

POWER SECTOR IN INDIA

CHALLENGES AND OPPORTUNITIES

By

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The Power Sector in India

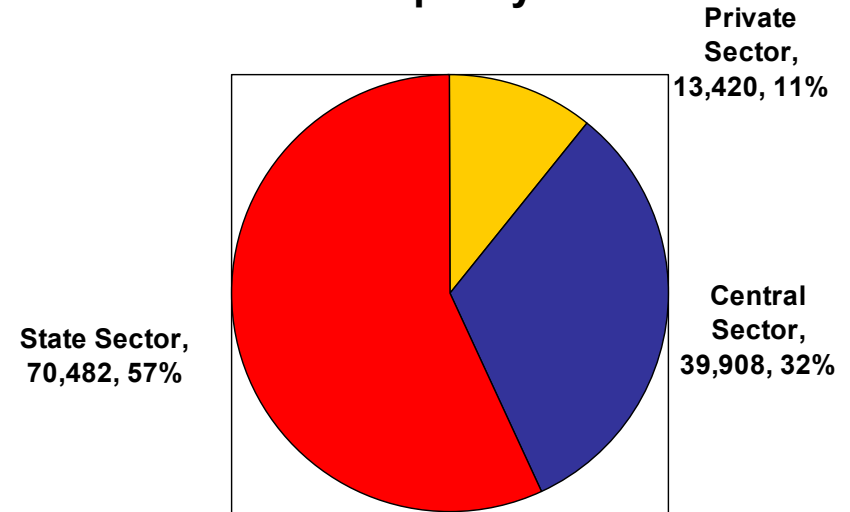
Power Infrastructure in India – March 2006



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Hydro	32,335 MW	26%
Thermal	82,507 MW	66%
Coal	68,643 MW	
Gas	12,663 MW	
Nuclear	3,310 MW	3%
Renewables	6,158 MW	5%

Installed Capacity in MW



In addition captive generation of approx. 41,000 MW

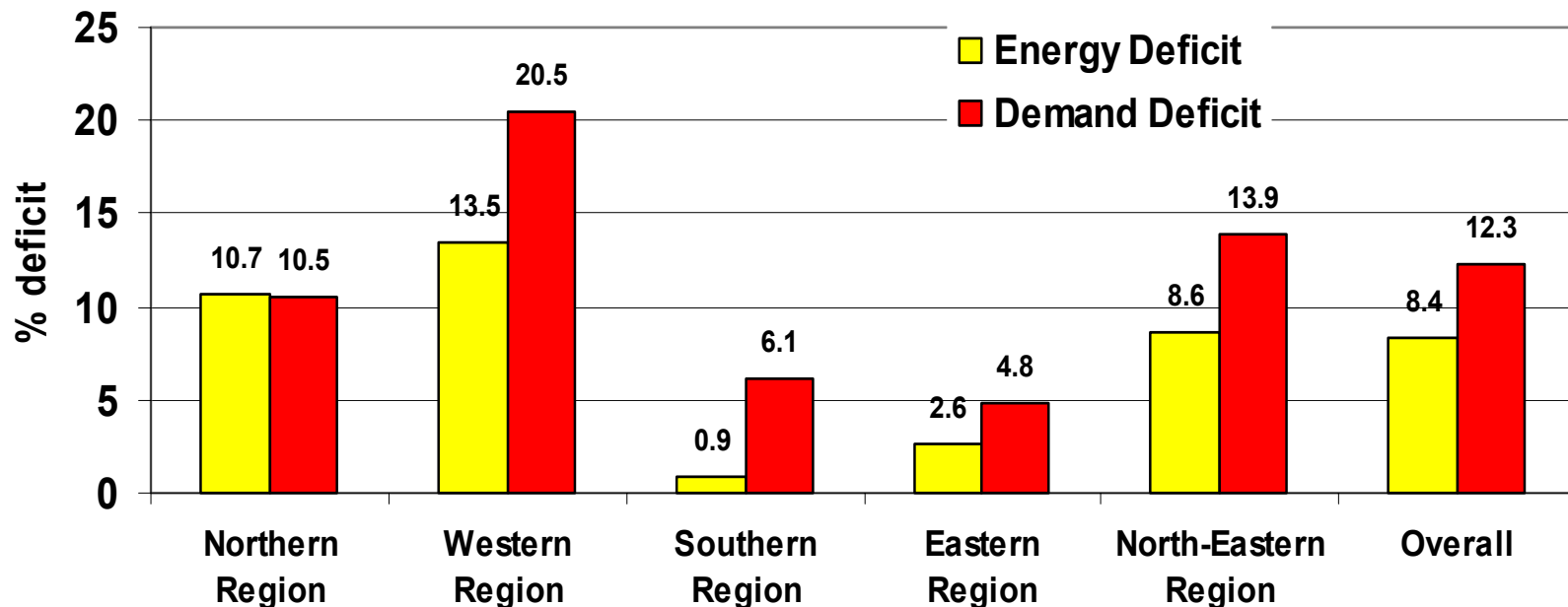
Total Installed Capacity in India as of March 2006 – 1,24,310 MW

