



ABSTRACT

**This is
Performance
Improvement
Plan for 2020-
2024 as
advised by
NERC**

**PERFORMANCE
IMPROVEMENT
PLAN**

JOS ELECTRICITY DISTRIBUTION PLC

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ACRONYMS

Acronym	Definition
AMI	Advance Metering Infrastructure
AMR	Automatic Meter Reading
ATC&C	Aggregate Technical, Commercial and Collection Loss
BPE	Bureau of Public Enterprises
CAPEX	Capital Expenditure
CMS	Customer Management System
ERP	Enterprise Resource Planning
IRMS	Incidents Recording & Management System
IT	Information Technology
GIS	Geographical Information System
GENCOs	Generating Companies
MAP	Meter Asset Provider
MDA	Ministries, Departments and Agencies
MYTO	Multi-Year Tariff Order
NESI	Nigerian Electricity Supply Industry
NERC	Nigerian Electricity Regulatory Commission
QMS	Queue Management System
PIP	Performance Improvement Plan
PSRP	Power Sector Recovery Program
REA	Rural Electrification Agency
TCN	Transmission Company of Nigeria
SCADA	Supervisory Control and Data Acquisition System
WAET	War Against Electricity Theft
WMS	Works Management System

1. One Page Fact Sheet for Stakeholders

Aura Energy Ltd with Aydem Energy FZE, UAE as the technical partner acquired 60% of JED Plc and took over the management on 1 November 2013. The other shareholders are Bureau of Public Enterprises and Ministry of Finance Incorporated owning 32% and 8% respectively.

Our strategic goal is to energize lives with pride in the four states of Benue, Bauchi, Gombe and Plateau where we cover. We currently have 2,699 permanent staff serving 486,967 customers connected to 6,845.9 km² 33KV route length and 1,538.2 km² 11KV route length feeders and 12,534 0.415KV route length lines.

We plan to significantly rehabilitate the network and construct new feeders to enhance reliability of supply through network flexibility programs, which will reduce our level of interruption by 75% in 2024. This reduction will translate into 80% of our feeders with high affordability to enjoy 24/7 uninterrupted power supply through end to end network metering and 100% customer metering via the MAP program. In addition, our focus is on proactive maintenance as well as rapid response program for corrective maintenance to reduce the number of minutes the customer is out of supply due to faults on the network.

We will also carry out massive business sustainability campaign which includes upgrade of our physical customer care centers and leverage on technology to enhance our customers' service experiences to the segments that crave for online real time services. Corporate social responsibility for low income areas so as to leave a positive environmental footprint to the society we serve. We also understand that while CSR will help reduce the vandalism, we need to improve on our existing security architecture to forestall any breakdown of law and order and protect the assets that serve our customers for reduction in interruption as planned and reduce the level of environmental pollution to global standard.

The estimated cost of the program upgrade is quantified in 3 different scenarios. The base case, scenario 2 has CAPEX cost of ₦35 billion and OPEX of ₦72.3 billion and intend to reduce the ATC&C loss to 27.1% in 2024, while the optimistic, scenario 3 will cost ₦60.3 billion in CAPEX and ₦85 billion in OPEX and reduce the loss to 23.1% in 2024. This will increase the cost reflective to ₦91.72 and ₦93.83 for scenario 2 and 3 respectively.

2. About JED Plc

Jos Electricity Distribution Plc (JED Plc) whose headquarters is situated in Jos Plateau State, is one of the 11 successor distribution companies of the unbundled government owned power utility, Power Holding Company of Nigeria Plc (PHCN). JED Plc is responsible for distribution and retail services in the four state namely Plateau, Bauchi, Benue and Gombe States covering 132,859km². We operate through 8 regional offices linked to the 8 TCN stations within our franchise states. In a bid to serve our customers better, we further decentralized our operations into 30 area offices and 147 feeder offices

Figure 1: JEDP Franchise Area Map



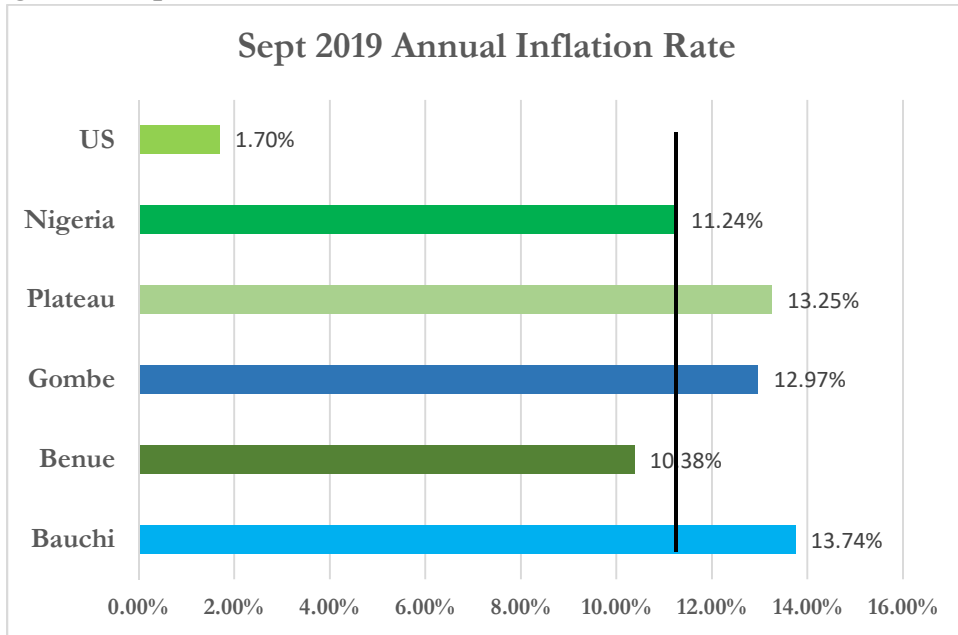
Table 1: Key Commercial Data

State	Population ¹	Land Mass	Installed Capacity	12 Months Energy Delivered
	Numbers	KM ²	MVA	MWh
Bauchi	6,997,314	49,119	391.51	195,142.15
Benue	6,096,869	34,059	607.45	360,890.43
Gombe	3,472,223	18,768	329.08	250,460.72
Plateau	4,433,501	30,913	419.05	421,412.81
	20,999,907	132,859	1,747.09	1,227,906

1. Estimated from the NBS statistic

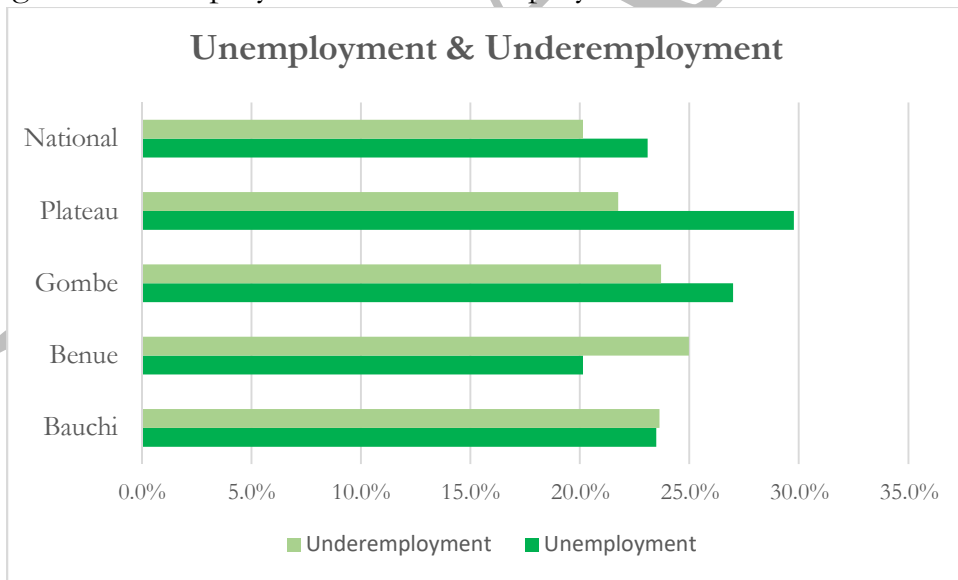
2.1 Key Macro-economic Variables

Figure 2: September 2019 Annual Inflation



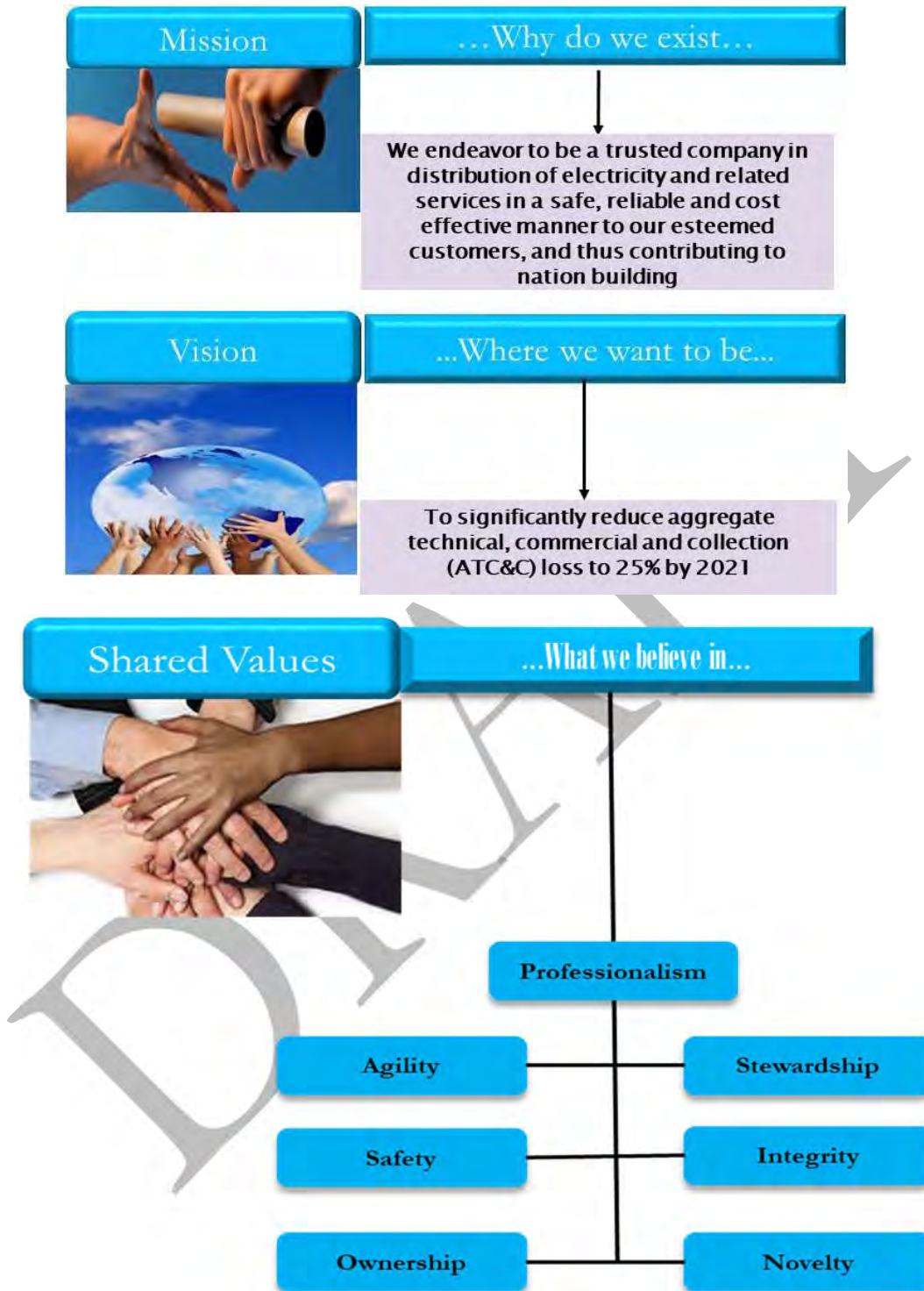
Source: NBS, Derived (CPI) September 2019

Figure 3: Unemployment & Underemployment Rate



Source: NBS, Q3:2018

Figure 4: Mission, Vision and Share Values



The performance of the organization has always been the most important criteria for the management. In order to focus all our activities to achieve the performance target as per privatization program, we revised the Vision & Mission statements. The

reduction in ATC&C loss will help improve value to all our stakeholders which will contribute to nation building.

In achieving the mission and vision, the culture within the company has a significant input thus we created shared values with Acronym “PASSION”, Professionalism, Agility, Stewardship, Safety, Integrity, Ownership and Novelty. The entrenchment of this new paradigm will help in achieving our strategic goal which is “*Energizing lives with pride*”. To achieve this, our critical success factors are Safety, Reliability, Cost Effectiveness and Loss Reduction. We will leverage on process reengineering, people management and technology. Cost effectiveness is key to achieving our strategic goal as it will reduce in the long run the end user tariff which has been the main aim of the privatization program.

2.2 Business overview

The core investor group bided for JED PLC on the basis of loss reduction trajectory. The successor government owned utility did not have data to support the baseline ATC&C loss thus, BPE assumed the baseline ATC&C loss to be 40% and stated that upon takeover, the loss will be verified and factored into the MYTO model. In 2014, followed NERC’s approved guidelines to calculate the baseline loss as 60.6%. However, the commission only approved 58% as the baseline loss. Subsequently, tariff has not been cost reflective which mitigated the performances of the Disco, the events that have occurred in the previous tariff period that stalled the cost progress of the industry includes:

- Non-funding of the deficit in the MYTO 2012 by government which the investors used in formulating the loss reduction plan.
- Removal of collection loss for MDA in the baseline loss in MYTO 2015, on the assumption that government will ensure the settlement of MDA debts. As at August 2019, the MDAs debt is on the increase and no clarity on the settlement.
- Removal of collection loss in March 2015, which reverses the tariff initially approved in January 2015.
- The collection loss was restored in February 2016 tariff but without commensurate increase in tariff
- The generation cost rose 50% from ₦12.28/KWh to ₦18.48/KWh
- The freezing of tariff from January 2018 which has increased the shortfall.

Despite the industry risks as highlighted above, which have increased the leverage in the Disco’s book therefore limiting fund raising from both debt and equity investors,

the company has achieved some milestones that have impacted on the business operating environment.

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3. Prior Tariff Period Initiatives & Results

Financial Performance

We have increased our annual cash generation based from ₦9 billion (2014) to ₦14.5 billion (2018) during the tariff period. During the tariff period our upstream market remittances has increased from an average ₦308 million per month in 2014 to ₦800 million per month in 2019.

Energy Management

The energy management is an important exercise for satisfaction of our customers. There are customers who require more energy and have capacity to pay whereas there are customers whose energy requirement and paying capacity is less. We carried out community engagement and also analyzed the energy consumption; revenue collections based on historical data available with us and accordingly classified our feeders into four classes A to D on the basis of appetite for energy, considering willingness and capacity to pay for the energy consumed. Class A feeders get energy within 20 to 24 hours per day, Class B gets 16 to 20 hours, Class C get 10 to 16 hours while Class D gets less than 10 hours daily.

Prepaid metering is seen as a pull model where energy vended is the demand for the energy by customers; hence increase in supply to the feeder to meet their demand. Postpaid is a push model where energy is consumed and customers will be required to settle for the credit owed. Feeders with significant metering qualify for Class A, and some feeders like Rayfield, Liberty, Ibrahim Taiwo in Plateau State enjoy 24 hours supply. We also have Tunfure, Shongo in Gombe, Waterworks in Bauchi, NNPC in Makurdi which enjoy the same level of availability.

We restructured the dispatch operations of the business to be more commercially oriented, with continuous capacity building the concept of effective service delivery and ATC&C loss reduction. To drive down the culture change initiatives, we have renamed the dispatch operations to energy management and the “Dispatch Officers” are now called “Energy Trader”. This changed their thinking to be commercially and technically oriented. The effectiveness of the approach is seen in the loss reduction and increase cash generation from the class A and B feeders accordingly.

Unified Vending and Billing System

At takeover, we met Unister metering system that is not STS compliant and two different STS compliant system that were also operating separately in different locations. We have unified all the system into a single STS compliant system that is real time online where customers can vend using any channel of their choice, presently our channels for payment collection are Website, Point of Sale (POS), Automatic Teller Machine (ATM) and our cashiers in over 100 JED Plc offices. We inherited a NEBSA billing system that is also defragmented, in various locations but have deployed a new system that is built on Microsoft Cloud Based Azure. These two systems have greatly improved our customer service experience and enhanced customer satisfaction.

Metering

We inherited 329,858 customers out of which below 5% have functional meters. Over the past few years, we have successfully metered 89,817 of our customers, this represents 35% of our target. Although, we encountered some resistances which slowed the pace of metering, we were able to work together to resolve the conflict that arose from the metering process.

