



MARKET OPERATIONS

- **SETTLEMENT
ISSUES IN TEM**

By

B.C.OGBU

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INTRODUCTION

- **Settlement uses metered data for correct and efficient allocation of energy/capacity quantities to Participants:**
 - **For each Generator – generating capacity and energy quantities sold in the contract**
 - **For each Distributor/special trader - generating capacity and energy quantities bought in the contract**
 - **“Settlement” means the process of calculating charges, due from Participants who are required to make payment, and to be paid to Participants who are due to receive payments, pursuant to these Rules (MR. definition)**

TEM – THE CONTRACT MARKET

Wholesale electricity market to be characterized by contracts during Transitional Electricity Market (TEM):

- PPA contracts (between NBET & GenCos)
- Vesting Contracts (between NBET & DisCos)
- Bilateral contracts (between GenCo and DisCo)

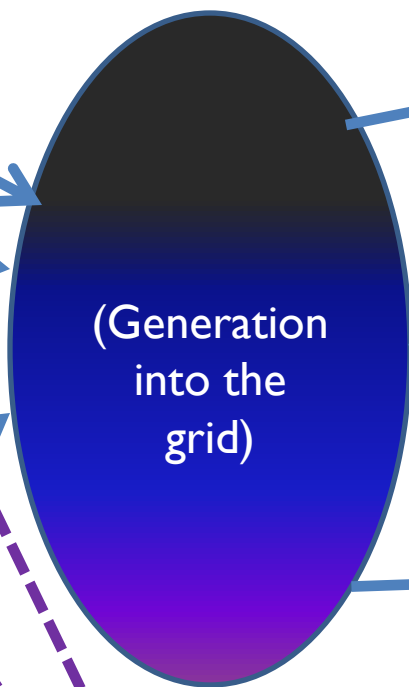
VESTING CONTRACTS

- means the contracts established to govern the trading arrangements between the Special Trader and Successor Distributors at the commencement of the Transitional Stage (MR definition)
- Features:
 - Same conditions and pricing system(MR.20.5.3a)
 - Contract quantities sold to each Distributor shall be calculated by assigning the Energy purchased by the Special Trader to each Distributor's contract proportionally to the total Energy requirements of each Distributor.(MR.20.5.3b)
 - Calculation of contract quantities to be administered by the market Operator (MR.20.5.3c)

- Genco 1

- GenCo 2

- GenCo z



Disco 1

DisCo

DisCo



Energy Flow



PPA CONTRACT



VESTING CONTRACT



BILATERAL CONTRACT

- means an agreement between two parties for the sale and purchase of a defined number of megawatt-hours of Energy for one or more Dispatch Periods in a Dispatch Day, which complies with conditions established in the Market Rules. (MR. definition)

Features:

- ✓ Direct agreement between the GenCo and DisCo
- ✓ Known capacity and energy output
- ✓ Known prices
- ✓ Give fair assurance for payments
- ✓ Sticks to all contractual obligations
- ❖ E.G Eko EDC & Paras Energy Ltd

RELEVANT RULES

1. **Market Settlement System (MR.27.1.2)**

“The Market Operator shall administer the market settlement system on a monthly basis and shall develop and maintain the requisite software, acquire the data and record the results of the market settlement system”.

2. **Preliminary Settlement Statement (MR 28.1)**

- MO to send Preliminary statement statement to participants not later than 10 business days of each month...

RELEVANT RULES contd

3. Final Settlement Statement

Not later the 20 days of each business month, Market Operator shall send to each Participant, the Final Settlement Statement, which shall contain the same information as contained in the