Power Infrastructure, still largely in the Public Sector

Energy and Demand Deficits - 2006



Energy & Demand Deficits - 2006

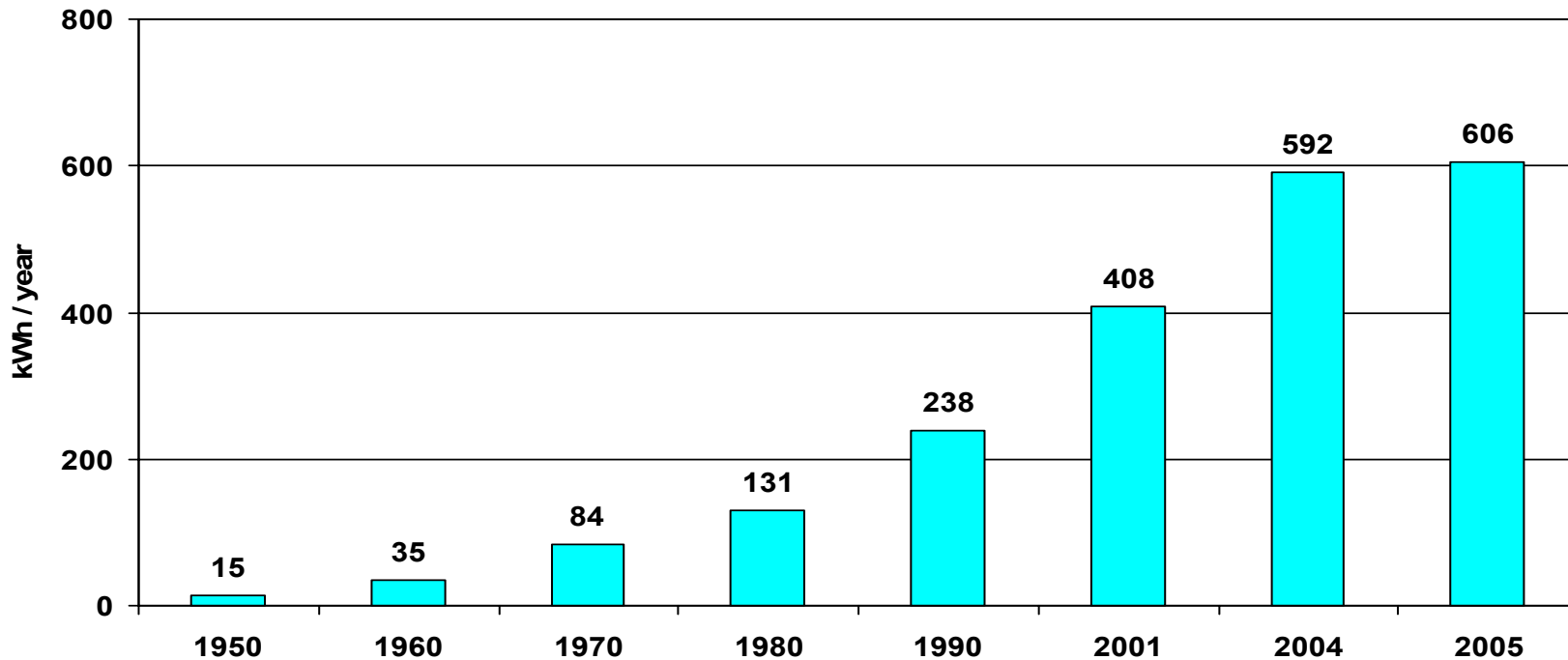


Despite a manifold increase in the installed capacity, supplies have not been able to keep pace with demand

Per capita Electricity Consumption



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In 1950, per capita consumption was 15 kWh. In 2012, it is projected at 1,000 kWh.

China - 1,200 Brazil - 2,070 Thailand - 2,000 Malaysia - 3,000

Large potential for the growth of the power sector in India, even as compared to China

Per capita consumption Region - wise



Per capita electricity consumption	
Region	kWh / year
Northern Region	564.57
Western Region	876.68
Southern Region	735.73
Eastern Region	357.22
North Eastern Region	218.92
All India	606.00

Vision of the Government of India

“ Power for All by 2012 ”

- **Generating Capacity to be increased from 124,310 MW to 212,000 MW**
- **Share of the Private Sector to be increased from 10% to 16.5%**
- **Hydel contribution mix to be increased from 25% to 30% : addition of almost 40,000 MW of new hydel capacity**
- **Inter-regional transfer capability to be increased from 9,850 MW to 30,000 MW**
- **Recovery of the power cost through the realised tariff from 70% to 100%**

Future Vision (contd.)



- **T & D losses to be reduced from 40% to 13%**
- **100% rural electrification from the existing 86%**
- **Peak Demand and Energy Shortages to be eliminated**
- **Industrial tariff, presently about Rs. 5 per kWh to be lowered to Rs. 2.50 per kWh in support of global competitiveness**
- **SEB commercial losses of Rs. 26,000 crores to be reduced and the sector made financially viable**

The Electricity Act 2003

(In force from 10 June 2003)

Salient Features of the Act



- **The Act creates a liberal and transparent framework for power development**
- **Entry barriers removed / reduced**
 - **Generation de-licensed**
 - **Freedom to captive generation, including group generation**
 - **Recognising Trading as an independent activity**
 - **Open access in Transmission**
 - **Multiple licenses in Distribution**
 - **Open access to consumers above 1 MW within 5 years from 27th January 2004**
- **Regulatory Commissions to develop market & to fix tariff**

