

# The Prospects of the Nigerian Electricity Market

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# The Outline

- Opening Statement
- The Truths about the Electricity Market
- The Realities of the Nigerian Electricity Market
- Ensuring success of the Market
  - Market Design
  - Trading Arrangement
  - Provision of Market Services
  - The MGDs
- What do we have? (the dynamics of electricity trading in Nigeria)
- Concluding Statement

# The Opening Statements

**“The Success or Failure of any Electricity Market depends on the Regulatory Framework, Market Structure and the applicable Trading Arrangement”**

**‘Further to the Regulatory framework, the quality of the Regulators and the independence of the Regulatory Commission, are critical to the success of an Electricity Market’**

# Some Truths about the Electricity Market

- Technical Truths
  - Electricity is not stored. Instant it is produced, electricity leaves the generating plant, travels at the speed of light and is consumed within a millisecond
- Commercial Truths
  - No matter how much buyers and sellers in the Market try to match load to supply, there will always be an imbalance.
  - The contract amounts will in most cases not match the actual amounts generated and consumed.
  - It is more economical to dispatch plants in merit order and settle possible imbalances later

# The Realities of the Nigerian Electricity Market

- Generation capacity is grossly inadequate for the nation
- Transmission network is highly constrained and congested
- The distribution network is weak and overloaded
- The ATC&C losses for the distribution network are too high for efficient operation of the Nigerian Electricity Market
- Due to the huge energy losses, revenue collection is very low, compared to the requirements of the market
- The few IPPs, prior to privatization could not be paid their monthly invoices, as and when due. There was no incentive to continue operations
- There was no incentive for the introduction of new capacities into the electricity market, from the IPPs
- With privatization, the IPPs increased from 5 to about 15. With the sale of the NIPPs, this will further increase to about 25
- The industry that could not cope with 5 IPPs will certainly not know what to do with 25 IPPs – a situation that will destroy the Industry and will not encourage any capacity entry into the market

