assessments carried out to determine technical projects and prioritisation for the Performance Improvement Plan were projects with:

1. Transformer and line capacity expansion impact; and
2. technical loss reduction impact.

Power Geo-based Load Forecast (Power GLF) application was used to for the Energy Demand Forecast and NEPLAN modelling software was used to carry out the load flow analysis and technical loss studies. The current technical estimate within the AEDC network is 11.72% and the following table lists out the expected technical loss improvements over the next five years upon implementation of the PIP projects.

Year	Current	Year 1	Year 2	Year 3	Year 4	Year 5	Total
<b>Technical Loss Trajectory</b>	11.72%	7.89%	6.76%	6.17%	6.08%	6.08%	
<b>Investment Required (NGN)</b>		11.43 Bn	9.63 Bn	3.12 Bn	0.50 Bn	0.41 Bn	<b>25.09 Bn</b>

*Table 4: Technical Loss Reduction Trajectory*

The table above shows the financial implication of projects to be executed and technical loss reduction impact. AEDC will require a total of **N25.09bn.** in network investment to reduce technical loss from **11.72%** to **6.08%** at the end of year five (5) of the PIP horizon.

It is important to note that the above projects do not only speak to technical loss reduction. Beyond technical loss reduction, the PIP projects will address overall network improvement on quality and reliability of power supply. In addition, implementation of these projects over the period as planned will contribute to improvement in commercial performance of the utility. For example, brown outs or poor voltage profile lead to meter ineffectiveness that contribute to low consumption by customers; thus investments in the network will improve voltage conditions thereby improving commercial performance.

From the Demand Study, load forecast for the next five (5) years shows that network capacity requirement will increase by an average of 6% per annum and a cumulative of 26.57% over the next five years from **1,129.4MW** to **1,429.5MW**.

		Year 1 (MW)	Year 2 (MW)	Year 3 (MW)	Year 4 (MW)	Year 5 (MW)
Demand Study Capacity	a	1,129.40	1,200.63	1,276.92	1,353.21	1,429.50
Current Capacity	b	980.0	1,565.40	1,780.90	1,843.90	1,859.60
Additional Capacity Required	c = a - b	149.40	-	-	-	-
Capacity from Network Expansion Projects	d	585.40	215.50	63.00	15.70	12.70
<b>Total Network Capacity</b>	<b>e = b + d</b>	<b>1,565.40</b>	<b>1,780.90</b>	<b>1,843.90</b>	<b>1,859.60</b>	<b>1,872.30</b>

Table 5: Infrastructure and Expansion Capacity

The detailed list of the projects that address technical loss reduction and network expansion are shown in appendix 1 and 2.

## 5.2 Commercial Loss Reduction Strategies

Commercial loss in the distribution system refers to non-technical losses that arise from energy consumed but not billed to the customer. It can arise for a number of reasons ranging from direct theft of energy from illegal connections by undocumented consumers; fraudulent by-passing of meter; inaccurate energy reading from faulty/obsolete meters; billing errors from wrong readings; understating revenue from wrong customer tariff classification and so on.

The Commercial loss component in AEDC's overall system losses is about 15% on average. This is significant and must be addressed for the utility to be financially viable.

As a result of this, AEDC has incorporated into its commercial operations a number of initiatives aimed at mitigating Commercial losses through effective commercial vigilance and revenue protection strategies. These initiatives are discussed in the following sections.

### 5.2.1 Revenue Protection Strategies

AEDC's has well-crafted Revenue Protection strategies for each of its customer categories – Large Power User Maximum Demand Customers, Un-metered Non-Maximum Demand Customers, Metered Non-maximum Demand Customers, Free riders (unregularized/undocumented energy consumers). Driven by business intelligence, revenue protection has the benefit of targeting localised loss generating segments of AEDC's network, observing customer activity from its database and the AMR platform.

**Maximum Demand Customers:** There are currently 4,350 Maximum Demand customers in AEDC, that consume 17% of energy while contributing over 40% to total revenue. Of this number, 2,630 customers have been acquired on an Automatic Meter Reading (AMR) platform. The strategy is to migrate all Maximum Demand customers to an Automatic Meter Infrastructure (AMI) platform. The implementation of a consolidated AMI for all 4,350 Maximum Demand customer in AEDC would enable close monitoring of all activities of the meters remotely and in real time. Benefits will include monitoring of power quality, tampers, equipment failures, power failures, load profile of customers and remote disconnection/reconnection of customers and ultimately loss reduction and revenue assurance.

In addition to the above, regular metering audits of LPUs are always conducted to verify that:

- meters are properly installed

- correct tariffs applied
- CTs properly rated & connected
- voltage and current cables properly secured
- test terminal blocks firmly tightened and sealed
- optical port of the meters are properly sealed.

**Metered Non-Maximum Demand:** There are currently 440,976 Prepaid Metered (PPM) customers in AEDC that consume roughly 22% of energy while contributing about 30% of revenue. About 50% of these customers do not vend or procure units of energy credits for their meters regularly with many of the meters being faulty or obsolete leading to huge losses. The Revenue Protection unit carries out analysis of vending patterns of customers to enable it focus efforts on identifying commercial loss hotspots within the network. There is a properly constituted Revenue Protection Unit that carries out the following activities in policing Metered Non-Maximum Demand customers:

- a. Routinely, review the customer database to identify customers with meters aged seven (7) years and above to carryout integrity test on whether the meter are still within normal ratings.
- b. Carry out data analysis by running queries to generate exception reports on customers with suspicious consumer patterns. Service orders are then generated for physical inspection at the customer premises to check for energy theft from bypass/tamper, or faulty meters in need of replacement etc.
- c. Marketers and linesmen in customer clusters with high meter penetration are trained on how to perform basic revenue protection activities and escalate suspected energy theft or other irregularity. This includes simple tracing of service cables to ensure they directly connected to the meter, querying of meter to display instantaneous load to compare with measured load by use of clamp on ammeters and so on.

**Unmetered Non-Maximum Demand Customers:** There are currently about 458,606 unmetered customers in AEDC that consumes 40% of energy and contributes about 30% of revenue, given their unmetered status, RPU policing of this class of customers entails:

- a. Daily inspections to determine customers are placed on the proper tariff
- b. Match customer's billing record with instantaneous load measured
- c. Ensuring no resell of energy by the customers

**Free Riders:** AEDC estimates about 240,000 illegal connections (free riders) in the franchise area. Roughly 40% of this number are documented free riders. These customers had sometime in the past applied formally to AEDC for connections but could not be connected due to unavailability of meters and a regulatory provision inhibiting connection of new customers without installing meters. These connections have been prioritised under the Meter Asset Provider program for quick metering and regularisation under the MAP program.

The remaining 60% who have connected illegally will be regularised through the unauthorised access to electricity regulation. This initiative is driven by a task force with support from the public through direct solicitation through the various media platforms.

### 5.2.2 Replacement obsolete meters.

A core regulatory requirement is to bridge the metering gap by ensuring that all unmetered customers are comprehensively metered. While the underlying assumption is that metering would reduce losses and also increase customer willingness to pay since customers are confident of the accuracy and can control



consumption, empirical evidence shown a slight exception to this thinking. Areas with close to 100%-meter penetration still have losses above 20%.

The table below shows metering penetration vs ATC&C loss profile. The chart below shows meter penetration across AEDC franchise area:

S/N	AREA OFFICE	% of Customers Metered	ATC & C
1	AREA OFFICE 1 - FCT	97.50%	22.32%
2	AREA OFFICE 2 - FCT	94.61%	41.24%
3	AREA OFFICE 3 - FCT	92.89%	25.38%
4	AREA OFFICE 4 - FCT	90.85%	40.75%
5	AREA OFFICE 5 - FCT	87.80%	30.03%
6	AREA OFFICE 6 - FCT	86.00%	40.11%
7	AREA OFFICE 7 - FCT	75.38%	48.57%
8	AREA OFFICE 8 - FCT	74.43%	40.89%
9	AREA OFFICE 9 - FCT	73.49%	47.80%
10	AREA OFFICE 10 - FCT	69.71%	41.32%
23	AREA OFFICE 23 - KOGI	23.86%	62.88%
24	AREA OFFICE 24 - KOGI	20.82%	65.56%
25	AREA OFFICE 25 - KOGI	18.92%	34.39%
26	AREA OFFICE 26 - KOGI	17.78%	67.86%
27	AREA OFFICE 27 - KOGI	13.60%	68.49%
28	AREA OFFICE 28 - KOGI	11.43%	85.81%
29	AREA OFFICE 29 - KOGI	10.22%	61.00%
30	AREA OFFICE 30 - KOGI	9.72%	56.61%
31	AREA OFFICE 31 - KOGI	8.05%	40.40%
32	AREA OFFICE 32 - KOGI	3.86%	42.96%

*Table 6: Meter Penetration vs ATC&C*

The meter penetration chart above shows that the first nine area offices have meter penetration rates above 80%. Adjusting for baseline technical losses of 12%, it is expected that overall losses to be moderated at below 20%. However, a closer look at the information in the table suggest that there are high commercial losses even in areas with high meter penetration. Further analysis revealed that a major cause of the higher than usual losses in these locations is as a result of:

1. Energy theft – (Meter Bypass)
2. Faulty Meters leading to inaccurate energy readings given that such meters are already at the end of their useful life (served beyond 10 years since manufacture).

The above issues must therefore be addressed to ensure business sustainability and performance improvement. While meter bypass is being addressed through aggressive revenue protection activities. It is important to have a roadmap for replacing obsolete meters as the potential risk to the business is significant.

A detailed review of the utility's asset register has shown that a majority of meters in service for periods of about 7 years and above from date of manufacturing have outlived their useful years and are malfunction and reading energy inaccurately. In total over 250,000 meters currently in service have started to malfunction thus leading to significant losses from inaccurate energy readings.

While the obligation to meter the customer remains with the Distribution Company, it is now the case that new meters installations and meter replacements would be passed through the MAP on behalf of the utility.

However, there is a delicate issue with regard convincing customers with faulty meters current benefiting from lower than normal energy bills to pay for a replacement meter under the MAP. This portends significant financial risks to the business as such customers are unlikely to agree to paying for meter replacement given that they derive benefits from this.

As part of the PIP, AEDC will engage on a customer education and enlightenment program to incentivize customers to agree to the replacement and energy credits for refunds over an agreed period of time.

### 5.2.3 Improving Billing Accuracy

AEDC recently implemented an integrated commercial management system (InCMS) which increases billing adds dynamic (daily, weekly and monthly) billing of individual customers. This helps in reducing billing errors and improving the integrity of the billing process in line with the estimated billing methodology. The following actions are ongoing to improve billing accuracy:

- a. Improve billing through enhanced estimated billing methodology by installing 12,000 Distribution Transformer and feeder meters and mapping them customers on the billing platform. Currently, 4,651 DT meters are installed.
- b. Rigorously pursue data clean up exercise by collecting and updating customer data through multichannel of walk in, web portal, social media, contact centre that will lead to e-billing.
- c. Timely capture and effective management of new connection applications to avoid energy loss
- d. Timely resolution of faulty meters through billing and replacement through MAP to avoid energy loss

### 5.2.4 Advanced Metering Infrastructure (AMI)

Advanced metering systems are comprised of state-of-the-art electronic/digital hardware and software, which combine interval data measurement with continuously available remote communications. These systems enable measurement of detailed, time-based information and frequent collection and transmittal of such information to various parties. AMI or Advanced Metering Infrastructure typically refers to the full measurement and collection system that includes meters at the customer site, communication networks between the customer and a service provider, such as an electric, gas, or water utility, and data reception and management systems that make the information available to the service provider.

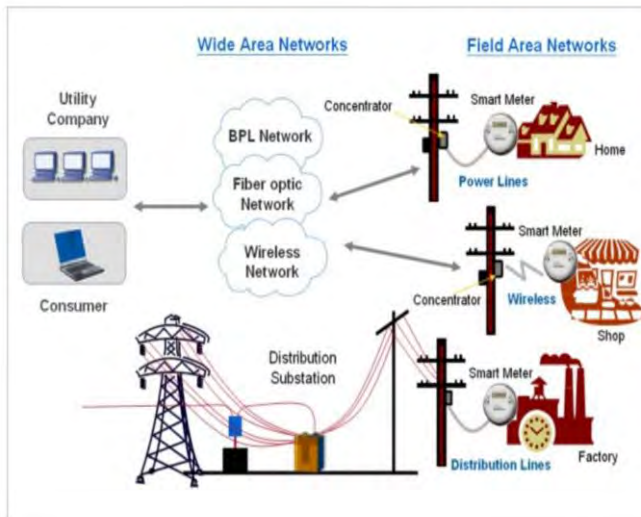


Figure 14: AMI Infrastructure

### 5.2.5 AEDC's Automated Metering Infrastructure (AMI) Strategy

AEDC currently has an Automated Meter Reading (AMR) solution which integrates about 2500 out of our 4000 LPU meters. AMR is essentially a step over a human being taking readings from the smart meter and writing them down. However, at the moment, AEDC has deployed over 4100 DT meters and therefore requires an Advanced Metering Infrastructure (AMI) system which will aggregate readings from these DT meters as well as those to be deployed in the future. An AMI will provide for two-way communication allowing the smart meters to not only communicate with the AMI platform and control room but also receive instruction in a two-way communication model.

The AMR and AMI will then have to be consolidated into one single AMI platform for:

1. Reduction of administrative overhead
2. Two-way communication
3. Simpler integration into the billing platform and other key platforms such as SCADA
4. Improved billing methodology for Non-MD customers
5. Improved ATC&C Loss Reduction

#### Benefits of AMI

Benefits associated with AMI deployment can be broadly categorized as:

- a) **System Operation Benefits** - primarily associated with reduction in meter reads and associated management and administrative support, increased meter reading accuracy, improved utility asset management, easier energy theft detection, and easier outage management.
- b) **Customer Service Benefits** - primarily associated with early detection of meter failures, billing accuracy improvements, faster service restoration, flexible billing cycles, providing a variety of time-based rate options to customers, and creating customer energy profiles for targeting Energy Efficiency/Demand Response programs.
- c) **Financial Benefits** - these accrue to the utility from reduced equipment and equipment maintenance costs, reduced support expenses, faster restoration and shorter outages, and improvements in inventory management.

## 5.3 Collection Efficiency Improvement Strategies:

AEDC currently records an average collection efficiency ranging between 70% and 85%. To improve on this level of efficiency, the following key strategies would be implemented:

### 5.3.1 “Manageable Areas” Strategy

Manageable Areas understood to be locations with clearly mapped out address system, decent network infrastructure, significant meter penetration and relatively high customer willingness pay.

The scope of the initiative is to improve supply reliability and commercial performance of customer in these areas. AEDC’s strategy would involve registering all users as regular customers “manageable” in the database of the CMS (supported by the GIS). Install consumption meters (post-paid or pre-paid, depending on type of consumer), and incorporate customers to the regular revenue cycle managed through the CMS.

A key strategic objective is to ensure business viability and improvement to service delivery in fully “manageable” locations possibly for a differentiated tariff. For the identified clusters, and energy demand audit would be conducted for the “manageable” clusters supported by technical audit to ascertain the available demand and distribution infrastructure required to deliver good quality supply. If necessary, a grid supply augmentation solution such as embedded generation could be developed for these clusters for improved service delivery.

Success of this initiative would rest largely on being able to negotiate a “differentiated” tariff to be paid by these customer clusters sufficient to cover the cost and investment required for premium service delivery.

### 5.3.2 Government Ministry Department and Agencies (MDAs) Payment Strategy

Smart GPRS enabled meters will be considered for installation at MDAs with difficult access and poor payment profile. The SMART meters will allow for remote disconnection of customer account in case of failure to pay within stipulated period. While max demand prepaid meters will be installed for the other difficult to collect MDA accounts to achieve zero collection loss from these class of customers. MDA customers include: Military and paramilitary formations, Federal and State government departments and agencies.

### 5.3.3 Other Collection Improvement Strategies

- a) Key Account managers are being empowered to strictly manage key customers from power supply, billing and collection.
- b) A number of metering activities are on-going to address the metering gap through MAP within two years in order to achieve zero % collection loss.
- c) Outsourcing of revenue collection in rural communities and other strategic customer clusters to collection agents.
- d) Deployment of multiple channels of collection points including off line and rural collection points throughout the franchise areas
- e) Deepening the use integrated customer management system

## Box 1: AEDC'S REVENUE PROTECTION PROCESSES

Revenue protection activities are vital to the survival of AEDC in plugging energy losses due to Meter tamperers, Meter bypass, faulty meters, wrong tariffs, Illegal consumption, wrong meter installations, energy resell by customers, wrong billing, unauthorised access to electricity etc

The following processes are followed in detecting, correcting and preventing energy loss by the Energy loss inspectors of the Revenue Protection unit.

- a. **INSPECTIONS:** The Energy loss inspectors mine the meter database to zero in on suspected energy loss areas and conduct daily inspections to confirm such cases.  
The Inspectors are armed with clamp on ammeters, Electricity Inspection forms, PPEs and a toolbox. Upon gaining access, a thorough inspection is carried out.
- b. **FINDINGS:** After successful inspection, all findings are entered into the EIR form and explanations and evidences are shown to the customer or his representative to their satisfaction. All evidences are captured electronically, and customer is requested to sign the EIR form that contains the customer data, Account/meter data, connection data, nature and details of the findings/violations. Disconnection notice that contains nature of violation, reconnection and administrative charges to be paid and the relevant bank and contact persons details will be served and the supply will be disconnected using appropriate service orders.
- c. **RESOLUTIONS:** The customer approaches the customer service desk, RPU desk for resolutions of any concerns, evidences are reviewed, expected recoveries discussed, payment terms agreed to and the customer proceeds to pay the administrative and reconnection costs.
- d. **RECOVERY:** Energy Recovery bills are produced based on the violations discovered at customers premises.
  - i. For meter bypass & tamper, energy recovery is calculated either based on the meter historical or load assessment (load reading) to determine the energy loss on the bypassed/tampered phase (s) for 3 or 6 months for residential and commercial customers respectively plus reconnections costs
  - ii. For faulty meters, only energy recovery is applied without disconnection/reconnection cost.
  - iii. For illegal customers/ consumption, energy recovery and reconnection costs are applied.
- e. **RECONNECTION:** Upon payment of the agreed costs, the customer premises is reconnected after correcting the violations and resealing the meter in accordance with AEDC metering policy. Computed energy recovery bill is issued for faulty meters while for functional meters the bill is migrated into the meter
- f. **BACK OFFICE:** The Revenue protection back office is the engine room for the RP activities involved in the following:
  - (i) **AMR BACK OFFICE** monitors the dashboard for irregularities in measured quantities like CT failures, phase reversals, low power factor, voltage failures, load profiles etc. and escalate same to the RPU field teams for resolution
  - (ii) **DATA ANALYTICS** conduct data mining on all meter data for vending irregularities, non-vending and escalate same to the field teams for resolution. They also keep a register for offenders and types of violations and evidences.
  - (iii) **CUSTOMER SERVICE** resolves customer complaints and update customer records and contracts, draws up and implement instalment payment plans
  - (iv) **FINANCE** tracks and updates customer payments, gives notices as to when next due date for payments
  - (v) **LEGAL** review violations and prepare briefs for prosecution of high and repeated offenders

Figure 15: Box 1 - Revenue Protection process

## 5.4 Enhance Operational Efficiency and Flexibility

In AEDC as part of the PIP, several utility specific technology tools will be deployed. While a few of these systems are in operation, several others need to be upgraded or deployed newly.

