ELECTRICITY SUPPLY AND DISTRIBUTION (STANDARDS OF PERFORMANCE, TECHNICAL AND OPERATIONAL) RULES……..

ARRANGEMENT OF RULES

Rule

Purpose and Application

Electricity Supply Safety

Reliability of Electricity Supply

Supply Quality

Miscellaneous provisions

SCHEDULE I

In exercise of the powers conferred on the Energy Commission by section 28 of the Energy Commission and acting on in consultation with the Public Utilities Regulatory Commission by section 27 of the Energy Commission Act, 1997, (Act 541) these Rules are made this ….. day of …….

Purpose and application

Purpose

1. The purpose of these Rules is to establish electricity standards of performance, technical and operational rules of practice for distribution and sale utilities to ensure the efficient, economic, and safe supply and use of electricity.

Application

2. These Rules apply to Suppliers licensed by the Commission and customers of electricity utilities.

Electricity Supply Safety

Safety of supply

3. The Supplier shall
   (1) take all reasonable steps to ensure that the design, construction, commissioning, operation, maintenance and decommissioning of its distribution network (or any part of its network) is safe and shall take the precautions necessary to avoid exposing the customer or the public to exposed live electricity cables.
   (2) appropriately place notices to warn the public of the danger.
   (3) take reasonable steps to ensure that it has in place arrangements to procure adequate electricity to all of its customers without discrimination.
   (4) procure relevant ancillary services in order to ensure an efficient, secure, reliable, safe and cost-effective operation of the distribution system

Safety Management Systems

4. (1) The Supplier shall have a safety management system in place that:
   (a) is in accordance with all applicable codes and standards, and
   (b) without limiting paragraph (a), deals with the following matters:
      i. protecting the public from dangers arising from the distribution, sale or use of electricity;
      ii. advice to the public about the hazards associated with electricity in relation to the distribution network;

iii. eliminate or reduce the risks of personal injury to any person, or damage to property of any person;

iv. report on all related accidents to the Commission and the PURC; and

v. reduces bush fire risks relating to electricity lines and other assets of the distribution utility's network.

(2) The Supplier shall ensure that:

(a) audits of its safety management system are carried out by a nominated auditor in consultation with the Commission every five years; and

(b) a written report of the results of each audit, prepared by the nominated auditor shall be

i. submitted to the Commission; and

ii. published on the Supplier's website.

Protection Systems and Precaution against atmospheric electricity

5. (1) The protection system of a Supplier shall be appropriately designed and maintained to ensure;

(a) that the protection system is able to detect an electrical fault within a specific zone of the electrical network and to trip only the appropriate or relevant sections of the network in order to isolate that fault with minimum disturbance to the rest of the network; and

(b) safety and minimum interruptions to customers.

(2) A Customer shall install and maintain protection system, which is compatible with the existing distribution system protection.

(3) A Customer using electricity from any installation shall provide such means for obviating any damage to the installation by atmospheric electricity.

Precaution in the execution of works

6. (1) All works in respect of the supply of electricity which affects any:

(a) water bodies, irrigation system, forest, drainage or water supply system; or

(b) road works, railway, mine, or

(c) telecommunication equipment, aviation or harbour works; or

(d) public or private works

shall notwithstanding any other requirement, be carried out in the manner prescribed by these Rules and without danger to public or private safety.

(2) The Supplier shall liaise with the appropriate authorities to install and execute works in sub rule(1).

Connection of Supply

7. (1) A Supplier shall provide, install, and maintain the necessary equipment required for the distribution or sale of electricity to customers.

(2) The supply of electricity shall be connected through an appropriate service connection and protective device in accordance with the approved standards.

(3) An applicant may construct a part of the distribution network in accordance with approved standards established by the distribution utility, for purposes of supplying electricity to the applicant's facility.

(4) Notwithstanding (3) above, the Supplier shall have the exclusive right to own, operate and maintain any distribution network within its operational area as licensed by the Commission.

(5) The Supplier shall always ensure that its distribution network is free from vegetation and obstructions.

