Indian Minerals Yearbook 2019

(Part- I : GENERAL REVIEWS)

58th Edition

INDIAN MINERAL INDUSTRY & NATIONAL ECONOMY

(ADVANCE RELEASE)

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

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1 Indian Mineral Industry & National Economy

NATIONAL ECONOMY

As in other major economies, India's Gross Domestic Product (GDP) growth also correlates with the growth of global output, an observation earlier made in the Economic Survey of 2015-16. Not surprisingly, the deceleration in India's GDP growth since 2017 has tracked the decline in world output. However, for three years prior to 2017, when global output growth was not declining, India surged ahead of the rest of the world, recording in 2014-18 an average growth significantly higher than that of any comparable peer, both among advanced and emerging market economies. The World Economic Outlook (WEO) Update of January 2020 has projected the growth of Indian economy to increase to 5.8 per cent in 2020 expecting India to contribute significantly to an eventual pickup in the growth of world output. India's GDP in nominal prices was ₹ 190.1 lakh crore (US$ 2.7 trillion) in 2018-19.

The WEO Update of January 2020 published by IMF has estimated the global output to grow at 2.9 per cent in 2019, declining from 3.6 per cent in 2018 and 3.8 per cent in 2017. The global output growth in 2019 is estimated to be the slowest since the global financial crisis of 2009, arising from a geographically broad-based decline in manufacturing activity and trade. Stabilising, yet uncertain, trade tensions between China and the USA have contributed to the decline of world output and trade. The growth of advanced economies has similarly declined from 2.5 per cent in 2017 to 2.2 per cent in 2018 and is estimated to further decline to 1.7 per cent in 2019. The larger group of Organisation for Economic Co-operation and Development (OECD) countries has also seen a drop in their growth from 2.6 per cent in 2017 to 2.3 per cent in 2018 and is estimated to grow at 1.7 per cent in 2019. The WEO has projected the declining growth of global output to rebound in 2020 with a modest uptick to 3.3 per cent.

The WEO of October 2019 has estimated India's economy to become the fifth largest in the world, as measured using GDP at current US$ prices, moving past United Kingdom and France. The size of the economy is estimated at US$ 2.9 trillion in 2019. In July 2019, the Union Budget 2019- 20 had articulated the vision to make India a US$ 5 trillion economy by 2024-25. The march towards this milestone has, however, been challenged by less than expected growth of India's GDP so far this year, on the back of a decline in world output. Yet, given India's record of growth with macroeconomic stability over the last five years (annual average growth rate of 7.5 per cent and annual average inflation of 4.5 per cent), the economy is poised for a rebound towards the US$ 5 trillion goal.

The National Statistical Office (NSO) has estimated India's GDP to have grown at 4.8 per cent in the first half (H1) (April- September) of 2019-20, lower than 6.2 per cent recorded in the second half (H2) (October-March) of 2018-19. On the supply side, the deceleration in GDP growth has been contributed generally by all sectors save 'Agriculture and allied activities' and 'Public administration, defence, and other services', whose growth in H1 of 2019-20 was higher than in H2 of 2018-19.

On the demand side, the deceleration in GDP growth was caused by a decline in the growth of real fixed investment in H1 of 2019-20 when compared to 2018-19 induced in part by a sluggish growth of real consumption. However, growth of real consumption started picking up in Q2 of 2019-20, mostly driven by a significant jump in government final consumption. Growth of private final consumption expenditure also picked up in the same quarter. The contribution of net exports to GDP in Q2 of 2019-20 became less negative as in real terms the contraction of exports was much smaller than contraction of imports. Lower growth of GDP and softer price of crude oil caused a large contraction of imports.

As several policies have been implemented to enhance the formalisation of the economy, examining the impact of the same is crucial due to the changes in methodology and sampling design, labour market estimates based on Periodic Labour Force Survey (PLFS) are not strictly comparable with the results of earlier quinquennial surveys on Employment-Unemployment conducted by National Sample Survey Organization (NSSO).

The GST (Centre+States) collection for the month of November 2019 was the third highest monthly collection since introduction of

GST (July 2017). From April-December 2019, gross GST revenue collection has crossed the mark of ₹1 lakh crore.

On the expenditure side, the budgeted expenditure of the Central government grew at 12.8 per cent in April-November 2019 over the corresponding period of the previous year, expending almost 60 per cent of the budget. The capital expenditure during April to November 2019-20 has grown at roughly three times vis-à-vis the same period in 2018-19.

In October and November 2019, major commodity groups have shown a positive growth in exports over the corresponding month of the previous year while imports of major commodity groups have contracted. However, the slower contraction in merchandise exports as compared to imports has so far resulted in improvement in trade balance in 2019-20.

The contraction in import bill was partly contributed by a decline in oil prices in the current year as compared to 2018-19, while slower contraction of exports may have resulted from a pick-up in global activity. Despite muted growth of services exports, the trade balance on the services account continued to be positive in 2019-20.

Foreign Direct Investment (FDI) provides a more stable source of financing the Current Account Deficit (CAD) as compared to external borrowings. During 2014-19, gross FDI to India has been robust as compared to the previous five years; the trend has continued in 2019-20 as well.

Share of agriculture and allied sectors in the total Gross Value Added (GVA) of the country has declined from 2009-14 to 2014-19 mainly on account of relatively higher growth performance of tertiary sectors.The contribution of industrial activities to GVA has also declined from 2009-14 to 2014-19. Manufacturing sector, which contributes more than 50 per cent of industrial GVA, has driven the decline while the share of Construction Sector has also moderated. Services sector has moved ahead faster, distancing itself further from Agriculture and Industry. Financial, Real Estate and Professional services have driven the increase in the contribution of Service Sector followed by Public Administration.

As per First Advance Estimates, growth in real GDP during 2019-20 is estimated at 5.0 per cent, as compared to the growth rate of 6.8 per cent in 2018-19. The nominal GDP is estimated at ₹ 204.4 lakh crore in 2019-20 with a growth of 7.5 per cent over the provisional estimates of GDP (₹ 190.1 lakh crore) for 2018-19.

Growth of real GVA at basic prices is estimated at 4.9 per cent in 2019-20, as compared to 6.6 per cent in 2018-19. Deceleration in GVA growth is estimated across all subsectors except 'Public Administration, Defence and other services'.The drop in fixed investment by households from 14.3 per cent to 10.5 per cent explains most of the decline in overall fixed investment between 2009-14 and 2014-19. Fixed investment in the Public Sector marginally decreased from 7.2 per cent of GDP to 7.1 per cent during the two periods. However, the stagnation in private corporate investment at approximately 11.5 per cent of GDP between 2011-12 and 2017- 18 has a critical role to play in explaining the slowing cycle of growth and, in particular, the recent deceleration of GDP and consumption.

India's Merchandise Trade

Exports

India's merchandise exports including re-exports had reached the level of US$ 313.36 billion in 2019-20.

The slowdown of world output has definitely had an impact on reducing the export to GDP ratio, particularly from 2018-19 to H1 of 2019-20. The appreciation in the real exchange rate has also contributed to the declining exports to GDP ratio. Petroleum, Oil and Lubricants (POL) exports have a dominant share in India's export basket. However, since petroleum exports are a value-added pass through of petroleum imports, exports net of POL exports reflect how broad-based India's exports are in generating value addition in the country. Growth in Non-POL exports dropped significantly from 2009-14 to 2014-19. This is a challenge that needs to be addressed in times to come. In 2019-20 (April-November), petroleum products continued to be the largest exported commodity, in value terms. In terms of growth, it was drug formulations, biologicals which grew the highest between 2011-12 and 2019-20 (April- November).

India's largest export destination country continues to be the United States of America (USA) in 2019-20 (April-November), followed by United Arab Emirates (UAE), China and Hong Kong. Between

2011-12 and 2019-20, India's exports to USA grew the highest.

Imports

India's merchandise imports including re-imports had reached the level of US$ 474.70 billion in 2019-20.

An increase in the merchandise imports to GDP ratio has a net negative impact on the Balance of Payments (BoP) position. Over the years the ratio has been declining for India entailing a net positive impact on the BoP position. Crude oil imports have a large presence in the import basket that correlates India's total imports with crude prices. Evidence also bears this out. As crude price rises so does the share of crude in total imports that increases imports to GDP ratio. Gold imports also have a significant presence in the import basket that correlates India's total imports with gold prices. While broadly that has been true for the two five-year periods, 2009-14 and 2014-19, the share remained the same between 2018-19 and the first half of 2019-20, despite an increase in gold prices, possibly due to increase in import duty that reduced the import of gold.

China continues to be the largest exporter to India followed by USA, UAE and Saudi Arabia. In recent times, Hong Kong, Korea and Singapore have also emerged as significant exporters to India.

Trade Deficit

Merchandise trade deficit is the largest component of India's current account deficit significantly impacting the BoP position. In recent years, the escalation of global trade tensions leading to slowdown in world trade has increased the fragility of India's trade deficit with the potential of worsening the BoP. In syncronise with an estimated 2.9 per cent growth in global output in 2019, growth in global trade is estimated to grow at 1.0 per cent after having peaked in 2017 at 5.7 per cent. The slowdown of world trade reflects a confluence of factors, including a slowdown in investment, reduced spending on heavily traded capital goods and a sizable decline in trade in cars and car parts. Global trade growth is however projected to recover to 2.9 per cent in 2020 with recovery in global economic activity. However, there is heightened uncertainty regarding the future structure of global value chains and the repercussions of trade tensions on technology, which may continue to weigh down the growth in world trade.

On an average, India's merchandise trade balance has improved from 2009-14 to 2014-19, although most of the improvement in the latter period was on account of more than fifty per cent decline in crude prices in 2016-17. Lately the improvement in trade balance has positively contributed to the improvement in BoP position. With two top trading countries, i.e., USA and United Arab Emirates, India has consistently run trade surplus since 2014-15. On the other hand, India has trade deficit continuously since 2014-15 with respect to other major trading partners, i.e., China, Saudi Arabia, Iraq, Germany, Republic of Korea, Indonesia and Switzerland. India had trade surplus with Hong Kong and Singapore till 2017-18, before it changed to trade deficit in 2018-19. The bilateral imbalances have remained stable in most cases.

Trade Related Logistics

Indian Logistics Sector is riding a growth wave and is a sunshine industry. According to estimates, Indian logistics sector is expected to grow at 8-10 per cent over the medium term. The Logistics Industry of India is currently estimated to be around US$ 160 billion and is expected to touch US$ 215 billion by 2020.

The Indian warehousing and logistic market received around US$ 3.4 billion of institutional capital over the last few years (January 2014-January 2018). Investments into the Warehousing Sector account for around 26 per cent of the total private equity investments into real estate during this period. Many new startups are coming up in logistics eco-system with already 350 startups registered in Logistics. Agri-logistcs is also attracting attention. Solar powered micro cold stores are being developed and application based grading facilities are being created. Startups are also working on providing solution to making vehicles more fuel-efficient and environment friendly. In terms of job creation, experts predict that Logistics Sector can be the largest job creator by 2022. The sector currently provides employment to more than 22 million people in the country.

