

PN-ACS-063

118897



U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

**Center for Environment
Office of Energy, Environment, and Technology**

In collaboration with:

The Public Utilities Regulatory Commission, Ghana

**Ghana Tariff Review
Comments on Rate-Setting Guidelines**

July 1999

23865-104-0002

A

This review was completed under the U.S. Agency for International Development's (USAID) Energy and Environment Indefinite Quantity Contract No. LAG-I-00-98-00006-00 With Bechtel National Inc as prime contractor.

The work was a collaborative effort by PricewaterhouseCoopers (PwC), Bechtel and Resource Management International (RMI) under Task Order No. 4.

TABLE OF CONTENTS

SECTION 1 - EXECUTIVE SUMMARY	1
1.1 Introduction	1
1.2 Approach and Methodology of Review	1
1.3 Overview of Key Components of the Guidelines	2
1.4 Summary of Significant Findings	2
1.5 Summary of Significant Recommendations (Way Forward)	3
SECTION 2 - REVIEW OF REGULATORY FRAMEWORK	4
2.1 Introduction	4
2.2 Ministry of Mines and Energy	4
2.3 Energy Commission	5
2.4 Public Utilities Regulatory Commission	6
2.5 Conformity of the PURC's Guidelines with Regulatory Framework	6
SECTION 3 - REVIEW OF GUIDELINES	8
3.1 Introduction	8
3.2 Rate-making Cost Components	8
3.3 Tariff Structure	9
3.4 Rate Setting Process	10
3.5 Rate-Setting Process	13
3.6 Findings and Recommendations	14
APPENDIX I - SECTIONAL COMMENTS ON GUIDELINES	15
APPENDIX II - PURC RATE-MAKING PROCESS CHART	18
APPENDIX III - GUIDELINES FOR RATES	19

SECTION 1 - EXECUTIVE SUMMARY

1.1 Introduction

In June 1999, a consulting team comprised of experts from PricewaterhouseCoopers LLP, Resource Management International and Bechtel National met with the Public Utilities Regulatory Commission (PURC) and initiated a project under the sponsorship of USAID to assist the PURC with implementation of its electric tariff pricing responsibilities. As a first step, the team undertook to review the "Guidelines for Rates Chargeable for Electricity Services" (referred to in this report as the Guidelines and included as Appendix III) drafted by the PURC in July 1998. These Guidelines, which are required by the Public Utilities Regulatory Commission Act of 1997 (Act 538), outline the approach, method and process the PURC will use to establish rates for end-users under its jurisdiction.

The comments, which follow, are the observations of the team on the Guidelines, based on fact-finding meetings with the PURC, Electricity Company of Ghana (ECG), Volta River Authority (VRA) and the team's extensive familiarity with the process of regulation internationally. The purpose of our observations is to highlight the areas the team believes may be subjects that other stakeholders (utilities, end-users, investors) will find of concern, and where further clarification could be useful.

1.2 Approach and Methodology of Review

There are four general criteria, which the team used to assess the appropriateness of the Guidelines. These are:

- Conformity to "Act" requirements
- Completeness of detail
- Reasonability of practices
- Inclusion of other stakeholders

In formulating its comments, the consulting team considered the draft guidelines independently and from three basic perspectives: (1) the legislative mandates, (2) the prospective stakeholders, especially prospective investors and (3) from good utility regulatory practice. The team's comments seek to highlight potential shortcomings or items needing clarification. In doing so, it has not been the team's intent to propose any specific changes to the Guidelines, rather we leave consideration of our comments and any appropriate actions to the Commission.

1.3 Overview of Key Components of the Guidelines

The Guidelines document drafted by the PURC staff contains three key sections describing (1) the cost of components of pricing (2) the tariff structure and (3) the process of electric rate-setting. In addition, there are brief introductory sections on the responsibilities of the Commission under Act 538 for rate-setting and definition of terms. In total, these sections present an orderly overview of the activities to be followed by the Commission. The process is summarized on a flow chart showing the step-by-step activities of a typical annual rate-setting event.

The key components presented in the Guidelines usefully organize and detail the process. The team believes it is of importance to do so at this stage of the PURC's activities, as it displays the expected actions of the Commission openly, which will engender understanding of stakeholders in the process and help allay uncertainties. Such Guidelines are not common in mature regulatory regimes, as past precedent essentially formulates the approach. Ultimately, the team would expect this to also be the case in Ghana.

1.4 Summary of Significant Findings

The following are the key findings of the team's review, organized by section:

1.4.1 Provisions of Act 538

- The Guidelines as drafted appear to fully outline the approach to rate-setting in accord with the Act and with the approaches suggested in the Power Sector Reform Committee Final Report (April, 1997)
- The detail provided helps considerably to provide "transparency" to the PURC's actions.
- The presentation in a workshop session will usefully help refine stakeholder inputs to the final document.

1.4.2 Cost Components

- To help ensure investor confidence, the establishment of "benchmark values" for production investment and operating costs will need to be illustrated.
- It is unclear how bilateral power supply contracts may be allowed and treated. detail on this in the workshop may be appropriate.
- Clarification is needed to define what role the Energy Commission will have in establishing the cost of the transmission system.
- Details of cost components, which may be unclear, can be usefully addressed by example in the upcoming workshop or by supplemental illustration.
- Cost allocations to voltage service classes needs improved definition.

1.4.3 Tariff Structure

- The basic structure of the tariff is sound and continuation of the present rate classes and pricing structure is appropriate, for the near term.
- Modification to the present structure to address the collection of the "lifeline" subsidy and usage amount for compound houses should be proposed and discussed with stakeholders at the workshop.
- Consideration should be given to instituting seasonal rates and/or a monthly adjustment mechanism to address the generation cost shifts due to hydro conditions.
- Consideration should be given to tariff provisions which will enhance cogeneration/supplemental customer supply.

1.4.4 Regulatory Process

- The process outlined closely follows the directions given in the PURC Act 538.
- The process should consider that it includes the holding of a public hearing prior to any formal Commission decisions.
- A full description of the possible appeals process through the courts to a Commission Order should be provided.
- It is unclear how a stakeholder can question and contest the utility in the formal hearing process.
- The formal hearing process should include the ability for qualified stakeholders to request information and directly question the utility.

1.5 Summary of Significant Recommendations (Way Forward)

Based on the findings of our review we offer the following recommendations:

- The workshop session in July 1999 on the Guidelines should contain an illustrative example of the calculation of allowed costs and tariff prices.
- The subsequent workshop session (planned in September 1999) could present a refined version of the Guidelines, based on the July 1999 results.
- Going forward, the issuance of Commission rate-setting Orders with details explaining the decisions reached should replace the need for Guidelines.
- The Commission should initiate, or give notice of its intents to examine tariff structure issues in the near future.
- The Commission should initiate revisions to accounting and regulatory reporting systems to allow the rate setting process to be efficient.

