



POWER

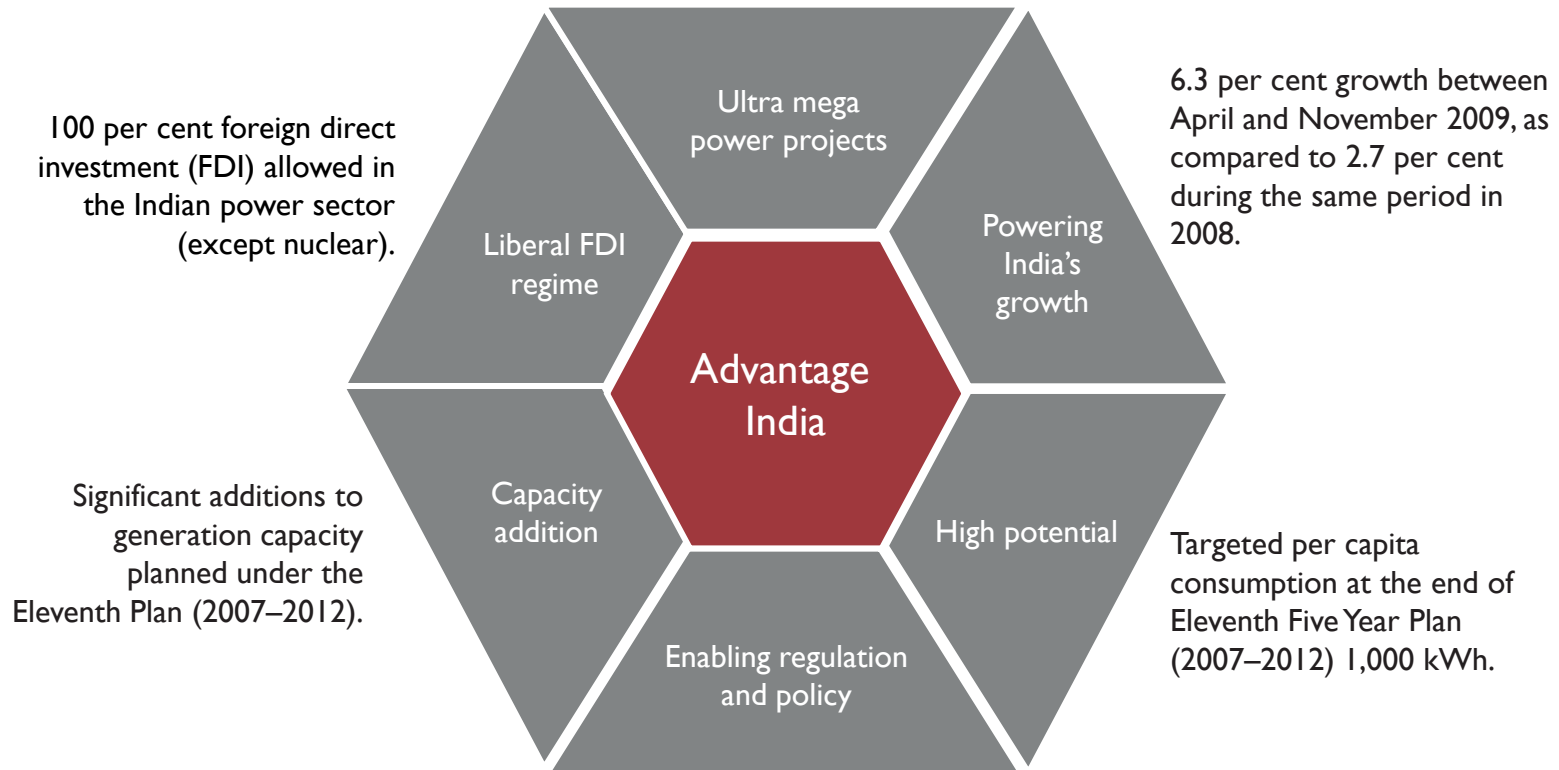
April 2010

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Advantage India

Nine projects are being targetted by the government at a total estimated investment of US\$ 3.3 billion (INR 160 billion), with the size of each project being 4,000 MW.



India's power market has evolved into a competitive structure that has minimal regulatory micro-management.

