



Presentation on
Open Access, Electricity
Trading
and
Challenges in Organizing
Electricity Trading Through A
Power Exchange In The
Indian Power Sector

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CERC

Overview

- ◆ Electricity Act -2003 Features
- ◆ Overview of Indian Power Sector
- ◆ Open Access
- ◆ Existing Power Market Mechanisms
 - ◆ Regulated Tariff
 - ◆ Trading
 - ◆ Real Market (UI)
 - ◆ Competitive Bidding
- ◆ Mechanism in the making
 - ◆ Power Exchange (PX)
- ◆ Challenges in formation of PX



Electricity Act 2003 - Features

Electricity Act – 2003, Salient Features

- ◆ **Unbundling of SEBs.**
- ◆ **More powers to regulators**
- ◆ **Delicensing of Generation**
- ◆ **Non-discriminatory open access**
- ◆ **Promotion of competition and electricity trading including market development.**
- ◆ **Transparent policy regarding subsidy**
- ◆ **Tariff discovery through competitive bidding.**

Related Statutory Provisions of the Electricity Act - 2003

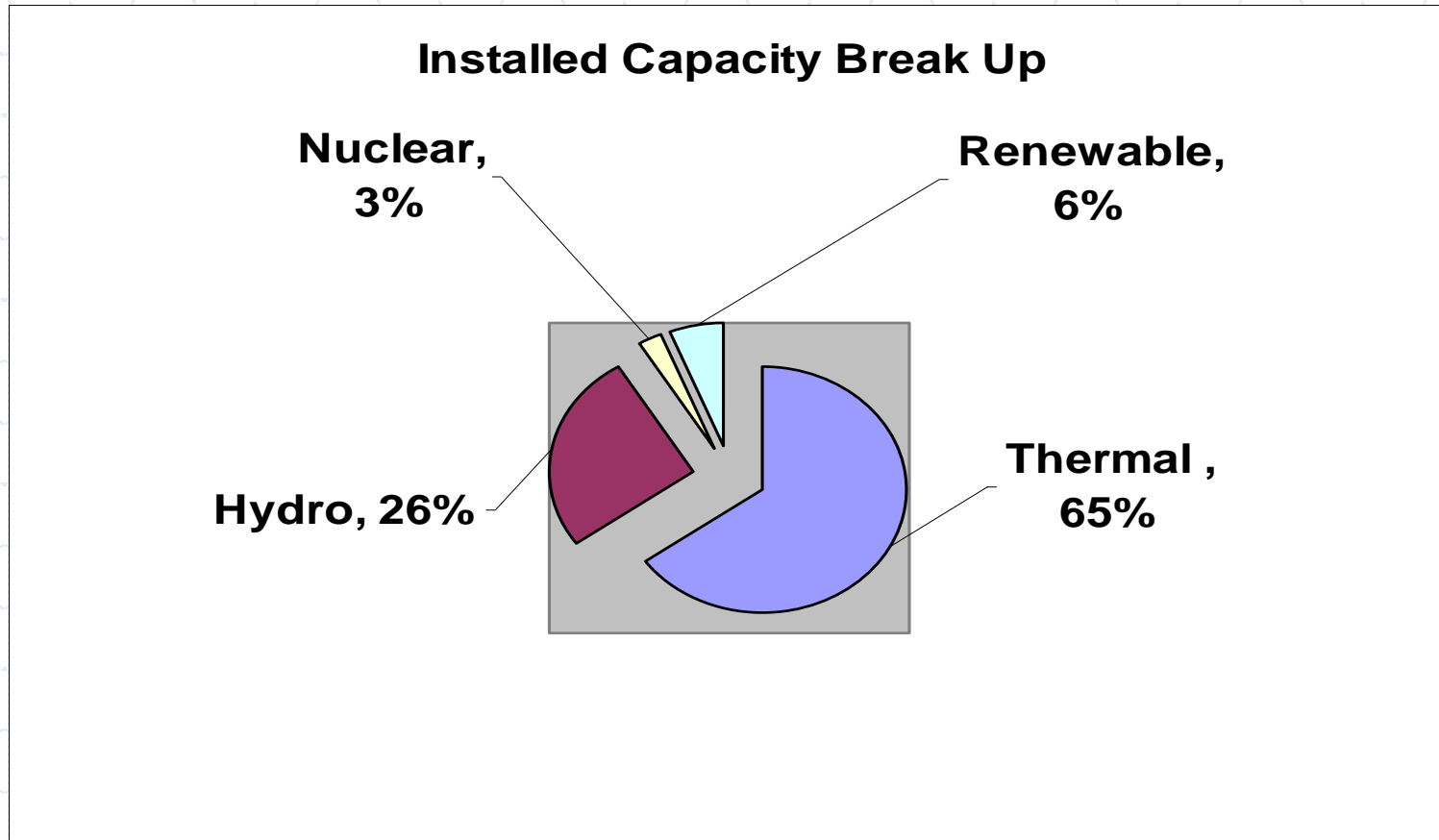
- ◆ **Section 60 : Preventing market domination-responsibility of the Regulators.**
- ◆ **Section 62 : Commission to determine the tariff for:**
 - **Supply of electricity by a generating company to a distribution licensee**
 - **Transmission of electricity**
 - **Wheeling of electricity**
 - **Retail sale of electricity**
 - **Provision of parallel distribution license in the same area**
- ◆ **Section 63 : Commission shall adopt the tariff determined through transparent process of bidding**
- ◆ **Section 66: Market Development is the responsibility of the Electricity Regulators.**



Overview of Indian Power Sector

Overview of Indian Power Sector

- Installed Capacity – 132 GW



Installed Capacity targeted – 200 GW by end of year 2011-12

Overview of Indian Power Sector

◆ Transmission Lines

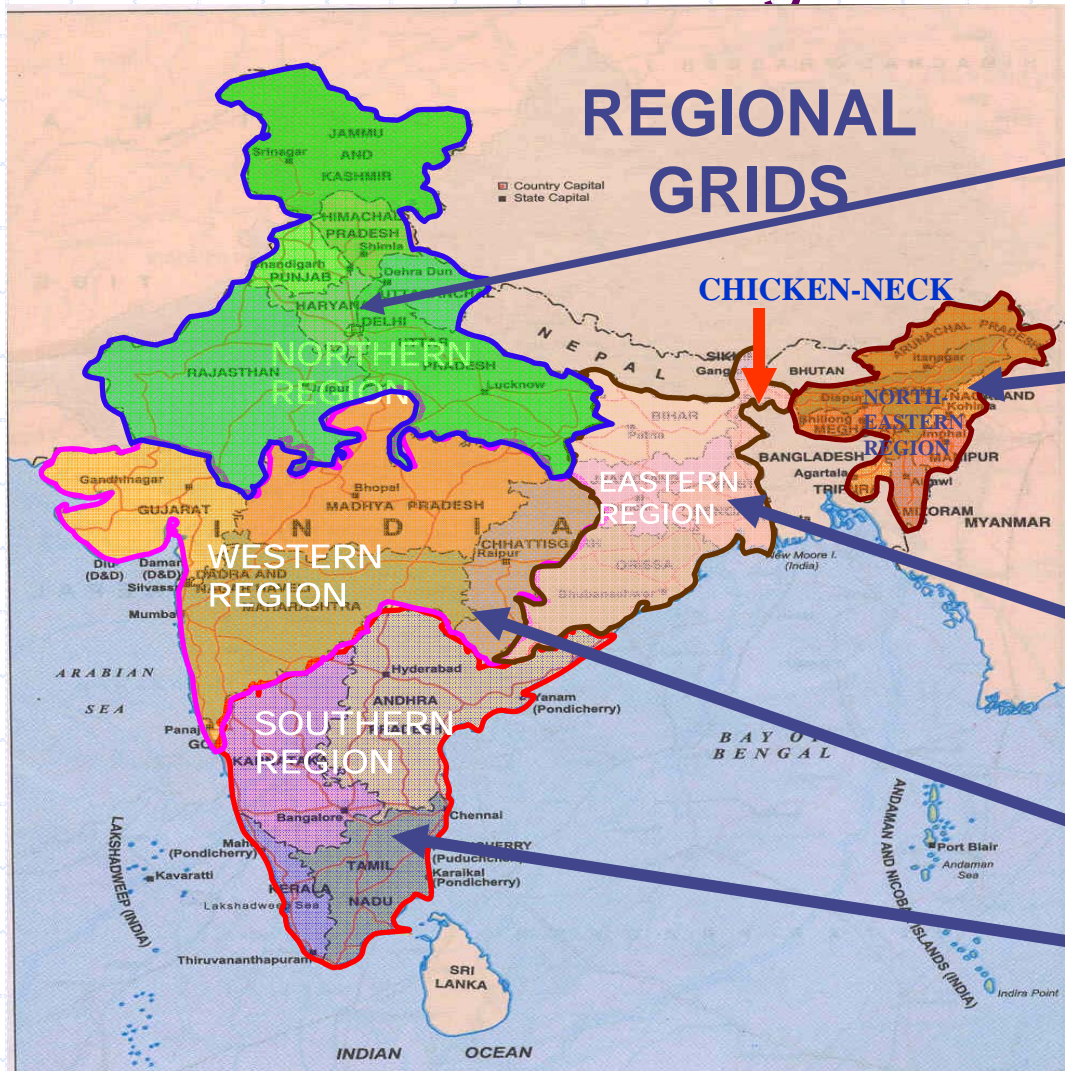
- 220kV/400kV/765kV/HVDC - 194563 Ckt-Kms

	Demand	Met	Surplus/Deficit
◆ Energy in MUs.	572812	519656	-9.3%
◆ Peak Demand in MW	100403	86425	-13.9%
◆ Per Capita Consumption	-	606 kWh/annum	

