

Presentation on the **Power Sector in India**

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- 1. INDIA- AN OVERVIEW**
- 2. THE ELECTRICITY ACT 2003**
- 3. PROGRESS OF REFORMS**
- 4. POWER SECTOR PLAYERS**
- 5. OPPORTUNITIES**
- 6. CONCLUSION**

India –Some Facts

Population

1050 Million (Growth Rate of 1.5%) -2003 data

GDP

Rs 24.6 lakh Crores = US \$ 572 Billion

11th Highest GDP in the World

4th Highest in GDP (PPP)- US \$ 2400 Billion

System of Government

•Multiparty Parliamentary System –Westminster Model

•Two Houses of Parliament

• Worlds largest democracy

Concurrent Subjects

•Power, Education, Health and Finance etc

India has 28 States and 6 Union Territories

Economic Highlights

Sensex Growth

+77 % in last 12 months

Power Stocks Growth

+ 243 % in last 12 months

Expected GDP Growth

- 8% in 03-04
- 10.5 % in Q3 of FY 04

Forbes 2000 List

•27 Indian Companies in list

The Rupee has strengthened 8.7 % vs US \$ in the last one year

Tariffs in India



Typical Electricity Tariffs in India (Maharashtra)

	<u>Rs/Unit</u>	<u>Cents/Kwh*</u>
Residential	2.8	6.4
Commercial	3.9	8.9
Small Industrial	3.3	7.5
Agriculture (Metered)#	1.5	3.4
Big Industrial	4.0	9.1
Railways	3.9	8.8

* 1\$= Rs 44

Actual paid is less due to Govt Subsidy

The Tariffs are structured to have a built in Cross Subsidy

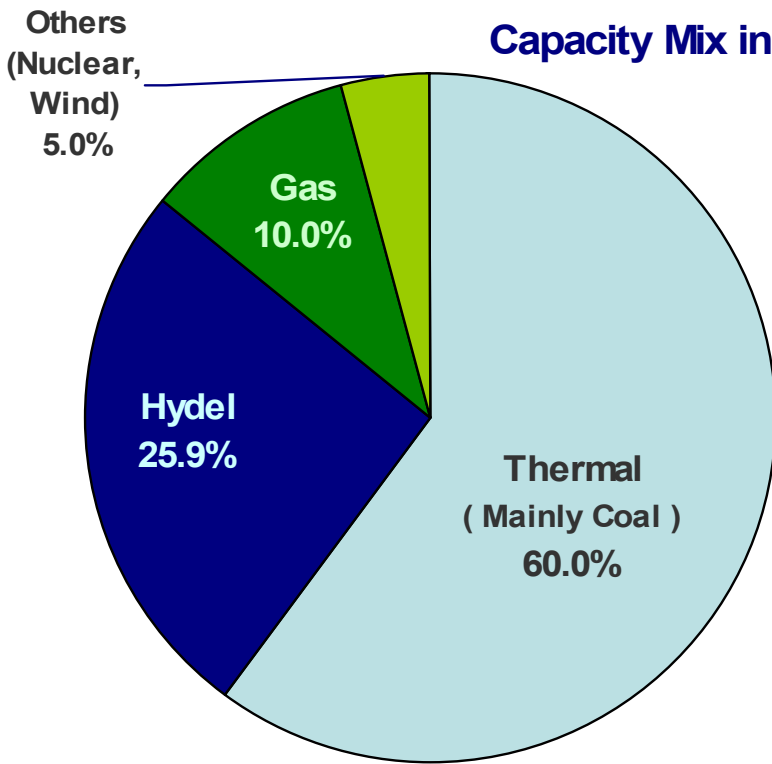
The Cross Subsidy has been reduced over a period of time

Power Scenario - Capacity

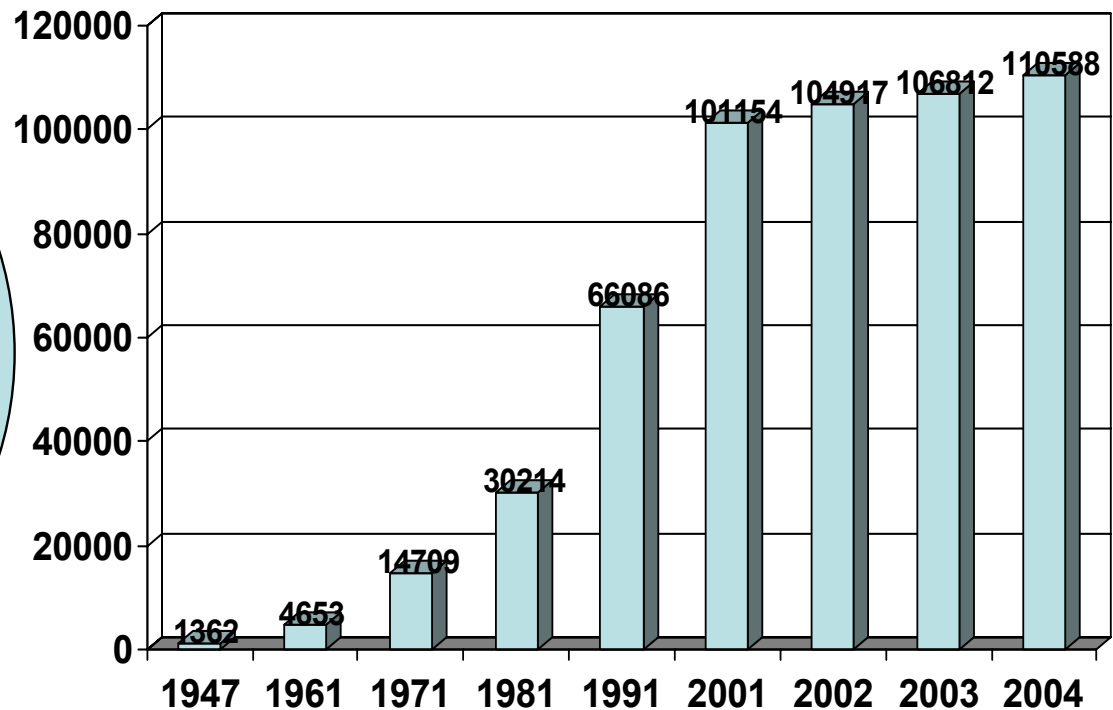


- **Installed Generating Capacity in India (FY03) :**
 - **State Government Owned** **64,428 MW** (58%)
 - **Central Government Owned** **34,500 MW** (31%)
 - **Private Sector Owned** **11,660 MW** (11%)
 - **TOTAL** **1,10,588 MW**