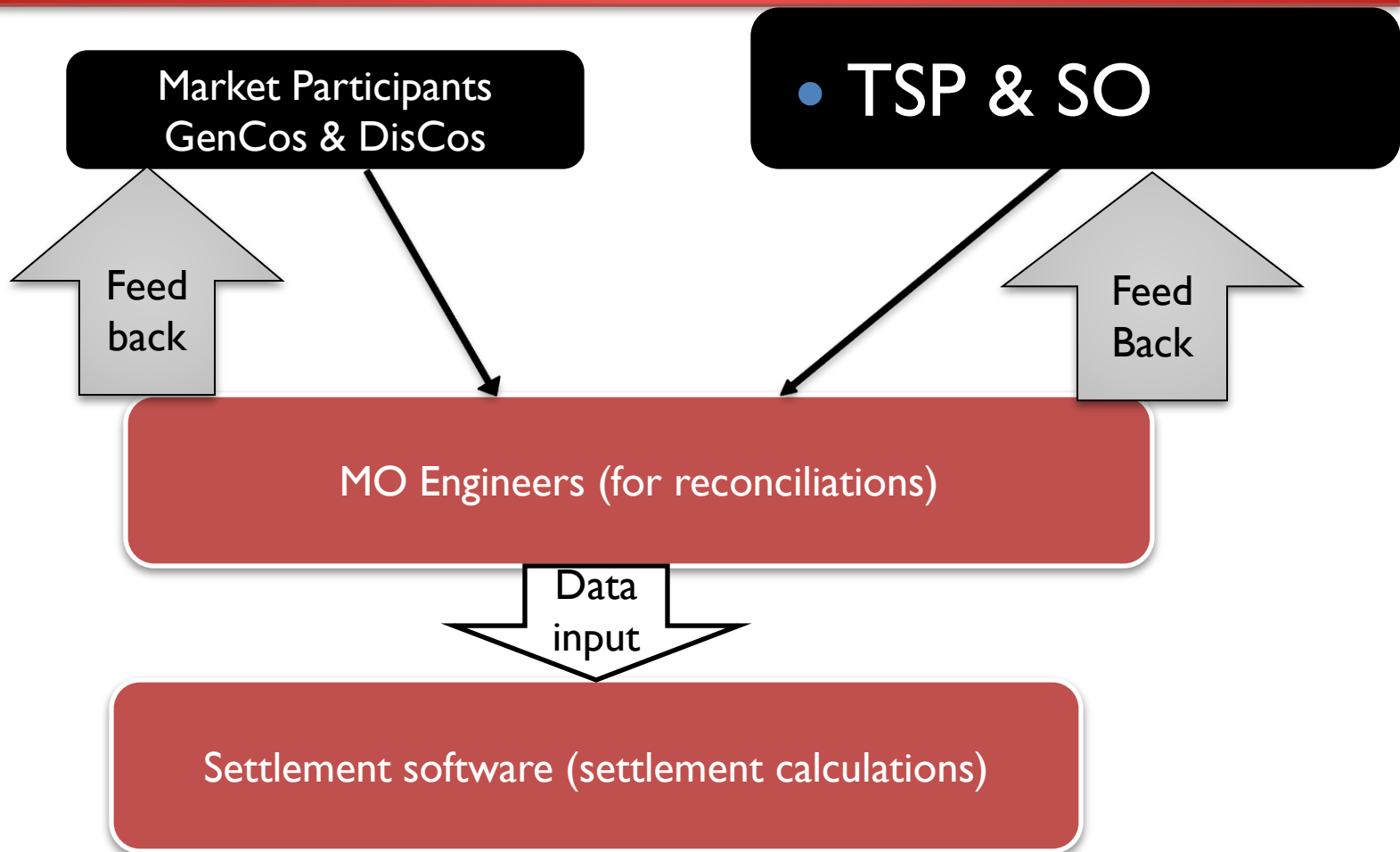
preliminary Settlement Statement, but adjusted to rectify any errors (MR.28.2)

“Settlement Statement” means the document prepared by the Market Operator stating the Charges to be settled, or the payment to be , by each Participant as a result of the trading and activities on the Market Operator Administered Market, and the Energy bought and sold in Bilateral Contacts by Participants(MR.def.)

