Workshop on

"Power Market Development in India : Key Lessons Learnt"

Session Topic :

Development of Competitive Power Market in India: Key Laws, Policies and Regulations

By

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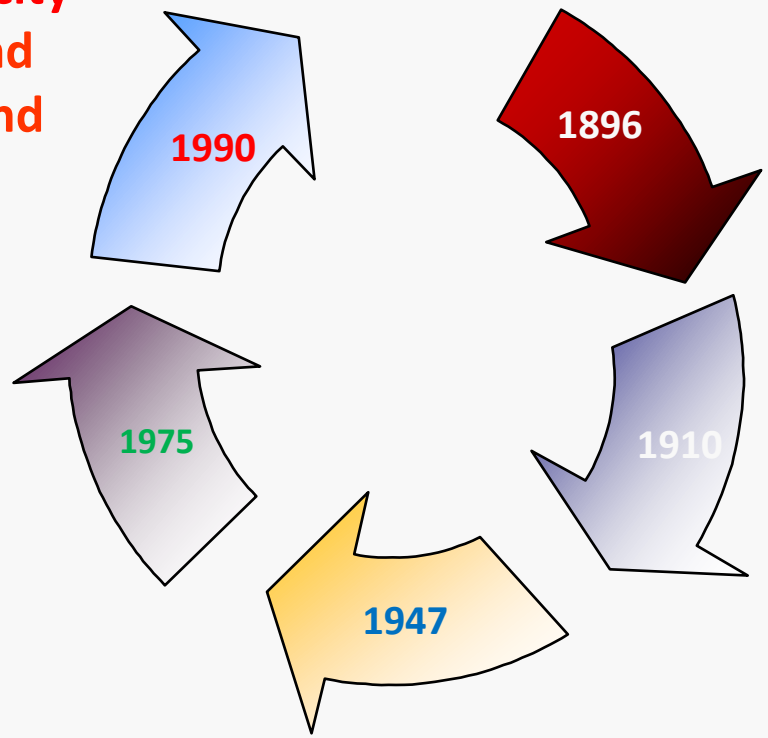
21st April 2016

DHAKA, BANGLADESH

Changing Phases of Market Development / Evolution in India

Changing Phases of Power Sector in India

Down turn of Electricity
Erosion of profits, and increases in losses and subsidy



Darjeeling:
Hydel Plant
started operations

Regulating power sector :
Indian Electricity Act, 1910
Private Ownership

Rural Electrification focus since 1975

Indian Independence: thereafter Electricity (Supply) Act, 1948
Electricity was put under Concurrent list of the Constitution
Emphasis on Public Ownership

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Changing Phases of Power Sector in India

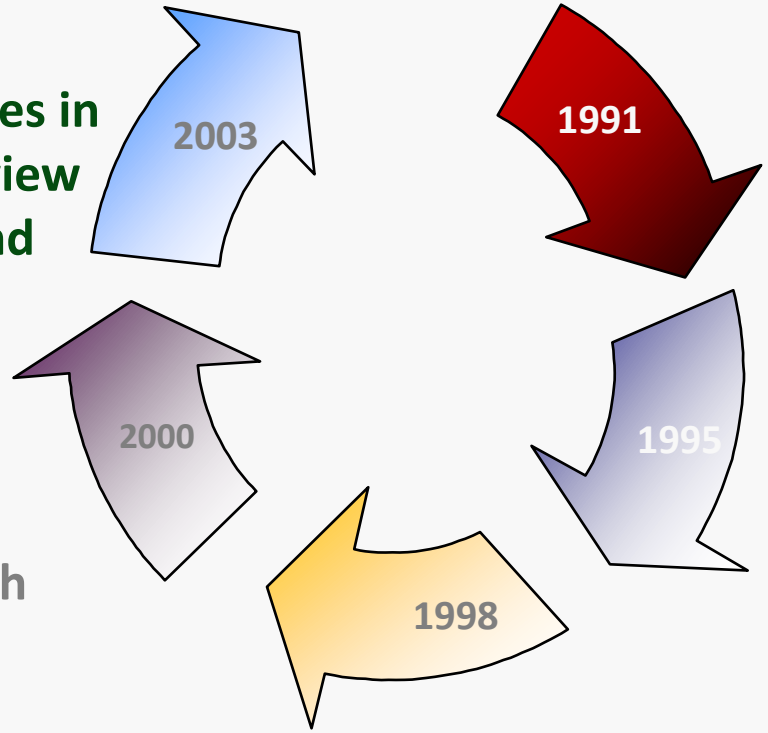
Consolidation of all Electricity legislations
Comprehensive changes in the legislation and review of market structure and facilitating trading

:
Generation Sector opened to Private players

Segregation of G, T, D businesses, Creation of Discoms, Privatisation. Setting of ERCs

Grid Discipline

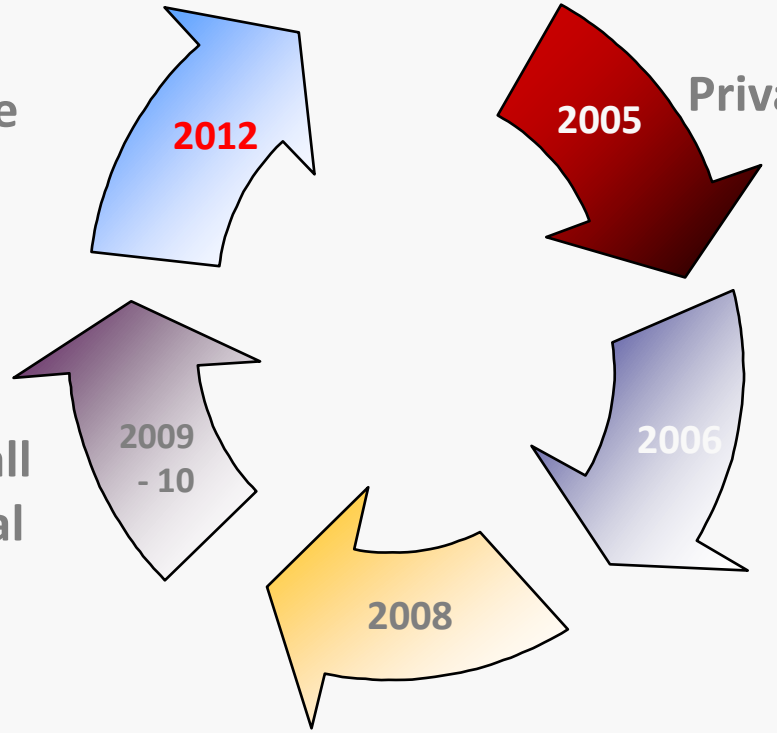
Merit Order Despatch



Starting of Regulatory Framework

Regulatory Regime for Public and Private ownerships

Changing Phases of Power Sector in India



Full Competition in Generation, No preference to anyone

Trading activity started

Private Traders start operations

National Tariff Policy, Case 1, Case 2 Bidding, UMPP Bidding, Shifting to Sec 63 based tariff

1st Power Exchange IEX starts operations

Merchant Tariffs at all time Peak in Bilateral and Exchange

Changing Phases of Power Sector in India : Electricity Act, 2003

Power Sector in India has undergone sudden and rapid changes in last decade since passing of the Electricity Act 2003.