With the wide metering gap, we use estimated billing methodology in line with the regulations. We deployed statistical meters to 1,210 distribution substations to read the energy that is consumed by customers through the DT and use the energy reading for their billing. This methodology has improved our billing efficiency and reduced complaints of overbilling significantly.

For proper load analysis, energy accounting and loss reduction plan, we have deployed AMR software where we can monitor our meters functionality online. We have 8,225 meters that we monitor online for proactive energy management and loss reduction.

Meter Asset Provider Scheme

The metering gap is huge with 110,000 of our customers metered, 20% of total customers. We appreciate the regulators for bringing Meter Asset Provider (MAP) scheme for bridging the metering gap across the nation. We enthusiastically participated in above MAP scheme, completed procurement process in line with the guidelines of the regulators and were first amongst the Disco to obtain the approval of MAP by the regulators. We have followed the MAP process, with the launch of the process to take effect in the month of October, 2019. We will aggressively pursue this scheme in bridging the metering gap. Because of the importance of metering, we are responsible for pre-installation and post-installation inspection to ensure effective commercial and

collection loss reduction. In addition, our IT team has developed an integrated MAP application for ease of project management. We are ready for the successful launch of the MAP.

Customer Enumeration and Asset Mapping

We inherited 329,858 customers numbers as against 382,140 as assumed in the MYTO. As the accuracy and integrity of our customer database is the foundation for revenue generation and loss reduction, we are enumerating our customers. So far, we have increased the numbers to 486,701. We are encountering challenges in some areas that are hostile, and declared unsafe which had not made us to complete the project in good time. This project has increased our metering gap with over 170,000 new customers as well those requesting for separation. We have also successfully completed the mapping of our assets using the GIS software. 91% of the assets have also been successfully mapped and 15% tagged.

3.1 Network Rehabilitation and Expansion

1. Installation of 11KV ABB Control panels at West of Mines 2X15MVA, Bukuru 2X15MVA, BSU 1X7.5MVA, Doma 1X8.9MVA and Azare Main 1X7.5MVA Injection Substations, to replace obsolete and faulty ones at the locations.

The replacements were aimed at ensuring improved service delivery and customer satisfaction, as faults due to obsolete and faulty panels were eliminated. Also, the new Control panels provided the necessary protections for the 11KV feeders, power transformers and other substation equipment, in addition to eliminating risks of electrocutions.

2. Installation of Transformer Control Panels at Makeri 1X15MVA, BSU 1X7.5MVA, Azare Main 1X7.5MVA and Doma 1X8.9MVA Injection Substations, to provide primary protections and controls for the power transformers.

The aims were to improve service delivery to our esteemed customers and effective protections for the power transformers and other substation equipment.

3. Installation of Energy Analyzers in 100 No 11KV feeders across JED PLC, for energy accounting and improvement in billing and revenue.

4. Construction of new 33KV Feeder (BCC LINE 2) from Yandev Transmission Station, to meet projected power demand of Dangote Cement Factory and also enhances network flexibility.
5. Construction of new 11KV Federal Low cost feeder, for improved power supply availability and stability, as well as reduction of technical losses.
6. Construction of new 33KV Secretariat line to feed to 2No 15MVA, 33/11KV Power transformers at Anglo-Jos Injection substation, for evacuation of power from the newly commissioned 2No 60MVA,132/33KV Makeri Transmission Station.
7. Repairs of failed 2 No 7.5MVA,33/11KV at Tashan Dukku, Gombe and Games Village, Bauchi, Injection substations. Also, repairs of failed 2.5MVA, 33/11KV transformer at Gombe State University.
8. Construction of new 11KV Polo feeder from West of Mines Injection substation Jos, for improvement in service delivery, customer satisfaction, revenue generation and network flexibility.
9. Construction of 11KV line to divert high profile Distribution transformers from Tudun Wada feeder to Ibrahim Taiwo feeder in Jos, to increase revenue generation, customer satisfaction, as well as create network flexibility.
10. Construction of 11KV line to divert high profile Distribution transformers from Murtala Mohammed feeder to Dilimi feeder in Jos, to increase revenue generation, customer satisfaction, as well as create network flexibility.
11. Classification of 33KV and 11KV feeders for effective energy management, improvement in revenue generation, customer satisfaction and reduction of ATC&C losses.
12. Construction of 11KV line to Bingham University Teaching University Jos, for improvement in revenue generation and also creates network flexibility between 11KV Polo and Ibrahim Taiwo feeders in Jos.
13. Installation of 15MVA 33/11KV power transformer at West of Mines Injection substation Jos.

Health & Safety

Delivering energy safely is one of our critical success factors, we carry out the following to enshrine the “Zero Accident” culture:

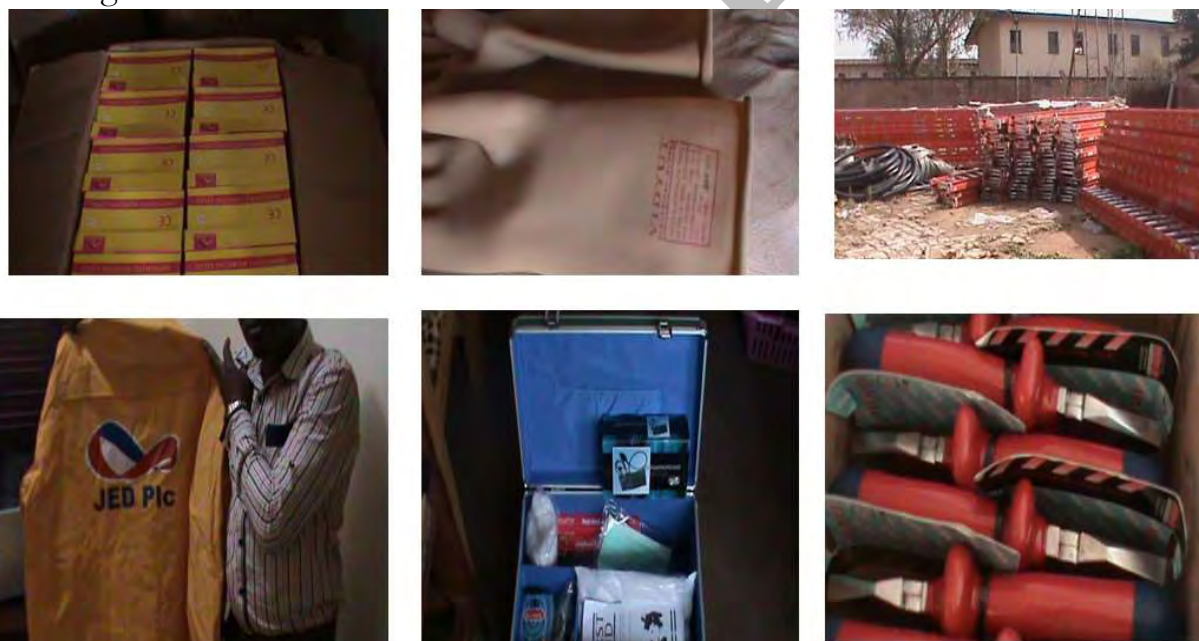
1. **In-house Monthly Safety Training:** The Training is held every last Thursday of the month from 1600hrs to 1700hrs. Topics presented as planned for the year and updated based on gaps identified at the various regional offices simultaneously.

2. **Safety Call (Staff and Public):** To further enhance safety, we carry out random phone calls to staff discussing their planned activities and the safety procedures to follow to prevent accident. If there are no work planned during the call, general safety is discussed. For the public or customers, we use stratified random sampling to pick their contacts from our data base and make calls to them to educate them on the importance of observing safety, general electrical home safety tips.
3. **Induction of Network Engineers/Area Managers and others as Safety Champions:** we use our managers as our safety champions for optimum human resource management. These safety champions have been trained to enshrine our culture of ensuring “Zero accident”.
4. **Monthly Community/Schools awareness campaign:** Communities and school students are engage to enlighten them on the dangers associate with electricity and how to avoid its hazards. We banners, flyers to educate the communities as well.
5. **Weekly Radio program for awareness:**
Our weekly radio programs within our franchise state have been a good means of communicating with our stakeholders. We discussed current related issues which include MAP, tariff impact, vandalism of network assets, billing, collection channels and safety procedural process communities and neighborhoods need to be aware of.
6. **Safety Pledge:** We developed a safety pledge and encourage teams to recite it at the start of their operational tasks every day. At any senior management meetings or gatherings, the pledge is also recited before the commencement of the program. The safety pledge reads “I am fully aware that I am responsible for my safety at workplace. I pledge to practice Safety and Integrity at all times and all places, for the sake of myself, my family, my colleagues and ultimately for my nation. So help me God”. This culture is building up and had helped in reducing accidents.
7. **Permit to Work:** This is spelled out in the recently developed Distribution System Operation Manual, and it is aimed at ensuring safety of personnel working the network
Provision of Safety equipment/Materials: we have purchased several safety equipment and materials for use by our technical operations staff. The table below shows the items purchased till date

Table 2: List of Safety Items Purchased till date

S/NO	SAFETY MATERIAL	2015	2016	2017	2018	2019	TOTAL
1	Protecting Helmet		613	105	1,562		2,280
2	Hand Gloves		634		672		1,306
3	Rain Coat	400	217		1,025	604	2,246
4	Grounding Leads				30		30
5	Rain Coat		120		629	1,000	1,749
6	Safety Belt	50	745		634		1,429
7	Safety Boot	400	793		1,667		2,860
8	Station Guaranty	250			300		550
9	Customized JED Overall		231		665	90	986
10	Protection Guaranty				300		300
11	Jed Tag				150		150

Figure 5: PPEs for Staff





For adequacy of emergency response, we have put the understated in place:

1. **Regular Maintenance of Firefighting Equipment:** This involves the proper placement of fire extinguishers at all working places companywide (ISS, Area Offices, Regional offices and HQ) including the company vehicles both official and personal vehicles that operate in and within the company premises to ensure safety compliance and for emergency response as well.
2. **Provision of First Aid Kits:** Provision of First aid boxes is done to ensure easy access for all employees on emergency response. First Aid training and replenishment are done periodically to prepare for any emergency

Figure 6: Numbers of Accidents



The impact of our Zero Safety Culture campaign is been felt in the last one year

War against Electricity Theft (WAET)

We have made a collaborative effort with the security personnel and vigilante group in launching and implementing war against electricity theft. We have achieved some successes with communities that are difficult to penetrate for our staff initially. The increasing awareness is however, slowed down by insufficient logistics.

Customer Relationship Management

We have re-engineered our processes to reduce the time taken resolving customer complaints. JED PLC is ranked 4 of 11 in speed to resolving customer complaints by the regulator, NERC. We have expanded our channels of communication into the social media, direct customer care hotlines. WhatsApp group, 24/7 Call lines (07069403531, 09039393818), active email address (customercare@jedplc.com), referral, Site survey and KYC forms. Furthermore, our customer care agents now are customer centric oriented with increasing knowledge of the industry and macro-economic earned through focused capacity building initiatives.

3.2 Information Technology

Technology is a leverage for us in achieving our strategic goals. The right mix of effective people with efficient processes that is automated is a scalable leverage for JED PLC. In the past tariff period, apart from the unified vending and billing system initially mentioned, our IT team have developed the following systems:

- **The Employee Management System (EMS):** this has brought a level of cohesion and order to the human resources processes, and has allowed effective manpower planning and efficiency and attending to employee-related issues such as leave and compensation management.
- **The in-house payroll system:** built to consolidate a number of offline processes and has allowed correctness and efficiency in computing staff monthly payroll.
- **The deployment of SAGE X3:** an enterprise resource planning (ERP) application has introduced seamless accounting and procurement as well as inventory management processes with greater oversight of these functions.
- **The IT Incident Tracker:** it enables the quick resolution of technical support tickets, and has enhanced productivity of employees due to shortened technical support response time.
- **The Utility vending System (UVS) for prepaid developed for JED Plc:** has enabled the company to reduce the investments and recurring costs of servicing

vendor systems, while also reducing commissions and support fees paid to vendors. This has, in addition to allowing greater control of revenue systems, freed up some much-needed funds to allocate to support other critical infrastructure.

- **The in-house MAP application interlinked with the MAP partner's systems:** allows for a seamless meter acquisition experience for customers. The flexibility offered by owning the system also opens broad ranges of adapting the meter acquisition process to a number of channels, such as online, via mobile applications, and so on.
- **Usage of Cloud Servers for efficient cost and risk based management:** we now use cloud servers with the latest technology. This has significantly cut down our cost of maintaining physical servers and creation of disaster recovery plan. The control risk of physical servers has also been managed.
- **Development of website:** we now have domain name www.jeplc.com which was most recently upgraded with better focus to serve our esteemed customers and other stakeholders.

3.3 Human Resource Management

The third of the three leverage of our strategic goal is our people. We inherited a culture that is bureaucratic, slow to customer service, a significant amount of skills gap. We have however, been able to improve the staff morale, confidence through consistent learning and development, talent management and effective employee relations.

The culture we met was full of slacks in character, attitude towards work, lack of capacity to take initiatives without been directed. We understood these at the preliminary stage of the tariff period and commenced the capacity building process geared towards entrenching our core values “**PASSION**”. So far we have trained all the employees of the company at least once annually. Our training program includes internal, external and online training. Our training hours per employee in a month is averaging 4 hours. This has impacted on the attitude and character of the employees, and those who were still caught in the act that negates our core values have been replaced with better ones.

In addition, the company has signed condition of service with the labor unions viz. Nigeria Union of Electricity Employees (NUEE) and Senior Staff Association of Electricity Employees of Nigeria (SSAEEN). This step has enhanced employees’

confidence and morale in the work place and has improved the productivity of the work force.

We have developed performance management system, which we use in appraising our staff. We particularly focus our attention on the field operations staff that interfaces with our customers. These has helped increase our customer responses from 110,466 with ₦442.5 million cash payment in April 2018 to 173,372 with ₦630.2 million in August 2019 for our retail segment.

We did introduce exit interview and documentation process that helps to have insight to the reason for the staff voluntarily leaving the organization. The feedback has been very useful in our culture change management process

3.4 Corporate Social Responsibility

Table 3: List of CSR events

Date	Project	Objective
16/01/2019	Immaculate Sec. Sch. Shendam Excursion and donation of exercise books	1. Help create awareness on use of electricity 2. Donation of learning materials to school
11/7/2018	Donation of learning materials at Fagge Pri. Sch. and gov day sec. sch. Deba	1. Enhance relationship with our host community 2. disseminate information about our activity
13/05/2019	Electrical Safety lecture St. Theresa girls college Jos	1. To create awareness on safety of lives and property 2. To contribute on social wellbeing of pupils
9/9/2019	Donation of Security accessories to Vigilante Association of Nigeria- Jos North	To support security of Host Communities and JED Plc
4/10/2019	Tivid Orphanage Home North Bank Makurdi	To support Orphans and less privileged.

Figure 7: CSR events



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The impact of our community engagements have yielded results in apprehending vandals who are handed over to security personnel. In collaboration with our legal team, we have convicted a vandal with 10 years' imprisonment.

4. Current State of Infrastructure

4.1 Metering Infrastructure

Table 4: Metering Infrastructure Status

	<i>Metered</i>	<i>Unmetered</i>
<i>33KV Feeders (TCN)</i>	45	0
<i>33KV Feeders (Check Meter)</i>	-	45
<i>11KV Feeder:</i>		
<i>Energy Analyzers</i>	100	0
<i>Statistical Meters:</i>		145
<i>Incoming (Manned)</i>	0	99
<i>Incoming (11KV HT Energy Metering Panel)</i>		38
<i>Outgoing</i>	0	107
<i>Public Distribution Substation</i>	1,210	4,904
<i>No of Customers:</i>		
<i>MD (Prepaid)</i>	1,414	0
<i>MD (Postpaid)</i>	858	0
<i>Non-MD (Prepaid)</i>	102,839	377,645
<i>Non-MD (Postpaid)</i>	6,217	0

For energy accounting we do not have check meters at the TCN stations, we have situations within the tariff period where the TCN meters required recalibration and we were initially billed, but trend analysis was used to detect the challenge.

We also intend to install meters at the incoming side of our power transformer so as to know the level of line losses on the 33KV from time to time.

Our plan is to focus on metering of the DSS at the urban and semi-urban, and will use any model of franchising which include prepaid DT metering and counter postpaid meter for individual customers at the rural, non-manageable area

4.2 Network assets

We are in the business of distributing energy to customers. Network assets are the core infrastructure used in delivering energy to the customers' premises. The table below showed a summary of our current level of infrastructure.