4. TEM contract

Both parties accept to adopt the Settlement data and quantities in the Market Operator's Settlement Statement as contract quantities (MR:20.2.1C)

METER DATA FLOW



METER DATA FLOW contd

- Grid Meter reading is done jointly between the participant's Representative and TSP Representative
- Grid meter readings are obtained from two different trading points:
 - GenCo/TSP interface
 - TSP/DisCo interface
- To validate the meter readings both representatives must sign the documents

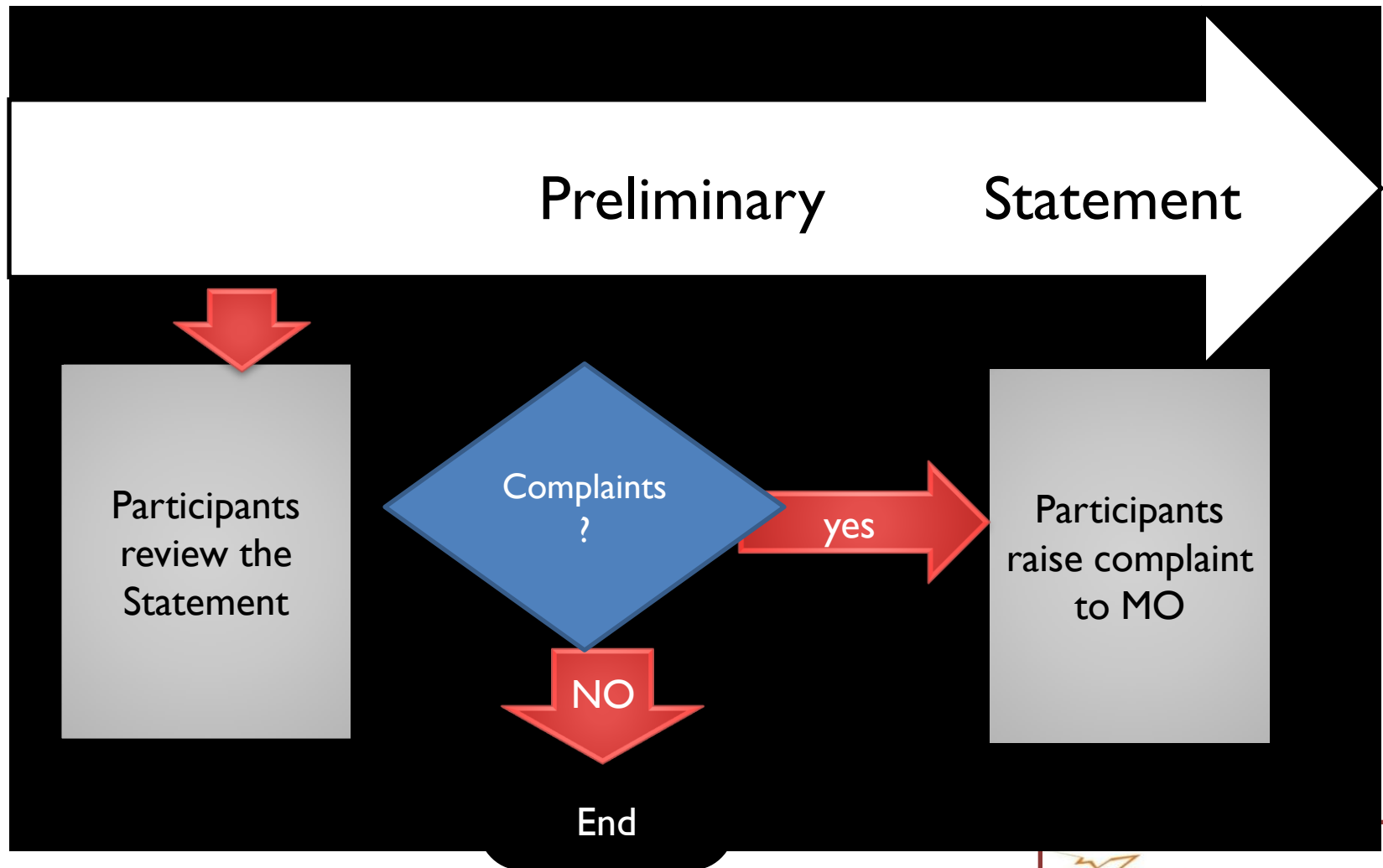
METER DATA FLOW contd

- Each participant and TSP must send the data to MO before the 5th day of the month for further processing
- Metered data is obtained from GenCos and DisCos in respect of energy sent out and energy delivered.(MR: 27.6.4)
- MO collates, validates, and where necessary, correct the Meter Data received from Participants, in order to establish the Metered Quantities applicable to each Participant for the settlement process(MR.27.6.5)

