

## **MINERAL AND MINING INDUSTRY IN INDIA**

## 1. INDIA'S MINERAL SECTOR

### 1.1 Background

The history of mineral development is as old as the civilization. In case of India, the mineral production dates back to the ancient times as the mining activities can be traced as far back as 6,000 years or so. The remains of some of the old mine workings are a witness to this fact. A few of these workings have led to the discovery of a number of significant mineral deposits, which are being worked in the present time.

In recent times the impetus to the mineral development was imparted in the country only after the political Independence came in the year 1947 when the significance of role of minerals was realized in nation building.

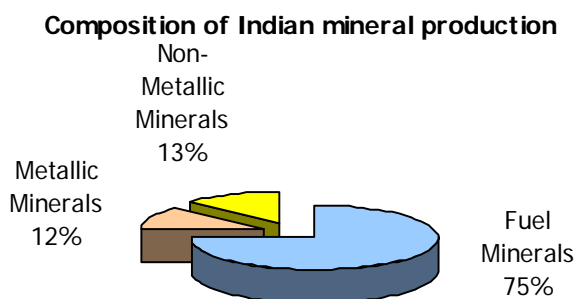
Realising the significance of industrial development of the country, Industrial Policy Resolution was promulgated in 1956 by the Central Government. Under this ambitious programme of developing several industries (such as steel, non-ferrous metals, cement, power, fertilizers, etc.) were launched which required increasing quantities of minerals. Coal was the one to have received the maximum attention for being the basic fuel for a whole range of industries such as steel, railways and power plants.

The entire production of lignite, petroleum and natural gas, copper, lead- zinc ores, gold, silver, diamond, tungsten concentrates, pyrites, rock phosphate, etc. was contributed from the mines operated under the public sector.

### 1.2 Current Status

Being aware of the vast potential of the sector, the Indian Government has been consistently and in a pragmatic manner opening up the previously controlled regime to usher private investment in the sector and infuse funds, technology and managerial expertise. The opening up of the Indian mining sector has, therefore, generated considerable global interest. The Indian mining sector was opened up to Foreign Direct Investment in 1993 after the announcement of the New Mineral Policy.

In India, 80 per cent of mining is in coal and the balance 20 per cent is in various metals and other raw materials such as gold, copper, iron, lead, bauxite, zinc and uranium.



*Source: Department of Mines, Government of India*

Of the 89 minerals produced in India, 4 are fuel minerals, 11 metallic, 52 non-metallic and 22 minor minerals. India is the largest producer of mica blocks and mica splittings, ranks third in the production of coal & lignite, barytes and chromite; 4th in iron ore, 6th in bauxite and manganese ore, 10th in aluminium and 11th in crude steel. Iron-ore, copper-ore, chromite and or zinc concentrates, gold, manganese ore, bauxite, lead concentrates, and silver account for the entire metallic production.

The search for minerals did not remain confined to landmass only. It was extended to off shore area and even deep sea. Result was the discovery of large petroleum deposits in the Arabian Sea which came to be known as Bombay High. The exploration work in the deep ocean led to the discovery of polymetallic nodules bearing cobalt, nickel, copper and manganese at a depth of 3,000 metres. This work earned India the status of Pioneer Investor in seabed mining conferred by the United Nations.

Limestone, magnesite, dolomite, barytes, kaolin, gypsum, apatite & phosphorite, steatite and fluorite account for 92 per cent of non-metallic minerals. However India is not endowed with all the requisite mineral resources.

Today, the reserves details are available for as many as 20,000 mineral deposits all over the country. The Indian Bureau of Mines has prepared inventory of mineral deposits for the country and updates it every five years. The country is self sufficient in case of 36 minerals and, deficient in respect of a number of minerals.

Grouping	Abundant	Adequate	Deficient	Scarce
Fuel Minerals	Non-coking coal	Lignite	Coking coal	Petroleum crude
Metallic minerals (ferrous)	Iron ore	Chromite (metallic), Manganese	Chromite (refractory grade)	Nickel, Tungsten, Cobalt, Molybdenm, Vanadium
Metallic minerals (Non-ferrous)	Bauxite (metallurgical grade)	Zinc	Bauxite(chem), Copper, Lead	Antimony, Gold, Platinum group of minerals , Tin
Industrial minerals	Dolomite, Gypsum, Limestone, Mica,	Graphite	Apatite, Rockphosphate, Kyanite	Sulphur, Potash
Precious stones				Diamond, Emerald, Sapphire, Ruby

Demand for minerals is expected to grow very fast, due to increasing levels of consumption, infrastructure development, and growth of the economy. Management of mineral resources has, therefore, to be closely integrated with the overall strategy of development and exploitation of minerals is to be guided by long-term national goals and perspectives.