SECTION 2 - REVIEW OF REGULATORY FRAMEWORK

2.1 Introduction

Historically, the structure and regulation of the Ghana electricity industry was established to provide electricity service through monopolies [i.e. the Volta River Authority (VRA) for Generation and Transmission and Electricity Company of Ghana Ltd. (ECG) for Distribution]. In so doing, the concept was that one corporate body could provide more efficient and less costly service than a multiple of competing companies. Therefore, the utilities acting in conformity with this national policy framework assumed an obligation to serve any customer who seeks service and charge wholesale, or retail, rates as set by the Government.

The historical structure, which existed for more than thirty years was changed with the enactment of two key legislation, Public Utilities Regulatory Commission Act (Act 538) and Energy Commission Act (Act 541) in 1997 to respond to the Government of Ghana's (GoG) Power Sector reform program. The enactment of the two Acts were hastened following public opinion about GoG approved electricity tariff increases in May 1997 and the following impasse that occurred when the tariff increases were suspended.

As set forth in the recent legislation, the electricity industry in Ghana is now regulated through three main institutions, namely:

- Ministry of Mines and Energy (MME)
- Energy Commission (EC)
- Public Utilities and Regulatory Commission (PURC)

A brief description of the responsibilities of each of these institutions follows.

2.2 Ministry of Mines and Energy

The Ministry of Mines and Energy, acting for and on behalf of the GoG, formulates policy for power sector development, and has the responsibility to translate GoG policy objectives into a core set of regulatory norms for the power sector, referred to as "Electricity Regulations". The MME is required under Act 541 to present for the approval of Parliament a core set of legislative instruments that together will form the Electricity Regulations. Work on these regulations is currently underway.

2.3 Energy Commission

The Energy Commission (EC) has key roles in power sector development. As the formal advisory body to the Minister of Mines and Energy on the monitoring and evaluation of GoG's policies and programs for the management and utilisation of the country's energy resources, the EC advises on strategies to achieve efficient, economical, and safe supply of electricity. The EC reviews and provides advice to the sector minister on draft legislative instruments on the Electricity Regulations for approval by Parliament. The EC also has the mandate to regulate the activities of power sector operators.

Specifically for the Energy Sector, the EC:

- Controls the entry to and exit from the power sector by granting licences to commercially registered operators; and
- Controls the conduct of licensees by developing and enforcing specific "Rules of Practice" and "Standards of Performance" that are supplementary to the Electricity Regulations. These Regulations will address the structure of the power sector operations as follows:
 - Establishment of a National Interconnected System (NIS) under Act 541, which would consist of the high voltage electricity transmission network, VRA's hydroelectricity generation facilities, other thermal power generation facilities, the low voltage electricity distribution networks, and large industrial and mining enterprises that are connected directly to the electricity transmission network.
 - Formation of an Electricity Transmission Utility (ETU) under Act 541 with the role to ensure that:
 - a) The NIS is operated in a safe and reliable manner. Economic (merit order) principles are applied for the dispatch of hydro and thermal power generation facilities within the NIS.
 - b) All wholesale power suppliers, have "open access" without discrimination to the use of the high voltage transmission network to supply electricity to distribution utilities (through the Wholesale Power Supply Market) and/or large independent "bulk" consumers.
 - Creation of Distribution Areas and Zones, which will decentralise, and increase private participation in, the provision of electricity distribution and retail services. Specifically, the GoG intends to create five distinct distribution areas out of the existing areas that are currently served by ECG and VRA- (NED). As part of the process, the Energy Commission will grant licences for the operation of electricity distribution and retail services in each of the five proposed distribution areas or zones. Within each zone, a licensee will have the monopoly to distribute and retail electricity, and therefore will also be obliged to provide service to all prospective customers.

2.4 Public Utilities Regulatory Commission

The Public Utilities Regulatory Commission (PURC), acts as an independent body with the mandate to establish and apply criteria, guidelines, and transparent procedures to regulate all aspects of the commercial interface between public utilities and their customers. Within the framework of the GoG's power sector development policy and as supported by the PURC Act 538, for electric utilities, the key PURC functions include:

- Receiving, vetting, and approving proposals on tariffs that power utilities would charge customers for electricity supply services
- Developing and applying the appropriate regulations that are needed to protect the interests of consumers and providers of electricity
- Monitoring standards of performance for the provision of electricity services
- Developing the framework to promote and encourage fair competition among utility companies.

2.5 Conformity of the PURC's Guidelines with Regulatory Framework

The Public Utilities Regulatory Commission Act of 1997 (Act 538) explicitly provides in Section 16 that:

- (i) "No public utility shall fix rates to be charged for any service provided by it unless the rate is in accordance with guidelines provided by Commission, and
- (ii) "The Commission shall prepare and provide to public valuations guidelines on levels of rates that may be charged by the public utilities for the services provided."

These requirements for Guidelines in the Act appear to the consulting team to be the logical outgrowth of the Government's objectives articulated in the final report of the Power Sector Reform Committee issued in April 1997. In that the report, the strategic objectives included "Improving the transparency in the regulation of power utilities, including the setting and adjustment of prices and tariffs".

The Guidelines offered by the PURC appear to the team to be clearly aimed at the objectives above in that they broadly define both the procedures and processes to be used for setting and adjusting prices and tariffs, as well as the process for inclusion of all stakeholders' interests.

From its review the consulting team observes that:

- The structure of the Guidelines will usefully inform the utilities and the public on the rate setting process in accordance with the requirements.
- The topics explored in the Guidelines are in accord with the PURC's jurisdiction outlined in the Act.
- The definitions of methods described are reasonably within the scope of authority set forth for the Commission in the Act.
- The time schedules of the events of the rate setting process are detailed in the Guidelines corresponds with the terms in the Act.

Issues relating to the requirements of the Act, which may require some additional consideration and perhaps modifications in the Guidelines are:

- The role of the Energy Commission pertaining to the valuation of the transmission system (Ref. Section 4,2).
- Clarification of the inclusion of "all" or only "low-income" residential consumers in lifeline pricing provisions.

SECTION 3 - REVIEW OF GUIDELINES

3.1 Introduction

To implement the requirement to provide guidelines for the rate-setting process as set forth in the Act, in 1998 the PURC formulated a preliminary outline of such guidelines and held a workshop for interested parties. Based on the results of that workshop and written comments received, the PURC has redrafted its Guidelines, which are the focus of our review in this report.

The current draft Guidelines (see Appendix III) is organized by sections and subsections to provide a complete overview of the rate-setting process and key details. The contents include:

- Introduction and background
- Definition of terms
- Electricity pricing details
- Tariff structure details
- Rate-setting process details.