Table 5: Network Infrastructure Status

	Unit	Quantity	Unit	Capacity
33 KV Feeders:				
Overhead	Numbers	45	Km	6,854.9
Underground	Numbers		Km	
Injection Substation:				
Manned	Numbers	43		
Unmanned	Numbers	44		
Power Transformers:(33/11KVA)				
Manned	Numbers	56	MVA	601.4
Unmanned	Numbers	39	MVA	66.7
11KV Feeders:				
Overhead	Numbers	145	Km	1,538.2
Underground			Km	
Distribution Substation:				
33/0.415KV	Numbers	3,148	MVA	755.4
11/0.415KV	Numbers	4,102	MVA	1,017.3
33KV Outdoor Breaker	Numbers	53		
11KV Indoor Breaker	Numbers	193		

The table below shows the route length of our feeders. The feeders with longer route lengths are old, dilapidated networks which the company inherited at privatization. Only 38% of our current 33KV networks are within 40km, the standard network. Also, some of the feeders span across other States and Discos in the country.

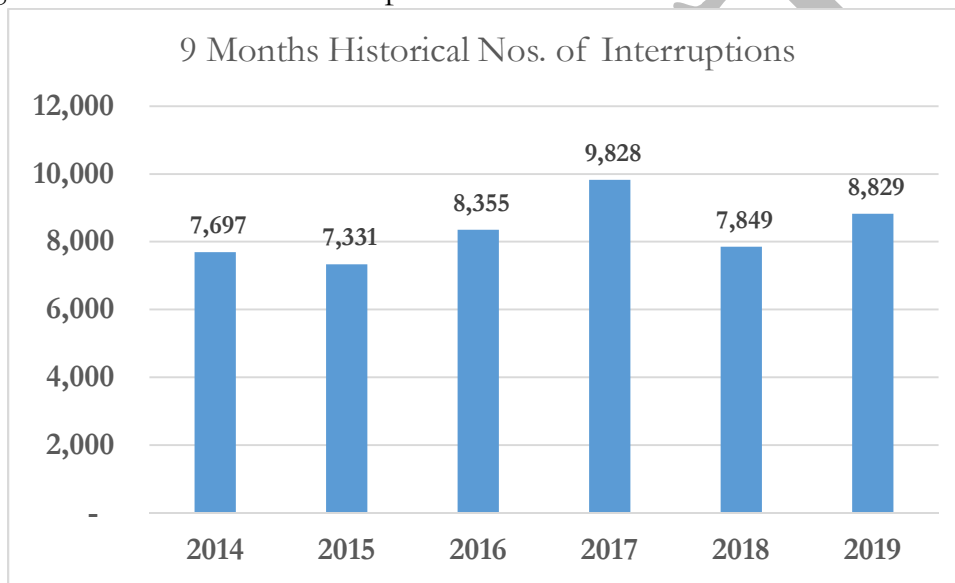
Table 6: Ranges of Network Infrastructure

33KV Feeders								
KMs Range	0-40	40-80	80-120	120-160	200-240	240-280	320-360	Total
Count	17	4	7	2	2	3	10	45
11KV Feeders								
KMs Range	0-10	10-20	20-30	30-40	40-50	50-60	80-90	
Count	92	28	17	4	2	1	1	145
Power Transformer								
MVA Range	0-2.5	2.5-5	5-7.5	7.5-10	12.5-15			
Count	10	25	4	36	20			95
Numbers of DTs								

KVA	<50	100	200	200-500	500	>500		
33/0.415KV	286	349	1,438	645	364	6		3,088
11/0.415KV	1,130	456	716	798	889	34		4,023
Capacity								
	<50	100	200	200-500	500	>500		
33/0.415KV	14,270	34,900	287,600	193,590	182,000	4,530		716,890
11/0.415KV	54,400	45,600	143,160	239,950	444,500	26,140		953,750

The impact of the long route is felt in the number of Interruptions shown in the table below

Figure 8: Numbers of Interruptions



Note: 9 months is used for relative analysis because we only have data for 9 months in 2019

	2014	2015	2016	2017	2018
Full Years	10,326	10,009	10,968	13,068	10,464

The route length of these feeders can be better addressed by the TCN or interconnected grid solutions. Our discussions with TCN about their projects have impact on JED PLC as follows:

Table 7: TCN Interface Challenges with JEDP

	Issue	TCN	Timelines	Status
1	Dorowa 33kv feeder radiating from Makeri TS in Jos is very lengthy, hence experiences very low voltage at the tail end. Feeder is over 600 km route length	Completion & commissioning of Pankshin 2x40mva, 132/33kv TS.	H1, 2020	The TS has been completed but construction of 132kv line is yet to be completed
2	Pronounced voltage imbalance amongst the three phases at 330kv voltage level is cascaded down to 132kv, 33kv & 11kv voltage levels in our franchise states of Gombe, Bauchi, Plateau and Benue	Transposition of 330kv Enugu-Makurdi-Jos line.	May-20	Yet to start. We request to review timelines
3	1. Poor voltage profile On Ashaka 132KV line radiating from Gombe TS 2. 132KV Bypass towers to Ashaka	Construction Of 2no 132kv Towers across River Bank	Aug-19	Yet to start. We request to review timelines
4	1. 33KV Kumo feeder too lengthy (Over 600 Km Route Length) 2. Loaded 98% (19.6 Mw)	Completion of Biliri 132KV TS.	May-21	Yet to start. We request to review timelines
5	Non completion and commissioning of the second 60 MVA, 132/33kva Transformer At Yandev TS	1. Completion & commissioning of the second 60 Mva, 132/33kva Transformer At Yandev TS	May-20	Yet to start. We request to review timelines
6	Ankpa 33kv feeder radiating from Asa TS is too lengthy, (over 600km route length	Completion of Ayingba 132/33KV TS		Yet to start. We request to review timelines

Table 8: Capacity Utilization Analysis

	Azare	Bauchi	Bukuru	Gboko	Gombe	Jos Metro	Makurdi	Otukpo
TCN Capacity								
Inservice	40.0	130.0	120.0	105.0	135.0	120.0	100.0	77.5
Out of Service	40.0	-	-	60.0	-	60.0	-	-
Total Installed Capacity	80.0	130.0	120.0	165.0	135.0	180.0	100.0	77.5
Capacity Utilization	65%	65%	65%	65%	65%	65%	65%	65%
Available Capacity	26.0	84.5	78.0	68.3	87.8	78.0	65.0	50.4
Power Transformer								
Inservice	28.5	88.5	159.5	5.0	88.5	179.4	81.3	37.5
Out of Service	-	7.5	25.0	-	-	-	-	2.5
Total 11/0.415KV	28.5	96.0	184.5	5.0	88.5	179.4	81.3	40.0
33KV/0.415	65.8	115.7	65.8	109.8	193.4	51.7	37.4	115.8
Total Capacity	94.3	204.2	225.3	114.8	281.9	231.0	118.7	153.3
Capacity Utilization:								
Power Transformer	75%	75%	75%	75%	75%	75%	75%	75%
11/0.415	75%	75%	75%	75%	75%	75%	75%	75%
33/0.415	70%	70%	70%	70%	70%	70%	70%	70%
Available Capacity								
11/0.415	16.03	54.00	103.78	2.81	49.78	100.88	45.70	22.50
33/0.415	46.05	81.01	46.06	76.83	135.37	36.16	26.18	81.03
Total Available Capacity	62.08	135.01	149.84	79.64	185.15	137.04	71.88	103.53
JEDP to TCN Utilization Ratio	2.39	1.60	1.92	1.17	2.11	1.76	1.11	2.06

The above table shows the load gap the JED PLC has relative to their target. The existing network requires rehabilitation and reinforcement for optimum utilization of the existing installed capacity at TCN and JED PLC for the quality service delivery to our customers.

At present, JED Plc has 25 number of overloaded power transformers, 14 number of overloaded 33kV lines and 41 number of overloaded 11kV lines and 882 distribution substations requiring relief substations across the franchise area.

For optimal performance of network distribution infrastructures and also reduce stress which could lead to breakdown, the benchmark peak load of 33KV and 11KV feeders were pegged at 15MW and 3.5MW respectively.

Table 9: Overloaded 33KV Feeders

S/No	33KV FEEDER	PEAK LOAD (MW)	% LOADING
1	DOGON DUTSE	17.80	119%
2	ANGLO - JOS	19.00	127%
3	JUTH	20.00	133%
4	GOVT. HOUSE	17.00	113%
5	BUKURU	19.00	127%
6	WATER WORKS	24.00	160%
7	DASS	28.00	187%
8	GOMBE TOWN	18.60	124%
9	DOMA	22.00	147%
10	BARRACK ROAD	19.00	127%
11	NNPC	19.90	133%
12	ANKPA	17.40	116%
13	YANDEV	16.00	107%
14	KASTINA ALA	20.50	137%

Table 10: Overloaded 33/11KV Power Transformers

REGION	NAME OF INJECTION	TRANSFORMER RATING (MVA)	TOTAL LOAD (MW)	TOTAL LOAD (MVA)	% LOADING
BAUCHI	RAILWAY (CONTROL)	15	11.5	13.5	90%
	YELWA	7.5	6.8	8	106%
	FADAMADA	15	12.1	14.3	95%
GOMBE	DOMA	8.9	6.7	7.9	89%
	TASHAN	7.5	5.4	6.4	85%
	DUKKU	7.5	8	9.4	125%
MAKURDI	INDUSTRIAL	7.5	6	7.1	95%
	NORTH BANK	7.5	6.5	7.6	101%
	BSU	7.5	6.6	7.8	104%
OTUKPO	ASA	7.5	5.64	6.6	88%

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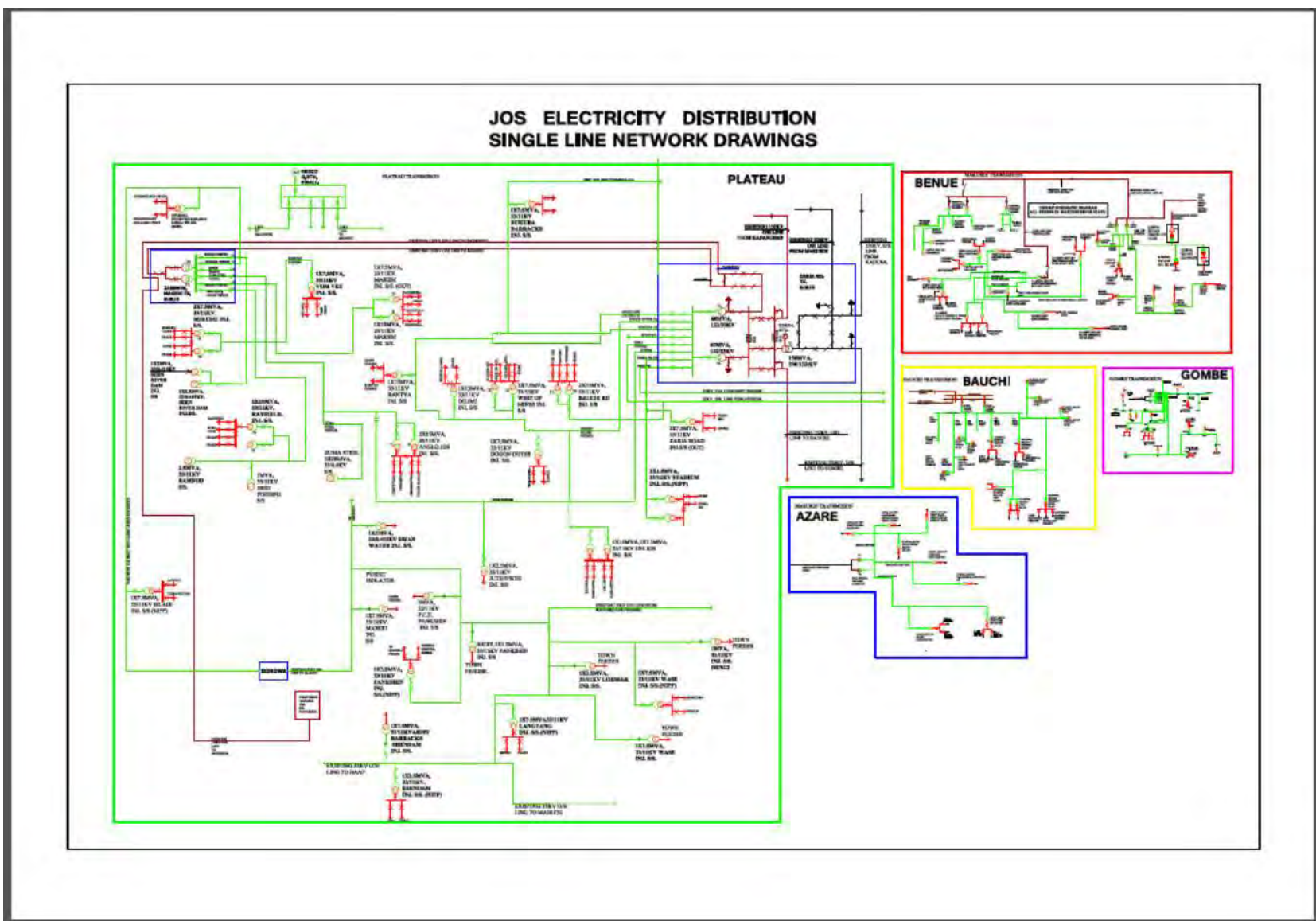


Figure 9:JEDP Single Line Diagram

Table 11: Overloaded 11KV Feeders

S/No	11KV FEEDERS	PEAK (MW)	% LOADING
1	Rantya	4.31	123%
2	Rukuba Road	5.7	163%
3	West Of Mines	5.03	144%
4	Nasarawa	5.73	164%
5	Katako	5.94	170%
6	Bauchi Ring Rd	4.88	139%
7	Bauchi Road Township	6.09	174%
8	Zaria Road 11Kv	4.2	120%
9	Utan	6.45	184%
10	Bukuru Town	4.92	141%
11	NIPSS Kuru	4.59	131%
12	Hwolshe	3.53	101%
13	Ibrahim Taiwo	4.29	123%
14	Tudun Wada Jos	5.12	146%
15	Gwallameji	4.13	118%
16	Fed. Low Cost Bauchi	5.4	154%
17	Railway	6.06	173%
18	Govt. House Bauchi	5.93	169%
19	Bank Road	4.97	142%
20	Industrial Bauchi	4.58	131%
21	Barrack	4.5	129%
22	Ran Road	4.5	129%
23	GRA Azare	5.17	148%
24	BCGA	6.72	192%
25	Fed. Low Cost Gombe	5.4	154%
26	Tudun Wada Gombe	5.09	145%
27	Mallam Inna	5.82	166%
28	Tunfure	4.22	120%
29	Govt. House Gombe	4.29	123%
30	Riyel	4.7	134%
31	Gra Makurdi	4.76	136%
32	Makurdi Town 11Kv	4.31	123%
33	High Level	4.89	140%
34	Wurukum	4.89	140%
35	Naka Road	4.83	138%
36	Nasme	4.01	114%
37	SRS	4.29	123%
38	District	5.27	150%
39	Gboko Road	4.82	138%
40	Old Enugu Road	5.21	149%
41	Otukpo Town	5.64	161%

4.3 Network Challenges

1. **Radial Connectivity of 33 KV Network:** Most of the electrical network at 33 KV is radially connected. There are long feeders emanating from TS and many T-Offs and Distribution Transformers are connected on 33 KV lines before feeding to Injection Substations. The tripping due to any fault on such DTs affects the availability of the power at Injection SS. Such connectivity is a challenge for maintaining reliable availability of power to its customers as any fault in any Distribution Transformer or T-off circuit trips the main feeder at the TS.
2. **Radial Connectivity of 11 KV Network:** Similarly the distribution network at 11 kV has radial connectivity. These situations have caused network issues like overloading of feeders and voltage drop at the tail end of the feeders and in case of breakdown of one feeder, customer remain in dark due to lack of back up connectivity.
3. **Reliability of the Network:** There are 23 rural feeders out of a total of 46 no. 33 KV feeders, operation of which is directly controlled from TCN. These feeder lengths are very long i.e. in the range of 400 Km to over 600 Km, passing through various areas. In the year 2019, from January to September JED experienced a total of 11 system collapses (partial and full). The momentary tripping of such feeders affects the reliability of the network.
4. **System Collapses from TCN:** The system reliability is affected due to frequent system collapses from TCN. In the year 2018 JED experienced a total of 18 system collapses (partial and full).
5. **Voltage Imbalance from TCN:** The 330 KV line from Ugwuaji to Jos has concerns of voltage imbalance amongst three phases of the network. The large industrial customers have their plants with sensitive equipment. Due to voltage imbalance amongst phases, they are not able to use the grid power for their commercial production.
6. **Multiple Joints in the O/H Network:** Most of the 33 & 11KV line, sections require major rehabilitation or reconstruction. There are multiple joints in wires. Most of the power connections are made through binding wires. These improper joints are also responsible for high technical losses
7. **Single Source Supply for Injection Substations:** All the injection substations are with only one source of power supply. In absence of the alternative supply source there is no arrangement of back feeding the injection substation and customers are forced to remain on outage.
8. **Capacity Constraints due to Illegal Connections:** With the load growth every year, capacity of transformers and distribution lines, especially in urban areas, demands for up-gradation. While utility plans network assets for the legitimate customers, there are a huge number of customers connect themselves on the

public DTs illegally. This results in failure of windings of DTs due to overloading.

