ELECTRICITY LAWYER

SIMPLIFIED LEGAL *And* REGULATORY GUIDE:

Nigerian Electricity Metering Code, 2013

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OVERVIEW

Nigerian Electricity Metering Code, 2013

OVERVIEW

The Metering Code ("the Code") for the Nigerian Electricity Supply Industry (NESI) was developed to regulate metering activities in the electricity sector. It is divided in three (3) different parts: the first part defines the General Conditions which applies to the whole Code; the second part, the Grid Metering Code (GMC) sets out the requirements for the metering of the participant connection point on the Transmission or Distribution Network; the third part, the Distribution Metering Code (DMC) specifies technical and operative criteria including the procedures to be complied with by the Distributor in carrying out its obligations to provide Metering services for the Metering of Customers of the Distribution System. The Glossary of Terms used in the Code and referenced in this guide can be found in the main Metering Code[1] and in our Glossary of Industry Terms.

ENABLING LAW

The Metering Code is established by virtue of the Electric Power Sector Reform Act (EPSRA)[2]; therefore, the Act gives the Code its legal backing. The Act stipulates the functional unbundling of generation, transmission and distribution sectors and it empowers NERC to enact rules and regulations for the enforcement of the provisions.[3] The Metering Code should be read in conjunction with the Market Rules, the Grid Code, the Distribution Code, and the Metering Market Procedures. Please refer to EL's guide on the Electricity Act.

OBJECTIVE

Nigerian Electricity Metering Code, 2013

OBJECTIVE

The objectives of the Electricity Metering Code include the establishment of:[4]	• Technical, design, and operational procedures for the commercial metering system. • The required accuracy and calibration of the commercial metering system. • The procedures to be followed regarding the testing, approval, and certification of metering systems. • Performance standards to be met by the Market Operator, the Transmission Service Provider, and Users of the Transmission Network or MV Distribution Network. • The responsibilities of the Market Operator and Users regarding the ownership and management of metering systems; and • Technical and operational criteria, including the procedures to be complied with by the distributor, in carrying out its obligation to provide metering services to users at each metering point.

KEY PROVISIONS

Nigerian Electricity Metering Code, 2013

KEY PROVISIONS

The following are the key provisions of the Electricity Metering Code to be noted by persons or entities looking to participate in the Nigerian Electricity Supply Industry, whilst engaging in metering activities:

Disputes

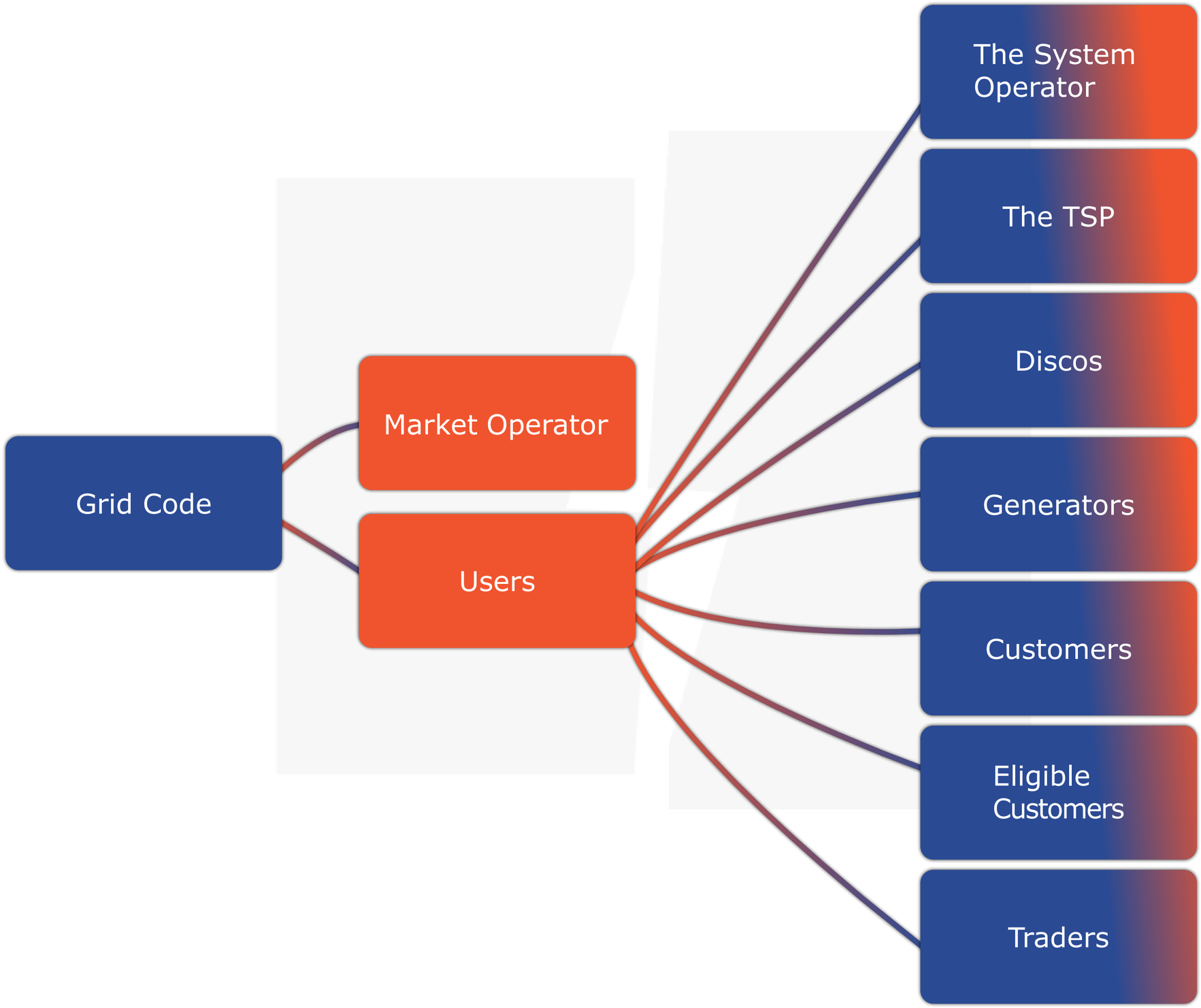
Disputes relating to the following matters:

- Siting of the Commercial Metering System;
- Technical specifications for Meters, Metering Equipment, or the Data Collection System;
- Sealing of Metering System;
- Compliance of Metering System with technical specifications of the Metering Code;
- Compensation values;
- Such other matters as the relevant Parties may agree;

These matters will be referred to the Metering Code Review Panel who would act as experts and its decision would be final and binding on parties and communicated to parties with the panel providing reasons for its decision. Any other dispute under the metering code is to be handled in accordance with the dispute procedure agreed upon in the connection agreement.

Grid Metering Code

The primary objectives of the Grid Metering Code are to establish the technical, design and operational procedure for the Commercial Metering System; the required accuracy and calibration of the Commercial Metering System; the procedures for approval, certification and testing of the Meters and Metering Equipment; the standards to be met by Market and System Operators, the TSP and Users who have or plan to have access to the Transmission Network or MV Distribution Network; and the responsibilities of the Market Operator and Users in relation to ownership and management of the Metering System which includes the provision and use of metering data. It applies to:


Grid Code
Market Operator
Users
The System Operator
The TSP
Discos
Generators
Customers
Eligible Customers
Traders

Users that are unable to comply with the GMC standards, may apply to the Market Operator (MO) for a derogation.[5]

Types of Connection Points

By virtue of the Code, Commercial Metering Systems are expected to be installed to measure active energy and reactive energy, at each Connection Point on the Transmission or Distribution Network consisting of both Import and Export metering as required by the Market Operator.

