



Department of Industrial and Management Engineering
Indian Institute of Technology Kanpur



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**Competitive Power Procurement:
Guidelines and Recent Experience**

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India's Premier Investment Bank



Competitive Bidding Guidelines

Background

Sec – 63 of the Electricity Act states that:

- Notwithstanding anything contained in section 62, the Appropriate Commission shall adopt the tariff if such tariff has been determined through transparent process of bidding in accordance with the guidelines issued by the Central Government.
- The guidelines have been framed under the above provisions of the Act.
- Issued by the Ministry of Power on 19th January 2005

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Objectives

- Promote competitive procurement of electricity
- Facilitate transparency and fairness in procurement processes:
 - Transparency ensured by Guidelines & Standard Bid Documents for tariff based bidding
 - Enhance standardization and reduce ambiguity and time for materialization of projects
 - Standardization of Bid documents, Bid submission and evaluation process, timeline for bidding process, tariff structure
 - Provide flexibility to suppliers on internal operations while ensuring certainty on availability of power and tariffs for buyers
 - Tariff to be quoted upfront for life of plant and Regulator to adopt tariff arrived through transparent bidding process as specified by Guidelines
 - Developer has flexibility to choose optimum unit configuration
 - Provides incentive to Developer to adopt innovative financial modeling and tax planning to ensure competitive tariff & return on investment.

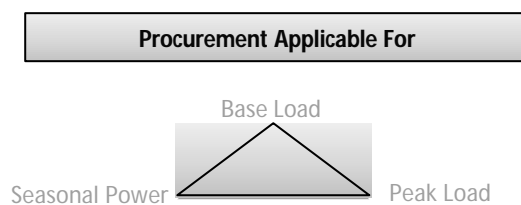
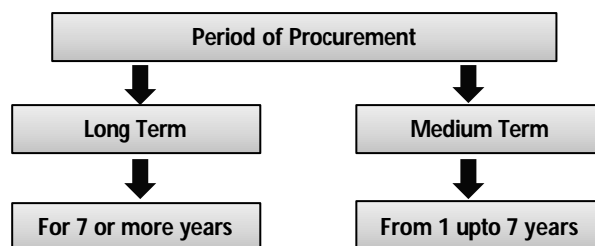
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National Tariff Policy 2006

- Provides uniform guidelines to SERCs for fixation of tariffs for their respective entities as well as CERC
- Competitive Bidding:
 - Distribution licensee to procure power solely through competitive bidding but central & state owned units were exempted
 - Tariff for public sector projects to be decided through bidding after a period of 5 years
- **Maithon Case:**
- Maithon Power (generator) & NDPL (distribution licensee) signed a negotiated PPA
- BSES Rajdhani & BSES Yamuna filed an objection petition contending the approval of the said PPA
- DERC however granted approval to the PPA as the Electricity Act provides alternative routes (Sec 62 & 63) to distribution licensee for procuring power
- DERC's order was challenged in the ATE by the appellants and there too the PPA was upheld
- The order of ATE has been challenged in the Supreme Court

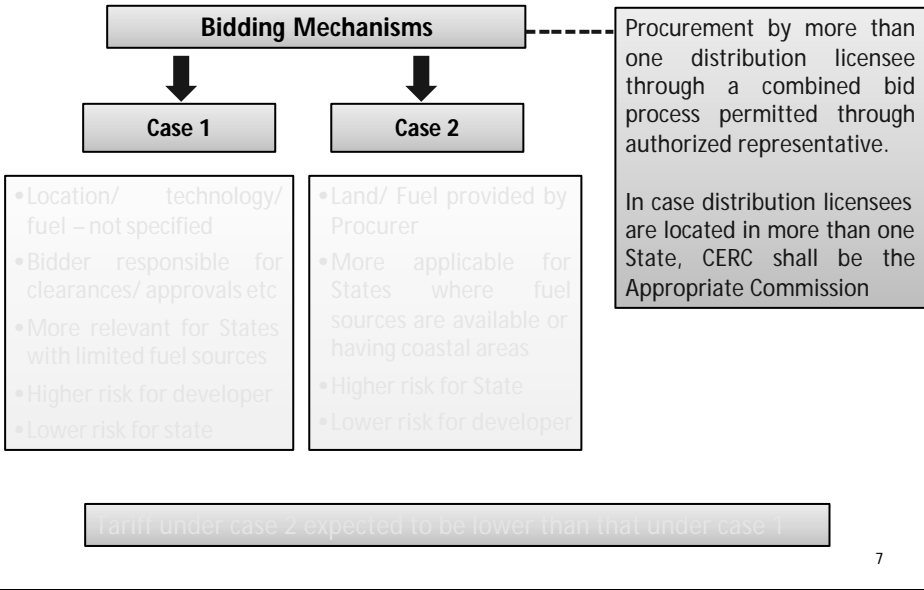
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Scope