Capacity Mix in India



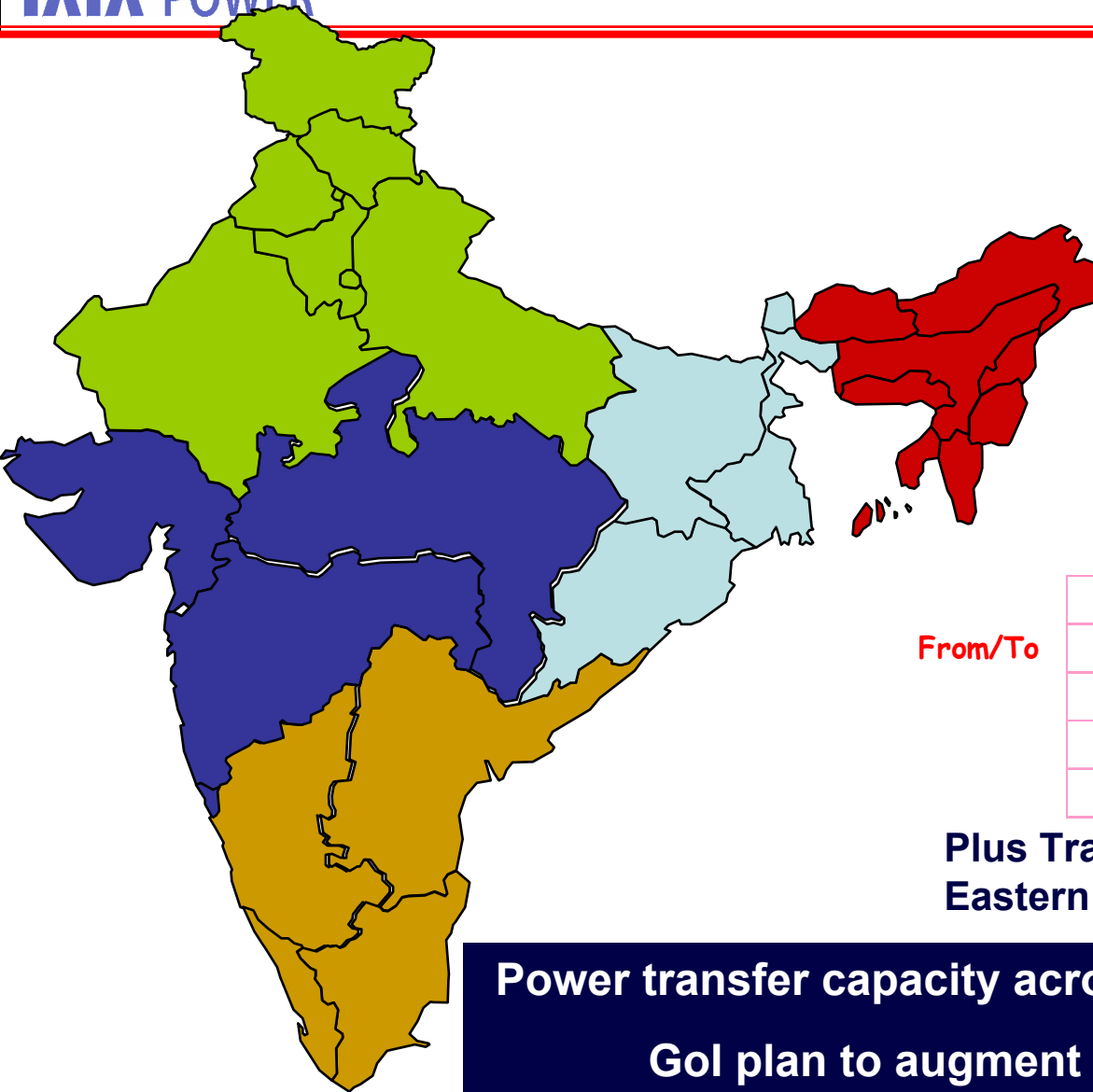
All India Installed Capacity in MW



Power Regions of India



TATA POWER



- Eastern Grid (EG) –16695 MW
- Northern Grid (NG) –28553 MW
- Western Grid (WG) –31563 MW
- Southern Grid (EG) –28452 MW
- North – Eastern Grid

Power Transfer Matrix (MW)

		From/To				
From/To		EG	NG	WG	SG	Total
EG			1700	2450	2700	6850
NG	1700		700			700
WG	2450	700		1400		1400
SG	2700		1400			
						8950

Plus Transfer Capacity of 900 MW From the Eastern Grid to the North – Eastern Grid.

Power transfer capacity across regions limited to 9800 MW.

Gol plan to augment it to 30,000 MW by 2012.

Per-Capita Energy Consumption



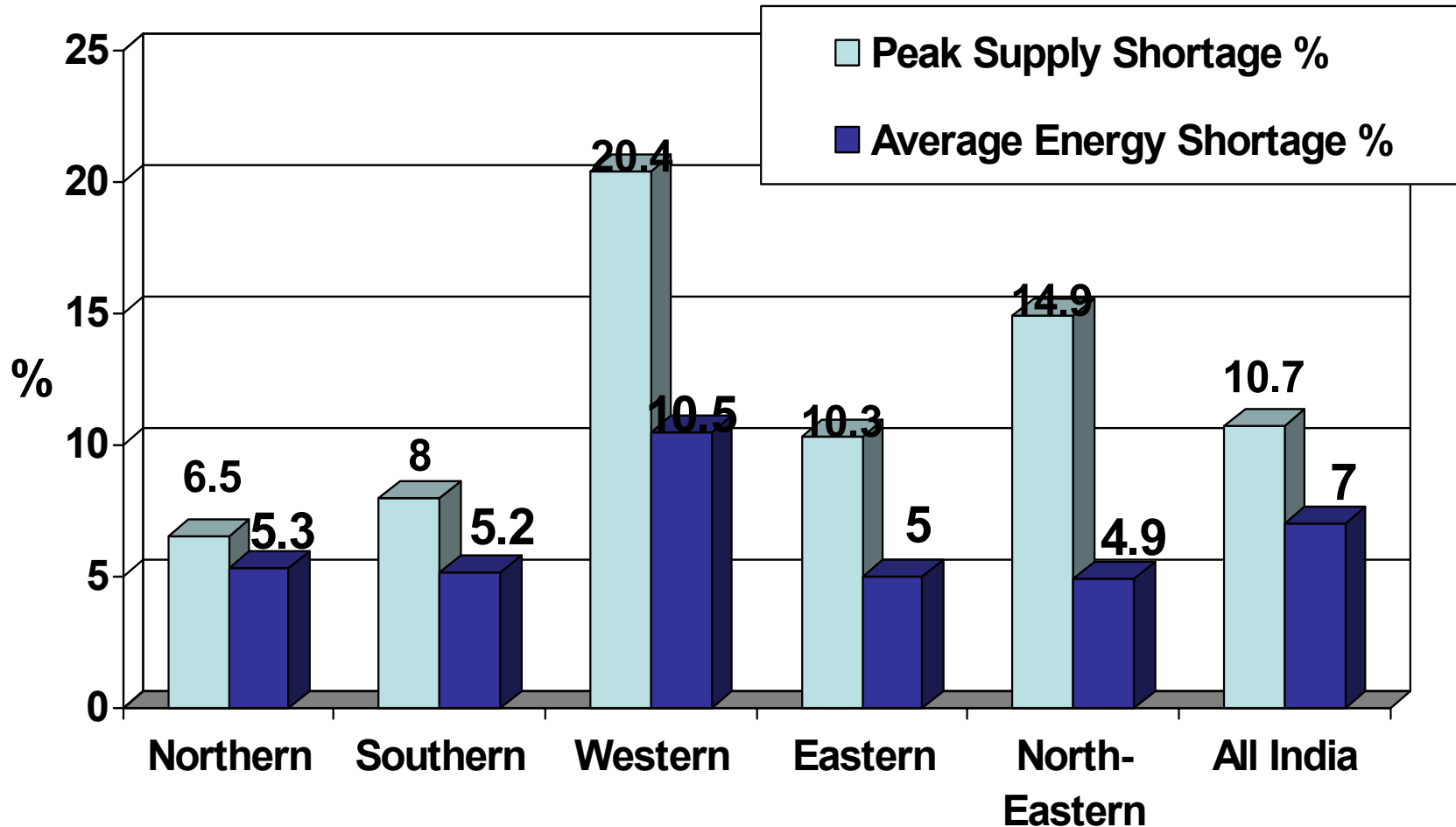
TATA POWER

(Kwh per Year per Capita)

Indonesia	379
India	473
China	1019
Mexico	1779
UK	5759
France	6901
USA	12406
Canada	15661

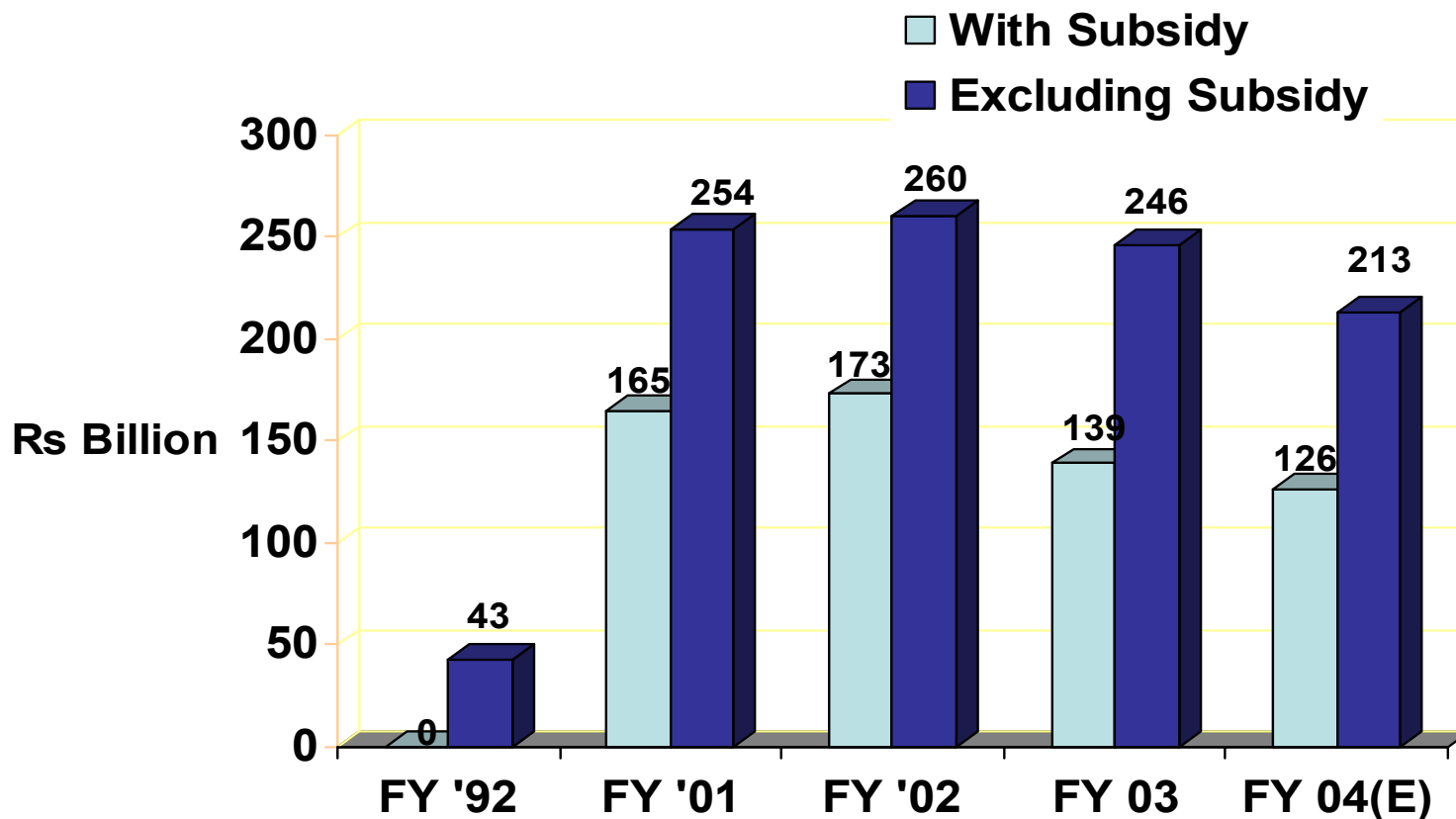
**High potential for growth of the power sector in India,
even as compared to China**

