



Electricity Tariff Reforms: Case Study of India

Rajasekhar Devaguptapu, Fellow
Centre for Social and Economic Progress (CSEP)
New Delhi, India



Workshop: International Experience on Energy Tariff Reforms

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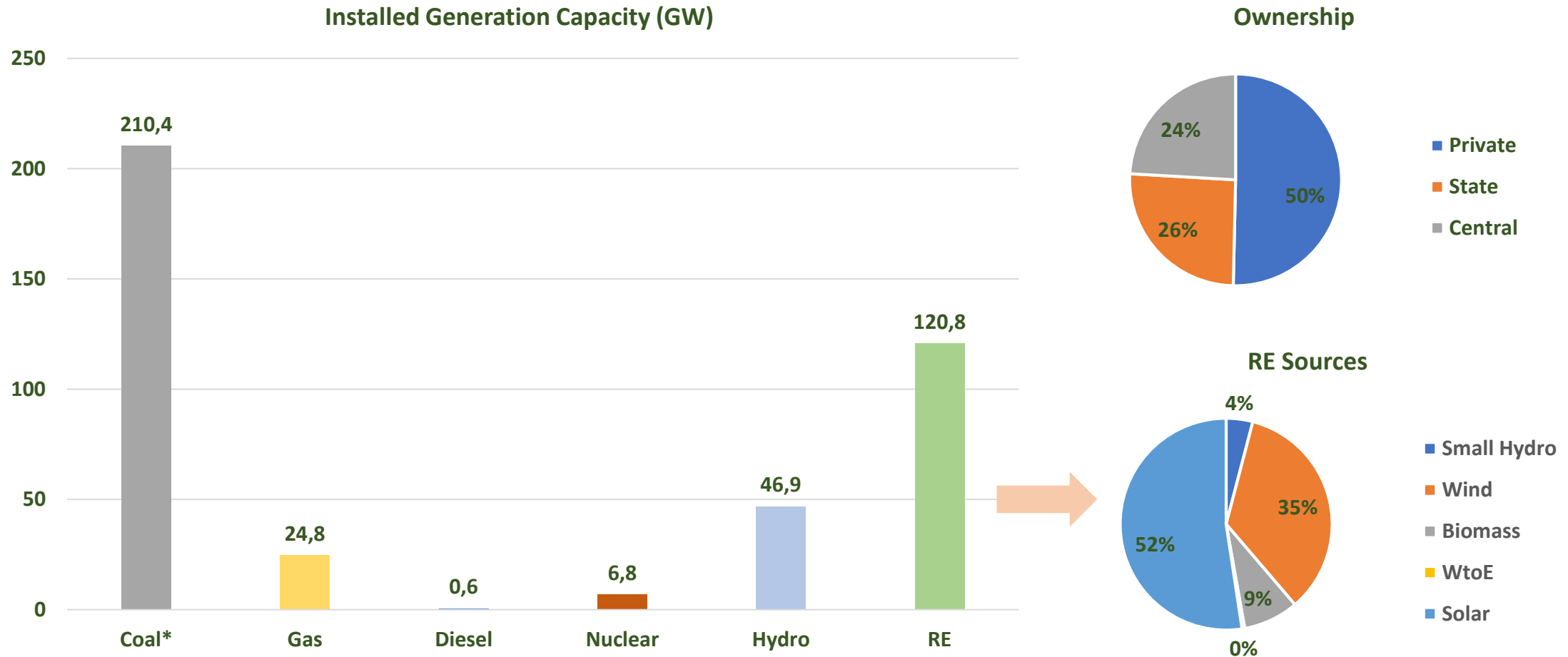
Overview of Indian Electricity Market

Clear demarcation of Roles & Responsibilities

- Electricity – A concurrent subject as per Constitution of India
- Both Central Government and State Governments can legislate
- In case of conflict, Central Government legislation prevails
- Government does Policy Formulation (Central, State Governments – In concurrent list)
- Regulation of sector through *independent* Central and State level Regulators

