INVESTORS’ FORUM FOR THE PRIVATISATION OF
PHCN SUCCESSOR COMPANIES

“CURRENT STATUS AND FUTURE OUTLOOK OF
THE TRANSMISSION NETWORK

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Introduction
  ▪ What is a Transmission Grid
  ▪ Overview of generation capability

Current State of Transmission Infrastructure

Challenges
  ▪ Limiters to progress

Way Forward
  ▪ Where we want to be
  ▪ Progress on reform of the Sector

Investment opportunities
Introduction

What is a Transmission Grid

Consists of conductors carried on steel towers in between transformation stations

Conveys generated power from Power Stations to Major Load Centers

Inter-connects all Power Stations to form a solid network that is accessible to all load centers

It transports power and energy at minimum technical loss
2. Structure of electricity industry

Generation, Transmission and Distribution of Electricity
Principal Power Stations

- Shiroro 400MW
- Kainji 400MW
- Geregu 360MW
- Papalanto 200MW
- Omotosho 250MW
- Omoku 200MW
- Omoku 120MW
- Omoku 420MW
- SHELL 420MW
- Afam 350MW
- Alaoji 305MW
- Delta 500MW
- Sapele 200MW
- Sapele 360MW
- Sapele 450MW
- Egbem 270MW
- Calabar 561MW
- Ibom 155MW
- Ihovbor 360MW
- Egbema AES 1,200MW
- Okpai 450MW
- Okpai 450MW
- Geregu 360MW
- Okp 450MW
- Sapele 200MW
- Omoku 120MW
TRANSMISSION LINES
150MVA 330/132kV TRANSFORMER NEWLY COMMISSIONED AT AYEDE TS
Introduction:- set up of TCN

TCN is run by 2 Departments:

- Transmission Service Provider (TSP)
  - Develops the Transmission Grid to new areas
  - Maintains the infrastructure in the Grid

- Systems Operator (S/O)
  - Operates the whole System which includes GENCOs & DISCOs ie
    - decides which power station comes on and when and by how many MW
    - Decides which transmission line or transmission station should be supplied
      what quantity of MW ie load shedding
  - Enforces Grid discipline

TCN’s operations cover the whole country and administratively it is divided into 8 Transmission Regions that contain various Work Centers
GEOGRAPHICAL STRUCTURE OF THE TRANSMISSION COMPANY OF NIGERIA, TCN

[Map showing geographical structure with various regions and cities highlighted]
Introduction: Overview of generation capability

• Unlimited Quantity of Gas & Crude Oil

• Abundant Hydro Reserve

• Large Coal Deposits

• Abundant Reserve of Renewable: Wind & Solar

• Power Sector Reform in progress

• High Investment Opportunities to meet economic needs
Current State of Transmission Infrastructure

• Transmission Capability < 6,000MW

• High Non-Technical loss

• Low Infrastructure Coverage < 40% of the country

• Low per capita of generation < 25W
State of Infrastructure

Transmission Grid Post-NIPP
Current State of Infrastructure

• **EXISTING:**
  - 5,523.8km of 330 kV of Transmission lines
  - 6,801.49km of 132kV of Transmission lines
  - 32No. 330/132kV Substations with total installed transformation capacity of 7,688 MVA (equivalent to 6,534.8 MW)
  - 105No. 132/33/11kV Substations with total installed transformation capacity of 9,130MVA (equivalent to 7,760.5 MW)
  - The Average Available Capacity on 330/132kV is 7,364MVA and 8,448MVA on 132/33kV which is 95.8% and 94.1% of Installed capacity respectively
  - Average Transmission Loss is 8.5%
Current State of Infrastructure

ON-GOING PROJECTS

- 986.5KM of 330kV Lines are under construction;
- 705.3kM of 132KV Lines are under construction;
- 1,350MVA Capacity of 330/132kV transformers are presently being installed in new substations;
- 3,000MVA Capacity of 132/33KV transformers are presently being installed in new substations;
- Overloaded Transmission stations are constantly being reinforced with additional capacity
- Overloaded transmission lines are being re-conductored with higher capacity conductors
Current State of Infrastructure

ON-GOING NIPP PROJECTS

- Increase 330kV capacity by 5,590 MVA
- Increase 132kV capacity by 3,313 MVA
- Increase 330kV line length by 2,194 km
- Increase 132kV line length by 809 km
- 10 new 330kV S/S
- 7 new 132kV S/S
- Expansion/Reinforcement of 32 existing 330kV and 132kV S/S
Challenges

• Radial Lines with no redundancies
• Obsolete Substation Equipment
• Overloaded transmission lines and Substations
• Inadequate Coverage of Infrastructure
• Limited Funds for Development projects
• High Technical and Non-Technical loss
• Limited training opportunities
• Community issues during project execution
Way Forward:- Strategy

• Build Transmission Grid that can efficiently evacuate all generated power

• Create adequate network redundancies to ensure at least 99.9% reliability

• Reduce transmission loss to less than 5%

• Pursue Inter connection with neighboring countries for power exchange

• Improve TCN’s revenue base to ensure a self sufficient and self sustaining company

• Aggressively, pursue reform of the sector to ensure development of infrastructure.
Transmission Expansion Plan

Present on-going projects can evacuate up to 15,000MW
Highlights of Expansion Plan include:

- All power stations to have alternative evacuation routes
- All State capitals to have 330/132kV TS
- All Local Govt. Headquarters to have 132/33kV TS
- All major towns, local Govt. Headquarters and State Capitals to be on dual source of supply
- All Transmission Stations to have at least 2 transformers that are less than 75% loaded at any time
- All Transmission Stations to be rehabilitated for automation operation
Transmission Expansion Plan

Accordingly, expansion of the Grid will include construction of the following within 5 years:

- 2,460km of 760kV line,
- 2,349km of 330kV line
- 2,353km of 132kV line,
- 3,000MVA capacity at 760/330kV
- 3,900MVA capacity at 330/132kV and
- 3,680MVA capacity at 132/33kV
Impact of new projects on system reliability

- Improve system wide voltage profile, especially in the northern parts of the network

- Positive impact on system security as sufficient transmission resources will now be available

- Loss reduction and efficiency improvement

- Improve the communication network for system operation since each new line will have OPGW strung on it.

- Reduced requirement of compensation equipment

- Increased access to electricity
Way Forward: Implementation of Strategy

- Restructure TCN to operate more efficiently

- Execute projects through IGR, Contractor-Financing, Foreign Loans (ADB, W/B, AFD etc)

- Encourage full implementation of Road map for power sector reform so that all sectors will operate efficiently.

- Encourage investors to set up power equipment manufacturing companies for major equipment in the country.
Way Forward:- Highlights of the Roadmap

- Removes all obstacles to Private Sector Investment

- Privatize Thermal Generation companies via sale of 51% equity

- Offer for concession, hydro generation plants

- Offer for Management Contract the TCN

- Privatize Distribution Companies via sale of 51% equity
Supply and Demand Balance By Region – 2015
Proposed Super-Grid Route

North West
G = 30MW
L = 3,813MW

North East
G = 500MW
L = 2,849MW

North Central
G = 2,329MW
L = 5,702MW

South East
G = 1,965MW
L = 3,321MW

South West
G = 961MW
L = 2,781MW

South South
G = 8,107MW
L = 4,558MW

Lagos
G = 4,689MW
L = 8,659MW
Nigerian 330KV and Super Grid Transmission Network - 2020
PHCN GRID NETWORK FOR 30,000MW UNDER STUDY
Thank You for
Your Attention