

Short Term Power Procurement

Case Study

22nd April 2015, IIT Kanpur

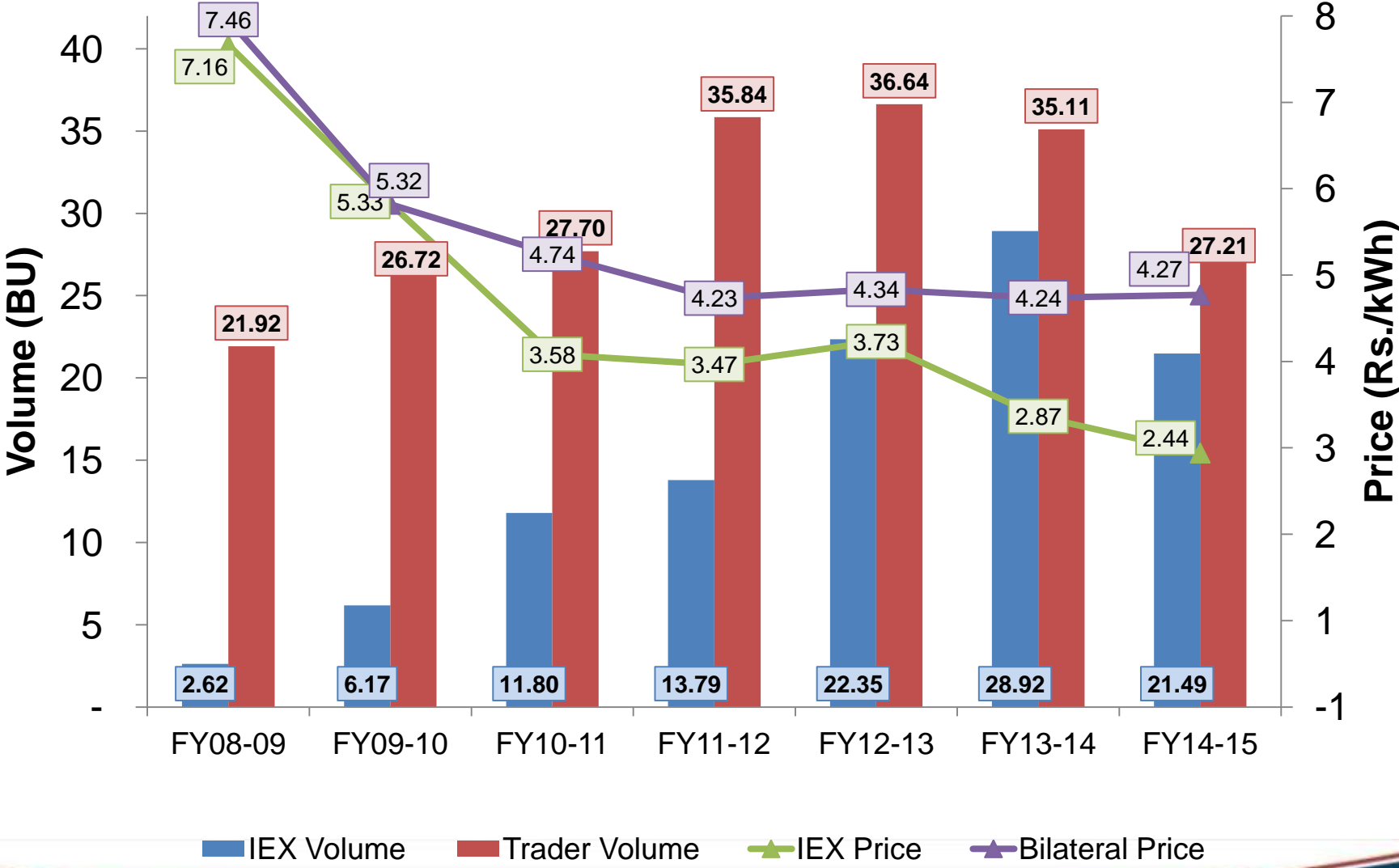


Akhilesh Awasthy
Director (MO)

