PUBLIC UTILITIES REGULATORY COMMISSION GHANA

Rate Setting Guidelines

for

Procurement and Supply of Electricity Generation Capacity and Energy

for the Regulated Electricity Market

Revision 1.2

August 2025

PURPOSE, SCOPE, APPLICATION AND REVISION

PURPOSE

These guidelines are issued by the Public Utilities Regulatory Commission (PURC) as part of the Government of Ghana's Policy for Competitive Procurement of Energy Supply and Services Contracts. The Policy stipulates the procurement of energy in a sustainable and least-cost manner in accordance with the Public Procurement Act 2003, as amended by the Public Procurement [Amendment] Act 2016 (ACT 914), and other applicable laws of Ghana.

The purpose of these guidelines is to set out the principles, methodology and processes to be applied by the PURC for:

1. the determination of cost of procuring new generation capacity and energy
2. the approval of tariffs for existing power plants
3. the determination of cost of procuring capacity and energy from the wholesale electricity market

SCOPE AND APPLICATION

Power plants operating in the regulated market have been categorised according to their income scheme:

- Type A: generators whose revenues are determined by a PPA. Within which the following two cases can be distinguished:
    a) Type A1: generators that have a PPA already in force (existing IPPs and state-owned power plants)
    b) Type A2: new generators that will be selected through a new competitive process (New Entrant Power Plants)
- Type B: generators for which no PPA is in force and for which a regulated tariff shall apply.

Type A generators will integrate Type B after the expiry of their PPA.

New Entrant Power Plants (Type A2)

The procurement of electricity generation capacity and energy both from conventional and non-conventional (renewable energy) sources under Government's competitive procurement and bidding process for deployment in the regulated electricity market shall be based on a Reference Ceiling Capacity Charge determined by PURC in line with these guidelines and in addition, for non-conventional energy sources under Section 25(1) of the Renewable Energy Act, 2011 (Act 832) as amended by the Renewable Energy (Amendment) Act, 2020 (ACT 1045).

From the effective date of these guidelines, no new generation capacity and energy shall be procured for the regulated electricity market by a Distribution Licensee (DisCo) without recourse to the *Reference Capacity Charge* as a key bidding requirement as contained in the PURC's Rate Setting Guidelines for Procurement and Supply of Electricity Generation Capacity and Energy for the Regulated Electricity Market.

Existing Power Plants Contracted Under Power Purchase Agreement (Type A1)

A public utility licensed under any law to own or operate electricity generation assets in the regulated electricity market in Ghana shall operate within the scope of its Power Purchase Agreement (PPA) and, upon expiry of the PPA, within the scope of these guidelines, as follows:

- The tariff approved by the PURC between the generation utility and a DisCo under a PPA existing prior to the effective date of these guidelines, shall remain applicable as provided for in the PPA.

- The tariff at which a DisCo shall continue to procure electricity from a power plant following the expiry of its PPA shall be in accordance with the tariff determined and approved by PURC under these guidelines.

Existing Power Plants Under No Power Purchase Agreement (Type B)

A public utility licensed under any law to own or operate electricity generation assets in the regulated electricity market in Ghana, for which no PPA is in force and a regulated tariff has been approved by PURC shall operate within the scope of these guidelines.

The tariff approved by the PURC between the generation utility and a DisCo under no PPA existing prior to the effective date of these guidelines, shall remain applicable as approved.

EFFECTIVE DATE, REVIEW, ADDITIONS AND AMENDMENTS

i. These guidelines shall take effect from ……2025.

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 Public Utilities Regulatory Commission Act, 1997 (Act 538) ('the Act").

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

ENFORCEABILITY

These Guidelines are issued as an Order of the Commission and are enforceable in accordance with the Act.

In accordance with section 17 of the Act, the Commission reserves the right, at any time, to investigate the cost of production of a producer or generator in order to determine the reasonableness of the cost, where a public utility does not itself produce or generate the service which it provides to consumers, but obtains it from another source.

Approved by the Commission on the 29TH Day of AUGUST 2025

Signed.....
Chairman, PURC

Signed.....
Executive Secretary, PURC

CONTENT AND STRUCTURE OF DOCUMENT

This document, issued by the Public Utilities Regulatory Commission (PURC) constitutes the approved Rate Setting Guidelines for the competitive procurement of energy supply and services contract and the approval of tariffs for existing power plants which are continued in operation upon the expiration of their Power Purchase Agreements.

