



PUBLIC UTILITIES REGULATORY COMMISSION

**TARIFF PROPOSALS FOR REVIEW OF ELECTRICITY DISTRIBUTION AND
SUPPLY AGGREGATE REVENUE REQUIREMENTS AND TARIFF**

BY NEDCo ELECTRICITY DISTRIBUTION COMPANY LTD

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Executive Summary

NEDCo's mandate entails distributing and supplying electricity primarily to the Northern, Upper East, Upper West, Savannah, North-East, Bono, Ahafo regions and parts of Bono East, Oti and Ashanti regions.

NEDCo's coverage area is 152,665 sq. km (64%) of Ghana's land area, with a customer population of 1,290,0087, representing 8 customers per square kilometre as of December 2024. The vast geographical area of NEDCo's utility territory, coupled with the sparse nature of the dwellings of its customers, especially those in the rural communities, means that the average cost of supplying every kWh of electricity or serving customers is relatively higher in Ghana

NEDCo's customer base is predominantly residential. In terms of percentages, NEDCo's residential customer population is 83.55%. The non-residential customers, on the other hand, constitute 16.44% while the industrial customer segment is 0.01% of the total customer population as of December 2024.

The economically infertile geographical location of NEDCo, in comparison with ECG's operational area, has aggravated the financial situation of NEDCo, resulting in its inability to breakeven or deliver quality service at the level desired by Management. In addition, NEDCo presently sells electricity at lifeline rate of GHp67.6495/kWh (per October 01, 2024, Gazette Tariff) to 39% of its customers. This rate is significantly lower than the total approved DSC rate of GHp56.474/kWh and BGT tariff of GHp74.7715 for 2024 Q3, which totals GHp131.2455/kWh. Specifically, the difference between the two rates is GHp63.596/kWh, excluding TSC1, TSC2, and the Regulatory levy.

After PURC approved the tariff for the last regulatory period, 2022 to 2026, NEDCo implemented several initiatives to enhance its operational efficiency, service delivery, and financial sustainability. These include the construction of Lamashegu 34.5/11.5kV Substation and Sub-Transmission Lines, 100km Conductor upgrade, Supply and Installation of 71,050 Prepaid meters, construction of 11 customer service centres among others.

Despite these interventions, NEDCo's operating costs have increased significantly due to several factors including inflation, exchange rate fluctuations, rising costs of fuel and maintenance cost for operational vehicles, vital electrical materials, equipment such as power transformers, switchgear, fuses, drop-outs, auto re-closers, sub-transmission, LV and service poles, insulators, breakers, surge and lightning arrestors etc.

Other sources of increased operational costs include general labour costs and the charges for outsourced network maintenance and expansion works.

In addition, NEDCo faces several challenges in its operations such as high levels of distribution losses due to theft, aged network infrastructure, inadequate revenue, and indiscriminate installation of streetlights/public lighting systems within its Operational Area. Others include, predominantly low income customers, weak financial position and limited customer service centres. Some of these challenges have contributed to the increasing NEDCo's distribution losses which have negatively impacted on the company's finances.

Several challenges are inherent in the geographical location and socio-economic circumstances of NEDCo's customers. However, NEDCo does not accept these challenges as insurmountable barriers to the delivery of quality service, and as such, some projects have been identified for implementation to eliminate or reduce the negative impacts of these challenges on the quality of utility service to customers and on revenue generation.

Furthermore, NEDCo has proposed service delivery and efficiency improvements in the tariff proposal derived from its five-year strategic plan (2023-2027) aimed at enhancing customer experience, reducing losses, and improving service quality and revenue collection.

However, the main source of funding for NEDCo's operations is Internally Generated Funds (IGF) to which our cherished customers must contribute through end-user tariffs. NEDCo, therefore, proposes tariffs that reflect the actual cost of electricity distribution, which includes operational expenses, infrastructure maintenance, and capital investments.

To be able to match costs of service to tariff revenue, NEDCo seeks tariff adjustment of 171% of the October 01, 2024, revised Distribution Service Charge (DSC) tariff approved by PURC.

Finally, to enable NEDCo recover at least its cost of service and fixed cost, NEDCo proposes GHp153.03/kWh for Distribution Service Charge (DSC) for the year 2025.

1 Introduction

The Northern Electricity Distribution Company Limited (NEDCo) submits this Electricity Tariff Proposal to the Public Utilities Regulatory Commission (PURC) for consideration and approval. This proposal aims to assist NEDCo in achieving financial sustainability, operational efficiency, and service reliability as a going concern and to make electricity affordable for our customers.

As a key player in the electricity distribution sector, NEDCo faces rising operational costs, increasing technical and commercial losses, aging infrastructure, inadequate customer service centres. Additionally, there is the urgent need for network expansion to serve our growing customers, which need to be financed by the tariffs to be approved by the PURC. Economic factors such as inflation, exchange rate fluctuations have negatively impacted NEDCo's revenues and financial stability since the last DSC was approved for NEDCo (September 2022), limiting NEDCo's ability to provide quality service to its customers.

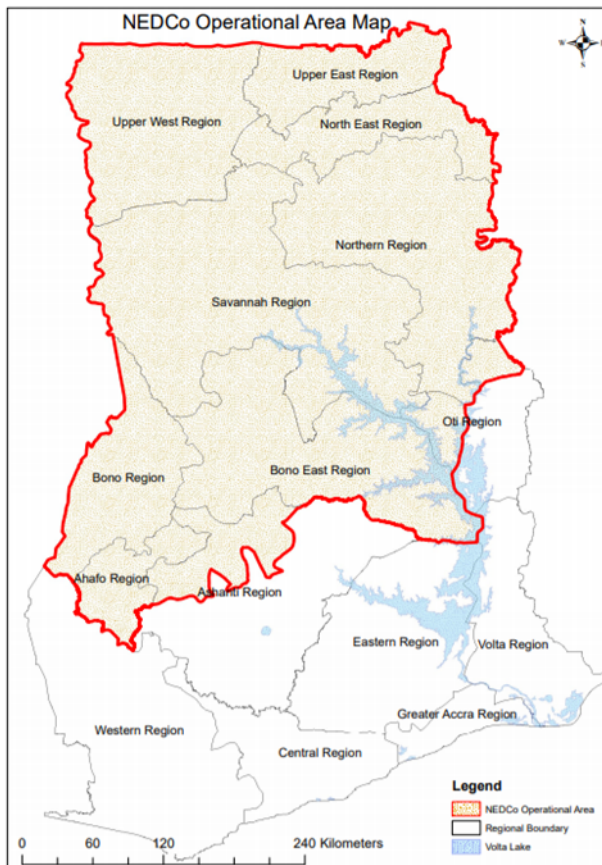
This proposal is submitted to enable NEDCo to:

1. Recover operational costs and ensure financial viability of the company.
2. Invest in infrastructure upgrades to enhance network reliability and efficiency.
3. Expand access to electricity in underserved communities.
4. Invest in energy loss reduction and revenue collection strategies.
5. Align with national energy policies and regulatory frameworks.

NEDCo remains dedicated to transparency, stakeholder engagement, and delivering excellent service in ensuring equitable electricity tariffs that benefit both NEDCo and its customers.

1.1 Brief Background of NEDCo in Electricity Distribution and Supply Operations

The Northern Electricity Distribution Company (NEDCo) is a subsidiary of the Volta River Authority (VRA) in Ghana, established to manage the distribution and supply of electricity in the northern parts of the country. The company was created as part of the power sector reforms aimed at enhancing efficiency and improving electricity access across the country.



NEDCo's mandate entails distributing and supplying electricity primarily to the Northern, Upper East, Upper West, Savannah, North-East, Bono, Ahafo regions and parts of Bono East, Oti and Ashanti regions.

NEDCo's operational area covers nearly two-thirds of Ghana's landmass, making NEDCo essential for promoting economic development and social inclusion in these underdeveloped regions. NEDCo plays a critical role in ensuring reliable power delivery to both urban and rural communities in its coverage area.

NEDCo's customer base is predominantly residential. In terms of percentages, they form about 83.55% of NEDCo's customer population. The non-residential customers constitute about 16.44% while the industrial customer segment is 0.01% of the customer population as of December 2024.

TARIFF CLASS	Residential	Non-Residential	SLT	Total
Customer population (%)	83.55	16.44	0.01	100.00
Energy consumption (%)	65.23	26.70	8.07	100.00
Revenue contribution (%)	60.43	30.48	9.09	100.00
Cash contribution (%)	44.08	35.92	20.00	100.00

This customer distribution reflects the socio-economic makeup of the northern part, where industrialization is relatively low, and electricity demand is mainly driven by households and small businesses.

The economically infertile geographical location of NEDCo, in comparison with ECG's operational area, has aggravated the financial situation of NEDCo, resulting in its inability to breakeven or deliver quality service at the level desired by Management. In addition, NEDCo sells electricity at lifeline rates of GHp67.6495/kWh to 39% of its customers. This rate is significantly lower than the total approved DSC rate of GHp56.474/kWh and BGT tariff of GHp74.7715 for 2024 Q3, which totals GHp131.2455/kWh. Specifically, the difference between the two rates is GHp63.596/kWh, excluding TSC1 and TSC2. (Per October 01, 2024, Gazette Tariff).

