Indian Minerals Yearbook 2022

(Part- I : GENERAL REVIEWS)

61st Edition

INDIAN MINERAL INDUSTRY & NATIONAL ECONOMY

(ADVANCE RELEASE)

GOVERNMENT OF INDIA
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NATIONAL ECONOMY

In general, global economic shocks in the past were severe but spaced out in time. This changed in the third decade of this millennium. At least three shocks have hit the global economy since 2020. It all started with the pandemic-induced contraction of the global output, followed by the Russian-Ukraine conflict leading to a worldwide surge in inflation. Then, the central banks across economies led by the Federal Reserve responded with synchronised policy rate hikes to curb inflation. The rate hike by the US Fed drove capital into the US markets causing the US Dollar to appreciate against most currencies. This led to the widening of the Current Account Deficits (CAD) and increased inflationary pressures in net importing economies. The rate hike and persistent inflation also led to a lowering of the global growth forecasts for 2022 and 2023 by the IMF in its October 2022 update of the World Economic Outlook. The frailties of the Chinese economy further contributed to weakening the growth forecasts. Slowing global growth apart from monetary tightening may also lead to a financial contagion emanating from the advanced economies where the debt of the non-financial sector has risen the most since the global financial crisis. With inflation persisting in the advanced economies and the central banks hinting at further rate hikes, downside risks to the global economic outlook appear elevated.

The Indian economy, however, appears to have moved on after its encounter with the pandemic, staging a full recovery in FY22 ahead of many nations and positioning itself to ascend to the pre-pandemic growth path in FY23. Yet in the current year, India has also faced the challenge of reining in inflation that the European strife accentuated. Measures taken by the government and RBI, along with the easing of global commodity prices, have finally managed to bring retail inflation below the RBI upper tolerance target in November 2022. However, the challenge of the depreciating rupee, although better performing than most other currencies, persists with the likelihood of further increases in policy rates by the US Fed. The widening of the CAD may also continue as global commodity prices remain elevated and the growth momentum of the Indian economy remains strong. The loss of export stimulus is further possible as the slowing world growth and trade shrinks the global market size in the second half of the current year.

Despite these, agencies worldwide continue to project India as the fastest-growing major economy at 6.5-7.0 per cent in FY23. These optimistic growth forecasts stem in part from the resilience of the Indian economy seen in the rebound of private consumption seamlessly replacing the export stimuli as the leading driver of growth. The uptick in private consumption has also given a boost to production activity resulting in an increase in capacity utilisation across sectors. The rebound in consumption was engineered by the near-universal vaccination coverage overseen by the government that brought people back to the streets to spend on contact-based services, such as restaurants, hotels, shopping malls, and cinemas, among others. The world's second-largest vaccination drive involving more than 2 billion doses also served to lift consumer sentiments that may prolong the rebound in consumption. Vaccinations have facilitated the return of migrant workers to cities to work in construction sites as the rebound in consumption spilled over into the housing market. This is evident in the housing market witnessing a significant decline in inventory overhang to 33 months in Q3 of FY23 from 42 months last year.

The Capital Expenditure (Capex) of the central government, which increased by 63.4 per cent in the first eight months of FY23, was another growth driver of the Indian economy in the current year, crowding in the private Capex since the January-March quarter of 2022. On current trend, it appears that the full year's capital expenditure budget will be met. A sustained increase in private Capex is also imminent with the strengthening of the balance sheets of the Corporates and the consequent increase in credit financing it has been able to generate. A much-improved financial health of well-capitalised public sector banks has positioned them better to increase the credit supply.