To improve trade logistics, Government is building infrastructure through ambitious projects like the Bharatmala, Sagarmala and the Dedicated Freight Corridors. Inland waterways are being developed as a cost-effective means of transportation. Multimodal logistic parks are being created to promote multimodal transportation.

Foregin Direct Investment (FDI)

Net FDI in the first eight months of 2019-20 stood at US$ 24.4 billion. An increase in net FDI improves the BoP position. The impressive improvement in BoP position from March, 2014 to March, 2019 is mainly attributed to almost doubling of net FDI into the country from 2009-14 to 2014-19. Net FDI inflows have continued to be buoyant in 2019- 20 attracting in the first half itself an amount more than 50 per cent of the previous year level. Continuous liberalisation of FDI guidelines has been responsible for rising inflows of foreign investment into the country.

MINING INDUSTRY

The index of mineral production (excluding atomic minerals) (with base year 2011-12=100) for 2018-19 was at 107.9 and displayed a growth of 2.9% as compared to the previous year.

The total value of mineral production (excluding atomic minerals, fuel and minor minerals) was at ₹ 73,257 crore during 2018-19.

The value of metallic minerals in 2018-19 at ₹ 64,042 crore increased by about 26% over the previous year. Among the principal metallic minerals, iron ore contributed ₹ 45,184 crore (71%), lead (concentrate) & zinc (concentrate) together ₹ 7,240 crore (11%), chromite ₹ 3,584 crore (about 6%), manganese ore ₹ 2,270 crore (about 4%), silver ₹ 2,582 crore (4%), bauxite ₹ 1,717 crore (3%) and the remaining value was from copper (ore & concentrate), gold (ore & metal), lead & zinc ore and tin concentrates (Table-1).

In metallic ores, production increased in respect of copper ore (12%), gold ore (3%), lead & zinc (9%), manganese ore (8%), chromite (14%), bauxite (4%) and iron ore (2.5%) during the year 2018-19 as compared to the previous year.

The value of production of non-metallic minerals at ₹ 9,215 crore during 2018-19 increased by 4% as compared to the previous year. Limestone with a contribution of 92% of the total value of non-metallic minerals, retained its leading position in 2018-19 in the group. The other important non-metallic minerals in value terms, were phosphorite/rock phosphate (4%) and garnet (abrasive) (2%).

Table – 1 : Indian Mineral Industry : Value of Production*
2016-17 to 2018-19

(In ₹ crore)

Sector	2016-17 (R)	2017-18 (R)	2018-19 (P)
Total : All Minerals	**47789**	**59831**	**73257**
Metallic minerals	39760	50976	64042
Non-metallic minerals	8029	8855	9215

** Excluding the minerals declared as prescribed substances under the Atomic Energy Act,1962; fuel minerals and minor minerals.*

Reporting Mines

Reporting mine is defined as "A mine reporting production or reporting 'nil' production during a year but engaged in developmental work such as, overburden removal, underground driving, winzing, sinking work, exploration by pitting, trenching or drilling as evident from the MCDR returns".

There were 1,364 reporting mines (excluding atomic, fuel and minor minerals) in India located in 20 States during 2018-19. Among them, 597 belong to metallic minerals and 767 to non-metallic minerals (Table-2). There were 145 mines in the Public Sector and the remaining 1,219 mines were under Private Sector.

Table – 2 : Number of Reporting Mines
2017-18 and 2018-19

Sector		2017-18#	2018-19# (P)
All Minerals		**1430**	**1364**
I	(i) Public sector	146	145
	(ii) Private sector	1284	1219
II	(i) Metallic minerals	638	597
	(ii) Non-metallic minerals	792	767

Note: *#: Excluding atomic, fuel and minor minerals.*

Role of Public Sector

The Public Sector has played an important role in the overall mineral production in 2018-19. The share of Public Sector in fuel minerals was dominant in 2018-19.

The entire production of copper ore & conc. among metallic minerals and diamond, fluorite, salt (rock) and sulphur (by-product) in respect of non-metallic minerals was reported from the Public Sector. By and large, almost entire production (99.82%) of gold (primary) came from Public Sector during 2018-19.

Gross Value Added from Mining & Quarrying Sector

The Ministry of Statistics & Programme Implementation has released the new series of national accounts, revising the base year from 2004-05 to 2011-12 in the year 2015. The industry-wise estimates are now presented as Gross Value Added (GVA) at basic prices. Certain changes have been made in this series including for Mining & Quarrying industry. During 2018-19 Mining and Quarrying industry accounted for about 2.4 % of the GVA at current prices. The GVA at current and constant prices for the period from 2016-17 to 2018-19 is furnished in Tables-3 & 4.

Employment

The estimated average daily employment of labour engaged in Mining Sector (excluding atomic and minor minerals) was 4,82,752 in 2018-19. Of this, 3,78,458 or 78% were in Public Sector and 1,04,294 or 22% in private sector. Fuel minerals accounted for 76%, metallic minerals 18% and non-metallic minerals 6% of the total labour force during the year.

India's ranking in 2018 in world production was 2nd in steel (crude/liquid), 3rd in zinc (slab); 4th in aluminium, chromite, iron ore & lead (refined); 5th in bauxite, 7th in manganese ore, 11th in copper (refined), 15th in magnesite and 16th in apatite & rock phosphate. The statistics on indigenous and world production of principal minerals and metals are detailed in Table-5.

Afforestation

Afforestation & no. of plantations carried out from 1989-90 to 2017-18 by various mine owners are detailed in Table-6.

Table-3 : Gross Value Added at Basic Price, 2016-17 to 2018-19 (At Current Prices) (31.05.2019)

(in ₹ crore)

Industry	2016-17 (NS)	2017-18(NS)	2018-19 (PE)	% Change in 2018-19 over the previous year
GVA (All)	**13935917**	**15482715**	**17199815**	**11.1**
Mining & Quarrying	321872	351058	410151	16.8

Source : CSO. *NS : New Series Estimates* *PE : Provisional Estimates*

Table-4 : Gross Value Added at Basic Price, 2016-17 to 2018-19 (At 2011-12 prices)

(in ₹ crore)

Industry	2016-17 (NS)	2017-18 (NS)	2018-19 (PE)	% Change in 2018-19 over the previous year
GVA (All)	**11318972**	**12104165**	**12906936**	**6.6**
Mining & Quarrying	348089	365677	370564	1.3

Source : CSO. *NS: New Series Estimates.* *PE: Provisional Estimates.*

Table-5: Contribution and Rank of India in World Production of Principal Minerals & Metals, 2018

Sector	Unit of Commodity	Production quantity		Contribution (Percentage)	India's rank in World order $
		World	India*		
Metallic Minerals					
Bauxite	'000 tonnes	326000	23688	7.27	5th
Chromite	'000 tonnes	40800	3971	9.73	4th
Iron ore	million tonnes	2923	206	7.05	4th
Manganese ore	'000 tonnes	53000	2820	5.32	7th
Industrial Minerals**					
Magnesite	'000 tonnes	29500	147	0.50	15th
Apatite & Rock phosphate	'000 tonnes	232000	1285	0.55	16th
Metals					
Aluminium (primary)	'000 tonnes	62700	3696	5.89	4th
Copper (refined)	'000 tonnes	23900	454	1.90	11th
Steel (crude/liquid)	million tonnes	1812	110.92	6.12	2nd
Lead (refined)e##	'000 tonnes	12000	620#	5.17	4th
Zinc (slab)	'000 tonnes	13300	696	5.23	3rd

Source: *World mineral production data compiled from World Mineral Production, 2014-2018; British Geological Survey.*

** Figures relate to 2018-19 except lead (refined).*

Note: *Data in respect of World Mineral Production is on calendar year basis, however the data on India's production is based on financial year, except lead refined (calender year).*

*** As per Government of India Notification S.O. 423(E) dated 10th February, 2015, following minerals have been declared as minor minerals: i) barytes ii) dolomite iii) felspar iv) fireclay v) quartz/silica sand and vi) talc/steatite/ soapstone & pyrophyllite, hence not included in the table due to non-availability of production data with respect to India.*

$: India's rank based on production mentioned in World Mineral Production 2014-18; British Geological Survey.

 # : Figures as published in World Mineral Production, 2014-18. However, the production of lead (primary) during 2018-19 was 198 thousand tonnes.

##: Figure relates to both primary and secondary refined lead and include the lead content of antimonial lead.

e: Estimated

Table-6 : Mineral-wise Area Covered by Afforestation & Nos. of Plantation from 1989-90 to 2017-18

Minerals	Area Covered (Ha)	Tree Planted (000 nos.)
Bauxite	3599.64	10099.593
Chromite	1311.83	3846.46
Copper	1311.83	3846.46
Dolomite	387.76	564.82
Gold	468.9	938.842
Iron & Man. Ore mine	411.16	1739.27
Iron Ore	12683.94	54135.92
Lead & Zinc ore mine	1730.22	1017.70
Limestone mine	20226.04	31370.48
Magnesite mine	699.85	543. 40
Manganese Ore	2621.74	7082.85
Pyrites	7	21
Other mine	4205.84	4609.31

Source: - 1 IMIG for the year 1989-90 to 2011-12 and 2013-14 & 2014-15.

2 TMIS Database of IBM for year 2012-13, 2015-16 to 2017-18

POLICY

National Mineral Policy

National Mineral Policy, 2019 has been approved by the Union Cabinet, on 28th February 2019.

The aim of National Mineral Policy, 2019 is to have a more effective, meaningful and implementable policy that brings in further transparency, better regulation and enforcement, balanced social and economic growth as well as sustainable mining practices.

The National Mineral Policy, 2019 includes provisions which will give boost to Mining Sector such as,

- introduction of Right of First Refusal for RP/PL holders,
- encouraging the Private Sector to take up exploration,
- auctioning of virgin areas for composite RP-cum-PL-cum-ML on revenue share basis,
- encouragement of merger and acquisition of mining entities
- transfer of mining leases and creation of dedicated mineral corridors to boost Private Sector mining areas.
- proposes to grant status of industry to mining activity to boost financing of mining for Private Sector and for acquisitions of mineral assets in other countries by Private Sector
- proposes to auction mineral blocks with prembedded clearances to give fillip to auction process.
- propose to make efforts to harmonise taxes, levies & royalty with world benchmarks to help Private Sector

The NMP-2019 will ensure more effective regulation. It will lead to sustainable Mining Sector development in future while addressing the issues of project affected persons especially those residing in tribal areas.

Star Rating of Mines

Ministry of Mines, in its endeavor for taking up exhaustive and universal implementation of the Sustainable Development Framework (SDF) in mining, has evolved a system of Star Rating of Mines.

The Ministry of Mines instituted the Sustainable Development Framework (SDF) for taking up mining activity, encompassing inclusive growth, without adversely affecting the social, economic and environmental well-being, at present and also in future generation.

