

Power Trading and Power Markets

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Prayas, Energy Group, Pune, India

- 'Prayas' means 'Focussed Effort'
- Registered Charitable trust working from 1992
- Areas: Health, Energy and Parenthood
- A Public Interest Group
- Prayas Energy Group: Power sector policy analysis and advocacy

Interaction Plan

- Power Trading in India
- AP Case
- Power Trading & Markets
- Discussion

Power Trading: Pre E-Act

- Sporadic bi-lateral trading between States, CGS
- Power Trading Corporation
 - Set up in 1999, now PTC Limited
 - To handle inter state mega projects
 - Short (3 day) and Long (5 years) contracts for surplus power in states, CGS, Nepal, Bhutan
 - Around 300-500 MW traded in 2002-3
 - Trade margin of 5p/unit

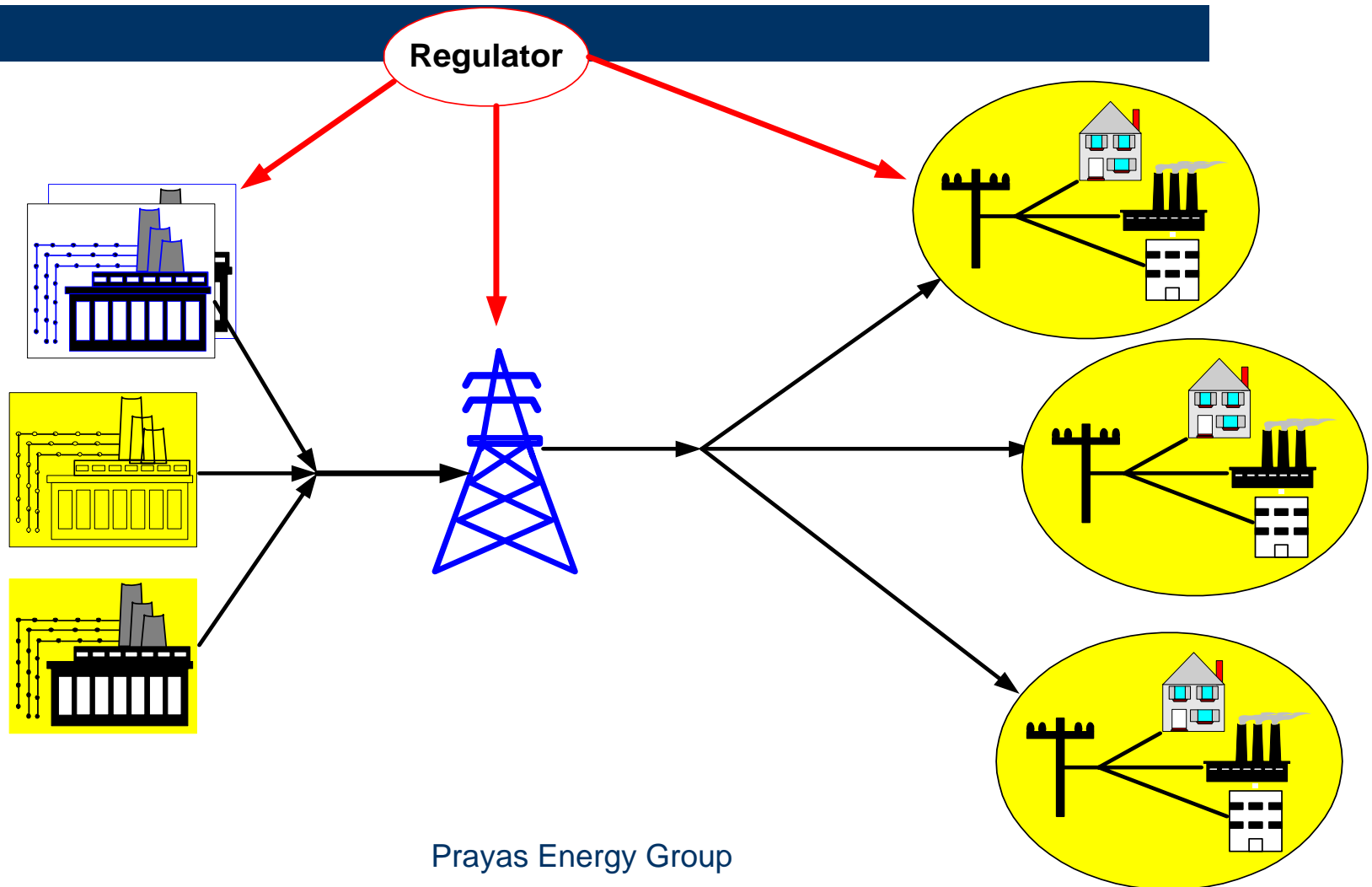
Power Trading: Pre E-Act

- Power Trading Corporation (Cont'd)
 - Promoters : POWERGRID,NTPC,PFC,NHPC (32%)
 - Other share holders:
TPC,DVC,IDBI,IDFC,LIC,IFCI,GIC (29%)
 - Public and reserve: (39%)
- Trading licence by CERC in June 2004

E-Act 2003 - Key 'change agents'

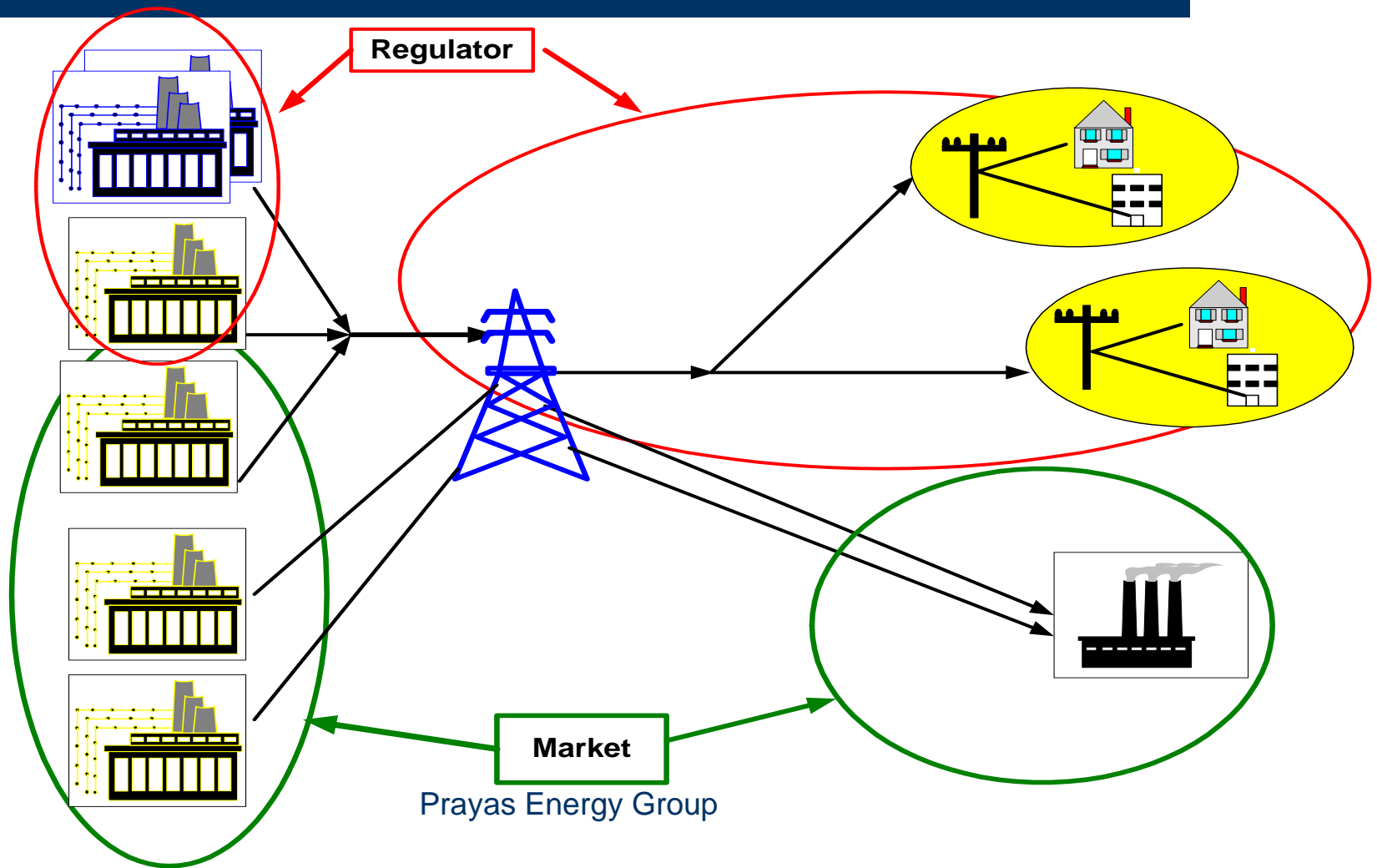
- De-license Generation
- Liberalise Captive
- **Open Access** in Transmission, Distribution
- **Trading**
 - Parallel Distribution License
 - Cross subsidy elimination