Power Procurement options

Procurement Contracts		Pros	Cons
Long Term		<ul style="list-style-type: none"> • Escape volatility of short term and spot markets • Meets base load requirements • Transmission availability 	<ul style="list-style-type: none"> • Capacity + Energy • Falling short term prices may make costly contracts obsolete and sunk
Medium Term		<ul style="list-style-type: none"> • Escape volatility of short term and spot markets • Meets intermediary load requirements, help escape long term commitment for such requirements 	<ul style="list-style-type: none"> • Transmission availability after LT • Only to meet fixed seasonal or intermediary load requirements
Short Term	Bilateral	<ul style="list-style-type: none"> • No long term commitment • Flexible response to demand • Priority over PX, unless Spot 	<ul style="list-style-type: none"> • Costlier than PX Spot • Congestion • Regulatory risks
	PX Spot	<ul style="list-style-type: none"> • No long term commitment • Price transparency • Flexible response to demand 	<ul style="list-style-type: none"> • Volatile • Congestion • Regulatory risks
UI		<ul style="list-style-type: none"> • Realtime load balance 	<ul style="list-style-type: none"> • Volatility • Penalties

Price and Volume: Bilateral vs. IEX DAM



Power Purchase through IEX



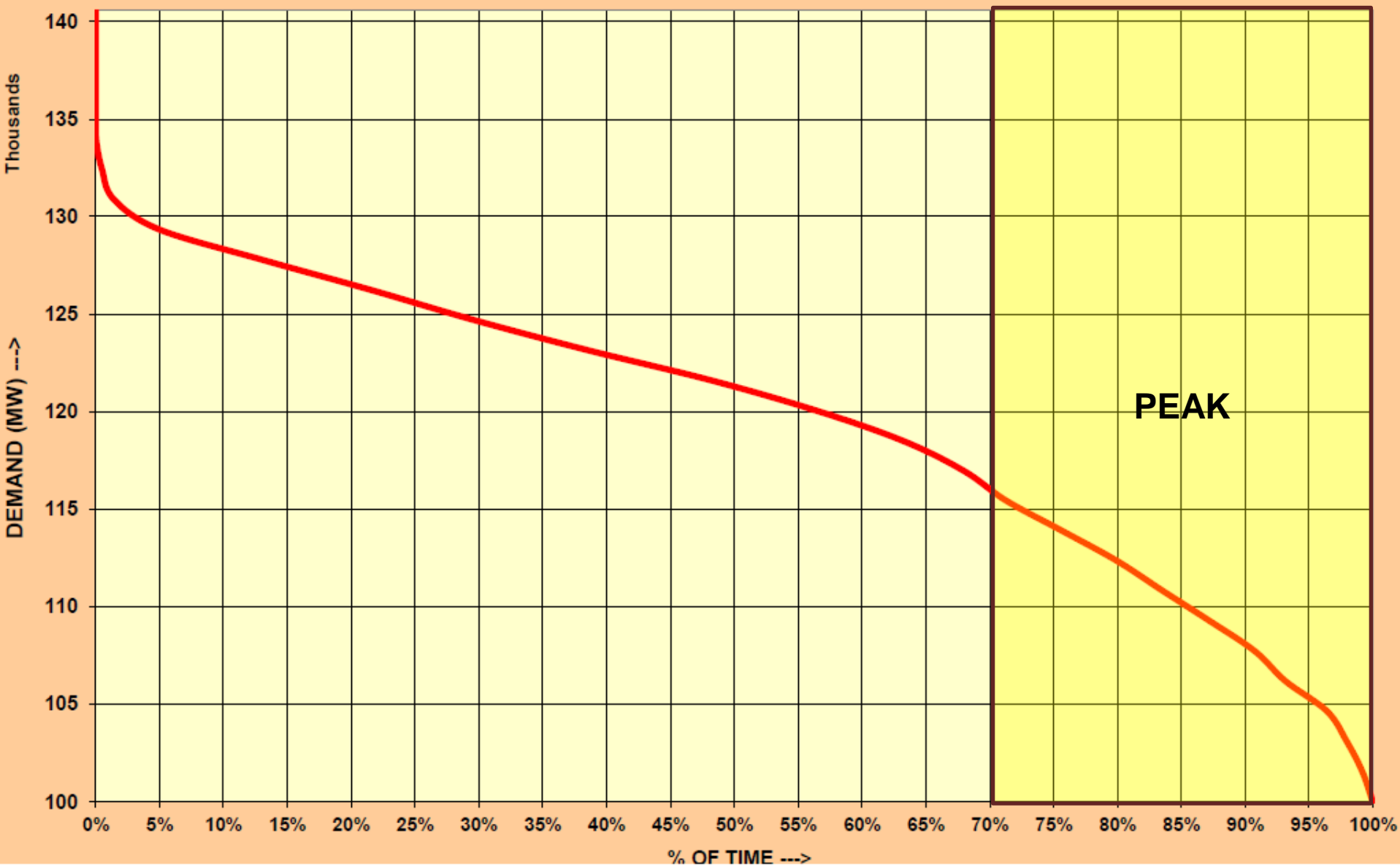
- Power Exchanges provides a competitive option for purchase of power
- IEX rates have been always lower than rates through bilateral
- Better demand management can be done by purchase through power exchange
- High liquidity on exchange ensuring assured supply

