PERFORMANCE IMPROVEMENT PLAN

Kano Electricity Distribution Company

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Submitted to the Nigerian Electricity Regulatory Commission

Contents

Figures

Tables

Acronyms

TABLE 1: ACRONYMS AND DEFINITIONS

Acronym	Definition
AMI	Advanced Metering Infrastructure
ATC&C	Aggregate Technical, Commercial and Collection Losses
BPE	Bureau of Public Enterprises
CAPEX	Capital Expenditure
CMS	Commercial Management System
Disco	Distribution Company
ERP	Enterprise Resource Planning
EXIM	Export Import
GIS	Geographical Information System
IRMS	Incidents Recording and Management System
IRR	Internal Rate of Return
IT	Information Technology
KEDCO	Kano Electricity Distribution Company
MAP	Meter Asset Provider
MDA	Ministries, Departments and Agencies
MO	Market Operator
MYTO	Multi-Year Tariff Order
NBET	Nigerian Bulk Electricity Trading Plc.
PHCN	Power Holding Company of Nigeria
PIP	Performance Improvement Plan
RMU	Remote Monitoring Unit
RPP	Revenue Protection Project
SCADA	Supervisory Control and Data Acquisition System

WACC	Weighted Average Cost of Capital
WMS	Works Management System

1 Executive Summary

Introduction to KEDCO

Kano Electricity Distribution Company (KEDCO) Plc is one of the PHCN successor companies covering Kano, Katsina and Jigawa franchised area within the North West area of Nigeria.

The Company receives bulk of its power from 330/132kV Kumbotso Transmission Station as well as from Kwanar-Dangora and Funtua 132/33KV Transmission Sub-Stations. In total, KEDCO receives supply from twelve (12) 132/33kV Transmission Sub-Stations, twenty-seven (27) 132/33KV Transformers, fifty-seven (57) 33kV Outgoing Feeders, fifty-four (54) Injection Sub-stations, seventy-two (72) 33/11kV Transformers, and one hundred and fifteen (115) operational 11kV Feeders.

In 2013, KEDCO had an estimated customer number of 340,222, and its 2019 data shows an increase to 598,352 registered customers.

The Company has about 2,754 staff across all levels and anticipates expansion and growth over the next five years. The Company's length of networks includes 6,349.37km for 33kV feeders and 2,114.2km for 11kV feeders.

Expected Output

KEDCO's expected output from the PIP execution would achieve the following:

- Reduce actual losses from 49.31% as at June 2019 to 17.21% in 2024;
- Increase from 119,309 metered customers in 2019 to 594,309 in 2022;
- Reduce interruptions from 1,624 per month in 2019 to 50 per month in 2024;
- Connect an average of 48,000 new customers in years 2020 to 2024; and
- 100% market remittance over the planning horizon.

Impact on Tariff

To achieve the PIP, it is expected that tariffs would be higher than the current 2019 MYTO Minor Review tariffs set by NERC. The anticipated average cost reflective tariff is ₦62.94/kWh in 2020. Over the horizon, the revenue received from this tariff would assist KEDCO to make the prudent investments (in collaboration with KEDCO's stakeholder engagements) in the expansion, reinforcement and rehabilitation of its network to serve its growing number of customers in an efficient, reliable and safe manner.

2 Overview of the PIP

Since takeover, KEDCO has painstakingly improved service delivery through initiatives aimed at providing electricity supply in safe and reliable way. Although, the lack of accessibility to finance has limited our drive and commitment to achieving the required outputs based on the performance agreement with the Bureau of Public Enterprise (BPE) in serving our growing customers and growing demand.

In line with NERC's requirements and guidelines for the PIP, KEDCO have engaged stakeholders and incorporated the feedbacks into the PIP. These feedbacks have further consolidated our plans to embark on initiatives that would improve supply and customer satisfaction. KEDCO's focused investment initiatives are to achieve its loss reduction path, improve reliability, meter its customers, and make investments in network expansion and rehabilitation. Other planned investments would make KEDCO achieve global best practices in safety, ensure its market obligations are fully paid and ultimately improve customer satisfaction.

To achieve our loss reduction trajectory, KEDCO has considered Four (4) scenarios from 2020 to 2024 and the potential impact on key performance indicators (KPIs) and expected output:

1. Regulatory allowed Capex, ATC&C loss reduction path and energy forecast;
2. Regulatory allowed Capex, ATC&C loss reduction path and KEDCO energy forecast;
3. Regulatory allowed Capex, KEDCO actual ATC&C loss reduction trajectory and its energy forecast; and
4. KEDCO required Capex, actual ATC&C loss reduction trajectory and energy forecast.

For business sustainability and full remittance of market bills, it is of utmost interest to all stakeholders that KEDCO be allowed the required Capex and to charge cost-reflective tariffs. KEDCO is committed to reducing its ATC&C loss level from 49.31% to 17.21% by 2024 with the required Capex. Consequently, the right pricing signals are sent to investors and lenders.

It is also important to note that the risks and challenges expressed in this report have continuously plagued the stakeholders in the Nigerian power sector, and these challenges require quick fix to ensure that the expected outputs in the PIP are achieved.

Summary of Managerial Process in Developing the PIP

KEDCO has followed a robust process to prepare this plan and justified its planned expenditure by applying a bottom-up approach in data collection. The management analyses this data and develops strategies leading to the creation of projects and their implementation plans. These plans are then communicated to the heads of units in meetings and via emails and the information is passed down to all operating staff and further to other stakeholders via different communication outlets such as press and social media handles.

The process is described in more detail in Section 4.

Capex Scenarios Used in Developing the Plan

The key characteristics of the PIP four scenarios are:

- The first scenario considers a situation where the Capex provision is retained based on NERC's tariff and energy forecast assumptions from the December 2019 Minor Review MYTO 2015, as well as the regulatory ATC&C losses from 2020 to 2024;
- The second scenario considers a situation where the Capex provision is retained based on NERC's tariff and projected ATC&C losses from the December 2019 Minor Review MYTO 2015 as well as KEDCO's energy forecast assumptions based on historical growth in energy received;
- The third scenario is based on the regulatory Capex provision based on NERC's December 2019 Minor Review MYTO 2015, KEDCO's projected ATC&C losses, cost-reflective tariff, as well as KEDCO's energy forecast assumptions based on historical growth in energy received; and
- The fourth scenario is based on the KEDCO's required Capex, projected ATC&C losses, cost-reflective tariff, as well as its energy forecast assumptions based on historical growth in energy received.

The third and fourth scenarios allow KEDCO to achieve the desired loss levels and its most ambitious output goals in the planning horizon.

The scenarios are described in more detail in Section 4.

Outputs Based on KEDCO Required Capex

Over five years, the outputs based on KEDCO's required Capex and cost reflective tariff will provide the following estimated results:

- Achieve ATC&C losses from the current level of 49.31% to 17.21%. Consequently, the outputs will allow our business to be sustainable;
- Reduce the number of customer interruptions from the current level of 1,624 per month in 2019 to 50 per month in 2024 (97% reduction), increasing reliability for our customers;
- Increase the number of new meters installed from the current level of 119,309 in 2019 to 594,309 in 2022, allowing customers to trust the bills they receive;
- Mitigate the occurrence of deaths and accidents in our service area; and
- Connect an average of 48,000 new customers in years 2020 to 2024.

These outputs are discussed in Section 4.

The justified investment plan to achieve these objectives is in Section 6.

Navigating this report

TABLE 2: MAPPING THE STRUCTURE OF THIS REPORT TO NERC CRITERIA

NERC criteria for evaluating the PIP	NERC questions for the PIP	Relevant Section
Criterion 1 - Process	Has the Disco followed a robust process?	Section 3: Process
Criterion 2 - Outputs	Detail of individual outputs.	Section 4: Outputs: strategic objectives
	Does the Plan deliver the required outputs?	Section 5: Detailed Program Plans
Criterion 3 - Expenditure	Are the costs of delivering the outputs efficient?	Section 6: Delivering outputs efficiently
	Detail of individual cost items.	Section 6: Detailed Program Plans
Criterion 4 - Financing	Are the proposed financing arrangements efficient?	Section 7: Funding Plans
	Detail of individual financing areas.	Section 7: Funding Plans
Criterion 5 - Uncertainty and Risk	How well does the Plan deal with uncertainty and risk?	Section 9: Approach to managing risk
	Detail of individual uncertainty area.	Section 9: Risk analysis

3 Executive Summary of the Processes Used

List of Processes for Developing the PIP

This section covers:

- Process for stakeholder consultation and engagement;
- Process for demand forecast;
- Process for setting output goals; and
- Process for investment planning.

Process for Stakeholder Consultation and Engagement

Stakeholder engagements are planned and executed at both headquarters and regional office levels. Based on feedback from field officers and customers, the management comes up with a stakeholder engagement plan and schedule. The budget for the stakeholder engagements is prepared and approved by the management.

Stakeholder engagement for the purposes of sharing information on the proposed PIP and its estimated outcomes was held on 26th September 2019. See Figure 1 for further details and pictures of the stakeholders' engagement conducted for the dissemination of the PIP related information to customers and to obtain their valuable feedback.

Invitation for stakeholder consultation and information dissemination in KEDCO is via:

Formal letters to customers;

- Open invitation or announcements advertised in at least two (2) national dailies;
- Jingles in radio stations across each state in Kano, Katsina and Jigawa;
- Social media handles; and
- KEDCO web page announcements.

KEDCO follows a robust process by holding quarterly stakeholder consultations - usually forums for detailed discussion, deliberations and opinion sampling for decision making.

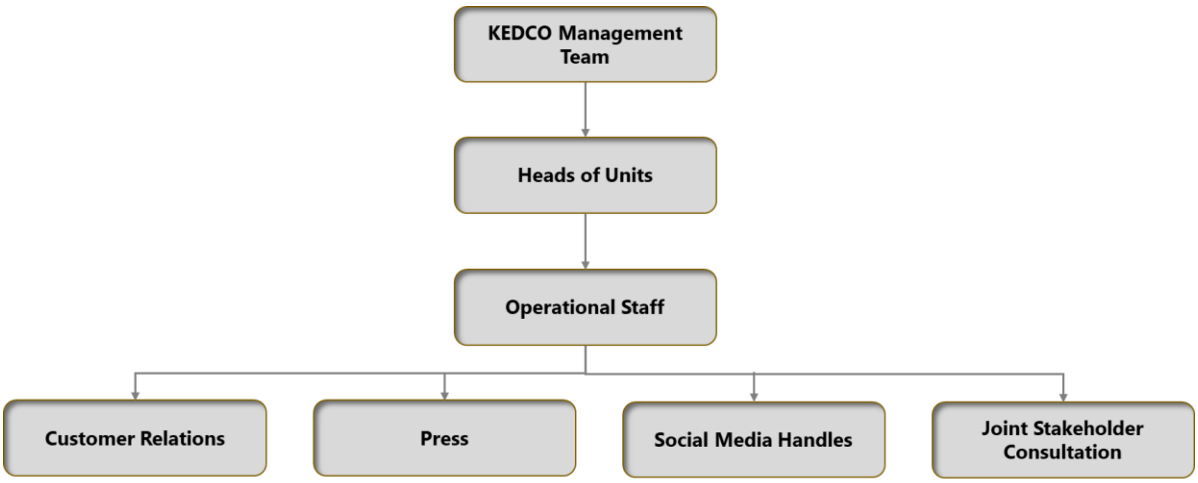


FIGURE 1: PROCESS FOR STAKEHOLDER CONSULTATION

The consultation provides opportunity for stakeholders to understand the output target per-time and the impacts on customers. These processes have yielded great results especially with stakeholder cooperation – see Figure 2.

FIGURE 2: PIP STAKEHOLDER CONSULTATION

Annex A provides the PIP Newspaper publication and detailed results from the stakeholder engagements.

Process for Demand Forecast

KEDCO has undertaken a robust demand forecast from 2019 to 2024 using a combinatorial time-series and econometric data to provide input to log-log linear regression models that forecast the average diurnal peak demand in its licensed area. The time-series data relating to hourly load of feeders at 33kV and 11kV feeders was collated. Some of the data sources were logs kept at TCN and at the injection substations of KEDCO. Data on outages, unserved areas and areas under load shedding at the same time were also collected.

The robust process followed by KEDCO in its demand forecast computation include:

1. Having established that the explanatory or independent variables for various sectors of the economy were different and not correlated, secondary statistical data exclusively for electricity sector were not available, and no established correlation with any other representative data, the forecast was confined to the time-series data available for the KEDCO area specifically;
2. It was determined independently that all the factors impacting demand for electricity have a positive impact other than price (tariff);

3. A log-log linear regression model was applied to the time-series data for forecasting future demand, which factors in the historic growth in demand and provides for elasticity due to impact of independent variables;
4. The best fit and statistically significant output with least error was considered for the final forecast values, with a confidence interval of 90-95%;
5. The assumptions for sectoral and gross state domestic product were used to provide auto-regressive models for the independent variables. The data is sourced from the website of the Nigeria Bureau of Statistics (www.nigerianstat.gov.ng);
6. The state nominal GDP for Kano was used for the forecast analysis;
7. Based on the statistical data, the following inferences were derived:
   - The state GDP grew at a rate of 9.58% during the period;
   - The major drivers for growth in power demand – viz., manufacturing, real estate, showed much slower growth during the period than the nominal growth overall;
   - Real estate contracted during the period by a factor of (-) 4/27%; and
   - The overall growth rate in demand based on these nominal growth rates is projected as 4.34% annually.

The results of the above forecast incorporating base demand on 33kV and 11kV feeders are shown in section 4.

Process for Setting Output Goals

KEDCO follows a robust process for its output goals through budgeting, prioritization of projects based on performance agreement targets, interface meetings with stakeholders and execution of projects.

One of the output goals is to reduce ATC&C losses from 49.31% in 2019 to 17.21% in 2024. To achieve this output, the Company prioritizes investments based on approved budget as reviewed by KEDCO's management that is presented to the Board of Directors for review and approval after incorporating observations by the Audit and Finance Committee of the Board.

KEDCO's achievement of its loss reduction output takes into consideration the feedback from stakeholder engagements. One of such engagements (see Figure 7) that was held 26 September 2019 incorporated these feedbacks:

- Collaboration with local government administrators and the police to curb energy theft and meter bypass activities from customers.
- To organize sensitization programs with different customers groups to communicate the dangers inherent in energy theft and to encourage customers to take advantage of the MAP for proper energy accounting. This would resolve issues of estimated billings within its license area.

Process for investment planning

KEDCO follows a robust process for its investment planning through budgeting, project listing and categorization, project analysis, and tendering and contract awards.

Budgeting

As an initial step, a detailed forecast income statement and profit/loss projections are prepared with inputs from various departments to determine revenues, collections, operating expenses, among others. Cash flow statement for the planning horizon is also prepared.

Budgets are then reviewed by management and presented to the Board of Directors for review and approval after incorporating observations by the Audit and Finance Committee of the Board.

Surplus cash flow at the end of a period is identified using projected expenses and Board's estimation and approval of market remittance commitments.

Source of funds for Capex program is estimated as the surplus or retained revenues and available credit from banks, non-banking financial institutions, EXIM banks, suppliers' credit, etc. Final figure for Capex is then estimated, and the budget is accordingly prepared.

Project Listing and Categorization

List of projects which have already undergone preliminary analysis at departmental level in terms of determination of input costs, project timelines and impact on revenue (pre-feasibility and feasibility analysis) are carried out. Projects are normally categorized into the following:

- Capacity Expansion or Augmentation e.g., distribution transformers, new feeders and/or feeder extension, injection substation capacity, new dedicated customer lines;
- Reliability of Supply e.g., network redundancy, RMUs, auto-reclosers, SCADA, Outage Management System;
- Quality of Power Supply e.g., capacitor banks, earthing systems, controls and instrumentation;
- Efficiency Improvement including projects in IT and Information Technology Enabled Systems (ITES);
- Regulatory Compliance as directed by NERC or NERC Forum Offices;
- Customer Service Systems including IT and ITES systems;
- Office Infrastructure, Tools and Equipment; and
- Customer Metering, Energy Accounting and Loss Reduction.

Analysis of Projects

Analysis of projects are as follows:

- Analyze and verify project linkages – whether projects are mutually exclusive or dependent on another project;
- Project returns and hurdle rates will vary by project type, e.g., replacement projects will typically have lower risk and more definitive rate of return (as they are required to maintain established performance levels) than new projects (less certain returns);
- Projects implementation are focused on lowest cost; and
- Typically, hurdle rates for internal rate of return of projects are established as the NERC approved WACC rate used to establish tariffs;

Projects are prioritized on these bases:

- Highest differential between the IRR and the hurdle rate;
- Must-do projects under government or regulatory directives;

- Total surplus and leveraged funds available for the project; and
- Shortlisted projects are then handed to the Planning and Investment (P&I) unit along with Procurement unit for further action.

Tendering and Contract Award

The tendering and contract award process include:

- Request for Proposal (RfP) documents is issued to pre-qualified contractors/suppliers for providing their most competitive techno-commercial bids;
- Bids are evaluated on QCBS (Quality and Cost Based Selection) methodology. Vendors with the highest technical and cost scores (based on weighted average scores) are selected for final award of the contract for the project; and
- Contract costs are capitalized on the books of the Company based on the actual commercial date of commencement of operations of the project which is declared officially by the end-user project in-charge.

Process for Electricity Distribution Planning

KEDCO's process for electricity distribution planning is often based on in-house projects that are contracted to third parties or small-scale industry projects initiated by customers. An example of the in-house project could be installation of a distribution transformer or injection substation construction. An initial step would be from the technical service points where projects are initiated by writing report of the intended projects such as overloaded transformer that requires upgrade or relief. Based on the report, proper survey and inspection are done, and thereafter, project proposal is developed, and forwarded to the Chief Technical Officer (CTO) for consideration and approval. After the approval of the project, the Capital Sanction Document (CSD) is developed to capture expected benefits and requirement of the project in terms of materials and parts. The materials required for the project implementation are booked and consequently, the project construction is commenced.

The electricity distribution investment will help KEDCO achieve the following targets:

- Reduce ATC&C losses with KEDCO required Capex from the current level of 49.31% in 2019 to 17.21% in 2024, which will allow our business to be sustainable;
- Reduce the number of customer interruptions from the current level of 1,624 per month in 2019 to 50 per month in 2024, thereby, increasing reliability for our customers;
- Connect an average of 48,000 new customers in years 2020 to 2024; and
- Market remittance of 100% over the planning horizon.

Refer to Section 5 and Section 6 for detailed description.

Process for Commercial Operation Planning

The commercial operations comprise meter installation and reading, along with periodic monitoring of pre-payment meters (PPM), billing/bill printing, bill distribution, collections and customer service support for handling commercial complaints.

The key driver or Company philosophy towards commercial operations is summed up by – "Customer Intimacy". The focus is to provide services close to the customers in order to achieve optimum coverage of the Company's vast distribution network. It was this philosophy that went into the restructuring of the Company's operations in 2016 – which led to consolidation of the 14 business units into 9 regions and more than 190 customer service points (CSPs) and more than 50 technical service points (TSPs). Each CSP is manned by 4-10 staff, depending on area and number of customers, responsible for handling customer enumeration, bill distribution, collections and customer complaints. The TSPs provide technical operations and maintenance functions and also support the CSPs in carrying out disconnections when mandated.

The operations planning process is carried out to optimize the coverage of all customers in a monthly cycle, constrained by the operational expenses budget allocated to these activities. Activity based accounting has provided that commercial operations constitute nearly 11.7% of the monthly operational expenses (excluding salaries and wages) on an average. The operational planning process aims to optimize the Company's commercial performance within the budgetary constraints in terms of billing and collection efficiency to achieve the loss reduction target commitment. Commercial capital expenditure projects pipeline has been prepared and covers all commercial operations to minimize lapses, optimize input costs and automate most functions.

The Customer Relations Department headed by the Chief Customer Relations Officer (CCRO) handles metering, and commercial complaints, along with a dedicated unit for Maximum Demand (MD) Customers. The CCRO is also responsible for regional commercial staff handling meter reading, PPM monitoring, bill distribution and collections.

The Billing and Collections Unit is managed by the Chief Revenue Assurance Officer (CRAO) responsible for billing, estimation of energy billed for un-metered customers, collection accounting, vending platform for PPM meters, data analysis and operational support, among other activities, relating to assurance of revenue billing and collections.

Our process for commercial operations covers the following:

1. **Meter Installation** – KEDCO has installed nearly 62,000 new pre-payment meters for its mass base of customers in the residential and commercial categories. The meter installation department is headed by the Head of Energy Metering and a staff of over 130 technicians fully trained in the process of meter installation. All pre-payment meters (PPM) procured using the CBN-NEMSF have now been installed across all the nine regions of KEDCO.
   Further meter installation shall be undertaken by the selected MAPs in line with the meter roll-out plan, as modified or amended from time to time. The priority on metering is based on high-consumption areas – based on transformer (DT) based customer enumeration and load assessment.
   The department also handles customer enumeration under NERC mandated guidelines and has so far achieved detailed enumeration of nearly 56% of the network and over 500,000 customers.
2. **Meter Reading and Monitoring** – All MD customers of KEDCO have been metered and meter readings are carried out regularly for all customers at the end of every month – based on a meter reading schedule managed by the Head of MD Customers' Business Unit, reporting to the Chief Customer Relations Officer.
   Monitoring of pre-payment meters is based on analysis of vending data. Each regional office and the HQ has a dedicated PPM monitoring team. Based on the analytics of vending data, the monitoring team checks the PPM for tampering, bypass or other faults not attributable to the customer. In case bypass/tamper is detected, appropriate action is taken under the regulations.
3. **Billing and Bill Printing** – Billing of all post-paid customers (based on meter reading, estimation or fixed billing) is carried out by the Billing Unit, in consultation with the regional

commercial staff. All inputs required for the billing period (Master Data Update, Payment Update, Customer Accounts Adjustments, Meter Reading Data, etc.) are updated before commencement of billing which starts on the first day of the month for MD customers and 5th day of the month for non-MD customers.

4. **Bill Distribution** – All bills for mass distribution are handed over to the regions latest by the 10th day of the month. Sales Executives located at various customer service points (CSP) in the regions deliver the bills and follow up for collection, delivery of disconnection notice and supervision of disconnections. Targets are designed to ensure 100% delivery of all bills generated providing all customers ample time to meet their payment obligations.
5. **Collections** – Collections are handled by cash collection offices located at most CSPs and regional offices. The Company has deployed more than 770 online point-of-sale (POS) devices that generate receipts against payment for each paying customer. The information is also instantly updated in the collections database located at the Company's Data Center. Neary 1100 sales executives are employed by the Company to optimally reach out to all its customers every month and ensure that bills are delivered and paid for, as per the norms provided by the regulations in this matter.
6. **Customer Complaints Handling** – Each regional office has a dedicated Customer Care Unit (CCU) that receives and resolves customer complaints on commercial issues like billed energy, billed amount, tariff change, name change, load enhancement, payment reconciliation, etc. The CSPs also receive and escalate customer complaints for resolution if insufficient information is available at this point to achieve resolution. An escalation process has been established within the Company up the MD/CEO and if still unresolved, customers are made aware of their option to approach the NERC Customer Forums established in Kano, Katsina and Jigawa.