Single Buyer Model



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E-Act – Model : Bulk (Limited) Competition



Power Trading: E-Act provisions

- Trading = Purchase of power for resale [1.71]
- CERC to regulate **inter** state trading
- SERC to regulate **intra** state trading
- Inter state trader can do intra state trade [Electricity Rules, MoP, June 2005]

Power Trading: E-Act provisions

- Do not need license [14]
 - Distribution licensees
 - Governments
 - Cooperatives etc in Rural Electrification (subject to notification)
- Cannot trade [38,39,41,26,27,31]
 - Transmission licensees -Central, State or Private
 - Load Dispatch Centres -National, Regional, State
- RCs to fix trade margins, if necessary [79,86]
- CEA to record data, promote research on trading [73]

Power Trading: Inter state trading regulation

- Prepared by CERC, January 2004
- Trading application: Public notice, application to be on website inviting comments
- 25 year license given
- Technical and Financial requirements
- Trader cannot:
 - Take over any utility
 - Undertake transmission
- Quarterly reporting to CERC and on website

Power Trading: Inter state trading regulation – License categories

S.No	Category	Volume – MU/Yr	Net worth – Rs Cr	License fee –Rs lakh/Yr
1	A	< 100	1.5	1
2	B	100-200	3.0	2
3	C	200-500	7.5	5
4	D	500-700	10.0	7
5	E	700-1000	15.0	10
6	F	> 1000	20.0	15

Power Trading: Inter state trading Licensees – Jan 2006

S. No	Name	Date	Category
1	Adani Exports Ltd, New Delhi	Dec04	F
2	Chhattisgarh Electricity Company Ltd , Raipur	Nov04	A
3	DLF Limited , Gurgaon	Nov04	A
4	GMR Energy Limited ,Bangalore	Nov04	A
5	Instinct advertisement & Marketing Pvt. Limited ,New Delhi	Sep05	A

Power Trading: Inter state trading Licensees – Jan 2006

S. No	Name	Date	Category
6	Jindal Steel & Power Limited ,New Delhi	Nov04	A
7	Karam Chand Thapar & Bros. (Coal Sales) Limited ,New Delhi	Jan05	A
8	Lanco Electricity Utility Ltd ,Hyderabad	Jul04	A
9	MMTC Limited ,New Delhi	Jul04	C
10	Maheshwary Ispat Limited ,Kolkata	Jul05	A

Power Trading: Inter state trading Licensees – Jan 2006

S. No	Name	Date	Category
11	NTPC Vidyut Vyapar Nigam Ltd ,New Delhi	Jul04	F
12	PTC India Limited ,New Delhi	Jun04	F
13	Reliance Energy Trading Ltd .Mumbai	Jun04	A
14	Special Blasts Limited ,Raipur	Jul05	A
15	Subhash Kabini Power Corporation Ltd ,Bangalore	May05	A