Overview of Indian Electricity Market

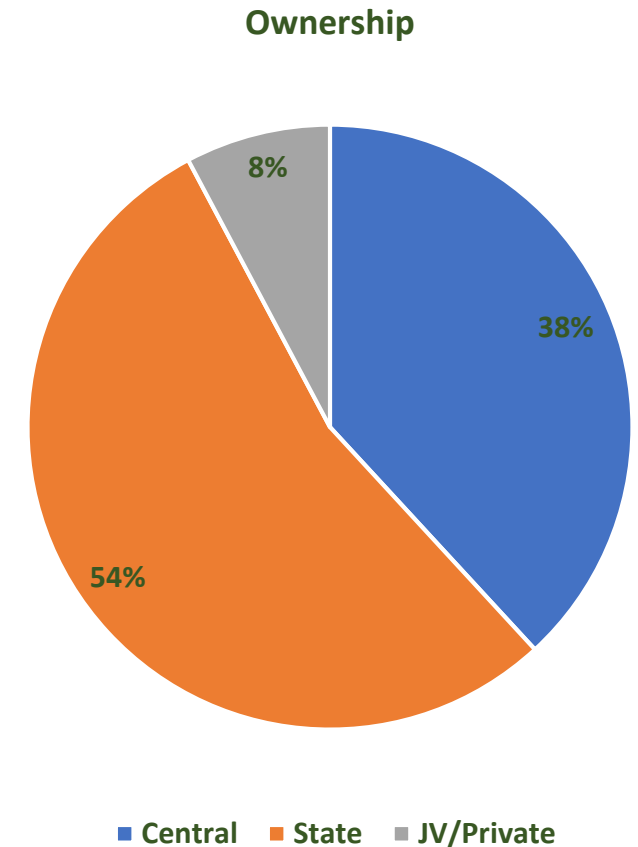
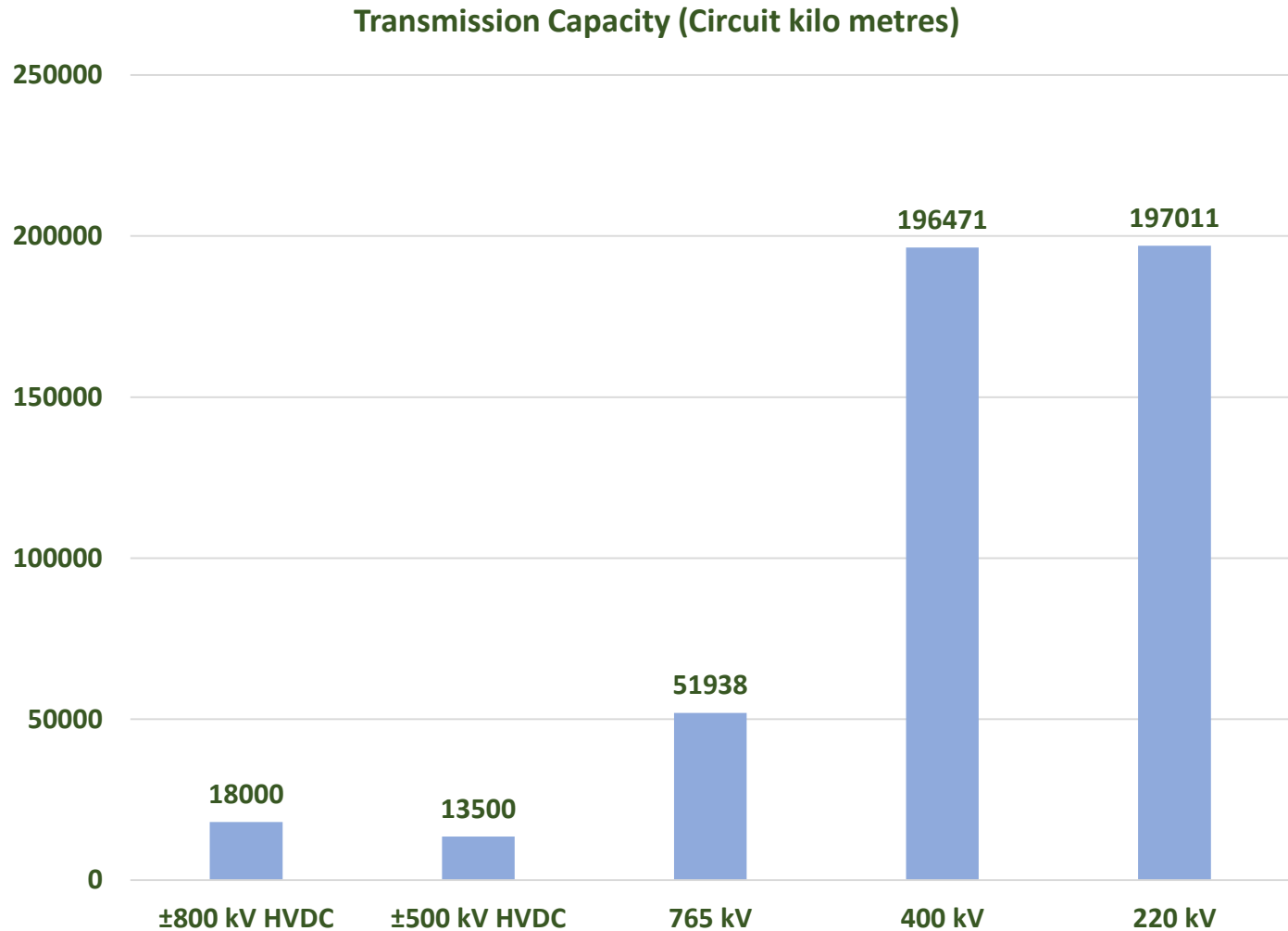
410 GW Generation Capacity; vibrant private sector participation (50%); Renewable Sources constitute a quarter of total capacity



* Hydro includes large hydro
RE Includes small hydro (<25 MW)

