RWANDA UTILITIES REGULATORY AUTHORITY

Inspiring development

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REGULATION Nº 02/R/EL-EWS/RURA/2016 GOVERNING ELECTRICITY QUALITY OF SERVICE IN RWANDA

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PREAMBLE

Pursuant to Law n°21/2011 of 23/06/2011 governing Electricity in Rwanda;

Pursuant to Law n° 09/2013 of 01/03/2013 establishing Rwanda Utilities Regulatory Authority (RURA) and determining its mission, powers, organization and functioning;

Based on the recommendations made during the consultative meeting on the draft Regulations governing Electricity Quality of Service in Rwanda held on 15th August 2015 between RURA and various stakeholders in the Electricity Sector;

The Regulatory Board, upon due consideration and deliberation in its meeting of 29th March 2016;

HEREBY ADOPTS:

CHAPTER ONE: GENERAL PROVISIONS

Article One: Purpose of the Regulations

The purpose of this Regulation is to ensure that any Licensee involved the generation, transmission; distribution and trade of electrical power meet an adequate level of quality and reliable service in the electricity supply in Rwanda.

Article 2: Definitions of Terms

For the purpose of this Regulation, terms below shall have the following meanings:

1. **Customer :** a person or legal entity that either has entered into an electricity supply agreement with a Licensee, or legally consumes electricity supplied by a Licensee;

2. **Customer Average Interruption Duration Index (CAIDI)"**: a reliability indicator that measures the average time each consumer is without electricity per interruption, within a certain period;

3. **EAPP:** Eastern African Power Pool

4. **Force majeur :** An event that directly and exclusively results from the occurrence of natural causes that could not have been prevented by the exercise of foresight or caution; it can be a natural or social act or event that occurred in the country or community such as; earthquakes, lightning, cyclones, floods, volcanic eruptions, fires or wars, armed conflict, insurrection, terrorist or military action, which prevent the licensee from performing its obligations under the license or other acts or events that are beyond reasonable control and not arising out of the fault or any level of negligence of the licensee, and the licensee has been unable to overcome such act or event by the exercise of due diligence and reasonable efforts, skill and care.

5. **Forced Interruption:** an interruption encountered when the supply system or a component of it, is taken out of service immediately, either automatically or as soon as switching operations are performed as a result of emergency conditions, or human error or by the malfunctioning of equipment.

6. **High Voltage (HV)**: is the voltage equal or above seventy thousand volts plus or minus ten per cent;

7. **Hz** : Hertz

8. **IEC**: International Electro-technical Commission

9. **kV**: Kilo volt

10. **Licensee** : any person authorized by the Regulatory Authority to carry out activities of electricity generation, transmission, distribution, domestic and/or international trade in Rwanda;

11. **Low Voltage (LV):** the voltage less or equal to four hundred volts plus or minus five per cent;

12. **Medium Voltage (MV):** the voltage above four hundred volts plus or minus ten percent and less or equal to thirty three thousand volts plus or minus ten percent;

13. **MW:** Megawatt

14. **MWh**: Megawatt-hour

15. **Network**: the transmission or distribution lines and their associated equipment and accessories of any Licensee;

16. **Person:** is either Natural or legal person

17. **Planned interruption:** interruption that occurs when a component is deliberately taken out of service (by the Licensee or its agent) at a selected time, usually for the purpose of construction, preventative maintenance, or repair;

18. **Point of Delivery :** the point where the Licensee's conductors meet the conductors of the Customer;

19. **Regulatory Authority:** Rwanda Utilities Regulatory Authority **(RURA)** as established by the Law No. 09/2013 of 01/03/2013;

20. **Service:** provision of electricity supply with all its related activities;

21. **System Average Interruption Duration Index (SAIDI):** is a reliability indicator that measure the average duration of interruption to electricity supply per customer, over a given period in the distribution system.

22. **System Average Interruption Frequency Index (SAIFI):** is a reliability indicator that measure the number of times or the frequency of interruptions to electricity supply in a given period in the distribution system.

23. **Temporary supply:** electricity supply that is temporarily provided to a Customer in the event of unusual circumstances;

24. **Unplanned interruption:** interruption that:

    (a) occurs when service is interrupted because a component is taken out of service immediately, either automatically or as soon as switching operations can be performed, as a direct result of emergency conditions, or

    (b) is caused by human error or by the improper operation of equipment;

25. **Quality of Service Standards:** a set of parameters and their corresponding values that are used to evaluate the adequacy of the level of electricity services provided by a Licensee;

26. **V**: Volt

27. **Voltage flicker:** refers to an increase or decrease in voltage over a short duration of time which is usually associated with fluctuation load, and sufficient in duration to allow a visual observation of a change in electric light source intensity.

28. **Voltage imbalance:** refers to any differences in the three phase voltage magnitudes in a power system.

29. **Voltage Harmonic:** refers to distortion of the normal voltage waveform.

Article 3: Scope of application

This Regulation shall apply to:

a. interactions between a Licensee and Consumers.
b. technical aspect of electricity supply
c. technical performance of the licensees

Article 4: Objective of this Regulation

The main objective of this Regulation is to:

a. to establish standards to be adhered to by the Licensee in the provision of electricity supply service;
b. to ensure adequate quality of Service to Customers;
c. to improve the operation and performance of the network;
d. to make quality of service information available to Customers.