Status (April 06) of Implementation of the Act



- **National Electricity Policy announced**
- **Electricity Appellate Tribunal operational**
- **Guidelines for determining tariff through competitive bidding notified**
- **Regional Power Committees for all the 5 Regions notified**
- **Tariff policy announced**
- **Open access in Transmission notified by CERC**
- **Action initiated on open access in Distribution by several SERCs**

Power - The Challenges

- **Achieving the capacity addition target of 100,000 MW in G/T/D to ensure power for all by 2012**
- **Refurbishing existing G / T / D through APDRP and other means to provide reliable, quality supply and reduce losses**
- **Converting a loss making sector into a profitable, self-sustaining, consumer oriented operation**
- **Political stumbling blocks - coalition governments, federal structure, electricity a concurrent subject, electoral politics**
- **Change in social behaviour**

MoP's Ranking of States



- **Ministry of Power has ranked all States / Electricity Departments in June 2006**
- **Part I and Part II – overall rating based on 75% of Part I and 25% of Part II**
- **Parameters of Part I – State Govt., Regulatory process, G / T / D, Financial Risk, Commercial viability**
- **Parameters of Part II – Sustainability of State power Sector revenue model, Creation of competitive environment**
- **Top three States are – Andhra Pradesh, Gujarat and Delhi**
- **Top three have scored in the region of 50 – 55% - A lot more needs to be done**

- **Introduced by Gol in March 2003 to accelerate distribution sector reforms. The main objectives of the programme are:**
 - **Reduce Aggregate Technical & Commercial (AT&C) losses**
 - **Bring about commercial viability in the power sector**
 - **Reduce outages & interruptions**
 - **Increase consumer satisfaction**
- **Gol provides Additional Central Assistance for strengthening and up gradation of sub-transmission and distribution network. Additional Central Assistance covers 50% of the project cost in form of 50% grant and 50% loan. Remaining 50% of the fund from PFC and REC or other financial institutions or from own resources**
- **An incentive equivalent to 50% of the actual cash loss reduction by SEBs/ Utilities, is provided as grant**

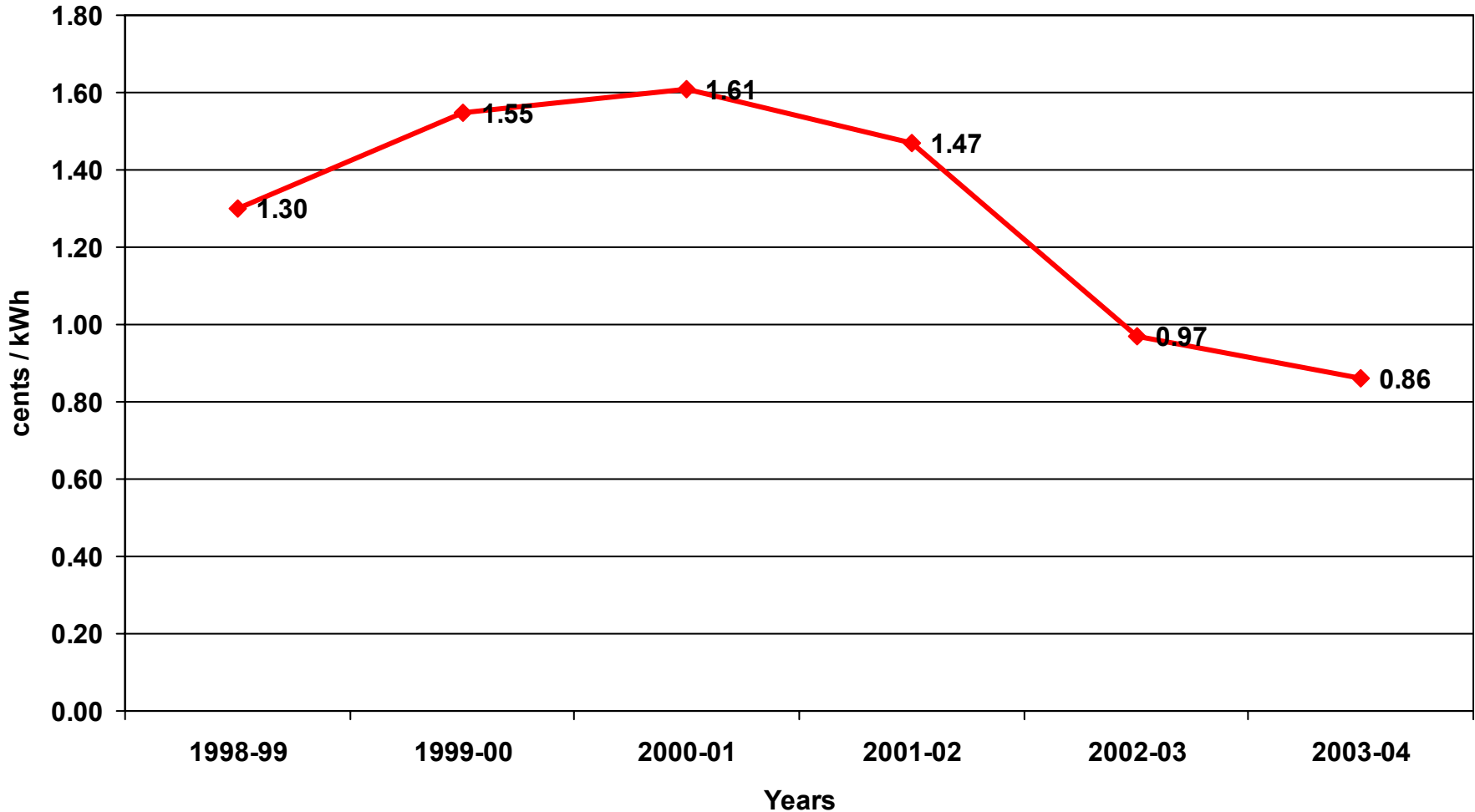
- **583 Projects sanctioned valued at Rs 19182.33 crs. APRDP component is Rs 11279.88 crs, of which Rs 5872.32 crs are released (as of February 2006)**
- **Andhra Pradesh has the highest number of Projects sanctioned – 101 with APDRP component of Rs 566.76 crs**
- **Maharashtra has 35 Projects sanctioned with APDRP component of Rs 1115.79 crs**