Power Trading: Inter state trading Licensees – Jan 2006

S.N o	Name	Date	Cate gory
16	Sumex Organic Pvt. Ltd,Mumbai	Jul04	B
17	Tata Power Trading Company Ltd ,Mumbai	Jun04	F
18	Essar Electric Power Development Corporation, Mumbai	Nov05	C
19	Suryachakra Power Corporation	Jan 06	A

Reports by Trader – Form III

Name of the Trader : Power Trading Corporation o PTC INDIA LIMITED

Information for the Quarter (JANUARY to MARCH 2005) - Form III

License Details (No. & date) : No.3/Trading/CERC dated 30th June 2004

S.No.	Volume of Trading in million kWhs	Purchased from	Sold to	Point of Purchase	Purchase Price	Point of Sale	Sale Price	Transmission charges borne by	Transmission losses borne by
					Rs./kWh		Rs./kWh		
1	20.5	MPCL	HVPNL (RTC)	5&	2.35	5&	2.40	@	#
2	16.1	GEB	PSEB(NI GHT)	4&	2.23/2.30	4&	2.30/2.35	@	#
3	40.7	GEB	MPSEB (NIGHT)	4&	2.32/2.30	4&	2.37/2.35	@	#

37 transactions totalling to 1228 MU

Note	4&	POWERGRID Bus in WR	RTC	Round the clock power					
	5&	POWERGRID Bus in NR							
	@	The Transmission/wheeling charges upto the delivery point are to be borne by Seller and charges beyond the delivery point are to be borne by Buyer.							
	#	The Transmission losses upto the delivery point are to be borne by Seller and losses beyond the delivery point are to be borne by Buyer							

