

Indian Institute of Technology Kanpur (IITK) and Indian Energy Exchange (IEX) are delighted to announce  
Training Program on  
"Power Procurement Strategy and Power Exchanges"  
28-30 July, 2014

Care  
Integrity  
Excellence  
Collaboration  
Trust  
Respect



## Open Access: Regulation & Operationalization

Mr. Bikram Singh  
Head Marketing  
Tata Power Trading Company Ltd

# Tata Power Company – Business Overview

- Established in 1910, Tata Power is India's largest integrated power company with a significant international presence
- The Company has an installed generation capacity of 8613 MW in India and a presence in all the segments of the power sector
- One of the largest renewable energy players in India ( around 900 MW)
- It has developed India's first 4000 MW Ultra Mega Power Project

## Tata Power – International Presence

- South Africa - 50: 50 JV with Exxaro Resources (234 MW of wind power)
- Georgia - Development of three hydro projects in 2 phases of 185 MW and 215 MW
- Indonesia – Coal Assets and Geothermal project being developed

# Tata Power Trading Company Limited (TPTCL) - Overview

- Wholly owned subsidiary of The Tata Power Company Limited
- Was incorporated on 31st December 2003 and registered as a Limited company on 16th February 2004
- First company to be awarded a power trading license by CERC - On 9th June 2005
- 450+ Clients in Power exchanges ( IEX & PXIL)
- TPTCL serves DISCOMs across all the states in India and sells power of almost 30 generators
- 2nd largest power trader in India (CERC MMC Report)
- Has increased its trading volume from 3000 MU in FY 2009 to 12000 MU in FY 2014
- Revenue of 4140 Crore(s) in FY 2014
- International presence – Power trade from DHPC, Bhutan
- 24 X 7 state of art automated control room manned by skilled professionals



**TATA**

## TPTCL SERVICE PORTFOLIO

Bilateral Power Contracts

Power Exchanges

Renewable Energy Certificate (REC)

Coal Supply Facilitation

Advisory Services

Short Term Contracts

Medium/Long Term Contracts

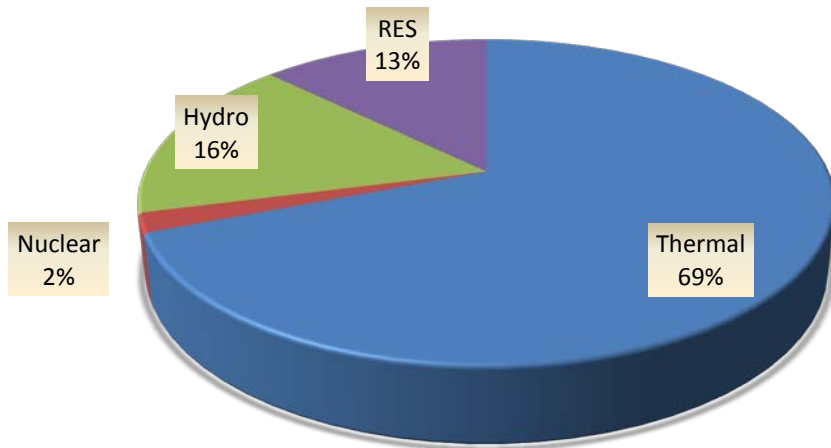
# Installed Generation Capacity



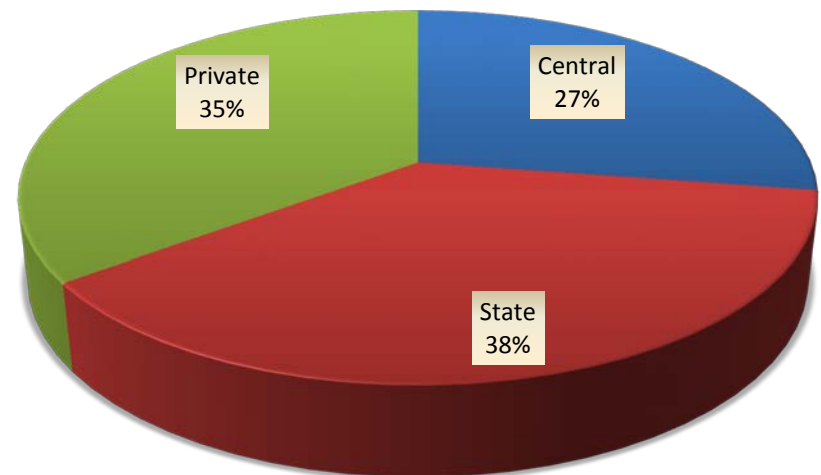
As on 30.06.2014	Thermal				Nuclear	Hydro	RES	Grand Total
	Coal	Gas	Diesel	Total				
Central	45925	7066	0	52991	4780	10554	0	68325
State	54678	6974	603	62255	0	27482	3804	93541
Private	47875	8568	597	57041	0	2694	27888	87623
All India	148478	22608	1200	172286	4780	40730	31692	249488

All figs in MW, Source: [www.cea.nic.in](http://www.cea.nic.in)

## Generation Mix in India



## Sector wise Generation in India



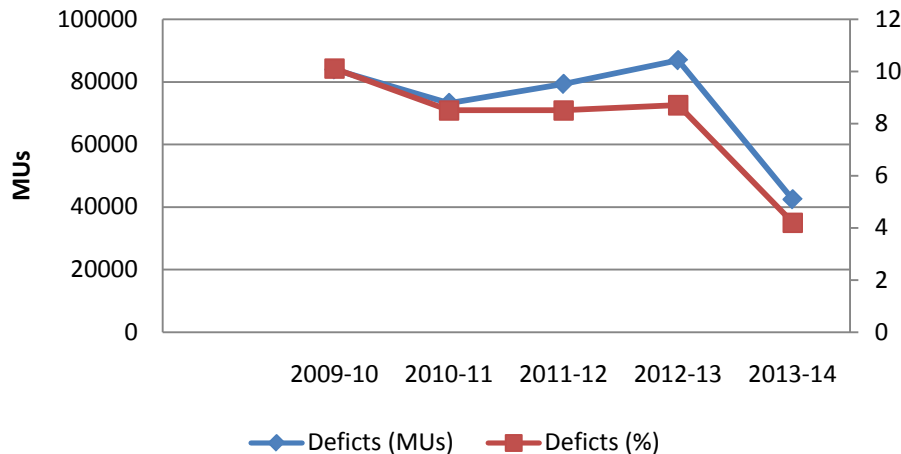
# Power Supply Position in India



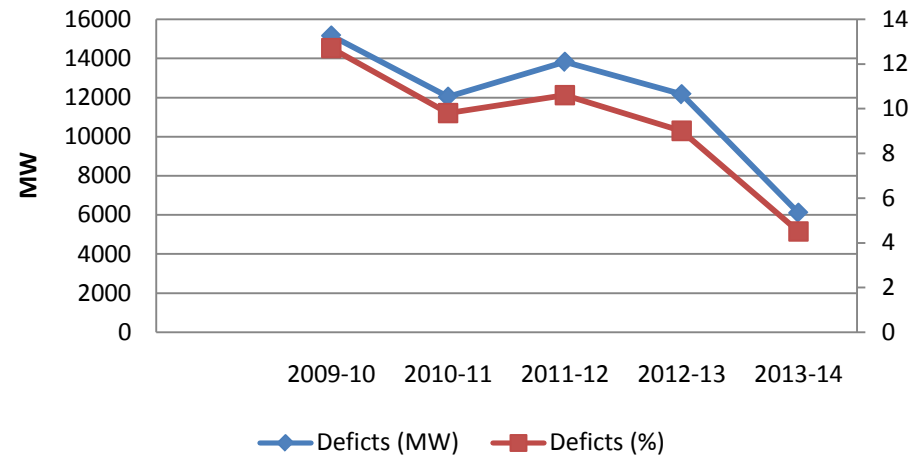
The power supply position in the country during 2009-10 to 2013-14 :