1.2 Rationale/Objectives Underpinning Tariff Submission

NEDCo's objectives for the tariff proposal submission for the regulatory period 2025-2030 include the following.

- A. To propose tariffs that reflect the actual cost of electricity distribution which includes operational expenses, infrastructure maintenance, and capital investments.
- B. To propose the discontinuation of the lifeline tariffs (exclusively 0-30 kWh) for residential customers and introduce a straight tariff for all residential customers.
- C. To propose the elimination of cross-subsidization and promote a non-discriminatory tariff structure that ensures fairness among customer classes.
- D. To propose the introduction of a streetlight tariff in the tariff structure to help account for the cost of streetlight consumption, as the public lighting levy covers only about 20% of the actual cost of streetlight consumption.
- E. To propose the recovery of investment costs for projects ongoing and planned for the five-year regulatory period.
- F. To request sufficient revenue to sustain operations and meet financial obligations.

1.3 Highlights of Major Issues Which Describe Structure of Tariff Submission

The tariff proposal considers NEDCo's cost of doing business, which is very high mainly due to high inflation, exchange rate fluctuations, rising costs of fuel and maintenance of the distribution network, salaries and related expenses, and other working costs, add up to a high cost of operations. These underscore the need for increased tariffs to cover NEDCo's operational costs.

There is also the need to ensure that the tariffs provide adequate returns to sustain operations, meet debt obligations, and fund future capital investments. Also worth noting is the dominance of residential customers in NEDCo's customer demography, with a high rate of lifeline customers, minimal industrial customers, and high distribution losses. All these impacts negatively on the finances of NEDCo, hence the call for an increase in tariff adjustment.

2 Initiatives Undertaken Since 2022 Tariff Review

Since the 2022 tariff review, the Northern Electricity Distribution Company has undertaken several initiatives to enhance its operational efficiency, service delivery and financial sustainability.

2.1 Projects Undertaken

2.1.1 Construction of Lamashegu 34.5/11.5kV Substation and Sub-Transmission Lines

Objective	To reduce the length and overloading of 11.5kV lines in Tamale Metropolis
Anticipated Impact of Project	• Increased installed capacity (increased capacity by 40MVA) • Increased reliability (SAIFI: • Improved voltage quality (Feeder end voltage from 90% to > 95%) • Increased revenue • Reduce losses by (when the lines are shortened)
Project Cost	The total cost of the project is USD13.80million+ GHS26.90 million
Level of completion	Project is 71% completed

2.1.2 100km Conductor Upgrade

Objective	To increase line capacity and reduce technical losses on 11.5kV overhead lines
Anticipated Impact of Project	• Increased installed capacity (increase installed capacity by 75%) • Loss reduction (1.5%) • Improved voltage quality (Improve feeder end voltage to >90%) • Increased revenue
Project Cost	The total cost of the project is USD 1.3m

Level of completion	Project is 100% completed
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2.1.3 KEXIM Projects

Objectives	Improve distribution network performance
Scope	Major project items include the construction of six distribution substations, two switching stations, one Distribution Network Management System (DNMS), Construction of sub-transmissions and feeder lines (NEDCo funded)
Anticipated Impact of Project	• Reduction of power supply cost which may arise as a result of reduction of distribution power loss. (Reduction in technical losses by 1.05%) • Improve feeder voltage from 87.7% to 95% • increase power supply capacity • Reducing the emission of environmental substances • Reduction of unserved energy cost by reducing the power supply interruption
Project Cost	The total cost of the project is USD 80.8 million. +USD12.4m
Level of completion	Draft bidding document has been submitted to KEXIM Bank for their No-objection. Project on hold because of IMF conditionality.

2.1.4 Construction of NEDCo Head Office Complex

Objective	The construction of the building will bring together all Departments of NEDCo in Tamale under one roof for easy workflow
Anticipated Impact of Project	• Cost-saving by avoiding expensive rental of office spaces. • Increased productivity by having all NEDCo Staff in the same building • Reduced operational cost by sharing resources. • Improved VRA/ NEDCo image • Avoided threat of ejections by Landlords. • Improved Security to NEDCo's equipment and tool
Project cost	The total cost of the project is USD 12million.
Status	The Geotechnical Investigation for the construction of the Head Office complex has been done and the report submitted by the contractor. This project has been delayed because of funding issues.

2.1.5 Supply and Installation of 30,750 (Lot 2) and 40,300 Smart Split Prepaid Meters (Lot 3)

Objective	The project is to procure 71,050 split smart meters aimed at reducing commercial losses and improving revenue collection.
Scope	The project consists of the procurement and installation of pole-mounted smart & split prepaid meters for LV customers in the Tamale metropolis, where non-technical losses are predominant.

Anticipated Impact of Project	• Reduction of non-technical losses. • Reduced Tamale commercial losses from 28% to 12% over 3 years) • Increased collection efficiency
Project Cost	The total cost of the project is (GHS99.39M)
Status	Lot 2 is 60% complete (GHS 41.7M) Lot 3 99% complete (GHS 57.69M)

2.1.6 Procurement of distribution materials

Objectives	The objective of the project is to procure materials required for the continuous operation of the distribution infrastructure.
Scope	Some of the distribution materials earmarked for purchased are transformers, wood and steel poles, fuses, energy meters, conductors, cables etc.
Anticipated Impact of Project	• Increased service availability • Improved customer perceptions • Increased installed capacity. • Increased energy sales/revenue
Project Cost	The total cost of the project is USD 1.44 million.
Status	Distribution materials procured

3 Compliance with Directives of the Commission

The Northern Electricity Distribution Company (NEDCo) has demonstrated a commitment to adhering to directives issued by the Public Utilities Regulatory Commission (PURC). For example, it has consistently complied with the tariff reviews issued by the commission for charges to customers and other parties in the utility distribution value chain. We have also very often complied with directives issued by the Commission during arbitration or dispute settlements between NEDCo and customers. We have also been consistent in the submission of quarterly and annual reports to the Commission.

4 Key Policy Issues for Tariff Consideration

NEDCo proposes the introduction of streetlight tariffs in the tariff structure to help account for the cost of streetlight consumption, as the public light levy covers only about 20% of the actual cost of streetlight consumption.

Additionally, NEDCo proposes the discontinuation of the lifeline tariffs (exclusively 0-30 kWh) for residential customers and request for the introduction of a straight tariff for all residential customers.

5 Proposed Service Delivery and Efficiency Improvements During Tariff Period

NEDCo's proposed service delivery and efficiency improvements for the tariff proposal derived from NEDCo's five-year strategic plan (2023-2027) are:

A. Loss Reduction Strategies

- Implement e-billing to improve billing accuracy and reduce commercial losses.
- Strengthen revenue protection programs to curb illegal connections and power theft.
- Upgrade overloaded distribution transformers and substations to minimize technical losses.

B. Network Reliability Enhancement

- Invest in preventive maintenance programs to reduce downtime and enhance network reliability.
- Deploy smart grid technologies for real-time monitoring and fault detection.
- Improve voltage stability.

C. Customer Service Enhancements

- Develop and deploy a customer contact centre for easier complaint resolution and service requests.
- Enhance mobile payment options and expand collection centres to increase revenue mobilization.
- Strengthen customer education on energy conservation and tariff structures.

D. Revenue Collection Improvement

- Implement prepaid metering systems to improve cash flow and reduce arrears.
- Enforce strict disconnection policies for defaulters while offering structured payment plan agreements.

E. Cost Optimization Initiatives

- Conduct energy audits to identify and eliminate distribution losses (inefficiencies) in power distribution.
- Optimize workforce management through capacity-building programs and process automation.

5.1 Service Delivery and Efficiency Targets

STRATEGIC OBJECTIVE	MEASURES/ KPI	TARGETS				
		2025	2026	2027	2028	2029
Increase Revenues	Collection Rate (%)	93	95	98	98	98
Increase Customer Satisfaction	Customer Satisfaction Index (%)	90	90	90	90	90
Enhance Customer/Stakeholder Engagements	Stakeholder satisfaction index	85	87	88	89	90
Reduce Distribution losses	% reduction in distribution loss	27.13	25.93	24.73	23.53	22.33
Improve power supply quality and reliability	SAIDI-Urban (Hrs)	54.76	49.28	44.35	39.92	35.93
	SAIDI-Rural (Hrs)	75.76	67.72	60.95	54.86	49.37
	SAIFI-Urban (No)	31.27	28.14	25.33	22.80	20.52
	SAIFI-Rural (No)	48.60	43.74	39.37	35.43	31.89
	CAIDI-Urban (No)	1.75	1.75	1.75	1.75	1.75
	CAIDI-Rural (No)	1.54	1.54	1.54	1.54	1.54
	Planned Maintenance %	100%	100%	100%	100%	100%
	No. of Secondary Substations (No)	8793	9232	9694	10179	10688