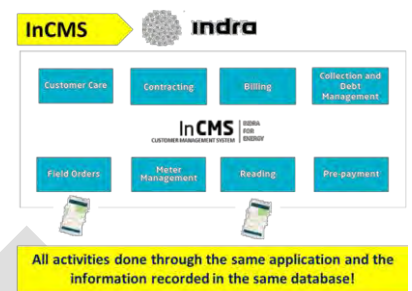
A cross section of these technology solutions to enhance operational efficiency and flexibility as part of the transformation program as well as their current status are shown below:

	Project	Function	Status	Comment
1	InCMS (Integrated Commercial Management System)	Commercial	Already deployed and in operation	This solution is already adding value in the Vending, Billing and other key commercial processes
2.	ERP (Enterprise Resource Planning)	Enterprise wide	The Finance and Logistics modules are already implemented to drive key processes	Other modules such as HR, Supply Chain are slated for implementation Q4: 2020
3	Geographic Information System GIS	Technical	Some level of GIS mapping exists for few areas within FCT.	The mapping of the entire network is essential for efficiency, improved service, asset management. Procurement of GIS equipment and software is outstanding
4	Incident Recording & Management System (IRMS)		Not Available	
5	SCADA for HV and MV	Technical	Not Available	SCADA is a component of the Advanced Distribution Management system ADMS and is essential for transformation
6	Outage Management Systems (OMS)	Technical	Not Available	OMS is a component of the Advanced Distribution Management system ADMS and is essential for transformation
7	Works Management System (WMS) – Network Construction and Installations	Technical	Not Available	

Table 7 Status of Technology Projects for the PIP

### 5.4.1 Integrated Commercial Management System (InCMS)

AEDC in Q1 2019 completed the deployment of InCMS - an integrated, modular, system designed to support customer management for utilities. Its functional structure, rich, flexible and highly configurable, was designed to respond to the requirements of a constantly evolving dynamic market. InCMS provides support to AEDC in all aspects of its commercial operations and customer service activities which include but not limited to; customer service, meter management, billing, prepayment and reporting. InCMS is designed to optimize the most important processes of the commercial cycle in utilities including customer loyalty, sales growth, cost reduction and prompt decision making.



#### Business Impact

The Integrated Commercial Management System has resulted in meaningful business transformation in the following areas:

- a. Commercial inputs are automated resulting in fewer errors and customer complaints
- b. Accountability -The audit trails for all transactions can be tracked and origins for frauds are easy to investigate especially payment related complaints which has resulted in fewer unprocessed payments
- c. Business Process Customization ability- The current Business process flow was configured on the system for better work management and efficiency
- d. Strong quality control on billing to prevent issuance wrong bills resulting in increased customer satisfaction.
- e. Improved Management Control due to detailed and user-friendly reports

InCMS provides all necessary information for daily operations and notifies the activities, to the different management levels in order to facilitate processes decision making. It comprises of different system modules stated below:

#### Customer Care & Contracting Module

- a. New connection processes are managed on the system from start to finish
- b. Customer's Information is managed in one database for the entire organization
- c. One stop shop for all customer enquires with the tools and information necessary to monitor all customer activities
- d. Customer information such as balances, premise details can be accessed from any location
- e. Complaints can be lodged on InCMS and Customer web portal and tracked. Notifications are sent to the customers on progress of complaint resolution process
- f. Bills directly related to a complaint are isolated from the disconnection process

#### Web Portal

- a. Self-service portal where customers can create complaints and apply for new connection from the comfort of their homes
- b. Bills and transaction reports can be viewed and printed from any location by the customer
- c. All inquiries can be made on the customer's electricity account
- d. Real time information on changes in contract information such as tariff, meter details
- e. Consumption history can be monitored for energy efficiency

#### Meter Management Module

- a. This module tracks the movement of meters from the time of purchase from a supplier up to Installation at a customer's premises.



- b. The control of meter statuses and attributes is managed on the system and ensures the integrity of the distribution process to the customers. This process prevents the diversion of meters and other unfair practices.
- c. Seal assignment and other meter accessories are managed on the system and assigned to an identifiable technician to secure the meters.

### Reading and Billing Module

- a. Test billing (prebilling) functionality available in the system to ensure billing accuracy
- b. Day based billing and reading according to structured routes and Itineraries
- c. Prompt management of Bill Anomalies e.g Usage out of limit
- d. On-spot Bill adjustment, rebilling and reprinting
- e. Improved appearance of the Bill for easy customer interpretation
- f. Additional bill distribution methods such as email and SMS
- g. Group Accounts Management

### Collection & Debt Recovery Module

- a. The system is capable of sending bills by e-mail or SMS
- b. It runs a program on a daily basis in order to determine the accounts eligible for disconnection
- c. Notice of disconnection are issued according to the distribution method defined for the bills for the particular account e.g SMS and email.
- d. The bills are suspended within the disconnected period.
- e. Availability of an instalment plan functionality which allows customers negotiate a reasonable payment plan and prevents their disconnection during this period
- f. Functionality for flagging “Non-Disconnectable” Accounts which will not be included in the debt recovery process.
- g. A Debt Recovery work flow is maintained in the system and automated demand letters are issued to the customers in accordance with the configured parameters

### PENTAHO

- a. Transactional Reports and Control with online predefined queries that should give access to the commercial information up to the lowest detail level.
- b. Operative Reports organized by area and business areas.
- c. Management Control Reports, a data model based on the Operational Data Store (ODS) used to create Dashboards and KPI trackers.

## 5.4.2 Dynamics 365 Areas of Coverage

An ERP is an enterprise software that allows the integrated management of core business processes, often in real-time and mediated by technology. AEDC approved the deployment of a new ERP called Microsoft Dynamics 365 – Finance & Operations.

Microsoft Dynamics 365 - Finance & Operations connects all processes and departments including procurement, commercials, logistics, technical, projects, finance, human resources management, and business administration to enable better and quicker decision making and business processes.

The areas immediately covered in the ERP project include the following:

- General ledger management
- Fixed assets management module
- Payroll management
- Inventories management



- Trade receivables & Payables management
- Cash & Bank Management
- Budget Management
- Procurement management
- Human resources management
- Fleet management
- Project management

### Business Impact and benefits of Dynamics 365 (D365) ERP deployment

D365 ERP is an asset that will make our business processes run smoother by unifying and protecting our information, automating processes, and producing easy-to-understand trends. With the capabilities and modules listed in the previous section, the benefits of D365 ERP will make our day-to-day operations and long-term planning more efficient. In more specific terms, below are the benefits/business impact of D365 ERP:

#### Total Visibility

Our business operation covers a wide geographical area spanning across four states thereby necessitating our zonal organizational structure. D365 ERP allows total access to every important process in our business by making data from every region and department easily accessible from the HQ. In addition, the availability of all of the company's information in a centralized location allows for increased collaboration and more streamlined completion of tasks. This complete visibility provides more coherent workflows and allows inter-departmental processes to be easily tracked with maximum efficiency. All of this makes it possible to make quick but well-informed decisions in full confidence that complete picture at any given moment is readily available.

For example, it gives us the capability to monitor inventory levels across all regions on a daily basis, including future consignments that are yet to be received, inventory currently in transit and reorder levels for all inventory items. This allows us to control working capital on a more precise level.

#### Improved Reporting and Planning:

Along with improved visibility, D365 provides better insight. By having a centralized source of information, D365 ERP can readily generate useful reports and analytics at any time. This software comes with the ability to collate, analyze and compare functions across regions and departments, without the hassle of multiple spreadsheets, emails or physical travels. One of the most popular reports involves financial reports. Standard financial reports such as income and cash flow statements can be generated as at when needed with reduced manual intervention.

#### Improved Efficiency

D365 ERP will reduce the time and effort required by staff to carry out their daily activities arising from the reduction/elimination of repetitive manual processes, thus freeing up team members to focus on revenue-affecting tasks. The system also brings about uniformity in our internal controls across all regions as the same automated processes are implemented throughout the enterprise.

#### Data Security and Quality

One of the biggest advantages of the ERP system is data security. D365 ERP has the intrinsic control over who can see, edit and obtain the information from the system

The database system the ERP runs also enables centralized backups of critical and sensitive data.

#### Improved Collaboration and Workflows

Collaboration is an essential part of a thriving business but without an ERP, collaboration requires more time and effort. D365 ERP makes collaboration seamless. It streamlines the process of collaborating with others by providing employees with access to the data they need when they need it. This allows for real-

time project updates and better communication across the whole company. The net effect is increased efficiency and reduced operational costs associated with manual data tracking, as well as higher employee engagement.

#### Standardized Business Processes

Microsoft Dynamics 365 ERP is developed according to global business best practices. These tried-and-true processes bring major benefits to the table for our business. It also allows us the benefit to standardize our processes and systems, which further enhances productivity and efficiency. Arising from the automation of many processes, errors and costs are greatly reduced.

#### Compliance with International Financial Reporting Standards (IFRS)

Maintaining perfect accuracy within financial records requires recording and retention of audit trail. D365 ERP aids in compliance with the IFRS by virtue of secure and validated data, combined with built-in reports.

### 5.4.3 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

This refers to a detailed network model of the distribution system. It integrates hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information.

#### **BUSINESS BENEFITS OF GIS**

Distribution Management Utilities worldwide use GIS to manage and map the location of millions of miles of overhead and underground circuits. With GIS, AEDC's assets will be linked directly to customer information system, allowing for proactive monitoring work orders, vegetation management, and outages.

1. Planning and Analysis GIS will help AEDC identify vulnerabilities that cause outages, to weigh asset investments, and to understand customer satisfaction. With a rich set of easy-to-use spatial analysis tools, GIS helps you determine the right
2. GIS Workforce Automation systems will allow AEDC efficiently schedule and dispatch utility service staff thereby increasing their productivity. GIS will show realtime where crews are working and the status of their work.
3. Meeting regulatory requirements and keeping the public informed becomes less time consuming and easier to accomplish when you use GIS to communicate with regulators and the public.

### 5.4.4 ADVANCED DISTRIBUTION MANAGEMENT SYSTEM (ADMS)

ADMS is an umbrella suite of tools essential for efficiency of electricity distribution business. AEDC needs an ADMS to automate fault location, isolation and restoration; volt/volt-ampere reactive optimization; conservation through voltage reduction; peak demand management; and support for microgrids and electric systems. The components of an ADMS include the following:

- Electrical Supervisory Control & Data Acquisition (SCADA)
- Incident Report Management System, (IRMS)
- Outage Management System (OMS)
- Energy Management System (EMS)
- Geospatial Information System (GIS)
- Fault location, isolation, & service restoration (FLISR) a/k/a/ dist. automation
- Volt-var optimization (VVO)
- Advanced metering infrastructure (AMI)

#### **ADVANCED DISTRIBUTION MANAGEMENT SYSTEMS (ADMS) ARCHITECTURE**

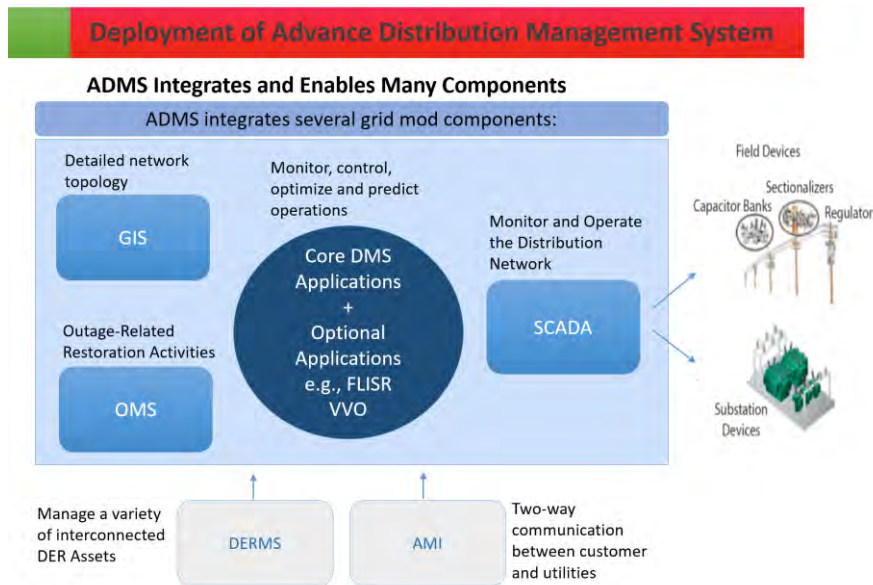


Figure 16: ADMS Architecture

## 5.5 Improve Customer Service Delivery

### 5.5.1 Customer Service Performance Improvement Strategy Document

AEDC Customer Service Performance Improvement strategy is highlighted in the four parts discussed below. They include the: 1) Background 2) Customer care improvement plan highlighting current challenges and improvement initiatives 3) Customer Care Improvement Charter and: 4) Office and social media contacts.

#### Background

Customer centricity is a cardinal philosophy within AEDC. In the last couple of years, AEDC invested significant resources to ensure superior customer service delivery. In our transition to becoming a world-class utility, AEDC deployed a world class contact center with active listening capabilities. The contact center is linked to our integrated customer management system (inCMS) – a single customer database with visible linkages for support units to work collaboratively in accelerating resolution of complaint leading to improved service delivery.

Together, these platforms provide business excellence via full management of complaints received from customers relating to bills, payments, contracts, meters, service application, and other complaints. Customers are able to reach the company via our Voice services (Inbound and Outbound), Data services (Facebook, email, live chat, WhatsApp, Instagram and twitter handle). These channels of communication have attracted positive feedback from customers describing the ease of communication and accessibility to AEDC as “a departure from the past...” More so, such timely complaints and feedback are contributing to prompt fault clearance, and outage resolution thereby improving the entire customer service.

However, in the long term and more sustainably, enhancements are required to deliver on excellent customer service. The matrix below illustrates the inter-dependencies between the identified gaps and remedial initiatives to achieve performance improvement towards excellent customer experience.

AEDC’s customer service charter further defines the scope and service level improvement process within the overall customer service improvement strategy.

### 5.5.2 Customer Care Performance Improvement Plan

The matrix below summarizes the immediate focus areas in terms of customer care improvement, relevant initiatives and timelines to addressing challenges associated with these focus areas with a view to improving overall customer experience.

S/N	FOCUS AREA	CURRENT CHALLENGES	INITIATIVES/ACTIVITIES	TIMELINES
1	<b>Implementation of new process and procedures leading to service failures</b>	<ul style="list-style-type: none"> <li>- Inefficient feedback mechanism to Customers</li> <li>- Staff not in tune with our brand promises</li> <li>- Bottlenecks/ bureaucracy /elongated process in complaint resolution</li> <li>- Poor/lack of cross departmental collaboration</li> </ul>	<ul style="list-style-type: none"> <li>- Establish and implement Customer service standard</li> <li>- Developed a customer service policy</li> <li>- Develop Customer Service Charter</li> <li>- Establish clear and simple processes focused at customer satisfaction</li> </ul>	Ongoing
2	<b>Address staffing behavioural deficiencies especially customer facing</b>	<ul style="list-style-type: none"> <li>- Lack of Customer service culture company wide</li> <li>- Area offices preference for cash collection as against complaint resolution</li> <li>- Understanding Customer service role in the business strategic plan</li> <li>-</li> </ul>	<ul style="list-style-type: none"> <li>- Amplify a cross cutting Customer Centricity culture change program that focuses on “making being customer centric everyone’s business” in a practical way</li> <li>- Implementation of a measurement system for customer service compliance</li> <li>- Leadership Sponsorship (MD/CEO)</li> <li>- Appointment of Customer Centricity Champions from the HQ level down to the Service Center level</li> <li>- Customer Centricity Awareness Workshops</li> <li>- Departments &amp; Units supporting complaint resolution to have a designated appraisal</li> </ul>	Ongoing

S/N	FOCUS AREA	CURRENT CHALLENGES	INITIATIVES/ACTIVITIES	TIMELINES
			<p>score embedded in their yearly appraisals of performance for supporting and facilitating complaint resolution</p> <ul style="list-style-type: none"> <li>- Cultural shift towards customer centric standard and behaviour</li> <li>- Create “internal customer” focus and culture within AEDC by:</li> <li>- Providing customer care training to all staff in sequence</li> <li>- Developed internal Service Level Agreements amongst functions</li> <li>- Recognising and rewarding staff who have demonstrated excellent service culture</li> </ul>	
3	<b>Tardiness in compliance to regulatory mandates</b>	<ul style="list-style-type: none"> <li>- Complaints resolution timelines are not always met</li> <li>- Increase in Forum cases and unfavourable rulings</li> </ul>	<ul style="list-style-type: none"> <li>- Stream line our processes for ease and simplicity to meet up with regulatory timelines on complaints resolution.</li> <li>- Full adoption of InCMS in compliance with regulatory requirement to timeline</li> <li>- Empowered Customer Service to issue queries to:</li> <li>- Staff who have acted unprofessionally while dealing with customers and Non co-operative and defaulting ancillary units in the complaint resolution value chain</li> <li>- Signed Service Level Agreement for each department and unit showing commitment to resolve issues</li> </ul>	Immediately

S/N	FOCUS AREA	CURRENT CHALLENGES	INITIATIVES/ACTIVITIES	TIMELINES
4	<b>Infrastructural deficit</b>	<ul style="list-style-type: none"> <li>- Inadequate Customer Care units</li> <li>- Unbefitting ambiance in most Customer care unit</li> </ul>	<ul style="list-style-type: none"> <li>- Ambiance improvement plan</li> <li>- Setup of the new regional offices</li> <li>- Renovation of Customer Care Unit to service industry standards</li> </ul>	Jan 2020 to Dec 2024

OTHER INITIATIVES/ACTIVITIES				
<b>Improved Social Media Presence</b>				Immediately
<ul style="list-style-type: none"> <li>- Online real-time Customer engagement (within 10min response time)</li> <li>- Increased traffic to our handles and websites</li> <li>- Creating liaison with Social Media influencers to boost followership base</li> <li>- Introduction of loyalty schemes/giveaways/quiz to robustly drive attention to our activities and products</li> <li>- Pinned and Promoted tweets and posts to achieve a wide and prolonged coverage of broadcast</li> </ul>				
<b>Continuous Improvement/Technology</b>				-
<ul style="list-style-type: none"> <li>- Reinforcing and adapting both personal and material service delivery processes on an ongoing basis.</li> <li>- System check/process</li> <li>- Live and interactive support (Automation and modernization of the Contact center)</li> <li>- Ensuring management support in provision of relevant tools and resources</li> <li>- Benchmarking</li> </ul>				
<b>Customer Service Excellence Award</b>				Yearly
<ul style="list-style-type: none"> <li>- Recognising and rewarding staff who have demonstrated excellent service culture</li> <li>- This rewards cuts across staff in different capacities and functions who have imbibed and demonstrated exceptional service culture</li> </ul>				
<b>Replication of Customer Service Units at the Service Centre levels</b>				Proposal stage
<ul style="list-style-type: none"> <li>- Improves accessibility of Service and requests by customers</li> </ul>				
<b>AEDC Customer Service staff pledge</b>				Immediately
<ul style="list-style-type: none"> <li>- Inculcate the culture of Customer service in staff</li> <li>- A constant reminder on the importance of Customers and the need to treat them right all the time</li> </ul>				
<b>Customer Service Week</b>				Yearly
<ul style="list-style-type: none"> <li>- Customer Loyalty Scheme</li> <li>- Senior Management (EMT) Involvement and active participation in the weeklong celebration as a sign of Visible Demonstrable Action</li> </ul>				
<b>Community Engagement</b>				Ongoing
<ul style="list-style-type: none"> <li>- Engaged Customers via town hall meetings</li> <li>- Radio appearances on Bereketi family radio</li> </ul>				
<ul style="list-style-type: none"> <li>- Customer Satisfaction Survey/Net Promoter Score</li> <li>- Successful 21st Century businesses strives for continuous improvement through robust feedbacks from the customers.</li> </ul>				Periodically



OTHER INITIATIVES/ACTIVITIES	
- AEDC cherishes feedback it receives from Customer who have responded to online surveys and this has helped in improving service delivery.	
- Physical Regionalisation of Complaints management unit	Proposal Stage
- Mystery Shopping Service	Periodically
- In measuring our level of Customer Centricity Culture adoption:	
- Anonymous and unscheduled Spot checks periodically conduct at our Customer care units	
- Outstanding acts of service by staff are noted and rewarded	
- Improvement areas are identified	

Table 8: Customer Care Performance Improvement Plan

### 5.5.3 Customer Service Improvement Charter

AEDC Customer Service Charter defines standards of service delivery that our customers should expect from us and how to seek remedy where we fall short and also, we commit to continuous improvement in pursuit of Customer satisfaction and achievement of excellence in our operations.

