

**PUBLIC UTILITIES
REGULATORY COMMISSION**



REGULATORY BRIEF

ISSUE 3

Guidelines on Performance
Improvement Plan (PIP) for
Distribution Companies
(DISCOs)

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**Guidelines to be issued by PURC &
Energy Commission on key activities
to be carried out by distribution
utilities to improve their operational
performance in all business areas.**

KEY HIGHLIGHTS

- DISCOs should incorporate a Commercial Management System (CMS) to manage all commercial processes: revenue cycle, customer management, etc.
- DISCOs should map customers (points of electricity supply) and network infrastructure on a Geographical Information System (GIS), including customers' connections and links with network assets.
- DISCOs should implement a Revenue Protection Project (RPP) supported by Advanced Metering Infrastructure (AMI) to systematically record and monitor the consumption of large and medium customers and permanently eliminate commercial losses in that "high value" segment
- DISCOs should implement a 3-Year Loss Reduction Plan Revenue to optimize management of losses in electricity supply to its customers in a sustainable manner.
- KPIs and time frames described in LI 1935 need to be reviewed to send the right signal to the distribution sector, chasing the improvement of DISCOs' performance.
- PURC/EC must audit information provided by DISCOs on KPIs.

1. Introduction

The Guidelines for Performance Improvement Plans are proposed guidelines to be issued by the Public Utilities Regulatory Commission (PURC) and Energy Commission (EC) to the distribution utilities on key activities to be carried out to improve their operational performance in all business areas (electricity supply to customers, commercial operations and management of corporate resources). The guidelines were developed based on best practices adopted by well-performing utilities in emerging countries worldwide. The document also aims at strengthening the regulatory system by offering recommendations to the EC and PURC.

The PIP's primary focus areas include;

Loss reduction/Distribution System losses, System voltages and load balance, Reliability/availability indices, Assessment of operating (Opex) and capital expenditure (Capex), collection rate, metering, metering penetration and meter review, customer satisfaction, New connection/network expansion and Safety and social responsibility.

This regulatory brief is a synopsis of the Performance Improvement Plan Guidelines developed for Ghana through the Ghana Energy Sector Transformation Initiative Project (GESTIP) - Technical assistance for capacity development and tooling for regulatory appraisal and monitoring of performance improvement projects.

2. Assessment of the Current Situation of the Electricity Distribution and Retail Sector

2.1 System Outlook on Distribution and Commercial Operations

An evaluation of the existing situation shows that Discos' operational performance in commercial and distribution operations must be improved if they are to consistently offer their customers, high-quality services and sell and collect revenues for all of the power used. To do this, businesses must increase both their operational support tools and people resources. Discos must also improve upon the performance of their commercial operations by lowering energy losses and raising collection rates, improving customer service, and increasing operational efficiency, transparency, and accountability. Additionally, to make such changes, Discos must use cutting-edge solutions to assist the effective execution of all processes and operations in all business areas within a framework of accountability and transparency.

Preliminary evaluation of the existing state of the distribution sector enabled the consultant to identify the following issues:

- i. Revenues are eroded by system losses and non-billing: System losses (technical & non-technical) for Discos, stood at over 26.2% for the year 2020, indicating a loss of 3,806GWh of energy.
- ii. The average collection rate for ECG was 84%, which indicates that the company is financially burdened (well - performing utilities of the sector report more than 99% as collection rates).
- iii. The System Average Interruption Duration Index (SAIDI) for ECG, improved from 74h in 2015 to 26h in 2020, however, its current value, still stands far from what could be considered by the sector as an "acceptable performance".

2.2 Regulations on the Reliability of Supply

The Electricity Supply and Distribution (standards of performance) Regulations, 2008 (L.I. 1935) was enacted to ensure the reliability of supply and new service connection processes. The L.I. 1935 was

to provide performance benchmarks for electricity supply and distribution in conformity with the provisions of the Electricity Supply and Distribution (Technical and Operational) Rules, 2005 (L.I. 1816). However, the L.I. 1935, when compared with international standards have the following deficiencies;

- i. Applicable penalties for not meeting the standard are not calculated based on related unserved energy.
- ii. Related thresholds for SAIDI and SAIFI, stated within the standard, do not drive toward the improvement of its performance in terms of reliability of supply. As an example, L.I.1913 states 6 outages/year as SAIFI - threshold, regardless of the area - type (metro, urban or rural).
- iii. As global KPIs on the reliability of supply, the standard considers SAIDI and SAIFI, leaving out of its scope other important KPIs (e.g., some sustained interruption indices, load-based indices under momentary indices defined by IEEE1366).
- iv. The standard does not provide clear information on how discos should map the restoration process within an Outage Management System (OMS) for SAIFI and SAIDI calculations.