Consequently, the credit growth to the Micro, Small, and Medium Enterprises (MSME) sector has been remarkably high, over 30.6 per cent, on average during Jan-Nov 2022, supported by the extended Emergency Credit Linked Guarantee Scheme (ECLGS) of the Union government. The increase in the overall bank credit has also been influenced by the shift in borrower's funding choices from volatile bond markets, where yields have increased, and external commercial borrowings, where interest and hedging costs have increased, towards banks. If inflation declines in FY24 and if real cost of credit does not rise, then credit growth is likely to be brisk in FY24. India's economic growth in FY23 has been principally led by private consumption and capital formation. It has helped generate employment as seen in the declining urban unemployment rate and in the faster net registration in Employee Provident Fund. Still, private capex soon needs to take up the leadership role to put job creation on a fast track. Recovery of MSMEs is proceeding apace, as is evident in the amounts of Goods and Services Tax (GST) they pay, while the Emergency Credit Linked Guarantee Scheme (ECGLS) is easing their debt servicing concerns. The Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) has been directly providing jobs in rural areas and indirectly creating opportunities for rural households to diversify their sources of income generation. Schemes like PM-Kisan and PM Garib Kalyan Yojana have helped in ensuring food security in the country, and their impact was also endorsed by the United Nations Development Programme (UNDP). The results of the National Family Health Survey (NFHS) also show improvement in rural welfare indicators from FY16 to FY20, covering aspects like gender, fertility rate, household amenities, and women empowerment.Global growth has been projected to decline in 2023 and is expected to remain generally subdued in the following years as well. The slowing demand will likely push down global commodity prices and improve India's CAD in FY24. However, a downside risk to the Current Account Balance stems from a swift recovery driven mainly by domestic demand addressing-cost-living-crisis-developing-countries-poverty-and-vulnerability-projections-and-policy responses.

State of the Economy 2022-23: Recovery Complete 3 and, to a lesser extent, by exports. The CAD needs to be closely monitored as the growth momentum of the current year spills over into the next. Growth is expected to be brisk in FY24 as a vigorous credit disbursal, and capital investment cycle is expected to unfold in India with the strengthening of the balance sheets of the corporate and banking sectors. Further support to economic growth will come from the expansion of public digital platforms and path-breaking measures such as PM GatiShakti, the National Logistics Policy, and the Production-Linked Incentive schemes to boost manufacturing output.

India's Merchandise Trade

India's exports of both goods and services have been exceptionally strong so far in 2021-22. Merchandise exports have been above US$ 30 billion for eight consecutive months in 2021-22, despite a rise in trade costs arising from global supply constraints such as fewer operational shipping vessels, exogenous events such as blockage of Suez Canal and COVID-19 outbreak

in port city of China etc. Concurrently, net services exports have also risen sharply, driven by professional and management consulting services, audio visual and related services, freight transport services, telecommunications, computer and information services. From a demand perspective, India's total exports are expected to grow by 16.5 per cent in 2021-22 surpassing pre-pandemic levels. Imports also recovered strongly with revival of domestic demand and continuous rise in price of imported crude and metals. Imports are expected to grow by 29.4 per cent in 2021-22 surpassing corresponding pre-pandemic levels.

Exports

Following the global trend, India's merchandise exports recovered strongly from the pandemic-induced collapse and registered positive growth in the current financial year. During 2021-22 (April-December), the merchandise exports recorded growth of 49.7 per cent to US$ 301.4 billion, compared to corresponding period of last year and 26.5 per cent over 2019-20 (April-December), exceeding the pre-pandemic levels. Out of an ambitious export target of US$ 400 billion set for 2021-22, India has already attained more than 75 per cent of it by exporting goods worth US$ 301.4 billion, which is actually higher than the export target of US$ 300 billion set for the April-December period of 2021-22.

Trade Deficit

Foregin Direct Investment (FDI)

Measures taken by the Government to put in place an enabling investor friendly FDI Policy has resulted in increased FDI inflows setting up new records. FDI inflows in India stood at US $ 45.14 billion in 2014-15 and have continuously increased since then. India registered its highest ever annual FDI inflow of US$ 81.97 billion (provisional) in 2020-21 reflecting a growth of 10 per cent as compared to the previous year. The increase has been on the back of growth of 20 per cent in 2019-20. In the year 2021-22, FDI inflow grew by 4 per cent in the first six months to reach US$ 42.86 billion as compared to US$ 41.37 billion for the same period of last year.

As per DPIIT report statement on sector-wise FDI equity inflows during the year 2021-22, FDI in Mining Sector was ₹ 26,08.53 crore.

MINING INDUSTRY

The index of mineral production (excluding atomic and minor minerals) (with base year 2011-12=100) for 2021-22 at 113.3 displayed an increase of 12.2 % as compared to the previous year.

The value of metallic minerals in 2021-22 at ₹ 122142 crores increased by about 69.2 % over the previous year.

The value of production of non-metallic minerals at ₹ 10606 crores during 2021-22 increased by 14.8 % as compared to the previous year (Table-1).