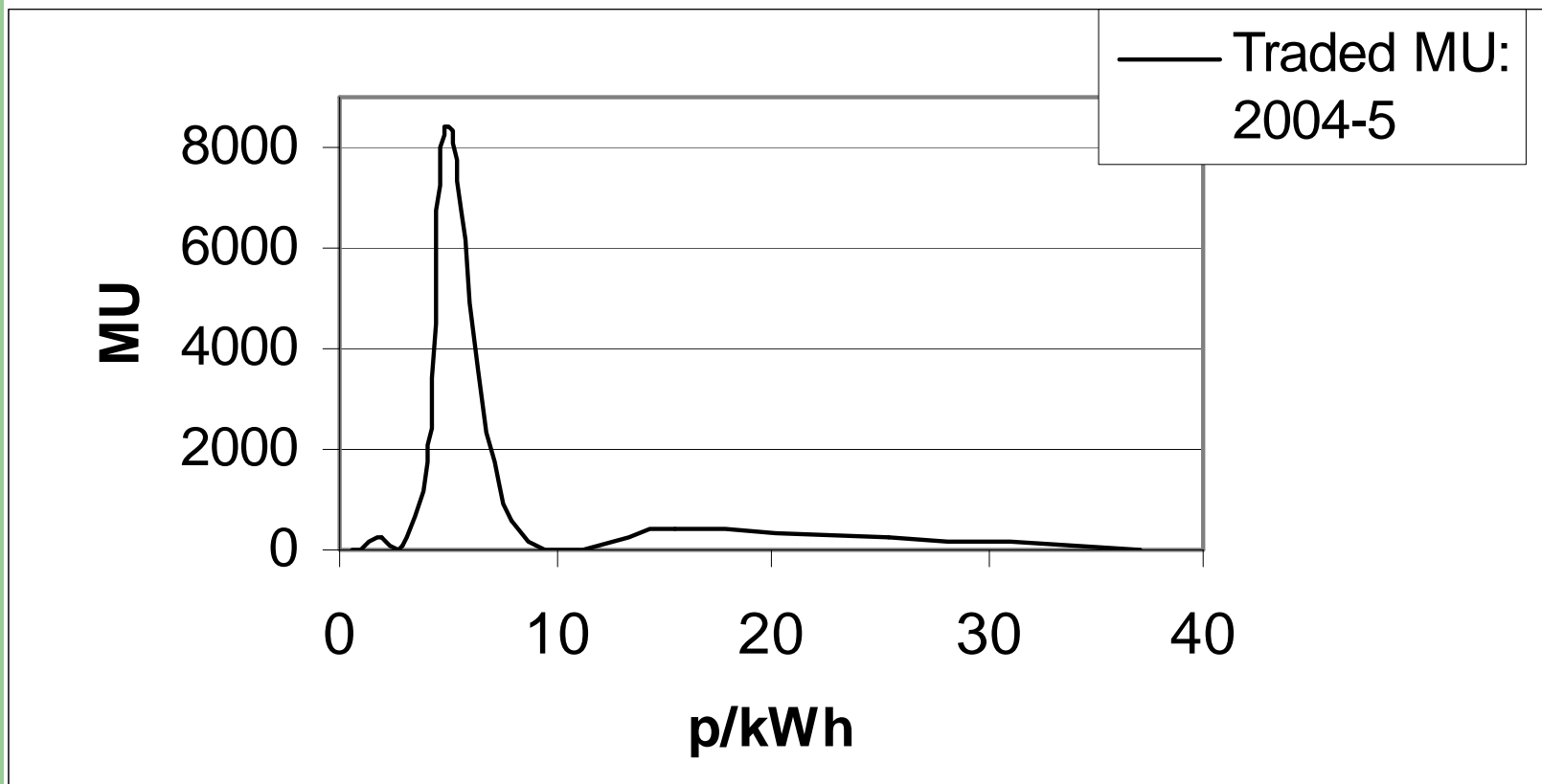
Reports by Trader –Form III

- At the website of trader
- Quarterly
- Details of each Trading Transaction
- Peak power costly (>3/unit)
- Round the clock, Off peak, Night power cheaper (2.3-2.5/unit)
- Trade Margin 5-7p/unit

Reports by Trader –Form IV

- At the website of trader
- Quarterly
- Region-wise quarterly, cumulative sales
- Changes in trader category, net worth

Trade Margin 2004-5



Trading – Key Data

	2004-5	I half of 2005-6
Traded at <5p TM Weighted av	89.05 6	31.7 % 10 p/kWh
TM Highest	43	128 p/kWh
TM fixed 1/06		4 p/kWh
Traded MU	11846	MU
Total MU	587000	MU

AP Trading

- Regulation December 2005
- Procedure for application for License
- DISCOM and GoAP exempted
- Technical & Financial requirements of trader
- Post all (?) information on trade at trader's website, provide information to SERC, SLDC, TRANSCO
- Without approval of SERC, Trader shall not:
 - Take over another utility, Merge with another utility
 - Transfer license
 - Engage in any other business
- Refer disputes to GRF or Vidyut Ombudsman

AP Intra state trading regulation – License categories

S. No	Category	Volume – MU/Yr	Net worth –Rs Cr	License fee –Rs lakh/Yr
1	A	<50	1	0.5
2	B	50-100	1.5	0.75
3	C	100-200	3	1
4	D	200-300	4.5	1.5
5	E	300-400	6	2
6	F	400-500	7.5	2.5
7	G	>500	10	3

Open Access

- “Enabling non-discriminatory sale/purchase of electricity between two parties, utilising transmission/distribution system(s) of a third party, and not blocking it on unreasonable grounds”
 - Adapted from Bhanubhushan
- Transmission/Distribution system is like toll highway, with transport companies contracting its use, at a price

AP Intra-State Open Access-Phasing

Criteria	Commencement Date
Consumers availing power from NCE	Sep 05
Contracted capacity > 5 MW	Sep 05
Contracted capacity > 2 MW	Sep 06
Contracted capacity > 1 MW	Apr 08

Power Trading & Markets

- Trading is notional. Buyer pays the seller for contracted schedule
- Variations to be handled by some mechanism like UI (IEGC, ABT provisions)
- Trading
 - Active Power
 - Reactive Power (Not yet done)
 - Transmission capacity (Not yet done)
 - Ancillary services (Not yet done)
 - required for reliable grid operation – load dispatch, reactive support, reserve support
- Trading can facilitate
 - Easier distribution of surplus
 - Product differentiation (firm/non-firm, peak/non-peak, ToD etc)
 - Economic Pricing