Building Blocks for Developing Electricity Market

- ◆ **Grid Code**
- ◆ **Experienced System operators**
- ◆ **Day ahead scheduling and dispatch procedures**
- ◆ **Reliable Energy Accounting systems**
- ◆ **Real time price and settlement mechanisms (UI Mechanisms)**
- ◆ **Electricity traders dealing in short term and long term contracts**
- ◆ **Open Access regulations**
- ◆ **Adequate transmission system**
- ◆ **Bilateral trading through physical forward contracts**
- ◆ **A transparent real time market**
- ◆ **The coming up of merchant power plants**
- ◆ **Possibility of a day ahead power exchange etc.**

Peculiarities of Regional Grids in India



Deficit Region
 Snow fed - run-of-the-river hydro
 Highly weather sensitive load
 Adverse weather conditions: Fog & Dust Storm

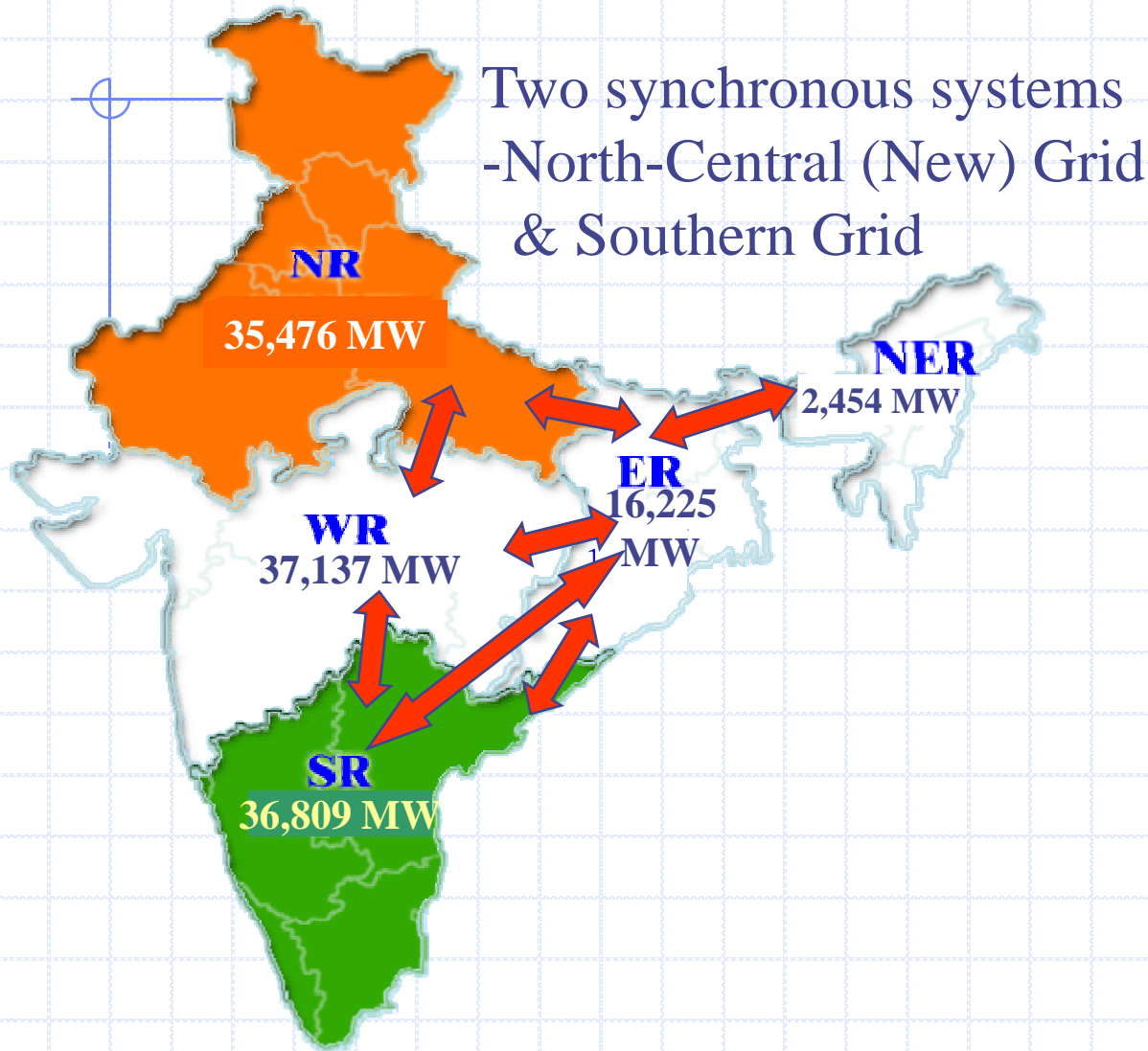
Very low load
 High hydro potential
 Evacuation problems