Revenue Gap (cents / kWh)



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Difference between Average Cost of Supply (ACS) and Average Revenue Realised (ARR)

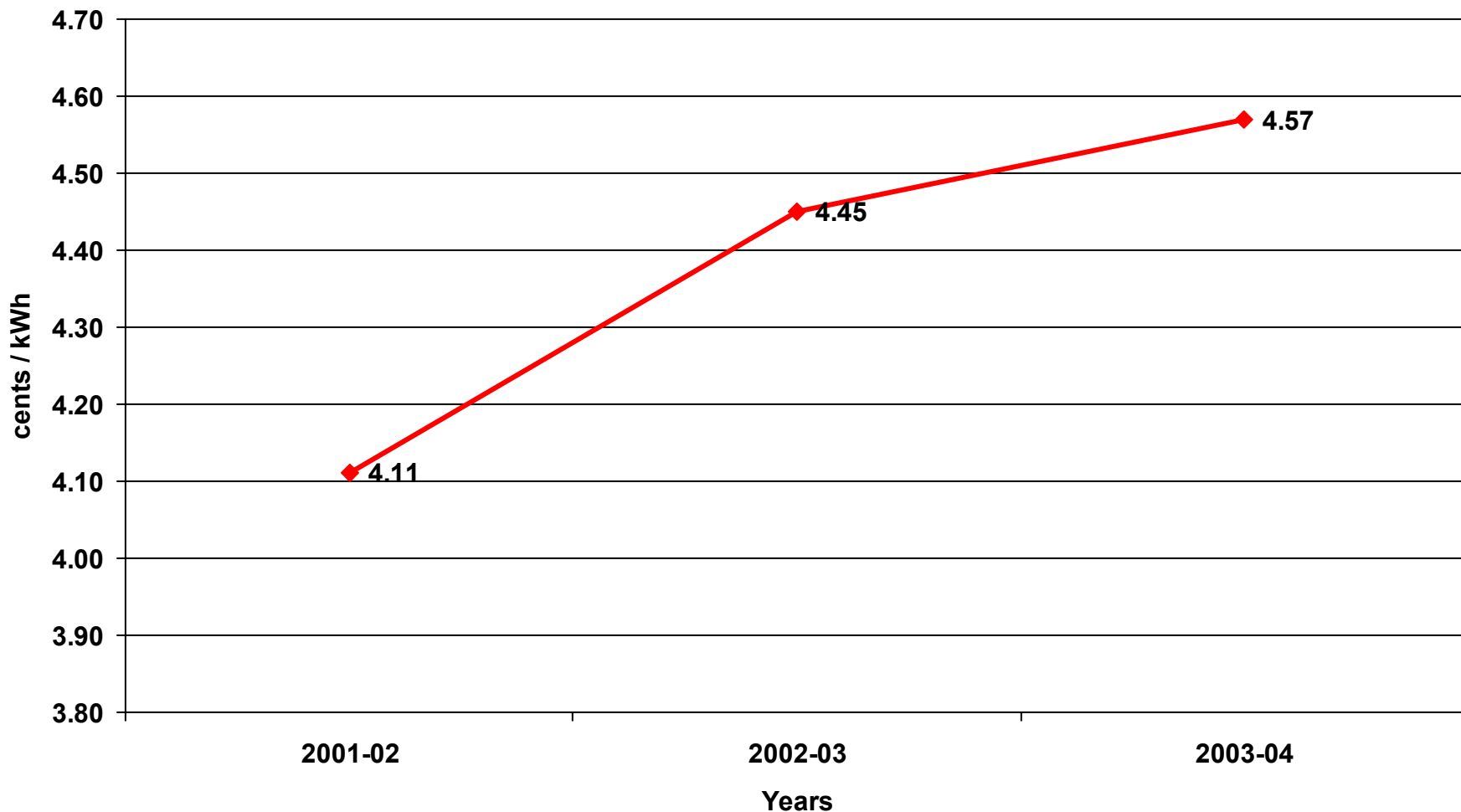


Tariff Realisation (cents / kWh)



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Average Revenue Realised (ARR)



