



# **DISTRIBUTION AND RETAIL SUPPLY PERFORMANCE STANDARDS CODE**

## **Electricity Regulatory Commission**

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## GLOSSARY AND DEFINITIONS

Any word or expression defined in the General Electricity Law or the Grid Code or the Distribution Code and that is not defined otherwise in this Performance Standards shall have, unless the contrary intention appears, the same meaning and interpretation when used in this Performance Standards, including its Annexes.

When applying the provisions contained in this Performance Standards, and unless otherwise specified or the subject matter or context otherwise requires or is inconsistent therewith, the following words and expressions shall have the following meaning:

- **Annex** means an annex of this Performance Standards.
- **Business Day** means any day other than Friday, Saturday or a public holiday in Jordan, when commercial banks are open for business in Jordan.
- **Changes to the Existing Distribution System** (in the Consumer Service Quality Standards) means any extension or upgrade of the Distribution System in service at the moment any application for connection is received, either in MV or LV, other than the trench of overhead line or underground cable required to actually connect the Consumer internal installation with the Distribution Network.
- **Commercial Office** means an office of the Distributor, either managed by itself or a contracted third party, where a Customer can at pay the invoiced bills, rise a complain or ask for general information, including the required requisites to apply for a connection.
- **Condition** means a condition in this Performance Standards.
- **Connection Point** means the point of connection of the Consumer's system or equipment to the Distribution System.
- **Consumer** means a natural or juridical person or entity connected to the Distribution System, supplied and purchasing electric power for its own needs under a contract with a Distributor.
- **Consumer Services** means the day-to-day transactions between a Distributor and its Consumers, including metering, payment of bills, application for connection, and Consumer complaints. It also includes any activity that the Distributor does to add value or efficiency to these transactions.
- **Consumer Service Standards** means a list of Consumer Services indicators that measure how effectively a Distributor conducts its day-to-day transactions with its Consumers. Consumer Service Standards are intended to ensure Consumer satisfaction.
- **Control Area** means a definite portion within the Distribution System where the Distributor shall keep control in order to determine the Interruptions caused to Customers and to calculate the prescribed Indicators accordingly.



- **Control Phase** has the meaning defined in the Distribution Performance Standards
- **Connection Cost By-law** means the “Cost of Service By Law” put into force according to article 31 and 32 of the Electricity Law No. 16 of 1986.
- **Distribution Code** means the code issued by the ERC and reviewed from time to time by the Distributors with the approval of ERC.
- **Distribution Performance Standards** means Part 1 of the Performance Standards Code.
- **Distribution System** means a system consisting of cables, overhead lines, electrical plant and apparatus, having a design voltage of 33 kV or lower, used for the distribution of electric power from interconnection points of the transmission system with the distribution system to the point of delivery to Consumers or connection of Users, but shall not include any part of a transmission system.
- **Distributor** means a holder of a distribution licence or concession.
- **Electric System** means the system consisting of power stations, the transmission system, the distribution system, and control centres and required equipments for their operation.
- **Embedded Generation** means a generating unit that is connected to the distribution system, and not to the transmission system, and that does not have an impact on the operation of the transmission system in the manner specified in the Grid Code.
- **Emergency Maintenance Interruption** means a Consumers Interruption decided by the Distributor to perform maintenance or other operations that do not follow the procedures established in this Performance Standards to be considered Scheduled Interruptions.
- **Energy** means, unless otherwise qualified, active energy.
- **ERC** means the Electricity Sector Regulatory Commission constituted under the General Electricity Law.
- **Emergency Condition in a Distribution System** means a condition when a contingency or unexpected circumstances produces an Interruption to more than 6 % of the number of Consumers of the Distributor, or when two or more transformers HV/MV are simultaneously disconnected, or when there are contingencies that disconnect more than 200 MV/LV transformers.
- **External Interruption** (In the Distribution Performance Standards) means a scheduled or unscheduled Interruption, due to generation shortage or transmission congestion or having its origin in facilities owned and operated by other licensees or by generation not owned by the Distributor.
- **Force Majeure** means any circumstance not within the reasonable control of the affected party, but only if and to the extent that (i) such circumstance, despite the exercise of reasonable diligence and observing prudent industry practice, cannot be, or be caused to be, prevented, avoided or removed by such party, and (ii) such circumstance materially and adversely affects the ability of the affected party to comply with its performance



obligations under this Performance Standards, and such party has taken all reasonable precautions, due care and reasonable alternative measures in order to avoid the effect of such event on the affected party's ability to perform its obligations under its performance obligations under this Performance Standards and to mitigate the consequences thereof.

- **Force Majeure Interruption** means an Interruption caused by exceptional and unpredictable events that are not under the affected party control, provided it has taken all possible actions to eliminate or mitigate the problem. In order for an Interruption to be classified as Force Majeure the affected party shall request and the ERC will issue an explicit authorisation to that party.
- **General Electricity Law** means the General Electricity Law No. 64 of the Year 2002 or any amendments thereto or any other law that replaces the said law.
- **Generators Connected to Distribution** means any generator connected to the Distribution System, including embedded generators.
- **Harmonics** means sinusoidal voltages and currents having frequencies that are integral multiples of the fundamental frequency.
- **High Voltage (HV):** means a voltage level exceeding 33 kV.
- **Individual Performance Indicator** means a Performance Indicator to measure the performance of the service provided by a Distributor to an individual Consumer.
- **Interruption** means the interruption of electricity supply to a Consumer or to a group of Consumers or to other facilities.
- **Interruption Duration** means the period from the initiation of an Interruption up to the time when supply is restored.
- **Load** means an entity or electrical equipment that consumes Energy.
- **Long Duration Voltage Variation** means a variation of the RMS value of the voltage from nominal voltage for a time greater than one minute.
- **Low Voltage (LV)** means a voltage level not exceeding 1000 volts.
- **Medium Voltage (MV)** means a voltage level greater than one (1) kV up to 33 kV.
- **Nominal Voltage** (of a Distribution System) means the voltage that characterizes or identifies the network and to which it is referred for some functioning characteristics. Nominal Voltages for different levels are defined in the Distribution Code.
- **Normal Condition** means the condition in the Transmission or Distribution System, as applicable, when the system frequency, voltage, and transmission and/or distribution lines and equipment loading are within their normal operation limits.
- **Overall Performance Indicator** means a Performance Indicator to measure the performance of a Generation, Transmission, Distribution or System Operator Licensee.



- **Performance Indicator** (In the Distribution Performance Standards) means a parameter (measured or calculated) that is related to service continuity, voltage wave or the commercial relationship between the Distributor and its Consumers.
- **Performance Standard** means the Distribution Performance Standards Code.
- **Power quality** means the quality of the voltage, including its frequency and the resulting current that exists at the connection point during normal conditions.
- **RMS** means the root-mean-square.
- **Rural Consumer** means a Consumer that is located in a village with less than 3.500 distribution connections or a Consumer not located in a town or village (dispersed Consumers).
- **Rural Distribution Transformer** means a MV/LV transformer that feeds mainly Rural Consumers
- **SCADA** means Supervisory Control and Data Acquisition
- **Scheduled Interruptions** means an Interruption to a Consumer decided by the Distributor. An Interruption will be considered scheduled if it has been advertised to the affected Consumers at least 72 hours in advance. When a Distributor considered that to comply with the above mentioned period will causes major problems, and/or imposes important over costs, it may request to the ERC, with adequate supporting documentation, to authorise a reduction of the advertising period to 48 hours in advance.
- **Section** means a section of this Performance Standards.
- **System Loss** (In the Distribution Performance Standards) means in a Distribution System, the difference between the Energy purchased and/or generated by the Distributor and the Energy sold by the Distributor.
- **System Operator** means the holder of the licence that authorises system operation granted under Articles 28 and 34 of the General Electricity Law.
- **Tariff Methodology** means the principles for tariff calculation and review, approved by the ERC and applicable to the Distributor and modified from time to time by the ERC, in accordance to article 9 B and 47 of the General Electricity Law;
- **Tariff Review Period** means the period of time for which the ERC will set tariffs for a Distributor, as established in the Tariff Methodology.
- **Temporary Interruption** during Control Phase 1 and the first two years of Control Phase 2, means a Consumer Interruption that lasts less than 5 minutes. Otherwise, it means a Customer Interruption that last less than 3 minutes.
- **Third Party Interruption:** means an unscheduled Interruption having its origin in an unexpected action of any person (except of another Licensee) that has as a consequence the outage of one or more facilities of the Distribution System owned by the Distributor.



- **Total Affected kVA** (in case of an Interruption) means the sum of total installed kVA capacity in MV/LV transformers of the Distributor, affected by the Interruption, plus the sum of total contracted power of MV Consumers.
- **Transmission Licensee** means the holder of the transmission licence granted under Articles 28 and 33 of the General Electricity Law, and that during the single buyer model is also the system operation licensee and the single bulk supply licensee.
- **Unscheduled Interruption** (forced) means an Interruption that does not qualify as temporary, third party, external or scheduled, regardless of the cause and duration.
- **Urban Consumer** means a Consumer that does not qualify as Rural Consumer.
- **Urban Distribution Transformer** means a MV/LV transformer that feeds mainly Urban Consumers
- **User** (In the Distribution Performance Standards) means a person or entity that uses the Distribution System and related distribution facilities, including generation connected to distribution and Consumers.
- **Voltage Variation** means the deviation of the RMS value of the voltage from its nominal value, expressed in percent (percentage). Voltage Variation will either be of short or long duration.
- **Voltage Level** means the average value of RMS value of the voltage, measured at the connection point, during a continuous 15 minutes period.



## **PART 1: DISTRIBUTION PERFORMANCE STANDARDS**

### **1. SECTION: GENERAL CONDITIONS**

#### **1.1. INTRODUCTION AND PURPOSE**

1.1.1. This Part of the Performance Standards Code (Distribution Performance Standards) establishes the rules, procedures, requirements and indicators for the technical and operational performance of the Distribution System and for the commercial performance of the retail business.

#### **1.2. APPLICABILITY**

1.2.1. This Distribution Performance Standards must be applied and used together with the Distribution Code, when such code is approved by the ERC.

1.2.2. This Distribution Performance Standards applies to:

- (a) Distributors,
- (b) Generation connected to the Distribution System, and
- (c) Consumers

#### **1.3. OBJECTIVES**

1.3.1. The objectives of this Distribution Performance Standards are:

- (a) To ensure the quality of electric power in the Distribution System;
- (b) To ensure that the Distribution System will be operated in a safe and efficient manner and with a high degree of reliability
- (c) To specify Consumer Services for the protection of the Consumer; and
- (d) To ensure that the voltage at the connection point of a Consumer or User is adequate for the normal operation of equipments and appliances.

#### **1.4. CONFIDENTIALITY**

Unless otherwise specifically stated in this Performance Standards, the ERC shall be at liberty to publish the Performance Indicators, and performance results of each Distributor or Licensee to whom this Performance Standards applies.

### **2. SECTION: SUPPLY QUALITY STANDARDS**

#### **2.1. RURAL AND URBAN CUSTOMERS**

2.1.1. Customers of the Distributor shall be classified either as Urban Customers or Rural Customers, according with the definition stated in the Glossary and Definitions.

2.1.2. When a Distributor considered that, due to topological reasons and/or scattering of population on a specific town or village, although with more than 3,500 distribution

Consumers, it should be considered as a rural area, it should rise the issue to the ERC, together with adequate supporting documentation, including maps, planes or drawings as considered suitable, and asking for an authorisation to consider these Consumers as Rural Consumers.

2.1.3. The ERC will evaluate the submitted documentation, conduct independent analysis or studies that can include meetings or hearings with the involved Customers and/or representative institutions. Based on this analysis or studies the ERC may grant an authorisation for this specific town or village, or part of town or village to be considered as rural, and the Consumers located in that zone to be considered as Rural Consumers.

2.1.4. When a Distributor considered that a specific town or village, due to location of the population in it, should be considered as two or more separate towns or villages, it should rise the issue to the ERC, together with adequate supporting documentation, including maps, planes or drawings as considered suitable, and asking for an authorisation to consider this town or village to be split into two or more town or villages.

2.1.5. The ERC will evaluate the submitted documentation, conduct independent analysis or studies that can include meetings or hearings with the involved Consumers and/or representative institutions. Based on this analysis or studies the ERC may grant an authorisation for this specific town or village to be split into two or more towns or villages. The Distributor should categorise the involved Consumers accordingly.

2.1.6. The ERC can revise, from time to time, the authorisations granted under 2.1.3 and/or 2.1.5. and ask the Distributors for updated information. If it is considered that the situation has substantially changed, the ERC can revoke the granted authorisation. The Distributor shall re-categorise the involved Consumers accordingly.

