

**RATE CASE APPLICATION FOR JOS ELECTRICITY
DISTRIBUTION PLC**



JULY 2023

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INTRODUCTION

About The Company

Jos Electricity Distribution, a Public Liability Company (JED Plc) is one of the eleven Electricity Distribution Companies (DisCos) privatized by the Federal Government of Nigeria pursuant to the Power Sector Reform Act of 2005, which led to the unbundling of Power Holding Company of Nigeria (PHCN) as a government owned power utility company. JED Plc took over operations on November 1st, 2013 with the mandate to be the first-choice provider of quality electricity in Nigeria.

With its Headquarters in Jos, Plateau state, JED Plc is an indigenous electricity company incorporated in Nigeria to carry out the business of electricity distribution and retail sale in the regions of Plateau, Gombe, Bauchi and Benue States. JED Plc operates one of the longest distribution networks in the country. It spreads across a geographical span of 152, 901 KM² and caters for over Six Hundred Thousand (600,000) customers.

With links to eight transmission stations of Transmission Company of Nigeria (TCN), JED Plc operates through eight Regional Offices which are further decentralized into thirty-two Area Offices and one hundred and forty-seven Feeder Offices. JED Plc receives a daily average energy allocation of about 6% from the National Grid (227MW daily average offtake target) that is distributed through its Eight (8) regional offices.

The core business of JED Plc is the distribution and retail of electricity, under which it provides:

- Energy distribution within its franchise states
- Connection of New Services
- Metering and Network Maintenance

Objectives of the Report

Following submission by JED on its sustainability plan, NERC conducted a review of its current market remittance and found an average monthly shortfall of N1.77Bn over the period September to November 2022. The company is not meeting its minimum remittance obligations (MRO) to the market, which currently stands at a combined average of 47.94% as against expected MRO of 62.17% as contained in the Minor Review Order.

Accordingly, JED was required to provide a bank guarantee to NBET covering 3-month average under payment to the market, to be adjusted on a quarterly basis having regard to the assessed payment performance of JED.

In pursuit of this, JED could opt for a reset of its operating variables including optimal energy commitment, adjustment to PIP, efficiency parameters, among others, and file for rate review with the Commission.

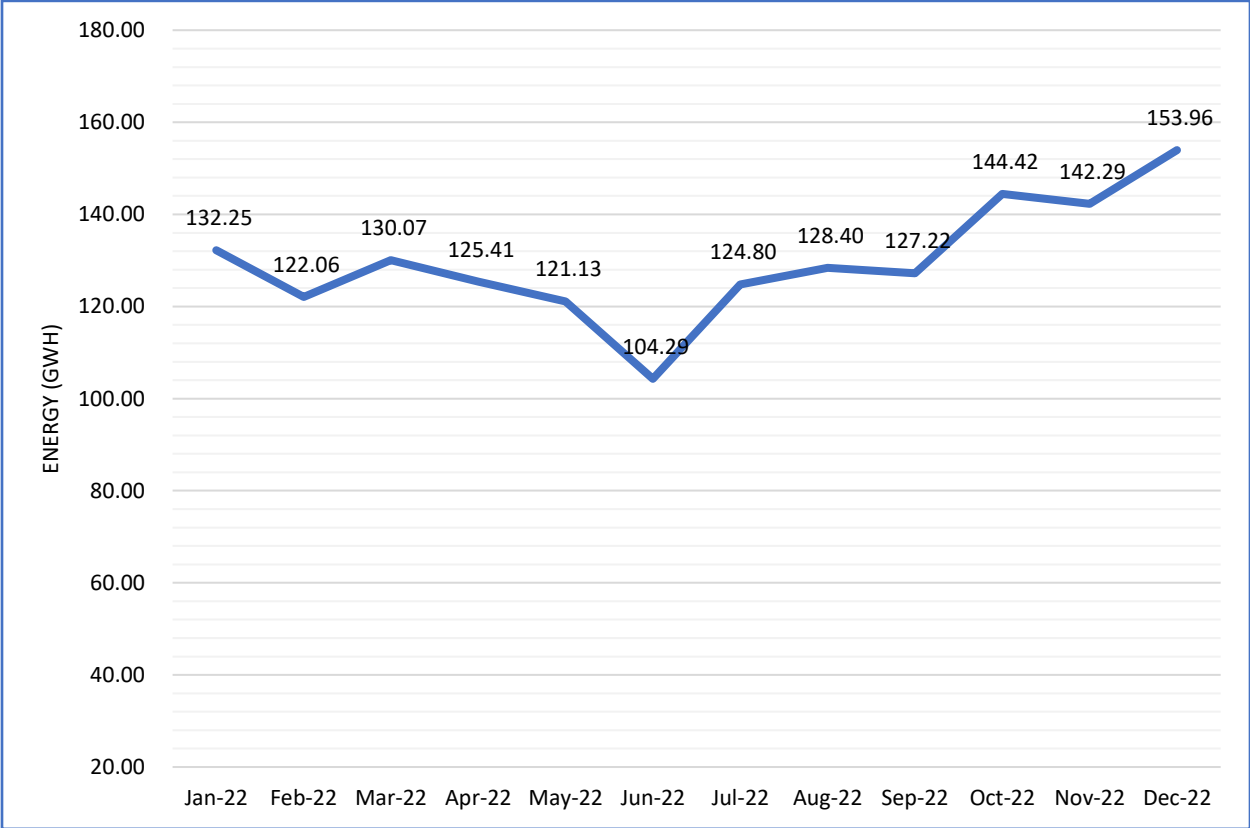
Accordingly, the objective of the report is to formally file a rate-case review before the Commission geared towards ensuring operational efficiency, improved quality of service and meeting JED’s obligations to the market.