The document is organized as follows:

- Part 1 – This Part provides the Methodology for Determination of Cost of Procuring Generation Capacity
- Part 2 - This Part sets out the Methodology for Determination and Recovery of Variable Supply Cost
- Part 3 – This Part provides the Methodology for Determination of Bulk Generation Charge
- Part 3 - This Part deals with procurement of Capacity and Energy from the Wholesale Electricity Market
- Part 4 - This Part highlights Indexation of Monthly Billing of Capacity and Energy Procured for the Regulated Electricity Market
- Part 5 – This Part deals with Publication of Underpinning Tariff Parameters and Data

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DEFINITIONS AND INTERPRETATION

Term	Definition
Act	Means the Public Utilities Regulatory Commission Act, 1997 (Act 538).
Bulk Supply Tariff	Means the price of the electricity at the Bulk Supply Point set to recover the capacity and energy charges of generation and transmission service charges.
Commission	Means the Public Utilities Regulatory Commission established under the Public Utilities Regulatory Commission Act, 1997 (Act 538).
Consumer	Means a person or his successor, who purchases, receives or makes use of any service provided by a public utility and who does not deliver or resell the service to others.
Corporate Tax	Means as stipulated in the Ghana Income Tax Act, 2015 (Act 896) and its amendments.
Cost of Debt	Means the effective interest rate that a Public Utility pays on its current debt to fund its operations.
Cost of Equity	Means the rate of return on investment that is required by Shareholders of a Public Utility.
Depreciation	Means a measure of the consumption, use or wearing out of a generation asset over the period of its economic life.
Generation	Means the process of producing electrical power (kilowatts or kW) and energy (kilo-watt hours or kWh) through conversion of other primary forms of energy.
Net Effective / Guaranteed Capacity	Means PURC Approved Percentage of installed capacity (MW) of a power plant which is available for dispatch at all times taking into consideration PURC Benchmark ambience conditions.
Plant Heat Rate	Means the measure of efficiency of power plants that convert fuel into heat and into electricity.
Power Purchase Agreement	Means bilateral contracts established between Distribution Utilities and wholesale power suppliers for the purchase of electrical power and energy.
PURC	Means Public Utilities Regulatory Commission established under the Public Utilities Regulatory Commission Act, 1997 (Act 538).
Regulatory Year	Means a designated consecutive twelve months period of operations, for which the approved tariffs shall apply during the tenure of the Power Purchase Agreement.

Term	Definition
Reference Capacity Charge	Means a maximum or ceiling price approved by PURC upon which potential Electrical Generation Capacity Suppliers shall bid. For purposes of preventing collusion/uncompetitive procurement outcomes, there shall be no disclosure of the Reference Capacity Charge to bidders.
Selected Power Plant Type	Means simple cycle power plants, combined cycle power plants and any other generation facilities determined by PURC in consultation with the Energy Commission.
Spot Market	Means power supply transactions to settle: (i) the differences between the contractual obligations of wholesale power suppliers to distribution utilities and/or other customers and the hour-by-hour amounts of power and energy produced on the basis of economic merit order dispatch of generation facilities in the National Interconnected System, and (ii) the differences between the hour by hour and contractual consumption of distributors and/or other customers.
Useful Investment Life	Means the investment life of a generation asset as determined by the PURC with a minimum of 20 years for thermal generation assets and 45 years for hydroelectric generating stations.
Wholesale Electricity Market	Means an electricity market established by market rules approved by the Commission for bulk trading of electricity, ancillary services or any other related electricity supply product or service.
Wholesale Supplier	Means a person licensed under the Act to install and operate a facility to procure or produce electricity for sale to a bulk customer or to a distribution company for distribution and sale to consumers.

Interpretation
These Guidelines shall be interpreted in accordance with PURC Act 1997, (Act 538) and Government Policy Guidelines on Energy Supply and Services Contract and other applicable laws of Ghana.

Capitalized terms used but not defined shall have the meanings assigned in these Guidelines.

EQUATION PARAMETERS

Allowable Rate of Return	As calculated pursuant to Section 1.1.2.2 & 7.1.2.2
Capacity Charge	As calculated pursuant to Sections 1.1.1 & 7.1
Composite Bulk Electricity Generation Charge	As calculated pursuant to Section 3.1
Corporate Tax	As calculated in pursuant to Section 1.1.4 & 7.4
Fixed Operation & Maintenance Expenses (FOMEx)	As calculated pursuant to Sections 1.2 & Section 7.2
Fuel Recovery Charge	As calculated pursuant to Section 2.4
Non-Fuel Variable Operation & Maintenance Expenses (NFVOM)	As calculated pursuant to Section 2.5
Working Capital Allowance	As calculated pursuant to Sections 1.1.3 & 7.3

PART 1: METHODOLOGY FOR DETERMINATION OF COST OF PROCURING GENERATION CAPACITY

The cost at which a Distribution Utility/Company (DisCo) shall procure generation capacity whether from an existing power plant (Type A1 or Type B) or a new entrant power plant (Type A2) shall be determined by PURC as Capacity Charge. The Capacity Charge shall comprise Capital Cost and Fixed Operation and Maintenance Costs.

Power plants in the Ghanaian electricity sector can obtain revenues through:

1. Sales through Power Purchase Agreements (PPAs)
2. Sales at the tariffs availed under this regulation
3. Sales on the Wholesale Electricity Market

For the purpose of generation charges computation in the following sections, all monetary amounts are computed in real Ghana Cedis of the base year.

1.1 Existing Operating Power Plants

The PURC shall adopt the following methodology in determination of Capacity Charge for existing operating power plants that do not have a PPA in force (Type B). This methodology also applies to operating power plants with a PPA (Type A1).