5.2 Technical / Operating Performance Indicators/Indices

INDICATOR	Unit	2020	2021	2022	2023	2024
Saidi-Metro	Hrs	65.1	59.2	45.26	37.50	70.31
Saidi--Urban	Hrs	45.1	38.7	28.06	36.90	33.45
Saidi-Rural	Hrs	76.6	81.0	102.59	104.60	102.36
Saifi-Metro	#	50.5	27.5	19.86	25.20	52.12
Saifi--Urban	#	33.8	24.7	19.36	24.7	40.03
Saifi-Rural	#	47.9	55.10	59.62	64.8	131.85
High/Medium Network voltage length	Km	15,641	17,141.80	20,361.50	31,668.9	34,925
Distribution Transformers	#	6,983	7,465	7,712	8,276	8,458
Bulk Supply Points	#	16	16	16	16	16
34.5/11.5Kv Primary Substations	#	11	11	12	13	13
Planned Maintenance	%		102	109	103	110

5.3 Financial Performance Indicators/Indices

Indicator	Unit	2020	2021	2022	2023	2024
Revenue (Sales)	GH¢m	688.98	884.19	1,002.49	1,774.66	1,920.32
Other Income	GH¢m	49.90	62.81	83.88	2	585.64
Net Profit	GH¢m	-379.02	-170.72	-460.36	-547.97	-550.55
Total Assets	GH¢m	2,174.39	8,771.51	11,731.53	16,089.38	19,033.00
Current Assets	GH¢m	1,454.43	1,573.49	1,651.62	1,837.33	2,265.85
Current Liabilities	GH¢m	614.61	756.70	979.18	999.51	1,270.66
Total Liabilities	GH¢m	1,966.08	2,418.06	2,569.92	7,369.70	7,922.55
Equity	GH¢m	208.31	6,558.66	9,134.61	8,719.69	11,110.47
Ratios:						
Net Profit Margin	%	-55	-19	-46	-31	-34
Return on Equity	%	-103.34	-5.05	-13.92	-8.17	-496
Current Ratio	No.	2.35	2.08	1.69	1.84	1.78
Gearing	No.	-	-	-	-	-

6 Key Challenges Likely to Impact Service Delivery

Over the years, NEDCo is confronted with inadequate revenues, which makes it difficult to make significant investments to improve the system. Other challenges affecting the company include the following.

- a. Low revenue collection
NEDCo continues to experience low revenue collection from its customers leading to significant cash flow constraints that hinder operational efficiency and maintenance of the network.
- b. High distribution losses
Technical and commercial losses remain high due to outdated infrastructure, illegal connections, and metering irregularities. These are not fully accounted for in the current tariff framework, leading to erosion of revenue.
- c. Aging and overstretched infrastructure
Much of the distribution infrastructure is obsolete and in urgent need of rehabilitation and expansion. Current tariff levels do not allow for the necessary capital investments.
- d. Weak financial position and limited access to capital
The company's weak balance sheet, coupled with declining cash flows, continues to undermine its ability to access financing for infrastructure upgrades and operational improvement.
- e. Rising operating and maintenance costs
Inflation, exchange rate volatility, and rising prices of materials and services have significantly increased NEDCo's operational costs.
- f. Predominantly low-income customers
There is increasing demand for electricity for rural communities that do not have electricity. Serving these communities with electricity is uneconomical due to their typically low consumption levels. Serving such communities will only be feasible under a sustainable, cost-reflective tariff structure that supports rural electrification and network expansion.
- g. Limited Customer Service Centres (Office Buildings)

NEDCo faces significant operational challenges due to the limited number of customer service centres within its operational areas. Although NEDCo maintains a presence in most districts across its catchment areas, many of these offices operate from rented premises rather than company-owned buildings. This situation negatively impacts NEDCo's public image and undermines ongoing efforts to enhance service delivery. To mitigate this challenge, NEDCo plans to construct several purpose-built customer service centres across its operational areas. This initiative aims to strengthen the company's physical presence, improve customer experience, and support long-term operational efficiency and brand credibility.

6.1 Metering Including Prepayment Metering

NEDCo uses different types of meters, both post-paid and prepaid, to account for the electricity consumption of customers. Some customers have however, devised means of by-passing these meters to enable them use power free of charge, leading to financial loss to NEDCo. Some post-paid customers also fail to pay for the electricity they consume. Most of these defaulting customers often resist disconnection of their services. Some customers prefer post-paid meters and resist switching to prepaid, due to an unwillingness to pay. Delays in meter procurement and installation due to lengthy procurement processes lead to a backlog of new service connections. There are also situations where faulty meters take too long to detect, all of which contribute to energy and revenue losses. Software and communication failures often disrupt vending systems, causing inconvenience to customers. Lack of smart metering infrastructure in NEDCo makes it hard to monitor usage in real-time.

6.2 Energy Audit

NEDCo experiences significant technical and commercial losses, which call for investigations. As of 2024, NEDCo's distribution system losses stood at 31.35%, comprising 13.03 % technical losses and 18.32% commercial losses. To address this, NEDCo implemented an Automatic Meter Reading (AMR) Infrastructure to audit energy purchases and sales. This infrastructure enabled NEDCo to identify and monitor Service Centre boundaries with high technical and commercial losses. The systems were installed at bulk supply points, primary substations, and Service Centre boundaries. The AMR should be complemented by systems like Customer Information Systems (CIS) and Geographic Information Systems (GIS) and transformer monitoring systems to enable further energy auditing to distribution and low voltage (LV) networks. Other initiatives aimed at improving energy accounting include the following: Regularization of unauthorized connections, monitoring to identify any unmetered premises, illegal connections and capture SHEP unbilled meters/connections.

While we aim to enhance monitoring and efficiency across the entire network, current funding limitations prevent full coverage. We remain committed to expanding installations as additional resources become available.

6.3 Theft of Power, Cables, and Equipment

NEDCo has not been spared of power theft where customers deliberately manipulate or by-pass their energy meters to enable them consume electricity free of charge. As a result of this deliberate action of customers, NEDCo losses have been rising steadily over the years resulting in financial/revenue loss to NEDCo.

The issue of cable theft was also rampant in the past but has declined following management's decision to replace copper service cables with aluminium. While equipment theft is not rampant in the NEDCo Areas, there reported instances of energy meter theft. Power theft and cable theft have negatively impacted on NEDCo's ability to supply quality electricity to its customers.

6.4 Loss Control- Technical and Commercial

Distribution losses are a major operational challenge affecting efficiency, revenues, and service reliability in NEDCo. Technical losses arise because of inadequate investment in the network infrastructure leading to overloaded transformers, conductors, the use of low-voltage networks over long distances which increases power dissipation. Commercial losses are caused by Power theft, faulty and over-aged meters, inadequate flat rate billing among others. Over the years, NEDCo has initiated various interventions including upgrading and replacing overloaded transformers and conductors, installation of capacitor banks, regular maintenance and system monitoring, regular monitoring and inspections of energy meters to detect and eliminate illegal connections, installation of smart meters and automated meter reading (AMR) etc. yet the problem persists. NEDCo has begun the construction of primary substations and sub-transmission lines to help reduce technical losses significantly.

6.5 Suppressed Demand

Many areas in NEDCo's operational areas have old, overloaded, and underdeveloped distribution networks, making it difficult to supply power efficiently. Many other places have long-distance transmissions which results in high voltage drop. Long transmission lines reduce the effective supply available to customers. NEDCo's liquidity challenges limit its ability to expand infrastructure and improve supply in most of the areas where these challenges exist.

6.6 Management Information System Including E-Payment

NEDCo started with stand-alone billing and vending systems. The two systems never communicated with each other, making it difficult for reporting, as separate reports had to be sourced to obtain information, duplication of data and delays in submitting reports to stakeholders. To resolve this challenge, NEDCo procured a consolidated billing and vending system and other systems to make it more efficient and effective in providing services to the customers and for easy access to common reports. The integration of these systems made it possible to bring on board other systems such as digital payments and electronic billing. The digital payment solution is currently in use. The payment solutions in the channels are;

- USSD channel (*914#)
- Android mobile application
- IOS (Apple) mobile application
- Web application
- POS based payments using major bank cards, mobile money and Near Field Communication (NFC)

Another key component of digital transformation of NEDCos' operations is the electronic billing. NEDCo is in the process of developing this platform to cater for all aspects of the billing process, that is, from meter reading through to bill delivery via multiple channels such as physical, SMS or email. This will ultimately culminate into a self-service portal where customers can manage their accounts from any web-enabled device. A key component of this is to build a resilient Customer Relationship Management (CRM) system that has accurate and up-to-date data of our customers. NEDCo intends to procure an Enterprise GIS system to replace the dysfunctional one.

6.7 Billing and Collection

NEDCo operates a monthly billing cycle for both post-paid and prepaid customers. Meter readers go around the premises of customers to read their post-paid meters manually each month after which they submit the readings to the office for data inputting. To ensure that customers are billed accurately, consumption proof (audit) is carried out on the data inputted into the billing system and all identified errors corrected, after which the bills are produced and distributed to customers.

NEDCo also has cash collection points and third-party vendors located all over the operational Areas. The entity also has an e-payment platform to enable customers to pay their bills or buy electricity for their meters at their convenience through their mobile phones.

6.8 Organisational Reform & Restructuring

To ensure efficiency in the business, NEDCo Management decoupled the Human Resources Department from the Services Department. The Human resource department was decoupled from the Services Department to allow for a professional handling of Human Resource issues. The Human Resource Department currently has three managers supporting the Director. Managerial positions namely, Manager Risk, Manager Design, and Manager Corporate Office, have also been created.