9. **Dilapidated Network & Poor Maintenance:** Most of the equipment installed are aged ones or not seen the maintenance for very long periods. As a result frequent power outage and supply voltage drop occur due to deterioration of equipment. The most of 33 KV, 11 KV & LT lines have undersized conductors during their lengths and therefore contribute to increased technical losses when supplying power.
10. **Voltage Drop:** Because of radial nature of network, the feeder lengths are overstretched. Long feeders with many T- offs, a huge number of joints, snapped or vandalized conductors etc. experience significant voltage drop, especially at the tail ends of the feeders. Illegal connections further aggravate the situation.
11. **Poor Power Factor:** The actual power factor of the system is currently unknown as measurements are only available at some injection substations resulting in the power factor being estimated at 0.85 and nominal voltage. These readings are also manually taken at the substations therefore the data is not easily available.
12. **Lack of Protection System:** Most of the protection relays are electromechanical type. All the events are recorded manually; hence thorough analysis of any fault is a challenge. The fuses in the transformers are inadequate and low voltage feeders are protected with wire wound fuses in place of HRC fuses, thus potentially a fault at the LV side can result in the entire feeder tripping.
13. **Poor Earthing of Lines:** 33 and 11KV lines do not have earth wire arrangement with cradle guards for protecting the line conductor from falling on the ground and facilitating faster operation of overcurrent protection. This is a serious safety lapse in view of the large number of improper joints in wires.
14. **On Load Tap Changers:** Most injection substations have on-load tap changers on the 33 kV side, however they are set to a fixed position. The only voltage regulation for the entire distribution system is performed by TCN at the 132/33 kV substations. Similarly Off-Load Tap changers at Distribution Transformers are never used.
15. **Cross Arms:** The cross arms of 33 KV & 11 KV network are very old. A significant number of cross arms are wooden which has expired their life expectancy. The bracing straps of above cross arms are broken leaving one or two phases hanging.
16. **Condition of Poles:** 33KV and 11KV line poles don't have Danger boards, Phase Marking, Pole numbering and Anti-Climbing Devices. These lines have many damaged concrete / rotten wooden poles / cross arms, besides, porcelain insulators also need replacement at many locations.

17. **Overstretched LT network:** The Low Voltage systems have areas with significant over-extension (very long LV circuits). The DTs are placed at locations without considering the load centers. The long LT feeders are extended by communities without proper specifications. The undersized conductors with multiple joints leads to substantial technical losses and reliability concerns.
18. **Poor Maintenance:** Many 415 V LV panels/kiosks have broken doors that are wide open. There are many oil leaks on injection and distribution substation transformers. Some distribution transformers only has one or two phases connected to the high voltage side i.e. 11/0.415 kV resulting in unbalances. Many Injection and distribution transformers are covered with overgrown vegetation and signs of charring, flashing and burning.
19. **Collapsed Network:** The network across rural areas is affected due to natural calamities. Approximate 25% of the 33 KV overhead network is collapsed due to heavy rain and wind storms.
20. **Vandalism:** The vandalism of the network assets is a crucial challenge. Even in the urban areas vandals take out copper cables, transformer oils and many a times the copper windings of the distribution transformer. This affects the power supply to the customers.

4.4 Operational Vehicles

Our rapid responses to corrective maintenance, project management requires mobility for quality customer services. The table below shows our current state of assets that we use to serve our customers.

Table 12: Status of operational vehicles

	Holding			Gap	Required Total
Years range	0 - 6	> 6	Total		
Fair	30	22	52		52
Good	96	2	98	250	348
	126	24	150	250	400

4.5 Customer Care Units

We have 8 regional offices and 30 Area Offices that have the capacity to fulfill the NERC requirements for full customer care units. We have revamped 3 offices and currently have 35 more offices to go. We intend to urgently revamp these offices so as to serve our customers efficiently in a conducive environment.

Safety Tools

The safety tools, most especially wearable ones and fast moving requires replenishment periodically. Consequently we have need for them often.

4.6 IT and Automation

Table 13: Status of NERC's required systems

System	Functionality	Status
Customer Management System (CMS)	Revenue cycle, Customer Relationship Management	Developed a utility vending solution that will incorporate CRM, prepaid and postpaid in a single database
Enterprise Resource Planning (ERP)	Support corporate planning & management of shared resources (accounting, finance, human resources, procurement, logistics and information technology)	Implementing SAGE X3. Phase 1- Accounting & Procurement Phase 2- Consolidate HR existing HR software
Geographical Information System (GIS)	Mapping of Customers connection & network assets	Not available, but built a module and ready for integration
Advance Metering Infrastructure (AMI)	Revenue protection Energy & load analysis	Deployed Mojec & Ortech AMR systems
Supervisory Control and Data Acquisition System (SCADA)	Operate and control of HV & MV infrastructure	Not available
Works Management System (WMS)	Manage all construction/installation works of network infrastructure	Not available
Incidents Recording & Management System (IRMS)	Identify locations & analyze extent of interruption in electricity supply to enable fast resolution and service restoration	Not available

4.7 Human Resources

The staff strength of the company is 2,700 as at September 2019, focused on serving over 500,000 customers across four states. The work force is tilted towards the core occupying 75% while the support staff have the balance of 25%.

4.8 Key Performance Indicator (Aggregate Technical Commercial & Collection Loss)

The ATC&C loss has a baseline of 58%, and 53.87% (post MDA collection loss). The loss as at year end 2018 stood at 66.6% (MYTO 43.95%) but had decline 60% as September 2019.

We have old dilapidated infrastructure in network assets, operational vehicles and offices we occupy. The wide metering gap, significant low income earners and slow economic development had impacted on the increase in ATC&C loss.

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5. PIP Development Process

We followed a market based approach towards development of the plan. This approach commenced from the reviewing our key stakeholders claims against the existing status of the economy, industry and company. All stakeholders are considered, but the once we engaged actively are the tariff payers who we are in business to serve, and the suppliers of all resources TCN, REA, financiers, vendors, the policy makers and regulators.

In this process, we reviewed the energy demand on the basis of coincidental and non-coincidental load demand, from each feeder been supplied. The output produced a baseline for our energy demand studies. Thereafter we benchmarked the demand from each feeder cumulative to the TCN station available capacity.. Where we noticed our available capacity is in shortage of TCN's available capacity, we provided for expansion of network assets to take energy from the TCN station. Subsequently, we analyzed against the existing utilization rate and evaluated wherever there is any gap. The analysis of the identified gaps helped us forming our investment plan, which is aimed at reducing the interruption rate, improving reliability of quality supply, rapid response to corrective maintenance, customer complaint resolution and expansion for meeting the growth in the demand of electricity across various regions.

The entire development process must achieve the KPI, loss reduction which will make the pricing fair over time and improve quality customer service. Also, in management of resources we have chosen a cost-efficient approach in determining the basis of our expenditure by taken input from the market through seeking input from our vendors on the estimated cost of the items.

5.1 Stakeholders Engagement

Out of various stakeholders, customers and suppliers of resources are important stakeholders. Our supplier for electricity is the TCN whose source are the Genco's.

5.1.1 Transmission Company of Nigeria (TCN)

TCN have invested in 8 nos. 132/33KV stations within our franchise with an installed capacity of 987.5 MVA. TCN is about to complete Pankshin station, Biliri is coming up by 2021.

Our engagement with stakeholders at various NESI meetings, one on one in their offices and our offices showed that the following stations are coming up to address the long route of Kumo, Ankpa, Doma etc. Our plan has taken into consideration the supply constraints and expansion plan.

5.1.2 Rural Electrification Agency (REA)

The REA is driving interconnected grid solutions. We have penciled down 5 communities that could be viable for this supply solutions. We have also taken into considerations the developers who have approached us for participation in our franchise.

5.1.3 NERC's Regulation

As a licensed market participant, we are guided by the relevant regulations and consultative papers of NERC in the development of this plan.

Customers Consultation

The key principles in engaging all our stakeholders lies in the willingness to provide improved quality power supply to their premises at affordable cost when benchmark with substitute product like self-generations process using generators roof top solar system. The benchmark also cut across other closely linked Discos as well as countries that are been placed in the same segment with ours. We have the understanding that capacity to consume electricity differs which is seen in the number of hours they are willing to take supply. Minimal voltage depression, acceptable voltage level and frequency regulation forms our plan for quality energy supply. One important thing that we established is that all the customers wants accurate meter reading that reasonably measure the consumption and not been cheated. We segmented our customers and utilized different approaches in consulting with them as discussed below.

5.1.5 Key Customer Group

Maximum Demand Customers: we carried out extensive consultation with our maximum demand customers through our relationship managers. Their request of stable power supply and investment needed, as well the pricing have been incorporated into this plan.

State Governments: we engaged state governments top government officials, traditional rulers, and special committees on power concerning the debts owed and how they could use the settlement of the debt to help improve the network infrastructure in their states. Major talking points are on metering and how the improvement in power

could alleviate their socio-economic environment. They also requested that we should manage the tariff pending improvements in metering.

5.1.6 Community Engagements

We have intensify our community engagements for improved customer orientation about the change in the industry from been a social goods to private ownership where every cost counts. We considered their requests in the development of this plan. We have weekly radio programs where customers listen and could phone in to log there complaints that have been left unattended to. Most recently we have communicated on MAP scheme, tariff shortfall and possible increase in tariff as published by NERC, vandalism of network infrastructure and the need for the community to protect those assets. They were also educated on whistleblowing of energy thief and how they collaboration will help lower their own tariff over time.

Figure 10: Community engagements

Kabong-Jos Community



Laranto Community

Miango Community



Azare Town



Bauchi Town



State Level Customer Consultative Programs

We carried out customer consultative program wherein the under listed were the outputs.

Figure 11: Makurdi Customer Consultative Forum



5.2 Energy Demand

The table shows that TCN has planned to be able to wheel 442 MW in 2020 and 657 in 2025, representing an average growth rate of 8.25% annualized over five years.

Escalating the year 2020 data to 2024, it gives 607 MW. The existing data shows that the eight 132/33KV TCN station has the capacity to deliver the power as envisaged.

Figure 12: Pg 7 of Transmission Expansion Plan

Table 1-3: Load demand per DisCo

DISCO	DisCo	2020	Increase 2020-2025	2025	Increase 2025-2030	2030	Increase 2030-2035	2035
IKEDC	1-Ikeja	1250	16.08%	1451	39.57%	2025	13.66%	2302
IBEDC	2-Ibadan	1225	45.31%	1780	50.28%	2675	23.94%	3315
AEDC	3-Abuja	745	35.70%	1011	66.92%	1688	49.86%	2529
BEDC	4-Benin	1273	37.47%	1750	39.98%	2450	16.54%	2855
KAEDCO	5-Kaduna	590	78.31%	1052	93.96%	2040	21.82%	2486
JEDC	6-Jos	442	48.64%	657	86.06%	1222	10.40%	1350
EEDC	7-Enugu	1090	22.29%	1333	25.22%	1669	11.36%	1859
PHEDC	8-Port Harcourt	946	55.39%	1470	43.42%	2108	17.70%	2481
EKEDC	9-Eko	1320	25.08%	1651	35.51%	2237	13.38%	2537
KEDCO	10-Kano	705	34.04%	945	59.22%	1505	31.23%	1975
YOLA	11-Yola	309	99.03%	615	83.14%	1126	51.78%	1710
Total MW		9895	38.61%	13715	51.26%	20746	22.42%	25397
Export MW		387		1540		1831		2000
Total load MW		10282		15255		22577		27397

The increase of load that can be supplied by the planned generation in the period 2020-2035 is shown in Figure 1-3

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Reviewing the progress since 2017 that the above plan has been made public, data as at July 2019, revealed that the Independent System Operator indicated that the demand for electricity in Nigeria was an estimated at 25,770 MW, with supply at about 4,500 MW.

MYTO 2015, minor review order release in August 2019, forecast the energy for JED PLC for the proposed tariff period as:

Table 14: Energy demand analysis

		2019	2020	2021	2022	2023	2024
MYTO 2015 Assumption	GWh	1,625	2,147	2,342	2,608	2,814	2,975
TCN Forecast							
JEDP daily energy demand	MW		442	478.5	517.9	560.7	606.9
JEDP annualized energy demand	GWh		3,883	4,203	4,550	4,925	5,331
% of MYTO to TCN forecast	%		55.3%	55.7%	57.3%	57.1%	55.8%

We will use MYTO assumed energy as it incorporates the most realistic assumption relative to the TCN forecast of 10,000MW in 2020 whereas they were only capable of 4,500 as at July 2019.

Our target output is geared towards meeting our customers demand. The customers are the tariff payers and they desire service quality defined in terms of reliable and quality supply at the fair price with accurate metering that measures their consumptions to pay for what is utilized. In achieving fair price, loss needs to be reduce and efficient sourcing need to be considered over a long-term view.

We are constrained in our investment planning. Considering all customers' request immediately (year 2020) will escalate the revenue requirement and the capacity of our business partners to meet the demand with the timeline will most likely fall short. Consequently we have prioritized our plan towards achieving optimum output that satisfies the key stakeholders' claims over the five years period. Our plan is focused on achieving the key performance metrics as stated in the guideline issued by the regulator while building on our three cardinal leverage, people, process and technology.

1. Loss reduction: we will focus on this more in the initial two years as it will help to meet the performance target, achieve a fairer tariff in the medium to long term
2. Metering: this enhances stakeholders confidence in accountability, from the energy supplier, customers who we deliver energy to as well segmentation of losses for improved performance.
3. Reliability/availability: reinforcement of our network, as well as construction of new feeders to evacuate energy from the proposed TCN stations as listed in the TCN and JED PLC interface project will enhance reliability.
4. New connection and expansion: we proposed low investment for expansion in the initial two years (2020 to 2021), while increasing the expansion in the final three years. This approach is taken considering our capacity against that of the TCN.
5. Safety: been a critical success factor derived from our mission statement, we focus on environmentally friendly investment and creating a "Zero Accident" safety culture.
6. Social Responsibility: the corporate social responsibility is geared towards leaving a positive environmental footprint in the community we serve. We have considered the impact that some programs will have in some chosen communities. The focus is to increase their economic capacity, invest in social development and sports recreations.
7. Market Remittance: the plan is geared towards improvements in cash flow and remittances to the market accordingly. We do recognized that we are the

collection agents of the entire NESI, consequently the growth of the industry is hinged on the liquidity flow in the industry.

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6. Detailed Program Plan

6.1 Commercial Operations

6.1.1 Customer Care Contact Channels

Our strategic focus is tailored towards improved customer satisfaction. In achieving this, our critical success factors are

- Expansion of our customer care physical location to all our 30 area offices, and upgrading those in our 8 regional office to industry standard
- Expansion of our online channels of communication via social media and company's website for enquiries and live chat
- Establishment of full fledged call center/IVR for 24/7 service delivery
- Reduction in our customer resolution and feedback process time. We will re-engineer our process and leverage on IT.
- Continuous training and development of employees in industry best practices and customer centric approach
- Queue Management System (QMS) for controlling customers traffic and reduce queuing time.

6.1.2 Customer Enumeration and Asset Mapping

- Complete the asset mapping and tagging process
- Deploy own GIS and integrate it with other software for effective of asset management
- Build a reliable customer database for improve customer service and effective asset management

6.1.3 New Customer Acquisition

The customer enumeration is a project outsourced with a completion timeline. With the development and growth envisaged within our franchise, we will have new customers or those that require separation of services as a result of either metering program or increase in load consumption. We have developed new customer connection process to take care of this, which will be concluded by metering the customer through the MAP process before connection to the grid as per NERC directives.

6.1.4 Metering of Customers

We are to launch our MAP scheme in October 2019. Our MAP business partner, MOJEC/Triple Seven and JED PLC have committed to rolling out 500,000 units of different customer meter types as shown below.

Table 15: Summary MAP Rollout

LOCATION	YEARLY	TOTAL	SINGLE PHASE PPM	SINGLE PHASE CREDIT	THREE PHASE PPM
JED PLC 8 REGIONS	YEAR 1	100,000	70,000	20,000	10,000
	YEAR 2	180,000	126,700	35,900	17,400
	YEAR 3	220,000	153,300	44,100	22,600
TOTAL		500,000	350,000	100,000	50,000

We acknowledged that loss reduction is the primary responsibility of JED PLC, we have therefore set up a process that ensure we achieve our objectives. We carry out pre installation inspection of the customer's premises for determining the right metering and tariff class. Upon completion of installation of the meter, we also carry out post installation inspection so as to ensure the installation is carried out according to specification and quality standard. 2,051 customers have shown interest for upfront payment option, while we have carried out 1,627 pre-installation inspections awaiting the launch of the scheme.

