

# **Nigeria: Regulation and Power Sector Reform**

## ***Policy Module Goals and Characteristics of Restructuring International Trends and Applicability to Nigeria***

**Abuja, May 19th, 2003**

**(Afternoon: 3:45 p.m.)**

# International Trends: Objectives of Restructuring

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- ◆ Vertical Unbundling : split per activity
  - Separate the activities that can be open to competition
  - Specific Codes / regulation for each activity ⇒ efficiency
    - Encourage reasonable timing of investment to secure long-term supply at reasonable costs / prices
    - Improve quality of service, reliability and availability
- ◆ Split each activity, when possible and efficient, into more than one Company
  - Create conditions for a market to exist
    - Diversify sellers and buyers
    - Horizontal unbundling of integrated utility
    - Allow free decisions in new entry (generation competition)
    - Allow free choice on how and from whom to buy (retail competition)

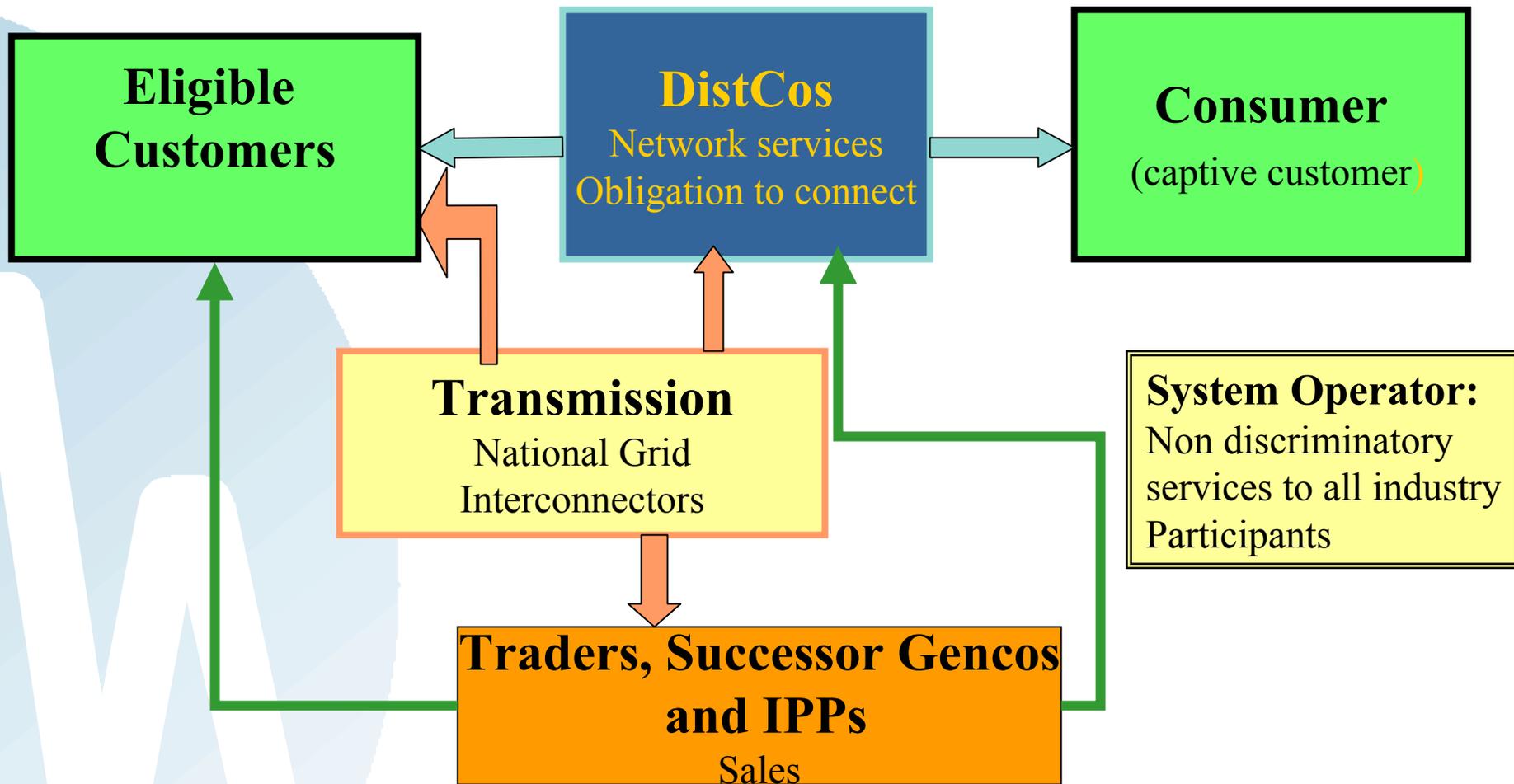
# Nigeria

## Proposed New Sector Structure

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- ◆ Unbundling
  - Distribution nor generation allowed to own shares in TransCo
  - Generation not allowed to own shares in DistCo and vice-versa
  - Each activity needs a separate licence
- ◆ Single transmission company 100% state-owned, which initially will also coordinate system operation and dispatch
  - But Law does not set a monopoly and more than one transmission provider could develop
- ◆ Diversification of Generation but mandatory central dispatch
  - Successor companies
    - Thermal : privatisation
    - Hydro?
  - New IPPs
- ◆ Diversification of DistCos
- ◆ Initial:
  - Bulk Trader
  - TransCo projections of future demand (Grid Code) and system expansion

# Unbundling the Chain of Responsibilities



# International Trends: Unbundling

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- ◆ Initially differentiation of three activities: generation, transmission, distribution
- ◆ Today, trend to a higher detail in differentiation and separation of activities:
  - generation, transmission, trader, distribution, retail sales
  - System Operator, Market Operator, Distribution Operator(s)
- ◆ Functional or ownership separation?
  - Initially, tend to allow cross ownership and oblige only functional / accounting separation
    - Experiences: Intrusive regulation and difficult to monitor.
  - Trend to ownership unbundling
  - Trend to generation divestiture to reduce risk of Market power abuse
    - For a competitive Market to exist, sufficient diversification in generation ownership, in capacity and type (e.g. peak, baseload)

# Functions of Transmission Company

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- ◆ Provide transmission services for a fee charged to Transmission Users
  - Transmission Users : those connected / using the grid
  - Adequate maintenance of facilities
  - Operation
  - System Plan (indicative or mandatory)
  - Monopoly and obligation to expand or competition in expansions
  
- ◆ Basic principles in a Competitive Market: non discriminatory open access
  
