PUBLIC UTILITIES REGULATORY COMMISSION GHANA

Rate Setting Guidelines

for

Electricity Distribution and Supply

VOLUME 2

METHODOLOGY

REVISION 1.6

June 2018

PUBLIC UTILITIES REGULATORY COMMISSION (GHANA)
PURC

PURPOSE, SCOPE, APPLICATION AND REVISION

PURPOSE

The purpose of the guidelines is to set out the principles, methodology and processes for the approval of electricity distribution and supply tariffs by PURC. The guidelines aim to provide PURC with the information it needs to make decisions on tariff adjustments. Finally the guidelines provide industry participants with information to facilitate tariff application and approval processes.

SCOPE AND APPLICATION

The guidelines apply to a Public Utility licensed or authorised under any law to own or operate electricity distribution assets or to provide electricity distribution and electricity supply services in the regulated market in Ghana.

EFFECTIVE DATE, REVIEW, ADDITIONS AND AMENDMENTS

i. These guidelines shall take effect from November 2017 and revoke all guidelines previously issued by PURC for electricity distribution and supply utilities.

ii. PURC reserves the right to review or add to the guidelines periodically. Review or addition to the guidelines shall be done in consultation with stakeholders and in accordance with the Act.

iii. Amendments, additions and relaxations to the guidelines may be made only with the approval of the Commission.

APPROVAL PROCESS	
2016	Issue of Electricity Rate Setting Guidelines: Version 1.1 to industry stakeholders
2016	Initial comments from industry stakeholders
2016 - July 2017	Industry consultation
August 2017	Issue of Version 1.2 to wider stakeholder group
August 2017	Stakeholder consultation and revisions
August 2017	Commission approval of Version 1.3
September – October 2017	Receipt of wider stakeholder comments
	Commission approval of Version 1.4
November 2017	Publication of Electricity Rate Setting Guidelines: Version 1.5
June 2018	Issue of Electricity Rate Setting Guidelines: Version 1.6

ENFORCEABILITY

These Guidelines are issued as an Order of the Commission and are enforceable in accordance with the Public Utilities Regulatory Commission Act, 1997 (Act 538).

Approved by the Commission on the 27TH Day of ..... June..... 2018

Signed..... Signed.....
Chairman, PURC For: Executive Secretary, PURC

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CONTENT AND STRUCTURE OF DOCUMENT

This document issued by the Public Utilities Regulatory Commission (PURC) constitutes the approved Rate Setting Guidelines for electricity distribution and supply in Ghana. The document is organized as follows:

- Volume 1 – The main volume which is required as part of all other Volumes describes the Tariff Philosophy and Tariff Approval process, including the legal basis and minimum filing requirements underlying the rate setting guidelines for Electricity Distribution and Supply.

- Volume 2 - This Volume which is complementary to Volume 1 sets out the methodology including the formulae and principles for the determination of revenue requirements for Electricity Distribution Network System Operator (EDNSO) by PURC.

This volume is structured as below:

- Definitions and Equation Parameters
- Methodology for determination of Annual Revenue Requirements for Electricity Distribution Network System Operator
- Methodology for determination of Annual Revenue Requirements for Electricity Supply
- Appendix

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DEFINITIONS

Term	Definition
Approved Financial Model	Means an Excel-based financial model that calculates the Distribution Service Rates and Supply Service Rates in accordance with this Volume.
Concession Agreement	Means the agreement by that name entered into between EDNAO and EDNSO, as such agreement may be amended by the parties thereto from time to time.
Distribution Zone	As defined in the Electricity Distribution and / or Supply Licence.
Five-year Ghanaian Sovereign Bonds	Means outstanding Dollar-denominated bonds issued by the Republic of Ghana with maturities of five years, including locally issued Dollar-denominated bonds.
Ghanaian Credit Rating	Means a current credit rating published by Moody's, Standard & Poor's, or Fitch for the Republic of Ghana.
Lease Payments	The Lease Payments for a Regulatory Year (Regulatory Year 't') shall equal the sum of the return on legacy assets plus depreciation on legacy assets as determined by PURC based on filings by EDNAO, stated in nominal US Dollars.
LIBOR	The London interbank offered rate administered by ICE Benchmark Administration Limited (or any other person which takes over the administration of that rate) for US Dollar deposits for a six (6) month period displayed on pages LIBOR01 or LIBOR02 of the Thomson Reuters screen (or any replacement Thomson Reuters page which displays that rate) or an equivalent interest rate should LIBOR cease to be published.
Suitable Ghanaian Sovereign Bonds	Means outstanding bonds that are not Five-year Ghanaian Sovereign Bonds but are similar Dollar-denominated bonds issued by the Republic of Ghana, including locally issued Dollar-denominated bonds.
Transfer Date	Means the date on which EDNAO delivers (i) possession of the leased assets, other assets and other rights and (ii) ownership of all of EDNAO's right, title and interest in and to the Transfer Date Moveable Property to EDNSO pursuant tothe Distribution Licence and/or Concession Agreement.

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EQUATION PARAMETERS

Capital Expenses (Distribution)	As calculated pursuant to Section 1.7.4
Capital Expenses (Supply)	As calculated pursuant to Section 2.1.1.1.1
Corporate Tax (Distribution)	As calculated pursuant to Section 1.6
Corporate Tax (Supply)	As calculated pursuant to Section 2.1.7
Correction Factor (Distribution, First)	As calculated pursuant to Section 1.10.1
Correction Factor (Distribution, Second)	As calculated pursuant to Section 1.10.2
Correction Factor (Supply, First)	As calculated pursuant to Section 2.1.5.1
Correction Factor (Supply, Second)	As calculated pursuant to Section 2.1.5.2
Depreciation (Distribution)	As calculated pursuant to Section 1.7.6
Depreciation (Supply)	As calculated pursuant to Section 2.1.1.1.2
Depreciation on Regulated Asset Base (Distribution)	As calculated pursuant to Section 1.4
Depreciation on Regulated Asset Base (Supply)	As calculated pursuant to Section 2.1.8
Disposition Proceeds (Distribution)	As calculated pursuant to Section 1.7.7
Disposition Proceeds (Supply)	As calculated pursuant to Section 2.1.1.1.3
Equity Yield	As calculated in pursuant to 1.8
Mid-Year Regulated Asset Base (Distribution)	As calculated pursuant to Section 1.7.8
Mid-Year Regulated Asset Base (Supply)	As calculated pursuant to Section 2.1.1.2
Initial Opening Regulated Asset Base (Distribution)	As calculated pursuant to Section 1.7.1
Initial Opening Regulated Asset Base (Supply)	As calculated pursuant to Section 2.1.1.1
Opening Regulated Asset Base (Distribution)	As calculated pursuant to Section 1.7.2
Opening Regulated Asset Base (Supply)	As calculated pursuant to Section 2.1.1.2
Operating Expenses (Distribution)	As calculated pursuant to Section 1.2
Operating Expenses (Supply)	As calculated pursuant to Section 2.1.4.1
Return on Debt	As calculated pursuant to Section 1.8

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Return on Regulated Asset Base (Distribution)	As calculated pursuant to Section 1.3
Return on Regulated Asset Base (Supply)	As calculated pursuant to Section 2.1.6
Target Aggregate Technical and Commercial Loss Ratio	As calculated pursuant to Section 2.5
Target Collection Loss Ratio	As calculated pursuant to Section 2.6
Working Capital Allowance (Distribution)	As calculated pursuant to Section 1.5
Working Capital Allowance (Supply)	As calculated pursuant to Section 2.1.2
Cost of Working Capital Allowance	As calculated pursuant to section 2.1.3

Interpretation

This Volume shall be interpreted in accordance with Volume 1; and capitalized terms used but not defined shall have the meanings assigned in Volume 1.