CHAPTER II: CONNECTION, METERING AND BILLING

Section One: CONNECTION TO ELECTRICITY SUPPLY

Article 5: Timeframe for connection to the electricity supply

If the Customer fulfills all requirements stipulated by the Licensee and if, where applicable, all subsidies have been received, the Licensee shall connect the Customer to the electricity supply within the following timeframes:

a. Not later than five (5) working days from the date of application where existing infrastructure can be used;

b. Not later than two (2) months from the date of application where LV network extensions are required and;

c. Not later than three (3) months from the date of application where MV network extensions are required;

Article 6: Negotiation for connection to the electricity supply

Without prejudice to the provisions of Article 5, the Customer and Licensee may negotiate a longer timeframe for the connection to electricity supply if:

a. new networks have to be installed;

b. HV extensions are required;

c. the equipment to be used for connection are not in the licensee's store and are to be delivered by manufacturers;

d. the terrain, topography and distance of connection will affect the timeframe for the connection

Article 7: Location of the meter

The customer shall provide an accessible, protected and satisfactory location for the meters on his premises unless the Licensee decides to install meters on poles or other locations controlled by the Licensee;

Article 8: Procurement, maintenance and installation of equipment for electricity supply

a. All pipes, wires and devices on the Licensee's side of the point of delivery shall be procured, installed and maintained by the Licensee unless otherwise agreed in writing between the Licensee and the Customer;

b. All wiring, devices and appliances located on the Customer's side of the point of delivery shall be procured, installed and maintained by and at the expense of the Customer;

Article 9: Procedures for new connection to electricity supply

If a customer requests for a new connection, the licensee is required to provide the customer with a quotation for the new supply or a modification to an existing connection.

Upon acceptance of the quotation and making the minimum payment, the Licensee shall make an appointment with the Customer to fit a meter and connect the Customer within the period stipulated in Article 5 of this Regulation , provided that:

a. The Customer has submitted an application for electricity supply in a format required by the Licensee as approved by the Regulatory Authority;
b. The Customer has provided the Licensee with acceptable identification and all information necessary to enable the Licensee to arrange the provision of supply to the address specified by the Customer;
c. The Customer has complied with the Electrical Installations Regulations approved by the Regulatory Authority; and
d. The Customer has paid the Licensee all charges for the supply of electricity as approved by the Regulatory Authority;

Upon connecting a new premise, the Licensee shall provide a contract or a supply agreement to the Customer, with its terms and conditions of supply approved by the Regulatory Authority;

Article 10: Failure to connect a customer

If the connection to the electricity supply is not provided, the Licensee shall promptly refund the Customer's deposit plus accrued interests (5%) on the balance if any, in excess to the charges paid for the service applied for.

Article 11: Refusal to connect a customer

The Licensee may refuse to connect a customer to electricity supply if;

a. The applicant does not fulfill all the requirements to qualify for the service applied for as set by the in law and the licensee;
b. If the applicant's facilities are inadequate;
c. The person requesting the service owes the Licensee an amount for any Licensee's services previously provided, whether to the same or different premises;

Article 12: Notice of refusal to connect a customer

If the Licensee refuses to connect a customer to electricity supply for the reasons stipulated in Article 11, the Licensee shall, within five (5) working days, inform the Customer in writing of the reasons for such refusal and the actions to be taken by the Customer for the Licensee to fulfill the request;

Article 13: Filing a complaint against the Licensee

The applicant may file a complaint with the Regulatory Authority appealing the Licensee's decision regarding the refusal of connection.

Article 14: Transfer of connection

The transfer of electricity connection from one premise to another within the service area of the Licensee shall not be deemed as a disconnection and no additional deposit shall be demanded.

Article 15: Temporary Service

The Customer shall pay to the Licensee the cost of the facilities required to provide temporary service as well as the cost of connection and disconnection of service.

Article 16: Changes in Installation

Before any Customer makes any material changes in his/her facilities that would substantially alter the electric requirements for the class of service of his premises, the Customer shall consult with the Licensee to ascertain the effect, if any, of the proposed changes on the Licensee's facilities or on the Licensee's ability to serve the Customer's additional electric requirements.

Section 2: METERING AND BILLING

Article 16: Frequency of Meter Reading

The licensee is required to read and physically inspect the meters at regular intervals to avoid or minimize electricity theft, and ensure that billing is done based on actual energy consumption.

Article 17: Meter requirements

Unless otherwise authorized by the Regulatory Authority, each Licensee shall provide, install, own and maintain all meters used for measurement of electricity delivered to its Customers;

The Licensee shall use meters that are reliable and of a standard or type approved by the National Bureau of Standards;

Each Licensee shall keep a record of all its meters showing the Customer's names and address.

Article 18: Meter tests and inspection

Each Licensee shall, upon request of a Customer, provide for a test of the accuracy of the meter serving that Customer;

The Licensee shall inform the Customer of the time and place of the test and allow the Customer or his or her authorized representative to be present if the Customer desires so;

The Customer shall be properly informed of the result of any test on his/her meter;

Article 19: Charges for meter test

If a test on the meter proves that the meter is accurate, the cost of the test would be charged to the customer.

In the event that the meter accuracy is found to be outside the declared limits specified in the supply agreement to either the Customer's or the Licensee's disadvantage, any fee charged for a meter test shall be refunded to the Customer.

