

mainly used as a backup in case of power cuts, or to supplement power available from the grid. Captive power can be expensive — some industries reportedly pay as much as US\$ 0.25 per kWh, to guarantee themselves a secure source of power.

Box 1.2. Captive power

In the face of costly and unreliable grid service, many Indian industries are assuring their power needs by building their own generating facilities. Two recent examples:

- **HEG (Hindustan Electro-Graphite)** of the LNJ Bhilwara Group is building a small (14 MW) hydro plant for captive use at its facilities in Madhya Pradesh. It plans to go on to build much larger, grid-connected hydro plants in Himachal Pradesh, in cooperation with Hydro-Québec.
- A Belgian concern, Tractabel, is teaming up with an Indian partner, (O.P. Jindal Group), to build a 2x120 MW power supply for a steel mill at Toranagallu in Karnataka. It will sell its surplus power to the local SEB.

On another front, the Government is planning to invite bids to set up private captive power stations in the country's major ports, where operations are frequently interrupted by lack of power.

Co-generation is another way in which non-utility companies are becoming involved in power generation. Several industries with burnable waste products, especially the sugarcane and paper industries, are installing electric generating capacity for their own use and for sale to the grid.

Sources of power generation

Thermal power generation accounts for 71 per cent of India's total electricity supply. The share of hydro-electricity (called "hydel" in India) has been shrinking, and now stands at 26 per cent. Another 3 per cent is produced by India's small but growing nuclear power program. Non-conventional sources (wind, solar etc.) are attracting increasing interest, but their share is so far minimal.

In turn, about 90 per cent of thermal power generation is coal-fired. The balance is fuelled mainly by natural gas, LPG and naphtha, as well as from biomass, particularly in the sugar industry.

Coal. India's coal reserves are estimated at 192 billion tons, of which 78 bn tons are proven. In this total are 24 bn tons of coking coal (11 bn tons proven). The bulk of coal reserves are in the Bengal-Bihar coal field. In addition, there are 36 bn tons of lignite reserves, mainly in Tamil Nadu.

Indian coal is low in sulphur, but also low in heat content (with an average GCV of under 4,000 kcal/kg), and high in ash (up to 45 per cent). The most commonly used coal-burning technology is still based on pulverized coal, although a 100 MW coal-fired plant with a fluidized bed unit is now being built. Coal supplies may be located far from the generating stations, and the railway system, which must carry the bulk of it, is often inefficient and prone to delays.

The situation is not helped by the fact that coal supply is the virtual monopoly of a state corporation, Coal India, which produces 90 per cent of India's output. The government is now opening up the coal sector to private investors — including the right to build