Low load
 High coal reserves
 Pit head base load plants

Industrial load

High load
 Monsoon dependent hydro

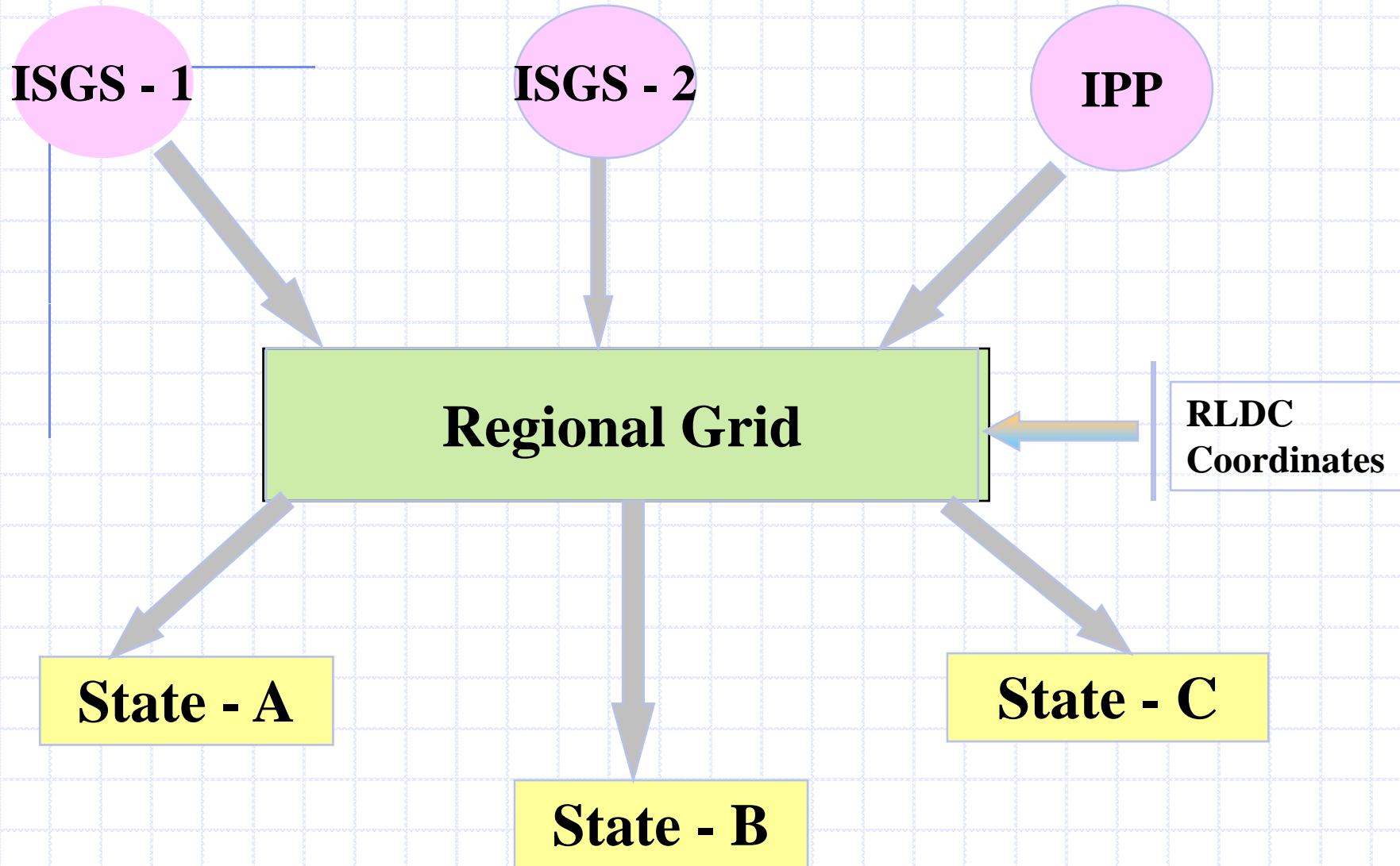
Indian Scenario: Regional Grids



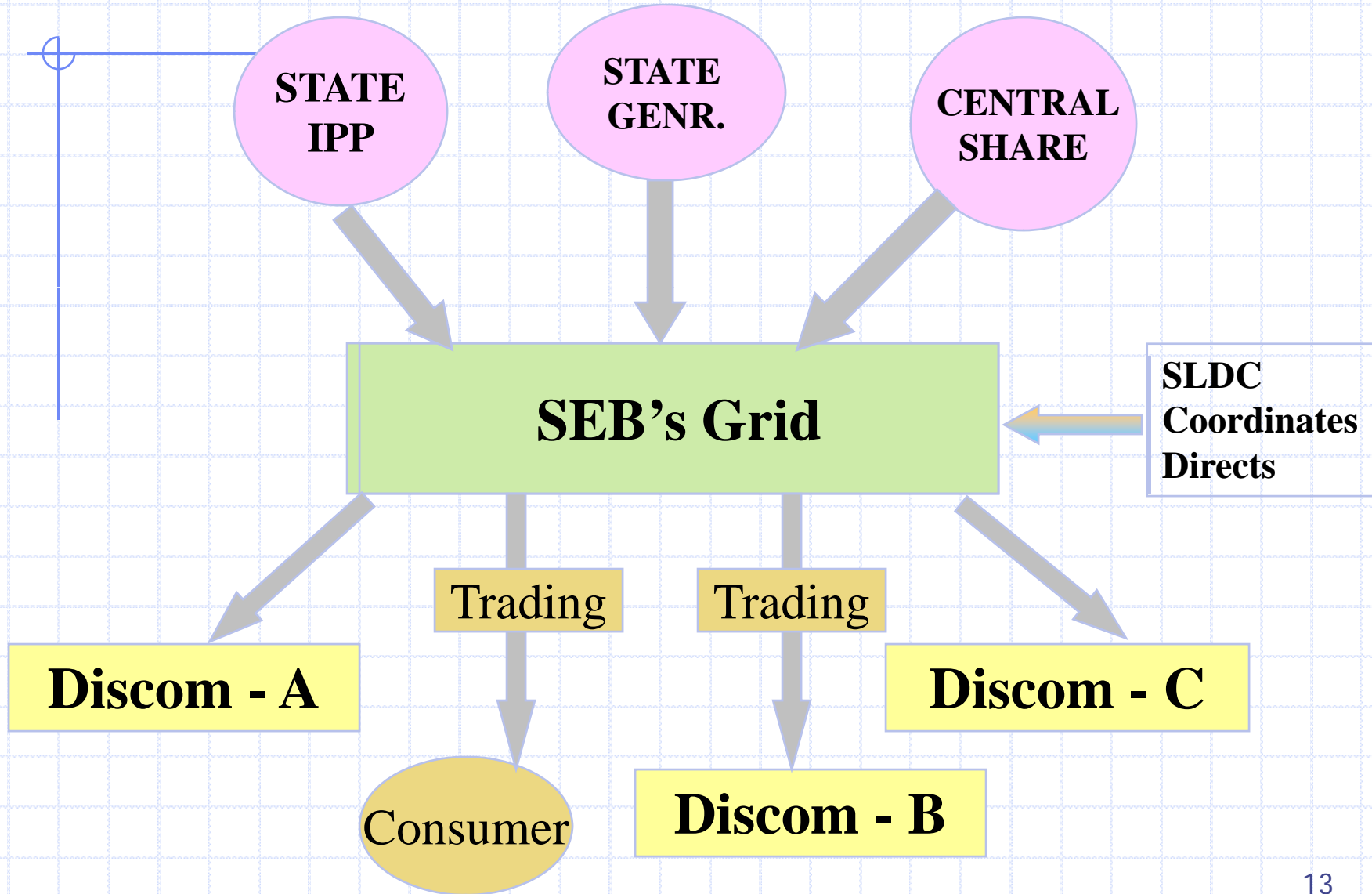
Inter regional Link	MW capacity
NER-ER	1,850
ER-NR	2,700
ER-SR	1,200
ER-WR	1,650
SR-WR	1,200
WR-NR	900
Talcher Kolar HVDC Bipole	2,000
Total as on date	11,500
Target for 2012	39,200