Overview of Indian Electricity Market

477k ckm (upto 220 kV level)*; Private Sector participation picking up



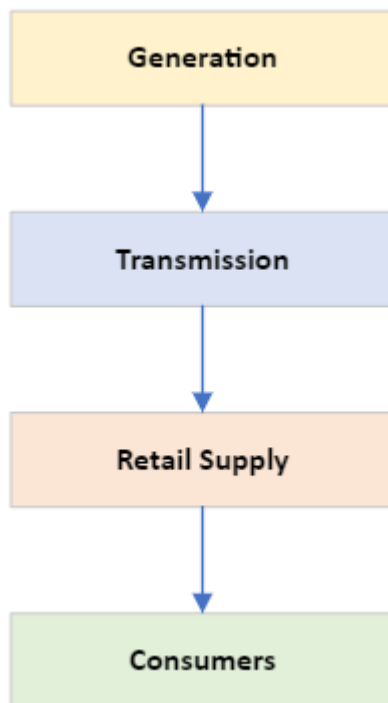
* Network below 220kV not included

Overview of Indian Electricity Market

Competition-Efficiency-Consumer

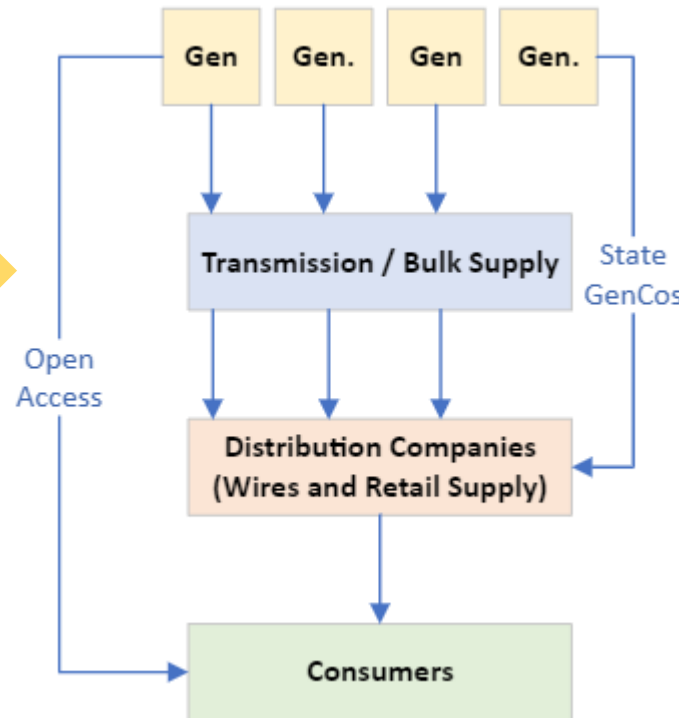
Pre-Reforms (before Electricity Act, 2003)

- Vertically Integrated Utility
- Decisions by Government
- No choice
- Monopoly of utilities
- No stakeholder participation



Current Position (series of changes, 2003 onwards)

- Un-bundled Utilities
- Decisions by Utilities
- Availability of Choice
- Emergence of Competition
- Stakeholder participation



De-licensed
Contracts for LT/MT/ST
Cost-plus tariff, Bidding route, PX, Traders etc.

Still Licensed
General Network Access
Cost-plus tariff, Bidding route

Technically allows multiple-licensing
Cost-plus tariff
Allows Open Access (≥ 1 MW), but gets compensation against losing high value consumers

Open Access
Participation in Decision Making

Tariff reforms

Scope of reforms facilitating growth and efficiency

Guidance

Tariff should be cost reflective; (Electricity Act, 2003)

Set of guiding principles (Tariff Policy; latest 2016)

Multi Year Tariff Regulations (appropriate Regulator)

Coverage

- Intra-State
- Inter-State

Time

- Long Term
- Medium Term
- Short Term

Competition

- Regulated
- Negotiated
- Competitive Bidding
- Power Exchanges

Participation

- Generators
- DisComs
- Consumers (OA)
- Traders
- Power Exchanges

Tariff reforms

Generation Tariff

Jurisdiction

- Central Regulator (Central Generation, Inter-State Generation)
- State Regulator (Generation to be sold within that State)

Principles

- Multi-Year-Tariff Regulations determine the principles (every 5 years)
- Two part tariff (Fixed and Energy costs)
- Cost+ Tariff – PPAs vetted by Regulator (long & medium term)
- Bidding Tariff – Competitive Bidding route price adopted (long & medium term)
- Short Term – Price on Power Exchange accepted
- Annual Tariff Order, periodical true-ups

Tariff

- Average Power Purchase Cost of all Public DisComs - USD 0.059 per kWh*
- Delay in clearing dues would attract penalty, discount if paid within due date

Tariff reforms

Transmission Tariff

Jurisdiction

- Central Regulator (Inter-State Transmission (ISTS))
- State Regulator (Intra-State Transmission)

Principles

- General Network Access Regulations
- Sharing of IST Charges & Losses Regulations
- Multi-Year-Tariff Regulations (every 5 years)
- Cost+ Tariff & Tariff through Competitive Bidding route adopted
- Access Charges are paid by Injecting & Drawee entities
- Transmission Charges are paid by drawee entities