Article 20: Record of meter tests

The record of each test made shall show the identification number and contents of the meter, the standard meter and other measuring devices used, the date and kind of test made, the person who performed the test, the error or percentage of accuracy at each load tested, and sufficient data to allow verification of all calculations.

Article 21: Replacement of prepayment meter

The Licensee shall provide the means to read, to transfer or refund, as appropriate, the amount of unexpended credit due to a Customer when a prepayment meter is replaced or removed as a result of faulty meters.

Article 22: Licensee's right to inspect meters

The Licensee shall have the right to inspect a meter at the Customer's premises if tampering or theft is detected or suspected. Theft of electricity may be ascertained by studying the purchase patterns of the Customer.

Where reasonable but unsuccessful attempts have been made to gain access to a meter, the Licensee may disconnect the supply after having delivered a written warning to the Customer.

Article 23: Billing frequency

Bills for electricity supply shall be delivered to the address of the Customer monthly, unless otherwise agreed by the Customer and Licensee or unless service is rendered for a period of less than one month.

Article 24: Bill computation

All electricity sold by the Licensee shall be charged for by meter measurements or by a flat monthly amount;

Unless otherwise agreed, monthly bills shall be calculated for periods of not less than twenty-five (25) calendar days and not more than thirty-five (35) calendar days;

The Licensee shall exercise all reasonable means to assure accurate computation of all monthly service billings;

Billing may be based on pro rata estimates which shall be settled annually according to the actual figures;

Bills shall be prepared as promptly as possible following the reading of meters, or following a flat monthly amount if the monthly amount is determined.

Article 25: Bill contents for credit meters customer

Unless otherwise agreed, all electricity bills for the supply of electricity shall be issued in the name of the Customer;

A Customer's bill shall clearly present the following information:

a. the date of the previous meter reading and the corresponding meter reading;
b. the date of the current meter reading and the corresponding meter reading;
c. the number of units consumed (or estimated) during the period covered by the account;
d. the applicable tariff ;
e. the cost of the electricity consumed during the period covered by the bill;
f. the outstanding balance, if applicable;
g. any other amounts charged and a description of what the charges are for;
h. the total amount payable;
i. the latest date by which the account is to be paid in order to avoid penalties;

Article 26: Payment Locations

The Licensee shall ensure that, wherever practical, facilities are provided within or close to Customers premises areas to afford Customers a reasonable opportunity to pay their accounts and to resolve account queries.

Article 27: Late Payment Charge

In the event that the Customer fails to pay a bill on or before the delinquent date, a late payment charge shall be assessed and charged to the Customer as outlined in the contract or supply agreement. Such charge shall be calculated as a percentage of the unpaid balance of the current bill for service.

Section 3: ACCOUNT QUERIES AND DISPUTED BILLS

Article 28: Account and meter accuracy query

The licensee shall respond to an account or meter accuracy query from a customer within ten (10) working days, if the query was made in writing.

To ensure that this is complied with, the licensee must record the receipt date of the query, as well as the licensee's response date.

Article 29: Disputed bills

Where there is a dispute between the Customer and the Licensee regarding the electricity bill, the Licensee shall make an investigation and report the results in writing to the Customer;

Where the dispute is not resolved amicably, the aggrieved party may file a complaint in accordance with the procedures provided in Article 44 of this Regulation.

The Customer shall not pay the disputed portion of the bill which exceeds the amount of the Customer's average usage for the billing period at current rates until the resolution of the dispute.

Article 30: Bill adjustments

If a meter test reveals a meter accuracy to be outside the declared limits specified in the supply agreement, the Licensee shall correct previous readings consistent with the inaccuracy found in the meter for the period that has revealed unusual consumption by the Customer;

If a meter is found not to register for any period of time, the Licensee may make a charge for units used but not metered for during that period of time based on consumption patterns by the same Customer at the same location.

CHAPTER III: DISCONNECTION AND RECONNECTION

Article 31: Conditions for disconnection of service

The Licensee may disconnect the Customer for any of the following reasons:

a. Failure to comply with the terms and conditions of the contract or supply agreement;

b. If the Customer has not paid the amount correctly billed to his address by the relevant date; provided that :

   i. The payment date is clearly shown on the bill;

   ii. The payment date is at least 21 calendar days from the date of delivery of the bill to the supply address or a delivery address provided by the Customer, which is acceptable to the Licensee;

   iii. The payment date has not been superseded by a subsequent payment date issued to the same Customer at the same supply address;

   iv. The Licensee has clearly verified in its record that the bill has not been paid ;

   v. The Licensee has given a written warning to the Customer that the electricity supply shall be disconnected if payment is not made within the payment period ;

c. If the Customer has violated the Licensee rules pertaining to the use of service in a manner which interferes with the service of others;

d. If the Customer uses sub-standard equipment and if he has been made notified on the same and given reasonable opportunity to remedy the situation;

e. If the Customer has tampered with or has by-passed the Licensee's meter or equipment;

Article 32: Procedure for disconnection of service

The licensee shall notify the customer in writing about the intention to disconnect the service at least five (5) working days before the disconnection.

Article 33: Notice of disconnection

Whenever the Licensee disconnects electricity supply to a Customer's premises, the Licensee shall leave a written notice of disconnection informing the Customer of the following:

a. The date and time of disconnection;

b. The reason for disconnection;

c. The actions to be taken by the Customer to have the electricity supply reconnected; and

d. The contact address and telephone number of the Licensee.