Figures as on 31-Jan-2007

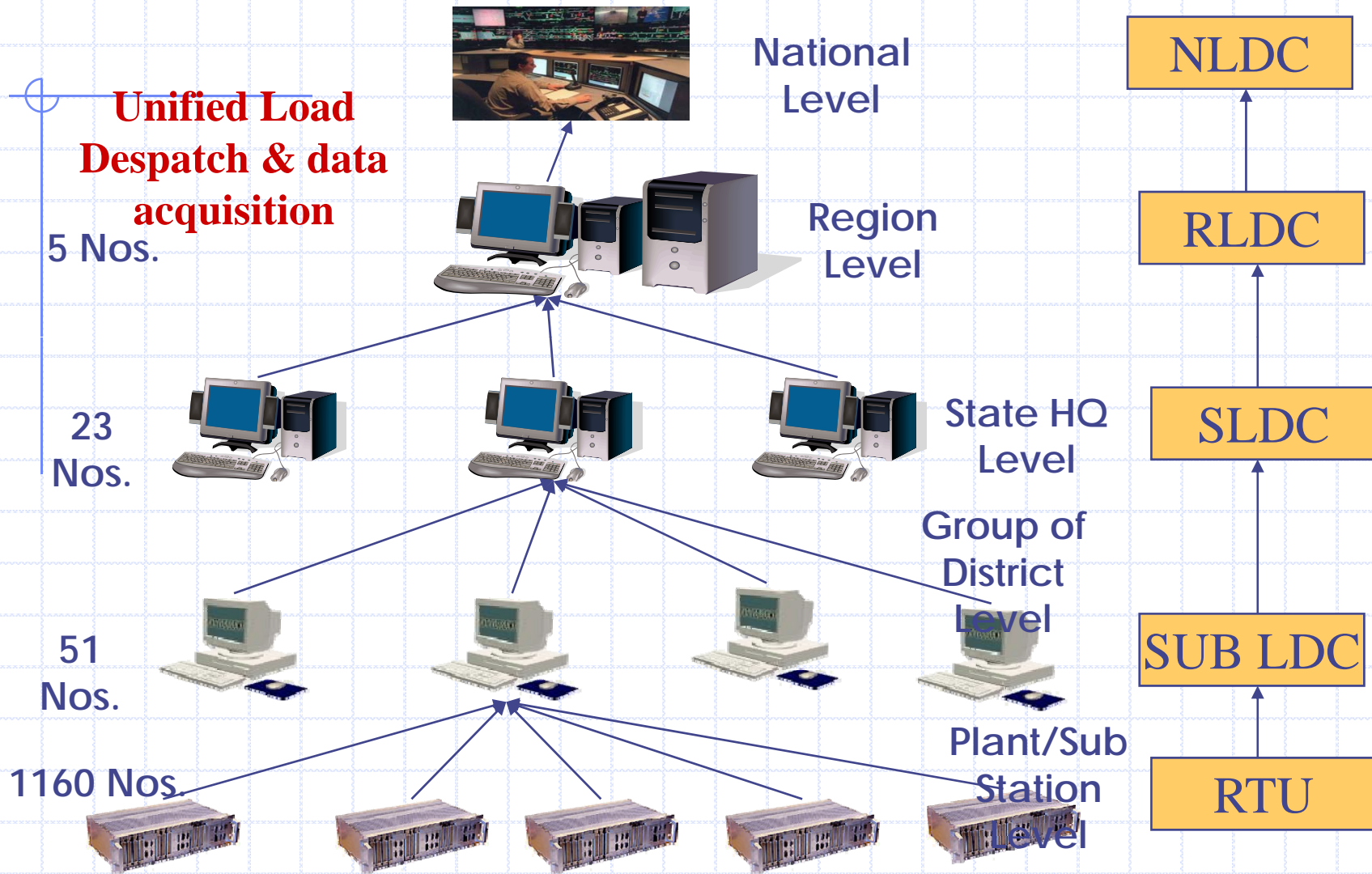
Interstate Grid



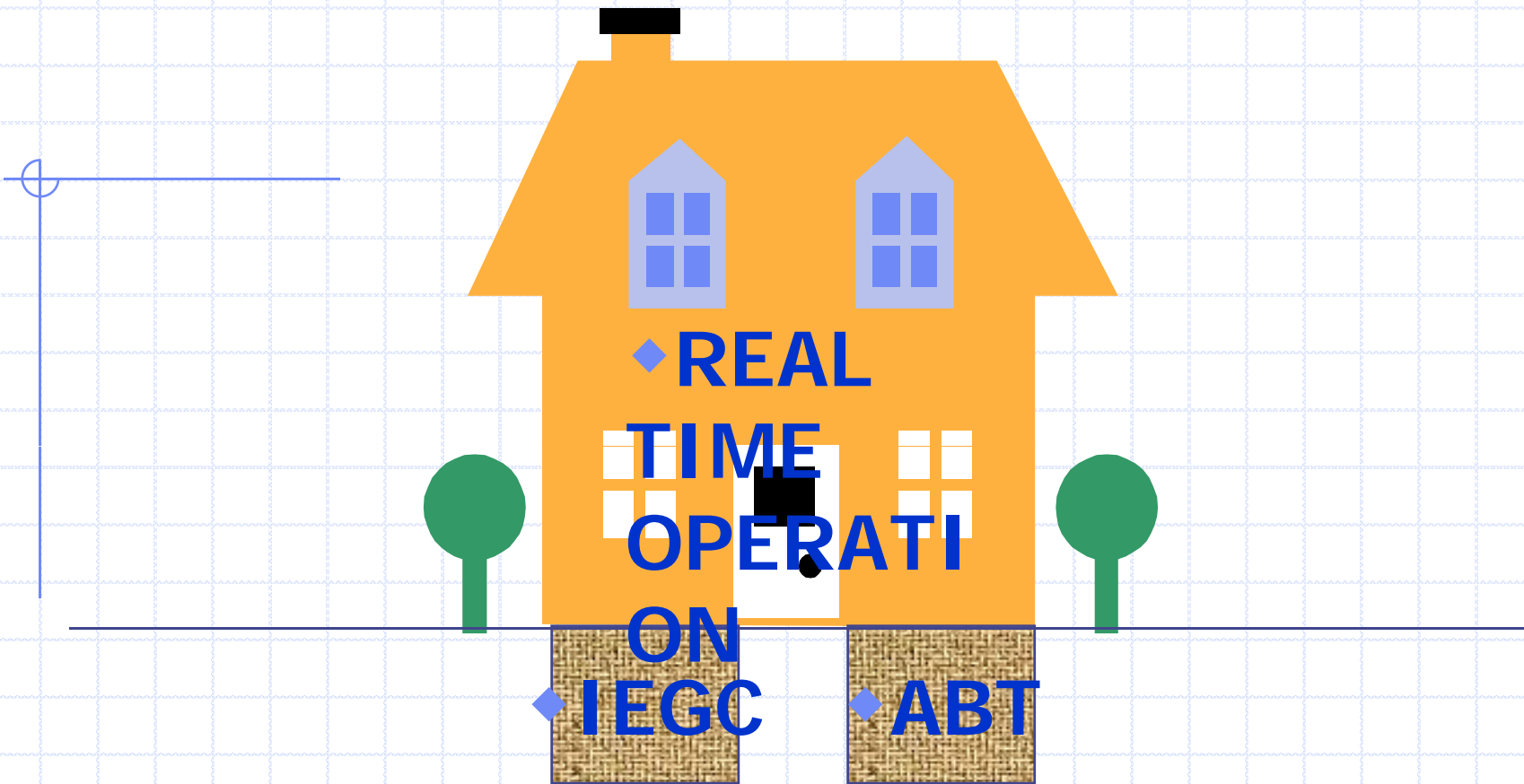
Intrastate Grid



Information Flow hierarchy

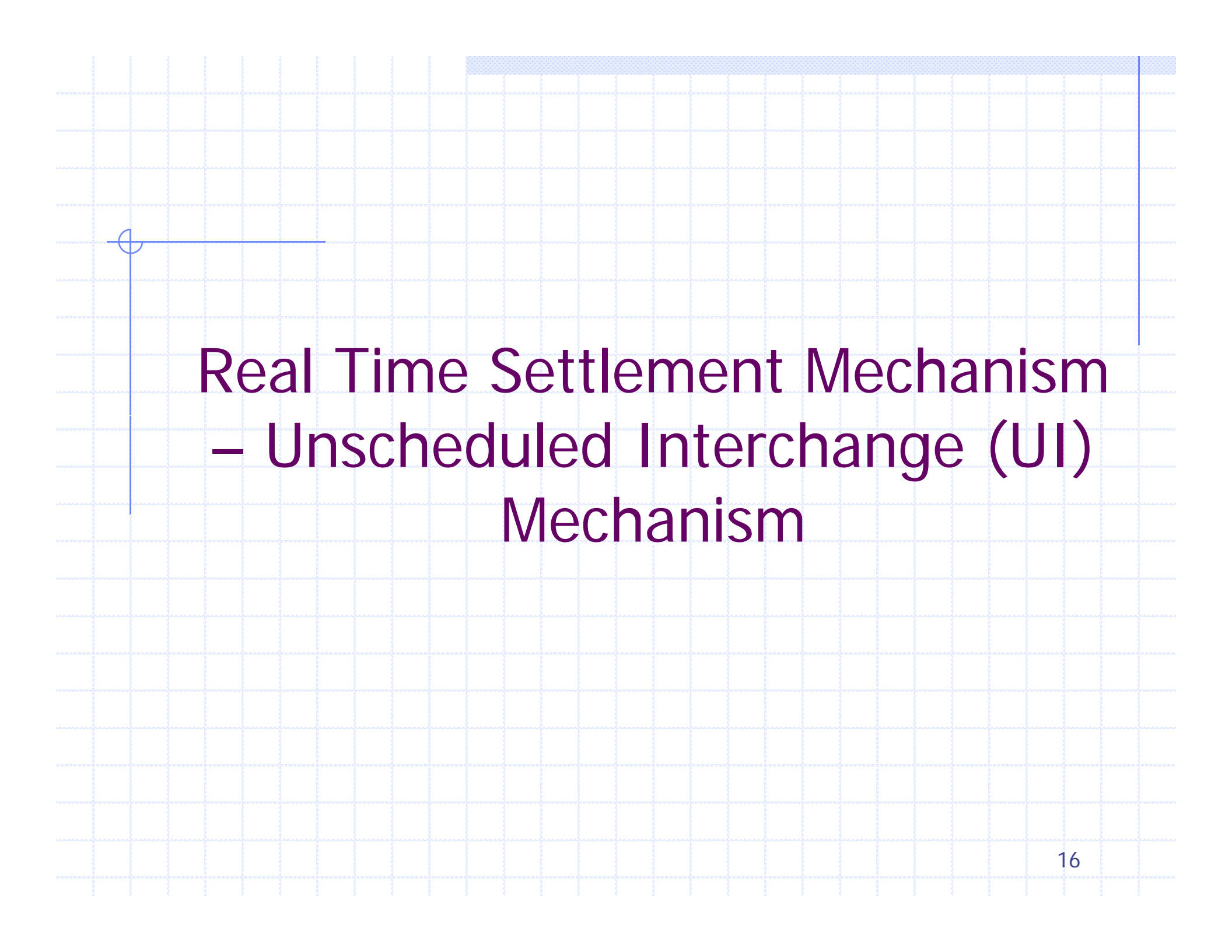


REAL TIME GRID OPERATION



◆ REAL TIME OPERATION STANDS ON TWO FIRM FOOTINGS

- IEGC – THE INDIAN ELECTRICITY GRID CODE
- ABT – AVAILABILITY BASED TARIFF

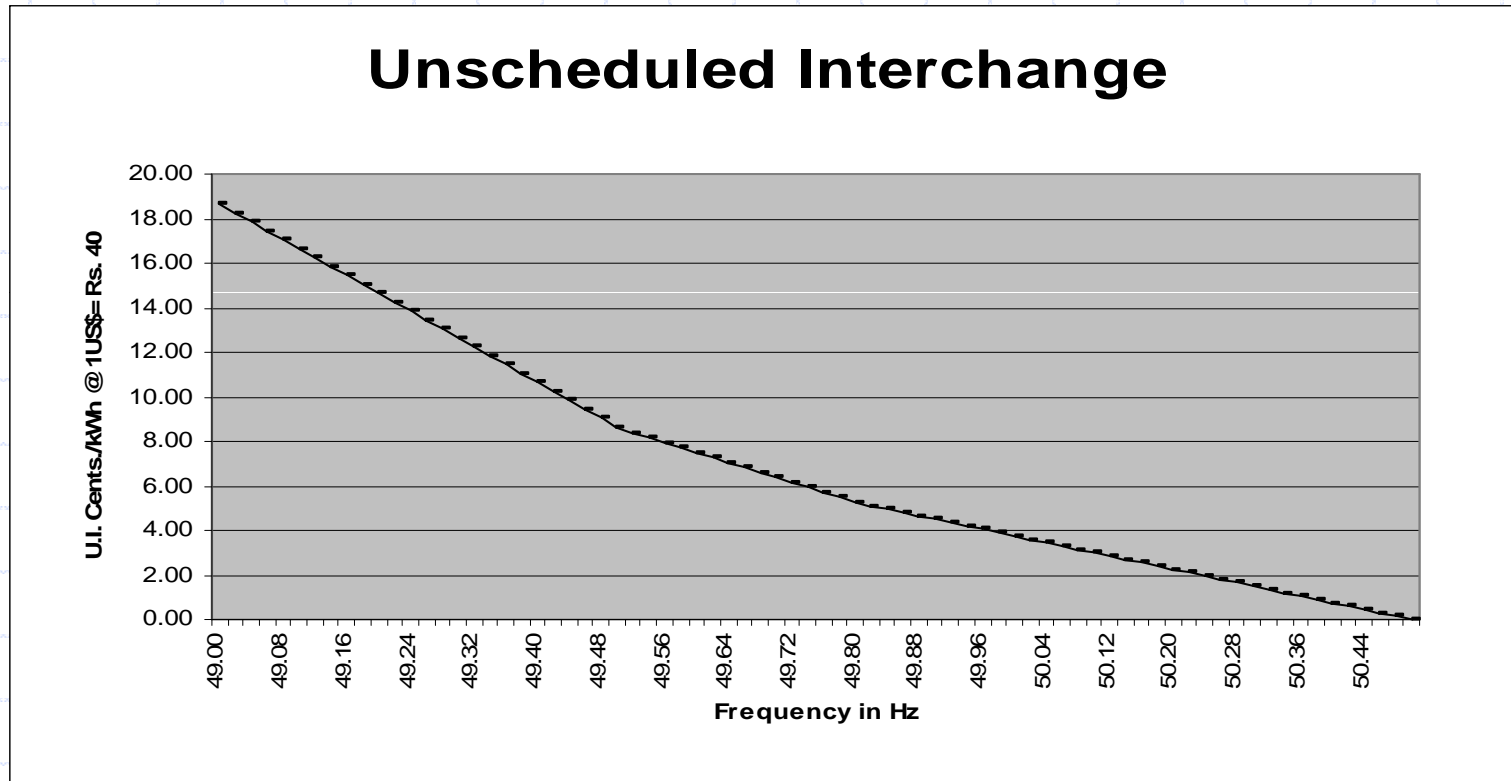


Real Time Settlement Mechanism – Unscheduled Interchange (UI) Mechanism

U. I. Mechanism Features

- ◆ Linkage between frequency and price.
- ◆ Helps maintain reliability standards.
- ◆ Every utility reacts to floating frequency in real time and adjusts its generation/demand accordingly. This helps in achieving equilibrium.
- ◆ Induces frequency linked dispatch of generating stations. Induces real time merit order in generation.