Cost Optimisation through IEX for Power Procurement



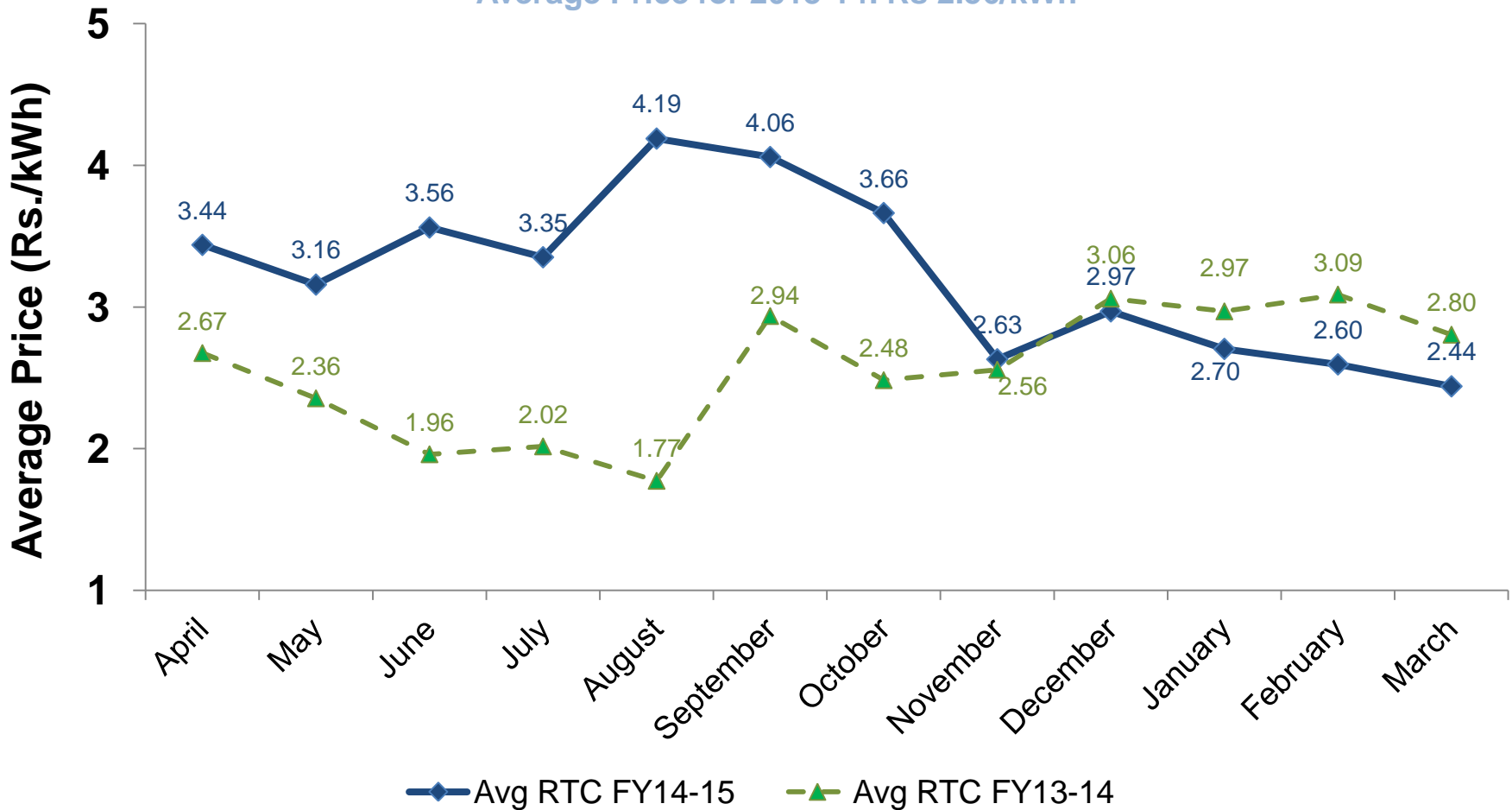
- **Under long term PPA two component**
 - **Capacity charges (commitment charges):** paid irrespective of whether discom purchase power from these plants or not
 - **Energy charges :** Paid corresponding to the number of units of power purchased from that particular plant
- **Discoms can replace costlier long term power by procurement from IEX, if,**
 - Energy charge of power plant is greater than IEX rates
 - During night hours prices at IEX are further low and savings can be enhanced
- **Discoms can continue paying fixed charge to Long Term PPAs and substitute where energy charge is higher than IEX price**