- ◆ Implementation of open access = regulations on connection, use and charges
  - Connection to grid and disconnection
  - Security and quality standards

# Transmission Activity: Options in Structure and Regulation

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- ◆ Transmission services activity separated from generation and distribution activity
  - Exception: Chile, where generator can also own transmission
- ◆ Monopoly or competition for expansions?
  - Experiences of competition in countries with significant need of transmission investment has reduced costs
- ◆ Independent from trading interests: Not allowed to buy or sell energy
  - Exceptions:
    - Chile (allowed bundled transmission - generator)
    - If also a Single Buyer
      - Better to differentiate activity in a separate Licence
    - Panama (in the transition, as Principal Buyer)
- ◆ Regulated revenues and maximum tariffs
  - Exception: Chile, negotiated wheeling tariffs
  - Performance based?

# Types of Transmission Company (1)

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## ◆ “Active”

- Responsible for system plan, expansion and operation, including losses, ancillary services and congestion (with performance standards)
  - Assigned risks and remunerated accordingly
- Responsible for system planning or indicative planning
  - System Plan usually requires final approval by Regulator
- Responsible and exclusivity on expansion
- Responsible for Operation and Maintenance
- Responsible for System Operation and Dispatch
- Decision making and control on expansion, O&M and system operation, to be able to manage cost risk.
  - Efficient cost of congestion, AS and losses included in regulated transmission charges of users
  - Actual cost of congestion, AS and losses paid by transmission
  - Sometimes, may own generation dedicated to provide Ancillary services
- Good for “mature” grids (example: NGC England)

# Role of Transmission Company (2)

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## ◆ “Passive”

- Responsible for operation and maintenance (with performance standards)
- Obligation and exclusivity for minor expansions and upgrades
- Does not make the decisions on expansion
- May own System Operator but is not responsible for congestion, ancillary services and losses
  - Cost of congestion, AS and losses paid by Participants
- Must inform about expected constraints
  - Indicative planning: inform about expected constraints, best localization of new load or generation
- Lower risk, lower rate of return = lower revenue
- Example: Argentina, Brazil, Colombia

# Role of Transmission Company (3)

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## ◆ Partly “Passive”, Partly “Active”

- Operation and maintenance (with performance standards)
- Responsible for system plan
- Obligations to expand according to the system plan approved by Regulator
  - Approval also that expansion will be included in assets for revenue, but at what regulated cost?
- May own System Operator but not responsible for congestion, ancillary services and losses
  - Cost of congestion, AS and losses paid by Participants

## ◆ Proposed for Nigeria

- Obligation to expand
  - Financing?
- Facilitate electrification through grid connections