Our comments on these sections follow:

3.2 Rate-making Cost Components

Based on the expressed needs for the Guidelines in the Act and the discussion of the appropriateness of transparency of the rate setting process in the Government's previously announced objectives for the regulatory process, the team considers that a key requirement is for the Guidelines to give reasonably complete descriptions of the electric pricing cost component details. Our review here, therefore, considers if the electricity pricing section of the Guidelines provide sufficient information to allow a reasonably informed individual to understand both the regulatory intents and key details.

From the standpoint of completeness, our review indicates that:

- The overall outline of the detail appears to be satisfactory; all relevant key topics are identified and discussed.
- The organisation of the topics is logical and leads to useful explanation and understandings of the procedures and process.
- An illustration of the details, methods and calculations would be helpful in a workshop session or in a supplement.

In our review, we have examined each subsection of the Guidelines, using our familiarity with the rate-setting process elsewhere and issues that are raised therein, to consider the adequacy of the detail. Additional details that the team believes may enhance the Guidelines and provide clearer definition to the process are given in Appendix I of this report, organized by reference to the numbered sections in Guidelines.

3.3 Tariff Structure

The end-user tariff structure outlined by the PURC consists of five user classes, which are those instituted in 1994 and presently in effect. The characteristics of these are as follows:

Class	Pricing Structure	Rate Charges
Residential	Block step with an initial flat charge for up to a lifeline amount and increasing unit prices	Per month, per kWh
Non-Residential (415 w. <100 kVa)	Increasing block step process with service charge	Per kWh
Commercial/Industrial SLT-LV (415v) SLT-MV (11 kV) SLT-HV (11kv)	Two-part, demand energy Charges, with service charges Charges, with service charges	Per kVa Per kWh Per Customer

The Guidelines provide no specific changes or alternatives to the existing structure. However, the Guidelines do indicate that the PURC shall revise the structure when necessary.

Our review finds that the outlined tariff structure is sufficient, and that it normally would be most appropriate for this to change going forward based on the petition of the utility company (ies) or by an investigation initiated by the PURC. Based on our discussions and review of materials provided to us, we do note, however, that there are the following outstanding issues to be resolved:

- introducing a per unit charge for the "lifeline" quantity
- accommodation of multi-unit premises ("compound houses") with "lifeline" quantities
- introduction of prepayment meters
- rationalization of increasing the non-residential unit prices
- potential of "off-peak" pricing
- reflection of seasonal cost swings due to hydro condition by seasonal pricing or a periodic adjustment mechanism
- municipal/educational service pricing

With such issues outstanding, we believe it may be desirable for the PURC to informally indicate its thinking on these, particularly to the extent that it may request the utility (ies) to make analysis or proposals, or that it would initiate a hearing process to investigate these.

3.4 Rate Setting Process

Our review has focused on two key elements of the approach described in the Guidelines:

- Determination of costs
- Setting of rates and consideration process

Our comments, on these two issues follow. These are preliminarily based on the consulting team's extensive regulatory experience internationally.

3.4.1 Determination of Costs

There are two commonly used formats for the expression of costs of utility services for rate setting; (1) costs based on actual incurred expenditures, or (2) costs based on theoretical/target values. From our experience, we note that there is no overall consensus of opinion that either of these methods is ultimately more effective. However, it appears that the worldwide trend is to depart from the more traditional method founded solely on allowance of actual incurred costs, toward incentive-based approaches. It is believed that doing so most directly fosters management efficiency in operations and asset management, without excessive regulatory oversight.

The team observes that the cost determination approaches outlined in the Guidelines intermix the incurred cost method with an innovative cost determination methodology (i.e. "Benchmark Values"). The team believes this to be a reasonable approach, for the near term consistent with good, modern utility regulatory practices we have observed elsewhere. In the longer term, however allowing prices to be set at market is important, especially for Generation. The following are our preliminary comments for clarification or additions on the practices relating to key elements outlined in cost determination process:

(a) Wholesale Prices

- The use of "Benchmark Values" for existing facilities (esp. Hydro) could reflect significantly on the actual costs incurred to continue to provide a base for low-cost resources.
- The "Benchmark Values" for capital and operating cost of new units should be segregated by resource type (e.g. Peaking, mid-range, base).
- The use of a "Weighted Average Unit Cost" for the Bulk Generation Tariff over the entire system on a unit cost/ kWh basis may adversely affect load management processes within the distribution areas.
- The "value" of power supplied directly to the distribution system could reflect the added values of lower delivery losses and delivery system reinforcement.
- The inclusion/exclusion of generation step-up and lead-line costs in the transmission charges needs definition.
- A value for hydro's use of water needs should be introduced, over time.

(b) Transmission Service

- The concept of the "economically adapted" system cost approach may not be suitable at this time, given the surplus capability existing, from previous decisions.

- An apportionment of VRA corporate (overhead) costs to the transmission function would be appropriate.
- The “annuity” rate should reflect conditions attendant with transmission facilities, only.
- The establishment of the responsibility for the adequate supply of Ancillary Services in the transmission function, is appropriate and consistent with good practice
- The establishment of the required ancillary service quantities should be co-ordinated with the EC, as well as the suppliers (utilities, IPP’s, etc).
- A “Code of Conduct” is commonly specified for the transmission system operator, to help assure power suppliers of fair access to markets and market rules which govern relationships and market transactions will become necessary.
- The “annuity” rate should reflect conditions attendant with the transmission system.

(c) **Distribution Service**

- The allowance for losses could be differentiated by type of delivery area (e.g., Urban, Suburban, Rural, Remote), to recognise the inherent differences in the concession areas.
- The fixed assets should include values for working capital (inventories, prepayments, working cash, etc.)
- Customer service costs commonly also contain the investment costs of services and meters.
- The annuity rate should reflect conditions attendant with the distribution system.

3.4.2 Setting of Rates and Consideration Process

The following are the team's comments and observations on the process outlined for the establishment of rates.

(a) Correction Factor

- The use of correction type factors are increasingly less common in utility cost setting, as more emphasis is placed on the risk sharing implicit in performance based cost allowance methods.
- It is common for corrections to be made at the earliest possible date, as the timeliness of price signal may be important. For example, if there is to be higher energy costs due to low water conditions, a contemporary reflection of higher prices will help to foster conservation when it is cost effective.
- Correction factors usually apply solely to items beyond the reasonable control of management, and to the extent that the cost changes resulting threatens the financial integrity.

(b) Allocation of Costs

- The allocation of costs to classes of consumers and voltage delivery levels as outlined is the common method; but lacks complete definition. It is also common that such a study is periodically required to be supplied by the utility with its filing (Notice).
- The determination of load and usage characteristics by class is commonly done by a load survey (sampling) program. This should be an ongoing activity of the distribution utility (ics).
- Allocation factors used in the cost allocation process commonly reflect coincident class use for power supply capacity and transmission costs, and non-coincident use for distribution.

