

METERING & METERING MARKET PROCEDURES IN THE NIGERIAN ELECTRICITY MARKET

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TRADING POINT METERING

WHY ENERGY METERING?

METER-TO-CASH Accountability

- *The Generator*
- *The Transporter (TSP)*
 - *The Distributor*
 - *The Consumer*

WHY IS MO HANDLING GRID METERING TO DATE

- *In the defunct PHCN, recall, there was a Department Called Grid Metering. In 2001 this Department and the Meter Test Stations (MTS Oshodi, PH & Kaduna) were put together under a General Manager charged with the responsibility of cleaning the Grid-metering n/w with a view to accurately accounting for the Energy Generated, Energy Injected into the Trx n/w, the Energy Injected into the Dix n/w and the resulting TLF which is a KPI to measure the efficiency of the Trx System*

WHY MO IN METERING Cont.

*The Grid Metering Clean-up was a prelude to the inception of Market Operations in 2004 and Metering for energy accountability became Pivotal for the business of Settlement and billing operations to date. With the delineation of the Grid n/w into Gencos, Trx and Discos, these Grid-meters invariably became the Trading Point Meters. **What you cannot measure, you cannot sell !!!** This is for the Records! The MO cannot own any asset, further in this discussion, we shall see how these meters will be handed over to the Market Participants.*

METERING SYSTEM & METERING ERRORS

- ***VOLTAGE TRANSFORMER (VT)***
- ***CURRENT TRANSFORMER (CT)***
- ***THE CABLING***
- ***TERMINATION KIT***
- ***THE METER***
- ***Are there Grid Deficiencies?***

NETWORK DELINEATION

**IN ORDER TO ACHIEVE ADEQUATE METERING,
THE GRID NETWORK WAS DELINEATED AS
DEFINED IN THE GRID CODE, THUS, THERE ARE:**

- **THE GENERATION- 21 No**
(a moving Target)
- **TRANSMISSION - 8 REGIONS**
- **DISTRIBUTION - 11 DISCOS**

GENCO-TRANSMISSION INTERFACE

The Trading Point b/w the Genco and TRX NetWork is at the High Voltage Bushing of the Generator TF.

The Trading-Point Energy Meters b/w Gencos and the TSP are therefore expected to be installed at these points - before the HV lines enter into a Trx n/w.

LEVEL OF COMPLIANCE WITH GENCO METERING LOCATIONS

- * A few number of the Gencos are not compliant with the location of their trading point energy meters.*
- * A few Others are expected to become compliant before or during the TEM.*
- * This group presently have their energy meters located at the low voltage side of the Generator TFs as against locating them at the high voltage side, after the Voltage step-up.*

Does TSP suffer any loss?