Year	Energy				Peak			
	Requirement	Availability	Surplus/Deficts(-)		Peak Demand	Peak Met	Surplus/Deficts(-)	
	(MU)	(MU)	(MU)	(%)	(MW)	(MW)	(MW)	(%)
2009-10	830,594	746,644	-83,950	-10.1	119,166	104,009	-15,157	-12.7
2010-11	861,591	788,355	-73,236	-8.5	122,287	110,256	-12,031	-9.8
2011-12	937,199	857,886	-79,313	-8.5	130,006	116,191	-13,815	-10.6
2012-13	998,114	911,209	-86,905	-8.7	135,453	123,294	-12,159	-9
2013-14	1,002,045	959,614	-42,431	-4.2	135,918	129,815	-6103	-4.5

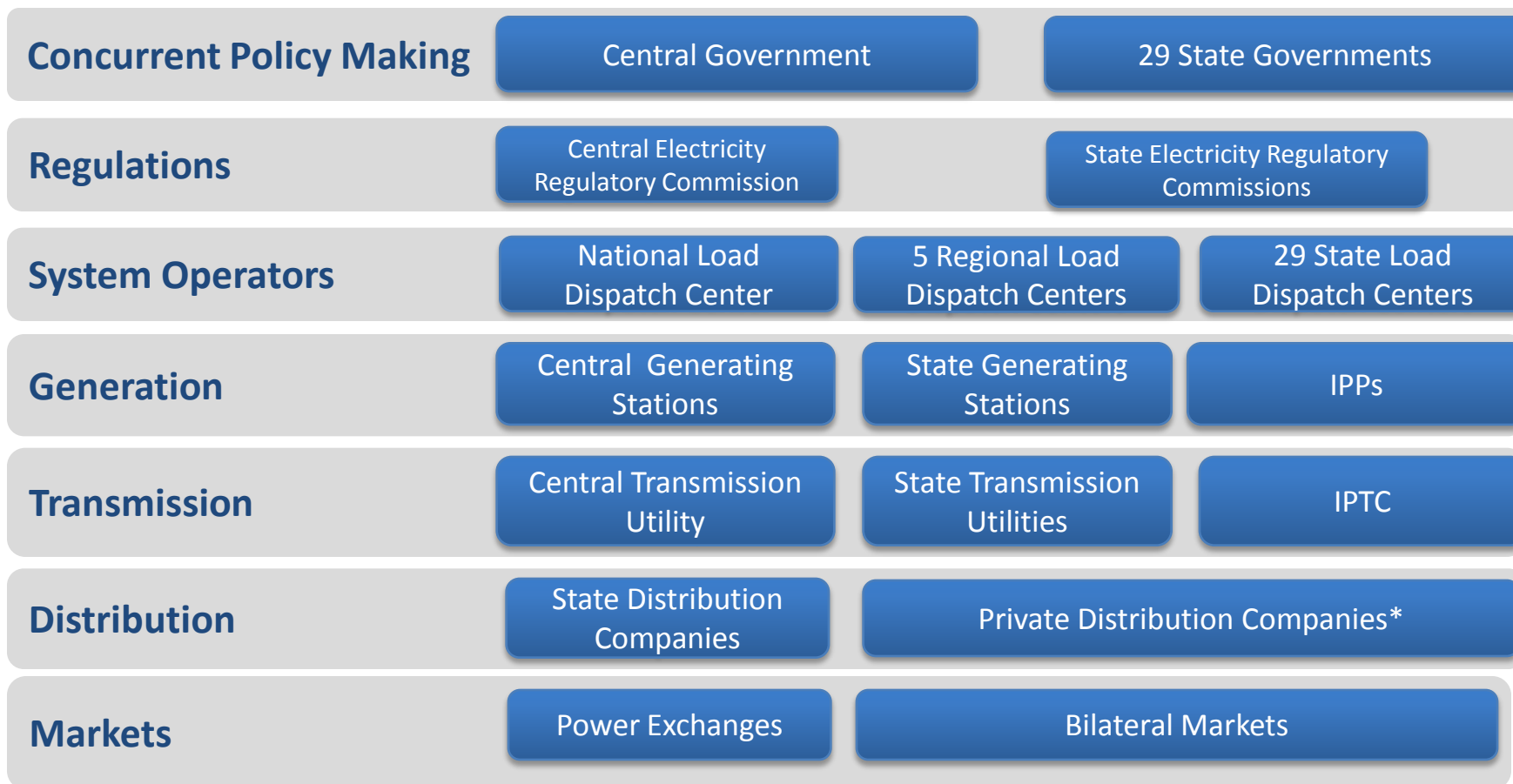
Deficit in Energy – (MUs)/(%)



Deficit in Peak - (MW)/(%)



# Structure of Indian Power Market



\* Private distribution companies are few in number. Tata Power-Mumbai and Tata Power- Delhi are amongst the best performing distribution companies

# Electricity Act 2003: Paradigm Shift in Sector

<u>Prior to EA 2003</u>	<u>Post EA 2003</u>
<ul style="list-style-type: none"> <li>◆ Electricity Sector govern by The Indian Electricity Act 1910 &amp; The Electricity (Supply) Act 1948</li> <li>◆ SEBs vertically integrated i.e., responsible for Generation, Transmission and Distribution</li> <li>◆ Growing power need and continuous shortage – surplus situations faced in different part of country</li> <li>◆ Though Generation was licensed but opened for private players to bring investment in the sector</li> </ul> <p><b>1991:</b> Generation Sector was opened for private players to bring investment in the sector.</p> <p><b>1996:</b> Orissa model of unbundling and setting up of regulatory commission of Orissa Reforms.</p> <p><b>1998:</b> Regulatory Commissions Act was enacted</p> <p><b>1999:</b> Distribution business in Orissa was completely privatized.</p>	<ul style="list-style-type: none"> <li>◆ Electricity Sector govern by Electricity Act 2003</li> <li>◆ <b>Trading Recognized as a distinct licensed activity</b></li> <li>◆ Unbundling of SEBs into Generation, Transmission and distribution</li> <li>◆ Sections about Electricity Trading in EA 2003- Section 2(71), EA 2(26),12 &amp;13.</li> <li>◆ Bring competition in the market and benefit the end consumer</li> <li>◆ De-licensing of Generation</li> </ul>