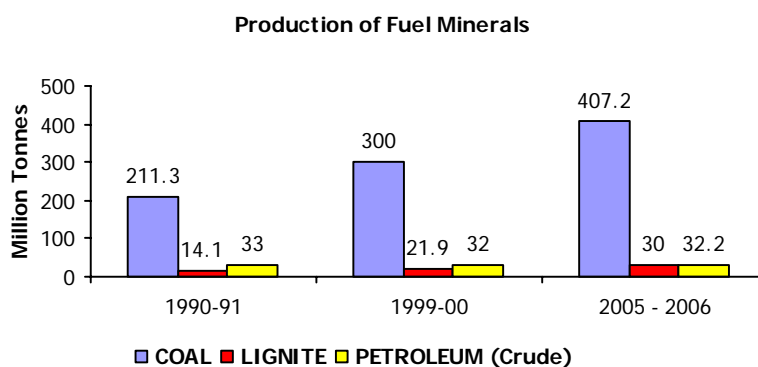
## Mineral production

The total value of mineral production (excluding atomic minerals) during 2005-06 was estimated at US\$ 16.27 billion. The composition is as follows

- Fuel minerals: US\$ 12.22 billion (75 per cent)
- Metallic minerals: US\$ 1.94 billion (12 per cent)
- Non-metallic minerals: US\$ 2.11 billion (13 per cent)

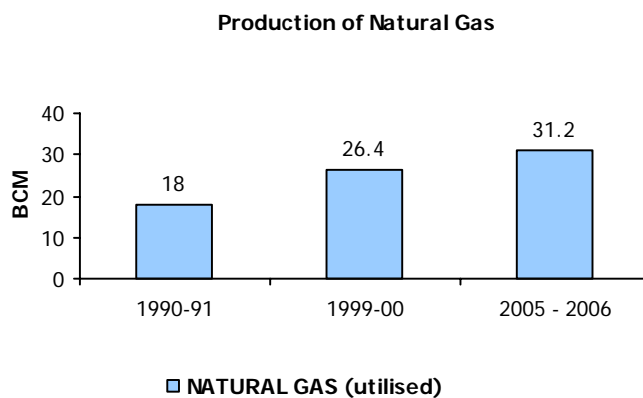
### Production of some selected minerals in India

#### *Fuel Minerals*



Sources: Department of Coal,  
Ministry of Petroleum and Natural Gas,  
Department of Mines, Government of India

The production of coal has increased considerably from 1990-91 to 2005-06, it was 211.3 Million Tonnes in 1990-91 and it nearly doubled (407.2 Million Tonnes) by 2005-06. The production of Lignite was 14.1 Million Tonnes in 1990-91 and it has also nearly doubled (30 Million Tonnes) by 2005-06. But there is a slight decline in the production of Petroleum (Crude) from 33 Million Tonnes in 1990-91 to 32.2 Million Tonnes in 2005-06.

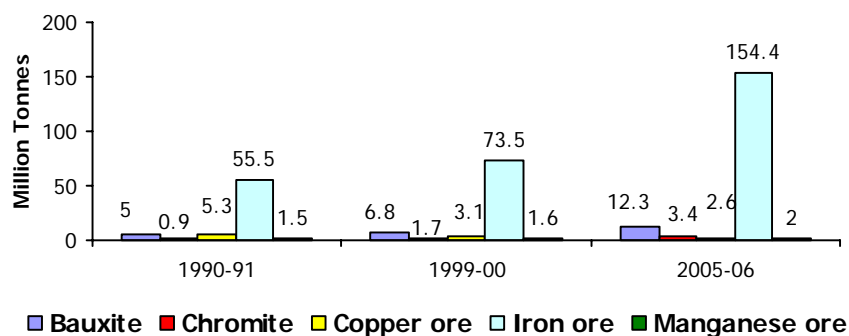


Source: Ministry of Petroleum and Natural Gas, Government of India

The production of Natural Gas (utilised) has nearly doubled to 31.2 Million Tonnes in 2005-06 from 18 Million Tonnes in 1990-91.