# System Operator and Market Operator: Options in Functions and Organization

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- ◆ In Transco or an independent Company (ISO)
  - New non profit (private) independent company
    - West Europe, Argentina, Ecuador, Bolivia, Guatemala, El Salvador, USA
  - Where TransCo State owned, usually also assigned System and Market Operator Functions (S&MO)
    - Cheaper and easier: based on existing Dispatch Centre, with added new functions
      - England, Colombia, Panama, Nicaragua
  - Initially in TransCo, later separated and independent
    - Proposal in Colombia, in implementation
- ◆ System Operator and Market Operator in the same company or separated
  - Separated: Brazil, West Europe
    - Complex coordination, more expensive
  - Partial separation in Colombia and Guatemala
  - Chile, Peru: owned by Generators
    - A “Generators Club”, lack of transparency
    - Proposals to move to ISO

# Market Design

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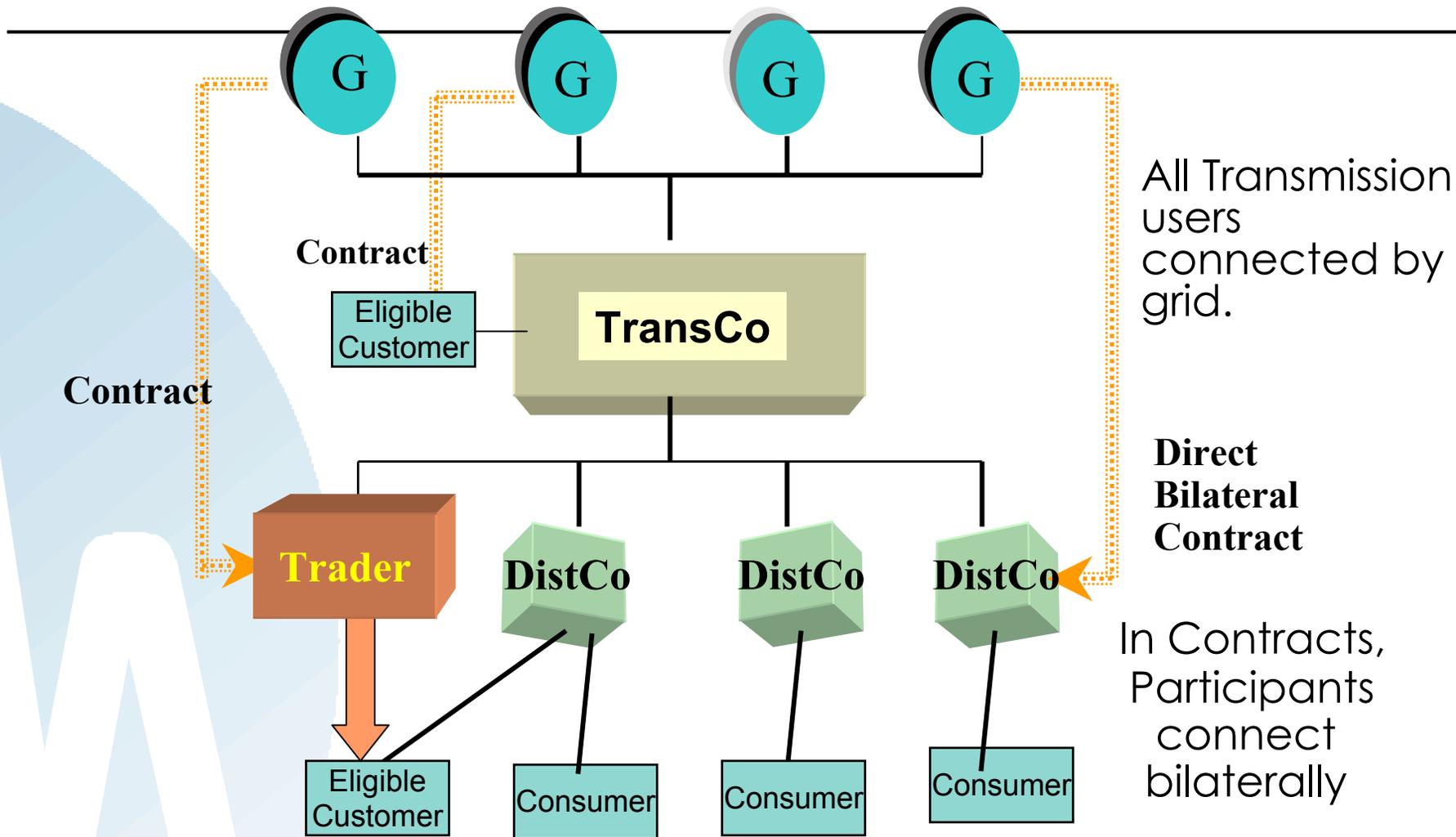
- ◆ Single Buyer or Multiple Buyers
  - Trend to multiple buyers as Single Buyer stalls competition
  - Alternative to Single Buyer: A regulated “Principal” Buyer but DistCos in certain conditions allowed to buy on their own
- ◆ Captive customers (consumers) or freedom to choose (retail competition)
  - All Market allow a level of retail competition
  - Trend to full retail competition has slowed due to actual and perceived problems
    - Trend to more careful and conservative gradual approach
- ◆ Open access of generators to the market:
  - Must accept Grid Code and Market rules
  - Allow free decisions on new entry risk (technology, size, cost, financing, others)
  - May require or not Licences
    - If yes, only environmental, safety and technical requirements