In addition to the above, the CR department also engages customers for clearance of outstanding dues, settlement of bills, disconnection/reconnection related activities, issue of reconnection, loss of revenue and administrative charges and collection of the same.

Process for Meter Investment Planning

KEDCO's process for meter investment planning is in collaboration with Meter Asset Providers (MAP) to provide meters to customers through the approved vendors by NERC. In selecting these vendors, bids were evaluated on QCBS (Quality and Cost Based Selection) methodology. Vendors with the highest technical and cost scores (based on weighted average scores) were selected for final award of contract for the project.

The selected vendors in line with NERC's no objection include Momas Limited, Mojec International Limited, Crest Hill Engineering Limited, Armese Consulting Limited, and Meron Nigeria Limited.

Our meter investment via Meter Asset Providers will help KEDCO increase the number of new meters installed from the current level of 119,309 in 2019 to 594,309 in 2022, allowing customers to trust the bills they receive;

The actual MAP plans are described in section 6.

Process for Safety Investment Planning

Occupational Health, Safety and Environment issues are dealt by a dedicated business unit headed by a qualified and accredited professional with more than 30 years' experience in similar job function. The Head reports directly to the MD/CEO.

The planning process involves review of occupational health and safety hazards, identified during the routine annual audit of safety related issues across the Company. Adequate safeguards and measures are then proposed to the management for allocation of capital and operational expenses.

The primary areas covered are:

1. **Firefighting equipment and systems** – Continuous monitoring upgrade and maintenance of firefighting equipment is carried out across all KEDCO facilities. Capital expenditure is being proposed for upgrade of firefighting systems incorporating more automation in fire detection and safety hazards, alarm systems, sprinkler systems (where appropriate) and other technological interventions.
2. **Safety Training** – Training of staff is an ongoing and regular exercise being undertaken at all levels to apprise all technical, non-technical and support staff towards safety awareness and safe operational practices, including proper use of safety gear and protection equipment.
3. **Safety Gear and Personal Protection Equipment (PPE)** – The Company takes the issue of safety gear and PPE very seriously, and all its technical/non-technical staff are issued with standard safety gear compliant with the best practices and standards for the electricity distribution sector. All technical staff are mandated to use the safety equipment, including boots, fire and flash-over retardant overalls, proper gloves, safety belts, helmets, safety glasses, etc., under penalty of sanctions for any violations.
4. **Monitoring of Network Related Safety Issues** – This is carried out regularly by our technical staff in conjunction with the Head of HSE and team to identify potential hazards at our distribution substations, overhead lines, etc.
5. **NEMSA Review** – The HSE Unit also handles for repair, restoration, maintenance of network related issues identified by NEMSA.
6. **Illegal and Dangerous Construction** – HSE Unit monitors our network for illegal encroachment and dangerous construction close to the overhead lines both HT and LT. Notices are served to violators and the unit ensures that the construction is stopped or demolished under the directions of the appropriate civil authorities.
7. **Health Inspection** – The unit inspects and rectifies any health-related issues at all our facilities including, inter alia, civil construction, plumbing and water supply, sewage, food and other waste handling, house-keeping and other issues to be compliant with all state and federal regulations relating to public health and safety.
8. **Investigation and Reporting** – The unit also handles investigation and reporting of incidents for both Company employees and customers relating to accidents leading to injuries and/or fatalities. The unit also investigates incidents of near misses and documents the same in order to carry out further rectification and/or training of personnel.

The actual HSE investment plans are discussed in section 6.

4 Introducing the Context for this PIP

Overview

This section covers:

- Introduction to KEDCO;
- Scenarios in this PIP; and
- Strategic objectives.

Introduction to KEDCO

Vision

To Enable Re-industrialization and Economic Empowerment through Safe and Reliable Power Distribution.

Mission

To be an Efficient Power Distributor Focused on Customer Satisfaction.

Overall Strategy

KEDCO's overall strategy is to improve staff effectiveness, operating efficiency, customer service and intimacy which are ultimately geared towards improving revenue.

Business Environment 2013-2019

Following the privatization of the distribution companies in November 2013, the Discos have continued to operate in an adverse business environment which has led to limited progress in the performance improvement of the Discos. Some of the factors that have made the business environment very challenging are discussed below.

Lack of Cost Reflective Tariff

At the time of privatization of the Discos, the Multi Year Tariff Order II (MYTO II) was in effect. However, it became clear during the privatisation process that the key assumptions of the MYTO II (including generation levels, ATC&C losses and customer numbers) were inaccurate and resulted in tariffs that were not cost reflective. Since the true PHCN performance was not known, NERC and BPE agreed that the new owners of the Discos should carry out a study to determine their baseline losses and real customer numbers at the time of privatization, and this would be the basis of a tariff reset.

Despite this commitment, the full cost of the electricity value chain has never been allowed to pass-through to tariffs since privatisation. Table 3 shows a summary of the major events that mean tariffs have not been cost reflective. Table 45 in Annex B provides a more detailed timeline.

TABLE 3: SUMMARY TIMELINE OF KEY TARIFF CHALLENGES

Year	Tariff cost reflective?	Events
2013	No.	– Privatisation process recognised that tariff review would be required once true level of ATC&C losses were understood. Interim Rules Period (IRP) introduced to recognise Disco's inability to pay the market until tariffs were cost reflective.
2014	No.	– Discos conducted Baseline Losses Studies to determine true levels of ATC&C losses.
2015	No. Only 2 months (February and April) where tariffs were close to cost reflective.	– Commencement of TEM in February 2015. Discos were expected to pay full market invoices from this date. – February 2015 was the start of revised tariffs based on a new tariff model known as MYTO 2.1 which recalculated tariffs based on the results of the Disco's baseline losses study. However, MYTO 2.1 assumed that the Discos has started their loss reduction path in January 2013. This meant that tariffs were not truly cost reflective. – In April 2015, tariffs are amended to strip out collection losses. The removal of collection loss led the majority of the Discos to issue notice of Force Majeure under their Performance Agreements in 2015. – Minor reviews not implemented.
2016	No. MDA debts still not resolved. Minor reviews not implemented.	– New MYTO 10-year tariff order from February 2016, reinstated most collection losses but reduced allowed losses by removing Ministries, Departments & Agencies (MDA) debt. The intention was for FGN to pay these historic liabilities and introduce a mechanism to meet future bills. Addresses one of the flaws of MYTO 2.1 by adjusting the assumed first year of loss reduction from 2013 to 2015. – From March 2016, generation dropped dramatically as a result of insurgency, Discos revenue decreased dramatically as a result of less power to sell. – From May 2016, foreign exchange weakens considerably, and PPA indexation means cost of generation jumps from 12 N/kWh to 18 N/kWh. – Six monthly minor reviews in June and December were not implemented, these should have incorporated the impact of the generation level and foreign exchange in retail tariffs.
2017	No.	– Six monthly minor reviews in June and December were not implemented in tariffs. – MDA payments have still not been resolved.
2018	No.	– Tariff freeze in January 2018, when NERC instructed the Discos to freeze their tariff at the 2017 level. – Six monthly minor reviews in June and December were not implemented. – MDA payments have still not been resolved.

Year	Tariff cost reflective?	Events
2019	No.	– Six monthly minor review in June was implemented, but revised tariffs were delayed until January 2020, so tariff remains not cost-reflective. – MDA payments have still not been resolved.

The NERC tariff review process was designed with the intent to undertake major reviews every five years, in addition to minor reviews every six months to adjust tariffs for changes to the gas price, the foreign exchange rate, generation output, and inflation. The minor reviews have not been implemented since the release of MYTO 2015 and as a result, tariffs continue to slide further below cost-reflective levels, undermining the Discos ability to fulfil their obligations under the Performance Agreements and Vesting Contract.

There is inadequate Capex provision in the MYTO model for the ambitious performance improvement required. It is hoped that this PIP will form the basis for revised Capex.

The lack of a cost reflective tariff has resulted in accrued liabilities to NBET and MO and means that Discos are unable to raise finance for performance improvement.

Eligible Customers

The eligible customer regulations will allow large ("eligible") customers to purchase power directly from generating companies. Large customers are a major source of revenue for Discos due to their ability and willingness to pay, and heavy cross subsidies between tariff classes. Although a Competition Transition Charge and Distribution Use of System Charges were intended to address the financial impact of losing these customers, they have not yet been put in place.

Under the regulations, eligible customers are required to apply to NERC for eligible customer status, with their proposed supplier. NERC has not officially granted eligible customer status to any customers yet within KEDCO's franchise area, but eligible customers are still taking advantage of this new policy.

The assumption under worst case scenario is the possibility of KEDCO losing some of its prime MD customers due to the implementation of the Eligible Customers regulation. This is not feasible in the long run, but it is important to know that, there are about five viable clusters that could be exposed to the policy directive. Dakata, Katsina, Kumbotso, Sharada and Nassarawa/Sabon-Gari clusters may be very attractive to entrepreneurs who may want to invest in embedded generation or eligible customers, and thereby, forming association within clusters to buy energy from Gencos directly.

We are aware of at least six cases across different Discos in which these customers have refused Discos access to read meters and invoice for demand. If the customers do have a PPA with a provider to supply them power, the Market Operator would need to be aware of it and account for it in Settlement Statements.

Customer Perceptions

The lack of liquidity has resulted in an adversarial public discussion, with various participants blaming others. This has reinforced negative customer perceptions, and together with a perception of electricity as a public good that should be consumed freely, has led to low willingness to pay, energy theft, meter bypass and vandalization of power assets. This is exacerbated by insecurity in some areas of operations.

The sector should try to present a more unified vision in the future, to support customer confidence and encourage customers to pay their bills.

Policy and Regulatory Uncertainty

The regulatory framework in Nigeria has changed very rapidly since 2013. There is a need for regulatory stability, and for regulations to be applied consistently. We recommend:

- The MYTO minor reviews should be implemented in tariffs every six months, without delay;
- Conditions precedent should be met – the conditions for the TEM were not met before it was declared. This materially contributed to the failure of participants to meet their obligations;
- New regulations such as Eligible Customers and Meter Asset Providers (and in the future potentially Franchising) have increased the number of players in the sector, but it is not yet clear that they will increase investment unless the resulting risks are reduced;
- Proposed regulations, in particular the Business Continuity Regulations, may make it impossible to raise finance in the sector;
- Transparency is essential – instructions by NERC to specific market players (such as the MO or NBET) should be made public and consulted on – as they may result in changes to market charges that are not reflected in retail tariffs; and
- The pace of regulatory change should be slowed, and full regulatory impact assessment conducted, so that new regulations do not have unintended consequences, such as worsening the ability of market participants to raise capital or reducing the liquidity of the sector.

Description of achievements 2015-2019

KEDCO's description of achievements from 2015 to 2019 is as follows:

2015 Achievements

- Completion of System-wide Study of Entire Network and Mapping using GIS to aid Planning;
- Investment in Metering to the tune 4.3 billion Naira;
- Integration of Cash Offices with Billing System with Multiple Payment Channels; and
- Procurement of Working Tools and Operational Vehicles.

2016 Achievements

- Company-wide restructuring to regional structure for Enhanced Coverage, Energy Accountability, Reliability and Customer Intimacy; and
- Procurement of additional working tools and official vehicles for senior management staff.

2017 Achievements

- Upgrade of ICT Data Centre; and
- GIS-based Asset Mapping and Customer Enumeration.

2018 Achievements

- Updating Policies, Procedures and Processes to Satisfy the Requirement for ISO Certification;
- Development and deployment of the HC Matrix as an Enterprise Resource Planning alternative tool; and
- Development of the KIMETRIC software for incidence recording and management system that identifies and assigns reported incidences to specified units for resolution.

2019 Achievements

- Development and deployment of CENTRAK System which performs the following:
  - Full Automation of both the Customer Identification Number Generation and Customer Validation/Capture processes with a complete end-to-end process and Dashboard for real time viewing/tracking for both internal and external stakeholders;
  - System Integration with automatic report generation capabilities with other core functions/units within KEDCO (Billing, P&I, Technical, Customer Relations, Procurement/Store among others);
- Commencement of production of quick response (QR) Codes;
- Training, knowledge transfer and staff capacity building; and
- 100% metering of all 11KV outgoing and main power transformers.

Scenarios in this PIP

There are four scenarios considered and their differences are summarized in Table 4.

TABLE 4: SUMMARY OF THE FOUR SCENARIOS

Assumption	Regulatory allowed Capex, ATC&C loss reduction path and energy forecast	Regulatory allowed Capex, ATC&C loss reduction path and KEDCO energy forecast;	Regulatory allowed Capex, KEDCO actual ATC&C loss reduction trajectory and its energy forecast	KEDCO required Capex, actual ATC&C loss reduction trajectory and energy forecast.	Detailed description
Energy	NERC Energy Forecast	KEDCO Energy Forecast			Section 4
Generation tariffs	Increasing with foreign exchange; increasing due to additional capacity charges once PPAs are activated				Section 4
Tariffs	Tariff assumes NERC's	Tariff assumes NERC's	Cost reflective tariff from	Cost reflective tariff from	Section 7

Assumption	Regulatory allowed Capex, ATC&C loss reduction path and energy forecast	Regulatory allowed Capex, ATC&C loss reduction path and KEDCO energy forecast;	Regulatory allowed Capex, KEDCO actual ATC&C loss reduction trajectory and its energy forecast	KEDCO required Capex, actual ATC&C loss reduction trajectory and energy forecast.	Detailed description
	ATC&C loss reduction trajectory according to the Performance Agreement which ends in 2021	ATC&C loss reduction trajectory according to the Performance Agreement which ends in 2021	January 2020 with 2020 as year 1 of ATC&C loss reduction	January 2020 with 2020 as year 1 of ATC&C loss reduction	
Market shortfall	Historic shortfall written off based on NERC Minor Review only; new shortfall may be accrued	Historic shortfall written off based on NERC Minor Review only; new shortfall may be accrued	All historic shortfall written off based on 2020 as year 1 of ATC&C loss reduction; no new shortfall accrued	All historic shortfall written off based on 2020 as year 1 of ATC&C loss reduction; no new shortfall accrued	Section 7
Allowed Capex	MYTO levels	MYTO levels	MYTO levels	KEDCO proposed levels from 2020-2024	Section 7
Access to capital	Unable to raise capital	Unable to raise capital	Unable to raise capital	The Capex is expected to be funded by a 20% retained revenue surplus generated by the Company, 20% from commercial loan, 45% from CBN/FGN, and 15% grant-in-aid.	Section 7
Actual ATC&C	2020 is year 4 of ATC&C loss reduction; limited access to capital means slow loss reduction; no solution for MDA payment	2020 is year 4 of ATC&C loss reduction; limited access to capital means slow loss reduction; no solution for MDA payment	2020 is year 1 of ATC&C loss reduction; KEDCO required means faster loss reduction; FGN solution for MDA	2020 is year 1 of ATC&C loss reduction; KEDCO required means faster loss reduction; FGN solution for MDA	Section 7

Assumption	Regulatory allowed Capex, ATC&C loss reduction path and energy forecast	Regulatory allowed Capex, ATC&C loss reduction path and KEDCO energy forecast;	Regulatory allowed Capex, KEDCO actual ATC&C loss reduction trajectory and its energy forecast	KEDCO required Capex, actual ATC&C loss reduction trajectory and energy forecast.	Detailed description
			payment in place	payment in place	

Demand Forecast

The supply to KEDCO received from the transmission network (operated at 132kV and 330kV) by Transmission Company of Nigeria (TCN) is restricted to an average of 280 MW with an all-time peak of 330MW. The restriction is applied due to single circuit 330kV single line to Kano with rated maximum capacity of 380MW and maximum rated capacity of main receiving station at Kumbotso, Kano of 3*150 MVA (290MW peak) with other two receiving stations at Kwanar Dangora and Funtua restricted to 80MW.

System outages are quite frequent for a grid of this size – typically two to four times in a month, thereby, leaving the entire coverage area in darkness, and such outages range from 4 to 24 hours in some instances. This problem experienced by KEDCO is due to the chronic shortages of power, equipment unreliability, and in some cases unenergized feeders. Consequently, only parts of the network are energised at any point in time which makes the underlying total load difficult to determine. To combat this issue of sparseness in the data, KEDCO modelled the time series of hourly load of its feeders using the log-log linear regression model to determine forecast average annual peak demand for the network.

Since the customer database is incomplete and not aligned by feeder and customer category, it was not possible to undertake a category-wise forecast of demand. It is assumed that with the completion of enumeration and alignment of customers to be identified by both tariff class and the feeder/DT connectivity, a more detailed breakup of demand can be estimated. However, with the present data available, we are constrained to use past billing data as a proxy to reverse determined demand based on energy consumption/allocation among customer categories.

Forecasting Methodology

The forecasting methodology used include:

- Econometric analysis – This method models the demand for electricity in terms of driving factors such as income, price, sectoral economic growth rates, etc.;
- Time series analysis – This approach assumes that the demand for electricity in a certain period can be modelled in terms of the past values of the demand and the forecasted demand can be fitted on the regression curve based on the time-series data;
- Combination of econometric and time series methods – This methodology models the demand for electricity in terms of driving factors and lagged values of demand; and
- End-use analysis – This model uses norms for various categories of consumers and aggregates the demand based on growth curves for each consumer category.

The forecast used a combination of models according to the availability of data, time, resources and statistical significance of equations.

Determinants of Demand for Electricity

The following independent variables were assessed using this formula:

$$C = f(PCY, GDP, UI, IIP, Nf.Ne, Pop)$$

Where the demand for electricity is defined as dependent on:

PoP - Population

GDP- Sectoral GDP

PYC - Per Capita Income

UI - Urbanization Index

IIP - Index of Industrial Production

Nf - Number of Industries

Ne - Tariff Index (negative correlation)

Forecasting Results

The results from the econometric and time series model for KEDCO in 2019 reveals an unconstrained peak demand of 796.33MW, actual peak demand served at 340MW, and with demand supply gap of 456.33MW. This represents a 57% shortfall in supply – see Table 5.

TABLE 5: KEDCO DEMAND PROJECTION 2019-2024

Year	Total Demand (MW)	Actual Peak Demand Served (MW)	Demand Supply Gap (MW)	% Shortfall in Supply (MW)
2019	796.33	340.30	456.33	57%
2020	820.25	340.30	480.25	59%
2021	869.43	340.30	529.43	61%
2022	928.14	340.30	588.14	63%
2023	998.22	340.30	658.22	66%
2024	1082.10	340.30	742.10	69%

Over the forecast period, the load for total demand is expected to grow from 796.33MW to 1,082.10MW by 2024 representing a growth of 36%, as shown in Figure 3.

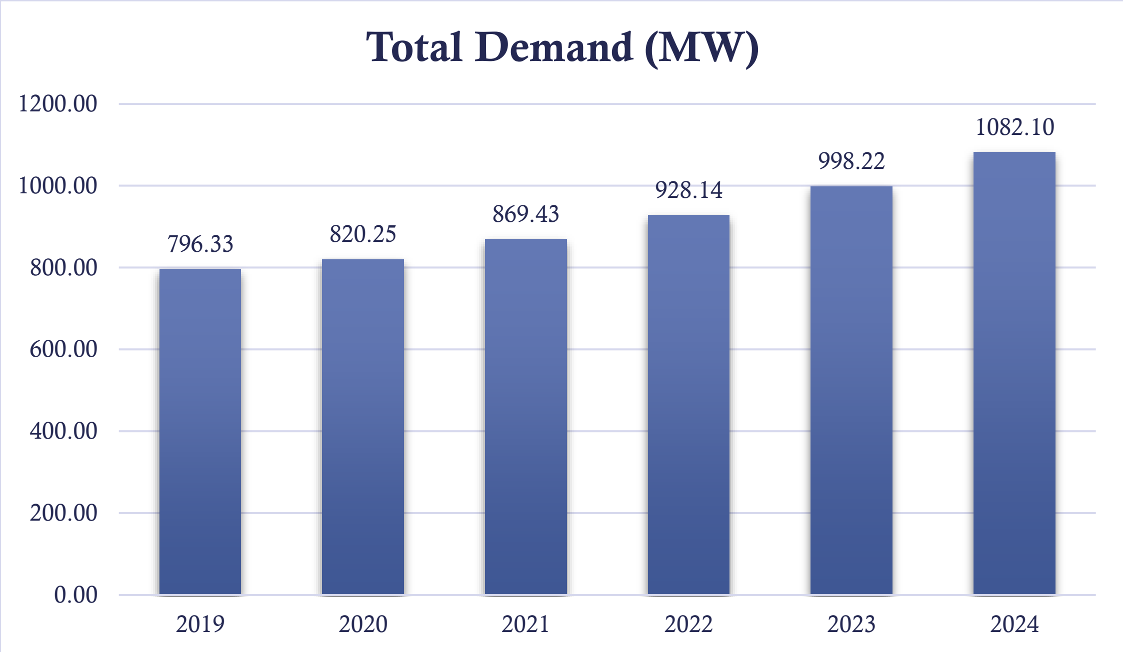


FIGURE 3: KEDCO NON-SIMULTANEOUS PEAK DEMAND (MW) 2019-2024

KEDCO plans to bridge this supply gap by procuring additional energy from embedded generation and increase the current volume of energy procured via bilateral agreements – see Annex C . The network infrastructure analysis presented here is based on the demand projection for customers served by KEDCO.

Generation

Energy Generation

Assumptions for energy generation is based on the considered scenarios. For KEDCO this means an average of 273 GWh/month bases on historical growth in energy received. Although the MYTO historical generation have not significantly improved - see Figure 4.