Real Time Price For Unscheduled Interchange



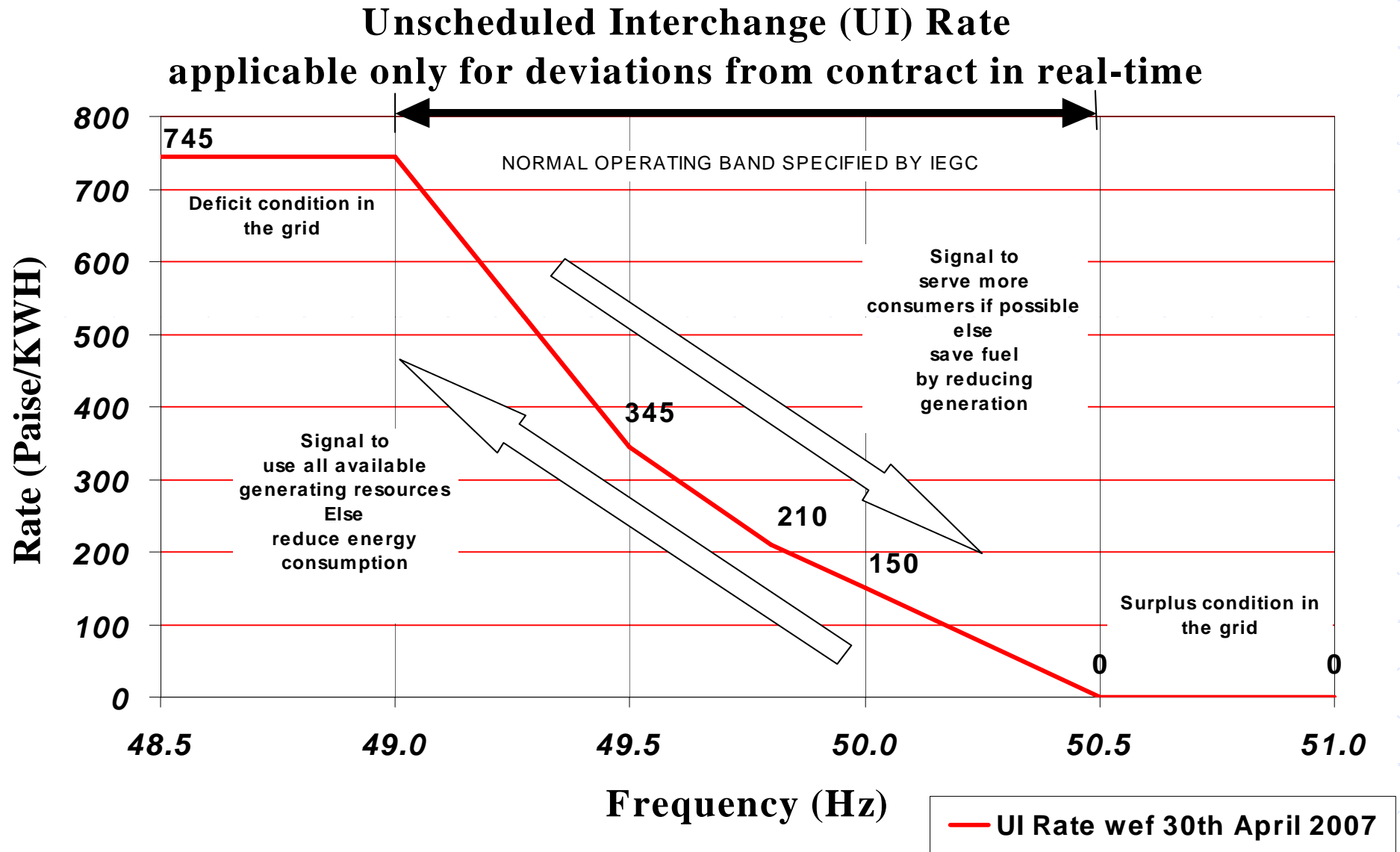
U.I. @ 49.00 Hz 18.625 Cents/kWh
@ 50.50 Hz 0.00 Cents/kWh

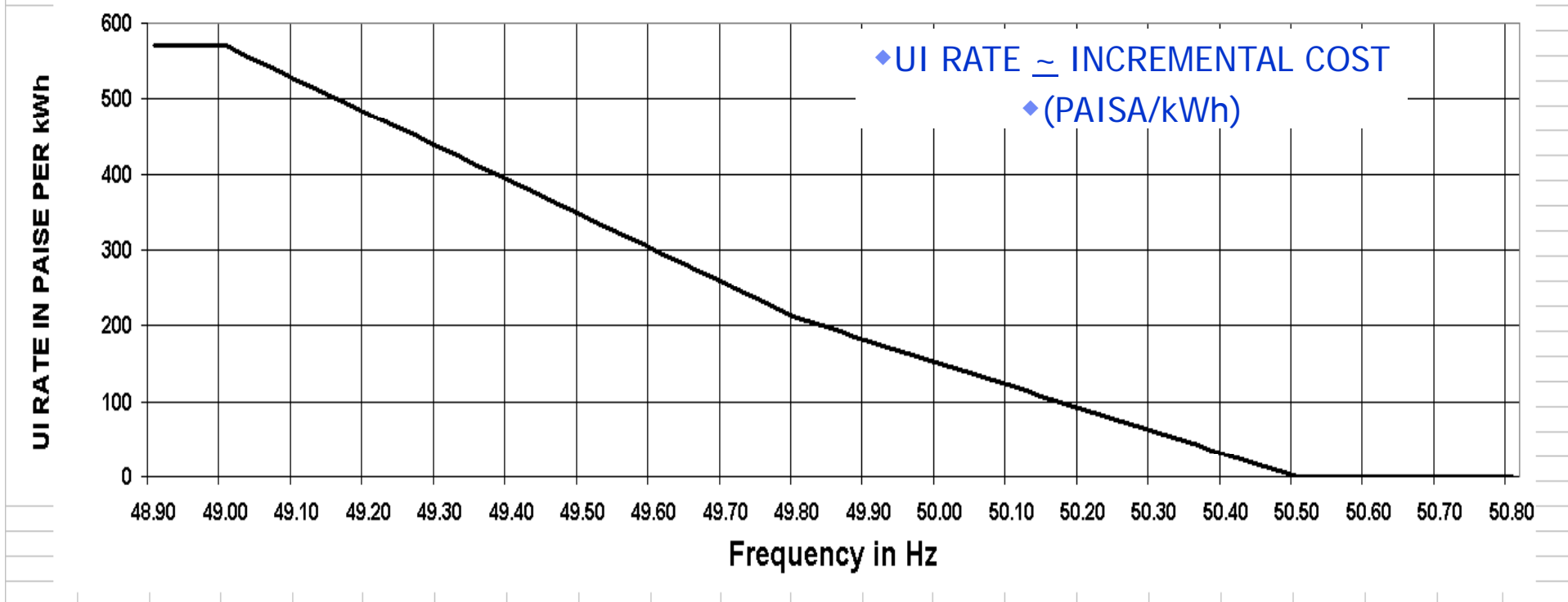
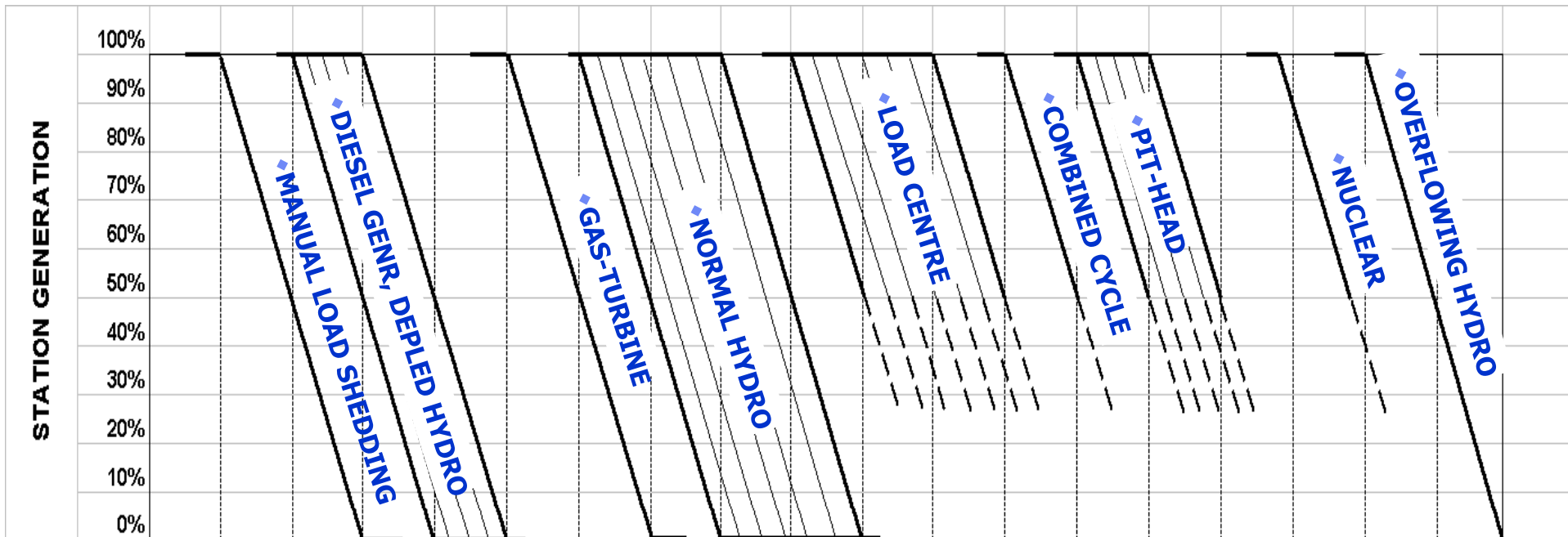
Increment of 0.15 Cents/0.02Hz in frequency from 50.50 Hz to 49.80 Hz