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PART 1: ANNUAL REVENUE REQUIREMENT-ELECTRICITY DISTRIBUTION NETWORK SYSTEM OPERATOR

1.1 Calculation of Annual Revenue Requirement (Distribution)

The Annual Revenue Requirement (Distribution) shall be estimated as of each Major Tariff Review Determination Date in accordance with the following formula:

$$ARR(Dist)_t = OpEx(Dist)_t + RtnRAB(Dist)_t + DepRAB(Dist)_t + LP_t + WCA(Dist)_t + CorpTax(\text{Dist})_t + K1(Dist)_t + K2(Dist)_t$$

Where:

$ARR(\text{Dist})_t$	means the Annual Revenue Requirement (Distribution) for Regulatory Year 't', stated in nominal US Dollars;
$OpEx(\text{Dist})_t$	means the Operating Expenses (Distribution) for Regulatory Year 't' calculated in accordance with Section 1.2;
$RtnRAB(\text{Dist})_t$	means the Return on Regulated Asset Base (Distribution) for Regulatory Year 't' calculated in accordance with Section 1.3;
$Dep.RAB(\text{Dist})_t$	means the Depreciation on Regulated Asset Base (Distribution) for Regulatory Year 't' calculated in accordance with Section 1.4;
LP_t	means the Lease Payments for Regulatory Year 't' calculated in accordance with Section 1.9;
$WCA(\text{Dist})_t$	means the Working Capital Allowance (Distribution) for Regulatory Year 't' calculated in accordance with Section 1.5;
$Corp.\ Tax\ (\text{Dist})_t$	means the Corporate Taxes (Distribution) for Regulatory Year 't' calculated in accordance with Section 1.6;
$K1(\text{Dist})_t$	means the Correction Factor (Distribution, First) calculated in respect of Regulatory Year 't in accordance with Section 1.10.1; and
$K2(\text{Dist})_t$	means the Correction Factor (Distribution, Second) calculated in respect of Regulatory Year 't' in accordance with Section 1.10.2.

1.2 Operating Expenses (Distribution)

1.2.1 OpEx(Dist) for the first Regulatory Control Period

The Operating Expenses (Distribution) for each Regulatory Year (Regulatory Year 't') occurring during the first Regulatory Control Period shall equal the following amounts:

with respect to Regulatory Year 1, US$[•][1];

with respect to Regulatory Year 2, US$[•];

with respect to Regulatory Year 3, US$[•];

with respect to Regulatory Year 4, US$[•]; and

with respect to Regulatory Year 5, US$[•];

[1] **Note** – The values for Operating Expenses (Distribution) will be agreed with the Preferred Bidder including the division of operating expenses (including the ECG Transferred Staff Cost) between Operating Expenses (Supply) and Operating Expenses (Distribution).

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in each case stated in nominal US Dollars, plus amounts provided for in Section 1.2.3 (*OpEx(Dist) (ECG Transferred Staff Cost)*).

1.2.2 OpEx(Dist) for subsequent Regulatory Control Periods

The Operating Expenses (Distribution) in respect of a Regulatory Year (Regulatory Year 't') occurring during a Regulatory Control Period filed by the EDNSO that is not the first Regulatory Control Period shall equal a projection of all efficient and prudent costs approved by PURC in connection with the provision of Distribution Service during Regulatory Year 't' other than:

i. Depreciation on Regulated Asset Base (Distribution) for Regulatory Year 't';
ii. Interest payments on loans, payments made on leases, and other financing charges allocated to distribution including financing cost of Securities, specifically, costs related to Escrow Accounts, Bank Guarantees and Letters of Credit to cover three months Lease Payments and Power Purchases all of which will be treated as part of Operating Expenses. However, these costs shall be reasonable and in conformity with international best practice at the time. Furthermore, like all other costs, which are subject to PURC's prudence and efficiency test, the cost of financial securities noted above shall be justified before the Commission; and
iii. Corp. Tax (Distribution) for Regulatory Year 't'.

as set forth in the relevant Major Tariff Review Decision, stated in nominal US Dollars, with any Cedi component of such amount stated in nominal Cedi and converted to US Dollars using the relevant projected Exchange Rate (Dollars) provided in the Major Tariff Review Decision.

1.2.3 OpEx(Dist) (ECG Transferred Staff Cost)

PURC shall give due consideration to Government's Employment Protection Policy for the ECG Concession in the Major Tariff Review with respect to prudent staff costs approved by PURC as pass-through in the Operating Expense (Distribution) component of the Annual Revenue Requirement (Distribution) in order to protect ALL existing ECG staff transferred to the Concessionaire.

PURC shall ensure that EDNSO maintain a separate line item for ECG transferred staff cost as part of the Operating Expense which shall be monitored to ensure compliance with the Government's Employment Protection Policy.

1.3 Return on RAB (Dist)

The Return on Regulatory Asset Base (Distribution) for a Regulatory Year (Regulatory Year 't') shall be calculated as follows:

$$RtnRAB(Dist)_t = MidYearRAB(Dist)_t * WACC_t$$

Where:

$RtnRAB(Dist)_t$	means the Return on Regulated Asset Base (Distribution) for Regulatory Year 't';
$MidYearRAB(Dist)_t$	means the Mid-Year Regulated Asset Base (Distribution) for Regulatory Year 't' calculated pursuant to Section 1.7.8;
$WACC_t$	means the Weighted Average Cost of Capital for Regulatory Year 't', calculated pursuant to Section 1.8.

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1.4 Depreciation on RAB (Dist)

The Depreciation on Regulated Asset Base (Distribution) shall be calculated using the straight line method of depreciation/amortisation using the principles set forth in Appendix 1. The Depreciation on Regulated Asset Base (Distribution) in respect of a Regulatory Year (Regulatory Year 't') shall equal the depreciation the EDNSO will recognize and approved by PURC during Regulatory Year 't' with respect to the Opening Regulated Asset Base (Distribution), consistently applied, stated in nominal US Dollars.

1.5 Working Capital Allowance (Distribution)

The Working Capital Allowance (Distribution) for the Regulatory Year (Regulatory Year 't') shall be calculated as follows:

$$WCA(Distribution)_t = \frac{(Lag(days)_t - Lead(days)_t) + Inventory(days)}{365} * OpEx(Distribution)_t$$

Where:

$WCA(Distribution)_t$	Working Capital Allowance(Distribution) calculated for Regulatory Year 't'
Lag Days	Average Debtor days calculated for Regulatory Year 't'
Lead Days	Average Debtor Days Calculated for regulatory Year 't'
$OpEx(Distribution)_t$	Sum of Operating Expenses (Distribution) calculated for Regulatory year 't'

1.5.1 Cost of Working Capital Allowance (Distribution)

The Cost of Working Capital Allowance (Distribution) for the Regulatory Year (Regulatory Year 't') shall be calculated as follows:

$$CWCA(Distribution)_t = WCA_t * WACC$$

Where:

$CWCA(Distribution)_t$	Cost of Working Capital Allowance(Distribution) calculated for Regulatory Year 't
$WCA(Distribution)_t$	Working Capital Allowance(Distribution) calculated for Regulatory Year 't'
WACC	Weighted Average Cost of Capital

PURC shall ensure that the EDNSO observes optimal working capital allowance management practices in accordance with international standards.

Prior to or upon commencement of the Regulatory Control Period, a lead – lag study shall be undertaken to form the basis for the determination of the regulatory working capital allowance.

1.6 Corporate Tax (Distribution)

Corporate Tax (Distribution), if any, on the distribution licence business shall be treated as expense and shall be recoverable from consumers through tariff. The corporate tax actually payable or paid shall be included in the Annual Revenue Requirement (Distribution) in accordance with the provisions of Applicable Tax Laws.

1.7 Regulated Asset Base (Distribution)

The Electricity Distribution Network System Operator's RAB(Dist) shall be based on historic cost whiles that of the EDNAO shall be based on revalued cost.

1.7.1 Initial Opening RAB(Dist)

The Initial Opening Regulatory Asset Base (Distribution) for Regulatory Year '1' of Regulatory Control Period '1' shall equal the Transfer Date Moveable Property Purchase Price (as defined in the Lease and Assignment Agreement).

1.7.2 Opening RAB for first Regulatory Year in Subsequent Regulatory Control Periods

The EDNSO shall provide the detailed information for the calculation and filing of the initial Regulated Asset Base (Distribution) for the upcoming Regulatory Control Period other than the First Regulatory Control Period for determination and approval by PURC.