ALL INDIA LOAD DURATION CURVE FOR FEBRUARY' 2015

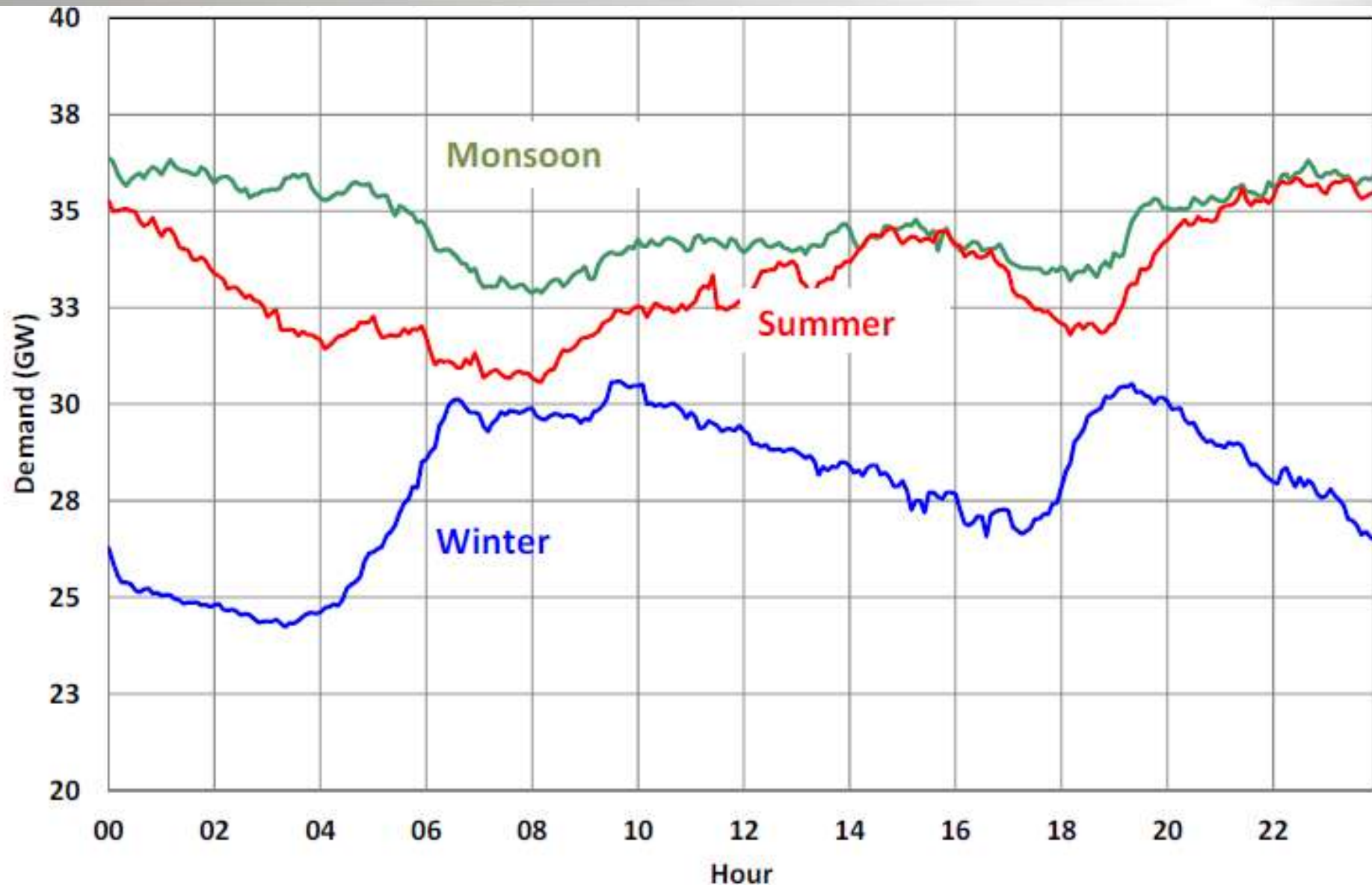


Monthly Average Price: Trend for Northern Region

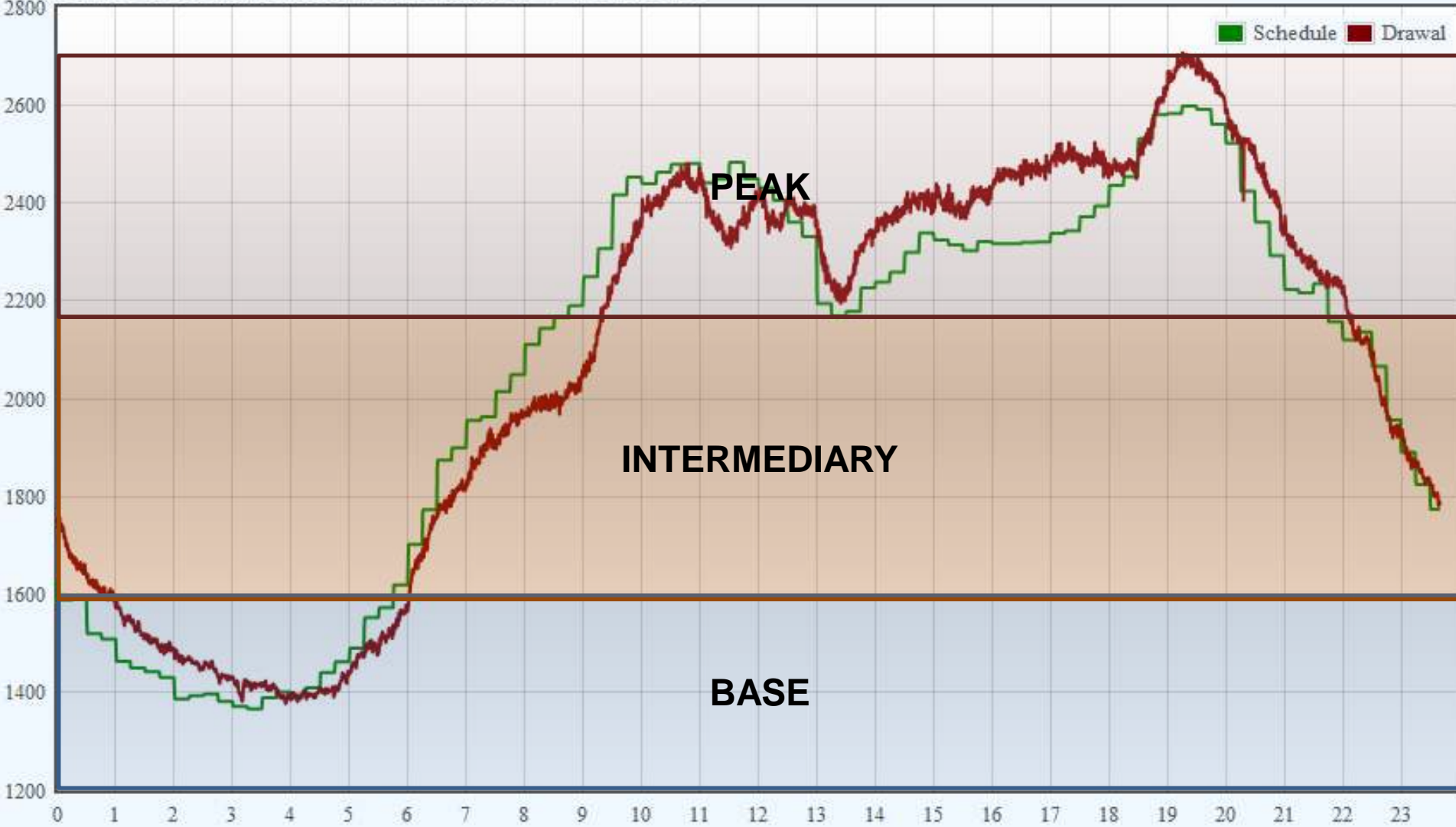
Average RTC Price for 2014-15: Rs 3.23/kWh
Average Price at Night (11pm-6am) for 2014-15: Rs 2.72/kWh
Average Price for 2013-14: Rs 2.56/kWh