Preamble of the Act:

- *"An act **to consolidate the laws** relating to **generation, transmission, distribution, trading and use of electricity** and generally for taking measures conducive to **development** of electricity industry, **promoting competition** therein, **protecting interest of consumers** and supply of electricity to all areas, rationalisation of electricity tariff, ensuring **transparent policies** regarding subsidies, promotion of efficient and environmentally benign policies, **constitution of Central Electricity Authority, Regulatory Commissions and establishment of Appellate Tribunal** and for matters connected therewith or incidental thereto".*

Electricity Industry Structure in India

	CENTRE		STATE	
Policy	Ministry of Power		State Government	
Plan	CEA		State Government	
Regulations	CERC	CAC	SERC	SAC
Generation	CGS, Mega Power Plants , UMPPs		Gencos	IPPs
Transmission	CTU	PTU	STU	PTU
Systems Oprn	NLDC, Regional LDCs (N,E,S,W, NER)		State LDC	
Billing Settlement	Regional P Cs		S P Cs	
Distribution			SEBs, DISCOMs	
Trading	Trading Licensees		Trading Licensees	
Market	Trading Platform - PXs, Bilateral, OTC etc			
Appeal	Appellate Tribunal			

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Indian Electricity Market Participants

Regulators

- CERC
- SERC

Supply side

- Central Generators
- State Generators
- Independent power producers
- Captive generators
- Non-conventional energy sources

Intermediaries

Wire Owners

- CTU
- STU
- Transmission Licensees

System Operators

- NLDC
- RLDC
- SLDC

Traders

- Trading Cos
- Generating Cos
- Distribution Cos

Demand side

- Distribution Cos
- SEBs
- Large Industrial consumers
- Small Industrial consumers

- The generation companies can obtain a trading license and carry on the trading activities.
- The large industrial consumers will be able to participate in the market only after appropriate regulator provides them the open access right
- Emergence of independent transmission companies will facilitate non-discriminatory open access
- With regional Load Dispatch Centers (LDCs) having jurisdiction to manage the grid discipline, local markets will emerge

Role of Government of India Power in Electricity Market Development in India

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Ministry of Power on Electricity Market Development in India

Thrust on Rural Electrification

Setting-up of NTPC, NHPC

Invited Private Sector to enter Generation (IPPs)

IPPs invited to Bid for Naptha based Generation

Mega Power Policy – Projects above 1000 MW (Multi-State)

Electricity Regulatory Mechanism

Creation of Power Trading Corporation

Creation of Power Grid Corporation of India

A New Comprehensive Electricity Act, 2003

Ministry of Power on Electricity Market Development in India

A New Comprehensive Electricity Act, 2003

Promotes Competition

National Tariff Policy

Segregation of Wires and Content in Transmission at National Level

Standardised Model PPA

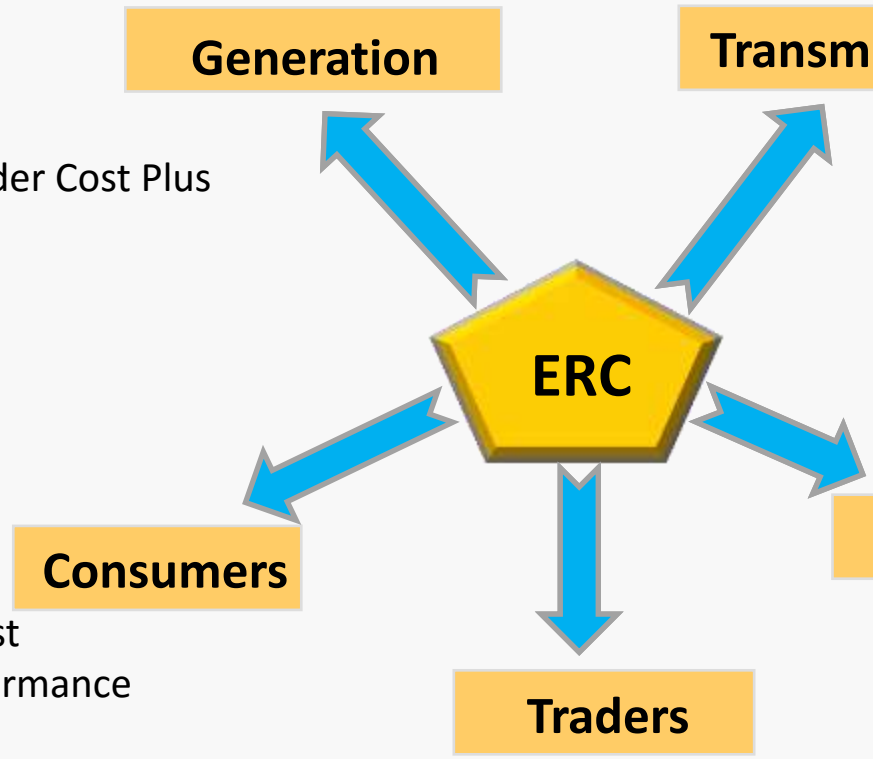
Standardised Model Bid Documents

Case I – (Any Fuel, Any Location any Capacity)

Case II – (Fuel Specific, Location Specific and Capacity Specific)

Ultra Mega Power Projects (~4000 MW)

