
Overview of Indian Power Sector

The installed generating capacity in India (in utilities) as of 31 March 2006 was nearly 125,000 megawatts (MW). This included thermal (coal, gas and liquid fuel), hydro, nuclear, and renewable based generation. Hydropower constituted about 32,325 MW. A detailed energy breakdown of the installed capacity in utilities in the five power regions of the country on a sector-wise and mode-wise basis is given in Appendix 1. As may be seen there the hydro-thermal mix is low with hydropower constituting about 26% of the total capacity.¹ Nearly 90% of the installed capacity is in the public sector. In the case of hydropower, the public sector has a predominant share of over 97%. Nearly 78% is in the state sector. The annual gross electricity generation was about 617 billion units (BU) during 2005--2006; the share of hydropower in this was around 16%.

The energy resources of the country are unevenly distributed with bulk of the hydro resources in the northern and north-eastern part, and fossil fuel resources in the central and western parts. In order to ensure optimal utilization of these resources, the power systems of the country were demarcated into five power regions and a regional concept for power planning was introduced in the 1960s. This led to development of regional power grids and inter-regional interconnections. In the 1980s the concept of a national grid was adopted and this led to further strengthening of the intra-regional and inter-regional transmission systems. As a result an extensive network of transmission and distribution lines (over 6 million circuit kilometers) is presently in operation and a National Power Grid is in the process of evolution. The Indian power system is also interconnected with the power systems of Bhutan and Nepal, facilitating transnational power exchanges as per bilateral agreements.

The demand for power has been growing at the rate of 5.74% in recent years.² During 2005-2006 the demand was 632 BU in terms of energy and 93.21 gigawatts (GW) in terms of peak power requirements. The availability of power had been continually falling short of the demand and, as a result, the country is experiencing power shortages of varying degrees in different parts of the country³. The shortages during 2005-2006 were 8.4% in energy and 12.3% in peaking power. Per-capita consumption of electricity is relatively low, of the order of 600 kilowatt-hours (kWh). Presently, over 84% of the villages are electrified; but only 43.5% of the rural households have access to electricity.

¹ A hydro-thermal mix of 60:40 is often considered ideal; but it is not sacrosanct. Nevertheless, a higher component of hydropower is preferred from the system operation point of view.

² *TERI Energy Data Directory and Yearbook, 2004–05*

³ This may be attributed to a host of factors like shortfalls in targeted capacity addition (only 47.5% of the planned additions could be achieved during the Ninth Five-Year Plan 1997–2002), inefficiencies in production and usage of power, pricing distortions, etc..

The technical and commercial performance of the power utilities is a matter of grave concern. While some improvements have been noticed in recent years, there is considerable scope for improvement. The thermal plant efficiencies are of the order of 31.5% and the system losses are around 32.5%.⁴ The Government is conscious of the situation and has in recent years taken a number of policy initiatives and reform measures aimed at improving the health of the sector. As part of the reform program, the sector was opened up for private sector participation in generation in 1991. During the mid-1990s a more broadbased reform leading to changes in the structure, ownership patterns and regulatory set up was initiated. The Electricity Act, EA 2003 provides an appropriate legal and regulatory framework for this. The reform measures especially focus on creating an investment-friendly environment for private sector participation, promotion of competition and protection of consumer interests. Some of the key features of the EA are in Box 1. Independent regulatory commissions have been established in most of the States. In case of Mizoram and Manipur, a Joint Electricity Commission (JERC) has been notified. An Appellate Tribunal has also been constituted which would hear appeals against orders of regulatory commissions. Under the provisions of EA 2003, a National Electricity Policy and Tariff Policy have been notified. A draft National Electricity Plan (NEP) was notified in 2005; this is now being finalized based on the revised information on generating capacity addition targets. Similarly, almost all the regulatory commissions have given tariff orders and a number of them have notified open access regulations. There is also an added focus on renewable energy.

There is considerable scope for improvement of efficiencies in the end use sector. Realizing this, the Government had legislated an Energy Conservation Act, which came into effect in March 2002. This Act laid down a number of measures to ensure efficient use of energy and its conservation like establishment of a Bureau of Energy Efficiency (BEE), powers to the Central and state governments to facilitate and enforce efficient use of energy and its conservation, provision for standards and labeling of energy-intensive equipment and appliances, mandatory energy audits, etc.

Box 1. Key Features of Electricity Act 2003

- The Central Government to prepare a National Electricity Policy in consultation with state governments.
- Central Electricity Authority to prepare a National Electricity Plan.
- Thrust to complete rural electrification; provision for license free generation and distribution in rural areas.
- De-licensing of generation (except hydropower projects beyond a certain capital cost and nuclear) and freeing of captive generation.
- Provisions for promoting renewable energy based generation.
- Provisions for private licensees in transmission and entry in distribution through an independent network
- Open access in transmission from the outset; to be introduced in phases in distribution.
- Establishment of state electricity regulatory commissions made mandatory.
- Provisions for payment of subsidy through budget.
- Trading recognized as a distinct activity licensed by the appropriate regulatory commission.
- Provisions for reorganization of state electricity boards.
- Metering of all electricity supplied made mandatory.
- An Appellate Tribunal to hear appeals against decisions of the state electricity regulatory commissions.
- Provisions relating to theft of electricity made more stringent.
- Provisions for safeguarding consumer interest. Ombudsman scheme for redressal consumer grievance.

⁴ 32.5% system losses translate into 174 BU; approximately 24 GW at 60% load factor.