

Republic of the Philippines
ENERGY REGULATORY COMMISSION
San Miguel Avenue, Pasig City

**GUIDELINES FOR THE MONITORING OF RELIABILITY STANDARDS FOR
DISTRIBUTION UTILITIES**

Pursuant to Section 43 (b) of Republic Act No. 9136, Rule 3 Section 4 (g) of its Implementing Rules and Regulations, and Article 3.3 of the Philippine Distribution Code (PDC), the Energy Regulatory Commission (ERC) hereby adopts and promulgates the following Guidelines for the Enforcement of Reliability Standards.

ARTICLE I

GENERAL PROVISIONS

Section 1. Objectives. These Guidelines shall have the following objectives:

- a) To ensure the continued Reliability of electric service to End-Users.
- b) To adopt rules and regulations for assessing the Reliability of the Distribution System.
- c) To adopt requirements for maintenance of Interruption data, retention of records, and report filing.
- d) To provide well-defined data to allow trend analysis over time for a given utility or among Distribution Utilities.
- e) To establish a way of tracking and identifying System Reliability problems.
- f) To establish reporting requirements to provide consumers, the ERC, and Distribution Utilities with methodology for monitoring Reliability within a Distribution Utilities' franchise area.

Section 2. General Obligations of a Distribution Utility.

- (a) Each Distribution Utility shall make reasonable efforts to avoid and prevent Interruptions of service. However, when Interruptions occur, service shall be reestablished within the shortest time practicable.
- (b) The Distribution System shall be designed and operated with sufficient protection to ensure safety and to limit the frequency and Duration of Interruptions to End-Users.
- (c) Each Distribution Utility shall keep records of Interruptions of service on its primary Distribution System and shall make an analysis of the records for the purpose of determining steps to be taken to prevent recurrence of such Interruptions.

ARTICLE II

SCOPE AND DEFINITION OF TERMS

Section 1. Scope. These Guidelines shall apply to:

- a) Privately-owned Distribution Utilities;
- b) Electric Cooperatives;
- c) Local government unit owned-and-operated Distribution Utilities;
- d) Entities duly authorized to own, operate and maintain Distribution facilities within the economic zones; and
- e) Other duly authorized entities engaged in the Distribution of Electricity.

Section 2. Definition of Terms. As used in these Guidelines, the following terms shall have the following respective meanings:

- (a) “**Act**” unless otherwise stated, refers to Republic Act No. 9136, otherwise known as the “Electric Power Industry Reform Act of 2001”.
- (b) “**Adverse Weather**” refers to a weather condition that result in abnormally high rate of Forced Outages for exposed Components while such condition persists, but does not qualify

as a Major Storm Disaster. An Adverse Weather condition can be defined for a particular System by selecting the proper values and combinations of the weather conditions reported by the Weather Bureau including thunderstorm, wind velocity, precipitation, and temperature.

- (c) **“Component”** refers to a piece of Equipment, a line or circuit, a section of line or circuit, or a group of items, which is viewed as an entity for a specific purpose.
- (d) **“Customer”** refers to any person or entity supplied with electric service under a contract with a Distributor or Supplier.
- (e) **“Distribution of Electricity”** refers to the conveyance of electric power by a Distributor through its Distribution System.
- (f) **“Distribution System”** refers to the system of wires and associated facilities belonging to a franchised Distribution Utility extending between the delivery points on the transmission, sub-transmission System, or generating plant connection and the point of connection to the premises of the End-User.
- (g) **“Distribution Utility”** refers to any electric cooperative, private corporation, government-owned utility or existing local government unit which has an exclusive franchise to operate a Distribution System in accordance with its franchise and the Act.
- (h) **“Distributor”** has the same meaning as Distribution Utility.
- (i) **“End-User”** refers to any person or entity requiring the supply and delivery of electricity for its own use.
- (j) **“Energy Regulatory Commission” or “ERC”** refers to the regulatory agency created under Republic Act No. 9136.
- (k) **“Equipment”** refers to all apparatus, machines, conductors, etc. used as part of, or in connection with, an electrical installation.
- (l) **“Forced Outage”** refers to an Outage that results from emergency conditions directly associated with a Component requiring that it be taken out of service immediately, either automatically or as soon as switching operations can be performed. Also, an Outage caused by human error or the improper operation of Equipment.