CURRENT OPERATIONAL LEVEL – A LOOK AT 2022 PERFORMANCE

Energy Analysis

Total energy received by JED Plc over the period Jan – Dec 2022 was 1,556 GWh, an average of 129 GWh monthly. The average energy received for the last quarter of 2022 was 146 GWh.

Figure I – Energy Data (Jan – Dec 2022)



Energy received marginally grew by an average of 2% over the period, with around 15% of the total energy delivered Maximum Demand (MD) customers, while around 62% of the energy was delivered to NMD customers.

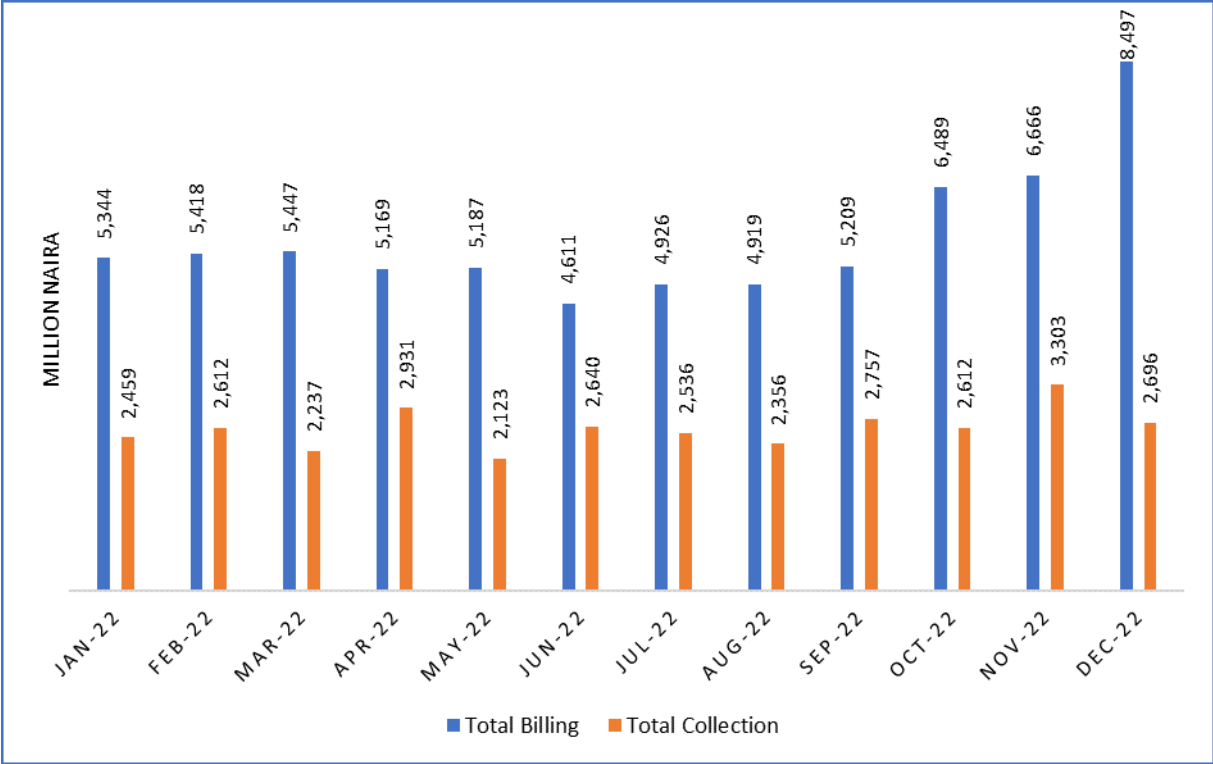
The data reveals that around 23% of the energy is not accounted for. From the total energy to MD customers, around 15% was delivered to MDAs while the remaining (85%) went to private MD customers.

Billing & Collection

Over the period under review (Jan – Dec 2022), average billing efficiency was 75% while average collection efficiency stood at 47%. The low billing and collection efficiency levels undoubtedly pose a major risk to the sustainability of JED as a business.

Average MD and NMD collection efficiencies were 70% and 40% respectively. A further breakdown of the MD customer category reveals that average collection efficiency for MD-MDAs was 39% and for the private MDs was 76%. MD collection efficiency went below 50% in May and Dec.

Figure 2 – Billing and Collection (Jan – Dec 2022)



Average ATC&C loss levels for the period under review was 65%, with the highest loss level recorded in Dec. 2022 at 75% and the lowest recorded in Jun 2022 at 55%. The high

level of ATC&C losses is quite concerning with significant impact on remittance and profitability of the business.

Market Remittance & Shortfall

The average monthly NBET bill (energy and capacity) for JED in 2022 was N3.24Bn, with an average Minimum Remittance Obligation (MRO) of 65.11% for the period. The average adjusted (for MRO) NBET invoice for the period was N2.48Bn monthly.

With an average of N815Mn monthly TCN invoice, the average total market obligation was N3.3Bn monthly. JED Plc paid an average of N2.3Bn monthly, leaving a shortfall of around N1.1Bn monthly. It is important to state that this does not account for the insufficient operational expenses allowed during the period.