Article 34: Conditions for disconnection without notice

The licensee has the right to disconnect the Customer without notice if:

a. the Customer is connected to the Licensee's network illegally ;

b. the Licensee considers a Customer's installation to be dangerous to the lives of customer and those in his neighborhood;

c. the Licensee considers a Customer's installation unsafe and may affect the network reliability and/or the quality of supply to other Customers;

Article 35: Period of disconnection

The Licensee shall not carry out disconnections if payment points and reconnection service are not available within the next twenty four (24) hours from the time of disconnection;

Article 36: Prohibition of disconnection of electricity supply

The licensee is prohibited to disconnect the Customer in the following circumstances:

a. for non-payment on weekends or public holidays;

b. for electricity non-payment where :
   i. the Customer has entered into payment arrangement with the Licensee and payments are being made in accordance with the arrangement;

   ii. the Customer has made a complaint concerning the unpaid bill in accordance with the Licensee or the Regulatory Authority complaint procedure and the complaint remains unresolved;

   iii. for non-payment of a bill for a service other than electricity supply; and

   iv. if a life support machine is in use in the premises of the Customer.

Article 37: A Customer's right to request for disconnection

Whenever a Customer requests a Licensee to disconnect electricity supply to his premises, the Licensee shall disconnect the supply in accordance with the request, provided that the Licensee has conducted investigations and confirmed that the consent of the other occupants of the premises has been obtained;

Article 38: Billing after disconnection

The Licensee shall not bill a Customer for any period after the date on which the electricity supply to the Customer's premises should have been disconnected in accordance with the provisions of Article 39 of this Regulation, provided that the Customer does not cancel the request.

Article 39: Reconnection of electricity supply

The Licensee shall reconnect electricity supply to the Customer in the following circumstances:

a. Whenever a Customer, disconnected for non-payment of electricity bill pays off the due amount and other Licensee's charges involved or enters into an acceptable payment arrangement with the Licensee;

b. Whenever a Customer, disconnected for theft of electricity or for illegal connection to the Licensee's network, formalizes his electricity supply arrangements to the satisfaction of the Licensee and pays all charges owed to the Licensee or enters into an acceptable payment arrangement to pay the charges;

c. If a Customer, disconnected for dangerous or unsafe installations, rectifies the problem associated with the installation, and the installation is certified by an authorized person in accordance with the Licensee's requirements;

d. If a Customer, disconnected for failure to provide access to the meter in his premises, provides access or makes reasonable access arrangements and pays necessary reconnection fee;

Reconnections shall be effected as promptly as possible and not later than the first working day after the account has been settled satisfactorily and the reconnection fee has been paid.

CHAPTER IV: CUSTOMERS COMPLAINTS HANDLING AND USE OF INFORMATION

Article 40: Response to Customer requests and complaints

All general Customer written requests should be replied to in writing by the Licensee within Ten (10) working days following the receipt of the written request. The reply should include information on the requirements for the service requested for, the Customer's obligations and the time frame or addressing the request.
To ensure that this is complied with, the licensee must record the receipt date of the Customer complaint, as well as the date of licensee's response.

Article 41: Emergency reporting for interruptions and emergencies

The Licensee shall provide a facility for Customers to report interruptions during normal office hours and a twenty four (24) hour free telephone service to receive reports of interruptions, emergencies and general complaints.

Article 42: Record of Information

The Licensee shall request and record the following information from a Customer reporting any interruption or complaint:

a. the Customer's name;

b. physical address and telephone number (if any);

c. the nature of the interruption or complaint;

Article 43: Confidentiality and use of information

The Licensee shall ensure that Customer information, including payment history and consumption patterns are kept confidential, except when required by laws or relevant institutions, or to the extent authorized by the concerned Customer or the Regulatory Authority.
Customer information may be provided under a protective order issued and/or confidentiality agreement executed in a legal proceeding, but in such proceedings the Licensee should make every effort to maintain the Customer's privacy.

Article 44: Customer complaints and dispute resolution

If a Customer has a complaint regarding the Licensee's obligations under this Regulation, the Customer may in case of a serious complaint lodge the complaint in writing with the Licensee, and in other cases verbally to have the complaint solved amicably;
Upon receiving the complaint, the Licensee shall promptly make a suitable investigation and advice the complainant in writing of the results of its investigation within ten (10) working days;

Additionally, the Licensee shall keep a record of all complaints that shall indicate the name and address of the complainant, the date and nature of the complaint and its disposition;

Where after raising the complaint with the Licensee, the Customer is not satisfied with the Licensee's response to the complaint, the Customer may refer the complaint to the Regulatory Authority;

If the Customer is not satisfied by the decision of the Regulatory Authority in a dispute resolved, he or she may appeal to a Competent Court of Law.

Article 45: Establishment of an appropriate avenue to make a claim

The Licensee shall create an avenue for any Customer to make a claim for loss or damage of property due to an adverse action of the Licensee in connection with the provision of the service;

Article 46: Licensee's properties

All wires, meters, transformers or other materials or equipment installed by the Licensee shall remain the property of the Licensee and shall not be tampered or interfered with directly or indirectly by the Customer or any other unauthorized persons;

Article 47: Responsibility and liability of Customers

The Customer is solely responsible for the safe use of electricity on the Customer's side of the Point of Delivery and to ensure that its premises and any equipment thereon are adequately protected.