### ***Metallic Minerals***

**Production of Metallic minerals**

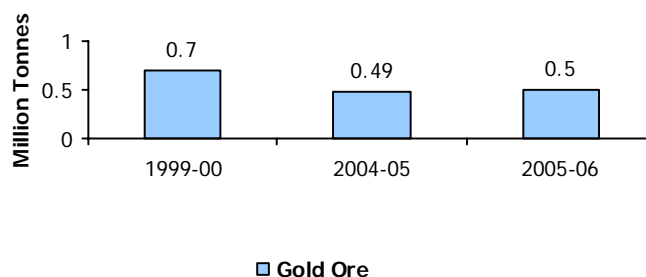


*Source: Department of Mines, Government of India*

The production of Bauxite has more than doubled from 5 Million Tonnes in 1990-91 to 12.3 Million Tonnes in 2005-06. The production of Chromite has increased more than 3 times from 1990-91 to 2005-06, it was only 0.9 Million Tonnes in 1990-91 while it grew to 3.4 Million Tonnes by 2005-06.

Copper ore production has decreased from 5.3 Million Tonnes in 1990-91 to 2.6 Million Tonnes in 2005-06. Iron ore production has increased almost three folds from 55.5 Million Tonnes in 1990-91 to 154.4 Million Tonnes in 2005-06. Production of Manganese ore has increased very slightly from 1.5 Million Tonnes in 1990-91 to 2 Million Tonnes in 2005-06.

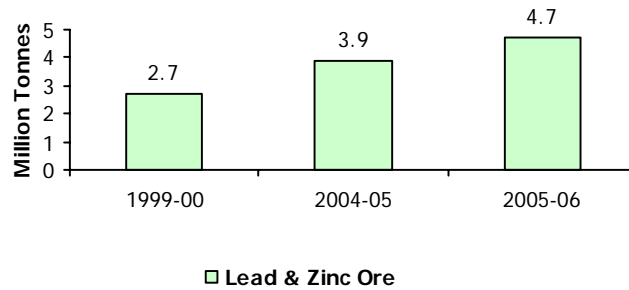
**Production of Gold Ore**



*Source: Department of Mines, Government of India*

Production of Gold Ore has decreased from 0.7 Million Tonnes in 1999-00 to 0.5 Million Tonnes in 2005-06.

### Production of Lead & Zinc Ore

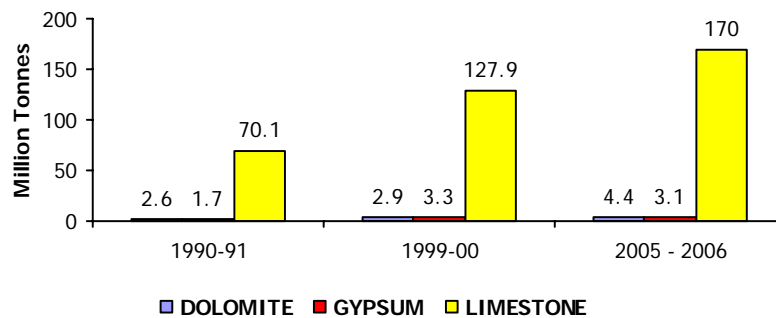


Source: Department of Mines, Government of India

Production of Lead & Zinc Ore was 2.7 Million Tonnes in 1999-00, it almost doubled to 4.7 Million Tonnes in 2005-06.

### Non-Metallic Minerals

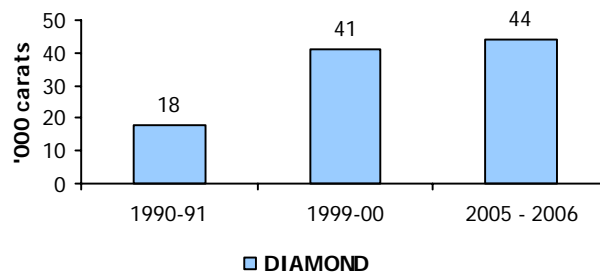
#### Production of Non-metallic minerals



Source: Department of Mines, Government of India

Production of Dolomite was 2.6 Million Tonnes in 1990-91 and it grew to 4.4 Million Tonnes by 2005-06. Production of Gypsum almost doubled from 1.7 Million Tonnes in 1990-91 to 3.1 Million Tonnes in 2005-06. Limestone production increased considerably from 70.1 Million Tonnes in 1990-91 to 170 Million Tonnes in 2005-06.