REVIEW OF KEY OPERATIONAL PARAMETERS

ATC&C Loss Levels

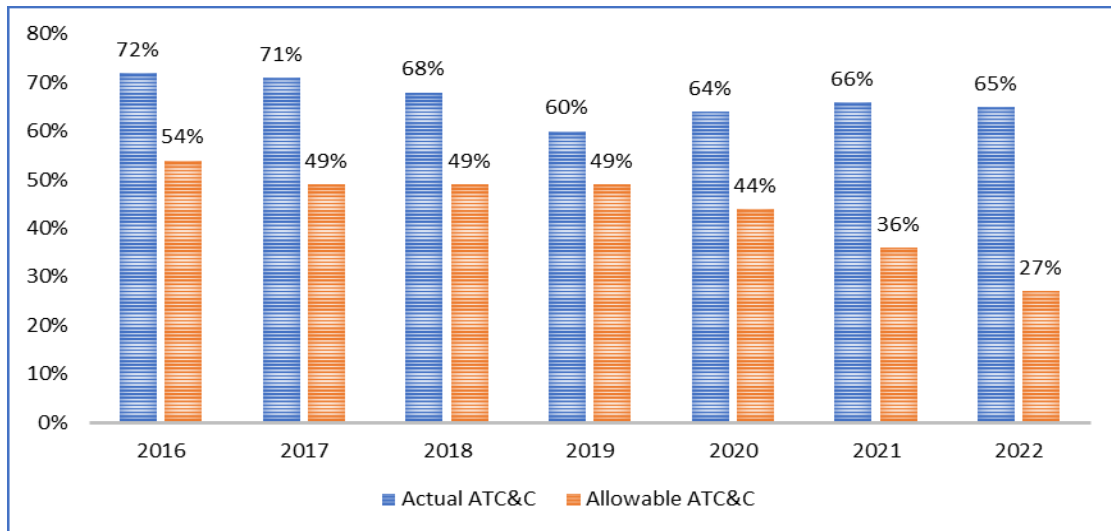
JED Plc conducted a baseline energy loss assessment study in 2021 to ascertain the actual level of losses within its franchise area. The study, which was conducted by PwC adopted the Bottom up - Voltage State – Assessment (BVSA) methodology (copy of the report hereby attached as Appendix I).

A sample of 33kV and 11kV feeders were selected for the assessment which was undertaken for the period Jan-19 to Dec-20. The assessment reveals that the losses on the 33kV feeders (technical and commercial) range from a maximum of 29% and minimum of 2%, while on the 11kV feeders the losses range from a maximum of 42% and a minimum of 5%. The assessment further reveals that the overall ATC&C loss level ranges from a maximum of 82% and a minimum of 73%, which is higher than the numbers reported in the previous baseline study. The report recommended JED Plc to streamline its energy accounting and audit in terms of processes, technology, organization and infrastructure which will support an effective loss reduction and metering strategy.

Historical ATC&C Losses

Average ATC&C loss levels over the period 2016 to 2022 was 66%, with the highest loss level recorded in 2016 at 72% and the lowest recorded in 2019 at 60%.

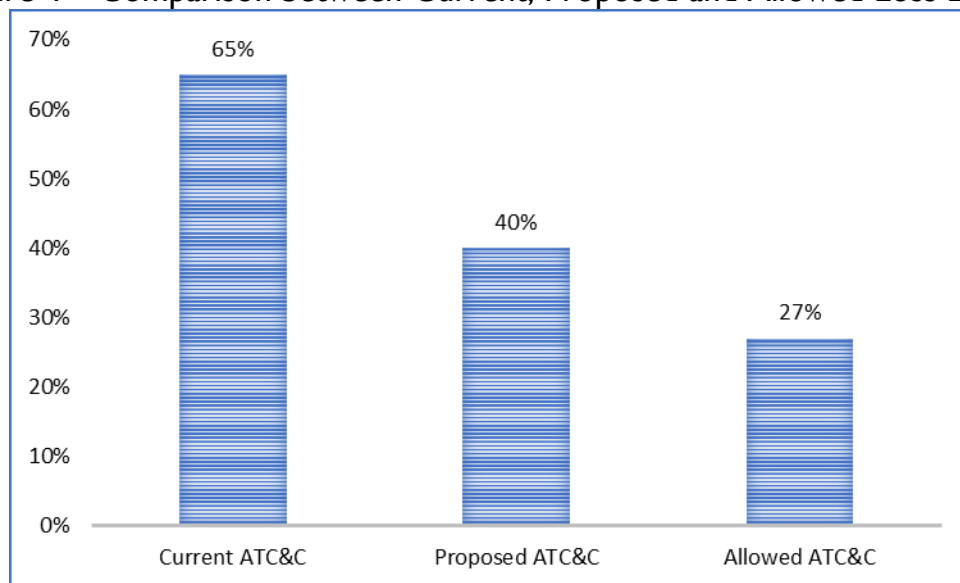
Figure 3 – Historical ATC&C Loss Levels



The high level of ATC&C losses is quite concerning with significant impact on remittance and profitability of the business. To bring down ATC&C to committed levels is difficult to achieve, even with significant improvement in billing and collection efficiency levels. JED currently has allowable ATC&C loss level of 27.27%, which is far from the current levels of over 60%.

This significant disparity between the committed and actual loss levels adversely affects company's operational efficiency and distorts its performance. JED Plc therefore propose resetting the ATC&C loss level to 40%, which is believed to be a more realistic baseline.

