INDIA-AUSTRALIA ENERGY & MINERALS FORUM

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India's Energy Policy

Challenges & Policy Initiatives for Power Sector

PRESENTATION BY

NTPC

Energy Policy - Background

- India needs to achieve & sustain 8 to 9% growth in GDP to achieve the human developmental goals and eradicate poverty
- By 2031-32, total primary energy will grow to 4-5 times the level in 2009-10
- Electricity generation capacity will have to be around 5 times 2009-10 level
- India's growing energy needs have to be met in a sustainable manner and at competitive prices.
- Report of the Expert Committee on Integrated Energy Policy, brought out in 2006, has given its recommendations in addressing various challenges in achieving energy security in the long-run.

Energy Policy - Approach

- Energy system to be sustainable & cost effective
- Energy markets to be competitive whenever possible
- Pricing & resource allocation to be market determined under credible regulatory oversight
- Transparent & targeted subsidies
- All available sources of energy to be exploited
- Improved efficiencies across the energy chain

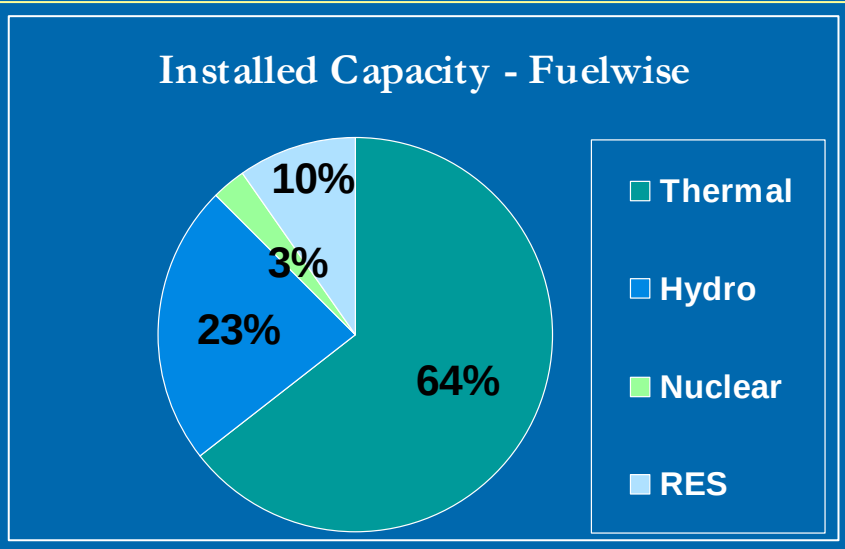
Key Indicators

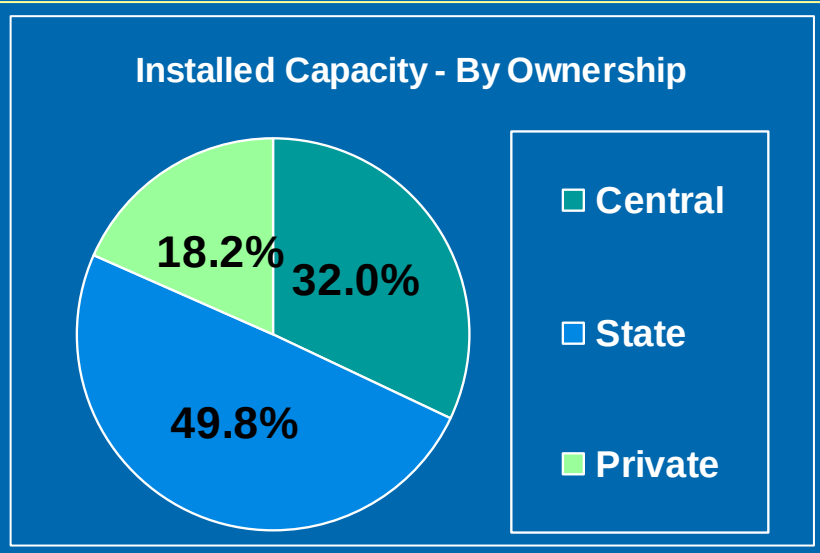
S. No.	KEY INDICATORS FOR 2007	UNIT	INDIA	WORLD
1	TPES per capita	Toe per capita	0.53	1.82
2	Electricity consumption / capita	Kwh per capita	543	2752
3	CO_2 per capita	t CO_2 / capita	1.18	4.38

Source: IEA Key Energy Statistics 2009

Power Sector Overview

Generation Installed Capacity (as on 30.04.2010) : 1,59,649 MW





- **Generation:**
  - 2007-08: 662 BU
  - 2008-09: 724 BU
  - 2009-10: 771 BU
- **All India Thermal PLF (%):**
  - 2007-08: 78.10 %
  - 2008-09: 77.19 %
  - 2009-10: 77.48 %

Power Sector Overview contd…..