(c) Establishment of Discount Rate

- It is common practice for discount rate/cost of capital to be periodically determined, as is proposed.
- The discount rate commonly reflects both actual costs and financial objectives, which may be reasonably accomplished in near future.
- The discount rate (annuity) commonly reflects a mix of capital resources (debt and equity) in proportions approved by the Commission. These may differ from the actual.

(d) **Establishment of Fixed Assets**

- It is a common practice to have assets revalued by detailed analysis periodically. The proposed five-year period between an overall revaluation appears to be reasonable.
- Necessary time to properly analyse and review the detailed valuation (every 5th year) needs to be allowed for setting rates.
- The facilities placed in/out of service each year should be reflected in costs for rates based on the Commission's view of these being necessary and appropriate.
- Facilities under construction, but to be placed in service within the upcoming year are frequently allowed into the assets for rate-setting purposes.

(e) **Performance Benchmarks**

- It may be advisable to review the "Benchmarks" annually for a few years as the program is initiated, to help assure accuracy.
- Benchmark/Performance factors are commonly set forth for multi-year periods, where these may be readily discerned from significant data.

(f) **Lifeline Supply**

- The concept of a "lifeline" supply at low cost for residential consumers or an entitlement to low cost generation resources has had limited application, but wide debate. Many commissions have opted to leave the issue to be addressed by income subsidies.
- Where practised, "lifeline" is commonly limited, both in the amount, and by the customer's need. Finding a practical basis to evaluate eligibility is always a problem.
- The subsidy from "lifeline" could be considered a responsibility of all consumers, not only residential.
- The establishment of a residential entitlement to a portion of the existing, low-cost hydro could eliminate the direct discussion of subsidies.

3.5 Rate-Setting Process

Our observations and comments on the rate-setting process are:

- A public hearing with pre-notice to all potentially affected parties should be the initiation for all commission actions.
- In the "investigation phase" qualified, interested parties should be able to both present information to the Commission and inquire of the utility.
- Stakeholder involvement in the process could have two basic forms: (1) to make a statement for the record or (2) to act as an intervenor during the investigation hearing phases, presenting testimony/exhibits and questioning the utility.
- The results of the Commission's deliberations should be detailed in its Orders, by topic, including discussion of both policy decisions and numerical calculations.

- It would appear that the final recourse of a party not satisfied with a Commission's Order, after appeal for reconsideration is to the courts of law. If so, it would be useful to explain this in the Guidelines. An illustrative process chart showing recourse to the courts is included in the Appendix II of this report.
- It should be anticipated that variations of the otherwise normal time schedule for rate setting would be necessary.

3.6 Findings and Recommendations

- Based on our review, we find that the Guidelines as drafted provide a very useful and quite comprehensive description of the PURC's role in rate-setting. This will help introduce the PURC to all stakeholders, and in particular, help allay the risks that investors may otherwise ascribe.
- We further find that the planned holding of a workshop for interested parties on the Guidelines will be an effective method to further explore details of concern to individual stakeholders and to acquire additional comments useful in finalizing the document.
- We recommend that the PURC consider the points of concern we have identified in the proceeding sections and address them as it deem appropriate. It does not appear to us that there is a necessity to significantly modify the draft Guidelines to include further detail to which a number of our comments were directed. Rather, description of such could be accommodated by a supplementary document illustrating the approaches with some example values or by discussion/presentation at the workshop.

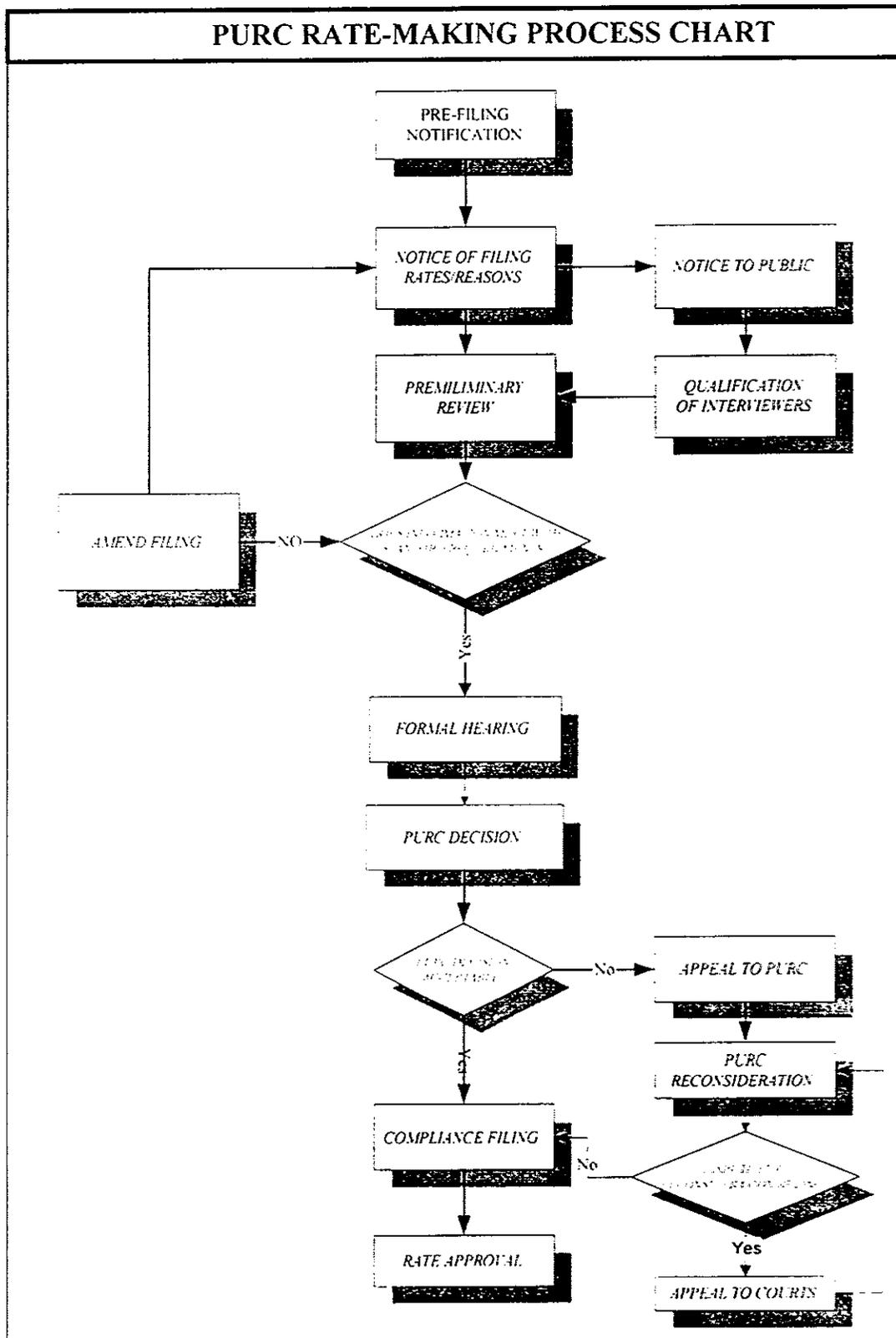
APPENDIX I - SECTIONAL COMMENTS ON GUIDELINES

The following are the detailed comments of the consulting team, by referenced section of the draft Guidelines.