The roll-forward for the Regulatory Asset Base (Distribution) shall be subject to a prudency test by PURC. The following formula shall be used to roll-forward the Regulatory Asset Base (Distribution) from the opening value for the first year of the previous Regulatory Period:

$$OpeningRAB\ (Dist)_t = OpeningRAB\ (Dist)_{t-1} + ActCapEx\ (Dist)_{t-1} - ActDep\ (Dist)._{t-1} - ActDisp\ (Dist)._{t-1}$$

Where:

Opening RAB(Dist)$_t$	means the Opening Regulated Asset Base (Distribution) for Regulatory Year 't';
Opening RAB(Dist)$_{t-1}$	means the Opening Regulated Asset Base (Distribution) for Regulatory Year 't-1';
ActCapEx(Dist)$_{t-1}$	means the actual Capital Expenses (Distribution) for Regulatory Year 't-1', subject to a prudency test by PURC if actual Capital Expenses (Distribution) exceeds the approved Capital Expenses (Distribution) for such Regulatory Year, calculated in accordance with Section 1.7.4;
ActDep(Dist).$_{t-1}$	means the actual Depreciation (Distribution) for Regulatory Year 't-1', calculated in accordance with Section 1.7.6; and
ActDisp(Dist).$_{t-1}$	means the actual Disposition Proceeds (Distribution) for Regulatory Year 't-1', calculated in accordance with Section 1.7.7;
RegulatoryDays$_t$	means the numbers of days from start of the opening RAB to the end of the Calendar Year (i.e. December 31) in Regulatory Year 't'.

1.7.3 Opening RAB (Dist) for Subsequent Regulatory Years

The Opening Regulatory Asset Base (Distribution) for each subsequent Regulatory Year 't' occurring during a Regulatory Control Period shall be calculated as follows:

$$OpeningRAB\ (Dist)_t = OpeningRAB\ (Dist)_{t-1} + CapEx\ (Dist)_{t-1} - Dep\ (Dist)._{t-1} - Disp.(Dist)_{t-1}$$

Where:

Opening RAB(Dist)$_t$	means the Opening Regulated Asset Base (Distribution) for Regulatory Year 't';
Opening RAB(Dist)$_{t-1}$	means the Opening Regulated Asset Base (Distribution) for Regulatory Year 't-1';
CapEx(Dist)$_{t-1}$	means the approved Capital Expenses (Distribution) for Regulatory Year 't-1', calculated in accordance with Section 1.7.4;
Dep(Dist)$_{t-1}$	means the Depreciation (Distribution) for Regulatory Year 't-1', calculated in accordance with Section 1.7.6; and
Disp(Dist)$_{t-1}$	means the Disposition Proceeds for Regulatory Year 't-1', calculated in accordance with Section 1.7.7.

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1.7.4 Capital Expense (Distribution)

Capital Expense (Distribution) for each Regulatory Year (Regulatory Year 't') occurring during the first Regulatory Control Period shall equal the following amounts:

with respect to Regulatory Year 1, US$[•][2];

with respect to Regulatory Year 2, US$[•];

with respect to Regulatory Year 3, US$[•];

with respect to Regulatory Year 4, US$[•]; and

with respect to Regulatory Year 5, US$[•];

in each case stated in nominal US Dollars.

Capital Expenses (Distribution) for each Regulatory Year occurring during subsequent Regulatory Control Period shall equal the amount approved by PURC pursuant to the relevant Major Tariff Review Decision, stated in nominal US Dollars, with any Cedi component of such amount stated in nominal Cedi and converted to US Dollars using the relevant projected Exchange Rate (Dollars) set forth in the Major Tariff Review Decision. Capital Expenses (Distribution) in respect of a project shall be recognized at the time of commissioning and shall include capitalized interest.

1.7.5 Casualties to the Distribution System

Upon the occurrence of a Casualty to an asset that constitutes part of the Regulated Asset Base (Distribution), the following shall apply.

EDNSO will be required to:

- procure and maintain, in its name, property and casualty insurance over the Distribution System;
- use the proceeds of any insurance claim in respect of such Casualty to repair or replace the asset that was the subject of the Casualty unless it is not necessary for EDNSO to repair or replace such asset in order to continue providing Distribution Service and Supply Service in accordance with the terms of the Distribution Licence and the Supply Licence; and
- in the event that such proceeds are not sufficient to repair or replace the asset, to fund the repair or replacement as it would fund any other capital expense.

The portion of the value of such asset that is (i) recovered from the proceeds of any insurance claim, and (ii) used by EDNSO to repair or replace the asset shall remain in the Regulated Asset Base (Distribution). In the event that a portion of the value of the asset is recovered from the proceeds of any insurance claim but not used by EDNSO to repair or replace the asset as a result of the circumstances contemplated by Paragraph (a)(ii) above, then an amount equal to the portion of such insurance proceeds that are not used to repair or replace the asset shall be removed from the Opening Regulated Asset Base (Distribution).

The portion of the value of such asset that is not recovered from the proceeds of any insurance claim shall be:

[2] **Note** – The values for Capital Expenses (Distribution) will be agreed with the Preferred Bidder, including the division of capital expenses between Capital Expenses (Supply) and Capital Expenses (Distribution).

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- added to Operating Expenses (Distribution) for the Regulatory Year during which the Casualty occurred; and

- removed from the Opening Regulated Asset Base (Distribution);

provided, that, if such amount would cause a material increase in the Annual Revenue Requirement (Distribution), then PURC may, in its discretion, decide that such amount shall remain in the Opening Regulated Asset Base (Distribution) and shall be depreciated over such period as PURC may determine.

The costs incurred by EDNSO to repair or replace the asset minus the amount of any insurance proceeds shall be added to Capital Expenses (Distribution) for the Regulatory Year during which the Casualty occurred.

1.7.6 Depreciation (Distribution)

Depreciation (Distribution) for each Regulatory Year (Regulatory Year 't') shall equal that amount of depreciation the EDNSO will recognize during Regulatory Year 't' with respect to the Regulated Asset Base (Distribution), calculated using the principles set forth in Section 1.7, consistently applied, stated in nominal US Dollars.

1.7.7 Disposition Proceeds (Distribution)

Disposition Proceeds (Distribution) for each Regulatory Year (Regulatory Year 't') shall equal the proceeds realized by the EDNSO from the sale of any assets that are no longer useful in connection with the provisions of Distribution Service, stated in nominal US Dollars, with any Cedi component of such amount stated in nominal Cedi and converted to US Dollars using the Exchange Rate (Dollars) determined as of the relevant Major Tariff Review Determination Date.

1.7.8 Mid-Year Regulated Asset Base (Distribution)

The Mid-Year Regulated Asset Base (Distribution) as of the mid-point of each Regulatory Year shall be calculated as follows:

$$MidYearRAB(Dist)_t = OpeningRAB(Dist)_t + 0.5(CapEx(Dist)_t - Dep(Dist)_t - Disp(Dist)_t)$$

Where:

$MidYearRAB(Dist)_t$	means the Mid-Year Regulated Asset Base (Distribution) for Regulatory Year 't';
$OpeningRAB(Dist)_t$	means the Opening Regulated Asset Base (Distribution) for Regulatory Year 't';
$CapEx(Dist)_t$	means the Capital Expenses (Distribution) for Regulatory Year 't', calculated in accordance with Section 1.7.4;
$Dep(Dist)_t$	means the Depreciation (Distribution) for Regulatory Year 't', calculated in accordance with Section 1.7.6; and
$Disp(Dist)_t$	means the Disposition Proceeds (Distribution) for Regulatory Year 't', calculated in accordance with Section 1.7.7

1.8 Weighted Average Cost of Capital

The Weighted Average Cost of Capital for a Regulatory Year (Regulatory Year 't') shall be calculated as follows:

$$WACC_t = (E * R_e) + (D * R_{d\,t})$$

Where:

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$WACC_t$	means the Weighted Average Cost of Capital for Regulatory Year 't';
E	means 0.3;
R_e	means the Equity Yield, which is equal to [●]%.[3];
D	means 0.7; and
$R_{d,t}$	means the Return on Debt calculated in respect of Regulatory Year 't' using the principles set forth in Section 1.8.1 below.

1.8.1 Determination of Cost of Debt

The Return on Debt for a Regulatory Year (Regulatory Year 't') that is in Regulatory Control Period '1' shall be the Debt Margin of [●]%[4] plus LIBOR prevailing on the date that occurs 10 Business Days prior to the date of the relevant Major Tariff Review Proposal submitted by the Company.