- (m) **“Interruption”** refers to the loss of service to a Customer or a group of Customers or other facilities. An interruption is the result of one or more Component Outages.
- (n) **“Interruption Duration”** refers to the period from the initiation of an Interruption up to the time when electric service is restored.
- (o) **“Major Storm Disaster”** refers to a weather condition wherein the design limits of Equipment or Components are exceeded, and which results in extensive mechanical fatigue to or failure of Equipment, widespread Customer Interruption, and unusually long service restoration time.
- (p) **“Momentary Interruption”** refers to a state of zero voltage of a Component that lasts not more than five (5) minutes.
- (q) **“Outage”** refers to a state of a Component when it is not available to perform its intended function due to some event directly associated with that Component. An outage may or may not cause an Interruption of service to Customers.
- (r) **“Power Quality”** shall refer to the quality of the voltage, including its frequency and resulting current, that are measured in the Grid, Distribution System, or any User System.
- (s) **“Reliability”** refers to the probability that a System or Component will perform a required task or mission for a specified time in a specified environment. It is the ability of a power System to continuously provide service to its Customers.
- (t) **“Scheduled Interruption”** refers to an Interruption of electric power that result when a Distribution Component is deliberately taken out of service at a selected time, usually for the purposes of construction, preventive maintenance, or repair.
- (u) **“Supplier”** refers to any person or entity authorized by the ERC to sell, broker, market, or aggregate electricity to the End-Users.
- (v) **“Sustained Outage”** refers to a state of zero voltage of a Component that lasts greater than five (5) minutes.
- (w) **“System”** refers to the Distribution System or any User System. Also, a group of Components connected or associated in a fixed configuration to perform a specified function.

ARTICLE III

RELIABILITY INDICES AND SPECIFICATIONS OF DATA INCLUSIONS AND EXCLUSIONS

Section 1. Reliability Indices. The following Reliability indices shall be imposed on all Distribution Utilities:

- a) System Average Interruption Frequency Index (SAIFI) is the average number of Interruptions per Customer during the year. It is calculated by dividing the total annual number of sustained Customer power Interruptions by the average number of Customers served during the year.
- b) System Average Interruption Duration Index (SAIDI) is the average Interruption Duration per Customer during the year. It is calculated by dividing the annual sum of customer-minutes of sustained power Interruptions by the average number of Customers served during the year.
- c) Momentary Average Interruption Frequency Index (MAIFI) is the average frequency of momentary Interruptions per Customer during the year. It is calculated by dividing the total annual number of momentary Customer power Interruptions by the average number of Customers served during the year.

Section 2. Specification of Data Inclusions. A power Interruption shall include any Outage in the primary Distribution System, extending from the distribution substation to the distribution transformers, which may be due to the tripping action of protective devices during faults or the failure of primary distribution lines and/or transformers, and which results in the loss of service to one or more Customers or Users.

Section 3. Specification of Data Exclusions. The following events shall be excluded in the calculation of the Reliability indices:

- a) Outages that occur on the secondary lines of the Distribution System;
- b) Outages due to generation, transmission line, or transmission substation failure;
- c) Planned or Scheduled Outages where the Customers or Users have been notified at least three (3) days prior to the loss of power;

- d) Outages that are initiated by the System Operator/Market Operator during the occurrence of Significant Incidents or the failure of their facilities;
- e) Outages caused by Adverse Weather or Major Storm Disasters which result in the declaration by the government of a state of calamity in the franchise area of the Distributor; and
- f) Outages due to other events that the ERC shall approve after due notice and hearing.

ARTICLE IV

RECORDING REQUIREMENTS

Section 1. Outage Management System (OMS). Each Distribution Utility shall maintain an automated outage management system (OMS) sufficient to determine a history of sustained electric service Interruptions experienced by each Customer. The OMS shall have the ability to access data for each Customer in order to determine a history of electric service Interruptions. Data shall also be sortable by each of the following factors:

- a) Town/s or City/Cities affected,
- b) Barangay or Subdivision affected,
- c) Substation affected,
- d) Circuit Number.
- e) Service Account Number

And in combination with the following factors:

- f) Number of Interruptions in reporting period, and
- g) Number of hours of Interruptions in reporting period.

Section 2. Required Records. Records on interruptions shall be sufficient to determine the following:

- a) Starting date and time the Distribution Utility became aware of the Interruption;

- b) Location of the outage (town or city and Barangay or Subdivision);
- c) Circuit number(s) of the distribution circuit(s) affected;
- d) Number of Customers affected;
- e) Service account number or other unique identifier of each Customer affected;
- f) Description of the cause of the Interruption;
- g) Weather conditions at time of Interruption;
- h) System Component(s) involved (e.g., distribution substation, primary lines, distribution transformer, etc.)
- i) Date and time service was restored;
- j) Duration of the Interruption;
- k) Whether the Interruption was scheduled or unscheduled.

Section 3. Cause Codes. Each Distribution Utility shall keep information on interruption cause codes, interruption weather codes, interruption isolating device codes, and interruption equipment failed codes. The Distribution Utilities may augment the following code sets to enhance tracking:

- a) The minimum Interruption cause code set should include: (01) human being, (02) lightning, (03) major storm disaster, (04) scheduled, (05) trees, (06) overload, (07) error, (08) supply, (09) equipment, (010) other, (011) unknown, and (012) earthquake.
- b) The minimum Interruption weather code set should include: (11) wind, (12) lightning, (13) rain, (14) clear day, and (15) typhoon.
- c) The minimum Interruption isolating device code set should include: (21) breaker, (22) recloser, (23) fuse, (24) sectionalizer, (25) switch, and (26) network protectors.
- d) The minimum Interruption equipment failed code set should include: (31) primary line, (32) secondary line, (33) distribution transformer, (34) distribution sub-station, (35) splice, (36) lightning arrester, (37) switches, (38) cross arm, (39) pole, (310) insulator, (311) connector, (312) others, and (313) unknown.