**Table – 1 : Indian Mineral Industry : Value of Production*
2019-20 to 2021-22**

(In ₹ crore)

Sector	2019-20 (R)	2020-21 (R)	2021-22 (P)
Total : All Minerals	**165325**	**158869**	**202095**
Metallic minerals	68298	72198	122141
Non-metallic minerals	9503	9236	10605
Minor minerals	87523	77434	69347

** Excluding the minerals declared as prescribed substances under the Atomic Energy Act,1962; fuel 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 1311 reporting mines (excluding fuel minerals, atomic fuel and minor minerals) in India located in all states and UTs during 2021-22. Among them, 545 belong to metallic minerals and 766 to non-metallic minerals. There were 157 mines in public sector and the rest of 1154 mines were in private sector (Tables-2).

Table – 2 : Number of Reporting Mines# 2020-21 and 2021-22

Sector		2020-21	2021-22 (P)
All Minerals		**1323**	**1311**
I	(i) Public sector	156	157
	(ii) Private sector	1167	1154
II	(i) Metallic minerals	589	545
	(ii) Non-metallic minerals	734	766

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

Role of Public Sector

The public sector has played important role in the overall mineral production in 2021-22.

The entire production of Copper Ore & Conc., among metallic mineral and Diamond, Fluorite, Salt (Rock) and Selenite in respect of non-metallic minerals was reported from the public sector. By and large, the entire production of Gold, Tin Conc. and Phosphorite came from public sector during 2021-22.

Gross Value Added from Mining & Quarrying Sector

The Ministry of Statistics & Programme Implementation has released the provisional estimates of national income, 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 2021-22 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 2019-20 to 2021-22 (Tables- 3 & 4).

Employment

The average daily employment of labour engaged in mining sector (excluding fuel minerals, atomic and minor minerals) was 109304 in 2021-22. Out of this, 36080 or 33 % were in public sector and 73224 or 67 % in private sector. Metallic minerals accounted for 80 % and non-metallic minerals 20 % of the total labour force during the year.

As per World Mineral Production, 2017-21, British Geological Survey, India's ranking in 2021 in world production in term of quantity was 2nd in Steel (crude/liquid) and aluminium (primary) followed by 3rd in Zinc (slabs) and chromite; 4th in iron ore; 5th in Bauxite; 7th in manganese ore. The statistics on indigenous and world production of principal minerals and metals are given in Table-5.

Table - 3 : Gross Value Added at Basic Price, 2019-20 to 2021-22 (At 2011-12 prices) (31.05.2022)

(in ₹ crore)

Industry	2019-20 (2nd RE)	2020-21 (1st RE)	2021-22 (PE)	% Change in 2021-22 over the previous year
GVA (All)	**1,32,19,476**	**1,25,85,074**	**1,36,05,474**	**8.1**
Mining & Quarrying	3,21,766	2,94,024	3,27,984	11.5

Source:CSO RE:Revised Estimates PE:Provisional Estimates

Table - 4 : Gross Value Added at Basic Price, 2019-20 to 2021-22
(At Current Prices) (31.05.2022)

(in ` crore)

Industry	2019-20 (2nd RE)	2020-21(1st RE)	2021-22 (PE)	% Change in 2021-22 over the previous year
GVA (All)	**1,83,55,109**	**1,80,57,810**	**2,13,49,399**	**18.2**
Mining & Quarrying	3,58,517	3,24,980	5,13,076	57.9

Source : CSO. RE : Revised Estimates PE : Provisional Estimates

Table-5: Contribution and Rank of India in World Production of Principal Minerals & Metals, 2021

Sector	Unit of Commodity	Production quantity		Contribution (Percentage)	India's rank in World order $
		World	India*		
Metallic Minerals					
Bauxite	'000 tonnes	342600	22495	6.56	5th
Chromite	'000 tonnes	35100	3785	10.78	3rd
Iron ore	million tonnes	3108	254	8.17	4th
Manganese ore	'000 tonnes	56200	2347	4.17	7th
Industrial Minerals**					
Magnesite	'000 tonnes	34300	113	0.32	17th
Apatite & Rock phosphate	'000 tonnes	222000	1395	0.62	19th
Metals					
Aluminium (primary)	'000 tonnes	67000	4016	5.99	2th
Copper (refined)	'000 tonnes	24800	484	1.95	11th
Steel (crude/liquid)	million tonnes	1915	120.007	5.60	2nd
Lead (refined)[e]	'000 tonnes	14400	191	1.32	12th
Zinc (slab)	'000 tonnes	14000	775	5.53	3rd

Source:*World mineral production data compiled from World Mineral Production, 2017-2021; British Geological Survey.*

** Figures relate to financial year 2021-22 and MCDR returns for production data.*

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.*

*** 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 2017-21;British Geological Survey.

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

e: Estimated

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 aim to boost the 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 endeavour 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 2021-22, till (31st Dec-2021), a total of 987 online templates for the assessment year 2020-21 have been filed by the lessees. Validation of the submitted template for final evaluation is under progress and so far 411 leases field varification has been completed.