Figure 4 – Comparison between Current, Proposed and Allowed Loss Levels

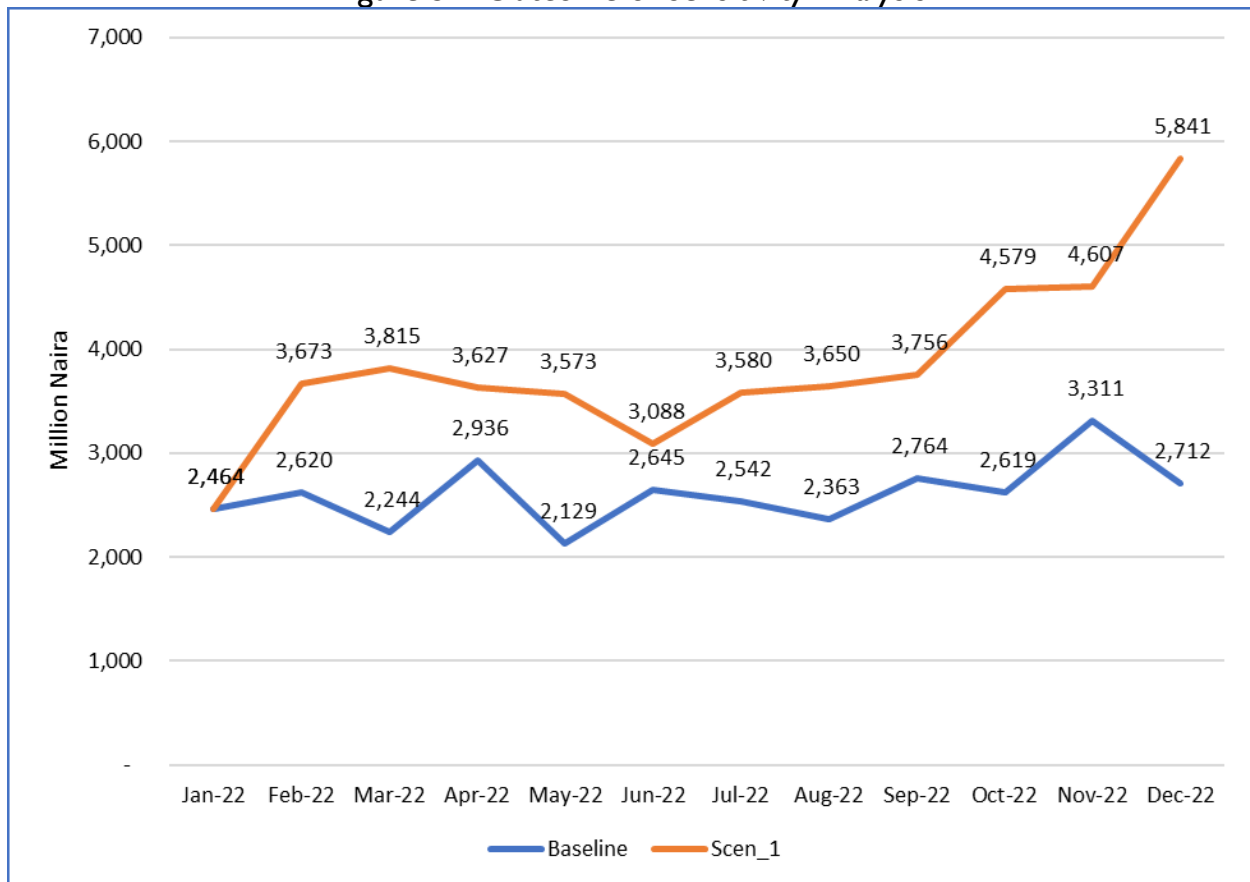


As shown in Figure 4 above, there is a 25% disparity between the current and proposed loss levels. After conducting a detailed scenario analysis based on different loss levels and

its impact on tariffs, the proposed loss level was adjudged to be the most balanced, both in the short-term and long-term sustainability of the business. The short-term losses resulting from this disparity can be closed through internal efficiency improvement and energy optimization.

Sensitivity analysis conducted using the 2022 operational data reveals that assuming the same energy was received but 10% more energy was delivered to the MD customer category (5% from unaccounted energy and 5% from NMD to MD), and a collection efficiency of 90% for MD customer category and 50% for NMD, average monthly collection would increase from N2.6Bn to N3.9Bn and average ATC&C loss level would reduce from 65% to 48%.

Figure 5 – Outcome of Sensitivity Analysis



Investment Strategy to Improve Performance and Reduce Losses

Some of the major drivers of losses within the JED franchise area include use of undersized cables and conductors, aged/weak network infrastructure, high level of vandalism, huge metering gap leading to majority of the NMD customers billed on estimation, high level

of meter tampering and bye-pass, minimal process automation, unremitted cash collections by staff and agents, among others. A summary of the planned strategies and initiatives required to support the loss reduction drive is provided in the table below. The improvement plans cover technical, ATC&C, management and customer services improvement areas.

Table 1 – Improvement Plans

Loss Reduction Plan	Strategy
Technical Improvement Plan	<ul style="list-style-type: none"> • Rehabilitation and upgrade of 6 critical 33kV Feeders and associated injection substations serving customers on Bands A and B • Upgrade of 7 substation from 1X7.5MVA to 2X7.5MVA and in some cases 1X15MVA in Mangu, Pantami, Tudun-Wada Gombe, Doma, Govt. House Bauchi among others • Construction of 8 new injection substations to relieve over loaded feeders and improve quality of supply • Extension of 33kV and 11kV Feeders to connect more MD and NMD customers • Upgrade/Standardization of 1,300 DTs across the JED network (protection, fencing, standard cabling etc.) • Rehabilitation of 11/0.415kV lines on critical feeders
ATC&C Loss Reduction Plan	<ul style="list-style-type: none"> • Deployment of smart network metering systems – 50 Feeder meters and 1,500 DT meters for effective energy accounting on priority feeders • Replacement of obsolete MD meters with AMI compliant meters and procurement of new MD meters (MV-Panel MD meters and LV-MD meters) • Deployment of 100,000 smart consumer meters per annum, including PPMs, credit meters, whole-current • Normalization of 130,000 customer connection points per annum
Management and Customer Service Improvement Plan	<ul style="list-style-type: none"> • Deployment of GIS and AMI system • Process automation through the deployment of ERP systems • Phased deployment of micro-SCADA system • Deployment of advanced call centre management system • Provision of hardware equipment such as servers, computers • Restructuring and internal re-organization • Implementation of cashless policies

	<ul style="list-style-type: none"> • Provisions of alternative payment channels and operational applications • Upgrade of offices, customer service points and injection substations • Provision of operational vehicles, including cranes for effective services and enforcement activities
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The investment requirement to implement the plans highlighted above is provided in Table 2 below. It is important to state that the investment cost highlighted is the average annual requirement over the five-year period.