Energy and Peak Shortages 2003 - 2004



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

Commercial Losses of SEBs



Source: Economic Survey of India 2002-03

Future Vision



- **Vision 2012 by the Government of India – “ Power for All by 2012 ”**
 - **Generating Capacity to be increased from 105,000 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 9850 MW to 30,000 MW**
 - **Recovery of the power cost through the realised tariff from 70% to 100%**
 - **T. & D. losses to be reduced from 40% to 13%**
 - **100% rural electrification from the existing 86%**

Future Vision (contd.)



- **Vision 2012 by the Government of India – “ Power for All by 2012 ”**
 - **Peak Demand Shortage to be brought down to 0 from the existing 13% (2001-02).**
 - **Average Energy Shortage to be brought down to 0 from the existing 8%.**
 - **Industrial tariff, which is presently about Rs. 5 per Kwh to be brought down to about Rs. 2.50 per Kwh to support global competitiveness.**
 - **Commercial losses of Rs. 26,000 crores to be eradicated and the sector made financially viable.**

Electricity Act 2003, Brief Synopsis

Objects and Reasons for the new Act



- **Objectives of the Electricity Act 2003**
 - **To consolidate laws relating to electricity generation, transmission, distribution, trading and use**
 - **To promote competition , protect the interest of consumers and extend supply of electricity to all areas**
 - **To rationalize tariffs and ensure transparency in subsidies**
 - **To promote efficient and environmentally benign policies**
- **The new Act passed by both Houses of the Parliament was notified and thus enacted wef 10 June 2003**

Some Time Lines



- **By 10th Dec 2003**
 - **Establishment of Consumer Grievance Forums by Distribution Licensees**
 - **Appointment of Ombudsman by the State Commission.**
 - **Application of the Act in a State if so notified by that State**
- **By 10th June 2004**
 - **Vesting assets of SEBs (STUs after enactment) in Govt.Co/s unless agreed otherwise between State & Central Govts.**
 - **Appropriate Commissions to notify fresh terms and conditions for determination of tariff**
 - **State Commissions to specify phases and conditions for introduction of Open access in Distribution.**
- **By 10th June 2008**
 - **compulsory provision of open access for consumers with load \geq 1 MW.**

- **Licenses required for**
 - Transmission
 - Distribution
 - Trading
- **Deemed licenses awarded to**
 - Existing licensees such as Tata Power, BSES
 - Central Tx Utility (CTU) and State Tx Utilities (STU)
 - Government companies formed after segregation of SEBs
- **Local authorities, municipal corporations, Panchayats may not require a license, if so recommended by State government**
- **No license required for generation and distribution in rural areas which are to be notified by the Govt.**

The Act's Provisions - GENERATION



- **Generation has been delicensed i.e. no license and clearances required to establish, operate and maintain thermal / combined cycle stations.**
- **CEA clearance required only for hydel projects**
- **Tariffs for sales to distribution licensees to be determined by the Regulatory Commissions.**
- **Generating companies can sell directly to consumers at mutually agreed rates and conditions, subject to open access**
- **Captive plants can be set up by any person, association of persons or co-operatives primarily for their own use**
- **Captive plants have right to open access to transmit electricity to the destination of use, subject to availability of capacity and are not required to pay cross-subsidy surcharge**

- **Two or more distribution licensees having their own network allowed in the same area.**
 - Provision for franchisees
- **Open access of distribution network to be allowed by State Regulators in a phased manner**
- **Consumers availing open access must pay**
 - Wheeling charges
 - Surcharge for cross-subsidy and
 - Certain fixed costs of licensee whose network is used
- **Distribution licensees do not require a separate license for trading**



- **National Load Despatch Centre, Regional Load Despatch Centres and State Load Despatch Centres to ensure**
 - integrated operation of the power system
 - optimal scheduling and despatch and
 - energy accounting
- **CTU, STUs and other Tx licensees to be engaged in inter-state and intra-state transmission of electricity and responsible for ensuring adequacy of capacity / efficient operation**
- **Tx licensees to allow non-discriminatory open access to their network on payment of**
 - Transmission charges and
 - Surcharge for cross subsidy (applicable only to direct consumers)
- **Surcharge to be progressively reduced and eliminated**
- **Transmission licensees not allowed to engage in trading**

The Act's Provisions - TARIFFS



- **Provisions under earlier acts to continue for one year**
- **Determination of tariffs by Regulators to be guided by**
 - **National Tariff Policy specified by Gol**
 - **Commercial principles**
 - **Factors encouraging efficient use of resources and performance improvement**
 - **Recovery of electricity cost and removal of cross-subsidies**
 - **Multiyear tariff principles**
- **Regulators to determine tariffs for generator selling to distribution licensee and transmission, wheeling and retail sales**
- **Regulator not to discriminate between any class of consumers except on grounds of load profile, power factor, voltage etc.**
- **Regulator may fix a tariff ceiling in a Mumbai Area to promote competition**
- **Tariff (except fuel) not to be revised more than once in a financial year**

Progress of Reforms

Reforms - So Far



- **The Central Electricity Regulatory Commission established and functional**
- **9 (out of 28) states have passed their own reform laws prior to enactment of The Electricity Act 2003.**
- **10 States have unbundled State Electricity Boards.**
- **Almost all States have constituted State Electricity Regulatory Commissions, most of whom have issued tariff orders.**
- **28 States have signed tripartite agreement with RBI paving the way for securitisation of Rs 420 billion dues to CPSUs thus enhancing their creditworthiness.**

- **Rules and regulations required for implementation being framed by the Government, CEA, Central Electricity Regulatory Commission, State Governments and the State Electricity Regulatory Commissions.**
- **Drafts of the National Tariff Policy circulated for consensus.**
- **CERC's terms and conditions for tariff regulation issued for the period 2004 – 2009.**
- **Transmission “open access” regulations issued by CERC.**
- **Trading Regulations issued by CERC and trading licenses to be issued shortly to several private players.**
- **Appellate Tribunal to be appointed shortly.**

CERC's New Tariff Norms



- **Multi-year tariff guidelines declared.**
 - **These guidelines are for the period 2004 – 2009**
- **All projects to be deemed to be funded by a normative debt : equity ratio of 70% : 30%.**
- **14% post-tax return on equity for all .**
- **Total depreciation charges to equal loan repayments where loan repayment period is equal to 10 years.**
 - **Depreciation to be spread out over the useful life of the asset .**
 - **Rates of depreciation to be specified by the Commission.**

CERC's New Tariff Norms

----- (Contd.)