- **Transmission Network (as on 30.04.2010):**
  - HVDC (± 500 kV) : 7,452 ckt-km
  - 765 kV AC: 3,660 ckt-km
  - 400 kV AC: 97,808 ckt-km
  - 220 kV AC & below: 1,28,650 ckt-km
- **National Grid:**
  - 5 Regional grids- 4 synchronously connected (NEW grid), SR connected asynchronously to ER & WR
  - Inter-regional Transmission capacity (220 KV & above): 20,750 MW
- **Players:**
  - CTU (Central sector) : 81,864 ckt-km
  - STU (State sector): 1,48,788 ckt-km
  - Private Sector : 3,694 ckt-km
- **System Operator:**
  - Central Transmission Utility (CTU) runs NLDC & 5 RLDCs
  - State Transmission Utilities (STUs) run respective SLDCs
  - Power System Operation Co. created to run NLDC/ RLDCs

Projection for Electricity Requirement

Year	Total energy requirement (Billion KWh)		Energy required at busbar (Billion KWh)		Projected Peak demand (GW)		Installed capacity required (GW)	
	@ GDP Growth rate		@ GDP Growth rate		@ GDP Growth rate		@ GDP Growth rate	
	8%	9%	8%	9%	8%	9%	8%	9%
2016-17	1524	1687	1425	1577	226	250	306	337
2020-21	2118	2438	1980	2280	323	372	425	488
2026-27	2866	3423	2680	3201	437	522	575	685
2031-32	3880	4806	3628	4493	592	733	778	960

Source: Integrated Energy Policy - Report of the Expert Committee

Energy Potential

S. No	Energy Source	Unit	Energy reserves / Potential
1	Coal (as on 01.04.2009)	Billion tonnes	267.21
2	Oil (as on 01.04.2009)	Million MT	775
3	Natural gas (as on 01.04.2009)	Billion Cubic meters	1074
4	Hydro power	MW	1,50,000
6	Solar PV	Mtoe / year	1200*
7	Solar Thermal	Mtoe / year	1200#
8	Wind energy	MW	65,000

1) * - Expected by utilizing 5 million hectares wasteland at an efficiency level of 15 percent for Solar Photovoltaic Cells.
2) # - MWe scale power plants using 5 million hectares for solar thermal

Source: Integrated Energy Policy - Report of the Expert Committee & respective Ministries

Fuel Mix Scenario by 2032 with High Renewables

Source	Capacity (MW)
Coal	269,997
Natural Gas	69,815
Coal Bed Methane	27,778
In-situ Coal Gas	22,222
Nuclear	63,060
Hydro	150,150
IGCC Pet Coke	3,137
Wind-Onshore	32,141
Wind-Offshore	1,200
Other Renewables (including solar)	70,500
Total	**710,000**

Key Challenges of Power Sector

- Persistent Energy & Peak Shortages
- Massive fund requirement for capacity addition
- Fuel Security
- Financial viability of Distribution Utilities
- Mitigation of GHG emission & climate change
- Resource constraints

Policy Initiatives

- Conducive policy framework for attracting investment & providing access to electricity for all
  - The Electricity Act, 2003 provides enabling framework for introducing competition, market mechanism in power sector, encouraging private investment & power sector reforms
  - National Electricity Policy notified by Govt. of India in 2005 mandates
    - Access to electricity for all in the next five years
    - Increase in per capita availability of electricity to over 1000 units by 2012.
  - Tariff Policy notified in 2006 by Govt of India facilitates attracting investment through reasonable tariff and protection of consumer interest
  - Mega Power Policy - Provides fiscal benefits in form of exemption of custom duty & excise.
  - Hydro Policy 2008 issued to promote private investment in hydro sector
    - Sale of at least 60% power at regulated tariff & balance may be sold on merchant basis
    - Liberal R&R Package to facilitate land acquisition in addition to National R&R Policy 2007

Policy Initiatives contd…..

- 100 % FDI permitted in all segments of Power Sector.
- Tariff based competitive bidding :-
  - Guidelines & Standard Bidding Documents issued by Govt. of India.
  - Projects aggregating to around 40,000 MW capacity awarded during last 3 years to successful bidders through tariff based bidding
  - This includes 4 Ultra Mega Power Plants of total capacity of 15,880 MW awarded to successful bidders (Sasan, Mundra, Krishnapattnam & Tilaiya)
- Private investment in Transmission :-
  - Guidelines for private investment in transmission issued in 2006.
  - Tariff based bidding for transmission projects already initiated.

Policy Initiatives contd…..

- Fuel security
  - Opening up of coal sector -
    - Allocation of captive coal blocks to private developers
    - Coal regulator expected shortly
  - Import of coal to meet shortfall in domestic production
    - Development of transportation logistics - ports, freight corridors, etc.
  - Natural gas
    - Private investment in new gas fields through NELP
    - Development of National gas grid for effective transportation
    - Gas regulator in place
    - Import of RLNG to meet shortages
    - Development of LNG terminals
- Reform and restructuring of SEBs
  - Unbundling of SEBs completed in most States
  - Reduction in AT&C losses through R-APDRP
  - Distribution reforms and bidding out of specific urban areas as distribution franchises

Policy Initiatives contd…..