Power - The Opportunities

By 2010

- Village electrification to be 100%

By 2012

- Per capita availability 1,000 units
- Installed capacity 200,000 MW
- Spinning reserve 5%
- Minimum lifeline consumption of 1 unit per household per day
- Quality and reliable power supply

Tariff Policy



- **Tariff of all Generation & Transmission projects in private sector through competitive route. Public sector in 5 years time.**
- **Reduction of cross subsidy to + / - 20% in 5 years**
- **Emphasis on formulating Open Access in Distribution**
- **Transmission tariff framework sensitive to distance and direction**

Generation - The Opportunities

Capacity Addition during XI Plan

2007-08 to 2012-2013



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Fuel	Central sector (MW)	State sector (MW)	Private sector (MW)	Total (MW)
Thermal	21,000	11,000	12,000	44,000
Hydro	10,000	5,000	-	15,000
Nuclear	3,000	-	-	3,000
Total	34,000	16,000	12,000	62,000

- *May be revised to 67,000 MW, depending on the availability of Gas / LNG in require quantities and right prices.*
- *In addition, 5,000 MW through non-conventional sources.*
- *Captive capacity not included.*

Ultra Mega Power Projects



- **Large sized projects of 4,000 MW capacity – economies of scale**
- **Latest high efficient super critical technology**
- **Past experience of IPPs reveals following Government intervention:**
 - **Securing reliable fuel supply**
 - **Obtaining environmental clearances**
 - **Co-ordination with States and Bulk Power Purchases for achieving financial closure**
- **Locations:**
 - **Pit head location with domestic coal**
 - **Coastal location with imported coal**
 - **Coastal location with domestic / blended coal**

Ultra Mega Power Projects

contd



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- **Power Finance Corporation (PFC) nominated as nodal agency to set up shell companies for each identified site**
- **Shell company to work independently till major tie-ups, statutory clearances and linkages are in place (Project report, Land acquisition, Allocation of fuel linkage / coal blocks, Allocation of water, Appointment of consultants for EIA, Appointment of consultants for ICB, Various approvals / statutory clearances, Off-take of power, Power evacuation system)**
- **Selection of successfully Bidder through Tariff based International Competitive Bidding**

Ultra Mega Power Projects

contd



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Sites identified / Shell Companies formed:

- **Sasan Power Ltd. (Madhya Pradesh)**
- **Akaltara Power Ltd. (Chhatisgarh)**
- **Coastal Gujarat Power Ltd. (Mundra)**
- **Coastal Karnataka Power Ltd. (Karwar)**
- **Coastal Maharashtra Power Ltd. (Ratnagiri)**

Payment Security Mechanism:

- **As per conditions in the PPA**
- **Letter of Credit by Distribution Licencees**
- **Escrow Account of Distribution Utilities**
- **In the event of default, direct supply to HT consumers as per the provisions of EA, 2003**

Opportunities in Generation



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- **Setting up pit-head stations and availing open access in transmission**
- **Captive Plant installation by Industries / Groups facilitated by elimination of SEB & techno-economic clearances**
- **Joint ventures possible with CPSUs eg NTPC & States - NTPC financially strengthened by one-time settlement scheme**
- **100% FDI in all sectors allowed**
- **Opportunity to sell generation to Trading company**
- **50,000 MW Hydro initiative launched**
- **Ultra Mega Power Projects**

Transmission - The Opportunities

- **Intra-regional expansion of transmission capacity linked to generation projects**
- **Inter-regional connectivity planned with hybrid systems**
- **Present Inter-regional transfer capacity of 9,500 MW being enhanced to 17,000 MW by 2007**
- **To be enhanced to 37,000 MW by 2012**

Opportunities in Transmission



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- **Evolution of National Grid with Inter-regional transfer capacity of 37,000 MW by 2012 will provide scope for Private participation via:**
 - **Independent Power Transmission Companies**
 - **Joint ventures with Powergrid**
- **Enhanced transfer capability will support power trading and open access and help match regional surplus & shortages**
- **Enhanced transfer capability will resolve mismatch between fuel location and load centre need**

Distribution - The Opportunities

Regulatory Reforms



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Issues	Total	Andhra Pradesh	Assam	Chhattisgarh	Delhi	Gujarat	Haryana	Himachal Pradesh	Jharkhand	Karnataka	Kerala	Maharashtra	Madhya Pradesh	Orissa	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	Uttaranchal	West Bengal
Electricity grid code	11	Yes	Yes	No		Yes	Yes	No	Draft	Yes	Yes	Draft	No	Yes		Yes	No	No	Draft	
Distbt. Open Access Regulation	19	Yes	Yes	Yes	Draft	Yes	Yes	Yes	Yes	Yes	Draft	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Method for Open Access Surcharge	12	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes	No	SI	Yes	SI		Yes	Yes	No	Yes	No
Reduction of cross - subsidy	11	SI			Yes	No	No	Yes	Yes	SI		SI	SI	SI		SI	No	Yes	SI	
100% metering of consumers	10	SI	SI	No	No	SI	No	SI	SI	SI		Yes	No	SI (89)		SI	No		SI	
Time of Day (ToD) tariff	12	SI		Yes		Yes		Yes	Yes	Yes		Yes	Yes	Yes		No	Yes	Yes	Yes	
Transmission Charges for Open Access	11	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No		Yes	No		SI	No
Intra- State Trading Regulations	10	SI	Yes		No	Yes	No		Draft	Yes		Yes	Yes	Yes		Yes	No	Yes		
Terms and conditions of Tariff	15	Draft	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Draft	Yes		Yes	Yes	No	Yes	Yes
Technological Upgradation of SLDC/ SCADA for Distribution Licensees	17/16	Yes	Yes		Yes	Yes/SI	Yes	Yes	SI	Yes/SI	Yes	Yes/SI	SI	SI	Yes	Yes	Yes*	Yes	Yes	
Differential pricing for power procurement	8	Yes	No			SI			No	Yes		SI	Yes	SI		SI	No	Yes		
Guidelines for Consumer Grievance Redressal Forum	17	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes
Establishment of Consumer Grievance Forum/ Number of Forum	14	Yes	Yes		Yes	Yes		Yes	Four	Yes		14	3	10		35	Yes	Yes	Yes	
Guidelines for Appointment of ombudsman	16	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes		Yes		Yes	Yes	Yes
Number of ombudsman appointed for different area	14	Yes			Yes	Yes	One	Yes	One	One		One	1	4		Three	Yes		Yes	Yes