3. Performance Improvement Plan Guidelines

3.1 Commercial Operations

3.1.1 Commercial Management System (CMS)

To ensure long-term successful commercial performance, the Disco must have a cutting-edge CMS that allows for the appropriate execution and monitoring of all operations linked to:

- i. Commercial or revenue cycle, including specific stages for customers with post-paid meters (meter reading, billing, bill distribution and collection) and customers

with pre-paid meters (energy sales, issuance and distribution of statements, etc.).

- ii. Attending to customers at commercial agencies, by phone (contact centre), WEB, and social media.
- iii. Disconnection and reconnection of electricity supply related to commercial debts and other actions to manage unpaid bills.
- iv. Management of requests for connection and registration of new customers.
- v. Energy flows and balance and management of non-technical losses.

3.1.2 Customers and Network Infrastructure Mapping using a Geographic Information System (GIS)

This activity is critical for the appropriate geographic identification of all sites of energy supply as well as network infrastructure maintained by the Disco. The Disco's main implementation steps are outlined below:

- i. Install a GIS Tool to map on a master map the following basic layers: asset, a family of assets, network entities, customer premises, and Customer - Network Links.
- ii. Create a Centralized Network Asset / Facility Database (network model + CNL).
- iii. Identify the Customer - Network Link (CNL) and incorporate it into the DMS.
- iv. Construction of customers' database, integrating customers' location and CNL.

3.1.3 Implementation of a Revenue Protection Program (RPP) targeting large and medium consumers supported by Advanced Metering Infrastructure (AMI)

A Revenue Protection Program (RPP) targeting all high and medium-voltage consumers, as well as low-voltage customers, must be included in the PIP. The RPP's goal is to ensure that every unit (kWh of energy) consumed in the Disco's "high value" portion

of the market is metered and invoiced permanently.

3.1.4 Implementation of a Loss Reduction Plan (LRP)

The LRP aims to optimize Discos' commercial and distribution operations by collecting best practices from comparable international experience in emerging countries and taking into account the tools already available to the company as well as those being incorporated under ongoing projects, such as information systems and revenue protection programs.

LRP must consider the activities listed below:

- i. Re-engineering of P&A for distribution and commercial operations.
- ii. Roadmap to implement the new organizational structure, processes and activities.
- iii. Actions for the consolidation of the use of existing supporting tools (CMS, RPP, etc.), and incorporation of new tools to optimize customer service and maximize effectiveness in the management of losses in supply.
- iv. For key actions in the loss reduction plan, indicate the expected impact on losses on an annual basis.
- v. Outline of resources required for successful implementation of the loss reduction plan.

3.2 Electricity Distribution

3.2.1 Outage Management System (OMS)

OMS is a tool that can rapidly and correctly detect the position and amount of any interruption in the power supply, allowing for swift resolution and service restoration. Using a Geographic Information System, the system is backed by a thorough depiction of the distribution network and linkages between locations of power supply and network assets (GIS).

The OMS is, in general, composed of three modules:

- i. Reception and automatic classification of customers' calls (complaints).
- ii. Follow-up on complaints and actions on the distribution network for service restoration.
- iii. Information to management to assist decision-making and monitoring.

The system relies on a fully functional database that contains:

- a. data on customers in the database of the CMS.
- b. link of each customer to supplying MV/LV transformer and LV lines.
- c. supply circuit 'upstream' of each MV/LV transformer to the transmission substation.

3.3 Preparation and implementation stages

For quantitative measuring of the impact of planned projects (PIPs), Discos shall submit to the Commissions, the following information during the preparation stage:

- i. 3-Year Performance Improvement Plan (PIP), fully aligned with Capex and Opex available for the period.
- ii. 3-Year data on targeted KPIs as a result of the implementation of PIPs.
- iii. 3-Year Forecast of energy (purchases and sales), collection, and the number of customers, as a result of the implementation of PIPs.

During the implementation stage, Discos shall submit to the Commission every quarter

the following information:

- i. Data on actual records against targeted KPIs.
- ii. Data on actual records against forecasted parameters: energy (purchases and sales), collection, and the number of customers.

4. Policy Recommendations

The Report makes two key recommendations as follows;

1. Update the Electricity supply and distribution (standards of performance) regulations, 2008 (L.I. 1935)

Electricity supply and distribution (standards of performance) regulations, 2008 (LI1935) needs to be reviewed to send the right signals to the electricity distribution sector, chasing the improvement of Discos' performance, and

2. Establish a "Quality Control Team" at PURC:

Establish/strengthen a "Quality Control Team" to audit the reliability of supply provided by Discos. The "Quality Control Team" will audit information provided by utilities on the reliability of supply through the installation of data loggers (installed by Discos as per PURC/EC requirements) or by inquiring about data from Discos' AMI systems, on a representative number of customers, which usually involves less than 3% of active customers in the sector.

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