0.225 Cents /0.02 Hz from 49.80 Hz to 49.50 Hz

0.40 Cents/ 0.02 Hz from 49.50 to 49.00 Hz

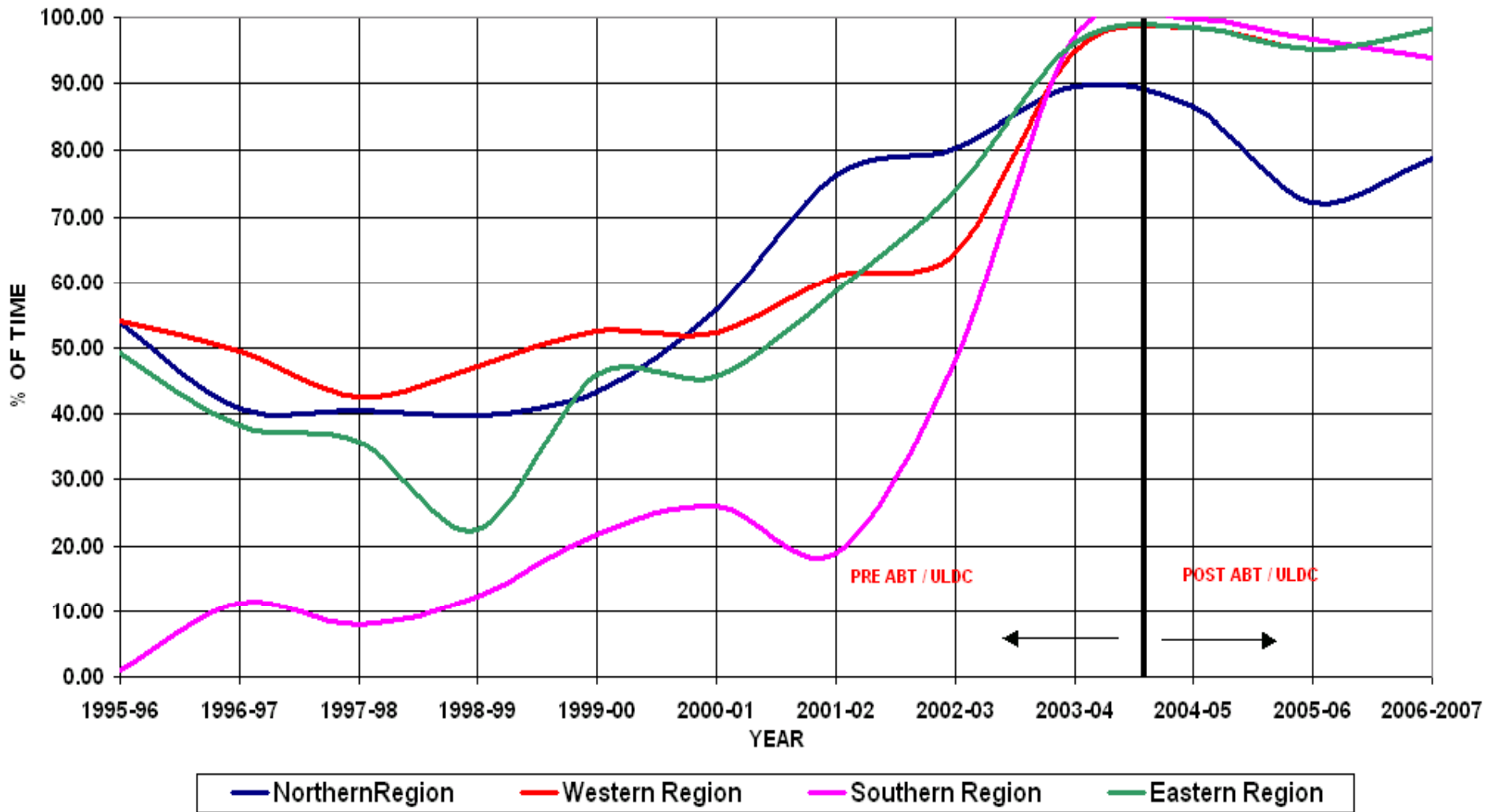
Balancing market guiding vector





◆ Improvement in Frequency Profile

PERCENTAGE OF TIME FREQUENCY IN NORMAL BAND (49.0-50.5 Hz)



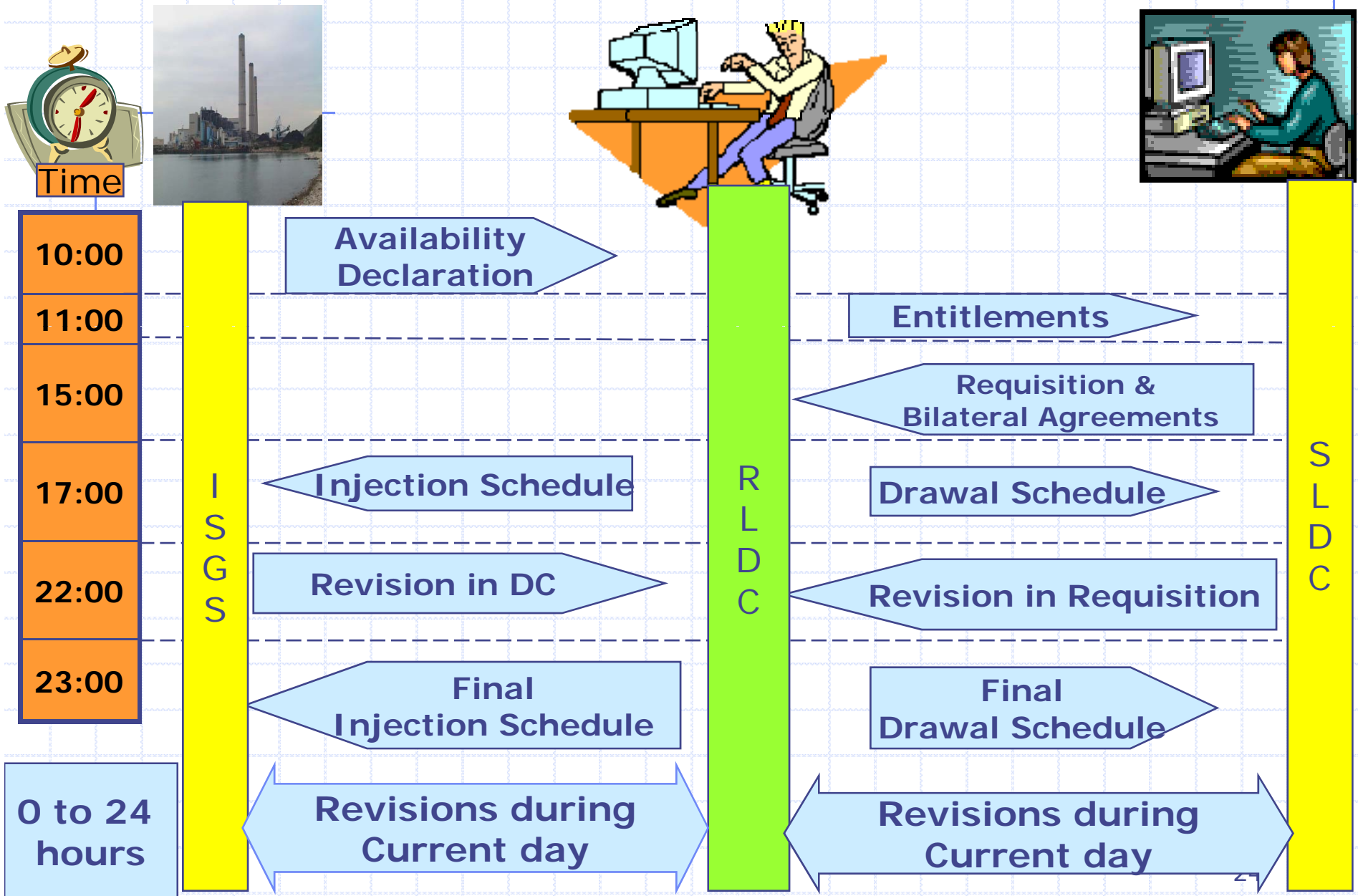


Open Access

Open Access

- ◆ Open Access concept paper - Aug 2003
- ◆ Regulations in force - May 2004
- ◆ Amendment in regulations - Feb 2005
and Dec 2006.
- ◆ Trading regulations for grant of license in
force - Feb 2004
- ◆ Amendment in trading regulations
- Apr 2006

Decentralised Scheduling



CERC's Open Access Regulations for Inter-State Transmission

Two Types of Transmission Service to meet the need for energy market development

- ◆ *Long Term Service*
- ◆ *Short Term Service*
- ◆ A *long term customer* will be allowed access based on transmission planning criteria stipulated in the Indian Electricity Grid Code.
- ◆ Access to *short term customer* shall be allowed subject to availability of transmission capacity.

Nodal Agency

- ◆ Nodal Agency for arranging long term access:
Central Transmission Utility (POWERGRID), if its system is used. Otherwise the nodal agency shall be the transmission service provider in whose system the drawl point is located.
- ◆ The nodal agency for short term access:
Regional Load Dispatch Centre (RLDC) of the Region where the drawl point of electricity is situated.

Features of Long Term Service

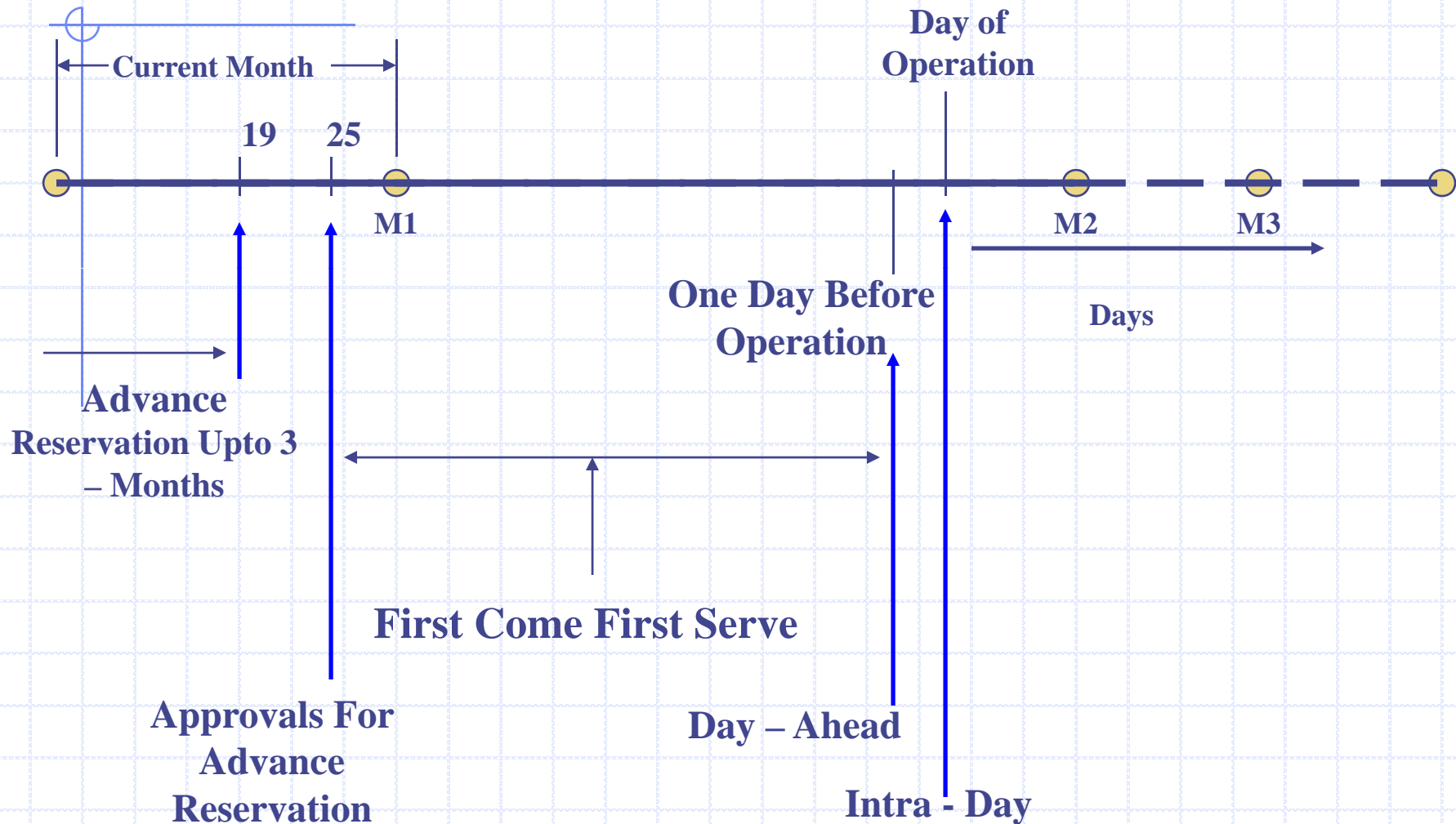
- ◆ Firm point to point Transmission Right
- ◆ Non Transferable
- ◆ Exit Option
- ◆ Long terms BPTA to facilitate investment
- ◆ Higher priority in allotment
- ◆ Last to be curtailed
- ◆ Assured recovery for Transmission Service Charges