SECTION	COMMENT
2.1	Inclusion of the taking into account of "distinction of rates by class of customers", should be mentioned. Determination of reasonable compensation for joint-use of facilities of utilities should be mentioned.
4.0	Inclusion of charges or compensation for use of joint-use facilities, as a price responsibility of PURC
4.1.1	Distinction of treatment for any new Hydro facilities should be covered.
4.1.2	A definition of the "Benchmark Value" and detail of its determination basis; perhaps as a separate subsection (i.e. Section 4.7).
4.1.3	The reference to the PURC's "review" should be change to be "approval", to conform to the Act.
4.1.4	The nature of this supply is unclear; how is it to be cost; how will any cost of energy supplied be recognized as offset to BST?
4.2	The jurisdiction of the EC here appears to be incorrect; these costs are to be established by the PURC.
4.2.3	The utilization of "Benchmarks" needs fuller explanation as to how those are developed both for transmission and distribution. (See Section 4.7).
4.3	The applicability of "customer service charges" should also be referenced.
4.3.4	The determination of this supply cost needs fuller explanation as to how it will be developed. (See 4.1.4).
4.3.5	The stated applicability of this may be incorrect, as it will not apply to residential service. Also, the considerations in developing the "benchmark value" need fuller description.

SECTION	COMMENT
4.3.6	A correction factor applied on a more current basis may be necessary to more effectively pass-on price signals to customers.
4.4	The specification of allocation methods in this topic needs review; a coincident peak method may not be the appropriate basis for local distribution costs. Additionally, it may be desirable to consider differentials in "risk" or other factors between classes in the establishment of rate prices from costs.
4.5	The type of "supporting data" to be submitted will need to be detailed somewhere. The indexation scheme for interim years should be explained further.
4.6	The constituent elements of the determination of the discount rate need to be identified somewhere, to help assure that all critical factors are considered, and to indicate those that could cause a "modification". It is unclear if there are any semi-annual or partial year corrections anticipated, or would this be adjusted in the correction factor?
4.7	This topic needs amplification, as previously noted, as to how these are to be established. Perhaps each "benchmark value" should be addressed individually here, or by supplement, with current examples.
4.8	The applicability of lifeline to only low-income or to all residential consumers may need to be clarified. The approach to offset any subsidy created by lifeline needs description, as to how it will be assessed amongst other customers. It is not uncommon for such subsidies to be shared by all consumers (Residential, Commercial and Industrial).
4.9	The rate orders of the Commission should also incorporate detailed descriptions of the rate calculations. If the EC is planning new facilities, the "expected values" used by the PURC will need to be co-ordinated with its determinations.
5.0	As the rates outlined reflect the current situation, no new details appear necessary at this time.

SECTION	COMMENT
6.1	If new rate classes could be considered, rates for municipal services, street lighting, and back-up/stand-by power are potential issues.
6.2	<p>The phrase "necessary documentation" is undefined, needs clarification. (e.g. would this include just exhibits or also testimony, written discussions will this be pre-specified by the Commission, etc.)</p> <p>It is implied that the PURC can ask for details beyond those initially presented, how can other stakeholders do likewise?</p> <p>Needs identification here, and in subsequent parties, as to how other "Stakeholders" participate.</p>
6.3	Perhaps, options (a) and (b) noted here should not be specified; or these should be utilized only in conjunction with a public hearing on the matter, where comments pro/con can be presented.
6.4.3	<p>The involvement of the staff and other stakeholders needs description.</p> <p>The final order needs to contain ample details as to how values rates determined, how views of stakeholders considered, etc.</p>
6.5	The process, if any, available to parties after exhausting all administrative remedies needs description.



APPENDIX III

DRAFT

PUBLIC UTILITIES REGULATORY COMMISSION

**GUIDELINES FOR RATES CHARGEABLE
FOR ELECTRICITY SERVICES**

July, 1998

APPENDIX III – GUIDELINES FOR RATES

1. INTRODUCTION

These guidelines, issued by the Public Utilities Regulatory Commission (PURC) in pursuance of the PURC Act, 1997, Act 538 (sections 3a and 16) shall apply to electricity rate-setting in Ghana.

2. BACKGROUND

The Public Utilities Regulatory Commission (PURC) was established under the PURC Act, 1997, Act 538 to, among other functions, provide guidelines on rates chargeable for provision of utility services (Reference Section 3 (a) of the Act 538).

2.1 Rate-Setting Provisions of PURC Act 538

Sections 16(3 a-d), 17, and 20 of the Act 538 also requires the Public Utilities Regulatory Commission, in preparing the guidelines, to take into account the following:

- (i) consumer interest
- (ii) investor interest
- (iii) assuring reasonable cost of production of the service
- (iv) assurance of the financial viability of the public utility
- (v) *economic development of the country*
- (vi) best use of natural resources
- (vii) uniformity of prices throughout the country
- (viii) competition among utility companies

To satisfy the above requirements, the following considerations would be taken into account:

- (i) fair apportionment of total cost of supply to various classes of consumers and provision of a certain minimum level of service (lifeline supply) at an "affordable" price to residential customers who may not be able to pay the full cost;
- (ii) appropriate Rate of Return on investments to satisfy investors interests;
- (iii) setting of Bulk Generation Tariff (BGT) to ensure reasonable least cost of production;
- (iv) setting of Transmission Service Charge to ensure economically efficient, reliable and secure operation of the Transmission System;
- (v) setting of Distribution Service Charge to ensure economically efficient, reliable and secure operation of the Distribution System;
- (vi) provision of adequate revenue to ensure financial viability of the utility companies;
- (vii) allowance for "Special Rates" for priority consumers whose activities may enhance economic development;
- (viii) allowance for a tariff structure which incorporates uniform rates for all customers within particular category of consumers regardless of geographic location.

2.2 Contents of Guidelines

The succeeding four sections are:

Section Three: contains definitions of key terms used in these guidelines.

Section four: provides the key elements of electricity rate making methodology. It contains the general guiding principles used as the basis for rate-setting.

Section five: contains the structure of end-user tariff.

Section Six: outlines the Rate-setting process adopted by the Commission.