## **2.2. TYPES OF INTERRUPTIONS**

2.2.1. Supply quality will be expressed as a function of the Interruptions to Consumers, and supply quality will be evaluated using indicators that measure the number of Interruptions and their duration

2.2.2. Interruptions will be classified according to type and origin as:

- (a) Scheduled Interruptions
- (b) Unscheduled Interruptions
- (c) External Interruptions (both scheduled and unscheduled) , and
- (d) Third Party Interruptions

2.2.3. Interruptions will also be classified according to the affected Consumer as:

- (a) Interruptions to Rural Consumers, and
- (b) Interruptions to Urban Consumers

## **2.3. INTERRUPTION REGISTER**

2.3.1. Each Distributor is obliged to have a detailed chronological register of all Interruptions caused to their Consumers, with clear identification of starting and ending date



and time. The information in this register shall be maintained by the Distributor during at least five (5) calendar years

2.3.2. An Interruption starting time in the register shall be:

- (a) For a Scheduled Interruption, the initiation of the manoeuvring,
- (b) For an Unscheduled Interruption,
  - (i) The time the SCADA system detects and reports as the disconnection of equipments, or
  - (ii) The time when the first Consumer complaint call was received by the Distributor regarding the Interruption, or
  - (iii) The time the Distributor has knowledge of the situation by any other means, whichever occurs first.

2.3.3. In the register the ending date and time of an Interruption shall be the time when the Consumer was reconnected to the Distribution System.

2.3.4. To ensure adequate timing of Consumer complaints upon an Interruption, the Distributor shall assure the availability of sufficient telephone lines and operators to attend Consumers' incoming complaint calls.

2.3.5. The Distributor shall implement a system and procedures to ensure time uniformity among all the offices and locations that are involved in assigning times to the Interruptions.

## **2.4. SPECIAL CASES**

2.4.1. The following Interruptions will not be considered for the calculation of supply quality indicators:

- (a) Temporary Interruptions
- (b) Force Majeure Interruptions
- (c) Interruptions due to authorised disconnection of a Consumers due to non payment
- (d) Interruptions due to disconnection for illegal abstraction of electricity or metering tampering

2.4.2. For the calculation of the supply quality Performance Indicators,

- (a) Emergency Maintenance Interruptions shall be considered Unscheduled Interruptions; and
- (b) When, due to protection malfunctioning, a fault in a facility owned by a Distributor is not correctly cleared by equipment under the responsibility of the Transmission Licensee or of another Distributor, all Interruptions to Consumers of the Distributor in excess of those strictly necessary will be classified as External Interruptions.

2.4.3. The Interruptions affecting a Consumer whose facilities are the source of the event will not be considered for the calculation of supply quality of such Consumer. When such Interruption causes also an Interruption to another Consumer, the Interruption to the other Consumers will be classified as Unscheduled Interruption for the calculation of Performance Indicators.

## 2.5. PERFORMANCE INDICATORS

2.5.1. The same type of Performance Indicators will be applicable to all Distributors.

2.5.2. Supply quality of each Distributor will be assessed thorough two types of Performance Indicators:

- (a) Individual Performance Indicators
- (b) Overall Performance Indicators

2.5.3. The Individual Performance Indicators to measure supply quality of each individual Consumer will be:

- (a) Total number of Scheduled Interruptions per calendar year ( $N_s$ )
- (b) Total number of Unscheduled Interruptions per calendar year ( $N_u$ )
- (c) Total number of External Interruptions per calendar year ( $N_e$ )
- (d) Total duration of Scheduled Interruptions per calendar year ( $D_s$ )
- (e) Total duration of Unscheduled Interruptions per calendar year ( $D_u$ )
- (f) Total duration of External Interruptions per calendar year ( $D_e$ )

2.5.4. The Overall Performance Indicators to measure average supply quality of a Distributor will be the following:

- (a) **Average frequency of Interruptions per nominal installed kVA (AFIK):** the number of times that the average kVA had an Interruption during a pre-specified period.
- (b) **Total time of Interruption per nominal installed kVA (TTIK):** the total time during a pre-specified period which the average kVA has been interrupted.
- (c) **System average Interruption duration indicator (SAIDI):** the total time an average Consumer has been interrupted during a pre-specified period.
- (d) **System average Interruption frequency indicator (SAIFI):** the number of times an average Consumer has been out of service during a pre-specified period.
- (e) **Expected Energy not supplied (EENS):** an estimation of the Energy not supplied to Consumers due to the Interruptions during a pre-specified period..
- (f) **System average momentary Interruptions frequency indicator (MAIFI):** the total number of times an average Consumer has experienced an Interruption during a pre-specified period.

2.5.5. Except for MAIFI, all these Performance Indicators will be calculated differentiated:



- (a) for Scheduled Interruptions, Unscheduled Interruptions, External Interruptions, and Third Party interruptions; and
- (b) for Rural Consumers and for Urban Consumers.

2.5.6. The calculation of the Overall Performance Indicators will be done by the Distributor on a monthly and yearly basis. When calculated on a yearly basis, the pre-specified period mentioned above shall be considered as a calendar year. When calculated on a monthly basis the pre-specified period shall be considered from the beginning of the calendar year up to the month the Overall Performance Indicator is calculated.

2.5.7. The detailed description and mathematical formulation of overall Performance Indicators are established in Annex 1.

## **2.6. TOLERANCE OF PERFORMANCE INDICATORS**

2.6.1. The ERC will assign the numerical values for the tolerances of each Performance Indicator for each Distributor taking into consideration the characteristics of its Distribution System and load dispersion in the area of supply.

2.6.2. The tolerances for the Performance Indicators of a Distributor shall be approved by the ERC in each Tariff Review Period and may be different for each calendar year during such period.

## **2.7. CONTROL PHASES**

2.7.1. The implementation of the Performance Indicators and this Distribution Performance Standards shall be done in three consecutive Control Phases.

2.7.2. The first Control Phase shall be called Control Phase 1 or adaptation Control Phase, and will have duration of nine (9) months, after the ERC approval of this Distribution Performance Standards or the granting of a distribution and retail supply licence that includes Performance Indicators in accordance with this Distribution Performance Standards. During Control Phase 1 the Distributor will have the following obligations:

- (a) Provide the ERC monthly the numerical values resulting from the calculation of SAIDI, SAIFI and EENS Performance Indicators. In calculating these indicators:
  - (i) The Control Area will extend from the interconnection with the Transmission Licensee, Generators Connected to Distribution or any other Distributor, to the terminals in the low voltage side to the MV/LV transformers and/or the Connection Point of every MV Customer.
  - (ii) The Consumers connected to each MV/LV transformers will be estimated by the Distributor, based on the size of the transformer and/or the load connected.
  - (iii) The Energy Not Supplied for each interruption will be the best estimation made by the Distributor based on the available measurements and/or its knowledge of the system and the moment the interruption took place
  - (iv) Indicators will be calculated for the whole system, without discrimination between Rural and Urban Consumers.



- (b) Develop, organise and maintain data bases, internal procedures and information systems to properly calculate the Overall Performance Indicators as defined in paragraph 2.5.4 of Condition “Performance Indicators” in this Distribution Performance Standards

2.7.3. The second Control Phase shall be called Control Phase 2, and will initiate at the end of Phase 1 with a duration of thirty (30) months.

2.7.4. During Control Phase 2, the Distributor will have the following obligations:

- (a) Calculate and send to the ERC the Overall Performance Indicators as defined and established in this Distribution Performance Standards. In calculating these indicators:
  - (i) The Control Area will extend from the interconnection with the Transmission Licensee, Generators Connected to Distribution or any other Distributor, to the terminals in the low voltage side to the MV/LV transformers and/or the Connection Point of every MV Customer.
  - (ii) The Consumers connected to each MV/LV transformers will be estimated by the Distributor, based on the size of the transformer and/or the load connected.
  - (iii) The Energy Not Supplied for each interruption will be the best estimation made by the Distributor based on the available measurements and/or its knowledge of the system and the moment the interruption took place.
- (b) Plan, maintain, manage and operate the Distribution System and retail business in order to comply with the Overall Performance Indicators within the tolerances approved by the ERC.
- (c) Develop, organise and maintain internal procedures, data bases and information systems to properly register and calculate the Individual Performance Indicators as defined in paragraph 2.5.3 of Condition “Performance Indicators” of this Distribution Performance Standards.

2.7.5. The Final Control Phase will begin at the end of Control Phase 2.

2.7.6. During the Final Control, the Control Area will comprise the whole Distribution System, including the LV networks.

2.7.7. During this period, the Distributor will have the following obligations:

- (a) Calculate and send to the ERC the Overall Performance Indicators and Individual Performance Indicators as defined and established in this Distribution Performance Standards.
- (b) Plan, maintain and operate the distribution system and retail business in order to comply with the Overall Performance Indicators and the Individual Performance Indicators within the tolerances approved by the ERC.

2.7.8. Upon a specific request by the Distributor, the ERC will have the right to extend the duration of either Control Phase 1 and/or Control Phase 2. The Distributor shall rise the request for that extension at least 3 months in advance to the starting of Control Phase 2 or



Control Phase 3 as appropriate, and with adequate supporting documentation that proves its endeavour to adapt itself to the requirements of the next Phase of this Performance Standards.

## **2.8. PROCEDURES AND INFORMATION SYSTEM**

2.8.1. Before the end of Control Phase 1, the Distributor shall prepare and submit a report to the ERC for approval, containing adequate documentation regarding internal procedures, data bases and information systems to be implemented in order to control supply quality and calculate Performance Indicators in accordance with this Distribution Performance Standards.

2.8.2. To comply with the previous paragraph, the Distributor shall implement the necessary procedures and systems, including among others the following:

- (a) Procedures and systems to identify and register all the Interruptions to Consumers that occur in its Control Area of the Distribution System.
- (b) Procedures and systems to classify the Interruptions to Consumers according to this Distribution Performance Standards
- (c) Following an Interruption affecting more than one Consumer, procedures and systems to determine the duration of the Interruption for each Consumer or group of Customers.

2.8.3. To comply with paragraph 2.8.1, the Distributor shall implement the necessary data bases and information systems including, among others, the following information:

- (a) Consumer data base with the information to identify all the components of the associated supply network chain, including:
  - (i) Consumer identification (number)
  - (ii) LV feeder and branch number to which the Consumer is connected
  - (iii) MV/LV transformer number to which the above mentioned feeder is connected, with adequate classification in Rural or Urban transformer.
  - (iv) MV/MV or HV/MV substation which feeds the above mentioned transformer
  - (v) HV network that feeds the substation
- (b) Interruption data bases with all the information regarding each Interruption that occurs in the area of supply of the Distributor, including among others for each Interruption the following information:
  - (i) Date and hour when the Interruption started
  - (ii) Identification of the section or sections of the Distribution System affected by the Interruption
  - (iii) Identification of the cause of the Interruption (scheduled, unscheduled, third party or external)
  - (iv) Equipment left out of service by the Interruption
  - (v) Quantity of Consumers affected by the Interruption



- (vi) Date and hour when the Interruption ended. If the reposition is done in phases, the duration shall be different for each group of Consumers.

2.8.4. The Distributor shall implement an information system to control supply quality and Performance Indicators, as defined in this Distribution Performance Standards, that has the following capabilities:

- (a) Adequately connect the above mentioned data bases, in order to clearly identify all the Consumers affected by each Interruption that occurs in the Distribution System
- (b) Make all necessary processes and calculation to determine all values and calculate Overall Performance Indicators as established in this Distribution Performance Standards.
- (c) After the initiation of the Final Control Phase, make all necessary processes and calculation to determine supply quality and calculate Individual Performance Indicators for each Consumer

2.8.5. After the approval by the ERC of the procedures, data bases structures and information system any modification to any of such procedures, data bases structures or information system, either in their structure or in their functions, shall be communicated to the ERC. The Distributor shall prepare and submit to the ERC a report describing and documenting the modification and their justification. The ERC can reject the modification if it is considered that these changes can affect the quality or adequacy of the indicators defined in this Performance Standards. In this case, the Distributor shall not implement the proposed changes, or to take back the implementation if already done.

## 2.9. MONITORING AND CONTROL

2.9.1. The ERC will have the right and the Distributor shall allow the ERC or its authorised representatives to inspect and revise the data bases and information system defined in Condition “Information System” of this Distribution Performance Standards, in order for the ERC to audit the process, data and the accuracy of the information submitted periodically by the Distributor to the ERC. The ERC will have the right to hire qualified companies or persons to perform this activity on its behalf.

2.9.2. With the purpose of carrying out suitable control and monitoring of the obligations regarding supply quality and associated Performance Indicators, the Distributor shall submit to the ERC, in a suitable organized manner or in such format as the ERC may establish the following monthly information:

- (a) During Control Phase 1, Control Phase 2 and the Final Control Phase:
  - (i) List of the Interruptions that occurred in the Medium Voltage system of the Distribution System (including MV/LV transformers), identifying for each Interruption:
    - a.i.1) Affected feeder or feeders
    - a.i.2) Total time to reconnect the affected Customers.
  - (ii) List of Force Majeure Interruptions, including the reports and/or documents that support that the Interruption qualifies as Force Majeure.



- (iii) Overall Performance Indicators as calculated until that month of the calendar year, as established in this Distribution Performance Standards.

The ERC will issue directives regarding the format in which the above mentioned information will be supplied.

