ANNUAL CONFERENCE OF THE KOREAN INSTITUTE OF ELECTRICAL ENGINEERS

12 – 14 July 2006

Energy Scenario in India – An Overview

By

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•**RURAL DEVELOPMENT FORUM (RDF) –**
Head Quarters: Kolkata, West Bengal

• **WATER MANAGEMENT FORUM (WMF) –**
Head Quarters: Ahmedabad, Gujarat

• **SUSTAINABLE DEVELOPMENT FORUM (SDF) –**
Head Quarters: Kolkata, West Bengal

• **NATIONAL DESIGN AND RESEARCH FORUM (NDRF) –**
Head Qrters: Bangalore, Karnataka

• **ENGINEERING STAFF COLLEGE OF INDIA (ESCI) –**
Head Quarters: Hyderabad – Andhra Pradesh

• **SAFETY AND QUALITY FORUM (SQF) –**
Head Quarters: New Delhi

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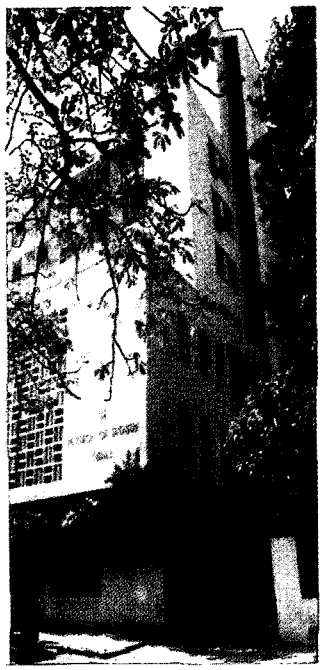
THE INSTITUTION OF ENGINEERS (INDIA)
IEI



With a Committee of 50 Members.
Formed in January 1919.
Incorporated under Indian Company's Act on September 13, 1920

ROYAL CHARTER granted to the Institution on September 9, 1935.

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PRIME OBJECTIVES OF IEI

To promote and advance the practice of Engineering and Technology through

- 15 Engineering Disciplines
- 6 Fora
- 94 State / Local Centres
- 6 Overseas Chapters
- 5.50 Lakh Members

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IEI's REPRESENTATION IN INTERNATIONAL BODIES

- World Energy Council (WEC)
- World Mining Congress (WMC)
- World Federation of Engineering Organisation (WFEO)
- Commonwealth Engineers Council (CEC)
- Federation Internationale du Beton(Fib))
- Federation of Engineering Institutions of South & Central Asia

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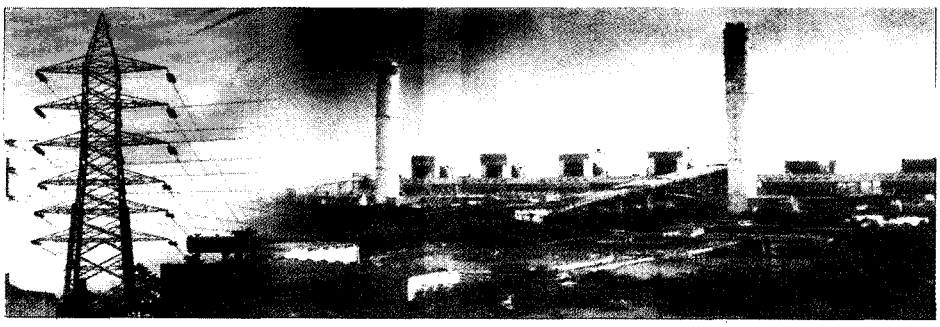

PRELUDE

- Electricity is an essential requirement for Socio Economic Development .
- Rural Development, Industrial Growth and their sustainability.
- Service sector.

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Background

- Since Independence, growth of power has been noteworthy
- Power development in India commenced from 1897
- In the Pre-Independence era (i.e prior to 1947) the power sector was *mainly in the hands of private entrepreneurs restricted to urban* areas.
- After Independence, the Government of India broadened the power industry to rationalize its growth all over the country.
- *State Electricity Boards were constituted in various parts of the country in* the early 50's, for bringing about systematic growth of power industry all over India.

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- Power development was planned through five year plans. A number of multipurpose projects were set up. The Government of India created generating corporations at National level.