Tariff

- Average transmission charges differ between utilities – in the range of USD 0.005 – 0.006 per kWh*

Tariff reform

Retail Tariff

Jurisdiction

- State Regulators determine retail consumer tariff

Principles

- Multi-Year-Tariff Regulations determine principles (5 years)
- Cost+ tariff; Two part tariff (Fixed and Energy costs)
- Broad Consumer Categories (Domestic, Commercial, Industrial, Agriculture, Others etc.)
- Annual Tariff Order, periodical true-ups
- Subsidy offered to Domestic and Agriculture consumers vary between States
- Cross subsidy (beyond subsidy) between categories allowed (restricted to $\pm 20\%$ of Cost of Supply)

Tariff

- Average Billing Rate of all Public DisComs - USD 0.079 per kWh*
- Scope to cover costs other than power purchase

Motivations for tariff reforms

Continued process of reforms; First big move in 1998

- **1948 – Nationalization of electricity sector**

- Challenges
- Operational inefficiency
 - Generation not matching economic growth; need for private investment to supplement govt. efforts

- **1991 – Opening of Generation Section**

- Challenges
- Limited private sector participation
 - Concern for non-recovery of revenues from SEBs; Distribution remained a concern

- **1998 – Distribution Sector Reforms**

- Challenges
- All States have not unbundled vertically integrated utilities
 - Distancing Government from regulation beyond tariff determination
 - Need for Strong and Independent Regulatory Institutions in all States
 - Competition; Efficient operation
 - Cost reflective tariffs
 - Option to choose the supplier (Open Access)
 - Facilitative framework for private sector participation
 - Stakeholder participation; Consumer Grievance Redressal Mechanism

Motivations for tariff reforms

Paradigm shift in 2003

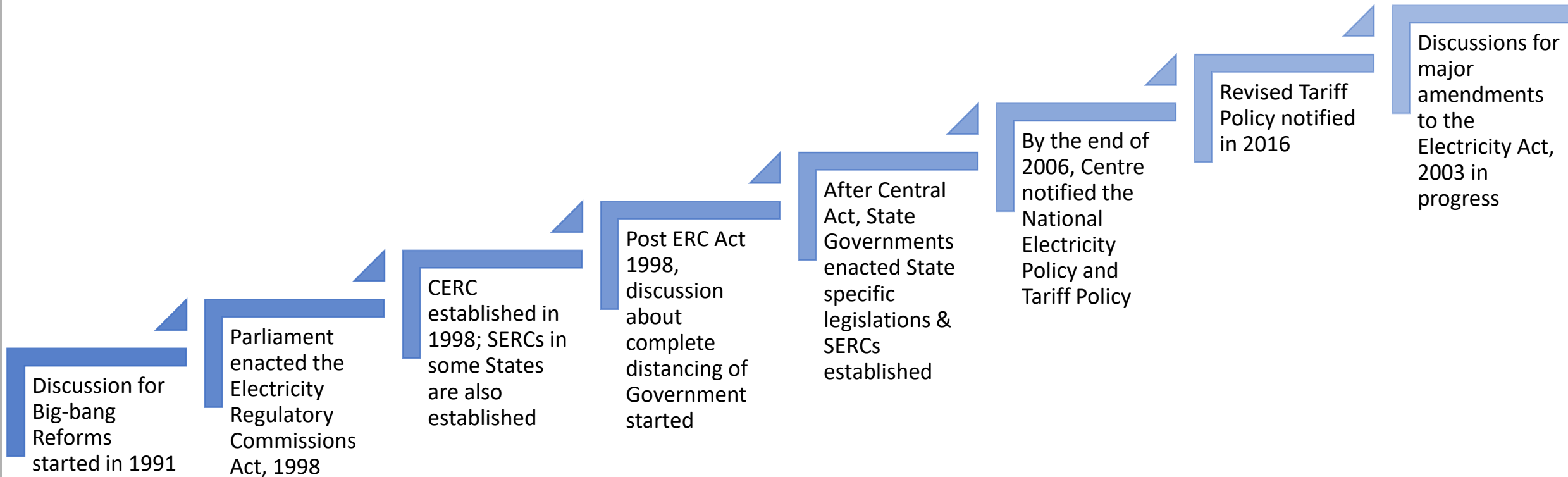
- **2003 – The Electricity Act**

- De-licensing of Generation Sector
- Bidding route in Generation & Transmission segments
- Market Development
- Grid Discipline and Grid Security
- Consumer Protection

Challenges { *• Complete unfolding of Competition in Retail Sale of Electricity* } **Under discussion**
• Privatization ?