# Multi Market Model: Multiple Buyers and Sellers

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- ◆ Each Buyer can choose from whom to buy, and each Seller can choose to whom to sell
  - Prerequisite: sufficient choices, sufficient offer
- ◆ Bilateral contracts
  - Market approach = contracts to share risks and as financial instruments to smooth prices / payments / revenues
  - Different prices
- ◆ Typically needs a mechanism to clear imbalances
  - Spot or Real Time or Balancing Market
- ◆ Administration of transmission congestion and its cost
  - Nodal pricing / must run generation
- ◆ Market approach to quality and security
  - Ancillary Services Markets or competitive contracts or competitive auctions

# Multiple Buyers and Sellers



# Simple Power Markets: Typical Latin America

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- ◆ Mandatory net Pool
  - Mandatory centralised dispatch
    - Based on pre existent centralised dispatch and hydro optimisation
    - Water value: future replacement cost
  - Market Contracts as financial instruments
    - Pre existent PPAs have special rules
  - Spot market with day ahead nomination and ex post, hourly energy prices
  - Transmission constraints:
    - Nodal prices, must run generation, congestion
  - Generation Capacity pricing and buying / selling
- ◆ Independent System Operator is also Market Administrator
  - Using staff / infrastructure / software / systems of existing Dispatch and National Control Centre

# Sophisticated Power Markets: USA, West Europe

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- ◆ Independent System Operator and Independent Market Operator
- ◆ Allow self scheduling
  - Physical bilateral contracts with incremental / decremental bids
- ◆ Day-ahead market:
  - Transmission rights and market power mitigation
- ◆ Real time Balancing Market:
- ◆ Congestion management
- ◆ Ancillary services:
  - Markets (auctions)
  - Must run contracts
- ◆ Allocation of interconnectors and regional trading
- ◆ Generation capacity markets (East US)

# Retail Model: Consumers Access to the Market

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- ◆ Open access to consumers = retail competition
  - Certain eligible (all) consumers have the right to choose how and from whom to buy.
    - Cost reflective tariffs, no cross subsidies
    - Wheeling tariffs
    - Metering / load profiling ?
- ◆ Today, high transaction costs in small consumers retail Market
  - Cost of obtaining info and maintaining client
  - Cost of aggregating small loads
  - Metering
  - Cost of negotiating Contracts with Generators

# Retail Sales Market Design

## *MORE COMPETITIVE*

- ◆ Total Retail Competition - all customers are free
- ◆ Independent Traders - retailers allowed and compete
- ◆ Traders / retailers free in procurement decision (how much and when to contract)
- ◆ Demand direct participation in the central administered Markets as bids for dispatch (willingness to pay) or reserve (curtailable loads)

## *LESS COMPETITIVE*

- ◆ Gradual implementation of retail competition - Eligible customers and captive customers
- ◆ Traders or independent retailers not allowed
- ◆ Contracting obligations to regulated retailers (DistCo) in sales to captive customers
- ◆ Use of value of lost load to represent willingness to pay
  - May include curtailable load programs

# Nigeria Market Design

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- ◆ Based on bilateral contracts, centralised dispatch with Generators bids and Balancing Market to clear the differences
- ◆ Generators and DistCos and Traders buy and sell energy and generation capacity in the contract market
- ◆ Stages of increasing competition
- ◆ Initially, no Balancing Market
  - All energy produced (injected) or taken from the grid must be bought / sold in contracts
    - Contract design?
    - A set of imbalance tariffs or contracts between Generators when produce or less more energy than contracted?
- ◆ Gradual introduction of Eligible Customers
  - Important issue when attracting privatisation of DistCos
  - Law establishes it as a decision of Minister
    - Best practices: set in advance a plan (indicative?) and timetable
  - Law provides for implementing Competition Transition Charges (CTC) if necessary (Minister directive to NERC)
    - NERC determines allocation , collection and distribution mechanisms

# Relationship between Participants and users