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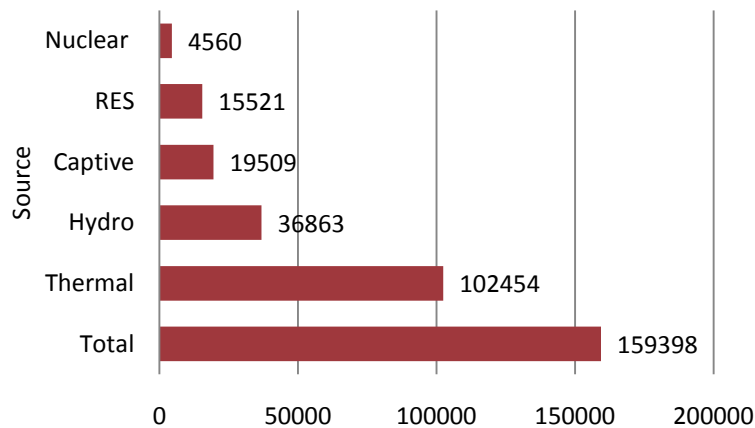
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Market overview ... (1/3)

Power generation

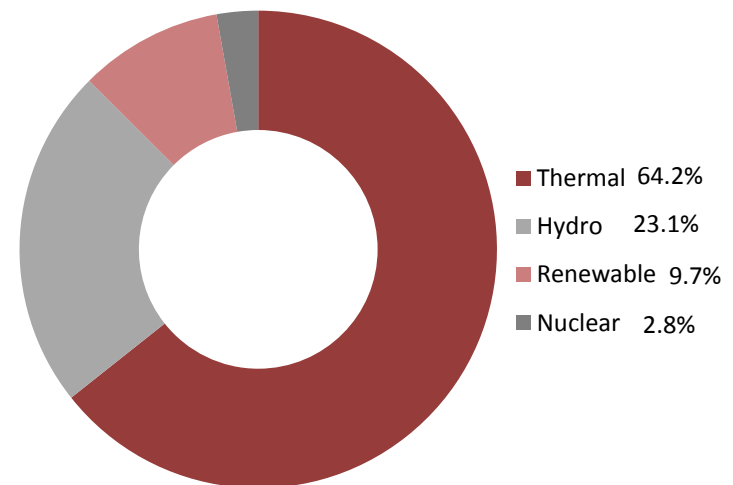
- Thermal power accounts for 64.2 per cent of the power produced in India, followed by hydro-electric power.

Installed capacity in MW (as on March 31, 2010)



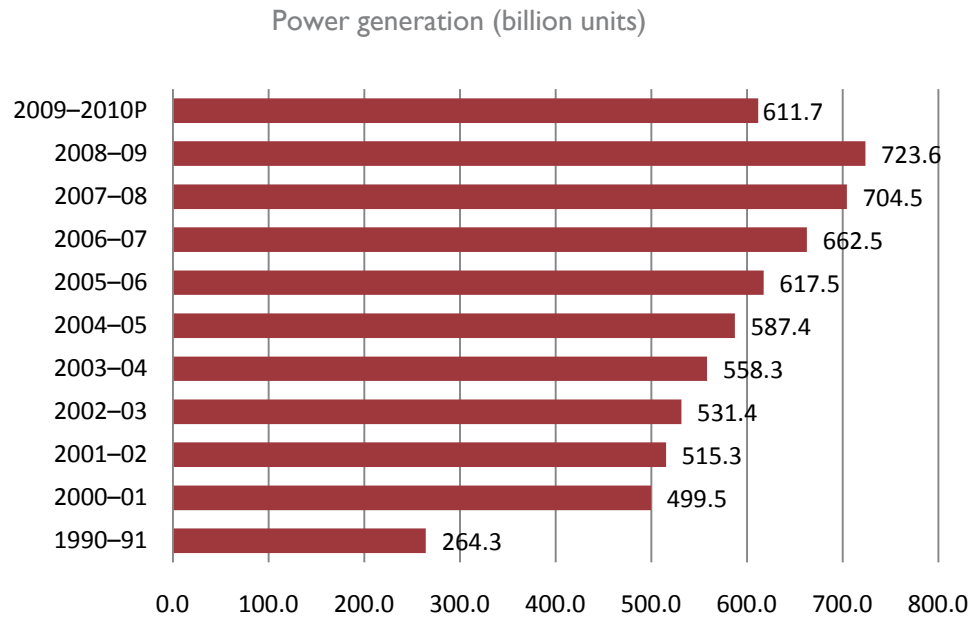
Source: Central Electricity Authority (CEA)
RES: Renewable energy sources

Generation mix (as on March 31, 2010)



Source: Central Electricity Authority (CEA)

Market overview ... (2/3)



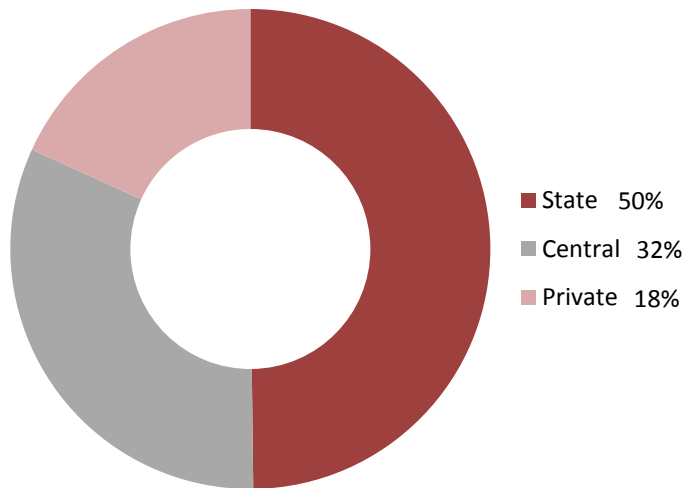
Source: Central Electricity Authority (CEA)
P: provisional estimates up to January 2010

