Nigerian Electricity Regulatory Commission

Methodology for Estimated Billing, 2012

REGULATION NO:

NIGERIAN ELECTRICITY REGULATORY COMMISSION

In the exercise of the Powers conferred upon it by Section 96 the Electric Power Sector Reform Act, 2005 and all other powers enabling it in that behalf, the Nigerian Electricity Regulatory Commission hereby establishes the following Regulation on **METHODOLOGY FOR ESTIMATED BILLING, 2012.**

Arrangement of Clauses

CHAPTER I
GENERAL

1. Short Title and Commencement

(1) This Methodology shall be cited as the Methodology for Estimated Billing 2012 by the Nigerian Electricity Regulatory Commission.

(2) This Methodology shall come into force on August 1, 2012

2. Objective of the Methodology

This Methodology is to provide for the standardization of the method used by Distribution Companies (Discos) to estimate a Customer's power usage and bills accruing thereby in instances where the Disco is unable to read the Customer's bill within a billing period.

This Methodology also provides for the standardization of the indices to be considered by Discos in estimating the power usage of a Customer connected to the electricity system without a meter.

3. Definitions and Interpretation

(1) In this Methodology, unless the context otherwise requires:

"**Act**" means the Electric Power Sector Reform Act 2005

"**Commission**" means The Nigerian Electricity Regulatory Commission (NERC)

"Customer" means any end –user of electricity who is registered with a Distribution licensee that is not an eligible Customer and, for the purpose of filing a complaint with the Commission and for any other reason that the Commission may determine, a person who is temporarily disconnected or otherwise without service, provide that a person who has applied for, but has yet to receive service shall also be deemed to be a Customer.

"Codes" means the collection of Rules, Regulations that are consolidated and classified according to subject matter, like the Grid Code, Metering Code, etc.

"Distribution Company (DISCO)" means a Distribution licensee that is granted license to distribute electricity under Section 67 (1) of the Act or the entity Licensed by the Nigerian Electricity Regulatory Commission to carry out the management of electricity distribution within an authorized area.

"Person" includes an individual, company, partnership or any other association of individuals, whether incorporated or not;

"Methodology" means the Methodology for Estimated Billing 2012 for unconnected Customers by the Nigerian Electricity Regulatory Commission.

"Power Factor" means ratio of active power to apparent power (KW to KVA)

"Load Factor" means ratio of average load to peak load over a designated period

(2) All other words or phrases not defined in this Methodology shall have the meaning defined in the Electric Power Sector Reform Act of 2005 or any Regulation or Codes issued by the Commission.

CHAPTER II
METER READING

4. Routine Meter Reading

4.1 DISCOS shall endeavor to obtain an actual reading of all meters recording electricity usage at all supply addresses within their areas of operations every month, or at such intervals as approved by the Commission.

4.2 Where the DISCO is unable to obtain an actual meter reading at a Customer's premises, the Customer's electricity usage shall be estimated by the company unless the Customer provides his own meter readings within a stipulated period.

4.3 Where a DISCO estimates a Customer's usage the DISCO shall adopt the Commission's approved methodology for estimated billing, and the Customer's estimated electricity usage shall, under no circumstance, be arbitrarily inflated by the DISCO.

The following Categories of Customers may be Issued Estimated Billing:

5.1 **Customers with faulty meters**: These are existing Customers who have been issued meters which are no longer functional.

(a) Where a Customer's meter develops a fault and a complaint is appropriately made by the Customer, the DISCO shall repair or replace the faulty meter before the end of the billing cycle within which the complaint was made.

5.2 **Customers whose meters cannot be read:** These are Customers whose meter readings could not be obtained by the DISCO due to inaccessibility occasioned by locked doors, Customers not being at home at the time of reading the meter, presence of dogs on the premises etc.

(a)Whenever a DISCO is unable to obtain a meter reading at a Customer's premises and notifies the Customer in a manner approved by the Commission, the DISCO shall estimate the Customer's usage for the period.

(b)The DISCO shall Endeavour to read the meter, at least, once in three (3) months and the estimated bills issued shall not amount to a figure in excess of the cumulative average of the Customer's consumption.

5.3 Existing Customers without meters: These are directly connected Customers that have not been provided with meters.

CHAPTER III

METHODOLOGY FOR ESTIMATED BILLING

6. Metered Customers

6.1 Every DISCO shall obtain, through its authorized representatives an actual reading of all meters in all supply addresses within its area of supply every month but not later than once in every three months.

6.2 The Customers shall be to billed based on the last actual reading obtained until another reading is established. Consequently, a reconciliation shall be carried out which may result in the crediting or debiting of the Customer.