#### India's growing production of Diamond



Source: Department of Mines, Government of India

The production of Diamond has increased considerably from 18 Million Tonnes in 1990-91 to 41 Million Tonnes in 1999-00, since then it has increased at a stabilized rate to 44 Million Tonnes in 2005-06.

As can be seen from the tables, there has been a rapid growth in the production of coal and lignite, iron ore, limestone and many other minerals in the past three decades.

The National Mineral Policy, 1993 facilitated the growth of mineral based industries through investment in the private sector. As per the policy, processing units which desire to develop captive mines to secure assured supplies of raw material are allowed foreign equity participation in the manner and to the extent applicable to such processing units. The major mineral based products are pig iron, sponge iron, crude steel, ferro – alloys (ferro-chrome, ferro - manganese, ferro – silicon, charge-chrome), non ferrous metals (aluminium, copper, lead, zinc), dry cell batteries, cement, asbestos cement, ceramics, glass and glasswares, fertilisers and chemicals.

## Exports

During the period April-September 2006-07, the export for ores and minerals stood at US\$ 2895.90 million (prov.) as compared to US\$2677.40 million during the same period in the year 2005-06, registering a growth rate of 8.2 per cent.

### Exports of Ores & Minerals 2003 - 2004 to 2005 - 2006

Value in Rs million							
Mineral	Unit	2003- 2004		2004- 2005(R)		2005- 2006 (P)	
		Quantity	Value	Quantity	Value	Quantity	Value
Bauxite	t	896138	1,710	1016141	1,340	2355277	3,050
Chromite	t	745119	1,490	1116644	7,990	692673	6,310
Coal (Excl. Lignite)	'000 t	1610	2,920	1372	2,430	1988	2,670
Copper ores & conc.	t	300	-	18990	150	-	-
Diamond (mostly cut)	-	-	3,81,450	-	4,65,570	-	5,14,030
Iron ore	'000 t	51497	51,740	87285	1,47,270	84046	1,68,290
Lead ores & concs.	t	543	30	81157	1,720	9838	290
Lime stone	t	219258	180	344246	260	341070	330
Manganese ore	t	239632	500	317787	700	237344	460
Mica	t	123566	1,370	98453	900	80173	1,060
Natural gas	t	17164	390	29524	540	79948	25,700
Zinc ores & concs.	t	62041	750	180704	2,740	433648	9,060
All Minerals	-	-	4,99,260	-	7,04,680	-	79,790

P: figures are provisional and likely to be revised

R: Revised

Source : DGCI&S Kolkata

**Imports of Ores & Minerals 2003 - 2004 to 2005 - 2006**

Value in Rs million							
Mineral	Unit	2003- 2004		2004- 2005 (R)		2005- 2006 (P)	
		Quantity	Value	Quantity	Value	Quantity	Value
Bauxite	t	37432	210	56398	420	45240	360
Coal (Excl.Lignite)	'000 t	21682	50,080	28949	1,02,660	38587	1,49,090
Copper ores & conc.	t	488063	13,410	774160	31,460	1072905	51,980
Diamond( uncut )	-	-	3,22,510	-	4,17,790	-	3,96,440
Gypsum & plaster	t	18501	60	34250	90	75911	130
Iron ore	'000 t	1587	3,590	485	1,780	611	2,740
Lime stone	'000 t	1214	1,330	1349	1,820	1604	2,220
Manganese ore	t	6258	80	240914	2,090	13281	180
Mica	t	2552	110	1002	100	1135	160
Natural gas	t	82818	1,160	2371848	15,580	4776791	32,090
Petroleum ( Crude)	'000 t	93178	8,65,120	96694	11,89,320	99334	17,24,290
Zinc ores & concs.	t	103007	1,440	81547	1,350	40187	1,330
All Minerals	-	-	13,00,600	-	18,47,580	-	24,38,390

*P: figures are provisional and likely to be revised*

*R : Revised*

*Source : DGCIE&S Kolkata*

### CHAPTER - 3

#### MAJOR PLAYERS & ORGANISATIONS IN THE SECTOR

In India mining has a large presence of public sector companies which account for over 80 per cent of the total value of minerals produced. Large integrated players with interests from mining to metallurgy and processing like SAIL and Tata Steel in steel and Hindalco and Nalco in aluminium, dominate the metal and mining industry.