Settlement Calculations

- Data flow, collating, validating and correcting of data culminate into settlement calculations.
- All Energy calculations for Settlement in the Wholesale Electricity Market shall be measured through the Commercial Metering System(MR.27.6.12)
- For Power Purchase Agreements or bilateral agreements contracted prior to start-up of the Transitional Market, the metering administration shall be performed in the manner established in the preexisting agreement(MR.27.6.13)

Settlement Statement



Review by participants

- Raise Complain if participant does not agree with preliminary statement
- MO reviews complain from participant
- If necessary MO corrects preliminary statement and informs participants affected
- MO issues final settlement statement
- If Participant complains on final settlement statement,
- MO applies an amicable solution according to MR;
- Adjustments (if required) are made in subsequent statements
- if the complaint is not resolved it goes to dispute resolution procedure

Review by participants Contd

- Please note the difference between “Complaints” and “Disputes”
- If a Participant reasonably believes that there is an error or discrepancy in the preliminary Settlement Statement, the Participant shall notify the Market Operator within five (5) Business Days of receiving the preliminary Settlement Statement (MR.28.1.3)
- Sections 28.3 also provided for complaints on the final Settlement Statement
- .

- MR 28.3.1 provided “At any time within sixty (60) days of receiving a Final Settlement Statement, a Participant may notify the Market Operator of any complaint or dispute relating to its contents, concerning either:
 - (a) the contract quantities, or
 - (b) the settlement amount in respect of Service And Correction Charges, or
 - (c) the settlement amount in respect of Service And Correction Payments”
- Up to the point of the FSS, complaint could be resolved;
- If however MO and the participants fails to resolve the issues raised, the complaint becomes a dispute in line with MR. 28.3.3 and the dispute follows the procedure in MR 43.

Settlement Statement Analysis

| ENERGY BALANCE SUMMARY - | | | AUG 2016 FINAL | | | | | |
|--------------------------|----------------------------|-----------------------|---------------------|-----|--------------------------|-------------------------|----------------------|--------------------------------|
| GENERATORS | | | | | DISCOS/SPECIAL CUSTOMERS | | | |
| S/N | GENCO | ENERGY EXPORTED | ENERGY IMPORTED | S/N | DISCO/ CUSTOMER | ENERGY RECEIVED | TLF ENRGY (KWH) | ADJUSTED ENERGY RECEIVED (KWH) |
| | | (KWH) | (KWH) | | NAMES | (KWH) | | |
| 1 | SHIRORO | 376,636,000.00 | 840,100.00 | 1 | ABUJA | 231,663,710.00 | - 448,273.81 | 231,215,436.19 |
| 2 | JEBBA | 287,458,500.00 | | 2 | BENIN | 173,035,849.00 | - 334,827.75 | 172,701,021.25 |
| 3 | KAINJI | 203,922,200.00 | | 3 | EKO | 200,079,414.65 | - 387,157.58 | 199,692,257.07 |
| | SUB-TOTAL (HYDRO) | 868,016,700.00 | 840,100.00 | 4 | ENUGU | 196,743,060.00 | - 380,701.67 | 196,362,358.33 |
| 4 | AFAM | - | 34,570.00 | 5 | IBADAN | 262,742,040.00 | - 508,410.99 | 262,233,629.01 |
| 5 | DELTA | 203,542,700.00 | 161,000.00 | 6 | IKEJA | 279,358,320.00 | - 540,563.82 | 278,817,756.18 |
| 6 | GEREGU | 57,300,000.00 | 121,900.00 | 7 | JOS | 90,619,410.00 | - 175,350.33 | 90,444,059.67 |
| 7 | SAPELE | 43,561,700.00 | 1,280,800.00 | 8 | KADUNA | 154,991,840.00 | - 299,912.24 | 154,691,927.76 |
| 8 | EGBIN | 264,153,670.37 | 2,836,100.00 | 9 | KANO | 142,701,540.00 | - 276,130.27 | 142,425,409.73 |
| 9 | OMOTOSHO 1 | 70,780,100.00 | 11,400.00 | 10 | P/HARCOURT | 146,003,950.00 | - 282,520.50 | 145,721,429.50 |
| 10 | OLORUNSOGO 1 | 61,247,500.00 | 2,700.00 | 11 | YOLA | 62,785,900.00 | - 121,491.95 | 62,664,408.05 |
| | SUB-TOTAL (THERMAL) | 700,585,670.37 | 4,448,470.00 | | DISCO TOTAL | 1,940,725,033.65 | -3,755,340.92 | 1,936,969,692.74 |