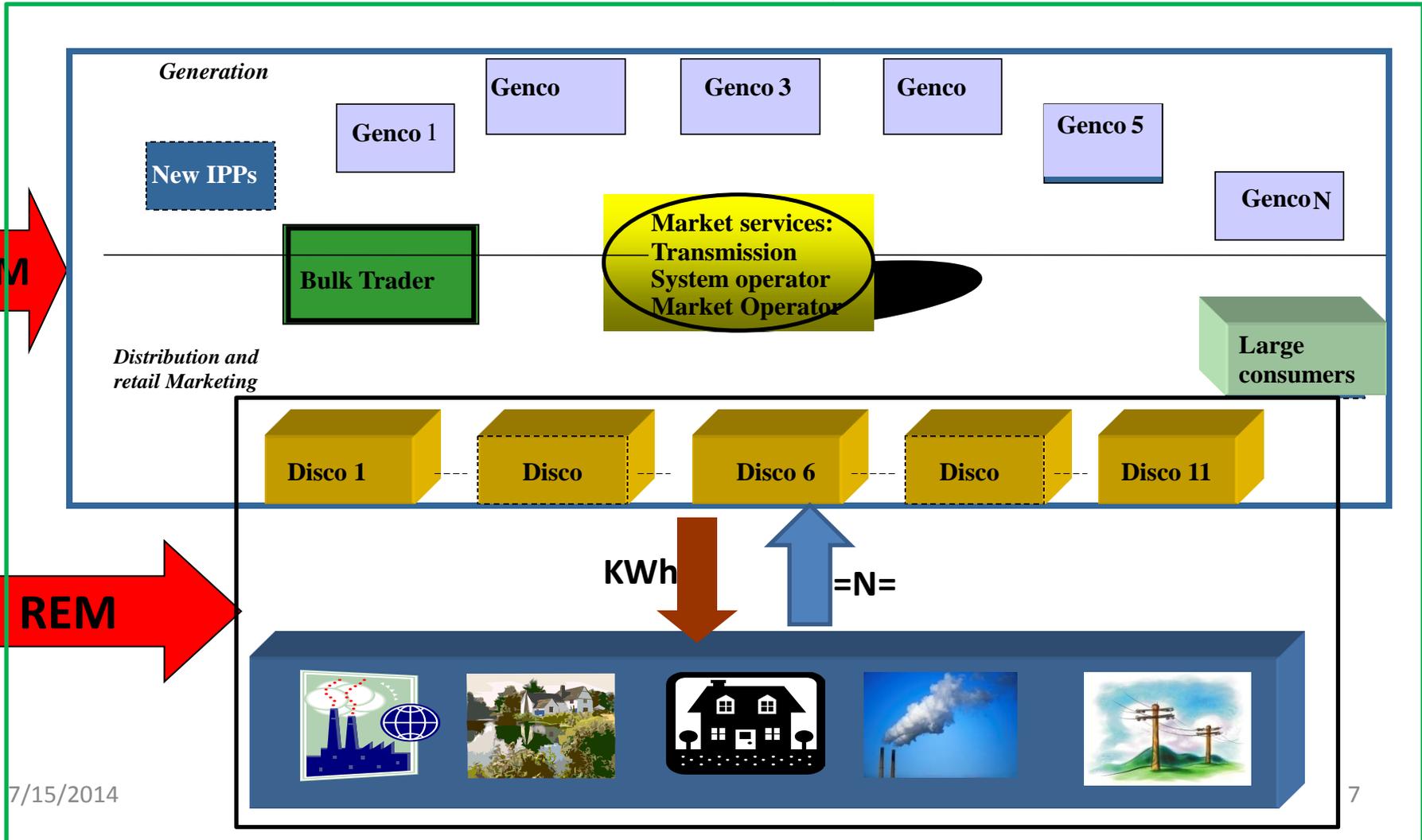
# Ensuring success: The Market Design

The Nigerian Electricity Market has been designed to take care of the basic truths about the Electricity Market, as well as to accommodate the peculiarities of the Nigerian Market

# The Nigerian Electricity Market: Institutional Organisation

NERC

The Electricity Market



# Parts of The Nigerian Electricity Market

- **The Retail Market:**
  - Arrangement for the sale of electricity to the final consumers at the distribution voltage levels
  - Governed by the Distribution Code and Retail Contracts (Consumer Tariffs & conditions of supply)
  - Players are the Discos and the end-consumers
  - Most of the power generated is consumed here, most of the market revenue is generated here
- **The Wholesale Market:**
  - Arrangement for the purchase and sale of electricity from the generators to resellers(who sell to retail consumers) along with the ancillary services needed to maintain reliability and power quality at the transmission level
  - Players are the Gencos & Discos as the market participants, the TSP, MO and SO as service providers. Bulk Trader is a special Market Participant, as well as a special service provider
  - **Governed by the characterization of the Market, stage of its development and the Trading Arrangement**