Electricity Regulatory Framework



- Norms for Generators under Cost Plus approach
- Encourage efficiency

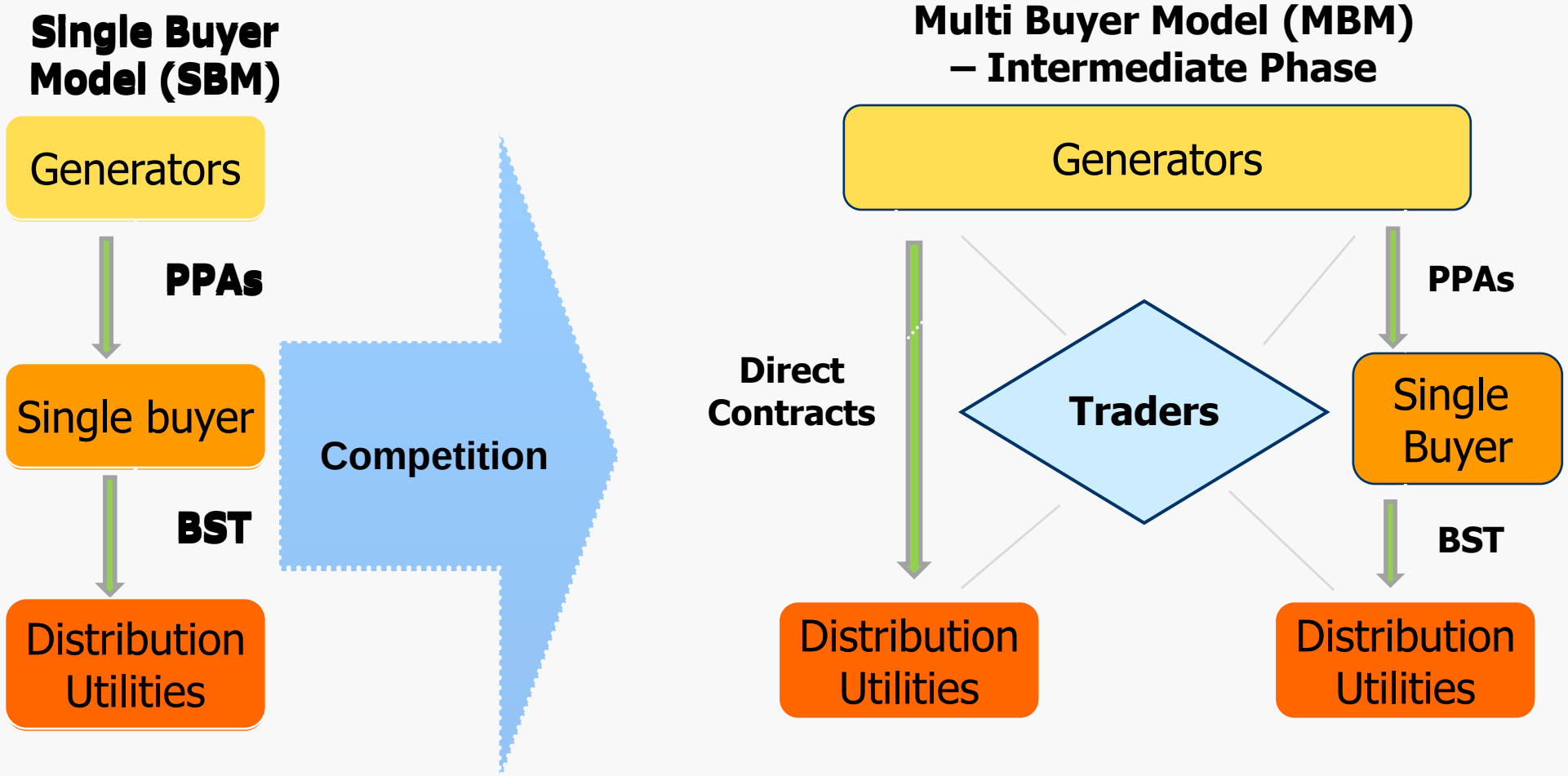
- Grant Licences
- Encourage efficiency
- Resolve disputes arising in operation of SLDC
- Open access with Tr. charges and surcharge
- Intervening transmission facilities

- Protect Consumer Interest
- Frame Standards of Performance
- Effect penalties for non-compliance
- Ombudsman

- Grant License
- Fix Tariffs
- Open access with wheeling charge and surcharge
- Fix and monitor standards of performance
- Promote competition
- Encourage efficiency and good performance

- Grant License , Facilitate and promote Trading and to Fix "Trading Margins"

Evolving Market Structure



Role of CERC in Electricity Market Development in India

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CERC Regulations on Market Development

CERC came out with various Regulations to develop the Power Market

- Tariff Regulations
- Indian Electricity Grid Code
- Shifting to Availability Concept
- Unscheduled Interchange (UI)
- Steps towards Grid Discipline (Narrowing the Band Gradually)
- Ancillary Market

- *Need for derivative products for the Market depth*

Open Access

- Facilitated Trading
- Initially Transmission Charges lower for trading, now Long / Medium / Short have same Tariff
- Facilitated Exchanges to commence operations
- Renewables being promoted
- REC Market created
- Regulated Trading Margin

Role of SERCs in Electricity Market Development in the State

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SERC Regulations on Market Development

APERC was formed out of APER Act, 1998 to develop the Power Market in Andhra Pradesh

Key Functions

- To aid and advise the State Government;
- To issue licenses
- To regulate the working of the licensees;
- To promote efficiency, economy and safety in the use of electricity;
- To regulate the purchase, distribution, supply and utilisation of electricity, the quality of service, the tariff and charges payable;
- To promote competition and progressively involve the participation of private sector;
- To collect data and forecast on the demand and use of electricity;
- To require licensees to formulate perspective plans;
- To regulate the assets, properties and interest in properties related to the electricity industry in the State;
- To lay down a uniform system of accounts among the licensees.

SERC Regulations on Market Development

APERC came out with various Regulations to develop the Power Market

- Tariff Philosophy
- Tariff Regulations
- AP Transmission Grid Code,
- Distribution Code
- In phases Unbundled the Tariffs
  - Generation and Bundled Transmission and Distribution
  - Generation, Transmission and Bundled Distribution and Retail Supply
  - Generation, Transmission, Distribution and Retail Supply
- Cost of Service Model for setting Tariffs
- Multi-year Tariff (MYT) – predictability and improving efficiency

Open Access

- Renewables being promoted
- Open Access to 1KW consumers for Renewable Energy
- HT Consumers allowed Open Access for 500 KW and above

Regulatory Problems

- **Technological features of infrastructure sector**
  - Long life of assets
  - Investments irreversibility
  - High share of Fixed Costs
  - Natural Monopolies
- **Fast changing industry structure with Competition**
- **Need to Regulate**
- **What do we need to achieve the objectives in the most efficient way:**
  - A clear conceptual framework
  - Data
  - Mechanism to turn data into financial information
    - Regulatory Financial Model
      - To ensure consistency and allow quantification of different alternatives
    - Benchmarking
      - To reduce information asymmetry while preserving incentives to cost minimization
  - Clear and transparent procedures

Regulatory Objective

- **Sustainability : Adequate return on capital; attraction of capital to the industry**

Tariffs should generate sufficient revenues so as to cover

  - Reasonable operating and maintenance costs
  - Taxes
  - Repayments
  - Fair and reasonable return on invested capital (according to the level of risk)

- **Allocative Efficiency : Prices = Costs**

- **Productive Efficiency : Cost minimization**

Companies should minimise production costs given the production level or maximise output for the given input level