Required for Power Trading

- Freedom to buy/sell
- Adequacy of transmission capacity
- Agreement on Transmission/Wheeling charge
- Handling T&D loss
- Mechanisms for Scheduling, Metering, Balancing, Accounting, Settling

Power Trading mechanism -1

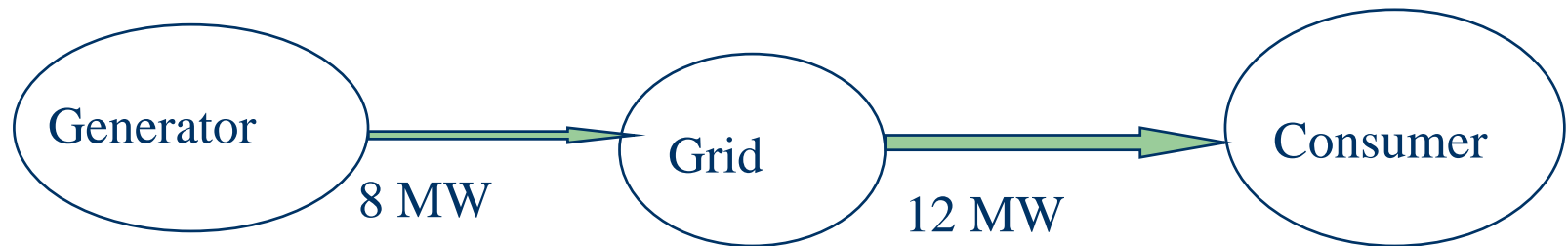
Agreement



- From Bhanu Bhushan

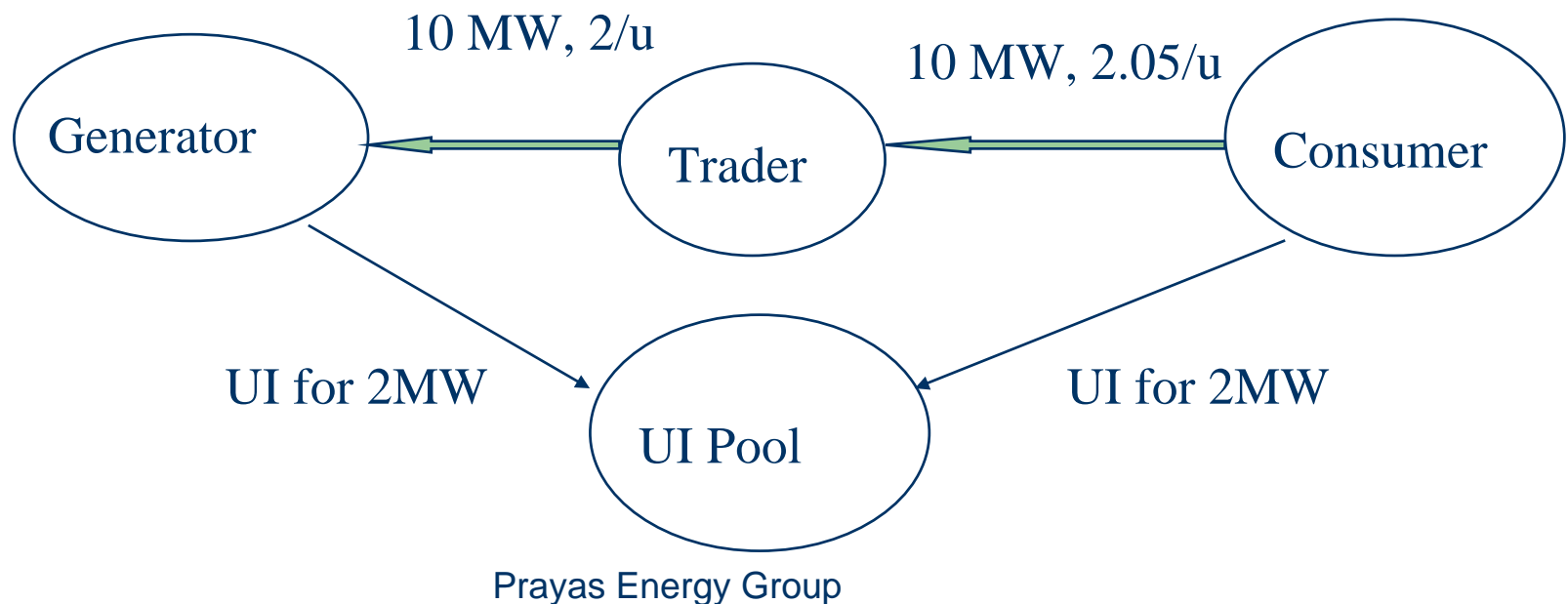
Power Trading mechanism -2

Actual Flow



Power Trading mechanism -3

Payments



Power Trading mechanism -4

Generator (G) in WR to Bulk Consumer (C) in SR

- Contract between G and Inter-state trader (Trd)
- Trd to be an Open access customer with STU in WR, CTU and STU of SR /DISCOM in SR
- SLDCs in WR & SR, RLDCs in WR&SR to ascertain transmission capacity
- Scheduling, metering, balancing, accounting, settling, grievance redressal systems

Power Trading & Markets – Challenges and Risks

- Demand Side
 - Many buyers
 - Responsiveness to price
 - Prevent market power
- Supply side
 - Many sellers
 - Responsiveness to price
 - Prevent market power
- Equal access to T&D
- Liquid and efficient market place
- Handle equity, ecology, institutional issues
 - From 'Making Competition Work in Electricity', Sally Hunt
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Challenges and Risks

- Demand Side
 - Many buyers
 - Active power, reactive power, transmission capacity, ancillary services
 - Responsiveness to price
 - No shortages, Adequate market information
 - Prevent market power
 - Some buyers should not control the prices
 - Markets possible in Bulk and Retail

Challenges and Risks

- Supply side
 - Many sellers
 - No long term contracts
 - Easy entry and exit
 - Short term: Based on market
 - Long term adequacy: No assured returns. Risk based on long run marginal cost and tariff
 - Responsiveness to price
 - Price different from cost
 - Prevent market power
 - Markets possible

Challenges and Risks

- Equal access to T&D
 - T&D = Natural monopoly
