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# From Vertically Integrated to Wholesale Electricity Market: the Nigeria Experience

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# Outline

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- Background to the Nigeria Power Sector Reform
- The promises of the Nigerian Power Sector Reform
- Unfulfilled Reform Promises
- How did we get there?
- Issues of Intervention
- Some Outcomes of the Nigerian Power Sector Reform
- Conclusion

# Background to the Nigeria Power Sector Reform

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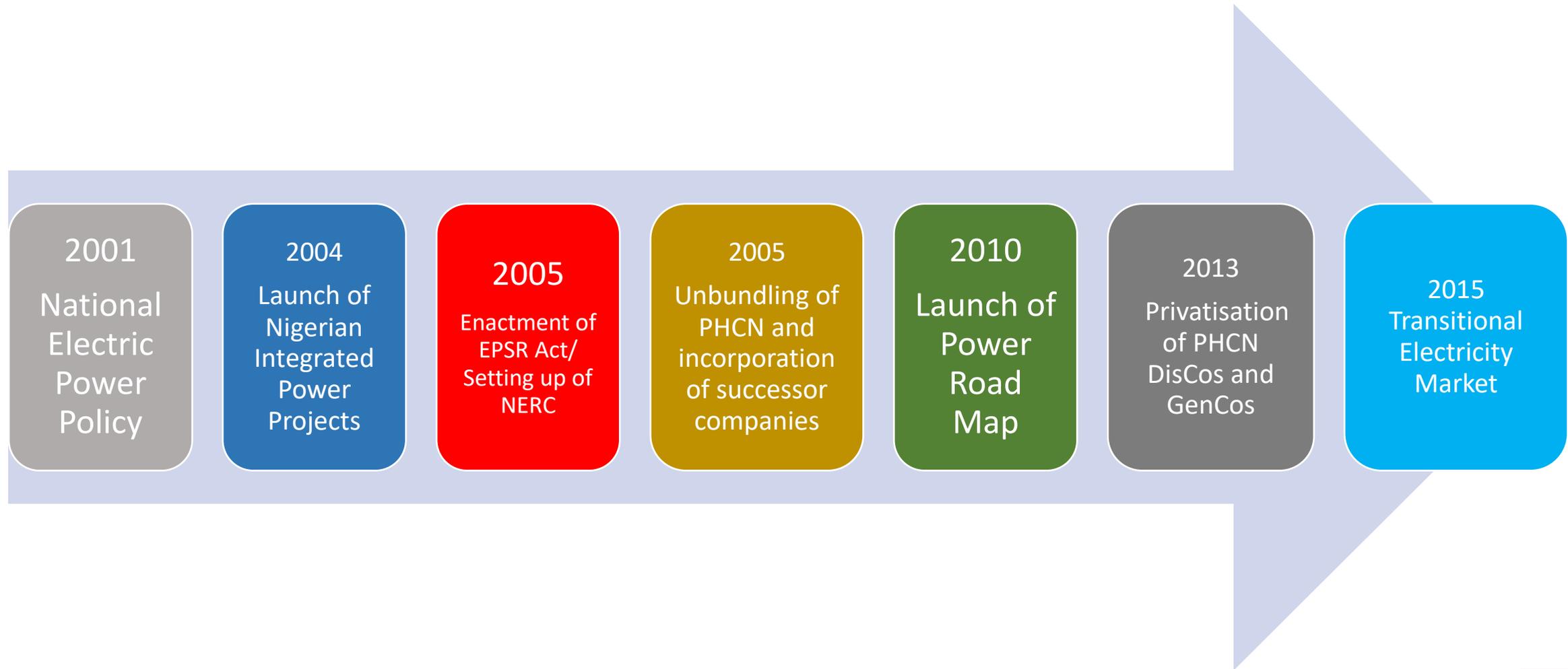
- At the onset of the democratically elected civilian administration in 1999, the Nigerian electric power sector had reached, perhaps, the lowest point in its 100 year history
- Of the 79 generation units in the country, only 19 units were operational. Average daily generation was about 1,750 MW
- No new electric power infrastructure was built between 1989-1999. The newest plant was completed in 1990 and the last transmission line built in 1987
- An estimated 90 million people were without access to grid electricity
- Accurate and reliable estimates of industry losses were unavailable, but were believed to be in excess of 40%