6.9 Customer Complaints & Dispute Resolution

Effective complaint and dispute resolution is crucial for improving customer satisfaction, revenue collection, and overall operational efficiency. Several challenges facing NEDCo, however, make it difficult to handle customer complaints effectively. Among them is the challenge of limited Digital and Automated Systems. We lack a centralized online platform where customers can complain and receive feedback without coming to the office. NEDCo still operates in old-fashioned customer service without a call centre where customers make their complaints in writing, in person (face-to-face), or by telephone. Efforts are, however, advanced to acquire a Contact Centre where customers can lodge their complaints and receive feedback without necessarily walking to the office.

Inadequate staff and other logistics to handle customer complaints, especially in field investigations and meter inspections, poses a great challenge to our resolve to serve our customers promptly.

Where there is a dispute between NEDCo and the customer, it is handled by the Customer Service Officer at the Area Offices of NEDCo. Where the Customer Service Officer is not able to handle the dispute, it is referred to the Area Manager. If the Area Manager is not able to satisfy the customer, the customer sometimes will escalate the complaint to the Public Utilities Regulatory Commission (PURC) for settlement.

6.10 Resolution of Court Cases

Typically, NEDCo initiates legal action against customers who engage in power theft or default in paying their electricity bills. NEDCo is, however, guided by the fact that it has to treat its customers leniently; as a result, this option is adopted hesitantly. Occasionally, however, customers drag NEDCo to Court when they are dissatisfied with the services they receive or when there is damage to their equipment or property and they suspect it is due to an electrical voltage surge. The NEDCo Legal Team and Customer Service Team handle legal cases between the customer and NEDCo.

6.11 Government and Public Sector Debts

NEDCo is facing financial challenges due to substantial debts owed by various entities, including government institutions and other power consumers. NEDCo supplies electricity to the government through state institutions, including Ministries, Departments and Agencies (MDAs), most of which are connected on post-paid meters. The government, however, has not been settling its debt on time, leading to the accumulation of huge amounts on its accounts. Of late, however, NEDCo has received some credit notes in settlement of MDA's bills. The increasing inflation erodes the value of this amount over time. As of December 31, 2024, the Government of Ghana owed NEDCo over GHS10.5 million for electricity bills and GHS19 million in COVID-19 relief granted.

Beyond government arrears, the Ghana Water Company Limited has also accumulated significant debts on its accounts amounting to GHS78.76 million, which is yet to be settled.

The accumulation of debts from government and public sector entities has severely impacted NEDCo's financial health. The company has struggled with cash flow issues, hindering its ability to invest in infrastructure upgrades, which affects service delivery.

6.12 Bad & Doubtful Debts

NEDCo's financial records reflect significant amounts of irrecoverable debt. These debts stem from various challenges, including ineffective revenue collection, billing and metering issues, economic hardships within its operational area, rural electrification challenges, changes in customer occupancy, demolished structures, and general customer unwillingness to pay bills.

Over the years, NEDCo has made provisions for bad debts in its accounts, writing off some of these irrecoverable amounts. Specifically, the company wrote off GHS1.53 million, GHS25.26 million, and GHS2.55 million in 2021, 2022, and 2023, respectively.

6.13 Surcharge & Subsidies

As a responsible, publicly owned and regulated electric utility, NEDCo has always made serious efforts to comply with all regulations that govern the supply of electricity to consumers. These include all Legislative Instruments, Rules and Laws set out by the power sector regulators, such as the Energy Commission, PURC and MoEn. So far, these efforts have paid off, and NEDCo has not been surcharged for any offence by any regulatory body.

There is GHS75million outstanding subsidies owed to NEDCo by the government and GHS 19.00 million in respect of COVID-19 electricity relief to customers.

5.13 Government Grants

Over the years, the Government of Ghana (GoG) has, through the Ministry of Energy, extended the grid to unserved and underserved locations within NEDCo's operational area, at a cost of GHS400.00 million. This amount has been duly captured as a government grant. The recognition of the grant was undertaken in early 2023, with the purpose of distinguishing the grant from NEDCo's fixed assets.

NEDCo has however not directly received any grant for the period under review.

6.14 Access to Finance and Repayment of Financing Costs

NEDCo primarily relies on internally generated funds for its operations as lenders do not find it very attractive to extend credit facility to NEDCo due to its deteriorating financial position.

However, the Government of Ghana is securing a loan of US\$68 million from the Korean Export-Import Bank (KEXIM) for NEDCo to undertake the Northern Ghana Rural Electrification Infrastructure and Access Project (NGREIA) across NEDCo's Operational Areas.

The Project comprises the construction of Six (6) 34.5/11kV primary substations, two (2) 34.5kV switching substations and one (1) Supervisory Control and Data Acquisition (SCADA) system, Distribution Network Management System (DNMS) made up of 42km sub-transmission lines and about 29km distribution/offloading feeders. The loan process was truncated due to IMF conditionality. As a result, NEDCo has not been able to access the much-needed financing to undertake the project.

Additionally, NEDCo, in collaboration with VRA, is negotiating an on-lending facility with the AFD and EU to finance selected projects outlined in the 10-year distribution master plan. The total funding amount is €35.95 million, comprising a €15.95 million grant and a €20 million concessional loan.

Furthermore, KfW Development Bank of Germany is expected to provide a concessional loan of €30 million to NEDCo, which will be utilized to fund identified techno-commercial improvement projects.

Presently, NEDCo is not obligated to paying any financing cost since it has no debt obligation to any financial institution or development partner.

6.15 Tariff Structure and Rates Design

Tariff structure and rate design set by the Public Utilities Regulatory Commission (PURC) for the last regulatory period saw an improvement over the previous multiple level tariff bands (step-tariff). While these tariffs are intended to ensure cost recovery and financial sustainability, certain aspects of the tariff structure and rates design negatively impact NEDCo's ability to remain viable.

As indicated earlier, the geography and demography of NEDCos' utility territory makes the electricity distribution business inherently infertile economically. As much as 83.55% of NEDCos' customer population are residential customers with 46% of these customers being lifeline as of December 2024. The residential customers consumed about 65.23% of the energy billed and contributed about 60.43% to revenue. The Non-residential customers constituted 16.44% of the customer population, consumed about 26.70% of total energy sales and contributed 30.48% of revenue. SLT customers also constituted 0.01% of the customer population, consumed about 8.07% of total energy sales and contributed 9.09% to revenue. The current PURC tariff design includes cross-subsidisation for the lifeline customers, but the financial burden of these subsidies is not adequately compensated for by the consumption of the SLT customers in the NEDCo Areas because they are very few and consume less of the energy. In effect, the PURC tariff structure does not adequately support the financial aspirations of NEDCo.

6.16 Introduction of Wholesale Electricity Market

The Wholesale Electricity Market (WEM) consists of the regulated and deregulated components. The customers under the regulated market purchase electricity at tariffs set or approved by the regulator, while wholesale customers are allowed to negotiate their own tariff and other supply arrangements, such as time-of-use tariffs etc, directly with generators and, or the transmission company.

In September 2019, the Government of Ghana declared its intention to launch the first ever WEM in Africa by the year 2022. The introduction of a WEM moves electricity as a commodity away from centralized trading under fully regulated tariffs and supply arrangements and allows the determination of electricity prices by market forces, thereby introducing more competition into the industry, which in turn exerts downward pressure on the cost of electricity to end-users, especially for bulk purchasers.

The introduction of a wholesale electricity market in Ghana will negatively impact NEDCo's operations, finances, and overall sustainability.

6.17 Wholesale Market Bulk Customers Embedded in Distribution Network

NEDCo operates in a challenging environment, which affects its operations and profitability.

This is so because the wholesale market allows commercial customers like the mines and other factories to negotiate their tariffs directly with the generators at a reduced tariff, thus depriving NEDCo of business with the large customers in their catchment area.

Currently, NEDCo does not have such customers embedded in its distribution network. This market arrangement deprives NEDCo of the revenue it would have earned.

6.18 Embedded Generators and Interconnection

The introduction of net metering in NEDCo allows customers to install solar power systems and connect them to the distribution network. This enables customers to offset their electricity consumption by feeding excess power into the grid. While net metering promotes renewable energy and energy independence, it also poses challenges for NEDCo's operations, revenue, and grid management. As large customers begin to generate electricity, they may cut their electricity purchases, thus reducing revenue that may have accrued to NEDCo.

We also have three (3) embedded generation facilities in the NEDCo operational area, a 2.5MWp at Navrongo, 13MWp at Kaleo and 6.5MWp at Lawra in the Upper East and Upper West regions. The Navrongo solar plant was commissioned in June 2013 with an annual generation of 3,843MWh. The solar plant connects to NEDCo's grid at 10km via a medium voltage of 34.5kV from a 2.5MVA power transformer. The Lawra solar plant is also connected to the grid via a medium voltage line of 34.5kV. The Lawra solar plant was commissioned in October 2020.

6.19 Power Procurement from Independent Power Producers and Renewable Energy Generators

Due to the lack of high-consuming economic customers within NEDCo's operational area, VRA is always able supply NEDCo's power requirements. Apart from the embedded generators, namely the 2.5MWp solar generator at Navrongo, the 13MWp generator at Kaleo, and the 6.5MWp solar generator at Lawra and individual prosumers, NEDCo does not procure power from any independent power producers.