- **Performance norms have been raised.**
 - **Thresh-hold PLF for thermal plants for earning incentive raised to 80% from the existing 77%. However, incentive increased from 21.5 to 25 paise per Kwh.**
 - **Availability for recovery of all fixed costs of run-of-the river hydel plants raised to 90% from the existing 85%.**
- **For all new projects, tariff based competitive bidding process to be adopted by the ERCs.**
 - **Guidelines for competitive bidding to be announced shortly.**
 - **Efficiency and economy of operation can earn utilities incentives.**
 - **Light – handed regulation with only major norms being specified.**
 - **Terms and conditions are intended to be investor friendly.**
- **The ABT regime has been successfully implemented at the inter-state level.**
 - **To be implemented at the intra-state level also.**

Privatisation of Distribution



- **Private distribution stable and successful in Mumbai, Kolkata, Ahmedabad and Surat for the last several decades.**
- **Distribution privatisation undertaken in Orissa in 1999.**
 - **Problems due to over-valuation of assets and under assessment of T&D losses in the absence of metering.**
- **Distribution privatized in Delhi about two years ago.**
 - **Evolving into a success story with pro-active and sustained support from the Government.**
- **Privatisation planned in A.P., Karnataka, Rajasthan and U.P.**

The Accelerated Power Development Reforms Programme



TATA POWER

➤ Objectives :

- Reduction of T. & D. losses .
- Up-gradation of sub-transmission and distribution system.
- 100% metering
- Renovation and modernisation of power plants.
- Improving the quality and reliability of power supply.

The Accelerated Power Development Reforms Programme



- **Investment Assistance**
 - ◆ *25% grant, 25% loan from GOI.*
 - ◆ *Balance 50% IGR / FIs*

- **Incentive Scheme**
 - ◆ *Reward for actual cash loss reduction*

- **Fund release based on achievement of milestones**

The Accelerated Power Development Reforms Programme- Status



TATA POWER

- **410 projects valued at Rs 166 billion approved**
- **Design of scheme rewards success of reforms with greater access to further funds.**
- **Results already visible; most States have “fundamentals” in place**
- **Feeder level metering has reached 92% and consumer level at 84%**
- **AT&C losses are down in States like Gujarat, Maharashtra, MP, UP and West Bengal.**

Opportunities

Sectoral Opportunities -- Generation



- **Hydro share to be raised from 24% to 27% in next five years.**
- **Generation delicensing.**
 - **Expansion of existing stations.**
 - **Coastal stations.**
 - **Coal & gas based stations**
 - **Renovation & modernisation**
- **Joint Ventures of Centre / State / Private Sector**

Sectoral Opportunities -- Transmission



- **National Grid**
 - **4950 MW to 30,000 MW of interregional transfer capability by year 2012 .**
- **Technology up-gradation – 800 KV A.C. and 500 KV D.C.**
- **RLDCs modernization.**
- **Reliability improvement, reactive compensation.**
- **Private participation via**
 - **Independent Power Transmission Co.**
 - **Joint Venture with Powergrid**

Sectoral Opportunities -- Distribution



- **Refurbishment of sub-transmission and distribution networks.**
- **Energy accounting and MIS**
- **Metering and meter reading systems.**
- **LT – Less High Voltage Distribution Systems**
- **Technology enhancement for improved reliability**
 - **SCADA, Advanced Communications, Mobile Facilities and GIS.**
- **Web enabled facilities for consumers.**

Investment Needed During Next Ten Years



Investments During next 10 years

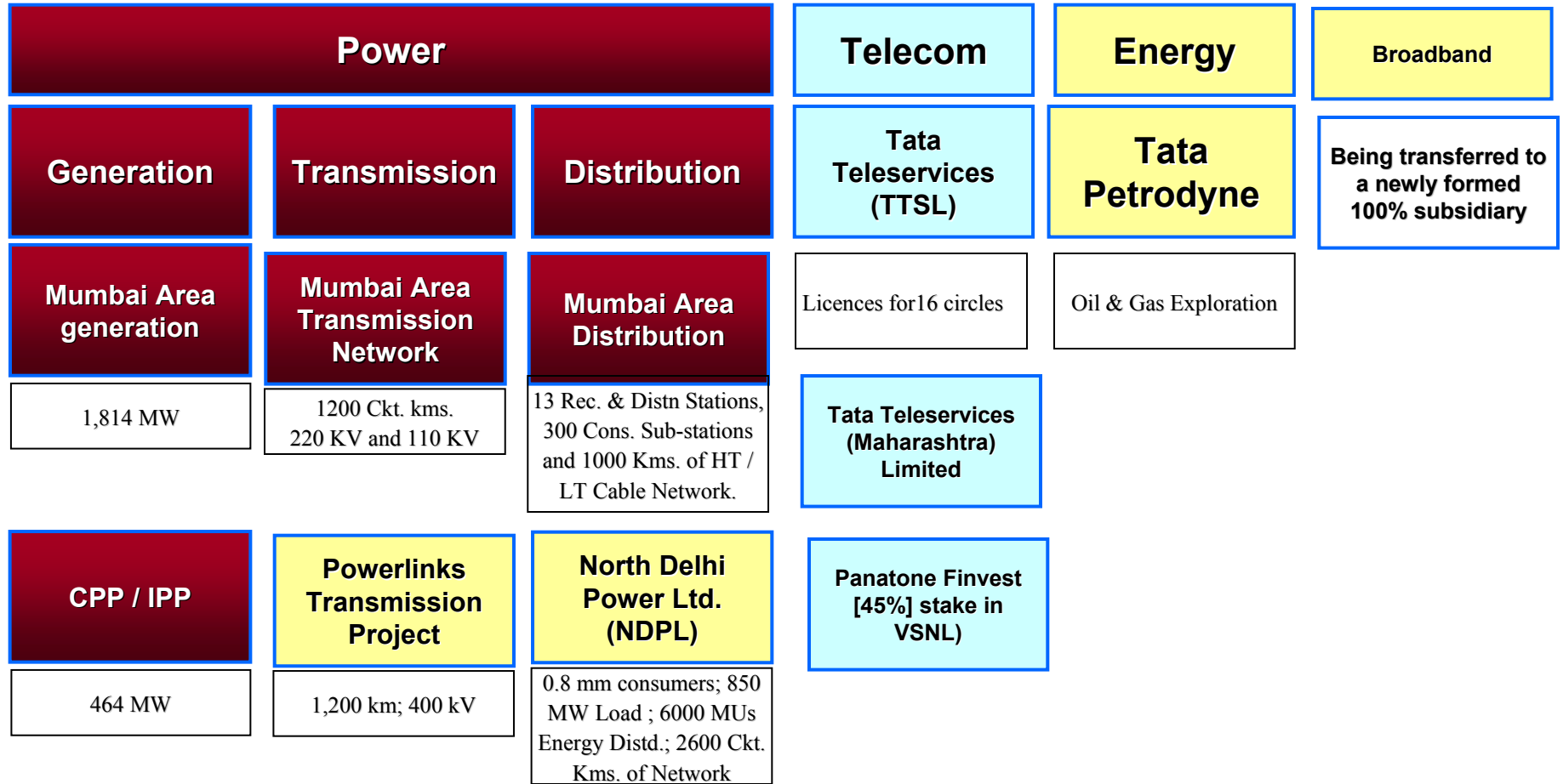
	Rs Cr	US \$ Billion
Generation Projects	576400	131
Transmission Schemes	132000	30
Distribution Network	74800	17
Rural Electrification	74800	17
Renovation and Modernisation	30800	7
Total	888800	202