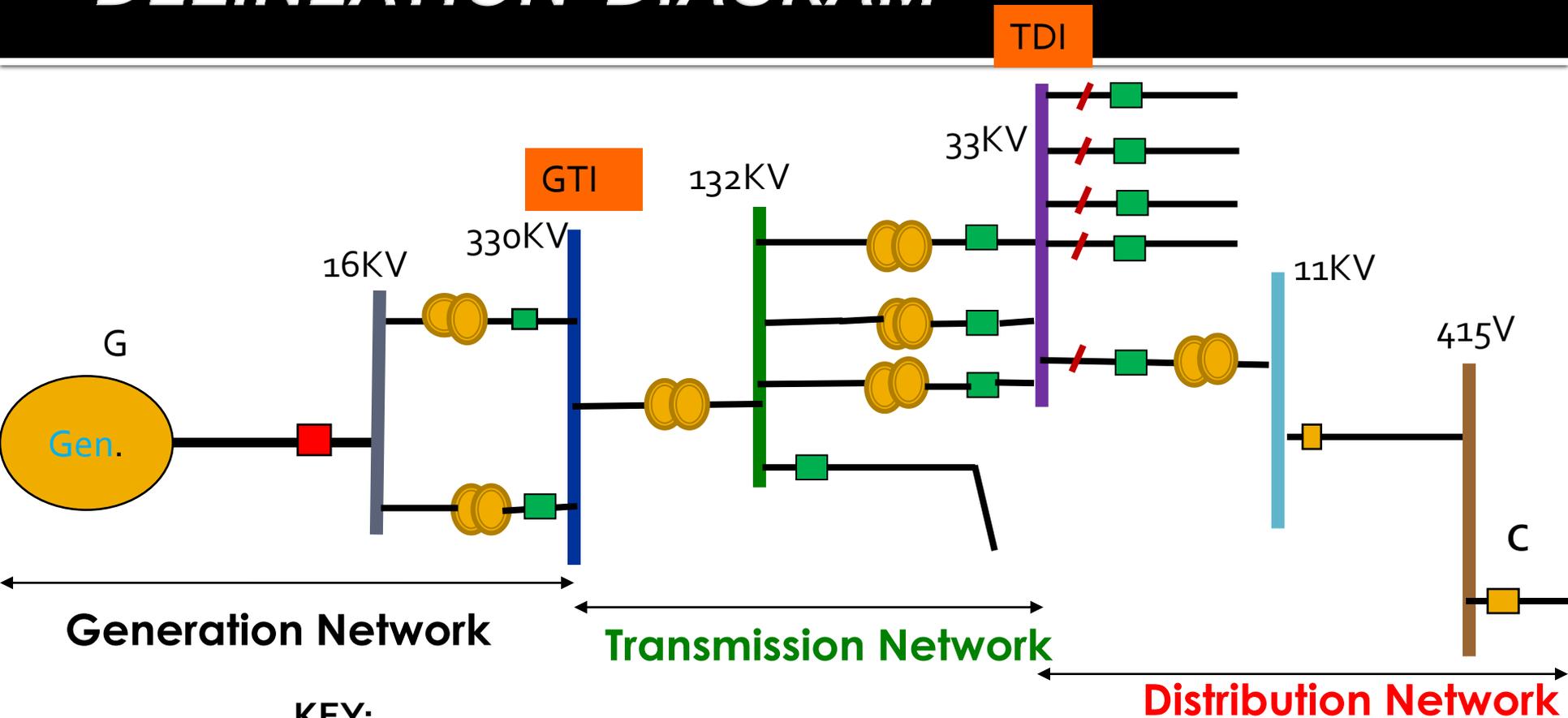
TRX-DISCO TRADING POINTS

The Trading Point between the TSP and the Disco is at the Low Voltage Bushing of the Step-down 132/33KV Power Transformer, according to the Metering Codes (MC).

Initially, the Metering Market Procedure assumed the Interface between the TSP is that point where the Discos' responsibilities start but this has been reversed in line with the MC .

Are all the Trx/Dix TPs metered?

GRID NET-WORK SINGLE LINE DELINEATION DIAGRAM



KEY:

GTI – Generation/Transmission Interface

TDI - Transmission/Distribution Interface

C - Customer interface

■ - Metering points ; ● - Transformer

/ - Representing: Isolators-Breakers-Relays

METERING MARKET PROCEDURES

Ref: Market Rule:

Sec. 27.6.10; 10.2.1; 6.3.2

This is one of the three Market Administrative Procedures for the Nigerian Electricity Market. It is part of the Market Rule and MUST be complied with by the Market Participants.

Metering Mkt Procedure Cont.

- *This Procedure describes:*
- *Participants Metering Systems Reg. (MR:10.2.3; 15.1.1; 15.1.2-5)*
- *Tech. Specs for Commercial Metering System*
- *Description of Trading Points*
- *Treatment of Trx Loss Factor (TLF)*

MMP Cont.