| | | | | | | | |
|----|-------------------------------|-------------------------|---------------------|----|----------------------|-------------------------|-------------------------|
| 11 | OMOTOSHO 2 | 80,291,500.00 | 363,000.00 | 12 | CEB (SAKETE) | 97,162,000.00 | 97,162,000.00 |
| 13 | OLORUNSOGO 2 (NIPP) | - | 281,700.00 | 13 | NIGELEC | 73,938,620.00 | 73,938,620.00 |
| 14 | ALAOJI NIPP | 57,146,120.00 | 205,900.00 | 14 | AJAKUTA STEEL | 4,116,100.00 | 4,116,100.00 |
| 15 | SAPELE 2 (NIPP) | 77,857,300.00 | - | 15 | SUB TOTAL | 175,216,720.00 | |
| 16 | GEREGU NIPP | 57,921,620.00 | 26,000.00 | 16 | GENCOS IMPORT | 6,914,620.00 | 6,914,620.00 |
| 17 | IHOVBOR NIPP | 81,922,200.00 | 373,900.00 | | | | - |
| | ODUKPANI | 40,466,760.00 | 40,160.00 | | | | |
| | GBARAIN | - | - | | | | |
| | SUB-TOTAL(NIPP) | 395,605,500.00 | 1,290,660.00 | | | | - |
| 18 | AFAM VI (SHELL) | 18,960,000.00 | 231,440.00 | | | | - |
| 19 | OKPAI | 274,302,700.00 | - | | | | - |
| 20 | RIVERS IPP | 2,220,000.00 | 94,950.00 | | TOTAL | 2,122,856,373.65 | 2,119,101,032.74 |
| 21 | IBOM POWER | 41,344,000.00 | 9,000.00 | | | | |
| | OMOKU | 3,588,630.00 | | | | | |
| | SUB-TOTAL(IPP) | 340,415,330.00 | 335,390.00 | | | | |
| | TOTAL (Trx Grid) | 2,304,623,200.37 | 6,914,620.00 | | | | |
| | | | | | | | |
| | TRX. LOSS FIGURE (KWH) | | 181,766,827 | | | | |
| | TRX LOSS FACTOR (%) | | 7.89% | | | | |
| | ALLOWED LOSS (8.05%) | 185,522,167.63 | 8.05% | | | | |
| | | - | | | | | |
| | EXCESS LOSS | 3,755,340.92 | | | | | |