Consistent with regulatory provisions, AEDC’s obligation to the Customer include:

- a) Provision of an adequate, affordable, reliable and secure power supply.
- b) Provision of timely information to customers
- c) Honest and transparent service
- d) Service improvement through promoting innovation and learning
- e) We will be easily accessible
- f) We will be fair and transparent in our billing

Consistent with regulatory provisions, the customer has the right to:

- a) Error free and timely bills
- b) Be treated with dignity and respect
- c) Prompt and efficient service
- d) Be treated fairly
- e) Enjoy confidentiality

- f) Lodge complaints and receive timely resolution/feedback

Consistent with regulatory provisions, a customer shall be obliged to:

- a) Pay promptly the energy once served with the bill
- b) Take good care of AEDC equipment installed at their premises.
- c) Respect and not harass AEDC staff
- d) Report immediately at AEDC office before relocating to new premises
- e) Report any significant modifications of electricity equipment and appliances to AEDC offices
- f) Report immediately to the nearest Police Station and AEDC office of any unauthorized or suspicious activities on power supply infrastructure or theft of electricity

Also, AEDC is committed to full compliance with regulatory position on NERC customer service complaint regulations. See table 24

<b>Box 2: InCMS for Customer Service Delivery Excellence</b>
To attain full compliance with regulatory service delivery standards whilst providing real time customer satisfaction and achievement of excellence in our operations.
<b>Challenges</b>
Current customer care contact center is somewhat limited with inadequate staffing and support outage management system that can permit instant resolution of some customer complaints, it isn't easily accessible less tech savvy customers
<b>Project Goals</b>
The goal of the project is to improve efficiency and service levels of customer care support via integration other complementary software like the outage management system.
<b>Customer Complaints, Enquiries and Requests Procedures</b>
AEDC has developed a complaint resolution, Customer enquiries and request procedures encapsulated in the newly deployed InCMS, that integrates both commercial and customer management function.
<b>Customer Complaints:</b>
<ul style="list-style-type: none"> <li>a. All complaints must be logged, whether received on phone, social media, in person or in writing and should be logged in Customer complaint module on INCMS. Written customer complaints should be acknowledged responded to in writing within 3 working days with complaint resolved within 2 weeks. Customer should be informed of inability to resolve their complaint within the stipulated time.</li> <li>b. In case service provided by AEDC is perceived by the customer as not satisfactory, the customer may finally refer the complaints to NERC after exhausting AEDC complaint resolution mechanism</li> </ul>
<b>Customer Enquiries:</b>
<ul style="list-style-type: none"> <li>a. All customer enquiries must be logged, whether received on phone, social media, in person or in writing and should be logged in Customer complaint module on INCMS</li> <li>b. Where investigative work is required, all telephonic queries or queries received in person should be responded to within 21 working days</li> <li>c. Written queries should be responded to within 7 working days</li> <li>d. Unless there is a prior explanation, queries should be resolved within 3 days.</li> </ul>
<b>Customer Requests:</b>
<ul style="list-style-type: none"> <li>a. All general customer requests must be logged on INCMS, whether received on phone, social media, in person or in writing.</li> <li>b. All written customer requests (for example moving of meters, changing of meters, pole movement, change of mode of supply), should be replied to in writing by AEDC within 2 weeks of receipt of a written request.</li> <li>c. The reply should include information on the cost to the customer, the customer's obligations and the time frame for the carrying out of the request.</li> </ul>

*Table 9: InCMS for Customer Service Delivery Excellence*

### 5.5.4 AEDC Offices and Social Media Contact

AEDC is engaging its customers through under listed area offices, phone lines and other electronic means including social media platforms.

AEDC is committed to achieving integrated customer service delivery mechanism by augmenting this touch centre to establish a 360 degree.

The customer experience that includes seamless communication for gathering queries, complaints, and providing feedback with appreciation.



Figure 17: AEDC Online Engagement Channels



Figure 18: Feedback from Social Media Channel

## 5.6 HSE Improvement Initiatives

AEDC recognizes the priority role of Health, Safety, Environment and Social in business growth, loss reduction and human sanctity assurance and hence committed to the reason to improve HSE practices which forms a strategic pillar in its transformation agenda.



Picture 1: Before & After Picture of Banex Plaza Distribution Substation, Wuse 2 Abuja

On inception, AEDC promulgated relevant Health, Safety, Environment and Social (HSES) policies and procedures. The objective was to develop initiatives and programs to support best in class HSES practices. AEDC's plan for the next five years is to ensure no loss of life (staff and the public), injuries and damage to equipment and the natural environment through practices and operations. This we plan to achieve through the "goal Zero" initiative aimed at the following:

- Zero accident – Injury and fatality to both staff and the public;
- Staff safe attitude and cultural change towards work and customer relations;
- Targeted, regular and effective public electricity safety awareness trainings and campaigns within schools, places of worship, markets, business premises and residential communities;
- Procurement of sufficient and monitoring of the adequate use of personal protective equipment among staff;
- Sustain the commitment in ensuring that only competent and authorized technical personnel work on our lines;
- Procurement and proper use of safety operational materials;
- Regular facility, office and network inspections and audits with adequate controls for non-conformances;
- Network and staff compliance monitoring for hazard identification using the newly established Safety Inspectorate for quick escalation of hazards for timely close-out and enforcement actions.

To achieve these targets, the following strategies are to be sustained:

### 5.6.1 Compliance with Local Regulatory & International Financing Institutions Requirements

- i. Conduct Licensing and Permits Requirements Audit and obtain the required Local Permits / Licenses
- ii. Ensure compliance 100% compliance with Statutory and Regulatory Industry Requirements
- iii. Closeout all Health, Safety, Environment and Social requirements for financial lending institutions



## 5.6.2 Design and Implement Strategic Staff Capacity Building and Public Safety Sensitization

Since the greatest asset in life is human and for any workforce is the employees, the following trainings and retraining has been targeted for the period under plan to improve our internal human capacity and promote safe culture among staff, help the public have sufficient knowledge of dangers associated with electricity, improve AEDC loss reduction, improve productivity through increased man-hour and achieve the “new AEDC” of desire. See Table 12 for the training calendar for the next five (5) years.

## 5.6.3 Formulate and Implement Strategic Accident / Incident Prevention & Reduction Plans

- i. Fence off, lock and provide warning signage at all AEDC Installations
- ii. Procure suitable and adequate working tools and equipment for Technical and Operational Staff
- iii. Timely and continually share with staff all lessons learnt from incident and ensure 100% close-out of actions recommended from every incident investigation.



## 5.6.4 Provide a Safe Working Environment for Staff & Members of the Community

- i. Sanitize the AEDC Electricity Distribution Network by closing out the exposed feeder pillars and cable end boxes in public places; correct and re-tension sagging distribution conductors which breach safe height clearances
- ii. Conduct Stakeholder engagement programmes to address right of way / Way-leave rights and encroachment incidents both historical and recent
- iii. Print and Distribute Safety Code to all Technical Staff in Portable A6 Booklets
- iv. Print and distribute to all AEDC facilities the “Goal Zero” target message
- v. Compile and print the AEDC Risk Assessment and Vulnerability Register and drive implementation of the remedial measures arising from the Risk Assessments and JHA
- vi. Effective implementation and closeout of recommended remedial actions
- vii. Improvement of toolbox safety talk delivery
- viii. Procurement and installation of communication radios



### 5.6.5 Provide and Enforce Key HSES Performance Drivers

- i. Procure task specific Personal Protective Equipment (PPE) for AEDC Staff and enforce PPE utilization through snap-checks;

### 5.6.6 Provide Protection to Company Property

- i. Ensure routine servicing of all Fire Extinguishing Equipment across the AEDC Geographical Spread
- ii. Install Modern Automatic Fire Protection Systems at all major substations and AEDC Buildings and Installations
- iii. Procure and Install state of the art / modern access control systems at the AEDC HQ and other important operational areas such as the main stores, regional offices and injection substations
- iv. Improve monitoring of CCTV Cameras at the AEDC HQ and other important operational areas such as the main stores, regional offices and injection substations;
- v. Ensure Security and Access Control by monitoring and periodically evaluating the engaged security contractors to provide requisite security needs across the AEDC Installations, Buildings and Service Centre Cash offices

### 5.6.7 Ensure Good Environmental and Social Stewardship

- i. Improve and sustain environmental footprints in our areas of operations
- ii. Construct Oil Containment facilities at all large transformer sites in AEDC where significant volumes of oil are handled
- iii. Construct oil storage facilities at all AEDC Oil Storage sites
- iv. Implement all involuntary resettlement action plans caused by AEDC operations and apply wise dispute resolution techniques.

### 5.6.8 Management of Hazardous Substances – PCBs

- i. Conduct tests to confirm the existence of PCBs containing materials and oils and conduct an audit to confirm the inventories and volumes of the PCBs containing materials and equipment
- ii. Construct storage sites for the quarantine of PCBs containing materials and equipment
- iii. Engage PCBs disposal experts to provide advice and drive the PCBs disposal project in accordance with international treaties.

### 5.6.9 Improvement on HSES performance Statistics

Reduction in electrocution and injuries of staff and members of the public arising from lack of compliance to operation and safety rules until “Goal Zero” target is achieved. The execution of the many strategic staff trainings and public sensitizations will surely bring staff and third party accidents to zero. A safety conscious

and good behaviourally based team of staff will do the NO staff accident magic. The conclusion of the HSEQ Integrated Management System training, auditing and certification by 2021 will be a sure case of arrival to the HSE PIP desire.

#### 5.6.10 Sound Implementation of a Strategically Aligned Projected HSES OPEX and CAPEX

To achieve AEDC's target of "goal Zero" and the PIP promise throughout its wide franchise areas, much funds are required to achieve the robust structured human capacity development, provide adequate control on all unsafe conditions that exposes the public to accident including fencing of the identified 1,696 exposed distribution substations, closing of feeder pillars and locking systems, procurement of adequate PPE and ensure reliable protection.

The funds requirements as here proposed are to be expended as capital or operational expenditures. AEDC plans to spend NGN 4,454,262,972 CAPEX and NGN 2,431,501,950 OPEX in the next 5 years to ensure this requirement is achieved. The annual breakdown is here summarized in table 10

Details	2020	2021	2022	2023	2024	Total
CAPEX	715,222,384	793,896,846	881,225,499	978,160,304	1,085,757,938	4,454,262,972
OPEX	462,585,613	474,150,254	486,004,010	498,154,110	510,607,963	2,431,501,950
<b>Total</b>	<b>1,177,807,997</b>	<b>1,268,047,100</b>	<b>1,367,229,509</b>	<b>1,476,314,414</b>	<b>1,596,365,901</b>	<b>6,885,764,921</b>

Table 10: Annual summary of planned CAPEX and OPEX for the HSES PIP realization



S/N	NAME OF TRAINING	DETAILS OF TRAINING	PROPOSED NO. OF TRAINEES/YR
1	Root Cause Analysis – Accident Investigation and Reporting	Targeted for Risk and Compliance, Technical and Internal Audit staff. To understand the root cause(s) for each accident with a view to formulating adequate actions and feeding back lessons learnt into the process to prevent future occurrence.	120 staff in 2020
			100 staff in 2021
			87 staff in 2022
			80 staff in 2023
			63 staff in 2024
2	HSE Culture	A compulsory general HSE training to be attended and retrained for all staff on behavioural base safety and HSE minimum requirement expectation for achieving “goal Zero”	1000 staff in 2020
			1000 staff in 2021
			800 staff in 2022
			800 staff in 2023
			300 staff in 2024
3	Internal and Contractor Permit to Work System	Trains and retrain staff project supervisors and external vendors (contractors) through a systemic approach of Permit to Work designed for authorization, supervision and monitoring for compliance to Standard Operating Procedures for all AEDC project execution as an accident prevention approach	60 persons in 2020
			60 persons in 2021
			60 persons in 2022
			65 persons in 2023
			70 persons in 2024
4	Distribution System Operation and Authorization	Trains and retrain Distribution Substation Operators (DSO's) on the safe operations of technical operations and the station guarantee/outage processes	600 staff in 2020
			400 staff in 2021
			400 staff in 2022
			300 staff in 2023
			200 staff in 2024
5	Distribution Code Awareness Training and competent staff authorization level	Sustain training and retraining on Distribution Code Awareness and competent staff authorization level for technical and distribution staff to facilitate implementation of the AEDC Distribution Safety Code	600 staff in 2020
			400 staff in 2021
			400 staff in 2022
			300 staff in 2023
			200 staff in 2024
6	Emergency Preparedness and Response Action	Training and retraining of emergency responders on best approaches and technique operations to human and	1000 staff in 2020
			1000 staff in 2021
			800 staff in 2022
			800 staff in 2023

		facility emergencies for accident prevention	300 staff in 2024
7	Basic First AID/CPR	Training and retraining of staff first aiders to aid in occupational injuries and accident effect escalation	200 staff in 2020 100 staff in 2021 50 staff in 2022 50 staff in 2023 200 staff in 2024
8	Journey Management/Defensive Driving Course	Training and retraining of staff in conjunction with AEDC's fleet management and FRSC on safe driving and "goal zero" target	100 staff in 2020 100 staff in 2021 80 staff in 2022 80 staff in 2023 100 staff in 2024
9	Facility Good Housekeeping and Vegetation Management	Sensitizes and sets schedules on benefits of good housekeeping and timely vegetation management to operations and the environment of work	80 staff in 2020 50 staff in 2021 50 staff in 2022 50 staff in 2023 100 staff in 2024
10	Special/Hazardous Waste Management – Introduction and Implementation of Polychlorinated Biphenyls (PCBs) Management Project.	As a major stakeholders in the Nigeria PCB management Project for the implementation of the Stockholms convention, AEDC builds strong critical staff capacity on the identification, handling and screening of special/hazardous solid and liquid waste within its facilities.	100 staff in 2020 100 staff in 2021 100 staff in 2022 80 staff in 2023 50 staff in 2024
11	Professional Trainings for HSES Staff (e.g. NEBOSH, OSHA, Risk Management etc)	HSES staff are continually selected in batches for certain international HSES professional certification courses to be in tune with international trends in practice	20 staff in 2020 15 staff in 2021 10 staff in 2022 10 staff in 2023 10 staff in 2024
12	Occupational Health and Hygiene	A routine trainings for staff to develop high consciousness for person hygiene while at work with capacity for early warning deteriorating health signs	20 staff in 2020 20 staff in 2021 15 staff in 2022 15 staff in 2023 10 staff in 2024
13	Job Hazard Analysis (JHA) Workshop	Aims at building the capacity of especially field staff in proactively knowing the component task of job assignments with a view to identifying their inherent and potential hazards and formulating adequate controls for them.	250 staff in 2020 150 staff in 2021 150 staff in 2022 100 staff in 2023 200 staff in 2024

14	AEDC Integrated Management System (IMS) training and certification: ISO 14001 – Environmental Management System; ISO 45001:2018 – Occupational Health and Safety Management System; and ISO 9001:2015 – Quality Management System	Trains and certifies persons and processes for a guaranteed system of continuous improvement with maximum leadership commitment to best industry practice and system sufficiency.	25 staff in 2020
			12 staff in 2021
			1000 staff in 2022
			800 staff in 2023
			800 staff in 2024
15	Field Safety and Crisis De-escalation Techniques	Training aimed at providing personnel with adequate skills to avert assaults	250 staff in 2020
			150 staff in 2021
			150 staff in 2022
			100 staff in 2023
			200 staff in 2024
16	Public Electricity Safety Sensitization	Routine and targeted public sensitization on dangers of electricity and community collaboration on hazard identification. These are achieved through door-to-door, organized market place, religious houses, schools including establishment of Electricity Safety Clubs, print and audio media, road show, courtesy visits to royal fathers and community heads, live radio phone in, posters and stationary bill boards, mobile bill boards etc planned towards total eradication of third party accidents and fatality	400 public sensitizations in 2020
			400 public sensitizations in 2021
			350 public sensitizations in 2022
			350 public sensitizations in 2023
			300 public sensitizations in 2024

Table 11: AEDC 5-year Performance Improvement Planned HSES Training and Public Enlightenment Calendar

Year	Year 1	Year 2	Year 3	Year 4	Year 5
HSES Training Budget (NGN)	63,300,000.00	53,619,000.00	43,101,900.00	43,600,000.00	39,400,000.00

Table 12: Summary of Annual HSES Training Budget

## **5.7 Stakeholder Communications and Engagement Strategies**

### **5.7.1 Corporate Communications and Stakeholders Engagement Strategies**

Effective engagement with customers and other categories of the stakeholders provides a beneficial avenue for improved appreciation of the unique challenges all stakeholders face, thus fostering better collaboration between AEDC and her stakeholders and stakeholder subscription to service improvement initiatives of AEDC.

Over the years, AEDC has engaged its customers and stakeholders through townhall meetings, community sensitization meetings, media houses and various social media platforms.

Face to face engagements have been deployed, interface with the Judiciary, collaboration with security apparatus, and sensitisation on the safe use of electricity have all been undertaken in line with regulatory requirements and have been part of AEDC's initiatives towards stakeholder engagement in line with her core value of Customer Centricity and Community Engagements.

In the Strategic Communication Initiative for the Performance Improvement Plan, the existing platforms will be further deepened as listed below, to improve on the existing stakeholder engagement initiatives

The communication plan aims to achieve the following:

1. Manage perception and expectation
2. Inform, educate and enlighten
3. Engender empathy that creates a sense of ownership and protection of critical assets from vandals
4. Trigger a gradual but steady change of certain culture inimical to the survival, growth and development of the NESI
5. Create a symbiotic relationship/build a partnership based on mutual understanding and cooperation between customers and service provider
6. Rekindle hope and build confidence of customers in the service provider.