We intend to pursue an aggressive implementation of the MAP scheme. NERC has issued updated regulation, so we will use the Meter Service Charge option for low income class segment so that all customers are be metered in any location we focus. Our strategic operational roll out plan on feeder wise is shown below

Figure 13: Strategic feeder level MAP rollout



The MAP scheme carries risk of running out of inventory, access to low cost finance that benefit the low income segment, manpower requirement to support the aggressive metering project, a functional automated meter infrastructure as required in the MAP regulation. We have assess these risks and provided mitigates to them, but events that could be practically beyond the control of the MAP may occur, which limit the achievement of the set targets.

Meter Maintenance and Testing Center

We currently have over 104,000 prepaid metered customers within our franchise, and the JED PLC is still responsible for these installed meters. We will set up a meter maintenance center that carries out testing and maintenance of this meter. The one off set up cost is ₦10m

6.2 Revenue Optimization

We intend to expand on these under listed strategies

6.2.1 Franchise our rural, non-manageable areas: we piloted a feeder factor model with recourse, and have some benefits and lessons from this strategy. We will decentralize the factoring model to DTs, with the primary goal of reducing operational cost; as well improve revenue from those areas. Our strategy could be any of the under listed options

- i. Use of prepaid DT meters with postpaid counter meter that uses radio frequency technology for individual customer. The franchise could be structured in a manner that the franchisee invests in the network upgrade at the LT level, as well as metering. Alternatively, JED PLC will provide the investment and sell energy on prepaid at DT level to the franchisee at a discount

- ii. Use of postpaid DT meter for bulk metering of the area
- iii. Use of postpaid DT meter with postpaid counter meter that uses radio frequency technology for individual customer

We will evaluate the right option for each location, while taking into consideration the socio-cultural issues as well the customer numbers attached to the DT's

6.2.2 Expansion of collection channels: we presently have challenges in collection of revenue in some rural area where there are no banks. We intend to use a community based collection approach in some segments. Furthermore, the numbers of our collection channels is low relative to the route length in our urban area. We intend to open up more channels to local supermarkets, business centers, and street agents with the deployment of new customer resource management software.

6.2.3 Collection of Receivables: with the aggressive metering programs through the MAP scheme, we will enter into agreement with our customer for the repayment of their account receivables prior to metering. The repayment will be agreeable to them considering their capacity with an option for waiver to encourage significant initial payment. This is expected to reduce our account receivables, boost collections and cut down on our collection loss going forward.

6.3 Revenue protection

- **Expanding the Usage of AMR/AMI System:** we will smart meter customers that have tariff higher than the weighted average tariff of JED PLC, and also large retail consuming customers in our class A and B feeders. We will further acquire them on the existing AMR software deployed and monitor their load and energy flow. With a data that established their consumption pattern, any significant deviation from energy consumption will be flagged and the enforcement team visiting them accordingly. We intend to procure a more robust AMI that has a two communication for effective loss reduction program
- **Expansion of War against Energy Theft (WAET):** we will continue our campaign against energy theft by reaching out to more communities, schools, and radio and TV programs. The campaign will leverage on risk based data analysis from historical revenue database, as well encourage whistle blowing activities from within the neighborhood through by protecting and compensating the whistleblower. We will also run a shift program that ensures areas that data analysis signal a huge commercial loss occurring will be patrolled 24/7. Furthermore, we will expand the enforcement team to area offices and feeders as the metering progresses. Effective operations is expected to send signal to the recalcitrant customers, and increase revenue

- **Expansion of Disconnection Team:** we piloted a focused disconnection process where we generate the list of customers who have inactivity in their accounts over 3 months. We follow the disconnection process as outlined in the regulation in disconnecting these customers. We ensure they remained disconnected until they respond to payment, and in the course of payment, they are made to pay reconnection fees.
- **Dealing with MDAs:** the MDAs within our franchise comprises of the federal, state and local government. States and local governments are handled at the state government's level. The federal MDAs has not been settling their monthly bills and has accrued up to ₦6 billion. The new methodology of smart metering the accounts, centralizing the invoicing and reconciliation at the Federal Ministry of Finance, as well settling the invoices is a welcome development. We desire that the outstanding debt should be settled or accounted for as part of the offsetting process of the year 2015 to 2018 tariff period tariff shortfall and outstanding market liabilities.

We will continue to pursue the state government settlement of outstanding debt as well prompt settlement of their monthly invoices. But a desirable option is that both state and local government be included as part of the centralized invoicing and settlement process

6.4 Grid Metering

Energy accountability is key to achievement of performance target. We will install check meters in all our 33KV feeders, statistical meters at the incoming side in the injection substation and outgoing. We will also meter all the DTs with high priority to DTs in the urban area in year one, 2020.

The expectation around this energy accounting is loss segmentation and optimal CAPEX investment implementation. In addition, provision of feedback mechanism for our future investment plans and employee responsibility accounting in performance management process.

6.5. Energy Management/Network Infrastructure

After thorough analysis of the network challenges we have planned our strategies majorly under two heads viz. reinforcement of existing network and planned expansion of network for meeting the load growth requirements of the customers.

While the corrective maintenance is to attend the faults of the network with minimum possible time, preventive maintenance will be done proactively to avoid such faults to

occur. With this approach we wish to minimize the breakdown time and improve customer satisfaction.

6.1.1 Preventive Maintenance

1. Injection substations: The maintenance of Injection substations with Power transformers will be done “*quarterly*”.
2. The equipment to be maintained are power transformers, 33KV & 11KV
3. Switchgears, Voltage transformers, current transformers, 110V & 30V Chargers, battery banks, communication Radios, protection relays and earthen systems.
4. The maintenance of Public distribution transformer substations will be carried out “*monthly*” on Feeder basis. The maintenance will be done on the distribution transformers, feeder pillars and armored cables, lightning arresters and earthen systems.
5. 33KV & 11KV Lines: The high tension lines will be maintained “*biannually*” using the schedule produced. Line tracing clearing, replacing of bad insulators, cross-arms, poles and undersized conductors.
6. Maintenance 0.415KV low tension line: This will be maintained “*quarterly*”, by doing line trace clearing and replacement of substandard line materials to improve power quality and reliability.

6.2.2 Corrective Maintenance

Faults will be fixed within the stipulated period set by the Company:

1. Injection substation: Within 6 hours except there is major equipment failure.
2. Distribution Substation: Within 8 hours except there is major equipment failure.
3. 33KV feeder: Within 6 hours except there is major breakdown on the line
4. 11KV feeder: Within 6 hours except there is major breakdown on the line
5. 0.415KV line: Within 8 hours except there is major breakdown on the line
6. Emergency Fault complaints

6.2.3 Rapid Action Team

A team will be stationed in each of the 8 Regional Offices, and will operate a 24-hour shift duty. However, the team will be extended to the 30 Area Offices by 2021.

Faults reported by customers will be expediently treated within 2 hours by this team.

6.2.4 New Department for network Planning, Standardization & Quality

In order to standardize the activities in technical division, a new department has been created with name Planning, Standardization & Inspection. This department is responsible for preparing the standard specifications, drawings for various material and guidelines for their installation. The network expansion shall be done after detailed

technical analysis of the network. Network plans shall be made for providing Ring connectivity of the network so that in case of interruption of one source, power supply can be maintained through alternate source. The proposed PIP document has plans for creating additional feeders and interconnectors to achieve ring connectivity.

Beside this, the department will manage be Technical Assets of the entire Company, network Expansion Plans, inspection and standardization of the entire distribution networks and ensure that all new projects and existing ones adhere to Company and regulatory standards.

6.2.5 Planning Criteria for Network Expansion

The existing procedure for network expansion lack uniform planning guidelines. The result is with overloaded and overstretched feeders facing voltage drops and increased technical losses. The new department shall prepare the standard guidelines for all new expansion and augmentation of existing network to meet those standards.

We have prepared our network plans considering the power transformer loading @ 70% for injection substations. The Distribution transformers are planned considering 90% loading. The 33 KV Feeder shall have a peak loading of 15 MW whereas 11 KV feeders shall be loaded to peak load of 3.5 MW.

The above criteria are based on international practices adopted by leading distribution companies across the world. The 70% loading of power transformer is to take care of the planning, approval, procurement, delivery period and installation of the equipment. By the time above activities are completed, the existing power transformer can take the load growth requirements. The procurement period for Distribution transformer is comparatively less and therefore their loading is considered as 90% of their rated capacity.

The 33 KV feeders are generally rated for 20 MW however planning criteria is kept as 15 MW for now. This will have available capacity to take up the load growth till further augmentation. The 11 KV feeder are rated for 5 MW. There will be one main feeder supported by two back up feeders. The ring connectivity shall ensure that in case of breakdown of one feeder, the full load can be supported by back up feeders.

The LT feeders shall be planned such that the length of the feeders is not exceed 800 meters. To achieve this the DT's will be placed at load centers and existing LT network shall be bifurcated.

6.2.6 Reinforcement of Feeders

The power availability of feeders shall be improved by the comprehensive actions of preventive and corrective maintenance. The existing categories of the feeders shall be reviewed for improvement and migrate more feeders into upward class.

To achieve our reliability target, we require major investments in current network rehabilitation and reinforcement in the initial two years (2020 to 2021). The preventive maintenance is planned for all major feeders comprising replacement of wooden, weak poles, cross arms, stay sets and undersized conductor. Beside this an aggressive line tracing schedule is developed to avoid the momentary faults due to touching of trees.

6.2.7 Reinforcement of Injection Substations

The defective panels, relays and other equipment have been identified during our analysis. The same shall be repaired or replaced as per requirement. There has been lack of maintenance of the major equipment due to lack of spares. The power transformers shall be maintained periodically. The oil filtration, replacement of Silica Gel, attending the leakage of oil wherever applicable, periodic checks of the transformer including oil samples is part of the improvement plan.

Performance Improvement Plan has provision for all above.

6.2.8 Construction of New feeders

Within this period, we will construct new feeders to take power from the TCN 132/33KV stations to be commissioned in Biliri, Gombe State and Pankshin, Plateau State. Altogether we intend to construct a total of 18 new 33KV feeders to evacuate power from the new TCN Stations and relieve the existing ones with peak load above 15MW and also those with long route lengths.

For very long 33kv feeders serving both the urban and rural areas, we will construct new lines for separation to improve the reliability index, power quality and availability to the affected customers. This approach will be the immediate solution of improving service delivery in the areas pending the constructing and commissioning of Transmission Stations to de-load the feeders. The same approach will be applied to overloaded and long 11KV feeders with peak load of over 3.5MW.

We also intend to introduce effective grid/network management by re-introducing Ring Monitoring Units (RMUs) for network flexibility and load management, where a feeder trips off and it's a major fault, we should able to switch customers to other another feeder prior to restoring the faulty feeder. Also we will introduce mobile relief DTs for

immediate relief of DTs that may be out on fault but could take longer time to restore the faulty DT.

Our greatest source of unreliable and low quality power supply is at the LT level (0.415KV) where a lot of substandard materials exist. We have forecasted to upgrade over 310km route length of the 0.415KV LT network in addition to maintaining about half of the total LT lines within the proposed tariff period. Also, 1,305KM new 0.415KV LT lines will be constructed within the 5-year period to relieve the existing lines and also evacuate power from the new substations to be commissioned.

6.2.9 Mobile DT for immediate Power Supply

We plan to provide mobile DTs of 500 KVA, 11/0.415 KV capacity in each region by year 2024. The mobile DT will be provided with incoming & outgoing cables. In case of breakdown of any DT, the mobile DT shall be supplied to the site till faulty DT is restored. This will help us save our revenue and customer satisfaction.

6.2.10 Fencing of DT

Our distribution substations (DSS) need to be rehabilitated and fenced with transparent fencing method, the 0.415KV lines will be changed to the required standard. This type of fencing has an advantage of visibility from outside against earlier designs of Blocked wall fencing. This has helped in reducing the vandalism of the substations as entry of any person is visible from outside. We have plans for fencing our DSS with priorities based on their locations and access of public. The public places viz. schools, markets and open ground where children play shall find priorities over other places.

Table 16: Proposed 33KV Feeders

Region	Existing 33kv Feeder / TS	Propose 33 kV Feeder	Year	Cost (₦)	
Jos Metro	Anglo Jos	Dilimi	2023	232,176,720.00	
	Juth 33kV	Bauchi Road	2024	154,784,480.00	
	Dogon Dutse	Uni Jos	2022	193,480,600.00	
Bukuru	Bukuru	Shen/Vom	2022	309,568,960.00	
	Makeri TS	Low Cost	2020	309,568,960.00	
	Pankshin TS (Under Construction)	Mangu		2020	309,568,960.00
		Lantang		2020	309,568,960.00
		Swan		2020	309,568,960.00
		Dengi		2020	309,568,960.00
		Shendam		2020	309,568,960.00
Pankshin		2020	77,392,240.00		

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Makurdi	North Bank	Naka Road	2021	154,784,480.00
	NNPC Makurdi	Ikpayongo	2020	193,480,600.00
	Apir TS	Abu King Shiluwa	2022	309,568,960.00
Gombe	Doma	Gombe Bye-Pass	2020	154,784,480.00
	Billiri TS (Under Construction)	Kaltungo	2021	309,568,960.00
		Kumo	2020	309,568,960.00
		shongo	2021	77,392,240.00
Total		18		4,333,965,440.00

Table 17: Proposed Power Transformer

Region	Capacity (MVA)	Description	Relief of what existing PT	Year	Cost (₦)
Makurdi	7.5	Added Capacity for Expansion	BBL	2023	169,629,196
Makurdi	7.5	Added Capacity for Expansion	BBL	2023	169,629,196
Makurdi	7.5	Augm. for the overloaded PT	Industrial	2021	169,629,196
Makurdi	7.5	Augm. for the overloaded PT	North Bank	2021	169,629,196
Makurdi	7.5	Augm. for the overloaded PT	BSU	2021	169,629,196
Azare	7.5	Added Capacity for Expansion	Jamaare	2020	169,629,196
Gboko	7.5	Added Capacity for Expansion	Gboko	2024	169,629,196
Gboko	7.5	Added Capacity for Expansion	Katsina Ala	2024	169,629,196
Bauchi	7.5	Augm. for the overloaded PT	Railway Control	2022	169,629,196
Bauchi	7.5	Augm. for the overloaded PT	Yelwa	2024	169,629,196
Bauchi	7.5	Augm. for the overloaded PT	Fadama Mada	2023	169,629,196
Gombe	15	Augm. for the overloaded PT	Doma	2022	242,327,423
Gombe	7.5	Augm. for the overloaded PT	Tashan Dukku	2022	169,629,196
Gombe	15	Augm. for the overloaded PT	Tashan Dukku	2020	242,327,423
Otukpo	7.5	Augm. for the overloaded PT	Asa	2024	169,629,196
Total					2,689,834,395

Table 18: Proposed 11KV Feeders

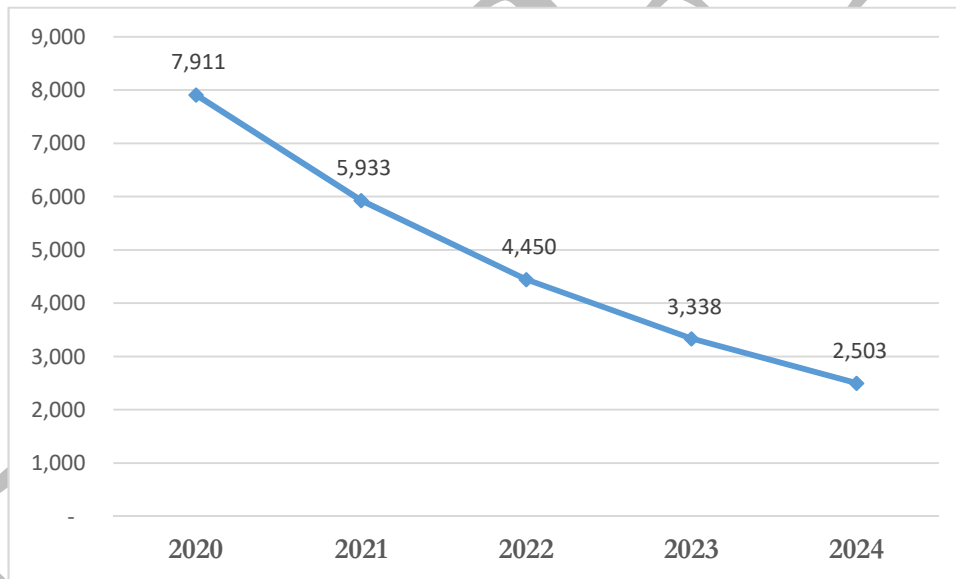
Region	33KV Feeder	Power Transformer Source	Propose 11 kV Feeder	Cost (₦)
Jos Metro	Anglo Jos	West of Mines	Car wash	58,621,200.00
	Dogon Dutse	Dogon Dutse	Duala	58,621,200.00
	Zaria Road	Zaria Road (Stadium)	Apata	58,621,200.00
Makurdi	NNPC Makurdi	BUS	Otukpo Road	58,621,200.00
Otukpo	Asa	Asa	Deport	58,621,200.00
	Ankpa	Old Enugu Road	Otobi	43,965,900.00
Gombe	Doma	Doma	Biu Road	51,293,550.00
	Gombe Town	Tashan Dukku	Jeka Dafari	58,621,200.00
	Gombe Town	Proposed Unisersity S/s	Arawa	58,621,200.00
Bauchi	GRA/Palace	Railway Control	Yelwa	36,638,250.00
	GRA/Palace	Railway Control	Prison	58,621,200.00
	Nabordo	Yelwa	Old Airport Road	58,621,200.00
Azare	Misau	Misau	GRA Misau	58,621,200.00
Gboko	Katsina Ala	Gboko	GRA Gboko	58,621,200.00
			Aliade	58,621,200.00
		Katsina Ala	COE	58,621,200.00
			GRA Katsina Ala	58,621,200.00
			Total	952,594,500.00

Table 19: 0.415KV rehabilitation plan

0.415kV RL (KM)	Year	Cost (₹)
25	2020	62,500,000.00
225	2021	562,500,000.00
300	2022	750,000,000.00
350	2023	875,000,000.00
405	2024	1,012,500,000.00
Total		3,262,500,000.00

The expected impact of the above is seen in the increase **reliability** index and the corresponding decline in power interruption rate as projected below

Figure 14: Forecast number of interruptions



6.6 Business Sustainability Campaign

The sustainability of the business is founded on understanding and meeting the key stakeholders’ claims. The energy demand sides of the business are the customers who we are in business to serve and they are to demonstrate loyalty by paying bills. However, some still have the perception that the business is a social good hence when consumed government should settle the liability.