Power Utilities in India

Tata Power -Company Snapshot



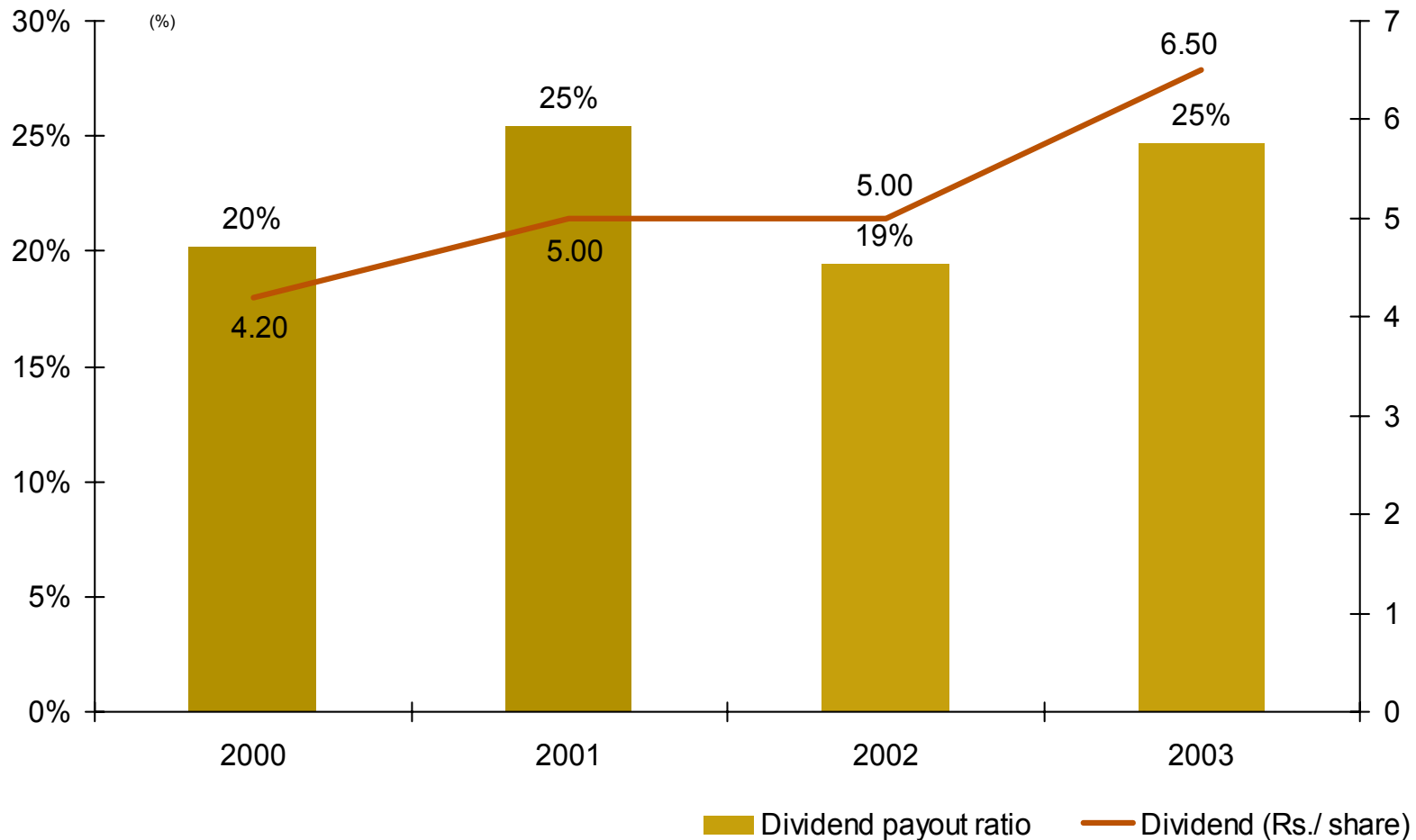
TATA POWER



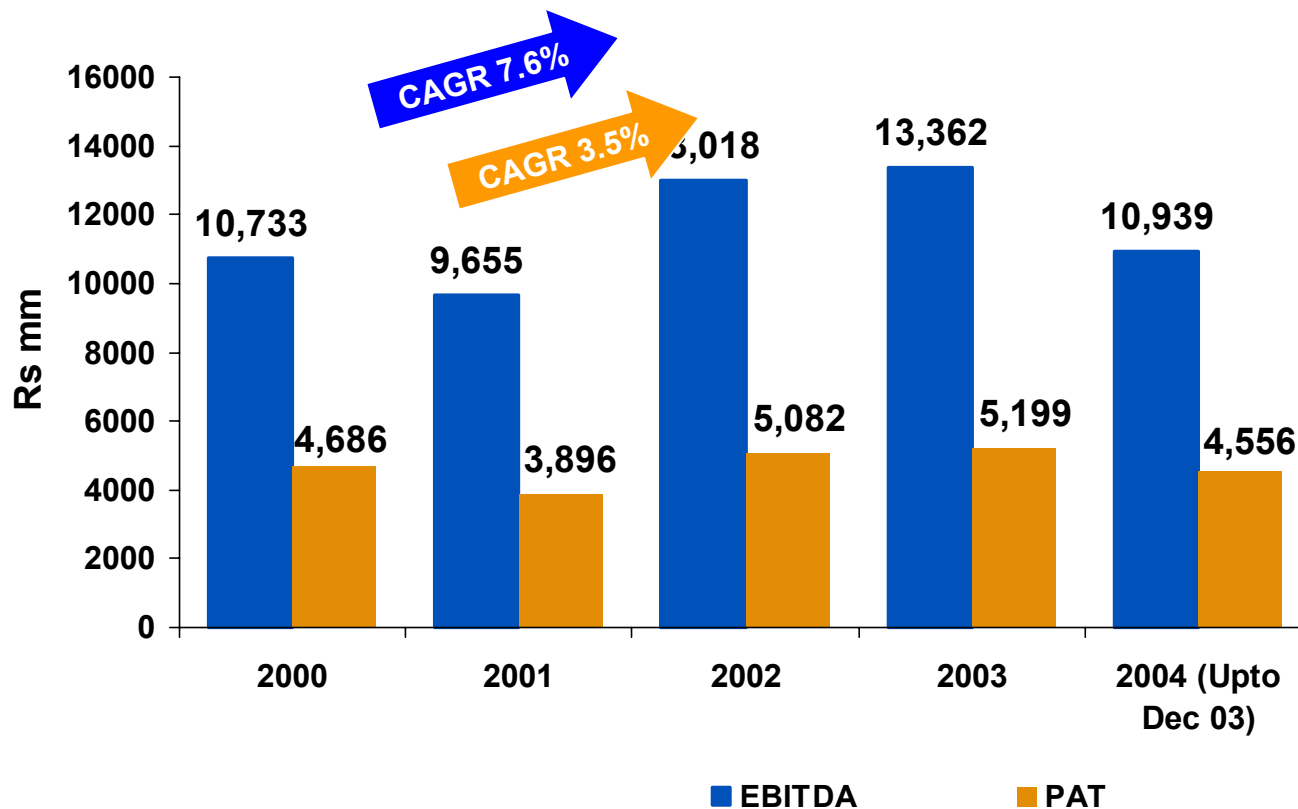
- Division
- Subsidiary / Joint Venture
- Associate

TPC has delivered consistent and growing dividends ...