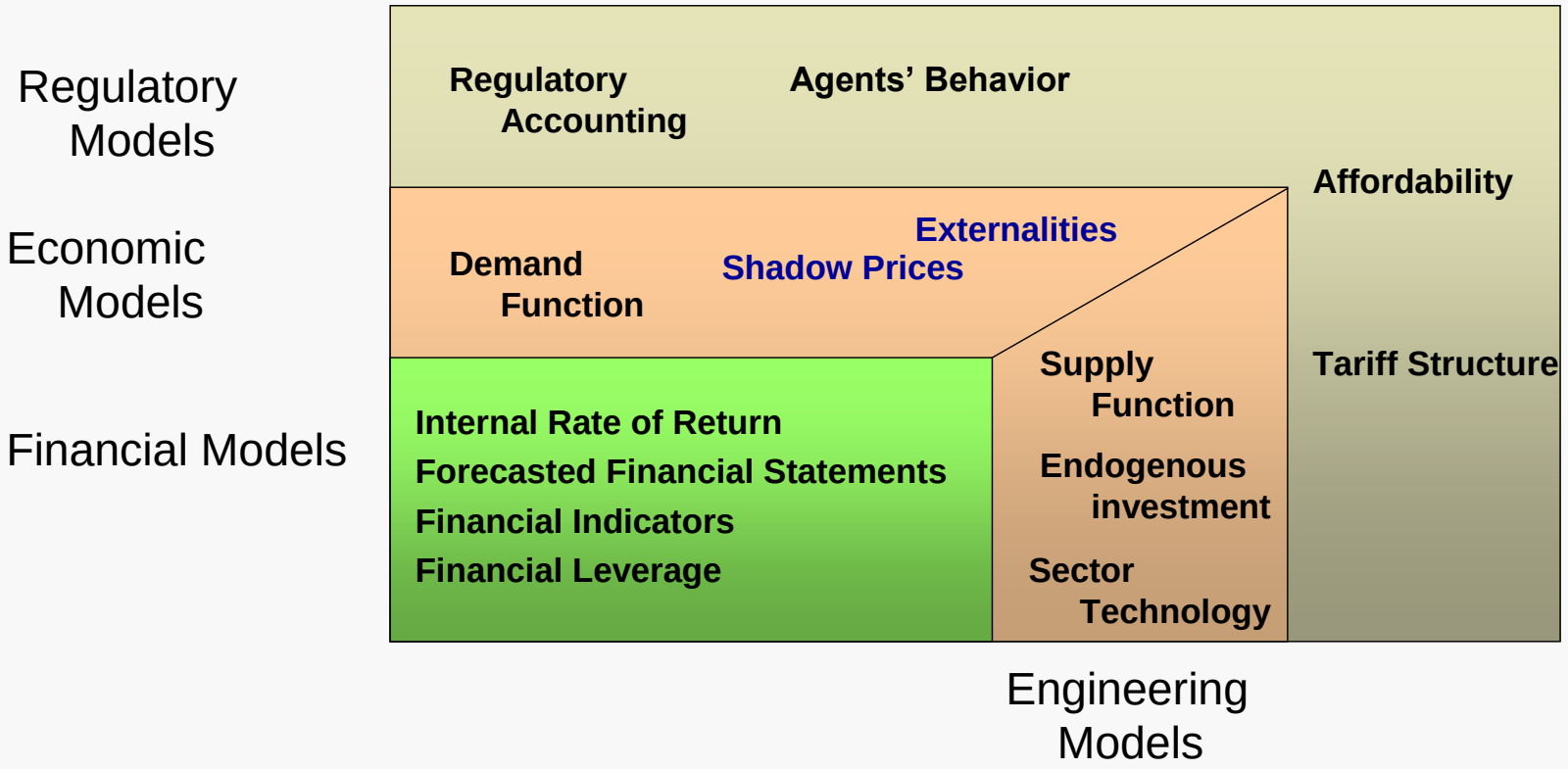
Through competition when feasible, else through proper incentives when competition is not an option

- **Fairness : Most regulatory regimes have a social objective in terms of:**

Access : Universal Service Obligation, ensuring access for all users, Avoid Unfair discrimination

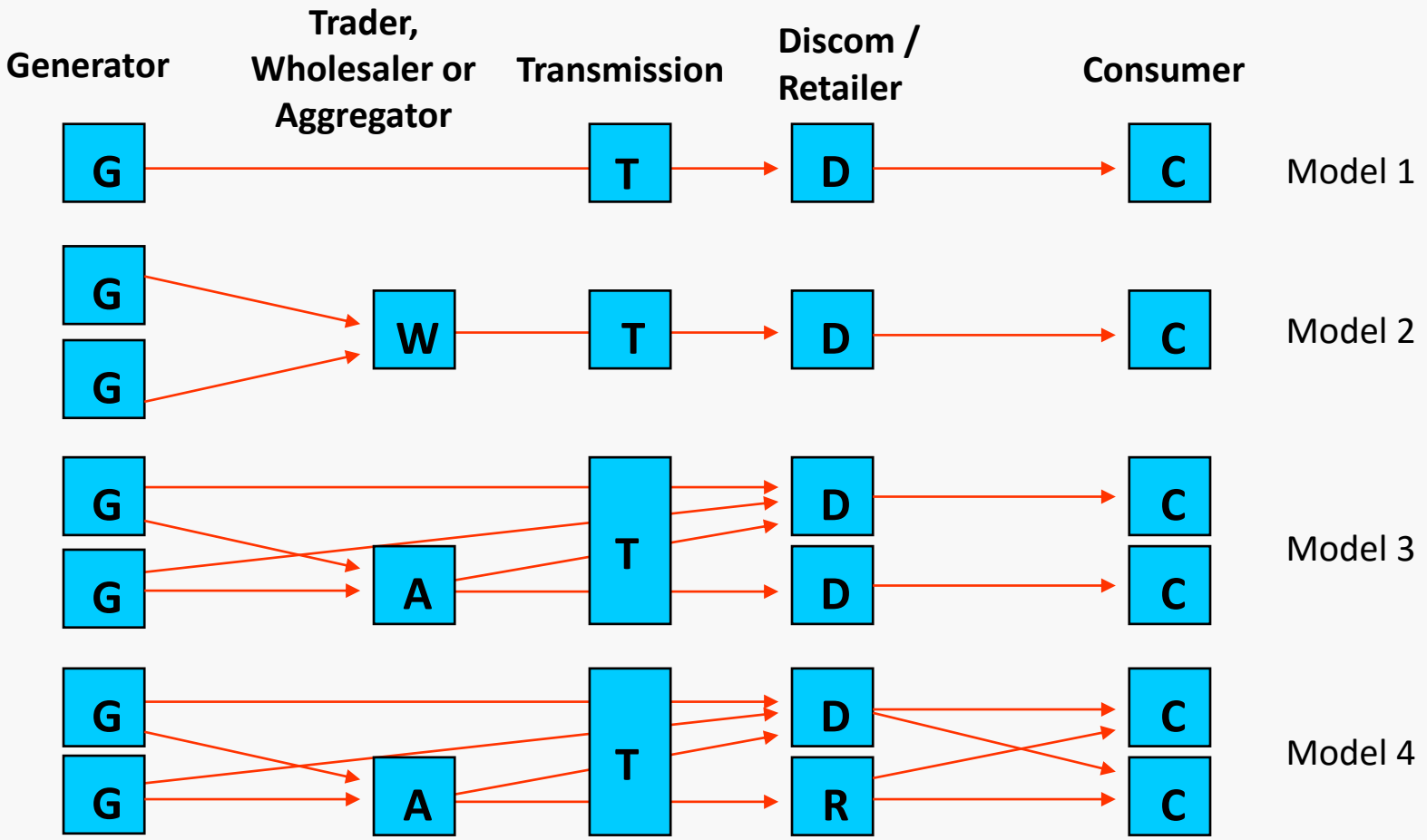
Affordability : Tariffs should be related to the capacity to pay particularly for the poor population