Table 2 – Capex Deployment Plan to Support Loss Reduction

Description		Amount
1	Technical Investment Plan	N6.57Bn
2	ATC&C Loss Reduction Plan	N8.11Bn
3	Management and Customer Service Improvement Plan	N3.20Bn
Total		N17.88Bn

Loss Reduction Trajectory

The table below summarizes the proposed loss reduction trajectory and effective loss levels over a five-year period. The baseline (2023) ATC&C is set at 40% in line with the reset model proposed.

Table 3 – Proposed Loss Reduction Trajectory

	Baseline	Y1	Y2	Y3	Y4	Y5
Loss Reduction Trajectory	-	10.50%	12.30%	12.30%	15.50%	15.50%
Effective Loss Level	40%	35.80%	31.40%	27.53%	23.27%	19.66%

End-User Meter Deployment

The work done in metering the grid points, including most of the private and public Distribution Substations has laid a foundation for the eventual closure of metering all end-user customer points.

Over the past three (3) years, a lot has been achieved in terms of grid metering – all 33kV and 11kV feeders are fully metered, all of which are AMR-compliant meters. It is gratifying

to note that JED Plc has been adjudged to be top of all the DisCos in FMDA metering and integration to the PowerTech Platform. The company has also achieved only 49.1% metering on Maximum Demand customers.

Table 4 – Metering Status

S/N	Meter Category	Total Count	Metered	% Metered
1	33kV Metering	45	44	97.78
2	DisCo Interface Meters	9	3	33.33
3	11kV Metering	140	140	100
4	Public DTs	5,325	1,782	33.46
5	MD Metering	1,267	622	49.1
6	PPMs	235,209	235,209	100
7	Unmetered	416,428	-	-

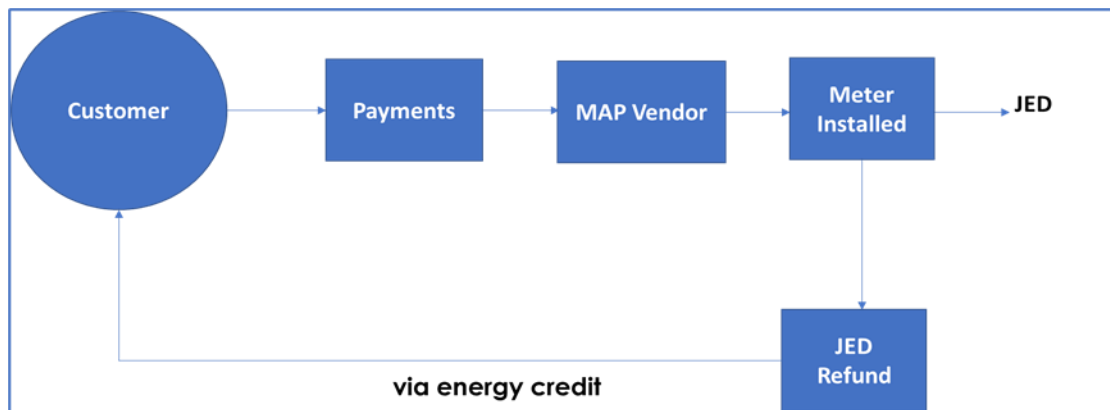
All the 33/11kV meters and most MD meters are AMR-compliant and active on the company’s AMR platform. Realtime monitoring of MD customers consumption via AMR has significantly reduced electricity theft and improved collections.

Metering Financing Programs

Considering the liberalized metering schemes, we have various options contemplated by the company, including the following:

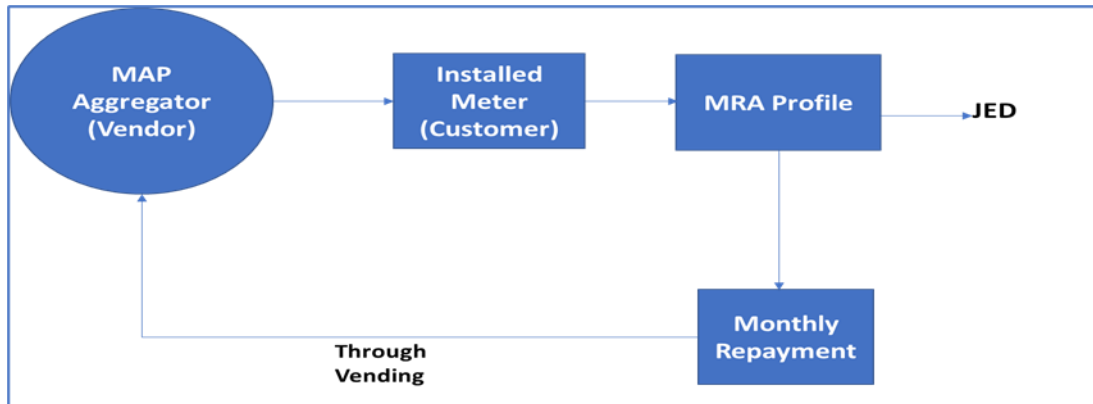
i. Current MAP Framework Schematic

Consumer approach the DisCo, pays for a meter and MAP installs the meter. The cost of the meter is refunded over a maximum 36 months via energy credit.



ii. MAP Aggregator Schematic

In place of individual customers, a single buyer who is the vendor will purchase multiple meters based on agreed contract. The DisCo and the vendor will meter the customers and account for it same as the current MAP transaction. The monthly repayment which to each customer that will be inform of energy token will be accrued and paid to the vendor directly



iii. Meter for Receivable Program

Customers that have receivables also do feel reluctant to pay because they don't feel confident about the estimated bills issued to them. Historically, we have used this to our advantage where we give meter, the customer is granted a discount to its account receivable, pay an immediate deposit and the balance is prorated over a period agreed by the customer. The monthly repayment is taken after VAT deduction and the balance is used to vend for energy credits