 - Economy of scale, Costly to duplicate
 - Open access provisions
 - Adequate T&D capacity
 - Separation of Ownership and Operation functions
 - LDC not with TRANSCO

Challenges and Risks

- Liquid and efficient market place
 - Independent System Operator (ISO – RLDC?)
 - Market Operator (Power Exchange)
 - Monitoring mechanisms

Challenges and Risks

- Handle equity, ecology, institutional issues
 - Access, subsidy
 - Long term environmental sustenance
 - Competition not equal to Privatisation
 - Competition benefits whom?
 - Regulating private companies
 - Transparency, Accountability, Participation

Challenges and Risks

- Market Power
 - Ability of some to change prices, elbow out competition
 - Herfinddahl-Hirschman Index (HHI) = Sum of squares of market shares of all participants
 - Many **necessary** conditions. Not sure if they are **sufficient**, since market monitoring mechanisms are weak

Challenges and Risks

- Market Power - HHI

Case	DISCOM-1 Share	DISCOM-2 Share	HHI
1	0.5	0.5	0.5
2	0.2	0.8	0.68
3	0.1	0.9	0.82

Power Market

- Bulk (whole) sale, Retail market
- Forward market
 - Day/Hour ahead: by Market Operator
- Real Time/Spot/Balancing market
 - by System Operator

Discussion

- Peak Power Shortage (11.7%), Energy Shortage (7.3%)
- Most generation capacity (56% State, 36% CGS, 11% Private) tied up with long term contracts. Only surplus can be traded.
- Access is a big challenge (44% households not electrified)
- Weak Market monitoring mechanisms
 - Technical
 - Management
- Government plans easy facilitation of 100% FDI in power trading
- Mixed experiences of Power markets abroad
- India cannot afford irreversible, costly mistakes

Data from MoP Presentation, June 2005

Discussion – Cont'd

- Large captive power capacity (25,000 MW)
- Possibility of low cost generation
- Interest from Private, International players
- Status quo will not do

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