Opportunities in Distribution

- **Open access for consumers**
- **Parallel distribution licenses & Distribution sub-licensing**
- **Unbundling & privatisation of SEB distribution zones**
- **Stand-alone rural electrification systems**
- **Metering, meter reading systems, energy accounting and MIS hardware & software**
- **Web enabled facilities for consumers**

Trading - The Opportunities

Opportunities in Trading

- **Trading recognised as a distinct activity in EA 2003**
- **Substantial scope for Trading with Inter-regional transmission capacities planned and generation capacity being set up**
- **Tradeable surplus capacity available from SEBs, Licensees, GENCOS, and CPPs on firm or infirm basis**

- **Legislation is in place and Reforms are in progress**
- **Ambitious generation capacity addition target of 100,000 MW by 2012 with matching capacities in Transmission & Distribution**
- **Inter - regional power transfer capacity to be augmented to 37,000 MW by 2012**
- **Investments required during XI plan:**
 - **US\$ 50 billion for Generation**
 - **US\$ 50 billion for Transmission, Distribution and Rural Electrification**

The Tata Power Company Ltd

The Tata Power Company Ltd



TATA POWER

- **The largest private power utility in India**
- **Experience of over 90 Years in field of generation, transmission and distribution of Electricity**
- **Financial strength and technical expertise**
- **Operations in Mumbai, Delhi, Karnataka, Jharkhand and cross-country Transmission (Tala Transmission from Siliguri to Mandaula – 1,200 kms to evacuate power generated by 1200 MW Tala Hydro Project, Bhutan)**