# Salient Features of Indian Electricity Act 2003

De-licensing of generation

Development of a Multi-Buyer Multi-Seller framework in power

Introduced Tariff based Competitive Bidding for procurement of Power

Provision of Non-discriminatory Open Access

Provision of Parallel license in Distribution

Thrust to Universal Service Obligation (USO)

Setting up State Electricity Regulatory Commission (SERC) made mandatory

Development of National Electricity Policy (NEP-2005) and National Tariff Policy (NTP-2006)

## Indian Power Market

Long Term

Medium Term

Short Term

Case-1 bids  
(DBFOO)

Case-2 bids  
(DBFOT)

Bilateral

Power Exchanges

Deviation Settlement Mechanism

From two hours ahead up to 3 month advance

Day Ahead Term Ahead

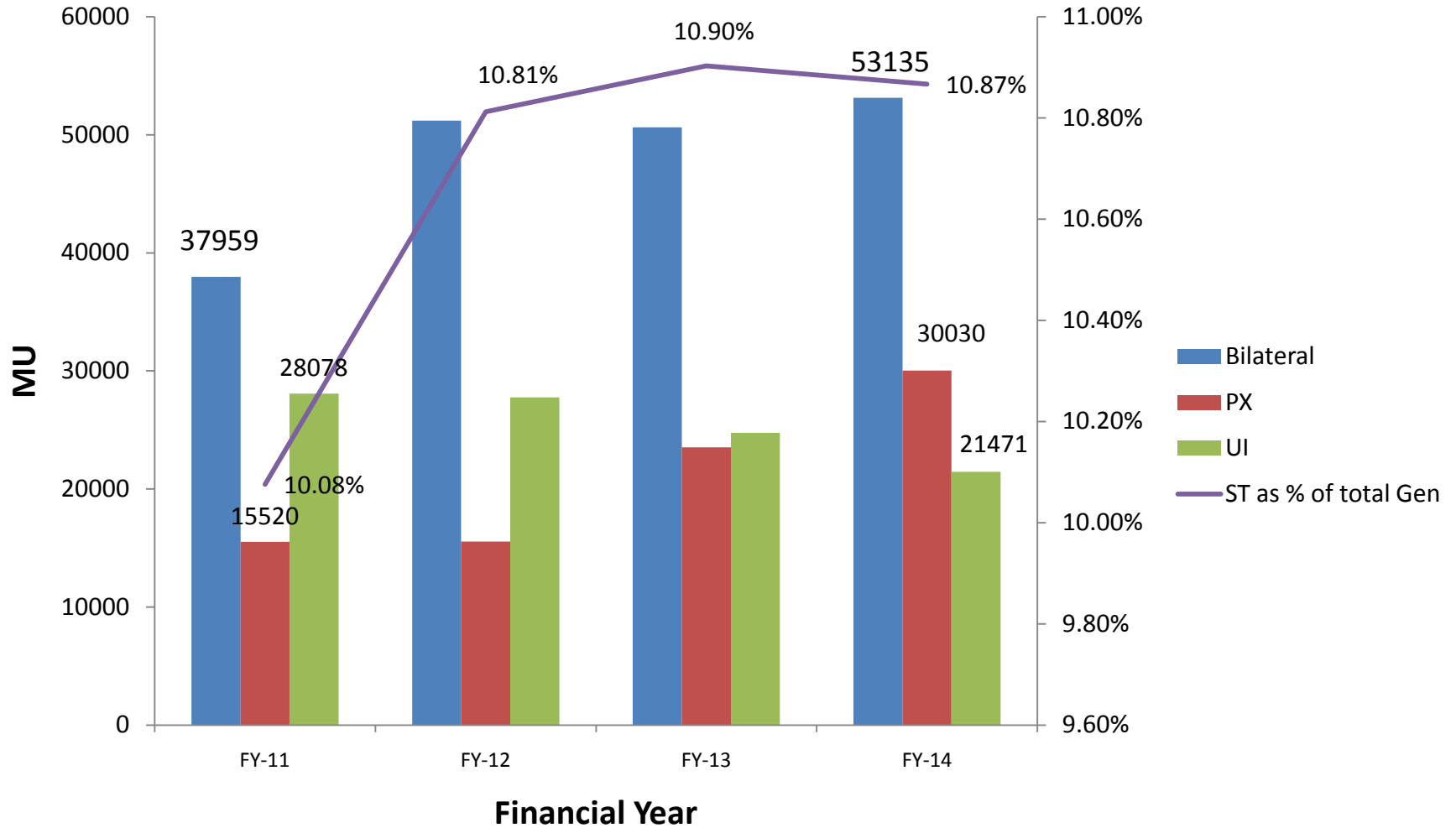
Real Time