The Return on Debt for a Regulatory Year (Regulatory Year 't') that is not in Regulatory Control Period '1' shall equal:

(a) in the event that there exists Five-year Ghanaian Sovereign Bonds, the yield to maturity for such Five-year Ghanaian Sovereign Bonds as reported by Bloomberg or a similar financial service;

(b) in the event that no Five-year Ghanaian Sovereign Bonds are outstanding, but Suitable Ghanaian Sovereign Bonds are outstanding, the yield to maturity that an investor could earn by purchasing such Suitable Ghanaian Sovereign Bonds as reported by Bloomberg or a similar financial service, with appropriate adjustments;

(c) in the event that no Five-year Ghanaian Sovereign Bonds or Suitable Ghanaian Sovereign Bonds are outstanding, but the Republic of Ghana has a Ghanaian Credit Rating, then the average yield to maturity that an investor could earn by purchasing Dollar-denominated bonds issued by five similar countries with the same credit rating as the Ghanaian Credit Rating; or

(d) in the event that no 5-year Ghanaian Sovereign Bonds, Suitable Ghanaian Sovereign Bonds, or Ghanaian Credit Rating are outstanding or available, then the average yield to maturity that an investor could earn by purchasing Dollar-denominated bonds issued by five countries with economies that have characteristics that are similar to the economy of the Republic of Ghana.

1.9 Lease Payments (Network Operations Legacy Assets)

The Lease Payments shall be filed by the respective EDNAO which shall equal amount determined by PURC as follows:

$$LP_t = RtnRNLFA_t + DepRNLFA_t$$

Where:

LP_t	means the Lease Payments for Regulatory Year 't', stated in nominal US Dollars;
$RtnRNLFA_t$	means the Return on Revalued Net Legacy Fixed Assets for Regulatory Year 't';
$Dep.RNLFA_t$	means the Depreciation on Revalued Net Legacy Fixed Assets for Regulatory Year 't';

[3]**Note** – The Equity Yield will be as agreed with the Preferred Bidder.

[4]**Note** – The Debt Margin will be as agreed with the Preferred Bidder and apply during the first Regulatory Control Period.

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The EDNSO shall collect the lease payments as a pass-through cost and pay same to the EDNAO.

1.10 Correction of Electricity Distribution Revenue

The correction factor shall be a monetary value whereby maximum allowed revenue for Regulatory Year 't' is decreased or increased by the difference between Annual Revenue Requirement (Distribution) and the adjusted efficient and prudent revenue requirement according to information specified in Section 1.11 for the relevant Regulatory Years calculated in accordance with the methodology below.

PURC shall correct for over-recovery or under-recovery of Electricity Distribution revenue using correction factors established on the basis of projected electricity to be distributed and actual electricity distributed, as well as variation in costs, as established in Sections 1.10.1 and 1.10.2. Correction Factors shall be calculated using Annual and Quarterly Reports as well as other relevant data submitted to PURC by EDNSO in accordance with Section 1.11.

For clarity, the correction factor is independent of the obligation to pay the Lease Payment under the Lease and Assignment Agreement.

1.10.1 Correction Factor (Distribution, First)

The Correction Factor (Distribution, First) in respect of Regulatory Year 't' shall equal zero (0) for the purposes of estimating the Annual Revenue Requirement (Distribution) for Regulatory Year '1' of Regulatory Control Period '1', and shall be calculated as follows:

$$\mathrm{K1(Dist)_t} = (\mathrm{ARR(Dist)_{t-1}} - \mathrm{EstRev(Dist)_{t-1}}) * (1 + \mathrm{WACC_t})$$

Where:

$K1(Dist)_t$	means the Correction Factor (Distribution, First) calculated for Regulatory Year 't';
$ARR(Dist)_{t-1}$	means the Annual Revenue Requirement (Distribution) for Regulatory Year 't-1' as established in the most recent Major Tariff Review Decision;
$EstRev(Dist)_{t-1}$	means an estimate of the revenues EDNSO will collect during Regulatory Year 't-1' by charging Distribution Service Rates, calculated assuming: (a) that EDNSO achieved the Target Aggregate Technical and Commercial Loss Ratio and Target Collection Loss Ratio that were applicable to Regulatory Year 't-1' given estimated energy metered at the bulk supply points; and (b) that EDNSO achieved service levels that are consistent with Applicable Laws, Regulations and Regulatory Orders,
$WACC_t$	means the Weighted Average Cost of Capital for Regulatory Year 't' calculated in accordance with Section 1.8.

1.10.2 Correction Factor (Distribution, Second)

The Correction Factor (Distribution, Second) in respect of Regulatory Year 't' shall equal zero (0) for the purposes of estimating the Annual Revenue Requirement (Distribution) for Regulatory Year '1' and Regulatory Year '2' of Regulatory Control Period '1', and shall be calculated as follows thereafter:

$$K2(Dist)_t = \left[(ActualARR(Dist)_{t-2} - ActualTRev(Dist)_{t-2}) - \left(\frac{K1(Dist)_{t-1}}{(1+WACC_{t-1})} \right) \right] \times [(1+WACC_{t-1}) \times (1+WACC_t)]$$

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Where:

$K2(Dist)_t$	means the Correction Factor (Distribution, Second) calculated for Regulatory Year 't';
Actual $ARR(Dist)_{t-2}$	means the Annual Revenue Requirement (Distribution) for Regulatory Year 't-2', calculated using: (i) the Approved Financial Model in line with PURC's Regulatory Accounting Filing Requirements; (ii) the adjusted prudent and efficient costs determined in accordance with the information submitted in accordance with Section 1.11. submitted in respect of Regulatory Year 't-2';
$ActualTRev(Dist)_{t-2}$	means the revenues EDNSO would have earned and collected during Regulatory Year 't-2' by charging Distribution Service Rates, calculated assuming that EDNSO achieved the Target Aggregate Technical and Commercial Loss Ratio and Target Collection Loss Ratio that were applicable to Regulatory Year 't-2' given the actual energy metered at the bulk supply points;
$K1(Dist)_{t-1}$	means the Correction Factor (Distribution, First) that applied during Regulatory Year 't-1';
$WACC_{t-1}$	means the Weighted Average Cost of Capital calculated in respect of Regulatory Year 't-1' pursuant to Section 1.8;
$WACC_t$	means the Weighted Average Cost of Capital calculated in respect of Regulatory Year 't' pursuant to Section 1.8.

1.11 Adjustment in Annual Revenue Requirement (Distribution)

In order to effect any adjustment, the EDNSO shall be required to provide in their Annual Report estimates of the following components of the Annual Revenue Requirement (Distribution) adjusted for variations from the assumptions of exchange rates, changes in CPI, and increases in wages and salaries used in deriving the original estimated efficient and prudent costs for that Regulatory Year:

- the efficient and prudent Operating Expenses (Distribution) for Regulatory Year 't-2';
- for the second and subsequent Regulatory Periods, the efficient and prudent Capital Expenses (Distribution) for Regulatory Year 't-2';
- the efficient and prudent Depreciation (Distribution) on Regulated Asset Base (Distribution) recognized by EDNSO during Regulatory Year 't-2';
- the Corporate Tax (Distribution) and Working Capital (Distribution) based on the efficient and prudent costs above for Regulatory Year 't-2';
- the energy metered at the bulk supply points in Regulatory Year 't-2'.

1.12 Process for Adjustment of Network Charges

At least 20 Business Days before the first Quarter of each Regulatory Year 't' (except for Regulatory Year '1' of each Regulatory Control Period), the EDNSO shall propose network charges (Distribution Service Charge and Distribution Wheeling Charges) that recover the Annual Revenue Requirement (Distribution) given the forecast demand. This will be provided in the form provided by PURC and PURC shall verify that the proposed network charges are compliant. If compliant, PURC shall approve the charges.

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PART 2: ANNUAL REVENUE REQUIREMENT - ELECTRICITY RETAIL SALE

As specified in Energy Commission Act, 1997 (Act 541), Section 26 and Electricity Retail Sale License, rates and tariffs to be charged by a Licensee for electricity retail sale services in the regulated electricity market or tariffs chargeable for electricity retail sale by a person Licensed to undertake bulk procurement of electricity from a wholesale supplier and selling to retail consumers without discrimination in a designated area or zone shall be subject to approval by the PURC using following methodology. The Retail Business as per Energy Commission Licensing regime is defined as all activities relating to Meter Reading, Billing and Customer Management.

