

# **ELECTRICITY TRANSMISSION (TECHNICAL, OPERATIONAL AND STANDARDS OF PERFORMANCE) RULES, 2008 (L.I. 1934)**

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SCHEDULE

ELECTRICITY TRANSMISSION (TECHNICAL, OPERATIONAL AND STANDARDS OF PERFORMANCE) RULES, 2008 (L.I. 1934)

IN exercise of the power conferred on the Board of the Energy Commission by sections 27 and 28 of the Energy Commission Act, 1997 (Act 541) these Rules are made this 4th day of June, 2008.

Purpose and application

Rule 1—Purpose

(1) These rules

(a) define the national interconnected transmission system; and

(b) establish the requirements, procedures, practices and standards that govern the development, operation, maintenance and use of the high voltage national interconnected transmission system.

(2) The rules shall ensure that the transmission system provides a fair, transparent, non-discriminatory, open access, safe, reliable, secure and cost efficient transmission and delivery of electricity.

Rule 2—Application

(1) These rules shall apply to the Utility and persons connected to the transmission system including

- (a) wholesale electricity suppliers licensed by the Commission,
  - (b) electricity distribution utilities licensed by the Commission, and
  - (c) bulk customers of electricity duly authorised by the Commission.
- (2) The Utility, as the independent operator of the transmission system, is not a grid participant.
- (3) A grid participant is a person who has a valid Connection Agreement with the Utility to
- (a) construct, own and connect a facility to the transmission system infrastructure,
  - (b) inject, wheel, or off-take power for its own use or for retail,
  - (c) provide ancillary services, or
  - (d) exchange power either with the electricity networks of neighbouring countries or within the West African Power Pool.

#### Rule 3—National interconnected transmission system

The transmission system shall comprise electricity plant and equipment within the borders of Ghana that function or are operated at any voltage higher than 36kV as well as any associated feeder or supply equipment that are for shared or for common use.

#### Rule 4—Requirement for transmission licence

The Utility shall be granted a transmission licence by the Commission.

#### Obligations of the Utility and grid participants

#### Rule 5—Obligations of the Utility as transmission system operator

- (1) The Utility shall independently operate the transmission system to offer fair, transparent, open access and non-discriminatory services in accordance with the prescribed quality to grid participants.
- (2) The Utility shall operate the transmission system to provide services in accordance with the Performance Reliability Standards.
- (3) Without limiting the effect of sub-rules (1) and (2), the Utility shall
- (a) operate the transmission system equipment, installations and facilities in accordance with the operating instructions and guidelines for the respective equipment and in accordance with Prudent Utility Practice;
  - (b) provide open, fair and non-discriminatory access and connection to the transmission system for applicants, licensees and grid participants, in accordance with the regulations and provisions of these Rules;
  - (c) plan for the expansion of the transmission system to adequately meet the requirements of forecast demand growth, potential generation, customers and reliability standards;
  - (d) schedule generation to meet forecast demand in accordance with merit order principles;

- (e) carry out real-time operations including dispatching and controlling the output of the generating units to ensure reliability and economic operation of the transmission system;
  - (f) control and operate the transmission system to ensure the security of the network, within its technical limits and in accordance with the provisions of these Rules;
  - (g) undertake outage planning and maintenance coordination for equipment and facilities which will or are likely to impact on the reliability of the transmission system;
  - (h) plan, develop, install and maintain an adequate central Supervisory Control and Data Acquisition system together with necessary associated backups, telecommunication systems and remote terminal units at transmission substations and generating stations and coordinate their expansion and upgrade;
  - (i) provide, install, operate and maintain the main bulk supply metering system of the transmission system;
  - (j) administer power supply and power purchase transactions;
  - (k) monitor and record capacity and energy balance and perform the accounting and billing function in respect of the transmission system as well as other supply services;
  - (l) coordinate the operations and liaise with interconnected utilities and the West African Power Pool Secretariat to carry out studies and analyses to ensure reliable operation of the West African Power Pool;
  - (m) develop a system operation manual for the co-ordinated operation of the transmission system;
  - (n) supervise and ensure adherence to safety rules by grid participants; and
  - (o) perform any other service that may be determined by the Commission from time to time.
- (4) The Utility shall collect information and data, publish reports and disseminate the information with regards to the performance of the transmission system.
- (5) The Utility shall liaise with the Public Utilities Regulatory Commission and grid participants to develop and ensure consistent and effective application of detailed procedures and manuals which will be approved by the Commission and will form part of the Grid Code.
- (6) The Utility shall operate the transmission system efficiently and in accordance with these Rules and the Grid Code.