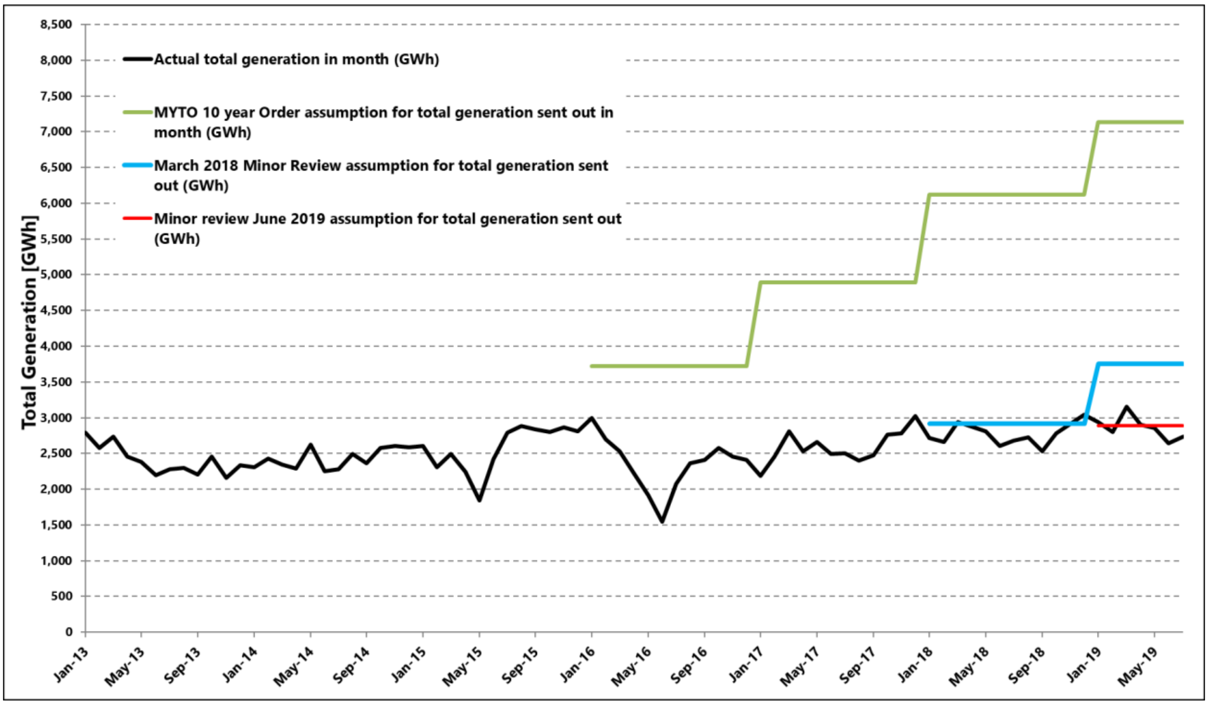


FIGURE 4: ENERGY SENT OUT BY GENCOS FROM JANUARY 2013 TO JULY 2019

Generation Capacity

Generation capacity is assumed to increase from January 2020, as PPAs will be activated. This means that Gencos who currently do not have active PPAs will be able to charge for their capacity that is available but not used.

- Generation capacity charges for those Gencos with active PPA's in 2019 (Omotosho, Olorunsogo, Agip, Shell and Azura): Capacity charges were calculated based on the average capacity factor for each Genco in the months January to May 2019. These are 66%, 84%, 28%, 43% and 64% respectively.
- Generation capacity charges for those Gencos without active PPA's in 2019: Using data on the daily energy sent out from stations and the daily available capacity from the TCN daily operational reports from the start of 2013 to the end of May 2019, an average capacity factor of 54% was calculated. The average monthly energy in MWhs and the capacity factor of 54% was used to project the capacity charges expected from the remaining Gencos once their PPAs are activated in 2020.

Outputs: Strategic Objectives

Performance Agreement

Table 6 presents the key performance from the base year to year 5, and the indexes based on the performance agreement with their corresponding metrics.

TABLE 6: PERFORMANCE AGREEMENT METRICS

No.	Key performance index	Measurement criteria defined in privatisation	Annual Performance					
			Base line	Y1	Y2	Y3	Y4	Y5
1.	Loss reduction	ATC&C (%)	48.70%	48.70%	44.94%	38.20%	29.41%	29.41%
2.	Metering	Number of new consumer meters installed		112,690	92,659	96,763	101,259	106,186
3.	New connection/ network expansion	Number of new customer connections		72,907	52,877	56,980	61,477	66,403

Current Service Deficits

Table 7 describes KEDCO's current service levels based on NERC key performance indices (KPIs) and the metrics.

TABLE 7: CURRENT SERVICE LEVELS

No.	Key performance index	Measurement criteria defined in privatisation	Annual Performance		
			2013 (handover)	2018	Six months to June 2019
1.	Loss reduction	ATC&C (%)	48.70%	51.54%	49.31%
2.	Reliability/availability	Number of customer Interruptions (#)		18,927	6,960
3.	Metering	Number of new consumer meters installed		118,884	119,309
4.	New connection/ network expansion	Number of new customer connections		7,360	7,702

No.	Key performance index	Measurement criteria defined in privatisation	Annual Performance		
			2013 (handover)	2018	Six months to June 2019
5.	Safety	Number of deaths and number of injuries		17	3
6.	Remittance	Market remittance to NBET and MO	57%	16%	16%

Goals 2020-2024

Target outputs are dependent on the modelling scenarios, in particular on tariff levels, allowed Capex and energy forecast. The target outputs assume all the allowed Capex is spent in each scenario.

In the scenarios, if finance is insufficient to meet the required Capex, the achievable outputs may differ from the target outputs.

Target outputs in "Regulatory allowed Capex, ATC&C loss reduction path and energy forecast" scenario

The first scenario considers a situation where the Capex provision is retained based on NERC tariff assumptions from the December 2019 Minor Review MYTO 2015, which also treated the end of 2020 as year 4 of ATC&C loss reduction – see Table 8.

TABLE 8: TARGET SERVICE LEVELS ("OUTPUTS") WITH REGULATORY ALLOWED CAPEX SCENARIO, ATC&C LOSS REDUCTION PATH AND ENERGY FORECAST

No.	Key performance index	Measurement criteria defined in privatisation	Annual Performance					
			Base line	2020	2021	2022	2023	2024
1.	Loss reduction	ATC&C (%)	48.70%	22%	17%	17%	17%	17%
2.	Reliability/ availability	Number of customer Interruptions		1624	1624	1624	1624	1624
3.	Metering	Number of new consumer meters installed		425	425	425	425	425
4.	New connection/ network expansion	Number of new customer connections		7,702	7,702	7,702	7,702	7,702

No.	Key performance index	Measurement criteria defined in privatisation	Annual Performance					
			Base line	2020	2021	2022	2023	2024
5.	Safety	Mitigate the occurrence deaths and injuries	3	0	0	0	0	0
6.	Remittance	Market remittance to NBET and MO		98.0%	98.9%	99.6%	99.4%	99.6%

KEDCO's limiting factors on its performance with this scenario is expressed in detail in Section 4.

Second Target outputs in "Regulatory allowed Capex, ATC&C loss reduction path and KEDCO energy forecast" scenario

The second scenario considers a situation where the Capex provision is retained based on NERC's tariff and projected ATC&C losses from the December 2019 Minor Review MYTO 2015 as well as KEDCO's energy forecast assumptions based on historical growth in energy received. The target outputs with this scenario is detailed in Table 9.

TABLE 9: TARGET SERVICE LEVELS "OUTPUTS" WITH REGULATORY ALLOWED CAPEX, ATC&C LOSS REDUCTION PATH AND KEDCO ENERGY FORECAST

No.	Key performance index	Measurement criteria defined in privatisation	Annual Performance					
			Base line	2020	2021	2022	2023	2024
1.	Loss reduction	ATC&C (%)	48.70%	22%	17%	17%	17%	17%
2.	Reliability/ availability	Number of customer Interruptions		1624	1624	1624	1624	1624
3.	Metering	Number of new consumer meters installed		425	425	425	425	425
4.	New connection/ network expansion	Number of new customer connections		7,702	7,702	7,702	7,702	7,702
5.	Safety	Mitigate the occurrence deaths and injuries	3	0	0	0	0	0

No.	Key performance index	Measurement criteria defined in privatisation	Annual Performance					
			Base line	2020	2021	2022	2023	2024
6.	Remittance	Market remittance to NBET and MO		96.6%	98.6%	99.4%	99.3%	99.6%

Third Target outputs in "Regulatory allowed Capex, KEDCO actual ATC&C loss reduction trajectory and energy forecast" scenario

The third scenario is based on the regulatory Capex provision based on NERC's MYTO 2020 Minor Review model, KEDCO's projected ATC&C losses, cost-reflective tariff, as well as

KEDCO's energy forecast assumptions based on historical growth in energy received. The target outputs in this scenario are detailed in Table 10.

TABLE 10: TARGET SERVICE LEVELS ("OUTPUTS") WITH REGULATORY ALLOWED CAPEX, KEDCO ACTUAL ATC&C LOSS REDUCTION TRAJECTORY AND ENERGY FORECAST

No.	Key performance index	Measurement criteria defined in privatisation	Annual Performance					
			Base line	2020	2021	2022	2023	2024
1.	Loss reduction	ATC&C (%)	48.70%	39.23%	30.11%	22.19%	19.17%	17.21%
2.	Reliability/ availability	Number of customer Interruptions	1624	1000	800	400	200	50
3.	Metering	Number of new consumer meters installed		240,000	150,000	45,000		
4.	New connection/ network expansion	Number of new customer connections		34,000	84,000	52,000	54,000	16,000
5.	Safety	Mitigate the occurrence of deaths and accidents	3	0	0	0	0	0
6.	Remittance	Market remittance to NBET and MO		100%	100%	100%	100%	100%

Fourth Target outputs in "with KEDCO required Capex, actual ATC&C loss reduction trajectory and energy forecast" scenario

The fourth scenario is based on the KEDCO's required Capex, projected ATC&C losses, cost-reflective tariff, as well as its energy forecast assumptions based on historical growth in energy received.

The target outputs in this scenario are detailed in Table 11.

TABLE 11: TARGET SERVICE LEVELS ("OUTPUTS") BASED ON KEDCO REQUIRED CAPEX, ACTUAL ATC&C LOSS REDUCTION TRAJECTORY AND ENERGY FORECAST

No.	Key performance index	Measurement criteria defined in privatisation	Annual Performance					
			Base line	2020	2021	2022	2023	2024
1.	Loss reduction	ATC&C (%)	48.70%	39.23%	30.11%	22.19%	19.17%	17.21%
2.	Reliability/ availability	Number of customer Interruptions	1624	1000	800	400	200	50
3.	Metering	Number of new consumer meters installed		240,000	150,000	45,000		
4.	New connection/ network expansion	Number of new customer connections		34,000	84,000	52,000	54,000	16,000
5.	Customer satisfaction		KEDCO has constituted a customer satisfaction survey program with detailed questionnaire and quantitative and qualitative assessment of customer satisfaction to arrive at a Customer Satisfaction index. The survey is being initiated and the final report would be out by Q4 in 2019.					
6.	Safety	Propose number of deaths and number of accidents	3	0	0	0	0	0
7.	Social responsibility		KEDCO has recently established a CSR unit with dedicated personnel to focus on elementary education in villages, Adult literacy programs, village level self-help associations for skills upgrade and women's education, sanitation and waste management, among others.					
8.	Remittance	Market remittance to NBET and MO		100%	100%	100%	100%	100%

Projected Investment

Two options presented for KEDCO's projected Capex investment are shown in Table 12. The first is the total allowed regulatory Capex of N22billion based on December 2019 Minor Review MYTO 2015, while the total for the other option is N50biillion based on projected full Capex in the PIP.

TABLE 12: KEDCO PROJECTED CAPEX OPTIONS

Naira Million	2020	2021	2022	2023	2024
Allowed in MYTO Minor Review (2016 - 2018)	3,816	3,816	4,769	4,769	4,769
Projected in this PIP (Required Capex without constraint)	6,256	9,732	13,024	11,626	9,157

Justification for KEDCO's goals

KEDCO's justification for the PIP goals are focused on achieving our loss reduction trajectory, engaging stakeholders, and restoring our financial viability over the next five years to deliver improved service to our customers.

ATC&C losses

KEDCO is committed to a loss reduction trajectory based on its Performance Agreement with the BPE, however, the Company is yet to achieve the expected ATC&C losses which is largely due to non-availability of KEDCO required Capex. The provision of full Capex as reported in this PIP would enable KEDCO achieve its loss reduction path from 2020 to 2024.

Stakeholder consultation engagement

The major feedback from KEDCO's stakeholders is that customers expect improved supply reliability and metering. However, the investments required for better power supply would result to higher tariffs when compared to the December 2019 Minor Review MYTO 2015. Our plan is to communicate the higher tariffs to our stakeholders including the regulator, customers, and the FGN among others – see Annex A .

Financial viability

Since the privatization in 2013, KEDCO have not been able to raise the necessary funds for investments. Tariffs have not been cost reflective and therefore, KEDCO is unable to access loans from commercial lenders. However, if the PIP is endorsed by the regulator, and other stakeholders, then KEDCO is likely to access finance from the financiers – see section 7.

5 Infrastructure Review

Overview

This section covers:

Current state of infrastructure;

- Review of current limitations;
- Recent and ongoing projects; and
- Implications of the infrastructure review.

Current state of infrastructure

Kano Electricity Distribution Company (KEDCO) distributes power to a population of nearly 20 million, spread over 67,000 sq. km., across the states of Kano, Katsina and Jigawa in Northern Nigeria. There are 172 feeders in the KEDCO Network; 115 - 11kV feeders and 57 - 33kV feeders and 7,129 distribution transformers – see Table 13.

TABLE 13: KEDCO DISTRIBUTION NETWORK

No.	Distribution Network	Number
1.	33kV feeders	57
2.	11kV feeders	115
3.	Distribution Transformers	7,129

Configuration

The KEDCO single line diagram (SLD) shows the network configuration and the flow of energy from Transmission Company of Nigeria (TCN) stations to 33kV feeders, to injection substations and then to 11kV feeders as shown in Figure 5.

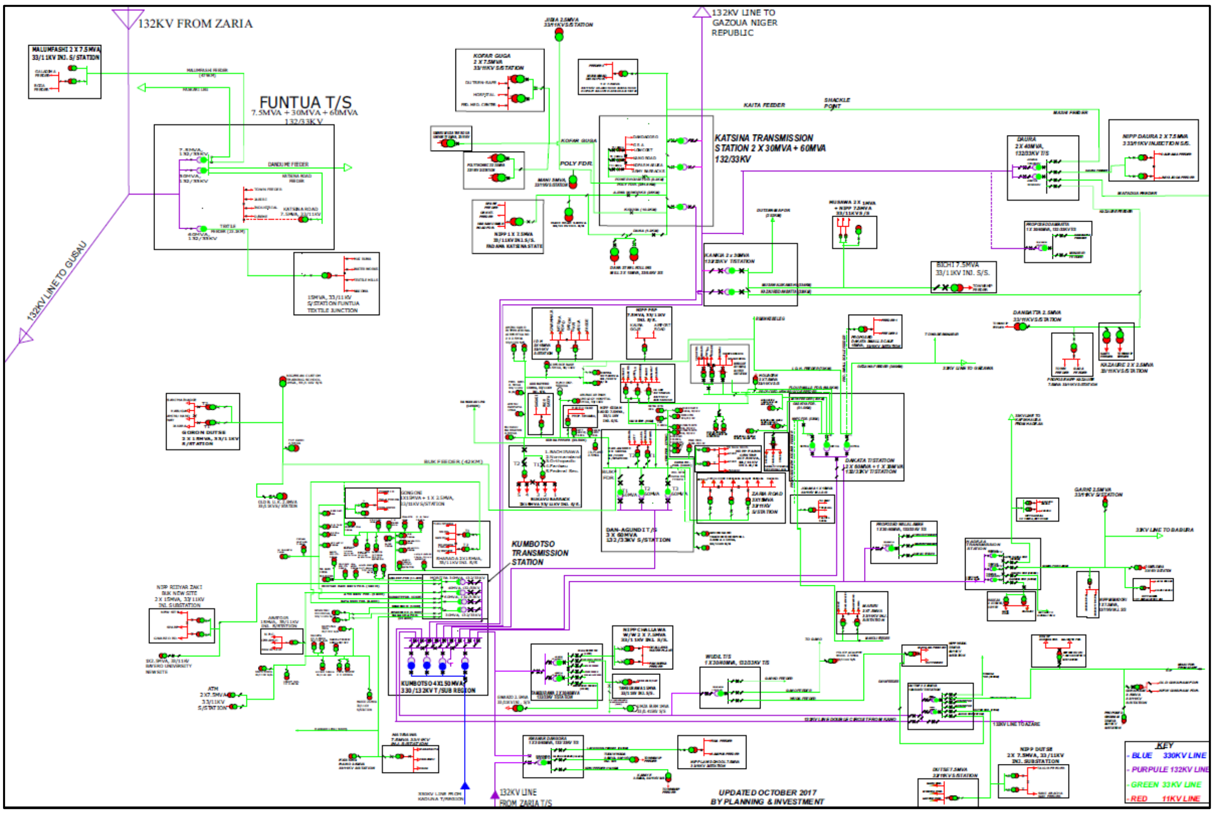


FIGURE 5: KEDCO SINGLE LINE DIAGRAM SCHEMATIC

The KEDCO network is supplied from 12 TCN transmission stations with a combined nameplate capacity of 1,042.50 MVA. The 57 - 33kV feeders supply 68 - 33/11kV power transformers across 54 - injection substations. With a total 33/11kV power transformer transformation capacity of 705 MVA, 115 - 11kV feeders are energized for onward downstream power distribution – see Table 14.

TABLE 14: KEDCO NETWORK CONFIGURATION

No.	Network Parameters	Unit	Total
1.	Transmission Substations	No	12
2.	132/33kV transformers	No	25
3.	Injection Substations	No	54
4.	33/11KV Transformers	No	68
5.	33/0.415kV Transformers	No	3,530

No.	Network Parameters	Unit	Total
6.	11/0.415kV Transformers	No	3,599
7.	Installed Transmission Capacity	MVA	1,042.50
8.	Installed Transformer Capacity (33/11kV)	MVA	705
9.	Installed Transformer Capacity (33/0.415kV)	MVA	1,892.56
10.	Installed Transformer Capacity (11/0.415 kV)	MVA	1,072.23
11.	Route Length 33KV Feeders	ckt km	6,349.37
12.	Route Length 11KV Feeders	ckt km	2,114.2

There are 3,599 11/0.415kV distribution transformers and 3,530 33/0.415 kV distribution transformers served by KEDCO. The total transformational capacity of the 11/0.415kV and the 33/0.415kV distribution transformers are 1,072.23 MVA and 1,892.56 MVA respectively. The route length for the 33kV and 11kVfeeders are 6,349.37 km and 2,114.2 km.

Review of Current Limitations

There has been a prolonged period of underinvestment in the distribution networks in Nigeria. In November 2013, KEDCO inherited networks from PHCN that had received minimal investment for many decades. In some cases, this was simply emergency investment to maintain supply, or expansion based on political rather than economic drivers. Much investment is needed to turn KEDCO into a modern distribution Company.

Technical network constraints

The analysis of the demand forecast is discussed in section 4, and tables of the network constraints analysis are provided in Annex I .

11kV Feeders Constrained Analysis

Table 57 in Annex I shows the constrained analysis of 11kV feeders based on 2019 and 2024 peak demand. The 2019 base year reveals 19 feeders of KEDCO's 115 feeders are being constrained, representing 17% of the 11kV feeders. The five most constrained feeders in 2019 are Panshekara, Ajasa, Kabuga, Industrial Phase 3, Army Barracks.

By 2024, constrained feeders are expected to grow to 41 feeders, representing 36% of the 11kV feeders, if no investments are made. In 2024, without any investments, the five most constrained feeders are expected to be New Site, FMC, Panshekara, Ajasa, and Aminu Kano.

33kV Feeders Constrained Analysis

Table 58 in Annex I shows the constrained analysis of the 33kV feeders in 2019 and 2024. The 2019 base year reveals 20 feeders of KEDCO's 55 feeders are being constrained, representing 36% of the 33kV feeders. The five most constrained feeders in 2019 are CBN, Dangote, Power House, IDH, and ATM.

By 2024, constrained feeders are expected to grow to 24 feeders, representing 44% of the 33kV feeders, if no investments are made. In 2024, without any investments, the five most constrained feeders are expected to be CBN, Law School, Flour Mills, NNPC, and MTN.

TCN Interface Constraints

Our TCN interface constraints are as follows:

- Kumbotso 2x30MVA+40MVA+60MVA, 132/33KV TS: The Kaduna (Mando) – Kano Single Circuit (SC) line cannot be loaded beyond 350MW comfortably at any given time. This is a major drawback on power evacuation in our coverage area;
- Dan'agundi 3x60MVA, 132/33KV TS: The 132KV line from Kumbotso TS to Dan'agundi is under sized and over loaded. The line feeds half of the entire Kano Metropolis and already overstretched. This has made the available capacity of 3x60MVA effectively under-utilized as the line can only accommodate 70MW safely;
- Dakata 2x60MVA+30MVA, 132/33KV TS: The 132KV line from Kumbotso TS to Dakata has similar issue with that of Dan'agundi line, it is under sized and overstretched. This has also made the available capacity of 2x60MVA + 30MVA under-utilized as the line can only accommodate 70MW safely;
- Kankia 2x30MVA, 132/33KV TS: Kankia – Katsina 132KV line is in critical need of re-conductoring. The line has a history of low voltage at full load due to under sized conductor. Though the feeders are all rural in nature, but they have a combined load demand of about 30MW; and
- Walalambe 2x40MVA, 132/33KV TS: The transmission substation has been on-going for the last ten (10) years which was proposed to be connected to 132KV Hadejia line that needs re-conductoring.

Aging infrastructure

The reliability of electrical power supply is amongst the conditions that inform aging analysis at KEDCO. Reliability depends in part on the conditions of the distribution infrastructure involved, and in part on its source of supply of energy. Its value to customers may be capitalised into the value of the Company.

We use an aging analysis approach, comparing initial cost of purchase to its net book value to test the reliability offered by distribution infrastructure. An estimate of the remaining useful life of the infrastructure against the initial cost is computed, therefore showing the reliability. The details of our aging infrastructure are in our asset register.

Customer enumeration analysis

The following milestones have been achieved in the on-going customer enumeration exercise:

Asset Tagging

- Downstream (LT Network) - 100% Completed; and
- Upstream (HT Network) - 92%.

App and System Development

- Mobile Capture App- Completed: Status - completed and operational;
- Dashboard Development (Web App) completed and operational;
- Digitalization of Captured Data & Report Generation in NERC/Mgt Format- completed and operational; and
- Migration and Integration to Billing and other System – 76% Completed.

Customer Information Capture

- 1st – 4th Batch: 114 Customer Service Points (CSPs) have gone Live out of a total of 180 CSPs;
- 5th Batch: 41 CSPs to commence in Q4 2019; and
- 6th Batch: 25 CSPs pending due to present security challenges.

Customer enumeration exercise is critical to the survival of any electricity distribution Company and KEDCO is not an exception in this. Completing the enumeration exercise within the shortest possible time is key to changing the ugly narrative of our customer numbers.

Customer metering gaps

As at September 2019, there are 119,309 metered customers in KEDCO network. Table 15 summarizes the current metering status.

TABLE 15: CUSTOMER METERING ANALYSIS

Customer Number Breakdown	Total	Prepaid	Postpaid
Residential	456,786	102,395	354,391
Commercial	33,157	15,255	17,902
Industrial	2,999	1,292	1,707
Special	848	367	481
Street Lightening	14	0	14
MDAs	1,250	0	1,250
Classification by Demand			

Customer Number Breakdown	Total	Prepaid	Postpaid
MD Customers	1,875	154	1,721
Non-MD Customers	493,179	119,155	374,024
Metered Customers			
Residential	117,574	102,395	15,179
Commercial	16,498	15,255	1,243
Industrial	1,803	1,292	511
Special	462	367	95
Street Lightening	11	0	11
MDAs	410	0	410
Metered Customers by Demand			
MD Customers	1,875	154	1,721
Non-MD Customers	134,883	119,155	15,728

Network metering gaps

Table 16 provides a network metering gap analysis for feeders and MDAs.