Commercial Metering Systems include both the Main Metering System and the Check Metering System, and they can be classified as follows:

Type 1: Between a Generator Unit or Generator Group with a Connection Capacity equal to or higher than 20 MW and the Transmission Network

Type 2: Between the Transmission Network and a Distribution Network

Type 3: Between the Transmission Network and an Eligible Consumer, with a Connection Capacity equal to or higher than [10 MW]

Type 4: International Interconnections

Type 5: Between two Distribution Networks of different licensees

Type 6: All other Connection Points

Location of Main and Check Metering Systems

Type of connection point	Location
Type 1	• As far as possible, the Main Metering System at Generation Stations shall be located at the actual Connection Points: (i) At the HV side of the Step-Up Transformer of the Generator Unit for energy exported (ii) At the HV side of the Station Auxiliary Transformer • Check Metering shall be obtained either: (i) Through a Redundant Meter, located at the same point as the Main Metering System, or (ii) Through Verification Metering, with Meters located at the Connection Points of each outgoing feeder of the Generation Substation
Type 2	• The Main Metering System shall be located at the LV side of the Power Transformers of the substation that connects the Transmission System with the Distribution System. • Check Metering shall be obtained either: (i) Through a Redundant Meter, located at the same point as the Main Metering System or (ii) Through Verification Metering, with Meters located at each of the outgoing MV distribution feeders, or (iii) Exceptionally, in case neither (i) or (ii) could be applied, through Verification Metering, with Meters located at the HV side of the Power Transformers of the substation that connects the Transmission System with the Distribution System

Type 3	• The Main Metering System shall be located at the actual Connection Point between the Transmission System and the Eligible Customer. • Check Metering shall be obtained either: (i) Through a redundant Meter, located at the same point as the Main Metering System or (ii) Through Verification Metering, with Meters located at each incoming Transmission Line into the Substation
Type 4	• The Main Metering System shall be located at the Connection Point, in the Nigerian Substation, of the line that interconnects Nigeria with any neighbouring country. • Check Metering shall be obtained either: (i) Through a Redundant Meter, located at the same point as the Main Metering System, or (ii) Through Verification Metering, with Meters located in the other extreme of the interconnection line (in the neighbouring country), if the Market Operator agrees with this possibility and the Metering Code –Interconnection Agreements allows adequate interchange of the information required in a timely manner.
Type 5	• The Metering Systems shall be located at both ends of the line between substations of different licensees. • Each licensee shall consider the Metering System at its own substation as Main Metering. Verification Metering can be obtained through the measurements in the other extreme.
Type 6	• The Main Metering System shall be located as close as possible to the actual Connection Point.

Applicable Standards

There are various relevant standards which form the criteria for adequate performance as regards meters and metering systems adopted within the Grid Metering Code. One of such is the International Electrotechnical Commission (IEC) standards which serve as operational criteria applicable to Meters and Metering Systems; these standards include:[6]

• IEC Standard 62053-22 – Alternating current static meters for active energy (classes 0.2 S and 0.5 S).
• IEC Standard 62053-21 – Alternating current static meters for active energy (classes 1 and 2).
• IEC Standard 62053-11 – Alternating current electromechanical meters for active energy (classes 0.5, 1 and 2).
• IEC Standard 62053-23 – Alternating current static meters for reactive energy (classes 2 and 3).
• IEC Standard 60044 Part 1 – Current transformers.
• IEC Standard 60044 Part 2 – Voltage transformers.
• IEC Standard 60044 Part 3 – Combined transformers.
• IEC Standard 62056-21 – Data exchange for meter reading – Direct local data exchange.
• IEC Standard 62052-11 General Requirements for meters

Note that where a User cannot comply with the above standards, a request for derogation must be made to the Market Operator by such User.[7]

Also, the accuracy of the Meters and Metering Equipment must conform to these established standards.[8]