#### Rule 6—Responsibilities of transmission system asset owners

A transmission system asset owner shall

- (a) vest in or delegate to the Utility the authority to grant and control connections to its facilities in order to facilitate open, fair and non-discriminatory access to its transmission assets by other grid participants;
- (b) design, install and maintain its transmission equipment to meet system performance and reliability requirements;

- (c) design, install and maintain its protection system to ensure timely disconnection of faulty facilities and equipment;
- (d) execute the instructions of the Utility with respect to system operation limits and performance standards;
- (e) cooperate with the Utility and other grid participants in the discharge of system security responsibilities;
- (f) provide accurate and timely data and information to the Utility; and
- (g) implement the system expansion plans developed by the Utility.

#### Rule 7—Responsibilities of the Utility as vested owner of transmission system

The Utility shall be responsible to

- (a) grant and control connections to the transmission system in order to facilitate open, fair and non-discriminatory access to the transmission assets by other grid participants;
- (b) co-ordinate the design, installation and maintenance of the transmission equipment to meet system performance and reliability requirements;
- (c) co-ordinate the design, installation and maintenance of the protection system to ensure timely disconnection of faulty facilities and equipment; and
- (d) co-ordinate the implementation of the system expansion plans developed by the Utility.

#### Rule 8—Obligations of wholesale supplier

A wholesale supplier's obligations with respect to the transmission system are:

- (a) to design, install and maintain its plant and equipment to meet the requirements of the Connection Sub-code and other relevant regulations;
- (b) to observe at all times the applicable requirements and conditions of connection for generating units according to agreements with the Utility and relevant transmission system asset owners;
- (c) to provide the Utility with information on its available capacities and the operational constraints to its generation units in order to facilitate dispatch under emergency system operating situations;
- (d) to develop maintenance plans for its equipment and provide necessary information to the Utility for outage planning and maintenance coordination;
- (e) to operate its plant and equipment in accordance with the dispatch instructions of the Utility and to meet system performance and reliability requirements in a manner that is consistent with the reliable operation of the transmission system; and
- (f) to provide accurate and timely data and reports to the Utility .

#### Rule 9—Obligations of distribution utilities and bulk customers

A distribution utility's or a bulk customer's obligations with respect to the transmission system are to

- (a) operate its distribution network or the facility connected to the transmission system so as to ensure safe and reliable operation to meet reliability standards;
- (b) comply with the operational instructions of the Utility in a manner that is consistent with the reliable operation of the transmission system;
- (c) ensure that its facility or network operations do not degrade the performance of the transmission system by taking the necessary measures to promptly remedy any degradation; and
- (d) procure and deploy adequate reactive electricity compensation and other devices to meet the obligations under these Rules and the Grid Code.

#### Rule 10—Additional obligations of grid participants

A grid participant shall maintain and operate its equipment forming part of its facilities in accordance with

- (a) the relevant laws,
- (b) permits granted,
- (c) Prudent Utility Practice, and
- (d) applicable international standards.

#### Management and governance of the transmission system

##### Rule 11—Preparation and issue of the Grid Code

The Commission shall prepare and issue the Grid Code to govern the technical operation of the national interconnected transmission system.

##### Rule 12—Uniform application of Grid Code

- (1) The Grid Code shall be equally and uniformly applied to all entities.
- (2) There shall be equitable treatment with regard to conditions and situations that are similar.

##### Rule 13—Publication of procedures

- (1) The Utility shall develop and publish in detail the requirements, qualifications and administrative procedures to be fulfilled or followed by those seeking to be provided services by the Utility.
- (2) The requirements in sub-rule (1) shall include technical standards for connecting equipment, communication, operating parameters and performance benchmarks for service provision.
- (3) The qualifications in sub-rule (1) shall include legal, financial and technical qualifications to be fulfilled.

(4) Administrative procedures in sub-rule (1) shall include administrative, financial, technical and any other procedures to be followed prior to the commissioning of the connection as well as the obligations of the grid participant for the continued operation of the connection.

(5) The Utility shall make available to the public copies of the Grid Code and all related publications upon the payment of a prescribed fee.

#### Rule 14—Transparency

(1) The Utility shall conduct its affairs as the transmission system operator in accordance with published rules, regulations and procedures that are known to interested parties such that all its actions are predictable and in accordance with the Grid Code.

(2) There shall be transparency in all decisions, procedures, application of rules, regulations and charges of the Utility regarding participation in the development of the transmission system, connections to the transmission system, utilisation of transmission system services, and allocation of resources and costs of service provision.