- (b) Additionally, during Control Phase 2 and the Final Control Phase:
- (i) List of the Interruptions that occurred in the Medium Voltage system of the Distribution System (including MV/LV transformers), identifying for each Interruption:
- b.i.1) Affected feeder or feeders
  - b.i.2) Total number of MV/LV transformers affected, with Urban / Rural discrimination.
  - b.i.3) Total number of MV Customers affected, with Urban / Rural discrimination
  - b.i.4) Total kVA affected with Urban / Rural discrimination.
  - b.i.5) Time to reconnect the affected Customers. In the case that the Customers affected are reconnected in different groups or phases, a list of kVA affected – Time to reconnect.
  - b.i.6) Total amount of energy sold to Rural Consumers and to Urban Consumers, with Urban / Rural discrimination.

The ERC will issue directives regarding the format in which the above mentioned information will be supplied.

2.9.3. Additional to the monthly information established in the previous paragraph, every six months on the months of [January] and [July], the Distributor shall submit to the ERC, in a suitable organized manner or in such format as the ERC may establish, the following information:

- (a) During Control Phase 2 and the Final Control Phase: List of actions to be undertaken by the Distributor to improve supply quality to those Consumers with quality below the Performance Indicators tolerance

2.9.4. During Final Control Phase, in addition to the information established in 2.9.2 and 2.9.3, the Distributor shall supply the ERC in an electronic format, a file with a list of interruptions occasioned to each Customer. The ERC will issue directives with the format in which the above mentioned information will be supplied.

2.9.5. In case of an Emergency Condition in a Distribution System, the affected Distributor shall,

- (a) not later than eight (8) hours after the beginning of the emergency, submit to the ERC by fax or electronic mail, information with preliminary analysis of the incident;
- (b) following the information submitted in accordance to (a) and up to the moment all Consumers are reconnected and/or the Distribution System is restored, at least every eight (8) hours submit to the ERC (by fax or electronic

mail) an update regarding the number of MV circuits and Consumers affected by the emergency;

- (c) once the emergency has ended and not later than five (5) Business Days after the end of the emergency, submit to the ERC a detailed report of the event, its consequences and any remedial action to avoid or mitigate a similar incident in the future.

2.9.6. The ERC shall have the right to request additional information as necessary to perform its monitoring and control role, and the Distributor shall allow the access to the primary documentation and/or send the necessary data regarding supply quality as requested by the ERC. The deadline to submit this additional information shall be not less than seven (7) Business Days from the date of receipt of the request by the Distributor.

## **2.10. NON COMPLIANCE WITH AUTHORISED TOLERANCES**

2.10.1. During Control Phase 1, the ERC will not establish tolerances for the Performance Indicators. The Distributor shall calculate the Overall Performance Indicators and submit to the ERC the information established in this Distribution Performance Standards in order for the ERC to evaluate the performance of the Distributor.

2.10.2. During Control Phase 2, the ERC will establish tolerance values for the Overall Performance Indicators of the Distributor, but any deviation by the Distributor to such targets will not have a direct economic impact on the Distributor's revenues.

2.10.3. During Control Phase 2, if the Distributor fails to perform in one or more of the Overall Performance Indicators established in this Performance Standard, not later than ninety (90) calendar days after an Overall Performance Indicator fails to comply with the authorised tolerance, the Distributor shall submit to the ERC for approval a detailed report with an action plan to solve or mitigate the deficiency, subject to that the duration of such plan shall in no case exceed two years. The report shall include, among others, the following:

- (a) Analysis of the causes of the deficiencies in quality
- (b) Description of the current situation and the detected deficiency
- (c) Description of electrical equipment which contribute in a large extent to the non-compliance
- (d) Remedial actions to correct the situation, including immediate and medium term actions and maintenance) and expected improvements
- (e) Detailed work-plan with the proposed actions and required investments,

2.10.4. When the Distributor submits during Control Phase 2 a report in accordance to the previous paragraph, the ERC will review the proposed plan and may request clarifications or modifications prior to approval. Once approved, the plan will be binding to the Distributor and the ERC shall have the right to monitor and audit its effective execution. During the plan, for the implementation of the remedial actions, the ERC will have the right to exempt the Distributor from compliance with the affected Overall Performance Indicators, and/or to modify the tolerances in accordance with the approved plan.

2.10.5. In addition to the obligations established in Control Phase 2, during the Final Control Phase the Distributor shall comply with the tolerance defined by the ERC for the



Overall Performance Indicators and the Individual Performance Indicators for each Consumer. If the Distributor fails to comply with the tolerance of any of such Performance Indicators, it will be considered as a lack of efficiency, that will be translated in an economic impact in its allowed revenues, such that:

- (a) The economic value of the non compliance with the tolerances will be calculated yearly, according to the methodology in Annex 2;
- (b) This economic value will be considered as reductions in the revenue requirements in the calculation of tariffs the succeeding years, as established in the Tariff Methodology

### 3. SECTION: POWER QUALITY STANDARDS

#### 3.1. DEFINITION

3.1.1. A Power Quality problem exists when at least one of the following conditions is present:

- (a) The System Frequency has deviated from the nominal value of 50 Hz;
- (b) Voltage magnitudes are outside their allowed range of variation;
- (c) There are imbalances in the magnitude of the phase voltages;
- (d) The phase displacement between the voltages is not equal to 120 degrees;
- (e) Voltage fluctuations cause by:
  - (i) Flicker that is outside the allowed flicker severity limits; or
  - (ii) Harmonics that are outside the allowed values; or
  - (iii) High frequency over voltages.

#### 3.2. FREQUENCY STANDARDS

3.2.1. The nominal fundamental frequency shall be 50 Hz.

3.2.2. Although frequency deviations will not be a controlled indicator under this Performance Standard, the Distributor shall design and operate its Distribution System in order to assist the System Operator in maintaining the fundamental frequency within the limits established in the Grid Code during normal conditions.

#### 3.3. VOLTAGE STANDARDS

3.3.1. The Performance Indicator to control voltage quality will be the voltage level, measured within seven (7) consecutive calendar days.

3.3.2. Deviation of actual voltage level from its Nominal Voltage shall not exceed the tolerance values established in the following table:

| Voltage level | Steady state change       |
|---------------|---------------------------|
| < 1.0 kV      | ± 6 % to Urban Consumers  |
|               | ± 10 % in Rural Consumers |
| 1.0 to 33 kV  | ± 10 %                    |

3.3.3. The tolerances for the voltage quality standard may be reviewed by the ERC together with tariff approval for a Tariff Review Period, based on technical and economic studies.



3.3.4. The Distributor shall maintain voltage level deviations within the allowed tolerances at least during 97 % of the time. During the remaining 3 % of the time, voltage deviations shall not exceed 50 % of the allowed tolerance values.

3.3.5. Control of the adequacy of voltage level to Consumers will be assessed through a random / directed measurement campaign, started during Control Phase 2, at the Consumer's connection points. The ERC will define the specification of the equipment to be used to perform this campaign. The duration of each measurement shall be not less than seven (7) consecutive days.

3.3.6. Each year the Distributor will be required by the ERC to perform:

- (a) One measurement for every 100 MV Consumers
- (b) One measurement for every 1,000 LV Consumers

3.3.7. In the measurement campaigns, voltage level will be determined as the average RMS voltage during a 15 minutes period. The Distributor, with the approval of the ERC, will select the Consumers to be measured taking into account:

- (a) Consumers located in areas where voltage problems have been detected.
- (b) Consumers that have presented voltage complaints to the Distributor.
- (c) At least 50 % of the Consumers randomly selected.

3.3.8. Every year, during the month of January the Distributor shall submit to the ERC a complete list of its Consumers, in order to be used during the selection of Consumers to be measured. Not later than the 15<sup>th</sup> day of each month, the Distributor will submit to the ERC the list of Consumers selected to be measured next month. The ERC shall have the right to propose another location in view of consumer complaints or previous results in Performance Indicators. The Distributor shall design a measurement program with following characteristics:

- (a) Authorised staff of the Distributor shall perform the connection and disconnection of the equipments.
- (b) The ERC has the right to have one representative present during these activities, and also during data unloading. In the cases the ERC wants to exercise this right shall inform it to the Distributor, asking for the day and time where the activities shall take place, and to coordinate with it. When the measurement equipment is disconnected, the ERC representative can ask for a copy of the measurement archive in an electronic format.
- (c) The Distributor shall inform the ERC any case where the measurement was not possible and the causes of this situation.

3.3.9. In addition to the measurement campaigns defined in the previous paragraphs, the ERC shall have the right to request measurement of a specific Consumer (or Consumers within a specific zone) during a specific, week in view of consumer complaints and/or analysis done by the ERC based on the monitoring information. In case it is no technically feasible to install the required equipment, the Distributor may justify selecting another Consumer that is near to the one requested by the ERC.

3.3.10. The Distributor shall process the information registered by the power quality measurement equipment and submit to the ERC before the last Business Day of the next month, a monthly report with the following information:

- (a) A list with all the measurements made in the previous month
- (b) The results of the processing of the monthly measurements, indicating those outside the tolerance and where this deviation could be subject to penalties.
- (c) Individual registers for each measurement realized including:
  - (i) Indication regarding the connection point measured and the type of Consumer
  - (ii) Date and hour when the measurement started and ended
  - (iii) Total number of measurements registered
  - (iv) Maximum and minimum voltage registered (for the valid measurements)
  - (v) Total time that the measured values of voltage were outside the approved tolerance, grouped in different voltage deviations bands
  - (vi) Percentage of registries are outside the permissible tolerance, grouped in different voltage bands
  - (vii) Total supplied energy
  - (viii) Total supplied energy with voltage outside the tolerances stated in 3.3.2

The ERC will issue directives regarding the format in which the above mentioned information will be supplied.

3.3.11. The detailed information of each measurement performed shall be suitable organized and maintained by the Distributor during at least five (5) calendar years. The ERC will have the right and the Distributor shall allow the ERC or its authorised representatives to revise and analyse the stored registers for each measurement in order for the ERC to audit the process, data and the accuracy of the information submitted periodically by the Distributor to the ERC. The ERC will have the right to hire qualified companies or persons to perform this activity on its behalf.

3.3.12. Voltage levels of a Distributor will be considered out of range if the results of the performed measurements show that the registered values are outside the approved tolerance during more than 3 % of the measurement period.

3.3.13. When voltage levels fall out of range, the Distributor shall take remedial actions to correct the deficiency within the following four (4) months. When all the remedial actions have been finished or at the end of the four (4) months, whichever is earlier, the Distributor shall notify the ERC, with a description of the actions undertaken. The ERC will have the right to order a measurement campaign at the connection points that had voltage deviations outside tolerance to verify the adequacy of the remedial actions.

3.3.14. In the cases the magnitude of remedial actions to be undertaken will be important, and the Distributor considers it will be impossible to correct the deficiency within the

timeframe indicated in 3.3.13, it shall inform this situation to the ERC in its monthly report, indicating at least:

- (a) The cause of the deficiency
- (b) If the deficiency affects only the measured Customer or it also affect other Customers. In this case, an estimation of the number of Customers affected.
- (c) The actions to be undertaken to remedy the deficiency
- (d) A detailed explanation of the reasons that prevents that these actions be completed within three (3) months.

The ERC will analyse the situation and if it is justified, it can grant an authorisation for executing the remedial actions within a longer period.

3.3.15. In addition to the remedial actions obligations, during the Final Phase, when the voltage levels fall out of range, the situation it will be considered as a lack of efficiency of the Distributor, that will be translated in an economic impact in its allowed revenues. This economic impact will be calculated yearly, according to the methodology established in Annex 2.

#### **3.4. PERTURBATIONS STANDARDS**

3.4.1. During Control Phase 1 and Control Phase 2 the following perturbation Indicators will be controlled:

- (a) Flicker: defined as the impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time
- (b) Harmonic distortion: defined as the sinusoidal voltages and currents having frequencies that are integral multiples of the fundamental frequency.

3.4.2. During the Final Control Phase, in view of the obligations of the Distributor stated in the Distribution Code and due to existing reported problems and based on technical and economic studies, the ERC may establish additional perturbation Indicators in order to control other disturbances as necessary.

3.4.3. The assessment of the disturbance caused by a Flicker shall be measured according to the following:

- (a) For disturbances caused by a Flicker source with a short duty cycle, the Short Term Flicker Severity (Pst) shall be computed over a 10-minute period, as defined in the Distribution Code.
- (b) For disturbances caused by Flicker sources with a long and variable duty cycle, the Long Term Flicker Severity (Plt) shall be derived from the Short Term Flicker Severity levels, as defined in the Distribution Code.

3.4.4. The Performance Indicators to measure harmonic distortion will be:

- (a) Total Harmonic Distortion (THD), as defined in the Distribution Code;
- (b) Values of each individual harmonic, as defined in the Distribution Code.

3.4.5. The allowed ranges for flicker and harmonic indicators are established in the Distribution Code, and shall not be exceeded, at the connection point, during a time greater than 3 % of a measurement period.

3.4.6. Control of the adequacy of flicker and harmonic distortion will be assessed through measurements at connection points of Consumers. Measurements shall be performed by the Distributor at the Consumer connection point, in accordance with the methodologies of IEC 1000-4-7, during at least 48 hours with measurements taken at 10 minute intervals. The measurements shall be made by the Distributor on the following cases:

- (a) Each time a Consumer presents a complaint on this matter. All these complaints shall be copied to ERC, with an indication of the time when the measurement verifications will be performed.
- (b) At a request of ERC for control and verification of compliance purposes, to perform flicker or harmonic measurements at specific connection points, even if no Consumer complaint exists.