# Background to the Nigeria Electric Sector Reform

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- Based on the dismal state of the power sector, the government decided to embark on a power sector reform program based on the following key objectives:
  - Ensuring an integrated approach to power sector planning through the enactment of a policy document
  - Providing the enabling legal framework for private sector participation and competition in the power sector
  - Institutional Reform of the State owned vertically integrated utility towards commercialization and eventual privatization
  - Ensuring proper governance and accountability in the power sector
  - Meeting the need of adequate, safe, reliable and affordable electricity

# Power Sector Reform Implementation



# The Promises of Reform

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- To overcome the issues of technical and commercial inefficiencies in the sector, through improvement in investments in-flow and in management expertise
- Expectations include:
  - Improvement in generation capacity and supply
  - Continuous improvement in system loss reduction
  - Long term tariff reduction
  - Continuous improvement in customer satisfaction
  - Improvement in revenue collection
  - Achieving and maintaining good market liquidity
  - Continuous incentives for investments in the sector to cater for future load demand due to economic growth

# Unfulfilled Reform Promises

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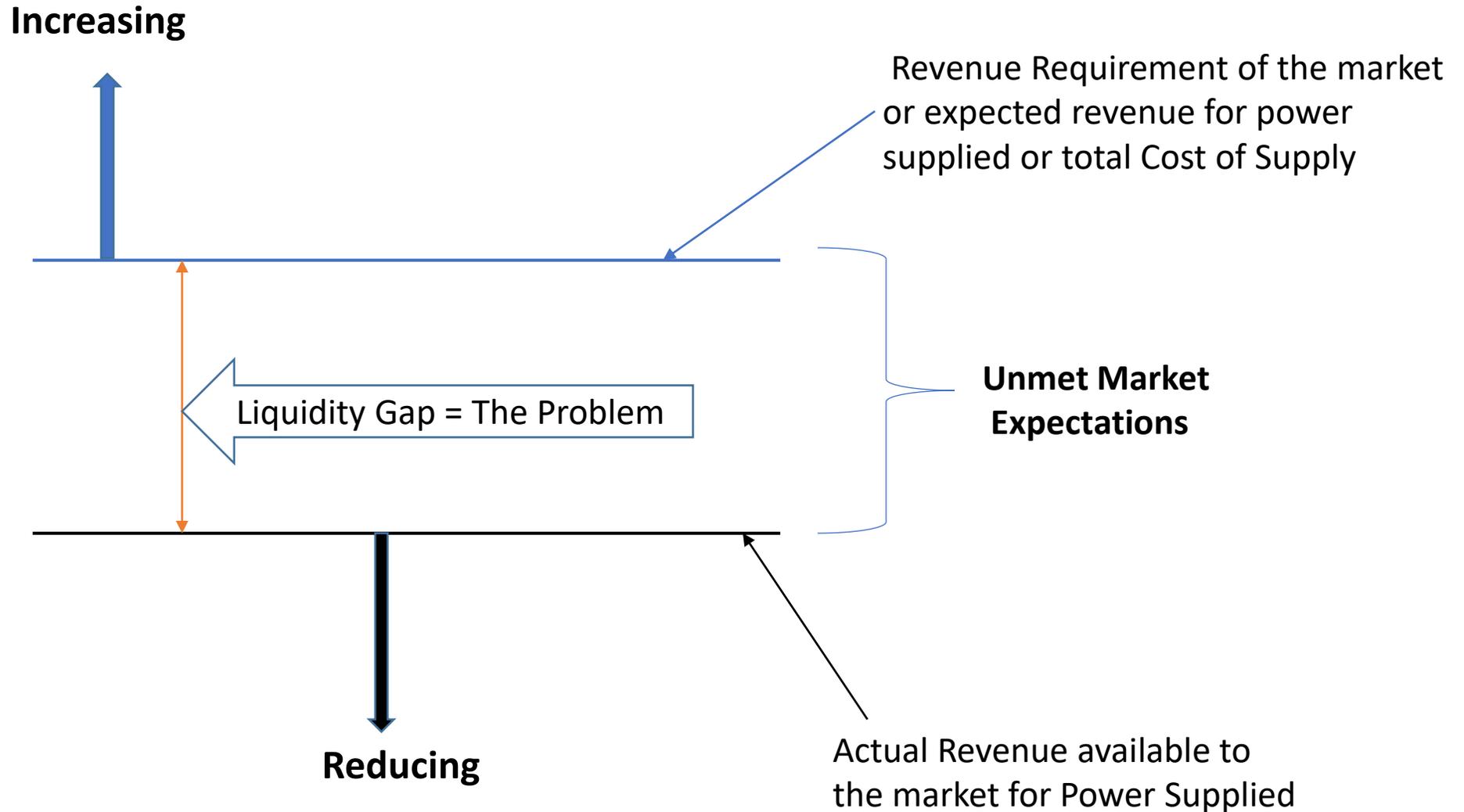
- To the average Nigerian, the key promise of the power sector reform was uninterrupted supply of electricity
- Reform was initiated about 18 years ago, the generation and distribution assets and their operations were privatized about 9 years ago, as part of the reform program. However, constant and reliable electricity remains an illusion to Nigerians
- To most Nigerians, as long as there is no reliable electricity supply after 18 years of reform, the reform program has failed
- Signs of failed reform is linked to the failure of the electricity market
- The first sign of a failing market is dwindling liquidity
- The complete and acceptable sign of a failed market, and by extension, failed reform is the Low Liquidity Equilibrium (LLE) of the market, where the market cannot sustain itself, from its own internally generated resources, or from borrowing from the financial institutions to invest in itself
- Low Liquidity Equilibrium is the overriding indicator of a failed reform program