# Indian Power Market - Design



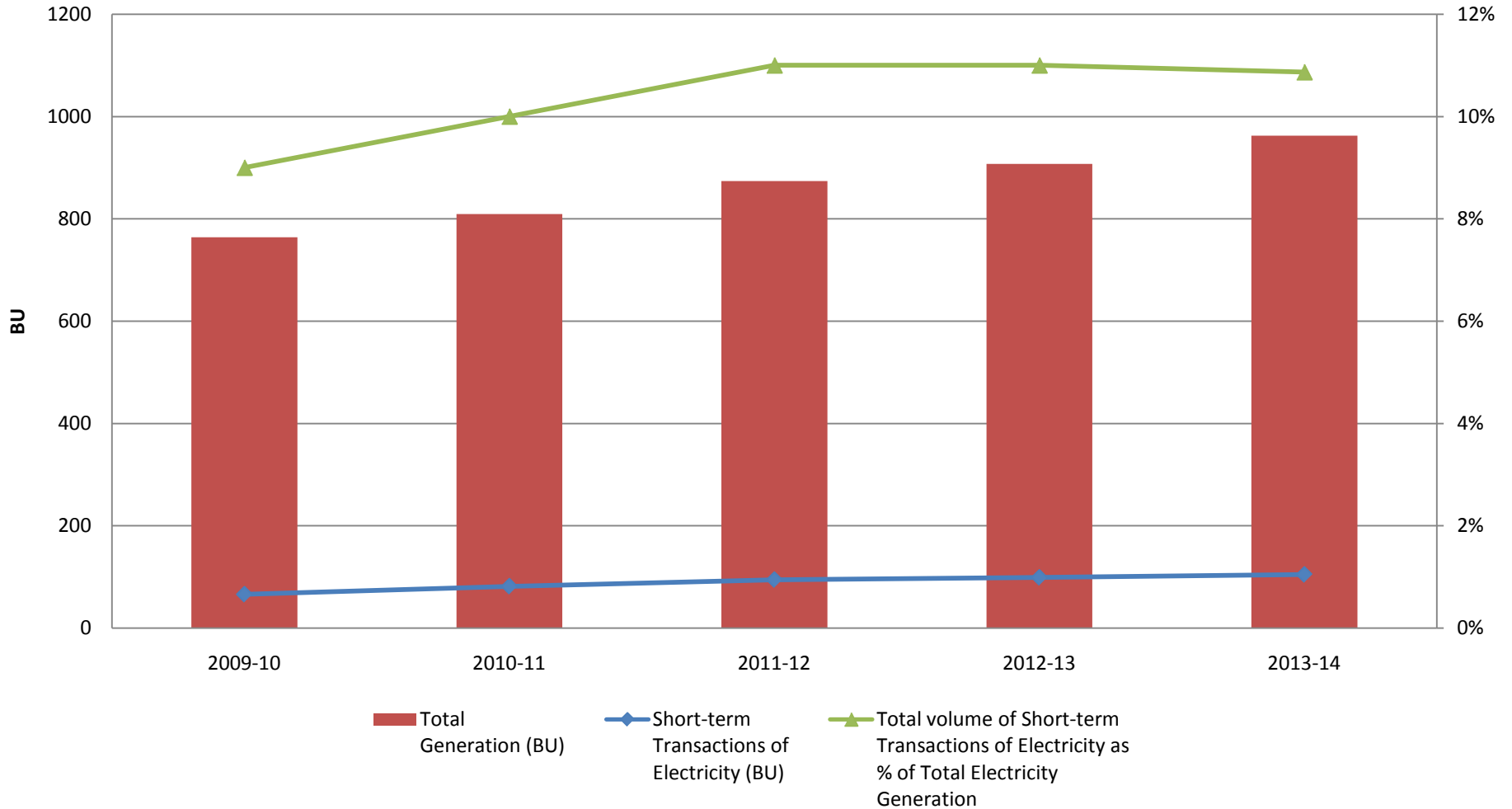
Nature of Contract	Duration of Contract	Transmission Open access availability
Long Term	> 7 years and up to 25 years	Long term open access is available for a period of 12 years to 25 years
Medium Term	> 1 years and up to 7 years	Medium term open access is available for a period of 3 months to 3 years
Short Term		
Short Term – Bilateral	Up to 1 year	For a period of up to 3 months
Short Term – Power Exchange	Day Ahead Market (1 day)	1 day (corridor left after short term bilateral)
	Term Ahead Market ( up to 10 days)	Up to 10 days in advance
Deviation Settlement Mechanism	Real time balancing mechanism for settling deviation from schedule	

# Short Term Power Market (1/4)



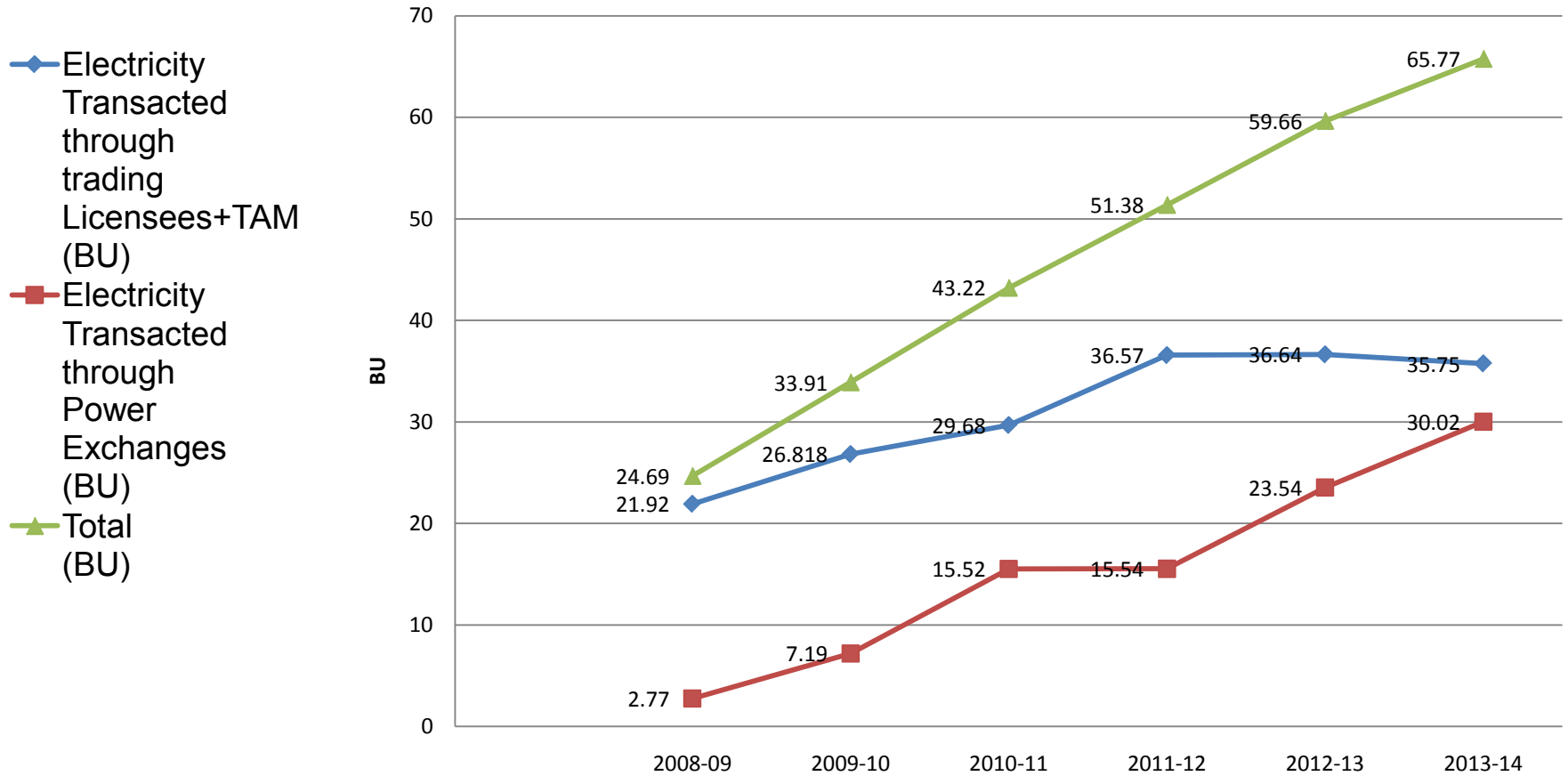
# Short Term Power Market (2/4)