Regulatory Perspective with Progressive Outlook

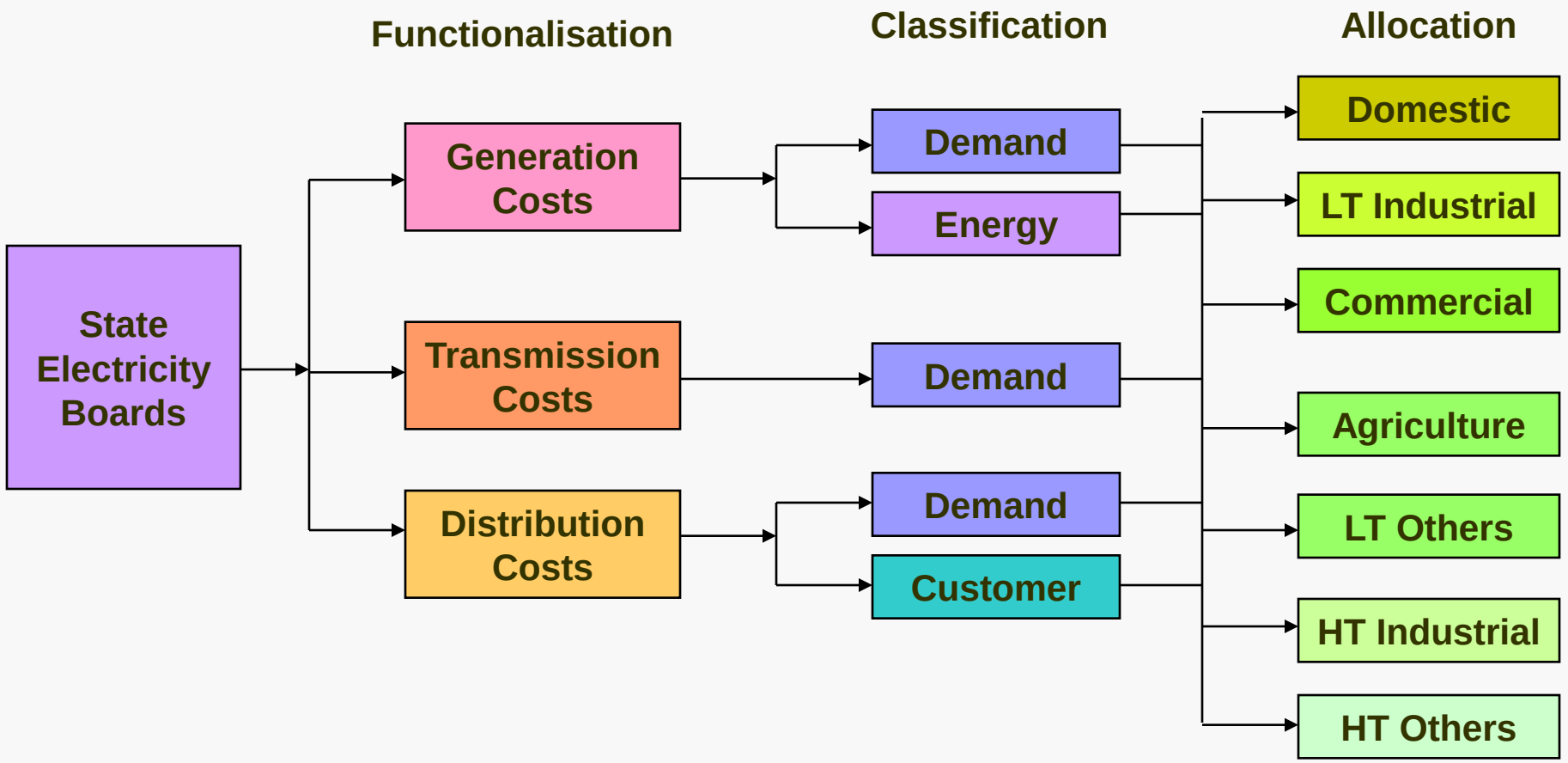


Financial Model for Regulatory Purposes

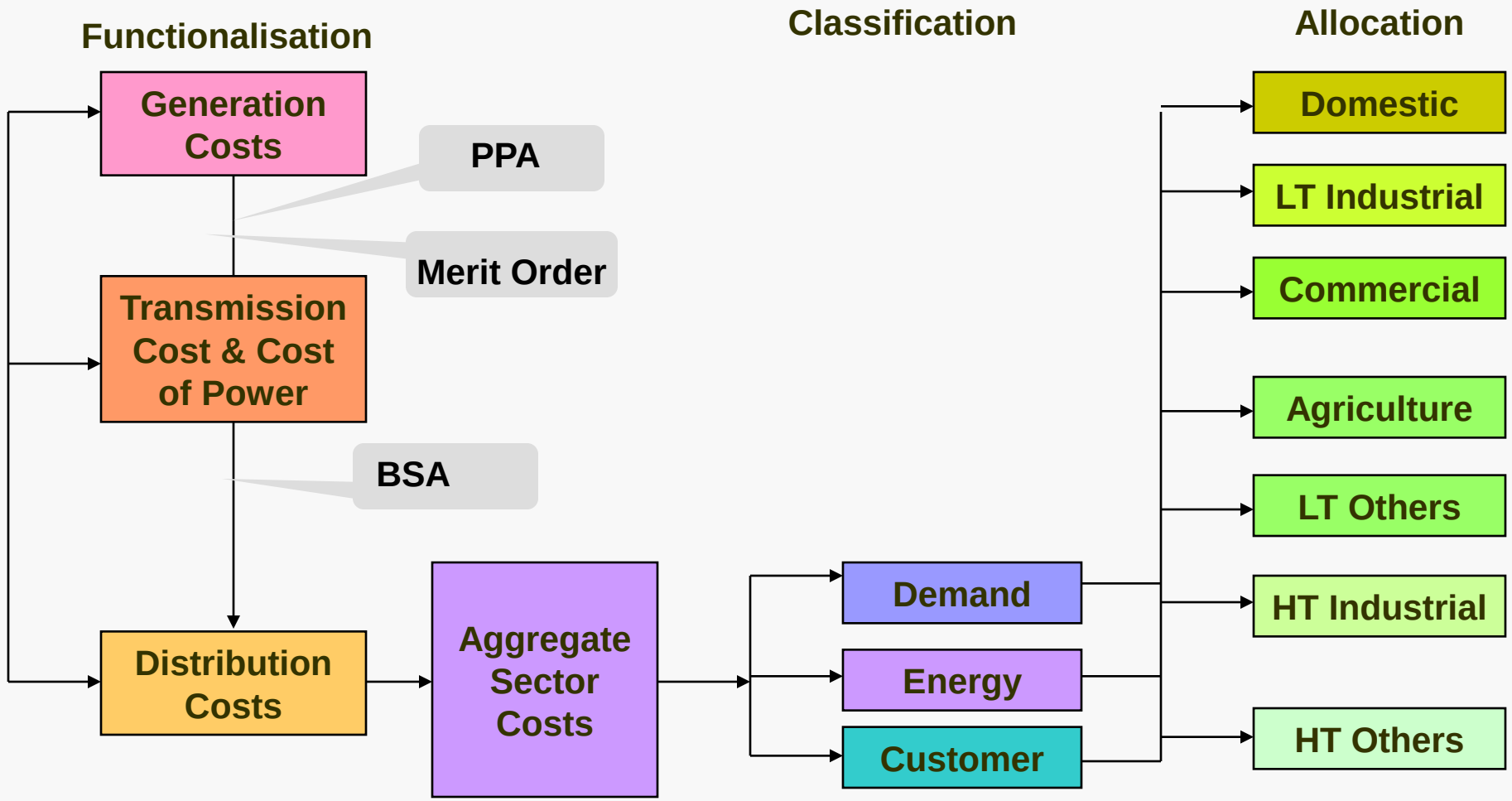
Choice of Electricity and Competition



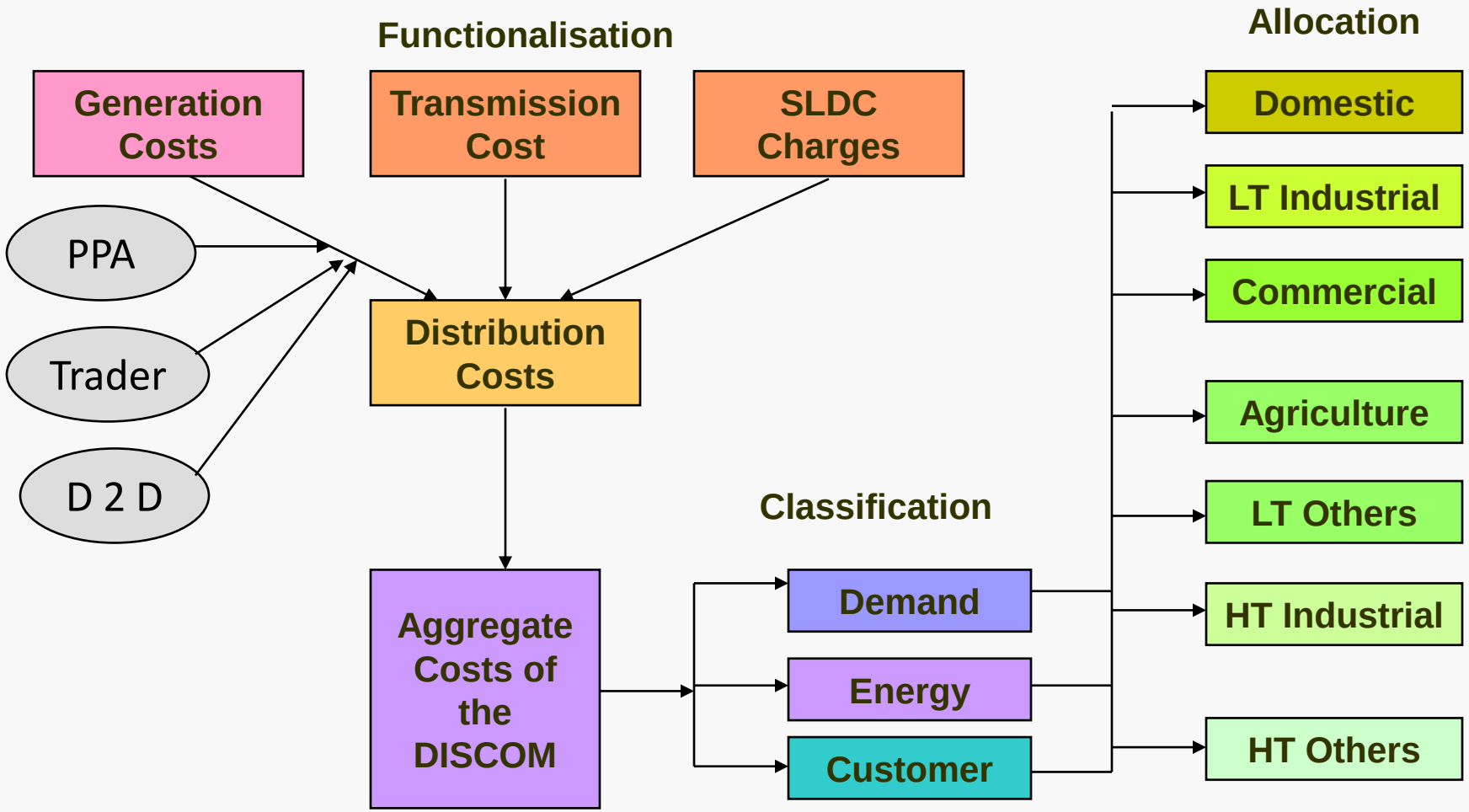
Cost of Service (Tariff Model) – For an Integrated Utility



Cost of Service (Tariff Model) – For an Unbundled Utility



Cost of Service (Tariff Model) – For a Competitive Unbundled Utility