# Liquidity Defined

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- Liquidity of the electricity market is the market's ability to invest in itself from its own internally generated resources or its ability to borrow for investments in itself
- A liquid market has the ability to generate enough revenue to support investments or support borrowing from any financial institution
- Market liquidity is self-sustaining and can also improve on its own without any external support
- Also, the problem of low liquidity can be self-sustaining, in which case individual market participants may have little incentive or capacity to address it
- An electricity market is said to have attained a Low-Liquidity Equilibrium (LLE) when it is obvious that liquidity cannot improve from its own internal resources

# The Nigerian Power Sector Liquidity Problem



# How did we get there?

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- Factors responsible for the **poor performance of the sector**, the **low market liquidity** and the consequent **failure of the reform program** are around four key areas:
  - Policy perspective
  - Regulatory Perspective
  - Market Structure Perspective
  - Operations perspective

# Policy: Irregular Power Sector Reform Process

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- Most successful power sector reform programs normally go through stages in the process of implementation.
- The stages recommended for Nigeria:
  - Restructuring the electric power supply chain (horizontally & vertically)
  - Developing economic regulation for the power market which is implemented transparently by an Agency that operates independently
  - Developing and introducing the Rules to enable the introduction of competition
  - Obliging the emerging electricity enterprises to operate according to commercial principles
  - Developing a power market that is enduring and operates efficiently
  - Development of competition in generation and supply segments
  - Entry of private capital into the market, at all levels of the supply chain
  - Privatization of the unbundled generation and distribution entities under dispersed ownership to bring in financial resources, technical and managerial expertise that will rectify the prevailing low standards under the State. **This should start with a pilot program**

# Policy: Irregular Power Sector Reform Process (Cont'd)

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- Each stage typically takes years to conclude before entry into the next stage. **Reform is not an event, but a process and work in progress**
- Nigeria omitted critical stages in the programme and rushed to the high-end privatization (ownership transfer), with grave consequences
  - everything the government earned in through the privatization exercise, plus more was spent on staff severance
  - Industry is plagued by inefficiency and low revenue collection, even years after privatization
- Again, people were made to believe that privatization only means assets sales, thereby omitting the stage of letting private capital into the market, to help improve operations, without ownership transfer