(3) To ensure transparency in access, use and operation of the transmission system, only fees and charges that have previously been published by the Utility may be levied on applicants or participants and the dispatch of generating plants shall strictly follow the procedures prescribed in the Scheduling and Dispatch Sub-Code.

#### Compliance and oversight

#### Rule 15—Transmission system oversight

The Electricity Technical Committee established under section 29 of the Act has the mandate to oversee the activities and decisions of the Utility towards ensuring the attainment of the objectives of the transmission system.

#### Rule 16—Functions of Electricity Technical Committee regarding transmission system

(1) The primary function of the Electricity Technical Committee with respect to the transmission system is to have technical oversight of the operations of the Utility to ensure transparency, consistency and fairness for grid participants.

(2) Without limiting the effect of sub-rule (1), the responsibilities of the Committee with respect to the transmission system are

(a) to monitor the general performance of the transmission system functions of the Utility and make appropriate recommendations to the Commission;

(b) to make appropriate recommendations for the smooth operation of the transmission system;

(c) to review the operations of the transmission system as well as studies relating to its development;

(d) to review procedures, manuals and the Grid Code for the safe, efficient and reliable operation of the transmission system and make appropriate recommendations to the Commission;

(e) to resolve disputes referred to it by grid participants;

(f) to ensure the effective and consistent application of the rules and standards in the Grid Code; and

(g) to perform any other functions conferred on it by the Commission.

(3) The Committee shall submit quarterly report of its activities to the Commission on its assessment of the Utility's governance and administration of the Grid Code and make recommendations as may be found appropriate.

#### Rule 17—Exercise of discretion

(1) A person or the Utility shall not take a decision regarding the usage of or provision of services by the transmission system that is incompatible or inconsistent with the Grid Code.

(2) The Utility shall provide reasons in writing to the Commission for its decisions where it exercises discretionary power.

#### Rule 18—Conduct of the Utility

(1) The Utility shall be responsible for the good governance and management of the transmission system in accordance with the Grid Code.

(2) The Utility shall not act on advice, directions or instructions that may subvert the fundamental principles of fairness, transparency, non-discrimination and open access in the governance and management of the transmission system.

#### Rule 19—Reporting

The Utility shall provide information to the Public Utilities Regulatory Commission and the Commission on the performance of the transmission system in a form and at such times determined by the Commission.

#### Contents of the Grid Code

#### Rule 20—Parts of the Grid Code

The Grid Code shall consist of

- (a) a Planning Sub-Code,
- (b) a Connection Sub-Code,
- (c) standards of performance rules,
- (d) technical rules of practice,
- (e) a Metering Sub-Code,
- (f) complaints and dispute resolution, and
- (g) transitional provisions.

#### Rule 21—Planning Sub-Code



(1) The Planning Sub-Code shall specify the planning responsibility for grid developments and policy, organisational procedures, standards or criteria to be applied.

(2) The Planning Sub-Code shall indicate information required to be supplied by grid participants to facilitate the evaluation of

(a) impact of the connection of new facilities,

(b) identification of congestion, and

(e) the planning for expansion or development of the transmission network having regard to its adequacy to meet the needs of all users.

(3) Without limiting sub-rules (1) and (2), the Planning Sub-Code shall address issues including

(a) the responsibility for planning of the grid,

(b) the formulation of a grid development plan and procedures for its implementation,

(c) the grid planning criteria to be adopted, and

(d) the sources of data for preparing grid planning studies.

#### Rule 22—Connection Sub-Code

(1) The Connection Sub-Code shall set out the basic rules and conditions for connection and access to the transmission system or to a grid participant's system.

(2) Without limiting sub-rule (1), the Connection Sub-Code shall:

(a) provide the framework, rules and guidelines for connection to the transmission system to facilitate the harmonious and coordinated development of the transmission system;

(b) set out the principles and rules governing access to transmission system services;

(e) establish the procedures to be followed by a grid participant to set up or modify a connection to the transmission system;

(d) specify the technical, design and operational criteria at the grid participant's connection point; and

(e) define the data exchange requirements between the grid participant and the Utility.

#### Rule 23—Standards of Performance rules

(1) The Standards of Performance rules shall specify the minimum technical performance benchmarks for monitoring the operations of the Utility and the grid participants including matters relating to

(a) voltage stability,

(b) maximum number of scheduled and unscheduled outages,

(c) number and duration of load shedding periods, and

(d) metering.

(2) Without limiting the effect of sub-rule (1), the Standards of Performance Sub-Code shall

(a) define the minimum level of quality of electric power supply in the transmission system,

(b) define the minimum reliability standards, benchmarks and performance targets for the transmission system,

(c) establish standards and mechanisms for information and data exchange and disclosures among the Utility and grid participants, and

(d) define monitoring and event reporting standards to be applied by the Utility.