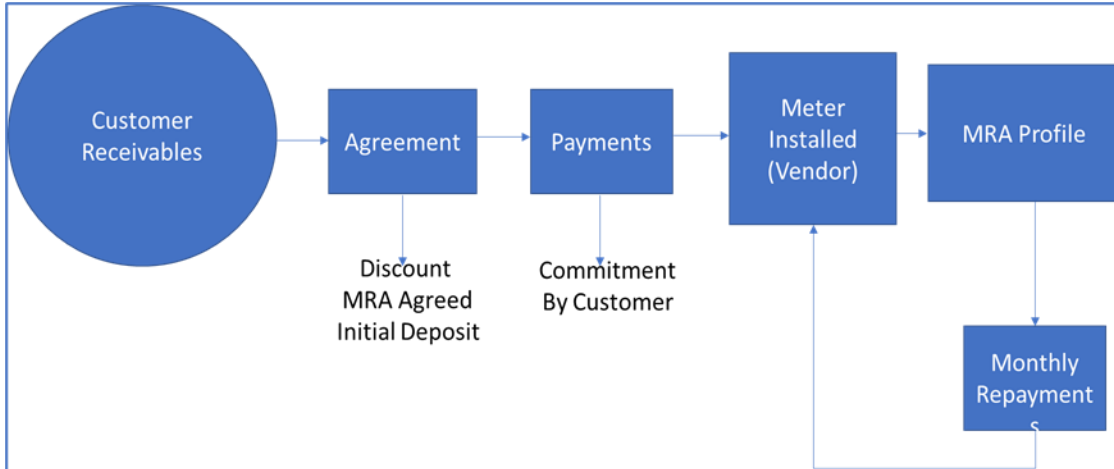
Our Proposal – Expanded Meter for Receivable Program

Customers that have account receivable after providing a discount covers the cost of the meter will be installed meters. The meters will be procured from a vendor through vendor or bank financing.

The monthly account receivables collections from each installed customers will be accrued and paid to the vendor.

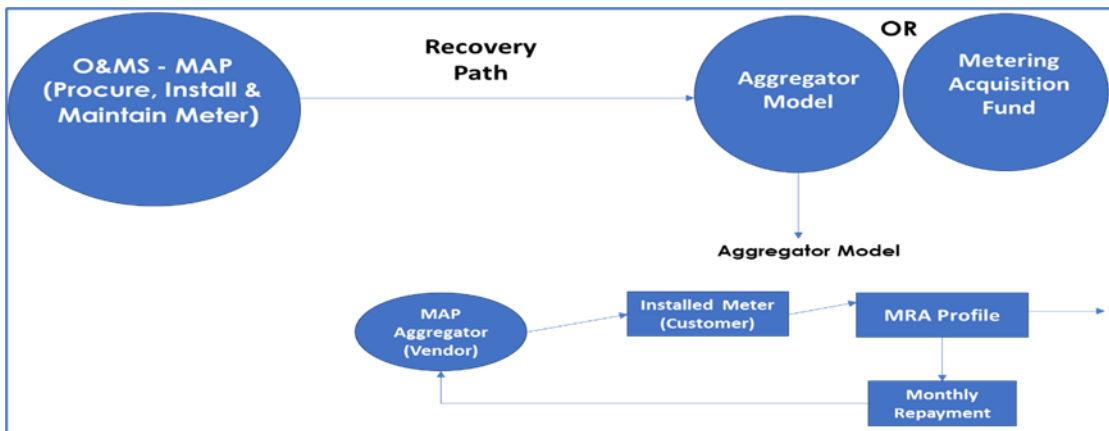
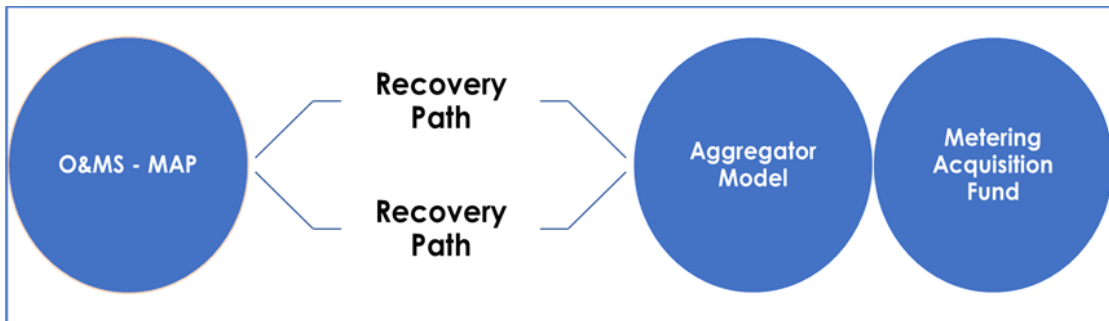
The financing cost could be built into the repayment will be in line with the regulation and where an increase is required based on commercial rate, the DisCo pays from their regulatory allowed monthly operating cashflow.

Relative to the MAP that has an existing regulation and current practice, the meter for receivable doesn't have any. The current practice is that it is part of the monthly DisCos cash collection and cannot be ring-fenced and pooled to attract investment in the area.



iv. Own & Maintain Scheme- Meter Asset Providers (O&MS-MAP) Model

Shareholders are allowed to Supply, Install, Own, Operate and Maintain customer meters. This Business Model ring-fences customer metering from the DisCo's business and allows third parties to invest. The Investment recovery path is through Metering either the NERC established Metering Acquisition Fund or the same recovery method applicable for MAP Aggregator Model.