While SAIL, Nalco, National Mineral Development Corporation (NMDC) and Hindustan Copper are the largest public sector companies; Tata Steel, Hindalco and Sterlite are the major companies in the private sector. Sesa Goa (a subsidiary of Mitsui) is one of the largest companies in mining and export of iron ore. Orissa, Jharkhand and Chattisgarh are the most mineral-rich states of India. Orissa has over 50 per cent of India's bauxite reserves and over 20 per cent of India's reserves of iron ore.

The major players in the Mining sector are classified on the basis of the minerals produced by them namely

Mining Sector	Major Players
Exploration and Production of Coal / Lignite	<ul style="list-style-type: none"> <li>• Coal India Ltd</li> <li>• Neyveli Lignite Corporation</li> <li>• IISCO</li> </ul>
Exploration of Metals	<ul style="list-style-type: none"> <li>• NALCO</li> <li>• BALCO</li> <li>• Mineral Exploration Corporation Ltd</li> <li>• Bharat Gold Mines Ltd</li> <li>• ONGC</li> <li>• Ircon</li> <li>• Hindustan Zinc Ltd</li> <li>• Hindustan Copper Ltd</li> <li>• Sikkim Mining Corporation</li> </ul>
Iron Ore Sector	<ul style="list-style-type: none"> <li>• National Mineral Development Corporation</li> <li>• Kudremukh Iron Ore company</li> <li>• Steel Authority of India Ltd</li> <li>• Orissa Mining Corporation</li> </ul>
Bauxite Mining and Aluminium Production	<ul style="list-style-type: none"> <li>• National Aluminium Company</li> </ul>
Copper	<ul style="list-style-type: none"> <li>• Ore Mining</li> <li>• Hindustan Copper Ltd</li> </ul>
Rock	<ul style="list-style-type: none"> <li>• Phosphate and Barytes Mining</li> <li>• Rajasthan State Mines and Minerals Ltd</li> <li>• Andhra Pradesh Mining Development Corporation</li> </ul>

## **Organizations in Survey and Exploration**

### ***Geological Survey of India (GSI)***

A premier organisation of earth science studies was set up in 1851. It is a subordinate office of the Ministry of Mines; Govt. of India. GSI has provided vital earth science input into all facets of national economic development.

### **Mineral Exploration Corporation Ltd (MECL)**

Since its inception in the year 1972, MECL is carrying out mineral exploration activities and has added 129130 million tonnes of mineral reserves to the National Mineral Inventory.

## **Organisations in Regulation and Conservation**

### ***The Indian Bureau of Mines (IBM)***

IBM is a subordinate office under the Ministry of Mines. It is engaged in the promotion and conservation of minerals, protection of mines environment and scientific development of mineral resource of the country, other than coal, petroleum and natural gas, atomic mineral and minor minerals.

## **Companies into Mining and Processing**

### ***Hindustan Copper Limited (HCL)***

HCL was incorporated on 9th November 1967, under the Companies Act, 1956. It was established as a Government of India enterprise to take over all plants, projects, schemes and studies pertaining to the exploration and exploitation of copper deposits, including smelting and refining from National Mineral Development Corporation Ltd.

### ***National Aluminium Company Ltd (NALCO)***

NALCO was incorporated in 1981 and is Asia's largest integrated alumina- aluminium complex, comprising bauxite mining, alumina refining, aluminium smelting and casting, power generation, rail and port facilities. NALCO enjoys the status of a Star Export House and a Miniratna company.

## **CHAPTER - 4**

### **INVESTMENT POLICY & INITIATIVES**

#### **Institutional Framework**

The Mines and Minerals (Development & Regulation) Act (MMDR), 1957 and the Mines Act, 1952, which constitute the basic laws governing the mining sector, are promulgated by the Central Government.

The Ministry of Mines regulates and promotes the activities of mining in the country and is responsible for:

- Survey and exploration of all the minerals, other than coal, natural gas, petroleum and atomic minerals;
- Mining and metallurgy of non ferrous metals like aluminium, copper, zinc, lead, gold, nickel; and
- Providing administration for prospecting and mining laws.