(6) Where the applicant has paid all relevant charges for connection of supply of electricity in accordance with procedures established by the PURC, that Supplier shall provide the connection within

a. three working days, if the connection is to be made from an existing supply line in metropolitan and urban areas; or
b. five working days, if the connection is to be made from an existing supply line in a rural area; or
c. ten working days, if the connection requires a line extension in a metropolitan and urban area; or
d. fifteen working days, if the connection requires a line extension in a rural area.

Responsibility of the Customer

8. (1) A customer shall

a) ensure that the Customer's electrical installation is done in accordance with relevant rules and regulations, and is safe for the supply of electricity;
b) provide safe and reasonable access at the Customer's premises for the Supplier to undertake work related to the supply of electricity;
c) keep vegetation at the Customer's premises clear from the Supplier's medium and low voltage distribution systems in consultation with the Supplier; and
d) be responsible for all associated charges in the case of reconnection.

(2) A customer shall not

a) use electricity in a manner that would make the Supplier's distribution network unsafe;

b) use any electrical equipment or appliance that will cause damage to or degrade the quality of electricity supply to other customers on the Supplier's system;

c) interfere or intentionally cause damage or knowingly allow damage to the Supplier's distribution system, meter or any equipment that is used for the supply of electricity to the customer; and

d) act in a manner that seeks to restrict access to the meter.

(3) An industrial customer shall not increase the contracted electricity demand without the consent of the Supplier.

Power to disconnect or connect supply

9. (1) Where a customer or an applicant for a new connection fails to comply with any of the provisions of rule 8, the Supplier may

a) in the case of a customer already connected to the distribution system, disconnect electricity supply to the customer; or

b) in the case of an applicant for a new connection, refuse to connect the applicant to the distribution system.

(2) Notwithstanding sub rule 9(1), the Supplier shall reconnect supply to the customer in accordance with rule 13 when the customer complies with rule 8 and the customer shall be responsible for all associated charges in reconnecting supply.

Response to unsafe conditions

10. (1) Where a Supplier becomes aware either by being informed by the public or otherwise, that its distribution system at a locality is unsafe and may pose danger to the public, the Supplier shall visit the locality and respond to the unsafe condition

(a) in the case of a metropolitan or municipal area within 0.5 hours, where the location of the unsafe condition is within a radius of 10 kilometres from the nearest office of the Supplier or within 1 hour, where the location of the unsafe condition is beyond a radius of 10 kilometres from the nearest office of the Supplier; or

(b) in the case of a rural area 1 hour, where the location of the unsafe condition is within a radius of 30 kilometres from the nearest office of the Supplier, or 2 hours, where the

location of the unsafe condition is beyond a radius of 30 kilometres from the nearest office of the Supplier;

(2) The Supplier shall correct the unsafe condition and restore supply where necessary in accordance with rule 13.

Reliability of electricity supply

Interruption of supply

11. (1) A Supplier may disconnect or interrupt electricity supply to a locality or a customer for the purpose of carrying out planned maintenance, including repair and installation of new equipment.

(2) A Supplier shall ensure that the electricity interruption to a customer's premises within an operational year shall not exceed twelve periods.

(3) Despite sub rules (2) the duration of each outage for each customer shall not exceed

(a) two hours, in a metropolitan or municipal area or industrial estate;

(b) three hours, in a district capital; and

(c) six hours, in rural areas.

(4) Despite sub rules (2) and (3) the cumulative electricity interruption for each customer within an operational year shall not exceed

(a) Twenty-four hours, in a metropolitan or municipal area, or industrial estate;

(b) Thirty-six, in a district capital; and

(c) Seventy-two, in a rural area.

(5) Despite sub rule (4) electricity interruption shall be reduced annually by one hour for the next 10 years

(6) For the purposes of sub rules (2), (3) and (4) the period of interruption shall be consistent and commence from the time the Supplier is initially informed by:

(a) a customer that the supply to the customer's premises has been interrupted; or

(b) a person other than the customer or is otherwise made aware by the operation of any automatic system operated by the Supplier in circumstances in which the supply to the customer's premises has been interrupted or may reasonably be expected to have been interrupted.