Derogation

As earlier indicated, the Grid Metering Code provides that if a User realizes that an installation cannot comply with certain provisions within the Code, such User must report the inability to comply, to the Market Operator stating the reason for the non-compliance and solutions which will be implemented to remedy the situation. Also, where the costs of modifying existing equipment to meet the standards set in the Code are excessive and the equipment is expected to be changed or decommissioned within one year, then an application can be made to the Market Operator for a derogation.[9]

An application or request for derogation must contain the following information:[10]

- The issue number and date of the provision in the Code the derogation concerns.
- An identification of the Meter or Metering System that has caused the need for derogation and the nature or extent to which the derogation applies.
- The provision within the Code that the derogation is focused on.
- The reason for non-compliance.
- Actions which will be taken to remedy the situation; and
- The proposed date by which the derogation will end, following the achievement of compliance.

If the application for derogation is then granted by the Commission, the User will be relieved from its obligation to comply with the applicable provision and will not be held liable for sanction following non-compliance with the provision.[11]

Functional Requirements

Meters are required to be of static type, taking to note relevant standards regarding the number of wires;[12] be capable of measuring data at least half-hourly, and record them automatically on integral or separate Data Registers;[13] have an adequate communication channel which will permit automatic downloading, including remote interrogation and batch downloading, by the Data Collection System;[14] possess security schemes which will prevent unauthorized access to the data in the Meter or Data Register;[15] be enclosed in a cabinet or otherwise installed in a manner which shall conform to the manufacturer's stated environmental conditions;[16] The accuracy class of the measuring equipment comprising of meters and metering equipment must conform to the relevant IEC standards listed above.[17]

Ownership Rights and Obligations

Default ownership arrangements exist per the Grid Metering Code which will be implemented unless something different is agreed among Users, and authorized by the Market Operator; these arrangements include:[18]

- **Generation Company** – The relevant Generation Company will own regarding Generation Stations directly connected to the Transmission network, the Main Metering and Check Metering Systems. If the Check Metering Systems amounts to a Verification Metering System however, such will be owned by the Transmission Service Provider.
- **Transmission Service Provider** – With regard to Distributors connected to the Transmission network, the Main Metering and Check Metering Systems will be owned by the Transmission Service Provider. If the Check Metering System amounts to a Redundant Metering System, it will be owned by the TSP, however, if it amounts to a Verification Metering System, it will be owned by the relevant distribution company.
- Regarding **Eligible Customers** connected to the Transmission Network, the Main Metering System will be owned by the Eligible Customer while the Check Metering System will be owned by the Transmission Service Provider.

- Regarding **International Interconnections**, the Main Metering System will notably be owned by the Transmission Company of Nigeria (TCN) while the ownership of the Check Metering System will be governed by the relevant Interconnection Agreement.
- **Concerning Interfaces amongst distribution companies**, Main and Check Metering Systems will be owned by the relevant Discos.

It is worthy of note that relevant owners will be responsible for installing and maintaining their metering equipment at the Connection Point, unless there is an agreement with the Market Operator stating otherwise.[19]

Furthermore, Users who own the substation where the metering equipment is located will be required to provide the Market Operator with:[20]

- 24-hour unrestricted access to the facilities where the Metering System is located.
- Sufficient space for installing communications devices; and
- Reliable power supplies

Owners are expected to keep all Meters and Metering Equipment in good working conditions to allow for adequate recording, registration and transmission of data relating to active and reactive energy which is measured by the Meters.[21] Also, Meters are to be periodically checked to ensure that they are operated within the accuracy limits and requirements established within the Code.[22]

Certification, Calibration and Testing of Metering System

Users are required to ensure that their Meters and Metering Equipment are certified, calibrated, or compensated in accordance with the Grid Metering Code to meet the accuracy requirements established within the Code.[23] Such certification shall be done by an approved Metering Test Station.[24]

Electricity meters can however be purchased already certified by the manufacturer following prior approval received from the Commission, however, further certification must be given by an approved Metering Test Station.[25]