NR Typical Demand Curve



Schedule Vs Actual Drawal For Delhi For : 02-04-2015



Power Purchase Cost Reduction for States

Power Portfolio of State-A

Power Plant	Allocated Capacity (MW)	Annual Volume (MU)	Fixed Cost (Rs./kWh)	Variable Cost (Rs./kWh)
IGPCL Gas Turbine	267	1,207	1.29	5.05
Pragati-I	236	1,613	0.81	4.45
Badarpur TPS	532	2,892	1.21	4.29
APCL, Jhajjhar	267	1,162	2.66	4.25
Auraiya Gas	74	277	1.38	3.89
Farakka	23	132	1.09	3.83
Dadri Gas	93	407	1.17	3.81
NCPD-Dadri	630	3,478	1.15	3.65
Rajghat	131	569	2.41	3.50
Anta Gas	45	208	1.28	3.39
Dadri Extension	735	5,126	1.84	3.36
Pragati-III, Bawana	919	2,344	2.66	3.32
Kahalgaon Stage-I	52	301	1.19	2.92
Mejia Unit-6	71	610	1.84	2.80
Kahalgaon Stage-II	160	896	1.53	2.75
Unchahar-I	25	166	1.07	2.52
Unchahar-III	30	198	1.63	2.50
Unchahar-II	48	327	1.10	2.49
Chandrapur (Ext.-7 and 8)	329	1,728	2.41	1.97

Power Portfolio of State A

Power Plant	Allocated Capacity (MW)	Annual Volume (MU)	Fixed Cost (Rs./kWh)	Variable Cost (Rs./kWh)
Maithon Power Limited	300	2,215	1.41	1.92
Rihand-II	128	861	1.12	1.62
Rihand-I	101	695	0.95	1.61
Rihand-III	126	880	0.89	1.55
Singrauli	152	1,081	0.61	1.15
Sasan UMPP	107	1,084	0.04	0.99
Thermal	5,580	30,455		
Nuclear	750	2,914		
Hydro	121	609		
Renewable	11	64		
Total	6,462	34,042		

Cost Optimisation Potential in State-A(Annual): Plant-wise

S. No	Power Plant	Allocated Capacity (MW)	Variable Cost (Rs./kWh)	Annual Savings (Rs. Cr)
1	Badarpur TPS	532	4.29	181
2	NCPP-Dadri	630	3.65	163
3	Pragati-I	236	4.45	161
4	IGPCL Gas Turbine	267	5.05	142
5	Dadri Extension	735	3.36	87
6	Pragati-III, Bawana	919	3.32	39
	Total	3,319		772

Source:

- Annual Variable Cost of Power Stations (FY 2014-15) from ARR
- Source for Volume:
 - Volume of CGS taken from NRPC
 - Volume of SGS taken from SLDC