Our sustainability is built on customers who settle their obligations as at when due, join in protecting the network infrastructure that serve their local communities and neighborhood. The cash flow generated will be used to settle the supply side of the market which makes the entire NESI liquid, enhance our credit ratings in the sight of the financiers, employees and donor agencies. It will also improve our asset condition life, lowers the cost of service and end user tariff.

We will continue our massive marketing, health, safety and environmental campaign aimed at changing the orientation of the customers, through radios, TV programs, social media, customer care physical contact centers, scheduled community engagements programs etc.

We understand that some communities are difficult to penetrate, but we would turn these non-manageable to manageable areas through giving them what they desire and we evaluate will be impactful on their socio-economic life. Doing so will enhance their economic capacity; improve their education, health status and culture.

Corporate branding is also an essential part of business sustainability, hence remodeling and upgrading our office premises and equipment will enhance the stakeholders' confidence in doing business with us.

6.7 Human Resource

The plan to deploy software and automate some of our processes presently manual is expected to impact on our human resources management strategy going forward. Low skilled workforces are expected to be supported with data to improve on their productivity. We will also require new highly skilled workforce that will drive the implementation of the proposed software. They will be augmented by training our existing employees for optimum effective usage of the software.

Our learning and development plan has been tailored towards retooling employees that implementation of projects and development of software will impact. Employees in the meter installation have been converted to pre and post installation inspection team. Marketers are being trained in detection of bypass as MAP program will impact the way they carry out their marketing task. More customer centric training will be given to them to enhance their customer relationship management skills as some will be converted to customer care agents, as we expand our customer care physical contact channels in the area offices.

For improved productivity, it is important we have the right mix of skilled workforce that are productive. We will continue to carry out performance appraisal for all staff bi-annually, while the commercial field operations staff gets their performance scorecard every month using the 3 months moving average of the KPIs. The KPIs setting uses a dynamic process where we tilt the weight towards a known area of weakness for it to be strengthened. We will continue the coaching program for low performers while the high performers are placed on fast-track list and mentored by some senior management and trained towards enhancing their skills. This talent management process has helped us to develop a succession plan, so that we cut down on the risk of losing highly skilled employees.

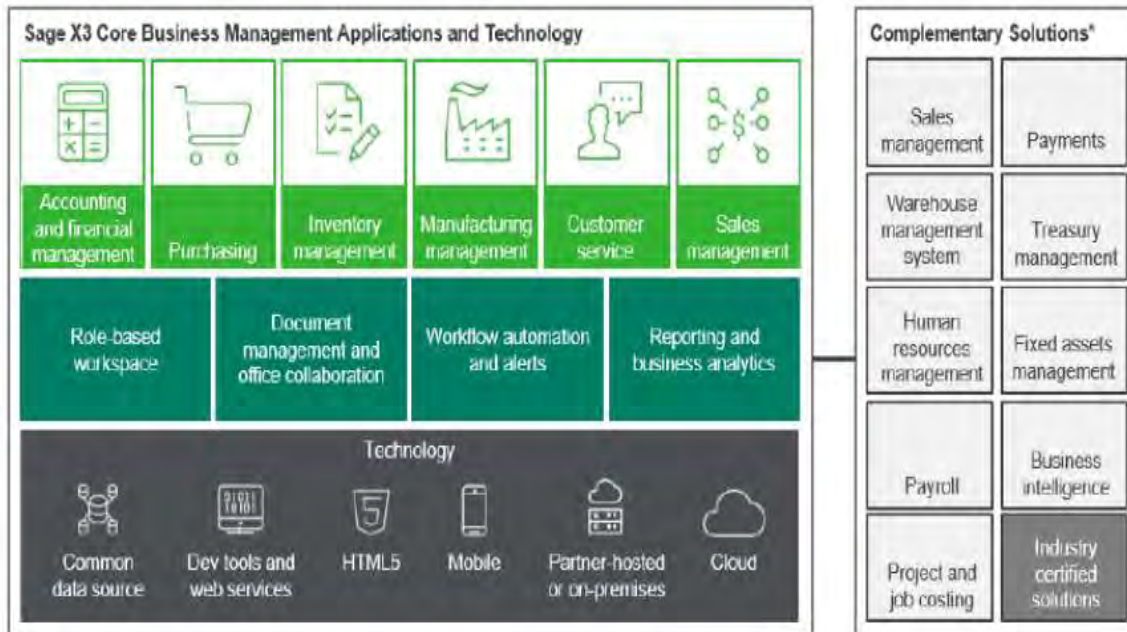
Motivation of employees includes fairly competitive package, building the right culture that is focused on high performance and team work and recognition of employees' contribution to the productivity of the company. In achieving the goal of highly motivated workforce, we will carry out employee satisfaction survey at least once in a year, while also using the appraisal process to get feedback from the employee about their capacity developmental need.

The network expansion plan, growth in new customer connections, increased activities in revenue generation via loss reduction programs, we expect our workforce to increase but with increased capacity to work in a multi-function environment. Due to the strategic importance of capacity building, we intend to establish a training school in the four states we cover. The development program will be more internal and online than external for cost efficiency.

6.8 Enterprise Resource Planning (ERP)

We will expand the implementation of Sage X3 to support our corporate planning activities. Sage ERP X3 is a fully web based, all in one business management solution offering new levels of power and flexibility that is functionally advanced, simple to use and cost effective. It is a comprehensive enterprise resource planning software that combines business value, standards-based technology, and deep industry experience into a business solution with a low total cost of ownership.

Figure 15: SAGE X3 Functions



Sage X3 also allows us to shape the software to meet our needs. It allows you to centralize some functions while decentralizing others and eliminates redundant data entry. With the fully integrated Sage X3 solution, our managers have access to the whole financial picture. So they can see where and how they can support the organization’s business practices.

Its extensive industry and functional coverage, coupled with powerful workflow engine as well as easy to use reporting and business intelligent tools, gives the organization real time control and visibility over its activities and improved decision key areas it supports.

SAGE’s X3 combines classic ERP functionalities of speed, visibility and enablement throughout an organization with the unique attributes of simplicity, flexibility and scalability resulting in an integrated making in all end-end solution.

6.9 Commercial Management System

Currently we have two different systems that manages our postpaid customers and prepaid customers. The deficiency in the migration process that required human intervention that is prone to error and time lags is to be addressed through the deployment of a new single software which will warehouse all customers of any segment and has the flexibility to take in any additional functionality when needed in the future.

eVend is a cloud based ERP system for Electricity Distribution Companies. It was built by industry experts in order to specifically address the industry peculiar business needs. The eVend was built to be the major revenue system of JED for both prepaid and

postpaid customers, therefore, apart from the reporting and the administrative modules; there is also the revenue channels module, which enables collecting of payments from customers as described below;

A mobile web application (ePOS) built to support internal cashiers to collect payments. It transparently hold every cashier accountable. Therefore, this is a collection tool for internal use.

Another payment collection module (Sales APIs for third-party) was built to enable third-party collection agents to integrate the eVend with their systems (mobile app, website, USSD, e.t.c) to be able to sell natively in their own systems.

- **CRM:** Customer Relationship Management is a system designed to manage the engagement of a business with current and potential customers. This uses data analysis on the experience of consumers with a brand to enhance business relations with customers, focusing specifically on customer retention, customer satisfaction and eventually increasing sales growth.
- **Billing:** Billing module automates the process of generating and measuring the electricity bill with all the charges and penalties applicable to a customer who has been granted electricity link thus acknowledging the billing circle payments.
- **Meter Management:** this is manages meter inventory, meter maintenance, meter status as well as meter allocation to customers.
- **Network Assets Management:** All the distribution network assets from 33kv Feeders are managed down to customers. New assets creation, replacement of an existing asset, as well as maintenance history of an asset are covered here.
- **Trader Management:** Trader refers to any individual or company who sells or collect payments on behalf of JED be it internally or externally.
- **Sales Management:** this refers to the wallet system of the eVend that applies to both internal cashiers as well as third-party collection agents. Regardless of post-paid or prepaid, the wallet system is applied to ensure accountability and transparency.
- **Receivables & Payables Management:** Debt repayments and refund are dynamically handled here. This is beyond just debt and refund, it allows and track all kind of receivables.
- **Third-Party Sales API:** this allows third-parties to integrate into their system (USSD, Mobile APP, Website, Desktop App, etc) and transact natively.

- **Prepayment & Token Generation:** beyond customers billing, the eVend is an STS compliant system, it generates all kinds of tokens that may be required for meter management and Transfer of energy credit in form of token.

DRAFT

7. Financials

7.1 Historical Performance

The core investor, Aura Energy Ltd submitted a bid for the loss reduction with targeted reduction trajectory that was reflected in the approved baseline loss shown below:

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
Relative loss reduction plan		10.30%	9.04%	11.01%	17.82%	24.21%
Baseline Loss (MDA Incl.)	58.00%	52.03%	47.32%	42.11%	34.61%	26.23%
Baseline Loss (MDA Excl.)	53.87%	48.32%	43.95%	39.12%	32.15%	24.36%
MDA Debt Impact	4.13%	3.70%	3.37%	3.00%	2.46%	1.87%

Note: the yearly figures are at year end

JED PLC's loss position currently is 60% as at September 2019, as against the NERC's minor review that assumed we are in end of year 2, 43.95%. Despite the unfavorable regulatory environment which had forced us into remitting more to the market seeing our market remittance increased from ₦308 million per month in 2014 to ₦800 million per month in 2019. Consequently, leaving us with little to run the operations of the business and invest from our operating cash flows. The implication of the increased market remittance is evidenced as the only distribution company with a positive net position of ₦1.5 billion from the market.

7.2 Financial Forecast

a. Treatment of January 2015 to June 2019 Tariff Period Position

NERC's minor review order, the "2016 – 2018 Minor Review of MYTO 2015" issued in August 2019, have some implications on JED PLC's financial position as follows:

1. Reversal of accrued finance cost from outstanding NBET invoices
2. Recognition of tariff shortfall as regulatory assets

We have a net positive position of ₦1.5 billion when the regulatory asset is offset against the outstanding market obligations to both NBET and MO. The impact of this puts us in a viable position to raise capital from investors. The speed of derecognizing the liabilities from the books has a significant positive correlation with raising capital for the reduction of the high losses we have in the Disco.

In the same minor review order, NERC issued a proposed tariff with effect from 1 January, 2020. We have evaluated this and propose a revision to this tariff primarily because of the huge metering gap within our franchise area. In view of this we propose new tariff that grows with the level of metering and compensate for purchasing power.

This makes MAP to be an important project of JED PLC and will drive it aggressively using the option of Meter Service Charge (financing) for low income class customers who could not afford the upfront payment option. Although metering the customers is key to measurement of energy consumed for them to settle their bills promptly, metering the network connections from the TCN stations down to the DTs is also important for optimum investment management, billing, reliability and loss reduction.

7.3 Scenarios

We proposed Scenarios as such

Scenario 1: MYTO loss level with no increase in CAPEX and OPEX as assumed that the CAPEX is stated in nominal terms.

Scenario 2: JED PLC actual loss level with no increase in CAPEX and OPEX but with the interpretation that the CAPEX used in the MYTO with based figure of USD22 million in 2012 and escalated using the current cost accounting principle as stated in the MYTO order.

	2010	2014	2020	2021	2022	2023	2024
NGN/USD	N150	158.7	309.97	309.97	309.97	309.97	309.97
US CPI FX Adjusting factor			1.95	1.95	1.95	1.95	1.95
CAPEX (Nm)		3,572	6,978	6,978	6,978	6,978	6,978
Total CAPEX for 5 years	N34,888m						

Scenario 3: JED PLC actual loss level with the required optimum CAPEX and OPEX to reduce loss to the target ATC&C level as per performance agreement.

Loss level under the 3 scenarios

	2019	2020	2021	2022	2023	2024
Scenario 1	43.95%	39.12%	39.12%	39.12%	39.12%	39.12%
Scenario 2	60.0%	53.8%	49.0%	43.6%	35.8%	27.1%
Scenario 3	60.0%	50.6%	45.0%	39.6%	32.2%	23.1%

JED PLC believes the scenario 2 as the most realistic option considering the stakeholders claims as explained below:

1. NERC uses the MYTO model, interpreting the model in the proposed manner does not change the principle in the revenue requirements computation

2. Customers are most likely not going to be impacted upon significantly
3. The core investors will be committed to their relative loss reduction on the assumption of restarting the business within favorable operating environment

Each of the above scenarios assumes the following

1. MAP rollout plan will be implemented within the set timeline.
2. NERC will speedily see to the implementation process of derecognizing the outstanding liabilities off the financial position of JED PLC
3. A proposed new tariff as detailed below will be implemented. We have proposed two new class for three phase customers in C1 and R2 classes and because of eligible customers we have proposed the market price for the large industrial customers.

Tariff	2020	2021	2022	2023	2024
A1	46.88	50.63	55.70	60.15	66.17
A2	46.88	50.63	55.70	60.15	66.17
A3	46.88	50.63	55.70	60.15	66.17
C1S1	47.12	53.24	61.23	73.47	84.50
C1S3	50.33	56.88	65.41	78.49	90.26
C2	51.02	57.65	66.30	79.55	91.49
C3	51.02	57.65	66.30	79.55	91.49
D1	47.12	53.24	61.23	73.47	84.50
D2	45.90	51.87	59.65	71.58	82.32
D3	28.97	31.86	36.64	43.97	50.57
R1	4.00	4.00	4.00	4.00	4.00
R2S1	32.94	37.22	42.81	51.37	59.07
R2S3	38.68	43.70	50.26	60.31	69.36
R3	50.56	57.14	65.71	78.85	90.68
R4	50.56	57.14	65.71	78.85	90.68
S1	49.70	56.16	64.59	77.51	89.13

4. The impact of the proposed tariff will change the load allocation pattern and minimum market remittance level as stated in the Minor Review order
5. The change in the minimum market level will extend JED PLC tariff shortfall to 2022.

6. MDA debt at Federal and State level will be settled as at when due, to enable the Disco generate the required cash flow for its optimum investment implementation.
7. Macro-economic variables shown below are used

		2020	2021	2022	2023	2024
Nigeria inflation rate	%	11.34%	11.34%	11.34%	11.34%	11.34%
US inflation rate	%	1.76%	1.76%	1.76%	1.76%	1.76%
Energy delivered to JED PLC	GWh	2,147	2,342	2,608	2,814	2,975
Exchange rate	N/\$	309.97	309.97	309.97	309.97	309.97
Gas Price	\$	\$2.30	\$2.30	\$2.30	\$2.30	\$2.30
Genco unit cost	N/KWh	19.94	19.91	19.96	20.04	20.12
MO unit cost	N/KWh	6.45	6.31	6.06	5.99	6.02

8. Scenario 2 brings in more CAPEX funding requirements for immediate rehabilitation of dilapidated network which will enabled us improved service quality to the customers. The existing operating cost as stated in the MYTO model will be utilized, while the ROI and depreciation will increase accordingly.