3.4.7. To monitor and measure flicker and harmonic distortion, the Distributor shall have:

- (a) At least two portable flicker meters, with their associated equipment
- (b) At least five portable harmonic meters

The Distributor can use these equipments for its own purposes, but they shall be available in short notice when a Consumer raises a complaint.

3.4.8. Each time the Distributor carries out flicker and harmonic distortion measurements, the Distributor shall submit to the ERC a report containing at least the following:

- (a) Data describing the measured point and type of Consumer
- (b) Date and hour at which the measurement started and ended
- (c) Registered values of flicker or harmonics, as applicable
- (d) An identification whether the values measured are within or outside the allowed tolerances
- (e) In case of non compliance with the allowed tolerances, a remedial plan including:
  - (i) A description of the causes of non compliance
  - (ii) Remedial actions to be taken in order to correct the situation
  - (iii) Time required to implement these actions, where, unless explicitly authorized by the ERC, the time to correct the situation shall not exceed three (3) months.

3.4.9. When in case of non-compliance with the flicker or harmonic distortion standards, the Distributor submits a remedial plan in accordance to paragraph 3.4.8 (e), the ERC will review the proposed plan and may request clarifications or modifications prior to approval. Once approved, the plan will be binding to the Distributor and the ERC shall have the right to monitor and audit its effective execution.



3.4.10. During the plan for the implementation of the remedial actions, the ERC will have the right to exempt the Distributor from compliance with the affected Performance Indicator.

#### 4. SECTION: CONSUMER SERVICE QUALITY STANDARDS

##### 4.1. CHARACTERISTICS TO BE EVALUATED

4.1.1. Consumer Service Quality will be evaluated based on four different characteristics:

- (a) Connection and disconnection of Consumers
- (b) Consumer information
- (c) Management of complaints
- (d) Billing

##### 4.2. NEW CONNECTIONS FOR CONSUMERS

4.2.1. Once a Consumer has presented a complete and valid connection application in accordance with the prescriptions indicated in the Distribution Code, and the associated procedures for Consumer's installation checks and payments have been completed, the Distributor is obliged to connect the Consumer within the following maximum allowed times.

- (a) If the connection does not require Changes to the Existing Distribution System:

- (i) During Control Phase 1:

| Connection Size | Tolerance                                                            |
|-----------------|----------------------------------------------------------------------|
| Up to 50 kW     | 15 Business Days                                                     |
| More than 50 kW | To be agreed with the Consumer but not greater than 30 Business Days |

- (ii) During Control Phase 2 and the Final Control Phase:

| Connection Size | Tolerance                                                            |
|-----------------|----------------------------------------------------------------------|
| Up to 50 kW     | 10 Business Days                                                     |
| More than 50 kW | To be agreed with the Consumer but not greater than 30 Business Days |

- (b) If the connection requires Changes to the Existing Distribution System:

- (i) During Control Phase 1:

| Connection Size                      | Tolerance                      |
|--------------------------------------|--------------------------------|
| Up to 50 kW (overhead connection)    | 30 Business Days               |
| Up to 50 kW (underground connection) | 45 Business Days               |
| More than 50 kW:                     | To be agreed with the Consumer |

- (ii) During Control Phase 2 and the Final Control Phase:

| <b>Connection Size</b>               | <b>Tolerance</b>               |
|--------------------------------------|--------------------------------|
| Up to 50 kW (overhead connection)    | 15 Business Days               |
| Up to 50 kW (underground connection) | 30 Business Days               |
| More than 50 kW:                     | To be agreed with the Consumer |

4.2.2. If within fifteen (15) Business Days a Consumer making an application for a connection greater than 50 kW does not reach an agreement with the Distributor on the time required for the connection, the Consumer is entitled to present the case to the ERC. The ERC will make the final decision, based on available technical information and consultation with the two parties. If the Distributor does not connect the Consumer within the time established by the ERC, it will be considered a non-compliance of the Distributor to the consumer service quality standards.

4.2.3. Each month the Distributor shall send a report to the ERC containing:

- (a) Aggregate information regarding the Consumers connected to the Distribution System during the previous month.
- (b) List of the Consumers connected, indicating the type of Consumer, time to connect it, and all other relevant information.
- (c) Separate registers of the cases in which the tolerances for connection time have been exceeded, with the necessary explanations.

4.2.4. If the connection requires special extensions or upgrading of the Distribution System and according to the applicable regulation regarding connection costs, the Consumer should pay a special charge, once a valid and complete connection application has been presented, the Distributor shall send the Consumer the proposed budget within the following time:

(i) During Control Phase 1:

| <b>Connection Size</b>                                                   | <b>Tolerance</b> |
|--------------------------------------------------------------------------|------------------|
| Low voltage, no installation of new MV/LV transformer required           | 10 Business Days |
| Low voltage, installation of new MV/LV transformer required              | 20 Business Days |
| Medium Voltage (11 kV)                                                   | 45 Business Days |
| Medium Voltage (33 kV). No modification required in the HV/MV substation | 60 Business Days |
| Medium Voltage (33 kV). Modification required in the HV/MV substation    | 90 Business Days |

(ii) During Control Phase 2 and the Final Control Phase:

| <b>Connection Size</b>                                                   | <b>Tolerance</b> |
|--------------------------------------------------------------------------|------------------|
| Low voltage, no installation of new MV/LV transformer required           | 10 Business Days |
| Low voltage, installation of new MV/LV transformer required              | 15 Business Days |
| Medium Voltage (11 kV)                                                   | 30 Business Days |
| Medium Voltage (33 kV). No modification required in the HV/MV substation | 45 Business Days |
| Medium Voltage (33 kV). Modification required in the HV/MV substation    | 60 Business Days |

4.2.5. If the Consumer and the Distributor do not reach an agreement on the budget, the Consumer is entitled to present the case to the ERC, which will take a final decision, based on:

- (a) The Connection Cost By-law, or any other By-law or enforceable directive issued by the ERC which regulates the connection cost.
- (b) Available technical and economic information in the cases the connection requires equipment and/or works not explicitly covered by the Connection Cost By-law or any other By-law or enforceable directive issued by the ERC which regulates the connection cost, and
- (c) Consultation with the two parties.

The ERC may request the appraisal by an expert. The final decision will be mandatory for the Distributor.

### **4.3. TEMPORARY DISCONNECTION OF SERVICE DUE TO NON PAYMENT**

4.3.1. The Distributor is obliged to issue a formal written notification before the disconnection to any Consumer due to non-payment of bills, in accordance with the procedures and time established in the Distribution Code and the distribution and retail supply licence.

4.3.2. If the affected Consumer pays in full the outstanding debt, including any interest, penalties or additional charges that may apply, the Distributor must reconnect the Consumer within 24 hours after payment.

4.3.3. The Distributor is obliged to organise, maintain and update a record of Consumers disconnected due to non-payment of bills.

### **4.4. CONSUMER INFORMATION**

4.4.1. The Distributor has the obligation to provide its Consumers the following information:

- (a) The quality standards the Distributor must fulfil.



- (b) Consumers rights that result from this Performance Standard
- (c) Applicable tariffs
- (d) If tariff options are available for a Consumer class, advise on the most favourable tariff to be selected by the Consumer, subject to its expected consumption and load profile.

4.4.2. To comply with the consumer information obligation, the Distributor shall have in each of its Commercial Offices copies of this Distribution Performance Standards and approved tariffs, and shall make it available to the Consumers for consultation, upon their request.

#### **4.5. CONSUMER COMPLAINTS**

4.5.1. In order to record consumer complaints, the Distributor shall have and organize:

- (a) Commercial Offices in each region of its supply area. The Distributor shall decide the location of these regional offices, provided that there is at least one commercial office every 50,000 Consumers connections in urban areas and every 20,000 Consumers connections in rural areas.
- (b) Adequate number of free phone lines (continuously available)
- (c) A dedicated consumer complaints department or division, in charge of receiving and responding to complaints, monitoring that the problem is solved when applicable, and with the associated data organization and processing, and reporting.

4.5.2. The Distributor shall organise, maintain and update an adequate information system for the registration of every complaint received from its Consumers, regardless of the way the complaint is received (written or by telephone).

4.5.3. Each Consumer complaint shall be replied by the Distributor to the Consumer, in a written form, within the next fifteen (15) Business Days of the complaint reception. The answer to the Consumer shall contain at least the following:

- (a) A clear indication if the complaint has been accepted or rejected
- (b) If the complaint has been accepted, a clear explanation of the actions taken to remedy the situation
- (c) If the complaint has been rejected, the justification for the rejection
- (d) All other necessary information so that the Consumer can clearly evaluate the current situation.

4.5.4. After the end of each month, the Distributor will send a report to the ERC containing:

- (a) An overall evaluation of the Consumers' complaints
- (b) A list and short description of each Consumer complaint received during the month, indicating the cause and the time to respond or correct the problem



- (c) Separated registers of the cases during the month in which the time to answer or correct the problem have exceeded the timeframes stated in 4.5.3.

#### **4.6. METERING AND BILLING**

4.6.1. The Distributor shall:

- (a) Ensure that the metering system is appropriate to the tariff of the Consumer and comply with the conditions included in the Distribution Code.
- (b) Install, verify, maintain, repair and replace electric meters and metering system.
- (c) Comply with all conditions established in its licence and the Distribution Code in relation to billing and metering

4.6.2. The Distributor shall procure that billing is based on actual readouts of meters. Only in the case of impossibility of reading a meter, billing may be done based on estimated consumption, subject to the following:

- (a) For each individual Consumer, the Distributor is not allowed to issue two (2) consecutive bills based on estimated consumption
- (b) During one calendar year and for each individual Consumer, the number of bills issued based on estimated consumption shall not exceed three (3).
- (c) For each billing period, the number of bills issued based on estimated consumption shall not exceed 8 % of the total numbers of bills, for each Consumer category.

4.6.3. In the cases that a special situation, not under the control of the Distributor, exists in part of the Distribution System, that prevents that during specific periods of the year the obligations stated under 4.6.2 can not be fulfilled, the Distributor shall rise the issue to the ERC with all required supporting documentation. The ERC will evaluate the submitted documentation, conduct independent analysis or studies if required, and it may grant an authorisation for this specific part or zone of the Distribution System to exceed the prescribed values regarding estimated billing. The maximum monthly allowed estimated bills shall be re-calculated accordingly.

4.6.4. The Distributor must solve each Consumer complaint on possible errors in its bill (including complaints on estimation) before the subsequent bill is issued. If an error actually existed, it cannot be repeated in the following bill. Maximum allowed time for informing the Consumer about the results of his complaint is 15 Business Days.

4.6.5. In case malfunctioning was detected in the metering units/electric meters, the Energy previously invoiced shall be recalculated, according to average consumption, for all the period it is supposed that the meter was malfunctioning.

#### **4.7. ECONOMIC IMPACT**

4.7.1. Starting during Control Phase 2 and continuing during the Final Phase, in the case there is non-compliance with any of consumer service standards established in this Distribution Performance Standards, this situation it will be considered as a lack of efficiency



of the Distributor, that will be translated in an economic impact in its allowed revenues, according to the values defined in Annex 2.

## **5. SECTION: DISTRIBUTION LOSSES**

### **5.1. DEFINITIONS**

5.1.1. For a specified period, Distribution Energy Losses are defined as the difference between the total energy purchased by the Distributor during such period from the Bulk Supply Licensee and from Generation Connected to Distribution, and the total energy invoiced to Consumers during such period, independently on whether the energy (purchased or sold) has been paid or not.

5.1.2. Distribution Energy Losses shall be classified in three categories:

- (a) Technical Losses: There are the distribution losses that occur due to the current flowing into the Distribution System, including conductor losses and core losses on transformers.
- (b) Administrative Losses: This corresponds to the Energy used by the Distributor for its own consumption in order to carry out the distribution and retail activities.
- (c) Non Technical Losses: This is the difference between the Distribution Energy Losses and the sum of (a) and (b)

### **5.2. CAP TO DISTRIBUTION ENERGY LOSSES**

5.2.1. The ERC will determine and approve in each Tariff Review Period, after due notice and consultation with the Distributor, a cap on the Technical Losses, a cap on the Non Technical Losses and a cap on the Administrative Losses. The caps approved may be different for each calendar year during such Review Period. The Distributor shall be allowed to pass through to tariffs and recover from its Consumers the caps to the Distribution System Losses approved by the ERC.

5.2.2. The caps to the Distribution System Losses approved by the ERC will be used for tariff determination and as Performance Indicators, and each Distributor shall procure to maintain Distribution Energy Losses below these caps.

5.2.3. The caps to the Distribution System Losses to be used for the first Tariff Review Period are established in Annex 4.