In broader context, AEDC stakeholder engagement Strategy can be classified grouped into

1. External Stakeholders Engagement Strategies
2. Internal Stakeholder Engagement Strategies

#### **5.7.1.1 External Stakeholders Engagement**

External stakeholder are entities not within a business itself but who care about or are affected by its performance and activities. To support the implementation of the PIP, AEDC will deploy strategies on these fronts:

1. Electronic Platforms (Social Media, televised and Radio programmes)
2. Strategic Engagement with Media Practitioners
3. Corporate Social Responsibility
4. Anti-Vandalism Engagement Initiatives & Campaign Against Energy Theft

### **5.7.2 Electronic Platforms (Social Media, televised and Radio programmes)**

Prior to the preparation of the PIP, AEDC's external engagement profile had focused on a wide range of methodologies such as town hall meetings, radio appearances, social media etc. For instance, as a result of

high visibility on the social media through a flurry of activities, AEDC now has a tweeter followership population of 12,600, Facebook likes of 11,000 and 1,878 viewers on Instagram. Under the PIP SCI, higher traffic will be generated through a combination of several other already identified professional initiatives such as shot video skits that captivates the social media community, especially tweeter because of its tendency to engage through short messages and potential for informative content to go viral. Furthermore, the PIP SCI will also enjoy the benefit of AEDC managed radio programmes where it can have more time to itself rather than share such airtime with some other organisations as it currently does with some of its radio appearances.

Electronic Platforms (Social Media, televised and Radio programmes) Strategies			
SN	Challenge/Issue to Address	Consequences	Management/Mitigation
1.	a) Wrong expectation b) Poor perception c) Disillusionment after privatisation d) Inadequate public sensitization e) Host community & entitlement mentality. f) Rigid adherence to public ownership mentality of the power sector g) Inadequate legislative instruments to check certain anti performance conducts on the part of customers h) Policy instability i) Not taking ownership of assets of the DisCo.	I. Low and outright loss of willingness to pay for electricity consumed. II. Theft of energy through bypass and free connection to the network III. Hostile customers IV. Electrical accident and electrocution V. Resort to alternative sources VI. Customer advocacy groups making unrealistic demands. VII. Illegal reconnections/ trespass to AEDC equipment in circuit VIII. Feeding from multiple public sources in order to ensure availability. IX. Resort to the use of unauthorized persons (internal & external qualified-unauthorized personnel) in DisCo network because of its porousness by customers.	I. Stakeholders mapping to separate large power users from medium and low power users II. Customer engagement with different segments of the customer mix (large, medium & low power users) through different platforms such as social media, face to face (f2F), electronic media etc. The platform for engagement will depend on the type of customer mix. For instance, meeting with OPS or members of the State Houses of Assembly or federal legislature or Judiciary will be through face to face engagement II. Specialised writings in newspapers through 3 <sup>rd</sup> party advocacy who are subject matter experts, radio & television appearances using popular program platforms like Brekete on Human Rights Radio, Brugami on Vision FM, Wazobia FM etc. <b>This will also be replicated in other parts of the AEDC catchment areas outside the Federal Capital Territory.</b> V. Jingle production to deliver specific messages to customers V. Short radio drama series with caption like “Mr. Safety” to broadcast safety messages in promotion of HSE VI. Newspaper adverts /advertiser’ announcement. II. Specialised and serialised columns/pullouts in newspapers. II. Sponsorship of magazine programs on radio.

			<p>X. Use of informal means as well as socialization points to engage formal institutions and personalities.</p> <p>X. Development of engagement strategies with customers in hostile communities.</p> <p>KI. Sponsorship of newspaper adverts to felicitate with workers on Labour Day, felicitate with customers on religious festivals as well as Customer Service Week.</p> <p>II. Publicise company's achievements through TV documentaries and other platforms.</p> <p>II. Undertake customer satisfaction survey in conjunction with Customer Care Department.</p> <p>V. Working in tandem with Strategic with relevant departments like Legal and Regulatory for strategic engagements with relevant stakeholders.</p>
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Table 13: Electronic Platforms Strategies

### 5.7.2.1 Strategic Engagement with Media Practitioners

Over the years, the Nigerian media has efficiently served as the conveyor belt for information to the public and has also played its agenda setting role professionally and to the extent to which its competency in any area of the Nigerian economy allows it. What this therefore translates into is that the Nigerian media made of practitioners from different backgrounds and persuasions can only play their role of informing, educating and entertaining to the extent of their depth of knowledge of the subject matter, the poses a risk of misrepresenting the on-goings and players of the NESI and not just AEDC. In mitigating these strategies, the Mitigation/Management action has been developed as follows:

Strategic Engagement with Media Practitioners			
SN	Challenge/Issue to	Consequences	Management/Mitigation
	The crucial role of the media in any nation cannot be over-emphasised hence the need to ensure that any observed knowledge gap in this crucial sector of any economy is bridged. From various engagements with different levels of media practitioners, there is obvious knowledge gap about the power sector.	<p>i. Insufficient or total lack of knowledge of the power sector</p> <p>ii. Misreporting and biased commentaries on issues concerning the power sector in the media.</p> <p>iii. Poor management of the agenda setting role of the media through inadequate research on issues dealing with the power sector.</p>	<p>i. Periodic media education engagement</p> <p>ii. Facility visit for media men</p> <p>iii. Seminar/workshops for media men</p> <p>iv. Periodic visitation to media houses within franchise area</p>

Table 14: Strategic Engagement with Media Practitioners

### 5.7.3 Corporate Social Responsibility/Sustainability

One proven tool for winning and retaining customer loyalty apart from quality of service is also to give back to the host community of business endeavours. Such strategic engagement helps the business to sustain its interest within the community of operations as the host is encouraged to take ownership and ensure the security of the business entity.

AEDC has adopted this strategy fully, making financial donations to professional bodies like the NMA, NSE, books to schools, water batch to riverine community in Kogi State, medical consumables in the Palace of Etsu Nupe, IDP Camp in Nasarawa and a host of others. In furtherance of AEDC pursuit of this strategy which consistent with her core values of Community engagement, AEDC will employ the following Mitigation/Management strategies with regards to Corporate Social Responsibility/Sustainability.

Corporate Social Responsibility/Sustainability			
SN	Challenge/Issue to	Consequences	Management/Mitigation
	Implementation of high impact corporate social responsibility/sustainability projects as drivers for the identified purposes of the communication plan.	<ul style="list-style-type: none"> <li>i. Lack of empathy</li> <li>ii. Feeling of alienation through inadequate power supply</li> <li>iii. Feeling of exploitation through perceived huge electricity bills</li> <li>iv. Perception as a conduit for corruption.</li> <li>v. No sense of ownership hence the rising cases of vandalism and theft of energy through various means.</li> <li>vi. Disillusionment with quality of service especially with the resolution of complaints in the area of billing and faults clearing.</li> <li>vii. Dissatisfaction with staff attitude.</li> </ul>	Elicit support/cooperation through: <ul style="list-style-type: none"> <li>i. Strategic intervention through the donation of medical consumables, renovation of medical facilities such as maternity or children's ward, sponsorship of minor surgeries, working with strategic agencies like National Agency for the Control of AIDS (NACA) to join in the fight against HIV/AIDS or other killer diseases that may be ravaging localities within AEDC catchment areas.</li> <li>ii. Contribution to disaster/national emergencies in AEDC catchment areas.</li> <li>iii. Strategic intervention in educational institutions through the donation of educational materials, scholarship for best male and female engineering students in any higher institution of our choice within our catchment area.</li> <li>iv. Youth empowerment through vocational training in chosen communities within AEDC catchment areas.</li> </ul>

Table 15: Corporate Social Responsibility

### 5.7.4 Anti-Vandalism Engagement Initiatives & Campaign Against Energy Theft

Reduce vandalism in areas/locations prone to vandalism by regular interface with the Chiefs, vigilante groups and opinion leaders of the areas, and where necessary encourage them with some monthly or quarterly stipends as compensation for non-occurrence of vandalism in their areas/location and presentation of Awards at the end of the year.

Using CSR tools to enter into a partnership and mutual relation with communities with high vandalism tendencies. AEDC will continue to actively pursue the passage of the draft legislation of Electricity Offences



for presentation to the State Houses of Assemblies of our franchise areas to ensure a more stringent provision and easy prosecution of cases of electricity offenses/vandalism.

Intense campaign against all forms of energy theft to aid revenue protection and ensure greater revenue yield from sales of energy will be undertaken.

### 5.7.5 Regulatory & External Stakeholders Engagement Strategy

AEDC has also developed a strategy for managing its engagement with regulators and other government stakeholders. Some of the regulators whose mandates have a serious impact on AEDC's business include NERC, NEMSA, the Federal Competition and Consumer Protection Commission (FCCPC), the National Information Technology Development Agency (NITDA), and National Environmental Standards and Regulatory Enforcement Agency (NESREA). Other relevant government stakeholders include the Bureau of Public Enterprises (BPE), the Federal Ministry of Power, Public Complaints Commission (PCC), the National Assembly and the State governments within AEDC's coverage area.

The goal is to foster a healthy, professional and principled relationship with these critical stakeholders, and through formal and informal engagements under this strategy, potential difficulties and challenges are identified and quickly resolved.

### Tariff Review and Stakeholder Engagement Process

Given the importance of stakeholder engagement in the tariff review process, AEDC shall undertake robust consultations and other engagements with her critical stakeholders in accordance with the provisions of the Regulations on the Procedure for Electricity Tariff Reviews in the Nigerian Electricity Supply Industry 2014.

Consequently, AEDC shall, over a period of one month hold a total of six (6) enlightenment and consultation meetings with her stakeholders as follows:

- (i) One meeting with Industrial and Commercial customers in the FCT regions
- (ii) One meeting with Residential customers in the FCT regions
- (iii) One meeting with customers from Kogi Region
- (iv) One meeting with customers from Nasarawa Region
- (v) One meeting with customers from Niger Region
- (vi) Three separate meetings with the Governments of Kogi, Nasarawa and Niger states.

The consultation process will commence with a publication of the PIP document on AEDC's website, and the public will be requested to make their comments. Shortly thereafter, a detailed consultation process will be published in both the print and electronic media. During the consultation meetings, the details of the PIP document, including the promises to, and the expectations from the customers and stakeholders will be freely discussed. The comments, objections, or other observations received from the stakeholders will be collated and considered, and the outcome will be communicated to NERC. A register of attendance taken at those meetings, together with their video coverage will be produced and communicated to the Commission.

It is hoped that the service improvement plans being proposed by AEDC in the PIP document will receive a greater sense of ownership and stakeholder buy-in with this level of consultation and engagement.

## 5.7.6 INTERNAL STAKEHOLDERS

The concept of charity begins at home clearly underscore the need for extra attention to be paid to the workforce especially because they are the ones that will deliver on the vision and mission of the organization. AEDC performance of AEDC in the area of MAP implementation, which has earned it the commendation of NERC after a nationwide evaluation of performance underscore this point. While certain tools of communication identified and listed herein have been in use, they will not only be reinforced, fresh ones, which are intended to bring out the best in the staff will also be pursued through the PIP SCI.

<b>Corporate Social Responsibility/Sustainability</b>			
<b>SN</b>	<b>Communication Recipient</b>	<b>Implication</b>	<b>Objective/Desired outcome</b>
1.	Board		<ul style="list-style-type: none"> <li>i. Constant high-level briefings through meetings and other platforms.</li> <li>ii. Periodic engagement with staff.</li> <li>iii. Courtesy visits to opinion and political leaders as well as policy makers.</li> </ul>
2.	Staff Communication	<ul style="list-style-type: none"> <li>i. Work ethics</li> <li>ii. Brand management</li> <li>iii. Culture change/reorientation</li> </ul>	<p>Constant communication with staff through the underlisted platforms.</p> <ul style="list-style-type: none"> <li>i. Website</li> <li>ii. Quarterly &amp; Annual Workers Assembly (QWA/AWA)</li> <li>iii. Circulars</li> <li>iv. In-House journal and magazine publication for dissemination of information and championing of change process.</li> <li>v. Develop strategic staff corporate social responsibility</li> <li>vi. End of year staff award</li> <li>vii. Scheduled and unscheduled visitation by Management team to field offices</li> <li>viii. Annual Staff Satisfaction Survey (ASSS)</li> <li>ix. Sports &amp; wellness programmes.</li> </ul>
3	<b>Industrial Relations</b>	<ul style="list-style-type: none"> <li>i. Improved industrial atmosphere</li> </ul>	<ul style="list-style-type: none"> <li>i. Scheduled periodic meetings with in-house labour unions like SSEAC &amp; NUUE</li> <li>ii. Periodic meeting with leadership of NLC &amp; TUC</li> <li>iii. Seminar/workshop for labour leaders</li> <li>iv. Guided tour of power facilities by labour leaders under the sponsorship of AEDC</li> <li>v. Visitation of Labour Leaders under the auspices of HR.</li> </ul>

## 6 Financial Projection and Resources Mobilisation

### 6.1 AEDC Historical Performance

The business environment for energy utility companies has been particularly challenging since privatisation. The sector has been characterized by non-cost reflective tariffs and huge collection losses. This has led to severe liquidity challenges and a significant accrual of market liabilities by most Discos.

#### a. Market Obligations

Based on the 2016 – 2018 Minor Review of MYTO 2015 (“Minor Review Order”), NERC computed AEDC’s tariff shortfall as ₦102.2bn. This figure highlights the under-recovery of tariffs by AEDC since 2015 due to non-cost reflective tariffs. The Minor Review Order also computes the total market shortfall for AEDC as ₦176bn resulting in a net shortfall position of ₦73.8bn. However, the resulting market obligation for AEDC at ₦73.8bn puts the business at a significant disadvantage to sourcing additional finance to transform its business.

AEDC is in discussions with NERC with regards to the non-recognition of certain items in the current computation of its net shortfall. A summary of these proposals is presented in [Appendix 3]. Without a review downwards of AEDC’s net shortfall position, it will be in a difficult position to implement the initiatives of this PIP due to huge debt liabilities and associated cash constraints.

#### b. ATC&C Loss Reduction

ATC&C losses reduction commitment was a critical aspect of the Performance Agreement executed between KANN Utility Consortium (KANN) and Bureau for Public Enterprise (BPE) during the privatisation process in 2013. As at handover by BPE, the approved aggregated ATC&C loss for AEDC amounted to 52.7%.

Subsequently, NERC ordered the removal of Collection Losses attributable to Government’s Ministry Departments and Agencies (MDA)’s from the ATC&C loss baseline and target losses. As a condition of this removal, NERC committed that a mechanism for the recovery of these debts would be put in place shortly after the 10-Year MYTO Order came into force. This revised AEDC’s baseline ATC&C loss to 46.05% and its target losses for the Performance Agreement period. A summary of the loss reduction commitments is presented below:

	Year 1	Year 2	Year 3	Year 4	Year 5
<b>ATC&amp;C Loss Performance – Performance Agreement</b>	36.15%	27.54%	25.59%	22.80%	19.27%
<b>ATC&amp;C Loss Performance (without MDA Debt Collection Losses – NERC</b>	31.54%	24.03%	22.33%	19.89%	16.81%

Table 16: Comparison of ATC&C Performance Loss Targets

Despite the challenging environment, AEDC has managed to reduce ATC&C losses from 53% at inception to 39% as at June 2019, representing a 14% reduction in absolute terms and 26% reduction in relative terms.

## 6.2 AEDC 5-Year Financial Projection

The PIP has presented another opportunity for AEDC to transform its business and define key performance measures to transform the business over the next five (5) years. AEDC has identified key initiatives to improve its performance over the period of this Improvement Plan. However, these performance measures cannot be achieved without the implementation of these key assumptions:

### Treatment of market liabilities

Based on the Minor Review 2019, NERC has outlined a path to resolving the impairment of the financial records of Discos arising as a consequence of tariff shortfalls. This Order also provided guidance on the treatment of the shortfalls as follows:

- All accrued liabilities to AEDC arising from tariff shortfalls be transferred off its balance sheet and fully settled under the financing plan of the Power Sector Recovery Plan (“PSRP”) initiative
- Interest payable by AEDC on unpaid invoices issued by NBET and MO and attributable to tariff shortfall shall be transferred off the balance sheet

The implementation of the treatment of this shortfall would have a positive impact on the financial performance of AEDC in terms of additional revenues in and transfer of some of AEDC’s market liabilities. However, the portion of market obligations still payable by AEDC has been estimated at ₦8.8bn and assumed to be paid off over a [15] year period.

### Loss Reduction Targets

The Minor Review 2019 sets a new tariff for the next five (5) years with a transition to full cost reflectivity by 2020. These tariffs were derived from CAPEX levels of ₦26.5bn over a five (5) year period and an annual average OPEX levels of approximately ₦24bn respectively. Our analysis of the performance improvements required to drive the turnaround of the business and achieve loss reduction targets per the Performance Agreement indicate that the business requires more robust CAPEX and OPEX limits. Different scenarios have been presented below to provide insight into the loss performance trajectory that is more realistic within the current operating environment.

Scenario	CAPEX Levels	2020	2021	2022	2023	2024
Previous ATC&C Loss Target Commitments	n/a	25.59%	22.80%	19.27%	19.27%	19.27%
Scenario 1 - Pessimistic Case	No Increase Beyond Allowable CAPEX and OPEX per Minor Review 2019	35%	35%	35%	35%	35%
Scenario 2 – Base Case	Moderate CAPEX Plan - ₦56bn	30%	27.54%	25.59%	22.8%	22.8%
Scenario 3 – Optimistic Case	Full CAPEX Plan - ₦81bn	30%	27.54%	25.59%	22.80%	19.27%

Table 17: :Scenario Analysis for ATC&C Loss Reduction

In order to keep the average tariff within a range so as to avoid tariff shock to the customers, the base case (Scenario 2) formed the basis of the financial assumptions discussed in this PIP.

AEDC is proposing a more realistic loss reduction target based on its current ATC&C loss levels and the amount of capital injection required to improve performance and reduce losses. The rationale for reviewing the ATC&C loss performance targets is listed below:

- **Current Loss Levels:** Due to the constraints in NESI, AEDC's current ATC&C loss is 39%. Without fresh capital injection into the business, it will be difficult to make the required investments to reduce the ATC&C losses to levels initially proposed.
- **Non-implementation of Power Sector Reforms:** AEDC had set an ATC&C performance loss target of 30% for the end of 2019. However, this target was based on the outcome and implementation of the Minor Review by [January 2019]. It was also expected that the implementation of the PSRP would have been commenced.
- **Full Implementation of MAP:** It has been found that it is not possible to make significant reductions to ATC&C losses without 100% metering of customers. The MAP is expected to be fully implemented by 2021. Before the full implementation of MAP and metering of all customers, it is not realistic to expect the ATC&C losses to be reduced significantly as the commercial losses would still be substantial.
- **Settlement of MDA Debts:** A key success criteria for implementing the PSRP was the development of a sustainable mechanism for ensuring settlement of electricity invoices by all branches of Government. However, since no such mechanism exists, there is no assurance of collections in the future which would continue to have an adverse impact on AEDC's collection losses.

A comparison of the three (3) scenarios and the strategic initiatives required to meet the proposed ATC&C loss targets are presented in Figure [20] below. The full CAPEX Plan for Scenario 2 is also presented in section [6.3].

PIP - period	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Period	2019	2020	2021	2022	2023	2024
Loss Trajectory Commitment	35.00%	30.00%	27.54%	25.59%	22.80%	19.27%
<b>Strategic Initiatives</b>						
Full & Prompt Settlement of MDA Debts	✓	✓	✓	✓	✓	✓
Tech Module of Customer Management System		✓	✓	✓	✓	✓
Full Metering SPU&LPU (MAP)			✓	✓	✓	✓
Advanced Metering Infrastructure (AMI) + DT Meter Reading				✓	✓	✓
Full Deployment of DT Metering				✓	✓	✓
ADMS - Geographic Information Systems					✓	✓
ADMS - Energy Management System (EMS)					✓	✓
ADMS - Outage Management System (OMS)						✓
ADMS - Supervisory Control & Data Acquisition (SCADA)						✓

Table 18: Impact of Strategic Initiatives on ATC&C Loss Targets

### Allowable CAPEX and OPEX

As mentioned above, the transformation of this business in line with the PIP require the full financing of a robust CAPEX Plan, introduction of cost-reflective tariffs and a minimum level of operating expenses to optimize performance. AEDC's CAPEX and OPEX plans are presented in more detail.