Scenario 2		2020	2021	2022	2023	2024	Total
OPEX	N'm	11,710	12,943	14,312	15,832	17,521	72,318
ROI & Depreciation	N'm	19,549	21,249	22,614	24,386	26,039	113,837
Total Disco Cost	N'm	31,259	34,191	36,926	40,218	43,560	186,155

9. Scenario 3 has the under listed CAPEX total ₦60.3 billion over the five year tariff period

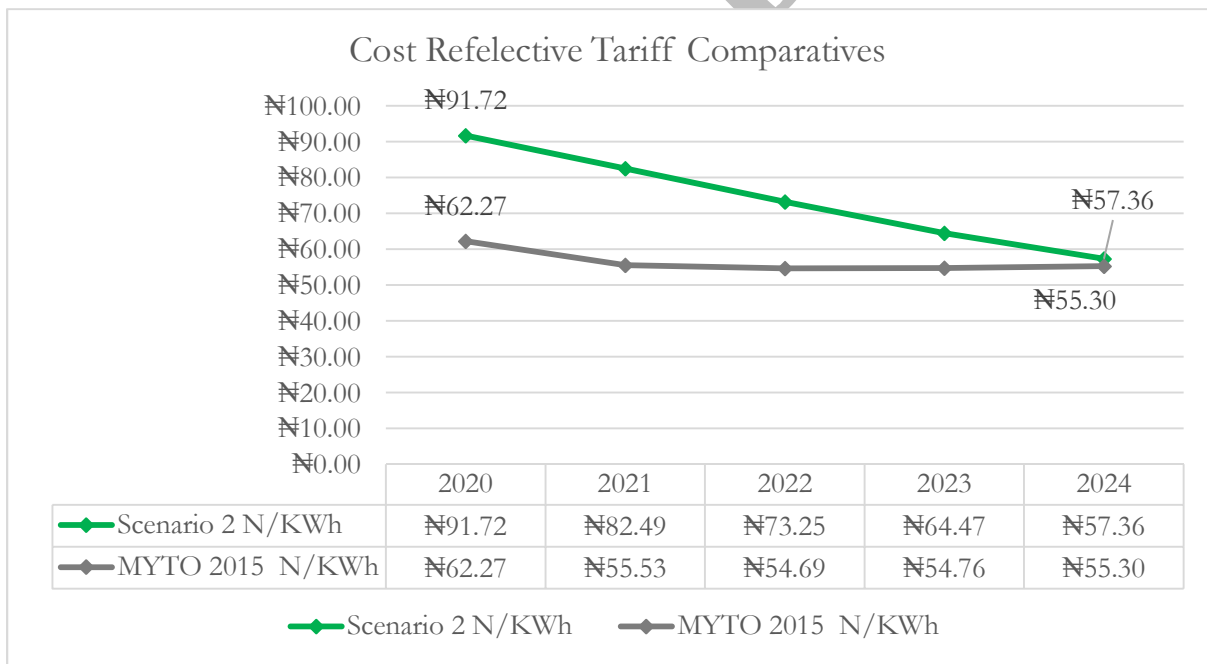
	2020	2021	2022	2023	2024
Network Expansion	684.76	1,981.63	3,249.83	4,040.56	5,453.58
Network Upgrade	171.48	491.59	418.89	418.89	631.22
Network Reliability	2,340.17	3,609.76	4,185.44	5,411.02	6,166.01
Network Rehabilitation	1,618.69	1,706.85	1,955.02	2,004.51	2,318.04
HSE Projects	80.62	161.23	161.23	201.54	201.54
Grid Metering	408.70	-	-	-	-
DSS Metering	2,275.00	912.60	-	-	-
Business Sustainability Cost	300.00	250.00	150.00	150.00	150.00
IT Infrastructure	500.00	250.00	50.00	100.00	100.00
Operational Vehicles	1,250.00	1,250.00	1,250.00	1,250.00	-
	9,629.41	10,613.66	11,420.40	13,576.52	15,020.38

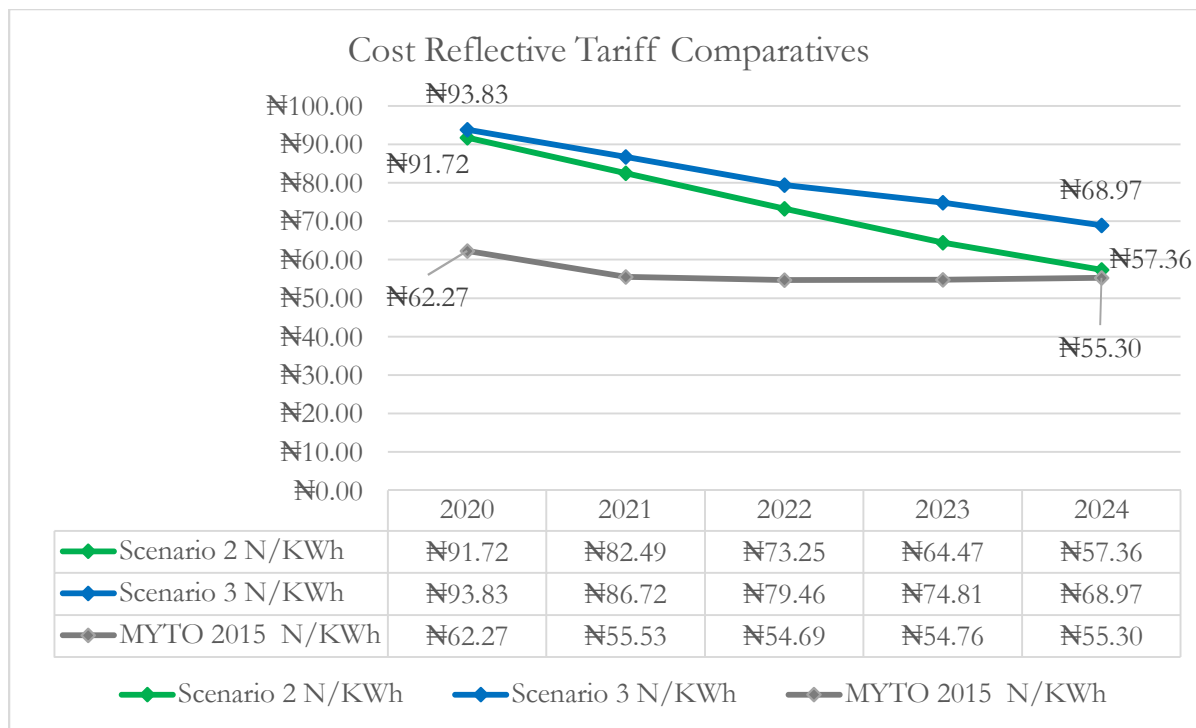
OPEX							
Scenario 3		2020	2021	2022	2023	2024	Total
OPEX	N'm	12,881	14,884	17,174	18,999	21,025	84,963
ROI & Depreciation	N'm	26,979	32,321	37,013	47,448	56,053	199,813
Total Disco Cost	N'm	39,859	47,205	54,187	66,447	77,078	284,776

7.4 Cost Reflective Tariff

The impact of the scenario 2 and 3 relative to the tariff proposed in the Minor Review Order is shown in figure 16 below:

Figure 16: Cost Reflective Tariff Comparatives





7.5 Financing Plan

Over the past period, the company has been funded from operating cash flows generated, vendor financing and CBN-NEMSF loan. The limitation to these three sources of finance is primarily due to regulatory uncertainty, lack of cost reflective tariff through government intervention (subsidy). These risk factors has encumbered our Statement of Financial Position, and raised our credit risk profile and limited our ability to raise external capital for the achievements of our set strategic goals and meeting our performance targets.

With the Minor Review Order released by the commission in August 2019, and the expected speedy conclusion of the process of derecognizing the outstanding liabilities from our books, we will be able to raise capital in the proposed debt to equity ratio 70:30 as assumed in the MYTO model. Our equity contribution, the return of investment (Depreciation) and return of investment will come from retained operating cash flow while the debt will be targeted from the following sources:

1. Commercial borrowing: We have indicative offer letter for loan from United Bank for Africa Plc, our banker, but was not concluded due to the industry risk and the exposure of the bank to the power sector. Our preliminary discussion after the minor review showed improved confidence in the Disco once the

process of de-recognition of the outstanding market liabilities commences, funding will be available.

2. Vendor financing: with expected increase in cash flow from key strategic investments, settlement of the outstanding obligations due to the vendors, the confidence of settling obligations will improve and more cost efficient funding will be made available through a competitive bidding process.
3. World Bank (PSRP): the World Bank has been a key driver of the Power Sector Recovery Program and has signify willingness to fund the Discos' prioritized impactful investment program. They mentioned they have earmarked USD1 billion for this programs and the portion due to JEDP will be used for some of the projects.
4. West Africa Power Pool/German Corporation for International Cooperation: we recently attended a workshop for electricity in Benin Republic where we are introduced to funding programs by WAPP/GIZ, the criteria for the securing the funding have been evaluated and we are confidence that post minor review order and the de-recognition of outstanding market liabilities, we will be able to secure funding to execute some of the projects outlined.
5. Other funding structures: we are open to any funding structure that is cost efficient. We have reactivated our treasury desk in charge of sourcing finance from development agencies and financial institutions.

	Key Risk Area	Risk Description	Probability	Impact	Proposed Mitigate
1	Assumptions in MYTO not changed	<p>Some key assumptions in MYTO which is not part of the minor review variables still carried forward without changes:</p> <ol style="list-style-type: none"> 1. Beta coefficient of 1 still not changed to reflect the business risk and financial risk of 70:30 debt to equity ratio 2. The Misinterpretation of CAPEX allowance, as it was stated to be real and thus expected to be escalated appropriately in each year. Initially it was assumed that it was stated in US Dollars and escalated at the annual depreciation rate of the NGN/USD with the ROI computed on Real WACC. But the practical application now is the CAPEX is in Naira and it is Nominal without any escalation. 3. Exclusion of TCN component costs from working capital that generates returns of investment 4. Treating Meter as an asset class as a component of plant & machinery with a useful life of 40 years instead of 10 years as prescribed by meter manufacturers 5. Removal of collection loss for MDAs in the baseline loss, and still there is no clear pathway of how the backlog of will be clear and the mitigate for the future as effort are currently concentrated on the Federal MDAs leaving the Discos with State & Local Government to deal with. 	High	High	<p>Strategy: Accept</p> <p>This is not within the control of the Discos as the MYTO model is developed by NERC and it is there proprietary revenue model. The Commission is however, to be persuaded to review these key assumptions to reflect best practice for appropriate reward of entrepreneurship and more inflow of private capital into the industry.</p>

PERFORMANCE IMPROVEMENT PLAN

2	Speedy Settlement of Historical Shortfall from Tariff and Market Settlement	The issuance of the Minor Review Order stated that the tariff shortfall from years 2015 to 2018 has been recognized as regulatory asset and FGN is to settle and offset it against the outstanding market liabilities. If this settlement or de-recognition process of the outstanding market liabilities is not carried out speedily, the Discos statement of financial position could still be encumbered thus limiting ability to raise capital at low cost which will benefit the customers.	Medium	High	<p>Strategy: Avoid</p> <p>This is not within the control of the Disco. This is a FGN transaction, and NERC and B.P.E are to ensure speedy settlement of this historical shortfall.</p>
3	Loss Reduction Pathway	<p>The Disco filed a force majeure in 2015, thus have argued that the non-performance period should be 2015 to 2018 as it was only in 2019 that the commission was able to take proactive steps in correcting the major crop of the force majeure. Within this period, the Disco have not been able to raise capital as the SFP has been encumbered and they could not reduce losses as committed in the Performance Agreement</p> <p>The Minor Review Order 2016-2018 considered 2016 and 2017 as mutually non-performing years, which implies that the Discos are in the year three of performance agreement. However, none of the Discos have achieved their third year loss level. The implication of this risk is that the Disco will be re-purchased at USD1 at end of year 2021.</p>	High	High	<p>Strategy: Avoid</p> <p>This is not within the control of the Disco. The recognition of the force majeure is by the powers of the commission who will limit the exposure to be funded by FGN.</p> <p>The Disco will persuade the commission and B.P.E to reflect more favorable years as non-performance years, if not the Disco is likely to lose their investment and will further deter the equity investors to invest the business</p>

PERFORMANCE IMPROVEMENT PLAN

4	Capping of Estimated Bills	<p>There is a consultative paper on capping of estimated bills. The challenge is our huge metering gap within our franchise, and when the commission issues a regulation on this, the Disco's revenue is to be impaired.</p> <p>This will worsen the financial health of the Disco, as the MAP might not have the financial capacity for the inventory requirement to mitigate the risk as envisaged in the consultative paper.</p> <p>The Disco could also face resistance from customers against metering, when they reject the bills as overbilling without seeking to understand the methodology used in computing the bills</p>	High	High	<p>Strategy: Reduce</p> <p>The commission is to consider the readiness of the MAP within our franchise before the issuance of the regulation. They are to monitor the milestone whether the MAP has secured the financial base and have the inventory to meet the expected surge in customer demand for meters when the regulation is issued.</p>
5	Meter Asset Provider	<p>The responsibility of the Disco is loss reduction and metering is a key component of loss reduction. The Discos had been unable to bridge the huge metering gap and the commission had introduce MAP scheme to help mitigate the risk of encumbered SFP, which has limited the Discos from raising capital.</p> <p>The Disco still carry the risk that the MAP will not be able to secure the required financial capital that will help build the inventory requirement which the Disco will face from surge in customer demand when the</p>	High	High	<p>Strategy: Reduce</p> <p>The commission is to consider the readiness of the MAP within our franchise before the issuance of the regulation.</p> <p>The commission is to consider allowing the Disco to also continue their metering while expanding the CAPEX allowance to cater for metering</p>

PERFORMANCE IMPROVEMENT PLAN

6	Project Management Timelines for PIP Contractors	The Disco is primarily responsible for achievement of loss reduction as set in the Performance Agreement. However, due to the enormous task ahead, the Discos will have to outsource some non-core business to contractors. The contractors might not deliver on timelines with external factors that are beyond their control. However, if the loss reduction target is not achieved by year end 2021, the Disco business could be repurchased at USD1.	Medium	Medium	<p>Strategy: Reduce</p> <p>JEDP has always tie contractors to performance bond to help mitigate the risk. However, even with the bond, external factors that will not warrant calling in the bond for compensation could occur, while the FGN exercise the right to repurchase. FGN is to consider the circumstances for not achieving the loss target level.</p>
7	Eligible Customer	The activation and implementation of the regulation will impact negatively on the Disco's revenue and thus worsen her financial health	High	High	<p>Strategy: Reduce</p> <p>The commission is to implement the Competition Transition Charge (CTC) that will erect the high switching cost of EC. The Disco is to improve the service to CTC for them to remain. Pricing could also be a huge consideration</p>

PERFORMANCE IMPROVEMENT PLAN

8	MDAs Payments	The commission removed the portion of collection loss in the baseline and assume that the Government can control their MDAs to and settle their obligations as at when due. However, history shows that the Governments have defaulted consistently thus impairing the financial health of the Discos.	High	High	<p>Strategy: Reduce</p> <p>The commission should work with the Government to implement the proposed mechanism of centralizing the invoicing through a bill validation mechanism via automatic meter reading and invoice generation. This will manage the prospective bills and implement the discounting mechanism for the historical and net it off from outstanding market liabilities</p>
9	Project Management Timelines of TCN Stations under construction	<p>We have several very long, old dilapidated 33KV feeders spanning through several states. The implication is increased level of interruptions, low quality supply and dis-satisfied customers.</p> <p>We have planned mitigates by constructing new feeders and the associated cost of injection substations as well the distribution substation of evacuate power from the new TCN stations yet to be commissioned or conclude construction.</p>	High	High	<p>Strategy: Reduce</p> <p>JEDP will de-load the feeders by construction new feasible feeders to feed some customers which will reduce the number of customers who encounter such low quality services.</p>
10	Liquidity Risk	<p>Where the outstanding liability in the Disco's SFP is not speedily derecognized, the ability to raise capital to fund project exist</p> <p>When customers refuses to pay their bills as a result of</p>	Medium	High	

PERFORMANCE IMPROVEMENT PLAN

		non-payments of their salaries for several months. The account receivables will pile up			
11	Human Resourcing Risk	<ol style="list-style-type: none"> 1. Hiring and firing the wrong people 2. Usage of a semi-automation process for staff appraisal 3. Poor talent management and implementing learning & development programs 	Medium	High	<p>Strategy: Reduce</p> <p>JEDP understands that the service to the customer is carried out by the people. consequently, we will ensure strict hiring and firing process, continue the process in use of performance evaluation committee to review staff appraisals and approve the release of staff for non-performance</p>
12	Poor credit management regulations	<ol style="list-style-type: none"> 1. Customers not paying their bills despite disconnecting them from grid 2. The accounts receivables piling up without no pass due charges to match the charge from the market invoice 3. The Discos financials not attractive to financiers 4. Ease of electricity theft 			<p>Strategy: Reduce</p> <p>NERC should consider introducing pass due charges on account receivables to match market charges. Also consider law criminalizing debt on utility bills, energy theft and speed of resolving any utility credit management cases.</p>