### **5.3. MONITORING AND REPORTING**

5.3.1. With the purpose of carrying out suitable monitoring and control of the performance of each Distributor regarding Distribution Energy Losses, the Distributor shall submit to the ERC, in a suitable organized manner or such format as may be established by the ERC, the following information:

- (a) Information to be provided on a monthly basis:



- (i) Total Energy purchased from the Bulk Supply Licensee and from each Generator Connected to Distribution selling to the Distributor, identifying the connection points where the energy enters the Distribution System.
- (ii) Total Energy billed to Consumers, differentiated by voltage level.
- (b) Every six months in the month of January and July, semi-annual report on Distribution Energy Losses with aggregated information on losses, differentiated by:
  - (i) Categories of losses (technical, non technical and administrative)
  - (ii) Voltage level (losses at the medium and low voltage level)
  - (iii) Geographic zones, where proposed geographic zones shall be submitted by the Distributors to the ERC for its approval

5.3.2. Within six (6) months following the approval of this Performance Standards or the granting of a distribution and retail supply licence that includes Performance Indicators in accordance with this Distribution Performance Standards, the Distributor shall submit to the ERC for approval the methodology and assumptions to be used to calculate Distribution Energy Losses, the separation into the different categories of losses, the separation into the different voltage levels and different geographical zones. The proposed methodology shall take full advantage of all the technical data and metering capability the Distributor has available at the time the report is submitted, and shall use at least the following information:

- (a) Technical data of feeders, transformers and Generators Connected to Distribution within the supply area of the Distributor
- (b) Energy metered at each transmission connection point, connection of Generators Connected to Distribution and connection with other Distributors
- (c) Energy metered in each HV/MV transformer
- (d) Energy metered in each distribution feeder, connected at a HV / 33 kV substation
- (e) Energy metered in each distribution feeder, connected at a HV / 11 or 6.6 kV substation
- (f) Energy metered in the distribution feeders, connected at the main 33 / 11 or 6.6 kV substations.

5.3.3. If at the time of report submission there is a lack of adequate metering capabilities to fulfil the above mentioned requirements, the Distributor shall inform the ERC the transitory methodology to be used to overcome that situation, and/or the remedial plans to install all the required meters or to obtain the required technical data.

5.3.4. Additional to the information to be provided by the Distributor on a monthly and six monthly basis in accordance to paragraph 5.3.1, within the first three months of each year, the Distributor shall submit to the ERC an Annual Report on Losses, covering the full previous year performance, including among others the following:

- (a) Statistical losses data of the previous year and comparison with the two (2) years preceding the previous years.



- (b) Main actions undertaken by the Distributor in order to reduce technical and non-technical losses, with an identification of the cost of such actions and the achieved or expected results.
- (c) Feeders, zones or areas where the annual Energy losses considerably exceed the Performance Indicators, and actions to be undertaken to reduce losses in such feeders, zones or areas.
- (d) Any study or analysis carried out by the Distributor to reduce losses.
- (e) Plans for the following 24 months associated to loss reduction, together with the corresponding cost – benefit analysis.



## **6. SECTION: NON COMPLIANCE**

### **6.1. DEFINITION**

6.1.1. If the Distributor fails to fulfil all the provisions established in this Performance Standard, it shall be considered a Non Compliance situation.

6.1.2. A Non Compliance situation will include (but not be limited to):

- (a) Failure to provide the ERC, on time, with all the information established in this Distribution Performance Standards
- (b) Providing the ERC incomplete or inaccurate data or reports, in particular inaccuracies or other problems verified by the audits of the ERC in the information submitted by the Distributor.
- (c) Failure to implement in time the procedures and information systems established in this Performance Standard
- (d) Failure or unsuitable delays in the execution of the approved remedial actions and plans to improve supply quality
- (e) Failure or unsuitable delays in correcting situations that imply inadequate Power Quality (Voltage, Flicker or Harmonics)
- (f) Failure in maintaining the number of bills with estimated energy within the limits established in this Distribution Performance Standards
- (g) Failure to assure the Consumers the commercial services standards established in this Distribution Performance Standards.

### **6.2. PENALTIES**

6.2.1. If the Distributor is in a Non Compliance situation, the ERC can apply penalties, according to Article 40 of the General Electricity Law, to the corresponding Distributor, and consider the situation a non-compliance with its licence conditions.

6.2.2. In the case a Distributor exceeds the approved tolerances for an Overall Performance Indicator or an Individual Performance Indicator as established in this Distribution Performance Standards, the Distributor will be considered not to achieve the expected efficiency, and according to Article 47-C-1 of the General Electricity Law, this lack of efficiency translated in as a reduction in its revenue requirements for the next Tariff Review Period, as established in Annex 2 and the Conditions in this Distribution Performance Standards.



**ANNEX 1: OVERALL PERFORMANCE INDICATORS FOR SUPPLY QUALITY**



**Indicators based on kVA Installed Capacity**

| Indicator                        | Definition                                                                          | Mathematical Formula                                              | Parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><i>TTIK<sub>s,r</sub></i></b> | Average time of Scheduled Interruptions per nominal MV installed kVA in rural areas | $TTIK_{s,r} = \frac{\sum_{i=1}^{ks} (IC_i \cdot H_i)}{\sum IC_i}$ | <p><math>\sum IC_r</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in rural areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, in rural areas, affected by the Scheduled Interruption “i” (in kVA)</p> <p><math>H_i</math> = Duration of Scheduled Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ks</math> = Total number of Scheduled Interruptions during the reported period.</p> |
| <b><i>TTIK<sub>s,u</sub></i></b> | Average time of Scheduled Interruptions per nominal MV installed kVA in urban areas | $TTIK_{s,u} = \frac{\sum_{i=1}^{ks} (IC_i \cdot H_i)}{\sum IC_u}$ | <p><math>\sum IC_u</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in urban areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, in urban areas, affected by the Scheduled Interruption “i” (in kVA)</p> <p><math>H_i</math> = Duration of Scheduled Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ks</math> = Total number of Scheduled Interruptions during the reported period.</p> |



|                                       |                                                                                              |                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><math>TTIK_{u,r}</math></b></p> | <p>Average time of Unscheduled Interruptions per nominal MV installed kVA in rural areas</p> | $TTIK_{u,r} = \frac{\sum_{i=1}^{k_u} (IC_i \cdot H_i)}{\sum IC_r}$ | <p><math>\sum IC_r</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in rural areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, in to rural areas, affected by the Unscheduled Interruption “i” (in kVA)</p> <p><math>H_i</math> = Duration of Unscheduled Interruption “i” that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>k_u</math> = Total number of Unscheduled Interruptions during the reported period, excluding Temporary Interruptions and External Interruptions.</p>   |
| <p><b><math>TTIK_{u,u}</math></b></p> | <p>Average time of Unscheduled Interruptions per nominal MV installed kVA in urban areas</p> | $TTIK_{s,u} = \frac{\sum_{i=1}^{k_u} (IC_i \cdot H_i)}{\sum IC_u}$ | <p><math>\sum IC_u</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in urban areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, in to urban areas, affected by the Unscheduled Interruption “i”. (in kVA)</p> <p><math>H_i</math> = Duration of Unscheduled Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>k_s</math> = Total number of Unscheduled Interruptions during the reported period, excluding Temporary Interruptions and External Interruptions.</p> |



|                                       |                                                                                                                 |                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><math>TTIK_{e,r}</math></b></p> | <p>Average time of Interruptions per nominal MV installed kVA in rural areas, due to External Interruptions</p> | $TTIK_{e,r} = \frac{\sum_{i=1}^{ke} (IC_i \cdot H_i)}{\sum IC_r}$ | <p><math>\sum IC_r</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in rural areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, belonging to rural areas, affected by the External Interruption “i” (in kVA)</p> <p><math>H_i</math> = Duration of External Interruption “i” that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ke</math> = Total number of Interruptions during the reported period, that have their origin in the external system.</p> |
| <p><b><math>TTIK_{e,u}</math></b></p> | <p>Average time of Interruptions per nominal MV installed kVA in urban areas, due to External Interruptions</p> | $TTIK_{e,u} = \frac{\sum_{i=1}^{ke} (IC_i \cdot H_i)}{\sum IC_u}$ | <p><math>\sum IC_r</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in urban areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, in urban areas, affected by the External Interruption “i” (in kVA)</p> <p><math>H_i</math> = Duration of External Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ke</math> = Total number of Interruptions during the reported period, that have their origin in the external system.</p>          |



|                                        |                                                                                                              |                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><math>TTIK_{tp,r}</math></b></p> | <p>Average time of Interruptions per nominal MV installed kVA in rural areas, due to Third Party actions</p> | $TTIK_{tp,r} = \frac{\sum_{i=1}^{ktp} (IC_i \cdot H_i)}{\sum IC_r}$ | <p><math>\sum IC_r</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in rural areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, belonging to rural areas, affected by the External Interruption “i” (in kVA)</p> <p><math>H_i</math> = Duration of External Interruption “i” that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ktp</math> = Total number of Interruptions during the reported period, that have their origin due to third party actions.</p> |
| <p><b><math>TTIK_{tp,u}</math></b></p> | <p>Average time of Interruptions per nominal MV installed kVA in urban areas, due to Third Party actions</p> | $TTIK_{e,u} = \frac{\sum_{i=1}^{ktp} (IC_i \cdot H_i)}{\sum IC_u}$  | <p><math>\sum IC_r</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in urban areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, in urban areas, affected by the External Interruption “i” (in kVA)</p> <p><math>H_i</math> = Duration of External Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ktp</math> = Total number of Interruptions during the reported period, that have their origin due to third party actions.</p>          |



|                                         |                                                                                                 |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-----------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><i>AFIK<sub>s,r</sub></i></b></p> | <p>Average frequency of Scheduled Interruptions per nominal MV installed kVA in rural areas</p> | $AFIK_{s,r} = \frac{\sum_{i=1}^{ks} IC_i}{\sum IC_r}$ | <p><math>\sum IC_r</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in rural areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, in rural areas, affected by the Scheduled Interruption “i”.</p> <p><math>ks</math> = Total number of Scheduled Interruptions during the reporting period.</p>                                                                                                                                  |
| <p><b><i>AFIK<sub>s,u</sub></i></b></p> | <p>Average frequency of Scheduled Interruptions per nominal MV installed kVA in urban areas</p> | $AFIK_{s,u} = \frac{\sum_{i=1}^{ks} IC_i}{\sum IC_u}$ | <p><math>\sum IC_u</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in urban areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, in urban areas, affected by the Scheduled Interruption “i”.</p> <p><math>H_i</math> = Duration of Scheduled Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ks</math> = Total number of Scheduled Interruptions during the reporting period.</p> |



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|-----------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><i>AFIK<sub>u,r</sub></i></b></p> | <p>Average frequency of Unscheduled Interruptions per nominal MV installed kVA in rural areas</p> | $AFIK_{u,r} = \frac{\sum_{i=1}^{ku} IC_i}{\sum IC_r}$ | <p><math>\sum IC_r</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in rural areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, in rural areas, affected by the Unscheduled Interruption “i”.</p> <p><math>ku</math> = Total number of Unscheduled Interruptions during the reporting period, excluding Temporary Interruptions and External Interruptions.</p> |
| <p><b><i>AFIK<sub>u,u</sub></i></b></p> | <p>Average frequency of Unscheduled Interruptions per nominal MV installed kVA in urban areas</p> | $AFIK_{u,u} = \frac{\sum_{i=1}^{ku} IC_i}{\sum IC_u}$ | <p><math>\sum IC_u</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in urban areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, in urban areas, affected by the Unscheduled Interruption “i”.</p> <p><math>ku</math> = Total number of Unscheduled Interruptions during the reporting period, excluding Temporary Interruptions and External Interruptions.</p> |



|                                         |                                                                                                               |                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><i>AFIK<sub>e,r</sub></i></b></p> | <p>Average frequency of Interruptions per nominal MV installed kVA in rural areas due to external causes.</p> | $AFIK_{e,r} = \frac{\sum_{i=1}^{ke} IC_i}{\sum IC_r}$ | <p><math>\sum IC_r</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in rural areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, in rural areas, affected by the Interruption “i”.</p> <p><math>ke</math> = Total number of Interruptions during the reporting period, whose origin is in the external system.</p>           |
| <p><b><i>AFIK<sub>e,u</sub></i></b></p> | <p>Average frequency of Interruptions per nominal MV installed kVA in urban areas due to external causes.</p> | $AFIK_{e,u} = \frac{\sum_{i=1}^{ke} IC_i}{\sum IC_r}$ | <p><math>\sum IC_r</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in urban areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, belonging to urban areas, affected by the Interruption “i”.</p> <p><math>ke</math> = Total number of Interruptions during the reporting period, whose origin is in the external system.</p> |



|                                          |                                                                                                                   |                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><i>AFIK<sub>tp,r</sub></i></b></p> | <p>Average frequency of Interruptions per nominal MV installed kVA in rural areas due to third party actions.</p> | $AFIK_{tp,r} = \frac{\sum_{i=1}^{ktp} IC_i}{\sum IC_r}$ | <p><math>\sum IC_r</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in rural areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, in rural areas, affected by the Interruption “i”.</p> <p><math>ktp</math> = Total number of Interruptions during the reporting period, whose origin is in third party actions.</p>           |
| <p><b><i>AFIK<sub>tp,u</sub></i></b></p> | <p>Average frequency of Interruptions per nominal MV installed kVA in urban areas due to third party actions.</p> | $AFIK_{tp,u} = \frac{\sum_{i=1}^{ktp} IC_i}{\sum IC_r}$ | <p><math>\sum IC_r</math> = Sum of installed capacity in MV/LV transformers of the Distributor, plus the contracted power of MV Consumers, in urban areas. (in kVA)</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, belonging to urban areas, affected by the Interruption “i”.</p> <p><math>ktp</math> = Total number of Interruptions during the reporting period, whose origin is in third party actions.</p> |