The relevant rules in force under the MMDR Act are the Mineral Concession Rules, 1960, outlining the procedures and conditions for obtaining a prospecting license or a mining lease, and the Mineral Conservation and Development Rules, 1988 that lay down the guidelines for ensuring mining on a scientific basis and without environment degradation.

All the major minerals come under the purview of the Central Government. Minor minerals are separately notified and come under the purview of State Governments who have formulated Mineral Concession Rules for this purpose.

In the federal structure, the State Government is the owner of minerals in their respective territorial jurisdiction. In offshore areas, exclusive economic zone and the continental shelf, the rights are vested in the Central Government.

High quality geological databases have been generated by national agencies like the Geological Survey of India, Mineral Exploration Corporation, National Remote Sensing Agency, National Geophysical Research Institute and Indian Bureau of Mines. This database is accessible on a commercial basis and makes investment in mining exploration in India a low-risk investment proposition. In addition to the above, there exists a Federation of Indian Mining Industries (FIMI) which is an association of all those engaged in the business of mining. FIMI from time to time suggests to the Government desired changes in the prevailing mining policy that would facilitate improved activities in the sector.

#### **Private Participation in the mining sector**

The National Mineral Policy was revised in 1994 and as a result, private investment (both domestic and foreign), has been permitted for the exploration & exploitation of thirteen minerals. In 1994, the MMDR Act, 1957, had accordingly been amended. The Act had been amended with a view to accelerate the inflow of private capital, both domestic and foreign, as also state-of-the-art technology.

13 minerals in which there can be private participation (both domestic and foreign) for the exploration & exploitation are

Iron – ore ,Copper, Manganese, Lead, Chrome ore, Zinc, Sulphur, Molybdenum, Gold, Tungsten ore, Diamond, Nickel and Platinum group of metals

In December 1999, the Act has been amended further and made very progressive and investor friendly. The salient feature and implications of the amended Act are as follows:

- The concept of reconnaissance operations as a stage of operations distinct from and prior to actual prospecting operations has been introduced.
- The Reconnaissance Permit holder will have preferential right for grant of Prospecting License.
- The area restrictions of Reconnaissance Permits, Prospecting Licenses and Mining Leases will apply only state-wise.
- Area Limit/ Time Period for Mineral Concessions are as follows.

	<b>Maximum Area in a State</b>	<b>Initial Grant</b>	<b>Renewal</b>
Reconnaissance Permit	10,000 Sq. KM. (Single permit 5000 Sq. KM)	3 Years	-
Prospecting License	25 Sq. KM	3 Years	2 Years
Mining Lease	10 Sq. KM	20-30 Years	Blocks of 20 Years

The Minerals (except fuel minerals and atomic minerals) which require prior concurrence of Central Government for grant of mineral concessions are only 10. These are Asbestos, Bauxite, Zinc, Chrome Ore, Precious Stones, Copper Ore, Manganese Ore, Gold, Lead and Iron Ore

No case of renewal of prospecting license/ mining lease even for the 10 minerals listed above needs reference to the Central Government. Similarly, transfer of mining leases even for these 10 minerals does not require reference to the Central Government. State Governments have been delegated powers to grant mineral concessions even for areas, which are not compact or contiguous. State Governments have been empowered to permit amalgamation of two or more adjoining mining leases. State Governments have been delegated powers to approve mining plans for certain category of mines. For large mining operations (proposed investment exceeding Rs. 2 billion) mining lease shall not lapse if mining development does not take place in two years. Level playing field between Government owned Companies and others have been provided e.g. prematurely terminated lease area available for re-grant for both public and private sector and Government owned companies can not charge premium in case of transfer of mining lease.

### **Investment Policy**

In 1999, the foreign investment policy has been further liberalised to promote Foreign Direct Investment (FDI) in the mining sector. In a significant relaxation of the general policy governing process of automatic approval for FDI for the mining sector, the automatic route

for FDI and/ or technology collaboration is also available to those who have or had any previous joint venture or technology transfer agreement, subject to a declaration being filed that they have no existing joint venture for the same area and/ or the mineral concerned.

On April 24, 2000, the Coal Mines (Nationalization) Bill, 2000 was introduced in the Parliament, for amending the Coal Mines (Nationalisation) Act, 1973 and permitting private investment in coal and lignite mines, subject to certain conditions.