Annual Revenue Requirement process for a Competitive Unbundled Utility

Power Purchase Cost Fixed Charges in kW and energy in kWh

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Transmission charges in kW

↓

SLDC Charges in kW

↓

Distribution Charges O&M, Depreciation,Taxes less Capitalisation

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Return on Capital Employed

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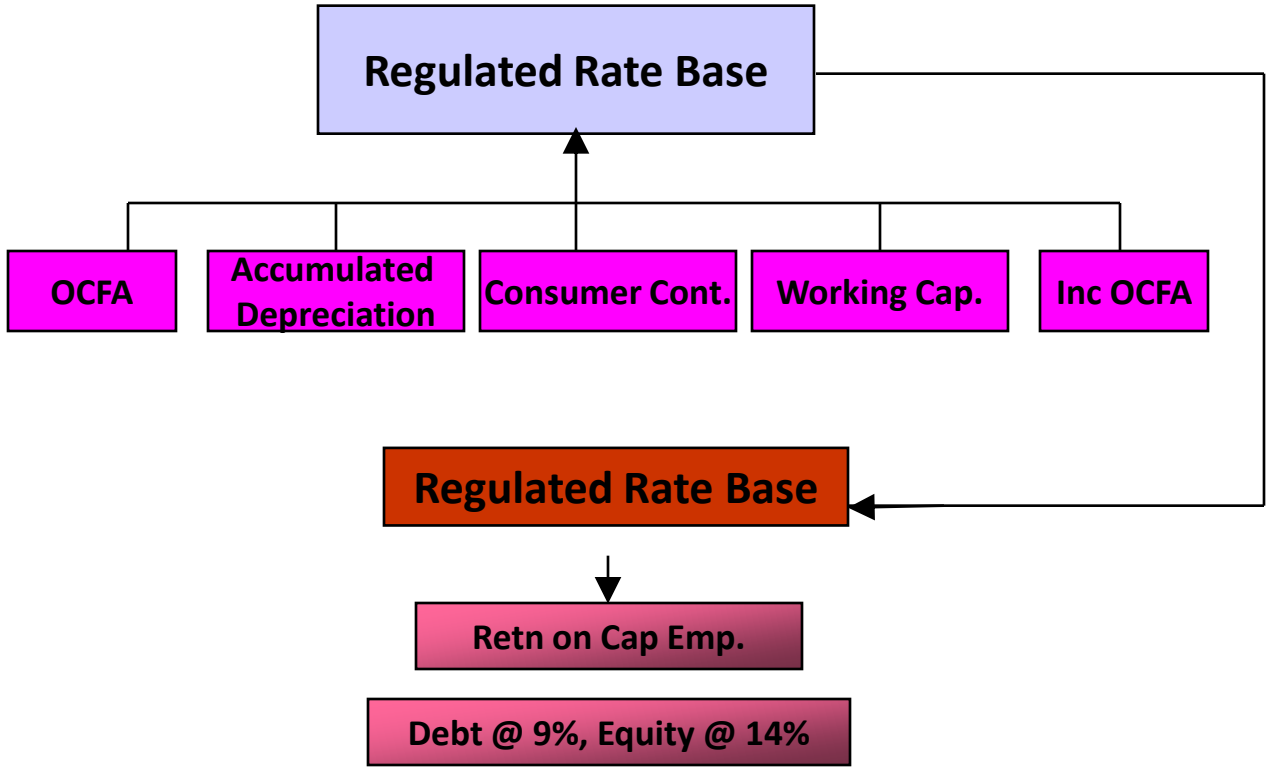
Retail Supply Margin