Types of Short Term Service

Four Types of Services:

- ◆ Advance Reservation upto 3 months.
- ◆ Current Reservation upto 1 month
- ◆ Composite Service for next day.
- ◆ Composite Service for the same day.

Time Line For Open Access



Salient features of Short -Term Service

- ◆ Point to Point Service
- ◆ Exit Option
- ◆ Revenue recovery reduces the payment obligation of long term customers and provides additional revenue to the Transmission Licensee.
- ◆ Part day charges.
- ◆ Non-transferable.
- ◆ Reduced charges when there is no congestion.
- ◆ Subject to "Use-it-or-loose-it" clause.
- ◆ Rs./MW/Day rates for each stamp are known in advance and total charges are very simple to calculate.

Trading Through Exclusive Open Access

- Open Access Regulations have facilitated power trading in an orderly manner.
- Energy agreements and transmission clearance have to be arranged separately.
- Revised open access regulations facilitate advance reservation for transmission as well as day ahead reservation for trading.
- Open Access charges are reasonable and simple to apply.

Transmission Charges for Short Term Access - Uncongested

Transmission Charges

- ◆ Inter-regional System
 - **ST_Rate = $0.50 \times (\text{TSC}/\text{CIR})/365$ Rs./MW/Day**
- ◆ Intra-regional System
 - **ST_Rate = $0.25 \times (\text{TSC}/\text{Av_Cap})/365$ Rs./MW/Day**
- ◆ Up to 6 Hrs. in a day 25% of ST_Rate
- ◆ More than 6 Hrs. and up to 12 Hrs. in a day 50% of ST_Rate.
- ◆ More than 12 Hrs. and up to 24 Hrs. in a day equal to ST_Rate.

Operating Charge

- ◆ Inter-regional System
 - **Rs. 3000 /day or part of the day/transaction**
- ◆ Intra-regional System
 - **Rs. 1000 /day or part of the day/transaction**

Bidding Procedure for Short Term Access

- ◆ ST_Rate shall be the floor price.
- ◆ No permission to quote price more than 5 times intraregional Transmission system and more than two and half times the floor price in case of interregional Transmission system.
- ◆ Reservation of capacity in decreasing order of price quoted.
- ◆ Pro rata allocation of capacity in case of equal prices quotes.



Trading

Current Scenario

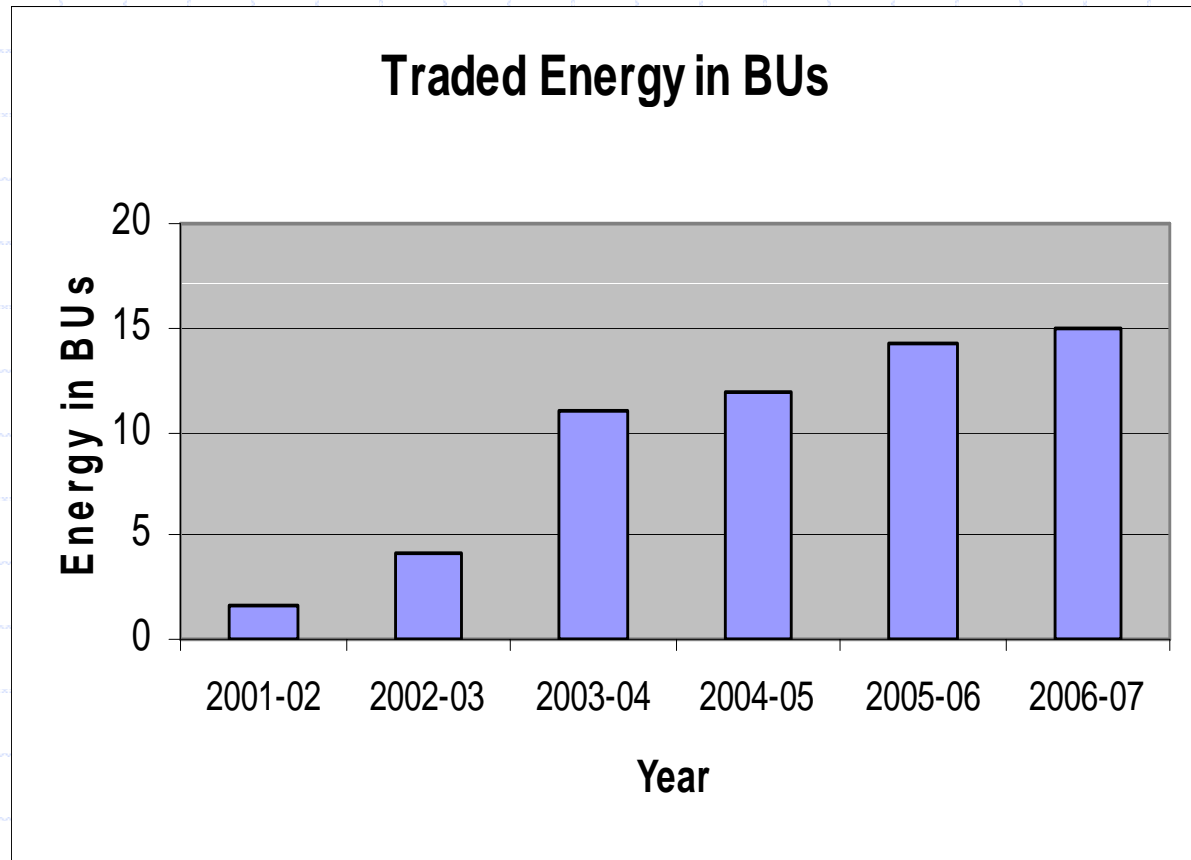
- ◆ Suppliers call for bids from buyers/traders
- ◆ Traders compete in the auctions to win the supply bids
- ◆ Buyers have no option but to buy from the trader having the supply contract
- ◆ Prices of traded electricity have been going up
- ◆ Most of the bilateral trading is inter-regional;
- ◆ ER, NER are suppliers
- ◆ NR, WR are buyers

Current Scenario

- ◆ Short term trading constitutes 2 to 3 % of the total supply.
- ◆ Trading essentially between surplus & deficit distribution utilities.
- ◆ Intra-state trading barriers.

Short-term Trading Volume

Year	BU
2001-02	1.61
2002-03	4.17
2003-04	11.02
2004-05	11.84
2005-06	14.18
2006-07	15.00