Following table shows the extent of investment allowed in the various activities of mining.

Activity	Investment Cap	Route
Exploration and mining of diamonds and precious stones	74 per cent	Automatic
Exploration and mining of gold and silver and minerals other than diamonds and precious stones	100 per cent	Automatic
Metallurgy and processing	100 per cent	Automatic
Private Indian companies setting up/operating power projects as well as coal and lignite mines for captive consumption	100 per cent	FIPB Automatic, provided such investment does not exceed 49 percent of the equity of a public sector undertaking
Setting up coal processing plants	100 per cent*	
Exploration or mining of coal or lignite for captive consumption	74 per cent	

\* subject to the condition that the company shall not do coal mining and shall not sell washed coal or sized coal from its coal processing plants in the open market and shall supply the washed or sized coal to those parties who are supplying raw coal to coal processing plants for washing or sizing

For FDI proposals not meeting the above mentioned guidelines, approval will be given by the Foreign Investment Promotion Board keeping in mind parameters such as project size, commitment of external resources for funding project costs, the company's mining track record and financial strength, level of technology and the Indian partner's equity holding.

### Investment Incentives

The government offers a wide range of concessions to investors in India, engaged in mining activity. The main concessions include, inter alia

- Mining in specified backward districts is eligible for a complete tax holiday for a period of 5 years from commencement of production and a 30 percent tax holiday for 5 years thereafter.
- Environment protection equipment, pollution control equipment, energy saving equipment and certain other equipment eligible for 100 percent depreciation.
- One tenth of the expenditure on prospecting or extracting or production of certain minerals during five years ending with the first year of commercial production is allowed as a deduction from the total income.
- Export profits from specified minerals and ores are eligible for certain concessions under the Income tax Act.
- Minerals in their finished form exempt from excise duty.

- Low customs duty on capital equipment used for minerals; on nickel, tin, pig iron, unwrought aluminium.
- Capital goods imported for mining under EPCG scheme qualify for concessional customs duty subject to certain export obligation.

### **Advantage India**

- World's largest producer of mica blocs and splittings
- 3<sup>rd</sup> among global chromite producers
- 3<sup>rd</sup> in the production of coal, lignite, and barytes
- 4<sup>th</sup> in the production of iron -ore
- 6<sup>th</sup> in the production of bauxite and manganese ore.
- 10<sup>th</sup> in the production of aluminium
- 11<sup>th</sup> in the production of crude steel
- Favourable climate for the rapid development of the mineral industry
- Heritage in mining and mineral processing

## 5. INVESTMENT OPPORTUNITIES & CHALLENGES

### Challenges in the Mining Sector

One of the major hurdles in investment in the mining sector is the delay in approval due to bureaucratic delays, discretionary interpretation and need of numerous approvals and agencies at Central and State Government level. At times this process takes 3-7 years for approvals and clearances which is much higher than other countries (e.g. 1.5 years in Australia).

Again infrastructural impediments like, high railway freight, inadequate availability of rail wagon capacity and inadequate power evacuation infrastructure also creates impediments to investment.

### The Opportunities

India has an estimated 85 billion tonnes of mineral reserves remaining to be exploited. Besides coal, oil and gas reserves, the mineral inventory in India includes 13,000 deposits/prospects of 61 non-fuel minerals. Expenditure outlay on mining is a meagre sum when compared to other competing emerging mining markets and the investment gap is most likely to be covered by the private sector. India welcomes joint ventures between foreign and domestic partners to mobilise finances and technology and secure access to global markets.

Potential areas for exploration ventures include gold, diamond, copper, lead, zinc, nickel, cobalt, molybdenum, lithium, tin, tungsten, silver, platinum group of metals and other rare metals, chromite and manganese ore, and fertiliser minerals.

The main opportunities in the mining sector (excluding coal and industrial minerals) are in the development and production of surplus commodities such as iron ore and bauxite, mica, potash, few low-grade ores, mining of small gold deposits, development of placer gold resources located on the frontal belt of the Himalayas, mining known deposits of economic and marginal categories such as base metals in Bihar and Rajasthan and exploitation of laterite for nickels in Orissa, molybdenum in Tamil Nadu and tin in Haryana.

Considerable potential exists for setting up manufacturing units for value added products. There exists considerable opportunities for future discoveries of sub-surface deposits with the application of modern techniques.