# Policy: Irregular Power Sector Reform Process (Cont'd)

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- In the privatization programme of most developing countries, revenue collection and payment mechanisms are usually secured before the market is saddled with huge PPA bills
- Viability of the Discos and their abilities to settle wholesale market invoices, should be reasonably guaranteed before privately developed power plants are allowed to dominate the market
- In the Nigerian programme, the reverse is the case. The market was first populated with an army of IPPs, by converting most of the government power plants into independent power plants, before trying to improve the viability of the revenue collection processes
- These PPA invoices are expected to be settled by a market with undeveloped and inefficient revenue collection and payment processes
- This is an error that has contributed to the current liquidity problem of the Nigerian Electricity Market

# Regulatory: non-implementation of the Key Initial Tasks

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- Reform of the Nigerian Power Sector started well, failure started with the privatization component of the reform program
- Most of the Key Initial Tasks (KITs) for successful privatization were omitted, while in the hurry to transfer assets to the private entities
- Some of the omitted KITs include:
  - Integrated Power System Planning, including Load Demand Forecasting – to ensure that asset utilization is optimized, and that only used and useful assets are considered in the determination of RAB and utility's Revenue Requirement
  - Cost of Service Studies (CoSS) – This is necessary to ensure that costs of providing services to customer classes are appropriately determined through efficient attribution of the utility's Revenue Requirement, for efficient rate design
  - Cost-reflective tariffs – investments in the electricity industry are attracted by the hope of cost recovery

# Regulatory: non-implementation of the Key Initial Tasks cont'd

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- Tariffs were not based on the outcomes of an integrated system plan and cost of service studies, and could not therefore be cost-reflective. They are either more or less than costs
- Proper due diligence of the private companies, to whom ownership of the Distribution Assets were transferred, was not conducted
  - Their technical capacity to run the electricity business not ascertained
  - Their financial ability to invest in the business not verified
- Because these tasks were not executed, liquidity was adversely affected, to the extent that the electricity market is currently in a low liquidity equilibrium situation where it cannot help itself

# Regulatory: Untested Market Design

- Electricity Market is defined in terms of its design, characterized by the Market Structure, Market Architecture and the Market Rules
  - Poor market structure poses the greatest threat to the health of power markets, as the structure of the market has a decisive impact on the cost of power
  - Every market design should therefore undergo at least the minimum test (bottom-line test), to highlight any flaws in the design, and check the effect of market design on the total cost of electricity, before it is operationalized
- Unfortunately, the design of the Nigerian Electricity Market was not tested before it was implemented.
  - The consequences are:
    - High and increasing wholesale market invoices, backed by contracts
    - Low and reducing revenue collection at the retail market
    - Wide and ever increasing liquidity gap
    - Inability of the market to pay for power generation and market services