3. DEFINITIONS

- 3.1 **Generation:** The process of producing electrical energy from other forms of energy; also the amount of electrical energy produced, usually in kilo-watt hours (kWh) or mega-watt hours.
- 3.2 **Transmission System:** Transmission system is defined as those circuits that transfer (transmit) electric energy from the generating stations to distribution transformation station (33KVA) through a network of lines, switching stations, and sub-stations for delivery to customers.
- 3.3 **Transmission Utility:** Transmission Utilities are service providers whose activities involve daily operation and maintenance of the transmission system.
- 3.4 **Distribution System:** Distribution is defined as those circuits that deliver (distribute) power and energy from the distribution substations to the customer.
- 3.5 **Distribution Utility:** Distribution utilities are service providers whose activities involve daily operation and maintenance of the distribution system, customer services and provision of other ancillary services to final consumers.
- 3.6 **ECG and NED:** are public distribution utility companies.
- 3.7 **End-users:** are customers serviced by the public distribution utilities.
- 3.8 **Residential Customers:** are customers whose nominal service voltage is 415 Volts for 3 phase and 230 Volts for single phase with maximum demand of less than 100 kilovolt Ampere. These are mainly residential dwellings.
- 3.9 **Non-Residential Customers:** are customers whose service voltage is 415 Volts and 220 Volts with consumption level of less than or equal to 100 kilovolt Ampere but who use electricity for commercial and non-domestic activities.
- 3.10 **SLT-LV Customers:** are consumers who are supplied at a voltage level of 415 Volts and have maximum demand equal to or above 100 kilo Volt Ampere.
- 3.11 **SLT-MV Customers:** are consumers who are supplied at a voltage level of 11 kilo Volts and have maximum demand of equal to or above 100 kilo Volt Ampere.
- 3.12 **SLT-HV Customers:** are consumers who are supplied at a voltage level of 33 kilo Volts and have maximum demand of equal to or above 100 kilo Volt Ampere.
- 3.13 **Replacement Value of Fixed Assets:** Represents the cost of replacing the works and physical assets used to provide the same service with the current technology and prices, also taking into account (a) the financial expenses during construction, calculated with an interest rate which shall not exceed the Discount Rate established by the PURC, (b) expenses and compensations for the establishment of rights of way, and other relevant expenses.
- 3.14 **Economically Adapted System:** is that electrical system in which an equilibrium exists between the supply and demand of energy, resulting in the lowest cost of maintaining the quality of service.
- 3.15 **Bulk Generation Tariff (BGT):** is the price of electricity paid to power producers.
- 3.16 **Transmission Service Charge (TSC):** are charges paid to the transmission utility company for its services.

- 3.17 **Transmission Ancillary Services:** are services carried out by the transmission system operator to support the transmission of energy from sources to loads while maintaining reliable operation of the transmission system, in accordance with established guidelines. These services include regulation and frequency response, operating reserves (spinning and supplemental reserves), reactive power, black starts etc.
- 3.18 **Bulk Supply Tariff (BST):** is the sum of the Bulk Generation Tariff and Transmission Service Charge.
- 3.19 **Distribution Service Charge (DSC):** are charges paid to the distribution utility companies for their services, separate from the cost of energy supplied (BST).

4. ELECTRICITY PRICING GUIDELINES

The following shall be subject to price regulations by the PURC.

- a) Power and energy supplied by generating company to distribution utilities destined for the public.
- b) Charges payable for transmission services
- c) Charges payable for distribution services
- d) Sales to users of electricity

4.1 WHOLESALE PRICES

The wholesale price of electricity to be sold to the distribution utility companies, the Bulk Generation Tariff (BGT), shall be calculated as the **weighted average unit cost (Cedis/kWh)** of supplying electricity on the basis of Economic Merit Order Dispatch to the distribution utility companies destined for public use.

The sources of electricity supply to the distribution utility companies are:

- i) Hydro Power Plants (Akosombo and Kpong)
- ii) Thermal Power Plants (TAPCO and other IPPs)
- iii) Other Renewables
- iv) Imports of electricity

The cost of electricity production from these sources shall be calculated/determined separately.

4.1.1 Cost of Production from Hydro

The cost of electricity production from hydro shall be set at a benchmark price which shall cover capital cost of the facilities and operation and maintenance costs of the systems.

4.1.2 Production Cost from Thermal

The cost of production of electricity from the thermals (TAPCO and IPPs) shall be set to cover investment cost, (capacity charges), fuel and other operation and maintenance costs (energy charges). The investment cost (capacity charges) shall be based on a "benchmark value" while energy charges would be regulated to ensure efficiency in fuel procurement and other variable cost elements. The relevant benchmarks shall be determined by the PURC in consultation with the utility companies.

4.1.3 Cost of Imports

The price of electricity imports shall be negotiated between utility companies and their foreign suppliers. A copy of the supply agreement shall be submitted to the PURC for review prior to signing.

4.1.4 Supply at Sub-transmission voltage

The cost of power supplied directly to distribution utility companies at the sub-transmission voltage (33KV and below) will be recovered as part of the distribution service charges paid to the distribution utility company.

4.2 TRANSMISSION SERVICE CHARGE

A Transmission Service Charge (TSC) paid to the transmission utility company shall cover the total transmission cost. Total transmission cost covers the annuity of investment and standard cost of operating and maintaining the "Economically Adapted" transmission system as determined by the Energy Commission.

4.2.1 Standard Losses

Transmission and transformation losses shall be established by the PURC and shall be accounted for in the rates through appropriate expansion factors.

4.2.2 Standard Capital Costs

Capital cost of transmission shall be calculated as the annuity of Replacement Value of Fixed Assets in service taking into account its useful life and corresponding discount rate determined by the PURC in consultation with the utility companies.

4.2.3 Standard O & M Costs

Operation and Maintenance costs include labour, transport and material costs and shall be related to the total amount of energy transmitted in any particular year. The necessary cost related benchmarks for the transmission service shall be determined by the PURC.

4.2.4 Standard Ancillary services costs

Ancillary services costs include costs associated with frequency response, reserves, reactive power and black starts. The level of these costs will be determined by the PURC in consultation with the transmission utility company.

4.3 DISTRIBUTION SERVICE CHARGE

Electricity shall be sold to distribution utility companies at the Bulk Supply Tariff (BST) for onward distribution to end-users. The Distribution Service Charge (DSC) shall recover all expenses of the distribution utility. It shall be recovered as an energy-related charge for residential and non-residential customers and both capacity and energy charges from industrial customers.

Rates to final users of electricity shall include Bulk Supply Tariff and the Distribution Service Charge.

The DSC shall consist of the following major components: (i) standard distribution losses of power and energy (ii) standard investment, maintenance and operation costs and (iii) costs associated with the user, independent from his demand for power and energy.

4.3.1 Standard Losses

The losses shall be regulated to reflect performance benchmarks. Allowed losses for the distribution utilities shall include technical losses and non-technical losses. The value of these losses shall be determined by the PURC after consultation with the distribution utility companies from time to time.