TABLE 16: REVIEW OF METERING GAPS

Metering	Priority assigned by NERC in PIP Guidelines	Current situation	KEDCO desired implementation date
Bulk metering (market interface)	Very high priority	All the 26 Incomers have been properly metered and 53 out of 57 outgoing feeders have been metered.	The remaining 4 outgoing feeders are to be metered in Q4 2019
MDAs metering	Very high priority	MDA metering is 54% covering Kano, Jigawa and Katsina	2020

IT gaps

KEDCO is in the process of gradually transiting to NERC's requirements on commercial operations and management of corporate resources, however, the Company has put in place alternative software tools, developed in-house to improved KEDCO's operational efficiency. Some of the tools designed by KEDCO staff are shown in Table 17. It is expected that in 2020, most of the tools would have been integrated with NERC's requirements to ensure optimal efficiency.

TABLE 17: REVIEW OF MANAGEMENT SYSTEM GAPS

Commercial systems	Priority assigned by NERC in PIP Guidelines	Current situation	Alternative tool	KEDCO desired implementation date
Commercial Management System (CMS)	High priority	Not in place		2020
Incidents Recording and Management System (IRMS)	Very high priority	Not in place	Kimetric	Plans are on the way to upgrade the Kimetric Software by first quarter of 2020 to add additional functionalities.
Enterprise Resource Planning (ERP) information system	High priority	Not in place	HCMatrix for HRMS Tally for Payroll Tawk for Customer Complains Handling	2020
Geographical Information System (GIS) mapping of customers and network assets	High priority	Not in place	QGIS	Plan to acquire ArcGIS in 2020.
Supervisory Control and Data Acquisition (SCADA) system	High priority	Not in place		Plan for phased implementation from 2020 to 2024.

Recent and Ongoing Projects

As part of efforts to improve the quality of power supply and satisfy our customers, we have embarked on several ongoing projects. Majority of these projects are targeted at ensuring supply reliability is improved in a safe and efficient manner.

The list of some of our ongoing programs is in Annex J .

Implications of the Infrastructure Review

In developing this PIP, KEDCO have prioritized investment to best deliver the outputs given current liquidity constraints. The process for investment planning was discussed in section 3. The output goals are defined in section 4. The resulting infrastructure investment plan is in section 6.

6 Detailed Program Plans

Overview

This section covers:

- Delivering outputs efficiently;
- Electricity distribution investments;
- Working with Meter Asset Providers (MAP);
- Commercial operations investments;
- Health and safety plans;
- Resourcing plans; and
- Overall investment plan.

Delivering Outputs Efficiently

How the planning for each output delivers efficiently:

To effectively and efficiently deliver outputs in the PIP, KEDCO had to ensure that our internally prioritized initiatives were aligned with the feedback received from our stakeholders. The issues that were priority for our stakeholders bothered on metering and power supply availability/reliability which both coincide with our priority initiatives for investment.

Investing in improving the availability/reliability of power supply enable us increase revenues and recover our costs. Supporting the MAP metering exercise of our customers as well as investing in network metering infrastructure is top priority for us as we believe that it will greatly reduce commercial and collection losses within our network. Our investments in state-of-the-art technology will provide us the platform for real-time monitoring of our network performance and business operations which will allow us to perform efficiently.

Electricity Distribution Investments

KEDCO's electricity distribution investments will achieve the following targets:

- Reduce ATC&C losses from the current level of 49.31% to 17.21%, which will allow our business to be sustainable;
- Reduce the number of customer interruptions from the current level of 1,624 in 2019 per month to 50 per month in 2024, and thus, increasing reliability for our customers; and
- Connect an average of 48,000 new customers in years 2020 to 2024.

Network Investment Summary

KEDCO's network investment summary shown in Table 18 comprise of investment types and their corresponding Capex. Over the planning period, the Company will undertake projects to upgrade and rehabilitate its existing network infrastructure, invest in technological enhancements to reduce outages and system downtimes, acquire tools to analyze network performance and network assets that provide real-time visibility and performance data. The projected network summary investment requirement over the five years is N40billion.

TABLE 18: KEDCO'S NETWORK INVESTMENT SUMMARY

	Capex (₦Million)				
Network Investment Type	**2020**	**2021**	**2022**	**2023**	**2024**
Loss Reduction	1,134	1,134	1,134	1,134	1,134
Reliability, Distribution Automation	276	652	1,068	1,406	1,641
Planning and Construction (P&C)	3,514	5,529	8,266	7,145	5,241
Protection, Control & Metering (PC&M)	30	56	60	53	72
Energy Efficiency	11	17	19	23	29
Total	**4,965**	**7,388**	**10,547**	**9,761**	**8,117**

Our P&C projects involve acquisition of network improvement tools and machinery and the radiation of new 33kV and 11kV feeders to increase distribution capacity. Our loss reduction initiatives include the reconditioning of power transformers to reduce variable energy losses. Our Reliability and Distribution Automation projects include distribution transformer remote monitoring module, installation of remote terminal units at injection substations and the procurement of fault indicators.

Network Metering Plans

KEDCO's network metering plan is to complete the metering of its 1,471 Ministries, Departments and Agencies (MDA) customers in 2020 in the State and Local Government. Currently, all 154 federal customers have been metered. The plan is to meter 214 unmetered customers in Kano, 80 unmetered customers in Jigawa and 382 unmetered customers in Katsina in 2020 – see Table 19. The total number of unmetered customers is 676 out of the 1,471 MDAs within our license area.

TABLE 19: KEDCO'S MDAS NETWORK METERING PLAN

	Count of MDAs	Metered MDAs	Unmetered MDAs	Proposed Metering Year
Federal	154	154	0	
Kano	219	5	214	2020
Jigawa	584	504	80	2020
Katsina	514	132	382	2020

	Count of MDAs	Metered MDAs	Unmetered MDAs	Proposed Metering Year
Total	**1,471**	**795**	**676**	

New Connections Plans

KEDCO's new connection plans use alternative Geographical Information System (GIS) technology called Quantum GIS. The QGIS software maps customers (points of electricity supply) and network infrastructure on the QGIS, including customers' connections and links with network assets.

The Company's plan is to invest a total of N384million for GIS over the planning horizon, and ensure that the integration of the existing QGIS is adequately done for ease of transfer of information see - Table 20.

TABLE 20: NEW CONNECTIONS PLANS

	Capex (₦Million)				
Year	**2020**	**2021**	**2022**	**2023**	**2024**
GIS Acquisition	13	195	110	33	33
Total	**384**				

The Company's process for new connection are:

- **Step 1** - Customer apply for connection by filling New Connection Form (NCF) with attached passport photograph, means of identification, tenancy agreement or Proof of Ownership of Premises, attestation to settle of electricity bill either via Bank Statement of letter of employment to proof financial capability and fill guarantor form in case of default by customer;
- **Step 2** - Sales representative carryout load assessment of customer premises, identify customer supply/premises usage, type of home (holiday home/steady home), family size and the Customer and Assets Validation, Tagging and Indexing (CAVTI) is conducted downstream. Assessment document are jointly signed by customer and sales representative as any damage in meter as a result of false declaration of load, will result in such customer being responsible for meter cost;
- **Step 3** - Licensed Electrical Contractor certified electrical connection of premises. Damage of meter as a result of poor electrical connection; licensed contractor shall be responsible for meter cost;
- **Step 4** - Customer load Assessment is calculated by TSP engineer to identify connected load, recommend meter type/phase transformer to be connected on, unit to be connected on, phase to be connected on (in case where single phase is recommended) based on load balancing of the transformer and CAVTI number (upstream) for feeder and substation load and capacity indexing;

- **Step 5** - Customer Data is captured in the new service connection template; and template along with application Form 74 and all attached relevant documents are submitted to Revenue Assurance Department for due diligence before capturing/billing.

Working with Meter Asset Providers (MAP)

KEDCO's meter investment plan is based on agreements with approved MAPs. The Company has a total metering gap of about 475,000 consisting of actual unmetered customers and replacements. Customer enumeration and regularization are achieved through the Meter Asses Provider (MAP) know-your-customer process.

To access meters, interested customer downloads an application form from KEDCO's website or get such form through its customer service points located across its coverage area. Once the form is filled, it is taking to the nearest KEDCO office for processing and issuance of meter is done accordingly by the assigned MAP.

The contracted MAPs includes Mojec, Crest Hill, Armese, Momas and Meron, and are to install 175,000, 100,000, 100,000, 50,000 and 50,00 customer meters respectively over a 36-month period – see Table 21. The process is expected to end in 2022.

TABLE 21: MAP ROLLOUT PLAN

MAP Name	Mojec	Crest Hill	Armese	Momas	Meron	Total
Contracted Meters	175,000	100,000	100,000	50,000	50,000	475,000
Metering period (months)	36	36	36	36	36	
Annual Target (Year)						
2019	10,000	10,000	10,000	5000	5,000	40,000
2020	60,000	60,000	60,000	30,000	30,000	240,000
2021	60,000	30,000	30,000	15,000	15,000	150,000
2022	45,000					45,000

KEDCO's collaboration with MAPs would achieve the target to increase the number of new meters installed from the current level of 119,309 in 2019 to 594,309 (inclusive of MAP 475,000) in 2022, allowing customers to pay commensurately and accurately for the energy consumed.

Furthermore, it is assumed that the Capex component for meters in the NERC MYTO Minor Review model is not part of the proposed KEDCO's Capex. The estimated MAP capex for metering (single and three-phase meter) for 475,000 metered customers is ₦22billion from 2019 to 2022.

Commercial Operations Investments

KEDCO's commercial operations investments would achieve the following:

- Reduce ATC&C losses with KEDCO required Capex from the current level of 49.31% in 2019 to 17.21% in 2024, which will allow our business to be sustainable;
- Reduce ATC&C losses with KEDCO required front-ended Capex from the current level of 49.31% to 10.95%, which will allow our business to be sustainable;
- Reduce the number of customer interruptions from the current level of 1,624 per month in 2019 to 50 per month in 2024, increasing reliability for our customers; and
- Connect an average of 48,000 new customers in years 2020 to 2024.

Revenue Protection Plans

To reduce KEDCO's ATC&C losses from the current level of 49.31% to 17.21%, the Company plans to acquire Advanced Metering Infrastructure (AMI) to systematically record and monitor consumption of large and medium customers. The implementation of this AMI from 2021 to 2023 would ensure that KEDCO's operations are efficient. The total required AMI related investment is N146 Million – see Table 22.

TABLE 22: REVENUE PROTECTION INVESTMENT PLAN

	Capex (₦Million)				
Year	**2020**	**2021**	**2022**	**2023**	**2024**
Advanced Metering Infrastructure (AMI) – includes AMR		47	49	50	
Total	**146**				

Furthermore, the verification process of all our existing customers and capturing all the new customers within our franchise area will provide the necessary leverage and cash flow to cover all the cost of operation as well as meet up with all the market obligations.

Management System Plans

KEDCO's management system plan is expected cover these systems as required by NERC: Commercial Management System, Enterprise Resource Planning System, Geographic Information System, Supervisory Control and Data Acquisition System, and Works Management System.

Commercial Management Systems (CMS)

KEDCO have commenced a robust investment planning for commercial operations to ensure adequate management of all commercial processes, revenue cycle, and customers. Our plans to install metering systems to record all electrical parameters involved in commercial transactions with NBET and TCN and amounts of energy injected to the networks operated by the KEDCO.

Supervisory Control and Data Acquisition System

KEDCO intends to deploy a SCADA system to be fully functional in 2024. The total cost for the phased deployment is N2.6bn over the planning horizon – see Table 23. The Incident Reporting and Management System (IRMS) would be purchased as a module with SCADA to help identify location and analyze extent of interruptions in electricity supply. The tool will enable fast resolution of incidences and restoration of service to the affected areas.

TABLE 23: SCADA INVESTMENT PLAN

	Capex (₦Million)				
	2020	2021	2022	2023	2024
SCADA Acquisition	147	375	551	720	776
Total	**2,570**				

Geographic Information System

KEDCO's intends to acquire the Geographic Information System (GIS) in a phased approach. The total cost for the deployment is N384m – see Table 24.

TABLE 24: GIS INVESTMENT PLAN

	Capex (₦Million)				
	2020	2021	2022	2023	2024
GIS Acquisition	13	195	110	33	33
Total	**384**				

Enterprise Resource Planning System

KEDCO plans to invest total Capex of N227million for Enterprise Resource Planning (ERP) System from 2021 to 2024 – see Table 25.

KEDCO has formulated an Integrated Management System program providing details of all process workflows, responsibility centers, documentation and other requirements, which enables it to work seamlessly across departments and functions. The detailed IMS documentation has been finalized and is under implementation across all departments, units and functions.

TABLE 25: ENTERPRISE RESOURCE PLANNING PLAN

	Capex (₦Million)				
	2020	2021	2022	2023	2024
ERP Acquisition		54	64	72	37
Total	**227**				

KEDCO has evaluated the deployment of companywide ERP systems using either SAP R/3 or SAGE X3.

The key business functional objectives to be achieved were prioritized as:

- Support for the integrated management systems;
- Improved capital expenditure planning and provide key insight for executing organizational plans and strategies;
- Speed up the decision-making process by detailed analysis of accurate data;
- Enable extending the network, expanding the services to reach more customers, suppliers, and partners;
- Enable early detection of operational risks to improve governance and compliance;
- Protection against organizational data breaches and security threats to leakage of information;
- Provide accurate and integrated data analytics for performance improvement; and
- Provide long-term profitability by providing means to increase the customer base.

The company had initiated the deployment of SAGE X3 ERP system in 2017 but the project was put on hold due to financial considerations.

The company has already evaluated modules for deployment including the following:

- Finance;
- Customer Relationship Management (CRM);
- Human Resources Information Systems (HRIS);
- Procurement, Inventory and Supply Chain Management (PIS); and
- Fixed Asset Management (AM).

If the Capex proposed is permitted by the Commission, KEDCO proposes to pick up where it left off in 2018 and expedite the deployment of the ERP systems and enable connectivity to all functions covered under the system.

Customer Services

KEDCO have been able to improve its Contact Center Capability. If a customer intends to lodge complaints, several options or channels are available to the customer. Such customers can visit customer care centers in all Regional Offices and Customer service Point.

Our call center which operates from 8am to 10pm, use different forms of communication platforms including Email, Live chat, Facebook, Twitter and Instagram to address complaints. Plans are under way to commence 24hr operations in our call centers by the year 2020.

Also, KEDCO have commenced billing MD customers via email and SMS notification for August 2019 billing. However, phone number update is still on going for non-MD customers.

Health and Safety Plans

KEDCO's plan over the next five years is to mitigate the occurrence of deaths and injuries for staff and the general public within our coverage area. The Company's expected health and safety investment over the planning period is N581million – see Table 26.

TABLE 26: HEALTH AND SAFETY PLANS

	Capex (₦ Million)				
	2020	2021	2022	2023	2024
HSE	132	161	103	90	95
Total	**581**				

KEDCO's planned annual trainings and community engagements on safety for half year 2019 to 2024 are shown in Table 27 and Table 28 respectively.

TABLE 27: PLANNED ANNUAL SAFETY TRAININGS

Year	Number of Training Sessions	Details of Training on Occupational Hazard and Safety
H2 2019	20	For all staff including linesmen, cable jointers and electrical fitters.
2020	40	For all staff including linesmen, cable jointers and electrical fitters.
2021	40	For all staff including linesmen, cable jointers and electrical fitters.
2022	40	For all staff including linesmen, cable jointers and electrical fitters.
2023	40	For all staff including linesmen, cable jointers and electrical fitters.
2024	40	For all staff including linesmen, cable jointers and electrical fitters.

TABLE 28: PLANNED COMMUNITY ENGAGEMENTS ON SAFETY

Year	Name of Training	Details of each named Training
H2 2019	12 Community sensitizations/ engagements	Various communities

2020	36 Community sensitizations/ engagements	Various communities
2021	36 Community sensitizations/ engagements	Various communities
2022	36 Community sensitizations/ engagements	Various communities
2023	36 Community sensitizations/ engagements	Various communities
2024	36 Community sensitizations/ engagements	Various communities

Resourcing Plans

KEDCO's resource plan investments would achieve the following:

- Reduce ATC&C losses with KEDCO required Capex from the current level of 49.31% in 2019 to 17.21% in 2024, which will allow our business to be sustainable;
- Reduce ATC&C losses with KEDCO required front-ended Capex from the current level of 49.31% to 10.95%, which will allow our business to be sustainable;
- Reduce the number of customer interruptions from the current level of 1,624 per month in 2019 to 50 per month in 2024, increasing reliability for our customers; and
- Connect an average of 48,000 new customers in years 2020 to 2024.

Human Resources plans

KEDCO's talent management verifies the areas of strength and weakness of the workforce identified from due diligence exercise. This forms the basis for review and adoption of the proposed training and capacity building plan for KEDCO staff. Implementation of the plan will ensure that competencies are built up to enable the workforce support initiatives to optimize, rehabilitate and expand KEDCO's network and improve overall performance.

The training program selected include technical and non-technical courses. The avenues to be used in administering the training courses include; computer based, classroom, workshops and learning on the job via job rotation and shadowing

The strategy to be used in employee development in KEDCO will include options to achieve greater flexibility in work inputs by altering numbers of workers and hours of work, altering reward schemes, adjusting skill and competency requirements and changing work assignments, job responsibilities and management practices. Some of these trainings include:

- The technical and administrative staff of KEDCO will be trained in our learning center internally in-plant and externally (both Local & Foreign);
- Each staff will receive a minimum of 20 hours training per year;
- In addition, on-the-job training will be provided starting with the sales representatives and line workers who are the critical frontline employees;
- Health, safety and environment trained and certified; and
- The human resource managers will liaise with the heads of each of the business areas to identify training requirements and schedule training courses.

Other Resource Requirements

Our plan for the Fleet Logistics, Security, Buildings and Facilities over the planning period is to ensure that staff are equipped with the necessary tools to function effectively and efficiently. The total cost for other resource requirements is N1.5billion - see Table 29.

TABLE 29: OTHER RESOURCE REQUIREMENTS

	Capex (₦ Million)				
	2020	**2021**	**2022**	**2023**	**2024**
Fleet, Security, Building Facility and Working Tool	300	400	400	300	100
Total	**1,500**				

Achieving Cost Efficiency

At KEDCO, we ensure that effective supply chain management ensures service delivery, avoids revenue loss due to operational downtime and ensures that the organization receives value for money spent. For our growing customers, our procurement practices are important as delay in provision of necessary materials can lead to downtime in fault clearing, which in turn disrupts the lives and businesses of our customers. Our ability to secure high quality materials and equipment has an impact on customer safety and the stability of electricity supply.

Overall Investment Plan

KEDCO's overall investment plan from 2020 to 2024 is presented in Table 30. The total investment cost covering the commercial, technical, information technology, safety and security is N50billion. These investments would enable KEDCO to deliver electricity to our growing customers in a safe and efficient manner.

TABLE 30: PROJECTED CAPEX SUMMARY

		Capex (₦ Billion)				
Department	**Investment Initiative**	**2020**	**2021**	**2022**	**2023**	**2024**
Commercial	Metering Projects (MDA, DTs)	0.70	1.10	1.20	0.60	-
	Revenue Protection (AMI) and Customer Service and Revenue Efficiency		0.047	0.049	0.050	

		Capex (₦ Billion)				
Department	**Investment Initiative**	**2020**	**2021**	**2022**	**2023**	**2024**
Technical/ Commercial	GIS, New Connection Request, Customer Regularization	0.013	0.195	0.110	0.033	0.033
	SCADA, IRMS	0.147	0.375	0.551	0.720	0.776
	Network Investments, WMS	4.953	7.370	10.527	9.737	8.086
IT	ERP (CMS, Energy, Outage and Distribution Management Systems)		0.054	0.064	0.072	0.037
Safety	HSE	0.132	0.161	0.103	0.090	0.095
Others	Fleet Logistics, Security, Building and Working Tools	0.300	0.400	0.400	0.300	0.100
Total		6.245	9.702	13.004	11.602	9.127
Grand Total		**49.68**				

Innovative Strategies

KEDCO's innovative strategies are to segment its customers and the feeders by which they are served into different market segments such as manageable and difficult-to-manage areas – see Figure 6.

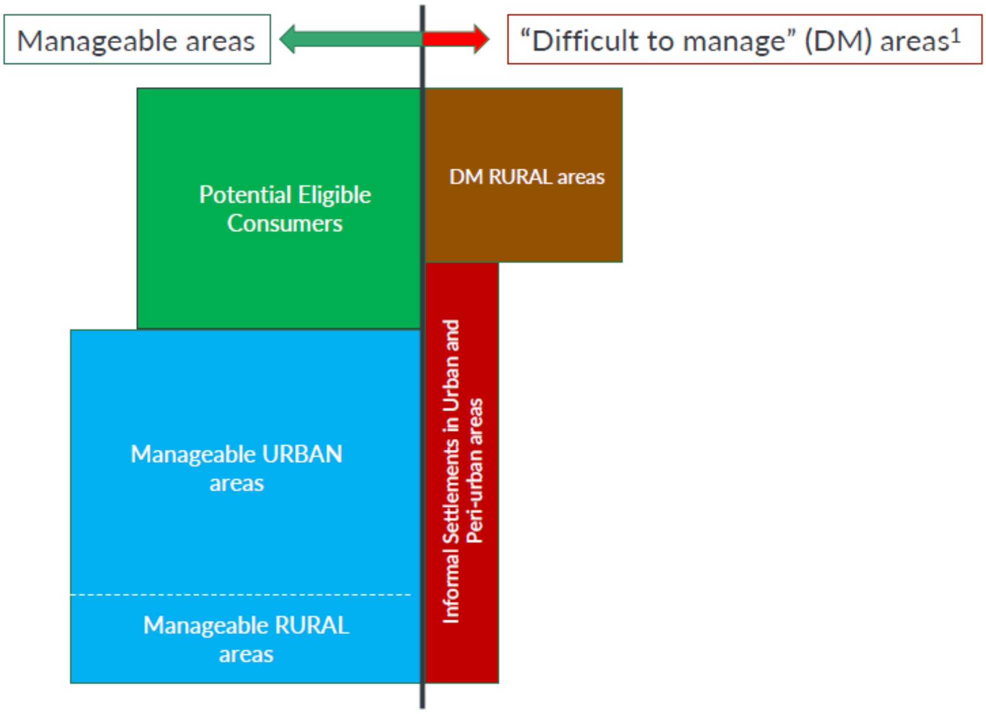


FIGURE 6: FOUR MARKET SEGMENTS DEFINED BY CABTAP[1]

Manageable areas

Potential eligible customers

The assumption under worst case scenario where the possibility of KEDCO losing some of its prime MD customers due to the implementation of the Eligible Customers regulation is not feasible even in the long run but it is important to know that, there are about five viable clusters as mentioned that could be exposed to the policy directive. Dakata, Katsina, Kumbotso, Sharada and Nassarawa/Sabon-Gari clusters may be very attractive to entrepreneurs who may want to invest in embedded generation or Eligible Customers forming association within clusters to buy energy from Gencos directly.