7. Unmetered Maximum Demand (MD) Customers

7.1 The Unmetered MD Customers shall be billed based on the "**Load Measurement Method"** which shall be the measurement of the voltage and current on the Customer premises for a specific period (between one to twenty four hours) during normal operation and the application of the formula provided hereunder for estimation of monthly Consumption

Consumption in KWh = $\sqrt{3} \times V_L \times I_L \times PF \times A_v \times LF \times 1000$
Where :

V_L = Line Voltage in Volts
I_L = Line Current in Amperes
PF = Power Factor
LF = Load Factor
A_v = Number of hours of power supply availability in the month

Amount Payable = (Tariff Class rate x KWH) + Fixed Charge +VAT

8. Unmetered Non-MD Customers

8.1 The Unmetered Non -MD Customers and others not captured above shall be billed based on the **"weighted average cluster load".** This method involves the subtraction of the entire metered load from the energy supplied to the feeder (33kV or 11KV and others) and the application of an appropriately determined availability factor and correction of losses which is aggregated among the various number and classes of Customers supplied by the feeder.
8.2 The method shall require the determination (in advance through statistical analysis of historic information) of the averages of the proportions of the consumptions for the various classes of Customers in the urban and rural areas and the relationship derived below is applied to determine the proportion of the energy supplied to the feeder which shall be proportionately distributed among the various Customers.

8.3 The above methodology shall be determined as follows:
On the assumption that the total grid energy supplied to a Disco is equal to the sum of Energy on all its feeders, if energy on all feeders is X then,
Energy available for billing, Z =X - μX.
Where μ = % of Distribution technical loss (10% - MYTO rate)
Then

$$Z = X - 0.1X = 0.9X$$

If Z_m = Energy consumed by metered Customers (both prepaid and manually read)

Z_u = Energy consumed by unmetered Customers

Z_i = Energy of illegal connections (non Technical or commercial loss of 18% - applicable MYTO rate in the tariff for the Disco), then total energy available for billing which should be equal to the total energy billed will be,

$$Z = Z_m + Z_u + Z_i$$

Therefore, the energy which should be billed to unmetered and legally connected Customers,

$$Z_u = Z - Z_m - Z_i = 0.82Z - Z_m$$

Or

$$Z_u = 0.72X - Z_m$$ (in terms of the total grid energy to the feeders)

Considering that load on a feeder may be prone to shedding and lost due to transformer faults, line faults, etc, availability factor (α) is introduced.

Availability factor (α) = (Number of hour the feeder is on) **/** (Total number of hours in the billing cycle)

Then total energy for the unmetered Customers becomes

$$\mathbf{Z_u} = \alpha Z_u = \alpha (0.82Z - Z_m)$$

Or

$$\mathbf{Z_u} = \alpha Z_u = \alpha (0.72X - Z_m)$$

8.4 To determine the load for each Class and each Customer in the class, the weighted average of the load of each Customer class to the total load being considered for statistical analysis shall be applied.

If $\boldsymbol{\ell_c}$ represents the proportion of the load consumed per Customer class based on a historic figure per feeder (which could be the feeder being considered),

Where

Av = Average Consumption of a Customer over a period and

$$\mathbf{Ca} = \sum_{j=0}^{n} \mathbf{Avj}$$

j = Number of Individual Metered Customers in the feeder or cluster used for the statistical analysis.

Then,

$$\ell_c = \frac{NaCa}{\sum_{i=1}^{14} \mathrm{NiCi}}$$

Where: **Na** = Number of Customer in a class in the feeder

Ca = Average consumption or load of a class in the feeder

$\mathbf{N_iC_i}$ = Total Consumption or load of all classes in the feeder

I = Total number of class feed by the feeder considered

Consequently, the **consumption per Customer per class of Unmetered Customer** can be determined as:

$$\mathbf{Z_{ci}} = \ell_c \frac{Zu}{Nc}$$

Where: $\mathbf{N_c}$ = Number of Customers in a class being considered in the feeder

Therefore for formula applicable for the computation of the various Classes of Customers shall be as indicated in the table below:

Formula	**Customer Class**
$\ell_{cR1}\, Z_u / N_{R1}$	RI Customer Class
$\ell_{cR2}\, Z_u / N_{R2}$	R2 Customer Class
$\ell_{cR3}\, Z_u / N_{R3}$	R3 Customer Class
$\ell_{cR4}\, Z_u / N_{R4}$	R4 Customer Class
$\ell_{cC1}\, Z_u / N_{C1}$	C1 Customer Class
$\ell_{cC2}\, Z_u / N_{C2}$	I Customer Class C2 to
$\ell_{\text{Street Light}}\, Z_u / N_{\text{Street Light}}$	Street Lights

8.5 Customers in clusters within a feeder which experienced additional outages due to:

- failed transformer,
- transformer load shedding,
- Customers being connected to part of feeder that experienced prolonged outage and
- Customers not resident in the premises during the billing period or thereof

shall be compensated by applying availability factor on the load (**Zci**) obtained above for Customers on the feeder.