↓

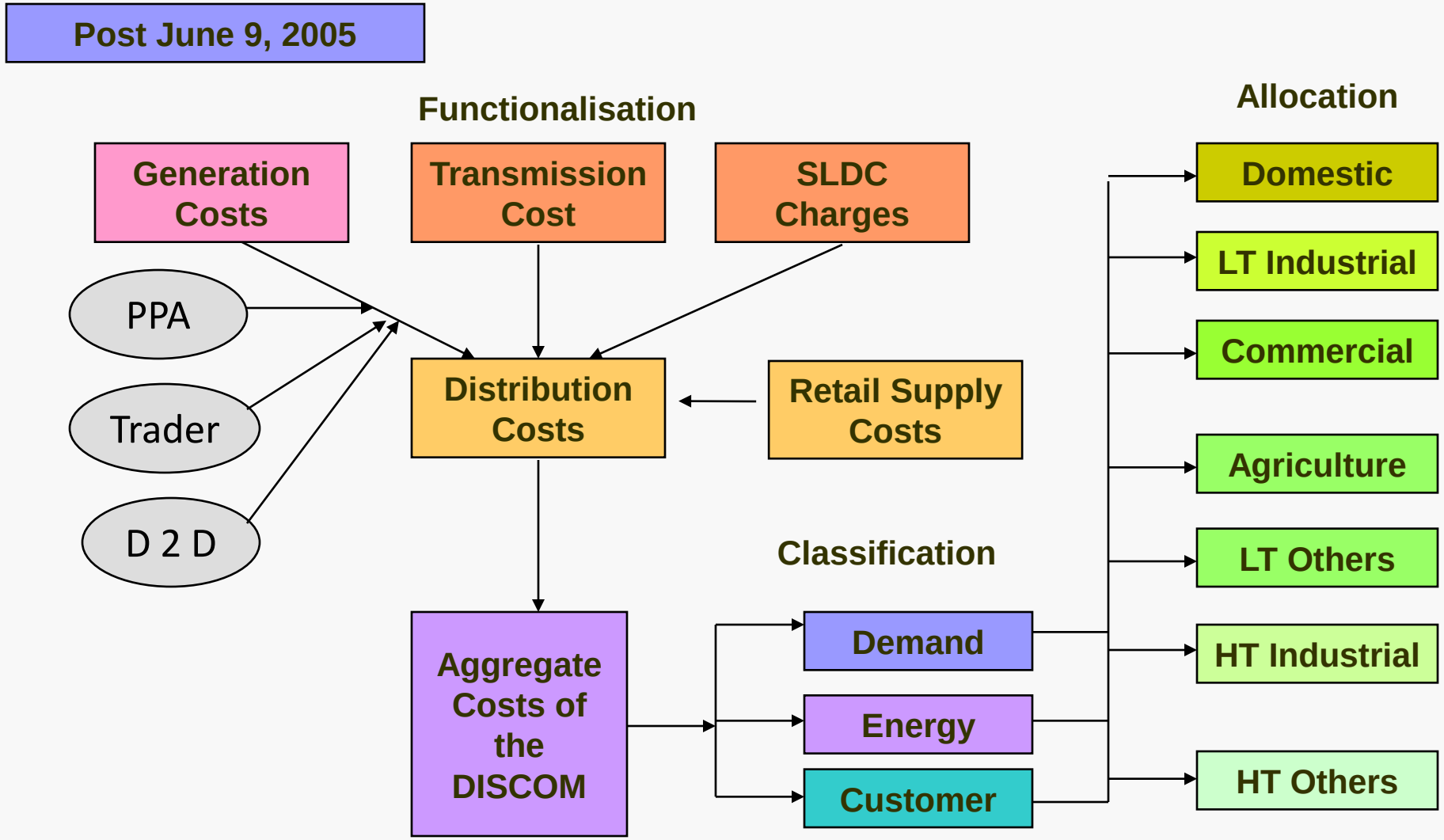
Non-Tariff Income

↓

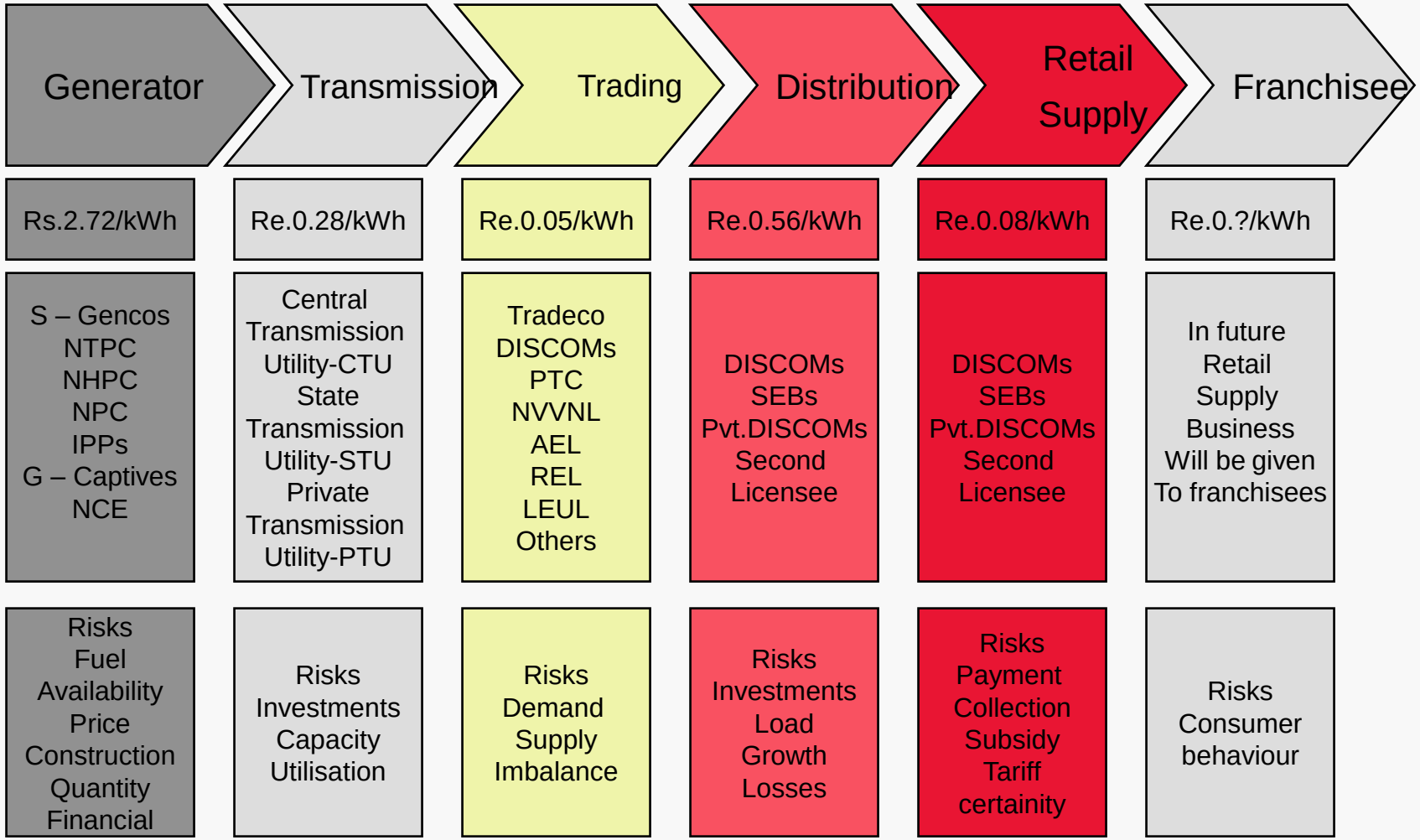
Net Revenue Requirement



Cost of Service (Tariff Model) – Where Electricity Choice is given by Utility



Typical Cost Structure of an Unbundled Utility



Evolution of Open Access

In some of the States Open Access was there much prior to the Electricity Act, 2003