1.1.1 Capacity Charge

For existing operating hydroelectric generating stations and thermal power plants, PURC shall determine the Capacity Charge using the following formula. However, PURC shall disallow the Capital Recovery Component of the Capacity Charge as per Section 1.1.4.

$$CC = \frac{PURCAppCRC + WCA + FOMEx + CorpTax}{NEGC}$$

Where:

CC	Is Capacity Charge (GHS/MW/Year)
PURCAppCRC	Is PURC Approved Capital Recovery Charge for existing operating hydroelectric generating stations and thermal power plants based on Capital Recovery Factor which includes a PURC Approved Useful Investment Life and a PURC determined Weighted Average Cost of Capital
WCA	Is PURC Approved Benchmark/Standard Working Capital Allowance calculated in accordance with Section 1.1.4
FOMEx	Is PURC Approved Benchmark/Standard Fixed Operation and Maintenance Expenses calculated in accordance with Section 1.1.3
CorpTax	Is Corporate Tax calculated in accordance with Section 1.1.5
NEGC	Is Net Effective/Guaranteed Capacity (MW)

1.1.2 Gearing and Allowable Rate of Return on Regulated Asset Base

1.1.2.1 Gearing

When calculating the allowable rate of return on Regulated Asset Base (RAB), PURC shall apply its benchmark gearing level of 30% equity and 70% debt[1].

[1] Refers to Corporate Entities which have Debt as part of their Capital Structure. The Commission's Benchmark Debt Component in the Capital Structure is 70%. However, where the Cost of Debt is determined by the Commission to be significantly lower than the Average Market Cost of Debt, the Commission may opt for a higher Debt Proportion beyond the 70% in the Capital Structure.

1.1.2.2 Allowable Rate of Return on Regulated Asset

The allowable rate of return shall be set equal to the estimated weighted average cost of capital (WACC). The PURC shall determine the post-tax WACC, by taking into consideration, cost of debt and cost of equity as well as the Commission's benchmark debt and equity ratios using the following formulae.

$$WACC = [\{E/(D+E)\} * K_e] + [\{D/(D+E)\} * K_d * (1-T)]$$

Where:

WACC	Is Post-Tax WACC
E	Is Equity
D	Is Debt
Ke	Is Cost of Equity as determined by PURC
Kd	Is Cost of Debt as determined by PURC based on market conditions
T	Corporate Tax Rate

1.1.3 Fixed Operation and Maintenance Expenses for Existing and Operating Hydroelectric and Thermal Power Plants

For existing and operating Hydroelectric generating stations, the Commission shall allow such generating stations to charge fixed operation and maintenance charge approved by the Commission (FOMEx). The FOMExt shall be calculated for the Base Year in a Regulatory Control Period and updated over time as per the PURC quarterly review guidelines (for Type B) or updated as per indexation clauses in Part 4 of these guidelines.

$$FOMEx_t = PAInC * \gamma$$

Where:

FOMExt	Is Fixed Operation and Maintenance Expenses
PAInC	Is PURC Approved Initial Infrastructure Cost
γ	Is PURC Approved Fixed O&M Benchmark Percentage

1.1.4 Cost of Working Capital Allowance

The Cost of Working Capital Allowance for the Regulatory Year (t) shall be calculated as follows:

$$CWCA_t = \frac{(Lag\ (days)_t - Lead\ (days)_t)}{365} * OpEx_t * WACC$$

Where:

$CWCA_t$	Is Cost of Working Capital Allowance calculated for Regulatory Year (t)
Lag Days	Is Average Debtor Days calculated for Regulatory Year (t)
Lead Days	Is Average Creditor Days calculated for Regulatory Year (t)
$OpEx_t$	Is Sum of Operating Expenses calculated for Regulatory Year (t)
WACC	Is Weighted Average Cost of Capital

1.1.5 Corporate Tax

Corporate Tax shall be treated as expense. Corporate tax paid shall be included in the Annual Revenue Requirement (Generation) in accordance with the provisions of Applicable Ghana Revenue Authority Tax Laws. To that end, the following formula shall be employed.

$CorpTax_t$ = (Pre-Tax WACC - Post-Tax WACC) * RAB

Where:

$CorpTax_t$	Is Corporate Tax
Pre-Tax WACC	Is Weighted Average Cost of Capital Including Corporate Tax Percentage
Post-Tax WACC	Is Weighted Average Cost of Capital Excluding Corporate Tax Percentage

1.1.6 Disallowance of Capital Recovery Charge

PURC shall restrict recovery of the Capacity Charge for existing operating Independent Power Producers to approved fixed operation and maintenance charge only where such power plants have served their contractual obligations under a Power Purchase Agreement (PPA). This shall apply to both hydroelectric generating stations under contract[2] and thermal power plants, hence recovery of the Capital Recovery Charge component contained in the Capacity Charge formula shall be disallowed based on the following:

1. That such power plants have served their Useful Investment Life, which useful life formed the basis for determination and approval of their Capital Recovery Charge and have fully recovered their capital/investment costs but continue to operate.