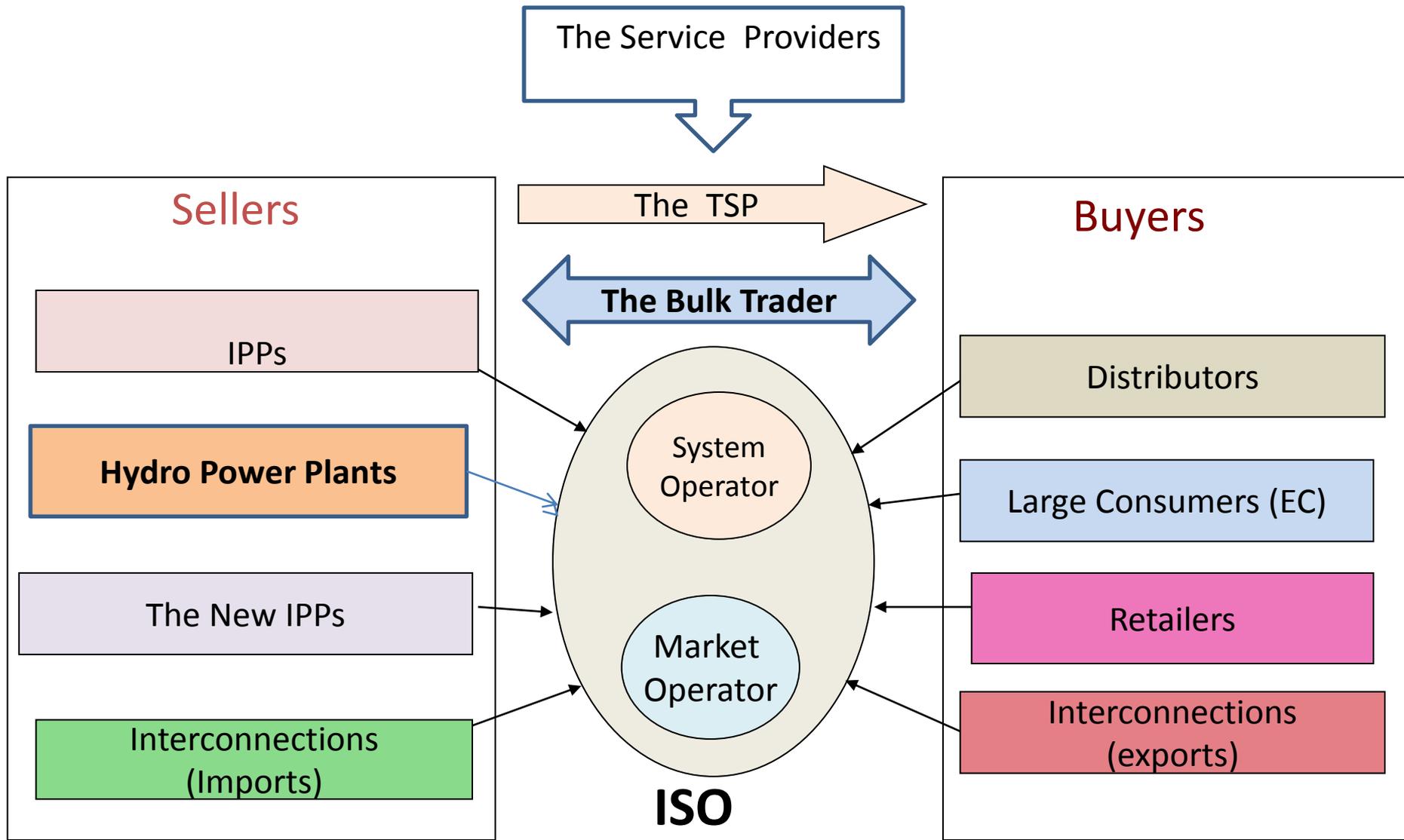
# The Nigerian Wholesale Electricity Market

- Defined by:
  - Characterisation
    - The Market structure
    - Market Architecture
    - Market Rules
  - Stages of development
  - Trading Arrangement
- Other characteristics include
  - Non-discriminatory access
  - Publicly know prices – MYTO
  - Transparent operations

# Characterisation: The Market Structure

- Refers to the properties of the market closely tied to technology and ownership
- Refers to the physical system of the market (generation, transmission, distribution) and the arrangement for service provision
- Poor market structure poses the greatest threat to the health of power markets – incentive for reform
- Market structure has a decisive impact on market power and investments
  - The more the participants, the more competition and investment inflow
- The industry cost structure, another component of the market structure, describes the cost of generation and transmission
- Market structure includes the arrangement and capacity of the transmission lines. Insufficient capacity can cause bottlenecks and local market power, while additional capacity can expand the size of the market and reduce the possibility for market power

# The Wholesale Market Structure for the Nigerian Electricity Industry (Currently)



# Characterisation: Market Architecture

- Comprises the list of component sub-markets together with their types.
- Market's architecture is a map of its component sub-markets, eg
  - Forward market (Delivery is at some point in the future)
  - Spot or Balancing market (mkt for immediate delivery)
  - Energy & Capacity Market
  - Ancillary services market
- The market types: types of contracts driving the Market. The market types for the Nigeria Electricity Market are
  - Bilateral
  - Vesting
- Architecture is specified before the Rules are written.
- A good architectural design must take into consideration the market structure in which it is embedded