[1] Capacity Building and Technical Assistance Program (CABTAP) presentation 18-19 June 2019. NERC has divided the market in manageable and unmanageable areas.

Manageable urban areas

This area will be KEDCO's highest priority for ring-fencing communities and providing reliable power supply at cost-reflective tariffs. KEDCO will identify communities within its network who are willing to pay for cost-reflective power supply to cover the cost of embedded generation sources as well as its investment in improving the Company's ability to reliably distribute power in such areas. KEDCO will prioritize investments in feeders and associated distribution infrastructure in these areas.

Manageable rural Areas

This area will be KEDCO's next highest priority for ring-fencing communities and providing reliable power supply at cost-reflective tariffs. KEDCO will identify communities its coverage area who are willing to pay for cost-reflective power supply to cover the cost of embedded generation sources as well as the investment in improving the Company's ability to reliably distribute power in such areas.

Difficult to manage areas

Difficult to manage rural areas

The difficult-to-manage rural areas will be KEDCO's priority for franchising. The Company is willing to work with distribution sub-franchisees that can provide services in the following areas:

- Metering, Billing, and Collection;
- Total management of part of our distribution network; and
- Supply power and manage part of our distribution network.

Informal settlements urban and peri-urban areas

Identified community settlements in urban and peri-urban areas will be engaged to determine affordable tariffs and energy requirements. Based on agreed commercial commitments from the settlements, proposed strategies would include:

- Bulk metering for the community;
- Distribution of bulk bills for the community;
- Supply based on payment performance from the community; and
- Engagements with the state and local governments to determine energy subsidies and network investment support for poorer settlements.

7 Financial Plan

Overview

This section covers:

- Regulatory allowed Capex, ATC&C loss reduction path and energy forecast scenario;
- Regulatory allowed Capex, ATC&C loss reduction path and KEDCO energy forecast;
- Regulatory allowed Capex, KEDCO actual ATC&C loss reduction trajectory and its energy forecast; and
- KEDCO required Capex, actual ATC&C loss reduction trajectory and energy forecast.

Regulatory allowed Capex, ATC&C loss reduction path and energy forecast scenario

Inputs

This scenario considers a situation where the Capex provision is retained based on NERC's tariff and energy forecast assumptions from the December 2019 Minor Review MYTO 2015, as well as the regulatory ATC&C losses from 2020 to 2024 – see Table 31.

TABLE 31: REGULATORY ALLOWED CAPEX, ATC&C LOSS REDUCTION PATH AND ENERGY FORECAST INPUTS

Assumptions	2020	2021	2022	2023	2024
Energy Received (GWh)	2,364	2,493	2,628	2,771	3,070
Average Power Received (MW)	270	285	300	316	350
Capex (₦m)	3,816	3,816	4,769	4,769	4,769
Opex (₦m)	13,437	16,563	19,353	21,551	23,159
ATC&C Projection	22.06%	17.21%	17.21%	17.21%	17.21%
% of CAPEX from IGR	30%	30%	30%	30%	30%
% from Debt	70%	70%	70%	70%	70%
Equity Rate	27%	27%	27%	27%	27%
Bank Loan Rate	22%	22%	22%	22%	22%
Tenor – Bank Loan (years)	20	20	20	20	20
CBN Rate	18%	18%	18%	18%	18%
Tenor – CBN (years)	20	20	20	20	20

Outputs

Based on the assumptions in Table 31, Table 32 presents outputs from the financial statement. It is seen from this scenario that KEDCO will not be able to make Capex investments and will not have the funds to meet its full Opex obligations. Consequently, this scenario would put KEDCO in negative position of about ₦19 billion over the planning horizon.

TABLE 32: REGULATORY ALLOWED CAPEX, ATC&C LOSS REDUCTION PATH AND ENERGY FORECAST OUTPUTS

	Units	2020	2021	2022	2023	2024
Cost-reflective tariff	₦/kWh	49.48	61.55	63.02	64.87	65.93
Allowed tariff	₦/kWh	30.08	49.03	49.42	49.90	49.14
Income Statement						
Revenue	₦m	84,890	74,271	78,941	84,018	91,658
Cost of Sales	₦m	43,518	62,038	65,621	69,402	77,033
OPEX and Other Income/Loss	₦m	11,888	14,543	17,814	21,845	26,818
EBITDA	₦m	29,484	(2,310)	(4,494)	(7,229)	(12,193)
Net Income/(Loss)	₦m	17,931	(5,480)	(7,451)	(9,963)	(14,701)
Balance Sheet						
Assets	₦m	67,996	67,680	66,279	64,868	63,849
Liabilities	₦m	132,534	144,970	151,915	161,412	177,003
Equity	₦m	(56,300)	(61,781)	(69,231)	(79,194)	(93,895)
					-	-
Payments (%)						
NEMSF	(%)	100%	100%	100%	100%	100%
MO	(%)	100%	100%	100%	100%	100%
NBET	(%)	100%	100%	100%	100%	100%
Capex used	(%)	0%	0%	0%	0%	0%
OPEX	(%)	73%	7%	54%	51%	36%

Regulatory allowed Capex, ATC&C loss reduction path and KEDCO energy forecast scenario

Inputs

This scenario considers a situation where the Capex provision is retained based on NERC's tariff and projected ATC&C losses from the December 2019 Minor Review MYTO 2015 as well as KEDCO's energy forecast assumptions based on historical growth in energy received – see Table 33.

TABLE 33: REGULATORY ALLOWED CAPEX, ATC&C LOSS REDUCTION PATH AND KEDCO ENERGY FORECAST SCENARIO INPUTS

Assumptions	2020	2021	2022	2023	2024
Energy Received (GWh)	2,402	2,778	3,213	3,716	4,298
Average Power Received (MW)	274	317	367	424	491
Capex (₦m)	3,816	3,816	4,769	4,769	4,769
Opex (₦m)	13,437	16,563	19,353	21,551	23,159
ATC&C Projection	22.06%	17.21%	17.21%	17.21%	17.21%
% of CAPEX from IGR	30%	30%	30%	30%	30%
% from Debt	70%	70%	70%	70%	70%
Equity Rate	27%	27%	27%	27%	27%
Bank Loan Rate	22%	22%	22%	22%	22%
Tenor – Bank Loan (years)	20	20	20	20	20
CBN Rate	18%	18%	18%	18%	18%
Tenor – CBN (years)	20	20	20	20	20

Outputs

Based on the assumptions in Table 33, Table 34 presents outputs from the financial statement. It is seen from this scenario that KEDCO will be able to fulfil its minimum remittance obligations with full Capex utilization. However, the KEDCO will not have funds for its Operating expenses in 2020-21. Consequently, this scenario would put KEDCO in net income of about ₦78 billion over the planning horizon.

TABLE 34: REGULATORY ALLOWED CAPEX, ATC&C LOSS REDUCTION PATH AND KEDCO ENERGY FORECAST SCENARIO OUTPUTS

	Units	2020	2021	2022	2023	2024
Cost-reflective tariff	₦/kWh	49.30	52.19	46.85	45.22	44.32
Allowed tariff	₦/kWh	30.08	49.03	49.42	49.90	49.14
Income Statement						
Revenue	₦m	85,591	95,201	123,561	149,882	174,838
Cost of Sales	₦m	44,224	69,141	80,214	93,081	107,860
OPEX and Other Income/Loss	₦m	11,888	14,543	17,814	21,845	26,818
EBITDA	₦m	29,479	11,517	25,532	34,956	40,160
Net Income/(Loss)	₦m	17,931	5,297	14,096	19,429	22,015
Balance Sheet						
Assets	₦m	71,827	77,728	84,193	90,360	96,331
Liabilities	₦m	136,499	146,017	141,155	131,109	118,760
Equity	₦m	(56,301)	(51,004)	(36,908)	(17,478)	4,536
Payments (%)						
NEMSF	(%)	100%	100%	100%	100%	100%
MO	(%)	100%	100%	100%	100%	100%
NBET	(%)	100%	100%	100%	100%	100%
Capex used	(%)	100%	100%	100%	100%	100%
OPEX	(%)	71%	74%	141%	100%	100%

Regulatory allowed Capex, KEDCO actual ATC&C loss reduction trajectory and its energy forecast scenario

Inputs

This scenario is based on the regulatory Capex provision based on NERC's December 2019 Minor Review MYTO 2015, KEDCO's projected ATC&C losses, as well as KEDCO's energy forecast assumptions based on historical growth in energy received – see Table 35.

TABLE 35: REGULATORY ALLOWED CAPEX, KEDCO ACTUAL ATC&C LOSS REDUCTION TRAJECTORY AND ITS ENERGY FORECAST SCENARIO INPUTS

Assumptions	2020	2021	2022	2023	2024
Energy Received (GWh)	2,402	2,778	3,213	3,716	4,298

Av. Power Received (MW)	274	317	367	424	491
Capex (₦m)	3,816	3,816	4,769	4,769	4,769
Opex (₦m)	13,437	16,563	19,353	21,551	23,159
ATC&C Projection	39.23%	30.11%	23.19%	19.17%	17.21%
% of CAPEX from IGR	30%	30%	30%	30%	30%
% from Debt	70%	70%	70%	70%	70%
Equity Rate	27%	27%	27%	27%	27%
Bank Loan Rate	22%	22%	22%	22%	22%
Tenor – Bank Loan (years)	20	20	20	20	20
CBN Rate	18%	18%	18%	18%	18%
Tenor – CBN (years)	20	20	20	20	20

Outputs

Based on the assumptions in Table 35, Table 36 presents the outputs from the financial statement. It is seen that with this scenario, KEDCO will be able to fulfil 100% market remittance obligations with full Capex utilization. The average cost reflective tariff in 2020 is ₦62.88/kWh. Consequently, this scenario would put KEDCO in net income of about ₦54 billion over the planning horizon.

TABLE 36: REGULATORY ALLOWED CAPEX, KEDCO ACTUAL ATC&C LOSS REDUCTION TRAJECTORY AND ITS ENERGY FORECAST SCENARIO OUTPUTS

	Units	2020	2021	2022	2023	2024
Cost-reflective tariff	₦/kWh	62.88	55.80	50.96	49.49	48.33
Allowed tariff	₦/kWh	62.88	55.80	50.96	49.49	48.33
Income Statement						
Revenue	₦m	91,781	108,346	127,409	148,657	171,966
Cost of Sales	₦m	59,787	69,141	80,214	93,081	107,860
OPEX and Other Income/Loss	₦m	14,840	20,220	26,138	32,227	38,375
EBITDA	₦m	17,154	18,985	21,057	23,349	25,731
Net Income/(Loss)	₦m	9,550	10,376	11,052	11,537	12,203
Balance Sheet						
Assets	₦m	77,810	80,119	84,973	90,305	95,965
Liabilities	₦m	157,439	151,710	148,281	145,292	142,444

	Units	2020	2021	2022	2023	2024
Equity	₦m	(64,682)	(54,306)	(43,254)	(31,717)	(19,514)
Payments (%)						
NEMSF	(%)	100%	100%	100%	100%	100%
MO	(%)	100%	100%	100%	100%	100%
NBET	(%)	100%	100%	100%	100%	100%
Capex used	(%)	100%	100%	100%	100%	100%
OPEX	(%)	100%	100%	100%	100%	100%

KEDCO required Capex, actual ATC&C loss reduction trajectory and energy forecast scenario

Inputs

This scenario is based on the KEDCO's required Capex, projected ATC&C losses, cost-reflective tariff, as well as its energy forecast assumptions based on historical growth in energy received – see Table 37.

TABLE 37: KEDCO REQUIRED CAPEX, ACTUAL ATC&C LOSS REDUCTION TRAJECTORY AND ENERGY FORECAST SCENARIO INPUTS

Assumptions	2020	2021	2022	2023	2024
Energy Received (GWh)	2,402	2,778	3,213	3,716	4,298
Av. Power Received (MW)	274	317	367	424	491
Capex (₦m)	6,256	9,732	13,024	11,626	9,157
Opex (₦m)	13,437	16,563	19,353	21,551	23,159
ATC&C Projection	39.23%	30.11%	23.19%	19.17%	17.21%
% of CAPEX from IGR	30%	30%	30%	30%	30%
% from Debt	70%	70%	70%	70%	70%
Equity Rate	27%	27%	27%	27%	27%
Bank Loan Rate	22%	22%	22%	22%	22%
Tenor – Bank Loan (years)	20	20	20	20	20
CBN Rate	18%	18%	18%	18%	18%
Tenor – CBN (years)	20	20	20	20	20

Outputs

Based on the assumptions in Table 37, Table 38 presents outputs from the financial statement. It is seen that with this scenario, KEDCO will be able to fulfil 100% market remittance obligations as well as its Capex and Opex expenses. The average cost reflective tariff in 2020 is ₦62.94/kWh. Consequently, this scenario would put KEDCO in a positive position of about ₦58 billion over the planning horizon.

TABLE 38: KEDCO REQUIRED CAPEX, ACTUAL ATC&C LOSS REDUCTION TRAJECTORY AND ENERGY FORECAST SCENARIO OUTPUTS

	Units	2020	2021	2022	2023	2024
Cost-reflective tariff	(₦/kWh)	62.94	56.11	51.59	50.40	49.34
Allowed tariff	(₦/kWh)	62.94	56.11	51.59	50.40	49.34
Income Statement						
Revenue	₦m	91,878	108,941	128,972	151,377	175,554
Cost of Sales	₦m	59,787	69,141	80,214	93,081	107,860
OPEX & Other Income/Loss	₦m	14,840	20,220	26,138	32,227	38,375
EBITDA	₦m	17,251	19,580	22,620	26,069	29,319
Net Income/(Loss)	₦m	9,550	10,554	11,666	12,757	13,910
Balance Sheet						
Assets	₦m	80,206	88,382	101,469	113,461	123,007
Liabilities	₦m	159,835	159,795	163,985	166,436	165,767
Equity	₦m	(64,682)	(54,128)	(42,462)	(29,705)	(15,795)
Payments (%)						
NEMSF	(%)	100%	100%	100%	100%	100%
MO	(%)	100%	100%	100%	100%	100%
NBET	(%)	100%	100%	100%	100%	100%
Capex used	(%)	100%	100%	100%	100%	100%
OPEX	(%)	100%	100%	100%	100%	100%

Funding plans

KEDCO's expected funding sources will include 20% retained revenue surplus generated by the Company, 20% from commercial loan, 45% from CBN/FGN, and 15% grant-in-aid. The expected total funding is ₦49bn from 2020 to 24 – see Table 39.

TABLE 39: SOURCES OF FUNDING

Source of Funds	Proportion	Year 1	Year 2	Year 3	Year 4	Year 5
Retained Surplus (₦m)	20%	1,251	1,946	2,605	2,325	1,831
Commercial Term Loan (₦m)	20%	1,251	1,946	2,605	2,325	1,831
CBN/FG Loan (₦m)	45%	2,815	4,379	5,861	5,232	4,121
Grant-in-aid (₦m)	15%	938	1,459	1,954	1,744	1,374
Total (₦m)		**6,256**	**9,732**	**13,024**	**11,626**	**9,157**

8 Tariff Reclassification

Overview

This section covers:

- Tariff reclassification based on NERC's Capex, ATC&C loss reduction path and KEDCO's energy forecast; and
- Tariff reclassification based on KEDCO's Capex, ATC&C loss reduction path and its energy forecast

The tariff reclassification in this section gives KEDCO the opportunity to present its submissions on revised customer classes and load allocation to the Regulator in anticipation of the Extraordinary Tariff Review.

Tariff reclassification based on NERC's Capex, ATC&C Loss reduction path and KEDCO's energy forecast

Inputs

This scenario considers the NERC's Capex and ATC&C loss reduction trajectory from 2020 to 2024 as well as KEDCO's energy forecast based on historical growth in energy received – see Table 40. The average tariff for the customer classes is ₦54.63/kWh in 2020. The assumptions for the load allocation, energy sold and realized revenue for the tariff classes are shown in Annex E .

TABLE 40: TARIFF RECLASSIFICATION BASED ON NERC'S CAPEX, ATC&C LOSS REDUCTION PATH AND KEDCO'S ENERGY FORECAST INPUTS

Item	2020	2021	2022	2023	2024
Energy Input (GWh)	2,401	2,777	3,212	3,716	4,298
Forecast ATC&C Loss	22.06%	17.21%	17.21%	17.21%	17.21%
Collected Energy (GWh)	1,872	2,299	2,660	3,077	3,559
Billing (₦m)	116,767	134,224	158,362	191,641	223,035
Collection (₦m)	102,256	122,119	140,981	167,016	194,376
Power Purchase Cost (₦m)	74,421	88,378	101,965	123,802	148,073
Opex (₦m)	27,836	33,741	39,016	43,214	46,303
Average Tariff (₦/kWh)	**54.63**	**53.10**	**53.00**	**54.28**	**54.62**

Outputs

Based on the input assumptions, Table 41 presents KEDCO's proposed tariff reclassification.

TABLE 41: TARIFF RECLASSIFICATION BASED ON NERC'S CAPEX, ATC&C LOSS REDUCTION PATH AND KEDCO'S ENERGY FORECAST OUTPUTS

	2020	2021	2022	2023	2024
Proposed Tariff	**₦/kWh**				
Tariff Class					
R1	4.00	4.00	4.00	4.00	4.00
R2A	46.57	45.26	45.18	46.27	46.56
R2B	52.65	51.17	51.08	52.31	52.64
R3	59.74	58.06	57.96	59.36	59.73
R4	63.78	61.99	61.87	63.38	63.77
C1A	49.82	48.42	48.33	49.50	49.81
C1B	56.31	54.73	54.63	55.96	56.30
C2	57.08	55.49	55.38	56.73	57.08
C3	59.23	57.57	57.46	58.85	59.22
D1	55.63	54.07	53.97	55.28	55.62
D2	64.67	62.86	62.74	64.27	64.67
D3	76.42	74.28	74.14	75.94	76.41
A1	45.91	44.62	44.54	45.62	45.91
A2	48.18	46.84	46.75	47.88	48.18
A3	49.24	47.86	47.77	48.93	49.24
S1	54.55	53.02	52.92	54.21	54.54

Tariff reclassification based on KEDCO's Capex, ATC&C loss reduction path and its energy forecast

Inputs

This scenario considers the KEDCO's Capex, its ATC&C loss reduction trajectory from 2020 to 2024 as well as the energy forecast based on historical growth in energy received – see Table 42. The average tariff for the customer classes is ₦70.06/kWh in 2020. The assumptions for the load allocation, energy sold and realized revenue for the tariff classes are shown in Annex E .

TABLE 42: TARIFF RECLASSIFICATION BASED ON KEDCO'S CAPEX, ATC&C LOSS REDUCTION PATH AND ITS ENERGY FORECAST INPUTS

Item	2020	2021	2022	2023	2024
Energy Input (GWh)	2,402	2,778	3,213	3,716	4,298
Forecast ATC&C Loss	39.23%	30.11%	23.19%	19.17%	17.21%
Collected Energy (GWh)	1,459	1,941	2,467.87	3,003.77	3,558.46

Item	2020	2021	2022	2023	2024
Billing (₦m)	149,758	159,004	170,697	196,295	223,043
Collection (₦m)	102,256	122,119	140,981	167,016	194,376
Power Purchase Cost (₦m)	74,421	88,378	101,965	123,802	148,073
Opex (₦m)	27,836	33,741	39,016	43,214	46,303
Average Tariff (₦/kWh)	**70.06**	**62.90**	**57.13**	**55.60**	**54.62**

Outputs

Based on the input assumptions, Table 43 presents KEDCO's proposed tariff reclassification.

TABLE 43: TARIFF RECLASSIFICATION BASED ON KEDCO'S CAPEX, ATC&C LOSS REDUCTION PATH AND ITS ENERGY FORECAST OUTPUTS

	2020	2021	2022	2023	2024
Proposed Tariff	₦/kWh				
Tariff Class					
R1	4.00	4.00	4.00	4.00	4.00
R2A	59.72	53.62	48.70	47.40	46.56
R2B	67.52	60.62	55.05	53.59	52.64
R3	76.61	68.78	62.47	60.80	59.73
R4	81.79	73.43	66.69	64.91	63.77
C1A	63.89	57.36	52.10	50.71	49.81
C1B	72.22	64.84	58.89	57.32	56.31
C2	73.21	65.73	59.70	58.10	57.08
C3	75.96	68.20	61.94	60.28	59.22
D1	71.34	64.05	58.17	56.62	55.62
D2	82.94	74.47	67.63	65.83	64.67
D3	98.01	87.99	79.92	77.78	76.42
A1	58.88	52.86	48.01	46.73	45.91
A2	61.80	55.48	50.39	49.05	48.18
A3	63.15	56.70	51.50	50.12	49.24
S1	69.96	62.81	57.05	55.52	54.55

9 Risk Assessment and Management

Overview

This section covers:

- Approach to managing risk; and
- Risk analysis.

Approach to managing risk

KEDCO have carried out risk analysis of the business environment in the coming years. The following four steps approach to risk management were followed:

- A series of risk identification sessions were held in which the major technical and commercial risks to the Performance Improvement Plan were identified and listed;
- A subjectively assessed risk likelihood was assigned to each identified risk according to the following ranges:
  - High: 67% - 100% probability of occurring
  - Medium: 34% - 66% probability of occurring
  - Low: 0% - 33% probability of occurring
- Similar subjectively assessed impacts (high, medium, low) were attached to each identified risk.
- Risks assessed as being high, medium or low, the following risk management strategies were formulated:
  - Avoidance (eliminate, withdraw)
  - Reduction (optimize – mitigate)
  - Sharing (e.g. insure, transfer)
  - Retention (accept and budget)

The risk analysis is summarized in the next section.

Risk Analysis

Table 44 provides a risk assessment for this performance improvement plan.