#### Rule 24—Technical rules of practice

The technical rules of practice shall consist of

(a) the Operations Sub-Code,

(b) the Scheduling and Dispatch Sub-Code, and

(c) the Safety Sub-Code.

#### Rule 25—Operations Sub-Code

(1) The Operations Sub-Code shall define

(a) the general operations arrangements,

(b) the obligations of grid participants, and

(c) the policies, criteria and procedures

required to ensure a coordinated operation of the transmission system in a manner consistent with the security of supply and reliability requirements.

(2) The security of supply and reliability requirements shall be set out in a technical schedule approved by the Commission taking into account any expected or real constraints on the generation and transmission systems.

#### Rule 26—Scheduling and Dispatch Sub-Code

(1) There shall be established a transparent scheduling and dispatch process that will ensure that the varying demand on the grid is met in the most economic manner bearing in mind the limitations on the transmission system, security and other relevant requirements of the transmission system.

(2) Without limiting the effect of sub-rule (1), the Scheduling and Dispatch Sub-code shall include the following:

(a) responsibilities of the Utility, generating plants, retailers and bulk customers in the scheduling and dispatch process, including suppliers and customers in the West African Power Pool system;

(b) load forecasting obligations, procedures and methodologies;

- (c) operational criteria, for the preparation of the generation schedule and procedures for issuance of dispatch instructions;
- (d) the process and requirements for the preparation of the generation schedule;
- (e) the central dispatch procedures; and
- (f) requirements relating to the availability for dispatch of sufficient ancillary services including regulation and reserve services, reactive power support and voltage control and black start services so that the system operator can maintain the reliability of the grid, including requirements under emergency conditions.

#### Rule 27—Safety Sub-Code

(1) The Safety Sub-Code shall set out the safety arrangements which govern the interface between the Utility's network and grid participants' facilities in order to ensure safe working conditions for personnel working on or in close proximity to transmission system equipment or equipment at the connection points.

(2) Without limiting sub-rule (1), the safety rules shall define procedures and responsibilities for achieving safety of persons from inherent dangers and shall include the following provisions:

- (a) to make available the equipment concerned for the work,
- (b) to establish safe conditions for work,
- (c) to authorise the commencement of work,
- (d) to receive the authority to commence work and execute the work
- (e) to supervise safety during the work and clearing the authority when the work is terminated or completed,
- (f) to cancel the authority on termination on completion of the work, and
- (g) to restore the system to normal.

#### Rule 28—Metering Sub-Code

(1) The Metering Sub-Code sets out the requirements for standards, procedures and guidelines in respect of metering at the connection points within the national interconnected transmission system in order to ensure accurate and transparent accounting, billing and settlement for energy sales and purchase transactions.

(2) Without limiting sub-rule (1), the Metering Sub-code shall:

- (a) set out provisions relating to design, specifications, installation, maintenance and testing of metering installation equipment, and
- (b) describe provisions relating to security and rights of access to metering data, settlement and auditing.

#### Rule 29—Complaints and resolution of disputes

(1) The procedure for filing complaints and the resolution of disputes among the Utility and grid participants shall be specified in the Grid Code.

(2) Without limiting other provisions of these Regulations, a dispute concerning the Grid Code shall be settled by negotiation between the parties.

(3) Where the dispute cannot be resolved by negotiation, the parties shall refer the matter for mediation.

(4) Where the mediation fails, the matter shall be referred to the Commission which shall set up an arbitration panel under the Arbitration Act, 1961 (Act 38) and settle any dispute where the grid participants cannot reach an agreement.

#### Rule 30—Revision of Grid Code

(1) The Commission shall be responsible for the revision of the Grid Code.

(2) Proposals for Grid Code revision shall be in writing and be submitted to the Commission.

(3) The Commission shall receive, register and acknowledge submissions and notify the grid participants of such proposals and make copies available to them for comments.

#### Miscellaneous

#### Rule 31—Offences and penalties

(1) Where the Utility or a grid participant contravenes any obligation imposed under these Regulations, the Commission may impose a penalty on the Utility or grid participant as specified in the Schedule.

(2) A person who contravenes a provision of these Regulations commits an offence and is liable on summary conviction to a fine of not more than two hundred and fifty penalty units or term of imprisonment of not more than one year or both.

(3) Where an offence under these Regulations is committed by a body corporate, a partnership or other firm, every director or officer of that body corporate or any member of the partnership or firm or other person concerned with the management of the grid participant or the Utility, shall be considered to have committed the offence and is on summary conviction, liable to pay a penalty not exceeding one thousand penalty units or to a term of imprisonment not exceeding five years or to both.