The Customer shall be liable for any damage or loss to the property of the Licensee or other persons and injury to the Licensee employees or other persons through unauthorized tampering or interference stipulated in Article 48 of this Regulation.

Article 48: Customer education

The Licensee shall have the responsibilities of educating the Customers on issues relating to:

a. the safe use of electricity;
b. energy efficiency use;
c. the dangers of illegal connections and tampering;
d. the dangers of incompetent/unqualified persons conducting illegal/unsafe connections;
e. reconnections, modifications, repairs, etc.;
f. the use of unauthorized/unsafe devices;

g. protection against over-voltages;

h. reporting of illegal connections.

Article 49: Information to be provided to Customers with credit meter

The following information shall be provided to credit meter Customers after electricity service is provided:

a. the scheduled frequency of meter readings;

b. the method used to estimate electricity consumption during periods when no meter readings are taken;

c. the format of the electricity account;

d. the methods of payment of the account and the period allowed for payment before penalties are applied;

e. the location of payment venues and the hours of business;

f. the penalties for late payment, for non-payment and for the disconnection/reconnection process;

g. the process to initiate an account query or meter accuracy query and the fees charged for accuracy audits; and

h. the penalties applied in the case of tampering, by-passing of meters, or any other method used to procure electrical energy illegally;

Article 50: Information to be provided to Customers with prepayment meter

The Licensee shall provide every prepayment meter Customer with information listed in Article 49 of this Regulation where applicable;

The Licensee shall periodically provide the following additional information to every prepayment meter Customer:

a. the applicable tariff;

b. the location of points of sale of tokens and the hours of business;

c. the means to purchase and use the token.

Article 51: Provision of vending stations

Where practical, vending stations should be accessible to Customers through their normal course of business activities or areas frequented by the Customer such as supermarket, taxi parks etc. with acceptable service levels similar to other service providers in similar environments.

CHAPTER V: TECHNICAL QUALITY OF ELECTRICITY SUPPLY

Section One: GENERAL QUALITY OF SUPPLY STANDARDS

Article 52: Compliance with the Grid Code

The quality of electricity supply from the licensee shall comply with the provisions of the Grid Code;

Article 53: Network performance indices

The Regulatory Authority shall be responsible for determining and setting the Licensee's network performance indices as well as the format in which these are reported.

Article 54: Supply Voltage

The voltage of all networks shall be kept within ±10% of the nominal voltage.

For Low Voltage Supply, the Licensee is required to maintain nominal voltage levels at the point of delivery in accordance with the following standard nominal voltages and tolerance as specified in RS 565-1-2011 standard on Electrical Wiring of Premises:

a. 230V (±10%) –phase to neutral

b. 400V (±10%)- phase to phase

Article 55: Supply frequency

The licensed Transmission System Operator is responsible for the frequency of each licensee's distribution system and to use reasonable endeavours to maintain system frequency at 50 Hz, subject to the allowable variations specified under the Grid Code.

Article 56: Voltage Flicker

The total voltage flicker at a connection point shall not exceed:

a. ±1% of the steady voltage level, when these occur repetitively;

b. ±3% of the steady voltage level, when these occur frequently;

Article 57: Voltage Imbalance

The Licensee shall be responsible for limiting the unbalanced load drawn by its customers.

The Licensee shall ensure that its network does not contribute significantly to voltage unbalance conditions.

The acceptable or compatibility level for voltage unbalance at all voltage levels shall be set at 3% in accordance with IEC 61000-4-30.

Article 58: Voltage Harmonics and test for compliance

The compatibility levels for harmonic voltage, as a percent of the nominal voltage, shall comply with the standards provided in Appendix IV of this Regulation.

To test for compliance, the licensee shall take measurements for a period of at least one week at the delivery points, in accordance with IEC 61000-4-7.

Section 2: INTERRUPTIONS AND OUTAGES

Article 59: Service interruptions

The Licensee shall minimize electricity supply interruptions and in the case of planned interruptions, shall, except under special circumstances, ensure that Customers are given ten (10) working days notice prior to the interruption.

Article 60: Notification of planned interruptions

The Licensee shall make use of the appropriate media to inform its Customers of future major planned interruptions.

The Licensee shall be required to provide the following information:

a. the time that the interruption will occur or is planned to occur;
b. the area that will be affected;
c. the reason for the planned interruption(s);
d. the time at which it is anticipated that the supply will be restored; and
e. notification that Customers are to treat the supply as live at all times.

Article 61: Notification of unplanned interruptions

The Licensee shall make use of the appropriate media to inform its Customers of the reason for any previous major unplanned interruptions.

Article 62: Shortage of Electricity

The Licensee shall make reasonable efforts to provide a continuous supply of electricity to meet demands.
In the event that shortages occur due to Force Majeur or causes beyond the immediate control of the Licensee, the Licensee shall have to prepare a load shedding plan with a fair share of available electricity to all customers. In planning for load shedding, the Licensee shall grant preference to those services that are the most essential to the public welfare.

Article 63: Limitation of liabilities from shortages

The Licensee shall not be held liable for damages, including monetary loss or loss of business from shortages in supply of electricity; provided that the shortage has sufficient ground acceptable to the Regulatory Authority.

Article 64: Customer precautions against interruption

The Customer shall be responsible for taking whatever precautions the Customer deems appropriate to protect against interruptions of service.