# Regulatory: Delayed declaration of the Transitional Electricity Market (TEM) Stage

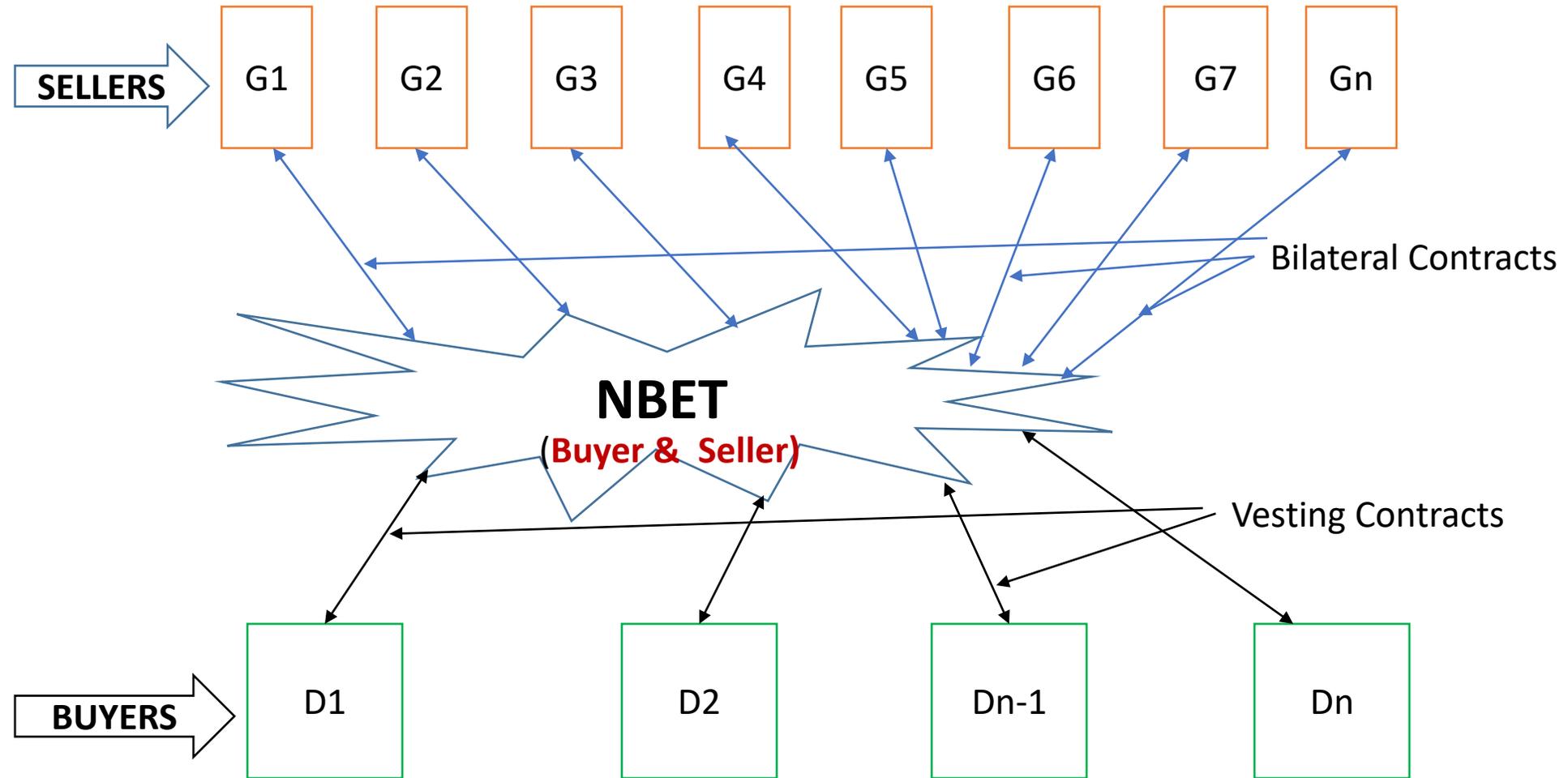
- The Nigerian electricity market was designed to develop in four stages with increasing competition and reducing monopoly
  - The 1st stage, the pre-transitional stage, represents the full monopoly stage where the government is the owner and manager of the Utility, from production to customer service
  - The 2nd stage is the Transitional stage (TEM) with an improved competition, where all transactions are governed by contracts and Rules
  - TEM also, is expected to operate on commercial principles, improve collection efficiency and attract investments in power generation, transmission and distribution, for market development
- TEM is a period for testing the adequacy of the Rules and the Contracts, which should be established before Privatization
  - In Nov. 2013, the generation and distribution assets were wholly privatized, without testing the Rules and the Contracts. Commercial efficiency of the market was still low and could not support payment of wholesale invoices.
  - In February 2015, NERC advised the Minister of Power to declare TEM. The market is contract based, but the Contract Agreements are not kept and there are no sanctions for default
  - The original plan was to declare TEM long before privatization
  - This reversal of events contributed to the liquidity problem of today