2. That thermal power plants under Power Purchase Agreements (PPAs) shall not benefit from periodic revaluation of their assets since allowing such revaluations will lead to over-recovery of their capital/investment costs. However, where revaluations of such power plants are allowed, tariff revenue from such revaluation shall be paid fully into a sinking fund established by the off-taker.

1.1.7 Capital Recovery Charge of Existing Non-Conventional Generation Power Plants

No Existing Non-Conventional Generation Power Plants shall be entitled to recover its Capital Recovery Charge on the basis of energy determined by PURC using their Capacity Factor and Net Effective Capacity (MW).

1.1.8 Recovery of New Investments (Overhaul Investments) to Extend Useful Life of Existing Operating Power Plants

Where an Existing Operating Power Plant fully recovers its investments in the form of Capital Recovery Charge but has been assessed collaboratively by Energy Commission and PURC, and approved by Energy Commission as capable of providing electrical energy generation capacity efficiently but requires new investments (overhaul investments) for such purpose, the PURC shall on the basis of such assessment and approval by the Energy Commission, determine a New Capacity Charge for such power plants taking into consideration the new investments (overhaul investments) made. The New Capacity Charge so determined and approved by the PURC shall be made up of Capital Recovery Charge including Corporate Tax, Fixed Operation and Maintenance Charge and Cost of Working Capital Allowance.

[2] *Where Bui hydroelectric generating station has served its twenty-year contractual period, its Capacity Charge shall be determined as per 'PART A' of these guidelines and taking into account its revaluation report.*

1.2 Existing Operating Power Plants with PPA (Type A1)

For existing thermal power plants with a PPA already in force, the Capacity Charge as approved by PURC and stated in the PPA shall continue to run over the Useful Life of the plant.

1.3 Procurement of New Entrant Power Plants

The procurement of electrical generation capacity and energy under competitive procurement process for deployment in the regulated electricity market are expected to be below the Reference Capacity Charge determined by PURC in line with these guidelines and in addition, for non-conventional energy sources under Section 25(1) of the Renewable Energy Act, 2011 (Act 832) as amended by the Renewable Energy (Amendment) Act, 2020 (Act 1045). PURC shall publish annually, the Reference Ceiling Capacity Charge so determined according to Annex 1.

Competitive procurement processes to select New Entrant Power Plants shall take into account not only the capacity charge offered by participants in the auction or tender but also the energy charge, applicable to each technology as per these Guidelines, thus optimizing the overall aggregate procurement cost.

New Entrant Power Plants will receive the capacity charge according to their bid, which in any case shall be equal or lower than the Reference Capacity Charge approved by the PURC for each technology, for the duration of their initial PPA.

1.3.1 No Objection Provision and Validity of Winning Bid Capacity Charge

The Winner of Competitively Bid New Entrant Power Plant shall submit the Winning Bid Price/Capacity Charge to PURC for a no objection. The Winning Bid Price/Capacity Charge for which PURC has provided a no objection shall have a validity period not exceeding two years.

PART 2: METHODOLOGY FOR DETERMINATION AND RECOVERY OF VARIABLE SUPPLY COST

This methodology applies for New Entrant Power Plants (Type A2 power plants and for Type B power plants). For existing PPAs (Type A1), the prevailing contractual rules shall apply.

2.1 Fuel Procurement Under Supply Contracts/Agreements

The fuel for generating electrical energy by existing operating and new entrant power plants shall be procured in line with Government Policy Guidelines on Least Cost Procurement of Fuel. The cost of such fuel so procured, shall be recovered as fuel recovery charge. The PURC shall determine Fuel Recovery Charge as a pass-through cost in electrical energy generation. In so doing, PURC shall take cognisance of its benchmark fuel characteristics and associated costs where applicable as follows.

1. Grade/ Quality
2. Calorific Value
3. Transportation
4. Premium and Fuel Handling Surcharges

2.2 Investigation of Fuel Supply Contracts

The PURC shall interrogate all fuel supply contracts in accordance with section 17(1) of the PURC Act 1997, (ACT 538), which section states "***In order to assess the cost of production of any service by a public utility for the purpose of this Act, the Commission may investigate and determine whether any expenditure incurred by the public utility is justified or reasonable***". To that extent, PURC shall on the basis of its investigations vis-à-vis its benchmark specific fuel characteristics determine the appropriate cost of such fuel.

2.3 Submission of Fuel Analysis Report

Fuel procured under Government Policy on Least Cost Fuel Procurement shall be subject to quality analysis by a licensed Laboratory or Authority. Such Laboratories or Authorities shall issue reports, specifying findings and submit same to PURC. The PURC shall review the laboratory findings vis-à-vis its Benchmark fuel characteristics as and when fuel is procured. Where fuel characteristics as analysed vary markedly from PURC Benchmark, PURC shall assume a price for such fuel(s) on the basis of variations in quality characteristics.