It has been instituted as a two-tier system providing self-evaluation templates to be filled in by the mine operator followed by validation through Indian Bureau of Mines.

The evaluation templates for Star Rating was notified vide notification dated 23.05.2016 for major minerals.

Based on the performance of the mining lease, 1 to 5 star rating would be awarded. The prospect of getting higher Star Rating is expected to drive miners to quickly adopt sustainable mining practices. In recently notified Mineral Conservation & Development Rule, 2017, Star Rating for mines has been included as statutory provision for achieving of minimum 3 stars.

A web enabled online system for evaluation of measures has been developed and launched on 18th August, 2016 as a vital step for ensuring compliance of environmental protection and social responsibility by the Mining Sector.

A template for star rating of minor minerals is also being prepared.

During the year 2017-18, total 57 mines have been rated as five star. During the year 2019-20, till 31st December 2020 total 863 online templates for the assessment year 2018-19 have been filed by the lessees. Field verification of these leases for final evaluation is under progress.

LEGISLATIVE FRAMEWORK

The Mines and Minerals (Development and Regulation) (MMDR) (Amendment) Act, 2015

Central Government has notified the Mines and Minerals (Development & Regulation) Amendment Act, 2015 vide Notification dated 27.3.2015 keeping in view reforms in the Mining Sector. Rules which have to be made to incorporate the provisions of the MMDR Amendment Act, 2015 have been framed and notified in the Official Gazette. The same is available at IBM's website on web link.

Mineral Laws (Amendment) Act, 2020

"The Mines and Minerals (Development and Regulation) (MMDR) Act, 1957 was amended

through the Minerals Laws (Amendment) Ordinance (MLAO), 2020. The same was made available at Ministry of Mines website on 10.01.2020, to facilitate seamless transfer of valid rights/ clearance to new lessees and to incentivise exploration of deep-seated minerals. The ordinance was replaced by Mineral Laws (Amendment) Act, 2020 (No. 2 of 2020). The same had also been made available at Ministry of Mines website. The Amendment Act 2020 came into effect from 10.1.2020. In order to implement the amended provisions of the MMDR Act, the Mineral Auction (Amendment) Rules, 2020 and Minerals (Other than Atomic and Hydrocarbon Energy Minerals) Concession (Amendment) Rules, 2020, which is available at Ministry of Mines website were notified on 20.03.2020. These amendments will help in early operationalisation of the mineral blocks auctioned and will also facilitate transfer of all the valid clearances of the old lessee to the successful bidder for a period of two years for mining leases expiring under the provisions of the Section 8 A (5) and (6) of the Act. Further, MoEF&CC has also issued notification for Environment Clearance (EC) dt. 28.03.2020 and guidelines for Forest Clearance (FC)(dt. 31.03.2020) in line with the Mineral (Auction) Amendment Rules, 2020.

Subordinate Legislation

The following rules have been framed to implement the provisions of MMDR Amendment Act, 2015 and MMDR Amendment Act, 2016:

(i) The Minerals (Evidence of Mineral Contents) Rules, 2015 [framed under Clause (a) of Sub-section (2) of Section 5] prescribes the parameters of existence of mineral contents.

(ii) The Mineral (Auction) Rules, 2015 [framed under Section 10B and Section 11] prescribes the terms and conditions subject to which mining leases shall be granted; terms and conditions, and procedure, subject to which the auction shall be conducted including the bidding parameters for the selection; terms and conditions for grant of prospecting licence-cum-mining leases; and terms and conditions, and procedure, including the bidding parameters for the selection.

(iii)The Mineral (Non-exclusive Reconnaissance Permits) Rules, 2015 [framed under Section 10C] prescribe the terms and conditions for grant of Non-Exclusive Reconnaissance Permit.

(iv) The National Mineral Exploration Trust Rules, 2015 [framed under Section 9C] prescribe the manner of usage of funds accrued to the National Mineral Exploration Trust (NMET); the composition and functions of NMET; and the manner of payment of amount to NMET.

(v) The Mines and Minerals (Contribution to District Mineral Foundation) Rules, 2015 [framed under Section 9b] prescribe the amount of payment to be made to the District Mineral Foundation.

(vi) The Mineral (Mining by Government Company) Rules, 2015 [framed under Section 13] prescribe the period of mining leases, including existing mining leases, of Government companies or corporations and the payment to be made by Government company or corporation, or a joint venture, for mining lease to be granted under the reservation route.

(vii) The Minerals (Other than Atomic and Hydro- carbon Energy Minerals) Concession Rules, 2016 [framed under Section 13] to regulate the grant of mineral concessions for major minerals and for purposes connected therewith.

(viii) Minerals (Transfer of Mining Lease Granted Otherwise than through Auction for Captive Purpose) Rules, 2016 [framed under powers conferred by Clause (qqja) of Section 13(2) read with the proviso to 12 A (6) of MMDR Act] prescribe the terms and conditions and the amount or transfer charges for effecting the transfer of a mining lease granted otherwise than through auction for captive purpose.

(ix) The Atomic Mineral Concession Rules, 2016 [framed under Section 11B of the Act] for regulating the grant of mining leases or other mineral concessions in respect of minerals specified in Part B of the First Schedule and for purposes connected therewith.

(x) Mineral Conservation and Development Rules, 2017 [framed under Section 18 of the Act] these Rules are framed for the conservation and systematic development of minerals in India and for the protection of environment by preventing or controlling any pollution which may be caused by prospecting or mining operations.

Amendments to the Subordinate Legislations

The Central Government has made amendment to the following rules:

(i) In exercise of powers conferred by Section 18 of the MMDR Act, 1957 the Central Government

has amended the Mineral Conservation and Development Rules, 2017 vide Notification no. GSR. 570 (E) dated 13th August 2019. Through this amendment the Central Government has reduced the requirement of star rating from 4 to 3 and also period for achieving the same has been increased from 2 years to 4 years considering the problems of medium and small mining lease holders.

(ii) In exercise of powers conferred by Section 11B of the MMDR Act, 1957, the Central Government has amended the Atomic Minerals Concession Rule, 2016 vide Notification no. GSR 126(E) dated 19.02.2019 and Notification No. GSR 134(E) (Second Amendment) dated 20.02.2019. Through this amendment the Central Government is empowered to amend Schedule A of the said rules.

(iii) In exercise of the powers conferred by Section 35 of the Offshore Areas Mineral (Development and Regulation) Act, 2002, the Central Government amended the Offshore Area Mineral Concession Rules, 2006 to ensure that no reconnaissance permit, exploration licence or production lease of atomic minerals shall be granted to any person, except the Government or a Government Company or a Corporation owned or controlled by the Government.

(iv) In exercise of powers conferred by Section 13 of the MMDR Act, 1957, the Central Government has amended the Minerals (Other than Atomic and Hydro-carbons Energy Minerals) Concession Rules, 2016 vide Notification no. GSR 674(E) dated 20th September 2019 for computing the Average Sale Price of metallurgical-grade bauxite.

(v) In exercise of powers conferred by Section 13 of the MMDR Act, 1957, the Central Government has amended the Mineral (Mining by Government Company) Rules, 2015, to clarify the legislative intention of Rule 3(2) & Rule 4(2), which prescribe the extension of mining lease of Government company, granted before or after 12th January, 2015.

Measures taken to Control Illegal Mining

Illegal mining means any reconnaissance or prospecting or mining operation undertaken by any person or a company in any area without holding a reconnaissance permit or a prospecting licence or, as the case may be, a mining lease as required under Sub-section (1) of Section 4 of the MMDR Act. Section 23C of Mines and Minerals (Development and Regulation) Act 1957, empowers the State governments to frame rules to prevent illegal mining and the State Government may by notification in the official gazette, make such rules for preventing illegal mining, transportation and storage of minerals and for the purposes connected therewith in the State.

There is a three-pronged strategy for prevention of illegal mining viz. constitution of task force by the State government at State and District Level, framing of rules under Section 23C of the MMDR Act, 1957 and furnishing of quarterly returns on illegal mining for review to the Central Government. The details of States who have constituted task force at State level, framed Rules under Section 23C of the MMDR Act, 1957 and have furnished quarterly returns on illegal mining to IBM are as follows:

Twenty-two State Governments have constituted the task force. The function of the task force is to review the action taken by member departments for checking the illegal mining activities in their respective jurisdiction.

Twenty-one State Governments have framed the rules under Section 23C of MM (D&R) Act, 1957 to curb illegal mining.

The State government submits quarterly returns on prevention of illegal mining to IBM. These returns contain details, such as, number of cases detected and action taken thereon etc. IBM on receipt of the returns from the various State governments, consolidates the information and sends it to the Ministry at the end of each quarter.

The Mineral Conservation and Development Rules, 2017 (MCDR) provide measures to ensure systematic & scientific mining. Rule 45 of the MCDR provides for the mining companies to submit periodic reports on the extraction and disposal of the mined material. Rule 45 of MCDR also facilitates end-to-end national-scale accounting of all minerals produced in the country from the pit head to its end-use, reducing the scope for illegal mining, royalty evasion, etc. The amended Rule 45 now makes it mandatory for all miners, traders, stockist, exporters and end-users of minerals to register and report on the production, trade and utilisation of minerals to the State Government(s) and Indian Bureau of Mines.

Space Technology for Checking Illegal Mining

Indian Bureau of Mines (IBM) has entered into an MoU with National Remote Sensing Centre (NRSC), for a pilot project "Sudoor Drishti" to demonstrate the feasibility of using High Resolution Satellite Imagery and Digital Elevation Model (DEM) in monitoring mining activities / changes over selected group of mines.

As a part of Pilot Project in Tandur area, Andhra Pradesh, volume changes in a cluster of mines (6) studied for 2007-2015 period it was observed that overall volume change is 10 to 11% only.

Regarding setting up of Remote Sensing Laboratories,it is confirmed that two remote sensing labs have been established—one at Nagpur and other at Hyderabad and both these are fully operational.Transfer of legacy data of Multi-Mineral Leasehold Map, which was earlier on AutoCAD system, is being carried out on GIS platform and all Reconnaissance Permit and Prospecting Licences are being digitised on GIS platform along with Integration of regional geology, forest map and mine lease boundary maps.

An MoU has been signed between IBM and MOIL for pilot study of MOIL leases in Maharashtra state using time series satellite imageries (for the year 2010, 2014 and 2018) procured from NRSC.

Mining Surveillance System (MSS)

MSS Project using satellite remote sensing technology together with information technology has been developed and rolled out for major & minor minerals to curb cases of illegal mining.

In the initial phase, a total of 296 triggers across the country covering a total area of 3,994.87 hectares wherein, 48 unauthorised mining have been detected after inspection of the triggers by the State Government officials. The training of all the States for its adoption of the MSS for minor minerals has also been done. A total of 164 Officers from States participated in the training.

