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## INDIAN POWER SECTOR SCENARIO

PRESENTATION  
At  
STAKEHOLDERS MEETING - IMPLEMENTATION OF  
MALE DECLARATION  
On  
SEPTEMBER 24, 2002  
By  
**MOHIT BHARGAVA**  
CORPORATE PLANNING  
NATIONAL THERMAL POWER CORPORATION

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## GROWTH OF INDIAN POWER SECTOR

- **INSTALLED CAPACITY WENT UP FROM 1.36 GW IN 1947 TO MORE THAN 104 GW IN 2002; CAPACITY COMPARABLE TO UK / GERMANY.**
- **TOTAL GENERATION DURING THE YEAR 2001-2002 WAS 515 BU AS AGAINST 4.1 BU IN 1947.**

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HOWEVER, INDIA'S PER CAPITA CONSUMPTION CONTINUES TO BE ONE OF THE LOWEST IN THE WORLD

PER CAPITA CONSUMPTION (kWh)	
• PAKISTAN	333
• <b>INDIA</b>	<b>363</b>
• CHINA	714
• UK	5241
• JAPAN	7241
• AUSTRALIA	8307
• USA	11822

(SOURCE: WORLD DEVELOPMENT REPORT 2000/2001 BY WORLD BANK)

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THE GROWTH IN INSTALLED CAPACITY NOT SUFFICIENT TO MEET THE GROWING DEMAND.

Year	Installed Capacity (MW)
1947	1362
1961	4653
1971	14709
1981	30214
1991	66086
2002	104917

As on March 31

- During April 2001-March 2002
- Energy shortages - 7.5%
- Peak deficit - 12.6%
- **Capacity addition during last decade**
- 1992-1997 - 16423 MW (54% of the target (30538 MW))
- 1997-2002 - 19015 MW (48% of the target (40245 MW))
- **Additional capacity Requirement**
- 1,00,000 MW for achieving objective of "Power for All" by 2012.

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## MAJOR REASONS FOR POWER SECTOR ILLS

- **Inadequate power generation capacity;**
- **Lack of optimum utilization of the existing generation capacity;**
- **Inefficient use of electricity by the end consumer;**
- **Inadequate inter-regional transmission links;**
- **Huge T&D losses (theft) and skewed tariff structure, making SEBs unviable.**

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## Envisaged capacity addition programme till 2012

Central Sector*	65270 MW
State Sector	18900 MW
Private Sector	22900 MW
<b>Overall Capacity Addition</b>	<b>107000 MW</b>

\*Includes Nuclear, Non conventional Energy sources

**Investment of Rs 8,00,000 Cr ( US\$ 160 Billion) required to add this capacity and associated T&D system**

45000 MW planned for addition during the X Plan period (2002-2007)

### Lack of optimum utilization of the existing generation capacity

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- 1 per cent increase in PLF effectively means capacity addition of approx 1000 MW (requiring nearly Rs.4000 Cr.)
- Increasing the PLF of SEB plants to 75% (presently 65.6%) would reduce the cost of supply by 8.5 paise/unit, i.e. a benefit of Rs 2800 Cr to SEBs.

### Optimum utilization of the existing generation capacity through R&M

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- Old SEB units performing at low efficiency due to lack of R&M / poor maintenance. States unable to undertake R&M because of funds constraints.
- R&M is a cost effective (Rs 1 Cr/MW for thermal and Rs 60-70 Lakh/MW for hydro) and quick return option for increasing generation (new capacity @ Rs 4-5 Cr/MW).
- 170 thermal (11,000 MW) and 35 hydel (3,000 MW) units identified for R&M by CEA.
- 90 BU (20% of current annual generation) expected through R&M

### HYDRO : THERMAL RATIO HAS GRADUALLY DETERIORATED, RESULTING IN NON-OPTIMAL UTILIZATION OF SCARCE RESOURCES.

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Plan	Hydro (%)	Thermal (%)
I <sup>st</sup> Plan (03/56)	35%	65%
III <sup>rd</sup> Plan (03/66)	46%	54%
V <sup>th</sup> Plan (03/79)	41%	57%
VII <sup>th</sup> Plan (03/90)	29%	69%
Today	25%	71%

4% Nuclear+Wind

- HYDRO POTENTIAL IN THE COUNTRY IS OF THE ORDER OF 150 GW. ONLY 17% HAS BEEN TAPPED SO FAR.
- OPTIMAL MIX IS 40 : 60 FOR HYDRO : THERMAL TO ENSURE MAXIMUM UTILIZATION OF INSTALLED CAPACITY AND TO REDUCE PEAKING SHORTAGES.