| | DISCO/ CUSTOMER | ENERGY RECEIVED | | ADJUSTED ENERGY RECEIVED (KWH) | % Received |
|-----|----------------------|-------------------------|----------------------|-----------------------------------|-------------|
| S/N | NAMES | (KWH) | TLF ENRGY (KWH) | | |
| 1 | ABUJA | 231,663,710.00 | - 448,273.81 | 231,215,436.19 | 10.91% |
| 2 | BENIN | 173,035,849.00 | - 334,827.75 | 172,701,021.25 | 8.15% |
| 3 | EKO | 200,079,414.65 | - 387,157.58 | 199,692,257.07 | 9.43% |
| 4 | ENUGU | 196,743,060.00 | - 380,701.67 | 196,362,358.33 | 9.27% |
| 5 | IBADAN | 262,742,040.00 | - 508,410.99 | 262,233,629.01 | 12.38% |
| 6 | IKEJA | 279,358,320.00 | - 540,563.82 | 278,817,756.18 | 13.16% |
| 7 | JOS | 90,619,410.00 | - 175,350.33 | 90,444,059.67 | 4.27% |
| 8 | KADUNA | 154,991,840.00 | - 299,912.24 | 154,691,927.76 | 7.30% |
| 9 | KANO | 142,701,540.00 | - 276,130.27 | 142,425,409.73 | 6.72% |
| 10 | P/HARCOURT | 146,003,950.00 | - 282,520.50 | 145,721,429.50 | 6.88% |
| 11 | YOLA | 62,785,900.00 | - 121,491.95 | 62,664,408.05 | 2.96% |
| | DISCO TOTAL | 1,940,725,033.65 | -3,755,340.92 | 1,936,969,692.74 | |
| 12 | CEB (SAKETE) | 97,162,000.00 | | 97,162,000.00 | 4.58% |
| 13 | NIGELEC | 73,938,620.00 | | 73,938,620.00 | 3.48% |
| 14 | AJAKUTA STEEL | 4,116,100.00 | | 4,116,100.00 | 0.19% |
| 15 | SUB TOTAL | 175,216,720.00 | - | 175,216,720.00 | |
| 16 | GENCOS IMPORT | 6,914,620.00 | | 6,914,620.00 | 0.33% |
| | TOTAL | 2,122,856,373.65 | | 2,119,101,032.74 | 100% |

Energy Shared

| GENERATORS | | DISCOS/SPECIAL CUSTOMERS | | | Energy Shared |
|----------------------------|-----------------------|--------------------------|--------------------------------|------------|---------------|
| GENCO | ENERGY EXPORTED | DISCO/ CUSTOMER | ADJUSTED ENERGY RECEIVED (KWH) | % Received | ABUJA disco |
| | (KWH) | NAMES | | | 10.91% |
| SHIRORO | 376,636,000.00 | ABUJA | 231,215,436.19 | 10.91% | 37,786,678.97 |
| JEBBA | 287,458,500.00 | BENIN | 172,701,021.25 | 8.15% | 28,839,787.11 |
| KAINJI | 203,922,200.00 | EKO | 199,692,257.07 | 9.42% | 20,458,858.70 |
| SUB-TOTAL (HYDRO) | 868,016,700.00 | ENUGU | 196,362,358.33 | 9.27% | |
| AFAM | - | IBADAN | 262,233,629.01 | 12.37% | - |
| DELTA | 203,542,700.00 | IKEJA | 278,817,756.18 | 13.16% | 20,420,784.69 |
| GEREGU | 57,300,000.00 | JOS | 90,444,059.67 | 4.27% | 5,748,724.78 |
| SAPELE | 43,561,700.00 | KADUNA | 154,691,927.76 | 7.30% | 4,370,405.31 |
| EGBIN | 264,153,670.37 | KANO | 142,425,409.73 | 6.72% | 26,501,688.48 |
| OMOTOSHO 1 | 70,780,100.00 | P/HARCOURT | 145,721,429.50 | 6.88% | 7,101,139.87 |
| OLORUNSOGO 1 | 61,247,500.00 | YOLA | 62,664,408.05 | 2.96% | 6,144,764.76 |
| SUB-TOTAL (THERMAL) | 700,585,670.37 | DISCO TOTAL | 1,936,969,692.74 | | |