# Characterisation: The Market Rules

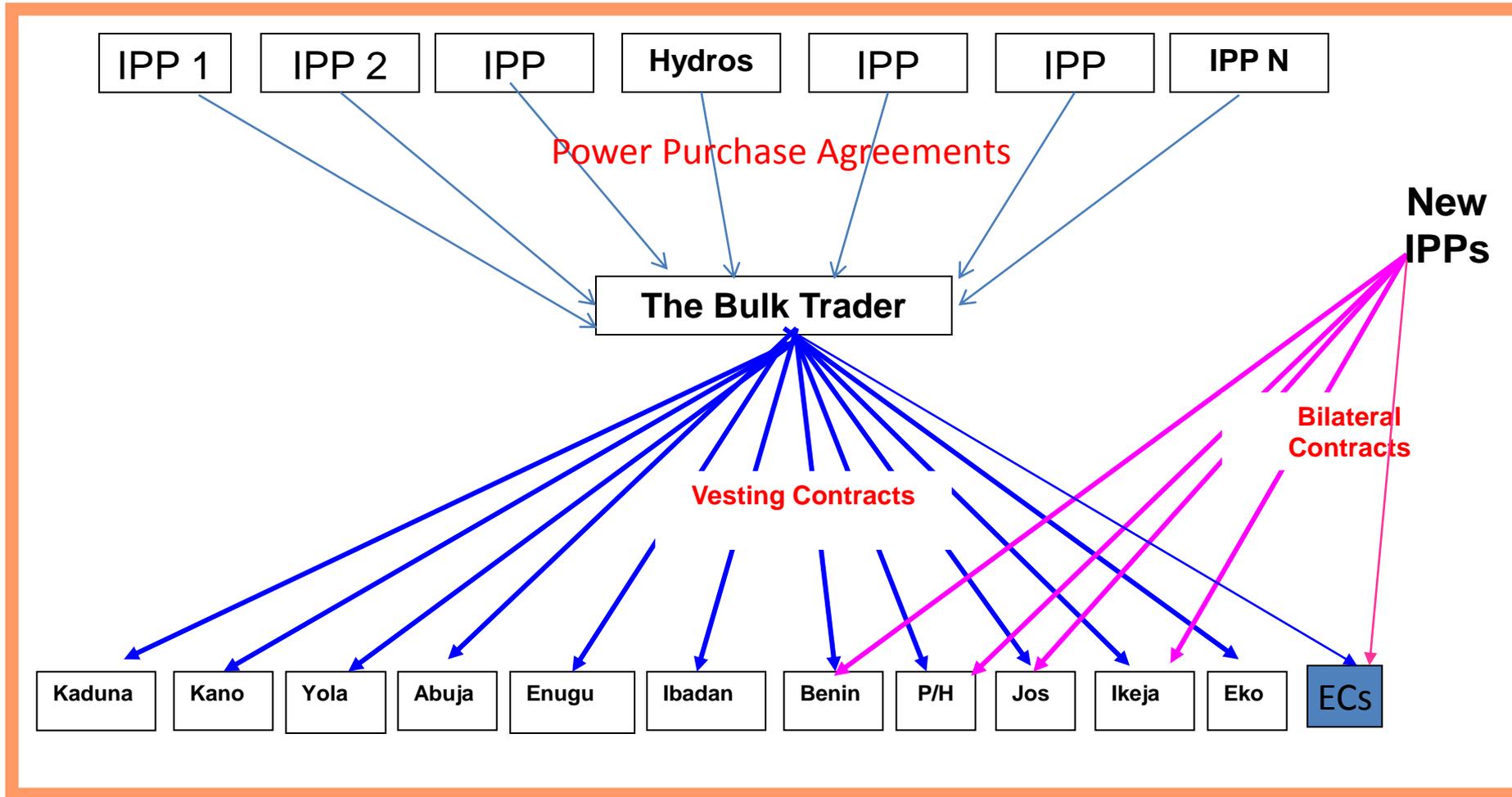
- Define the limits of the rights, the roles and obligations of all the Market Participants and the service providers , and the related interactions, in the Wholesale Electricity Market. The Rules are necessary so as
  - To ensure discipline in energy trading
  - To ensure transparency in Market Administration
  - To ensure that the MO does not make arbitrary decisions in his administration of the electricity Market
  - To protect the MO from being held responsible for failures in the power market

# Ensuring Success: Trading Arrangement

- Trading Arrangement is about the **operational integration of Generation with Transmission and Distribution, as well as the commercial arrangements** for Market Participants to pay each other
- It sets out the relationships and the day-to-day responsibilities of the Participants and those of the service providers in the Electricity Market
- Trading Arrangement gets more and more sophisticated as the Market grows from stage to stage
- **Market Operation** is the operationalization of the Trading Arrangement