**Indicators based on Number of Consumers**

| Indicator                         | Definition                                                     | Mathematical Formula                                           | Parameters                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><i>SAIDI<sub>s,r</sub></i></b> | System Average Scheduled Interruption Duration, in rural areas | $SAIDI_{s,r} = \frac{\sum_{i=1}^{ks} (NC_i \cdot H_i)}{TNC_r}$ | <p><math>NC_i</math> = Number of Consumers in rural areas, affected by the Scheduled Interruption “i”.</p> <p><math>H_i</math> = Duration of Scheduled Interruption “i”, that affected <math>NC_i</math> Consumers.</p> <p><math>TNC_r</math> = Total number of Consumers of the Distributor</p> <p><math>ks</math> = Total number of Scheduled Interruptions during the calendar year.</p>        |
| <b><i>SAIDI<sub>s,u</sub></i></b> | System Average Scheduled Interruption Duration, in urban areas | $SAIDI_{s,u} = \frac{\sum_{i=1}^{ks} (NC_i \cdot H_i)}{TNC_u}$ | <p><math>NC_i</math> = Number of Consumers in urban areas, affected by the Scheduled Interruption “i” .</p> <p><math>H_i</math> = Duration of Scheduled Interruption “i”, that affected <math>NC_i</math> Consumers.</p> <p><math>TNC_u</math> = Total number of Urban Consumers of the Distributor</p> <p><math>ks</math> = Total number of Scheduled Interruptions during the calendar year.</p> |



|                                   |                                                                         |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>SAIDI<sub>u,r</sub></b></p> | <p>System Average Unscheduled Interruption Duration, in rural areas</p> | $SAIDI_{u,r} = \frac{\sum_{i=1}^{ku} (NC_i \cdot H_i)}{TNC_r}$ | <p><math>NC_i</math> = Number of Consumers in rural areas, affected by the Unscheduled Interruption “i”.</p> <p><math>H_i</math> = Duration of Unscheduled Interruption “i”, that affected <math>NC_i</math> Consumers.</p> <p><math>TNC_r</math> = Total number of Rural Consumers of the Distributor</p> <p><math>ku</math> = Total number of Unscheduled Interruptions during the calendar year, excluding temporary and External Interruptions.</p> |
| <p><b>SAIDI<sub>u,u</sub></b></p> | <p>System Average Unscheduled Interruption Duration, in urban areas</p> | $SAIDI_{u,u} = \frac{\sum_{i=1}^{ku} (NC_i \cdot H_i)}{TNC_u}$ | <p><math>NC_i</math> = Number of Consumers in urban areas, affected by the Unscheduled Interruption “i”.</p> <p><math>H_i</math> = Duration of Unscheduled Interruption “i”, that affected <math>NC_i</math> Consumers.</p> <p><math>TNC_u</math> = Total number of Urban Consumers of the Distributor</p> <p><math>ku</math> = Total number of Unscheduled Interruptions during the calendar year, excluding temporary and External Interruptions.</p> |



|                                   |                                                                      |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>SAIDI<sub>e,r</sub></b></p> | <p>System Average External Interruption Duration, in rural areas</p> | $SAIDI_{e,r} = \frac{\sum_{i=1}^{ke} (NC_i \cdot H_i)}{TNC_r}$ | <p><math>NC_i</math> = Number of Consumers in rural areas, affected by the External Interruption “i”, of <math>H_i</math> duration.<br/> <math>H_i</math> = Duration of External Interruption “i”, that affected <math>NC_i</math> Consumers.<br/> <math>TNC_u</math> = Total number of Rural Consumers of the Distributor<br/> <math>ke</math> = Total number of Interruptions during the calendar year, whose origin is in the external network</p> |
| <p><b>SAIDI<sub>e,u</sub></b></p> | <p>System Average External Interruption Duration, in urban areas</p> | $SAIDI_{e,u} = \frac{\sum_{i=1}^{ke} (NC_i \cdot H_i)}{TNC_u}$ | <p><math>NC_i</math> = Number of Consumers in urban areas, affected by the External Interruption “i”.<br/> <math>H_i</math> = Duration of External Interruption “i”, that affected <math>NC_i</math> Consumers.<br/> <math>TNC_u</math> = Total number of Urban Consumers of the Distributor<br/> <math>ke</math> = Total number of Interruptions during the calendar year, whose origin is in the external network</p>                               |



|                                    |                                                                         |                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------|-------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>SAIDI<sub>tp,r</sub></b></p> | <p>System Average Third Party Interruption Duration, in rural areas</p> | $SAIDI_{tp,r} = \frac{\sum_{i=1}^{ktp} (NC_i \cdot H_i)}{TNC_r}$ | <p><math>NC_i</math> = Number of Consumers in rural areas, affected by the Third Party Interruption “i”, of <math>H_i</math> duration.</p> <p><math>H_i</math> = Duration of Third Interruption “i”, that affected <math>NC_i</math> Consumers.</p> <p><math>TNC_u</math> = Total number of Rural Consumers of the Distributor</p> <p><math>ktp</math> = Total number of Interruptions during the calendar year, whose origin is in the external network</p> |
| <p><b>SAIDI<sub>tp,u</sub></b></p> | <p>System Average Third Party Interruption Duration, in urban areas</p> | $SAIDI_{tp,u} = \frac{\sum_{i=1}^{ke} (NC_i \cdot H_i)}{TNC_u}$  | <p><math>NC_i</math> = Number of Consumers in urban areas, affected by the Third Party Interruption “i”.</p> <p><math>H_i</math> = Duration of Third Party Interruption “i”, that affected <math>NC_i</math> Consumers.</p> <p><math>TNC_u</math> = Total number of Urban Consumers of the Distributor</p> <p><math>ktp</math> = Total number of Interruptions during the calendar year, whose origin is in the external network</p>                         |



|                            |                                                                 |                                                      |                                                                                                                                                                                                                                                                                      |
|----------------------------|-----------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SAIFI<sub>s,r</sub></b> | System Average Scheduled Frequency Interruption, in rural areas | $SAIFI_{s,r} = \frac{\sum_{i=1}^{ks} (NC_i)}{TNC_r}$ | <p><math>NC_i</math> = Number of Consumers in rural areas, affected by the Scheduled Interruption “i”.</p> <p><math>TNC_r</math> = Total number of Consumers of the Distributor</p> <p><math>ks</math> = Total number of Scheduled Interruptions during the calendar year.</p>       |
| <b>SAIFI<sub>s,u</sub></b> | System Average Scheduled Frequency Interruption, in urban areas | $SAIFI_{s,u} = \frac{\sum_{i=1}^{ks} (NC_i)}{TNC_u}$ | <p><math>NC_i</math> = Number of Consumers in urban areas, affected by the Scheduled Interruption “i”.</p> <p><math>TNC_u</math> = Total number of Urban Consumers of the Distributor</p> <p><math>ks</math> = Total number of Scheduled Interruptions during the calendar year.</p> |



|                                   |                                                                          |                                                      |                                                                                                                                                                                                                                                                                                                                     |
|-----------------------------------|--------------------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>SAIFI<sub>u,r</sub></b></p> | <p>System Average Unscheduled Frequency Interruption, in rural areas</p> | $SAIFI_{u,r} = \frac{\sum_{i=1}^{ku} (NC_i)}{TNC_r}$ | <p><math>NC_i</math> = Number of Consumers in rural areas, affected by the Unscheduled Interruption “i”<br/> <math>TNC_r</math> = Total number of Rural Consumers of the Distributor<br/> <math>ku</math> = Total number of Unscheduled Interruptions during the calendar year, excluding temporary and External Interruptions.</p> |
| <p><b>SAIFI<sub>u,u</sub></b></p> | <p>System Average Unscheduled Frequency Interruption, in urban areas</p> | $SAIFI_{u,u} = \frac{\sum_{i=1}^{ku} (NC_i)}{TNC_u}$ | <p><math>NC_i</math> = Number of Consumers in urban areas, affected by the Unscheduled Interruption “i”<br/> <math>TNC_u</math> = Total number of Urban Consumers of the Distributor<br/> <math>ku</math> = Total number of Unscheduled Interruptions during the calendar year, excluding temporary and External Interruptions.</p> |



|                                   |                                                                |                                                      |                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------|----------------------------------------------------------------|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><i>SAIFI<sub>e,r</sub></i></b> | System Average External Frequency Interruption, in rural areas | $SAIFI_{e,r} = \frac{\sum_{i=1}^{ke} (NC_i)}{TNC_r}$ | <p><math>NC_i</math> = Number of Consumers in rural areas, affected by the External Interruption “i”.</p> <p><math>TNC_u</math> = Total number of Rural Consumers of the Distributor</p> <p><math>ke</math> = Total number of Interruptions during the calendar year, whose origin is in the external network</p> |
| <b><i>SAIFI<sub>e,u</sub></i></b> | System Average External Frequency Interruption, in urban areas | $SAIFI_{e,u} = \frac{\sum_{i=1}^{ke} (NC_i)}{TNC_u}$ | <p><math>NC_i</math> = Number of Consumers in urban areas, affected by the External Interruption “i”</p> <p><math>TNC_u</math> = Total number of Urban Consumers of the Distributor</p> <p><math>ke</math> = Total number of Interruptions during the calendar year, whose origin is in the external network</p>  |



|                                    |                                                                   |                                                        |                                                                                                                                                                                                                                                                                                                       |
|------------------------------------|-------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><i>SAIFI<sub>tp,r</sub></i></b> | System Average Third Party Frequency Interruption, in rural areas | $SAIFI_{tp,r} = \frac{\sum_{i=1}^{ktp} (NC_i)}{TNC_r}$ | <p><math>NC_i</math> = Number of Consumers in rural areas, affected by the Third Party Interruption “i”.</p> <p><math>TNC_u</math> = Total number of Rural Consumers of the Distributor</p> <p><math>ktp</math> = Total number of Interruptions during the calendar year, whose origin is in the external network</p> |
| <b><i>SAIFI<sub>tp,u</sub></i></b> | System Average Third Party Frequency Interruption, in urban areas | $SAIFI_{tp,u} = \frac{\sum_{i=1}^{kto} (NC_i)}{TNC_u}$ | <p><math>NC_i</math> = Number of Consumers in urban areas, affected by the Third Party Interruption “i”</p> <p><math>TNC_u</math> = Total number of Urban Consumers of the Distributor</p> <p><math>ktp</math> = Total number of Interruptions during the calendar year, whose origin is in the external network</p>  |



**Indicator of Temporary Interruptions**

|              |                                                |                                       |                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------|------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>MAIFI</b> | Momentary average Interruption frequency index | $MAIFI = \frac{\sum ID_i IC_i}{IC_T}$ | <p><math>ID_i</math>: Number of interrupting device operations.</p> <p><math>IC_i</math> = Installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers, affected by the interrupting device operation “i”</p> <p><math>IC_T</math> = Total installed capacity in MV/LV transformers of the Distributor plus the contracted power of MV Consumers.</p> |
|--------------|------------------------------------------------|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