## Short -term Transactions of Electricity



# Short Term Power Market (3/4)

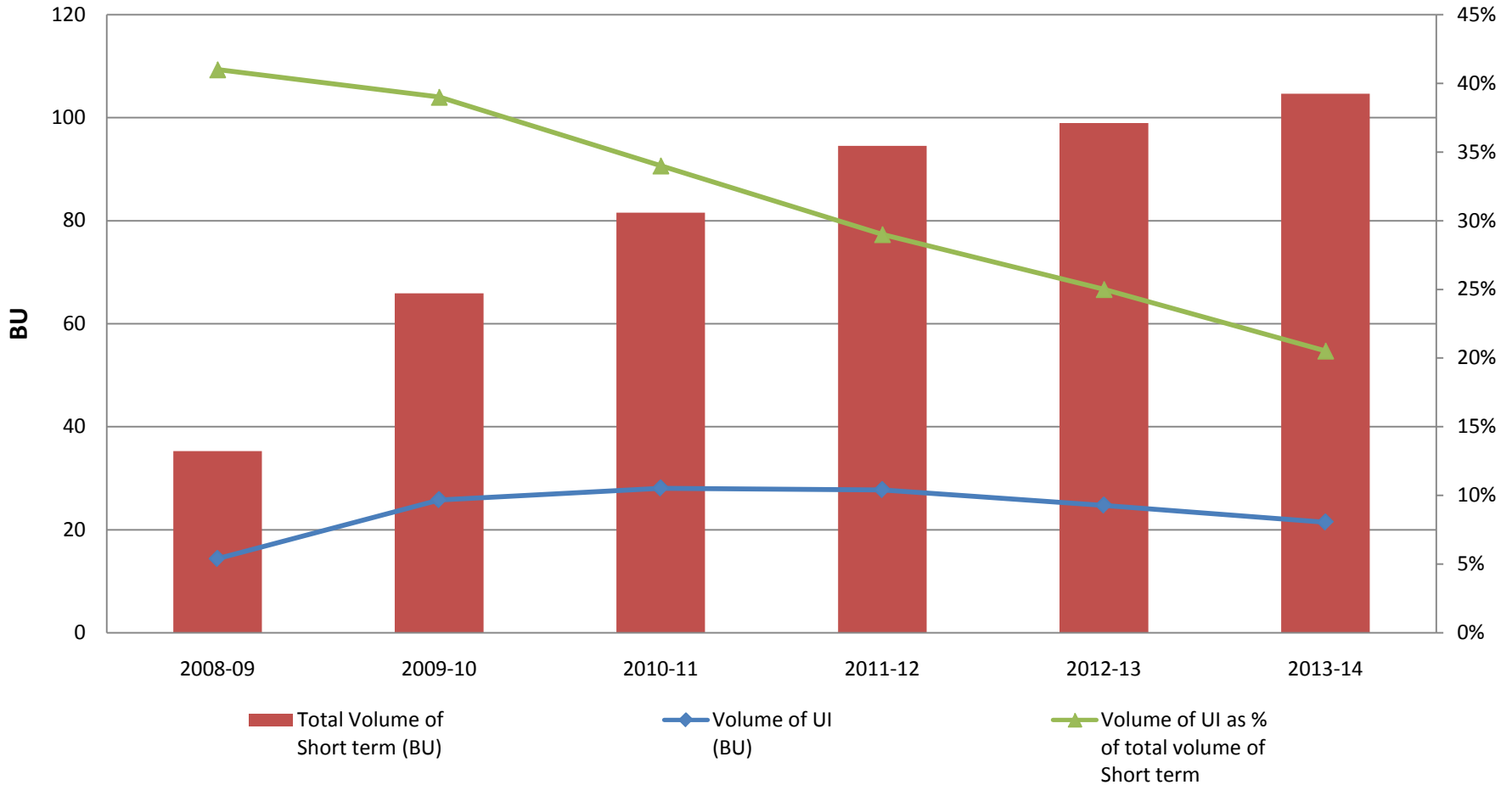
## Volume of Electricity Transacted through Trading Licensees and Power Exchanges



# Short Term Power Market (4/4)



## Volume of Electricity transacted through UI



## Provision for Open Access in Electricity Act 2003

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➤ **Section 2(47) of the Act** defines Open Access to mean “*non-discriminatory provision for the use of transmission lines or distribution system or associated facilities with such lines or system by any licensee or consumer or a person engaged in generation in accordance with the regulations specified by the Appropriate Commission*”

➤ Section 42 of the Act is central to open access and reads as follows:

"(2)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.....”



# Why Open Access?



Provision of non discriminatory open access



Opening up of the electricity market



Increase in the choices for all the stakeholders



A vibrant, dynamic and competitive market



Supply of power to all



Optimal use of resources

## 1. Generating Companies

- No license required for developing a Gen station;
- could sell power to any person through OA;
- Easy change in purchaser in the event of default in honoring contract by purchaser.

## 2. Consumers

- Buy power from anywhere – could explore cheaper sources; specially useful for high demand IND / COM consumers.
- Industrial houses could consolidate power supply to plants at various locations & build captive power plant to achieve economy

# Regulations for Development of Power Trading Market



- Availability based tariff (ABT) introduced in 1998.
- ***ABT is a commercial mechanism in which fixed and variable cost components are treated separately. And variable cost is paid as per the schedule and the Difference between schedule and actual is paid as per system condition(Frequency) known as unscheduled interchange (UI). Power is scheduled by SLDC's on merit order based on the variable cost.***
- All earlier Acts and Rules enacted were repealed by enactment of Electricity act 2003
- CERC (Procedure, Terms & Conditions for grant of Trading Licence and other related matters) Regulations, 2004. **TPTCL is the first trader to get trading license in 2004.**
- CERC (Sharing of Inter State Transmission Charges and Losses) Regulations, 2010.
- CERC (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-State Transmission and related matters) Regulations,2009.
- CERC (Deviation Settlement Mechanism and related matters) Regulations, 2014.
- CERC Open-Access regulation,2008-included collective transaction for mechanism of operation of PX keep the identity of buyer/ seller unknown to bidders
- CERC (IEGC) regulations 2010 (IEGC Grid code)

## Nature of Contract

Long Term

Medium Term

Short Term

Power Exchange

## Tariff Structure

Two Part Tariff

Either Two part or Single Tariff

Single Tariff

Single Tariff

## Nodal Agency

POWERGRID for Inter state & STUs for Intra State

Buyer RLDC for Inter State & SLDCs for Intra State

NLDC for "Day Ahead Market" & RLDCs for "Term Ahead Market"

## LONG-TERM AND MEDIUM-TERM OPEN ACCESS

- For long-term access, CTU shall consider augmentation of ISTS proposed under the plans made by the CEA
- Medium-term open access shall be granted if the resultant power flow can be accommodated in the existing transmission system or the transmission system under execution. No augmentation shall be carried out for the sole purpose of granting medium-term open access.
- LTOA or MTOA shall be processed on first-come-first-served basis separately.
- LTOA shall have identified Buyers/Regions.
- Nodal agency takes three years for granting of LTOA. System augmentation shall start after signing of PPA. PPA should be signed for at least a capacity equivalent to 50% of the quantum of power for which LTA has been sought.
- Start date of the MTOA shall not be earlier than 5 months and not later than 1 year from the last day of the month in which application has been made.