Market overview ... (3/3)

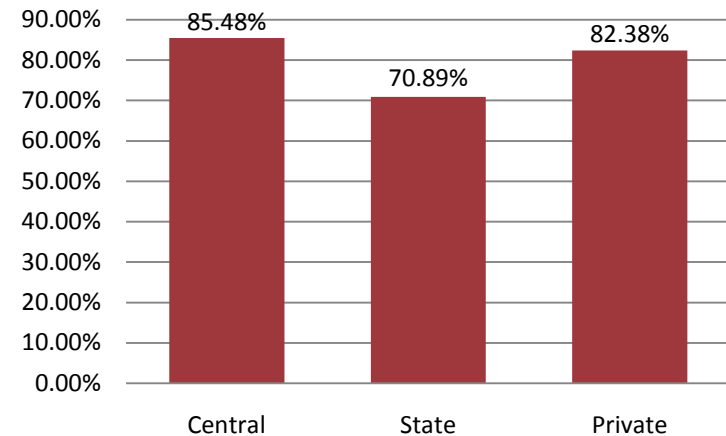
Power generation

- India's total installed capacity, as on March 31, 2010, has been estimated at 159,398.49 MW.
- The states contributed 79,391.85 MW to the total installed capacity, while the Central and private sectors contributed 50,992.63 MW and 29,014.01 MW, respectively, as of March 2010.
- The average plant load factor (PLF) of thermal plants, achieved in 2009–2010, has been estimated at 77.48 per cent.

Installed capacity — sector-wise share



PLF achievement (2009–2010)



Source: Power scenario at a glance, April 2010, CEA

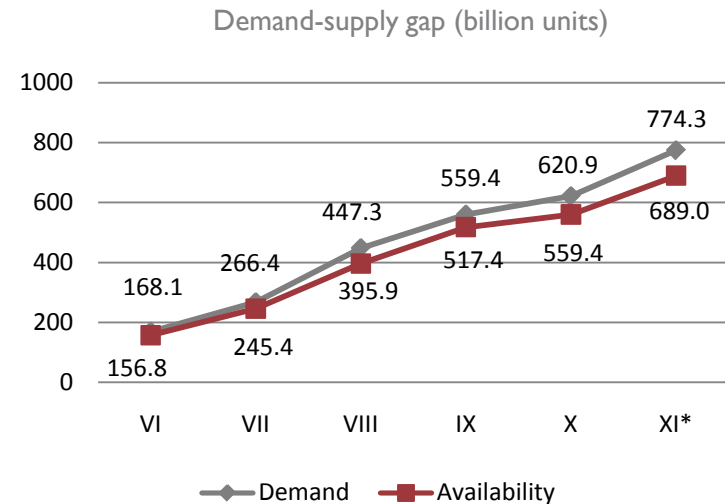
Sources of power

Coal	Oil	Natural gas	Nuclear	Hydro	Renewables
<ul style="list-style-type: none"> India has vast reserves of mineable coal (58.6 billion tonnes). Captive coal blocks have been allocated to encourage developers from the Central and private sectors. 	<ul style="list-style-type: none"> According to the Ministry of Petroleum and Natural Gas, India has 775 million metric tonnes (MMT) of oil reserves. 	<ul style="list-style-type: none"> India has natural gas reserves amounting to 1,074 billion cubic metres (BCM). Reliance Industries Ltd commenced production at its block in the Krishna-Godavari basin in 2009. 	<ul style="list-style-type: none"> India has one of the largest reserves of nuclear fuel thorium in the world. According to the Ministry of Atomic Energy (MAE), nuclear power generation in 2009–2010 has been estimated at 13,543 million units (MUs). 	<ul style="list-style-type: none"> The country has a potential of about 150,000 MW, only 25 per cent of which has been harnessed till date. The major portion of capacity addition is expected to take place in the North and North-eastern parts of India. 	<ul style="list-style-type: none"> Solar power, biomass and wind power have high potential for development. The installed capacity of the renewable energy industry has been estimated at 13,242 MW (as on July 31, 2009), which constitutes 9 per cent of the country's total installed capacity. India has the fourth-largest number of wind energy installations in the world.

Sources: Ministry of Petroleum and Natural Gas, Ministry of Atomic Energy, 'Renewable Energy in India — the evolving dynamics', Ernst & Young, 2009

Demand-supply gap

- India's energy requirement during the year 2008–09 was 774,324 million units (MU), while its energy availability was 689,021 MU.
- An energy shortage of 11 per cent was recorded in 2008–09, as compared to 9.9 per cent in 2007–08.
- The peak demand for energy in 2008–09 was 109,809 MW, while the peak demand met was 96,685 MW.
- The consequent peak shortage in 2008–09 was 12 per cent, as compared to 16.6 per cent in 2007–08.