**Indicators based on Energy**

| Indicator                      | Definition                                                                      | Mathematical Formula                             | Parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b><math>EENS_{s,r}</math></b> | Estimated Energy not supplied, due to Scheduled Interruptions, in rural areas   | $EENS_{s,r} = \sum_{i=1}^{ks} (EPD_i \cdot H_i)$ | <p><math>EPD_i</math> = Estimated power disconnected, in rural areas, by Scheduled Interruption “i” (in kVA). It should be determined using available information from SCADA systems, or estimated using other methods that take into account the number of Consumers disconnected, time of the day when the Interruption starts, yearly energy of the feeder where the disconnection takes place, etc.</p> <p><math>H_i</math> = Duration of Scheduled Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ks</math> = Total number of Scheduled Interruptions during the calendar year.</p>     |
| <b><math>EENS_{s,u}</math></b> | Estimated Energy not supplied, due to Scheduled Interruptions, in urban areas   | $EENS_{s,u} = \sum_{i=1}^{ks} (EPD_i \cdot H_i)$ | <p><math>EPD_i</math> = Estimated power disconnected, in urban areas, by the Scheduled Interruption “i” (in kVA). It should be determined using available information from SCADA systems, or estimated using other methods that take into account the number of Consumers disconnected, time of the day when the Interruption starts, yearly energy of the feeder where the disconnection takes place, etc.</p> <p><math>H_i</math> = Duration of Scheduled Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ks</math> = Total number of Scheduled Interruptions during the calendar year.</p> |
| <b><math>EENS_{u,r}</math></b> | Estimated Energy not supplied, due to Unscheduled Interruptions, in rural areas | $EENS_{u,r} = \sum_{i=1}^{ku} (EPD_i \cdot H_i)$ | <p><math>EPD_i</math> = Estimated power disconnected, in rural areas, by the Unscheduled Interruption “i” (in kVA). It should be determined using available information from SCADA systems, or estimated using other methods that take into account the number of Consumers disconnected, time of the day when the Interruption starts, yearly energy of the feeder where the disconnection takes place, etc.</p> <p><math>H_i</math> = Duration of Unscheduled Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p>                                                                                        |



|                                |                                                                                 |                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------|---------------------------------------------------------------------------------|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                |                                                                                 |                                                  | $ku$ = Total number of Unscheduled Interruptions during the calendar year.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b><math>EENS_{u,u}</math></b> | Estimated Energy not supplied, due to Unscheduled Interruptions, in urban areas | $EENS_{u,u} = \sum_{i=1}^{ku} (EPD_i \cdot H_i)$ | <p><math>EPD_i</math> = Estimated power disconnected, in urban areas, by the Unscheduled Interruption “i” (in kVA). It should be determined using available information from SCADA systems, or estimated using other methods that take into account the number of Consumers disconnected, time of the day when the Interruption starts, yearly energy of the feeder where the disconnection takes place, etc.</p> <p><math>H_i</math> = Duration of Unscheduled Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ku</math> = Total number of Unscheduled Interruptions during the calendar year.</p> |



|                                        |                                                                                        |                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b><math>EENS_{e,r}</math></b></p>  | <p>Estimated Energy not supplied, due to External Interruptions, in rural areas</p>    | $EENS_{e,r} = \sum_{i=1}^{ke} (EPD_i \cdot H_i)$   | <p><math>EPD_i</math> = Estimated power disconnected, in rural areas, by the External Interruption “i” (in kVA). It should be determined using available information from SCADA systems, or estimated using other methods that take into account the number of Consumers disconnected, time of the day when the Interruption starts, yearly energy of the feeder where the disconnection takes place, etc.</p> <p><math>H_i</math> = Duration of External Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ke</math> = Total number of External Interruptions during the calendar year.</p> |
| <p><b><math>EENS_{e,u}</math></b></p>  | <p>Estimated Energy not supplied, due to External Interruptions, in urban areas</p>    | $EENS_{e,u} = \sum_{i=1}^{ke} (EPD_i \cdot H_i)$   | <p><math>EPD_i</math> = Estimated power disconnected, in urban areas, by the External Interruption “i” (in kVA). It should be determined using available information from SCADA systems, or estimated using other methods that take into account the number of Consumers disconnected, time of the day when the Interruption starts, yearly energy of the feeder where the disconnection takes place, etc.</p> <p><math>H_i</math> = Duration of External Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ke</math> = Total number of External Interruptions during the calendar year.</p> |
| <p><b><math>EENS_{tp,r}</math></b></p> | <p>Estimated Energy not supplied, due to Third Party Interruptions, in rural areas</p> | $EENS_{tp,r} = \sum_{i=1}^{ktp} (EPD_i \cdot H_i)$ | <p><math>EPD_i</math> = Estimated power disconnected, in rural areas, by the External Interruption “i” (in kVA). It should be determined using available information from SCADA systems, or estimated using other methods that take into account the number of Consumers disconnected, time of the day when the Interruption starts, yearly energy of the feeder where the disconnection takes place, etc.</p> <p><math>H_i</math> = Duration of External Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p>                                                                                           |



|                                 |                                                                                 |                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------|---------------------------------------------------------------------------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 |                                                                                 |                                                   | $ktp$ = Total number of Third Party Interruptions during the calendar year.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b><math>EENS_{tp,u}</math></b> | Estimated Energy not supplied, due to Third Party Interruptions, in urban areas | $EENS_{e,u} = \sum_{i=1}^{ktp} (EPD_i \cdot H_i)$ | <p><math>EPD_i</math> = Estimated power disconnected, in urban areas, by the External Interruption “i” (in kVA). It should be determined using available information from SCADA systems, or estimated using other methods that take into account the number of Consumers disconnected, time of the day when the Interruption starts, yearly energy of the feeder where the disconnection takes place, etc.</p> <p><math>H_i</math> = Duration of External Interruption “i”, that affected installed capacity <math>IC_i</math> (in hours).</p> <p><math>ktp</math> = Total number of Third Party Interruptions during the calendar year.</p> |



## ANNEX 2: ECONOMIC IMPACT OF NON COMPLIANCE WITH SUPPLY AND POWER QUALITY STANDARDS

### 1. NON COMPLIANCE WITH SUPPLY QUALITY

#### 1.1. NON COMPLIANCE WITH OVERALL PERFORMANCE INDICATORS

1.1.1. Before the end of Control Phase 2, the ERC will determine and approve the unitary value of economic reduction of its revenue requirements, for each type of Consumer, as an estimation of the Consumer's economic cost of the non-supplied Energy.

1.1.2. If at the end of a calendar year, any of the tolerances approved by the ERC for the Overall Performance Indicators for Urban Consumers is exceeded by a Distributor, the economic value of this non compliance, impacting to such Distributor, shall be calculated with the following formula:

$$Econ\_impact_{u,u}(JD)_i = Max(Comp\_SAIDI_{u,u}; Comp\_TTIK_{u,u}; Comp\_SAIFI_{u,u}; Comp\_AFIK_{u,u})$$

where:

*Econ\_impact<sub>u,u</sub>(JD)<sub>i</sub>*: is the economic impact on Distributor "i" due to non compliance with the Overall Performance Indicators for Urban Consumers, in the corresponding calendar year.

*Max ( )*: means the maximum of all the values indicated within the brackets.

1.1.3. In the formula established in the previous paragraph,

(a) *Comp\_SAIID<sub>u,u</sub>* shall be calculated as follows

(i) If tolerance for *SAID<sub>u,u</sub>* is exceeded:

$$Comp\_SAID_{u,u}(JD)_i = (SAID_{u,u} - Tol) * \frac{YearEnergy_u}{8760} * Ucom$$

(ii) If tolerance for *SAID<sub>u,u</sub>* is not exceeded, *SAID<sub>u,u</sub>* will be zero

(b) *Comp\_TTIK<sub>u,u</sub>* shall be calculated as follows:

(i) If tolerance of *TTIK<sub>u,u</sub>* is exceeded:

$$Comp\_TTIK_{u,u}(JD)_i = (TTIK_{u,u} - Tol) * \frac{YearEnergy_u}{8760} * Ucom$$

(ii) If tolerance for *Comp\_TTIK<sub>u,u</sub>* is not exceeded, *Comp\_TTIK<sub>u,u</sub>* will be zero

(c) *Comp\_SAIFI<sub>u,u</sub>* shall be calculated as follows

(i) If tolerance of *SAIFI<sub>u,u</sub>* is exceeded:



$$Comp\_SAIFlu,u(JD)_i = (SAIFI_{u,u} - Tol) * \left( \frac{SAIDI_{u,u}}{SAIFI_{u,u}} \right) * \frac{YearEnergy_u}{8760} * Ucom$$

- (ii) If tolerance for  $Comp\_SAIFI_{u,u}$  is not exceeded,  $Comp\_SAIFI_{u,u}$  will be zero
- (d)  $Comp\_AFIK_{u,u}$  shall be calculated as follows
  - (i) If tolerance of  $AFIK_{u,u}$  is exceeded:

$$Comp\_AFIKu,u(JD)_i = (AFIK_{u,u} - Tol) * \left( \frac{TTIK_{u,u}}{AFIK_{u,u}} \right) * \frac{YearEnergy_u}{8760} * Ucom$$

- (ii) If tolerance for  $AFIK_{u,u}$  is not exceeded,  $AFIK_{u,u}$  will be zero

Where

$SAIDI_{u,u}$ ;  $TTIK_{u,u}$ ;  $SAIFI_{u,u}$  and  $AFIK_{u,u}$ : are the actual (registered) values for each of such Overall Performance Indicators during the corresponding complete calendar year

$Tol$ : is the approved tolerance for each of the selected Overall Performance Indicator.

$Year\ Energy_u$ : is the annual amount of Energy billed by the Distributor to its Urban Consumers during the year, expressed in kWh.

$Ucom$ : is the unitary value for each kWh of Energy non-supplied to an Urban Consumer approved by the ERC in accordance to paragraph 1.1.1

1.1.4. If at the end of a calendar year, any of the tolerances approved by the ERC for the Overall Performance Indicators for Rural Consumers is exceeded by a Distributor, conomic value of this non compliance, impacting to such Distributor shall be calculated with the following formula:

$$Econ\_impact_{u,r}(JD)_i = Max(Comp\_SAIDI_{u,r}; Comp\_TTIK_{u,r}; Comp\_SAIFI_{u,r}; Comp\_AFIK_{u,r})$$

where:

$Econ\_impact_{u,r}(JD)_i$ : is the economic impact on the Distributor “i” due to non compliance with the Overall Performance Indicators for Rural Consumers, in the corresponding calendar year.

$Max()$ : means the maximum of all the values indicated within the brackets.

1.1.5. In the formula established in the previous paragraph,

- (a)  $Comp\_SAIDI_{u,r}$  shall be calculated as follows
  - (i) If tolerance for  $SAIDI_{u,r}$  is exceeded:



$$Comp\_SAIDu,r(JD)_i = (SAIDI_{u,r} - Tol) * \frac{YearEnergy_r}{8760} * Ucom$$

(ii) If tolerance for SAIDI<sub>u,r</sub> is not exceeded, SAIDI<sub>u,r</sub> will be zero

(b) Comp\_TTIK<sub>u,r</sub> shall be calculated as follows:

(i) If tolerance of TTIK<sub>u,r</sub> is exceeded:

$$Comp\_TTIKu,r(JD)_i = (TTIK_{u,r} - Tol) * \frac{YearEnergy_r}{8760} * Ucom$$

(ii) If tolerance for Comp\_TTIK<sub>u,r</sub> is not exceeded, Comp\_TTIK<sub>u,r</sub> will be zero

(c) Comp\_SAFI<sub>u,r</sub> shall be calculated as follows

(i) If tolerance of SAIFI<sub>u,r</sub> is exceeded:

$$Comp\_SAIFu,r(JD)_i = (SAIFI_{u,r} - Tol) * \left( \frac{SAIDI_{u,r}}{SAIFI_{u,r}} \right) * \frac{YearEnergy_r}{8760} * Ucom$$

(ii) If tolerance for Comp\_SAFI<sub>u,r</sub> is not exceeded, Comp\_SAFI<sub>u,r</sub> will be zero

(d) Comp\_AFIK<sub>u,r</sub> shall be calculated as follows

(i) If tolerance of AFIK<sub>u,r</sub> is exceeded:

$$Comp\_AFIKu,r(JD)_i = (AFIK_{u,r} - Tol) * \left( \frac{TTIK_{u,r}}{AFIK_{u,r}} \right) * \frac{YearEnergy_r}{8760} * Ucom$$

(ii) If tolerance for AFIK<sub>u,r</sub> is not exceeded, AFIK<sub>u,r</sub> will be zero

Where

*SAIDI<sub>u,r</sub>; TTIK<sub>u,r</sub>; SAIFI<sub>u,r</sub> and AFIK<sub>u,r</sub>*: are the actual (registered) values for each of such Overall Performance Indicators during the corresponding complete calendar year

*Tol*: is the approved tolerance for each of the selected Overall Performance Indicator.

*Year Energy<sub>u</sub>*: is the annual amount of Energy billed by the Distributor to its Rural Consumers during the corresponding year, expressed in kWh.

*Ucom*: is the unitary value for each kWh of Energy non-supplied to a Rural Consumer approved by the ERC in accordance to paragraph 1.1.1

## 1.2. NON COMPLIANCE WITH INDIVIDUAL INDICATORS

1.2.1. If at the end of a calendar year any of the Individual Performance Indicators of a Consumer exceeds the tolerance approved by the ERC for the Distributor (either the number



or total time of Interruptions is exceeded), the Distributor shall be subject to a economic reduction of its revenue requirements for all Interruptions to that Consumer exceeding the tolerance.

1.2.2. In the case of a Distributor with non compliance to any of the Individual Performance Indicators of a Consumer as established in the previous paragraph, the economic impact for the Distributor for such Consumer will be calculated as:

$$Economic\_impact(JD)_{i,j} = Interruption.Duration_{i,j} * \frac{YearEnergy_i}{8760} * Ucom * FC_i$$

where:

*Economic\_impact (JD)<sub>i,j</sub>*: is the economic impact on the Distributor, for each Interruption “j” caused to Consumer “i” during the calendar year subsequent to the exceeding the tolerance to any Individual Performance Indicator of such Consumer.

*Interruption Duration<sub>i,j</sub>*: is the duration of the Interruption “j” to Consumer “i”

*Year Energy<sub>i</sub>*: the annual amount of Energy billed by the Distributor to the Consumer “i”.

*Ucom*: is the unitary value for each kWh of Energy non supplied corresponding to the type of Consumer, approved by the ERC in accordance to paragraph 1.1.1

*FC<sub>i</sub>*: is a factor that takes into consideration the time of day the Interruption occurs. These factors shall be calculated and approved by the ERC for each type of Consumer at the end of Control Phase 2 using typical load curves for the different types of Consumers.