#### Rule 32—Transitional provisions

Until the commencement of the Grid Code the Utility shall operate the transmission system based on existing rules and Prudent Utility Practice.

#### Rule 33—Interpretation

In these Regulations, unless the context otherwise requires—

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

"ancillary service" means a service necessary to support the transmission of energy from a generation resource to a load while maintaining reliable operation of the transmission system;

"asset owner" means a person who owns the whole or part of the transmission system infrastructure or any facility connected to the national interconnected transmission system;

"black start" means the start-up of a generating unit from a source other than the grid such as a diesel generator;

"bulk customer" means a customer that purchases or receives electric power of such amount or level that the Commission may specify;

"Commission" means the Energy Commission established under the Act;

"Committee" means the Electricity Technical Committee;

"Connection Agreement" means an agreement between the Utility and a grid participant that seeks connection of its facilities to the national interconnected transmission system that sets out the rights, obligations and liabilities of both parties;

"connection point" means the point of physical linkage to or with the transmission system for the purpose of enabling the flow of electricity as the boundary between the transmission system and a facility or other equipment;

"dispatch" means the operating control of an integrated electric system to assign specific generating units and other sources of supply to meet the relevant demand as the load rises or falls;

"distribution utility" means a person licensed under the Act to distribute and sell electricity without discrimination to consumers in an area or zone designated by the Commission;

"Electricity Technical Committee" means the Electricity sub-committee of the Electricity and Natural Gas Technical Committee established under section 29 of the Act;

"Grid Code" means National Electricity Grid Code;

"grid development plan" means a ten-year transmission development plan developed and continuously updated by the Electricity Transmission Utility to ensure a coordinated development of the national interconnected transmission System to provide adequate transmission transfer capacity without discrimination;

"grid participant" means a wholesale supplier, distribution utility or bulk customer with facilities that are connected to the national interconnected transmission system;

"merit order" means ranking in order of which a generation plant should be used, based on ascending order of price together with amounts of electricity that will be generated;

"Minister" means the Minister responsible for Energy;

"National Electricity Grid Code" means the technical and operational rules of practice and standards of performance rules developed and approved of by the Commission;

"national interconnected transmission system" means all electricity plant and equipment within the borders of the country that function or are operated at any voltage higher than 36 kilovolts as well as any associated feeder or supply equipment that are for shared or common use;

"Performance Reliability Standards" means a set of standards established in the National Electricity Grid Code for the purpose of monitoring the performance of the Electricity Transmission Utility in the delivery of its services;

"person" includes a body corporate, whether corporation aggregate or corporation sole and an unincorporated body of persons as well as an individual;

"prudent utility practice" means the generally accepted design, practice, method and operation of a power system, to achieve safety, dependability, efficiency and economy, and to meet utility and industry codes, standards and regulations;

"real-time dispatch" means a schedule determined by the market clearing engine that contains the actual quantities of energy, reserve and regulation schedule in respect of a registered facility;

"regulation" means the frequent adjustment to a generator's output so that any power system frequency variation or imbalance between load and the output from generation facilities can be corrected;

"reserve" means an ancillary service consisting of generation capacity that is available to, or load that can be interrupted by the Electricity Transmission Utility in the event of an unexpected outage of a scheduled plant;

"system operation manual" means a manual that sets out the policies, procedures, practices or system adjustments that may be automatically or manually implemented by the system operator within a specified timeframe to maintain the operational integrity of the national interconnected transmission system;

"transmission system" means the national interconnected transmission system;

"Utility" means the public utility granted a licence under section 23(2) of the Energy Commission Act, 1997 (Act 541) to transmit electricity throughout the country;

"vested owner" means a person granted authority to take ownership control over an item or asset;

"West African Power Pool" means the ECOWAS subregional organization established to create a pool and associated interconnection and other relevant infrastructure to facilitate cross border electricity trading among participating member countries with the objective of optimizing the production and utilization of energy resources in the subregion; and

"wholesale supplier" means a person licensed under the Act to install and operate a facility to procure or produce electricity for sale to a bulk customer or to a distribution company for distribution and sale to consumers.

## SCHEDULE

Prescribed Penalty in respect of Rule 31 (1)

Category      Amount (GH¢)

Utility 3,000

Wholesale supplier    2,500

Distribution utility    2,000

Bulk customer 2,000

PROF. F. K. A. ALLOTEY

Chairperson

Energy Commission

Date of Gazette Notification: 13th June, 2008.

Entry into force: 23rd October, 2008