### 6.3 Capital Expenditure (CAPEX) Plan

In order to implement this Performance Improvement Plan and achieve moderate improvements in the business at a comfortable tariff for its customers, AEDC has estimated a total capex of ₦56bn over the next five (5) years. This capital expenditure is expected to provide performance improvements across three areas:

- i. Loss reduction – *Technical, Commercial and Collection losses*
- ii. Customer service improvements
- iii. Health and safety improvements

To arrive at this CAPEX plan, the following were considered:

- i. **State of the Network:** Technical studies were conducted to determine the current state of the network for the purposes of technical loss reduction and related investments required for network expansion planning.
- ii. **Metering Plan:** AEDC has identified metering as a strategy to reduce non-technical losses. Through the MAP, AEDC plans to deploy 250,000 meters across its network as well as DT meters for monitoring energy usage.
- iii. **Market Study:** Studies have been conducted to optimise the planned roll out of new connections ensuring that the maximum numbers of new connections are made whilst still maintaining the financial and technical stability of AEDC and its network
- iv. **Information Communications Technology (ICT) needs:** The business has also assessed its ICT needs and the required hardware and software components necessary to run an efficient utility
- v. **Refurbishment/replacement:** Identification of existing assets that require that upgrade or replacement
- vi. **Work tools and equipment:** The assessment of work tools and equipment required for both core services and support functions

This CAPEX requirement is more than 100% higher than the allowed CAPEX in the 2016 – 2018 Minor Review of MYTO 2015 (“Minor Review Order”). However, this higher CAPEX levels are paramount to AEDC achieving significant reductions to its current loss levels. The CAPEX Plan for the PIP period is summarized below:

Details	2020	2021	2022	2023	2024	Total
Technical CAPEX	<b>10,919,037,661</b>	<b>11,497,354,621</b>	<b>10,611,187,981</b>	<b>10,863,187,981</b>	<b>6,273,586,861</b>	<b>50,164,355,105</b>
Network Expansion	3,594,768,138	3,594,768,138	3,594,768,138	3,594,768,138	3,594,768,138	17,973,840,689
Network Reconfiguration	152,105,137	152,105,137	152,105,137	152,105,137	152,105,137	760,525,686
Network Rehabilitation	568,158,778	568,158,778	568,158,778	568,158,778	568,158,778	2,840,793,890
Network Upgrade	1,454,554,808	1,454,554,808	1,454,554,808	1,454,554,808	1,454,554,808	7,272,774,040
SCADA	-	252,000,000	756,000,000	1,008,000,000	504,000,000	2,520,000,000
Advanced Metering Infrastructure	-	326,316,960	652,633,920	652,633,920	-	1,631,584,800
Meter replacement Initiative	5,149,450,800	5,149,450,800	3,432,967,200	3,432,967,200	-	17,164,836,000
						-
Non-Technical	<b>1,133,622,384</b>	<b>1,059,596,846</b>	<b>1,160,925,499</b>	<b>1,363,560,304</b>	<b>1,345,457,938</b>	<b>6,063,162,972</b>
HSSE	715,222,384	793,896,846	881,225,499	978,160,304	1,085,757,938	4,454,262,972
Customer Centric Plan	322,400,000	169,700,000	183,700,000	295,400,000	169,700,000	1,140,900,000
Operational Vehicles	96,000,000	96,000,000	96,000,000	90,000,000	90,000,000	468,000,000
<b>Total CAPEX</b>	<b>12,052,660,045</b>	<b>12,556,951,467</b>	<b>11,772,113,480</b>	<b>12,226,748,285</b>	<b>7,619,044,799</b>	<b>56,227,518,076</b>

Table 19: Proposed CAPEX Plan for PIP Period

## 6.4 Operating Expense (OPEX)

AEDC has assessed its OPEX requirements for the periods under review and considered the current level of operations, planned increase in network coverage, business culture change and overall organizational strategy. This has enabled the business to estimate realistic OPEX levels to optimize business performance. The OPEX consists primarily of the following expense categories:

- Collection expenses
- Maintenance of network assets and other categories of equipment and office buildings
- Consultancy services
- Customer-centric costs
- Staff costs
- Security and insurance
- Transportation costs
- Office rent, repairs and consumables

AEDC's unique environment and business strategies necessitating our current and estimated future OPEX needs are discussed as follows:

### Land mass covered

AEDC's coverage area consist mainly of non-industrialized areas spanning across Kogi, Abuja, Niger and Nasarawa. The land mass covered by the franchise area is estimated at 133,014 sq.km made up of Abuja (7,607 sq.km), Kogi (27,747 sq.km), Nasarawa (28735 sq.km), and Niger (68,925 sq.km). This unique situation has necessitated operating in a regional structure consisting of 8 regions, 34 area offices and over 254 service centres. In order to effectively serve electricity customers' spread over this landmass, substantial operating expenses are unavoidable.

### Customer centric service delivery

With the NESI steadily moving towards a free competitive market, customer focused way of doing business is now more than ever, a focal point in AEDC's business strategy. The goal is to make it easy for a customer to get connected to the network, obtain information about their transactions, make payments from the comfort of their homes and communicate effectively with the business. This is



what AEDC refers to as the customer centric way of doing business. It is a strategy that puts the customer first and at the core of our business.

This strategy would require:

- Hiring and retaining well motivated employees;
- Continuous development of employees;
- Opening more channels of contacts with customers

#### **Planned extensive customer capturing**

The Federal Capital Territory (FCT) region represents a landmass of only 6% of AEDC's total coverage area. However, it has more than 54% of the total captured customers in the AEDC customer database. This clearly shows that lots of field operating activities are required especially at the outer regions (Kogi, Nasarawa and Niger) to ensure that more customers are legitimately brought into the network. This necessitates additional operating expenses including staff costs, transportation and vehicle running costs, professional and consultancy costs over the next few years.

This is expected to result in significant growth in revenue and reduction in commercial and collection losses. However, for these benefits to be achieved, there must be an optimal level of operating expenses.

#### **Extensive network maintenance**

It is well acknowledged that maintaining an electricity distribution network requires constant routine proactive and reactionary maintenance work. This has taken into consideration the planned network expansion, maintenance schedule, technical staff requirements and technical training needs in arriving at the budgeted maintenance costs for the next five years.

This component of OPEX is critical to reduction in technical losses, network downtime and increase in customer satisfaction. Hence, as AEDC's network coverage expands over the next five years, recruitment of more technical staff and extensive trainings on electricity network maintenance measures would have an impact on our staff costs.

### **6.5 Cost Reflective Tariffs**

Since privatization, NESI has been characterised by non-cost reflective tariffs which have suppressed the growth potential of the sector. Based on the Minor Review 2019, Discos are expected to transition to cost-reflective tariffs by July 2020. However, the analysis of AEDC's revenue required and the approved tariffs per the Minor Review Order indicates that these tariffs are not sufficient to fund a robust improvement plan to transform the business and meet Performance Agreement targets.

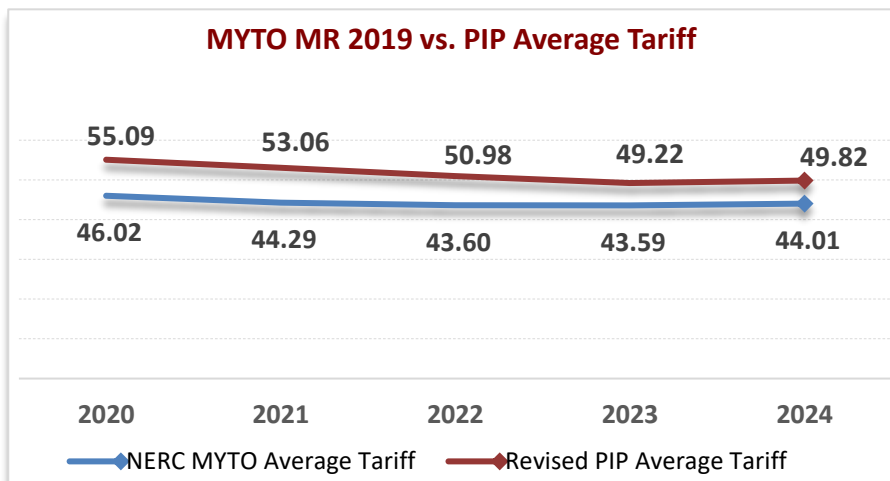


Figure 19: PIP Average Tariff vs. MYTO Minor Review Order Tariff:

AEDC has analysed the revenue required based on the projected CAPEX and OPEX provided in sections 6.4 and 6.5 above and computed the appropriate cost reflective tariffs to ensure the successful turnaround for the business. These cost-reflective tariffs are presented below:

**Tariff by Class**

Base Case		2020	2021	2022	2023	2024
Residential	R1	4.00	4.00	4.00	4.00	4.00
	R2	38.27	39.95	38.38	37.05	37.50
	R3	72.80	76.00	73.02	70.49	71.35
	R4	72.80	76.00	73.02	70.49	71.35
Commercial	C1	57.75	60.29	57.92	55.92	56.60
	C2	72.83	76.03	73.05	70.52	71.37
	C3	72.83	76.03	73.05	70.52	71.37
Industrial	D1	55.66	58.11	55.83	53.89	54.55
	D2	72.80	76.00	73.02	70.49	71.35
	D3	72.80	76.00	73.02	70.49	71.35
C&I Special	D4	58.24	60.80	58.42	56.39	57.08
Special	A1	55.14	57.57	55.31	53.39	54.04
	A2	55.14	57.57	55.31	53.39	54.04
	A3	55.14	57.57	55.31	53.39	54.04
Lighting	S1	42.26	44.12	42.39	40.92	41.42

Base Case		2020	2021	2022	2023	2024
<b>Loss Trajectory</b>		30%	28%	26%	26%	26%
<b>Average Tariff</b>		55.09	53.06	50.98	49.22	49.82

Table 20: Cost-reflective Tariff Proposal

For emphasis A new tariff class **C&I Special D4** was created to provide a competitive tariff for qualifying commercial and industrial customers with energy consumption level above a minimum threshold. This is consistent with the philosophy of granting volume discount as expected in normal business transactions.

Additionally, the key assumptions for determining the tariff design remain unchanged from the position per the Minor Review Order except for an adjustment in CAPEX and OPEX levels. A summary of these assumptions is presented below:

**Macroeconomic variables:** AEDC computed the cost-reflective tariffs based on the macroeconomic variables used in the MYTO Model of the Minor Review Order. A summary of these variables is presented below:

<i>Revised PIP MYTO</i>					
Category	2020	2021	2022	2023	2024
Nigerian Inflation	11.34%	11.34%	11.34%	11.34%	11.34%
US Inflation	1.76%	1.76%	1.76%	1.76%	1.76%
₦/\$	309.97	309.97	309.97	309.97	309.97
ATC&C Loss Trajectory	22.33%	19.89%	19.89%	19.89%	19.89%
Delivered to Discos (GWh)	4,489	4,897	5,453	5,884	6,220

*Table 21: Key assumptions for computing Proposed Cost-Reflective*

**]Projected Energy Allocation to AEDC:** As per the Vesting Contract with NBET, ₦11.5% of total energy available from national generation will be allocated to AEDC. The volume of available generation according to MYTO is a variable affecting tariffs which is subject to bi-annual review along with other variables. The projected energy allocation to AEDC used in the MYTO model for tariff calculation is shown in Table 21 above:

## 6.6 Financing Plan

As its base case for performance improvements, AEDC has a projected CAPEX plan of ₦56bn over the next five years. This CAPEX plan is expected to fund the loss trajectory required to meet the ATC&C loss reduction targets according to the Performance Agreements. Based on financial analysis, the business has identified a debt/equity position of 70/30 as the optimal capital structure to fund its capex requirements. The debt is expected to be financed through a blend of development finance and commercial debt. The funding from Development Finance Institutions is expected to come from institutions such as the World Bank that have indicated interest in supporting the Power Sector Recovery Plan (PSRP).

Financing Plan	Year1	Year2	Year3	Year4	Year5
<b>Equity: - 30%</b>	<b>4,881,318,013</b>	<b>4,289,110,352</b>	<b>3,169,043,868</b>	<b>3,244,834,310</b>	<b>4,594,513,440</b>
Internally generated - 50%	2,440,659,007	2,144,555,176	1,584,521,934	1,622,417,155	2,297,256,720
Capital injection - 50%	1,220,329,503	1,072,277,588	792,260,967	811,208,577	1,148,628,360
<b>Debt: - 70%</b>	<b>11,389,742,031</b>	<b>10,007,924,155</b>	<b>7,394,435,692</b>	<b>7,571,280,056</b>	<b>10,720,531,359</b>
Term loan: - 60%	6,833,845,219	6,004,754,493	4,436,661,415	4,542,768,033	6,432,318,815
Dev. financing: - 30%	2,050,153,566	1,801,426,348	1,330,998,425	1,362,830,410	1,929,695,645
Fixed income (Bond): - 10%	205,015,357	180,142,635	133,099,842	136,283,041	192,969,564
<b>Total</b>	<b>16,271,060,045</b>	<b>14,297,034,507</b>	<b>10,563,479,560</b>	<b>10,816,114,365</b>	<b>15,315,044,799</b>

Table 22: : Proposed Financing Plan for CAPEX during PIP period

The business expects that some of the proceeds from the business (approx. ₦1.8bn in 2020) will be ploughed back into the business to drive growth.

## 6.7 Summary of Financial Model Output

Based on the following projections, a summary of AEDC's financial performance over the next 5 years is presented in Table 23 below:

- Introduction of proposed cost reflective tariffs by July 2020
- Revised CAPEX and OPEX per AEDC estimates
- Tariffs per PIP/Extraordinary Tariff Review
- Energy delivered as per MYTO
- Implementation of Minor Review Order on treatment of market liabilities
- ATC&C Losses per AEDC's Base Case (Scenario 2)

Period (R'000)	2019	2020	2021	2022	2023	2024
Revenue	367,765 <sup>1</sup>	204,980	236,739	253,568	264,241	282,607
Cost of Sales	(99,781)	(119,194)	(129,079)	(143,689)	(155,645)	(170,121)
OPEX	(27,632)	(31,857)	(35,286)	(38,907)	(42,858)	(47,432)
EBITDA	231,795	41,795	55,265	51,075	43,189	39,703
Net Income/(Loss)	196,351	36,660	50,220	45,608	37,308	33,473
Cash from Operating Activities	41,950	48,087	38,233	36,689	25,995	14,979
Cash from Investing Activities	(11,478)	(11,343)	(11,282)	(10,497)	(10,952)	(6,344)
Cash from Financing Activities	(10,130)	(6,197)	(6,192)	(6,186)	(6,179)	(6,172)
Net Cash Position	24,636	55,184	75,943	95,948	104,813	107,276
Assets	207,145	285,413	330,422	371,108	401,299	421,172
Liabilities	(143,838)	(189,003)	(186,948)	(184,718)	(179,753)	(167,681)
Equity	63,307	96,410	143,474	186,390	221,546	253,492

Note:

1. The Revenues in 2019 consist of electricity sales and recognises AEDC's proposed tariff shortfall based on its response to the Minor Review Order

Table 23: Summary of AEDC's 5 Year Projected Financial Performance

The impact of the treatment of AEDC's market shortfalls per the Minor Review Order has a positive effect on the financial performance of the business. Following the implementation of some of the measures of the Minor Review Order, AEDC will benefit from a positive equity position from 2019. This could potentially provide opportunities for the shareholders to secure additional funding to further turnaround the business.

### Summary of AEDC Proposal to NERC on Market Shortfalls

	2015	2016	2017	2018	Total
Tariff Shortfalls (NERC)	20,339	17,741	26,061	38,079	102,220
MDA Debt	5,318	10,874	3,898	3,206	23,296
Adjustment to Capacity Charges	3,195	4,021	4,192	5,635	17,043
MAN Debt	-	-	1,839	967	2,806
Imbalance Penalty	4,560	-	-	-	4,560
IRP Shortfall not covered by NEMSF I	17,326	-	-	-	17,326
Updated Tariff Shortfalls	50,738	32,636	35,990	47,887	167,251
Market Shortfalls (NERC)	(21,866)	(41,825)	(51,300)	(61,066)	(176,057)
Net Shortfalls	28,872	(9,189)	(15,310)	(13,179)	
Cumm. Net Shortfalls	28,872	19,683	4,373	(8,806)	

Table 24: Impact of AEDC's Proposal on Tariff Shortfalls

## 7 Risk Assessment

### 7.1 AEDC Enterprise Risk Governance

The Board of AEDC is responsible for delivering sustainable shareholder value, determining the strategic direction of the organisation and for creating the environment and the structures for risk management to operate effectively. The Board determines the company's risk appetite, approves the risk management framework and the resources for implementation of critical remedial actions. These responsibilities of the Board are delegated to its Risk Management, Safety, Health & Environment (RMSHE) Committee to assist it in carrying out independent oversight including those relating to the establishment of policies, standards and guidelines for risk management in compliance with relevant regulatory requirements.

The duties of the RMSHE Committee include advising the board on the company's overall risk appetite, tolerance and strategy. The risk committee and the board have reviewed and approved AEDC's Risk Management Policy and Risk Appetite & Tolerance Statement among other governance frameworks.

The company-wide risk assessment requires business units to formally review business risks regularly. This approach to identification, analysis and assessment of risks ensures ownership and responsibility so that they are effectively managed, controlled and monitored. A broad spectrum of business risks is considered through this process including those relating to Insurance, Information Security, Project, Technology, and Business Continuity Management. The causes and the consequences of each risk are considered and, where appropriate, mapped to strategic and operational objectives.

Management controls designed to mitigate and monitor risks are documented and risk owners assigned to each risk. Our risk response is selected based on the assessment of potential risk exposure and the acceptable risk tolerance level. The response reflects whether we accept the risk on the basis of its assessed level of exposure and current mitigating controls in place, where possible, or reduce the risk through additional mitigation to keep it within set tolerance levels. Key risk indicators (KRIs) have been identified for each of our principal risks and are used to monitor our risk exposure. The KRIs are reviewed quarterly by the RMSHE committee to ensure that the activities of the business remain within our risk appetite.

Risk management in AEDC is about proactively identifying and understanding the factors and events that may impact the achievement of strategic and business objectives, then taking action on all the risks with a view to increasing the probability of success and reducing the likelihood of failure.

We have adopted the ERM process thus administering a structured, consistent and coordinated framework for assessing, responding to and reporting on risks that may affect the achievement of our corporate objectives. The scope of AEDC enterprise-wide risk management include: Strategic, Tactical, Operational and Compliance activities.

### 7.2 Risk Assessment In AEDC

Risk assessment involves the recognition of risks and their rating to determine the significant risks facing the company, its project or strategy. In line with good practice and standards, it is AEDC's overall process to identify all the risks flowing from all strategic, tactical, operational and compliance activities within the company, analyze and evaluate the risks with a view to generate a comprehensive list of risks from the events/uncertainties that might negatively impact or enhance the attainment of objectives. Because the risk

management input into strategy focuses on improved business decision making, risk assessment is the key risk management input into our strategy formulation.