1.2.3. The total economic impact for a Distributor for exceeding the tolerances of Individual Performance Indicators (for the applicable calendar year) will be calculated as:

$$Econ\_impact\ ind(JD)_i = \sum_i \sum_j Economic\_impact(JD)_{i,j}$$

where:

*Economic\_impact (JD)<sub>i,j</sub>*: is the economic impact, to the Distributor, for each Interruption “j” caused to Consumer “i” for non compliance with the Performance Indicators of such Consumer, calculated as established in paragraph 1.2.2

## 2. NON COMPLIANCE WITH POWER QUALITY

Reduction in revenue requirements due to non-compliance with the tolerances of the corresponding power quality Individual Performance Indicator of a Consumer shall be calculated as a function of the maximum voltage deviation and the Energy supplied to that



Consumer. Before the end of Control Phase 2, the ERC will define and approve the methodology to determine this economic impact using as a reference the estimation of the economic cost of the non-supplied Energy of Consumers

### **3. NON-COMPLIANCE WITH CONSUMER SERVICE QUALITY STANDARDS**

#### **3.1. NON COMPLIANCE IN NEW CONNECTIONS**

3.1.1. If the time for a new connection of a Consumer exceeds the tolerance established in Condition “New connections for Consumers” of this Distribution Performance Standards, the Distributor will be subject to the following reduction in its revenue requirements for each Business Day exceeding the maximum established:

$$\text{Economic impact} = \text{TCC} / (2 * \text{MAT})$$

Where

TTC: Total connection cost (JD)

MAT: Maximum allowed connection time as established in Condition “New connections for Consumers” of this Performance Standard

3.1.2. If the time for the Distributor to send the Consumer a budget, in the case of connections that requires special extensions or upgrading of the Distribution System, exceeds the tolerance established in Condition “New connections for Consumers” of this Distribution Performance Standards, the Distributor will be subject to the following reduction in its revenue requirements for each Business Day exceeding the maximum established:

$$\text{Economic impact} = \text{TBC} / (4 * \text{MAT})$$

Where

TBC: Total budget cost (JD)

MAT: Maximum allowed time for sending a budget as established in Condition “New connections for Consumers” of this Performance Standard

#### **3.2. NON COMPLIANCE IN RECONNECTION**

If after the disconnection to a Consumer due to non-payment of bills and the affected Consumer paying in full the outstanding debt, the time for the reconnection of the Consumer exceeds the tolerance established in Condition “Temporary Disconnection of Service due to Non Payment” of the Distribution Performance Standards, the Distributor will be subject to a reduction in its revenue requirements equal to 20% of the amount of monthly average Energy billed during the last twelve (12) months, for each Business Day exceeding the maximum established.

#### **3.3. NON COMPLIANCE TO CONSUMER COMPLAINTS**

If the Distributor does not answer a Consumer complaint within the time tolerance established in Condition “Consumer Complaints” of this Distribution Performance Standards, the



Distributor will be subject to a reduction in its revenue requirements equal to 10 JD for each complaint not resolved on time.

### **3.4. NON COMPLIANCE IN BILLING**

3.4.1. If the number of estimated bills for a single Consumer of a Distributor exceeds the maximum tolerance established in Condition “Metering and Billing” of this Distribution Performance Standards, the Distributor will be subject to the following reduction in its revenue requirements for each bill exceeding the maximum established:

**Economic Impact** = 20 % of the estimated bill

3.4.2. If a Consumer complaint on possible errors in its bill is not answered by the Distributor within the time tolerance established in Condition “Metering and Billing” of this Distribution Performance Standards, the Distributor will be subject to a reduction in its revenue requirements equal to 50 % of the value of each bill that originated the claim.

3.4.3. If the total number of estimated bills in a month for a Distribution Company exceeds the tolerance established in Condition “Metering and Billing” of this Distribution Performance Standards, the Distributor will be subject to a reduction in its revenue requirements, decided by the ERC, after due hearing of its case. The maximum reduction in its revenue requirements for the first time will not exceed 30 % of total estimated bills that exceed the tolerance. This percentage could be increased by the ERC in the case of non-compliance with this standard repeats on the following months.

## **4. COMPENSATION TO CONSUMERS**

### **4.1. CALCULATION OF ANNUAL COMPENSATION**

4.1.1. During the first three months of each calendar year, the ERC will calculate, using the detailed data provided by Distributors and monitored and controlled by the ERC as established in this Distribution Performance Standards, the total economic impact (reduction in revenue requirements) applicable to each Distributor, adding the economic impacts due to non compliance with:

- (a) supply quality Overall Performance Indicators for Rural Consumers and for Urban Consumers;
- (b) supply quality Individual Performance Indicators;
- (c) power quality Performance Indicators; and
- (d) Consumer service quality standards

4.1.2. The ERC shall send to each Distributor the total economic impact corresponding to the previous year applicable to such Distributor as calculated by the ERC in accordance to the previous paragraph, for the purpose of verification and comments. The ERC will analyse the comments or corrections raised by the Distributors, and revise if necessary the calculations to produce the final calculation of the economic impact for each Distributor in the previous year.



## **4.2. IMPACT OF COMPENSATION IN CONSUMERS' TARIFFS**

4.2.1. The annual economic impacts calculated in accordance to Condition "Calculation of Annual Compensation" will not be directly paid by the Distributor, but instead discounted from the annual revenue requirement in the calculation of the tariffs of the Distributor for the next Tariff Review Period, as established in the Tariff Methodology. The revenue requirement for tariff calculation of each Distributor will be equal to their required and approved revenue for the next Tariff Review Period minus the sum of all reductions due to non compliance calculated for the years since the last tariff calculation.



### ANNEX 3: TOLERANCES TO SUPPLY QUALITY INDICATORS

The following tolerances will apply for Control Phase 2, unless the ERC, when issuing a new license to a Distributor, specifies different values for one or more of these tolerances:

#### 1. JEPSCO

The following values shall be used for JEPSCO as tolerance for the Overall Performance Indicators during Control Phase 2.

##### 1.1. UNSCHEDULED INTERRUPTIONS

###### 1.1.1. Overall Performance Indicators for Urban Consumers:

| Overall Performance Indicator                                     |                      | Value                    |
|-------------------------------------------------------------------|----------------------|--------------------------|
| Name                                                              | Acronym              |                          |
| System average unscheduled frequency Interruption, in urban areas | SAIFI <sub>u,u</sub> | 3,0 disconnection / year |
| System average unscheduled Interruption duration, in urban areas  | SAIDI <sub>u,u</sub> | 2,5 hours / year         |

Tolerances for AFIK<sub>u,u</sub> and TTIK<sub>u,u</sub> will be established by the ERC at the beginning of the second year of Control Phase 2.

###### 1.1.2. Overall Performance Indicators for Rural Consumers:

| Overall Performance Indicator                                     |                      | Value                    |
|-------------------------------------------------------------------|----------------------|--------------------------|
| Name                                                              | Acronym              |                          |
| System average unscheduled frequency Interruption, in rural areas | SAIFI <sub>u,r</sub> | 6,0 disconnection / year |
| System average unscheduled Interruption duration, in rural areas  | SAIDI <sub>u,r</sub> | 7,0 hours / year         |

Tolerances for AFIK<sub>u,r</sub> and TTIK<sub>u,r</sub> will be established by the ERC at the beginning of the second year of Control Phase 2.

##### 1.2. SCHEDULED INTERRUPTIONS

No limits on Scheduled Interruptions Performance Indicators will be applied during Control Phase 1 and the first year of Control Phase 2. Following this period, the ERC will decide whether or not to impose tolerance to these Performance Indicators and, if tolerances are imposed, the ERC will establish and approve the corresponding values.



### 1.3. EXTERNAL AND THIRD PARTY INTERRUPTIONS

No limits on External and Third Party Interruptions will be applied.

## 2. EDCO

The following values shall be used for EDCO as tolerance for the Overall Performance Indicators during Control Phase 2.

### 2.1. UNSCHEDULED INTERRUPTIONS

2.1.1. Overall Performance Indicators for Urban Consumers:

| Overall Performance Indicator                                     |                      | Value                    |
|-------------------------------------------------------------------|----------------------|--------------------------|
| Name                                                              | Acronym              |                          |
| System average unscheduled frequency Interruption, in urban areas | SAIFI <sub>u,u</sub> | 6,0 disconnection / year |
| System average unscheduled Interruption duration, in urban areas  | SAIDI <sub>u,u</sub> | 6,0 hours / year         |

Tolerances for AFIK<sub>u,u</sub> and TTIK<sub>u,u</sub> will be established by the ERC at the beginning of the second year of Control Phase 2.

2.1.2. Overall Performance Indicators for Rural Consumers:

| Overall Performance Indicator                                     |                      | Value                      |
|-------------------------------------------------------------------|----------------------|----------------------------|
| Name                                                              | Acronym              |                            |
| System average unscheduled frequency Interruption, in rural areas | SAIFI <sub>u,r</sub> | 10,0 disconnections / year |
| System average unscheduled Interruption duration, in rural areas  | SAIDI <sub>u,r</sub> | 10,0 hours / year          |

Tolerances for AFIK<sub>u,r</sub> and TTIK<sub>u,r</sub> will be established by the ERC at the beginning of the second year of Control Phase 2.

### 2.2. SCHEDULED INTERRUPTIONS

No limits on Scheduled Interruptions Performance Indicators will be applied during Control Phase 1 and the first year of Control Phase 2. Following this period, the ERC will decide whether or not to impose tolerance to these Performance Indicators and, if tolerances are imposed, the ERC will establish and approve the corresponding values.

### 2.3. EXTERNAL AND THIRD PARTY INTERRUPTIONS

No limits on External and Third Party Interruptions will be applied.



### 3. IDECO

The following values shall be used for IDECO as tolerance for the Overall Performance Indicators during Control Phase 2.

#### 3.1. UNSCHEDULED INTERRUPTIONS

3.1.1. Overall Performance Indicators for Urban Consumers:

| Overall Performance Indicator                                     |                      | Value                    |
|-------------------------------------------------------------------|----------------------|--------------------------|
| Name                                                              | Acronym              |                          |
| System average unscheduled frequency Interruption, in urban areas | SAIFI <sub>u,u</sub> | 6,0 disconnection / year |
| System average unscheduled Interruption duration, in urban areas  | SAIDI <sub>u,u</sub> | 5,0 hours / year         |

Tolerances for AFIK<sub>u,u</sub> and TTIK<sub>u,u</sub> will be established by the ERC at the beginning of the second year of Control Phase 2.

3.1.2. Overall Performance Indicators for Rural Consumers:

| Overall Performance Indicator                                     |                      | Value                     |
|-------------------------------------------------------------------|----------------------|---------------------------|
| Name                                                              | Acronym              |                           |
| System average unscheduled frequency Interruption, in rural areas | SAIFI <sub>u,r</sub> | 8,0 disconnections / year |
| System average unscheduled Interruption duration, in rural areas  | SAIDI <sub>u,r</sub> | 8,0 hours / year          |

Tolerances for AFIK<sub>u,r</sub> and TTIK<sub>u,r</sub> will be established by the ERC at the beginning of the second year of Control Phase 2.

#### 3.2. SCHEDULED INTERRUPTIONS

No limits on Scheduled Interruptions Performance Indicators will be applied during Control Phase 1 and the first year of Control Phase 2. Following this period, the ERC will decide whether or not to impose tolerance to these Performance Indicators and, if tolerances are imposed, the ERC will establish and approve the corresponding values.

#### 3.3. EXTERNAL AND THIRD PARTY INTERRUPTIONS

No limits on External and Third Party Interruptions will be applied.



## ANNEX 4: CAPS TO DISTRIBUTION ENERGY LOSSES

Following values for caps to distribution losses will apply for the first 3 years following the approval of this Performance Standards, unless the ERC, when applying the Tariff Methodology for the next Tariff Period, specifies different values for the tolerance. In the latter case, the values used by the ERC in the calculation of Consumers' tariffs. will apply. In following years, the values used during the Tariff Review Period will apply

### 1. JEPKO

The following values will be used by the ERC for the first Tariff Review Period of the Tariff Methodology, as Distribution Energy Losses of JEPKO (Technical Losses plus Non Technical Losses plus Administrative Losses) in the calculation of Consumers' tariffs.

|          | First year | Second year | Third year |
|----------|------------|-------------|------------|
| % Losses | 10.0 %     | 9.8 %       | 9.6 %      |

### 2. EDCO

The following values will be used by the ERC for the first Tariff Review Period of the Tariff Methodology, as Distribution Energy Losses of EDCO (Technical Losses plus Non Technical Losses plus Administrative Losses) in the calculation of Consumers' tariffs.

|          | First year | Second year | Third year |
|----------|------------|-------------|------------|
| % Losses | 12.5 %     | 12.1 %      | 11.7 %     |

### 3. IDECO

The following values will be used by the ERC for the first Tariff Review Period of the Tariff Methodology, as Distribution Energy Losses of IDECO (Technical Losses plus Non Technical Losses plus Administrative Losses) in the calculation of Consumers' tariffs.

|          | First year | Second year | Third year |
|----------|------------|-------------|------------|
| % Losses | 11.5 %     | 11.1 %      | 10.8 %     |