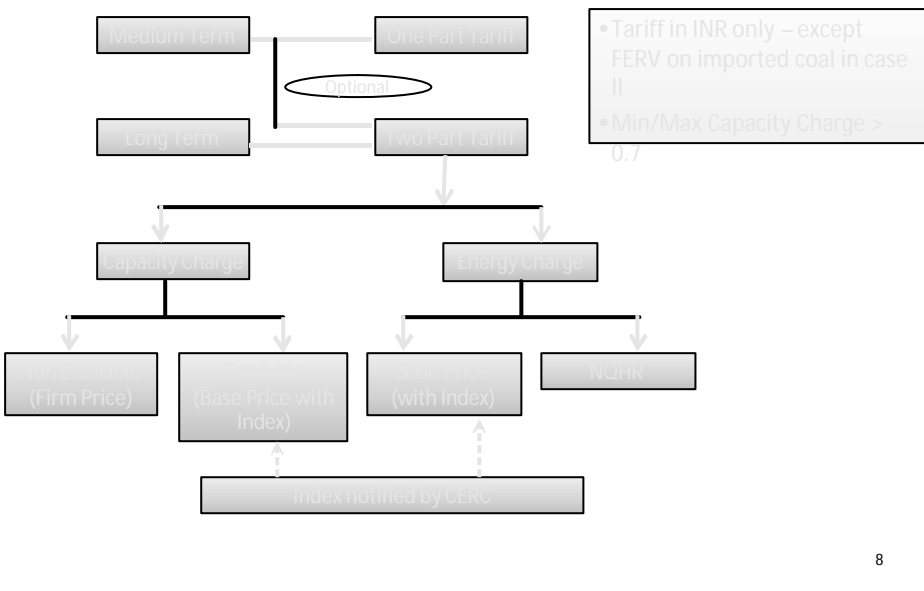


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Scope



Tariff Structure



Current CERC Rates

Parameter	Rate
Discounting Rate for bid evaluation	10.74%
Escalation Rate – Domestic coal	6.66%
Escalation Rates – Imported Coal	
Coal sub-component	14.02%
Transportation sub-component	15.99%
Inland handling sub-component	5.21%

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Bidding Process

- Two stage process for Long term procurement:
 - Request for Qualification (RFQ)
 - Request for Proposal (RFP)
- For Medium term the procurer has an option to adopt a single stage tender process combining the RFP & RFQ process.
- The bidding shall be necessarily by way of International Competitive Bidding (ICB).

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Bidding Process



Preparation of bid documents and technical analysis done by procurer



RFQ invited and qualified bidders selected



Creates a common platform and removes conditionality. Doubt clearance and feedback



Technical and financial bids evaluated



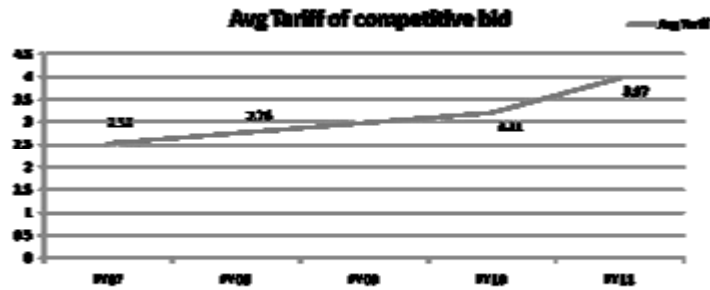
LOI issued
PPA signed

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Some Recent Case 1 Bids

Procurer	Capacity (MW)	Winner	Tariff (L1) (net of tx. Charges)	Capacity Offered (MW)
UPPCL	3000	PTC Athena	3.32	300
APPGCL	2400	PTC Hinduja	3.44	580
NPCL (Noida)	1000	Essar	4.09	240
Reliance Infra	1500	Wardha Power	3.42	320
Maharashtra	2000	EMCO Energy (GMR)	2.88	200
Bihar	1500	ESSAR (Tori)	2.29	450
Gujarat	3000	KSK Energy Ventures	2.34	1010
Rajasthan	1200	Adani Power Rajasthan	2.95	1200
Karnataka	2000	Monet Power (PTC)	2.93	150

Average Quoted Tariffs



Source: Infraline

Cost Plus Tariffs:

- Recent projects of NTPC have "cost plus" tariff of Rs 3.72/KWhr (for Kantibijli TPP) & Rs 3.64/KWhr (for Meja Urja Nigam TPP)
- Levelised tariff for Bajaj Hindustan's Lalitpur TPP is Rs 3.69/KWhr
- A study conducted by CERC in Sep 2010 concluded that tariffs being discovered through competitive bidding are lower than the cost plus tariffs.