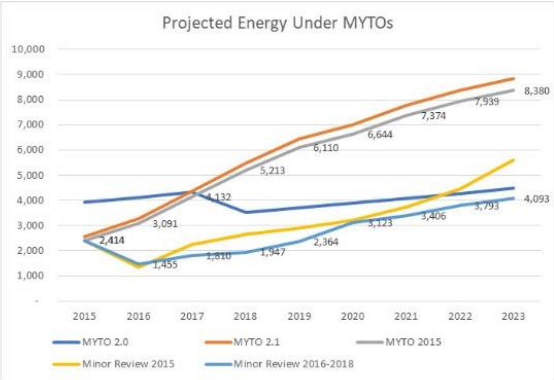
TABLE 44: RISK ASSESSMENT AND MANAGEMENT

Risk title	Risk description	Risk likelihood	Risk impact	Risk management strategy
Brief title	Description	e.g. High, medium, low	e.g. High, medium, low	*Avoidance (eliminate, withdraw)* *Reduction (optimize – mitigate)* *Sharing (e.g. insure, transfer)* *Retention (accept and budget)*
Loss reduction pathway in tariffs.	Discos have argued that NERC should recognize the actual loss position of the Discos. Discos have been unable to reduce losses due to non-cost reflective tariffs, low Capex allowance in the MYTO which doesn't reflect reality, high energy charges from NBET, and MDA collection loss is yet to be addressed. The timeline of non-cost reflective tariffs is provided in Section 4.	High	High	**Retention** (accept and budget). The decision on tariffs is outside the direct control of the Discos. Within the different scenarios modelled in section 7, we have considered different possible scenarios for allowed ATC&C losses. We have considered the impact this will have on Disco performance during the tariff period. It will be important to **negotiate with NERC** to avoid the worst tariff scenarios.
MDA payment.	MDA debts are not paid to date, current deliberations between the Discos and FGN only focuses on federal MDAs and not state. Discos need to engage with state MDAs to address the debt currently being accrued at the state level.	High	High	**Retention** (accept and budget). The decision on tariffs and the solution to MDA debt payment is outside the direct control of the Discos. Within the different scenarios modelled in section 7, we have considered different possible scenarios for MDA payment. It will be important to **negotiate with FGN** to avoid the worst MDA scenarios.

Risk title	Risk description	Risk likelihood	Risk impact	Risk management strategy
Performance agreement timescales.	The performance agreements end date was originally December 2019. BPE has indicated that 2017 and 2018 will be treated as non-performance years. 2 However, they are treating 2015, 2016 and 2019 as loss reduction years. None of the Discos have achieved the first three years of loss reduction, and even with cost reflective tariffs, it is unlikely they will achieve their full loss reduction commitment by the end of 2021. Based on the current performance of the Discos, the call option to buy back the Discos at $1 if they fail to meet their commitments.	High	High	**Avoidance** (eliminate, withdraw). Under the current treatment of the loss reduction targets, Discos can use their businesses without compensation. This makes it very challenging to finance improvements unless the targets are made more achievable. This risk is not possible to manage, unless BPE amend the performance agreement targets to reflect an achievable trajectory. **Negotiating with BPE** is essential. If this is not resolved, the business may not be viable.
Minor review.	No minor review has been implemented in tariffs since 2015 to date leaving the Discos operating under impossible economic conditions, and unable to meet their obligations.	High	High	**Avoidance** (eliminate, withdraw). Failure to implement a minor review could qualify as a "change of law" force majeure event under the performance agreement, since the regulation is not being enforced. By declaring force majeure within the timescales, Discos would protect themselves from the performance targets and make themselves eligible to receive full compensation if the situation is not rectified in performance agreement timescales. To date, Discos have been reluctant to declare force majeure because of political implications. Once new performance agreements and tariffs have been implemented, Discos should enforce their entitlement to a cost-reflective tariff.

[2] BPE - Presentation on the Review of Performance Target Dates of the DISCOS (21st February 2019)

Risk title	Risk description	Risk likelihood	Risk impact	Risk management strategy
NBET charges for generation inconsistent with Disco tariffs.	The NBET invoices issued to the Discos have remained significantly higher than MYTO projections, largely because NBET has been charging the Discos using the actual economic indices i.e. forex etc. However, the tariffs used by NBET remain higher than the generation tariff in the December 2019 Minor Review MYTO 2015 MYTO minor review model. Once PPAs are activated, generation costs will deviate further from MYTO assumptions as capacity factors will be considerably higher once successor and NIPP generators can charge for available capacity.	High	Low (providing minor reviews implemented)	**Retention** (accept and budget). The scenarios in this report assume that generation tariffs are consistent with NBET current tariffs in real 2019 terms. This is addressed retrospectively when NERC use actual NBET invoices in minor reviews but will have an impact in short term cashflow and ability to meet market remittances. **Regulatory need.** NERC are requested to ensure their generation tariff formulae are consistent with those being applied by NBET, and that the capacity factor assumptions are consistent with SO declarations for all generation, so that the MYTO model provides a realistic tariff base.
Generation levels.	In past MYTO models, forecast generation levels have been significantly in excess of reality. Actual generation levels have changed very little since 2013.	High	High	**Avoidance** (eliminate, withdraw). **Avoidance** – Reduced energy delivered to KEDCO has a negative impact on both collection efficiency and ability to serve customers, leading to high incidence of theft/bypass and non-payment. In the increased Opex scenario largely due to the Capex undertaken (if allowed), it becomes extremely important to true-up the actual energy delivered to KEDCO and consequently adjust both the loss reduction and market remittance levels.

Risk title	Risk description	Risk likelihood	Risk impact	Risk management strategy
	When there are generation shocks (such as in 2016), there is a disproportionate impact on payment, due to customer dissatisfaction and the fact that fixed costs are spread over fewer kWhs.  As can be seen from the above the energy delivered in 2019 is assumed as 6,110 GWh in MYTO 2015 whereas the current review places the same at 2,364 GWh. The energy gap is maintained up to 2023, where the figures are 8.380 GWh and 4,093 GWh. The impact of reduction of energy delivered to the DISCOs has not been computed or reflected in the tariff orders. Proportional adjustment of loss reduction trajectory is definitely warranted under these circumstances, as the reduction in supply of energy has a significantly high negative impact on the customer satisfaction levels leading to high			The scenarios in this report assume that generation levels remain at 2019 levels, with no increase. The models assume a marginal growth year-on-year in energy delivered to KEDCO, which is as a result of fewer breakdowns in the downstream network, larger availability of 330kV line, and reconductoring of key 132kV lines during the projection period to carry more load. **Regulatory need.** MYTO minor reviews will be essential for tariffs to keep pace with generation levels.

Risk title	Risk description	Risk likelihood	Risk impact	Risk management strategy
	incidences of meter tampering/bypass, unwillingness to pay, among others, which lead to significantly higher collection losses.			
Eligible Customers.	Some transmission connected customers of the Discos have self-declared themselves eligible customers and are currently receiving power illegally through TCN. The transmission corridor feeding KEDCO license area is already constrained and overloaded and is unable to supply KEDCO's capacity allocation from the grid. It is difficult to surmise a scenario wherein eligible customers would be able to avail of transmission capacity to serve their needs when currently the entire TCN capacity is contracted to KEDCO. Also, in the upcoming regulations on Competition Transmission Charges, KEDCO does not foresee competitive generation (in the planning horizon) that would allow customers to shift sources of supply. Customers who self-declare themselves without due process create a risk to our revenue, financial performance, energy received and customer numbers. At present, TCN is refusing to disconnect illegally defaulting customers as required under the Supplementary Order on the commencement of TEM.	High	High	**Avoidance** (eliminate, withdraw). If the market issue is not resolved, and tariff levels are not adjusted to compensate, the only option for some Discos may be withdrawal via force majeure. **Regulatory need.** It is important that any Eligible Customers pay the Competition Transition Charge (CTC) and that their status is legal.

Risk title	Risk description	Risk likelihood	Risk impact	Risk management strategy
Meter Assets Providers (MAP).	The MAP regulation has been in effect for over a year now, however there has been limited progress by the MAP's in commencing metering. Recent reports indicate that a number of MAP's currently do not have the necessary finance to commence metering within the set timelines. Metering is likely to be based only on those customers who can afford to pay. Discos are not permitted to use regulated Capex for metering.	High	High	**Reduction** (optimize – mitigate) KEDCO have managed their MAP contracts to ensure best possible service. KEDCO have managed its counter-party risk by engaging five MAPs and assigning specific regions across each MAP. The Company has standardized its backend application, scrutiny and permitting processes, payment and reconciliation to minimize risks relating to operations and management of the metering process, and subsequent sale of energy and cost recovery. However, a residual risk remains because the metering allowance by NERC is not adequate to allow financing of metering, therefore all meters will initially be financing by the customers themselves. Many of our customers may not be able to finance the Capex. Since the MSC formula has been fixed by NERC for a 10-year tenure and 21% annual rate of interest, KEDCO shall undertake to meter all its customers under this MSC based charges, while avoiding delays due to customer choice. **Regulatory need.**

Risk title	Risk description	Risk likelihood	Risk impact	Risk management strategy
				It is important that NERC reviews the metering Capex allowance to enable third party financing of meters and to ensure that metering can reach all our customers.
Allowed Capex in MYTO model.	If allowed Capex is not consistent with assumptions, it will restrict the ability of KEDCO to make the required investment and may prevent the planned Outputs being achieved.	High	Medium	**Retention** (accept and budget) We have prepared this PIP for a range of allowed Capex scenarios, and the projected outputs will differ depending on the allowed Capex. **Regulatory need.** It is incumbent upon the Commission to assess the impact on tariff for the high loss reduction scenarios and avoid tariff shock to the customers. The aggressive loss reduction conditions need to be tempered with economic realities of the region and adjusted for 'affordability' of the energy supplied.
Limited or no access to finance.	The regulatory uncertainty, non-cost reflective tariffs since privatisation in 2013, and the fact that most Discos are effectively insolvent mean that commercial lenders are unwilling to lend to Discos. Investors have not received dividends.	High	Medium	**Retention** (accept and budget) In our financial planning, we have considered known sources of finance. We have considered cases where investment is financed through retained surplus, commercial loans, CBN/FGN loan and grant-in-aid.

Risk title	Risk description	Risk likelihood	Risk impact	Risk management strategy
Acknowledged tariff shortfall covers liability.	NERC anticipated that liability to MO and NBET will be reduced by the tariff shortfall. However, NERC's calculation of the tariff shortfall differs from KEDCO's, as discussed in section 0.	Medium	Medium	**Retention** (accept and budget) We have considered a range of tariff scenarios based on a range of acknowledged tariff shortfall scenarios, and the projected outputs will differ depending on NERC's acknowledged tariff shortfall.
Project delivery timescales.	We have planned this PIP based on expected delivery timescales. However, there is a risk that external contractors may not deliver the work to time.	Medium	Medium	**Reduction** (optimize – mitigate) Cost and time overruns are realities for almost all projects in the region. However, KEDCO has a strong contingency planning framework and mitigation of cost/time overrun risks through strict implementation of performance guarantees and application of the contingency plan.
Insurgency activities damage KEDCO assets (other extreme events beyond KEDCO's control e.g. extreme weather).	In recent years, insurgency and civil unrest have caused damage to electricity infrastructure in Nigeria. There is a risk of recurrence. Other extreme events include (for example) extreme weather or seismic events.	High	High	**Sharing** (e.g. insure, transfer) It is possible that specific investment to address short-term insurgency activities could be allowed for in tariffs as additional Capex, and outputs and/or allowed Capex could be reviewed in an extraordinary tariff review following these or similar extreme events. **Avoidance** (eliminate, withdraw). The Performance Agreement allows for withdrawal in the case of severe or prolonged insurgency and other specific force majeure events.

ANNEXES

Annex A Results of stakeholder consultation

KEDCO have conducted various stakeholders' consultation with security personnel, local government chairmen, heads of communities, market women and different customer classes. Figure 7 shows the PIP Newspaper publication on issued by Daily Trust on 24 September 2019. Figure 8 and Figure 9 present some pictures of our Stakeholder consultations.

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DAILY TRUST, Tuesday, September 24, 2019

35

KEDCO

KANO ELECTRICITY DISTRIBUTION COMPANY

PUBLIC NOTICE INVITING CUSTOMERS IN KEDCO LICENSE AREA FOR ENGAGEMENT ON PROPOSED PERFORMANCE IMPROVEMENT PLAN (PIP)

This is to notify the general public that there shall be customers / stakeholders' interactive meeting with officials of KEDCO on Thursday, 26th Sept 2019, by 10.00am at Tahir Guest Palace, Kano.

The Company shall present its proposed performance improvement plan (PIP) to be submitted to the Nigerian Electricity Regulatory Commission (NERC) detailing its proposed capital investment plan to meet its performance commitments and revision in tariff to enable the Company to recover its costs including its commitments to the upstream market (Gencos and Transco, among others).

The Company shall provide an overview of its proposal in terms of demand-supply gap, proposed investment plan, proposed performance improvements and estimated impact on average tariff for customers.

All customers and stakeholders are requested to attend the interactive meeting in order to provide their opinions and views on KEDCO's plans so that they may be incorporated in the report to be submitted to NERC.

Signed:

Management

#EmpoweringLives www.kedco.ng kedcoplc

FIGURE 7: PIP NEWSPAPER PUBLICATION

FIGURE 8: KEDCO'S STAKEHOLDERS ACROSS DIFFERENT GROUPS

FIGURE 9: COMMUNITY HEADS AND SOME KEDCO STAFF

Annex B Timeline

TABLE 45: NIGERIAN ELECTRICITY SUPPLY INDUSTRY TIMELINE OF TRANSACTION AND REGULATORY EVENTS

Year	Month	Market			MYTO Model in Use					
		Interim Rules - initial period	Interim Rules - Amended	TEM declared but CPs not satisfied	MYTO II Order and Model	MYTO 2.1 Model	MYTO 2.1 Model for TEM (not released)	MYTO 2.1 Model for TEM - 2016 year	MYTO 10 Year Tariff Plan Model	
2012	J									01/06/2012 - start of MYTO II.
	J									31/7/2012 - Privatisation bids submitted.
	A									
	S									
	O									Privatisation bids opened.
	N									
	D									6 Month MYTO Minor Review - no evidence it took place.
2013	J									Privatisation bidder negotiations commenced.
	F									17/02/2013 - signature of Industry documents and payment of 25% of price.
	M									
	A									
	M									
	J									6-month MYTO Review - took place but looked backwards so no tariff change despite huge generation shortfall.

Year	Month	Market			MYTO Model in Use					
		Interim Rules - initial period	Interim Rules - Amended	TEM declared but CPs not satisfied	MYTO II Order and Model	MYTO 2.1 Model	MYTO 2.1 Model for TEM (not released)	MYTO 2.1 Model for TEM - 2016 year	MYTO 10 Year Tariff Plan Model	
	J									
	A									Signature of Transaction documents & payment of 75% of price.
	S									
	O									
	N									1/11/2013 - Handover.
	D									6-month MYTO Review - no evidence it took place. 04/12/2013 Interim Rules signed.
2014	J									
	F									NERC Letter (17/2/2014) restating Capacity and Energy tariffs and setting Capacity in MWh units.
	M									
	A									
	M									14/05/14 - Revised Interim Rules signed/ 01/05/2014 Fixed Charges Order restricting fixed charges if no power.
	J									6-month MYTO Minor Review - wholesale generation prices reduced (and basis changed, consumer tariffs increased for generation).
	J									
	A									
	S									
	O									

Year	Month	Market			MYTO Model in Use					
		Interim Rules - initial period	Interim Rules - Amended	TEM declared but CPs not satisfied	MYTO II Order and Model	MYTO 2.1 Model	MYTO 2.1 Model for TEM (not released)	MYTO 2.1 Model for TEM - 2016 year	MYTO 10 Year Tariff Plan Model	
	N									CBN in collaboration with the Ministry of Petroleum Resources, Ministry of Power and NERC, signed a MoU for CBN-NEMSF.
	D									6-month MYTO Minor Review - incorporated into the Major Review in Jan 2015.
2015	J									MYTO Major Tariff Review, known as MYTO 2.1. It was assumed in the model that Discos started the Loss Reduction path on 1 January 2013 and were in the third year of their loss reduction path on 1st January 2015.
	F									01/02/2015 Commencement of TEM (Order dated 29/1/2015 and Supplementary Order dated 18th March 2015). CBN-NEMSF disbursement commences.
	M									
	A									01/04/2015 Amended MYTO Tariff Order removing Collection Losses from ATC&C (dated 24/3/2015) - MO/NBET to use PPA prices from MYTO model.
	M									
	J									MYTO Minor Review - did not take place.
	J									Interim Order abolishing Balancing Mechanism (dated 30/07/2015).
	A									
	S									

Year	Month	Market			MYTO Model in Use					
		Interim Rules - initial period	Interim Rules - Amended	TEM declared but CPs not satisfied	MYTO II Order and Model	MYTO 2.1 Model	MYTO 2.1 Model for TEM (not released)	MYTO 2.1 Model for TEM - 2016 year	MYTO 10 Year Tariff Plan Model	
	O									
	N									
	D									NERC Commissioners 5-year tenure ends and Acting Chairman Appointed.
2016	J									Start of 2016 year in MYTO 2.1 Model, new gas prices and indexation.
	F									Tariff Order and commencement of 10-year Tariff Plan and Model. Model assumed that the first year of loss reduction was 2015, but reduced allowed losses by removing Ministries, Departments and Agencies (MDA) debts.
	M									Dramatic drop in generation as a result of gas pipeline attacks, the drop in delivered power means tariffs no longer cover costs.
	A									
	M									Naira weakens and PPA FX indexing means cost of generation jumps from 12 N/kWh to 18 N/kWh with no corresponding increase in end-user tariffs, thus exacerbating the liquidity crisis in the sector.
	J									Minor Review undertaken but results not implemented.
	J									Barrister Toluwani judgement issued against NERC.
	A									Discos begin to lose trust of the sector due to declining performance in % remittances to the market.

Year	Month	Market: Interim Rules - initial period	Market: Interim Rules - Amended	Market: TEM declared but CPs not satisfied	MYTO Model in Use: MYTO II Order and Model	MYTO Model in Use: MYTO 2.1 Model	MYTO Model in Use: MYTO 2.1 Model for TEM (not released)	MYTO Model in Use: MYTO 2.1 Model for TEM - 2016 year	MYTO Model in Use: MYTO 10 Year Tariff Plan Model	
	S									CBN constitutes two committees to look at means to address the liquidity problems - proposals for an "NBET Bond" to solve the liquidity crisis are tabled.
	O									Senate instructs that the proposal for the NBET Bond be put on hold until a comprehensive fix developed.
	N									Government turns to World Bank for support in solving the sector liquidity crisis - WB visit Abuja for discussions.
	D									MYTO Minor Review - the 7th since Handover - NERC requests Discos proposals for tariffs but results not implemented. FGN reportedly not wanting tariff increase before 2019 elections.
2017	J									2017 MYTO 10 Year tariffs are implemented by Discos but it is not enough to offset the continued rise in the cost of grid generation - now over 20 N/kWh. CBN Issues a new Foreign Exchange Policy in attempt to close gap between the official rate and parallel market. FGN approves ₦701bn Power Assurance Guarantee for NBET.
	F									
	M									Power Sector Recovery Program – jointly developed by FGN and World Bank. Plan has approved in principle by the FEC but gaps remain.
	A									
	M									Under section 27 of EPSRA the Minister of Power declares 4

Year	Month	Market: Interim Rules - initial period	Market: Interim Rules - Amended	Market: TEM declared but CPs not satisfied	MYTO Model in Use: MYTO II Order and Model	MYTO Model in Use: MYTO 2.1 Model	MYTO Model in Use: MYTO 2.1 Model for TEM (not released)	MYTO Model in Use: MYTO 2.1 Model for TEM - 2016 year	MYTO Model in Use: MYTO 10 Year Tariff Plan Model	
										categories of Eligible Customers who will be able to purchase power directly from Successor Gencos and IPPs.
	J									NERC release a Consultation Paper for the Review of MYTO Methodology asking if reviews should become more regular and whether a RDM should be introduced for TCN. MYTO Minor Review - did not take place.
	J									NERC enact the Regulation setting out permit and tariff approval procedures for Mini-Grid Operators.
	A									NERC releases a consultation on Eligible Customers.
	S									
	O									NERC publishes the Eligible Customer Regulations 2017 and 7 Discos declare Force Majeure on grounds of lack of cost reflective tariffs and presence of cross subsidy and in some instances, change of law.
	N									Further details of the ₦701bn PAG facility emerge. Will make up some of the shortfall from Discos remittances to Gencos such that Gencos receive 80% of amounts invoiced.
	D									MYTO Minor Review - undertaken but results delayed.
2018	J									NERC orders tariffs to be frozen at 2017 levels - 2018 change not implemented. Publishes Draft Meter Asset Providers (MAP) Regulations 2017 in attempt to close metering gap.

Year	Month	Market			MYTO Model in Use					
		Interim Rules - initial period	Interim Rules - Amended	TEM declared but CPs not satisfied	MYTO II Order and Model	MYTO 2.1 Model	MYTO 2.1 Model for TEM (not released)	MYTO 2.1 Model for TEM - 2016 year	MYTO 10 Year Tariff Plan Model	
	F									Assisted by World Bank. NERC prepares and circulates guidelines for Performance Improvement Plan an apparent requirement of the "reset" of the NESI.
	M									MYTO Minor Review - NERC presents outcomes of December 2017 Minor Review to Industry but results not implemented.
	A									A Bill to Amend the EPSR Act of 2005 to proscribe and criminalise Estimated Billing proceeds to its 2nd reading in the National Assembly.
	M									Permanent NERC Chairman - James Adeche Momoh - finally appointed, 29 months after previous.
	J									MYTO Minor Review - did not take place.
	J									
	A									
	S									
	O									BPE issued a press statement in October 2018, which clarified that the target date in the Performance Agreements signed with Discos is 31 December 2019.
	N									
	D									MYTO Minor Review - did not take place.
2019	J									

Year	Month	Market			MYTO Model in Use					
		Interim Rules - initial period	Interim Rules - Amended	TEM declared but CPs not satisfied	MYTO II Order and Model	MYTO 2.1 Model	MYTO 2.1 Model for TEM (not released)	MYTO 2.1 Model for TEM - 2016 year	MYTO 10 Year Tariff Plan Model	
	F									
	M									
	A									
	M									NERC issues amended Performance Improvement Plan Guidelines.
	J									MYTO Minor review undertaken but results not implemented in tariffs. Only 2017 and 2018 treated as FM years.
	J									
	A									December 2019 minor review tariff orders and minimum remittance percentages published. Tariffs not scheduled to change until January 2020, by which point NERC expects an extraordinary tariff review to have been completed.

Annex C Energy Forecast Plan

KEDCO's plans to bridge its energy gap through embedded generation and bilateral agreements.

TABLE 46: ENERGY FORECAST WITH EMBEDDED GENERATION AND BILATERAL AGREEMENT

	2020	2021	2022	2023	2024
NBET Energy	2,401.73	2,777.89	3,212.95	3,716.16	4,298.18
NBET Energy After Displacement	2,401.73	2,720.95	3,099.07	3,602.28	4,184.30

	2020	2021	2022	2023	2024
Plant 1 - Bilateral Energy from Gombe Hydro	-	56.94	113.88	113.88	113.88
Plant 2 - Solar Power ITAC Plant	-	8.76	26.28	26.28	26.28
Plant 3 - Solar Power Diginet Plant	-	13.14	26.28	26.28	26.28
Plant 4 - Solar Power NSIA NNPC Plant	-	7.82	17.52	17.52	17.52
TOTAL Energy Input GWh	**2,401.73**	**2,807.61**	**3,283.03**	**3,786.24**	**4,368.26**

TABLE 47: POWER PURCHASE COST FROM EMBEDDED GENERATION AND BILATERAL AGREEMENT

Power Purchase Cost (₦ Million)	2020	2021	2022	2023	2024
Plant 1	0.00	1,195.74	2,391.48	2,391.48	2,391.48
Plant 2	0.00	230.21	690.64	690.64	690.64
Plant 3	0.00	283.82	567.65	567.65	567.65
Plant 4	0.00	168.93	378.43	378.43	378.43
TOTAL	**0.00**	**1,878.71**	**4,028.20**	**4,028.20**	**4,028.20**

Annex D Financial Analysis Assumptions

Energy and Capacity Costs

The capacity and energy charges for the period 2020-2024 are based on the December 2019 Minor Review MYTO 2015 in nominal terms.