We use a combination of top-down and bottom-up risk assessment approaches. Sometimes risk assessments are undertaken by the Board of Directors and Executive Management team and cascaded downwards. Also, risk assessments are undertaken by involving individual members of staff and functional management as a valuable bottom-up approach. The bottom-up approach involves identifying, managing and monitoring risks in each business area of our organization. This way, risk management is embedded in our day-to-day operations. Control of this process is provided through maintenance of risk registers in each area. These risk registers are aggregated and reviewed with significant and emerging risks escalated for board consideration as appropriate.

### 7.3 Risks to the Implementation of PIP

The principal current and emerging risks to the implementation of the Performance Improvement Plan (PIP) with updates on current controls and actions to mitigate these risks are highlighted below.

Ref.	Risk Description	Risk Ranking
1	There is a risk of increased regulatory oversight and Regulatory Changes in the course of PIP implementation. For example: - <ol style="list-style-type: none"> <li>1. There is Risk that the regulator may enforce the estimated billing bill</li> <li>2. There is a risk that the NESI may fail to achieve the target of providing a cost reflective tariff</li> </ol>	Very High
2	There is a risk that AEDC may fail to attain the agreed Financial Performance Targets	Very High
3	AEDC may be unable to reduce ATC&C losses as indicated in the transactional documents.	Very High
4	ICT and Cyber Threats Covering the Loss of Critical Network Connectivity, Non-availability of Business Applications and Poor Execution Of Business Continuity Plan (BCP).	Very High
5	Inadequate capital and/or excessively high cost of capital to drive growth initiatives.	Very High
6	Potential for High Injury and Fatality Rate to Staff and Members of the Community.	High
7	Inability to detect and prevent fraudulent activities.	High
8	There is a risk of commodity electricity supply chain constraint resulting in non-availability of the commodity or reduced / restricted supply levels to AEDC customers.	Medium
9	AEDC's power distribution network may be in a poor state with network performance not meeting customer demand and expectations.	Medium
10	Inability to recruit, develop and retain appropriate skills	Medium

Table 25: PIP Implementation Risk Register

#### 7.3.1 Increased Regulatory Oversight and Regulatory Changes

The regulatory environment characterised by intense regulatory scrutiny, ongoing significant levels of regulations and policy change as well as the continual introduction of new regulations from multiple regulators creates thick uncertainties. This may have destabilizing effect on the industry and will require a sizeable portion of resource to mitigate while implementing the PIP.



Hitherto, a number of regulations have been issued while more are being expected for concurrent implementation. For example:

Criminalisation of estimated billing

The recent passage of “a bill for an act to amend the electric power sector reforms Act to prohibit and criminalise estimated billing by electricity distribution companies and provide for compulsory installation of pre-paid meters to all power consumers in Nigeria and other related matters” created more uncertainty about the future for Discos. Though the Senate is yet to concur, it is impossible to predict the outcome of the process. Should the bill be passed into law, we risk instant loss of about 17% (average) of total revenue attributable to customers on estimated billing consuming an average of about 40% of total energy.

We shall continue to participate in the legislative process to contribute to the making of legislations that are mutually favourable to the Discos, the customers and the national economy. AEDC has already signed-on to the MAP programme and is complementing the process via owned sponsored Mobile MAP programme. We shall expedite the closure of the metering gap by expanding the Mobile MAP programme as well as raise the monitoring and enforcement of the Metering Service Agreements entered with the MAPs.

There is a risk that the NESI may fail to achieve the target of providing a cost reflective tariff.

Causative factors may include succumbing to public and political pressure, insufficient political will to fully implement revised MYTO and other minor, major or extraordinary reviews as provided in the license agreements.

There are executed transactional agreements to protect the foreign investors who can have recourse to FG through the Bureau of Public Enterprise (BPE).

We shall call for Major Tariff Review as well as actively pursue the institution of a “Regulatory Instrument” to cater for any shortfall in tariff.

Generally, there is an upsurge in Regulatory activities in the distribution sub-sector of the NESI. Noteworthy is the NERC’s 2019 MYTO Order for AEDC, which prescribes a minimum remittance of 45% of NBET’S invoice for AEDC, as well as 100% of the MO’s invoice. It is likely that, changes in market conditions and customer attitude to payment may be disproportionate with the minimum remittance obligation on AEDC, hence, stringent enforcement of this order in the short-to-medium term may have liquidity and going-concern implications.

We will continue to refine our business processes and compliance infrastructure in order to effectively manage potential compliance issues. Also, the company-wide compliance management process will be automated.

### **7.3.2 Failure of AEDC to Attain the Agreed Financial Performance Targets**

The company may be inhibited from meeting agreed financial performance targets, achieving financial viability and leveraging growth opportunities as a result of adverse market and general economic conditions. This may also arise from failure by sensitive Government customers (MDAs) to pay on time.

AEDC offers electricity distribution and services to customers across a licensed area (Kogi, Nasarawa, Niger and FCT) mostly regarded as low industrialised and commercial states and populated more by SPUs. Continued deterioration in the economy and earnings of those customers will further diminish

their purchasing power and may induce unrelenting increase in commercial and collection losses. The direct impact will be on our operating performance, financial position and prospects.

We are poised to position our business to embrace potential opportunities in the initiatives. Also, we will ensure effective implementation of our e-commerce and automation programme (including InCMS and ERP).

### **7.3.3 AEDC may be unable to reduce ATC&C losses as indicated in the transactional documents.**

Pervasive customer misinformation and resultant negative reaction to tariff reviews and other market improvement interventions as well as the failure by sensitive Government customers (i.e. MDAs) to pay fully and on time exacerbate this license requirement. Similarly, there is no sign of reduction in electricity theft and other unethical practices in the industry.

We have embarked on an accelerated implementation of a Business Process Re-engineering programme in partnership with industry-experienced Consultants. As part of this programme, we have invested in an aggressive metering of our customers (including transformers). Implementation of a performance management system integrating our revenue functions will continue. In addition, we shall continue to pursue direct negotiations with market participants on payment and repayment plans.

### **7.3.4 ICT and Cyber Threats Covering the Loss of Critical Network Connectivity, Non-availability of Business Applications and Poor Execution of Business Continuity Plan (BCP).**

AEDC achieved significant aggregation of IT platform with the commissioning of its Integrated Commercial Management System and the State-of-the-Art Call Centre. While these bring business enhancement, they introduce other possibilities for attacks and security compromises which may be novel. More investments are currently being made in acquisition of Enterprise Resource Planners and the automation of other key processes.

During the PIP implementation, there may be inadequate infrastructure and capability in identifying cyber security threats; inadequate network fault tolerance, insufficiently sized bandwidth and inadequate network operations capability; insufficiently resourced application servers for critical applications; and inadequately deployed fault tolerance contribute to this risk.

We shall develop automated cyber defence and/or enhance existing cyber defences. There shall be continuous cyber security awareness and deployment of early warning monitoring infrastructure for proactive action and fact-based response; collaboration with trusted cyber security entities in the industry; deployment of regular organisation-wide compulsory cyber security training; enforcement of sanctions for breach of change management and related ICT PPPs; compliance to architecture review process to ensure fault-tolerant designs and implementations with sufficient capacity; implementation of sufficient ICT assets and resources to mitigate identified Critical Business Risks; and building of team capacity to enable appropriate response to issues in real-time.

### **7.3.5 Inadequate capital and/or excessively high cost of capital to drive growth initiatives.**

The current MYTO tariff is insufficient to absorb capital investment into the AEDC network. On the other hand, the company may not have efficient access to the capital it needs to drive its growth, execute its strategies, fund capital expenditure and generate future financial returns. Also, the

uncertainties and losses in the industry makes the sector unattractive to investors hence reduces the prospects of raising cash through equity offerings.

Actions to mitigate this risk shall include:

- Adept Business Plan
- Negotiation of changes in the Performance Agreement
- Shareholder Loans and other possible forms of Equity Injection will still be explored
- Government Shareholding to be capitalized and reviewed.

### **7.3.6 There is a risk of High Injury and Fatality Rate to AEDC Staff and Members of the Community / Public**

Part of possible causative factors may be: unsafe installations and infrastructure in the network; vandalism and illegal activities on the AEDC Network; infringement on the Right of way for AEDC network; failure to provide appropriate earthing requirements by the customers; and non-adherence to safety procedures and standards.

The revision of the SHE risk assessment has been concluded and resources have been allocated/will be approved to ensure implementation of plans that will reduce this risk to as Low as reasonably Practicable. Priority shall be given to the allocation of resources to close-out risk control action plans. Planned actions incorporated into the PIP and Initiatives (chapter 5 above) include:

- Network redesign
- Staff training and re-training programmes
- Increased efforts to secure funding to implement the network redesign programme
- Frequent operational risk assessment and Job Hazard Analysis workshop
- Completion of the development of AEDC Vulnerability Register
- Continuation and completion of planned procurement of working tools to improve operational efficiency
- Issuance of all operational and maintenance staff with PPE
- Continued community engagement and sensitization programmes.

### **7.3.7 Inability to detect and prevent fraudulent activities.**

There is a potential of failure to prevent, detect or promptly correct revenue leakages, losses and fraud accurately and completely. Contributing to this may be inefficient process design and implementation, inadequate assurance and work force / staff culture.

We shall implement the following mitigation actions:

- Adopt a proactive fraud risk management approach which includes approval and entity-wide communication, sensitisation and implementation of Anti-Fraud (Zero Tolerance to Fraud) Policy
- Integrate the Internal Audit Activity into the PIP implementation process and fully empower the function to provide an independent Third-Line-of-Defence.
- Currently, we have prepared draft legislations on Electricity and Related Offences for Kogi, Niger and Nasarawa States. We will do all that is needful to ensure that the bills are properly sponsored and passed in the respective houses of assembly
- Sustain advocacy for industry-specific legislations and prosecutions by continuing the workshop on Electricity and Related Offences for Judges, Magistrates and Law Enforcement Agencies.

**7.3.8 There is a risk of commodity electricity supply chain constraint resulting in non-availability of the commodity or reduced / restricted supply levels to AEDC customers.**

The industry may continue to experience low generation, vandalism of the supply chain network, inconsistency in gas availability for power generation as a result of gas supply pipes vandalism in the Niger Delta and poor state of transmission infrastructure.

Though not totally within our control, increased electricity generation capacity would be essential. However, we will commit reasonable resources to drive and implement imbedded generation projects.

**7.3.9 AEDC's power distribution network may be in a poor state with network performance not meeting customer demand and expectations.**

Though the business inherited substandard community executed networks, there is inadequate finance for immediate network redesign and reconfiguration and implementation of good industry maintenance strategies. On the customers' side, poor earthing and non-availability of standard earthing requirements and the use of substandard and inappropriate materials may prevail thus, contributing to an aggregate sub-optimal network performance.

Action to address this risk include:

- Disconnect of some very bad networks from the AEDC distribution network
- Revise (where necessary) and continue to implement proper maintenance regime for the network
- Monitor and enforce the use of standard and appropriate materials.

**7.3.10 Inability to recruit, develop and retain appropriate skills.**

The company as is the case with the industry requires specialised skills but is faced with limited pool of requisite skilled, knowledgeable and experienced people which is necessary for the successful implementation of the PIP. Lack of motivation due to unsuitable work environment and/or lack of confidence in the industry are key factors.

We shall put in place, best-in-class human resources strategy and practices. Adequate resources will be channelled towards capacity building, on-the-job training, succession planning and talent management, and diversity programme. In addition, an effective employee engagement programme (teaming, effective work environment and tools, culture) will be established.

## APPENDIX 1 -List of Technical Projects

Yr	Project Group	Project Description	Impact Area	Justification	Technical losses	Expected Additional Power(MW)	COST ESTIMATE (NGN)
Year 1 Start					11.72%	0.0 MW	-
Year 1	Network Expansion	Construction of 11KV Dedicated U/G Cable Feeder to Ecowas HQ	Ecowas HQ	<ul style="list-style-type: none"> <li>To reduce technical losses</li> <li>To enhance smart energy allocation</li> <li>To increase system stability</li> </ul>		n/a	3,706,194
Year 1	Network Expansion	Construction of 11KV Feeder from R3 to deload Feeder 3A	Guzape, Asokoro	<ul style="list-style-type: none"> <li>To deload feeder 3A</li> <li>To increase network flexibility</li> <li>To improve system stability and availability</li> </ul>		n/a	589,151
Year 1	Network Expansion	Construction of 2x15MVA, 33/kv injection substation with associated 33kv overhead line, complete with 4No. Outgoing 11kv feeders at Aso pada (Recovery and replacement of 60No 33/11KV Distribution transformers)	Aso Pada, Maraba	<ul style="list-style-type: none"> <li>To deload the existing feeder 3</li> <li>To enhance load optimization and control</li> <li>To increase the voltage profile in Aso Pada and environs</li> <li>To reduce ATC&amp;C losses</li> </ul>		24.0 MW	1,045,200,000
Year 1	Network Expansion	Construction of 33kv Dual feeder from Apo to Dantata junctn	Garki II, CBD, Asokoro	<ul style="list-style-type: none"> <li>To improve quality of power supply within Apo and environs</li> <li>To improve voltage profile To increase power availability and stability</li> <li>To increase customer population</li> <li>To reduce ATC&amp;C losses</li> <li>To increase revenue generation</li> </ul>		30.0 MW	11,255,076
Year 1	Network Expansion	Construction of 33kv Double Circuit Overhead Tower from Ajaokuta to Itohe.	(blank)	<ul style="list-style-type: none"> <li>To improve network stability and flexibility in Itohe and environs</li> <li>To enhance optimal load utilization</li> <li>To improve the voltage profile</li> <li>To increase customer base and revenue generation</li> <li>To reduce ATC&amp;C losses</li> </ul>		20.0 MW	459,450,000
Year 1	Network Expansion	Construction of 33kv feeder from Katampe T/S to Mpape junction	Mpape, Jikoko, Katampe	<ul style="list-style-type: none"> <li>To evacuate power from 100MVA Katampe 3 to Mpape axis</li> <li>To create network flexibility, To increase power reliability and availability in Mpape and environs</li> <li>To increase customer base</li> <li>To reduce technical losses and downtime on fault clearance</li> </ul>		15.0 MW	11,932,048
Year 1	Network Expansion	Construction of 33kv feeder from Nation Hosp. to Embassy inj.s/s	Embassy Zone, CBD, Are	<ul style="list-style-type: none"> <li>To deload feeder 5 from Central Area TS</li> <li>To Increase network flexibility</li> <li>To improve stability and availability of supply to National Hospital</li> <li>To reduce technical losses</li> </ul>		20.0 MW	10,098,766
Year 1	Network Expansion	Construction of 33kv feedr from kukwaba to deload Wuye inj. s/s	Wonderland, Wuye, Uta	<ul style="list-style-type: none"> <li>To Deload feeders 3 from AT5,</li> <li>To achieve increased power quality in Wuye axis</li> <li>To improve voltage profile and availability</li> </ul>		15.0 MW	33,461,419
Year 1	Network Expansion	Construction of 33kv U/G cable fromAT5 T/S to Televeras 4x 15MVA, CBD	CBD, AREA7,8,10	<ul style="list-style-type: none"> <li>To evacuate power from 4X15MVA Telaveras Substation,</li> <li>To improve power supply in Central Business District</li> <li>To increase customer satisfaction</li> <li>To reduce ATC&amp;C losses, To enhance statutory compliance to FCDA regulation on power supply within the FCT</li> <li>To increase revenue generation</li> </ul>		30.0 MW	105,850,360
Year 1	Network Expansion	Construction of 4Nos 11KV feeders at Televeras 2 Area 7 Garki Abuja for power evacuation	Eagle Square, Police HQ,	<ul style="list-style-type: none"> <li>To evacuate power from Telaveras Injection substation</li> <li>To deload 33kv feeder H1</li> <li>To stabilize power supply at Old Federal Secretariat Area 1</li> <li>To power supply to Garki Areas 1 , 2 &amp; 10: Defence HQ, Radio House, Agura Hotel , Fire Service</li> </ul>		24.0 MW	700,000
Year 1	Network Expansion	Construction of 5MVA,33/11kV inj. s/s at EFCC HQ	EFCC - HQ	<ul style="list-style-type: none"> <li>To improve power stability at EFCC HQ and increase customer satisfaction</li> <li>To improve network reliability and revenue generation</li> </ul>		3.5 MW	122,000,000
Yr	Project Group	Project Description	Impact Area	Justification	Technical losses	Expected Additional Power(MW)	COST ESTIMATE (NGN)
Year 1	Network Expansion	Construction of 5MVA,33/11kV inj. s/s at Madalla -Suleja	Madalla, Dakwa, Zuba	<ul style="list-style-type: none"> <li>To evacuate power from 5MVA Madalla injection substation and deload Madalla Feeder</li> <li>To Increase power supply in Madalla and environs</li> </ul>		4.0 MW	59,590,696