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Case 2 Bids

Project	Capacity (MW)	Winner	Bid Price	Coal
UMPPs				
Sasan UMPP	4000	Reliance power	1.196	Captive Block
Krishnapattam UMPP	4000	Reliance power	2.336	Imported
Mundra UMPP	4000	Tata Power	2.265	Imported
Tilaiya UMPP	4000	Reliance Power	1.77	Captive Block
Others				
Karachana , UP	1320	Jaiprakash Assoc.	2.97	Linkage
Bara, UP	1980	Jaiprakash Assoc.	3.02	Linkage
Rajpura , Punjab	1320	L&T	2.89	Linkage
Talwandi Sabo	2000	Sterlite	2.863	Linkage
Bhaiyathan	1320	India Bulls	0.81	Captive Block

Transmission Bids

Project	Winner	Tx. Charge (Rs. Mn p.a.)
WRSS Project B	Reliance Power	1084.899
WRSS Project C	Reliance Power	564.743
East-North Interconnection	Sterlite Energy	1187.95
North Karanpura	Reliance Power	2580.0051
Talcher-II	Reliance Power	1440.0215
Rajasthan PPP	GMR	356.50
Jabalpur	Sterlite Energy	1421.28
Bhopal Dhule	Sterlite Energy	1995.30

- HVPNL has awarded the 1st transmission project based on VGF to consortium of Kalpataru Power Transmission and Techno- Electric and Engineering Company Ltd
- Quoted one time grant of Rs. 93.90 Crs and unitary charge of Rs. 4.5 crs/month

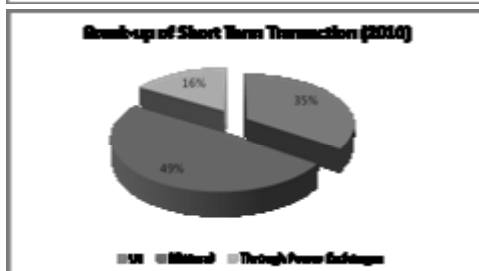
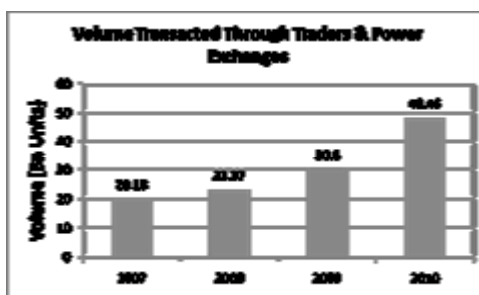
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Transmission - Private Sector

Projects

Project	Developer	Investment (Rs bn.)
Parbati-Koldam	PKTCL [RPTL (74%) and Powergrid (26%)]	10.00
WRSS-II	RPTL	13.85
Sugen	TPGL [Torrent Power (74%) and Powergrid (26%)]	3.20
Karcham-Wangtoo	JPL [(Jaypee (74%) and Powergrid (26%)]	10.00
Mahan	Essar Power Transmission Company	8.57
Teesta Urja	TPTL [(Teesta Urja (74%) and Powergrid (26%)]	7.00
Mundra (Adani)	Adani Power	15.00
Tiroda	MEGPTCL [Adani Power (74%) and Mahatransco (26%)]	43.79
Jaigad	Jaigad Power Transco (JSW Energy-74% and MSETCL 26%)	4.46
East-North Interconnection	Sterlite Technologies	18.00
Talcher-II	RPTL	9.00
North Karanpura	RPTL	41.00
HVPNL (evacuation for Jhajjar and power from Adani Power)	Kalpataru Power Transmission and Techno- Electric and Engineering Company Limited	3.82

Short Term Transactions - Volumes



58% increase in volume of power transacted through traders & exchanges from 2009 to 2010

In 2010, short-term power market (including UI) was 16 per cent of the total short term transactions

2009 was 1st year for procurement of power by industrial sector consumers through power exchanges (IEX only)