LEGISLATIVE FRAMEWORK

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

Auction of Mineral Blocks

As per information available on website of Ministry of Mines as on 28.12.2023, a total of 336 mineral blocks have been auctioned successfully across 13 States.

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) provides 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.

Application of Drone Technology in Mining

Furthering the efforts to utilize new technology, the Ministry of Mines has explored the applicability of the Unmanned Aerial Vehicles (UAV) Technology or commonly referred to as 'UAVs' for the mining sector. The UAV-based remote sensing is an emerging technology, increasingly used in agriculture, environmental, geology, mining, town planning and forestry applications and other applications. UAVs, typically operate at lower altitudes than manned aircraft and are also able to provide unique data with regard to spatial resolution angle of view. Compared to manned fixed-wing aircraft, typically used in aerial remote sensing, UAVs can provide lower ground sample distances (GSD) or higher spatial resolutions on the ground. After a successful pilot project during 2020-21 to ascertain the efficacy of using Unmanned Aerial Vehicles (UAV) to monitor the mining activities in the country, necessary amendments were made in the Mineral Conservation and Development Rules 2017 to include submission of digital images to IBM. The MCDR, 2017 vide rule 34A now mandates the mineral concession holders to submit digital aerial images to IBM on an annual basis. The digital images to be submitted to IBM will be based on drone (UAV) survey of the mines having production capacities of more than 1 million ton or lease area of 50 hectares or more based on the Standard Operating Procedure laid down by IBM. For other mines the lessee will be required to submit satellite images based on the SOP laid down by IBM.

The regular survey of the mines using drones will bring in more transparency and create more awareness to work following the proposals in the mining plans. The miners can self-regulate themselves to ensure that all their activities are restricted within the lease area and meet the requirements of the mining plan. In effect all future submissions of mining plans or modifications will be based on drone survey carried out in the mines resulting in better and scientific mining plans reflecting the actual ground realties. The mine surveys can be taken up at a faster pace using drone surveys there by increasing the accuracy and also reducing the time of survey.

To facilitate the regional offices in processing the drone and satellite image data, necessary hardware & software infrastructure is being provided progressively in a phased manner.

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 third phase of 2021-22 priliminary, a total of 177 triggers across the country are generated for major minerals and uploaded on the portal for further transmission to

the state governments. During 2021-22, field varification reports in respect of 79 triggers for major minerals have been received out of which unauthorised mining in ten cases of major minerals have been confirmed by the state government.

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 ₹56,369 crore have been collected till 30.11. 2021. Under the PMKKKY, 2,15,082 projects have been sanctioned. Till 31.11.2021, funds to the tune of ₹ 28,072.91 crore have been utilised and about ₹ 50602.59 crore have been allocated.

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 WMIMP, NMI, MCP and Final Mine Closure Plan modules are under examination.

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

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. All the maps viz lease boundaries, Geological layer and toposheet layer has been integrated for the state of Goa & Maharashtra. During 2021-22, the vectorisation of 61 toposheets and plotting of 273 mining leases and attachment of Assam, Meghalaya, Manipur, Kerala, Haryana, Himachal Pradesh, West Bengal and Jammu & Kashmir (UT) were completed. Up to march 2022, georeferencing, projection and vectorization of all the 561 identified toposheets having major mineral leaseholds were completed.

Mineral beneficiation studies were carried out by IBM to encourage value addition, conservation and development of mineral resources. During 2021-22, 40 Ore dressing investigations, 17,424 chemical analyses, 2344 mineralogical examinations and 3 in-plant studies were completed.

The Project on Mining Surveillance System (MSS) was undertaken by Indian Bureau of Mines, Ministry 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.

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 updation of National Mineral Inventory (NMI) as on 01.04.2020 for 46 major minerals was completed.