# Trading Arrangement for the NESI (TEM Stage)

(defines the relationships btw participants and sets the conditions for buying and selling)



# Ensuring Success: Provision of Wholesale Market Services

- System Operations Services
- Market Operations Services
- Transmission services
- Bulk Trading Services

# The System Operator (SO)

- The SO coordinates generating plants with loads to maintain a stable transmission system
  - The use of power by the consumers is not controlled. It is the plants that are controlled by the SO to meet the load at all times.
- The SO schedules the plants in advance
- He dispatches the Plants in real time – the Traffic Controller
  - Sits in the control room following changes in load and ordering plants to start and stop generating.
  - Merit order dispatch - least cost plants are dispatched before high cost ones (to achieve short-term economic efficiency) – future
- A major job of the SO is to keep the frequency and voltage of the Tx System stable. To do this he requires access to frequency support, voltage support and reserve power – ancillary services
- SO is independent of the buyers and sellers in the market, must not discriminate in the dispatch operations – Merit Order Dispatch

# The System Operator ( cont'd)

- Manages congestion (each line has a maximum load it can take. When it reaches that, it is said to be congested).
  - Beyond congestion, the line is said to be overloaded.
  - Overload is a threat to system stability
- Plans in advance, and manages the system in real time to ensure that no line is overloaded.
- The SO provides for the imbalance in the Wholesale Market from the Spot Market
- The SO advises on transmission expansion and maintenance, but does not have the responsibility to carry out the functions
- The SO has no assets, is not for profit and is owned by the Govt.
- SO's only asset is possibly the Control Room

# The Market Operator

- An entity with the responsibility of running the market for spot imbalances between contracts and actual flows
- The MO decides who used how much power from the grid, who delivered how much power into the grid and what the costs of the imbalances are – Settlement
- The MO administers the metering system for Wholesale Trading to be able to decide on the quantities, guided by the Metering Code
- The Market Rules are the MO's tools for transparent administration of the Market, to ensure stability
- The SO provides for the imbalances, but the MO settles the imbalances, to ensure both technical and commercial equilibrium in the electricity market