(7) Despite sub rules (2), (3), (4) and (6), an interruption of supply to a customer shall not be treated as wrongful where:

(a) the interruption was as a result of a major fault or damage to an indispensable equipment in the electricity Supplier's distribution network subject to sub-rule (8)

(b) the interruption was as a result of a failure of, fault in or damage to either the transmission system to which the electricity Supplier's distribution system was connected or a generating station connected to that transmission system; or

(c) the interruption was as a result of a failure of, fault in or damage to a generating station connected to the Supplier's distribution system;

(d) the customer informed the Supplier that the customer did not wish the Supplier to take any action.

(8) Where a major outage was due to the negligence of the Supplier, paragraph (a) of sub rule (7) shall not apply.

(9) A Supplier shall, subject to these Rules, pay into the Energy Fund the sum prescribed in the Schedule I where that Supplier is in breach of the supply interruption limits specified in sub rules (2) (3)(4) and (5).

Emergency interruption of supply or disconnection

12. (1) A Supplier may in an emergency disconnect or interrupt supply to a customer without notice to the customer.

(2) The Supplier shall act appropriately to rectify the situation and immediately advise the customer.

Rectification of faults and restoration of electricity supply

13. (1) Where a Supplier is informed of an interruption in the customer's supply due to a fault in or damage to the Supplier's distribution system either by the customer or a person other than the customer or where the Supplier has interrupted a customer's supply for purposes of carrying out maintenance on system equipment, the Supplier shall, unless the fault or maintenance was necessitated by a natural disaster, restore supply to the customer's premises

(a) in the case of a minor fault within

(i) two hours, in the case of a metropolitan or municipal area or industrial estate,

(ii) three hours, in the case of a district capital, and

(iii) six hours, in the case of a rural area; or

(b) in the case of a major fault that would require capital intensive equipment replacement, within

(i) twenty-four hours, in the case of a metropolitan or municipal area or industrial estate,

(ii) forty-eight hours, in the case of a district capital, and

(iii) Seventy-two, in the case of a rural area.

(2) Where the electricity supply to a customer's premises is interrupted by a natural disaster, the Supplier shall restore the supply within the period specified in sub rules (13) after the situation returns to normalcy.

(3) Where the interruption is to carry out planned or routine maintenance, sub rule (13) shall not apply.

Electricity Supply Quality

System Voltage

14. (1) The Supplier shall ensure that the voltage at the point of supply to a customer's premises or electrical installation is within plus or minus ten (±10) per cent of the following voltage levels:

(a) 230 Volts;

(b) 400 Volts;

(c) 11 Kilovolts;

(d) 33 Kilovolts; or

(e) 34.5 Kilovolts**.**

(2) Where a Supplier receives a supply voltage compliant from a customer, the Supplier shall respond as in rule 10 and rectify and restore supply as in rule 13

(3) Despite sub rule (2), the Supplier, where the customer requests, shall within seventy-two hours after rectification and restoration of the supply voltage problem send to the customer an explanation of the cause of the problem and measures taken.

(4) Any variations from the relevant standard voltage levels under sub rule (14) shall be as provided in Schedule II to these Rules.

(5) The Supplier shall minimize the frequent occurrence of voltage fluctuations, which shall not exceed the limits in the steady state in Schedule II.

Voltage fluctuations

15. (1) A Supplier shall

(a) ensure voltage fluctuations on its distribution system are within applicable standards,

(b) minimise the frequency of voltage fluctuations on the distribution system; and

(c) not connect customers whose loads are likely to cause voltage fluctuations at the point of common coupling.

(2) Where voltage fluctuations are traced to a customer, the Supplier may advise the offending customer on the appropriate solution to the problem and may after giving notice in writing, disconnect the offending customer's connection at the point of common coupling.

(3) The Supplier shall permanently disconnect the customer in (2) who repetitively offends.

(4) The Supplier shall reconnect the customer who has been disconnected under this rule in accordance with relevant rules and regulations.

(5) The Supplier in compliance with sub rule (15) shall ensure the frequent occurrence of the transient voltage fluctuations does not exceed the limits in Schedule II.

Power factor

16. (1) A Supplier shall advise an industrial customer on the appropriate steps to be taken to ensure that the customer's load power factor is within the relevant range set out in Schedule III.

(2) The Supplier shall impose a power factor surcharge to be determined by the PURC, if the customer fails to install appropriate devices or technology to improve the power factor to at least 0.9 lagging.