# Scheduling of Open Access under STOA

- ADVANCE SCHEDULING:
  - ❖ Three months in advance (Month wise Transactions)
- Time Line for submission
  - ❖ **Last date for submission ( -10 / -5 / 0 days prior to end of current month MO – for transaction in M1, M2, M3)**
  - ❖ Cut-off time of application: 17:30 Hrs. of last day (Day 0)
  - ❖ **Request for concurrence (RLDC) – by 12:00 Hrs. next day (Day 1)**
  - ❖ Concurrence - by 20:00 Hrs (Day 1)
  - ❖ **Congestion Information to Applicant by nodal RLDCs – Next day 12:00 Hrs (Day 2)-Format-IV(Congestion information-Advance scheduling)**
  - ❖ Revised Request – next day 11:00 HRs. (Day3)-Format-V-Request for revision due to congestion)
  - ❖ **E-bidding – in case of Congestion (Day 4)**
  - ❖ Acceptance/Refusal of Scheduling Request – (Day 5)-Format-VI-Acceptance for scheduling by nodal RLDCs.

- FIRST-COME-FIRST-SERVED (FCFS)
  - ❖ **FCFS shall be considered only when transactions are commencing & terminating in the same calendar month**
  - ❖ Processing time – 3 clear days on submission of Application
  - ❖ Application received up to 1730 hrs in a day to be processed together – same priority
  - ❖ Application Received after 17:30 Hrs. - to be considered as received next day
  - ❖ Congestion Management – pro-rata

## ➤ **Day Ahead Bilateral Transaction**

- ❖ Applications received within 3 days prior to the day of Scheduling and up to 15:00 Hrs. of the day immediately preceding the day of scheduling shall be treated as same priority
- ❖ Processing only after processing of the Collective Transactions of the Power Exchange (s)
- ❖ Congestion Management – Pro-rata

## ➤ **Contingency / SameDay Transactions**

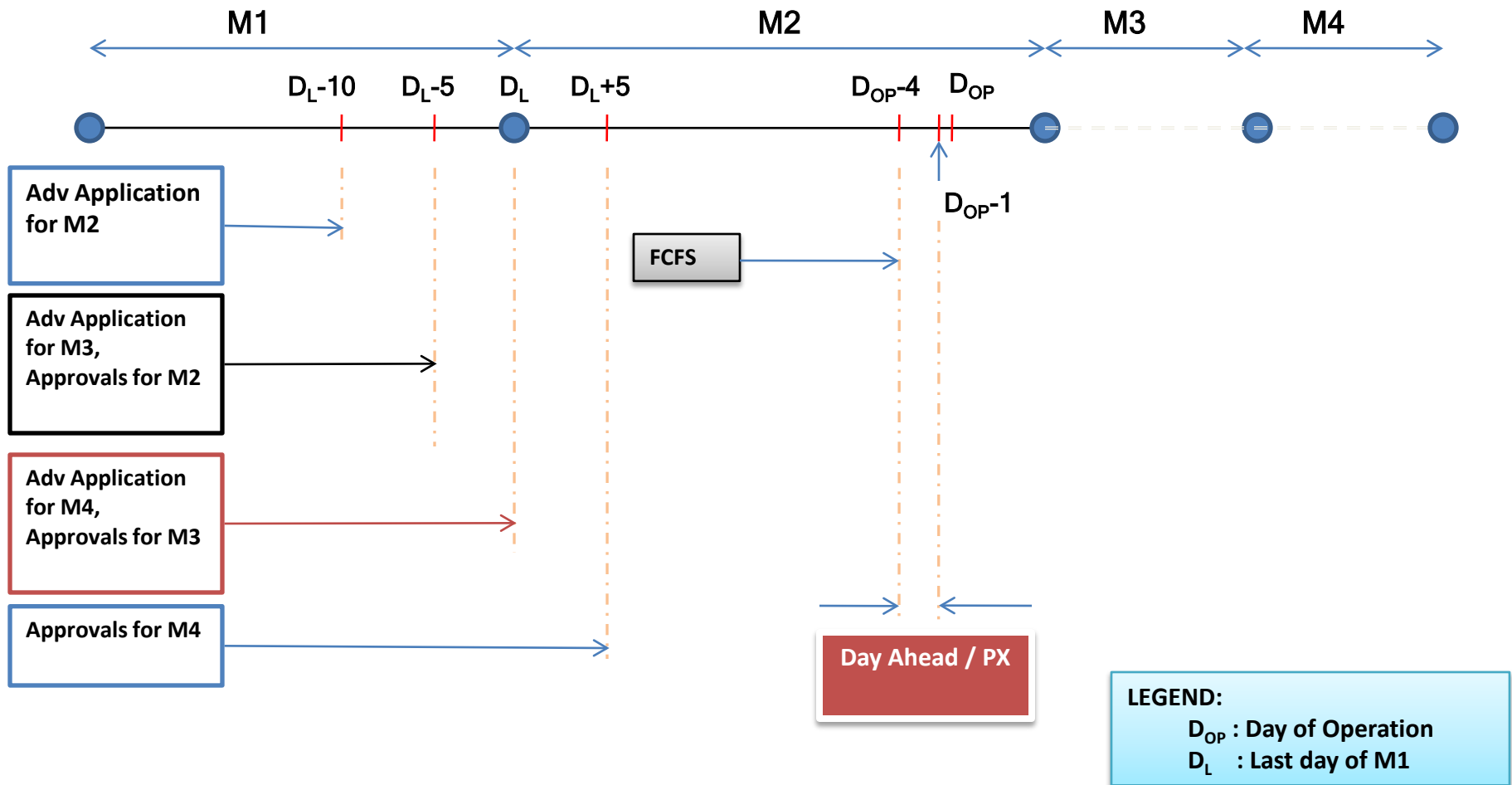
- ❖ Buying Utility/Trader on its behalf to make an Application to the Nodal RLDC To be considered after 1500 hrs of the day immediately preceding the day of scheduling
- ❖ In case of intra-day/same day – scheduling from 6<sup>th</sup> time block
- ❖ Congestion Management – Pro-rata