In the second phase, 52 major mineral triggers have been detected from the 3,280 plotted leases (Working Mines 1,689 plotted out of 1,694 and Non-Working Mines 1,596 plotted out of 2,129) across the country, out of which 45 have been verified by the State Governments and in 5 cases unauthorised mining activities have been identified.

Similarly, in respect of minor minerals, so far, 130 triggers have been generated, out of which 104 have been verified and in 9 cases unauthorised mining activities have been identified.

District Mineral Foundation / Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY)

District Mineral Foundation (DMF) established by contributions from the mining companies, came into force specially for addressing the long-time grievance of the neglected civil society consisting of people affected by mining activities. Pradhan Mantri Khanij Kshetra Kalyan Yojana (PMKKKY), scheme formulated for the welfare and development of the mining affected areas and people under DMF was also launched. About ₹ 40,279.58 crore have been collected till July, 2020. Under the PMKKKY, 1,76,636 projects have been sanctioned, 48,615 projects are ongoing and 32,258 projects are yet to start in the mining affected districts. Till July, 2020, funds to the tune of ₹ 16,741.36 crore have been utilised and about ₹ 37,226.56 crore have been allocated. A portal for monitoring of PMKKKY implementation has been launched on 20.3.2018 at the 3rd National Conclave on Mines & Minerals. Districtwise portal was made live on 27th August, 2018. The, National PMKKKY portal will also function as DMF portal for each district. It captures the details from the collection and accrual of funds, to its utilisation and monitoring, for implementation of projects.

Mining Tenement System (MTS)

The Mining Plan, Star Rating and OAS modules are under testing. The SRS V3.1 of Phase II Modules, i.e. Grant and Execution of Concession, Inspection Module, GIS Module, IBM existing databases, ML WMMP, NMI, MCP and Final Mine Closure Plan modules are under examination.

Constitution of Study Group on Revision of Rates of Royalty and Dead Rent for Minerals (Other Than Coal, Lignite, Sand for Stowing, and Minor Minerals)

Ministry of Mines has constituted a Study Group for revision of rates of royalty and dead rent for minerals (other than coal, lignite, sand for stowing and minor minerals) under the Chairmanship of Additional Secretary, Ministry of Mines, vide Order No. 9/1/2018-M.V dated 09.02.2018.

Terms of reference of the Study Group are as under:

a) To review the existing rates of royalty for minerals (other than coal, lignite, sand for stowing, and minor minerals) given in the Second Schedule to the MMDR Act, 1957 and to recommend the revision of rates of royalty;

b) To consider and recommend policies relevant to administration of royalty regime; and

c) To suggest appropriate revision in the existing rates of dead rent given in the Third Schedule to the MMDR Act, 1957.

Memorandum of Understanding (MoU) Signed during the Year 2018-19

MoU with Bolivia

An MoU between the Ministry of Mines of the Republic of India and the Ministry of Mining and Metallurgy of the Plurinational State of Bolivia was signed on 29th March, 2019 at Santa Cruz de la Sierra, Bolivia on cooperation in the field of Geology and Mineral Resources for an initial period of five years during the State Visit of Hon'ble President of India to Bolivia.

MoU with Chile

An MoU between the Government of the Republic of India and the Government of the Republic of Chile, which was signed on 17.03.2009 at New Delhi on cooperation in the field of Geology and Mineral Resources for an initial period of five years and with automatic renewal for a period of five years, was extended for a further period of five years by signing of a Joint Letter of Renewal on 01.04.2019 during the visit of Hon'ble President of India to Santiago, Chile. This will continue the existing institutional mechanism between India and Chile for cooperation in the field of Geology and Mineral Resources.

MoU with Zambia

An MoU between Ministry of Mines, Government of India and Ministry of Mines & Minerals Development of the Government of Zambia was signed at New Delhi on 21st August, 2019 on cooperation in the field of Geology and Mineral Resources for an initial period of five years during the State Visit of Hon'ble President of the Republic of Zambia to India.

MoU with Brazil

An MoU between the Geological Survey of India (GSI), Ministry of Mines of the Republic of India and the Geological Survey of Brazil – CPRM (GSB–CPRM), Ministry of Mines and Energy of the Federative Republic of Brazil was signed at New Delhi on 25th January, 2020 on cooperation in field of Geology and Mineral Resources for an initial period of five years during the State Visit of Hon'ble President of the Federative Republic of Brazil to India.

Bilateral Meetings

In pursuance of the MoU signed Mr. Winston Chitando, Minister of Mines and Mining Development, Government of Zimbabwe, met Shri Prahlad Joshi, Hon'ble Minister of Parliamentary Affairs, Coal and Mines, Government of India, on 19.11.2019 during his visit to New Delhi and had deliberations on cooperation in the field of geology, mining and mineral resources between India and Zimbabwe.

Joint Working Group Meeting between India and Mozambique

Second meeting of Joint Working Group between India and Mozambique under the existing MoU was held on 11th April, 2019 in New Delhi. Shri Anil Kumar Nayak, Joint Secretary (Mines) co-chaired the meeting on behalf of Government of India and Mr. Obete Francisco Matine, Inspector General at the Ministry of Mineral Resources and Energy of the Republic of Mozambiqueco, chaired on behalf of Mozambique side.

It was also decided that GSI and National Institute of Mines may explore the possibility for 1:50,000 scale geological and geochemical mapping and exploration of unexplored minerals in the prioritised and selected areas in Mozambique. Further, collaboration between IBM and Inspectorate General at the Ministry of Mineral Resources and Energy of the Republic of Mozambique to develop a framework for surveillance and inspection to control mining activities and prevent illegal mining in Mozambique, and exchange of information and sharing of experiences in the field of small-scale mining and gemstone processing was agreed upon during the meeting.

Khanij Bidesh India Limited (KABIL)

A company named 'Khanij Bidesh India Ltd (KABIL)' was formed during the year for exploring overseas mineral assets, particularly, strategic and critical minerals, with an objective of ensuring mineral security of the nation. A Joint Venture company of NALCO, HCL and MECL with equity participation of 40:30:30 has been created with a mandate to identify, explore, acquire, develop, mine, process, and sale critical & strategic minerals and other minerals overseas for mineral security and commercial use so as to ensure Mineral Security of the country through supply side assurance of Energy Minerals.

So far KABIL has initiated engagement with Australia, Russia, Argentina, Bolivia and Chile with a focus on lithium.While the primary interface in each country has been the respective federal agencies, engagement with central and state-owned public enterprises, namely, M/s YLB, Bolivia; M/s ENAMI and M/s. CODELCO in Chile; M/s YPF of Argentina, and M/s Remsa of Salta Province and M/s Jemse of Jujuy Province of Argentina are also underway.

KABIL is in the process of signing an MoU with M/s YPF of Argentina and M/s Jemse of Jujuy Province of Argentina for sharing of information and taking up due diligence for select lithium mineral acreages in Argentina for investment decisions.

The details of Legislative Framework are provided in the Review on "Mineral Policy and Legislation" under "General Review".

EXPLORATION & DEVELOPMENT

GSI, DGMs of various States, Public Sector companies like NMDC, MECL, MOIL, etc., continued their efforts in respect of surveying, mapping and exploration of new deposits and re-assessment of old deposits/mines during 2018-19. The ONGC and OIL, the two National Oil Companies (NOC) and a few private and joint venture companies were engaged in exploration and production activities of oil and natural gas, including coal-bed Methane in the country. The details of exploration carried out and discoveries found during the year 2018-19 are described in "General Review" on "Exploration & Development". However, the exploration conducted by various organisations during 2018-19 is highlighted below:

Geological Survey of India (GSI)

GSI is vested with the responsibility of maintaining broad-based and uniform national approach to data generation in respect of mineral resources. With the near exhaustion of resources to the proximity of surface, it has become imperative to have multidisciplinary approach to mineral exploration which comprises large-scale and detailed geological mapping aided by interpretative analysis of aerogeophysical and remotely sensed data, ground geophysical survey, geochemical prospecting and surface & subsurface exploration through pitting, trenching & drilling. GSI's activities in mineral exploration as well as baseline surveys have increased manifold in order to sustain the momentum of national economic development and to meet the increasing demands of various stakeholders. As per recent development towards Policy shift, GSI has been entrusted G2 level of investigations for M-IIA Items that were included in FS 2015-16. GSI also did engage in the task of upgrading the level of investigation in different important exploration items along with identification of resource potential of G3 level, for auctioning as per the recent policies of the Government. GSI has completed National Geochemical Mapping (NGCM) in the accessible part of the Obvious Geological Potential (OGP) areas of the country.

GSI pursued its most fundamental and basic mapping programme of systematic geological mapping in 2018-19 and had completed 9,330.6 sq. km large-scale mapping, 166.8 sq. km detailed mapping and 1,15,697 m drilling as against previous year's achievement of 9,960.51 sq. km large-scale mapping, 112.3 sq. km detailed mapping and 1,29,710 m drilling. Out of the total mappable areas of 3.146 million sq km of the country, 31,19,080 sq. km have been covered so far by systematic mapping bringing the total coverage to 99.15%.

Mineralwise total resources augmented by GSI during 2017-18 are listed below:

(i) A total of 353.024 million tonnes of iron ore resources were estimated.
(ii) A total of 5.203 million tonnes of manganese ore resources were estimated.
(iii) Estimated gold ore resource of 1.48 million tonnes.
(iv) Estimated a total of about 1.257 million tonnes of lead-zinc ore resources.
(v) Estimated about 0.039 million tonnes of PGE resources.
(vi) A total of 0.7 million tonnes of silver ore resources were estimated.

(vii) Estimated a total of 22.24 million tonnes of copper ore resources.

(viii) Estimated a total of about 1.19 million tonnes of REE resources.

(ix) Eestimated a total of about 20.83 million tonnes Gallium resources.

(x) Estimated a total of about 7.294 million tonnes Graphite resources.

(xi) Estimated a total of 28.50 million tonnes of bauxite resources.

(xii) Estimated 2,818.71 million tonnes of limestone resources.

(xiii) Estimated a total of 34.03 million tonnes of andalusite resources.

(xiv) Estimated a total of 147.72 million tonnes of potash resources.

MECL

MECL continued its core activities of regional and detailed mineral exploration involving exploratory drilling along with associated geological activities. During the year 2018-19, a total of 8,002 million tonnes of various mineral resources have been established.

The various exploration works carried out by MECL during 2018-19 are highlighted below:

(i) The Company has carried out 6.10 lakh metre of exploratory drilling for various minerals, out of which 5.63 lakh metre were through departmental resources and about 0.48 lakh metre from outsourcing.