(3) Pursuant to sub-rule (16), the customer shall within a maximum of six (6) months period, install appropriate devices or technology on the customer’s electrical system to improve the power factor and minimize line losses.

(4) Where the Customer fails to comply with subrule (1), the Supplier may disconnect electricity supply to the customer load.

(5) Notwithstanding sub rules (16) and (3) the Supplier shall install appropriate devices or technology anywhere in the distribution system as may be necessary.

Harmonics control

17. (1) A Supplier shall ensure that the voltage harmonic distortions at the point of common coupling nearest to a customer's point of supply do not exceed the levels set out in Schedule IV.

(2) Notwithstanding sub-rule (17), the Supplier shall comply with the recommended practices and requirements for harmonic control in electrical power systems in standards approved by Ghana Standards Authority.

(3) A customer categorized as a bulk or industrial customer shall ensure that the voltage and current harmonic distortions in the customer's electrical system are within the limits stated in Schedules IV and V.

(4) Where it is apparent to the Supplier that a customer's voltage and current harmonic distortions exceed the limits specified in Schedules IV and V, the Supplier may disconnect electricity supply to the customer.

(5) The Supplier shall restore supply to the customer in accordance with rule 13.

(6) A customer practising net metering should ensure that the voltage and current harmonic distortions in the customer's electrical system are within the limits stated in Schedules IV and V.

Negative sequence voltage

18. (1) A Supplier shall ensure that the negative sequence voltage at the point of common coupling to a customer's three-phase system is less than 1% and not more than 2% for a period of five minutes in every thirty minutes.

(2) In accordance with sub-rule (18), the Supplier shall prevent the negative sequence voltage from fluctuating above 1% of an applicable voltage level, and when it does fluctuate above 1%, prevent it from exceeding 2% for a period of five minutes in every thirty minutes.

Load balance

19. (1) A Supplier, in supplying electricity to customers, shall ensure that the connections are made to balance the loads on the three phases of the distribution network.

(2) A Customer shall ensure that the current in each phase of the customer's three-phase system, does not deviate from the average of the three-phase currents by more than

(a) 5% for a standard nominal voltage up to 1kV; or

(b) 2% for a standard nominal voltage above 1kV.

(3) Notwithstanding sub rule (2), deviations of

(a) 10% for a standard nominal voltage up to 1kV, or

(b) 4% for standard nominal voltage above 1kV,

for periods of less than two minutes, are permissible.

Metering

Installation of a meter

20. (1) The Supplier shall

(a) provide, install and maintain a meter that will measure and record the amount of electricity supplied to the customer within specified accuracy limits of that meter's class;

(b) affix the meter in (20)(a) at an appropriate location, and position it in such a way as to allow for easy access;

(c) ensure that the meter meets applicable standard;

(d) ensure that the accuracy of the meter is maintained throughout its usage and in accordance with the applicable codes or standards;

(e) test if necessary, calibrate all meters in accordance with the manufacturer's specifications;

(f) seal any meter installed at the customer's premises in the presence of the customer or the customer's representative, who shall ensure that the seal is not broken;

(g) replace the meter or provide an appropriate alternative to restore electricity supply to the customer in accordance with rule 13, where the meter becomes defective;

(h) replace the meter in (g) at the cost to the Customer, where it is established that the defect or damage was caused by the Customer,

(i) provide appropriate communication channels for seeking redress or for cases of emergency.

(2) Notwithstanding sub rule (20) paragraph (f), a Supplier may break a seal on a meter during testing, maintenance or repair and shall upon completion, reseal the meter in the presence of the customer or the customer's representative.

(3) A customer shall not tamper with or break the seal on a meter.

(4) Where a customer applies for a separate meter, the Supplier shall assess the Customer's load and provide a meter appropriately.

Meter Audit

21. (1) A Supplier shall each year undertake an audit of meters that have been in operation for ten years or more and replace if necessary.

(2) The Supplier shall, within six months of commencement of these Rules, submit to the Commission

(a) an audit report of the meters in operation for ten years or more; and

(b) a programme for replacement of the meters within the subsequent sixty (60) months.