				<ul style="list-style-type: none"> <li>• To rehabilitate Madalla LT network for technical loss reduction and elimination of HSE issues</li> </ul>			
Year 1	Network Expansion	Construction of 7.5MVA,33/11kV inj.s/s at Mpape Community	Mpape, Jikoko, Katampe	<ul style="list-style-type: none"> <li>• To evacuate power from 7.5MVA Mpape injection substation</li> <li>• To increase power reliability and availability in Mpape and environs</li> <li>• To increase customer base</li> <li>• To reduce technical losses and improve voltage profile</li> </ul>		6.0 MW	145,465,909
Year 1	Network Expansion	Proposed construction of dual 33KV feeder from Apo to Yayale junction	Apo, Wumba, Lokogoma	<ul style="list-style-type: none"> <li>• To deload feeder H33</li> <li>• To reduce forced outages</li> <li>• To improve voltage profile and supply</li> </ul>		12.0 MW	6,976,295
Year 1	Network Expansion	Proposed 33kV GRA/UNIVERSITY feeder at Keffi	GRA, University	<ul style="list-style-type: none"> <li>• To evacuate power from 60MVA Keffi TS</li> <li>• To deload existing Keffi feeder and improve power supply to Keffi and environs</li> </ul>		20.0 MW	76,389,473
Year 1	Network Expansion	Proposed 33KV Fdr from Suleja TS to deload Dei Dei and Kubwa Fdr	Deidei, Kubwa	<ul style="list-style-type: none"> <li>• To improve network stability and flexibility in Itoke and environs</li> <li>• To enhance optimal load utilization</li> <li>• To improve the voltage profile</li> <li>• To increase customer base and revenue generation</li> <li>• To reduce ATC&amp;C losses</li> </ul>		12.0 MW	192,000,000
Year 1	Network Expansion	Proposed 33kV Uke Masaka feeder from Keffi to Ado	Ado, Masaka, Maraba,	<ul style="list-style-type: none"> <li>• To reduce technical losses and</li> <li>• To deload feeders K5 &amp; K3</li> <li>• To improve network stability and availability in Masaka and environs</li> </ul>		25.0 MW	259,414,134
Year 1	Network Expansion	Proposed construction of 33kV Idu Industrial feeder from Katampe 3	Idu Industrial layout	(blank)			237,122,000
Year 1	Network Expansion	Proposed construction of 1 x 7.5MVA,33/11kV Injection substation at Kado Estate along Gwarinpa Life Camp road Abuja.	Kado Estate and Enirons	<ul style="list-style-type: none"> <li>• To reduce load on existing 33kV Jabi feeder, To enhance load optimization</li> <li>• To improve the load profile of Kado and environs</li> <li>• To increase customer base</li> </ul>		5.0 MW	632,613,642
Year 1	Network Expansion	Proposed construction of 10No 11kV feeders from the proposed Idu injection substations	Idu Industrial layout	(blank)			284,881,400
Year 1	Network Expansion	Proposed Construction of 2 X15MVA, 33/11kV Injection S/S at Gwarinpa (close to Kafe) and creation of new 33kV feeder (Recovery and replacement of 60No Dist. Transformers)	Gwarinpa	<ul style="list-style-type: none"> <li>• To increase network flexibility in Gwarinpa environs</li> <li>• To improve power availability in Kafe axis</li> <li>• To enhance load optimization and control</li> </ul>		24.0 MW	1,092,000,000
Year 1	Network Expansion	Proposed construction of 2No 33/11kV 2X15MVA Injection Substation at IDU Industrial layout	Idu Industrial layout	(blank)			2,013,875,000
Year 1	Network Expansion	Proposed construction of 2x 15MVA,33/11kV inj. s/s at Kabusa	Kabusa	<ul style="list-style-type: none"> <li>• To deload existing 33kV feeder H33</li> <li>• To improve voltage profile in Kabusa and reduce ATC&amp;C losses</li> <li>• To increase customer satisfaction</li> </ul>		20.0 MW	233,969,617
Year 1	Network Expansion	Proposed construction of 2x 15MVA,33/11kV inj. s/s at Lokogoma	Lokogoma	<ul style="list-style-type: none"> <li>• To deload existing 33kV feeder H33</li> <li>• To improve voltage profile in Lokogoma and environs</li> <li>• To increase customer satisfaction</li> </ul>		20.0 MW	219,698,319
Year 1	Network Expansion	Proposed construction of 33KV Akwanga feeder from 2 x 60MVA,132/33KV Akurba T/S Lafia	Akwanga, Nassarwa Egg	<ul style="list-style-type: none"> <li>• To improve power supply to Akwanga and environs</li> <li>• To increase voltage profile</li> <li>• To reduce technical losses in the network</li> </ul>		12.0 MW	6,267,980
Year 1	Network Expansion	Proposed Construction of 33KV Fdr from Zango to Lokoja	(blank)	<ul style="list-style-type: none"> <li>• To improve network stability and flexibility in Itoke and environs</li> <li>• To enhance optimal load utilization</li> <li>• To improve the voltage profile</li> <li>• To increase customer base and revenue generation</li> <li>• To reduce ATC&amp;C losses</li> </ul>		12.0 MW	102,000,000
Year 1	Network Expansion	Proposed construction of 33KV feeder from Katampe to 9 Mobile Center	9Mobile, Next Cash & Ca	<ul style="list-style-type: none"> <li>• To improve quality of power supply to 9Mobile, Next Cash &amp; Carry and other high profile customers</li> <li>• To increase network stability and flexibility</li> <li>• To increase revenue generation</li> </ul>		5.0 MW	5,850,150
Year 1	Network Expansion	Proposed Construction of 33kV Feeder from Suleja TS to deload Bwari fdr	(blank)	<ul style="list-style-type: none"> <li>• To deload existing feeder K3</li> <li>• To reduce technical losses due to lengthy feeder</li> <li>• To increase network stability and availability in Bwari and environs</li> <li>• To increase the voltage profile and customer satisfaction</li> </ul>		12.0 MW	150,000,000
Year 1	Network Expansion	Proposed construction of 33KV Town feeder, Shendam Road from 2 x 60MVA, 132,33KV Akurba T/S Lafia	Shendam Road, Lafia	<ul style="list-style-type: none"> <li>• To improve power supply to Lafia and environs</li> <li>• To increase voltage profile</li> <li>• To reduce technical losses in the network</li> </ul>		12.0 MW	7,398,980

Yr	Project Group	Project Description	Impact Area	Justification	Technical losses	Expected Additional Power(MW)	COST ESTIMATE (NGN)
Year 1	Network Expansion	Proposed construction of 33KV, 6Nos Take-off Bay from 2 x 60MVA,132/33KV Akurba T/S Lafia	Awe, Doma, Nassarawa	<ul style="list-style-type: none"> <li>To evacuate power from 2X60MVA, 132/33kv TS at Lafia</li> <li>To ease interphase connectivity between AEDC and TCN</li> <li>For optimal load utilization and control</li> </ul>			8,855,300
Year 1	Network Expansion	Proposed construction of additional 2 x 15MVA, at Apo Resettlement	Apo Resettlement	<ul style="list-style-type: none"> <li>To increase network stability and power supply to Apo and environs</li> <li>To reduce technical losses</li> </ul>		20.0 MW	233,969,617
Year 1	Network Expansion	Proposed construction of dual 2No,11KV feeders from 2 x 15MVA, Injection s/s at Apo T/S	Apo Resettlement, Loko	<ul style="list-style-type: none"> <li>To evacuate power from 2X15MVA Apo TS to Lokogoma inorder to deload Trademore 11kv feeder</li> <li>To optimize right-of-way</li> <li>To improve power supply to God's Own Estate</li> </ul>		24.0 MW	1,157,564
Year 1	Network Expansion	Proposed constructn of 11kv Dual line from B33 injection s/s to Masallachi junction	NDPHC, SEC, FRAIZER , G	<ul style="list-style-type: none"> <li>To deload feeder RM 24 from G24 National Hospital Injection substation</li> <li>To improve power availability to Central Business District</li> </ul>		10.0 MW	25,266,833
Year 1	Network Expansion	Proposed constructn of 2NOS, 11kv feeders from Kukwaba T/S to Kaura, and Enviroment	Kaura, Games Village, D	<ul style="list-style-type: none"> <li>To evacuate power from 4X15MVA Kukwaba Injection substation</li> <li>To improve network stability and reduce downtime in maintenance operation</li> </ul>		20.0 MW	266,729,562
Year 1	Network Expansion	Proposed creation of Additional 11kv feeder from Zarumai 2 x 7.5MVA,33/11kv injection substation to deload parliamentary feeder from T/S.	Ansarul Mosque, Minna/	<ul style="list-style-type: none"> <li>To deload the existing Parliamentary feeder</li> <li>To improve power supply to Zarumai and environs</li> <li>To reduce technical losses</li> </ul>		2.5 MW	24,000,000
Year 1	Network Reconfiguration	Construction of 33KV line to divert load from Dawaki and Gwarinpa feeder to Lugbe feeder at Katampe T/S.	Gwarinpa, Dawaki, Lugb	<ul style="list-style-type: none"> <li>To divert load from Dawaki and Gwarinpa Feeder</li> <li>To improve system stability and availability of supply to Dawaki axis</li> <li>To reduce technical losses</li> </ul>		12.0 MW	23,187,616
Year 1	Network Reconfiguration	Diversion of Jabi and Wuse 2 feedrs from Katampe T/S	Wuse 2 and Jabi	<ul style="list-style-type: none"> <li>To improve supply to Miatama, Wuse 2 and Mpape axis</li> <li>To increase customer satisfaction</li> <li>To increased revenue generation</li> </ul>			2,104,160
Year 1	Network Reconfiguration	Network Redesign Project at Gauraka Suleja	Guaraka, Suleja	<ul style="list-style-type: none"> <li>To reduce ATC&amp;C losses</li> <li>To increase network stability and availability</li> <li>To eliminate safety issues</li> <li>To improve voltage profile</li> </ul>			5,000,000
Year 1	Network Reconfiguration	Network Redesign Project at Dape Village FCT Central	Dape, Mpape	<ul style="list-style-type: none"> <li>To reduce ATC&amp;C losses</li> <li>To increase network stability and availability</li> <li>To eliminate safety issues</li> <li>To improve voltage profile</li> </ul>			8,000,000
Year 1	Network Reconfiguration	Network Redesign Project at Tudun-Wada Lugbe	FHA Lugbe	<ul style="list-style-type: none"> <li>To reduce ATC&amp;C losses</li> <li>To increase network stability and availability</li> <li>To eliminate safety issues</li> <li>To improve voltage profile</li> </ul>			6,000,000
Year 1	Network Reconfiguration	Network Redesign Project at Wumba Village Lokogoma	Lokogoma	<ul style="list-style-type: none"> <li>To reduce ATC&amp;C losses</li> <li>To increase network stability and availability</li> <li>To eliminate safety issues</li> <li>To improve voltage profile</li> </ul>			8,000,000
Year 1	Network Reconfiguration	Proposed construction of 11kv U/G Feeder to Jabi Mall	JABI MALL	<ul style="list-style-type: none"> <li>To improve quality of power supply to Jabi Mall</li> <li>To increase customer satisfaction</li> <li>To enhance smart energy allocation</li> </ul>		10.0 MW	85,514,124
Year 1	Network Reconfiguration	Proposed construction of Dedicated 33kv Line to CBN HQ. CBD	CBN HQ.	<ul style="list-style-type: none"> <li>To improve quality of power supply to CBN HQ</li> <li>To increase customer satisfaction</li> <li>To increase revenue generation</li> </ul>		15.0 MW	134,279,014
Year 1	Network Reconfiguration	Proposed conversion of 50Nos distribution transformers from 33/0.415kv to 11/0.415kv	Idu Industrial layout	(blank)			58,500,250
Year 1	Network Reconfiguration	Replacement of 33kv Broken U/G Cable in FCT Central (Maitama & CBD)	Maitama, CBD	<ul style="list-style-type: none"> <li>To create network flexibility and stability in Maitama and CBD</li> <li>To improve power supply</li> <li>To reduce technical losses</li> </ul>			250,310,000
Year 1	Network Reconfiguration	Replacement of 33kv U/G Cable from 3Arm Zone to B33 injection substation CBD.	CBD, STATE HOUSE NAS	<ul style="list-style-type: none"> <li>To increase network flexibility in Asokoro and environs</li> <li>For enhanced network stability and availability</li> </ul>		30.0 MW	128,829,877
Year 1	Network Reconfiguration	Construction of 33KV line to restore power supply to Galadimawa village	Galadimawa, Lokogoma	<ul style="list-style-type: none"> <li>To divert load</li> <li>To eliminate safety issues</li> <li>To reduce technical losses</li> </ul>			500,000
Year 1	Network Reconfiguration	Diversion of H23 load from H37 by repairing the circuit breaker	(blank)	<ul style="list-style-type: none"> <li>To improve network stability and flexibility in Itope and environs</li> <li>To enhance optimal load utilization</li> <li>To improve the voltage profile</li> <li>To increase customer base and revenue generation</li> <li>To reduce ATC&amp;C losses</li> </ul>		0.0 MW	



Yr	Project Group	Project Description	Impact Area	Justification	Technical losses	Expected Additional Power(MW)	COST ESTIMATE (NGN)
Year 1	Network Reconfiguration	Proposed Construction of 33kV Switching Station with 240mm <sup>2</sup> U/G cable to create flexibility on Lifecamp Feeder	Lifecamp	<ul style="list-style-type: none"> <li>To enhance load optimization and control</li> <li>To increase network flexibility and stability</li> <li>To improve revenue</li> </ul>			64,000,000
Year 1	Network Reconfiguration	Proposed Rehab . 11kv dual line from suleja T/S to Sabon Wuse to Dikko	Sabon Wuse, Diko, Kadu	<ul style="list-style-type: none"> <li>To reduce technical losses in Suleja axis</li> <li>To improve stability and availability in the axis</li> <li>To eliminate HSE issues</li> </ul>		10.0 MW	26,611,890
Year 1	Network Reconfiguration	Reconductoring of 200km Doko_Bida Fdr from 150mm <sup>2</sup> to 300mm <sup>2</sup>	Doko, Bida	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			20,000,000
Year 1	Network Reconfiguration	Reconductoring of 50km H21 Fdr from 150mm <sup>2</sup> to 300mm <sup>2</sup>	Lugbe, Kuje, Aco, Airport	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			55,000,000
Year 1	Network Reconfiguration	Rehabilitation of 33kV UG feeder from C3 To C2 to deload Wuse feeder	Wuse 2 and Environs	<ul style="list-style-type: none"> <li>To deload Wuse feeder</li> <li>To increase network flexibility and stability</li> <li>To increase customer satisfaction</li> </ul>		12.0 MW	350,000
Year 1	Network Reconfiguration	Rehabilitation of failed 11kV cable links within FCT Central to create redundancy and improve reliability	FCT Central	(blank)			1,030,450,000
Year 1	Network Reconfiguration	Resuscitation of failed 33kV cable links in Garki and Asokoro to create redundancy and improve reliability	Garki II, CBD, Asokoro	(blank)			250,237,000
Year 1	Network Upgrade	Construction of 88no 500kVA Relief Substations	Across AEDC Franchise A	Overloaded Substations undergoing loadshedding, needing relief		37.4 MW	1,188,000,000
Year 1 End					7.89%	585.4 MW	11,434,609,415.69
Year 2 Start					7.89%	585.4 MW	11,434,609,415.69
Year 2	Network Expansion	Construction of 2x15 MVA Injection S/s at Jikwoyi and creation of new 33kV Feeder (Recovery and Replacement of 60No 33KV/11KV Transformers)	(blank)	<ul style="list-style-type: none"> <li>To reduce ATC&amp;C losses</li> <li>To improve voltage profile in Jikwoyi and environs</li> <li>To reduce downtime due to fault clearance</li> <li>To increase network stability and availability</li> </ul>		24.0 MW	1,122,000,000
Year 2	Network Expansion	Engineering, procurement and installation of 2x 15MVA 33/11kv (Two 33kV Sources) injection substation at Kuje industrial layout 2 incoming, 4 outgoing and 1 CB (Recovery and Replacement of 60No 33KV/11KV Transformers)	(blank)	<ul style="list-style-type: none"> <li>To improve power supply to Idu Industrial and environs</li> <li>To increase network stability and flexibility</li> <li>To reduce technical losses in the network</li> <li>To deload the existing feeder</li> </ul>		24.0 MW	1,182,000,000
Year 2	Network Expansion	Proposed Construction of 10No 11kV feeders to evacuate power from the Kuje injection substation	Kuje(L36)	(blank)			285,681,500
Year 2	Network Expansion	Proposed Construction of 1X 15MVA 33/11 Injection S/S from Bida TS	Bida	<ul style="list-style-type: none"> <li>For effective load control and management</li> <li>To improve power supply to Bida and environs</li> <li>For enhanced network stability</li> </ul>		12.0 MW	102,000,000
Year 2	Network Expansion	Proposed construction of 23.8km 33kV Kuje feeder from Gwagwalada TS	Kuje(L36)	(blank)			142,800,000
Year 2	Network Expansion	Proposed Construction of 2X15MVA, 33/11kV Injection S/S at Jahi (Recovery and replacement of 60No 33KV Distribution Transformers)	Jahi District	<ul style="list-style-type: none"> <li>To create network flexibility</li> <li>To reduce forced outages and technical losses</li> <li>To improve power stability and availability in Jahi and environs</li> </ul>		24.0 MW	1,182,000,000
Year 2	Network Expansion	Proposed Construction of 2X15MVA, 33/11kV Injection S/S at Karshi and creation of new 33kV feeder (Existing 1x2.5 MVA) (Recovery and replacement of 60No Dist. Transformers)	Karshi	<ul style="list-style-type: none"> <li>To create network flexibility</li> <li>To reduce forced outages and technical losses</li> <li>To improve power stability and availability in Karshi and environs</li> </ul>		24.0 MW	1,212,000,000
Year 2	Network Expansion	Proposed Construction of 2X15MVA, 33/11kV Injection S/S at Maraba to separate Karu customers and creation of new 33kV feeder (Recovery and replacement of 60No Dist. Transformers)	Maraba, Karu	<ul style="list-style-type: none"> <li>To increase network flexibility in Karu environs</li> <li>To improve power availability in Maraba axis</li> <li>To enhance load optimization and control</li> <li>To increase customer satisfaction</li> </ul>		24.0 MW	1,032,000,000
Year 2	Network Expansion	Proposed construction of 2x15MVA, 33/11kV injection substation and creation of new 33kV feeder at Mabuchi (Recovery and Replacement of 60No 33KV/11KV Transformers)	(blank)	<ul style="list-style-type: none"> <li>To create network flexibility</li> <li>To reduce forced outages and technical losses</li> <li>To improve power stability and availability in Mabushi and environs</li> </ul>		24.0 MW	1,182,000,000
Year 2	Network Expansion	Proposed construction of 33/11kV, 2X15MVA Injection substation at Kuje industrial layout	Kuje(L36)	(blank)			1,003,112,000

Yr	Project Group	Project Description	Impact Area	Justification	Technical losses	Expected Additional Power(MW)	COST ESTIMATE (NGN)
Year 2	Network Expansion	Proposed Construction of 33kV Feeder from Gwagwalada 2X15MVA to Lugbe FHA 2X15MVA	FHA Lugbe	<ul style="list-style-type: none"> <li>To increase network flexibility and availability in FHA Lugbe and environs</li> <li>To reduce forced outages and technical losses</li> <li>To deload the existing feeder</li> </ul>		12.0 MW	210,000,000
Year 2	Network Expansion	Proposed construction of overhead Tee-off to link H2 to Guzape Fdr in other to deload H11	Guzape, Asokoro	<ul style="list-style-type: none"> <li>To improve network stability and flexibility in Itoke and environs</li> <li>To enhance optimal load utilization</li> <li>To improve the voltage profile</li> <li>To increase customer base and revenue generation</li> <li>To reduce ATC&amp;C losses</li> </ul>		12.0 MW	30,000,000
Year 2	Network Expansion	Proposed extension of 33kV feeder from CBN junction Lokoja via Govt House to link 2X15MVA , 33/11kV Injection S/S at Pata	Lokoja	<ul style="list-style-type: none"> <li>To create network flexibility</li> <li>To improve power availability to key customer</li> <li>To increase customer satisfaction and revenue generation</li> </ul>			21,000,000
Year 2	Network Reconfiguration	Network Redesign Project at Bosso Niger	Bosso	<ul style="list-style-type: none"> <li>To reduce ATC&amp;C losses</li> <li>To increase network stability and availability</li> <li>To eliminate safety issues</li> <li>To improve voltage profile</li> </ul>			8,000,000
Year 2	Network Reconfiguration	Proposed dualization of 11kV Bosso feeder in Minna	Banks Area	<ul style="list-style-type: none"> <li>To create network flexibility</li> <li>To improve voltage profile and improve power supply in Bosso and environs</li> </ul>		10.0 MW	42,800,645
Year 2	Network Rehabilitation	Reconductoring of 130km Uke_ Kef Fdr from 150mm2 to 300mm2	Uke, Masaka	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			63,000,000
Year 2	Network Upgrade	Construction of 60no 500kVA Relief Substations	Across AEDC Franchise A	Overloaded Substations undergoing loadshedding, needing relief		25.5 MW	810,000,000
Year 2 End					6.76%	800.9 MW	21,065,003,560.78
Year 3 Start					6.76%	800.9 MW	21,065,003,560.78
Year 3	Network Expansion	Proposed completion of 2x 15MVA,33/11kv inj.s/s at New Nyanya Nasarawa State	New Nyanya,	<ul style="list-style-type: none"> <li>To deload existing Karu injection substation</li> <li>To improve voltage profile and power supply to Nyanya axis</li> <li>To reduce ATC&amp;C losses</li> </ul>		20.0 MW	25,511,704
Year 3	Network Expansion	Proposed Construction of 2X15MVA, 33/11kV Injection S/S at Life Camp and creation of new 33kV feeder (Recovery and Replacement of 60No 33KV/11KV Transformers)	(blank)	<ul style="list-style-type: none"> <li>To deload the existing feeder</li> <li>To increase the voltage profile</li> <li>To improve power availability</li> <li>To enhance load optimization and control</li> </ul>		24.0 MW	1,152,000,000
Year 3	Network Rehabilitation	Reconductoring of 100km Kagara Fdr from 150mm2 to 300mm2	Kagara	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			10,000,000
Year 3	Network Rehabilitation	Reconductoring of 120km Lokogoma Fdr from 150mm2 to 300mm2	Lokogoma, Kogi	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			12,000,000
Year 3	Network Rehabilitation	Reconductoring of 127.8km Akwanga Fdr from 150mm2 to 300mm2	Akwanga, Nassarwa Egg	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			51,780,000
Year 3	Network Rehabilitation	Reconductoring of 20km Town_Sul Fdr from 150mm2 to 300mm2	Suleja	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			2,000,000
Year 3	Network Rehabilitation	Reconductoring of 220km Tegina Fdr from 150mm2 to 300mm2	Tegina	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			122,000,000
Year 3	Network Rehabilitation	Reconductoring of 25km H31 Fdr from 150mm2 to 300mm2	Apo, Wumba, Lokogoma	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			27,500,000
Year 3	Network Rehabilitation	Reconductoring of 26km Isanlu_ Okene Fdr from 150mm2 to 300mm2	Isanlu, Okene	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			32,600,000
Year 3	Network Rehabilitation	Reconductoring of 330km Kutigi_Bida Fdr from 150mm2 to 300mm2	Kutigi, Bida	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			683,000,000
Year 3	Network Rehabilitation	Reconductoring of 35km Keffi Fdr from 150mm2 to 300mm2	Keffi	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			78,500,000
Year 3	Network Rehabilitation	Reconductoring of 35km Wushishi_Bida Fdr from 150mm2 to 300mm2	Wushishi, Bida	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			78,500,000
Year 3	Network Rehabilitation	Reconductoring of 39km Jere_Sul Fdr from 150mm2 to 300mm2	Suleja	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			98,900,000
Year 3	Network Rehabilitation	Reconductoring of 48.15km NIPP Maikunkele Fdr from 150mm2 to 300mm2	Maikunkele	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			45,565,000
Year 3	Network Rehabilitation	Reconductoring of 59km Akwanga Fdr from 150mm2 to 300mm2	Akwanga, Nassarwa Egg	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			900,000
Year 3	Network Rehabilitation	Reconductoring of 85km L35 Fdr from 150mm2 to 300mm2	Railway Idu	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			33,500,000
Year 3	Network Rehabilitation	Reconductoring of 89km Nas_ Kef Fdr from 150mm2 to 300mm2	Keffi	<ul style="list-style-type: none"> <li>To improve the voltage profile</li> <li>To reduce ATC&amp;C losses</li> </ul>			53,900,000
Year 3	Network Upgrade	Construction of 45no 500kVA Relief Substations	Across AEDC Franchise A	Overloaded Substations undergoing loadshedding, needing relief		19.0 MW	607,500,000