# Transmission Services Provider (TSP)

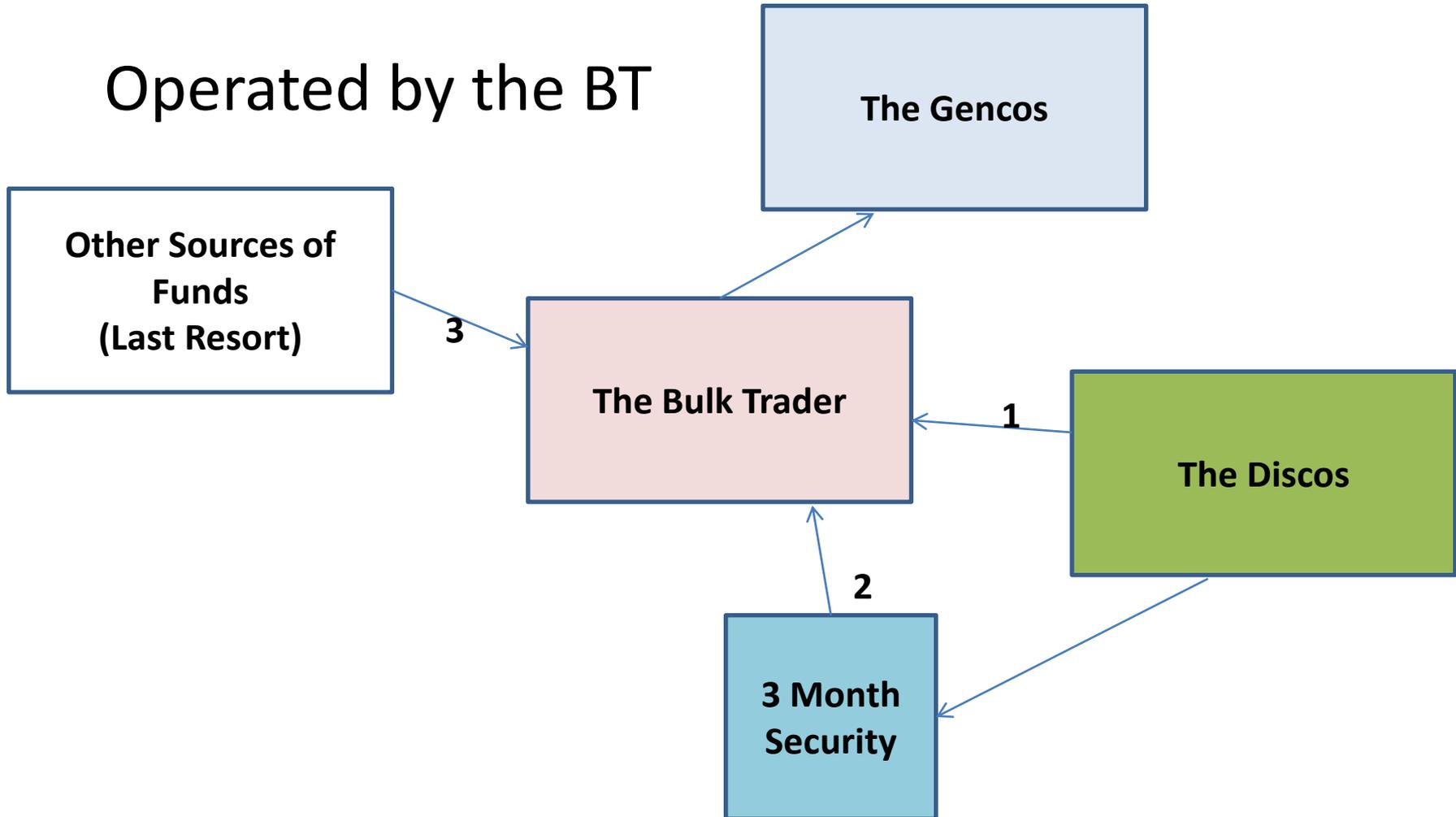
- The scope of an electricity market is determined by the transmission network that is available to the wholesalers, retailers and the consumers within the market
- Electricity Markets may extend beyond the national boundaries
- The TSP Provides the transmission services in the Wholesale Electricity Market
- He sets the terms of user's access to the transmission network
- He owns the transmission assets, but does not participate in buying and selling of electricity
- TSP earns returns on the assets through wheeling charges. It makes profits, but is regulated
- Relationships of the TSP with the Market Participants are governed by
  - Transmission Connection Agreement, which ensures that connections are properly provided
  - Transmission Use-of- Service Agreement, which regulates the terms and charges for use of the system

# Nigerian Bulk Electricity Trader(BT)

- Due to the realities of the Nigerian Electricity Market, there arose the need to secure the payments of the capacity and energy invoices of the generators to encourage on-going generation and further investments in capacity
- The Bulk Trader was set up as the arrangement to provide this need
- BT was set up as a Creditworthy off-taker to incentivise private investments in power generation in Nigeria
- It acts as a link between the GenCos and DisCos through the PPAs and Vesting Contracts
- The BT has to make long term contracts with the IPPs, so it needs to be credit worthy, and preferably a government Agency
- The BT has to be independent of the generators and should not discriminate in the Electricity Market