Load Management

Load shedding

22. (1) A Supplier shall not shed load unless

(a) demand is likely to exceed supply as a result of a forced outage of a generating unit;

(b) it is necessary to preserve the reliability and security of the transmission and distribution system;

(c) it is necessary to reinforce or rehabilitate the distribution network; or

(d) it is necessary for safety reasons.

(2) Where the Supplier decides to shed load under sub rule (22) except in emergency situations, the Supplier shall immediately notify the Commission and the PURC of the intended load shedding either by

(a) telephone, or

(b) electronic mail followed by a notice in writing.

(3) The Supplier, in addition to notifying the Commission and the PURC under sub rule (2), shall by a notice carried in the newspapers and on radio or television or social media platforms or any other communication media inform the public of any intended load shedding and the duration of it.

Installation of alternate source

23. (1) Where a Customer requires to provide an alternative source of electricity for own use, it shall be done in accordance with approved standards

(2) A customer who installs any alternative source of electricity in any premises connected to the distribution network shall

(a) provide an appropriate switching device which separates the Supplier's system from that of the alternative electricity source when the alternative electricity source is in operation.

(b) in the case of a grid-tied system provide an appropriate switching device in accordance with applicable codes and standards.

(c) The Customer is liable for any damage arising from the customer’s non-compliance with sub rule (1) (a) or (b) or from any defects in the Customer's alternative source of electricity system.

Reporting

Reporting Standards

24. (1) A Supplier shall prepare and submit to the Commission and the PURC separate technical and financial reports as per licence issued and shall contain proper records of the performance of the Supplier over the relevant period.

(2) Where a Supplier fails to submit as in sub rule (24) the Supplier shall pay to the Commission and Public Utilities Regulatory Commission the sum prescribed in the Schedule I.

Provision of information

25. (1) A Supplier shall, on request provide a customer with information about the services provided to the customer's premises including the following

(a) load profiles and power factors, where applicable;

(b) meter readings for electricity supply to the customer's premises.

Offences and penalties

Offences and penalties

26. (1) If at any time the Commission has reasonable grounds that the Supplier

(a) contravenes any obligation imposed under these Rules; or

(b) has persistently failed to maintain an uninterrupted supply of electricity conforming to standards regarding quality of electricity to the consumers; or

(c) has persistently defaulted in complying with any direction given by the Commission under the Act; or

(d) has broken the terms and conditions of the licence

the Commission may impose an administrative charge on the Supplier as in Schedule I.

Interpretation

27. In these Rules unless the context otherwise requires,

"Act" means the Energy Commission Act, 1997, (Act 541),

"advance deposit" means as provided for in the PURC ACT and Regulation

"approved electricity tariff" means tariff approved and gazetted by PURC,

"Commission" means the Energy Commission established under section 1 of the Act;

"Customer" means a person that contracts to purchase electricity from a Supplier,

"distribution system" means a system consisting of electric line, transformers, switchgear and other ancillary equipment interconnected for the supply of electricity;

"emergency" means an imminent occurrence of a situation that is out of the ordinary and that threatens to endanger a person, public safety or cause damage to property;

“Grid Participant” means a wholesale supplier, distribution company or bulk customer whose facilities are connected to the National Interconnected Transmission System;

"load shedding" means partial or total disruption of supply to customers caused by the Supplier as the Supplier may deem necessary to ensure the safety of personnel, equipment and system integrity;

"point of common coupling" means supply connections made to more than one customer from the same phase of a low voltage distribution system;

"PURC" means the Public Utilities Regulatory Commission;

“obstructions” means any objects or installations that seek to hinder the free access to the distribution system

"reinforce-" means the process of providing addition circuits to strengthen an existing electrical circuit of equipment;

"Supplier" means an entity that has been licensed by the Energy Commission under the Act as an

electricity distributor or retailer;

“connection service” means the installation and activation of connection assets in order to distribute electricity;

“customer” means a person that contracts to purchase electricity from a Supplier,

“customer average interruption duration index (CAIDI)” means a measure of the average duration of interruptions for customers interrupted during a year;

“distribution system” means a system consisting of a network of electric feeders, transformers, service lines meters, and other distribution switchgears;

“electric feeder” means an overhead conductor or underground cable used for bulk electricity supply;