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 21st PERC meeting held on 13-14th Dec. 2021, a total of 215 project proposals, as received under S&T Program Scheme of Ministry of Mines. After screening, 51 proposals covering five areas, namely (i) Geosciences and Exploration; (ii) Mining; (iii) Mineral Processing & recovery from waste; (iv) Metal Extraction (Metallurgical processes); and (v) Alloys, specialty materials and product; were shortlisted for further presentation by the respective Principal Investigators (PIs). Based on the detailed review and evaluation, the PERC recommended 28 Project Proposals with or without changes to SSAG.

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. Available information, details of some of the R&D. The research & development details are covered in the Review on "Research & Development" under "General Review".

FOREIGN TRADE

As per the World Trade Statistics Review 2022, India's ranking amongst the leading exporters in the world merchandise trade improved from 30 in 2004 to 18 in 2021 with a share of 1.80%. Similarly, India's ranking amongst the leading importer in world merchandise trade was 10 in 2021 as compared to 23 in 2004 with a share of 2.5 per cent.

Exports

During the year 2021-22, the value of exports (including re-exports) of ores and minerals at ₹2,57,863 crore accounted for about 8.19% of the total value of all merchandise exported from India. The value of exports of ores & minerals which increased from ₹ 1,96,654 crore in 2020-21 to ₹ 2,57,863 crore in 2021-22. The value of mineral exports showed an increase of 31.13% in 2021-22 as compare to that of the previous year.

Diamond (total) continued to be the largest constituent item with a share of 73.44% in the total value of mineral exports in 2021-22. Next in the order of share were iron ore with the contribution of 9.36% followed by granite 4.90%, precious and semi-precious stone (cut & uncut) 1.96% and alumina 1.84%. 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 of ores & Minerals (including re-exports) showed a mixed trend for most of the minerals in 2021-22 as compared to that of the previous year. A significant increase was also noticed in some cases. The exports value of minerals which have shown significant growth are coke (759.71%) and Sulphur excluding sublimed Precipited & colloidal) (385.39%). On the other hand, the exports value recorded significant decline in the cases of Limestone (89.40%), copper ores & conc. (48.44%), and Iron ore (33.40%), as compared to that in the previous year.

The value of exports (including re-exports) of metals & alloys at ₹ 3,47,457 crore in the year 2021-22 registered an increase of 67.67% as compared to ₹ 2,07,222 crore in the previous year. The contribution of metals & alloys in the total value of India's exports was 11.04% during the year under review.

Iron & steel with a share of 58.54% continued to hold the top position in the value of metals/alloys exported from India in 2021-22. Aluminium and alloys including scrap is in the second place and accounted for 22.79% value. Ferroalloys and copper & alloys (including brass & bronze) occupied the third & fourth place with a contribution of 7.81% and 4.93%, respectively. The contributions of zinc & alloys including scrap and silver were 2.15% and 1.04% pig & cast iron (incl. speigeliesen) and lead & alloy including scrap were 1.42% & 1.16% respectively. The individual share of other remaining metals and alloys was less than one per cent.

Imports

The value of imports of ores & minerals in 2021-22 accounted for 33.92% of the total value of all merchandise imported into India. During 2021-22, the total value of imports of ores and minerals at ₹ 15,51,380 crore registered an increase of 96.05% as compared to ₹ 7,91,320 crore in the year 2020-21.

Petroleum (crude) continued to be the largest constituent item with a share of 58.91% in the total value of minerals imported in 2021-22. Next in order of importance were diamond with a share of 13.26%, coal (ex.lignite) with 14.75% and natural gas with 6.48%. The combined share of these four minerals was 93.40% in 2021-22 as against 93.82% in the previous year.

The value of imports of metals & alloys at ₹ 6,26,927 crore showed an increase of 43.92% in 2021-22 as compared to ₹ 4,35,927 crore in the previous year. The share of metals & alloys in the total value of all merchandise imported to India was about 13.70 % in 2021-22.