Appendix 1

MAP PRE INSTALLATION CHECKLIST					
NAME OF LICENSED MAP:.....			Date:.....		
REGION:.....			Account No:.....		
AREA OFFICE:.....			DT Type: Private/Public		
33/11KV FEEDER:.....			Upriser: Private/Public		
DT/UP/POLE NO:.....			Tariff Type:.....		
1	Is there an existing service pole in customer premise		Yes <input type="checkbox"/>	No <input type="checkbox"/>	
2	POLE TYPE: Concrete <input type="checkbox"/>		Wooden <input type="checkbox"/>	Steel <input type="checkbox"/>	
3	Pole status		Good <input type="checkbox"/>	Bad <input type="checkbox"/>	
4	Does the household require Separation?		Yes <input type="checkbox"/>	No <input type="checkbox"/>	
5	Into how many accounts (for separation)?				
6	Number of Phases on the mains supply		<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
7	Number of phases from the mains to the customer Premises		<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
8	Number of Phases used at customer premises		<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>
9	Expected Maximum Demand in KW in the premise				
10	Type of protection at customer connection point		<input type="text" value="None"/>	<input type="text" value="MCB"/>	<input type="text" value="Fuse"/>
			<input type="text" value="ELCB"/>	<input type="text" value="RCB"/>	
11	Proposed Phase for Connection		<input type="text" value="R"/>	<input type="text" value="Y"/>	<input type="text" value="B"/>
12	Length of Incomer cable(Where Multiple meters are installed)				
13	Type/size of service wire Used				
14	Use of premises. Residential <input type="checkbox"/>		Commercial <input type="checkbox"/>	Industrial <input type="checkbox"/>	Special <input type="checkbox"/>
15	Want to propose a change in Tariff?		<input type="text" value="Y"/>	<input type="text" value="N"/>	
16	Meter type recommended Single ϕ		Three ϕ	Whole Current	CT-Operated
Justification/Comments:					
JED REP:			MAP REP:		
Name:			Name:		
Sign:			Sign:		Date:
ID:.....					
Note: Provide Pictorial evidence of service pole, Protection used at connection Point & Mains					

Appendix 2



MAP POST INSTALLATION CHECKLIST

NAME OF LICENSED MAP:.....	DATE:.....
REGION:.....	METER NO:.....
AREA OFFICE:.....	SEAL NO:.....
33/11KV FEEDER:.....	
DT/UP/POLE NO:.....	

1	POLE TYPE: Concrete <input type="checkbox"/> Wooden <input type="checkbox"/> Steel <input type="checkbox"/>	YES	NO
2	If wooden pole, is the pole good?		
3	Does the pole have morethan six(6) meters?		
4	Is the incomer cable properly fastened with linetap?		
5	Is the incomer/outgoing fixed properly to the mains?		
6	Are the incoming & outgoing connections to the MCB Ok?		
7	Is the pole mounting strap properly fastened?		
8	Is the flexible trunk fixed properly?		
9	Are cable ties used to fastened the flexible trunks?		
10	Are connections to the customer load properly made?		
11	Are the joints properly insulated with tape?		
12	Are water outlets properly provided?		
13	Any Phase or neutral mismatch?		
14	Where Multiple meters are installed, is the clearance Appropriate?		
15	Is there Output to the customer premises?		
16	Are there extra service cables to customer premises?		
17	Is the UIU communicating with the meter?		
18	Is Job completion form properly filled?		
19	Is the customer placed on right tariff based on installation form?		
20	Does the meter serial number match that in JED data bank?		
21	Does the seal number match that in JED data bank?		

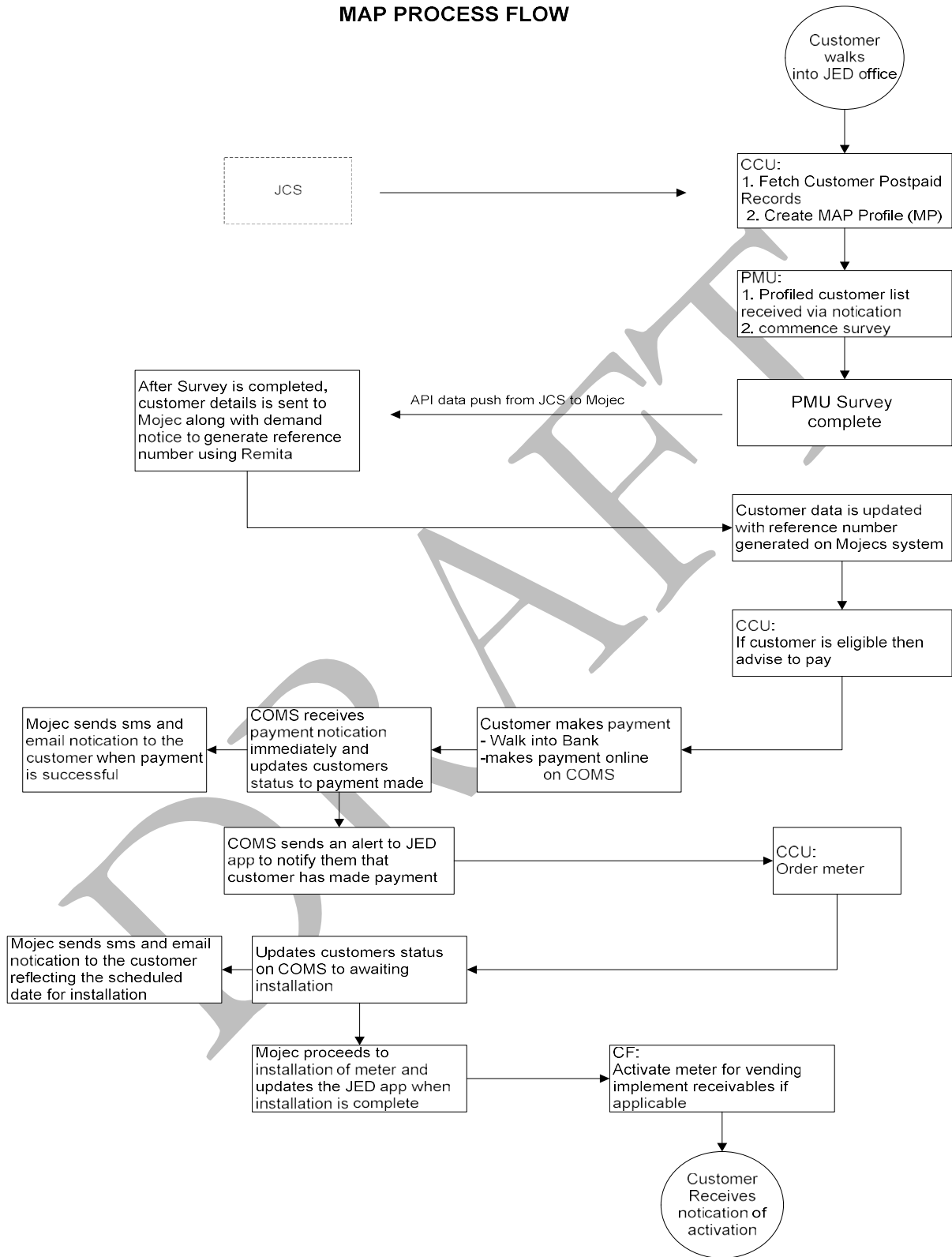
Comments:

Staff Name: _____ I.D: _____ Signature: _____

Note: Pictorial evidence is required for reference

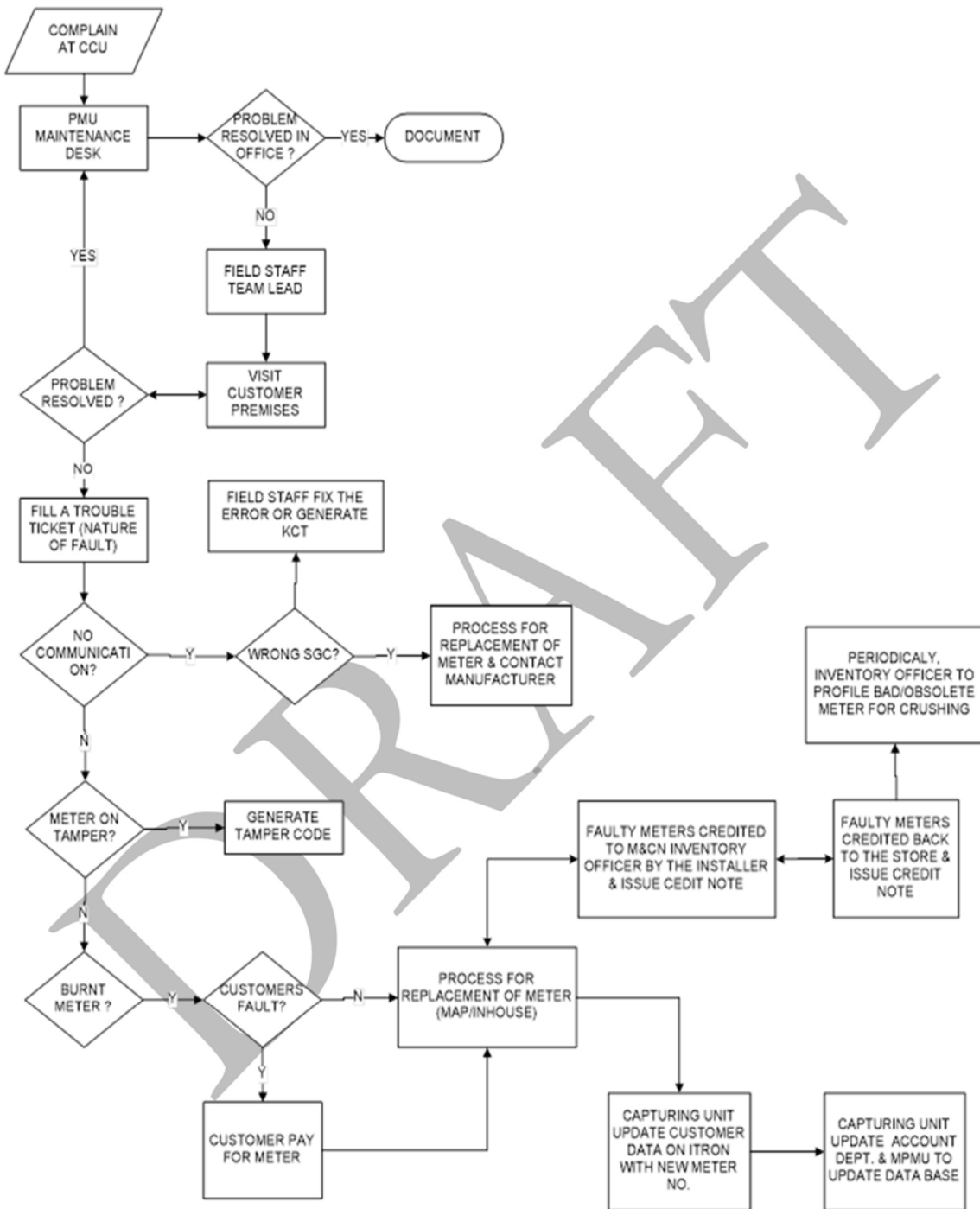
Appendix 3

MAP PROCESS FLOW



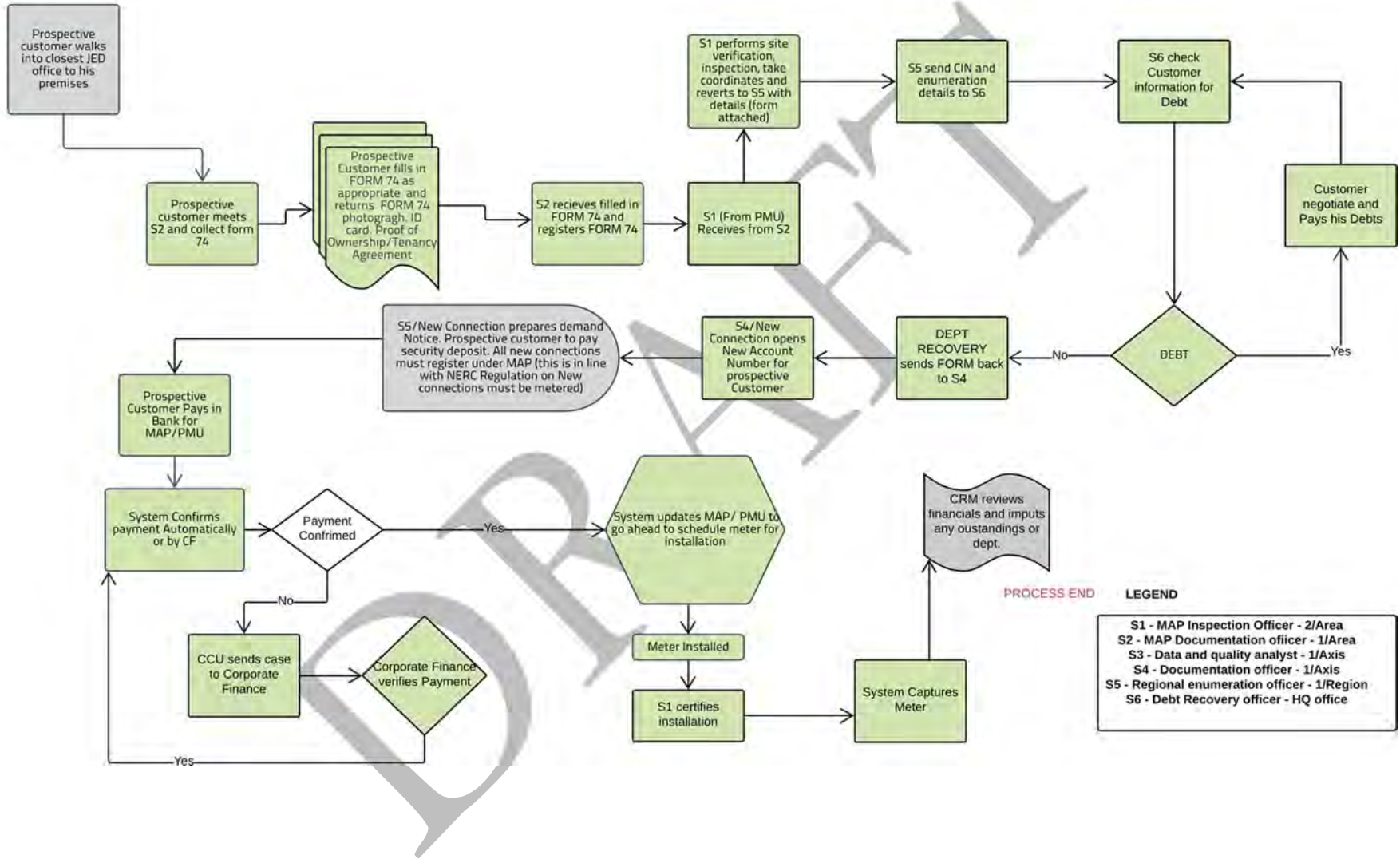
Appendix 4

EXISTING M&NC MAINTENANCE CYCLE



PERFORMANCE IMPROVEMENT PLAN

PROCESS BEGINS



- LEGEND**
- S1 - MAP Inspection Officer - 2/Area
 - S2 - MAP Documentation officer - 1/Area
 - S3 - Data and quality analyst - 1/Axis
 - S4 - Documentation officer - 1/Axis
 - S5 - Regional enumeration officer - 1/Region
 - S6 - Debt Recovery officer - HQ office

Forecast Customer Numbers

	2019	2020	2021	2022	2023	2024
A1	2,028	2,207	2,300	2,389	2,475	2,570
A2	223	241	250	258	266	274
A3	66	79	87	95	103	112
C1_1	33,388	35,750	38,146	39,546	40,888	42,302
C1_3	4,691	5,054	5,432	5,826	6,244	6,705
C2	4,678	5,100	5,376	5,668	5,977	6,304
C3	88	96	104	112	120	129
D1	1,959	2,235	2,439	2,653	2,877	3,123
D2	97	112	122	134	146	160
D3	11	13	13	13	13	13
R1	9,404	10,368	11,430	12,601	13,893	15,317
R2_1	404,318	464,989	523,295	567,107	573,318	576,559
R2_3	24,900	27,405	35,229	40,301	41,390	42,178
R3	804	818	832	836	838	840
R4	23	25	31	33	33	33
S1	23	25	27	29	32	36
	486,701	554,517	625,113	677,601	688,613	696,655