The volume transacted through power exchanges could have been 17% higher but was restricted due to transmission congestion

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Short Term Transactions - Prices

Price of Short-Term Transactions of Electricity (Rs/Kwh)								
Period	Bilateral Through Traders				Power Exchange		UI (Grid)	
	RTC	Peak	Off-Peak	Wt. Avg.	IEX	PXIL	New	SR
June-10	5.57	5.84	5.67	5.59	3.50	3.47	3.61	4.67
July-10	4.97	5.89	5.02	4.98	3.36	3.23	4.11	3.95
Aug-10	4.86	4.80	5.34	4.92	3.41	3.52	3.45	4.91
Sep-10	4.71	2.20	4.90	4.73	2.53	2.82	2.02	3.38
Oct-10	3.90	4.97	4.23	4.00	2.73	3.00	2.27	3.25
Nov-10	3.92	4.88	3.81	3.91	2.04	2.65	1.79	2.46
Dec-10	4.12	4.86	3.46	3.95	2.47	2.99	2.54	2.64
Jan-11	4.12	5.13	3.55	4.00	3.44	3.66	3.29	3.48
Feb-11	4.22	5.91	3.98	4.24	3.88	4.54	3.00	5.16
Mar-11	4.65	5.64	4.79	4.67	3.34	5.13	3.12	7.00
April-11	4.76	5.07	4.72	4.76	3.49	4.00	3.91	6.35
May-11	4.52	5.02	4.22	4.49	2.96	3.03	2.86	3.82

Prices of short-term transactions were higher during Apr-Aug period

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Developers' Perspective

Case Studies

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CERC Paper

- CERC Advise to Gol in Sep 2010:
 - Compares non UMPP bids with **same plants** under CERC norms under cost-plus mechanism for **domestic coal**
 - However, capital cost is imputed cost by CERC based on unit size, technology, site, etc
 - Similarly, coal and transport costs based on nearest probable mines
 - Interest rates taken at 7.05% p.a
- Based on above, Levelised tariff under cost-plus higher for 12 out of 14 plants are higher than the bid price
 - In spite of the fact that some assumptions like interest rate etc are out of market for IPPs and highly volatile
 - CERC also mentions that these are conservative cost estimates; no allowance has been made for additional capitalisation over the **LIFE of the Plant**.
 - Similarly coal transportation costs are also on conservative side: for example for less than 500 km, dist assumed is 100 km
- **The differences in prices are significant**

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.....CERC Paper

- CERC Advise to Gol in Sep 2010 mentions:
 - Competition, Efficiency and Innovation
Example of Mundra UMPP experienced by SBICAP
 - Lower Risk for consumers
 - In case of bids, the actual price paid is also dependent on how the bid is structured in terms of escalable and non-escalable components
 - Bidder is under competitive pressure to quote large part of his tariff as non-escalable..., which in turn reduces the amount by which tariffs can go up in future even though the actual cost escalations can be of very high order.
 - The risk is shared between consumer and the supplier under competitive bidding, whereas under the cost plus methodology, the risk is almost completely borne by the consumers and all escalations are generally required to be a pass through.
 - **RISK SHARING IS KEY**

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Bidding Considerations

- All assumptions to be questioned
- Determine the Hurdle Rate for IRR
 - Criteria shifts to IRR from RoE
 - Hurdle Rate usually determined by Cost of Equity and risk profile
 - Typical IRR for cost-plus is 11-12%

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Bidding Considerations

- Extremely important to have pre-bid tie-ups in place
- Commitment on major costs
- Time period for which commitments would hold
 - Interest rates risk?
 - Escalation & Currency provisions on EPC?
 - Ongoing capex

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Bidding Considerations

EPC:

- Costs: Are the Chinese really cheap?
- Performance guarantee on heat rate, aux
 - Sensitivity on domestic and imported coal
 - Degradations
- Construction schedule
- Currency, payment terms
- Availability of ECA financing

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Bidding Considerations

Domestic coal as fuel:

- Mine development expense
- Calorific value estimates
- Cost of ash disposal
- Cost of transportation – MGR etc
- Operations cost
- Mix of Indexed and non-indexed costs

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Bidding Considerations

Imported Coal as Fuel:

- Bidding Strategy and appetite for risk are more important
- Recent bids have clearly underlined this fact
- Mix of Indexed and non-indexed costs much more important
- More sensitive to variation in quality