Article 65: Restoration of electricity supply

When interruption occurs, the Licensee shall seek to restore electricity supply within the shortest possible time consistent with prudent operating principles in order to minimize the effects of interruption.

Each Licensee shall make reasonable provisions to meet emergencies resulting from a failure of service, and shall issue to its employees procedures to be followed in case of an emergency to prevent or mitigate the interruptions or impairment of service;

Article 66: Record of interruptions

Except for momentary interruptions lasting not more than five minutes and which do not cause a major disruption of service, each Licensee shall keep a complete record of all unplanned and planned interruptions;

The record under paragraph one of this provision shall include the following:

a. the cause of interruption ;
b. the date and duration of the interruption;
c. the approximate number of Customers affected;
d. the remedy and steps taken to prevent recurrence in cases of emergency interruptions; and
e. Any other information that may be required by the Regulatory Authority from time to time.

Article 67: Reporting of interruptions

The Licensee shall submit quarterly reports to the Regulatory Authority containing the records provided under Article 66.

Article 68: Measuring Outages

In order to measure the extent of interruptions, the Regulatory Authority shall use the industry indices provided in Appendix I of this Regulation:

SECTION 3: QUALITY OF SUPPLY STANDARDS BY GENERATION, TRANSMISSION AND DISTRIBUTION LICENSEES

Article 69: Generating Units Frequency

For synchronization purposes, the generation licensees shall ensure that the generating units are designed to provide continuous operation when the frequency changes from 50 Hz+3% to 50 Hz–5% (i.e. 47.50 Hz – 51.50 Hz).

The Regulatory Authority shall determine compliance by requesting the Transmission System Operator to submit periodic records of the number, magnitude and duration of frequency excursion events.

The Regulatory Authority shall also request information on the times that the generating units are desynchronised when the frequency is within 47.50 Hz – 51.50 Hz.

Article 70: Generation Plant Availability

The Regulatory Authority shall monitor the operating performance of the power plant based on the plant availability by determining the Plant Availability Index provided in Appendix II of this Regulation

The benchmark for assessing plant availability shall be specified by the Regulatory Authority in a separate document on Performance Monitoring and Assessment.

Article 71: Transmission System Security and Performance

The transmission system security shall be in accordance with the N-1 criterion, as specified in the EAPP Interconnection Code.

To ensure compliance, the Regulatory Authority shall use indicators provided in Appendix III of this Regulation which shall be calculated for each month and reported each year.

Article 72: Transmission System Voltage

The transmission system operating voltage shall be kept within ±10% of the nominal voltage.

To ensure compliance, the Regulatory Authority may request information on the number, magnitude and duration of voltage excursions from the Transmission System Operator. This information shall relate specifically to the number of transformer stations where the voltage level exceeded the allowable range.

Article 73: Monitoring of the Quality of Service for Distribution Licensees

The Regulatory Authority shall monitor the quality of service delivered by the distribution licensee with respect to the security of the system and effectiveness of the maintenance practices employed by the licensee.

This monitoring shall mainly focus on reducing the nuisance associated with the frequency of outages as well as the duration of the outages.

The quality of service indices provided in Appendix I as well as the distribution systems benchmark provided in Appendix VI of this Regulation shall be used to monitor the distribution licensee performance.

CHAPTER VI: ENFORCEMENT AND ADMINISTRATIVE SANCTIONS.

Section One: INVESTIGATION AND ENFORCEMENT MECHANISM

Article 74: Reporting guidelines

The licensees shall provide quarterly reports to the Authority following the guidelines provided in Appendix V of this regulation.

Article 75: Investigation of the Quality of Service

The Regulatory Authority may investigate at any time the quality of service measurement; reporting and recording procedures of a Licensee.

By doing so, the Regulatory Authority may exercise its powers of monitoring and enforcement of obligations.

Article 76: Auditing Data

The Regulatory Authority may audit some or all of the quality of service data retained by the Licensees.
The Regulatory Authority may vary the regularity and frequency of the audits, as well as the Licensees' services, parameters, reporting areas and reporting periods that require audits.

Article 77: Enforcement Action

If the Regulatory Authority realizes that the licensee has failed to comply with the Regulations, the Regulatory Authority shall send a written warning to the licensee including a deadline for correction of the alleged violation;

If any licensee, after receipt of the warning from the Regulatory Authority, does not cure the alleged non-compliance, the Regulatory Authority may open enforcement proceeding, which may consist of monetary sanctions, license suspension or revocation.

SECTION 2: ADMINISTRATIVE SANCTIONS

Article 78: Failure to comply with Quality of Service Standards

Any licensee who does not comply with the Quality of Service Standards provided in this Regulation shall be liable to an administrative fine between Five hundred thousand (500,000) and five million (5,000,000) Rwanda Francs.

Article 79: Failure to comply with reporting obligations

Any licensee who does not comply with the reporting obligation shall be liable to an administrative fine between five hundred thousand (500,000) and two million (2,000,000) Rwanda Francs.

Article 80: Hindering inspection or Audit

Any licensee who delays or intentionally hinders the Regulatory Authority inspection, investigation or audit shall be liable to an administrative fine of between five hundred thousand (500,000) and two million (2,000,000) Rwandan francs.

Article 81: Failure to comply with an enforcement notice or a regulatory directive

Any licensee that contravenes an enforcement notice or a directive of the Regulatory Authority issued for addressing a repetitive violation of any of the obligations under the provisions of this Regulation shall be liable to pay an administrative fine of between five hundred thousand (500,000) and fifteen million (15,000,000) Rwanda francs.