Dividend Payout Ratio and Dividends



TPC Profitability – EBITDA & PAT



Tata Power in Distribution - Delhi

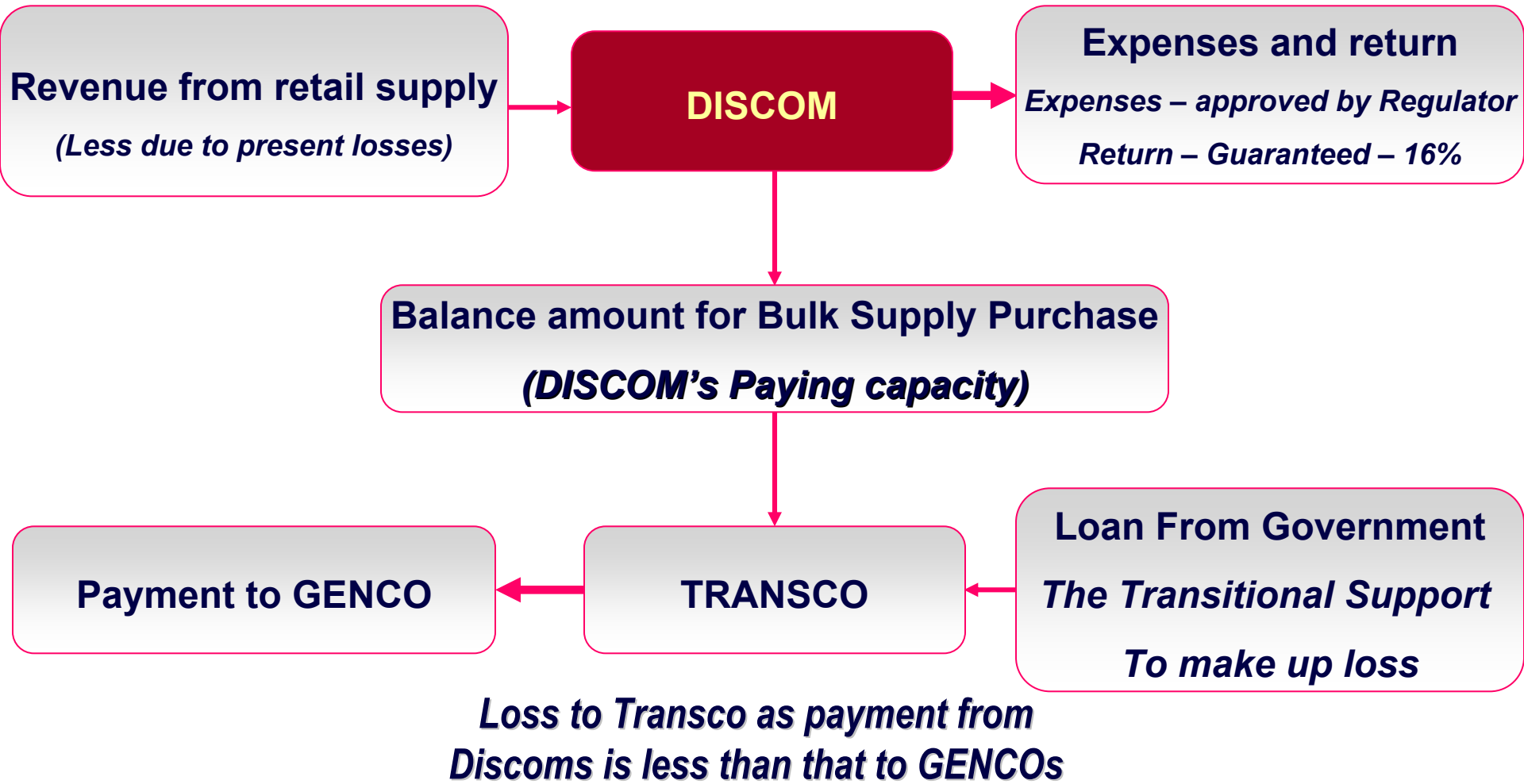


- **North Delhi Power Limited :**
 - TPC's maiden foray outside Mumbai into distribution.
 - Entire circle plagued by high A T & C losses in excess of 50%
 - Distributing 6000 MUs of electricity over a consumer base of almost 8 lakhs spread out over 570 sq. kms.
 - Distribution networks of over 40 major and 3000 minor receiving and distribution stations connected by a network of over 2600 ckt. Kms.

Area	550 Sq Kms
Population	4.5 Mn.
Peak Load	1050 MW
Estimated annual energy requirement	5,500 Mn. Units
Total registered consumers	850,000 (Actual estimated 1 Mn.)
Per capita consumption (Units)	1225 (National average 473)
Number of employees	4500 (At the time of take over 5400)
Local generation	15% (Balance purchase from Northern grid)
Load Growth	07% - 10%

- Peak Requirement – 3100 MW (restricted)
- **Daily energy requirement** – 65-67 MUs (Summer), 60-65 MUs (Winter)
- **Peak Shortage** – 300 MWs
- **AT&C loss level** - in excess of 50%
- **Peak Growth Rate** 7% – 8%
- **Consumer Profile**
 - Industrial 30%
 - Commercial 12%
 - Domestic 50%
 - Utilities 8%

Five Year Revenue Model



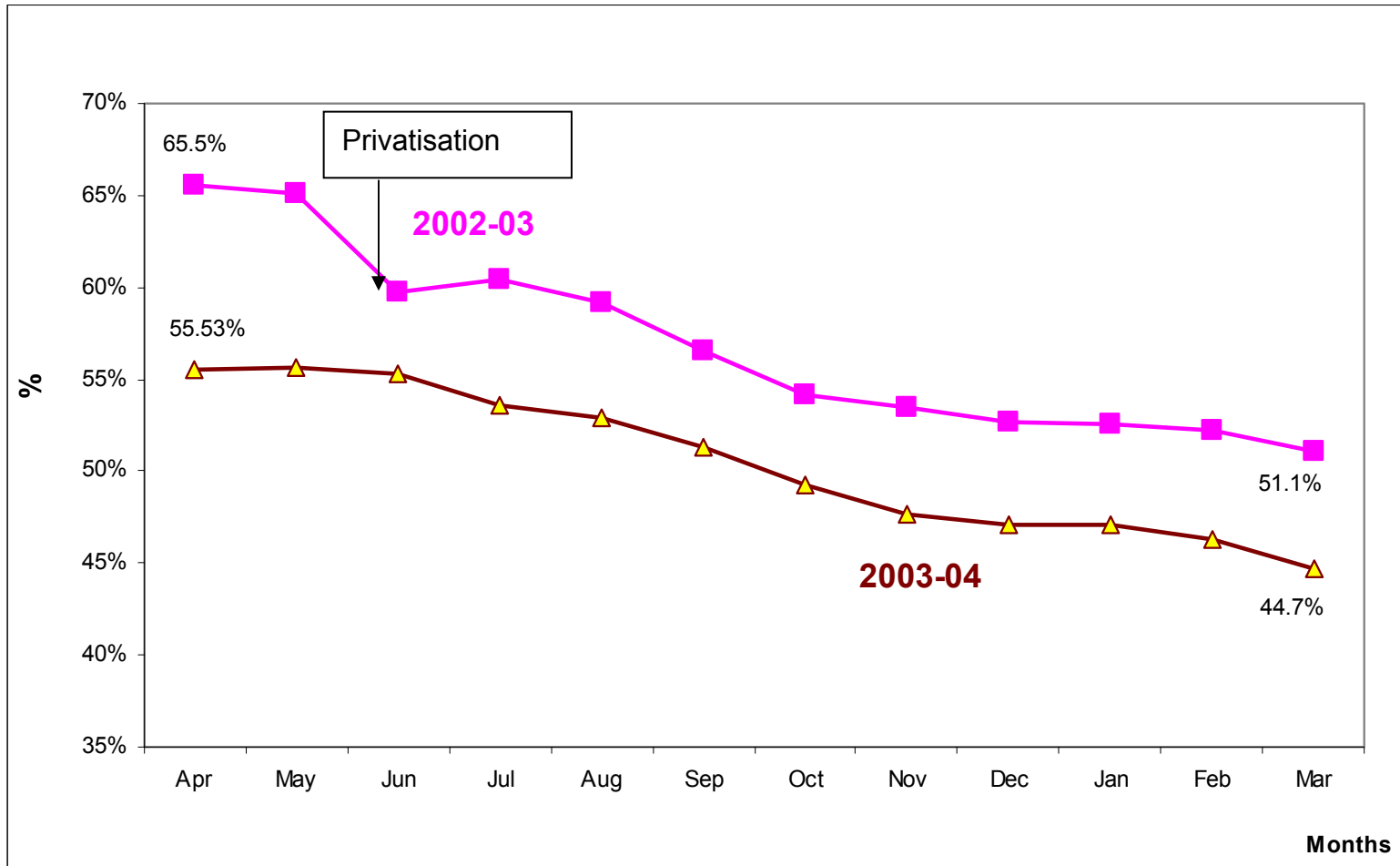
Emerging as a Distribution Privatisation Success Story

- **Operational and Technological Firsts introduced**
 - > **Unique SMS facility**
 - > **Unmanned and Remote controlled Grid Stations**
 - > **Package Substations**
 - > **Ring Main SF6 units**
 - > **Thermo Vision scanning for Hot spot detection**
 - > **Mobile Maintenance crews**
 - > **Mobile Transformer Unit**
 - > **High Voltage Distribution System (30 completed by Mar 04)**
 - > **State of art fully automatic meter testing lab**
 - > **Concept of fault free feeders**

- **Innovative Consumer care**
 - > **100% consumer commercial data uploaded on website**
 - > **automated meter reading**
 - > **Multiple bill payment options**
- **HR Initiatives**
 - > **HR development institute started**
 - **12000+man days of training achieved**
 - **State of Art training facilities**
 - > **Performance Management system introduced**
 - > **Formal recruitment process with pre-placement talks at prestigious institutes**
 - > **Reward , Recognition, Incentive schemes introduced**

- **Power Transformation Capacity increased by 19%**
- **Distribution Transformation Capacity increased by 12%.**
- **3 New Distribution Circles created for better monitoring.**
- **(N-1) concept implemented, providing 100% redundancies in 30 Grids out of 40, 7 grids are planned to be done in 04-05.**
- **Capital Expenditure in excess of Rs 300 crs already committed.**
- **Preventive maintenance schedules made and adhered to resulting in lower failures:**
 - **Transformer Failures reduced by 38%**
 - **Cable Faults reduced by 23%**
 - **Time taken to repair faulty cables reduced from 11 days to 3 days.**
- **Time taken for new connection energisation reduced by half to 23 days.**
- **Billing efficiency brought up from 49% to more than 60%**
- **Capacitor availability increased from 252 MVAR to 672 MVAR.**