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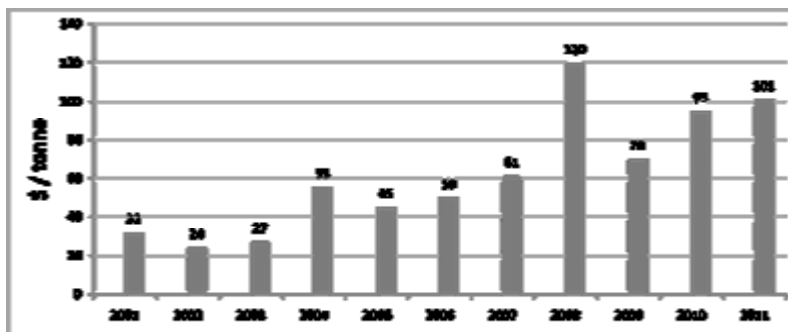
Imported Vs Domestic

Criteria	Domestic	Imported
Calorific Value (kcal/kg)	3500	6000
Cost (Rs/MT)	1000	2700
Variable Cost (Rs/kWh)	0.80	1.4

20 April 2007

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International Coal Prices



- Prices indicative of upward trend since 2001
- Prices increased in 2007 owing to huge demand from Asia, mainly China
- Supply constraints, like port congestion (Australia), floods in Indonesia & strike at export terminals (South Africa) also led to increase in prices in 2008
- During 2009, prices fell as a result of global financial crisis
- Current coal prices hovering around USD 101 per tonne

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Some Issues with Coal Supply

- India will have to import approx. 80 million tonnes of coal in this FY.
- Of the 219 coal blocks allotted to private players, 40 were declared 'no-go' by MoEF
- Coal India has been slow in awarding linkages to developers.
- **International coal prices have been on the rise as China & India have begun importing huge quantities and Vietnam & South Africa turn into net importers**
- **Change in Law in Indonesia (introduction of pricing benchmark, higher taxes & royalty) will lead to a steep rise in price of coal sourced from the country**

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Bidding Considerations

O&M Parameters:

- Again depends on risk appetite and experience of bidders
- Domestic coal requires more recurring capex
- Of particular importance to dwell into Chinese technology and performance history

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Bidding Considerations

- Financial Assumptions
- Financing Mix and sources to be decided
- Large projects like UMPP have to source mix of RTL and external financing
- Limited availability of ECB for sector and such tenures
- ECA are a viable option
 - Time consuming
- Equator Principles to be followed for ECB/ECA funding

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Bidding Scenarios

Scenario	Effect on Tariff
D/E 80:20	8 paise
Loan repayment 15 years	7 paise
Interest Rate increase by 1% p.a.	3 paise

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Case Studies

Some Bids

20 April 2007

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UMPP – Mundra

- For UMPP Bids for Mundra, Tata Power and Reliance had different bid strategies
- TPL bid numbers were broken into escalable and non-escalable components
 - Reflects clear direction of owning mine and ships (or equivalent long term contracts) while retaining limited risk
- Reliance had bid all numbers as escalable
 - Reflects strategy of procurement on spot basis for coal and transport
 - No upsides possible unless captive mines / long term contract on different terms
 - Was it conservative or aggressive?

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UMPP – Mundra

- Reliance Krishnapatnam Bid – Risk Allocation?
- Indonesian law Change has made imported coal based projects that did not have full pass through non bankable
- Lenders had demanded “Change in Law” provision at the time of UMPP Bidding; rejected

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Comparison of Original Bid parameters & Current Parameters for Mundra UMPP

CERC- Parameter	Value for Original Bid	Current Value advised by CERC
Annual Escalation for Capacity Charge	5.37%	5.21%
Annual Escalation for Variable Charge	3.46%	14.02%
Annual Escalation for Fuel Transportation	9.08%	15.99%
Annual Escalation for Fuel Handling	5.37%	5.21%
Discount Rate	10.60%	10.74%
Variability of Exchange Rate	1.07%	0.64%
Levelized Tariff	2.26449	4.75490

If we consider the price of imported coal at today's prices of \$ 101 /tonne (for international coal of similar GCV):

- Escalable and non-escalable in the same ratio as the original bid: Rs 3.74/KWHR.
- All escalable component: Rs. 4.36/KWHR

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UMPP – Sasan: Base Case

- CERC Levelized Tariff: Rs 1.77
- Base Operating Parameters:

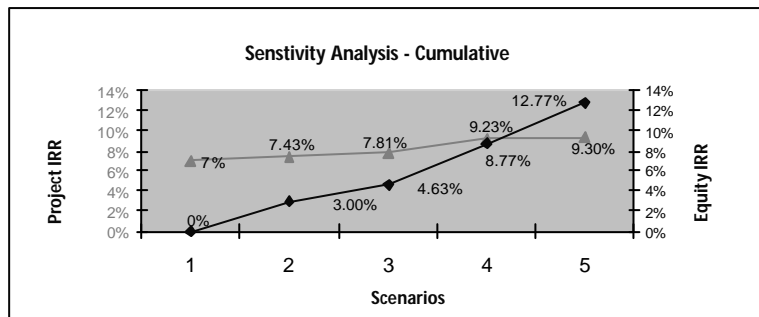
Auxiliary consumption	7.5%
O and M Values:	Rs. 1 Mn/ MW
Coal price escalation	6.77%
Senior debt repayment period:	11 years
Plant load factor	80%

Levelised Tariff Quoted by Reliance Power : Rs 1.196 / Kwh

	Project Cost / MW (Rs Mn)	Project IRR (%)	Equity IRR (%)
Base Case	40.48	7%	0%

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UMPP – Sasan: Sensitivity Analysis



Scenario	1	2	3	4	5
Rate of interest	11.0%	8.5%	8.5%	8.5%	8.5%
Auxiliary	7.50%	7.50%	6.50%	6.50%	6.50%
PLF	80.00%	80.00%	80.00%	90.00%	90.00%
Repayment period	11	11	11	11	18
Rate of interest	11.0%	8.5%	8.5%	8.5%	8.5%

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INFERENCE (SASAN) UMPP – Sasan: Inference

- Impact of Rate of Interest and debt repayment period is the highest
- In this case the repayment period is 18 years/Other cases 10-12 years
- Most of the loans planned with Re-Financing
- Some Major loans from IFC/ADB planned as long tenor loan
- Rate of interest greatly brought down by huge ECB borrowing

Tariff of Rs. 1.196 p.u. extremely aggressive

Reliance can make project viable only by squeezing every variable – ROI, Auxiliary consumption, Tenor of loan, PLF and other non-traditional venues

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UMPP – Sasan: Alternate Revenue Sources

- Use of bi-products – flyash, Steam
 - Fly ash used in production of Cement
 - Reliance plans Cement factory near Sasan to utilize flyash
 - Low pressure steam to be used in production of fertilizer
- Alternate use of coal
 - Additional Coal from Captive Mine to be used in setting up other power plants
- Certified Emission Reduction(CER)
 - CERs could be traded in the Market for \$15-\$20
- Vertical Integration
 - Entering into logistics Sector to reduce cost of transportation

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KPCL – Case 2 Bid “Gulbarga”

Capacity	1320 MW
Location	Gulbarga, Karnataka
Coal	Domestic/International - ?
Procurers	5 DISCOMS of Karnataka
Key Details	<ul style="list-style-type: none">• Coal to be arranged by the bidders either Domestic or Imported• Land and other approvals arranged by state• Plant location around 1000 kms by rail from nearby ports• Comfort letter required at bid stage from Domestic coal supplier – regarding supply for entire PPA tenure• FSA to be signed within 12 months from Lol

- Bid requirements practically rule out any participation based on domestic coal – linkages allotted are project specific, developers with captive blocks prefer merchant plant
- Imported coal also a practical ‘no-go’ due to plant location – nowhere near a port. Imported coal based tariffs would be very high
- Is this really a well thought out Bid -?

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Opportunities

- Payment Security offered differs widely amongst states
- Best recourse is 3rd party sale in case of default
- However, Open Access is a MUST
- Domestic mines offer a significant upside potential
- **Imported coal bidding has to change**

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Constraints

- Health of distribution companies
- Open Access Issues
- Linkage FSA
- Change in Law in case of Imported coal
- Funds crunch in Indian Financial market – Sector/Firm/ group Exposure
- Land Acquisition, R&R and approvals

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Conclusion

- Indian Power Sector has come a long way in terms of liberalization
- Electricity Act 2003 combined with NEP, NTP have promoted competition/ better tariff for end customer
- However developers should be aware of certain pitfalls
 - Competition from Captive Power Plants
 - Merchant Power tariff assumptions too high
 - Efficiency assumptions may not be entirely achievable in India
- Government should play more proactive role
 - Sector exposure/Financial closure issues eased out
 - Development of Power trading model to be handled carefully
- Path Ahead Really bright

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Thank You
Questions?