6.20 Human Resource-Skilled Manpower

NEDCo is endowed with rich human resources with varied professional backgrounds at all levels of our operations. NEDCo's annual expansion plan and the Government of Ghana's on-going nation-wide electrification programmes such as SHEP and GEDAP, calls for a commensurate number of skilled workers to handle issues. NEDCo is unable to recruit staff to match up with the expanded network due to insufficient cash flows to support the recruitment of staff. As a result of this, the existing staff are ever burdened with the workload. NEDCo is deficient in the required staffing to man its operational service centres due to the vast geographical land mass that it operates.

7 Strategies to Address Key Challenges

NEDCo has a Strategic Plan that guides the resolution of these key challenges. They are as follows.

A. Loss Reduction Strategies

- Implement e-billing to improve billing accuracy and reduce commercial losses.
- Strengthen revenue protection programs to curb illegal connections and power theft.
- Upgrade overloaded distribution transformers and substations to minimize technical losses.

B. Network Reliability Enhancement

- Invest in preventive maintenance programs to reduce downtime and enhance network reliability.
- Deploy smart grid technologies for real-time monitoring and fault detection.
- Improve voltage stability.
- Implement Network extension projects in the outskirts of Tamale.
- Ensure the completion of the SCADA/DMS Project to automate transmission and primary substations equipment for faster supply restoration and feeder management.
- Install capacitor banks to improve power factor and voltage regulation.

C. Customer Service Enhancements

- Develop and deploy customer contact centre for easier complaint resolution and service requests.
- Enhance mobile payment options and expand collection centres to increase revenue mobilization.
- Strengthen customer education on energy conservation and tariff structures.

D. Revenue Collection Improvement

- Implement prepaid metering systems to improve cash flow and reduce arrears.
- Enforce strict disconnection policies for defaulters while offering structured payment plan agreements.

E. Cost Optimization Initiatives

- Conduct energy audits to identify and eliminate distribution losses (inefficiencies) in power distribution.
- Optimize workforce management through capacity-building programs and process automation.

8 PROJECTS TO BE UNDERTAKEN

To be able to surmount the challenges facing NEDCo, various projects have been planned for future implementation when money becomes available. Among some of the projects are the following:

8.1 Critical Investment Projects

Critical Investment Projects

8.1.1 Energy metering enhancement project

- a. **Project Description:** This project consists of the procurement and installation of 1,420,000 meters comprising smart and non-smart meters across NEDCo's operational area. It is aimed at replacing defective and overaged energy meters as well as onboarding new customers.
- b. **Project Cost & financing:** The estimated cost of the project is US\$126.5 million. The project will be finance using NEDCo's IGF over a five-year period.
- c. **Project Benefits to Customer:** This project will improve customer satisfaction and enhance service delivery.
- d. **Project impact on Losses:** It is estimated that this project will reduce NEDCo's overall commercial losses by 5% over the next 5 years.
- e. **Source:** (PIP on page 53, NEDCo 5-Year Meter Deployment Plan)
- f. **Challenge to be addressed:** Low revenue collection rate and high commercial losses.

8.1.2 Project for the enhancement of power reliability in Tamale (RCC 40MVA Substation)

- g. **Project Description:** Japan International Cooperation Agency (JICA) of the Republic of Japan have expressed interest in assisting NEDCo to improve upon power supply in some parts of the Tamale Metropolis. It involves the construction of a 40MVA primary substation near the Regional Coordinating Council (RCC) in Tamale.
- h. **Project Cost & financing:** The estimated cost of the project is US\$ 14million. Out of the total cost, US\$13.4m will be financed through grant while US\$0.6m will be financed from NEDCo's IGF.
- i. **Project Timelines.** The project construction will commence in 2025 and complete in 2027.
- j. **Project Benefits to Customer:** This project will improve electricity supply reliability for customers.
- k. **Project impact on Losses:** the current technical loss on the affected feeders is 5%. For a do-nothing scenario, the losses will be 6% in 2027 but will reduce to 4.3% after the project in the affected area. (see the attached feasibility report). This represents a 28% reduction in technical losses on the affected feeder.
- l. **Source:** (PIP on page 63 and JICA survey report 2024)

- m. **Challenge to be Addressed:** Aging and Overstretched Infrastructure and high distribution losses.

8.1.3 NEDCo Digitalization Project

- a. **Project Description:** This project aims at modernizing NEDCo's Distribution operations by digitalizing its distribution grid and business processes. The current processes in NEDCo are paper-based, slow, and have no standard operating procedures or measures in place. This project intends to implement an Advanced Distribution management system (SCADA+ADMS+OMS), Customer management System (CMS), Geographic Information System (GIS), Advanced Metering system (AMI) etc.
- b. **Project Cost & financing:** The estimated cost of the project is Euro 50.1 million ($\approx$ US\$58million). The project will be financed with a Euro 14.4m grant from AFD/EU and a Euro 35.7m loan at an interest rate of 6.05% (SOFR + 0.95%) or 3% (month Euribor + 0.69%).
- c. **Project Benefits to Customer:** This project will improve customer satisfaction and enhance service delivery.
- d. **Project impact on NEDCo:** It is estimated that this project will reduce NEDCo's overall operational cost by 3.6M euro per annum. (Refer to the feasibility report).
- e. **Source:** Present (Support for NEDCo's Digitalization projects funded by AFD)
- f. **Challenge to be Addressed:** Rising operating and maintenance costs

8.1.4 Distribution grid reinforcement project

- a. **Project Description:** The distribution network in the NEDCo operational area was originally designed to serve a customer base of fewer than 20,000. This relatively small customer population informed the initial network design, with equipment and infrastructure sized primarily based on the limited electricity demand at the time and guided by the economics of power extension.
Since then, the electricity demand within the NEDCo jurisdiction has grown substantially from under 10MW in the late 1990s to approximately 382MW today. Despite this exponential growth in load, about 50% of the existing electricity infrastructure remains unchanged from its original state. This has placed considerable strain on aging assets that are no longer adequate to meet current or future demands.
To address these challenges, there is an urgent need to rehabilitate, reinforce, and upgrade the distribution infrastructure across the NEDCo operational area. The proposed project will focus on:
 - Upgrading undersized overhead conductors.
 - Injecting additional distribution transformers to relieve overloaded networks; and
 - Replacing undersized underground cables.

These interventions are essential to ensure network reliability, improve power quality, and support the growing energy needs of communities served by NEDCo, both now and in the future.

b. Project Benefits:

- Reduce technical losses.
- Improve reliability.
- Improve voltage quality.
- Improve installed capacity by 300MVA.

c. Project Cost & financing: The estimated cost of the project is US\$55.4 million. The project will be financed using NEDCo's IGF over a five-year period.

d. Project Benefits to Customer: This project will improve customer satisfaction and enhance service delivery.

e. Project impact on Losses: It is estimated that this project will reduce NEDCo's overall technical losses by 2% over the next 5 years

f. Source: (PIP on page 63 and NEDCo Masterplan).

g. Challenge to be Addressed: Aging and Overstretched Infrastructure

8.1.5 2x20 MVA, 34.5kV/11.5kV Islamic Substation project

a. Project Description: This project consists of the construction of a 2X20 MVA primary substation in Tamale near the Kamina Barracks with 2 incomer and 8 feeder bays. The objective of the project is to improve the reliability of supply and reduce technical losses.

b. Project Cost & financing: The estimated cost of the project is US\$8.2 million. The project will be financed using EU/EIB/KFW Loan at a rate of about 3% per month (Euribor+0.69%) over a five-year period.

c. Project Benefits to Customer: This project will improve customer satisfaction and enhance service delivery.

d. Project Impact to NEDCo: This project will

- Reduce technical losses
- Improve reliability.
- Improve voltage supply to 100% of rated MV voltage.
- Improve installed capacity by 40MVA.

e. Project impact on Losses: It is estimated that this project will reduce technical losses on affected feeder by 20%

f. Source: (PIP on page 63 and NEDCo Masterplan).

g. NEDCo Challenge to be Addressed: Aging and Overstretched Infrastructure.

8.1.6 Construction of NEDCo Head-Office Building

a. Project Description; NEDCo currently operates without its own built head office. As a result, its key directorates or departments are housed across multiple rented facilities scattered throughout Tamale. This arrangement poses several challenges, including operational inefficiencies, poor

coordination, and corporate image.

To address these issues, NEDCo proposes the construction of a dedicated Head Office building. The planned structure will be a six-story facility with a total of seven floors, designed to accommodate the Managing Director's office and all other directorates and support departments. The building will have a total floor space of approximately 6,000 square meters.

This project aims to consolidate all administrative functions under one roof to enhance organizational efficiency, improve service delivery, and project a strong corporate image.