(ii) A total of 128.72 sq. km area have been covered with detailed geological mapping for various minerals in different parts of the country. Besides, 3.59 lakh metre of geophysical logging were also carried out.

iii) In laboratories, a total of 94,516 samples were analysed for chemical analysis and 987 for microscopic and petrographic studies.

iv) A total of 39 geological reports of detailed exploration, geophysical survey, environmental & remote sensing studies for different minerals were submitted which led to addition of 8,002 million tonnes of mineral resources.

v) During 2018-19, a total of 8,002 million tonnes of mineral resources were established. Mineralwise details of resources estimated by MECL are as under:

- Andalusite –A total of 11.80 million tonnes of andalusite resources were estimated in Garhwa district, Jharkhand.
- Bauxite –A total of 1.65 million tonnes of bauxite ore resources were established in Kabirdham district in Chhattisgarh and Gumla district in Jharkhand.
- Coal – A total of 7,226.60 million tonnes of coal resources were established in Kamptee, Badner, Mand Raigarh, Tatapani Ramkola, Godavari valley, Jharia & Singrauli Coalfield in the States of Andhra Pradesh, Jharkhand, Chhattisgarh, Maharashtra and Madhya Pradesh.
- Gold–A total of 2.304 million tonnes of gold ore resources were established in KGF, Karnataka.
- Iron Ore – A total of 107.00 million tonnes of iron ore resources were established in Jumka Pathriposhi, Sundargarh district, Odisha and Jhunjhunu & Sikar districts, Rajasthan.
- Lignite – A total of 246.82 million tonnes of lignite resources were established in Tamil Nadu.
- Limestone– A total of 397.31 million tonnes of limestone resources were estimated in Raipur district in Chhattisgarh and Gothra Parasarampur in Rajasthan.
- Potash–A total of 8.56 million tonnes of potash resources were estimated in Jaitpur, Bikaner district, Rajasthan.

Oil and Natural Gas Corporation Ltd (ONGC)

During the year 2018-19, ONGC has made 13 discoveries (8 onland and 5 offshore). It has monetised 5 discoveries during the year.

During 2018-19, cumulative of 11,66,279 LKM of 2D seismic and 3,09,992 SKM of 3D seismic have been acquired and 6,887 exploratory wells have been drilled by PSUs. Indian private Exploration & Production companies (E & P) acquired a cumulative of 1,28,944 LKM of 2D seismic and 1,09,471 SKM of 3D seismic data and drilled 372 exploratory wells. Foreign companies have carried out 64,790 LKM of 2D seismic survey, 22,143 SKM of 3D seismic survey and drilled 249 exploration wells.

Oil India Ltd (OIL)

Oil India Ltd carried out 2D & 3D seismic survey to identify new prospects in the Petroleum Mining Lease (PML) areas and NELP Blocks. It has drilled 11 exploratory wells in PML areas in Assam & Rajasthan and continued exploratory efforts in other blocks. During the year, OIL made 2 oil & gas discoveries in the Upper Assam Basin and 1 gas discovery in KG Basin.

Indian Bureau of Mines (IBM)

IBM plays the role of National Repository of mineral data through maintaining a data bank of mines and minerals by developing advanced IT-based Mineral Information System. IBM also carries out mining research project on need-based aspects of mining; and conducts mineral beneficiation studies, including mineralogical testing and chemical analysis; and preparation of mineral maps. Indian Bureau of Mines (IBM), as a facilitator to the Mineral Industry, performs multifarious functions, such as, providing technical consultancy services for conducting feasibility studies, environment impact assessments, environment management plans, etc. as a storehouse of data.

A Remote sensing centre has been set up at IBM in 2018. Multi-mineral leasehold maps are updated on ARC-GIS platform. During 2018-19, geo-referencing and projection of 539 toposheets in ARC-GIS covering Goa, Andhra Pradesh, Kerala, Rajasthan, Madhya Pradesh, Gujarat, Chhattisgarh, Telangana, Tamil Nadu, Odisha, Jharkhand, Maharashtra, Karnataka, Bihar, Haryana, Himachal Pradesh and Jammu & Kashmir were completed. Vectorisation of 112 toposheets and plotting of 929 mining leases were also completed.

Mineral beneficiation studies were carried out by IBM to encourage value addition, conservation and development of mineral resources. During 2018-19, 50 ore dressing investigations, 33,644 chemical analyses, 2,751 mineralogical examinations and 02 in-plant studies were completed.

The Project on Mining Surveillance System (MSS) was undertaken by the Indian Bureau of Mines, Minintry of Mines, and BISAG (Bhaskaracharya Institute for Space Applications and Geo-informatics) of Ministry of Electronics and Information Technology (MEITY) to develop a system for detection of incidence of illegal mining by use of space technology and Surveillance of area up to 500 m outside the lease boundary to check instances of illegal mining. The deterrence effect of 'Eyes watching from the Sky' would be extremely useful in curbing instances of illegal mining. A total of 52 major mineral triggers in second phase have been detected from the 3,280 plotted leases across the country, out of which 38 have been verified by the State Governments and in 4 cases unauthorised mining activities have been identified.

IBM undertakes preparation of National Inventory of mineral resources on a quinquennial basis. Under this programme, implementation of UNFC system was adopted in 2002 replacing the earlier resource classification based on Indian system. The last National Mineral Inventory (NMI) was updated as on 01.04.2015 for 71 minerals. The preparatory work towards updating of National Mineral Inventory (NMI) as on 01.04.2020 for 46 major minerals is under progress.

Other Agencies

During 2018-19, a total of 10,983 m exploratory drilling involving 36 boreholes in 9 maganese ore mines were carried out by MOIL. Among these 13 mines, two mines viz, Dongri buzurg & Chikla manganese mines are situated in district Bhandara & seven mines viz, Kandri, Munsar, Gumgaon, Parsoda, Beldongri, New Satuk and Old Satuk are situated in district Nagpur, Maharashtra State. Four mines viz, Tirodi, Sitapatore Sukli, Ukwa and Bharweli mines are in district Balaghat, Madhya Pradesh. The reported reserves/resources of manganese ore as on 1.4.2019 of all the 12 mines of MOIL were estimated at 89.41 million tonnes. Ukwa (13.78 million tonnes), Bharweli (24.92 million tonnes), Tirodi (0.72 million tonnes), Sitapatore & Sukli (0.12 million tonnes & 0.16 million tonnes), Chikla (4.49 million tonnes), Dongri Buzurg (17.86 million tonnes), Kandri (12.10 million tonnes), Munsar (5.58 million tonnes), Parsoda (0.53 million tonnes), Beldongri (0.15 million tonnes), Old Satuk (0.50 million tonnes), New Satuk (0.02 million tonnes) and Gumgaon (8.5 million tonnes). A total of 20 samples were analysed from Kandri mine.

During 2018-19, HZL carried out about 100 km underground exploration and 60 km of surface exploration across all its properties. As on 31.03.2019 The total ore resources of all mines owned by HZL in the country stand at 403.00 million tonnes with 20.80 millions tonnes of zinc metal, 8.90 millions tonnes of lead metal and 964 million ounces of silver

metal. The average metal content of zinc is about 6.86%, lead 2.2% and silver 77.66 g/t.

Zawar group of mines consist of four operating mines, i.e., Mochia, Balaria, Zawarmala and Baroi mines. A total of 1,230 nos of boreholes were drilled to a cumulative depth of 98,222 m and 45,812 samples for chemical analysis were collected from Zawar group of mines.

A G2 level of exploration was carried out at Ballari district for iron ore jointly by MECL and NMDC. The iron ore resources estimated were at 0.787 million tonnes over a strike length of 178.0 m with Fe 52.05%, SiO_2 14.01% and Al_2O_3 6.70% at 45% cut-off. Resources at 35% Fe cut-off have been estimated at 5.611 million tonnes with grade of Fe 39.99%, SiO_2 34.4% and Al_2O_3 4.29% under Indicated category.

HCL has carried out various types of exploration in copper mines owned by it. Exploration in Malanjkhand copper mine, Balaghat district, Madhya Pradesh was carried out to find out the extent of ore body for dimension of stope and grade for underground mining. A total 1,950.85 meterage were drilled in 10 boreholes. Resources estimated of the mine are placed at about 308.45 million tonnes with average grade of 0.92% Cu. In Jharkhand, exploration work was carried out in (i) Rakha mine—comprised drilling of 15 boreholes to a cumulative depth of 2,796.00 m in Phase-I and 5,243.50 m in Phase-II; (ii) Surda mine—involved drilling of 2 boreholes to 1,576.00 m and shaft sinking of 168.00 m; and (iii) Kendadih mine involved 850.70 m drive & 984.60 m raise. The total resources of Rakha mine is placed at 125.52 million tonnes, Surda mine 28.57 million tonnes and Kendadih mine 32.26 million tonnes. Exploration work in Jhunjhunu district, Rajasthan was carried out by HCL in (i) Kolihan mine—comprised drilling of 23 boreholes to a total depth of 2,166.10 m and collection of 5,270 samples; (ii) Khetri mine — involved 5,279.85 meterage drilling in 52 boreholes and collection of 5,270 samples. Resources of copper were estimated at about 14.03 million tonnes at 1.34% Cu in Kolihan mine and 48.66 million tonnes at 1.43% Cu in Khetri mine.

NMDC has a dedicated exploration wing at Raipur, which is fully equipped to undertake mineral exploration works. NMDC has done more than 16,000 m of core drilling in during 2018-19, at existing mines.

RESEARCH & DEVELOPMENT

The Science and Technology (S&T) programmes of the Ministry of Mines, Government of India, cover the disciplines of Geology, Exploration, Mining, Beneficiation & Mineral Processing, Rock Mechanics, Ground Control & Non-ferrous Metallurgy and Environmental issues related to Mining & Metallurgy. During the financial year 2018-19, a total of 19 projects have been approved by SSAG for grant-in-aid under S & T programme of the Ministry. As per minutes of the 18th PERC meeting held on 24th October 2018 at JNARDDC, Nagpur, a total of 48 project proposals were received in the second phase for the year 2018-19.

During 50th meeting of SSAG held on 2nd November 2018, the projects which were reviewed and recommended by PERC were considered. After detailed deliberations, SSAG approved 9 (nine) project proposals.

The Research & Development (R&D) work in the field of Ores & Minerals is being carried out by IBM, JNARDDC, CSIR & allied laboratories, other research organisations relating to mineral/metal and various mining & mineral-based industries. As per available information, details of some of the R&D work conducted or completed by various organisations during 2018-19 are furnished below. However, the research & development details are covered in the Review on "Research & Development" under "General Review".

Indian Bureau of Mines (IBM)

Mineral beneficiation studies including mineralogical testing and chemical analysis intimately relates to both conservation and development of mineral resources. During the year 2019 (up to 31st December 2019), 37.75 ore dressing investigations, 19,082 chemical analysis, 2,046 mineralogical examinations and 02 in-plant studies were completed. It is anticipated that annual target of 50 ore dressing investigations, 30,000 chemical analyses (radicals) and 2,300 mineralogical examinations (M.E) will be achieved by 31st March 2020.