Cost Optimisation Potential in State-A

Annual: Month-wise



S.no	Month	Total Energy (MU)	IEX Price (Rs/kWh)	Energy Replaced (MU)	Annual Savings (Rs. Cr)
1	Apr-14	1,068	3.44	824	38
2	May-14	1,357	3.16	1,324	74
3	Jun-14	1,589	3.56	1,006	39
4	Jul-14	1,588	3.35	1,076	68
5	Aug-14	1,425	4.19	277	5
6	Sep-14	1,292	4.06	279	9
7	Oct-14	1,266	3.66	413	25
8	Nov-14	1,153	2.63	1,153	112
9	Dec-14	1,035	2.97	1,035	69
10	Jan-15	1,201	2.70	1,201	120
11	Feb-15	917	2.60	917	96
12	Mar-15	947	2.44	947	117
	Total	14,839		10,453	772

Note: Power Stations with variable cost above Rs.3/kWh & 6 high saving potential power plants are considered

Potential of replacing about 31% of 34 BU and achieving cost saving of about Rs. 772 Crores through IEX

- Power procurement from IEX is at more competitive prices than bilateral transactions
- Power purchase cost can be reduced by about Rs. 750 cr by substituting power from costlier generating stations with IEX
- Even when prices at IEX are high, cost savings can be achieved during night hours when prices are invariably low

Cost reduction of Long term Power Purchase – State-B

Cost Optimisation Potential in State-B

Annual: Plant-wise

S. No	Power Plant	Allocated Capacity (MW)	Variable Cost (Rs./kWh)	Annual Savings (Rs. Cr)
1	Jhajjar	18	4.21	13
2	Auraiya GF	46	3.89	8
3	Dadri GF	59	3.83	11
4	Suratgarh STPS I TO VI	1500	3.58	284
5	Dadri-2	50	3.36	5
6	Kota I TO VII	1240	3.27	126
7	Farakka	11	3.22	1
8	Anta GF	61	3.10	4
9	Dholpur	330	3.02	6
	Total	3,406	-	460

Source:

*Annual Variable Cost of Power Stations (FY 2014-15) from ARR

**Power Stations with variable cost above Rs. 3/unit are considered

***Source for Volume:

1. Volume of CGS taken from NRPC
2. Volume of SGS taken from ARR

Cost Optimisation Potential in State-B

Annual: Month-wise



S.no	Month	Total Energy (MU)	IEX Price (Rs/kWh)	Energy Replaced (MU)	Annual Savings (Rs. Cr)
1	Apr-14	1,692	3.44	43	1.9
2	May-14	1,704	3.16	901	19.5
3	Jun-14	1,737	3.56	78	2.5
4	Jul-14	1,724	3.35	64	3.6
5	Aug-14	1,798	4.19	0	0.0
6	Sep-14	1,680	4.06	5	0.0
7	Oct-14	1,689	3.66	43	1.1
8	Nov-14	1,701	2.63	1,701	96.0
9	Dec-14	1,711	2.97	1,605	39.0
10	Jan-15	1,690	2.70	1,690	82.6
11	Feb-15	1,623	2.60	1,623	95.4
12	Mar-15	1,684	2.36	1,684	118.0
	Total	20,431		9,435	460

Note: Power Stations with variable cost above Rs.3/kWh

Potential of replacing about 15% of 66 BU and achieving cost saving of about Rs. 460 Crores through IEX

Banking to be replaced by Sale/Purchase

Banking Transaction of State B



MONTH	DRAWAL by Rajasthan JVVNL (MUs)	IEX PRICE (Rs/kWh)	DRAWAL by Haryana HPPC (MUs)	IEX PRICE (Rs/kWh)
Oct-13	223	2.5		
Nov-13	360	2.6		
Dec-13	372	3.1		
Jan-14	186	3		
Feb-14	168	3.1		
Mar-14	60	2.8		
Jun-14			139	3.70
Jul-14			578	3.35
Aug-14			578	4.19
Sep-14			142	4.06
TOTAL/Wt. Avg.	1,369	2.84	1,437	3.79
Trading Margin	5%			
	68			
TOTAL	1,437	2.84	1,437	3.79

Indicative loss to State B is Rs 136 Crore

Thank You for your attention

www.ixindia.com



YEARS
OF

EMPOWERING
INDIAN POWER MARKET

Best Power Exchange in India

- Enertia Awards '14, '13 & '12**
- India Power Award 2014**
- Power Business View 2014**

Inc India Innovative 100 Award for 'Innovation in Product and Technology'

Best Performing Power Exchange **– Power Line Awards '13 & '12**

Best E-enabled consumer platform – India Power Awards '09