CHAPTER VII: FINAL PROVISIONS

Article 82: Repealing provision

All prior provisions contrary to this Regulation are hereby repealed.

Article 83: Commencement

This Regulation shall come into force on the date of signature by the Chairperson of Regulatory Board

Kigali, on the 29th March, 2016

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Eng. Coletha RUHAMYA

CHAIRPERSON OF THE REGULATORY BOARD

RWANDA UTILITIES REGULATORY AUTHORITY

Appendix One: MEASUREMENTS OF OUTAGES

To measure the extent of interruptions, the Regulatory Authority shall use the following indices:

a. $SAIFI = \frac{\text{Total Number of Customer Interruptions in a given period}}{\text{Total Number of Connected Customers}}$

b. $SAIDI = \frac{\text{Sum of the Duration of Customer Interruptions (Minutes or Hours) in a given Period}}{\text{Total Number of Connected Customers}}$

c. $CAIDI = \frac{\text{Sum of all Customer Interruption Duration}}{\text{Total Number of Customer Interruptions}}$

For the sake of transparency, the data for planned and unplanned interruptions, as well as those relating to load shedding would be separately analyzed.

For quality of service performance monitoring of outages, the Regulatory Authority shall use the following indices shown in the table Table 1 below.

Table1: Indices for Outages Performance Monitoring

Index	**Method**
SAIDI – Unplanned Interruptions	The calculation will exclude load shedding and exceptional events
SAIFI – Unplanned Interruptions	The computation will exclude load shedding and exceptional events
SAIDI – Planned Outages	Will measure the duration of planned interruptions. It will also give an indication of the effectiveness of the licensee's maintenance methods.

Appendix II: POWER PLANT AVAILABILITY INDEX

To monitor the operating based on the plant availability by determining the Plant Availability Index is calculates as follows:

$$AIP = \frac{\text{H x AC}}{\text{K X 8760 Hours}}$$

where:

AIP = Availability Index of Plant
H = Number of Hours of Annual Availability
AC = Available Capacity (MW)
K = Total Installed Capacity in MW.

Appendix III: TRANSMISSION SYSTEM AVAILABILITY INDEX

(a) The System Planned Unavailability Index (Up), giving the overall planned availability percentage for the transmission system

$$Up = \frac{\sum(CPo \text{ x } T)}{\sum C \text{ x } 720}$$

Where
Cpo : circuit experiencing a planned outage
T : duration of the outage
∑C : total number of circuits

(b) The System Unplanned Unavailability Index (Ui), giving the overall unplanned availability percentage for the transmission system:

$$Ui = \frac{\sum(Co \text{ x } T)}{\sum C \text{ x } 720}$$

Where
Co : circuit experiencing an unplanned outage
T : duration of the outage
∑C : total number of circuits

(c) The Transmission System Availability Index or Global Availability Index Ig, giving the overall percentage availability of the transmission system:

$$Ig = \frac{\sum 100 - (Ct \text{ x } T)}{\sum C \text{ x } 720}$$

Where
Ct : total circuit experiencing an interruption
T : duration of the outage
∑C : total number of circuits

The Regulatory Authority shall determine the maximum required Up, Ui and Ig indexes based on the following Industry standard:

a. Up value should vary between 2% and 8%.

b. Ui value should vary between 0.1% and 1%.

c. Ig value should be greater than 90%

Appendix IV: STANDARDS FOR VOLTAGE HARMONICS

The compatibility levels for harmonic voltage, as a percent of the nominal voltage, shall comply with the standards provided in the table 2 below:

Table 2. Standards for Voltage Harmonics

Voltage Level	Acceptable Harmonic Distortion Levels
220 kV	Total Harmonic Distortion of 1.5%, with no individual distortion exceeding 1%
110 kV	Total Harmonic Distortion of 2.5%, with no individual distortion exceeding 1.5%
MV	Total Harmonic Distortion of 5%, with no individual distortion exceeding 3.0 %
LV	Total Harmonic Distortion of 8%, with no individual distortion exceeding 3.0 %

Appendix V: REPORTING GUIDELINES FOR SUBMISSION OF QUALITY OF SERVICE REPORT BY LICENSEES

1. Introduction

The Quality of Service Reporting Guidelines presented below is to ensure consistency and transparency in the reporting of licensees' quality of service performance to the Regulatory Authority.

The licensees shall provide quarterly reports to the Authority indicating their actual performance against the Quality of Service (QoS) Standards defined in this Regulation.

The Regulatory Authority shall then prepare and publish an Annual Report on licensees' overall performance against the quality of service standards as defined in the Quality of Service Regulations, as well as the Key Performance Indicators, as described in the Performance Assessment, Evaluation and Monitoring document.

2. General Structure of the Quality of Service Report

The QoS Report shall be structured to cover the following main dimensions of quality of service in the electricity sector:

Part 1: Technical Quality of Electricity

Part 2: Continuity of Supply

Part 3: Quality of Supply from Licensees

Part 4: Quality of Service to Consumers (i.e. Commercial Quality of Electricity)

Part 5: Conclusions and General Observations

3. Key Issues to be Covered

3.1. Technical Quality of Electricity

This section of the report shall cover the following technical characteristics of electricity.