### Inadequate inter-regional transmission links

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- Uneven distribution of power resources (coal, hydel, etc.)
- Transporting coal costlier than transmitting power.
- Scenario of simultaneous surplus (ER) and shortage (Other regions); capacity in ER is 15000 MW, peak load is around 6500-7500 MW and off-peak load ONLY 4000-4500 MW.
- Existing interregional transmission capacity only 4950 MW

### Perspective transmission plan upto 2012

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Year	Cumulative Capacity (MW)
Existing	4950
2007	14000
2012	30000

### Toughest roadblock to sector's growth is poor financial health of (SEBs), primarily due to non commercial tariff and huge T&D losses (theft)

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SEB performance for FY 2001-02

- Low ROCE** (-33%) WITH SUBSIDY
- Average cost of power > Average Tariff obtained**
  - \* Skewed tariff system subsidising domestic and agricultural consumers at expense of industrial consumers
- High T&D losses**
  - \* Technical losses account for about 8-10% of these losses
  - \* Non-technical losses (theft/defective metering account for 12-14%)
- High Accounts Receivables**
  - \* Political interference and no firm policy on disconnection
  - \* Varies widely across states (lower in Tamil Nadu and higher in Bihar)

The average supply Cost of power incurred by SEBs continues to be more than the average retail tariff.

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- Cost remains uncovered on account of low average tariff.

YEAR	AVERAGE COST OF SUPPLY OF POWER (PAISE / UNIT)	AVERAGE TARIFF (PAISE / UNIT)	TARIFF AS % OF COST OF SUPPLY
1995-96	179.6	139.0	77.3
1996-97	215.6	165.3	76.7
1997-98	239.7	180.3	75.2
1998-99	262.5	185.5	70.7
1999-2000	283.6	199.0	70.2
2000-2001	303.8	212.0	69.8
2001-2002	349.9	239.9	68.6

Out of total energy generated, only 55% is billed and effectively only 41% is realised.

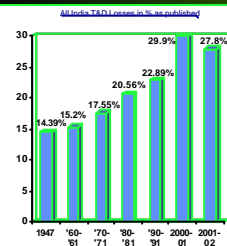
Heavy cross-subsidies for agriculture and domestic consumers; industrial tariff in India is perhaps the highest in the world, forcing industries to look for other options (captive plants etc.).

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Consumer Category	Consumer Category wise sale of Electricity (2001-02) (%)	Average Tariff (2001-02) in paise/kWh
Domestic	21.3	195.6
Commercial	5.1	426.3
Agricultural	28.8	41.6
Industrial	29.2	378.7
Rail Traction	2.2	449.2
Outside States	1.2	194.4
All India Average	-	239.9

TRANSMISSION & DISTRIBUTION LOSSES AFTER REFORM LINKED STUDY HAVE BEEN REPORTED TO BE MORE THAN PRE-REFORMS FIGURES

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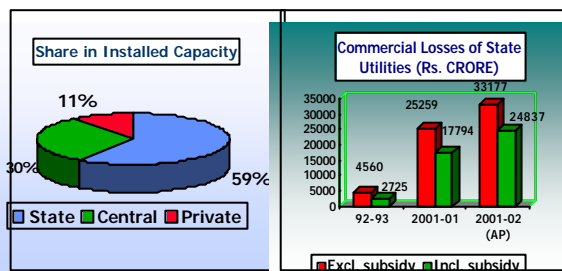
Reforming States	T&D losses (%) As Reported	T&D losses (%) After study
Delhi	46	50
Haryana	33	40
Rajasthan	26	43
U.P.	25	39
A.P.	25	45
Orissa	23	51

- Reforming States have reported higher T&D loss figures after studies.
- T&D loss figures cannot be reliable in the absence of Energy metering and audit.

- Against international standards of 8-10%, our T&D losses during 2001-02 were reportedly 28%.
- During IX Plan, the investment in T&D was half of that in Generation. Ideally it should be the same.

Currently about 60% of installed Capacity is owned by State Utilities, whose poor financial health is a major road block to power sector development in India.

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Source: Planning Commission

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Poor financial health of SEBs - toughest road block to power sector development

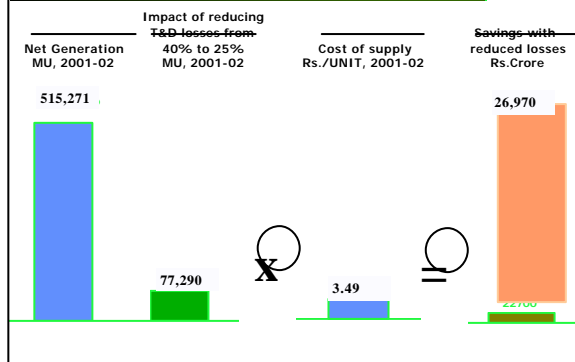
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- Theft of power estimated at 20,000 Cr (US\$ 4 Billion) per annum.
- Reducing T&D losses to 20% would reduce the cost of supply by nearly 43 paise/unit as worked out from the SEBs data.