Source: CEA

*In 2008–09

Planned capacity additions in the Eleventh Plan Period

In MW

- Significant additions to generation capacity have been planned under the Eleventh Plan Period.
- The capacity addition target for 2009–2010 is 14,507 MW. Against this, a capacity of 9,585 MW has already been commissioned as on March 31, 2010.
- 87 candidate hydro projects, with an aggregate capacity of 20,334 MW, have been planned during the Twelfth Five Year Plan (2012–17) to meet the country’s requirement for additional capacity.

Capacity addition during Eleventh Plan Period				
	Central	State	Private	Total
Hydro	8,654	3,482	3,491	15,627
Thermal	24,840	23,301	11,552	59,693
Nuclear	3,380	0	0	3,380
Total	36,874	26,783	15,043	78,700

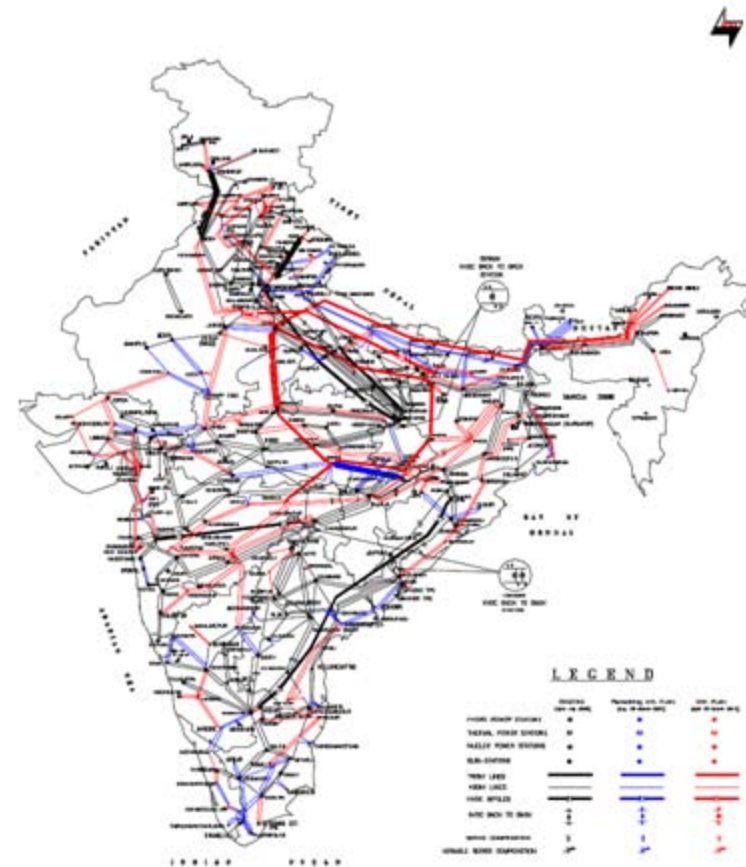
Source: Power scenario at a glance, CEA, February 2010

Transmission network

- The number of power transmission lines in India has increased from 3,708 circuit kilometres (ckm) in 1950 to about 220,794 ckm in 2009. They are estimated to reach 2,93,372 ckm by 2012.
- India is divided into five regions for transmission systems — northern, North-eastern, eastern, southern and western.
- A national grid is being developed and is estimated to have a grid capacity of 200,000 MW and inter-regional transmission capacity of 37,000 MW by 2012.
- The country's current sub-station capacity is 302,615 mega volt-ampere (MVA), which is estimated to increase by about 41 per cent to 428,000 MVA by 2012.

Sources: National Transmission Plan, Power Grid Corporation of India Ltd (PGCIL)

Major transmission networks in India (400 kv and above):
existing, approved and planned – upto 2011-12



Key players — Indian

Company	Category	Profile
National Thermal Power Corporation Ltd (NTPC)	Generation	The company is the sixth-largest thermal power producer in the world and India's largest power producer.
Tata Power	Generation	The Tata Group pioneered power generation in India nine decades ago. The group has a presence in all the segments — thermal, hydro, solar, wind energy as well as transmission and distribution.
Reliance Energy Ltd	Generation	India's leading integrated power utility company in the private sector, Reliance Energy has a significant presence in generation, transmission and distribution in the states of Maharashtra, Goa and Andhra Pradesh. The company has three ultra mega power projects of about 4,000 MW each.
Torrent Power	Generation	Torrent entered the power sector by acquiring two Gujarat state-owned electricity companies. It is also engaged in power distribution.
Bharat Heavy Electricals Ltd (BHEL)	Power equipment	BHEL has 14 power plants. It has installed 90,000 MW equivalent power generation units for utilities, captive and industrial plants. The company has supplied more than 225,000 MVA transformer capacity and other equipment for transmission and distribution networks. It has an outstanding order book of US\$ 24.4 billion (INR 1,174 billion), to be executed in 2009–2010 and beyond; 84 per cent of the company's business is from its power division.