Yr	Project Group	Project Description	Impact Area	Justification	Technical losses	Expected Additional Power(MW)	COST ESTIMATE (NGN)
Year 3 End					6.17%	863.9 MW	24,180,660,264.79
Year 4 Start					6.17%	863.9 MW	24,180,660,264.79
Year 4	Network Upgrade	Construction of 37no 500kVA Relief Substations	Across AEDC Franchise A	Overloaded Substations undergoing loadshedding, needing relief		15.7 MW	499,500,000
Year 4 End					6.08%	879.6 MW	24,680,160,264.79
Year 5 Start					6.08%	879.6 MW	24,680,160,264.79
Year 5	Network Upgrade	Construction of 30no 500kVA Relief Substations	Across AEDC Franchise A	Overloaded Substations undergoing loadshedding, needing relief		12.7 MW	405,000,000
Grand Total						892.3 MW	25,085,160,265

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## APPENDIX 2 -EXTRACT FROM NEPLAN NETWORK SIMULATION

Extract from NEPLAN Network Modelling and Simulation Tool

TECHNICAL LOSS PER FEEDER (YR 1)															
S/N	Name of Feeder	Route Length (KM)	P Loss (MW)	Q Loss (Mvar)	P Imp (MW)	Q Imp (Mvar)	P Load (MW)	Q Load (Mvar)	Stage Tech loss	P Load (MW)	% Contribution to P Load	FEEDER CATEGORY	FEEDER COUNT	PF	0.87
1	Fdr1_AT5	0.1	0	0	0.86	0.487	0.86	0.487	0.00%	0.00	0.00%			ACSR	150mm <sup>2</sup>
2	BIRGI_MINNA	12	0	-0.039	0.3	0.131	0.3	0.17	0.00%	0.00	0.00%			ACSR	150mm <sup>2</sup>
3	ADOGO FDR	38	0	-0.125	0.1	-0.068	0.1	0.057	0.00%	0.00	0.00%			ACSR	150mm <sup>2</sup>
4	Fdr2_AT5	0.1	0.003	0.005	11.003	6.239	11	6.234	0.03%	0.00	0.00%			ACSR	150mm <sup>2</sup>
5	K1_AT9	4.23	0.001	-0.012	1.001	0.555	1	0.567	0.10%	0.00	0.00%			ACSR	150mm <sup>2</sup>
6	Dam fdr	7.04	0.002	-0.02	1.002	0.547	1	0.567	0.20%	0.00	0.00%			ACSR	150mm <sup>2</sup>
7	FUT_MINNA	13.4	0.001	-0.043	0.501	0.24	0.5	0.283	0.20%	0.00	0.00%			ACSR	150mm <sup>2</sup>
8	NNPC_MINNA	18.8	0.001	-0.06	0.501	0.223	0.5	0.283	0.20%	0.00	0.00%			ACSR	150mm <sup>2</sup>
9	Fdr9_AT5	1.46	0.011	0.013	5.461	3.102	5.45	3.089	0.20%	0.01	0.02%			ACSR	150mm <sup>2</sup>
10	Fdr4_AT5	0.75	0.024	0.036	11.024	6.27	11	6.234	0.22%	0.02	0.04%			ACSR	150mm <sup>2</sup>
11	L31_Kukwuaba	5	0.005	-0.008	2.005	1.125	2	1.133	0.25%	0.01	0.01%			ACSR	150mm <sup>2</sup>
12	H37	2	0.033	0.047	8.033	4.581	8	4.534	0.41%	0.03	0.05%			ACSR	150mm <sup>2</sup>
13	BAURAKA FDR	9.2	0.013	0.008	2.913	1.652	2.913	1.652	0.45%	0.01	0.02%			ACSR	150mm <sup>2</sup>
14	West African Ceramics_Lok	13.85	0.007	-0.034	1.407	0.759	1.4	0.799	0.50%	0.01	0.01%			ACSR	150mm <sup>2</sup>
15	FIELD BASE_SUL	4	0.045	0.059	6.545	3.743	6.5	3.684	0.69%	0.05	0.07%			ACSR	150mm <sup>2</sup>
16	K3	60.5	0.014	-0.172	2.014	0.961	2	1.133	0.70%	0.01	0.02%			ACSR	150mm <sup>2</sup>
17	H15	2.6	0.135	0.209	14.135	8.143	14	7.934	0.96%	0.14	0.22%			ACSR	150mm <sup>2</sup>
18	W/Board	12	0.029	0.007	3.029	1.707	3	1.7	0.97%	0.03	0.05%			ACSR	150mm <sup>2</sup>
19	L36_GWA	6	0.095	0.133	9.895	5.687	9.8	5.554	0.97%	0.10	0.15%			ACSR	150mm <sup>2</sup>
20	OKENE_OKENE	3	0.125	0.191	12.625	7.275	12.5	7.084	1.00%	0.13	0.20%			ACSR	150mm <sup>2</sup>
21	CBN FDR3_Lokoja	30.21	0.015	-0.073	1.415	0.72	1.4	0.793	1.07%	0.02	0.02%			ACSR	150mm <sup>2</sup>
22	WATER WORKS	6.2	0.009	0.012	0.809	0.399	0.8	0.387	1.13%	0.01	0.01%			ACSR	150mm <sup>2</sup>
23	KONTAGORA_Kontag	4	0.134	0.203	11.334	6.55	11.2	6.347	1.20%	0.13	0.21%			ACSR	150mm <sup>2</sup>
24	POWER HOUSE_MINNA	3.85	0.148	0.226	12.148	7.027	12	6.801	1.23%	0.15	0.24%			ACSR	150mm <sup>2</sup>
25	Ibaji Fdr	20	0.053	0.022	4.053	2.288	4	2.266	1.33%	0.05	0.08%			ACSR	150mm <sup>2</sup>
26	CHINESE STEEL_AJAO	13	0.056	0.048	4.056	2.315	4	2.267	1.40%	0.06	0.09%			ACSR	150mm <sup>2</sup>
27	Matama	5.5	0.238	0.365	15.238	8.866	15	8.501	1.59%	0.24	0.38%			ACSR	150mm <sup>2</sup>
28	Fdr6_AT5	3.3	0.323	0.51	19.323	11.278	19	10.768	1.70%	0.32	0.52%			ACSR	150mm <sup>2</sup>
29	H2	6.6	0.179	0.268	10.179	5.935	10	5.667	1.79%	0.18	0.29%			ACSR	150mm <sup>2</sup>
30	L33_Kukwuaba	23	0.06	0.023	3.16	1.78	3.1	1.757	1.94%	0.06	0.10%			ACSR	150mm <sup>2</sup>
31	Life camp fdr	19	0.157	0.193	7.157	4.16	7	3.967	2.24%	0.16	0.25%			ACSR	150mm <sup>2</sup>
32	K5_AT9	15	0.172	0.229	7.672	4.48	7.5	4.251	2.29%	0.17	0.28%			ACSR	150mm <sup>2</sup>
33	LEMU	62	0.118	-0.007	4.918	2.713	4.8	2.72	2.46%	0.12	0.19%			ACSR	150mm <sup>2</sup>
34	L33_GWA	39	0.364	0.567	15.164	8.955	14.8	8.388	2.46%	0.36	0.58%			ACSR	150mm <sup>2</sup>



54	H23	50	0.842	1.268	10.042	6.482	9.2	5.214	9.15%	0.84	1.35%			ACSR	150mm <sup>2</sup>
56	MINNA ROAD	8.6	0.369	0.591	4.269	2.48	3.9	1.889	9.46%	0.37	0.59%			ACSR	150mm <sup>2</sup>
58	Bwari	58.5	0.839	1.235	9.339	6.052	8.5	4.817	9.87%	0.84	1.34%			ACSR	150mm <sup>2</sup>
59	DOKO_BIDA	200	0.496	0.277	5.496	3.111	5	2.834	9.92%	0.50	0.79%			ACSR	150mm <sup>2</sup>
63	Lokogoma	120	1.217	1.616	12.017	7.736	10.8	6.12	11.27%	1.22	1.95%			ACSR	150mm <sup>2</sup>
60	ISANLU_OKENE	26	1.433	2.232	13.933	9.316	12.5	7.084	11.46%	1.43	2.29%			ACSR	150mm <sup>2</sup>
63	LOKOJA_OKENE	140	1.547	2.238	14.047	9.323	12.5	7.085	12.38%	1.55	2.48%			ACSR	150mm <sup>2</sup>
64	UKE FDR_KEF	130	1.79	2.561	15.79	10.495	14	7.934	12.79%	1.79	2.86%			ACSR	150mm <sup>2</sup>
61	H21	62	1.295	1.923	11.295	7.59	10	5.667	12.95%	1.30	2.07%			ACSR	150mm <sup>2</sup>
67	LAPAI_MINNA	127.8	0.867	1.052	7.367	4.736	6.5	3.684	13.34%	0.87	1.39%			ACSR	150mm <sup>2</sup>
77	Kagara fdr_TEGI	100	0.868	0.907	6.668	4.194	5.8	3.287	14.97%	0.87	1.39%			ACSR	150mm <sup>2</sup>
85	KEFF FDR_FDR	95	2.621	4.127	20.121	14.044	17.5	9.917	14.96%	2.62	4.19%			ACSR	150mm <sup>2</sup>
72	Fdr8_AT5	20	3.272	5.21	23.572	16.715	20.3	11.505	16.12%	3.27	5.24%			ACSR	150mm <sup>2</sup>
73	JERE_SUL	39	1.845	2.863	12.645	8.984	10.8	6.121	17.08%	1.85	2.95%			ACSR	150mm <sup>2</sup>
77	Akwanga	59	1.742	2.641	11.742	3.511	10	0.87	17.42%	1.74	2.79%			ACSR	150mm <sup>2</sup>
79	AYIMGBA_AJAO	220	0.891	0.767	5.891	3.601	5	2.834	17.82%	0.89	1.43%			ACSR	150mm <sup>2</sup>
80	NASKO_KONTAGORA	278	1.981	2.524	12.681	8.588	10.7	5.064	18.51%	1.98	3.17%			ACSR	150mm <sup>2</sup>
81	NAS FDR_KEF	99	1.401	2.037	8.901	6.287	7.5	4.25	18.68%	1.40	2.24%			ACSR	150mm <sup>2</sup>
82	GWADA_MINNA	346	1.421	1.44	8.421	3.406	7	3.966	20.30%	1.42	2.27%			ACSR	150mm <sup>2</sup>
86	L35_GWA	85	2.084	3.209	12.084	8.876	10	5.667	20.84%	2.08	3.33%			ACSR	150mm <sup>2</sup>
87	TEGINA FDR_TEGI	220	1.295	1.594	7.295	4.994	6	3.4	21.58%	1.30	2.07%			ACSR	150mm <sup>2</sup>
86	ZANGO FDR 2	32.1	5.656	8.906	31.656	23.641	26	14.795	21.75%	5.66	9.05%			ACSR	150mm <sup>2</sup>
88	KUTIGI_BIDA	330	1.125	1.137	6.125	3.971	5	2.834	22.50%	1.13	1.80%			ACSR	150mm <sup>2</sup>
90	Iafia	45.5	2.727	3.273	11.727	8.373	9	5.1	30.30%	2.73	4.36%			ACSR	150mm <sup>2</sup>
91	BIWIKO FDR	14.5	1.37	2.201	5.87		4.38	4.5	30.44%	1.37	2.19%			ACSR	150mm <sup>2</sup>

<b>Total Load (MW)</b>	809.62	<b>Total Load Lost (MW)</b>	62.50	<b>Resultant Technical Loss</b>	7.7%
<b>FEEDER TECHNICAL LOSS RECALCULATED</b>					
<b>Category Key</b>		<b>Range</b>			
• Good/Fair	<5.00%				
• Poor	5.01% - 10.00%				
• Inadequate	>10.00%				

## APPENDIX 3 – AEDC Contact Centre Locations

FCT SOUTH	FCT NORTH	FCT CENTRAL	NIGER	KOGI	NASARAWA
<b>APO AREA OFFICE</b>	<b>BWARI AREA OFFICE</b>	<b>ASOKORO AREA OFFICE</b>	<b>BIDA AREA OFFICE</b>	<b>IDAH AREA OFFICE</b>	<b>LAFIA AREA OFFICE</b>
Lateef Jakande Crescent, off Jereton Mariete Street, Apo	No. 3, Bwari Area Council Road, By First City Monument Bank, Bwari Abuja	32, Eyadema Gnassigbe Street, Behind ECOWAS Secretariat, Off Yakubu Gowon Crescent, Asokoro Abuja	Opposite Union Bank, Off Lemu Road, Bida Niger State	No. 1, Odoma Road, Sabon Gari, Idah, Kogi State	No. 76, Markurdi Road, Opposite Romantic Bakery, Lafia Nasarawa State
<b>GWAGWAL ADA AREA OFFICE</b>	<b>GWARINPA AREA OFFICE</b>	<b>GARKI AREA OFFICE</b>	<b>BOSSO AREA OFFICE</b>	<b>LOKOJA AREA OFFICE</b>	<b>MARARABA AREA OFFICE</b>
Along Specialist Hospital Road, Opp. Army Check Point, Gwagwalada, Abuja	No. 11/12 2nd Avenue Gwarinpa Abuja	No. 3, Obosi Street, off Samuel Akintola Boulevard, Garki 2, Abuja	Dutsen Kura Gwari Junction, Bossou, Niger State	Murtala Mohammed Way, Beside Water Works, Okene, Kogi State	No. 5, Becky Yeduma Street, Opp. Major Gen. J.T Useni Road, Along Prince & Princess, Mararaba
<b>JABI AREA OFFICE</b>	<b>KATAMPE AREA OFFICE</b>	<b>KARU AREA OFFICE</b>	<b>KOTANGORA AREA OFFICE</b>	<b>KABBA AREA OFFICE</b>	<b>ADO AREA OFFICE</b>
Plot 420 Obafemi Awolowo Way, Opp. Ecobank, Jabi Abuja	No. 26B, Bola Ajibola Crescent, Katampe Abuja	Plot 147, Unity Road off Nnamdi Azikiwe Road, Behind Narai Primary School, Karu Site Abuja	No. 82, Maigari Gadabe GRA Road, Kotangora, Niger State	Opposite Holy Family Catholic Church, Along Oba Odolu's Palace, Kabba, Kogi State	Opp. L.E.A Primary School, Along Keffi Akwanga Road, Ado, Nasarawa State
<b>KUJE AREA OFFICE</b>	<b>KUBWA AREA OFFICE</b>	<b>MAITAMA AREA OFFICE</b>	<b>MINNA AREA OFFICE</b>	<b>OKENNE AREA OFFICE</b>	<b>KEFFI AREA OFFICE</b>
Plot 335, A&B Phase AA1 Layout, Kuje Area Council, Kuje Abuja	No. 285, Gado Nasco Road, Near Zenith Bank, Kubwa Abuja.	No. 7, Baltic Crescent, off Danube Street, Maitama, Abuja	Opposite U.K. Bello Art Theatre, P.M.B 23, Minna, Niger State	Opp. U.K Bello Arts Theater, Minna, Niger State	Plot 8098, GRA-Keffi, Along Akwanga Road, Keffi, Nasarawa State
<b>LUGBE AREA OFFICE</b>	<b>LIFECAMP AREA OFFICE</b>	<b>WUSE AREA OFFICE</b>		<b>SULEJA AREA OFFICE</b>	
Opp. Knaps School, Phase 2, FHA Lugbe Abuja	Plot 313, Efab Road, LifeCamp, Abuja	No. 6, Morija Close, off Ademola Adetokunbo Crescent, Wuse 2, Abuja		Suleiman Barau Road, Opposite Diamond Bank, Suleja, Niger State	
		<b>JIKWOYI AREA OFFICE</b>		<b>ZUMA AREA OFFICE</b>	
		Behind Former Aso Savings Bank, Jikwoyi Phase 2, Jikwoyi Abuja		Along Suleja Road, Opposite Islamic Jnction, Madalla, Niger State	

## ***APPENDIX 4 – Sample NERC Timeline on Complaints Resolution***

<b>S/N</b>	<b>Company Standards</b>	<b>Response time</b>
1	A case of no supply to customer's Premises	24 hours
2	Failure of fuse	24 hours
3	Minor fault in equipment	24 hours
4	Other equipment faults	24 hours
5	Estimation of metered customers	3 months
6	Notice of Planned Supply Interruptions	3 days
7	Voltage Complaints	24 hours
8	Meter request via MAP	10 days
9	Meter Disputes	3 days
10	Reconnection of supplies disconnected for non-payment	24 hours
11	Responding to faults With Prepayment Meters	24 hours

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