2.1 Calculation of Annual Revenue Requirement (Supply)

The Annual Revenue Requirement (Supply) shall be estimated as of each Major Tariff Review Determination Date in accordance with the following formula:

$$ARR(Sup)_t = OpEx(Sup)_t + RtnRAB(Sup)_t + DepRAB(Sup)_t + WCA(Sup)_t + CorpTax(\text{Sup})_t + K1(Sup)_t + K2(Sup)_t$$

Where:

$ARR(Sup)_t$	means the Annual Revenue Requirement (Supply) for Regulatory Year 't', stated in nominal US Dollars;
$OpEx(Sup)_t$	means the Operating Expenses (Supply) for Regulatory Year 't' calculated in accordance with Section 2.1.4.1;
$RtnRAB(Sup)_t$	means the Return on Regulated Asset Base (Supply) for Regulatory Year 't' calculated in accordance with Section 2.1.5;
$Dep.RAB(Sup)_t$	means the Depreciation on Regulated Asset Base (Supply) for Regulatory Year 't' calculated in accordance with Section 2.1.1.1.2;
$WCA(Sup)_t$	means the Working Capital Allowance (Supply) for Regulatory Year 't' calculated in accordance with Section 2.1.2;
$Corp.\ Tax\ (Sup)_t$	means the Corporate Tax (Supply) for Regulatory Year 't' calculated in accordance with Section 2.1.7;
$K1(Sup)_t$	means the Correction Factor (Supply, First) calculated in respect of Regulatory Year 't in accordance with Section 2.1.5.1; and
$K2(Sup)_t$	means the Correction Factor (Supply, Second) calculated in respect of Regulatory Year 't' in accordance with Section 2.1.5.2.

2.1.1 Regulatory Asset Base (Supply)

The Regulatory Asset Base (Supply) for an Electricity Retail Sale shall be determined taking the following into consideration.

2.1.1.1 *Initial Opening RAB (Sup)*

The Initial Opening Regulatory Asset Base (Supply) for Regulatory Year '1' of Regulatory Control Period '1' shall equal an amount approved by the PURC.

For an upcoming Regulatory Control Period other than the First Regulatory Control Period, the EDNSO shall provide the detailed information for the calculation and filing of the initial Regulated Asset Base (Supply) for such Regulatory Control Period for determination and approval by PURC.

The roll-forward for the Regulatory Asset Base (Supply) shall be subject to a prudency test by PURC. The following formula shall be used to roll-forward the Regulatory Asset Base (Supply) from the opening value of the first year of the previous Regulatory Period:

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$$OpeningRAB\ (Sup)_t = OpeningRAB\ (Sup)_{t-1} + ActCapEx\ (Sup)_{t-1} - ActDep\ (Sup)._{t-1} - ActDisp\ (Sup)._{t-1}$$

Where:

Opening RAB(Sup)$_t$	means the Opening Regulated Asset Base (Supply) for Regulatory Year 't';
Opening RAB(Sup)$_{t-1}$	means the Opening Regulated Asset Base (Supply) for Regulatory Year 't-1';
ActCapEx(Sup)$_{t-1}$	means the actual Capital Expenses (Supply) for Regulatory Year 't-1', subject to a prudency test by PURC if actual Capital Expenses (Supply) exceeds the approved Capital Expenses (Supply) for such Regulatory Year, calculated in accordance with Section 2.1.1.1.1;
ActDep(Sup).$_{t-1}$	means the actual Depreciation (Supply) for Regulatory Year 't-1', calculated in accordance with Section 2.1.1.1.2;
ActDisp(Sup).$_{t-1}$	means the actual Disposition Proceeds (Supply) for Regulatory Year 't-1', calculated in accordance with Section 2.1.1.1.3; and

2.1.1.2 *Opening RAB (Sup) for Subsequent Regulatory Years*

The Opening Regulatory Asset Base (Supply) for each subsequent Regulatory Year 't' occurring during a Regulatory Control Period shall be calculated as follows:

$$OpeningRAB\ (Sup)_t = OpeningRAB\ (Sup)_{t-1} + CapEx\ (Sup)_{t-1} - Dep\ (Sup)._{t-1} - Disp\ (Sup)._{t-1}$$

Where:

OpeningRAB(Sup)$_t$	Opening Regulated Asset Base (Supply) as of beginning of Regulatory Year 't'
RAB(Sup)$_{t-1}$	Opening Regulated Asset Base (Supply) for Regulatory Year 't-1'
CapEx(Sup)$_{t-1}$	Capital Expenses (Supply) for Regulatory Year 't-1'
Dep(Sup)$_{t-1}$	Depreciation (Supply) for Regulatory Year 't-1',
Disp(Sup)$_{t-1}$	Disposition Proceeds (Supply) for Regulatory Year 't-1'

2.1.1.1.1 *Capital Expenses (Supply)*

Capital Expense (Supply) for each Regulatory Year (Regulatory Year 't') occurring during the first Regulatory Control Period shall equal the following amounts:

with respect to Regulatory Year 1, US$[•][5];

with respect to Regulatory Year 2, US$[•];

with respect to Regulatory Year 3, US$[•];

with respect to Regulatory Year 4, US$[•]; and

with respect to Regulatory Year 5, US$[•];

in each case stated in nominal US Dollars.

[5] **Note** – The values for Capital Expenses (Supply) will be agreed with the Preferred Bidder, including the division of capital expenses between Capital Expenses (Supply) and Capital Expenses (Distribution).

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Capital Expenses (Supply) for each Regulatory Year occurring during subsequent Regulatory Control Period shall equal the amount approved by PURC pursuant to the relevant Major Tariff Review Decision, stated in nominal US Dollars, with any Cedi component of such amount stated in nominal Cedi and converted to US Dollars using the relevant projected Exchange Rate (Dollars) set forth in the Major Tariff Review Decision. Capital Expenses (Supply) in respect of a project shall be recognized at the time of commissioning and shall include capitalized interest.

2.1.1.1.2 *Depreciation (Supply)*

Depreciation (Supply) for each Regulatory Year (Regulatory Year 't') shall equal the amount of depreciation the ERSL will recognise during Regulatory Year 't' with respect to the Regulated Asset Base (Supply), calculated using the principles set forth in Section 2.1.8, consistently applied, stated in nominal US Dollars.

2.1.1.1.3 *Disposition Proceeds (Supply)*

Disposition Proceeds (Supply) for each Regulatory Year (Regulatory Year 't') shall equal the proceeds realized by the ERSL from the sale of any assets that are no longer useful in connection with the provisions of Distribution Service.

2.1.1.2 *Mid-Year Regulated Asset Base (Supply)*

The Mid-Year Regulated Asset Base (Supply) of an ERSL as of the mid-point of each Regulatory Year shall be calculated as follows:

$$MidYearRAB(Sup)_t = OpeningRAB(Sup)_t + .5 \times (CapEx(Sup)_t - Dep(Sup)_t - Disp(Sup)_t)$$

Where:

$MidYearRAB(Sup)_t$	Mid-Year Regulated Asset Base (Supply) for Regulatory Year 't'
$RAB(Sup)_t$	Opening Regulated Asset Base (Supply) for Regulatory Year 't'
$CapEx(Sup)_t$	Capital Expenses (Supply) for Regulatory Year 't'
$Dep(Sup)_t$	Depreciation (Supply) for Regulatory Year 't',
$Disp(Sup)_t$	Disposition Proceeds (Supply) for Regulatory Year 't'

2.1.2 Working Capital Allowance (Supply)

The Working Capital Allowance (Supply) for the Regulatory Year (Regulatory Year 't') including inventory, shall be calculated as follows:

$$WCA(Sup)_t = \frac{(Lag(days)_t - Lead(days)_t) + Inventory(days)_t)}{365} * OpEx(Sup)_t$$

Where:

$WCA(Sup)_t$	Working Capital Allowance(Supply) calculated for Regulatory Year 't'
Lag Days	Average Debtor days calculated for Regulatory Year 't'
Lead Days	Average Debtor Days Calculated for regulatory Year 't'
$OpEx(Sup)_t$	Sum of Operating Expenses (Supply) calculated for Regulatory year 't'