The various studies carried out during the year are highlighted below:

A) Research & Development—Ore Preparation & Processes

1. Bauxite

1.1 Beneficiation Studies on a Medium-grade Bauxite Sample, Jamnagar, Gujarat

1.2 Bench-scale Beneficiation Studies on a Low-grade Clayey Bauxite Sample, Jamnagar, Gujarat

2. Copper Ore

2.1 Bench-scale Beneficiation Studies on a Low-grade Copper Ore Sample from North of Golwa, Mahendragarh Distt., Chandigarh, Haryana

2.2 Bench-scale Beneficiation Studies on a Low-grade Copper Ore Sample from South of Gangutana Extension, Unit TS No. 54 A/1 Mahendragarh Distt., Haryana

2.3 Bench-scale Beneficiation Studies on a Copper-bearing Ore Sample (G-2 stage) of Dariba, North Block, Distt Sikar, Rajasthan

2.4 Bench-scale Beneficiation Studies on Copper-bearing Sample from Khera SE Block, Distt Alwar, Rajasthan

3. Iron Ore

3.1 Beneficiation Studies on a Low-grade Iron Ore Sample from Huldool Dongor Bimbol Mine

3.2 Reduction of Alkali Content from an Iron Ore Sample (No.2)

3.3 Beneficiation Studies on a Low-grade Iron Ore Sample from Gandhalpada, South Block, Kndujhar distt Odisha

3.4 Bench-scale Beneficiation Studies on Iron Ore Bulk Sample (Drill core) from Gandhalpada South-East, Part-B Block, Kendujhar distt, Odisha

4. Limestone

4.1 Beneficiation Studies on a Limestone from Chhattisgarh

B) Research & Development for Recovery and Utilisation of Wastes

1. Limestone Reject

1.1 Bench-scale Beneficiation Studies on a Siliceous Limestone Reject Sample from Village Bilakalaguduru, Gadivemula Mandal, Kurnool Distt, Andhra Pradesh

2. Lime Mud (Aragonite) from Gujarat Offshore

2.1 Beneficiation and Agglomeration Studies on a Lime Mud (Aragonite) Sample from Gujarat Offshore

3. Lime Sand (Aragonite) from Gujarat Offshore

3.1 Beneficiation and Agglomeration Studies on a Lime Sand (Aragonite) Sample from Gujarat Offshore

Jawaharlal Nehru Aluminium Research Development & Design Center (JNARDDC)

1. Completed R&D Projects

1.1 Studies on Trace Liquor Impurities, its Behaviour and Control in Bayer's Process with respect to Reduction in Product Hydrate (Joint Project with NALCO)

1.2 Development of Instrument for Instantaneous Onsite Measurement of Bath Parameters (Joint Project with HINDALCO, Hirakud)

1.3 Characterisation & Technical Assessment of Hazardous/Other Wastes from Process Industry (Joint Project with High Tech Metaflux, Raipur)

1.4 Effect of Modified Seed Properties in Precipitation of Aluminium Hydroxide from Bayer Liquor (Sponsored by S & T, Ministry of Mines, Government of India)

1.5 Large-scale Digital Database Creation of Bauxite and Laterite Deposits of Maharashtra State using Geo-informatics Technology (Joint Project with MRSAC & GSI)

1.6 Synergistic Utilisation of Aluminium Industrial Wastes for Development of Geopolymeric Building Materials (Joint Project with M/S Swarnalata Holdings, Raipur)

1.7 Developing Downstream Applications of Strip Cast Aluminium Alloys AA8011 and AA3004 (Joint Project with NALCO & VNIT, Nagpur)

1.8 Estimation of Morphodynamicity and its Remedial Action Using Red-Mud Based Concrete at Coastal Zone of Eastern Odisha (Joint Project with IIT, Bhubaneswar)

1.9 Status Report on Work Carried Out Nationally and Internationally on Red Mud to Benchmark Future Investigation in the Country

1.10 Mechanical Activation of Bauxite followed by Technological Studies (NALCO).

2. Ongoing Projects

2.1 Nano Processing of Industrial Rejects for Use as Additives in Mix-designs for Improved Pozzolanic Reaction Efficiency (Joint Project with VNIT, Nagpur)

2.2 Utilisation and Development of Process for Recovery of Strategic Rare-earths from Industrial Waste Bauxite Residue at Lab-scale (Joint Project with HINDALCO and IREL)

2.3 Fabrication of Advanced Ceramic Nano-coatings for Automotive Applications (Joint Project with Christ University, Bengaluru)

2.4 Development of Ceramic Proppant from Low-grade Materials (Partially Lateritised Khondalite - PLK, Fly Ash, etc.) (Phase-II –Scale up Studies)

2.5 Development of Inline Automated Anode Butt Monitoring System to Measure Anode Butt Parameters (Joint Project with NALCO)

2.6 Utilisation of PLK (Partially Laterised Khondalite) as a Potential and Value-added Filler Material with Specific Reference to White Ceramics and Pigments (Joint Project with C V Raman College of Engineering & NALCO)

2.7 Development of a Wi-Fi-enabled Sensor Arrangement for Online Measurement of Anode Current Distribution of Aluminium Electrolysis Cell (Joint Project with NALCO)

2.8 To Study the Fire Retardancy of Nano-ATH in Polymers

2.9 Bench-scale Study on Extraction of Pure Silica and Aluminium fluoride from Coal Fly Ash

2.10 Techno-economic Survey of Aluminium Scrap Recycling in India (Joint project with MRAI)

2.11 Technological Characterisation of Bauxite Sample for Establishing the Mass Balance of the Process Design of the Expansion Study at Vedanta Ltd, Lanjigarh, Kalahandi, Odisha

2.12 Technical Feasibility Study for Extraction of Alumina as Al F3 from Low-grade Bauxite (International Bauxite, Alumina and Aluminium Society IBAAS, Nagpur)

2.13 Development of a Process Technology (at lab-scale) for Low-cost Production of 3N (99.9%) Pure Alumina (Dept of Science and Technology)

National Institute of Rock Mechanics (NIRM)

Some of the major projects executed by the Institute during this year include:

- In situ stress measurements at a depth of 600 m at mine of SCCL in Telangana for optimising the orientation of workings of upcoming underground mines for maximising production at greater depth;
- Safe excavation of about 3.5 lakh m^3 of hard rock for the Darlipalli STPP (Stage-I) of NTPC;
- Design modification from underground structure to creation of circular shaft from surface leading to substantial reduction in construction time and cost of Devadulla lift Irrigation scheme, Warangal, Telangana;
- 3D-Modelling (incorporating Shear Zone and large cavity) for planning remedial measures for long-term stability of caverns of Powerhouse Complex of PHPA-II, Bhutan;
- 3D GPR tomography for locating buried archaeological monastery structure at Vadnagar, Gujarat;
- Active fault studies conducted through trenching for seismotectonic evaluation at Jaitapur (Maharashtra); and
- Planning and Design of Instrumentation layout with the help of 3D Model for Powerhouse Complex of Phunatsangchu-II project, Bhutan.

National Institute of Miners' Health (NIMH)

The Institute has completed following two S&T projects:
(i) Multi-centric Study of Dust-related Diseases in Stone Mines and Development of Sustainable Preventive Programme (In collaboration with Ministry of Labour & Employment).
(ii) Possible implications of bioavailable iron in coal mines dust on coal workers' — lung disease.

The Institute is also implementing the following two projects (Sponsored by Ministry of Mines):
(i) Development of standard protocol of field audiometry for notifying noise induced hearing loss.
(ii) Postural risk analysis of Mining equipment operators and its relation to Musculoskeletal Disorders.

CSIR-Central Glass & Ceramic Research Institute (CGCRI)

1. R & D for Development of Ceramics, Refractories and Glass-based on Minerals or Mineral Substitutes

1.1 R & D on Magnesite for Refractory Application

2. R & D on Clays, Zeolites and Beach Sand Minerals

2.1 R & D on Sillimanite Beach Sand for Refractory Application

CSIR-National Metallurgical Laboratory (NML)

Studies carried out in the area of Mineral Processing at CSIR-National Metallurgical Laboratory during 2018-19 are as given below:

1. Recovery of Chromite Values from Tailings of Chromite Ore Beneficiation Plant

2. Optimisation of Lead-zinc Ore Beneficiation Plant Comminution Circuit

3. De-ashing by Dry Beneficiation of Thermal coal

4. Prediction of Process Parameters for De-sliming Hydrocyclone in Iron Ore Beneficiation Plant

5. Technology for Beneficiation and Extraction of Tungsten from Gold Ore Tailings

6. Lowering of Water Consumption in Wet Beneficiation of Coking Coal

7. Beneficiation of Siliceous Limestone for Cement Industry

8. Pilot-scale Flotation Studies of Iron Ore

Hindustan Copper Ltd (HCL)

HCL has undertaken following R&D projects:

1. Recovery of copper through leaching, and

2. Experiments on bismuth removal from electrolyte.

Manganese Ore India Ltd (MOIL)

Significant R & D projects in MOIL are listed below:

1. Mine Environment

Ventilation reorganisation studies for deeper levels have been conducted at Gumgaon and Chikla Mines.

2. Mines Safety

a) Mining Subsidence: In-house scientific 3-D analysis of subsidence parameters has been carried out.

b) Decline: CSIR-CIMFR, Nagpur centre, has designed decline for faster evacuation of waste and ROM.

3. Mineral Conservation

R & D studies have been conducted at Munsar Mine.

4. Mining Technology

R&D project for mechanized stoping operation and support systems.

5. Mineral Beneficiation

R&D studies of old mineral reject manganese dumps of Ukwa Mine.

6. Metallurgical Studies

Project of upgradation of EMD quality has been taken up under R&D.

National Mineral Development Corporation Ltd (NMDC)

NMDC operates a state-of-the-art R&D centre at Hyderabad. It undertakes various projects related to the operational problems of the units of NMDC and provides solutions in terms of improvement in the system or change in technology to achieve continual improvement in its processes & operations. Projects undertaken by NMDC include as per MoU system with Ministry of Steel, In-house Programmes, Collaborative Programmes, Sponsored Assignments and Investigation Assignments.

Tata Steel Ltd

Tata steel carried out Mining R&D for GPS-based advanced portable tool to measure haul road parameters, Augmenting coal extraction ratio, Site selection & prefeasibility study for underground coal gasification, Ore Beneficiation Technology for recovery of Iron value, Agglomeration study, Blast Furnaces study, Ferro Alloys study and Characterisation & Specialty support studies.