Gold, non-monetary & monetary (total), with a share of 54.89% continued to occupy the top position in the total value of imports of metals and alloys in 2021-22. Iron & steel is placed in the second position and accounted for share of 18.49%, copper & alloys including brass & bronze occupied the third place with a share of 8.39% and aluminium & alloys including scrap occupied the fourth place with a share of 7.22%. Next in the order were silver with 3.90% followed by ferro-alloys, Nickel & Alloys incl. scrap with 1.97% and 1.27% 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 2021-22 with a share of about 8.19% (i.e., ₹ 25,78,629 million) in the total value of all merchandise. The contribution of minerals in exports in raw/unprocessed forms was about ₹ 3,68,369 million and in semi-processed/processed forms was about ₹ 22,10,260 million. The manufactured mineral-based commodities (final stage of transformation) contributed about ₹ 68,52,836 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-6 provides data on contribution of various value-added minerals and mineral-based products to India's exports during 2019-20 to 2021-22.

INFRASTRUCTURE

Infrastructure

In order to achieve the GDP of $5 trillion by 2024-25, India needs to spend about $1.4 trillion over these years on infrastructure. During FYs 2008-17, India invested about US$1.1 trillion on infrastructure. However, the challenge is to step up infrastructure investment substantially.

Keeping this objective in view, National Infrastructure Pipeline (NIP) was launched with projected infrastructure investment of around Rs. 111 lakh crore (US$ 1.5 trillions) during FY 2020-2025 to provide world-class infrastructure across the country, and improve the quality of life for all citizens. It also envisages to improve project preparation and attract investment, both domestic and foreign in infrastructure. NIP was launched with 6,835 projects, which has expanded to over 9,000 projects covering 34 infrastructure sub-sectors. During the fiscals 2020 to 2025, sectors such as energy (24 percent), roads (19 percent),

urban (16 percent), and railways (13 percent) amount to around 70 percent of the projected capital expenditure in infrastructure in India. Sector wise break-up of the pipeline for the period 2019-20 to 2024-25 is given in figure 23. NIP has involved all the stakeholders for a coordinated approach to infrastructure creation in India to boost short-term as well as the potential GDP growth.

NITI Aayog has developed the 'National Monetisation Pipeline (NMP Volumes 1&2)' in consultation with infrastructure line ministries. Asset monetisation, entails a limited period license/ lease of an asset, owned by the government or a public authority, to a private sector entity for an upfront or periodic consideration. The private sector entity is expected to operate and maintain the asset based on the terms of the contract/concession, generating returns through higher operating efficiencies and enhanced user experience. Funds, so received by the public authority, are reinvested in new infrastructure, or deployed for other public purposes. Such contracts include provision for transfer of asset back to the authority at the end of the period.

A robust asset pipeline has been prepared to provide a comprehensive view to investors and developers of the investment avenues in infrastructure. The pipeline includes selection of de-risked and brownfield assets with stable revenue generation profile (or long rights) which will make for an attractive investment option. Total indicative value of NMP for core assets of the Central Government has been estimated at Rs 6.0 lakh crore over 4-year period (5.4 percent of total infrastructure investment envisaged under NIP).

Coal

Coal production (provisional) at 778.21 million tonnes in 2021-22 was increased by 14.77% from that of 716.083 million tonnes in 2020-21. In 2021-22, out of the total production of coal, 6.25% (51.702 million tonnes) was of coking coal and the remaining 726.508 (671.29 million tonnes) was of non-coking coal.

Electricity

Electricity is essential for powering economic activity and is also required in leisure time. The Power Sector has witnessed substantial transformation from both the demand and supply-side.

The installed capacity was 395 GW as on 31.01.2022. During the year 2021-22 the total generation of energy (including imports and renewable sources of energy) was 1234.298 BU (up to January, 2022). During the year 2021-22 (up to December, 2021), peak shortage was 1.2% and the energy shortage was 0.4% as compared to 0.7% and 0.5%, respectively in the previous year.

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 2021-22, Indian Railways carried 1418.84 million tonnes of freight traffic and 3519 million passengers making it the world's largest passenger carrier and 4th largest freight carrier.

Civil Aviation

India is one of the fastest growing market for civil aviation in the world. It is expected to become the third largest overall (including domestic and international traffic) by the year FY25.

India's domestic traffic has more than doubled from around 61 million in FY14 to around 163.74 million in 2021.

Ports and Shipping

The Major Ports in the country have an installed capacity of 1,597.59 MTPA and handled traffic of 720.05 MT during 2021-22. 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 2021-22 improved to 53.34 hrs as against 55.99 hrs

in 2020-21. The Average Output Per Ship Berthday has increased from 12,458 tonnes in 2015-16 to 21,002 tonnes in 2021-22.

