# 1. SUMMARY AND RECOMMENDATIONS

## Summary

This study reviews Indian coal supply and makes suggestions to help overcome some of the continuing difficulties facing the industry. The main points of the study are summarised below.

***The government's policy goal is to ensure a secure energy supply based on the country's huge domestic reserves. Domestic coal production cannot meet the demand for electricity generation or industry. Imported coal will be needed to meet quality standards and any growth in demand.***

The long-term goal of the Government of India is to ensure energy supplies for more than one billion people – 17% of the world's population. About 80% of energy supply is produced domestically. With about one-third of energy supply, coal is second as an energy source only to renewables (very largely traditional biomass from plant and animal sources, but also including over 1 000 MW of wind power and some solar energy plants). Over 90% of the coal supply is indigenous production. Coal consumption has been growing at about 4.8% per year, and this rate is expected to increase in the future. To achieve its goal of energy security, Indian government policy focuses on expanding coal production. But imports also play an increasingly important role, primarily for coking coal. The Indian iron and steel sector is the second largest coal market after power generation, but only 20% of domestic coal meets coking coal quality standards.

India has the world's third-largest hard coal reserves, after the United States and China. Indian coal is generally low in sulphur but high in ash and low in calorific value. Domestic coking coal requires intensive washing to make it suitable for coke-making. Even then, it is only marginally acceptable because of its inert material content. For this reason India imports much of its coking coal. Domestic

1. Beneficiation includes a number of processes to reduce the inert content of coal to meet quality requirements for particular uses. By reducing the volume of material to be handled, beneficiation also reduces transport costs. Beneficiation processes can include separation of the coal from rock particles, crushing and screening of the coal into uniform particle sizes, and washing to yield commercial-quality steam and coking coal.

steam coal is generally more suitable, but without beneficiation[1] its high ash content can reduce boiler efficiency and reliability and hamper efforts to reduce emissions. The high inert content of untreated coal also imposes an extra load on the transport system.

Indian hard coal production in 2000-2001 totalled 310 Mt and consumption 317 Mt. About 225 Mt per year is produced from opencast mines and the remainder from underground mines.

Coal production is insufficient to cope with growing demand for electricity and industrial energy. Investment in electricity and coal supply is impeded by subsidised electricity prices and the poor financial state of the utilities which cannot afford to pay adequate prices for coal. Investment in coal supply is impeded further by regulation of distribution and controls on foreign investment.

***Transport costs and low productivity reduce the competitiveness of domestic coal.***

Main consumers are located far from production sites in the east of India. Long transportation distances add to costs, especially where coal is not washed. Indian coal is often uncompetitive with imported steam coal.

State-owned companies mine most of the coal in India. Coal India Ltd – the world's second-largest coal supplier – produces about 86% of total production, and Singareni Collieries Company Ltd produces 8%. Productivity in Coal India mines ranges from 152 tonnes to 2 621 tonnes per miner per year, compared with about 12 000 tonnes in Australia and the United States. This low productivity is attributable to the low level of mechanisation in underground operations, obsolete techniques and inadequate investment in replacement equipment. Several of Coal India's subsidiary companies are chronically loss-making. Low productivity operations, mostly engaged in underground mining, make substantial losses whereas other companies, with mainly opencast operations, achieve positive returns.

India's state-owned railways transport 51% of mined coal. A further 23% is transported on industry-owned rail networks. Coal is the largest single freight item handled by the railways, and rail freight can account for half the price to inland consumers. Multiple gauges reduce the efficiency of the rail network. Expansion of the network and new rolling stock will be necessary to meet any growth in coal transport, but expansion is unlikely because low profitability limits the scope for investment from internal resources.

Coastal shipping supplies the southern sections of the country, moving coal railed from mines in the centre and the east. Deliveries are uncertain during the monsoon months and delays of weeks can occur. Private investment in ports is unrestricted; steel companies and others operate their own facilities. New private ports are planned.

***Power generation is the main consumer. Electricity demand growth is outstripping supply capacity.***

The largest consumers are the electric power sector (67%), the iron and steel sector (13%) and the cement industry (4%). Other industrial consumers include the textile, fertilizer and brick industries. In 2000, some 15 Mt of coking coal and 9 Mt of steam coal were imported, primarily from Australia and South Africa.

About 75% of India's electricity is generated from coal, and 70% of indigenous coal is used to generate electricity. Despite growth in power output of 5% to 9% annually, electricity supply is inadequate to meet industrial and urban demand growth. Supply failures are increasingly common in peak periods. Because of widespread use of high-ash run-of-mine coal, many of India's power plants have low-load factors and efficiency.