NLC India Ltd (NLCIL)

1. R & D (Ore Preparation & Processes)

1.1 Pilot Plant Studies on Beneficiation of Iron recovered from Bottom Slag

2. R & D in Mining Technology

2.1 Electronification of Ground Water Control and Conveyor System in Mines

2.2 OB to Sand (Extraction of Construction grade Sand from Overburden materials)

3. R & D (Coal, Hydrocarbon, Energy)

3.1 Solar Drying of Lignite

3.2 R & D for Lignite to Diesel

3.3 R & D for Lignite to Methanol

4. R & D in Building Materials

4.1 Studies on Suitability of Sand recovered from Bottom Slag, Bottom Ash for Utilisation

5. ***R & D on Development of Specialty and Fine Chemicals from Minerals/Mineral-based Product/ Mineral Substitutes***

5.1 Studies on Aquaculture Development in Neyveli with Humic Products

6. R & D on Clays, Zeolite and Beach Sand Minerals

6.1 Development of Alternative Materials for Pebbles using Waste Materials

6.2 Studies on Synthesis of Zeolites from Lignite Flyash and its Efficiency in Cooling Water Treatment

6.3 Studies on Zeolite-based Catalyst for Mitigation of Exhaust Gas Pollution

Hindustan Zinc Ltd (HZL)

1. R&D—Ore Preparation & Process

To improve metal recoveries, bulk flotation was started in December 2008. Mineralogical studies were carried out to optimise required mog for new process (Bulk flotation).

2. R & D Projects Conducted in FY 2019

Various R & D like feasibility study of new technologies, modification in flotation circuit configuration, testing of new flotation reagents, plant surveys of grinding and flotation circuit, benchmarking of beneficiation plant performance, pilot-scale testing initiated, process feasibility for magnesium bleeding through zinc dross treatment etc. were conducted in FY 2019.

FOREIGN TRADE

India's Trade

During 2018-19, India's overall exports (Merchandise and Services combined) reached new peak, crossing the half trillion-dollar mark for the first time and achieved a total of USD 538.08 billion in 2018-19 which were about 7.91% of the previous year's exports.

India's exports have faced a very challenging period in recent years, on account of developments arising from the global financial crisis of 2008-09, which accentuated after 2013-14, when the world economy experienced a major trade slowdown. However, through concerted efforts like improved logistics, facilitation through increased digitisation to reduce human interface and increase transparency of government schemes aimed at incentivisation and facilitation of exporters, quick resolution of implementation issues of GST, capacity building through skilling etc., the Government was able to arrest the downturn affecting India, and our merchandise exports grew on secular basis over the last three financial years, to reach a new peak of USD 330.08 billion in 2018-19, which was also qualitatively better, as high-value-added sectors had a greater share in it than in earlier years.

India's merchandise exports as a percentage of GDP was 12.1 per cent during 2018-19 (P).

As per the World Trade Statistics 2019, India's ranking amongst the leading exporters in the world merchandise trade improved from 30 in 2004 to 19 in 2018 with a share of 1.70%. Similarly, India's ranking amongst the leading importer in world merchandise trade was 10 in 2018 as compared to 23 in 2004 with a share of 2.6 per cent.

Exports

The total exports (including re-exports) of all merchandise in 2017-18 and 2018-19 was ₹ 19,56,514 crore and ₹ 23,07,726 crore, respectively. During the year 2018-19, the value of exports (including re-exports) of ores and minerals at ₹2,19,168 crore accounted for about 9.50% of the total value of all merchandise exported from India. The value of exports of ores & minerals which declined from ₹ 2,00,131 crore in 2016-17 to ₹ 1,99,469 crore in 2017-18 rose to ₹ 2,19,168 crore in 2018-19. The value of mineral exports showed an increase of 9.88% in 2018-19 as compared to that of previous year.

Diamond (total) continued to be the largest constituent item with a share of 80.22% in the total value of mineral exports in 2018-19. Next in the order of share was granite with the contribution of 4.65% followed by iron ore 4.23%, alumina 2.14% and emerald (cut & uncut) total 1.05%. The individual share of remaining minerals in the total value of exports of ores and minerals from India during the year under review was less than one per cent.

The value of exports showed a mixed trend. The value of exports of copper ore & conc. increased more than four times and abrasive (natural) by about three times. The exports value of other minerals which have shown significant growth are kaolin 69.15%, salt (other than common salt) 55.56%, alumina 42.54%, coke 35.76%, other minerals 34%, quartz & quartzite 32.43%, emerald (cut & uncut) 29.68%, barytes 26.56%, felspar (natural) 22.24%, bentonite 21.17% and limestone 20.60%. On the other hand, the exports value, recorded significant decline in the cases of natural gas 39.79%, garnet (abrasive) 23.98% and chromite (total) 23.25% as compared to that in the previous year.

The value of exports of metals & alloys at ₹ 1,74,287 crore in the year 2018-19 registered a decrease of 8.43% as compared to that of ₹ 1,90,334 crore in the previous year. Iron & steel with a share of 58.68% continued to hold the top position in the value of metals/alloys exported from India in 2018-19. Aluminium and alloys including scrap is in the second place and accounted for 22.88% value. Ferroalloys and copper & alloys (including brass & bronze) occupied the third & fourth place with a contribution of 8.58% & 4.02%, respectively. The contributions of zinc & alloys including scrap and lead & alloys including scrap were 2.40% and 1.62% respectively. The individual share of other remaining metals and alloys was less than one per cent.

Imports

The total imports of all merchandise in 2017-18 and 2018-19 was ₹ 30,01,033 crore and ₹ 35,94,674 crore, respectively. During 2018-19, the total value of imports of ores and minerals at ₹ 12,99,186 crore accounted for 36.14% of the total value of all merchandise imported into India, registered a rise of 26.31% as compared to ₹ 10,28,529 crore in the year 2017-18. Petroleum (crude) continued to be the largest constituent item with a share of 61.44% in the total value of minerals imported in 2018-19. Next in order of importance was diamond (total) with a share of 13.70% followed by coal (excluding lignite) with a share of 13.16% and natural gas with 5.69%. The combined share of these four minerals was 93.98% in 2018-19 as against 91.80% in the previous year.

The value of imports of some ores & minerals has significantly increased as in the case of magnesite 111.08%, fluorspar 83.93%, bauxite 72.95%, alumina 70.21%, molybdenum ores & conc. 66.97%, sulphur (excl. sublimed precipitated & colloidal) 43.19%, petroleum (crude) 41.74%, natural gas 41.10%, iron ore (total) 39.82%, coke 31.91%, zirconium ore & conc. 30.34%, limestone 26.36%, rock phosphate 24.03%, borax (total) 23.82% and coal (lignite) 23.43% during the year 2018-19 as compared to that in the previous year. However, the value of imports in some cases declined as in emerald (cut & uncut) total where it showed a decline of 53.05%, copper ores & conc. also reported a decline of 56.36% during the year under review over the previous year.

The value of imports of metals & alloys at ₹ 4,77,483 crore showed an increase of 16% in 2018-19 as compared to ₹ 4,11,826 crore in the previous year. Gold non-monetary & monetary (total) with a share of 48.04% continued to occupy the top position in the total value of imports of metals and alloys in 2018-19. Iron & steel is placed in the second position and accounted for a share of 24.02%, aluminium & alloys including scrap occupied the third place with a share of 7.99% and copper & alloys including brass & bronze occupied the fourth place with a share of 7.72%. Next in the order was silver with 5.48% followed by ferroalloys, zinc & alloys including scrap, lead & zinc including scrap and nickel & alloys including scrap with 1.58%, 1.18%, 1.15% and 1.08% respectively. The individual share of remaining metals was less than one per cent of the total value of metals & alloys.

VALUE-ADDED EXPORT TRADE

India's foreign trade includes exports of minerals, both in the raw form and semi-processed & processed forms like mineral-based primary manufactured products.

Ores and minerals contributed significantly to India's exports trade in 2018-19 with a share of about 9.50% (i.e., ₹ 2,19,168 crore) in the total value of all merchandise. The contribution of minerals in exports in raw/unprocessed forms was about ₹ 22,649 crore and in semi-processed/processed forms was about ₹1,96,518 crore. The manufactured mineral-based commodities (final stage of transformation) contributed about ₹ 4,48,123 crore to the total value of exports of all merchandise. The value-added semi-processed/processed minerals figuring in India's foreign trade included cut & polished diamond/emerald, pulverised barytes, steatite, felspar (cut), garnet, calcined magnesite, magnesia (fused), magnesite (dead-burnt), magnesium oxide, slate (worked), processed mica & manufactured mica products, coke, cut & polished dimension stones, alumina, etc. The manufactured mineral-based commodities included metals & alloys and products thereof, cement, firebricks & other refractory materials, clay-bonded graphite crucibles & silicon carbide crucibles, manganese dioxide, asbestos-cement products, inorganic chemicals like lime & fluorine chemicals, refined borax & borates, elemental phosphorus & phosphoric acid, titanium dioxide, petroleum products, phosphatic & potash fertilizers, etc. Table-7 provides data on contribution of various value-added minerals and mineral-based products to India's exports during 2016-17 to 2018-19.

INFRASTRUCTURE

Infrastructure

Investment in infrastructure is necessary for growth. To achieve the GDP of $5 trillion by 2024-25, India needs to spend about $1.4 trillion (₹ 100 lakh crore) over these years on infrastructure. The challenge is to step-up annual infrastructure investment so that lack of infrastructure does not become a binding constraint to the growth of the Indian economy.

Inadequate transport infrastructure leads to bottlenecks both in the supply of raw materials as well as movement of finished goods to the market

Table – 7 : Contribution of Value-added (Processed) Minerals & Mineral-based Products in India's Export* Trade, 2016-17 to 2018-19

Sl. No.	Commodity group	Value of exports (₹ million)			Contribution (percentage)		
		2016-17	2017-18 (R)	2018-19 (P)	2016-17	2017-18	2018-19 (P)
1.	All Merchandise	18494335	19565145	23077261	100.00	100.00	100.00
2.	Ores & Minerals	2001306	1994690	2191682	10.82	10.19	9.50
	2.1 Raw/Unprocessed form	223701	208488	226497	1.21	1.06	0.98
	2.2. Semi-processed/ processed forms (preliminary and intermediate stages of processing)	1777605	1786202	1965185	9.61	9.13	8.52
3.	Manufactured Mineral-based Commodities (final stage of transformation)	3820738	4216562	4481235	20.65	21.55	19.41
	3.1 Metals/Alloys	1821860	1903345	1742868	9.85	9.73	7.55
	3.2 Others	1998878	2313217	2738367	10.80	11.82	11.86

Figures rounded off.
** Including re-exports.*

place. The price that farmers get for their produce is depressed if there is no connectivity through good quality rural roads, which in turn keeps rural incomes depressed negating the fruits of high overall growth performance. For all these reasons, provision of adequate infrastructure is essential for growth and for making growth inclusive. India recently launched the National Infrastructure Pipeline for the period FY 2020-2025. To draw up the National Infrastructure Pipeline (NIP) for each of the years from FY 2019-20 to FY 2024-25, an inter-ministerial Task Force was set up in September 2019 under the Chairmanship of Secretary (DEA), Ministry of Finance.