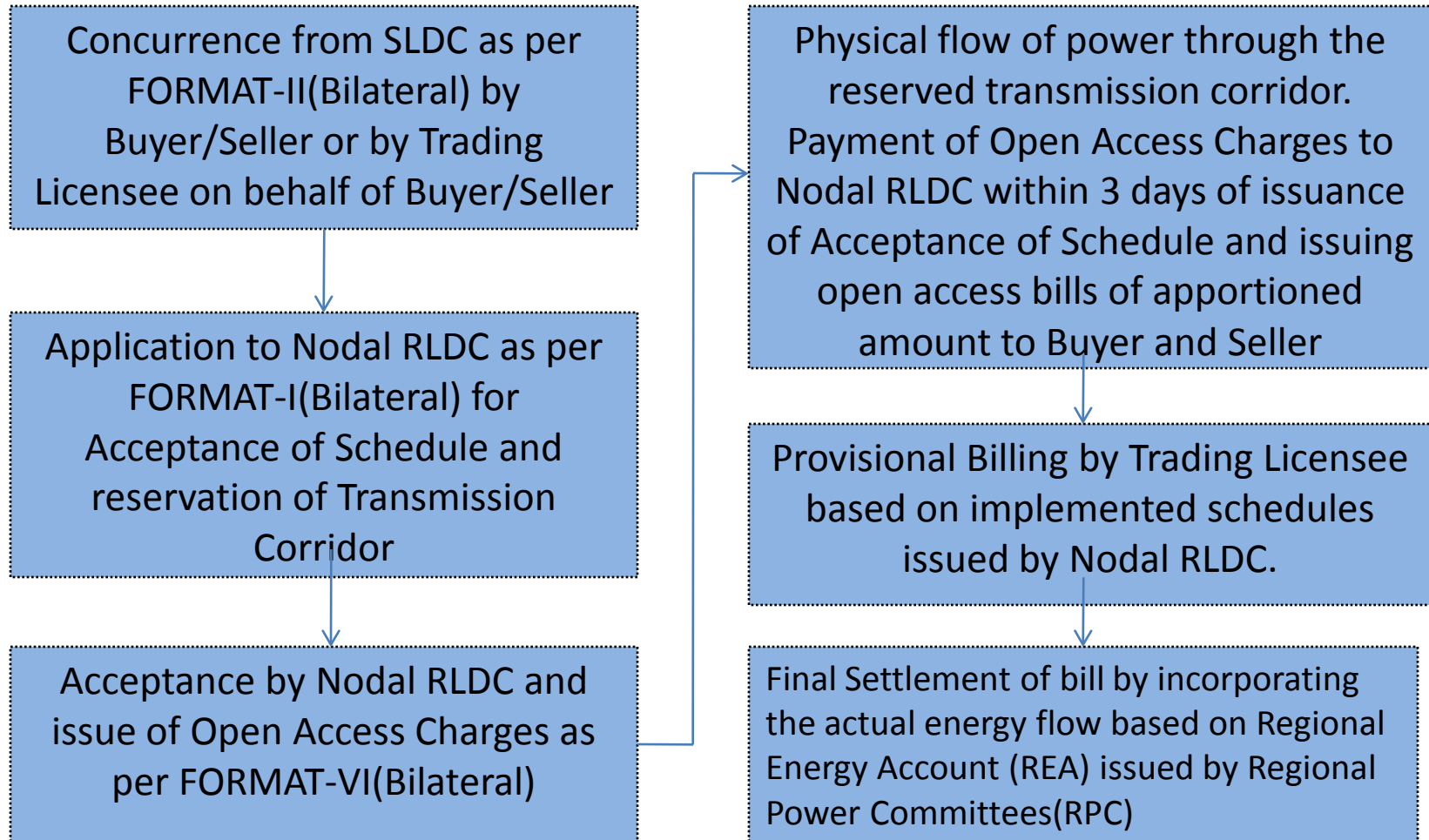
# E-Bidding Procedure

- Invitation of Bids from the concerned applicant
  - ❖ period of congestion
  - ❖ RTS/IR corridor – expected to get over stressed
  
- Only Registered Users
  - ❖ User ID & Password
  - ❖ Electronic submission – website of CTU
  - ❖ Bid Closing time as specified
  - ❖ Single Price Bid
  - ❖ No Modification/withdrawal once submitted
  
- Bid Price - in addition to Open Access Transmission Charges
- Multiples of Rs. 10/ MWh . ( Min. Rs. 10/MWh)
- Mandatory - Non-participation – Rejection of Application
- Acceptance - Decreasing order of Price Quoted
- Equal Price Bids – Pro-rata
- Applicants getting less quantum than applied shall pay the charges quoted by him.
- Applicant getting equal quantum of what sought by him shall pay the charges quoted by the last Applicant getting approval of its full scheduling request.

# Time Line For Open Access



# Schedule of Operations



# Open Access Status across India



## Northern Region

States	Buy	Sell
Haryana	Yes	Yes
Punjab	Yes	Yes
Rajasthan	Yes	Yes
HP	Yes	Yes
J&K	No	Yes
Uttaranchal	Yes	Yes
Delhi & U.P.	No	No

## Southern Region

States	Buy	Sell
Andhra Pradesh	Yes	Yes
Karnataka	Yes	Yes
Tamil Nadu	Yes	No
Kerala	Yes	Yes
Telangana	Yes	Yes

## East & North Eastern Region

States	Buy	Sell
Assam	Yes	No
Bihar	No	No
Manipur & Mizoram	No	No
Tripura & Sikkim	No	No
Jharkhand	No	No
Arunachal Pradesh	Yes	No
Meghalaya	Yes	Yes
Orissa	Yes	Yes
West Bengal	No	Yes

## Western Region

States	Buy	Sell
Madhya Pradesh	Yes	Yes
Gujarat	Yes	Yes
Chhattisgarh	Yes	Yes
Maharashtra	Yes	Yes

## Pre-requisites of Open Access

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- Special Energy meters are required to be installed for energy accounting.
- Available Transmission Corridor.
- Contract demand should be more than 1 MW.
- Payment security for availing Open Access.

# Landed cost Sample



Quantum at Regional Periphery	MW	5
Duration	Days	30
Time	Hrs	24
<b>Energy at Regional Periphery</b>		<b>3600000</b>
<b>Energy Rate Regional Periphery</b>		<b>3.00</b>
<b>Energy Amount Payable by Buyer in Rajasthan</b>		<b>10800000</b>
Rajasthan POC Loss	1.68%	3539520
Rajasthan Transmission Loss (RVPNL)	4.20%	3390860
Wheeling Losses	3.80%	3262007
<b>Energy at Buyers Periphery in Rajasthan</b>		<b>3262007</b>
Rajasthan POC Charges	0.1619	582840
Rajasthan State Transmission Charges	0.3573	1286280
Rajasthan Wheeling Charges	0.12	432000
Rajasthan SLDC Operating Charges	2000	60000
NR Operating Charges	2000	60000
Rajasthan SLDC Processing Fee	Rs.	5000
Total Amount Payable by Buyer		13226120
<b>Rate at Buyer's Periphery in Rajasthan</b>		<b>4.05</b>
Cross Subsidy (Rs.Kwh)		0.13
REC Cost (Rs.Kwh)		0.23
<b>Total Cost at Buyer's Periphery in Rajasthan</b>		<b>4.41</b>

# Open Access –Issues concerning DISCOMS

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- Forecasting Demand and Supply
  - ❖ Open Access means loss of load
  - ❖ DISCOMS continue paying capacity charges thus increasing financial burden
  
- Load Management
  - ❖ Most industries only meet their base load through open access
  - ❖ Rest of the times DISCOMs have to supply when load is variable
  - ❖ This makes load management a tricky issue
  
- Determination of Open Access Charges
  - ❖ If the Commission cannot determine the tariff of consumers having power requirement of 1MW and above then determination of open access surcharge is impossible.