- **National Thermal Power Corporation and**
- **National Hydro Power Corporation**
- **The Nuclear Power Corporation and**
- **Power Grid Corporation of India**

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Power Sector – Vital for Economic Growth

- **India needs to sustain GDP growth rate of 8% to 10% to eradicate poverty and to accomplish economic & human development goals.**
- **This would call for increased demand for energy ensuring access to clean, convenient, reliable and quality energy.**
- **By 2031, India would, in the very least, need to grow its primary energy supply by 3 to 4 times and electricity supply by 5 to 7 times of today's consumption.**
- **By 2031 - 32 power generation capacity would have to increase to 778,095 MW and annual coal requirement would be 2040 MT.**

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Objectives set by Government of India for Improvements in the Power Sector

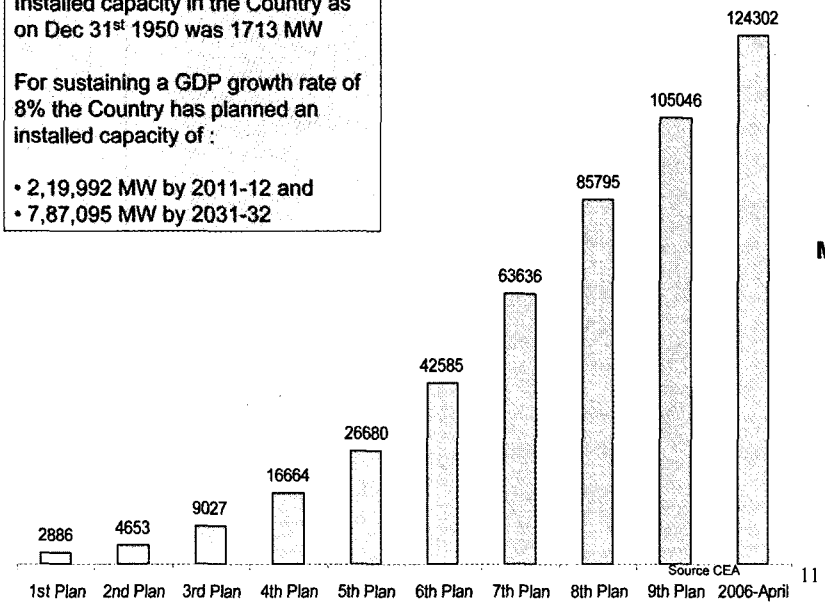
- **Sufficient power to achieve GDP growth rate of 8%**
  Capacity addition plan of 1,00,000 MW in next 10 years
- **Reliable & Quality power**
  Massive investments in T & D sector
- **Optimum power cost**
  Competitive bidding for capacity creating and loss reduction
- **Commercial viability of power industry**
  Tariff rationalization, loss reduction, institutional strengthening

Plan wise Capacity Addition Achievement...

Installed capacity in the Country as on Dec 31st 1950 was 1713 MW

For sustaining a GDP growth rate of 8% the Country has planned an installed capacity of :

- 2,19,992 MW by 2011-12 and
- 7,87,095 MW by 2031-32



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Installed capacity as on April 2006

	Hydro	Thermal				Nuclear	Wind/ RES	Total
		Coal	Gas	Diesel	Total			
ALL-INDIA	32325.8	68518.8	12704.8	1201.8	82425.4	3360.0	6190.9	124302.0

Installed capacity as on end April 2006 is 1,24,302 MW

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Resolve of Government of India

- Electricity to be made available to all House holds within the next 5 years.
- By 2012 – the requirements of all the consumers to be met on Demand.
- Reliable and quality power shall be supplied at competitive rates and in an efficient manner.
- To improve the per capita consumption to over 1000 MWH in the next 10 years (from the present level of 580 KWH).
- Electricity Sector to achieve financial turn around and commercial viability.
- Consumers interest to be safeguarded.

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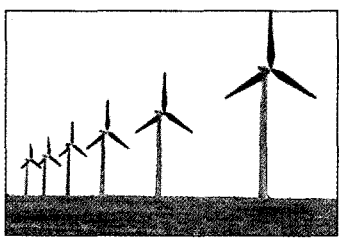
Power Sector – Future Plans

- Wind power development
- Commercial development of hydrogen fuel cells



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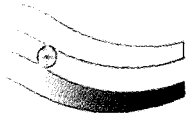
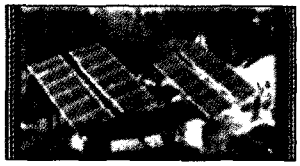


- Small hydropower can be a suitable guide. This should be completed by 2030.

- *Addition of nuclear power generation*



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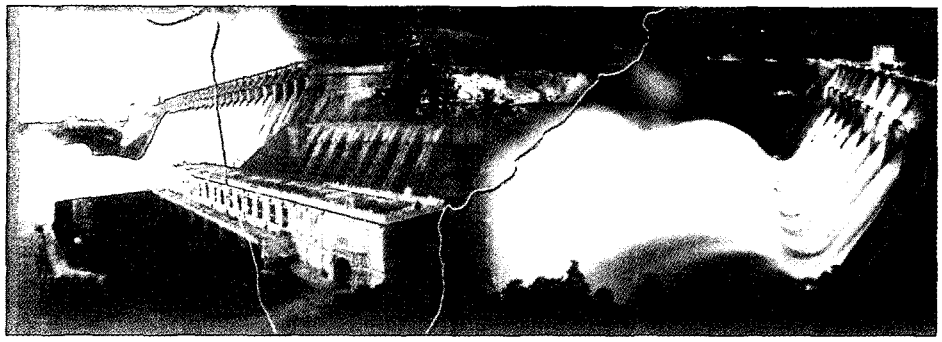