4.3.2 Standard Capital cost

The standard capital cost of distribution shall be calculated as the annuity of the Replacement Value of Fixed Assets of the distribution companies. The annuity shall be calculated using a capital recovery factor based on a useful life and discount rate determined by the PURC in consultation with the utility companies.

4.3.3 Standard O&M Costs

The major components of the O&M costs are related to labour costs, transport costs, material costs and administrative costs.

These cost elements shall be determined on the basis of key performance-related benchmarks in order to enhance efficiency in the provision of distribution services. The level of these performance benchmarks shall be determined by the PURC after consultation with the distribution utility companies.

4.3.4 Cost of power supply at sub-transmission voltage

Power generated and supplied to the distribution utility companies at the sub-transmission voltage will be charged as part of the DSC. The charges associated with these supply sources will be determined as capacity and energy charges.

4.3.5 Customer Service Costs

The User cost represents the cost of billing, processing, etc and shall be recovered from monthly service charges imposed on all consumers who are not on pre-paid metering.

The level of the standard user cost shall be related to a benchmark which shall be related to the number of customers to be served by the utility among others. The level of the standard user cost benchmark shall be determined by the PURC after consultation with the distribution utility companies.

4.3.6 Correction Factor

When setting tariffs at the start of a year a number of assumptions are made on the basis of which rates are determined. These assumptions may not be achieved exactly at the end of the year. Adjustments (Correction Factors) may be made the following year to recover losses to the utility or to pass on gains to consumers.

The percentage difference between the actuals and the assumptions at which the correction factor will be applied shall be determined by the PURC after consultation with the utility companies.

4.4 ALLOCATION OF COSTS TO END-USERS

The End-Users serviced by ECG and NED are classified as (i) Residential, (ii) Non-Residential, (iii) SLT- LV, (iv) SLT-MV and (v) SLT-HV. The residential, non-residential and SLT LV customers are supplied electricity at nominal voltage levels of 415/230 V and all classified as LV customers for the purposes of cost allocation.

The total cost of a distribution utility company shall be allocated to the classes of customers in a proportion to be determined by the PURC and shall reflect the actual costs incurred by the distribution companies in providing the services.

The distribution service expenses for each class of customers shall be allocated as energy or demand-related costs on the basis of factors related to their contribution to coincident peak.

The BST shall be allocated to end-users on the basis of energy and/or capacity charges which must be supplied to serve the customers taking into account the appropriate loss factors in transmission.

4.5 ESTABLISHMENT OF VALUE OF FIXED ASSETS

In order to establish the Value of Fixed Assets, the utility company shall submit supporting data which will be subjected to a full audit. The PURC may reject the inclusion of unnecessary assets, with reason

Every five years, the PURC shall update the new value of Fixed Assets of the transmission and distribution facilities on information submitted by the utility companies. In case of new works or withdrawals, the PURC shall increase or reduce the corresponding Value of Fixed Assets.

4.6 ESTABLISHMENT OF DISCOUNT RATE FOR CAPITAL RECOVERY

The Discount Rate to be used for setting tariffs shall be determined by the PURC at least once in every two years, in real terms, for tariff review purposes.

The Discount Rate can only be revised when the factors that influence its determination have suffered significant alterations that would justify its modification. The PURC at its own initiative or at the request of the utility company can commission the execution of studies for the revision of the rate.

4.7 ESTABLISHMENT OF PERFORMANCE BENCHMARKS

The PURC shall review performance benchmarks and other weighting factors relevant for rate setting at least once in every four years.

4.8 LIFELINE SUPPLY

The "lifeline" philosophy contends that electricity is an essential service rather than a luxury and people of low income should not be deprived of it because they cannot afford to pay the full cost of supply.

The affordability concern shall be addressed through the institution of a lifeline supply level and tariff that shall ensure that a certain quantity of electricity is provided at a low rate, such that low-income customers can afford to meet basic needs.

The lifeline supply shall be instituted as follows:

- The lifeline consumption level shall be set by the PURC from time to time.
- The rate for the lifeline consumption shall be related to the following factors as appropriate:
 - (i) National Monthly Minimum Wage;
 - (ii) Ability to pay of Rural Consumers;
 - (iii) The price of a gallon of kerosene;
 - (iv) Average cost of hydro;
- Beneficiaries of the lifeline shall be determined by the PURC.
- The lifeline supply shall be incorporated into the rate structure as to be determined by the PURC.

4.9 PREPARATION OF INFORMATION REPORTS ON RATE CALCULATION

The PURC will periodically prepare information on the procedures used to establish rates, and historical and expected values. The reports shall be made available to the public

5 END-USER TARIFF STRUCTURE

5.1 Residential Customers

Residential customers shall pay electricity tariff on the basis of energy (kWh) and shall be grouped into three classes on the basis of the level of consumption determined by the PURC from time to time.

5.2 Non-Residential Customers

Non-Residential customers shall be grouped into two classes on the basis of the level of consumption to be determined by the PURC.

5.3 SLT-LV Customers

End-user tariff for customers in this category will incorporate (i) Monthly Demand Charge denominated in Cedis/kVA/month, (ii) an energy charge denominated in Cedis/kWh and (iii) fixed Monthly Service Charge denominated in Cedis/Month.

5.4 SLT-MV Customers

End-user tariff for customers in this category will incorporate (i) Monthly Demand Charge denominated in Cedis/kVA/month (ii) and energy charge denominated in Cedis/kWh and (iii) fixed Monthly Service Charge denominated in Cedis/Month.

5.5 SLT-HV Customers

End-user tariff for customers in this category will incorporate (i) Monthly Demand Charge denominated in Cedis/kVA/month, (ii) energy charge denominated in Cedis/kWh and (iii) fixed Monthly Service Charge denominated in Cedis/Month.

5.6 Revision of Tariff structure

The PURC shall revise the tariff structure when necessary, after consultations with the utility companies.

6 RATE-SETTING PROCESS

The PURC shall adopt the following process in rate-setting.

6.1 Pre-filing Notification

Electricity rates shall be set at least once in every four years to be effective from the month of January billing cycle. Electric utilities shall file tariff notification by September 30 for tariffs to be effective from the month of January billing cycle of every year. In general, all tariff notifications to the PURC shall be filed at least 60 days from its effective date.

6.2 Preliminary Review

The PURC upon receipt of the necessary documentation shall review it and notify the utility company of its comments, if any. The utility company after receiving the comments shall respond to them within a maximum period of fourteen (14) calendar days.

The PURC shall accept or reject the filing.