- b. **Project Cost & financing:** The estimated cost of the project is US\$12 million. The project will be financed using NEDCo's IGF over a five-year period.
- c. **Project Benefits to Customer:** This project will improve customer satisfaction and enhance service delivery.
- d. **Project impact on NEDCo:** It is estimated that this project will improve NEDCo's operational efficiency as follows.
 - i. Cost savings by avoiding expensive rentals of office spaces.
 - ii. Increase productivity by accommodating all NEDCo Staff in the same building.
 - iii. Reduce operational costs by sharing resources.
 - iv. Improve NEDCo image and avoid the threat of ejections in rented premises.
 - v. Improve security to NEDCo's equipment and tools.
- e. **Present in the 2025 Budget:** (page 39)
- f. **Challenge to be Addressed:** Limited Customer Service Centres (Office Buildings)

8.2 Short-term Investment Projects

8.2.1 Service Centres Construction

a. **Project Description:**

The existing customer service centres in many locations are inadequate, with aging facilities that are in dire need of upgrading. In several instances, complete refurbishment or the construction of entirely new buildings is necessary to meet operational requirements. Currently, most of these outstations operate from rented commercial stores with floor areas ranging between 30 to 45 square meters. These limited spaces constrain the delivery of quality customer service and offer minimal room for material storage, thereby hindering operational efficiency.

To address this challenge and enhance customer experience, NEDCo plans to construct modern, purpose-built offices in 60 strategic locations across all eight regions within its five operational areas. This initiative is aimed at significantly improving customer service delivery, operational effectiveness, and corporate visibility across the company's catchment area.

- b. **Project Cost & Financing:** The estimated cost of the project is US\$20

- million. The project will be financed using NEDCo's IGF over a five-year period.
- Project Benefits to Customer:** This project will improve customer satisfaction and enhance service delivery.
 - Project impact on NEDCo:** It is estimated that this project will enhance corporate image.
 - Source:** (Present in the 2025 Budget on page 39)
 - Challenge to be Addressed:** Limited Customer Service Centres (Office Buildings) and rising operating and maintenance costs.

8.2.2 NGREIA Project (lines construction).

- Project Description:** The Northern Ghana Rural Electricity Infrastructure and Access Project (NGREIA) consists of the construction of substations to improve the distribution infrastructure in the Northern part of Ghana. Below are the list of substations to be constructed under this project:

Division	Area		Scale	Project Impact Area
34.5/11 kV Power Distribution Substation	Brong-Ahafo	Techiman	1	Reduced Power loss
		Sunyani	3	
	Upper West	Wa	2	
34.5 kV Switching Station	Upper West	Tumu	1	Improved distribution reliability
	Nothern	Bimbila	1	
Capacity Bank	Brong-Ahafo	Techiman	2	Compensation for loss due to power factor improvement in power distribution network
		Sunyani	6	
	Upper East	Bolgatanga	N/A	
	Upper West	Wa	2	
	Nothern	Bimbila	2	
Distribution Network Management System	Nothern	Tamale	1	Reliability Enhancement
Voltage booster	Nothern	Bimbila	1	Voltage drop compensation

- Project Cost & Financing** below is the cost and financing breakdown. The interest rate for the Loan (US\$68M) is 0.1% per annum over a 40-year period.

Division		Material & Equipment & Installation (EDCF)				GoG	NEDCo	Total
		Korean Product	3rd Country	Local	Sub-total			
Distribution substation (including buildings)	6 places	17,215	3,537	7,524	28,276			28,276

Switching station (including building)	2 places	2,881	1,233	2,402	6,516			6,516
Capacitor bank	12 Nos	0	2,036	39	2,075			2,075
Voltage Booster	1 No	504	0	12	516			516
Distribution network management system	1 Lot	4,210	8,528	936	13,674			13,674
Spare Parts	1 Lot	1,216	791	0	2,007			2,007
Sub-total		26,026	16,125	10,913	53,064	-		53,064
Training costs		333	164	0	497			497
O & M Cost		576	576	96	1,248			1,248
Consulting Cost		2,288	0	987	3,275			3,275
Direct Project Cost		29,223	16,865	11,996	58,084			58,084
Land and migration compensation		0	0	0	0	581		581
Project Management fee		0	0	0	0	714		714
Volume reserve amount (5%)		1,461	843	600	2,904	0		2,904
Price reserve amount		1,135	933	4,876	6,944	0		6,944
Loan Handling Fees (0.1%)		68	0	0	68	0		68
Tax		0	0	0	0	11,488		11,488
Indirect project expense		2,664	1,776	5,476	9,916	12,783		22,699
Sub-transmission lines and feeder							13,000	

Total (kUSD)	31,887	18,641	17,472	68,000	12,783	13,000	93,783
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- c. **Project Timelines.** The project construction will commence in 2026 and be completed in 2031.
- d. **Project Benefits to Customer:** This project will improve electricity supply reliability for customers.
- e. **Project impact on Losses:** The project will result in significant technical losses on the medium voltage network across the NEDCo area. (See the attached feasibility report).
- f. **Source:** (PIP on page 62 and in feasibility report)
- g. **NEDCo Challenge to be Addressed:** Aging and Overstretched Infrastructure

8.2.3 Construction of Area Offices Techiman and Sunyani

- a. **Project Description:** Currently, staff in the Techiman and Sunyani Areas are accommodated in offices within the 161kV substation control buildings. These facilities were originally designed to house switchgear equipment and operational staff, not for administrative or public-facing functions. Using these spaces for customer service poses significant safety risks and is not aligned with best practices for public access and operational efficiency.

To address these concerns, NEDCo proposes the construction of a three to four-storey office complex with a total floor area of 5,000 square meters. These purpose-built facilities will provide a safe, functional, and professional environment for staff and customers alike, ensuring improved service delivery, staff productivity, and a positive corporate image in the Techiman and Sunyani operational areas.

- b. **Project Cost & financing:** The estimated cost of the project is USD20 million. The project will be financed using NEDCo's IGF over a five-year period.
- c. **Project Benefits to Customer:** This project will improve customer satisfaction and enhance service delivery.
- d. **Project impact on NEDCo:** It is estimated that this project will improve NEDCo's operational efficiency.
 - i. Cost savings by avoiding expensive rentals of office space.
 - ii. Increase productivity by accommodating all staff in the same building.
 - iii. Reduction of operational cost by sharing resources
 - iv. Improved NEDCo image to avoid the threat of ejections in rented premises.
 - v. Improve security to NEDCo's equipment and tools.
- e. **Challenge to be Addressed:** Limited Customer Service Centres (Office Buildings)

8.2.4 Distribution network optimization and reconfiguration

- a. **Project Description:** More than 50% of the distribution networks in the

NEDCo operational area are old because they were constructed in the late 80s. These were constructed to provide electricity to rural communities with limited electricity demand. Over the years, there has been a rapid expansion of the network and load growth.

Some expansion of communities and creation of new settlements has resulted in a shift in the load centre, thereby making the existing electricity unoptimized for operations. There is therefore the need to optimise the network to ensure efficient operation of the distribution infrastructure. This project includes the construction of new medium and low voltage lines, upgrade of conductors as well as the introduction of switching elements like auto reclosers, line sectionalizers and voltage regulators.

- b. **Project Cost & Financing:** The estimated cost of the project is US\$7.3 million. The project will be financed using NEDCo's IGF over three years.
- c. **Project Benefits to Customer:** This project will improve the quality of voltage applied to customers.
- d. **Project impact on NEDCo:** This project will:
 - i. Improve feeder voltage profile.
 - ii. Reduce technical losses on the reconfigured feeders by 10%. (Refer to NEDCo feeder Optimization study report attached).
 - iii. Reduce overloads on certain portions of the distribution networks.
 - iv. Defer the need for large capital investment over a period.
- e. **Source: 10-Year Distribution Master Plan:** Present (pages 99 & 108)
- f. **Challenge to be Addressed:** Aging and Overstretched Infrastructure

8.2.5 Yendi switching station.

- a. **Project Description:** The Yendi substation was constructed in 1989 to supply power to the eastern corridor. The existing switchgear is obsolete and requires replacement. This project aims at constructing a new 10-feeder 34.5kV switching station in Yendi with the aim of improving reliability in the Eastern Corridor.
- b. **Project Cost & Financing:** The estimated cost of the project is USD3.9 million. The project will be financed using NEDCo's IGF over a three-year period.
- c. **Project Benefits to Customer:** This project will improve the quality of voltage applied to customers.
- d. **Project impact on NEDCo:** This project will improve feeder reliability and revenue.
- e. **Source:** (PIP page 63)
- f. **Challenge to be Addressed:** Aging and Overstretched Infrastructure

9 Total Distribution Utility System Load at Peak

The total distribution utility system load at peak is as indicated in the table below.

Distribution Utility System Load at Peak Demand

INDICATOR	2020	2021	2022	2023	2024
Peak load (MW) - Non-Coincidental	335.6	348.3	336	364.4	381.8

10 Regulated Market-Non-Special Load Tariff Customers

NEDCo serves a diverse customer base categorized into residential, non-residential, and Special Load Tariff (SLT) customers. Residential Customers constituted 83.55% of NEDCo's total customers. This group consumed 65.23% of the total energy sold by NEDCo and contributed 60.43% to NEDCo's total revenue. Non-Residential customers also constituted 16.44% of the total customer population. They consumed 26.70% of the total energy sold and contributed 30.48% to total revenue.

SLT customers form 0.01% of NEDCo's customer base. Despite their minimal representation in customer numbers, SLT customers consumed 8.07% of electricity and contributed 9.09% of the total revenue as of December 2024.