2.4 Recovery of Fuel Supply Cost/Fuel Recovery Charge

In determining the Fuel Recovery Charge in respect of existing power plants and new entrant power plants, PURC shall undertake the following:

1. Determine Heat Rate of selected plant type
2. Ascertain Delivered Fuel Cost per Least Cost Fuel Procurement Policy

2.4.1 Determination of Heat Rate

Contractual heat rates to be included in Power Purchase Agreements (PPAs) negotiated between New Entrant Power Plants and a Distribution Company as off-taker shall be determined in line with PURC's methodology provided for that purpose as contained in these Guidelines. In that regard, the Commission shall establish Heat Rates for both Combined Cycle power plants and Simple Cycle power plants using the following data and methodology.

1. Manufacturer's Nameplate Heat Rate (MNPHR) based on ISO conditions at stated ambient temperature conditions.
2. Six monthly average ambient temperature conditions of Ghana as published periodically by the Ghana Meteorological Agency.

In light of above, the Commission shall use the following formula to determine PURC's Approved Reference Heat Rate for both Combined Cycle and Simple Cycle Power Plants.

$PURC_{ARHR} = MNPHR_{@ISOCon} + (MNPHR_{@ISOCon} * OvDiE)$

Where:

$PURC_{ARHR}$	Is PURC Approved Reference Heat Rate
$MNPHR_{@ISOCon}$	Is Manufacturer's Nameplate Heat Rate at Stated ISO Condition
OvDiE	Is Overall Deterioration in Efficiency (%) due to Degree Change in Ambient Condition as stated by Manufacturer and computed using Ghana Meteorological Agency's Six-Month Average Published Temperature Data

The Heat Rates determined on the basis of above methodology shall be monitored by PURC on periodic basis to ensure compliance.

2.4.2 Delivered Fuel Cost

The PURC shall ascertain the delivered fuel cost as per the requirements of the Least Fuel Cost Procurement Policy. The Commission shall not grant approval to any generator to pass-through its tariff, fuel costs, which fuel, has not been procured in accordance with the Least Fuel Cost Procurement Policy. However, where circumstances dictate the use of fuel that has not been procured in line with the Least Fuel Cost Procurement Policy, the cost of such fuel shall be justified for PURC's consideration, approval and pass-through as Fuel Recovery Charge.

2.4.3 Fuel Recovery Charge

Upon establishment and approval of heat rates and delivered fuel cost as per Sections 2.4.1 and 2.4.2, the Commission shall determine the Fuel Recovery Charge as follows:

$FRC = PURC_{HR} * DFC * 10^{6}$

Where:

FRC	Is Fuel Recovery Charge
$PURC_{HR}$	Is PURC Approved/Benchmark Plant Heat Rate
DFC	Is Delivered Fuel Cost per Least Cost Fuel Procurement Policy

2.5 Non-Fuel Variable Operation and Maintenance Recovery Charge

For existing and operating power plants, the Commission shall allow such power plants to charge non-fuel variable operation and maintenance recovery charge (NFVOMRC) approved by the Commission. For Type A1 and A2 generators, the PURC shall apply the NFVOMRC as established in the respective PPAs.

Power plants which have served their useful life and fully recovered their investment costs but continue to operate shall also be allowed to charge NFVOMRC approved by the Commission.

For new entrant power plants, the PURC shall apply its Approved Non-Fuel Variable O&M Benchmark Percentage to Major Maintenance and Consumables Costs approved by the Commission using the following formula.

$NFVOMC_t = PAMMCC * \lambda$

Where:

$NFVOMC_t$	Is Initial Non-Fuel Variable Operation and Maintenance Costs
PAMMCC	Is PURC Approved Major Maintenance and Consumables Costs
λ	Is PURC Approved NFVOM Benchmark Percentage

2.6 Variable Costs Charge

Total Variable Costs Charge of the operating and new entrant power plants shall be computed as follows.

VC = FRC + NFVOMC

Where:

VC	Is Variable Charge
FRC	Is Fuel Recovery Charge
NFVOMRC	Is Non-Fuel Variable Operation and Maintenance Recovery Charge

PART 3: METHODOLOGY FOR DETERMINATION OF COMPOSITE BULK GENERATION CHARGE

3.1 Composite Bulk Electricity Generation Charge

For purposes of establishing a uniform price at which all Distribution Utilities shall procure their capacity and energy, PURC shall determine a Composite Bulk Generation Charge comprising a Composite Bulk Generation Capacity Charge and a Composite Bulk Generation Energy Charge taking into consideration contracted capacity and energy as stated in the underlying Power Purchase Agreements (PPAs) and Approved Electricity Supply Plan/Electricity Market Oversight Panel (EMOP) Hydro Allocation Volume vis-à-vis Approved PURC Tariff for each Power Plant using the following methodology.