Andhra Pradesh had by policy allowed Open Access to large consumers by early 1994 to meet the power deficit

HT Tariffs were being increased frequently and SEB unable to supply to the industries, thereby diesel generation usage by industries started.

Large Industries in Andhra Pradesh were encouraged to go in for Group Captive Mode

Andhra Pradesh Gas Power Corporation Limited (APGPCL) was the first Group Captive of the State, where the APSEB was one of the Stakeholder in the project.

Many Captive and Group Captive mushroomed in AP

Key features of Electricity Act, 2003 – Open Access

Commission (APERC) issued Regulations on

- Open Access
- Cross-Subsidy Surcharge

Open Access and Tariffs

- Role of Commission in fixing tariffs under competition
- Provisions under Sec 61, 62, 65

Wheeling Charges

- Transmission Rs. / kW per month
- SLDC Charges Rs. / kW per month
- Distribution Rs / kWh
- Plus losses of the respective voltage levels

Open Access Issues

- Surcharge
- Additional Surcharge
- Cross-subsidy reduction / ~~**elimination**~~
- Mechanisms for administration

Electricity Act, 2003 – Section-39(2)d(ii) Surcharge – Transmission Open Access

- "… any consumer as and when such open access is provided by the State Commission under sub-section (2) of section 42, on payment of the transmission charges and a surcharge thereon, as may be specified by the State Commission:
- Provided that such surcharge shall be utilised for the purpose of meeting the requirement of current level cross-subsidy.
- Provided further that such surcharge and cross subsidies shall be progressively reduced and eliminated in the manner as may be specified by the State Commission:
- Provided also that such surcharge may be levied till such time the cross subsidies are not eliminated
- Provided also that the manner of payment and utilisation of the surcharge shall be specified by the State Commission:
- Provided also that such surcharge shall not be leviable in case open access is provided to a person who has established a captive generating plant for carrying the electricity to the destination of his own use.

Electricity Act, 2003 – Section- 42(2) Surcharge – Distribution Open Access

•"..The State Commission shall introduce open access in such phases and subject to such conditions, (including the cross subsidies, and other operational constraints) as may be specified within one year of the appointed date by it and in specifying the extent of open access in successive phases and in determining the charges for wheeling, it shall have due regard to all relevant factors including such cross subsidies, and other operational constraints:

•Provided that such open access may be allowed before the cross subsidies are eliminated, on payment of surcharge in addition to the charges for wheeling as may be determined by the State Commission:

•Provided that such surcharge shall be utilised to meet the requirements of current level of cross subsidy within the area of supply of the distribution licensee:

•Provided also that such surcharge and cross subsidies shall be progressively reduced and eliminated in the manner as may be specified by the State Commission:

•Provided also that such surcharge shall not be leviable in case open access is provided to a person who has established a captive generating plant for carrying the electricity to the destination of his own use."

Electricity Act, 2003 – Section- 42(4) Addl. Surcharge – Distribution Open Access

Additional Cross Subsidy

- Where the State Commission permits a consumer or class of consumers to receive supply of electricity from a person other than the distribution licensee of his area of supply, such consumer shall be liable to pay an additional surcharge on the charges of wheeling, as may be specified by the State Commission, to meet the fixed cost of such distribution licensee arising out of his obligation to supply.

Cross Subsidy – Roadmap

•Section 61 (g)

•"… that the tariff progressively reflects the cost of supply of electricity, and also reduces ~~and eliminates the~~ cross-subsidies with in the period to be specified by the Appropriate Commission…."

Surcharge

• Surcharge shall be computed based on Cost-to-Serve approach and not on average cost as there will be financial burden on the utility or the State Government

• Surcharge shall include the entire loss of cross-subsidy and should be paid to the incumbent licensee may be based on avoided cost methodology

Exemption of applicability of Cross Subsidy

- ***No surcharge would be required to be paid in terms of Electricity being sold by Generating Companies with the consent of competent government U/S 43 (A) (1) (C) of Electricity Supply Act, 1948***
- ***No Surcharge would be required to be paid under Captive Consumption or under Group Captive Model***

Open Access Charges and Competition

Cost of Generation

Distribution Charges and Losses of Originating State Discom
Transmission Charges at the originating area
Scheduling and System Operation Charges (SLDC)
POC – Transmission Charges of the originating State / Point
POC -Transmission charges of the destination State / Point
Scheduling and System Operation Charges (SLDC)
Transmission Charges at the destination area
Distribution Charges and Losses of Destination State Discom

UI Charges (for deviations) if applicable
Back-up supply charges if applicable

Trading Margin

Surcharge
Additional Surcharge Charge

Key Lessons

S.No.	Issue	Lesson Learnt
1	Private Sector Participation	Rapid Capacity Addition
2	Unbundling of State Electricity Boards	Proper Costs being Identified
3	Transmission and Losses	Improved Efficiency – Losses Reduced
4	Competitive Bidding	Efficient Tariffs
5	Transmission Planning	Affected due to mushrooming Power Plants plans. Realistic planning could not be estimated
6	Open Access	Successful, but not as anticipated
7	Cost Reflective Tariffs	National Tariff Policy (NTP) uses Average cost mechanism, this may dampen cost causation and impact Tariffs
8	Trading / Merchant Operations	Trading still at 3% – 5% of the Total Market
9	Distribution Reforms	Not successful. Tariff Rationalisation not happening, and Tariff increases not being done to keep in line with the costs. Populist methods being adopted to make the sector unviable.
10	Grid Discipline	Entire country is having an uniform Frequency. Deviation settlement mechanism has disciplined

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Term

S.No.	Agency	Defination
1	Open Access	15 mts to 3 Months – Short Term 4th Month to 3 Years – Medium term Above 7 years Long Term
2	MoP under Bidding PPA	Above 7 years under Bidding Route
3	Gas PPA	Generally 15 years
4	Thermal PPA	Generally 25 years
5	Hydro PPA	Generally 35 years
6	Bulk Power Transmission Agreement	25 years – Lock-in 13 years
7	Regulatory – ARR (SERC)	Upto 1 year, and under MYT 3 – 5 years
8	Regulatory – Tariff Regulations (CERC)	5 years (present 2014-19)