ARTICLE V

FILING REQUIREMENTS AND PROCEDURES

Section 1. Petition for Approval of Performance Targets. Every Distribution Utility shall file a petition for the approval of performance targets for SAIFI, SAIDI, and MAIFI before the end of the first semester of the year 2005. The targets shall be based on the applicant's 5-year historical data. The data shall be recorded using Table-1R in Annex A. For available historical data that were recorded in different formats, a Distributor shall be allowed to normalize the data in order to comply with the requirement using Table-1 in Annex A.

Section 2. Setting of Performance Targets. Performance targets for each Distribution Utility shall be set using the mean of the complete five year or five year normalized historical data, with one standard deviation above and below the target to allow for normal fluctuations in performance.

Section 3. Separate Performance Targets for each Distribution District, Zone, or Work Center. Distribution Utilities who have divided their Distribution Systems to several distribution districts, zones, or work centers may opt to file separate performance targets for each distribution district, zone, or work center.

Section 4. Required Records. Petitions in legal format shall be submitted in one (1) original copy and three (3) conformed copies duly signed and verified by the Responsible Person of the Distribution Utility. However, all data requirements specified in Section 1, and computation of Performance Targets in Section 2, both of Article V shall be submitted in Portable Document Format (PDF) or any other format that cannot be altered. Two (2) electronic copies shall also be submitted in Microsoft Excel File or its equivalent for evaluation purposes.

ARTICLE VI

RELIABILITY REPORTS

Section 1. Quarterly Reports. Each Distribution Utility shall submit quarterly Interruption reports (presenting monthly data) for its Distribution System, on or before the end of the month following the quarter starting year 2005, using the standard format prescribed in Annex-A sufficient to compute the annual indices for SAIFI, SAIDI and MAIFI. The data shall be submitted in electronic copy using a Portable Document Format (PDF) or any other format that cannot be altered.

The quarterly report should also include calculation of the average minutes of interruption per customer due to causes in each of the following categories: Power Supplier, Major Storm Disaster, Scheduled, and All Others.

The Interruptions resulting from either scheduled or unscheduled outages on lines or substations owned by Transco are to be accounted for in the “power supplier” category.

The category “major storm disaster” represents service interruptions from conditions that cause many concurrent outages because of typhoon that exceed design assumptions for the lines.

The category “scheduled” refers to interruptions resulting when a distribution transformer, line or Distributor owned substation is deliberately taken out of service at a selected time for maintenance or other reasons.

The “all other” category includes outages primarily resulting from emergency conditions due to Equipment breakdown, malfunction or human error.

ARTICLE VII

REPEAL AND SEPARABILITY

Section 1. Repeal and Separability. All existing rules, regulations or orders or any part thereof inconsistent with this Rules are hereby repealed, amended or modified accordingly. If any part or provision of these Rules is declared unconstitutional or illegal, the other parts or provisions shall remain valid.

ARTICLE VIII

EFFECTIVITY

Section 1. Effectivity. This Rules shall take effect fifteen (15) days after publication in two newspapers of general circulation in the country.

Pasig City, _____, 2004.

RODOLFO B. ALBANO, JR.
Chairman

OLIVER B. BUTALID
Commissioner

JESUS N. ALCORDO
Commissioner

RAUF A. TAN
Commissioner

ALEJANDRO Z. BARIN, JR.
Commissioner

Formulas for Reliability Indices:**System Average Interruption Frequency Index (SAIFI)**

$$\text{SAIFI} = \frac{\text{Total Annual Number of Sustained Customer Power Interruptions}}{\text{Average Number of Customers Served during the year}}$$

$$\text{SAIFI} = \frac{\sum N_s i_s}{N_t}$$

System Average Interruption Duration Index (SAIDI)

$$\text{SAIDI} = \frac{\sum \text{Customer Interruption Durations}}{\text{Average Number of Customer Served during the year}}$$

$$\text{SAIDI} = \frac{\sum N_s r_s}{N_t}$$

Momentary Average Interruption Frequency Index (MAIFI)

$$\text{MAIFI} = \frac{\text{Total Number of Momentary Customer Power Interruptions}}{\text{Average Number of Customer Served during the year}}$$

$$\text{MAIFI} = \frac{\sum N_m i_m}{N_t}$$

Where:

N_s = total number of customers with sustained interruptions in a month

i_s = total number of sustained interruptions in a month

N_t = average number of customers served during the year

r_s = duration of sustained interruptions in a month

i_m = total number of momentary interruptions in a month

N_m = total number of customers with momentary interruptions in a month