| | | | | | |
|-------------------------|-------------------------|----------------------|-----------------------|----------------------------|-----------------------|
| OMOTOSHO 2 | 80,291,500.00 | CEB (SAKETE) | 97,162,000.00 | 4.59% | 8,055,388.05 |
| OLORUNSOGO 2 (NIPP) | - | NIGELEC | 73,938,620.00 | 3.49% | - |
| ALAOJI NIPP | 57,146,120.00 | AJAOKUTA STEEL | 4,116,100.00 | 0.19% | 5,733,286.49 |
| SAPELE 2 (NIPP) | 77,857,300.00 | SUB TOTAL | 175,216,720.00 | | 7,811,172.59 |
| GEREGU NIPP | 57,921,620.00 | GENCOS IMPORT | 6,914,620.00 | 0.33% | 5,811,089.91 |
| IHOVBOR NIPP | 81,922,200.00 | | - | | 8,218,990.94 |
| ODUKPANI | 40,466,760.00 | | | | 4,059,899.93 |
| GBARAIN | - | | | | - |
| SUB-TOTAL(NIPP) | 395,605,500.00 | | - | | |
| AFAM VI (SHELL) | 18,960,000.00 | | - | | 1,902,195.84 |
| OKPAI | 274,302,700.00 | | - | | 27,519,907.99 |
| RIVERS IPP | 2,220,000.00 | TOTAL | 2,119,101,032.74 | 100% | 222,725.46 |
| IBOM POWER | 41,344,000.00 | | | | 4,147,910.60 |
| OMOKU | 3,588,630.00 | | | | 360,035.71 |
| SUB-TOTAL(IPP) | 340,415,330.00 | | | Total Energy Shared | 231,215,436.19 |
| TOTAL (Trx Grid) | 2,304,623,200.37 | | | | |

CAPACITY SHARED

- -Same mode of sharing as in energy shared
 - Percentage sharing is based on the percentage of total energy received from the grid
 - For GenCos without effective PPAs:
 - Capacity is equal to the meter reading at the GenCos busbar (before passing through the grid)NERC Order NERC/15/0011 (8a iv)

CAPACITY SHARED Contd

- For GenCos with effective PPAs,
 - Capacity is according to the PPAs' provisions for example:
 - ❖ Tested capacity (Agip),
 - ❖ Minimum capacity (SEPCO PACIFIC Energy & Omotosho Electric Energy LTD)
 - ❖ Actual capacity generated plus deemed capacity (Shell)

CAPACITY SHARED – AUGUST 2016

| DISCOS/SPECIAL CUSTOMERS | | | | | |
|--------------------------|-----------------------------------|---------------|--------------------------|------------------------|---------|
| DISCO/ CUSTOMER | ADJUSTED ENERGY RECEIVED (KWH) | % Received | Total capacity (MW/H) | Capacity Shared (MW/H) | |
| NAMES | | | | | |
| ABUJA | 231,215,436.19 | 10.91% | 2,607,399.00 | 284,494 | |
| BENIN | 172,701,021.25 | 8.15% | | 212,496 | |
| EKO | 199,692,257.07 | 9.42% | | 245,707 | |
| ENUGU | 196,362,358.33 | 9.27% | | 241,610 | |
| IBADAN | 262,233,629.01 | 12.37% | | 322,659 | |
| IKEJA | 278,817,756.18 | 13.16% | | 343,065 | |
| JOS | 90,444,059.67 | 4.27% | | 111,285 | |
| KADUNA | 154,691,927.76 | 7.30% | | 190,337 | |
| KANO | 142,425,409.73 | 6.72% | | 175,244 | |
| P/HARCOURT | 145,721,429.50 | 6.88% | | 179,300 | |
| YOLA | 62,664,408.05 | 2.96% | | 77,104 | |
| DISCO TOTAL | 1,936,969,692.74 | | | | - |
| CEB (SAKETE) | 97,162,000.00 | 4.59% | | | 119,551 |
| NIGELEC | 73,938,620.00 | 3.49% | | | 90,976 |
| AJAOKUTA STEEL | 4,116,100.00 | 0.19% | | | 5,065 |
| SUB TOTAL | 175,216,720.00 | | | | - |
| GENCOS IMPORT | 6,914,620.00 | 0.33% | | 8,507.93 | |
| TOTAL | 2,119,101,032.74 | 100% | | 2,607,399.00 | |

TLF ENERGY PAYMENTS

- The regulated Transmission loss factor (TLF) is 8.05%
- $TFL = \frac{E_s - E_r}{E_s}$
- Where E_s is Energy Sent (by GenCos)
- E_r is Energy received (by DisCos & others)
- If $TLF > 8.05\%$, TSP bears energy cost of the excess
- If $TLF < 8.05\%$, TSP receives credit on the difference