Inflation in cost base

In all scenarios, we have applied inflation to operational costs consistent with NERC's December 2019 Minor Review MYTO 2015.

The regulatory asset base and Capex are inflated in the MYTO model by foreign exchange only. Since the December 2019 Minor Review MYTO 2015 assumed no change in foreign exchange, this means that the regulatory asset base only increases by Capex minus depreciation.

Note that this is an issue with the MYTO model, as US inflation should also be applied to the regulatory asset base to keep the investor whole in real terms.

Depreciation

The depreciation calculation has been simplified to only consider one kind of depreciation in the model across all asset classes – the same depreciation rates are used for accounting, taxation and MYTO allowable revenue purposes.

Other Income

The PIP has not considered income from the sale of energy from bilateral contracts for KEDCO, however, the financial model has the capability to account for bilateral contracts.

NEMSF I CBN Loan

It has been assumed that the MYTO reported annual principal and interest repayments from the December 2019 Minor Review MYTO 2015 for the NEMSF I loan are correct.

Macroeconomic parameters

Assumptions for foreign exchange and inflation are based on the December 2019 Minor Review MYTO 2015.

Tariff Shortfall

Tariff shortfall from the December 2019 Minor Review MYTO 2015 of N42 billion was used in the financial model.

Payment Waterfall

The payment waterfall assumes the priority order as described in the December 2019 Minor Review MYTO 2015. Proportion of payment to MO and NBET is an output of the model for each year.

Annex E Tariff Reclassification Assumptions

Tariff reclassification based on NERC Capex, ATC&C Loss reduction path and KEDCO energy forecast Assumptions

The assumptions for this scenario are as follows:

Table 48: Percentage Load allocation by tariff classes based on NERC's Capex

	2020	2021	2022	2023	2024
Tariff Class	Load Allocation (%)				
R1	0.23%	0.23%	0.23%	0.23%	0.23%
R2A	52.79%	52.79%	52.79%	52.79%	52.79%
R2B	7.26%	7.26%	7.26%	7.26%	7.26%
R3	0.59%	0.59%	0.59%	0.59%	0.59%
R4	0.05%	0.05%	0.05%	0.05%	0.05%
C1A	3.45%	3.45%	3.45%	3.45%	3.45%
C1B	1.36%	1.36%	1.36%	1.36%	1.36%
C2	2.34%	2.34%	2.34%	2.34%	2.34%
C3	1.94%	1.94%	1.94%	1.94%	1.94%
D1	0.81%	0.81%	0.81%	0.81%	0.81%
D2	5.14%	5.14%	5.14%	5.14%	5.14%
D3	19.40%	19.40%	19.40%	19.40%	19.40%
A1	0.31%	0.31%	0.31%	0.31%	0.31%
A2	1.22%	1.22%	1.22%	1.22%	1.22%
A3	3.00%	3.00%	3.00%	3.00%	3.00%
S1	0.08%	0.08%	0.08%	0.08%	0.08%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Table 49: Energy Sold by tariff classes based on NERC's Capex

	2020	2021	2022	2023	2024
Tariff Class	Energy Sold (MWh)				
R1	4.40	5.40	6.25	7.23	8.36
R2A	988.15	1,214.08	1,404.23	1,624.15	1,878.53
R2B	135.97	167.05	193.22	223.48	258.48
R3	11.13	13.67	15.81	18.29	21.15
R4	0.96	1.18	1.37	1.58	1.83
C1A	64.66	79.44	91.88	106.27	122.92
C1B	25.42	31.24	36.13	41.79	48.33
C2	43.89	53.92	62.37	72.13	83.43
C3	36.26	44.55	51.52	59.59	68.93
D1	15.22	18.71	21.63	25.02	28.94
D2	96.29	118.31	136.84	158.27	183.06
D3	363.20	446.24	516.13	596.97	690.46

	2020	2021	2022	2023	2024
Tariff Class	Energy Sold (MWh)				
A1	5.80	7.12	8.24	9.53	11.02
A2	22.82	28.04	32.43	37.51	43.39
A3	56.18	69.03	79.84	92.34	106.80
S1	1.56	1.92	2.22	2.57	2.97
Total	**1,871.90**	**2,299.90**	**2,660.10**	**3,076.72**	**3,558.59**

TABLE 50: REVENUE REALIZED BY TARIFF CLASSES BASED ON NERC'S CAPEX

	2020	2021	2022	2023	2024
Tariff Class	Revenue Realized (₦m)				
R1	0.02	0.02	0.02	0.03	0.03
Balance of ARR[3]	102,256	122,119	140,981	167,016	194,376
R2A	46,015	54,953	63,441	75,157	87,469
R2B	7,158	8,548	9,869	11,691	13,606
R3	665	794	916	1,086	1,263
R4	61	73	85	100	117
C1A	3,221	3,847	4,441	5,261	6,123
C1B	1,432	1,710	1,974	2,338	2,721
C2	2,505	2,992	3,454	4,092	4,762
C3	2,147	2,564	2,961	3,507	4,082
D1	847	1,011	1,168	1,383	1,610
D2	6,227	7,437	8,586	10,171	11,838
D3	27,756	33,147	38,267	45,334	52,761
A1	266	318	367	435	506
A2	1,100	1,313	1,516	1,796	2,090
A3	2,766	3,304	3,814	4,518	5,259
S1	85	102	118	139	162
Total	**102,252**	**122,114**	**140,975**	**167,010**	**194,369**

Tariff reclassification based on KEDCO's Capex, ATC&C loss reduction path and its energy forecast Assumptions

The assumptions for this scenario are as follows:

TABLE 51: PERCENTAGE LOAD ALLOCATION BY TARIFF CLASSES BASED ON KEDCO'S CAPEX

	2020	2021	2022	2023	2024
Tariff Class	Load Allocation (%)				
R1	0.23%	0.23%	0.23%	0.23%	0.23%
R2A	52.79%	52.79%	52.79%	52.79%	52.79%

[3] Accounting rate of return

	2020	2021	2022	2023	2024
Tariff Class	Load Allocation (%)				
R2B	7.26%	7.26%	7.26%	7.26%	7.26%
R3	0.59%	0.59%	0.59%	0.59%	0.59%
R4	0.05%	0.05%	0.05%	0.05%	0.05%
C1A	3.45%	3.45%	3.45%	3.45%	3.45%
C1B	1.36%	1.36%	1.36%	1.36%	1.36%
C2	2.34%	2.34%	2.34%	2.34%	2.34%
C3	1.94%	1.94%	1.94%	1.94%	1.94%
D1	0.81%	0.81%	0.81%	0.81%	0.81%
D2	5.14%	5.14%	5.14%	5.14%	5.14%
D3	19.40%	19.40%	19.40%	19.40%	19.40%
A1	0.31%	0.31%	0.31%	0.31%	0.31%
A2	1.22%	1.22%	1.22%	1.22%	1.22%
A3	3.00%	3.00%	3.00%	3.00%	3.00%
S1	0.08%	0.08%	0.08%	0.08%	0.08%
Total	100.00%	100.00%	100.00%	100.00%	100.00%

TABLE 52: ENERGY SOLD BY TARIFF CLASSES BASED ON KEDCO'S CAPEX

	2020	2021	2022	2023	2024
Tariff Class	Energy Sold MWh				
R1	3.43	4.56	5.80	7.05	8.36
R2A	770.47	1,024.87	1,302.75	1,585.65	1,878.46
R2B	106.01	141.02	179.25	218.18	258.47
R3	8.68	11.54	14.67	17.85	21.15
R4	0.75	1.00	1.27	1.54	1.83
C1A	50.41	67.06	85.24	103.75	122.91
C1B	19.82	26.37	33.52	40.80	48.33
C2	34.22	45.52	57.86	70.42	83.43
C3	28.27	37.60	47.80	58.18	68.92
D1	11.87	15.79	20.07	24.43	28.94
D2	75.08	99.87	126.95	154.52	183.05
D3	283.19	376.70	478.83	582.81	690.44
A1	4.52	6.01	7.64	9.30	11.02
A2	17.79	23.67	30.09	36.62	43.38
A3	43.80	58.27	74.07	90.15	106.80
S1	1.22	1.62	2.06	2.51	2.97
Total	**1,459.53**	**1,941.47**	**2,467.87**	**3,003.77**	**3,558.46**

TABLE 53: REVENUE REALISED BY TARIFF CLASSES BASED ON KEDCO'S CAPEX

	2020	2021	2022	2023	2024
Tariff Class	Revenue Realized (₦m)				
R1	0.01	0.02	0.02	0.03	0.03

	2020	2021	2022	2023	2024
Tariff Class	**Revenue Realized (₦m)**				
Balance of ARR	102,256	122,119	140,981	167,016	194,376
R2A	46,015	54,953	63,441	75,157	87,469
R2B	7,158	8,548	9,869	11,691	13,606
R3	665	794	916	1,086	1,263
R4	61	73	85	100	117
C1A	3,221	3,847	4,441	5,261	6,123
C1B	1,432	1,710	1,974	2,338	2,721
C2	2,505	2,992	3,454	4,092	4,762
C3	2,147	2,564	2,961	3,507	4,082
D1	847	1,011	1,168	1,383	1,610
D2	6,227	7,437	8,586	10,171	11,838
D3	27,756	33,147	38,267	45,334	52,761
A1	266	318	367	435	506
A2	1,100	1,313	1,516	1,796	2,090
A3	2,766	3,304	3,814	4,518	5,259
S1	85	102	118	139	162
Total	**102,252**	**122,114**	**140,975**	**167,010**	**194,369**

Annex F HSE Engagements

TABLE 54: HISTORICAL COMMUNITY ENGAGEMENT AND SAFETY TRAININGS

Year	Name of Training	Details of each named Training
2016	Public Safety Sensitization	Dawakin tofa, birnin Kudu, Takai, Gwaram, Ringim, Jahun, Gezawa, minjibir, gabasawa, Kafi Hausa, garki, gumel, Birniwa, Hadejia, Tarauni, Nasarawa, Tofa, Gwarzo, Rimin Gado.
2017	Public Safety Sensitization	Panshekara, Kwanar Dangora, kankia, Bichi, Barhim Estate, Katsina, gandun Sarki, maje, Malam Madori, Garki
2018	Public Safety Sensitization	BirninKudu, Gwaram, Buji, Taura, Tudun Murtala, Buji, Taura, Funtua, Jakara, Katsina North, Jigawa North.
2019	Public Safety Sensitization	DanKunkuru, dausara, Gayawa, panshekara, Bakori, Safana, YanNika, JanBango, Rahamawa, Kwado, Tambarawa.

Annex G Distribution Network Investments

TABLE 55: DISTRIBUTION NETWORK INVESTMENTS

Network Investments	Unit Of Measurement (No, Lot, KM etc)	Qty	Types	2020	2021	2022	2023	2024	Total Estimated Cost
New Distribution lines: 33kV; 11kV; 0.400kV			P&C	286.85	374.20	595.00	580.00	343.00	13,036,005,604.24
New distribution Transformers: All types	MVA	882	P&C	63.00	63.00	126.00	126.00	63.00	4,988,680,200.00
New injection Transformers: All types	MVA	288	P&C	22.50	75.00	52.00	52.00	77.50	2,965,240,770.00
System optimization projects	Lot	92	P&C	2.00	-	95.00	21.00	19.00	1,422,315,314.25
Loss reduction initiatives	Lot	21	P&C	2.00	5.00	5.00	4.00	4.00	5,668,000,000.00
Distribution lines rehabilitation projects- Emergency repairs (33kV; 11kV; 0.400kV)	KM	5105.6	P&C	1,091.09	1,136.54	951.44	1,018.29	908.22	1,094,352,523.00
Distribution/injection sub-stations rehabilitation projects- Emergency repairs	No.	145	P&C	5.00	35.00	35.00	35.00	35.00	290,000,000.00

Network Investments	Unit Of Measurement (No, Lot, KM etc)	Qty	Types	2020	2021	2022	2023	2024	Total Estimated Cost
Standardization of distribution sub-stations (fencing,earthing, fusing of feeder pillars etc.)	lot	805	P&C	50.00	175.00	180.00	200.00	200.00	229,000,000.00
Procurement and Installation of 33kV Autorecolosures and sectionalizers	No	70	Reliability Distribution Automation	-	10.00	20.00	20.00	20.00	560,000,000.00
Procurement and Installation of 11kV Auto-reclosers and sectionalizers	No	50	Reliability Distribution Automation	10.00	10.00	10.00	10.00	10.00	375,000,000.00
Procurement and Installation of Remote Controlled RMU	No	105	Reliability Distribution Automation	-	-	20.00	35.00	50.00	1,260,000,000.00
Procurement and Installation of Remote-Controlled Load Break Switch	No	90	Reliability Distribution Automation	10.00	20.00	20.00	20.00	20.00	134,185,896.00
Procurement and Installation of Ring Main Units (RMUs)	No	60	Reliability Distribution Automation	-	10.00	10.00	20.00	20.00	46,628,450.00
Construction and implementation of Ring Main Sources for major in Kano and Katsina	Lot	105	Reliability Distribution Automation			20.00	35.00	50.00	379,050,000.00
Installation of localized sub-station SCADA Automation System at 7No. injection s/station	No	7	Reliability Distribution Automation	1.00	1.00	1.00	2.00	2.00	919,251,537.50

Network Investments	Unit Of Measurement (No, Lot, KM etc)	Qty	Types	2020	2021	2022	2023	2024	Total Estimated Cost
Installation of self-powered, relay operated Ring Main Unit at the following 33/11KV unmanned injection substations: Gwaram, Gwarzo, Karaye, Gumel, Garki, Danbatta, Kazaure, Rano, Tudun Wada, Doguwa, Old Mani Rd, Mani Town, Jibia, Musawa.	No	14	Reliability Distribution Automation	-	3.00	3.00	4.00	4.00	70,000,000.00
Installation of Auto Reclosers and sectionalizers on the following lengthy 33KV Feeders: Poly, Kaita, Ajiwa, Musawa, Kazaure, Dutsin Ma, Malumfashi, Dan Dume, Gaya leg, Sumaila, Gezawa, NNPC, Falgore, Law School, Karaye, Kwankwaso, Bagauda, Gumel, Kafin Hausa, Birniwa, Jahun, Birnin Kudu.	No	81	Reliability Distribution Automation	10.00	11.00	20.00	20.00	20.00	405,000,000.00
Improvement of substation earthing on all rocky areas	No	10	Reliability Distribution Automation	1.00	3.00	2.00	2.00	2.00	3,750.00
Installation of Heavy Duty 33KV Isolators and improvent of their earthing	No	100	Reliability Distribution Automation	20.00	20.00	20.00	20.00	20.00	25,000,000.00
Purchase of Filtration Machines for Power Transformers	No	10	Reliability Distribution Automation	-	1.00	1.00	1.00	1.00	100,000,000.00

Network Investments	Unit Of Measurement (No, Lot, KM etc)	Qty	Types	2020	2021	2022	2023	2024	Total Estimated Cost
Purchase of Filtration Machines for Distribution Transformers	No	20	Reliability Distribution Automation	-	5.00	5.00	5.00	5.00	100,000,000.00
Treatment of Transformers identified with PCB poineous chemical. Affected stations Sharada TR1 & TR2, Bukavu TR1, Brisco TR3, Jogana TR1, Kawaji TR1, BuK TR1&TR2, Challawa TR1 & TR2, Mariri TR1, Farm centre TR1&TR2 & Abattoir TR1	No	14	Reliability Distribution Automation	-	2.00	4.00	4.00	4.00	130,000,000.00
11KV Panel (Set)	Set	15	Reliability Distribution Automation	-	5.00	4.00	3.00	3.00	600,000,000.00

Annex H Regulatory Asset Inventory

TABLE 56: SUMMARY STATEMENT OF THE REGULATORY ASSET BASE

	Building	Network Plant & Machinery	Overhead & Underground lines	Furniture, Fittings & Equipment	Computer Equipment	Motor Vehicles	Assets Under Construction	Total
	N'000	N'000	N'000	N'000	N'000	N'000	N'000	N'000
Cost:								
At 1 January 2017	1,413,905	21,181,897	51,141,028	268,309	247,243	1,511,119	409,331	76,172,831
Additions	-	1,756,472	1,041	14,892	58,936	37,200	283,653	2,152,195
Transferred (Note 14.1)	-	25,999	49,913	-	-	-	(75,913)	-
At 31 December 2017	1,413,905	22,964,369	51,191,982	283,201	306,179	1,548,319	617,071	78,325,026
At 1 January 2018	1,413,905	22,964,369	51,191,982	283,201	306,179	1,548,319	617,071	78,325,026
Additions		1,655,650	754,986	13,509	93,631	106,178	288,355	2,912,309
Transferred (Note 14.1)	-	247,983	47,681	-	-	-	(295,664)	-

	Building	Network Plant & Machinery	Overhead & Underground lines	Furniture, Fittings & Equipment	Computer Equipment	Motor Vehicles	Assets Under Construction	Total
	N'000	N'000	N'000	N'000	N'000	N'000	N'000	N'000
At 31 December 2018	1,413,905	24,868,001	51,994,650	296,710	399,810	1,654,497	609,762	81,237,335
Depreciation:								
At 1 January 2017	101,102	4,626,400	7,455,143	39,491	115,268	600,858	-	12,938,261
For the year	35,833	1,301,279	1,323,279	8,657	(1,607)	402,655	-	3,070,096
At 31 December 2017	136,935	5,927,679	8,778,421	48,147	113,661	1,003,513	-	16,008,357
At 1 January 2018	136,935	5,927,679	8,778,421	48,147	113,661	1,003,513	-	16,008,357
For the year	32,437	1,256,109	1,372,347	14,051	66,005	380,560	-	3,121,508
Adjustments								-
At 31 December 2018	169,372	7,183,788	10,150,768	62,198	179,666	1,384,073	-	19,129,865

	Building	Network Plant & Machinery	Overhead & Underground lines	Furniture, Fittings & Equipment	Computer Equipment	Motor Vehicles	Assets Under Construction	Total
	N'000	N'000	N'000	N'000	N'000	N'000	N'000	N'000
Carrying amount:								
At 31 December 2017	**1,276,970**	**17,036,689**	**42,413,561**	**235,054**	**192,518**	**544,806**	**617,071**	**62,316,669**
At 31 December 2018	**1,244,533**	**17,684,213**	**41,843,881**	**234,512**	**220,144**	**270,425**	**609,762**	**62,107,470**
This represents value of completed electricity distribution equipment installations ready and available for use as at year end.								

Annex I Network constraint analysis

The network constraint analysis is discussed in Section 5.

11kV Voltage Level Analysis

The 11kV feeders constraint analysis is presented in Table 57.

TABLE 57: 11KV FEEDERS CONSTRAINT ANALYSIS

11kV Feeders	Capacity MW	Peak Load (MW) 2019	2019 Constrained Feeders	Peak Load (MW) 2024	2024 Constrained Feeders
KOFAR NASSARAWA	5.2	4.06		4.37	
AJASA	5.2	7.32	Constrained	16.22	Constrained
IBRAHIM TAIWO	5.2	4.84		5.58	Constrained
CITY	5.2	4.26		5.72	Constrained
KOFAR NAI'SA	5.2	4.55		4.77	
JAKARA	5.2	5.81	Constrained	12.56	Constrained
KABUGA	5.2	7.15	Constrained	10.21	Constrained
SANI MAI NAGGE	5.2	2.81		3.54	
BELLO DANDAGO	5.2	0.10		0.10	
SAGAGI	5.2	1.65		1.73	
BACHIRAWA	5.2	6.56	Constrained	7.75	Constrained
NOMANSLAND	5.2	3.72		4.02	
FED. SECRETARIATE	5.2	5.34	Constrained	6.07	Constrained
ORTHOPAEDIC	5.2	4.07		4.42	
FANISAU	5.2	6.38	Constrained	7.29	Constrained
KATSINA RD.	5.2	3.24		6.01	Constrained
FAGGE	5.2	4.06		6.35	Constrained
GWAMMAJA	5.2	3.30		6.19	Constrained
SABON GARI	5.2	4.55		6.53	Constrained
ABUJA RD.	5.2	3.35		4.68	

11kV Feeders	Capacity MW	Peak Load (MW) 2019	2019 Constrained Feeders	Peak Load (MW) 2024	2024 Constrained Feeders
H ESTATE	5.2	4.18		5.15	Constrained
NNDC	5.2	3.73		4.03	
TUKUNTAWA	5.2	4.45		5.05	
SHARADA INDUSTRIAL	5.2	4.02		5.07	
INDUSTRIAL PHASE 3	5.2	6.62	Constrained	9.10	Constrained
CHIRANCHI	5.2	5.35	Constrained	5.62	Constrained
DALA FOODS	5.2	2.35		3.19	
KARKASARA	5.2	5.24	Constrained	5.97	Constrained
KUNDILA	5.2	2.73		2.86	
U/UKU	5.2	6.38	Constrained	8.43	Constrained
HOTORO	5.2	3.37		3.54	
HAUSAWA	5.2	2.69		2.83	
SALLARI	5.2	4.71		4.95	
MARHABA	5.2	3.50		3.50	
CERAMICS	5.2	1.67		1.75	
NBC	5.2	2.43		4.08	
ZAWACIKI	5.2	3.61		4.16	
CHALLAWA W/PLANT	5.2	4.82		10.95	Constrained
PANSHEKARA	5.2	8.12	Constrained	22.87	Constrained
TAMBURAWA W/PLANT	5.2	2.63		2.81	
YANLEMO	5.2	3.03		3.18	
MASARAUTA	5.2	3.52		5.61	Constrained
CAMPUS	5.2	0.20		0.20	
TIGA	5.2	1.70		1.70	
AHMADU BELLO	5.2	5.76	Constrained	7.12	Constrained
RACE COURSE	5.2	2.53		2.65	
BADAWA	5.2	3.34		3.40	