3.1.1 Composite Bulk Generation Capacity Charge

Composite Bulk Generation Charge shall be determined as per the following formula.

$$CBCCh = \frac{\sum_{i=1}^{N} BCCh_i \cdot CCap_i}{\sum_{i=1}^{N} CCap_i}$$

Where:

CBCCh	Composite Bulk Generation Capacity Charge (expressed in GHp/kW/month)
N	Total number of generators to be included in the CBCCh calculation
i	Index that designates each generator to be included in the CBCCh calculation
BCChi	Bulk Capacity Charge for generator i (expressed in GHp/kW/month)
CCapi	Contracted Capacity for generator i (expressed in kW)

3.1.2 Composite Bulk Generation Energy Charge

Composite Bulk Generation Charge shall be computed in accordance with the following formula.

$$CBECh = \frac{\sum_{i=1}^{N} BECh_i \cdot ESO_i}{\sum_{i=1}^{N} ESO_i}$$

Where:

CBECh	Composite Bulk Energy Charge (expressed in GHp/kWh)
N	Total number of generators to be included in the CBECh calculation
i	Index that designates each generator to be included in the CBECh calculation
BEChi	Bulk Energy Charge for generator i (expressed in GHp/kWh)
ESOi	Energy to be supplied by generator i (expressed in kWh)

3.1.3 Composite Bulk Generation Charge

The Composite Bulk Generation Charge shall be calculated using the following formula.

$$CBGCh = (CBCCh * \sum_{i=1}^{N} CCap_i) / (\sum_{i=1}^{N} ESO_i) + CBECh$$

Where:

CBGCh	Composite Bulk Generation Charge (expressed in GHp/kWh)
CBCCh	Composite Bulk Capacity Charge (expressed in GHp/kW/month)
CBECh	Composite Bulk Energy Charge (expressed in GHp/kWh)
CCapi	Contracted Capacity for generator i (expressed in kW)
ESOi	Energy to be supplied by generator i (expressed in kWh)

3.1.4 Bulk Generation Costs

In parallel to Bulk Generation Charges, total Bulk Generation Costs also stated as Generation Purchase Costs shall be computed by PURC as the addition of Bulk Generation Capacity Costs and Bulk Generation Energy Costs.

a) Bulk Generation Capacity Costs shall include capacity related costs (capital recovery, fixed O&M, working capital allowance and corporate tax).

$$BCC = \sum_{i=1}^{N} BCCh_i \cdot CCap_i$$

b) Bulk Generation Energy Costs shall include energy related costs (fuel cost, that is FRC, and non-fuel variable operation and maintenance costs, that is NFCOMC).

$$BEC = \sum_{i=1}^{N} BECh_i \cdot ESO_i$$

PART 4: PROCUREMENT OF CAPACITY AND ENERGY FROM WHOLESALE ELECTRICITY MARKET

4.1 Wholesale Electricity Market Participation by DisCos

Electricity Distribution Utilities (DisCos) licensed under Section 26 of the Energy Commission Act, 1997, (Act 541) as wholesale electricity market participants and as per Section 2(1), b(ii) of the Electricity Regulations, 2008 (LI 1937), shall procure their firm capacity and associated energy requirements of their customers from the wholesale electricity market under long-term Power Purchase and Supply Contracts.

Similarly, as per Section 2(1), b(ii) of the Electricity Regulations, 2008 (LI 1937), DisCos may procure their capacity and associated energy from the Spot Market organised by Market Administrator and System Operator (MA&SO). These transactions in the Spot Market may occur under the following conditions.

1. Where a wholesale supplier is unable to meet its contractual capacity and associated energy supply obligations either complete or partial to a DisCo and where such obligations as per the contract can either be met by the wholesale supplier or DisCo from the wholesale electricity market.

2. Where a DisCo's capacity and associated energy requirements at a particular point in time exceed its contracted capacity and associated energy and which excess/deficit has to be procured from the wholesale electricity market.

4.2 Purchase Price of Capacity and Energy from Wholesale Electricity Market

The purchase price of power and energy procured by a DisCo from the Wholesale Electricity Market shall comprise a capacity charge plus an energy charge determined as follows:

4.2.1 Long-term Power Purchase and Supply Contracts

1. Capacity Charge set at a value equal to the investment annuity and approved discount rate plus fixed operation and maintenance costs as per PART A and PART B of these Guidelines.

2. Energy Charge as captured in PART 2 of these Guidelines.

4.2.2 Spot Market Transactions

Capacity and Energy Charge determined by supply and demand conditions on the wholesale electricity market.

4.3 Treatment of Purchase Price of Capacity and Energy Procured from Wholesale Electricity Market

The treatment of purchase price of capacity and associated energy procured by a DisCo from the wholesale electricity market shall be based on the two conditions stipulated in Section 4.1 of these Guidelines.

Under Condition (1) of Section 4.1, the cost of capacity and energy procured shall be borne wholly by the wholesale supplier and shall not be treated as a pass-through cost to consumers.

Alternatively, where the capacity and energy so procured, is paid for by the DisCo, the wholesale supplier shall reimburse the DisCo with the full purchase price of the capacity and electrical energy procured.

In the event that the price of capacity and electrical energy procured in the wholesale electricity market is higher than the contracted price agreed between the wholesale supplier and the DisCo, the wholesale supplier shall pay to the DisCo the difference between the wholesale electricity market price and the contracted price.

Under Condition (2) of Section 4.1, the price paid by the DisCo on the wholesale electricity market for capacity and electrical energy procured shall be treated as a pass-through cost to end users.

4.4 Purchase Price of Electrical Energy from Embedded Power Generation Facilities

Distribution Utilities or Companies shall enter into long-term Power Sale and Purchase Contracts with wholesale suppliers for the supply of electrical energy from Embedded Power Generation Facilities for local distribution and retail within a particular distribution system.