The Tata Power Company Ltd contd

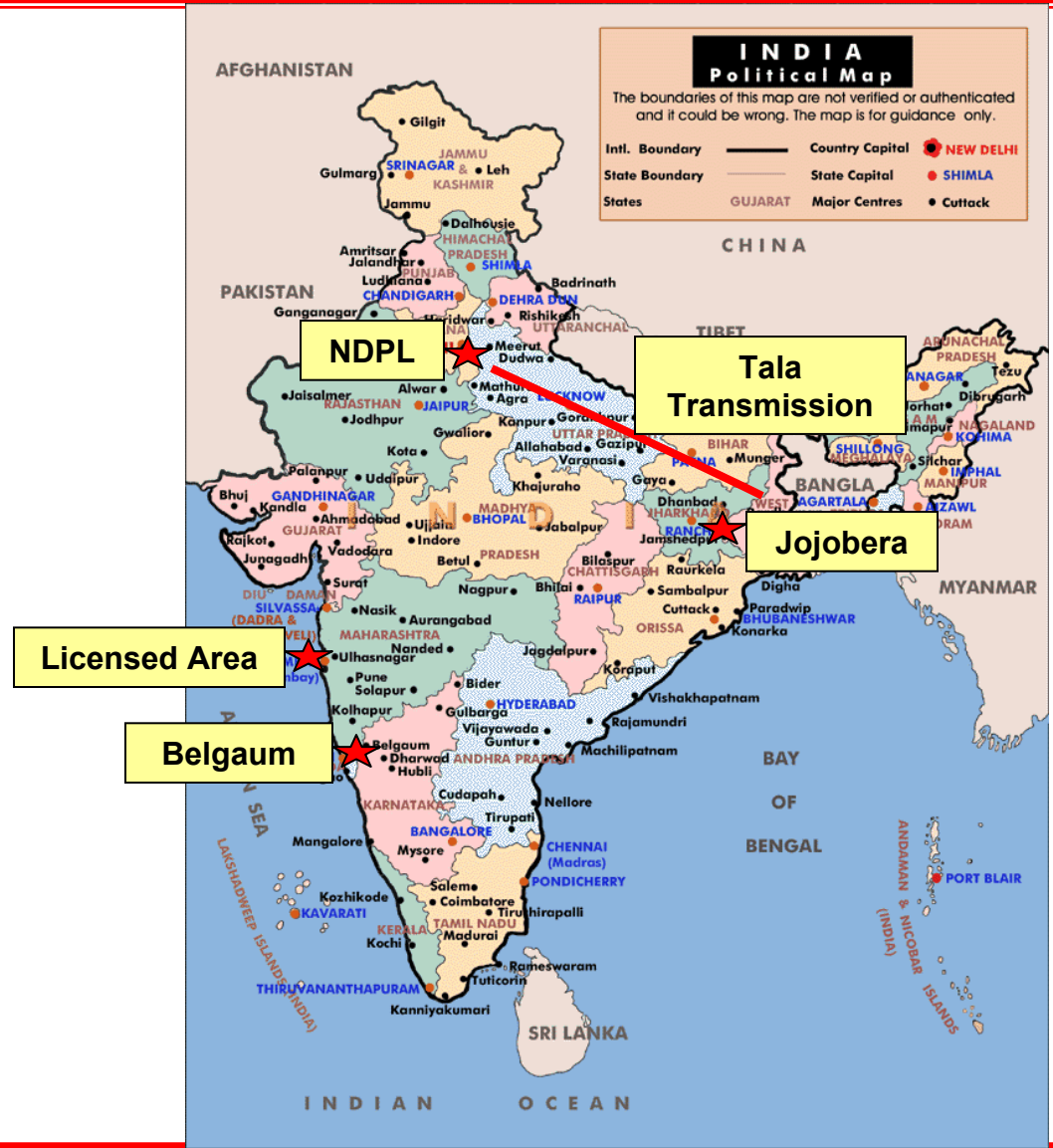


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Many of the "Firsts"



Operations



Financials – P&L (Rs mn)



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	31 st March 2006	31 st March 2005	31 st March 2004
Operating Income	45794.30	39517.00	41251.00
Non-Op. Income	3178.80	3497.40	700.10
Tax	1643.80	1588.80	2263.40
PAT	6105.40	5513.60	5268.50
Cash Profit	8987.00	9291.80	8742.40
Equity Dividend	1684.10	1486.00	1386.90

Financials – Ratios (Rs mn)



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	31 st March 2006	31 st March 2005	31 st March 2004
PBIT / Capital Employed (%)	11.57	11.86	16.08
PAT / Net Worth (%)	12.30	12.15	11.82
Total Debt / Net Worth	0.67	0.76	0.52
Current Ratio	3.07	2.32	1.86
Asset Coverage Ratio	3.86	3.06	4.75
Interest Coverage Ratio	7.91	7.70	5.38
EPS (Rs)	30.85	27.86	26.62
Book Value (Rs)	250.87	229.25	225.17
Dividend per Share (Rs)	8.50	7.50	7.00

Operations contd



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Trombay - Thermal

Unit 4	150 MW	Oil & Gas
Unit 5	500 MW	Oil, Coal & Gas
Unit 6	500 MW	Oil & Gas
Unit 7	200 MW	Gas