The Certification given by an authorized Metering Test Station or manufacturers will notably last for not more than 15 years and will clearly indicate the minimum required calibration tests and frequency to maintain its validity. Following the expiration of the certification, the User may replace the meter, request a new certification or extend the existing certification.[26]

With regard to calibration, the Code provides that all initial calibration of Meters and Metering Equipment shall be performed by an authorized Meter Test Station; the tests shall be executed in line with IEC standards aimed at proving the capacity of the Meter to meet the accuracy requirements stated within the Code.[27] If the tests go to prove that the Meter does not comply with the accuracy requirements established within the Code, any certifications issued regarding that Meter or Metering equipment will automatically expire and a new one will be required.[28]

Security and Data Access

Users must ensure to the best of their abilities that physical access to Meters and Metering Equipment is, where practicable, restricted to personnel who are required to have such access for the proper performance of their duties and have received permission for such access.[29] Records of such access will be made by the Market Operator and the User on whose premises the Meter and Metering equipment are located.

Scope of Application of the Distribution Metering Code

The Distribution Metering Code applies to the following participants:[30]

- Distributors; and
- Users connected to, or seeking connection to the Distribution System which in turn include:

- Customers connected to the LV Distribution Network.
- Customers connected to the MV distribution network (provided they are not Participants in the Market); and
- Generation Connected to Distribution (provided they are not Participants in the Market)

Obligations of the Distributor

Distributors have the main obligation of owning, installing, and verifying Meters and Metering equipment at Metering points on the Distribution System. Distributors are also expected to ensure that their Meters and Metering equipment meet the technical, functional, and operational standards set out within the Code. Other roles include Distributors: ensuring that their Meters and Metering equipment are tested for accuracy requirements, retrieving and processing data from each Metering Systems for the purpose of billing and settlement, and notifying the Commission where the Distributor finds it cannot oblige with certain provisions set within the Distribution Metering Code.[31]

Regarding the installation and replacement of meters, the Code dictates that Distributors have the duty of installing Metering Equipment as close as practicable to Connection Points.[32]

The Distributor also has the following obligations:[33]

- Assigning a unique identifier to the Metering System.
- Recording the date of installation of the Metering System.
- Recording the functionality of the Meter and the unit of measurement used to measure active and reactive energy flowing through the Metering System.
- Recording the identification of any ancillary equipment.
- Recording any site-specific loss adjustment factors to be applied.
- Recording the initial Meter reading.
- Recording redundancy details and sources of check metering data; and
- Ensure that the metering data stored in the Metering System is retrieved and, where a meter is removed, shall ensure that a final Meter reading is obtained.

Also, the Distributor is required to maintain the following information for each Metering System, which must be made available to Users and NERC upon request:[34]

- Location of the Metering System.
- A record of any calibration of the Metering System including any test results made to the Metering System.
- A record of any malfunction of the Metering System including any repairs made to the Metering System; and
- Documentation of Meter testing prior to installation.

Technical Requirements and Meter Accuracy

The Distributor is to ensure that the accuracy of each Meter in each Metering System is certified by an authorized Meter Test Station and meets the relevant accuracy limits as stipulated in the Code. The accuracy of the various measuring equipment must comply with the relevant IEC standards or any other equivalent Nigerian standards.[35]

Meter Certification

Every Meter Type (model) of meter to be used for metering installation must be certified by a Meter Test Station (MTS) or any other body approved by NERC to perform the Type tests to assess its characteristics and ensures that it complies with the applicable standards as set out in the Code. The Commission will maintain a register of certified Meter types for two (2) years for importers and five (5) years for local manufacturers of metering systems, subject to renewal.[36] Existing Meters and Metering Equipment installed in the Distribution System will wither be considered certified at the discretion of the Commission following calibration or verification tests deemed compatible with the Code or non-certified, in which case a re-certification can be undertaken, following replacement by the Distributors of the involved equipment or obtaining a valid certification based on the procedures captured in the Code.[37]

Each Metering System is to be inspected, tested, and calibrated by an authorized Meter Test Station according to the minimum frequencies stipulated in the Code.[38]