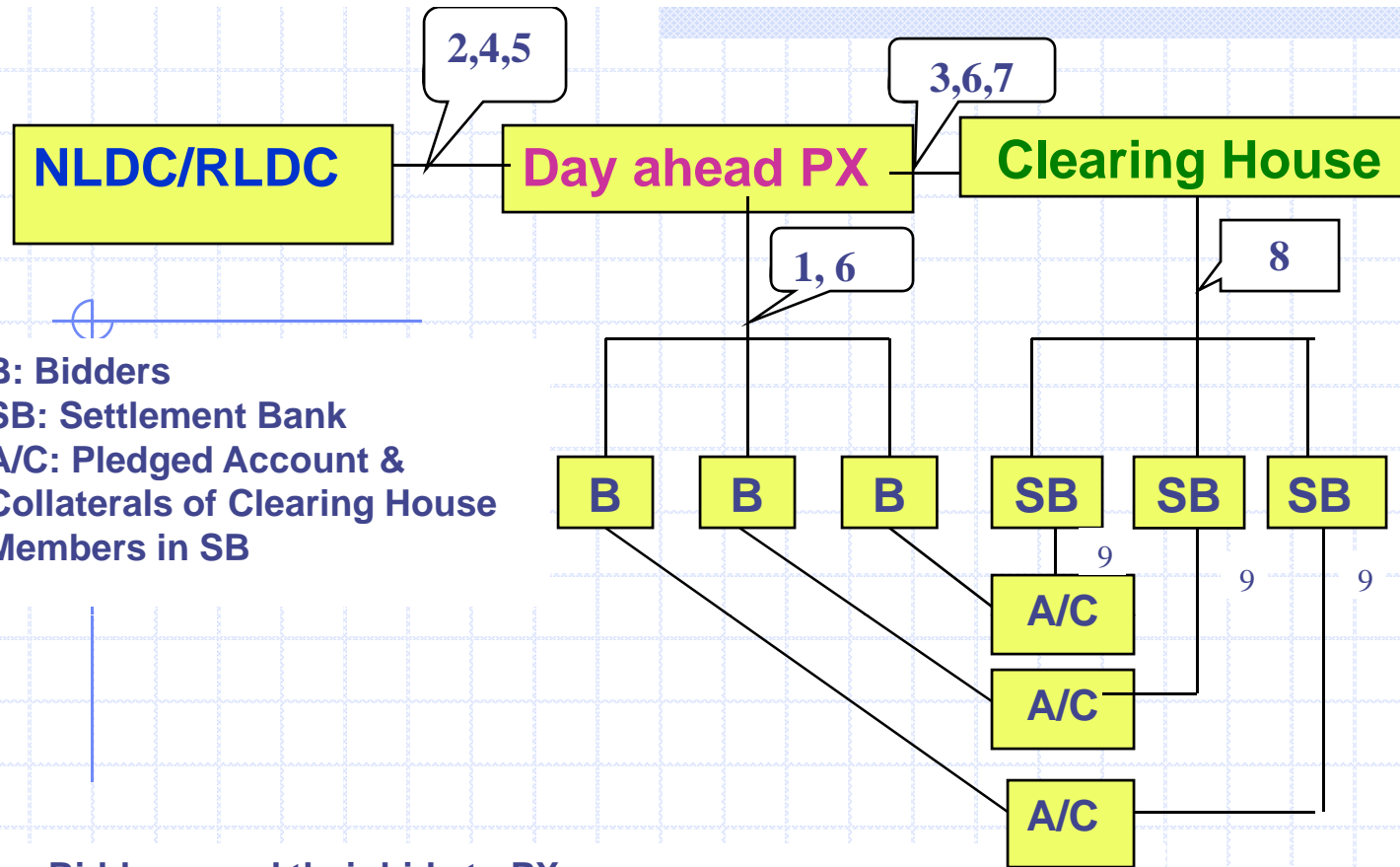




Market Mechanism (In The Making) – Power Exchange

Road Map For Future

- ◆ Need to organize short term trading on a transparent, equitable and efficient platform
- ◆ Need to increase the supplies/depth
- ◆ Need to bring surplus captive generation into the grid
- ◆ Need to encourage peaking power plants and merchant generation
- ◆ For optimum resource management, need to simultaneously clear energy contracts & transmission paths
- ◆ Need to modernize trading through electronic platform

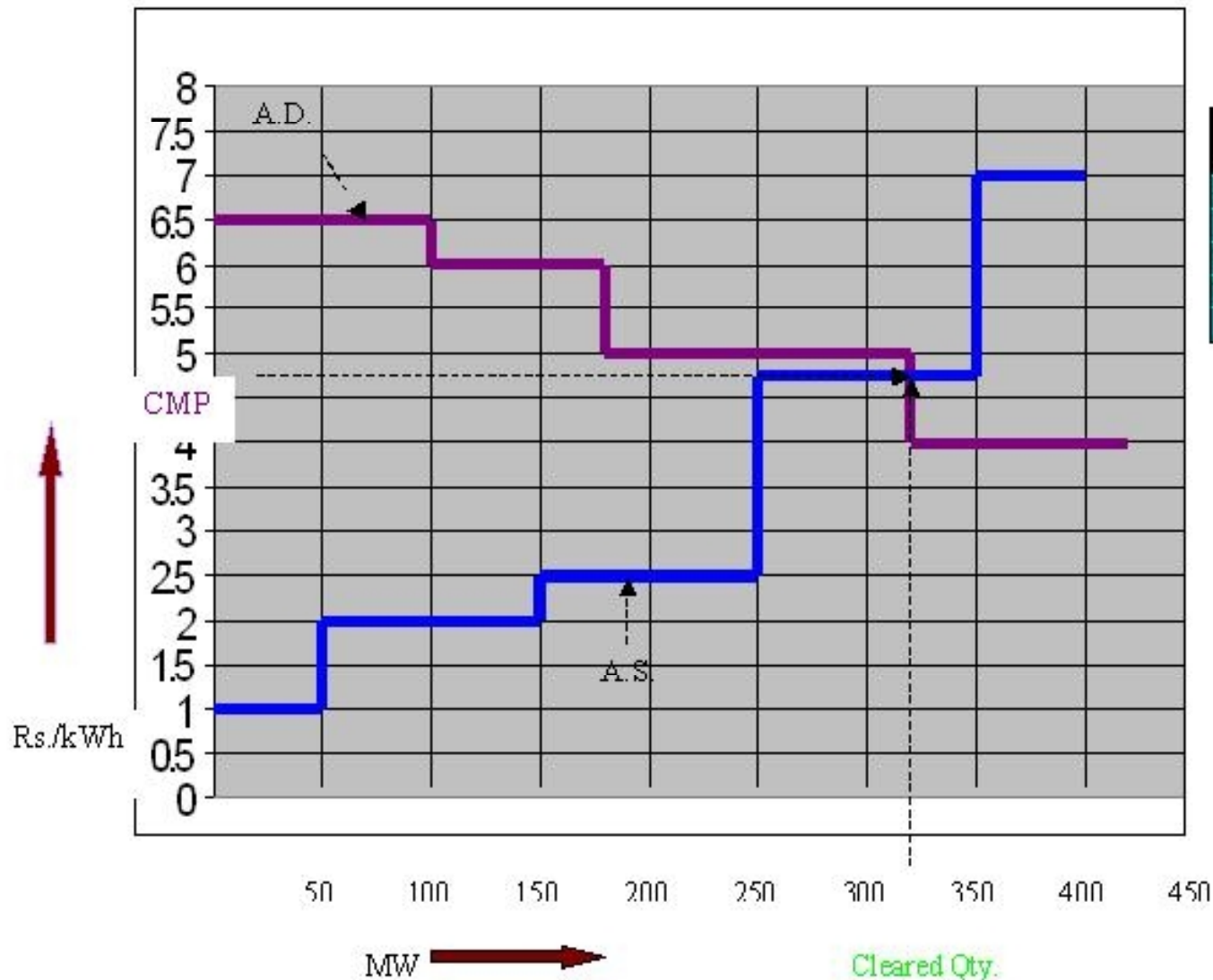


B: Bidders
SB: Settlement Bank
A/C: Pledged Account & Collaterals of Clearing House Members in SB

- 1- Bidders send their bids to PX.
- 2- NLDC informs transmission capacity to PX.
- 3- Clearing House confirms adequate collaterals of clearing agents.
- 4- PX obtains NLDC concurrence before releasing day ahead Trade schedules.
- 5 - RLDCs issues day ahead generation & dispatch schedules for PX participants.
- 6 - PX issues day ahead trade schedules.
- 7 - PX issues rolling collateral requirement.
- 8 - After settlement period Clearing House issues Invoice/Credit Notes .
- 9- Settlement Banks debit/credit the appropriate amounts.

Function Diagram in Staff Paper

Double Side Bidding



Buyer's bid		Seller's offer	
MW	Rs/kWh	MW	Rs/kWh
100	6.50	50	1.00
75	6.00	100	2.00
150	5.00	100	2.50
100	4.00	100	4.75
		50	7.00

STEPS TAKEN BY CERC

- ◆ Staff Paper released in July, 2006 for public comments
- ◆ Public Hearing held on December 19, 2006 in which 150 persons participated
- ◆ CERC issued Orders summing up the deliberations and conclusions on January 18, 2007
- ◆ CERC issued guidelines for setting up Power Exchange on February 6, 2007.

CERC GUIDELINES ON PX –Basic Principles

- ◆ PX to be a voluntary platform
- ◆ PX would be alternative to bilateral trading and UI mechanism
- ◆ No existing contracts or PPAs to be disturbed
- ◆ CERC not to get involved in the day to day functioning and PX design.

Highlights of CERC Guidelines on PX

- ◆ PX to be de-mutualized form of Organization
- ◆ Reliable, effective and impartial management
- ◆ Ring-fencing between ownership, management and participation
- ◆ Transparency in operation and decision-making
- ◆ Computerized trading and clearing system
- ◆ Efficient financial settlement and guarantee system
- ◆ Effective trade information dissemination system

CERC GUIDELINES ON PX – Legal

- ◆ The PX to comply with Electricity Act, 2003, IEGC and Forward Contract Regulation Act, 1952 to the extent applicable.
- ◆ PX to function in public interest and comply with conditions to be specified by the Commission.
- ◆ The Commission to issue permission to the PX ***(and not a license, since PX is viewed as a facilitator for trading by providing a platform and not a Trader per se).***

CERC Guidelines On PX -General

- ◆ The Promoters will have the freedom to develop, manage and operate the Power Exchange according to approved rules, bye-laws and procedures.
- ◆ Any company registered under the Companies Act or a consortium of companies would be eligible to apply.
- ◆ RLDCs not to be unduly burdened

CERC GUIDELINES ON PX- Role of CERC

The Commission to focus on the following:

- ◆ Scrutiny of the Rules and Bye-laws of the PX
- ◆ Whether and how to assign transmission capacity to the PX
- ◆ Apportionment of transmission charges and losses
- ◆ Procedure for handling transmission congestion
- ◆ Monitoring of the functioning of the PX to the extent of preventing speculation, collusion and unfair gaming
- ◆ Ensure that procedures are laid down for streamlined and mutually satisfactory interaction between RLDCs and PX

CERC Guidelines On PX –Project Report

The applicant's Project Report to contain the following:

- ◆ Constitution of the proposed PX
- ◆ Funding sources
- ◆ Management structure
- ◆ Infrastructure facilities
- ◆ Clearing and settlement mechanism
- ◆ R&D facilities
- ◆ Products to be traded
- ◆ Physical delivery system
- ◆ Time line

Challenges Ahead For PX Providers

- ◆ Provide transparent, equitable and efficient platform
- ◆ Harness captive generation
- ◆ Complementary platform to existing mechanisms
- ◆ Compatibility with the existing network
- ◆ Energy contracts and Transmission clearance to be handled simultaneously.



◆ Thank You

For any queries, do not hesitate to contact:

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