# Market Securitization Arrangement

Operated by the BT

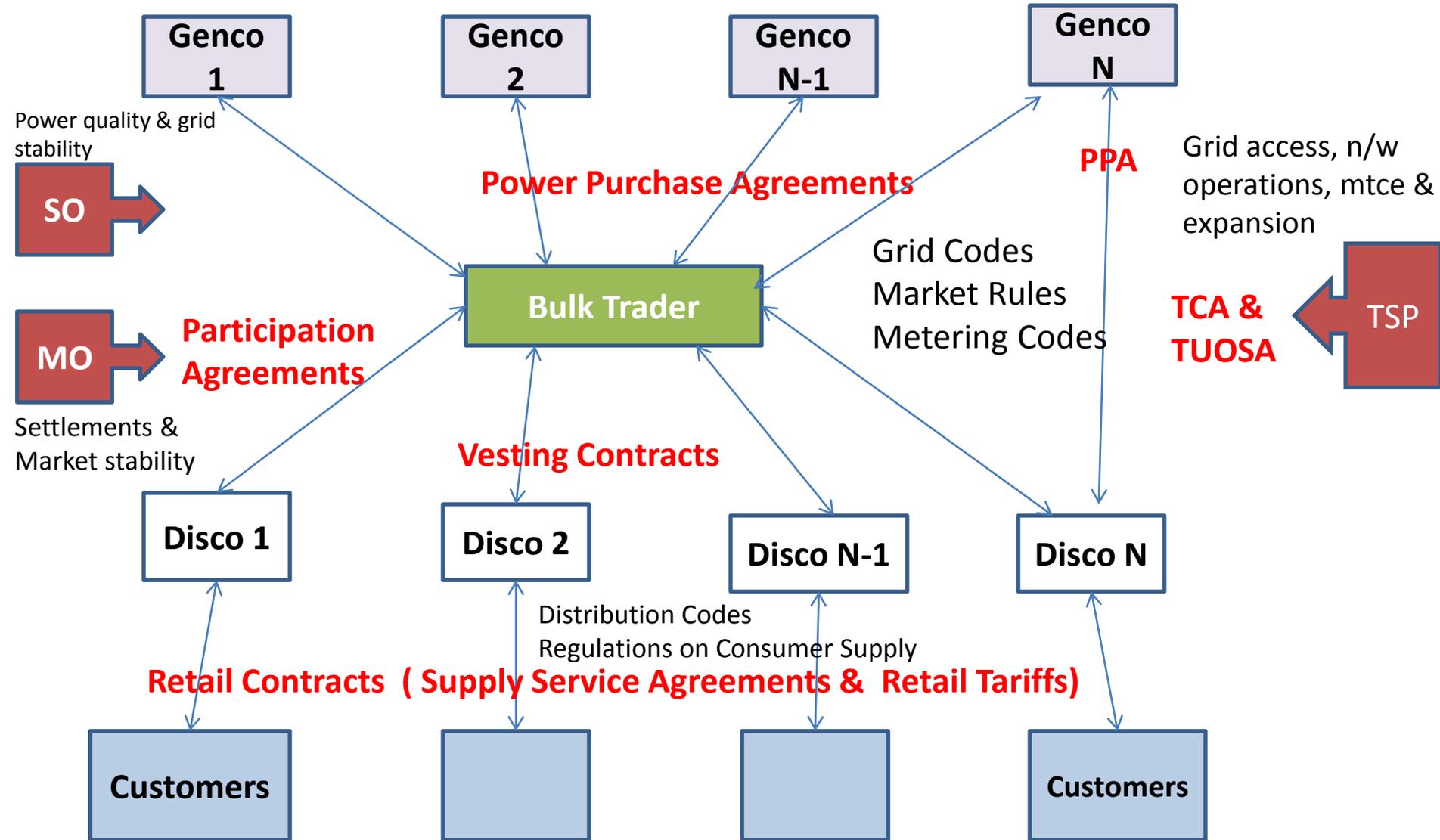


# The Market Governance Documents (MGDs)

- The Grid Code
- Operating Procedures
- The Market Rules (Interim Market Rules)
- Market Procedures
- The Metering Code
  - Accurate metering is critical for commercial stability of the Discos, and by extension, the electricity Market
- Distribution Code
- The Tariff Order

# Dynamics of Electricity Trading

Electricity Market Driven by Agreements, Codes and Rules



# The Dynamics of the Electricity Market

- The Electricity Market is in a constant state of flux
  - Generation, loads, frequencies, voltages, etc are constantly changing
- Rules, Codes and Agreements are used to achieve an electricity market in a steady state
- In-spite of the unbundling, the Nigerian Electricity Industry is tied together by means of contracts into an integrated whole

# Concluding Statement

**“In-spite of the peculiarities of the Nigerian Electricity Market, the chances of success of the emerging Market are high. This is because of the high emphasis on Nigeria-specific strategies and tools to drive the Market. Some of these have been developed and are being used to operate the market. These include the market design, the trading Arrangement, the specific services of the market service providers and the Electricity Market Governance Documentations (EMGDs)”**

THE END

Thank you for Listening