Meter Deployment Plan

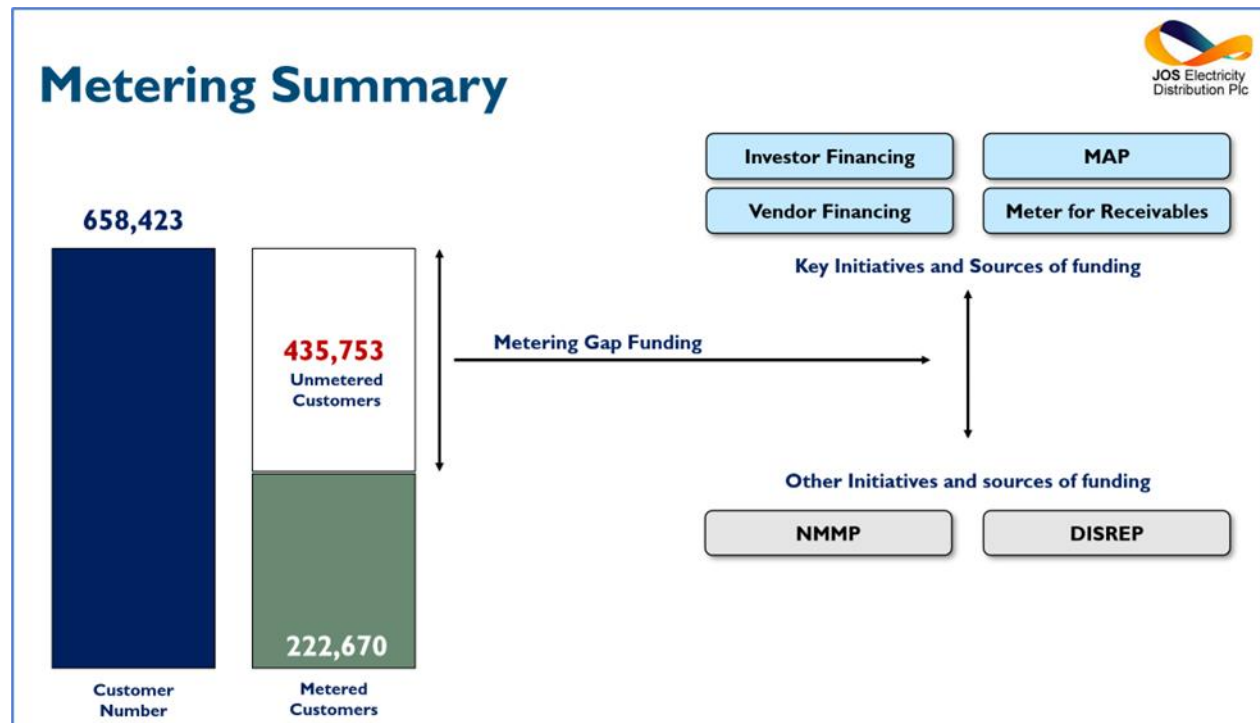
JED's 5-year meter deployment plan is provided in the table below.

Table 5 – Meter Deployment Plan

Meter Category	2023	2024	2025	2026	2027
Panel Meters – 33kV and 11kV	78	8	8	8	8
Smart LV-MD Meters	1,187	110	110	110	110
Prepaid Meters	114,797	188,754	100,000	100,000	100,000
Total	116,062	188,872	100,118	100,118	100,118

Total Amount of Investment needed to close the metering gaps above is about Thirty-Two Billion Naira, as broken down below:

1. Investors Financing – N0.9bn
2. Vendor Financing – N1.8bn
3. MAP – N0.9bn
4. Metering for Receivables – N3.1bn
5. DISREP – N5.3bn
6. NMMP (Phase I) – N20.0bn



Energy Offtake

Projected Energy Requirement

EMRC carried out energy demand studies for JED for the period 2021 – 2027 (copy attached as Annexure II) in line with the regulatory requirements. The forecast results are presented in Table 6 below.

Table 6 – Energy Demand

Year	Energy (GWh)	Peak (MW)
2023	1,612	283
2024	1,721	302
2025	1,806	317
2026	1,919	337
2027	2,040	358

The peak demand is projected to grow from 274MW in 2021 to 358MW in 2027, a growth of 31%. Energy is also projected to increase from 1,339GWh in 2021 to 2,040GWh in 2027, a growth of 52%.

MYTO Energy Assumption for 2023

Projected energy delivered to JED Plc in 2023 is 2,118 GWh, which is equivalent to 242 MWh/h. We consider this allocation sufficient in the short-term and will be maintained as such in the revised model.

The table below breakdown the projected energy delivered (242 MWh/h) by feeder/tariff bands.

Table 7 – Energy Delivered

Category	Av. Energy Consumption	No. of Customers	Total Energy	% Ratio
Life-line	98.34	14	1,571.64	0.00%
A - Non MD	176.00	408,568	83,291,105.34	47.80%
A - MD1	3,937.38	2,948	13,250,086.89	7.60%
A - MD2	87,963.03	296	29,721,813.21	17.06%
B - Non MD	161.77	125,240	24,234,902.83	13.91%
B - MD1	1,739.18	539	1,070,080.04	0.61%

B - MD2	19,306.18	104	2,291,991.77	1.32%
C - Non MD	162.09	86,633	16,311,589.96	9.36%
C - MD1	1,907.90	327	712,173.95	0.41%
C - MD2	9,376.02	36	385,304.64	0.22%
D - Non MD	91.46	12,561	1,311,382.14	0.75%
D - MD1	4,299.82	61	299,407.86	0.17%
D - MD2	1,260.81	2	2,878.47	0.00%
E - Non MD	55.05	21,037	1,322,076.37	0.76%
E - MD1	481.42	55	30,225.35	0.02%
E - MD2	2,181.82	2	4,981.19	0.00%
		658,423	174,241,571	100.00%

Key Network Limitation

Table 8 – Network Limitation

S/N	Nature of Constraint	Constraint Load (MW)	Remark
1	Overloaded Power Transformers	18.25	This includes public and Private PT
2	Failed Power Transformers & obsolete equipment	12.25	This includes public and Private PT
3	Overloaded Distribution Transformers	7.65	Undergoing local load shedding pending provision of relief and this limit energy offtake
4	Failed Distribution Transformers	5.1	Out of circuit DTs
5	Vandalized Network	1.2	This includes OH line and equipment such as transformer oil theft which left the customers out of supply
6	Collapsed Network & substandard lines	5.5	
7	Poor Power Quality due to TCN constrains	30.0	This hinders Industrial customers from off-taking energy

Analysis of Reliability Indices

Table 9 – Reliability Indices

Index	2017	2018	2019	2020	2021	2022
SAIDI (mins)	11,069	10,115	8,966	7,298	6,976	7,228
SAIFI	41.09	37.52	33.98	32.71	31.88	18.23
CAIDI (mins)	269.40	269.40	263.86	223.12	218.82	218.80

The above analysis was done using 33kV feeders, as 11kV feeders and distribution transformers were not fully metered during period under review.