Hydro Power Generation

Khopoli	72 MW	Mumbai Licensed Area
Bhivpuri	75 MW	
Bhira	300 MW	



**Non-
conventional**



CPP



IPP

Wind 17 MW

Jojobera 427.5 MW

Belgaum 81.3 MW

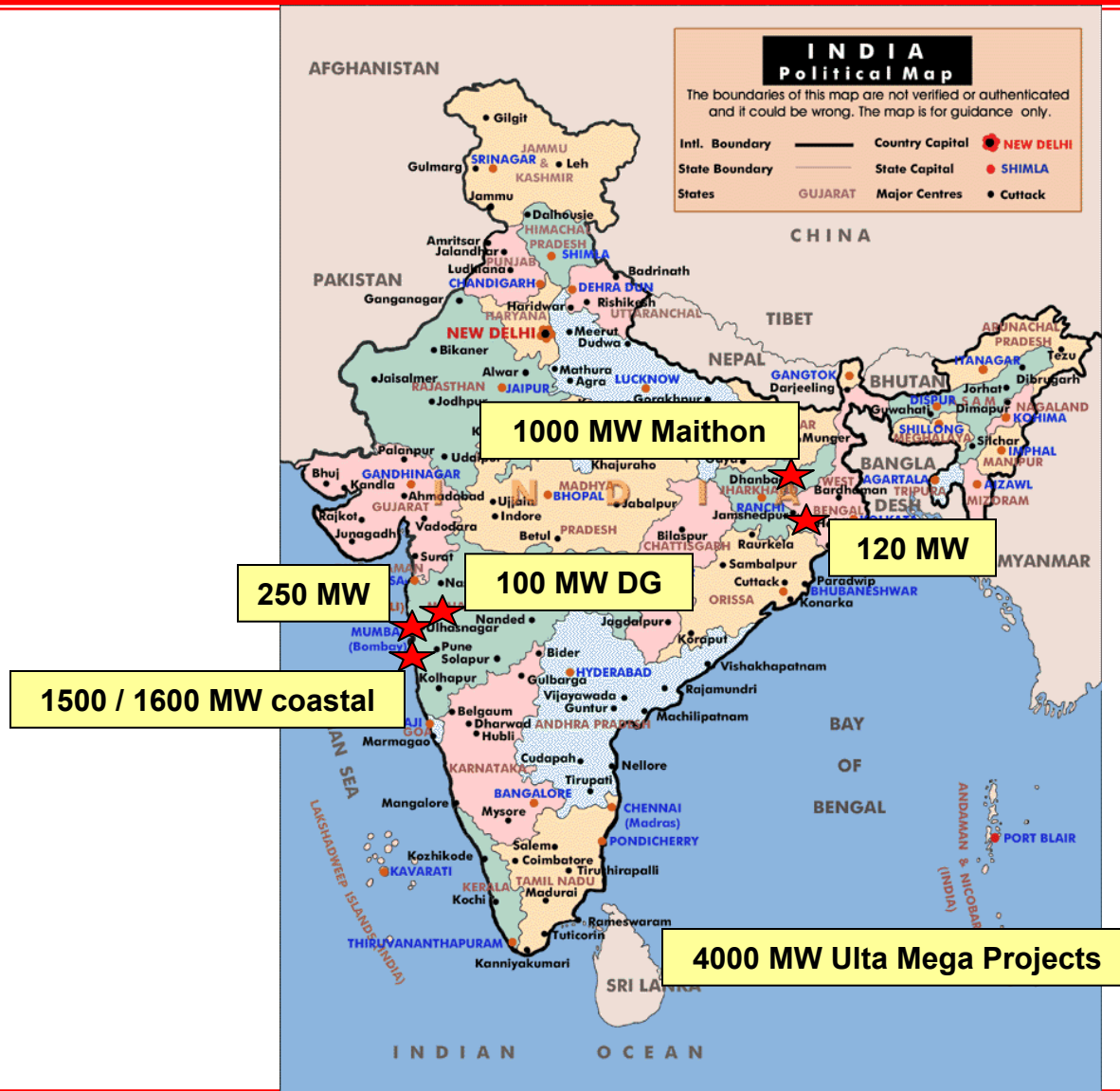
Tala Transmission



- **Powerlinks Transmission Ltd - Joint Venture of Tata Power (51 %) and Power Grid (49 %)**
- **Geographical span: Siliguri to Mandaula ~ 1200 Km**
- **400 kV double circuit transmission line to evacuate power from 1020 MW Tala Hydro Electric Project in Bhutan, and surplus power from Eastern / North-eastern region in India**
- **Longest power transmission corridor from Eastern India to Northern India**
- **Schedule: end June 2006. Erection completed on schedule. Commissioning on Sub-stations completion by PGCIL**

- **Distribution of power in Delhi**
- **NDPL - Joint venture between Tata Power and Govt. of Delhi – 51% : 49%**
- **510 sq kms**
- **8.5 lakh registered consumers**
- **Peak load – 1000 MW**
- **Operations commenced in July 2002**
- **Loss reduction targets (17%) achieved in 3 ½ years against schedule of 5 years**

The Future



250 MW at Trombay

- **Mumbai Licensed area demand grows by 5-7% per annum**
- **Present capacity enough to cater upto 2009-10**
- **2X250 MW of which all clearances for 250 MW received**
- **Major Order for Main Plant and Equipment and Balance of Plant placed on BHEL**
- **Scheduled to be commissioned during 2008-09**
- **Will operate under Licensed Area at 14% ROE**

Coastal Project



Capacity - 1500 MW

Land

- 527 hectares identified
- Hi-powered Committee of GoM approved the proposal in June 2006
- Application made to MIDC to acquire the land under MID Act

Water - Allocation obtained from MIDC

Sale of Power - Bidding process in progress – GUVNL & MSEDCL

Coal - Eol from reputed International (Australia, Indonesia) suppliers received

Clearances - Application made to MPCB

Financial Closure - Planned by March 2007

Schedule - 36 to 42 months from Financial Closure

120 MW, Jamshedpur

- **To meet Tata Steel's increase in demand in view of their expansion plans**
- **120 MW within Tata Steel Works at Jamshedpur**
- **Fuel – waste gases from Blast Furnances and Coke Ovens to be used as fuel. Presently these gases are waste. No consumption of coal**
- **Major Orders placed**
- **Scheduled to be commissioned during 2008-09**

1000 MW, Maithon

- **Maithon Power Ltd - 74:26 JV with Damodar Valley Corporation**

Capacity

- **1000 MW coal based**

Share Holders Agreement

- **Already in place**

Land

- **1120 acres – 55% already acquired**

Clearances

- **In place – Water, State Pollution Control Board, Ministry of Environment & Forests**

Fuel

- Long term coal linkage from BCCL for 4.86 MTPA
- DVC has also agreed to supply coal from mines owned by them
- Captive coal blocks being pursued

Financial Closure

- Comfort letter received from PFC

Schedule

- 44 months from March 2007

Ultra Mega Power Project

- **Pre-qualified for Sasan and Mundra projects. Proposal to be submitted by 22nd November 2006**
- **RFQ for Krishnapatanam, Andhra Pradesh due on 30th August 2006**
- **RFQ for Maharashtra & Karnataka due on 30th September 2006**
- **MOU signed with Siemens and Doosan for the Ultra Mega Power Projects. They would be EPC contractors**
- **Siemens Project Ventures Ltd willing to take equity stake**

Wind Project

- **50.4 MW Wind Project at Khandke, Ahmednagar District, Maharashtra**
- **63 machines of 800 kW capacity each**
- **Commissioning by March 2007**

Conclusion

Generation projects of approximately 7,500 MW in the pipeline valued at Rs 30-35,000 crores over the next 5 Years

Thank You