Source: Relevant company annual reports and official websites
This is an indicative list

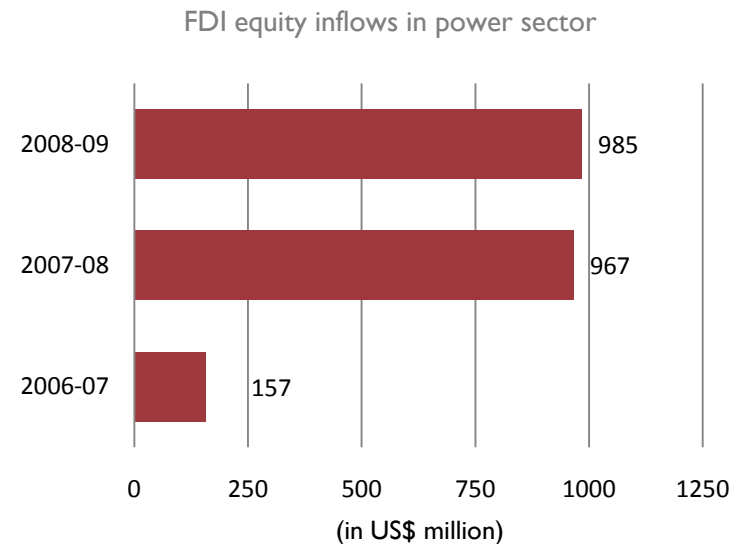
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Investments — FDI

- The power sector received FDI worth US\$ 1,320 million between April 2009 and January 2010, bringing the cumulative inflow from April 2000 to January 2010 to US\$ 4,510.45 million.
- The sector received 4 per cent of the cumulative FDI inflows into India between April 2000 and January 2010.
- Asset-backed investments with reasonable returns are an attractive proposition for international investors.
- 100 per cent FDI is allowed in all the segments of the power sector, including trading.
- No customs duty on import of capital goods for mega power projects.
- Income tax holiday for generating plants for 10 years.

Source: Department of Industrial Policy and Promotion



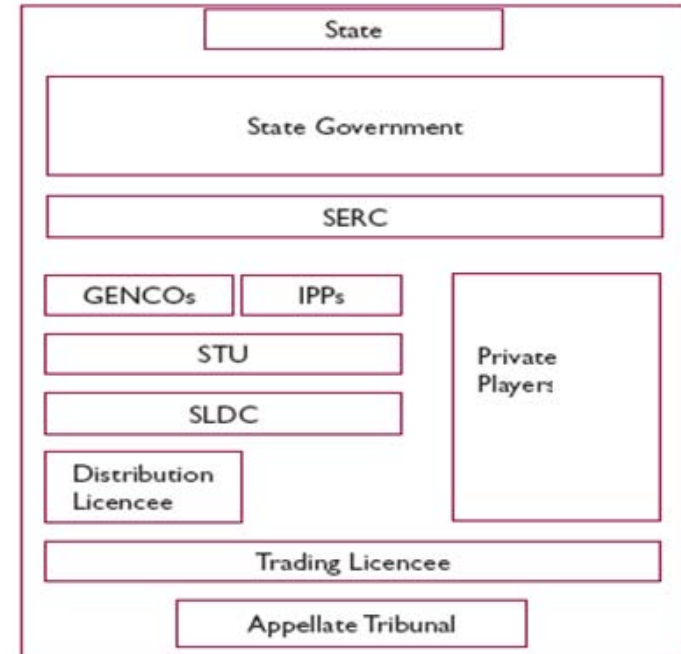
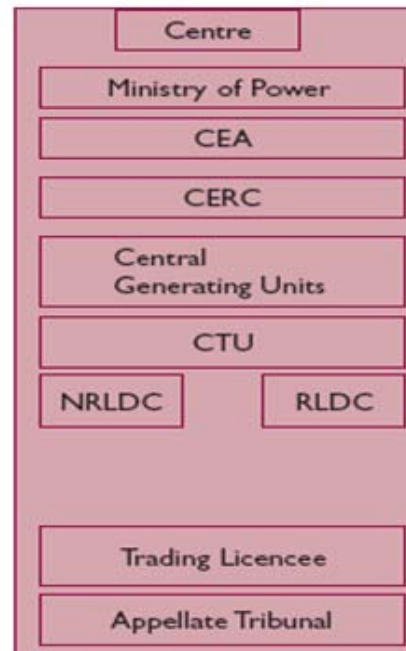
Source: Department of Industrial Policy and Promotion

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Policy and regulatory framework ... (1/4)

- The Ministry of Power, which began functioning on July 2, 1992, is the primary Central government agency responsible for the development of the power sector in India.
- The Ministry of New and Renewable Energy (MNRE) is responsible for developing renewable power, for which the funding agency is the Indian Renewable Energy Development Agency Ltd (IREDA).