Tariff reform process

Steady progress; Effective frameworks



Tariff reform results

Multiplicity of Players

Multiplicity of Players, leading to competition and efficiency in pricing

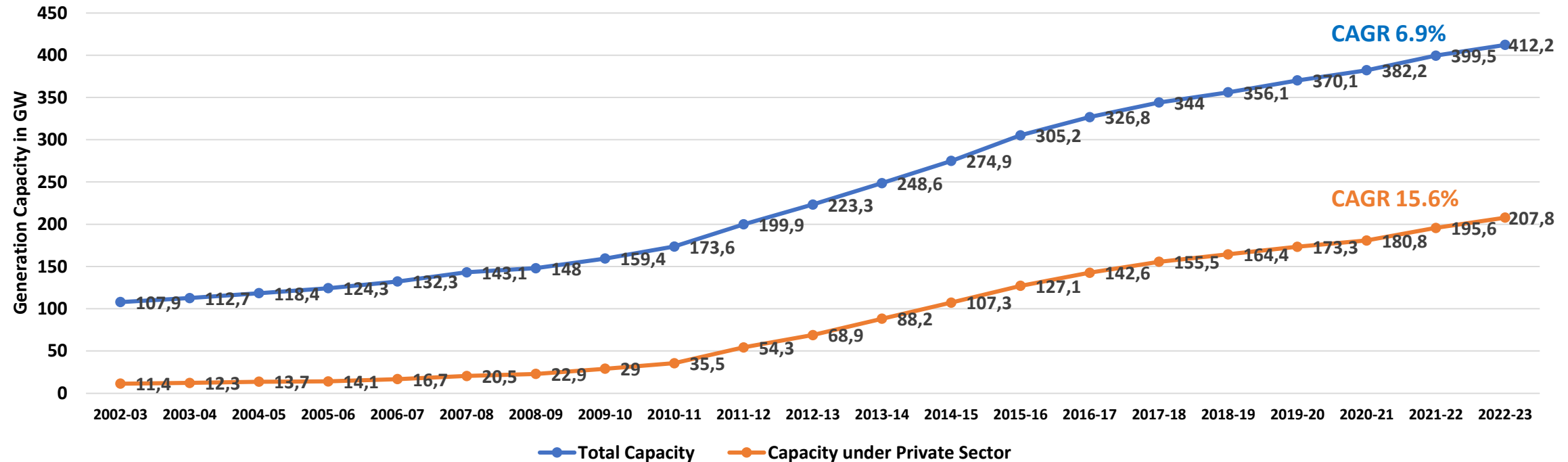
- Supply Side
 - Generating Stations (600+); Transmission Companies (70+)
- Demand Side
 - Distribution Utilities (65+); Open Access Consumers
- Market Platform
 - Long Term - Power Purchase Agreements, Bidding Route
 - Short Term - Power Exchanges (multiple products), OTC, Power Traders
- System Operation
 - System Operation (multilayered)

Tariff reform results

Increasing participation of private sector

Increased Private Sector participation

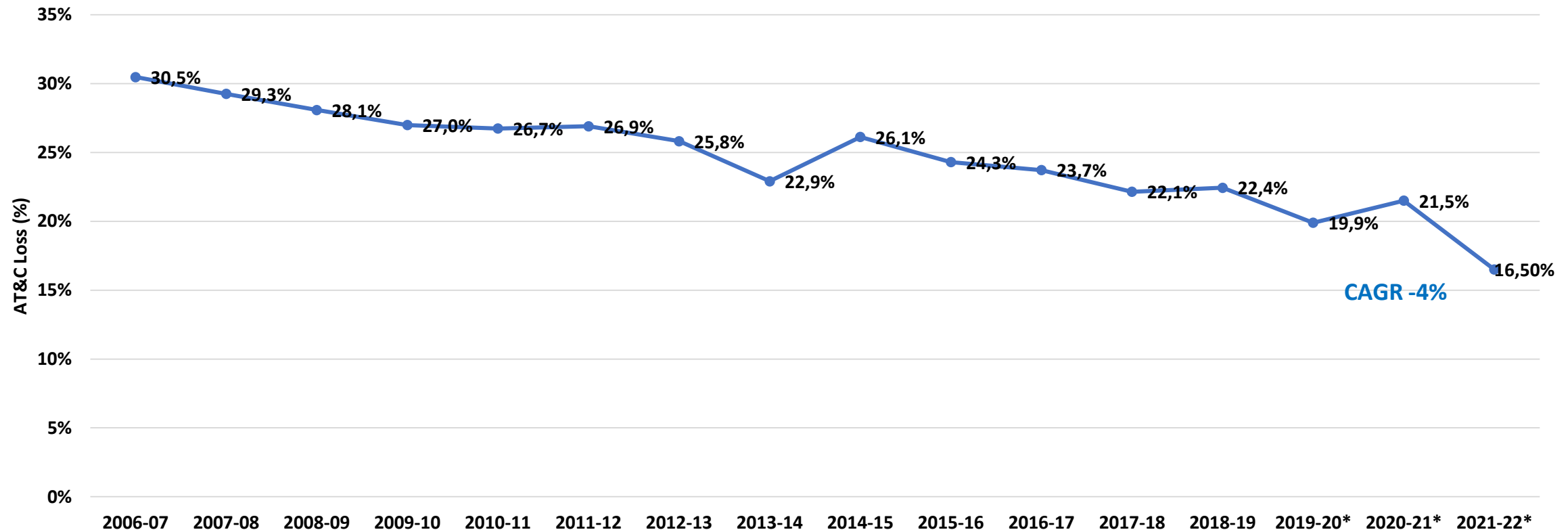
- 50% in Generation, 8% in Transmission, Private Distribution in Delhi State, Odisha State, Mumbai, Surat and Ahmedabad cities