“industrial estate” means an area or land demarcated and set aside for factories and warehouses

"major fault" means a fault that requires of high capital cost to fix or remedy such as a substation blast, cable blasts, damaged transformer, damaged switchgear, burnt HV pole, failure of SCADA system;

"minor fault" means a fault that requires the replacement of equipment of minimal capital cost to fix or remedy such as blown substation LV fuse, jumper cut, blown aerial fuse etc.;

"operational year" is the same as a calendar year;

"Supplier" means an entity that has been licensed by the Energy Commission under the Act as an electricity distributor or retailer;

"system average interruption duration index (SAIDI)" means a measure of the average duration of interruptions recorded for the distribution system during a year;

"system average interruption frequency index (SAIFI)" means a measure of the average number of interruptions recorded for the distribution system during a year;

"rural area" means an operational district with a customer population under five thousand and a demand below fifteen megawatts;

Schedule I

**Any such payments to be paid into the Energy Fund

REFERENCE RULES	DESCRIPTION	CHARGE Minimum penalty units
3.(1)(2)	Safety of Supply	3,000
4. (1)(2)	Safety Management systems	3,000
5(1)	Protection Systems and Precaution against atmospheric electricity	3,000
7. (1)(2)(3)(4)(5)(6)	Connection of Supply	3,000
11. (2)(3)(4)(5)(6)(7)(8)	Interruption of supply	3,000
13. (1)	Rectification of faults and restoration of electricity supply	3,000
14. (1)(2)(3)(4)	System Voltage	3,000
15. (1)(5)	Voltage fluctuations	3,000
16. (5)	Power factor	3,000
17. (1)(2)(3)(5)	Harmonics control	3,000
18. (1)(2)	Negative sequence voltage	3,000
19. (1) (2)(3)	Load balance	3,000
20. (1) (4)	Installation of a meter	3,000
21. (1)(2)	Meter Audit	3,000
22. (1) (2)(3)	Load Management	3,000
23. (1)	Reporting standard	3,000

Schedule II

STANDARD NOMINAL VOLTAGE

Voltage Level in kV	Voltage Range for Time Period		
	Steady state	Transient State	
		Less than 1 minute	Less than 10 seconds
<1.0	±10%	±15%	Phase to Earth +50% -100% Phase to Phase +20%-100%
11	±10%	±15%	Phase to Earth +80% -100% Phase to Phase +20%-100%
33	±10%	±15%	Phase to Earth +80% -100% Phase to Phase +20%-100%
34.5	±10%	±15%	Phase to Earth +80% -100% Phase to Phase +20%-100%

Schedule III

POWER FACTOR LIMITS

Supply Voltage	Power Factor Range for Customers Maximum Demand and Voltage					
	Up to 100Kva		Between 100kVA - 2MVA		Over 2MVA	
	Minimum		Maximum		Minimum	
	Lagging	Leading	Lagging	Leading	Lagging	Leading
<1.0	0.95	0.95	-	-	-	-
11	0.95	0.95	0.95	0.95	0.96	0.96
33	0.95	0.95	0.95	0.95	0.96	0.96
34.5	0.95	0.95	0.95	0.95	0.96	0.96

Schedule IV

VOLTAGE HARMONIC DISTORTION LIMITS

Voltage at point of common coupling	Total harmonic distortion	Individual voltage harmonics	
		Odd	Even
<1 kV	5%	4%	2%
>1kV	3%	2%	1%

Schedule V

VOLTAGE HARMONIC DISTORTION LIMITS

Maximum Harmonic Current Distortion In Percent of k						
Individual Harmonic Order "h" (Odd Harmonics)						
Isc/L	<11	11≤h<17	23≤h<35	17≤h<35	35≤h Distortion	Total Harmonics
<20*	4.0%	2.0%	1.5%	0.6%	0.3%	5.0%
20<50	7.0%	3.5%	2.5%	1.0%	0.5%	8.0%
50<100	10.0%	4.5%	4.0%	1.5%	0.7%	12.0%
100<1000	12.0%	5.5%	5.0%	2.0%	2.0%	15.0%
<100	15.0%	7.0%	6.0%	2.5%	1.4%	20.0%