GAINS FROM REDUCING T&D LOSSES

Reducing T&D losses by 15% would help save Rs.26970 Crore (US\$ 5.4 Billion)

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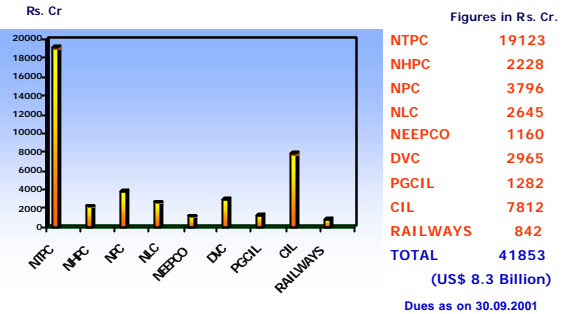
Poor financial health of SEBs - toughest road block to power sector development

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- SEBs' inability to pay effectively blocks private investment, both domestic and foreign, despite enabling policies / incentives at Central level; it also adversely affects CPSUs.
- SEBs' ability to add capacity, to upgrade their T & D network and to undertake system improvement seriously impaired.

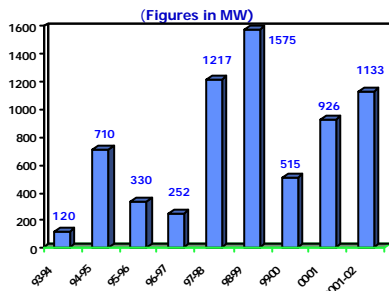
Mounting Outstanding SEB Dues is also impacting the CPSUs

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Private Participation in Power Development has been far less than the expectations.

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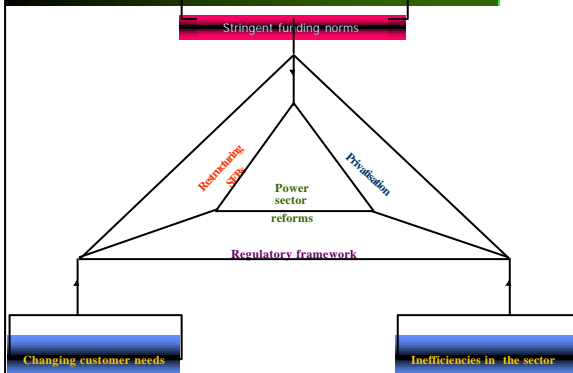
Capacity added by IPPs since 1991 is a mere 6778 MW

**THE SOLUTION LIES IN REFORMING THE SECTOR**

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Health of the sector critical to economic growth, hence pressing need to reform the sector

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**MAJOR REFORMS INITIATIVES**

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## Power Sector Reforms in India

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- 1991 - Private Sector allowed /encouraged to participate in generation. (MOUs & tariff on cost plus formula leading to problem of high tariffs)
- 1995 - To overcome the problem of high tariffs, policy for selection of generators on basis of competitive bids.
- 1997- Tariff notification for IPPs amended laying down rules for competitive tariff bidding.

## Legislative/administrative Initiatives taken by the Government to improve the health of Power Sector.

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- Electricity Regulatory Commissions Act, 1998.
- Electricity Laws (Amendment) Act, 1998 to facilitate private investment in transmission.
- Mega Projects Policy
- Setting up of Power Trading Corporation.
- New Hydel Policy to provide thrust to Hydro capacity addition.
- Accelerated Power Development & Reforms Programme
- Energy Conservation Act in place
- Electricity Bill 2001 to be tabled in Parliament
- Settlement of Outstandings of PSUs with States

**THE CRUX IS TO MAKE THE SECTOR FINANCIALLY VIABLE FROM WITHIN, PRIMARILY THROUGH DISTRIBUTION REFORMS**

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## MEASURES FOR DISTRIBUTION REFORMS

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- States to break even their operations in 2-3 years through bridging the revenue-cost gap.
- Operationalise SERCs in every state
- Enforce Energy audit, assess actual T & D losses.
- Eliminate theft within 2 years.

## Upgradation / Strengthening of sub-transmission and distribution system

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- Fix Static meters on all HT and LT consumers and high accuracy tamper proof meters for other consumers.
- Get Energy audit conducted for all distribution circles and sub divisions.
- Introduce time of the day metering for HT and LT consumers.

## Improve the Financial situation of State Power Sector

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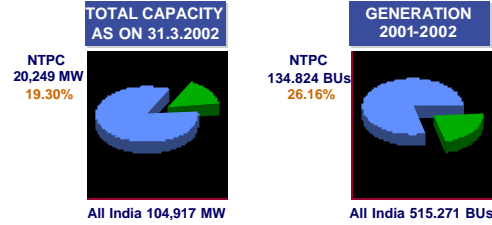
- Undertake comprehensive power sector reforms.
- States to sign MOU on reforms with Government of India (16 states have already signed).
- Settle outstandings with CPSUs (implementation of Montek Singh Ahluwalia Report).

Capacity Addition Target for NTPC  
- India's largest power company



To add over 20000 MW  
and become a 40,000 MW  
plus Company  
by 2012.

## NTPC IN INDIAN POWER SECTOR



NTPC contributes more than one-fourth of India's total power generation with less than one-fifth capacity.



*Thank you*