CERC: Central Electricity Regulatory Commission
 CTU: Central transmission utility
 NRLDC: Northern Regional Load Despatch Centre
 RLDC: Regional Load Despatch Centre

SERC: State Electricity Regulatory Commission
 GENCOs: Generation companies
 IPPs: Independent power producers
 RLDC: Regional Load Despatch Centre

STU: State transmission utility
 SLDC: State Load Despatch Centre

Policy and regulatory framework ... (2/4)

Government initiatives

- India's power sector outlay for the Tenth Plan Period was US\$ 56.31 billion (INR 2,703 billion) and estimated expenditure was US\$ 37.37 billion (INR 1,794 billion).
- The outlay for the sector is US\$ 115.56 billion (INR 5,547 billion), according to the Eleventh Plan.
- Regulatory commissions have been constituted in 22 states.
- Tariff orders, performance standards, terms and conditions for supply and tariff have been notified.
- State Electricity Boards (SEBs) are to be unbundled.
- Distribution reforms have been initiated.
- Distribution has been privatised in Mumbai, Orissa and Delhi.
- Recovery from SEBs has been regularised after securitisation.
- The principles of a multi-year-tariff (MYT) regime have been proposed for tariff rationalisation.

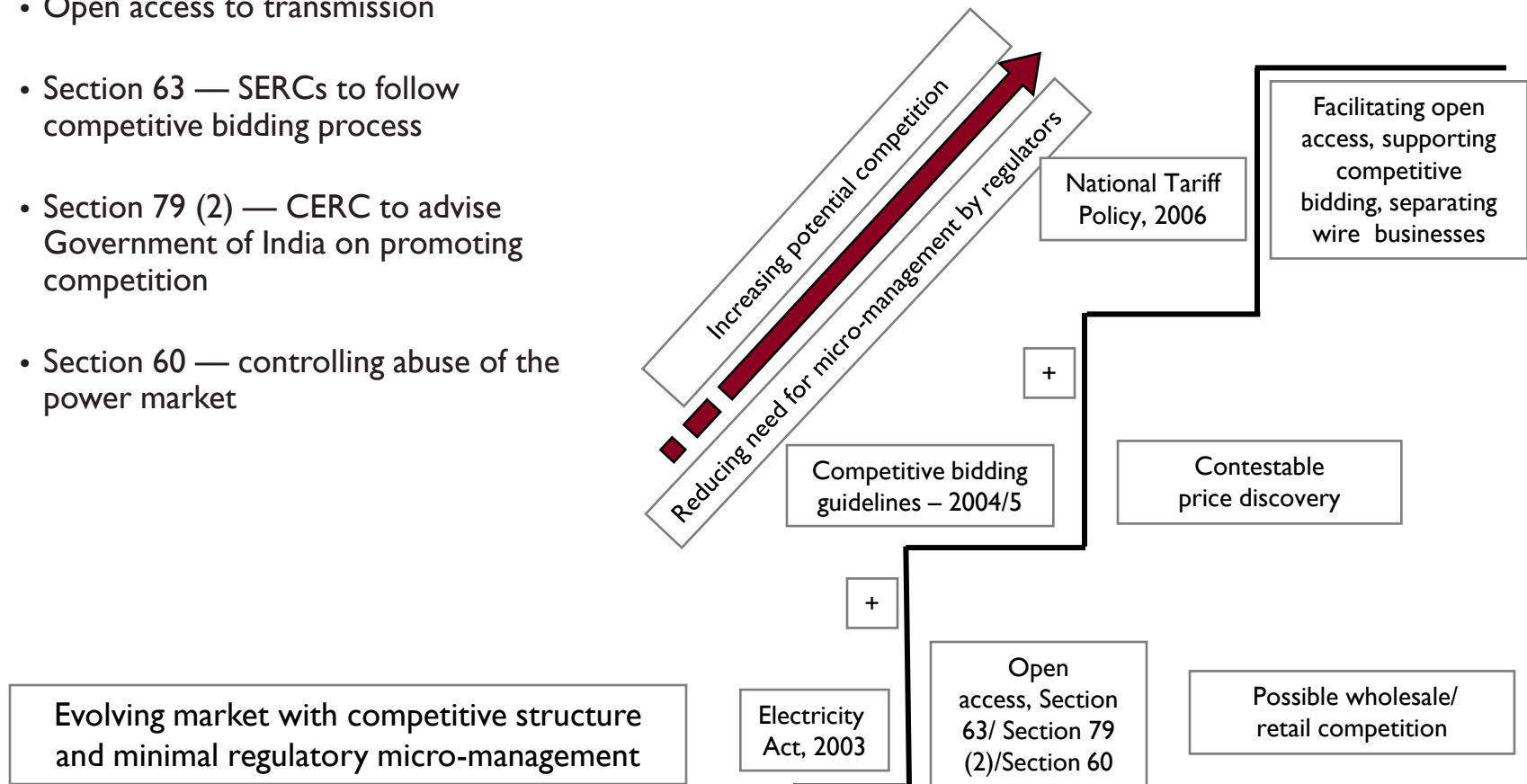
Source: Ministry of Power

Policy and regulatory framework ... (3/4)