MANAGEMENT OF TRANSMISSION LOSS FACTOR (TLF) BETWEEN TSP AND ELEVEN DISCOS

- Outlined by NERC Supplementary Order on TEM 8k(i-v)
 - ✓ Ensures that GenCos are paid 91.95% of the energy sent out (100% - 8.05% (TLF))
 - ✓ DisCos energy received is adjusted with excess TLF to achieve this.
 - ✓ DisCos therefore has an initial payment impact
 - ✓ MO debit/credit the attributable amount to TSP revenue while issuing service providers invoice.
 - ✓ Thus, removes the initial impact on Disco back to TSP

Excess/surplus TLF calculation

- MO shall apportion the positive or negative difference between the actual TLF and 8.05% to the respective Discos in line with their percentage of total consumption -**NERC/15/0011,(8k,ii)**;
- The amount to be paid by each Disco will be calculated by applying a charge rate which is equivalent to the weighted average cost of energy and capacity for the settlement cycle; or any other amount approved by the Commission- **NERC/15/0011(8k,v)**.

SERVICE PROVIDERS INVOICE - AUGUST

Participants Name: Abuja Electricity Distribution Company
Participants Number: 01400601088
Participants Rep Name: NEIL F. CROUCHER
Participant Rep Address: LOMA-MANSA ST, OFF IBB WAY, WUSE ZONE 4 ABUJA FCT

Market Invoice for the month of August 2016

| Description | Amounts (N) |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Ancillary Services | 11,720,310.46 |
| Regulatory Charges | 73,828,926.00 |
| TSP Charge | 677,729,437.68 |
| Market Operations Charges | 5,135,294.83 |
| BUIK Trader Charges | 5,327,203.65 |
| System Operations Charges | 76,319,591.15 |
| TLF Adjustment (August 2016) | 6,562,255.27 |
| Present Month Total | 856,623,019.04 |
| Brought Forward | 8,769,086,306.66 |
| Amount Due | 9,625,709,325.70 |
| Amount in Words: Naira | Nine Billion Six Hundred Twenty Five Million Seven Hundred Nine Thousand Three Hundred Twenty Five Naira and Seventy Kobo Only. |

Payment Instruction:

please remit payment to:

Duly Authorized sign:-----Date:-----

SERVICE PROVIDERS INVOICE - JULY

Participants Name: Abuja Electricity Distribution Company
Participants Number: 01400601088
Participants Rep Name: NEIL F. CROUCHER
Participant Rep Address: LOMA-MANSA ST, OFF IBB WAY, WUSE ZONE 4 ABUJA FCT

Market Invoice for the month of July 2016

| Description | Amounts (N) |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------|
| Ancillary Services | 10,175,897.84 |
| Regulatory Charges | 64,394,348.77 |
| TSP Charge | 588,423,450.70 |
| Market Operations Charges | 4,458,605.07 |
| BUIK Trader Charges | 4,625,225.61 |
| System Operations Charges | 66,262,780.81 |
| TLF Adjustment (July 2016) | (8,344,772.27) |
| Present Month Total | 729,995,536.53 |
| Brought Forward | 8,337,032,894.14 |
| Amount Due | 9,067,028,430.67 |
| Amount in Words: Naira | Nine Billion Sixty Seven Million Twenty Eight Thousand Four Hundred Thirty Naira and Sixty Seven Kobo only. |

Payment Instruction:

please remit payment to:

Duly Authorized sign:-----

Date:-----

MANGEMENT OF ENERGY IMPORT

➤ SCENARIO I

A GenCo uses part of the energy produced by her

❑ Treatment:

The energy is net off from the total energy that GenCo generated to get net energy sent – out, a single FSS is prepared.


➤ Scenario 2.

A GenCo imports energy from TSP network

❑ Treatment:

A separate settlement statement is prepared for the energy import depicting the GenCo as energy buyer from the grid.

The GenCo should pay for the energy and the attributable capacity payment at the wholesale level like any other participant taking power from the grid in addition to payment of services.



- discussions



**Thank
you**