Therefore,

Consumption per Customer per class of Unmetered Customer in the affected cluster,

$$\mathbf{Z_{cic}} = \alpha\, \mathbf{Z_{ci}}$$

Chapter IV

MISCELLANOUS PROVISIONS

9. Obligation to report on estimated bills

Every DISCO shall provide the Commission a report of estimated bills in every billing cycle in the format prescribed in ANNEXURE A.

10. Proceedings before the Commission

All proceedings before the Commission under this Methodology shall be governed by the Business Rules, including amendments and statutory re-enactments thereof.

11. Amendment or repeal

The Commission may from time to time amend or repeal, in whole or in part, the provisions of this Methodology.

12. Dispute resolution

Disputes between the Distribution Licensee and Customers which are not resolved by the parties will be handled in accordance with the Customer Handling Procedure

THE COMMON SEAL OF NIGERIAN ELECTRICITY REGULATORY COMMISSION
Was affixed pursuant to the ORDER OF THE COMMISSION

On this ……..day of……., 2012

…….
Dr. SAM AMADI
CHAIRMAN/CEO

ANNEXURE A

1. Name and address of the DISCO making the Report

2. List of metered Feeders (33KV, 11KV and others) and energy or load (KWH) recorded on the Feeders during the month or billing cycle. This excludes Feeders that are not metered.

3. Record of Number of Customers with functional Credit meters, Pre-paid meters and faulty meters.

4. Data and result of Historic Statistical Analysis on Feeders (either 33KV or 11KV or others) used to determine the weighted class average as indicated in **Table 1**. The Weighted Class Average (ℓ_c) for feeders supplying rural and urban load should be determined separately.

5. List of the feeders, availability (α) and load on the Feeders (either at 33KV or 11KV or other) used to derive **Zu** (for the unmetered and/or estimated Customers). See **Table 2.**

6. The summary of the result of the estimated average load per tariff class using the historically and statistically determined Weighed class Average as indicated in **Table 3.**

7. Report on estimated Customers in clusters within a feeder which experienced additional outages due to :

    a. failed transformer,
    b. transformer load shedding,
    c. Customers being connected to part of feeder that experienced prolonged outage and
    d. Customers not resident in the premises during the billing period.

    The report shall contain the location, availability as a result of the outage experienced, resultant load and details (name and Customer number) of the Customers affected by the outage.

8. Conclusions

Table 1: Historic Data Analysis table for the determination of Weighted Class Average

S/N	Feeders (Name/No)	Location	Total Feeder Load (KWH)	Customer Class feed by the Feeder	Total No of Metered Customers per Class	Class Average load (KWH) of metered Customer	Total Class Load (KWH) of Metered Customer	Weighted Class Average Load (ℓ_c)
				R1				
				R2				
				R3				
				R4				
				C1				
				C2				
				C3				
				D1				
				D2				
				D3				
				A1				
				A2				
				A3				
				S1				
				R1				
				R2				
				R3				
				R4				
				C1				
				C2				
				C3				
				D1				
				D2				
				D3				
				A1				
				A2				
				A3				
				S1				
				R1				
				R2				
				R3				

Table 2: Feeder Load used to Determine Estimated Load and Availability

S/N	Feeders (Name/No)	Location	Total Feeder Load (KWH)	Load for Estimation, **Zu**, (KWH)	Total Metered Load (KWH) Credit & PPM	Feeder Availability (α)

Table 3: Summary of Average Estimated Load using the Class Weighted Average

S/N	Feeders (Name/No)	Location	Total Feeder Load (KWH)	Customer Class feed by the Feeder	Weighted Class Average Load ($\mathscr{l}_c$)	Number of Customer on Estimation	Total Class load (KWH) Estimated	Total Number of metered Customers	Total Class Load (KWH) of Metered Customers
				R1					
				R2					
				R3					
				R4					
				C1					
				C2					
				C3					
				D1					
				D2					
				D3					
				A1					
				A2					
				A3					
				S1					
				R1					
				R2					
				R3					
				R4					
				C1					
				C2					
				C3					
				D1					
				D2					
				D3					
				A1					
				A2					
				A3					
				S1					
				R1					
				R2					
				R3					