Electricity Act, 2003

- Open access to transmission
- Section 63 — SERCs to follow competitive bidding process
- Section 79 (2) — CERC to advise Government of India on promoting competition
- Section 60 — controlling abuse of the power market

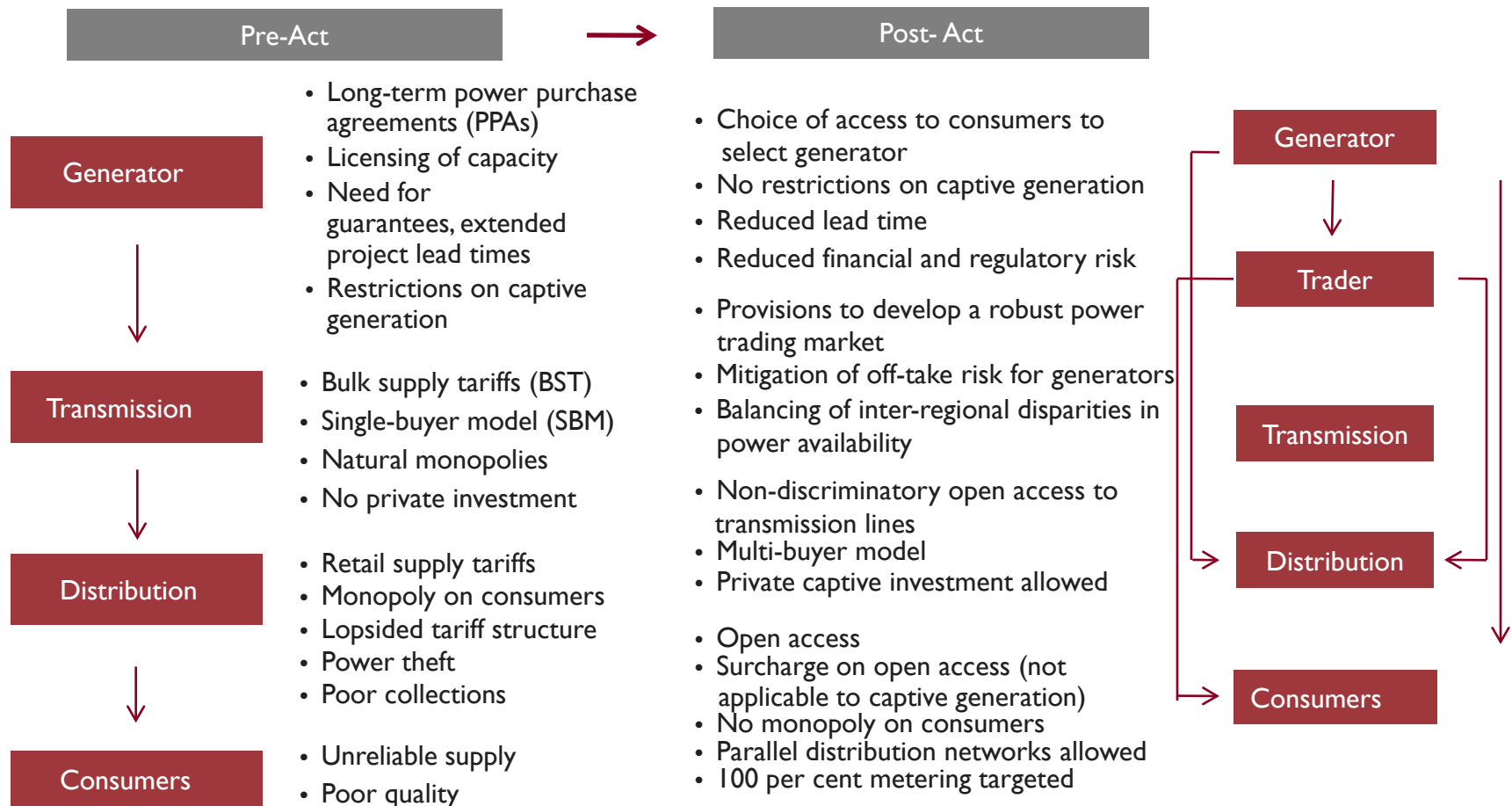
Evolving market structure in the power sector



Evolving market with competitive structure and minimal regulatory micro-management

Policy and regulatory framework ... (4/4)

Impact on industry structure



Mega Power Project Policy ... (1/2)

Conditions required to be fulfilled by a developer for grant of mega project status:

- The projects should be
 - Inter-state thermal power plants with a capacity of 700 MW or more, located in the states of Jammu and Kashmir, Sikkim, Arunachal Pradesh, Assam, Meghalaya, Manipur, Mizoram, Nagaland and Tripura
 - Inter-state thermal power plants with a capacity of 1000 MW or more, located in states other than those specified above.
 - Inter-state hydel power plants with a capacity of 350 MW or more, located in the states of Jammu and Kashmir, Sikkim, Arunachal Pradesh, Assam, Meghalaya, Manipur, Mizoram, Nagaland and Tripura.
 - Inter-state hydel power plants with a capacity of 500 MW or more, located in states other than those specified above.