- ***The Calendar and Procedures for Meter data collation, correction, validation and reconciliation for Market Settlement***
- ***Administration of Special Conditions***
- ***Administration of Complaints***
- ***Penalties for Violation of Metering Calendar (MR:27.6.4)***

METERING CHALLENGES

- *The MO has been providing, installing and maintaining the Grid Energy Meters for Trading in the NEM because the Market Rule saddles her with the job of **settlement** and **payment** in the Mkt.*
- *MO's mandate cannot succeed without administering metering. MO job is simply meter-to-naira administrative business.*
- *Metering responsibilities have numerous challenges that must be resolved quickly to maintain meter data integrity. Trading Point meters require trained metering staff, special metering equipment and constant checks.*

Metering Challenges cont.

- Metering and Metering Maintenance are continuous business and with new substation projects being commissioned new metering systems are being installed.
- From time to time, meters indicate errors due to extraneous factors not necessarily faulty meters.
- Some of these factors include the Instrument Transformers (VTs and CTs) which drive the energy meter operations. These Instruments are the properties of TSP which serve other purposes other than driving the energy meter.
- Routine Maintenance and Replacement of these Instruments by TSP often interfere with the operations of the metering system, hence metering system calls for constant monitoring.

METER HAND-OVER

- *The MO had earlier planned to hand over the meters to the participants after declaration of TEM but given the realities on ground, the MO has scheduled to hand-over of these Trading Point Meters to the respective Participants starting from this month, **July**.*
- *The handover will be simultaneously carried out regionally according to the network delineation - Genco/Trx and Trx/Disco*

RESPONSIBILITIES AFTER METER HAND-OVER

- *The Market Rules, (27.6.1-27.6.9), through this Metering Market Procedure, has a different metering mandate for the MO after handing over meters to the participants, these include:*
- *Receiving and Reconciling Energy Meter Data from the Participants for Monthly Settlement purposes. (MR:27.6.4)*
- *Certification of Trading Point Metering Systems*
- *Review and Upgrade of TP Metering specifications.*
- *Resolving Metering Issues between Participants*
- *Administration of Metering Systems Derogation*
- *Carrying out on-the-spot Meter Tests on any meter suspected to be giving wrong reading*
- *The MO Technical team will also be involved in Net-Dependable Capacity Tests of the Generators as well as adjudicate the technical aspects of all the PPAs.*

Responsibilities cont.

- *The Participants will assume full responsibilities for Providing their Meters, Installation, Maintenance, Security, Integrity and reading of the Meters with the SO staff pending when the Remote Reading would be achieved.*
- *The following conditions must apply in order to maintain the integrity of metering data and that of the NEM:*
- *The MO must be notified of any new Metering Installation for Certification before it is accepted for Trading.*
- *SO must ensure **New Substations** are metered before Commissioning and Loading.*

Responsibilities Cont.

- *All the necessary Stakeholders must be informed before VTs and CTs are replaced in any Transmission Station.*
- *CT Ratios must not be changed without first informing all the necessary stakeholders.*
- *To Reprogram any meter, the MO and the other necessary Stakeholders must be present.*
- *The TSP maintenance staff must ensure the VT or CT terminals are not unduly shorted for a very long time.*

Roles Cont.

- *The Participants will adjudicate their Inter-Disco Feeders;*
- *The Participants (Discos) are at liberty to take the already installed Feeder Meters as their check-meters at the Trx/Disco interface or opt for installation of new compliant meters in series with the Incomer Meters -(Main Trading Point Meters) (MR:27.6.2)*
- ***The MO would want to give a timely remark that the success of the TEM will, to a large extent, depend on the Integrity of Metering Data. Metering Discipline is therefore inevitable !!!***

THANK YOU

- FOR CLARIFICATIONS ON THIS PAPER, WE SHALL TAKE ALL YOUR QUESTIONS, THERE ARE GRID-METERING EXPERTS HERETO ASSIST IN FURTHER EXPLANATIONS.

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