Tariff reform results

Reduced Aggregate Technical and Commercial Losses at -4% CAGR

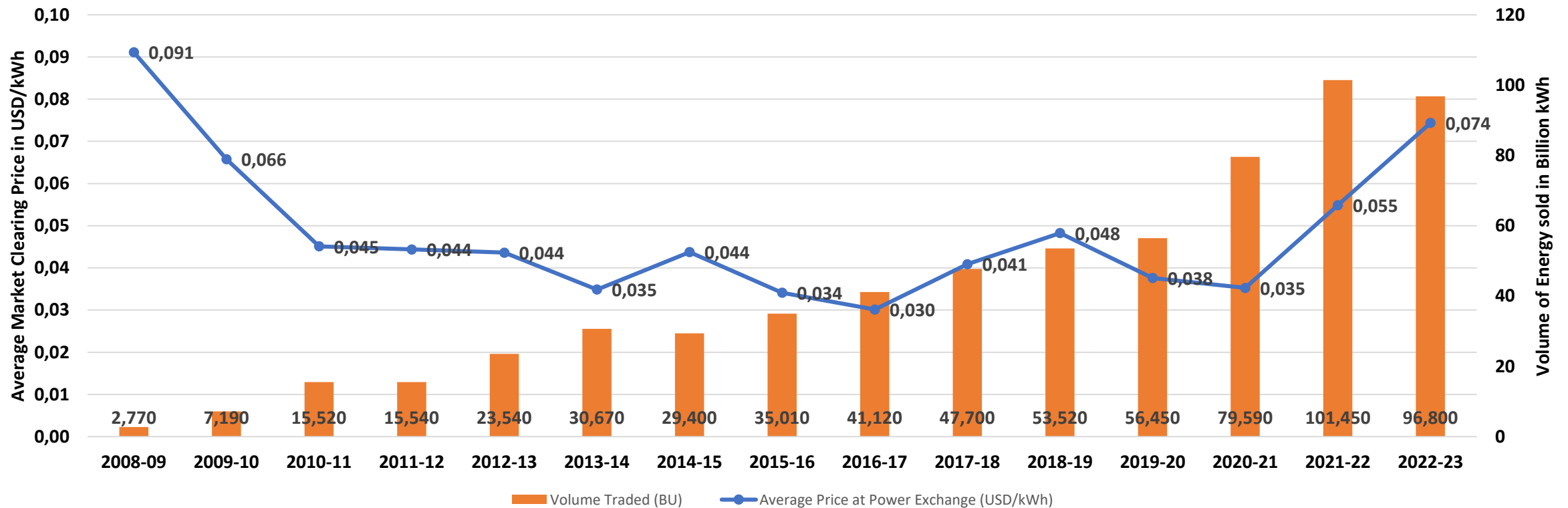
- Aggregate Technical & Commercial Losses reduced from 30.5% to 16.5% (FY2021-22)



Tariff reform results

More capacity traded on Power Exchange platform

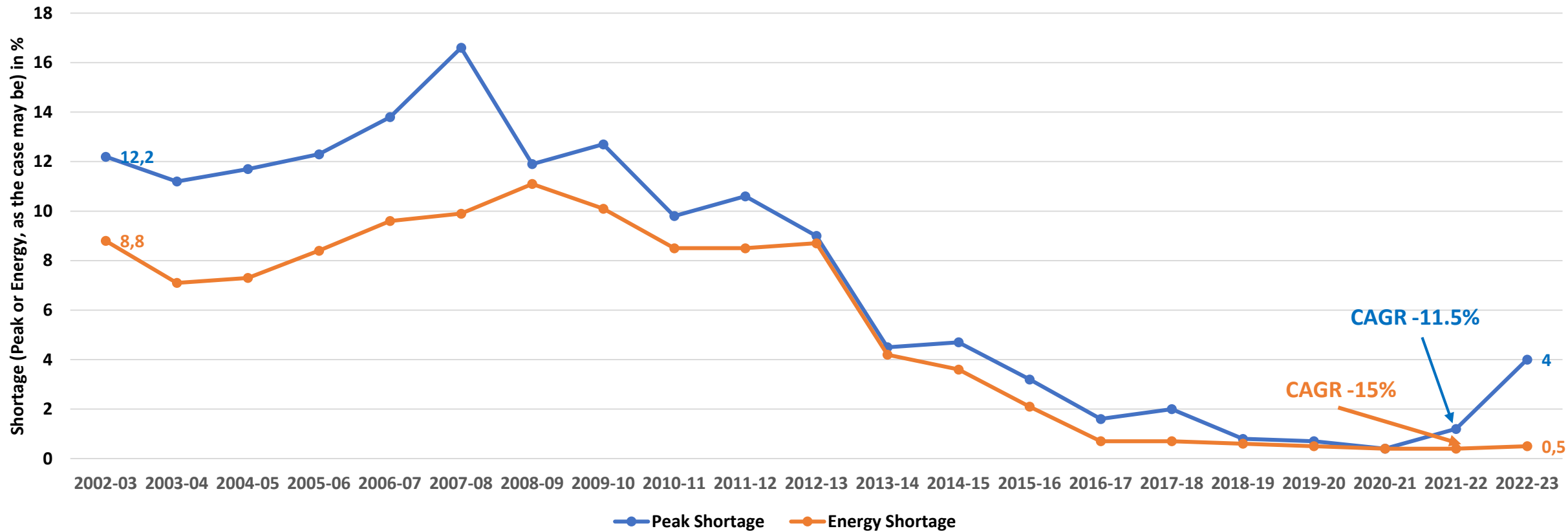
- More energy sold on Power Exchanges; Prices stabilized (except outliers due to COVID-19)