Hydro Resource Potential

Total Potential	1,48,700 MW
Present Installed	30,936 MW
Balance (Recoverable)	1,17,764 MW

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Capacity Addition Programme during XIth plan (2007-2012)

Through Govrnment & Private Sectors

a.	Thermal	44,000 MW
b.	Hydro	15,000 MW
c.	Nuclear	3,000 MW
d.	Non-conventional Energy services	5,000 MW
	Total	**67,000 MW**

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Investment requirements during XIth Plan

- US $ 50 Billion for Generation
- US $ 50 Billion for Transmission, Distribution and Rural Electrification

Indian Fuel Resource Scenario

Description	Unit	Reserves	Production
Coal (proved)	MT	90,085	336.5
Crud Oil	MT	786	34.0
Natural Gas	BCM	1,101	31.7

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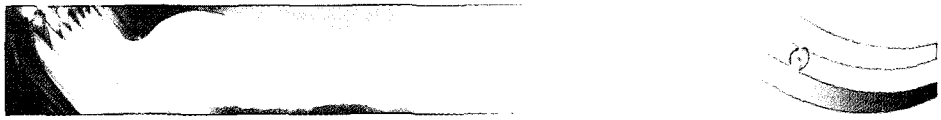
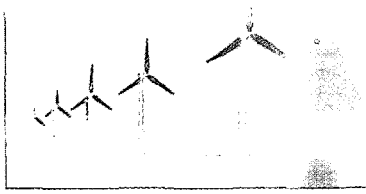


GLOBAL POWER INDICATORS – COMPARISON



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Installed Capacity of Top 20 Countries (Giga Watts)

Sno	Country Name	Installed Capacity
1	United States	848
2	China	338
3	Japan	238
4	Russia	206
5	India	120
6	Germany	115
7	France	111
8	Canada	111
9	United Kingdom	77
10	Brazil	76
11	Italy	69
12	Korea, South	54
13	Ukrain3	52
14	Spain	50
15	Australia	45
16	Mexico	42
17	South Africa	40
18	Sweden	34
19	Taiwan	30
20	Poland	29

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Per Capita consumption of Top 20 Countries

Sno	Country Name	K.W.H.
1	Iceland	25127
2	Norway	24861
3	Finland	15812
4	Sweden	15679
5	Canada	15666
6	United Arab Emirates	14714
7	Kuwait	13742
8	Luxembourg	13728
9	United States	12878
10	Qatar	10785
11	Australia	9643
12	Liechtenstein	9544
13	Cayman Islands	9102
14	Bermuda	8652
15	New Zealand	8525
16	Behrain	8168
17	Virgin Islands	7681
18	Belgium	7604
19	Japan	7432
20	Switzerland	7206

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MEASURES TO AUGMENT GENERATION, TRANSMISSION AND DISTRIBUTION CAPACITIES

- **Power Generation Strategy**
- **Transmission Strategy**
- **Distribution strategy**
- **Regulation Strategy**
- **Financing Strategy**
- **Conservation Strategy**
- **Communication Strategy**

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Our President's Vision of Developed India by 2020

- India to be economically and commercially powerful.
- Be one of the six top nations in terms of size of the economy
- Achieve GDP growth of 9 – 11% annually
- People below poverty line to be reduced to levels less than 10%
- Achieve near self-reliance in defence needs.

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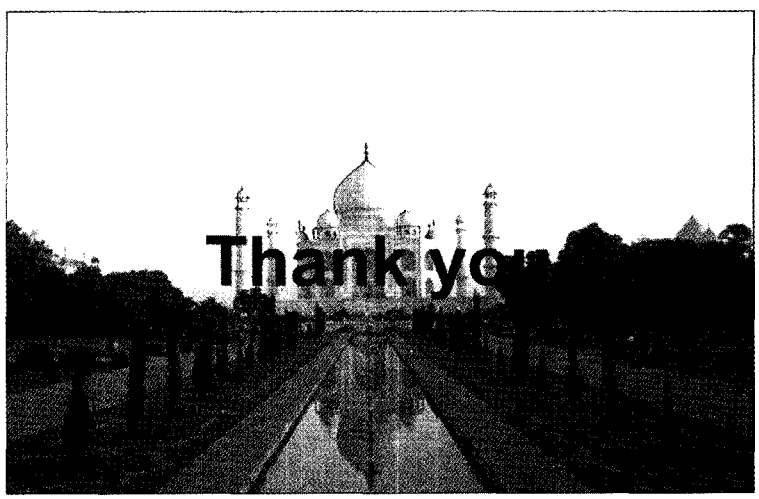

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