Technical Characteristics	Monitoring Voltage
Power Frequency	HV, MV, LV
Supply Voltage Variations	HV, MV, LV
Voltage Unbalance	HV, MV, LV
Harmonic Voltages	HV, MV
Voltage Dips	HV, MV, LV
Voltage Swells	HV, MV, LV

In order to ensure that the data for technical quality (i.e. voltage quality) can be robustly measured, the licensees must install the necessary monitoring systems at the following locations:

- Transfer points between transmission and distribution systems;
- Delivery points at HV;

- Substation output voltage, HV/MV;
- Delivery points MV;
- Substation output voltage MV/LV;
- Delivery points LV.

3.2. Quality of Supply from Distribution System: Continuity of Supply

The distribution licensee is be required to report on Continuity of Electricity Supply, and to ensure effective regulatory monitoring of performance, Appendix One of this Regulation have identified and defined the types of continuity indices or indicators which shall be used for reporting. For reporting purposes, all the continuity indices shall be calculated for long interruptions (i.e. Time > 3 minutes), by using the following indices.

Indicator	Type of Monitoring	Monitoring Voltage
SAIDI	Planned and Unplanned	HV, MV, LV
SAIFI	Planned and Unplanned	HV, MV, LV
CAIDI	Planned and Unplanned	HV, MV, LV

In order to calculate SAIDI and SAIFI, the licensee must know the number of consumers interrupted by each incident. In the event that the licensee is unable to quantify the number of affected consumers, the following indices which depend on the amount of rated power interrupted by each incident can be used. The rated power is usually the rating of a distribution transformer, the contracted power of an MV or HV consumer or the transformer at a delivery point.

Indicator	Type of Monitoring	Monitoring Voltage
ASIDI	Planned and Unplanned	HV, MV, LV
ASIFI	Planned and Unplanned	HV, MV, LV
CAIFI	Planned and Unplanned	HV, MV, LV

Notes:

I. **ASIDI: Average System Interruption Duration Index:**
It measures the average duration of an interruption, weighted by the rated or contracted Power, and expressed as number of interruptions per year.

It is calculated as: $ASIDI = \Sigma L_i * r_i / L_T$

Where:

L_i = Rated or contracted power interrupted by each incident

L_T = Total rated or contracted power.

r_i= Restoration for each incident.

II. ASIFI: Average System Interruption Frequency Index

It gives the number of interruptions weighted by the rated or contracted power.It is Mathematically defined as:

$$ASIFI = \Sigma L_i / L_T$$

Where:

L_i = Rated or contracted power interrupted by each incident

L_T = Total rated or contracted power.

III. CAIFI: The Consumer Average Interruption Frequency Index.

It measures the average number of long interruptions**,** during a given year. It is expressed as interruptions per consumer per year and mathematically defined as:

$$CAIFI = \Sigma N_i / CN$$

where:

CN = Total number of consumers which experienced at least one interruption during the reporting period

3.3. Quality of Supply from Licensees

Since power quality can be affected by power producers, the network users and consumers, it is important that the all licensees report on their actual performance, using the following indicators:

Generation Licensee

a. ***Generation Frequency***: Magnitude and duration when generating units are de-synchronized if frequency is still within the frequency range of 47.50 Hz – 51.5 Hz.
b. ***Plant Availability*** (per power plant)

Transmission Licensee

a. Transmission System Planned Availability Index (per month)
b. Transmission System Unplanned Availability Index (per month)
c. Overall or Global Transmission System Availability Index (per month)

Distribution & Sale Licensee

The QoS performance report shall cover SAIDI, SAIFI and CAIDI as indicated above in section 3.2. In the absence of robust data on the number of consumers affected by each incident or interruption, the licensee shall report on the following indicators: ASIDI, ASIFI and CAIFI.

4. Quality of Service to Consumers (Commercial Quality of Electricity Supply)

The distribution licensee is also required to report on the quality of Consumer Services provided to electricity consumers. In that regard, the following indicators shall be used for the reporting.

	Commercial Quality Indicator	**Standard**
1.	Connection	• Time of response to consumer request for new connections • Time for cost estimation or issuing of quotation/invoice • Time for connection or speed of connection • Time for signing contract and/or commencement of supply.
2.	Consumer Care	• Punctuality of appointment with consumers • Response time to consumer complaints in writing • Response time to queries on disputed bills and account queries.
3.	Technical Service	• Response time to voltage complaint • Advance time for information on planned interruption • Response time to meter queries
4.	Metering and Billing	• Time given to consumer for notice-to-pay until disconnection • Time taken for reconnection or restoration of power due to non-payment, after payment is made • Number of meter readings per quarter

Appendix VI: DISTRIBUTION SYSTEM BENCHMARKS

Indicator	**Low Standard**	**High Standard**
SAIDI (excludes load shedding and exceptional events):		
Duration of unplanned or forced interruptions per customer, per year	12 Hours	8 Hours
Duration of planned outages or interruptions per customer, per year	5 Hours	1 Hour
SAIFI (excludes load shedding and exceptional events):		
Frequency or number of unplanned or forced interruptions per customer, per year	15 Times	11 Times
Frequency or number of planned interruptions per customer, per year	10 Times	5 Times

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Eng. Coletha RUHAMYA

CHAIRPERSON OF THE REGULATORY BOARD

RWANDA UTILITIES REGULATORY AUTHORITY