2.1.3 Cost of Working Capital Allowance (Supply)

The Cost of Working Capital Allowance (Supply) for the Regulatory Year (Regulatory Year 't') shall be calculated as follows:

$$CWCA(Sup)_t = WCA_t * WACC$$

Where:

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$CWCA(Sup)_t$	Cost of Working Capital Allowance(Supply) calculated for Regulatory Year 't
$WCA(Sup)_t$	Working Capital Allowance(Supply) calculated for Regulatory Year 't'
WACC	Weighted Average Cost of Capital

The following assumptions shall be considered in the determination of the allowance for working capital funding

1. Tariff revenue debtors for prepaid meters at zero (0) days
2. Tariff revenue debtors for credit meters at 45 days for residential and non - residential
3. Tariff revenue debtors for credit meters at 30 days for SLT customers
4. Tariff revenue debtors for MDAs paying their bills directly outside government
5. Tariff revenue debtors for Government, MOF and MDAs paid directly by Government at about 90 to 120 days.
6. Operating cost creditors at averaging 30 days of annual non capital expenditure

Prior to or upon commencement of the initial year, a lead – lag study shall be undertaken to re-establish the above underlying assumptions as the basis for the determination of the regulatory working capital to form the basis for the working capital allowance calculation.

The Commission shall ensure that the Electricity Retail Sale Licensee observes optimal working capital management practices in accordance with international standards.

2.1.4 Weighted Average Cost of Capital

The Weighted Average Cost of Capital for a Regulatory Year (Regulatory Year 't') shall be calculated in accordance with Section 1.8.

2.1.4 Operating Expense (Supply)

2.1.4.1 *OpEx(Sup) for First Regulatory Period*

The Operating Expenses (Supply) for each Regulatory Year (Regulatory Year 't') occurring during the first Regulatory Control Period shall equal the following amounts:

with respect to Regulatory Year 1, US$[•][6];

with respect to Regulatory Year 2, US$[•];

with respect to Regulatory Year 3, US$[•];

with respect to Regulatory Year 4, US$[•]; and

with respect to Regulatory Year 5, US$[•],

in each case stated in nominal US Dollars.

2.1.4.2 *OpEx(Sup) for subsequent Regulatory Control Periods*

The Operating Expenses (Supply) in respect of a Regulatory Year (Regulatory Year 't') occurring during a Regulatory Control Period filed by the EDNSO (Retail) that is not the first Regulatory Control Period shall equal a projection of all efficient and prudent costs approved by PURC in connection with the provision of Retail Service during Regulatory Year 't' other than:

[6] **Note** – The values for Operating Expenses (Supply) will be agreed with the Preferred Bidder, including the division of operating expenses between Operating Expenses (Supply) and Operating Expenses (Distribution).

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i. Depreciation on Regulated Asset Base (Supply) for Regulatory Year 't';
ii. Interest payments on loans, payments made on leases, and other financing charges;
iii. Provisions for bad debt;
iv. Corp. Tax (Supply) for Regulatory Year 't'; and
v. Cost of electrical capacity and electrical energy,

as set forth in the relevant Major Tariff Review Decision, stated in nominal US Dollars, with any Cedi component of such amount stated in nominal Cedi and converted to US Dollars using the relevant projected Exchange Rate (Dollars) provided in the Major Tariff Review Decision.

2.1.5 Correction of Electricity Retail Sale Revenue

The correction factor shall be a monetary value whereby maximum allowed revenue for Regulatory Year 't' is decreased or increased by the difference between Annual Revenue Requirement (Supply) and the adjusted efficient and prudent revenue requirement according to information specified in Section 2.8 for the relevant Regulatory Years calculated in accordance with the methodology below.

PURC shall correct for over-recovery or under-recovery of electricity supply revenue using correction factors established on the basis of projected electricity to be supplied and actual electricity supplied, as well as variation in costs, as established in Sections 2.1.5.1 and 2.1.5.2. Correction Factors shall be calculated using Annual and Quarterly Reports as well as other relevant data submitted to PURC by EDNSO in accordance with Section 2.8.

2.1.5.1 *Correction Factor (Supply, First)*

The Correction Factor (Supply, First) in respect of Regulatory Year 't' shall equal zero (0) for the purposes of estimating the Annual Revenue Requirement (Supply) for Regulatory Year '1' of Regulatory Control Period '1', and shall be calculated as follows thereafter:

$$\mathrm{K1(Sup)}_t = (\mathrm{ARR(Sup)}_{t-1} - \mathrm{EstRev(Sup)}_{t-1}) * (1 + \mathrm{WACC}_t)$$

Where:

$\mathrm{K1(Sup)}_t$ means the Correction Factor (Supply, First) calculated for Regulatory Year 't';

$\mathrm{ARR(Sup)}_{t-1}$ means the Annual Revenue Requirement (Supply) for Regulatory Year 't-1' as established in the most recent Major Tariff Review Decision;

$\mathrm{EstRev(Sup)}_{t-1}$ means an estimate of the revenues EDNSO will collect during Regulatory Year 't-1' by charging Supply Service Rates, calculated assuming:

(a) that EDNSO achieved the Target Aggregate Technical and Commercial Loss Ratio and Target Collection Loss Ratio that were applicable to Regulatory Year 't-1' given estimated energy metered at the bulk supply points; and

(b) that EDNSO achieved service levels that are consistent with Applicable Laws, Regulations and Regulatory Orders,

WACC_t means the Weighted Average Cost of Capital for Regulatory Year 't' calculated in accordance with Section 1.8.

2.1.5.2 *Correction Factor (Supply, Second)*

The Correction Factor (Supply, Second) in respect of Regulatory Year 't' shall equal zero (0) for the purposes of estimating the Annual Revenue Requirement (Supply) for Regulatory Year '1' and Regulatory Year '2' of Regulatory Control Period '1', and shall be calculated as follows:

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$$K2(Sup)_t = \left[\left(ActualARR(Sup)_{t-2} - ActualTRev(Sup)_{t-2} \right) - \left(\frac{K1(Sup)_{t-1}}{(1+WACC_{t-1})} \right) \right] \times \left[(1+WACC_{t-1}) \times (1+WACC_t) \right]$$

Where:

$K2(Sup)_t$	means the Correction Factor (Supply, Second) calculated for Regulatory Year 't';
Actual $ARR(Sup)_{t-2}$	means the Annual Revenue Requirement (Supply) for Regulatory Year 't-2', calculated using: (i) the Approved Financial Model in line with PURC's Regulatory Accounting Filing Requirements; (ii) the adjusted prudent and efficient costs determined in accordance with the information submitted in accordance with Section 2.8 submitted in respect of Regulatory Year 't-2';
$ActualTRev(Sup)_{t-2}$	means the revenues EDNSO would have earned and collected during Regulatory Year 't-2' by charging Supply Service Rates, calculated assuming that EDNSO achieved the Target Aggregate Technical and Commercial Loss Ratio and Target Collection Loss Ratio that were applicable to Regulatory Year 't-2' given the actual energy metered at the bulk supply points;
$K1(Sup)_{t-1}$	means the Correction Factor (Supply, First) that applied during Regulatory Year 't-1';
$WACC_{t-1}$	means the Weighted Average Cost of Capital calculated in respect of Regulatory Year 't-1' pursuant to Section 1.8;
$WACC_t$	means the Weighted Average Cost of Capital calculated in respect of Regulatory Year 't' pursuant to Section 1.8.

2.1.6 *Return on RAB (Sup)*

The Return on Regulatory Asset Base (Supply) for a Regulatory Year (Regulatory Year 't') shall be calculated as follows:

$$RtnRAB(Sup)_t = MidYearRAB(Sup)_t * WACC_t$$

Where:

$RtnRAB(Sup)_t$	means the Return on Regulated Asset Base (Supply) for Regulatory Year 't';
$MidYearRAB(Sup)_t$	means the Mid-Year Regulated Asset Base (Supply) for Regulatory Year 't' calculated pursuant to Section 1.7.8;
$WACC_t$	means the Weighted Average Cost of Capital for Regulatory Year 't', calculated pursuant to Section 1.8.