- Mitigation of GHG emission and global warming
  - Introduction of higher size coal based units of 660 MW & above based on super critical technology
  - Promotion of renewable energy sources
    - Renewable purchase obligation mandated by State Electricity Regulatory Commissions (SERCs) which specifies purchase by distribution licensee of a minimum percentage of total consumption of electricity in his area
    - Preferential tariff provided by the Central and State Commissions
    - Framework for Renewable Energy Certificate created
    - National Solar Mission launched by Govt. of India has envisaged ambitious target of deployment of 20000 MW solar power by 2022

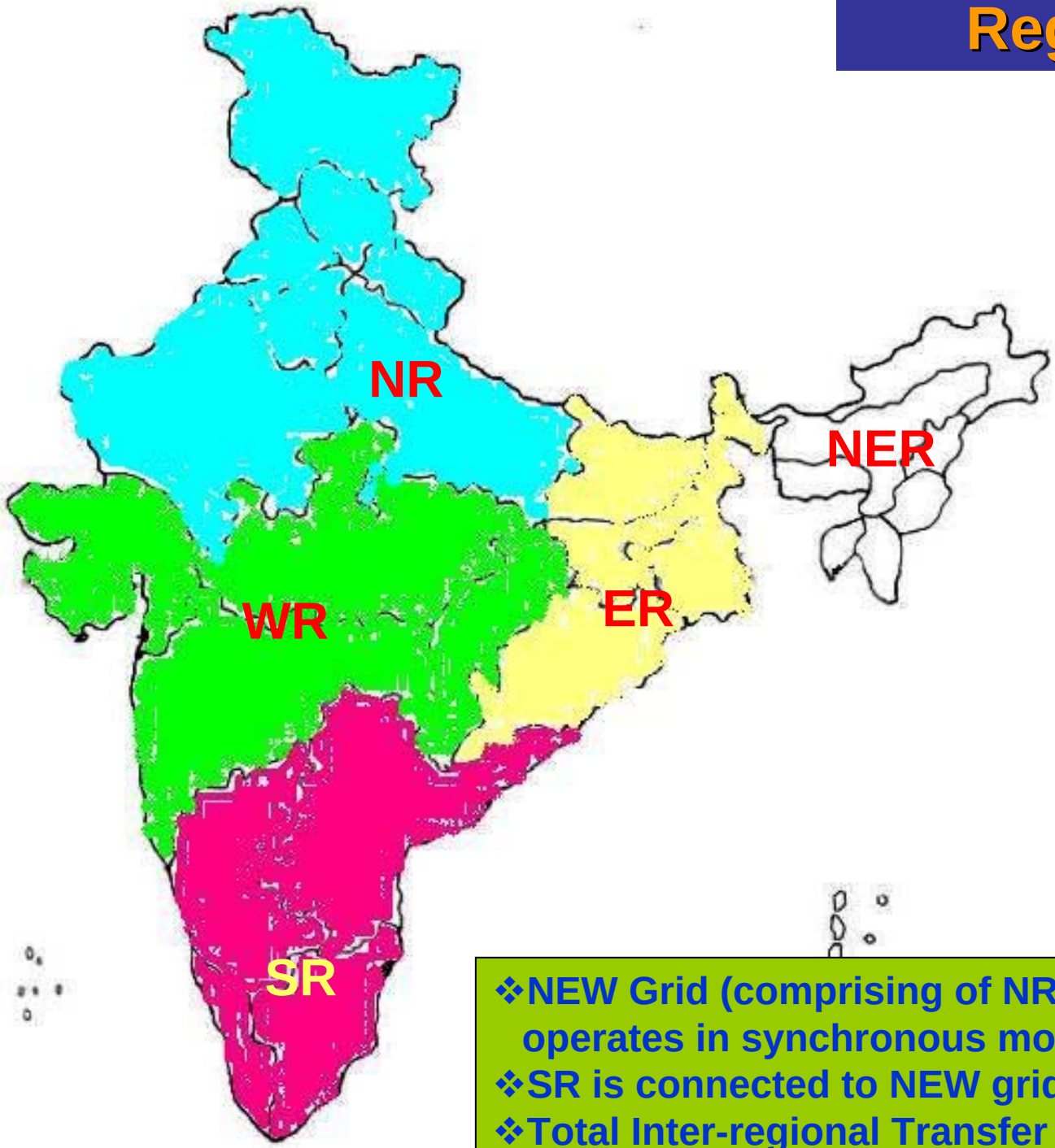
Policy Initiatives contd…..

- Resource Constraints
  - Manufacturing capability of main plant & balance of plant equipment to be commensurate with capacity addition
    - Enhancement of domestic equipment manufacturing capability by establishing JVs between Indian & foreign suppliers
    - Procuring equipment directly from international markets - Bulk tendering of 11 number of 660 MW supercritical units with the condition setting up manufacturing base in India
  - Skilled manpower
    - Need for development including training facilities commensurate with large capacity addition
  - Adequate construction equipments and erection Agencies

- **Growing economy, right policy framework and competitive environment of power sector will ensure required capacity addition to achieve Energy Policy objectives.**

Thank you

Regional Grids



- NEW Grid (comprising of NR, ER, NER & WR) operates in synchronous mode
- SR is connected to NEW grid to through HVDC links
- Total Inter-regional Transfer Capacity: 20,750 MW