The PURC shall approve a specific Bulk Supply Tariff (BST) for electrical energy supply procured from such Embedded Power Generation Facilities. The level of such specific BST shall not exceed the avoided costs of procuring electrical energy directly from the wholesale electricity market.

PART 5: INDEXATION OF CAPACITY AND ENERGY PROCURED FOR THE REGULATED ELECTRICITY MARKET

The following indexation formulae shall be employed by all Generators annually in billing capacity and energy procured under a Power Purchase Agreements (Type A1 and A2) by DisCos for the regulated electricity market.

5.1 Indexation of Capacity Charge

For billing of Capital Charge, the following indexation shall apply annually after the base year

$$CC_{bp(t)} = CRC + (FOMRC_{Base} * CPI_{Actual}/CPI_{PBP})$$

Where:

$CC_{bp(t)}$	Is Capacity Charge payable in billing Period (t)
CRC	Is Base Capital Recovery Charge as Approved by PURC
$FOMRC_{Base}$	Is Base Fixed Operation and Maintenance Recovery Charge as Approved by PURC
CPI_{Actual}	Is Actual Consumer Price Index for Billing Period (t) as Published by US Bureau of Labour Statistics (series id: CUUR0000SA0)
CPI_{PBP}	Is Consumer Price Index for Billing Period (t), Projected by Generator in Preceding Billing Period (t-1) and Approved by PURC

5.2 Indexation of Non-Fuel Variable Operation and Maintenance Recovery Charge

For annual billing of Non-Fuel Variable Operation and Maintenance Recovery Charge, the following indexation mechanism will apply. annually after the base year

$$NFVOMRC_{bp(t)} = NFVOMRC_{Base} * CPI_{Actual}/CPI_{PBP}$$

Where:

$NFVOMRC_{bp(t)}$	Is Non-Fuel Variable Operating and Maintenance Recovery Charge payable in billing Period (t)
$NFVOMRC_{Base}$	Is Base Non-Fuel Variable Operating and Maintenance Recovery Charge as Approved by PURC
CPI_{Actual}	Is Actual Consumer Price Index of billing period (t) as Published by US Bureau of Labour Statistics (series id: CUUR0000SA0).
CPI_{PBP}	Is Consumer Price Index for Billing Period (t), Projected by Generator in Preceding Billing Period (t-1) and Approved by PURC

5.3 Indexation of Fuel Recovery Charge

The PURC shall determine Fuel Recovery Charge (USCents/kWh) as a pass-through cost in electrical energy generation. However, the applicable amount of Fuel Recovery Charge to be passed on to DisCos shall be adjusted from time to time within the context of PURC's Quarterly Review of Natural Gas, Electricity and Water Tariffs.

PART 6: PUBLICATION OF UNDERPINNING TARIFF PARAMETERS/DATA

The PURC shall publish quarterly, the following Benchmark Parameters which shall be derived from studies conducted by the Commission taking into account data and recommendations from independent third parties.

1. Ghana's Risk Free Rate
2. US Risk Free Rate
3. Ghana's Country Default Spread
4. Ghana Cedi- US Dollar Exchange Rate
5. Levered Beta (Equity Beta)
6. Unlevered Beta (Asset Beta)
7. Benchmark Useful Investment Life by Technology Type
8. Benchmark Capital Investment Cost by Technology Type
9. Benchmark Fixed Operation and Maintenance Percentage by Technology Type
10. Benchmark Non-Fuel Variable Operation and Maintenance Percentage by Technology Type

PART 7: COMPUTATION OF REFERENCE CAPACITY CHARGE FOR NEW ENTRANT POWER PLANTS (TYPE A2)

Promoters of Potential New Entrant Power Plants, regardless of equipment or plant type shall bid on the Reference Capacity Charge determined by PURC as follows.

$$RCC_t = \frac{(PABCapC * CRF) + WCA + FOMEx + CorpTax}{NEGC}$$

Where:

RCC_t	Is Reference Capacity Charge (GHS/MW) for Initial Regulatory Year
PABCapC	Is PURC Approved Benchmark/Standard Capital Investment Cost for selected power plant technology or type
CRF	Is Capital Recovery Factor using PURC Approved Useful Investment Life and a PURC determined Weighted Average Cost of Capital
WCA	Is Working Capital Allowance calculated in accordance with Section 7.3
FOMEx	Is PURC Approved Benchmark/Standard Fixed Operation and Maintenance Expenses calculated in accordance with Section 7.2
CorpTax	Is Corporate Tax calculated in accordance with Section 7.4
NEGC	Is Net Effective/Guaranteed Capacity (MW)

7.1 Capital Recovery Charge

For new entrant power plants, PURC shall determine the Capital Recovery Charge as annuity of PURC Approved Benchmark/Standard Capital/Investment Cost.