Mega Power Project Policy ... (2/2)

- Zero customs duty on import of capital equipment.
- Increased external commercial borrowing (ECB) capital limits.
- State implementation support
- Decreased import duty on fuel, i.e., coal and liquid fuel
- Deemed export benefits to domestic bidders
- Price preference for public sector undertaking (PSU) bidders
- Tax holiday on the basis of section 80-IA

Source: Ministry of Power

Ultra mega power projects (UMPPs) ... (1/2)

- The government have launched an initiative for the development of coal-based UMPPs, each with a capacity of about 4000 MW.
- The objectives include:
 - Obtaining more cost-effective tariffs utilising economies of scale
 - Catering to the needs of the states
 - Mitigating risk related to tie-up of land, fuel, water and other statutory clearances
- Projects are awarded to developers on the basis of tariff-based competitive bidding.
- Power Finance Corporation Ltd (PFC) is the nodal agency for setting up special purpose vehicles (SPV) for projects.
- Projects to use supercritical technology based on pithead (captive block) or imported coal (coastal).
- Full exemption of central excise duty on goods procured under supercritical technology.
- Five coastal sites were originally identified, of which Mundra in Gujarat was awarded to Tata Power and Krishnapatnam in Andhra Pradesh to Reliance Power.

Ultra mega power projects (UMPPs) ... (2/2)

- Of the four pithead sites identified, Sasan in Madhya Pradesh and Tilaiya in Jharkhand were awarded to Reliance Energy.
- More sites are being identified to expand the number of UMPPs.
- The Ministry of Power is to facilitate coordination with other ministries and state governments for coal block allocation/coal linkage, environment and forest clearance, water linkage, allocation of power to different states, facilitation of PPAs and securing of the payment mechanism at the state level.
- PFC is responsible for facilitating the bidding process, land acquisition, clearances and approvals, securing coal blocks, etc.
- The first UMPP is expected to be commissioned in Mundra by 2012.

Source: Ministry of Power, Power Finance Corporation Ltd

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Opportunities ... (1/2)

Generation	Transmission	Distribution	Equipment and services
<ul style="list-style-type: none"> • Captive power plants (CPP) • Investment in coal, gas, nuclear, hydro and renewable energy 	<ul style="list-style-type: none"> • Participation in transmission bids • Working with generation companies to evacuate power from new projects 	<ul style="list-style-type: none"> • Participation in distribution franchisee privatisation • Operational distribution in special economic zones (SEZ) and industrial clusters 	<ul style="list-style-type: none"> • Generation, transmission, distribution equipment and infrastructure support • Operational and maintenance services

Opportunities ... (2/2)

- Construction, operation and maintenance of transmission lines by private players.
- Private transmission facilities to be either set up and operated by independent power transmission companies or joint ventures with state-owned transmission utilities.
- Competitive bidding for multiple transmission projects.

Opportunities	Target markets
<ul style="list-style-type: none"> • IPP • CPP • Distributed generation 	<ul style="list-style-type: none"> • Distribution licensees • Industrial consumers • Rural areas

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Industry associations

Organisation	Year of establishment	Core expertise
Damodar Valley Corporation (DVC)	1948	Generation, transmission and distribution in specified regions
Bhakra Beas Management Board (BBMB)	1967	Administration, operation and maintenance of projects
Rural Electrification Corporation (REC)	1969	Financing and implementation of rural electrification schemes
North Eastern Electric Power Corporation (NEEPCO)	1976	Development of power projects in the country's North-eastern region
Power Finance Corporation (PFC)	1986	Financing of power development schemes
Tehri Hydro Development Corporation (THDC)	1988	Development of hydro potential in specific rivers/valleys
Satluj Jal Vidyut Nigam (SJVN)	1988	Development of hydro potential in a specific basin
PGCIL	1989	Transmission system for evacuation of Central sector power and establishment/operation of inter-regional grids and load dispatch centres
CERC/SERCs	1998	Regulatory bodies to deal with Central and state-level issues
Power Trading Corporation (PTC)	2001	Trading of power
Bureau of Energy Efficiency (BEE)	2002	Responsibility for spearheading improvement of energy efficiency
Appellate Tribunal for Electricity	2004	To hear appeals against orders of adjudicating officer or appropriate commission under Electricity Act, 2003
National Load Dispatch Centre (NLDC)	2005	Scheduling and dispatching of electricity across inter-regional links and monitoring of national grid

Note

Wherever applicable, numbers in the report have been rounded off to the nearest whole number.

Conversion rate used: US\$ 1 = INR 48

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