AT&C Loss Trend at NDPL



- **A Joint Venture of Tata Power and Powergrid ;**
 - **First Joint Venture in Power Transmission in India - a trend setter**
- **1200 Kms of 400 KV Double Circuit Transmission Lines**
 - **The estimated Capital Cost of Rs 1400 Crores**
- **The project will facilitate creation of a Transmission highway to transfer power to the Northern region from the North-East and Sikkim**
- **Project completion scheduled for in FY 06**
- **Construction commenced- Financial closure imminent**
- **Tata Power has 51 % stake in the project**

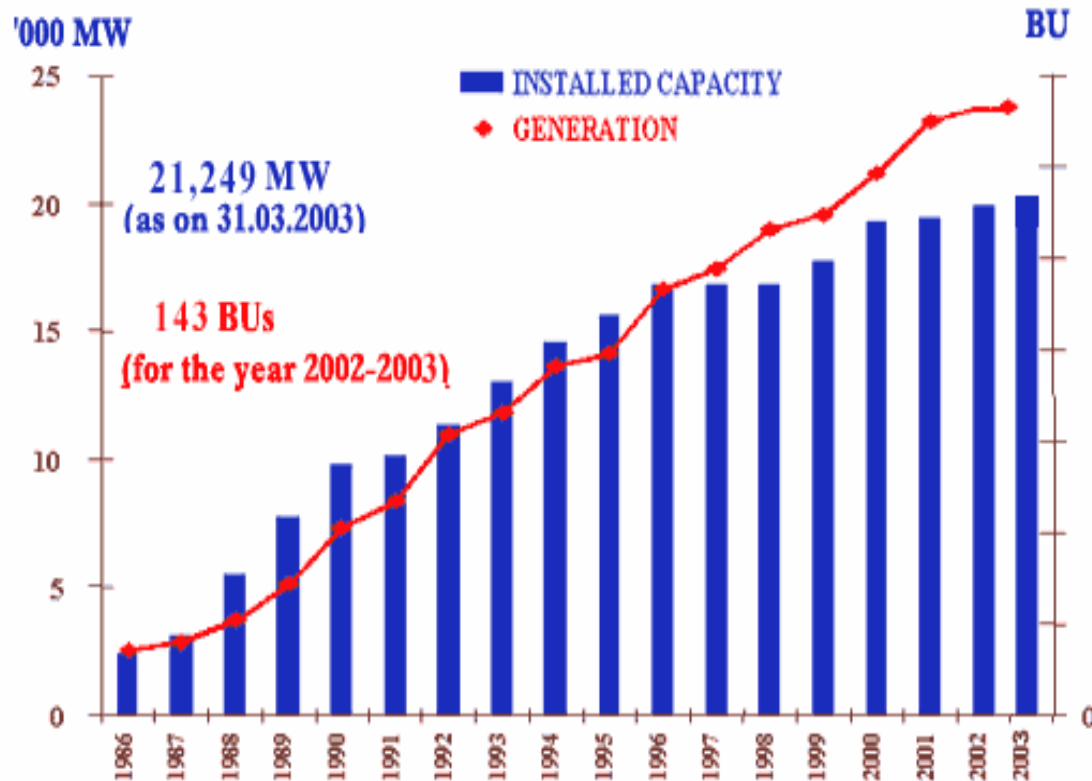
- **Electricity Act recognises power trading as distinct activity**
 - **Allows Private players to participate**
- **PTC has traded 4178 Mus in FY 03**
 - **Expects to trade 6000 Mus in FY 04 and about 9000 Mus in FY 05**
- **PTC has launched an IPO of Rs 58.5 Crores**
 - > **Tata Power holds 16% Equity in PTC (will reduce to 10% post IPO)**

NTPC – World Class and World Size Power Utility



TATA POWER

GROWTH OF NTPC INSTALLED CAPACITY & GENERATION



- Sixth Largest Thermal Generating Company in the World.
- Second in capacity utilisation Worldwide.
- 21,435 MW Installed Capacity as on date, constituting 19% of India's installed capacity
- 26% of India's energy generation.
- Turnover of U.S. \$ 4.5 Billion.
- PAT of U.S. \$ 820 Mio.
- U.S.\$ 7 Billion of Gross Fixed Assets

NHPC – Largest Hydel Power Utility in India



- **2275 MW of capacity in operation.**
- **4300 MW of capacity under construction.**
- **14400 MW of capacity under active development.**

- **~ 9900 MUs of generation.**
- **High Machine Availability of 97%.**
- **Turnover of U.S. \$ 301 Mio.**
- **PAT of U.S.\$ 116 Mio.**
- **Gross Fixed Assets U.S.\$ 3.2 Billion**

The Power Grid Corporation of India Limited



TATA POWER

- **Single Largest Transmission Utility in the World**
 - **Over 41,000 Circuit Kms. of EHV Transmission Network spanning the length and breadth of India.**
- **34,000 MVA of Transformer capacity.**
- **Transmits 40% of power generated in India.**
- **Turnover of U.S. \$ 550 Mio.**
- **PAT of U.S.\$ 136 Mil (FY 2003)**
- **Gross Fixed Assets U.S.\$ 4 Billion**

Overall Transmission System Availability - 99.4%

The Bharat Heavy Electricals Limited (BHEL)



TATA POWER

- **Manufactures 180 Products (30 Major Product Groups) at 14 Manufacturing Units.**
- **Product Range includes equipment for power generation, transmission and distribution, transportation, telecom.**
- **90,000 MW of power generation capacity supplied for utilities, industries and captive use.**
- **Turnover of U.S. \$ 1.6. Billion**
- **PAT of U.S. \$ 140 Million.**
- **Gross Fixed Assets U.S.\$ 700 Million**

Conclusion

- **The Indian Power Sector is on the move.**
- **Legislation is in place and Reforms are in progress.**
- **Ambitious capacity addition target of 1,07,000 MW by 2012, with matching capacities in Transmission and Distribution.**
- **Inter-regional power transfer capacity to be augmented to 30,000 MW**
- **Estimated investment of about U.S. \$ 200 Billion over 10 years.**
 - **Huge opportunity for global equipment suppliers, traders and investors.**

Thank You !

Back Up

Annual break up of commitments as quoted by Tata Power

	2002-03	2003-04	2004-05	2005-06	2006-07
Annual improvements of losses	0.50%	2.25%	4.50%	5.50%	4.25%
Loss levels at the end of year	47.6%	45.35%	40.85%	35.35%	31.10%

Total commitment for loss reduction in 5 years	- 17.00%
Opening loss level as decided by Regulator	- 48.10%
Closing loss level after 5 years	- 31.10%

Performance Change



1.0 Customer Service Indices

Particulars	Units	FY 2003-04		
		Feb-03	Feb-04	YTD 04
Reliability Index	%	99.62%	99.78%	99.55%
Load Shedding (as a %age of total energy input)	MUs	8.35	14.56	91.97
	%	2.19%	3.72%	1.79%
%age of billing errors corrected	% (Cumulative)	0.21%	0.12%	0.51%

2.0 Operational Performance Indices

Particulars	Units	FY 2003-04		
		Feb-03	Feb 04 (Actual)	YTD 04 (Actual)
Cases checked by Enforcement	Nos	748	401	5063
Collections from Enforcement	Rs. Crores	0.72	1.90	12.22
Meter Installations (all types)	Nos	0	33509	205124
Failure of Distribution Transformer	Nos	23	8	237