Access and Security

Users are to grant access to Distributors to enable the respective Distributor to fulfil its obligations under the Distribution Metering Code.[39]

It is the responsibility of the Distributor to maintain the security of metering data stored in or obtained from each Metering System.[40]

Meter Reading

The Distributor is to schedule reading for all manually read meters at least once in four (4) months. For kilowatt-hour meters, the Distributor is to verify at each Meter reading that the Meter identification number on the Meter matches the Meter identification number on the Meter reading schedule.[41] Regarding remote metering equipment, it is the responsibility of the Distributor to specify the type of equipment to be used for communication with remote meters.[42]

Derogation

Where a Distributor realizes an installation cannot comply with the standards set out in the Distribution Metering Code, such Distributor must report the non-compliance to the Commission stating reasons for non-compliance, proposed remedy for the situation, and a request for derogation.[43] Notably, if the Distributor receives technical advice stating that although the installation does not meet standards set out in the Code, it can meet the accuracy requirements set out therein; the Distributor can include such in the application for derogation.[44]

A request for derogation must contain the following information:[45]

- The issue number and the date of the provision against which the derogation applies.
- An identification of the Meters or Metering Equipment in respect of which a derogation applies and the nature and extent to which the derogation applies.
- The provision which the derogation applies to.
- The reason for the non-compliance.
- Proposed remedial actions, if any; and
- The date by which the derogation will end if compliance is achieved, or by which such derogation expires.

KEY STAKEHOLDERS

Nigerian Electricity Metering Code, 2013

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Nigeria Electricity Regulatory Commission

NERC is responsible for the promulgation of the Electricity Metering Code and serves as the regulatory body enforcing its provisions. The Commission grants derogations upon considering opinions given by the Market Operator;[46] implements changes to relevant operational standards regarding meters and metering systems;[47] approves communication protocols to be used with meters and metering systems;[48] approves Metering Service Providers who aid owners of Meters and Metering systems with installations, site inspections, technical audits, and maintenance;[49] the Metering Code Review Panel the extent to which any changes should be implemented,[51] defines communication protocols to be used by metering systems which will be unique and of a standard type in order to reduce the costs expended by Users;[52] handles remote communications to the Metering equipment, Meters, Data Registers, and connection equipment;[53] maintains a register of all Commercial Meters for settlement purposes at all Connection Points;[54] and is responsible for approving the initial design, testing, commissioning and sealing of any Commercial Metering System in Nigeria.[55]

Operator of the Nigerian Electricity Market

The Market Operator serves as the administrator of the electricity market and performs certain regulatory roles regarding metering in the electricity industry. Notably, the Market Operator keeps registers of all derogations granted by the Commission,[50] reviews changes made to relevant standards and recommends to NERC through The Market Operator also has the authority to inspect and examine Meters and Metering Systems being tested for certification.[56]

Metering Code Review Panel

The Metering Code Review Panel is established by virtue of the Code[57] and comprises members representing generation companies, distribution companies, meter manufacturers, market operator, transmission service provider, the Commission, etc.[58] The Panel has the responsibility of:[59]

- keeping the Metering Code under constant review.
- reviewing all suggestions for amendments to the Metering Code.

- publishing recommendations regarding amendments to be made to the Code.
- issuing guidance upon the reasonable request of any User on the implementation, performance, and interpretation of provisions in the Metering Code; and
- resolving disputes which may arise out of or relate to the implementation of the provisions within the Code.

PRICING AND TARIFFS

Nigerian Electricity Metering Code, 2013

PRICING AND TARIFFS

Static Grid Energy Meters (33kV and above) make use of a Time of use register, MD register, Programmable integration period, information on Switching times, Seasons time, Billing dates, and End of billing dates in determining tariffication.[60] Also, the Code provides a requirement that Smart Meters which are Single and Three Phase must be provided with alarms to indicate tariff change.[61]

INCENTIVES AND INVESTMENT OPPORTUNITIES

Nigerian Electricity Metering Code, 2013

INCENTIVES AND INVESTMENT OPPORTUNITIES

The Metering Code provides an avenue for investment in the installation of Meters, Metering Equipment, and notably Smart Meters for billing and proper revenue collection by distributors.