# Open Access –Issues concerning Consumers

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- Availability of Grid
  - ❖ Most of the industries not on independent feeders
  - ❖ In case of load shedding in there area they will also not get power
  
- Availability of power
  - ❖ Generators want to sell power in bulk (50-100 MW in single contract)
  - ❖ Industries typically have a demand of approx 5MW
  - ❖ Hence getting power on open access difficult
  - ❖ Traders may act as aggregators
  
- DISCOMS charging very high stand-by charges
  
- Cross subsidy surcharge



## Open Access –Other Issues

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- Metering: For effective implementation of open access Availability Based Tariff (ABT) meters needs to be installed which is a very comprehensive task.
  
- Energy Accounting: SLDCs are neither technically equipped nor have trained man power to carry out its various functions
  
- Inadequate transmission capacity
  - ❖ Little margin in transmission network for short term transactions
  - ❖ State transmission infrastructure needs to be strengthened

## Open Access Issues – State Level

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- Maharashtra
  - Very High Cross Subsidy Surcharge and Transmission Charges
  - Contract Demand Reduced
    - Any increase in demand leads to temporary tariff
  - Open Access through Power Exchange not allowed;
    - Only Week Ahead transactions allowed (RTC and constant quantum)
  - Stringent OA Procedure (Intra State)

## Open Access Issues – State Level

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### ➤ Haryana

- Very High Cross Subsidy Surcharge and Transmission Charges
- Short term/Power Exchange Open Access on instruction of High Court
- One day Advance intimation to SLDC regarding the quantum to be procured
  - Any over drawal leads to 1.5 times excess tariff

### ➤ Tamil Nadu

- OA provided during Load Shedding
- Imposition of Section 11
- No OA Permission for sale of power

## Cross-subsidy surcharge for open access

- National Electricity Policy lays down that the amount of cross-subsidy surcharge and the additional surcharge to be levied from consumers who are permitted open access should not be so onerous that it eliminates competition which is intended to be fostered in generation and supply of power directly to the consumers through open access.

- Surcharge formula:

$$S = T - [ C (1+ L / 100) + D ]$$

Where

S is the surcharge

T is the Tariff payable by the relevant category of consumers;

C is the Weighted average cost of power purchase of top 5% at the margin excluding liquid fuel based generation and renewable power

D is the Wheeling charge

L is the system Losses for the applicable voltage level, expressed as a percentage

## Cont.....

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- ❖ One group of consumers pays price for another group.
- ❖ Another way of financing a subsidy - Instead of State Government the consumer groups finance the subsidy
- ❖ Have no impact on the revenue requirement of the Licensee and thus on its average tariff level.
- ❖ These are justified on social and political grounds.

# Legal & Regulatory framework

## EA 2003

- Tariff should progressively reflect the Cost of Supply by reducing the cross subsidy. [Sec. 61(g)]

## National Electricity Policy

- Reduction in cross subsidy levels progressively & gradually without giving tariff shocks to the subsidized category of consumers. [ Clause 5.5.4 ]

## National Tariff Policy

- Tariffs to be within  $\pm 20\%$  of the average cost of supply by 2010-11. [ Clause 8.3.2 ]

# Reducing Cross Subsidy



## Subsidy Reforms

- Direct Subsidy to BPL (UID)
- Phased Removal of Inter consumer category cross subsidies
- Electricity Duty
- Interest on state government loans

## Unbundling Of Tariffs

- No cross subsidization of the retail business by the wires business
- Uniformity of approach for expense allocation in wires and retail supply business

## Cost Reflective Tariff

- Each State has formulated different methods of calculating the CSS (Cross Subsidy Surcharge)
- The tariffs to be made cost reflective and CSS needs to be eliminated.

Sr. No.	Indicative Cross Subsidy Charges in States	Rs. /kWh
1.	Haryana	2.02
2	Punjab	1.07
3	Tamil Nadu	3.57
4	Gujarat	0.81
5	West Bengal	2.16
6	Orissa (CESU)	1.97

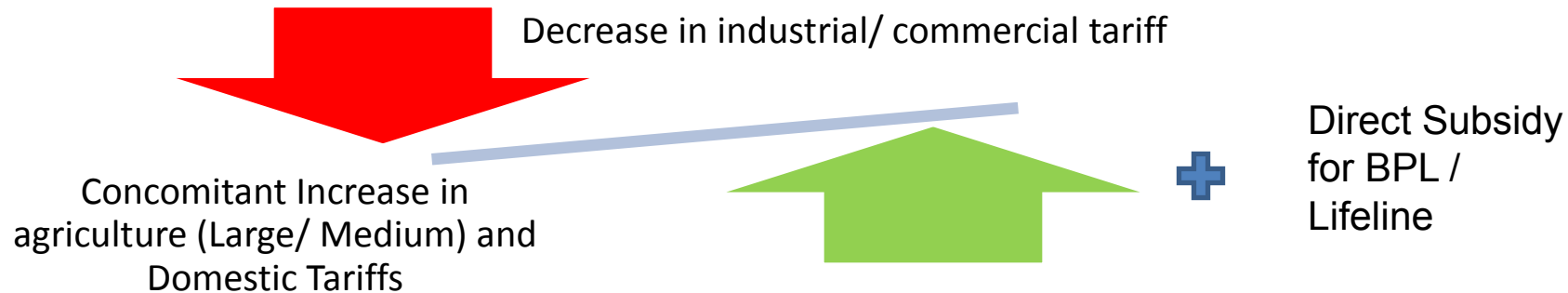


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We value your inputs, suggestions and  
critique.”**

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# Impact of reduction in Cross Subsidy

Agricultural Consumers	Industrial/ Commercial Consumers	Domestic Consumers
<ul style="list-style-type: none"> <li>• Sensitivity to Cultivation Cost</li> <li>• MSP</li> <li>• May not be inflationary for the states like MH, KA, AP</li> </ul>	<ul style="list-style-type: none"> <li>• Expected to be positive</li> <li>• Reduction of input costs &amp; Prices</li> <li>• Higher Profitability &amp; Job Creation</li> </ul>	<ul style="list-style-type: none"> <li>• Expected to suffer due to direct impact</li> <li>• Poorer groups to be affected worse</li> <li>• Direct Subsidy</li> </ul>



- Not possible to eradicate CS fully in one go, though time to relook at it is **NOW**
- High tariff is making the industries **UNCOMPETITIVE** in Global Scenario
- Rationalization of Tariffs will bring **GROWTH, JOBS AND HIGHER TAX COLLECTION**