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2.1.7 Corporate Tax (Supply)

Corporate Tax (Supply), if any, on the retail sales licence business shall be treated as expense and shall be recoverable from consumers through the tariff.

The corporate tax actually payable or paid shall be included in the Annual Revenue Requirement (Supply) in accordance with the provisions of Applicable Tax Laws.

2.1.8 Depreciation on RAB (Supply)

The Depreciation on Regulated Asset Base (Supply) shall be calculated using the straight line method of depreciation/amortisation using the principles set forth in Appendix 1. The Depreciation on Regulated Asset Base (Supply) in respect of a Regulatory Year (Regulatory Year 't') shall equal the depreciation the EDNSO will recognize and approved by PURC during Regulatory Year 't' with respect to the Opening Regulated Asset Base (Supply), consistently applied, stated in nominal US Dollars.

2.2 Power Purchase Cost

The Power Purchase Cost shall be treated as a passthrough. For purposes of determining Revenue Requirement of an Electricity Distribution Utility or an Electricity Retail Sale Licensee, the following formula shall be employed in the calculation of Power Purchase Cost.

$$PPC_t = \sum_{m=1}^{nmy} PCEP_m$$

Where:

PPC_t Power Purchase Cost for Regulatory Year 't', stated in nominal US Dollars

nmy means the number of whole months occurring during Regulatory Year 't' plus, in respect of the first and last Regulatory Year to occur during the Term, the number of days occurring during the Regulatory Year divided by 365

$PCEP_m$ means the Portfolio Capacity & Energy Payment for Regulatory Year 't', which equals the sum of:

(i) the Portfolio Capacity & Energy Charge (as defined under the Bulk Supply Agreement) payable under the Bulk Supply Agreement in respect of month 'm';

(ii) the sum of any capacity charges and/or energy charges payable under any other agreements or other arrangements under which the EDNSO may purchase capacity or energy in respect of month 'm'; and

(iii) the sum of all charges payable to GRIDCo or any other entity under any agreements or other arrangements in respect of ancillary services or transmission of electricity from generators to the Bulk Supply Points during month 'm',

stated in US Dollars, calculated assuming that the EDNSO purchases during month 'm' a quantity of electricity that is equal to $\frac{1}{(1-(ATLR_m + TATCLR_m))}$ multiplied by the Aggregate Sales Quantity for month 'm', where $TATCLR_m$ means the Target Aggregate Technical and Commercial Loss Ratio applicable during month 'm', and $ATLR_m$ means the actual transmission loss ratio (as opposed to the benchmark transmission loss ratio) applicable during month 'm'.

2.3 Total Cost of Electricity to End -Use Customers

The following formula shall be employed in the determination of Total Cost of Electricity Supply to End-Use Customers/Consumers by an Electricity Distribution Utility or Electricity Retail Sale Licensee

2.3.1 *Cost of Electricity Supplied by EDNSO to End-Use Customers or Consumers*

Where an EDNSO is engaged in the supply or sale of electricity to Retail Customers, the total cost to such Retail Customers shall be determined as follows:

$$TC_{EUT} = \frac{PPC_t + DSCost_t + ARR(Sup)_t}{(1 - TCLR_t)}$$

Where:

TC_{EUT}	means Total Cost of Electricity Supply/Sale to Retail Customers in respect of Regulatory Year 't;
PPC_t	means Power Purchase Cost in respect of Regulatory Year 't' pursuant to Section 2.2.1;
$DSCost_t$	means Distribution Service Cost, which shall be equal to the Annual Revenue Requirement (Distribution) in respect of Regulatory Year 't' minus any EDNSO revenues from wheeling services in respect of Regulatory Year 't';
$ARR(Sup)_t$	means the Annual Revenue Requirement (Supply) in respect of Regulatory Year 't'; and
$TCLR_t$	means the Target Collection Loss Ratio in respect of Regulatory Year 't'.

2.4 Quarterly Review of End User Tariffs

End User Tariffs determined as per methodologies in Section 2.3.1 and Section 2.3.2 and approved by PURC will be reviewed quarterly using PURC's Automatic Tariff Adjustment mechanism stated in Section 2.4.1 with the objective to addressing Exchange rate-related risk. The overall objective of this quarterly review is to ensure real value of PURC approved End User Tariffs are maintained at any particular period of time.

2.4.1 *Establishment of Retail Tariffs for the first Quarter of each Regulatory Year*

At least 20 Business Days before the first Quarter of each Regulatory Year 't' (except for Regulatory Year '1' of each Regulatory Control Period), the EDNSO shall propose retail tariffs that recover the ARR(Supply) and Power Purchase Cost given the forecast demand. The proposed tariffs must be consistent with the Approved Tariff Methodology and provided in the form determined by PURC. PURC shall verify that the proposed retail tariffs are compliant. If compliant, PURC shall approve the retail tariffs.

2.4.2 *Quarterly Adjustment of End User Tariffs*

At least 10 Business Days before the second, third, and fourth Quarters of each Regulatory Year 't', the EDNSO shall propose adjustments to the retail tariffs consistent with the formula below. PURC shall verify that the proposed adjustments are compliant. If compliant, PURC shall approve the adjustments.

In line with Section 2.4, Quarterly Retail Sale Tariffs shall be adjusted as follows:

$$RT_{q+1} = (RT_q * \beta) + K3$$

Where:

RT_{q+1}	means Projected Retail Tariff (GHp/kWh) for Next Regulatory Quarter;
RT_q	means Retail Tariff (GHp/kWh) in respect of Regulatory Quarter 'q';
β	means Projected Average Exchange Rate Index for Next Quarter defined as $ExchR_{t+1}/ExChR_{t;}$ ExR_1/ExR_0

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K3	a factor to adjust for variations between projected exchange rates (β) and actual average Ghana interbank rates for the previous Quarter as published by the Ghana Association of Bankers. ExR_1/ExR_0

2.5 Target Aggregate Technical and Commercial Loss Ratio

The Target Aggregate Technical and Commercial Loss Ratio in respect of each Regulatory Year 't' during the first Regulatory Control period of five years shall equal:

(a) i. in respect of Regulatory Year 1, provisional baseline aggregate technical and commercial loss ratio established by PURC based on data from the twelve months preceding the transfer date

ii. Thereafter, PURC will engage an independent consultant to undertake a study for establishing an independent baseline ("baseline")

iii. PURC, the Energy Commission, ECG and the Concessionaire can observe, participate in, and make recommendations with respect to the work of the independent consultant

iv. PURC shall make the ultimate decision based on the work of the Independent Consultant.

(b) in respect of Regulatory Year 2, the actual Aggregate Technical and Commercial Loss Ratio from Regulatory Year 1 (as established under section (a) i.- iv. above) minus **[Percentage Reduction in Aggregate Technical and Commercial Loss Ratio as per Agreement Year 2]**;

(c) in respect of Regulatory Year 3, the actual Aggregate Technical and Commercial Loss Ratio from Regulatory Year 1 (as established under section (a) i.- iv. above) minus **[Percentage Reduction in Aggregate Technical and Commercial Loss Ratio as per Agreement Year 3]**;

(d) in respect of Regulatory Year 4, the actual Aggregate Technical and Commercial Loss Ratio from Regulatory Year 1 %; and(as established under section (a) i.- iv. above) minus **[Percentage Reduction in Aggregate Technical and Commercial Loss Ratio as per Agreement Year 4]**;

(e) in respect of Regulatory Year 5, the actual Aggregate Technical and Commercial Loss Ratio from Regulatory Year 1 (as established under section (a) i.- iv. above) minus **[Percentage Reduction in Aggregate Technical and Commercial Loss Ratio as per Agreement Year 5]**;

provided, that, in the event that any failure to complete and commission an MCC-Funded Modification (as defined in the Lease and Assignment Agreement) in accordance with the Lease and Assignment Agreement or other planned ECG or other third-party investment in the Distribution System, PURC will adjust the above Target Aggregate Technical and Commercial Loss Ratio on a fair and equitable basis.

After the first 5 years, the Target Aggregate Technical and Commercial Loss Ratio shall equal the percentage established by PURC in the relevant Major Tariff Review Decision.