The following distribution network constraints result to high frequency and duration of interruptions:

- Massive vandalism of copper armored cables resulting to use of undersized and substandard aluminum conductors and aluminum armored cables
- Recoiling of failed transformer coils with substandard materials
- Substandard and obsolete distribution infrastructures such as wooden poles, aluminum conductor, feeder pillars, HV circuit breakers, switchgears etc.
- Lengthy HT and LT lines. Some 33kV feeders have route length of over 500km route length
- Over loaded feeders, power & distribution transformers
- TCN constraints and interruptions

Result of Recent Stress Test

The stress test which was anchored by TCN was conducted jointly with our team on 16th & 17th of June 2023.

Results:

A coincidental peak load of 238.06MW at 0700hrs and non-coincidental peak of 344.6MW was achieved on 17th June 2023.

It should be noted that one of our biggest customers Dangote Cement Plant Gboko with peak load of 23MW, was out of service within the two days on planned maintenance by TCN.

Also, some of the feeders were intermittently out of supply during the exercise due to the heavy rainfall and windstorms coupled with poor network infrastructures.

Bilateral Contracts and Embedded Generation

JED Plc is currently having exploratory conversations with the following Gencos on power procurement:

- NDPHC - 100MW
- Dadin-kowa - 20MW
- Kiri dam - 40MW
- Mainstream - 20MW

JED Plc's Investors have also commenced the assessment of a possible acquisition of NESCO (30MW). The potential acquisition and revamping of the NESCO facility will provide additional power supply to our customers within the franchise area.

OPEX

Table 10 – 3-Year Historical Opex (Million Naira)

Expense Line Description	2022	2021	2020
Repairs and Maintenance Expense	768	527	257
Billing and Collection Expense	5,321	3,750	3,179
Staff Cost (Staff, Mgt., and Board)	4,242	4,466	4,167
Administrative and Gen. Expenses	5,197	4,314	5,019
Total	15,528	13,058	12,622
Staff Numbers	2,244	2,541	2,576

CAPEX

Table 11 – 5-Year Historical Capex (Million Naira)

Capex	2018	2019	2020	2021	2022	Total
Metering	4,646	1,607	582	2,656	1,707	11,198
Technical	522	354	344	253	737	2,210
Others	90	124	467	125	4	809
Total	5,257	2,085	1,393	3,034	2,448	14,217
MYTO Allowed	2,275	2,021	1,280	719	10,157	16,452
Variance	2,982	64	112	2,315	(7,709)	(2,236)

The variance is due to uncompleted and unexecuted 2021 NEMSF-II Capex projects which has been provided for the Capex program.

Accordingly, the 5-Year investment plan in the Table 12 below.

Table 12 – 5-Year Capex Plan (Million Naira)

Capex	2023	2024	2025	2026	2027	Total
Technical Inv. Plan	3,285	4,250	6,570	7,285	7,285	28,675
ATC&C Loss Reduction Plan	4,055	9,125	8,110	9,055	9,055	39,400
Mgt. and Cust. Service Inv. Plan	1,600	3,550	3,200	2,600	2,600	13,550
Total	8,940	16,925	17,880	18,940	18,940	81,625

Summary of Proposed Changes

Table 13 below provides a summary of the proposed changes to the tariff model following the reset conducted. As required, the revised model is hereby attached.

Table 13 – Revised Parameters

Year	Current Model	Revised Model
Allowable ATC&C Loss Level	27.27%	40.00%
Energy Delivered	2,118 GWh	2,118 GWh
Annual Capex Provision	₦15.10Bn	₦15.10Bn
Annual Opex Provision	₦19.52Bn	₦19.52Bn
Cost Reflective Tariffs	₦95.21/KWh	₦115.23/KWh
Allowable Tariffs	₦90.45/KWh	₦109.47/KWh
Minimum Remittance Level	92%	80%

The allowable loss level has been adjusted from 27.27% to 40.00% while all other parameters (Energy, Capex and Opex) all remained the same. We opted to maintain the Capex provision in the model despite the annual average investment plan (₦17.88Bn) being slightly above the MYTO provision (₦15.10) because of the challenge around raising the full annual capital requirement, and the consideration around ensuring the tariffs does not go beyond a certain threshold.

CONCLUSION AND PRAYERS

The reset option provided by NERC offers a good opportunity for the sustainability and profitability of the business. The financial health of JED Plc hinges around its ability to improve its efficiencies through reduction in ATC&C losses, improvement in billing and collections and meeting short-term obligations. This can only be achieved if the underlying parameters in the tariff model are fairly set, and adequate investments are made towards improvement in performance and quality of service.

Prayers:

Based on the aforementioned, we kindly request the Commission to:

- a. Note the urgent need for a review of JEDC's allowable loss levels in the Multi-Year Tariff Order (MYTO) Model as part of the tariff review process.
- b. Take note of the attached revised MYTO model, which is a requirement in the rate review process.
- c. Note the planned investment in metering and other Capex-related activities.
- d. Consider and approve our application for a rate filing as detailed above.

We are available to engage with the Commission on this important exercise.

Yours Truly,

Engr. A. B. Mohammed
Managing Director/CEO