***Coking coal demand for steel-making is growing slowly but is expected to accelerate. Coal use in cement-making is growing faster than domestic supply capacity.***

India's steel industry occupies tenth place in world crude steel output. The sector has not expanded as quickly as the government had planned, and coking coal demand has risen only slightly. The government expects demand to rise more rapidly in the future. Coal use in cement-making is growing faster than the supply capacity of the domestic coal industry. Lower-quality domestic lignite is replacing hard coal in some cases. Since 1990, imports have met growth in demand from coastal producers. Demand for other coal uses is growing more slowly.

Overall, coal demand is forecast by government authorities to increase by about 7% per year to 2007, largely because of the planned addition of 116 GW of coal-fired power generation by that year. If growth on this scale is achieved – and that is questionable – a supply gap of some 133 Mt per year is forecast by 2007.

***Liberalisation of the coal industry has started, but customs duties and tax continue on imports, and the government controls distribution to major consumers. Some private investment is allowed, but state-owned companies dominate the industry.***

The growing imbalance between demand and supply has prompted liberalisation of the coal market. Prices of coking and higher-quality steam coal were deregulated in 1996. Complete deregulation of prices for all coal qualities took place in 2000. Prices now vary according to quality, but mining companies are still unable to set prices that fully reflect production costs. Import quotas were lifted in 1993 and import duties have been steadily reduced from an initial 85% to 35% in 1994 and to 10% in 1997. Import tax was also lowered, from an initial 35% to 3% in 1997. Distribution of coal to core markets such as power stations and steel producers remains controlled by the Ministry of Coal and Mines, while distribution to other sectors is left to the coal companies.

Private investment is now permitted in "captive" mines supplying particular consumers. Foreign investment is also permitted on a case-by-case basis, up to 50% of the equity in an Indian firm. In 1997, the subsidiaries of Coal India were restructured as financially independent competing units. Several international collaborative agreements encourage technology transfer.

***Local environmental regulations on mining and rehabilitation are having an impact on coal production, but power generation emissions are not regulated.***

Resettlement of communities, rehabilitation of mined sites, dust, noise, and underground fires are important environmental issues. There are no limits on sulphur dioxide or nitrogen oxide emissions, but the government has prepared a catalogue of measures to mitigate these emissions as well as greenhouse gases and particulates. Cost is a major barrier to the use of advanced clean coal-fired technologies. All companies which use at least 25% ash in their end-products are exempt from excise duty.

***Further reforms are needed. A policy framework is necessary that takes into account the need for progress in reform of the electricity sector.***

The Indian coal industry requires large-scale investment, particularly to expand mine capacity and to improve beneficiation of local coal. Investment in transport is also necessary. The scale of investment required calls for continuing liberalisation of the domestic coal market and the reduction of restrictions on foreign investment. Investment is impeded by inadequate geological data and by the lengthy and bureaucratic approval procedures governing land acquisition and new mine development. Rationalisation of existing mines is necessary. Employment policies and labour relations need to be addressed to raise productivity and mining profitability. Only then can adequate investment be generated for new facilities, especially in coal beneficiation plants to improve coal quality and reduce the burden of transporting waste material. Reform of the coal industry should be part of wider economic reform. Progress will be influenced strongly by reform in the electricity sector.

Imported coal will continue to be necessary. Competition with imports should be a stimulus to improving performance in the domestic industry.

## Recommendations

Raising the commercial performance of the industry to international standards should be the principal objective. The way to achieve this objective should be the creation of a freely competitive coal industry supplying a financially viable electricity industry.

Specific policy measures that are recommended include:

- Accelerating price reforms in the electricity sector.
- Allowing buyers and sellers freedom to choose with whom they do business.
- Fully liberalising coal pricing.
- Encouraging the industry to rationalise quality standards to better match coal products to consumer needs, especially in the power and steel industries.
- Encouraging the industry to close unprofitable mines.
- Addressing labour productivity and labour relations.
- Accelerating the opening of the coal sector to private investment, including foreign investment in mining, beneficiation and marketing.
- Removing impediments to full competition with imported coal, including the removal of remaining customs duties and taxes.
- Establishing a timetable for the privatisation of the existing coal companies.
- Establishing a framework of environmental standards for coal mining and consumption.
- Funding research and development on clean coal technologies through public-private partnerships.