2.6 Target Collection Loss Ratio

The Target Collection Loss Ratio in respect of each Regulatory Year 't' during the first Regulatory Control period of five years shall equal

(a) i. in respect of Regulatory Year 1, provisional baseline collection loss ratio established by PURC based on data from the twelve months preceding the transfer date

ii. Thereafter, PURC will engage an independent consultant to undertake a study for establishing an independent baseline ("baseline")

iii. PURC, the Energy Commission, ECG and Concessionaire can observe, participate in, and make recommendations with respect to the work of the independent consultant

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iv. PURC will make the ultimate decision based on the work of the Independent Consultant.

(b) in respect of Regulatory Year 2, the actual average Collection Loss Ratio from the twelve months before Regulatory Year 1 (as established under section (a) i.- iv. above) minus **[Percentage Reduction in Collection Loss Ratio as per Agreement Year 2]**;

(c) in respect of Regulatory Year 3, the actual average Collection Loss Ratio from the twelve months before Regulatory Year 1 (as established under section (a) i.- iv. above) minus **[Percentage Reduction in Collection Loss Ratio as per Agreement Year 3]**;

(d) in respect of Regulatory Year 4, the actual average Collection Loss Ratio from the twelve months before Regulatory Year 1 (as established under section (a) i.- iv. above) minus **[Percentage Reduction in Collection Loss Ratio as per Agreement Year 4]**; and

(e) in respect of Regulatory Year 5, the actual average Collection Loss Ratio from the twelve months before Regulatory Year 1 (as established under section (a) i.- iv. above) minus **[Percentage Reduction in Collection Loss Ratio as per Agreement Year 5]**.

provided, that, in the event that any failure to complete and commission an MCC-Funded Modification (as defined in the Lease and Assignment Agreement) in accordance with the Lease and Assignment Agreement or ECG or other planned third-party investment in the Distribution System, PURC will adjust the above Target Collection Loss Ratio on a fair and equitable basis.

After the first 5 years, the Target Collection Loss Ratio for each Regulatory Year 't' shall be determined by PURC for the subsequent Regulatory Control Periods as follows:

For the subsequent Regulatory periods, PURC shall apply the following formula;

1. In the Second Regulatory Period (Year 6 to Year 10): Min (Actual Collection Ratio, PURC Benchmark Collection Loss Ratio of 5%). Whichever is minimum shall be applied between the Actual Collection Loss Ratio and the PURC Benchmark Collection Loss Ratio of 5%

2. In the Third Regulatory Period (Year 11 to Year 15): Min (Actual Collection Ratio, PURC Benchmark Collection Loss Ratio of 3%). Whichever is minimum shall be applied between the Actual Collection Loss Ratio and the PURC Benchmark Collection Loss Ratio of 3%

3. In the Fourth Regulatory Period (Year 11 to Year 15): Min (Actual Collection Ratio, PURC Benchmark Collection Loss Ratio of 3%). Whichever is minimum shall be applied between the Actual Collection Loss Ratio and the PURC Benchmark Collection Loss Ratio of 3%

2.6.1 *Calculation of Collection Loss Ratio*

The Collection Loss Ratio of Retail Sale Licensee shall be calculated as of the beginning of each Regulatory Year (Regulatory Year 't') in accordance with the following formula:

$$CLR_t = \frac{TAI_t - TAC_t}{TAI_t}$$

Where:

CLR_t (*Collection Loss Ratio*) means the Collection Loss Ratio for Regulatory Year 't';

TAI_t (*Total Amount Invoiced*) means the total amount invoiced by ERSL in respect of Distribution Service and/or Retail Service provided during Regulatory Year 't'; and

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TAC_t (*Total Amount Collected*) means the total amount collected by ERSL in respect of Distribution Service and/or Retail Service provided during Regulatory Year 't'

2.7 Allocation of Total Cost of Electricity to End-Use Customers or Consumers

Having determined Total Cost of Electricity Supply, PURC shall translate such cost into rates payable by End-Use Customers or Consumers taking into consideration Cost of Servicing each customer category by:

- *grouping the End Users in the Distribution Zone into Customer Categories;*
- *assigning the costs incurred by EDNSO in providing Distribution Service to each Customer Category;*
- *assigning a portion of the Target Collection Loss Ratio to each Customer Category;*
- *assigning a portion of the Target Aggregate Technical and Commercial Loss Ratio to each Customer Category; and*
- *using the Annual Revenue Requirement (Distribution) and Annual Revenue Requirement (Supply) in conjunction with such methodology to determine the Distribution Service Rates and the Retail Rates.*

2.8 Adjustment in Annual Revenue Requirement (Supply)

In order to effect any adjustment, the ERSL shall be required to provide in their Annual Report estimates of the following components of the Annual Revenue Requirement (Supply) adjusted for variations from the assumptions of exchange rates, changes in CPI, and increases in wages and salaries used in deriving the original estimated efficient and prudent costs for that Regulatory Year:

- the efficient and prudent Operating Expenses (Supply) for Regulatory Year 't-2';
- for the second and subsequent Regulatory Periods, the efficient and prudent Capital Expenses (Supply) for Regulatory Year 't-2';
- the Depreciation (Supply) on the efficient and prudent Regulated Asset Base (Supply) recognized by EDNSO during Regulatory Year 't-2';
- the Corporate Tax (Supply) and Working Capital (Supply) based on the efficient and prudent costs above for Regulatory Year 't-2';
- the energy metered at the bulk supply points in Regulatory Year 't-2'.

2.9 Process for Establishment and Adjustment of Retail Tariffs

At least 20 Business Days before the first Quarter of each Regulatory Year 't' (except for Regulatory Year '1' of each Regulatory Control Period), the EDNSO shall propose retail tariffs that recover the Total Cost of supply determined under section 2.3.1 (as adjusted by the correction factors in sections 2.1.5.1 and 2.1.5.2) given the forecast billable sales. This will be provided in the form provided by PURC and PURC shall verify that the proposed tariffs are compliant. If compliant, PURC shall approve the charges.

At least 10 business days before the start of Quarters 2, 3 and 4 of each year, the EDNSO shall provide to PURC adjusted tariffs calculated in accordance with section 2.4.1. PURC shall verify that the proposed tariffs are compliant. If compliant, PURC shall approve the tariffs.

APPENDIX - Principles for Accounting for Depreciation

The Depreciation on Regulated Asset Base shall be calculated using the straight line method of depreciation/amortisation and the following useful asset life and depreciation rates.

Category	Description	Useful Life	Depreciation Rate
Sub-Transmission	Land	0	
Sub-Transmission	Structures	40	2.50
Sub-Transmission	33/11kV Underground Cables	40	2.50
Sub-Transmission	33/11kV Transformers	40	2.50
Sub-Transmission	33/11kV Overhead Lines/Wood Poles	20	5.00
Sub-Transmission	33/11kV Overhead Lines/Steel Tower	40	2.50
Sub-Transmission	Electrical Equipment	25	4.00
Distribution	Land	0	
Distribution	Structures	40	2.50
Distribution	11kV Underground Cables	40	2.50
Distribution	LV Underground Cables	30	3.33
Distribution	33kV/LV Transformers	30	3.33
Distribution	11kV/LV Transformers	30	3.33
Distribution	11kV Overhead Lines/Wood Poles	20	5.00
Distribution	11kV Overhead Lines/Steel Towers	35	2.86
Distribution	LV Overhead Lines	25	4.00
Distribution	LV Serv Connections/UGC	30	3.33
Distribution	LV Serv Connections/OHL	25	4.00
Distribution	Electrical Equipment	25	4.00
Buildings	Land	0	
Buildings	Structures	40	2.50
General Tools	Workshop Tools	8	12.50
General Tools	Instruments & Test Equipment	8	12.50
Fixtures/Fittings	Fixtures & Equipment	8	12.50
Fixtures/Fittings	Office Machines	8	12.50
Fixtures/Fittings	Computers and Accessories	4	25.00
Fixtures/Fittings	Computers &Access/Mframe,Server	5	20.00
Meters	Credit Meters	20	5.00
Meters	Prepayment Meters	10	10.00
Transport	Light Vehicles	4	25.00
Transport	Heavy Duty Vehicles	5	20.00
Transport	Specialised Vehicles	10	10.00
Computer Software	Persopay and HR	3	33.33
Computer Software	SunSystems	3	33.33
Computer Software	Local Area Network	3	33.33

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