Tariff reform results

Reduced Peak (Capacity in GW %) and Energy (kWh %) Shortages

- Shortages in terms of Peak capacity and Energy improved substantially



Tariff reform results

Other Critical Changes

- Grid Security and safety
- Performance standards in place, non-compliance by Distribution utilities entail payment of compensation to consumers
- Load shedding only on technical reasons; more stable supply of electricity
- Consumer grievance redressal mechanism working in all DisComs

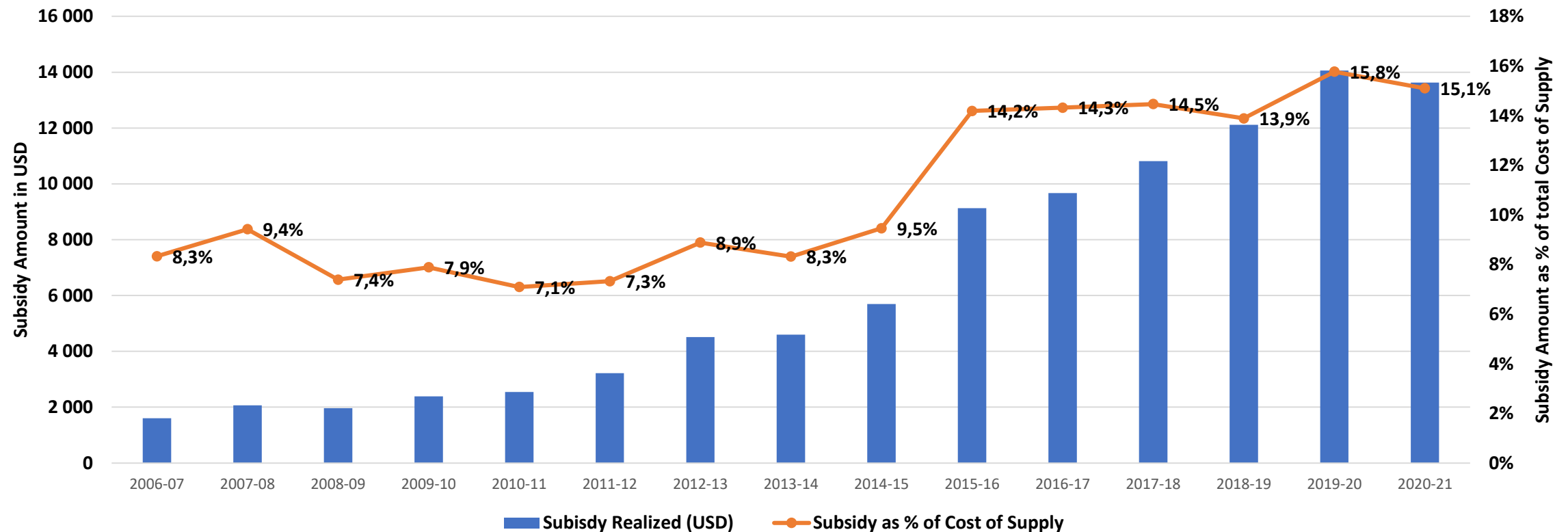
Tariff reform results

- Aggregate Technical & Commercial Losses reduced from 30.5% to 23% (FY2020-21)
- Vibrant short-term market (Power Exchanges in operation)
- Grid Security and safety
- Performance standards in place, non-compliance by Distribution utilities entail payment of compensation to consumers
- Load shedding only on technical reasons; more stable supply of electricity
- Consumer grievance redressal mechanism working in all DisComs