11 Regulated Market-Energy Commission Licensed Bulk Customers Embedded in Disco Network

12 Base Load Statistics

INDICATOR	2020	2021	2022	2023	2024
Base load (MW) -Non-Coincidental	174.51	350.2	320	314.7	320

12. Forecast of Energy to be Purchased

ITEM	2025	2026	2027	2028	2029	2030
Power Purchase (GWh)	2284	2444	2619	2807	3009	3221

13 Non-Conventional Energy - Renewable Energy

Renewable Energy	2025	2026	2027	2028	2029	2030
Hydro<100MW	NA	NA				
Waste to Energy	NA					
Biomass						
Wind						
Solar (GWh)	10.12	9.62	9.14	8.68	8.25	7.83
Wave						
TOTAL						

14 Distribution System Losses at Various Voltage Levels

Voltage Levels	2025	2026	2027	2028	2029	2030
34.5kV-11.5kV	6.42	6.17	5.92	5.67	5.41	5.16
33kV-11kV						
415V-240V	6.46	6.21	5.96	5.71	5.45	5.20

The estimated combined technical and commercial losses for 2024 was 31%, with the technical losses being 13% (42% of the total losses) while the commercial losses form 18% (58% of total distribution losses). The loss projection above is for only the technical losses.

15 Customer Population by Classification at Characteristics

Category	2025	2026	2027	2028	2029	2030
Active Customers	1,398,942	1,503,871	1,616,670	1,737,930	1,868,287	2,008,423
Non-active Customers	78,924	80,897	82,920	84,992	87,117	89,295
Total	1,477,866	1,584,768	1,699,589	1,822,923	1,955,405	2,097,719

15.1 Regulated Market- Non-Special Load Tariff Customers**15.1.1 Residential Customers**

Category	2025	2026	2027	2028	2029	2030
Lifeline	546,556	587,547	631,614	678,985	729,908	784,652
Medium	491,238	528,081	567,687	610,264	656,034	705,236
High	30,952	33,274	35,769	38,452	41,336	44,436
Total	1,068,747	1,148,903	1,235,070	1,327,701	1,427,278	1,534,324

These are active customer numbers.

15.1.2 Non-Residential Customers

Category	2025	2026	2027	2028	2029	2030
Non-Residential	186,538	200,529	215,568	231,736	249,116	267,800

These are active customer numbers.

13.1.2b Special Load Tariff Customers

Category	2025	2026	2027	2028	2029	2030
SLT-LV	24	29	35	41	50	60
SLT-MV	29	31	34	36	39	42
SLT-HV	35	40	46	54	62	72
Total	88	100	115	132	151	174

These are active customer numbers.

15.2 De-regulated Market-Energy Commission Licensed Bulk Customers Embedded in Disco Network

Category	2025	2026	2027	2028	2029	2030
Bulk (MV)	NA	NA	NA	NA	NA	NA
Bulk (HV)	NA	NA	NA	NA	NA	NA
Total						

16 Energy Allocated to Public Lighting (GWh)

Category	2025	2026	2027	2028	2029	2030
Streetlight Consumption	229.36	245.41	262.93	281.71	301.83	323.15

17 Distribution Company's System Load Data**Table-1 Disco System Load Data 2025-2030**

Parameter	2025	2026	2027	2028	2029	2030
Total System Load @ Peak	393.67	421.18	451.36	483.77	518.59	555.22
Regulated Market (Non-SLT Customers)	NA	NA	NA	NA	NA	NA
Regulated Market (SLT including Bulk Customers)	NA	NA	NA	NA	NA	NA
Regulated Market (Energy Commission Licensed Bulk Customers Embedded in Disco Network)	NA	NA	NA	NA	NA	NA
Projected Base Load	251.95	269.56	288.87	309.36	331.90	355.34

18 Capital Expenditure**Table 2 Tariff Revenue 2025-2030**

	2025	2026	2027	2028	2029	2030
Sales GWh	1,804.36	1,930.76	2,069.01	2,217.53	2,377.11	2,544.59
Sales Growth		7%	7%	7%	7%	7%
EUT (GHS)	1.53025	1.45949	1.46674	1.43861	1.41136	1.40737
Tariff Revenue (GHS Million)	2,761.13	2,817.93	3,034.71	3,190.17	3,354.96	3,581.20

The projected tariff revenue for NEDCo is GHS2,761.13 million in 2025, increasing to GHS3,581.20 million by 2030, representing a compound annual growth rate (CAGR) of 7%.

For 2025, NEDCo's revenue requirement is estimated to be GHS730.573 million, based on a pass-through cost of GHS2,030.56 million, tariff revenue of GHS2,761.13 and total energy purchases of 2,248 GWh.

Purpose of Capital Investment Plan

NEDCo intends to carry out a comprehensive Capital Investment Plan (CIP), which will ensure reliable, efficient, and sustainable supply of electricity to consumers, driving economic growth, customer satisfaction, and environmental sustainability.

Below is the specific purpose of the CIP:

- ❖ **Reliable and Efficient Power Supply:** The CIP will ensure that the distribution network is upgraded and expanded to meet growing demand, reduce power outages, and improve overall reliability.
- ❖ **Grid Modernization:** Investing in modern technologies, such as smart grids and automation, will enhance the efficiency, security, and sustainability of the distribution network.
- ❖ **Renewable Energy Integration:** Through scaling up of Renewable Project (SREP), the CIP will facilitate the integration of renewable energy, such as solar, into the grid, reducing dependence on the main grid in rural communities
- ❖ **Safety and Risk Mitigation:** Regular investment in the distribution network will help identify and address potential safety risks, reducing the likelihood of accidents and ensuring compliance with regulatory requirements.

- ❖ Customer Satisfaction and Economic Growth: A reliable and efficient electricity supply is critical for economic growth, attracting businesses, and improving the quality of life for customers within NEDCo operational Areas.
- ❖ Regulatory Compliance: The CIP will help NEDCo comply with regulatory requirements, such as those set by the Energy Commission of Ghana and Public Utilities Regulatory Commission, to avoid potential penalties.
- ❖ Asset Management and Optimization: The CIP will enable the effective management of distribution assets, identifying areas for optimization, reducing maintenance costs, and extending asset lifetimes.
- ❖ Financial Planning and Budgeting: The CIP will provide a clear roadmap for capital expenditures, enabling the entity to plan and budget effectively, and ensuring that investments are aligned with business objectives.
- ❖ Environmental Sustainability: By investing in grid modernization and renewable energy integration, distribution companies can reduce their environmental footprint and contribute to a more sustainable future.

Renovation and Modernisation (R&M) plans for the purposes of extending of asset life beyond its useful life.

NEDCo is expected to extend the asset life of its existing infrastructure beyond its useful life, ensure reliability, efficiency, and safety while reducing maintenance costs.

Scope:

The R&M plan covers the renovation and modernization of the following assets:

1. Substations (34.5kV, 11kV, and LV)
2. Overhead lines (34.5kV, 11kV, and LV)
3. Underground cables (34.5kV, 11kV, and LV)
4. Distribution transformers
5. Switchgear and circuit breakers
6. Protection and control systems

Renovation and Modernisation Strategies:

1. Condition-based maintenance: NEDCo is to assess the condition of its assets and prioritize renovation based on criticality and condition.
2. Asset replacement: replace assets that are beyond their useful life or are no longer supported by manufacturers.
3. Refurbishment: Refurbish assets to extend their life, improve performance, and reduce maintenance costs.

4. Upgrade and modernization: Upgrade assets to take advantage of new technologies, improve efficiency, and enhance reliability.

5. Standardization: Standardize assets and equipment to simplify maintenance, reduce spare parts inventory, and improve interoperability.

Implementation Plan:

Year 1-2: NEDCo is to conduct asset condition assessments, develop a prioritized renovation plan, and initiate refurbishment and replacement of critical assets.

Year 3-5: Continue refurbishment and replacement of assets, upgrade protection and control systems, focus on upgrading and modernizing assets, standardizing equipment, and implementing advanced technologies.

Budget Allocation:

NEDCo intends to allocate funds annually for R&M activities, prioritizing critical assets and projects. Consider budgeting:

30% for asset replacement and refurbishment

20% for upgrade and modernization

20% for condition-based maintenance

30% for contingency funding and unexpected expenses.

The benefits of the renovation and maintenance will be as follows:

Extended asset life, improve reliability and efficiency, reduce maintenance costs, enhance safety, improve customer satisfaction and compliance with regulatory requirements.

Monitoring and Evaluation:

NEDCo has established key performance indicators (KPIs) to monitor and evaluate the effectiveness of the R and M plan, including:

Asset availability and reliability

Maintenance cost reduction

Customer satisfaction

Safety performance

Regulatory compliance

NEDCo will regularly review and update the R&M plan to ensure it remains aligned with the company's strategic objectives and changing regulatory requirements.