6.3 Rejection and Re-filing

If the filing of the utility is rejected, it shall re-file within a maximum period of fourteen (14) calendar days for consideration by the PURC

6.4 Acceptance of Filing

When the PURC accepts the filing of the utility company, it shall do one of the following:

- (a) either accept the rates filed by the utility company
- (b) propose a lesser increase of rates, or
- (c) start a process of investigation of the rates

6.4.1 Acceptance of Rate

The PURC shall cause the accepted rates to be published

6.4.2 Option of Lesser Increase

In the case of option of lesser increase in rate, the PURC shall discuss with the utility company its decision following which it shall approve and publish a revised filing of lesser rates by the utility.

6.4.3 Investigation of Rates

In case the utility refuses a lesser increase in rate, the PURC shall set the matter down for formal hearing.

The PURC shall issue final orders to the utility company after the hearings to which the utility company shall file compliance tariff.

The PURC shall approve the compliance tariff that has been filled by the utility companies.

6.5 Petitions

Interested parties may file petitions requesting reconsideration of the resolutions of the PURC within ten calendar days following their date of publication.

The petition shall be resolved within ten calendar days from its filing, after which all administrative remedies are exhausted.

END-USER TARIFF STRUCTURE FOR CUSTOMER CATEGORIES

Interim structure for end-user tariffs for customer categories is shown below:

I. CATEGORY ONE: RESIDENTIAL

Service Voltage 415 V
Maximum Demand < 100 kVA

- a. Service Charge (Cedis/month)
- b. Energy Charge (Cedis/kWh)

II. CATEGORY TWO: NON-RESIDENTIAL

Service Voltage 415 V
Maximum Demand < 100 kVA

- a. Service Charge (Cedis/month)
- b. Energy Charge (Cedis/kWh)

III. CATEGORY THREE: SLT-LV

Service Voltage 415 V
Maximum Demand > 100 kVA

- a. Service Charge (Cedis/month)
- b. Demand Charge (Cedis/kVA/month)
- c. Energy Charge (Cedis/kWh)

IV. CATEGORY FOUR: SLT-MV

Service Voltage 11kV
Maximum Demand > 100kVA

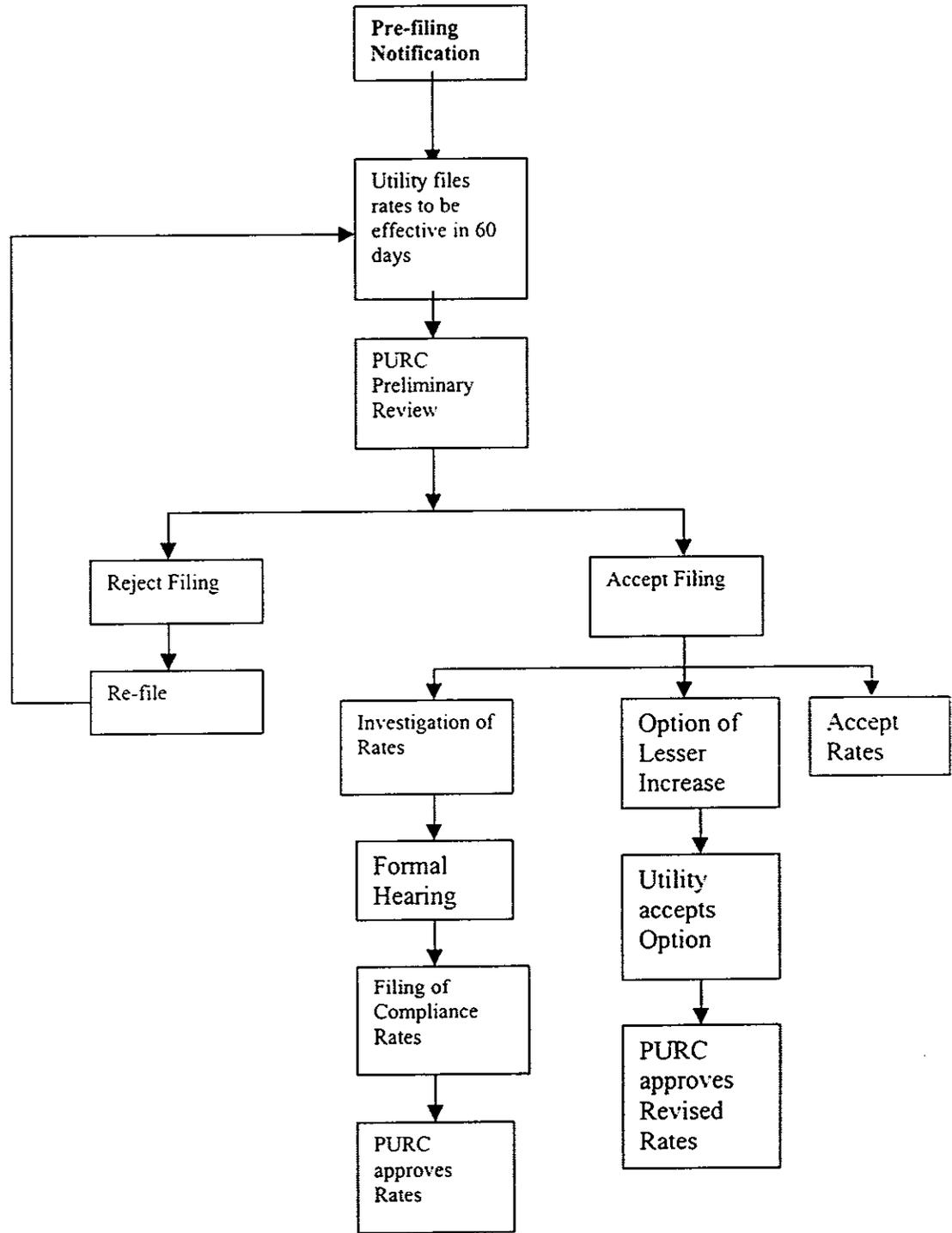
- a. Service Charge (Cedis/month)
- b. Demand Charge (Cedis/kVA/month)
- c. Energy Charge (Cedis/kWh)

V. CATEGORY FOUR: SLT-HV

Service Voltage >11kV
Maximum Demand > 100kVA

- a. Service Charge (Cedis/month)
- b. Demand Charge (Cedis/kVA/month)
- c. Energy Charge (Cedis/kWh)

PURC RATE-SETTING PROCESS



GLOSSARY

ECC	Electricity Company of Ghana Limited
GW	Gigawatts
GWh	Gigawatt hour (1,000 megawatt hours)
Kw	Kilowatt
KWh	Kilowatt hour
Kv	Kilovolt
Kva	Kilovolt ampere
LV	Low Voltage
MW	Medium Voltage
HV	High Voltage
NED	Northern Electricity Department
SLT-LV	Special Load Tariff - Low Voltage
SLT-MV	Special Load Tariff - Medium Voltage
SLT-HV	Special Load Tariff - High Voltage
PURC	Public Utilities Regulatory Commission
VRA	Volta River Authority
IPP	Independent Power Producer
TAPCO	Takoradi Thermal Power Company Limited