11kV Feeders	Capacity MW	Peak Load (MW) 2019	2019 Constrained Feeders	Peak Load (MW) 2024	2024 Constrained Feeders
BANK ROAD	5.2	5.88	Constrained	7.98	Constrained
AUDU BAKO	5.2	2.83		2.97	
MURTALA MUHD	5.2	3.19		4.21	
LAMIDO	5.2	4.26		5.72	Constrained
DR. BALA	5.2	2.94		5.26	Constrained
TARAUNI	5.2	3.33		5.74	Constrained
D/NASIDI	5.2	0.91		0.95	
MAIDUGURI ROAD	5.2	4.03		5.08	
FARAWA	5.2	4.65		7.48	Constrained
TALAMIZ	5.2	2.77		3.13	
TOKARAWA	5.2	0.51		0.53	
TSAMIYA	5.2	3.39		10.45	Constrained
WUDIL TOWN	5.2	0.00		0.00	
KUT	5.2	0.47		0.76	
DAKATA	5.2	3.41		4.58	
YANKABA	5.2	2.83		2.99	
MAIMALARI	5.2	1.88		2.12	
T/WADA	5.2	3.34		3.40	
YUSUF ROAD	5.2	2.70		2.70	
INDEPENDENCE	5.2	3.00		3.00	
GWAGWARWA	5.2	4.45		5.06	
BOMPAI	5.2	2.25		3.10	
KAURA GOJE	5.2	2.42		2.73	
AMINU KANO	5.2	4.87		16.11	Constrained
BICHI TOWN	5.2	0.84		0.90	
RIJIYAR ZAKI	5.2	0.00		0.00	
MAJE	5.2	4.84		5.58	Constrained

11kV Feeders	Capacity MW	Peak Load (MW) 2019	2019 Constrained Feeders	Peak Load (MW) 2024	2024 Constrained Feeders
SHAGARI	5.2	1.21		1.27	
SANI LAMIDO	5.2	1.59		1.71	
LIMAWA	5.2	1.22		1.22	
GARU	5.2	2.65		2.65	
SANI ABACHA WAY	5.2	4.05		7.35	Constrained
5. TAKUR	5.2	0.79		1.59	
NURSING SCHOOL	5.2	3.43		6.08	Constrained
GRA	5.2	6.41	Constrained	6.82	Constrained
LOW COST	5.2	3.03		3.18	
KANO ROAD	5.2	5.89	Constrained	6.19	Constrained
ARMY BARRACKS	5.2	6.57	Constrained	6.89	Constrained
KOFAR MARUSA	5.2	4.87		5.97	Constrained
DAN DAGORO	5.2	2.95		3.09	
HOSPITAL ROAD	5.2	5.23	Constrained	5.39	Constrained
FMC	5.2	5.84	Constrained	24.62	Constrained
DUTSEN SAFE	5.2	4.43		4.58	
INDUSTRIAL	5.2	1.71		4.09	
JABIRI	5.2	4.97		5.61	Constrained
DUTSEN REME	5.2	1.52		1.59	
TOWN	5.2	3.79		5.42	Constrained
NAKOWA	5.2	5.21	Constrained	6.88	Constrained
MAIRUWA	5.2	1.21		1.27	
TEXTILE MILL FUNTUA	5.2	2.27		2.64	
W/WORKS	5.2	1.37		1.45	
BCGA	5.2	1.70		2.12	
GALADIMA	5.2	2.24		4.45	
GWARZO RD.	5.2	0.12		0.13	

11kV Feeders	Capacity MW	Peak Load (MW) 2019	2019 Constrained Feeders	Peak Load (MW) 2024	2024 Constrained Feeders
NEW SITE	5.2	3.06		29.47	Constrained
HASSAN USMAN ROAD	5.2	4.48		4.70	
MAKWALLA	5.2	1.33		1.40	
LAUTAI	5.2	2.05		2.14	
COE GUMEL	5.2	0.00		0.00	
FANTAI	5.2	0.00		0.00	
JAMA ARE	5.2	2.53		2.65	
DAURAMA	5.2	2.53		2.71	
BAYAJIDDA	5.2	3.51		4.06	
KOFAR FADA	5.2	0.63		0.66	
MATAZU	5.2	0.71		0.74	
MAJESTIC	5.2	0.20		0.21	
DAN TUNKU	5.2	1.34		1.52	
KANTI	5.2	1.43		0.00	

33kV Voltage Level Analysis

The 33kV feeders constraint analysis is shown in Table 58.

TABLE 58: 33KV FEEDERS CONSTRAINT ANALYSIS

33kV Feeders	Capacity (MW)	2019 Peak Demand (MW)	2019 Overloading (MW)	2024 Peak Demand (MW)	2024 Overloading (MW)
DANGOTE	20.58	26.00	5.42	26.00	5.42
ANGELS	20.58	20.85	0.27	25.68	5.11
BATA	20.58	18.58		21.78	1.20
ATM	20.58	25.00	4.42	25.00	4.42
SPANISH 1	20.58	20.00		20.00	
SPANISH 2	20.58	20.00		20.00	
ZARIA ROAD	20.58	24.23	3.65	27.61	7.03
CLUB	20.58	24.24	3.66	35.14	14.57
CBN	20.58	28.43	7.85	83.87	63.30
BUK	20.58	22.20	1.62	22.20	1.62
KURNA	20.58	24.00	3.42	29.03	8.45
DAWANAU	20.58	0.30		0.30	
DAN AGUNDI 1	20.58	14.50		18.55	

33kV Feeders	Capacity (MW)	2019 Peak Demand (MW)	2019 Overloading (MW)	2024 Peak Demand (MW)	2024 Overloading (MW)
DAN AGUNDI 2	20.58	12.17		9.46	
RIJIYAR ZAKI	20.58	15.20		15.20	
IDH	20.58	25.24	4.66	32.32	11.74
FLOUR MILLS	20.58	24.99	4.41	39.90	19.33
MTN	20.58	19.42		37.78	17.20
GEZAWA	20.58	9.80		8.86	
GASKIYA	20.58	17.99		24.62	4.04
NNPC	20.58	24.76	4.18	39.07	18.49
WUDIL	20.58	0.00		0.00	
SUMAILA	20.58	7.20		7.20	
BAGAUDA	20.58	17.35		19.19	
LAW SCHOOL	20.58	23.97	3.39	64.16	43.58
KARAYE	20.58	11.60		13.82	
FALGORE	20.58	8.13		10.02	
KWANKWASO	20.58	18.14		18.88	
COCA COLA	20.58	20.60	0.02	20.60	0.02
CHALAWA W/WORKS	20.58	16.05		3.89	

33kV Feeders	Capacity (MW)	2019 Peak Demand (MW)	2019 Overloading (MW)	2024 Peak Demand (MW)	2024 Overloading (MW)
TAMBURAWA W/WORKS	20.58	11.52		10.64	
DR. JAMIL GWAMNA	20.58	0.00		0.00	
HADEJIA	20.58	6.78		8.37	
BIRNIWA	20.58	2.70		2.70	
GUMEL	20.58	7.22		8.44	
KAFIN HAUSA	20.58	8.60		34.93	14.36
BIRNIN KUDU	20.58	14.39		35.69	15.12
JAHUN	20.58	7.23		7.92	
DUTSE	20.58	8.21		10.57	
AJIWA WATER WORKS	20.58	24.78	4.20	32.29	11.72
POWER HOUSE	20.58	25.45	4.88	28.37	7.80
POLYTECHNIC	20.58	11.64		18.60	
KAITA	20.58	13.10		13.10	
DANA SRM	20.58	18.28		26.47	5.89
KOFAR GUGA	20.58	14.63		15.29	
DAURA	20.58	0.00		0.00	
MASHI	20.58	0.00		0.00	

33kV Feeders	Capacity (MW)	2019 Peak Demand (MW)	2019 Overloading (MW)	2024 Peak Demand (MW)	2024 Overloading (MW)
MAI ADUA	20.58	0.00		0.00	
KAZAURE	20.58	10.30		13.91	
AMPRI GLOBAL	20.58	0.00		0.00	
MUSAWA	20.58	11.19		13.39	
DUTSENMA	20.58	14.28		22.86	2.29
MALUMFASHI	20.58	20.37		22.35	1.77
DANDUME	20.58	6.53		7.22	
TEXTILE	20.58	18.20		28.87	8.30

Annex J List of Recent and Ongoing Projects

The list of KEDCO's recent and ongoing projects are seen in Table 59.

TABLE 59: LIST OF RECENT AND ONGOING PROJECTS

	Project Description	Project Type	Quantity	Cost (Naira Mill)	Expected Completion Date (Year)	Upstream Constraints e.g. TCN (Yes/No?)
1	ALI BABA 300KVA,11/0.416KV RELIEF	P&C	1	4,641,153.91	2019	No
2	CHANNEL TV 200KVA,11/0.415KV S/S	P&C	1	6,911,919.00	Aug-19	No
3	Prop. Gen. Usman Farm 200KVA, 33/0.415KV	P&C	1	3,749,373.56	Aug-19	No
4	Proposed Darmanawa Primary 500KVA, 11/0.415KV S/S.	P&C	1	6,500,000.00	September 2019	No
5	Proposed Unguwar Jakada Ring Road 200KVA, 11/0.415KV S/S.	P&C	1	5,850,000.00	September 2019	No
6	Proposed Ja'en Layin Tsakiya 500KVA, 11/0.415KV S/S.	P&C	1	8,750,000.00	September 2019	No
7	Proposed Ahmad Auditor 500KVA, 11/0.415KV S/S.	P&C	1	7,200,000.00	October 2019	No
8	Proposed Reconductoring of Mai Nika 500KVA, 11/0.415KV S/S.	P&C	1	3,500,000.00	September 2019	No
9	Proposed Sarkin Maska 300KVA, 11/0.415KV Relief substation	P&C	1	5,450,000.00	2019	No

	Project Description	Project Type	Quantity	Cost (Naira Mill)	Expected Completion Date (Year)	Upstream Constraints e.g. TCN (Yes/No?)
10	Proposed Wanzamai II 300KVA, 11/0.415KV Relief substation	P&C	1	7,000,000.00	2020	No
11	Proposed Local Govt. Area 300KVA, 11/0.415KV Relief substation	P&C	1	4,500,000.00	2020	No
12	Proposed Unguwar Baki 200KVA, 11/0.415KV Relief substation	P&C	1	3,200,000.00	2020	No
13	Proposed Up-rating of Abdu Juli 200-500KVA, 33/0.415KV substation	P&C	1	5,500,000.00	Dec-19	No
14	Proposed Construction of Briscoe 33KV feeder ex Dakata TS	Loss Reduction	1	12,500,500.00	2020	Yes
15	Proposed Construction of 4No. 33KV feeders ex R/Zakara 2x60MVA, 132/33KV TS	P&C	1	177,390,685.50	2020	Yes
16	Proposed Construction of double circuit of Yankaba and Tokarawa 11KV feeders to separate MD from NMD customers	Loss Reduction	1	60,000,000.00	Oct-19	No
17	Proposed extension of Airport 11KV feeder to Panisau	P&C	1	37,654,344.00	Dec-19	No
18	Proposed reconductoring of 29No. 11KV feeders	Loss Reduction	1	288,717,000.00	2020	No
19	Proposed ceasar Avenue 300KVA, 11/0.415KV Releif S/Station off Zungeru Road Sabon Gari, Kano.	Loss Reduction	1	2,689,137.15	December, 2019	No

	Project Description	Project Type	Quantity	Cost (Naira Mill)	Expected Completion Date (Year)	Upstream Constraints e.g. TCN (Yes/No?)
20	Proposed Gunde 300KVA, 33/0.415KV Relief S/Station at Gayawa Area, Kano.	Loss Reduction	1	3,911,880.51	January, 2020	No
21	Proposed unguwar Dabai behind North west 300KVA, 11/0.415KV Relief S/S at U/Dabai Area, Kano.	Loss Reduction	1	6,688,260.10	March, 2020	No
22	Proposed Kwarawa relief II 300KVA, 33/0.415KV S/S at Rijiyar Zaki.	Loss Reduction	1	6,168,835.17	August, 2020	No
23	Proposed Kwanar Dan Rimi 500KVA, 11/0.415KV Relief Substation at Rijiyar Lemo Area, Kano.	Loss Reduction	1	3,417,700.60	December, 2019	No
24	Proposed Jajira 4 Relief 300KVA, 11/0.415KV S/S at Jajira Road Bachirawa, Kano.	Loss Reduction	1	5,171,574.12	February, 2020	No
25	Proposed Burhana (Gobirawa) 300KVA, 33/0.415KV Relief S/S at Burhana Gobirawa, Kano.	Loss Reduction	1	5,699,185.91	March, 2020	No
26	Proposed Kadawa Mil Tara Masallacin Juma'a 500KVA, 11/0.415KV Relief s/s at Kadawa.	Loss Reduction	1	5,457,953.86	August, 2020	No
27	Proposed Layin Hudun Adu'a Dawanau 500KVA, 11/0.415KV Relief S/S at Kofar Dawanau Area, Kano.	Loss Reduction	1	6,709,955.94	January, 2020	No
28	Proposed Uprating of Mission Road (100-300)KVA,11/0.415KV S/S at Mission Road, Kano.	Loss Reduction	1	1,808,534.26	October, 2019	No

	Project Description	Project Type	Quantity	Cost (Naira Mill)	Expected Completion Date (Year)	Upstream Constraints e.g. TCN (Yes/No?)
29	Proposed Kurna Layin Hajara 500KVA, 11/0.415KV Relief S/S at Kurna Layin Hajara Islamiyya, Kano.	Loss Reduction	1	5,514,352.90	December, 2019	No
30	Proposed Tudun Yola Layin Akaram II 500KVA, 33/0.415KV Relief Substation at Tudun Yala Area, Kano.	Loss Reduction	1	5,788,082.39	January, 2020	No
31	Proposed Dorayi Babba Unguwar Jakada 300KVA, 33/0.415KV Relief Substation at Dorayi Babba Unguwar Jakada Area, Kano.	Loss Reduction	1	8,508,137.25	February, 2020	No
32	Proposed Bachirawa Layin Sararriyar Kuka 500KVA, 11/0.415KV Substation at Bachirawa Layin Sararriyar Kuka Area, Kano.	Loss Reduction	1	5,672,897.74	December, 2019	No
33	Proposed Dorayi Babbba Layin Tower 300KVA, 33/0.415KV Relief Substation OFF BUK New Site Road, Kano.	Loss Reduction	1	5,451,019.38	July,2020	No
34	Proposed Nafi'u mai Arna 300KVA, 33/0.415KV Relief Substation at Dorayi Babba Area,Kano.	Loss Reduction	1	7,664,174.08	October, 2020	No
35	Proposed Replacement of Lemon Tsami 500KVA, 11/0.415KV Substation at Sokoto Road, Kano.	Loss Reduction	1	5,192,250.00	December, 2019	No
36	Proposed Kadawa III 300KVA, 33/0.415KV Relief Substation at Kadawa Danbare Area, Kano.	Loss Reduction	1	4,981,246.40	January, 2020	No

	Project Description	Project Type	Quantity	Cost (Naira Mill)	Expected Completion Date (Year)	Upstream Constraints e.g. TCN (Yes/No?)
37	Proposed KEDCO Chalet HVDS 50KVA, 11/0.415KV Substation at Mundubawa Road, Kano.	Loss Reduction	1	1,018,248.48.	October, 2019	No
38	Proposed Relocation of Existing Dr. Bala 500KVA, 11/0.415KV Substation at Dr. Bala Road, Kano	Loss Reduction	1	458,049.21	October, 2019	No
39	Proposed Rehabilitation of LT Line to Balance over Loaded unit at existing Durumin Zungura 500KVA, 11/0.415KV S/S at layi Masallacin Jalli, Durumin Zungura, Kano.	Loss Reduction	1	1,053,853.39	October, 2019	No
40	Proposed Replacement of Faulty 500KVA, 11/0.415KV S/S.Masallacin Fagge, Kano.	Loss Reduction	1	5,248,600.00	October, 2019	No
41	Proposed Upgrading and Replacement of Faulty 200KVA, 11/0.415KV to 300KVA, 11/0.415KV Zangon Kaya Substatin at Mile 9 Area, Kano.	Loss Reduction	1	4,098,600.00	October, 2019	No
42	Proposed Replacement of Faulty 100KVA, 33/0.415KV Substation at Emir's Palace Nassarawa GRA, Audu Bako Way, Kano	Loss Reduction	1	1,380,000.00	October, 2019	No
43	Proposed Upgrading of Tudun Yola Layin Bare-Bari 300KVA, 33/0.415KV to 500KVA, 33/0.415KV Substation at Tudun Yola Area, Kano.	Loss Reduction	1	3,356,923.09	October, 2019	No
44	Proposed Rehabilitation of LT Network on existing Haladu Old 500KVA, 11/0.415KV	Loss Reduction	1	673,988.37	December, 2019	No

	Project Description	Project Type	Quantity	Cost (Naira Mill)	Expected Completion Date (Year)	Upstream Constraints e.g. TCN (Yes/No?)
	S/S at Rijiyar Zaki, Layin Haladu Nepa, Rijiyar Zaki Area, Kano.					
45	Proposed Engr. Rabi'u 300KVA, 33/0.415KV Relief Substation at Tudun Yola 'C' Area, Kano.	Loss Reduction	1	7,167,153.89	March, 2020	No
46	Proposed Replacement of Aminuddeen one 500KVA, 11/0.415KV Substation at Suleiman Crescent Road, Kano.	Loss Reduction	1	4,612,443.00	October, 2019	No
47	Proposed Replacement of Samsom Roger 300KVA, 11/0.415KV Substation at Farm Centre Area, Kano.	Loss Reduction	1	4,042,250.00	October, 2019	No
48	Proposed Uprating and Replacement of Farin Masallachi 300KVA, 11/0.415KV to 500KVA, 11/0.415KV S/S at Layin Farin Masallachi, Bachirawa Area, Kano.	Loss Reduction	1	4,898,481.76	October, 2019	No
49	Proposed Rehabilitation of Lamido 11KV Feeder Ex-Club Injection Substation.	Loss Reduction	1	3,209,305.00	April, 2020	No
50	Proposed Rehabilitation of 11KV Panisau Feeder Ex-Bukavu Injection Substation	Loss Reduction	1	4,749,169.11	February, 2020	No
51	Proposed Rehabilitation of 11KV Sabon Gari Feeder Ex-IDH Injection Substation.	Loss Reduction	1	2,504,673.22	May, 2020	No
52	Proposed Rehabilitation of 11KV Audu Bako Feeder Ex-Club Injection Substation.	Loss Reduction	1	1,221,990.00	June, 2020	No
53	Proposed Rehabilitation of 11KV M/Mohd Feeder Ex-Club Injection Substation.	Loss Reduction	1	3,768,112.50	August, 2020	No

	Project Description	Project Type	Quantity	Cost (Naira Mill)	Expected Completion Date (Year)	Upstream Constraints e.g. TCN (Yes/No?)
54	Proposed Rehabilitation of 11KV Ibrahim Taiwo Feeder Ex-Dan'agundi Injection Substation.	Loss Reduction	1	2,235,028.18	July,2020	No
55	Proposed Rehabilitation of 11KV Nomansland Feeder Ex-Bokavu Injection Substation.	Loss Reduction	1	3,721,344.86	August, 2020	No
56	Proposed Rehabilitation of 11KV Abuja Feeder Ex-IDH Injection Substation.	Loss Reduction	1	1,920,270.00	March, 2020	No
57	Proposed Rehabilitation of 11KV Dr. Bala Feeder Ex-Farm Center Injection Substation.	Loss Reduction	1	1,265,632.50	October, 2020	No
58	Proposed Rehabilitation of 11KV City Feeder Ex-Dan'agundi Injection Substation.	Loss Reduction	1	2,463,135.08	February, 2020	No
59	Proposed Rehabilitation of 33KV CBN Feeder Ex-Dan'agundi Transmission Station.	Loss Reduction	1	305,497.50	February, 2020	No
60	Proposed Rehabilitation of 11KV Fed Sec Feeder Ex-Bokavu Injection Substation.	Loss Reduction	1	547,605.77	February, 2020	No
61	Proposed Rehabilitation of 11KV Bompai Ex-Briscoe Injection Substation.	Loss Reduction	1	7,550,314.45	March, 2020	No
62	Proposed Rehabilitation of 11KV K/Na'isa Ex-Dan'agundi Injection Substation.	Loss Reduction	1	3,424,705.82	April, 2020	No
63	Proposed Rehabilitation of 11KV Kabuga Ex-Goron Dutse Injection Substation.	Loss Reduction	1	8,857,313.16	March, 2020	No

	Project Description	Project Type	Quantity	Cost (Naira Mill)	Expected Completion Date (Year)	Upstream Constraints e.g. TCN (Yes/No?)
64	Proposed Rehabilitation of 11KV Airport Road Ex-PRP Injection Substation.	Loss Reduction	1	1,454,739.36	January, 2020	No
65	Proposed Rehabilitation of 11KV Tudun Wada Ex-Briscoe Injection Substation.	Loss Reduction	1	3,706,317.24	January, 2020	No
66	Proposed Rehabilitation of 33KV Rijiyar Zaki Ex-Kumbotso Transmission Station.	Loss Reduction	1	7,081,470.00	February, 2020	No
67	Proposed Replacement and Upgrading of Sabon Garin Gadan 200KVA, 11/0.415KV to 300KVA, 11/0.415KV Substation at Sabon Garin Gadon, Kano.	Loss Reduction	1	4,036,648.78	October, 2019	No
68	Proposed Replacement of Makarantar Goron Dutse 300KVA, 11/0.415KV Substation at near Goron Dutse Primary School, Kano.	Loss Reduction	1	3,467,250.00	November, 2019	No
69	Proposed Kasuwar Murtala Gama 300KVA, 11/0.415KV Relief Substation at Gama Area, Kano.	Loss Reduction	1	8,376,398.00	February, 2020	No
70	Proposed Deloading of Overloaded Unit at Existing Hauwa Bala 500KVA, 33/0.415KV Relie Substation at Kwarawa Rijiyar Zaki Area, Kano	Loss Reduction	1	735,609.96	December, 2019	No
71	Proposed Garba Izala 300KVA, 33/0.415KV Relief Substationn at Layin Garba Izala, Rijiyar Zaki Area, Kano.	Loss Reduction	1	3,476,057.96	March, 2020	No
72	Proposed Replacement of Faulty 500KVA 11/0.415KV Badawa Ramin Gwado	Loss Reduction	1	6,398,600.00	October, 2019	No

	Project Description	Project Type	Quantity	Cost (Naira Mill)	Expected Completion Date (Year)	Upstream Constraints e.g. TCN (Yes/No?)
	Gwada Substation at Badawa Road, Badawa Area, Kano.					
73	Proposed Rehabilitation of LT Network on Existing Yandutse 500KVA, 11/0.415KV Substation at Yandutse Road, Kano.	Loss Reduction	1	232,760.00	October, 2019	No
74	Proposed Rehabilitation of LT Network for Existing Tafida Old 500KVA, 33/0.415KV Substation at 2nd Gate Janbulo, Kano.	Loss Reduction	1	1,504,481.49	November, 2019	No
75	Proposed Filin Tudun Wada 500KVA, 11/0.415KV Relief Substation at Tudun Wada Area, Kano	Loss Reduction	1	7,651,208.43	October, 2019	No

Annex K List of MDAs

KEDCO's MDA customer list will be submitted as separate document.