Table 3 Summary of Capital Investment Plan (Million GHS) 2025-2030

Item	2025	2026	2027	2028	2029	2030
Capital Cost	889.51	788.03	2,038.82	4,264.00	3,031.31	2,046.14
Initial Spares	37.8	41.6	45.8	50.4	55.4	61.0
Additional Capitalisation						
Renovation & Modernisation (R&M)						
Rehabilitation & Resettlement (R & R)						

18.1 Capital Expenditure Financing Plan**Table 4 Summary of Capital Expenditure Financing Plan (Million GHS) 2025-2030**

Item	2025	2026	2027	2028	2029	2030
Accumulated Depreciation	10,423	11,324	11,274	11,424	11,724	12,723
Retained Earnings	-3,958.89	-4,889.42	-5,855.04	-6,885.46	-7,957.38	-9,068.54
Commercial Borrowings:						
Domestic						
Foreign						
Additional Equity Contribution By Shareholder(s)						
Grants:						
Domestic						
Foreign	33.00	176.28	25.10			
Tariff Revenue (Revenue from Projected Capacity Charge)						

19 Operation and Maintenance Costs

Table 5 Operation and Maintenance Costs (Million GHS) 2025-2030

Item	2025	2026	2027	2028	2029	2030
Fixed O & M Costs	101.83	112.01	123.55	136.54	144.29	160.69
Variable O & M Cost	35.78	39.36	43.41	47.97	50.70	56.46

20 Administration and General Costs

Table 6 Administration and General Costs (Million GHS) 2025-2030

Item	2025	2026	2027	2028	2029	2030
Fixed O & M Costs	201.23	221.35	179.50	194.30	209.84	174.59
Variable O & M Cost	70.70	77.77	63.07	68.27	73.73	61.34

21 Human Resource Costs- Employee Costs

Table 7 Human Resource Costs (Million GHS) 2025-2030

Item	2025	2026	2027	2028	2029	2030
Fixed O & M Costs	254.34	249.02	294. 800	273.92	307.76	301.32
Variable O & M Cost	77.630	81.622	84.24	89.784	93.961	98.762

22 Public Education

Table 8 Summary of Public Education Costs (Million GHS) 2025-2030

Item	2025	2026	2027	2028	2029	2030
Stakeholder Communication & Sensitisation (Public Education)	0.57521	0.60275	0.63301	0.66631	0.70294	0.74323

23 Financing and Interest Costs:

Table 9 Financing and Interest Costs (Millions GHS) 2025-2030

Item	2025	2026	2027	2028	2029	2030
Interest on Foreign Loans						
Interest on Domestic Loans						
Interest on Working Capital Loan						

24 Return on Equity**Table 10 Equity Financing Costs (%) 2025-2030**

Item	2025	2026	2027	2028	2029	2030
Rate of Return	-10%	-10%	-9%	-10%	-9%	-8%

25 Depreciation**Table 11 Equity Financing Costs (%) 2025-2030**

Item	2025	2026	2027	2028	2029	2030
Rate of Return	-21%	-19%	-17%	-15%	-13%	-12%

26 Projected Electricity Distribution Revenue Requirement:**Table 12 Summary of Distribution Company's Revenue Requirement (Million GHS) 2025-2030**

Item	2025	2026	2027	2028	2029	2030
A. Capital Recovery Component (CRC)	71.16	63.04	163.11	341.12	242.50	163.69
B. Fixed O & M Component (FOMC)	101.83	112.01	123.55	136.54	144.29	160.69
C. Revenue from Energy Charge	2,761.13	2,817.93	3,034.71	3,190.17	3,354.96	3,581.20

D. Reactive Power Charge						
E. Revenue from Open Access-Wheeling						
F. Fixed Charges						
F1. Service Connection Charge	112.19	123.41	135.75	149.32	164.26	180.68
F2. Reconnection Charges	0.77	0.84	0.93	1.02	1.12	1.24
F3. Interconnection Charges	1.8	1.89	1.98	2.08	2.19	2.30
F4. Separate Metering Charges	1.53	1.84	2.20	2.64	3.17	3.81
F5. Penalties-Illegal Connection	43.58	47.94	52.73	58.01	63.81	70.19
F6. Revenue from Rural Electrification Levy	30.18	35.44	41.35	48.48	56.19	65.12

27 Proposed Tariff and Rates Structure

The operational area of NEDCo is very sparse with long distribution network with very limited number of SLT customers (0.01%). The customers of NEDCo do not provide NEDCo the needed revenue to cover at least its fixed and direct variable cost.

Again, procurement of Capital Expenditure items for distribution network expansion, consumer connections, meters and information technology infrastructure are mostly denominated in forex. Variable cost per unit in 2025 is expected to be GHp67.10 and Fixed cost per unit for the same period is also projected to be GHp85.92, totalling GHp153.03. To enable NEDCo recover at least its cost of service and fixed cost, NEDCo proposes GHp153.03/kWh for Distribution Service Charge (DSC) for the year 2025,

representing 171% of the prevailing distribution service charge of GHp56.474. The total variable cost in this case includes the allowable distribution loss of 21% in Ghana cedi, forming part of the variable cost per kWh.

Below is the summary of schedule showing the increase in distribution service charge:

	2025	2026	2027	2028	2029	2030
Average exchange rate (cedis)	16.42	17.54	18.73	20.00	21.36	22.81
Power Sales (GWh)	1,804.36	1,930.76	2,069.01	2,217.53	2,377.11	2,544.59
Salaries and related expenses	507,538	536,895	579,847	637,831	701,614	771,776
Material expenses	80,861	74,007	78,447	86,292	78,447	86,292
Repairs and maintenance	35,415	37,859	40,225	42,639	45,304	48,022
Transportation and Travelling	76,941	82,250	87,308	92,547	98,238	104,133
Other working costs	83,603	89,371	94,867	100,559	94,867	100,559
Regulatory Benchmark Value GH¢'000	426,417	501,917	591,642	634,112	679,745	727,636
Total Variable Cost	1,210,775	1,322,299	1,472,336	1,593,980	1,698,215	1,838,417
CAPACITY COST (GH¢'000)						
Average Net Fixed Assets (ANFA)	26,465,830	25,531,647	26,670,990	27,248,375	28,282,063	29,750,665
Total Depreciation	756,379	729,681	762,242	778,744	808,286	850,258
Return on ANFA (3%)	793,975	765,949	800,130	817,451	848,462	892,520
Total Capacity Cost	1,550,354	1,495,630	1,562,372	1,596,195	1,656,748	1,742,778
Variable Unit Cost (¢/KWh)	0.6710	0.6849	0.7116	0.7188	0.7144	0.7225
Fixed Unit Cost (¢/KWh)	0.8592	0.7746	0.7551	0.7198	0.6970	0.6849
Variable Unit Cost (\$/KWh)	0.0409	0.0390	0.0380	0.0359	0.0334	0.0317
Fixed Unit Cost (\$/KWh)	0.0523	0.0442	0.0403	0.0360	0.0326	0.0300
Total Cost (¢/KWh)	1.5303	1.4595	1.4667	1.4386	1.4114	1.4074
Total Cost (\$/kWh)	0.09	0.08	0.08	0.07	0.07	0.06
Average Exchange Rates (¢/\$)	16.42	17.54	18.73	20.00	21.36	22.81
PROPOSED DSC (GHC)	1.530254	1.459492	1.466744	1.438616	1.411362	1.407376
PURC APPROVED/EXISTING DSC1	0.56474	0.56474	0.56474	0.56474	0.56474	0.56474
Proposed Percentage Increase	171.8%					

NEDCo recorded a customer population of 1,290,087 as of 2024. This comprised 83.55% of residential customers, 16.44% non-residential customers and 0.01% of SLT customers. Additionally, 39% of the total customer population, totalling 508,424, are lifeline customers who consume power at a rate of GHp67.6495/kWh. This rate is significantly lower than the total approved DSC rate of GHp56.474/kWh and BGT tariff of GHp74.7715 for 2024 Q3, which totals GHp131.2455/kWh. Specifically, the difference between the two rates is GHp63.596/kWh, excluding TSC1 and TSC2.

This discrepancy in the tariff charged lifeline customers, for example, indicates that NEDCo incurs losses of GHp63.596/kWh (DSC and BGT only) for each kWh sold to lifeline customers. Though the lifeline band has been reduced from 50kWh to 30kWh, we recommend scrapping the lifeline band altogether, as it creates revenue shortfalls for the utility.

Furthermore, the amendment of the Energy Sector Levies Act (Act 899, 2015) to Act 941, 2017, resulted in a reduction of the public lighting levy rate from 5% to 3%. This decrease has led to significant shortfalls in providing public lighting, particularly due to the increased number of public lighting infrastructure resulting from the creation of new regional capitals and unauthorized installation of security lights in facilities. The public lighting levy covers less about 20% of the public lighting consumption. Despite the

significant shortfall, revenue generated from the levy is equally shared with the Ministry of Energy.

To properly account for streetlighting consumption, NEDCo requires the Public Utilities Regulatory Commission (PURC) to approve a tariff specifically for street/public lighting.

28 Appendices

- F-1D Distribution Sub-Transmission Data
- F-2D Distribution Network Capacity Parameters Data
- F-3D Distribution Substations Data
- F-4D Distribution Fixed Assets Schedule
- F-5D Distribution Fixed Assets Depreciation Schedule
- F-6D Distribution Project Cost Data (Foreign Costs)
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- F-8D Distribution System Capital Outlay Data
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- F-15D Summary of Distribution Costs
- F-16D Relevant Documentation In Respect of Distribution Tariff Proposal