Social considerations and customer affordability

Subsidy by Government

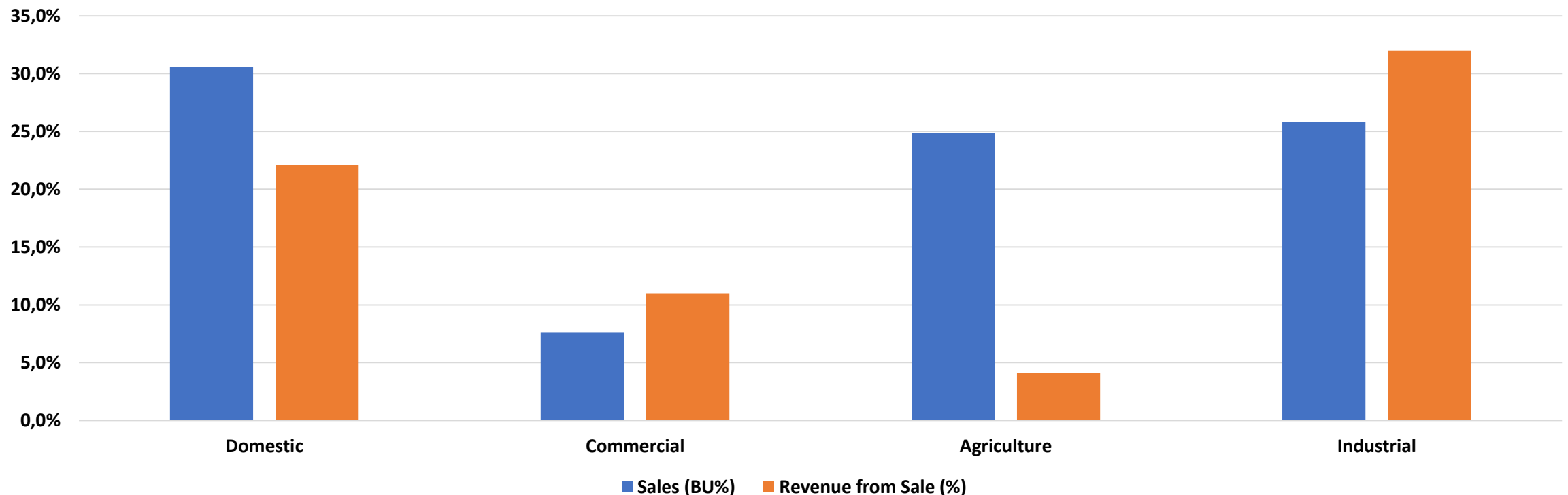
- Government offers subsidy to consumers (domestic & agriculture) who have low paying capacity



Social considerations and customer affordability

Additional Cross-Subsidy

- Cross-Subsidy restricted to +/- 20% of cost of supply



Social considerations and customer affordability

True-up Mechanism to Negate Tariff Shocks

- Tariff Shocks are a major concern
- True-up Process revisits the costs and revenues and allows a correction
- Corrected revenues subsumed in the tariff of subsequent year
- Quarterly revision in tariff to absorb changes in cost of power purchase (effectively cost of fuel)
- Periodical revisions are now changed to happen on monthly basis

Communication and Buy-in

Transparent process

Regulations

- Draft concept note in public domain seeking comments
- Draft regulations in public domain seeking comments (along with Explanatory Memorandum)
- Public Hearing (Open House)
- Final Regulations accompanied by Statement of reasons (addressing all issues raised by stakeholders)

Adjudication

- Open Hearing of all adjudicatory matters
- Orders placed in public domain
- Orders appealable in higher judicial forum (Appellate Tribunal for Electricity and Supreme Court)

Oversight

- Examination of Regulations by Parliamentary Committees
- Placing of Reports and Regulations on the table of Parliament
- Books of Accounts subject to scrutiny of Comptroller and Auditor General

Lessons learnt from the tariff reform

- Reforms facilitated processes to become timebound, objective and efficient
- Stakeholder participation in decision making lead to informed decisions
- Independent regulatory mechanism and transparent processes lead to cost reflective tariffs
- Strong regulatory oversight lead to reduction in technical and commercial losses
- Competitive environment facilitated 'Open Access' to consumers
- Consumers greatly benefited by the consumer grievance redressal mechanism

Recommendations

Critical Issues to Focus On

- Wholesale procurement is a key area to control costs
- System efficiency (loss control) is vital for finances and low consumer prices
- Competition is easiest in generation
- Need to rethink how to handle new technologies (like rooftop solar)

Recommendations

Larger Frameworks

- Unbundle Generation, Transmission, System Operation and Distribution activities into separate business entities
- Independent Regulatory Mechanism (focus 'tariff setting and true-up mechanism')
- Generation and Transmission be opened for bidding route
- Strong Forecasting mechanism
- Robust Open Access Framework

Recommendations

Tariff Mechanism

- Cost plus mechanism
- Time of use should be infused into the tariff setting process
- Determination of performance standards
- Efficiency in performance be incentivized with sharing of benefits
- Inefficiency in performance be dis-incentivized with penalties (these to be business loss for utilities)
- A robust process that connects employees with the business

Recommendations

Consumer Centric Processes

- Transparent stakeholder participation
- Clear trajectory of Subsidy Mechanism; Consumers should be aware of subsidy given to them
- Strong consumer grievance redressal mechanism; consumer awareness programs



**THANK YOU
FOR YOUR ATTENTION!**

Rajasekhar Devaguptapu
rsekhard@yahoo.com
DRajasekhar@csep.org