# Regulatory: Inadequate Trading Arrangement

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- The liquidity problem of the Nigerian electricity industry became more pronounced since TEM was declared in February 2015
- There are two types of contracts in the Trading Arrangement for Nigerian Electricity Market
  - Bilateral Contracts
  - Vesting Contracts

# Regulatory: inadequate Trading Arrangement (Cont'd)



TA is The interplay of Contracts, Agreements and Rules in the wholesale market

# Regulatory: inadequate Trading Arrangement (Cont'd)

- NBET purchases power from the generator participants with Bilateral Contracts (BC), but sells to the load participants with Vesting Contracts (VC), in the same market
- With TEM, the Gencos were promised 100% invoice payment, as part of the BCA
- It is therefore expected that the Gencos would have made some upfront investments, in anticipation of full recovery of investments
- BCs are pure commercial agreements that demand full compliance by parties
- The VC is a formalized procedure for transparent load allocation under supply shortage conditions
- Vesting makes sure that all the load participants get some allocation at all times, whether they have the capacity to pay or not
- VCs are more political than commercial and affect the efficiency of the electricity market
- For reasons of viability, most Gencos will be reluctant to trade with some Discos. Because of VCs, every Disco has a load allocation from every Genco
- The result is that most of the Discos are unable to pay their full invoices. Those who pay significantly are discouraged by those who do not pay much, particularly when no actions are taken against payment defaults
- This situation dislocated the market equilibrium and contributed to the low liquidity problem of the market

# Regulatory: inadequate regulatory supervision

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- Inadequate performance monitoring of the private companies by the regulator to ensure compliance with the provisions of the Sales and Purchase Agreements with the Government
- Privatization Agreement was based on a stepped reduction of the aggregate losses. Loss reduction is all encompassing, and includes requirements on Discos to:
  - invest in the network,
  - improve technical and commercial performance, etc.
- Performance on loss reduction is not being monitored and controlled. Therefore Losses are on the increase in most Discos, resulting in dwindling liquidity
- The market is being gamed by the Distribution Companies without adequate regulatory surveillance.
  - The Discos engage in what is locally referred to as Load Rejection, ie denial of supply to a group of customers, especially the low income ones, and shifting of supply to the richer customers in the urban centres
- There is no impact assessment of the regulations, like customer satisfaction survey to gauge how the customers are faring with the utility's services and the regulations

# Market Structure

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## Poor market structure:

- The Distribution Companies are few and most are too geographically vast to be privatized as single companies
  - They were to be re-delineated to increase the number and reduce the sizes of the companies, and make for more investments. This did not happen
  - Any failure in performance is usually widespread, restoration poses great challenge, because of size
  - Critical mass is not there for the Discos to compete effectively
- Structure of the Market affected both pricing and performance as well as the level of growth of the electricity industry
- Disco privatization demands the most investments from the private sector, and presents the greatest commercial risks to the investors. Nigeria was not ready for these, and this fact shows in the market outcomes of today

# Operations: High Energy & Revenue Losses

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- Liquidity depends on the efficiency of energy and revenue performance of the electricity industry
- The market can never make its revenue requirements when it is operated at high energy or revenue losses, **irrespective of the level of supply and how cost reflective the tariffs are**
- One of the reasons to justify privatization of the Nigerian electricity industry is the perennially high level of losses (ATC&C Losses) in the distribution network, which permanently made the industry un-viable
- One of the promises of privatization is urgent attention to these losses to improve sector viability
- Therefore, successful Discos in the privatization process were selected based on their ATC&C Loss reduction plan
- However, these loss reduction plans, even where they have been implemented, have had limited success, resulting in ever Declining Market Liquidity (DML)

# Operations

## High Energy & Revenue Losses

- Collection losses, which are considered the easiest to address have remained an issue
- In many countries, collection losses are not part of the tariff equation, but in Nigeria they constitute a significant component of costs to be recovered
- The ATC&C Losses for most Discos have continued to increase, instead of reducing. Result is decreasing cash flow
- With the decreasing cash flow, and the increasing market inability to support payback, Discos' ability to borrow for investments is low
- The vicious cycle of "inadequate investments, low cash flow and inability to borrow" perpetrates the sector's liquidity problem