The NIP has projected total infrastructure investment of ₹ 102 lakh crore during the period FY 2020 to 2025 in India. Energy (24 per cent), Roads (19 per cent), Urban (16 per cent) and Railways (13 per cent) amount to over 70 per cent of the projected capital expenditure during the said period. As per the NIP, Central Government (39 per cent) and State Government (39 per cent) are expected to have equal share in funding of the projects followed by the Private Sector (22 per cent). It is expected that Private Sector share may increase to 30 per cent by 2025. Out of the total expected capital expenditure of ₹ 102 lakh crore, projects worth ₹42.7 lakh crore (42 per cent) are under implementation, projects worth ₹ 32.7 lakh crore (32 per cent) are in conceptualisation stage and rest are under development. Hence about two-third of the pipeline is already firmed up. It is also expected that projects of certain States would be added to the pipeline in due course.

Coal

Coal production (provisional) at 728.72 million tonnes in 2018-19 was higher by 7.9% from that of 675.40 million tonnes in 2017-18. In 2018-19, out of the total production of coal, 5.64% (41.13 million tonnes) was of coking coal and the remaining 94.36% (687.59 million tonnes) was of non-coking coal. Of the 732.79 million tonnes, despatches of raw coal in 2018-19 were higher by around 6.2% as compared to that in the previous year. About 87.1% despatches were to Electricity Sector, 2.4% to the Steel Industry 1.7% to the Sponge Iron Industry and 1.2% to the Cement Industry. The remaining 7.1% was made for the priority sectors including chemical steel (boilers), textile & rayons, bricks and others.

Electricity

Power Sector in India has witnessed a paradigm shift over the years due to the constant efforts of Government to foster investment in the sector. As a

result, lndia has improved its ranking to 76th position in the Energy Transition Index published by the World Economic Forum (WEF).

The installed capacity has increased from 3,56,100 MW in March 2019 to 3,64,960 MW as on 31.10.2019. The total generation of energy (including imports and renewable sources of energy) was 659 BU (as on 30.09.2019). In addition, the peak deficit, i.e., the percentage shortfall in peak power supply vis-a-vis peak hour demand has declined from around 9 per cent in 2012-13 to 0.7 per cent during 2019-20 (October 2019).

Access to electricity is necessary for making growth inclusive and for promoting ease of living. Pradhan Mantri Sahaj Bijli Har Ghar Yojana (Saubhagya) was launched on September 25, 2017 with an outlay of ₹ 16,320 crores to achieve universal household electrification by providing last mile connectivity by 31.03.2019. All the States have reported electrification of all households on Saubhagya portal, as on 31.03.2019, except a few households in LWE affected Bastar region of Chhattisgarh.

Transport

Railways

Indian Railways (IR) with over 68,000 route km is the third largest network in the world under single management. During the year 2018-19, Indian Railways carried 120 crore tonnes of freight and 840 crore passengers making it the world's largest passenger carrier and 4th largest freight carrier. Revenue Earning Freight loading by IR during 2018-19 was 12,215 lakh tonnes as against 11,596 lakh tonnes during 2017-18, registering an increase of 5.34 per cent. Passengers originating was 84,390 lakh in 2018-19 as compared to 82,858 lakh in 2017-18, registering an increase of 1.85 per cent in 2018-19 over the previous year. During 2018-19, consequential train accidents decreased from 73 to 59 in comparison to the corresponding period of the previous year. Indian Railways cover over 8,700 stations and carry around 230 lakh passengers daily with clientele of varied socio-economic backgrounds.

Modernisation of Stations: Modernisation/ upgradation of Railway stations in Indian Railways is a continuous and on-going process. About 1,253 stations have been identified for development under Adarsh Station Scheme and are planned to be developed by 2019-20.

Aviation

India is the third largest domestic market for civil aviation in the world. The airline operators in India have scaled up their aircraft seat capacity from an estimated 0.07 annual seats per capita in 2013 to 0.12 in 2018.

To ease the strain on existing airport capacities, 100 more airports are to be made operational by FY 2023-24. Besides using 46 idle airstrips, 16 private greenfield airports, 15 Airports Authority of India (AAI) airports, 31 heliports, and 12 waterdromes would be developed. To bring in efficiency and resources, six airports (Ahmedabad, Guwahati, Jaipur, Lucknow, Mangaluru, and Thiruvananthapuram) have been taken up for development under PPP mode. Five new greenfield airports [Durgapur (West Bengal), Shirdi (Maharashtra), Pakyong (Sikkim), Kannur (Kerala) and Kalaburagi/ Gulbarga (Karnataka)] were successfully operationalised this year.

Ports and Shipping

Shipping is essential to both commodity and services trade of any country. Around 95 per cent of India's trade by volume and 68 per cent in terms of value is transported by sea. As on 30th September, 2019, India had a fleet strength of 1,419 ships. Despite one of the largest merchant shipping fleet among developing countries, India's share in total world dead weight tonnage (DWT) is only 0.9 per cent as on January 1, 2019 according to Institute of Shipping Economics and Logistics.

Ports Sector: The Major Ports in the country have an installed capacity of 1,514.09 MTPA as on 31st March, 2019 and handled traffic of 699.09 MT during 2018-19. While increasing the capacity of major ports, Ministry of Shipping has been striving to improve the operational efficiencies through mechanisation, digitisation and process simplification. As a result key efficiency parameters have improved considerably. The Average Turnaround Time in 2018-19 improved to 59.51 hrs as against 64.43 hrs in 2017-18. The Average Output Per Ship Berthday has increased from 15,333 tonnes in 2017-18 to 16,541 tonnes in 2018-19.

Roads

Road transport is the dominant mode of transportation in terms of its contribution to Gross Value Added (GVA) and traffic share. The share of Transport Sector in the GVA for 2017-18 was about

4.77 per cent of which the share of Road Transport is the largest at 3.06 per cent, followed by the share of the Railways (0.75 per cent), Air Transport (0.15 per cent) and Water Transport (0.06 per cent).

As on 31.3.2018, India had a road network of about 59.64 lakh km. The total length of National Highways was 1.32 lakh km as on March 1, 2019. The pace at which roads have been constructed has grown significantly from 17 km per day in 2015-16 to 29.7 km per day in 2018-19. However, the pace seems to have moderated in 2019-20. The total investment in the Roads and Highway sector has gone up more than three times in the five year period of 2014-15 to 2018-19.

PERFORMANCE OF SELECTED MINERAL-BASED INDUSTRIES

Steel

Globally, India is the second largest producer of crude steel in the world surpassing Japan with a global share of 6 per cent. During 2018-19, crude steel production stood at 110.92 million tonnes, witnessing a growth rate of 3.3 per cent over the corresponding period of 2017-18 at 103.13 million tonnes with utilisation capacity of 77.98 per cent. As per estimates, the Steel industry directly contributes to about 1.4 to 2 per cent of India's GDP and its weightage in the official IIP is 7.22 per cent and it accounts for 7.53 per cent of the Wholesale Price Index (WPI). India is the third largest consumer of the finished steel after China and USA. The total export of finished steel with highest volume of 9.62 million tonnes during 2017-18 fell to 6.36 million tonnes during 2018-19 due to weakening of steel market, increase in trade friction, imposition of protectionist measures and excess steel capacity.

Cement

As per DIPP Annual Report, 2018-19, production of cement during 2018-19 was 337.32 million tonnes as against 297.71 million tonnes in 2017-18 and registered an increase of about 13.30 per cent. The induction of advanced technology has helped the industry immensely to improve its efficiency by conserving energy, fuel and addressing the environmental concerns. Cement Industry has been undergoing a transition with modernisation and upgradation of technology particularly with a view to conserve energy. India exports cement including white cement and other cement clinker. The exports of cement (total) decreased marginally to 5.82 million tonnes in 2018-19 from 6.66 million tonnes in 2017-18.

Petroleum Oil and Refineries

Crude oil production & condensate in 2018-19 at 34.20 million tonnes registered a nominal decrease of 4.1% as compared to that in 2017-18. The production of natural gas (utilised) including CBM was at 32,057 million cubic metres in 2018-19, 1.8% lower than 32,649 million cubic metres achieved in 2017-18. The refinery crude throughput of 257.20 million tonnes in 2018-19 was 2.09% higher than 251.93 million tonnes processed in 2017-18. The total refining capacity in the country was about 249.36 MMTPA as on 1.4.2019. Production of petroleum products (including LPG production from natural gas) was 262.36 million tonnes in 2018-19 as compared to 254.40 million tonnes in 2017-18.

SELF-RELIANCE IN MINERALS & MINERAL-BASED PRODUCTS

India continued to be wholly or largely self-sufficient in minerals which constitute primary mineral raw materials that are supplied to industries, such as, iron & steel, aluminium, cement, various types of refractories, china clay-based ceramics, glass. India is self-sufficient in iron ore, bauxite, sillimanite, chromite and limestone. India is deficient in kyanite, magnesite, rock phosphate, manganese ore, etc. which were imported to meet the demand for either blending with locally available mineral raw materials and/or for manufacturing special qualities of mineral-based products. To meet the increasing demand of uncut diamonds, emerald and other precious & semi-precious stones by the domestic Cutting and Polishing Industry, India is dependent on imports of raw uncut stones for their value-added re-exports. The degree of self-sufficiency in respect of various principal minerals and metals in 2018-19 is furnished in Table-8.

Table-8: Degree of Self-sufficiency in Principal Minerals & Metals, 2018-19 (P)

Sl. No.	Commodity	Demand/Domestic Consumption ('000 tonnes)	Supply/Domestic supply ('000 tonnes)	Order of self-sufficiency (%)
Minerals				
1.	Bauxite	22189	23688	100
2.	Chromite	1920	3971	100
3.	Iron ore	159940	206446	100
4.	Kyanite	5.1	4.89	96
5.	Limestone	350878	379045 1/	100
6.	Magnesite	195	147	75
7.	Manganese ore*	5548 $	2820	51
8.	Rock phosphate (including apatite)*	8802	1285	15
9.	Sillimanite	56	69	100
Metals*				
10.	Aluminium (primary)	3676	3696	100
11.	Copper (refined)	1159 2/	454	39
12.	Lead (primary)	381 3/	198	52
13.	Zinc	778 4/	696	89

***Source: Production**: MCDR Returns for production data.*

** : Apparent demand (production+ import-export)*

***Note:** As per Government of India Notification S.O. 423(E) dated 10th February, 2015, the following minerals have been declared as minor minerals: i) barytes ii) dolomite iii) felspar iv) fireclay v) quartz/silica sand vi) talc/steatite/ soapstone & vii) pyrophyllite, these have not been included in the table due to non-availability of production data for the year 2018-19.*

Even in cases where almost entire domestic demand is satisfied by domestic supplies, some quantities of certain special quality/ types of minerals and metals/ferroalloys are imported to meet the requirement in certain specific end-uses.

1/ Excludes production of limestone as a minor mineral, calcite & chalk and includes limeshell, limekankar & marl.

2/ Based on production of copper cathode and imports & exports of copper & alloys.

3/ Based on production of lead (primary), and imports & exports of lead & alloys.

4/ Based on production of zinc (ingots) and imports & exports of zinc & alloys.

$ The reported consumption of manganese ore was 2016 thousand tonnes during the year 2018-19.