Roads

Road infrastructure in the form of a network of national highways, state highways, district roads, rural roads, and urban roads acts as a major mode of transportation and connectivity for the country's diverse population of consumers and businesses. Roads supplement the other modes of transport through last-mile connectivity to the far-flung regions of the country.

There has been an increase in the construction of National Highways (NHs)/roads over time, with 10,457 km of roads constructed in FY22 as compared to 6,061 km in FY16. In FY23 (until October 2022), 4,060 km of NHs/roads were constructed, which was around 91 per cent of the achievement in the corresponding period of the previous financial year. Total budgetary support for investment in the sector has been increasing rapidly in the last four years and stood at around ₹1.4 lakh crore during FY23 (as of 31 October 2022).

PERFORMANCE OF SELECTED MINERAL-BASED INDUSTRIES

Steel

Globally, India is the second largest producer of crude steel in the world after China. During 2021-22, crude steel production stood at 120.293 million tonnes. The total export of finished steel with highest volume of 13.49 million tonnes during 2021-22.

Cement

As per DIPP Annual Report, production of cement during 2021-22 was 360.19 million tonnes as against 299.94 million tonnes in 2020-21 and registered an increase of about 20% 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 to 1.90 million tonnes in 2021-22 from 2.80 million tonnes in 2020-21.

Petroleum Oil and Refineries

Crude oil production & condensate in 2021-22 at 29.69 million tonnes registered a nominal decrease of 2.63% as compared to that in 2020-21. The production of natural gas (utilised) was at 34.02 Billion cubic metres in 2021-22, 18.66 % higher than 28.67 billion cubic metres achieved in 2020-21. The total refining capacity in the country was about 251 MMTPA in 2021-22. Production of petroleum products (including LPG production from natural gas) was 254.31 million tonnes in 2021-22 as compared to 254.31 million tonnes in 2020-21.

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,cement,etc. India is self-sufficient in iron ore, Kyanite,Sillimanite, Aluminium (Primary) Lead (Primary) and Zinc. India is deficient in Bauxite, Chromite, Limestone, Magnesite, Manganese Ore, Rock Phosphate and Copper,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 is furnished in Table -7.

Table – 6 : Contribution of Value-added (Processed) Minerals & Mineral-based Products in India's Export* Trade, 2019-20 to 2021-22

Sl. No.	Commodity group	Value of exports (₹ million)			Contribution (percentage)		
		2019-20	2020-21(R)	2021-22(P)	2019-20	2020-21	2021-22 (P)
1.	All Merchandise	22198541	21590432	31470214	100.00	100.00	100
2.	Ores & Minerals	1896831	1966539	2578629	8.54	9.10	8.19
	2.1 Raw/Unprocessed form	292637	472525	368369	1.32	2.18	1.17
2.2.	Semi-processed/ processed forms (preliminary and intermediate stages of processing)	1604194	1494014	2210260	7.23	6.91	7.02
3.	Manufactured Mineral-based Commodities (final stage of transformation)	4251969	3694502	6852836	19.15	17.11	21.77
	3.1 Metals/Alloys	1660988	2072220	3474571	7.48	9.59	11.04
	3.2 Others	2590982	1622282	3378265	11.67	7.51	10.73

Figures rounded off.

**** Including re-exports.***

Table-7: Degree of Self-sufficiency in Principal Minerals & Metals, 2021-22 (P)

Sl. No.	Commodity	Apparent Consumption* ('000 tonnes)	Supply/Domestic supply ('000 tonnes)	Order of self-sufficiency (%)
Minerals				
1.	Bauxite	25124	22495	90
2.	Chromite	4028	3785	94
3.	Iron ore	234000	254000	100
4.	Kyanite	9	10	100
5.	Limestone	408182	392760(e)	96
6.	Magnesite	618	113	18
7.	Manganese ore	8734	2347	27
8.	Rock phosphate (including apatite)	11053	1395	13
9.	Sillimanite	3	5	100
Metals				
10.	Aluminium (primary)	2896	4016	100
11.	Copper (cathode)	868(b)	484	56
12.	Lead (primary)	186(c)	191	100
13.	Zinc	640(d)	775	100

Source: Production: *MCDR Returns for production data and trade data from DGCI&S.*

** : Apparent Consumption:(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 2021-22.*

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.

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

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

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

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