## People Side Issues

- Apart from the technical and commercial reasons, there are people side issues that affect the ability of Discos to collect revenue  
Some of these people side issues are:
  - Utility staff attitude
  - Utility Management attitude
  - The Public attitude
  - The Government attitude
- All the people side issues border on Indiscipline, a major contributor to the Nigerian power sector liquidity problem
- Majority of the trained and experienced workers of the industry were disengaged and replaced with inexperienced and poorly trained workers, after privatization. This contributed to low performance of the companies

# Issues of Intervention

- The Power Sector Liquidity problem has been described as critical, resulting in underfunding of the sector, to the extent that plants and equipment cannot be adequately maintained or efficiently operated
- It is a cash flow problem that reduces the ability of the value chains to meet their obligations
- When it becomes clear that liquidity cannot sustain itself in the market or improve on its own, intervention (political, regulatory or even legislative) becomes inevitable
- The intervention is required to kick-start improvements in liquidity that can remain self-sustaining
- However, such interventions must be targeted (i.e tied to projects), with predictable impacts

- The interventions must also be supervised to ensure objectives are achieved
- There have been a number of interventions in the Nigerian power sector in the past, but they were not properly deployed
- Most of the interventions were used for clearing outstanding debts, when they should be used to support critical investments, looking ahead
- Inappropriate deployment of interventions is the reason why there has not been much to show from the interventions

# Some Outcomes of the Nigerian Power Sector Reform

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- One of the objectives of privatization is maximization of sales prices of public assets to enrich the government or minimization of the energy prices for customer benefits
- In the case of Nigeria, neither the government nor the people benefited from the privatization of the Power Industry
  - Government treasury was not enriched from the proceeds of privatization. In-fact, government has spent over a trillion Naira, since privatization, to support privatization
  - The consumers have been saddled with higher tariffs since privatization, service quality and supply reliability have not improved either, and have in some cases, gotten even worse
- High technical and non-technical losses: Records show that there are more losses in the distribution network in recent times than there were before privatization. The reasons for this are many, and include
  - Inadequate investments in network for maintenance, upgrades and expansion
  - Inexperienced and inadequately trained work force
  - Aging and over loaded networks

# Some Outcomes.....(Cont'd)

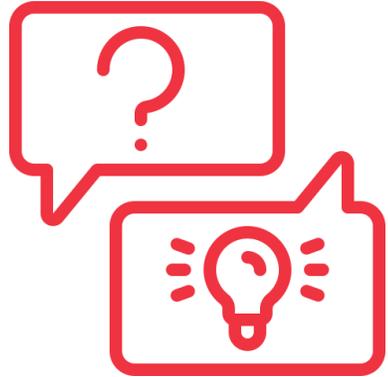
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- The current peak load demand for Nigeria is just above 11GW, according to a 2017 load demand survey
- The total installed generation capacity of the System is about 13GW, while the available generation capacity is about 7.5GW
- However the actual daily generation is less than 5GW
- The transmission and distribution network capacities, which are respectively more than the installed generation capacity, lack coordination with the load locations, and therefore cannot wheel more than 5GW
- This is the result of lack of adequate planning of the power system

# Conclusion

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- The political will for the Reform was present but the process was derailed
- The fundamental problem with the Power Sector Reform is not with the policy and legal framework, but with its implementation
- The Nigerian power sector reform program was well planned. Unfortunately it has been executed as a sprint, instead of a Marathon without adherence to the recommended gradual approach
- The drivers felt that reform should end with privatization and were in a hurry to conclude the process, even when the sector was obviously not ready for privatization
- Reform has not delivered the much needed improvements in electricity supply. Main reason is that implementation of program deviated from its original design and sequence
- Another key reason for the failure of the reform is personal interest by the drivers of the program, who were focused on **Privatization** and forgot the big picture – the **Sector Reform**



# THANK YOU FOR YOUR ATTENTION!

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