7.1.1 Capital Recovery Factor

The capital recovery factor, in other words annuity, shall be determined by PURC using the PURC Approved Useful Investment Life for thermal power plants and hydroelectric generating stations as well as Weighted Average Cost of Capital as discount rate. Specifically, the Capital Recovery Factor shall be calculated for each type of technology (using the PURC Approved Useful Investment Life) as follows:

$$CRF = \frac{WACC*(1+WACC)^P}{(1+WACC)^P - 1}$$

Where:

CRF	Is Capital Recovery Factor
P	Is PURC Approved Useful Investment Life applicable to each technology
WACC	Is Weighted Average Cost of Capital calculated in accordance with Section 1.1.3.2

7.1.2 Gearing and Allowable Rate of Return on Regulated Asset Base

7.1.2.1 Gearing

When calculating the allowable rate of return on Regulated Asset Base (RAB), PURC shall apply its benchmark gearing level of 30% equity and 70% debt[3].

7.1.2.2 Allowable Rate of Return on Regulated Asset

The allowable rate of return shall be set equal to the estimated weighted average cost of capital (WACC). The PURC shall determine the post-tax WACC, by taking into consideration, cost of debt and cost of equity as well as the Commission's benchmark debt and equity ratios using the following formulae.

$$WACC = [\{E/(D+E)\}*K_e] + [\{D/(D+E)\}*K_d*(1-T)]$$

[3] *Refers to Corporate Entities which have Debt as part of their Capital Structure. The Commission's Benchmark Debt Component in the Capital Structure is 70%. However, where the Cost of Debt is determined by the Commission to be significantly lower than the Average Market Cost of Debt, the Commission may opt for a higher Debt Proportion beyond the 70% in the Capital Structure.*

Where:

WACC	Is Post-tax WACC
E	Is Equity
D	Is Debt
Ke	Is Cost of Equity as determined by PURC
Kd	Is Cost of Debt as determined by PURC based on market factors
T	Is Corporate Tax

7.2 Fixed Operation and Maintenance Expenses for New Entrant Power Plants

The PURC shall apply its Approved Fixed O&M Benchmark Percentage to the Initial Infrastructure/Capital Cost approved by the Commission using the following formula.

$FOMEx_t = PAInC * \gamma$

Where:

$FOMEx_t$	Is Initial Fixed Operation and Maintenance Expenses
PAInC	Is PURC Approved Initial Infrastructure Cost
γ	Is PURC Approved Fixed O&M Benchmark Percentage

7.3 Cost of Working Capital Allowance

The Cost of Working Capital Allowance for the Regulatory Year (t) shall be calculated as follows:

$$CWCA_t = \frac{(Lag\ (days)_t - Lead\ (days)_t)}{365} * OpEx_t * WACC$$

Where:

$CWCA_t$	Is Cost of Working Capital Allowance calculated for Regulatory Year (t)
Lag Days	Is Average Debtor Days calculated for Regulatory Year (t)
Lead Days	Is Average Creditor Days calculated for Regulatory Year (t)
$OpEx_t$	Is Sum of Operating Expenses calculated for Regulatory Year (t)
WACC	Is Weighted Average Cost of Capital

7.4 Corporate Tax

Corporate tax shall be determined and included in the Annual Revenue Requirement for Electricity Generation Utilities in accordance with provisions of Applicable Ghana Revenue Authority Tax Laws. To that end, the following formula shall be employed.

$CorpTax_t$ = (Pre-Tax WACC - Post-Tax WACC) * RAB

Where:

$CorpTax_t$	means Corporate Tax
Pre-Tax WACC	means Weighted Average Cost of Capital Including Corporate Tax Percentage
Post-Tax WACC	means Weighted Average Cost of Capital Excluding Corporate Tax Percentage
RAB	means PURC Approved Test Year Regulatory Asset Base for Existing Power Plants or PURC Approved Project Investment Cost for New Entrant Power Plants

7.5 Determination of Capacity Utilisation

In determining capacity utilisation, PURC shall convert the approved lifespan (years) of operation of the power plant into hours of capacity utilisation calculated as follows.

LCU= APCU * NHY * ULP

Where:

LCU	Is Lifespan Capacity Utilisation (Hours)
APCU	Is PURC Approved Annual Capacity Utilisation (%)
NHY	Is Total Number of Hours in a Year

ULP Is PURC Approved Useful Life of Power Plant (Years)

Thus, where a New Entrant Power Plant, procured under Government Policy on Competitive Procurement of Energy Supply and Services Contract has not achieved/operated for the total number of hours of lifespan capacity utilisation but has recovered its capital investment cost via Capacity Charge payments by the off-taker, such Power Plant shall not be allowed to decommission but continue to operate over the remaining total number of hours of the PURC approved lifespan capacity utilisation as contained in its Power Purchase Agreement[4].

In terms of recoverable tariffs, the New Entrant Power Plant shall be entitled to Fixed Operation and Maintenance Costs and Non-Fuel Variable Operation and Maintenance Costs only, as approved by the PURC.

[4] *A Take-Or-Pay Power Purchase Agreements signed between New Entrant Power Plant and a Regulated Electricity Market Distribution Utility/Company as Off-taker, shall include in detail, the total number of hours of Capacity Utilisation over the PURC Approved Lifespan of the Power Plant.*