SANCTIONS AND PENALTIES

Nigerian Electricity Metering Code, 2013

SANCTIONS AND PENALTIES

The Metering Code does not prescribe any specific penalties for default regarding its provisions by Users of the transmission network, distributors, or licensees. It can however be deduced that a deviation from its provisions would be met with the penalties prescribed within the Electric Power Sector Reform Act which is its enabling law.[62]

Referenced Statutory Instruments

- Electric Power Sector Reform Act 2005;
- Market Rules for the Nigerian Electricity Supply Industry, 2009;
- Grid Code for the Nigeria Electricity Supply Industry (NESI) – Version 03, 2018;
- Distribution Code for the Distribution Sector of the Nigeria Electricity Supply Industry – Version 02, 2019; and
- Market Procedures for the Nigerian Electricity Supply Industry, 2010.

Endnotes

1 NERC, Metering Code. Available at https://nerc.gov.ng/index.php/library/documents/Codes-Standards-and-Manuals/Metering-Code/
2 NERC, Electric Power Sector Reform Act (EPSR), 2005. Available at https://nerc.gov.ng/index.php/component/remository/Regulations/Electric-Power-Sector-Reform-Act-(EPSR)-2005/?Itemid=591
3 Section 1 of the Metering Code for the NESI Version 01 of 128
4 Part 2, Section 1.1; Part 3, Section 1.1.1
5 Section 1.3.1
6 Part 2, Section 2.3.1
7 Part 2, Section 2.3.4
8 Part 2, Section 2.5.1
9 Part 2, Section 1.3.1
10 Part 2, Section 1.3.3
11 Part 2, Section 1.3.7
12 Part 2, Section 2.4.2
13 Part 2, Section 2.4.3
14 Part 2, Section 2.4.7
15 Part 2, Section 2.4.10
16 Part 2, Section 2.4.12
17 Section 2.5.1
18 Part 2, Section 3.1
19 Part 2, Section 3.1.2
20 Part 2, Section 3.1.4
21 Part 2, Section 3.2
22 Part 2, Section 4.4.1
23 Part 2, Section 4.1.1
24 Part 2, Section 4.1.2
25 Part 2, Section 4.1.3
26 Part 2, Section 4.1.5
27 Part 2, Section 4.2.1
28 Part 2, Section 4.6.1
29 Part 2, Section 5.1.4
30 Part 3, Section 1.1.2
31 Part 3, Section 1.1.3
32 Part 3, Section 2.1.4
33 Part 3, Section 2.1.5
34 Part 3, Sections 2.1.7 and 2.1.8
35 Sections 2.4.1 and 2.4.3
36 Section 3.1.2
37 Sections 3.2.1 and 3.2.3
38 Sections 3.4.1 and 3.4.2
39 Section 4.1.1
40 Section 4.2.1
41 Section 5.1
42 Section 5.2.1
43 Part 3, Section 1.2.1
44 Part 3, Section 1.2.2
45 Part 3, Section 1.2.3
46 Part 2, Section 1.3.5
47 Part 2, Section 2.3.3
48 Part 2, Section 2.4.9
49 Part 2, Section 3.1.2
50 Part 2, Section 1.3.8
51 Part 2, Section 2.3.3
52 Part 2, Section 2.4.9
53 Part 2, Section 3.1.5
54 Part 2, Section 3.3.1
55 Part 2, Section 3.1.3
56 Part 2, Section 4.1.7
57 Part 1, Section 3.2
58 Part 1, Section 3.2.1
59 Part 1, Section 3.2.3
60 Part 4, Section 4.4.10
61 Part 4, Section 4.10
62 Section 94 of the EPSRA.

DISCLAIMER

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