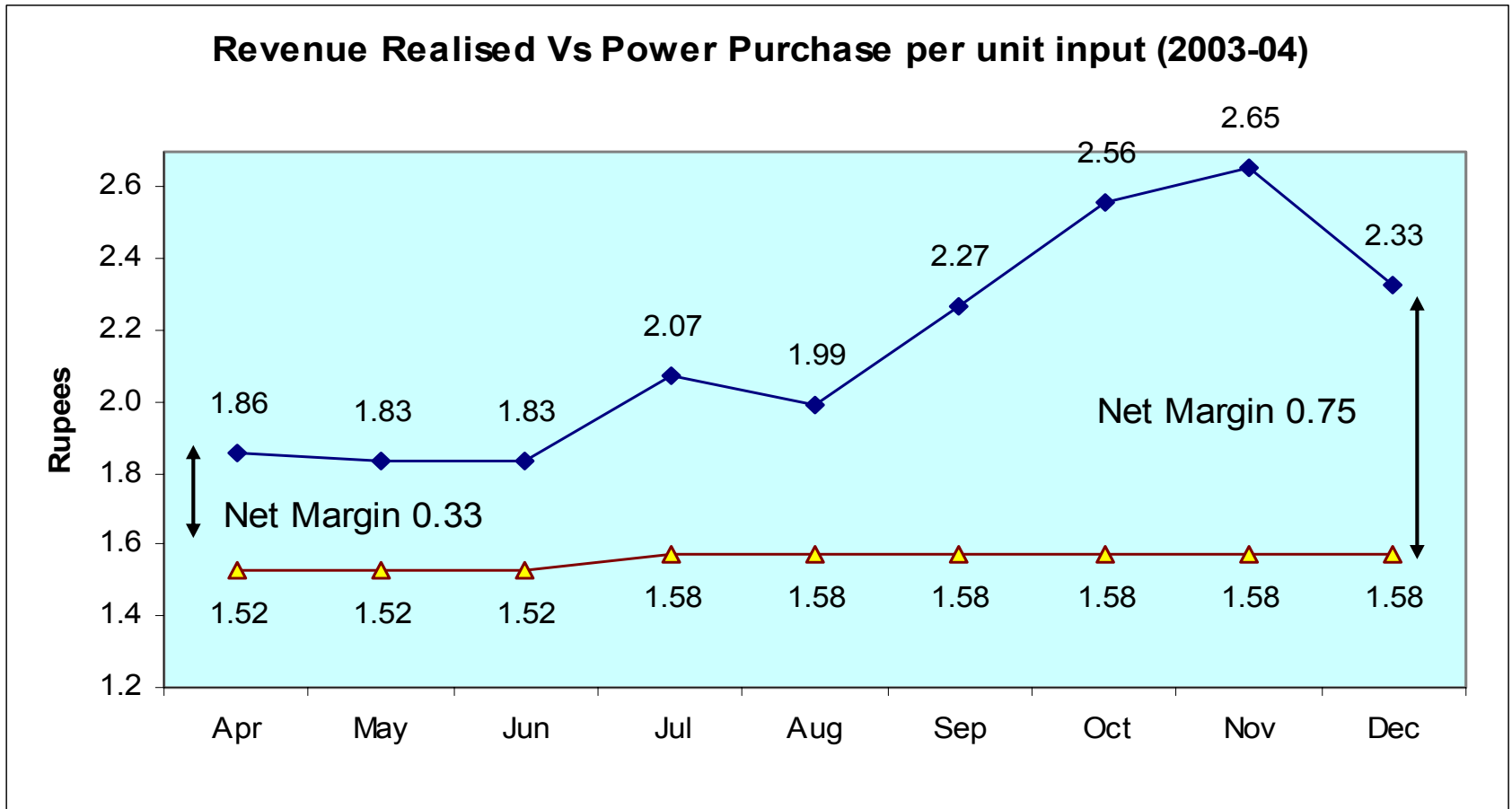
3.0 Shareholder Value Indices

Particulars	Units	FY 2003-04		
		Feb-03	Feb 04 (Actual)	YTD 04 (Actual)
Collection Efficiency (as per bills due for payment)	%	90.9%	92.8%	92.3%
AT&C Loss	%	48.69%	36.70%	46.25%

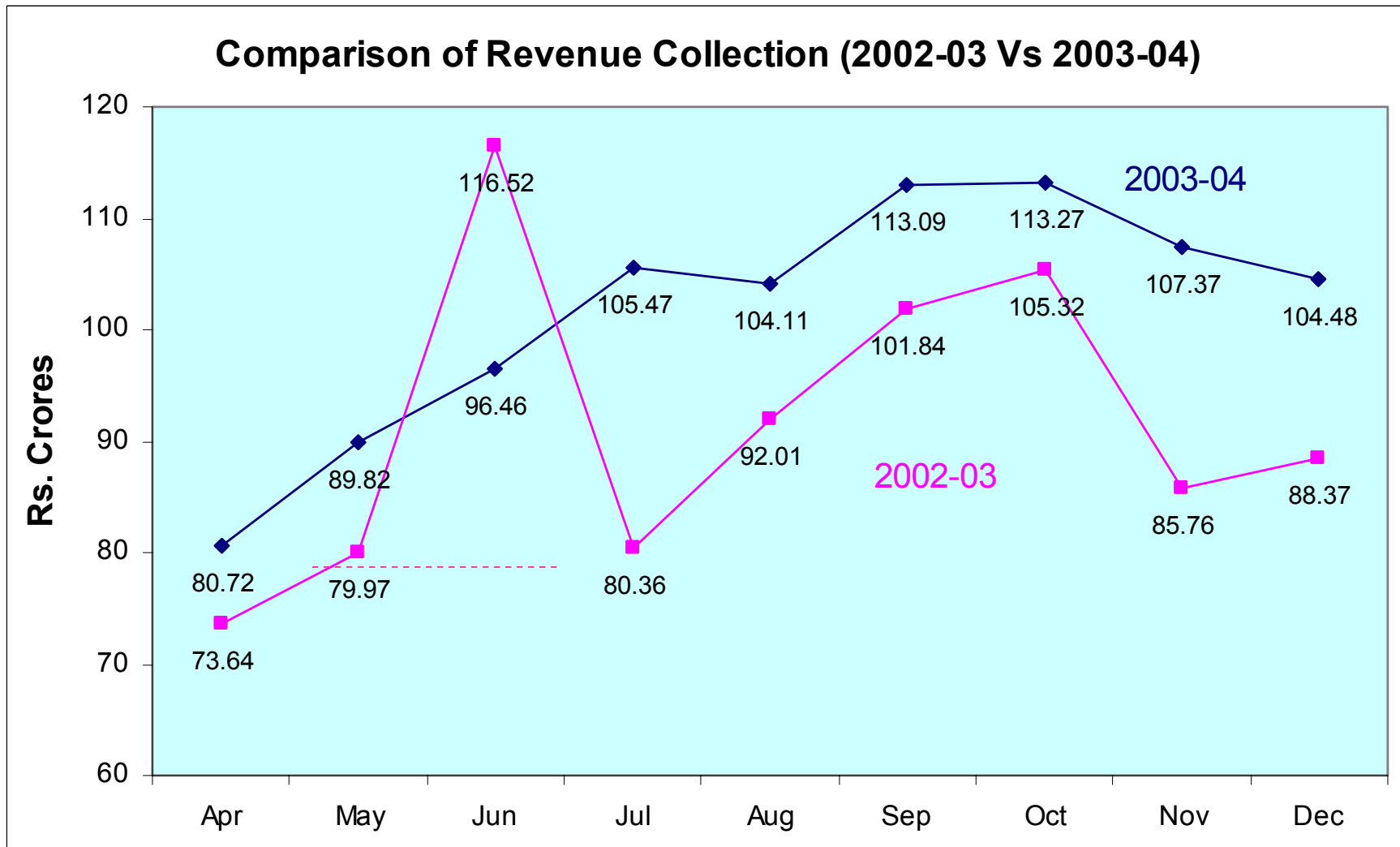
- **Forbes 2000 List (Ranking)**

- Indian Oil (243), SBI (251), ONGC (273), RIL(303), BPCL(804), ICICI Bank (820), HPCL(856), GAIL (1238), Canara Bank (1271), PNB (1286), ITC (1311), Infosys (1320), Wipro (1343), BOI (1344), BOB (1358), HDFC (1380), Sail (1393), Tisco (1530), IDBI (1555), Ranbaxy (1621), UBI (1642), MTNL (1922), NLC (1975), Bharati (1983), IOB (1984), Hindalco (1998), Oriental Bank (2000)

Revenue Realised



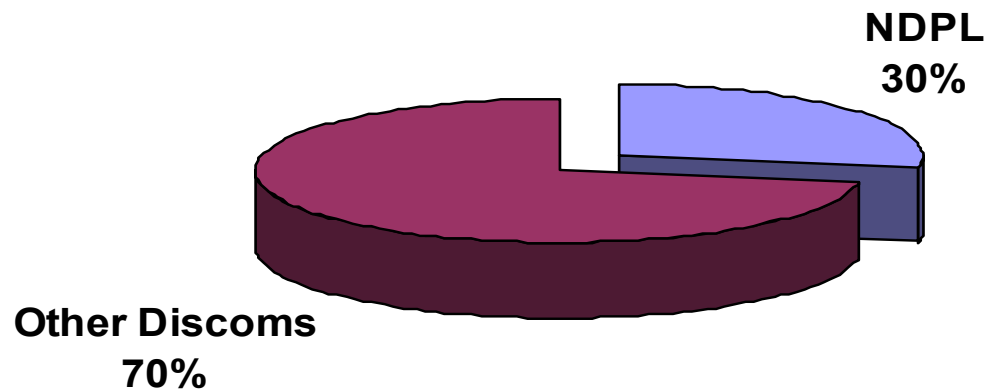
Revenue Collection Comparison



Business Lifeline - Power Reliability



Energy Distribution (FY 04)



Load Shedding (FY 04)

