Crisil
Intelligence

Central Mine Planning & Design Institute Limited– (CMPDIL)

Report on Indian Mining Consultancy Industry

26th May 2025

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Abbreviations

Abbreviation	Full form
CIL	Coal India Limited
CMPDIL	Central Mine Planning and Design Institute Limited
BCCL	Bharat Coking Coal Limited
CCL	Central Coalfields Limited
ECL	Eastern Coalfields Limited
MCL	Mahanadi Coalfield Limited
NCL	Northern Coalfield Limited
SECL	South Eastern Coalfields Limited
WCL	Western Coalfields Limited
APA	Accredited Prospecting/Exploration Agency
BMT	Billion Metric Tons
BU	Billion units
CAGR	Compound annual growth rate
Capex	Capital expenditure
CBA Act	Coal Bearing Areas (Acquisition & Development) Act, 1957, as amended
CM (SP) Act	Coal Mines (Special Provisions) Act, 2015
CPP	Captive power plant
Cr	Crore
CY	Calendar year (01 January to 31 December)
DRI	Direct reduced iron
EBIT	Earnings before interest and taxes
EBITDA	Earnings before interest, taxes, depreciation and amortization
EC/FC	Environment clearance/forest clearance
EHS	Environmental, health and safety
EIA/ EMP	Environmental Impact Assessment/ Environmental Management Plan
EL	Exploration Licenses
FY	Financial/fiscal year (April 1, XXXX, to March 31, XXXX+1)
GCV	Gross calorific value
GDP	Gross domestic product
GoI	Government of India
GSI	Geological Survey of India
Ha	Hectare
ICCP	International Committee of Coal & Organic Petrology
IMF	International Monetary Fund
JV	Joint venture
KABIL	Khanij Bidesh India Ltd.
km	Kilometer
Mcum/Mm^3	Million cubic metre
MCR	Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016
MECL	Mineral Exploration and Consultancy Limited

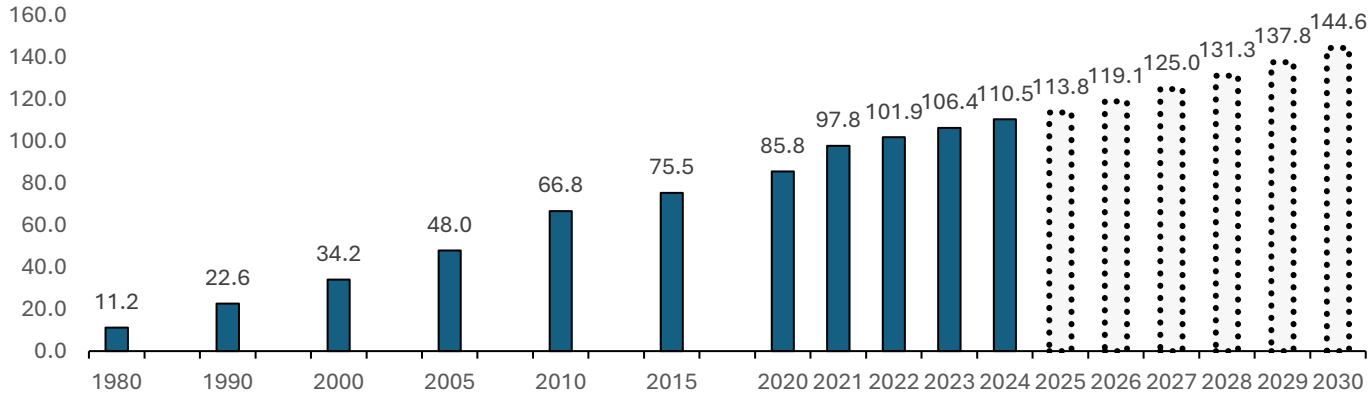
Abbreviation	Full form
MPPA	Mining Plan Preparing Agency
MO/MDO	Mine operator/mine developer-cum-operator
MoC	Ministry of Coal, Government of India
MoEFCC	Ministry of Environment, Forest and Climate Change, Government of India
MoM	Ministry of Mines, Government of India
MoU	Memorandum of Understanding
MMDR Act	Mines and Minerals (Development & Regulation) Act, 1957, and its amendments
MT/ MMT	Million metric tonne
MMTPA	Million metric tonne per annum
MSTC	Metal Scrap Trade Corporation Limited
MU	Million units
MW	Megawatt
NABET	National Accreditation Board for Education and Training
NABL	National Accreditation Board for Testing and Calibration Laboratories
NBCC	National Buildings Construction Corporation
NCDC	National Coal Development Corporation
NCDP	New Coal Distribution Policy
NMET	National Mineral Exploration Trust
OCBIS	Online Coal Block Information System
Opex	Operational expenditure
PAT	Profit after tax
PRC	Peak rated capacity
PSU	Public sector unit
PWD	Public Works Department
R&D	Research and Development
R&R	Rehabilitation and resettlement
REE	Rare Earth Elements
RERA	The Real Estate (Regulation and Development) Act
ROM	Run-of-mine
SCCL	Singareni Collieries Company Limited
SEZ	Special Economic Zone
SPV	Special purpose vehicle
STPP	Super thermal power plant
UCG	Underground coal gasification
UG	Underground mine

1 Indian Macro-economic Overview

1.1 World economy and Indian economy snapshot

India is the world's fifth-largest economy, behind United States (US), China, Germany and Japan, and the fastest-growing major economy. Its growth rate (7.4% in 2024) is about double that of the global economy (3.9% in 2024)[1]. The global economy is driven by production and consumption of goods and services which are heavily reliant on the extraction and processing of natural resources. The mining industry provides the basic raw materials necessary for energy generation, manufacturing of steel, aluminum, cement and other essential products thereby playing a critical role in supporting the economic growth and development of the world as well as India. The global economy, as measured by the *International Monetary Fund (IMF),* has reached a significant milestone, crossing the $100 trillion mark (nominal) in 2022, representing a significant increase from $25 trillion mark in 1992 and $50 trillion mark in 2006 which is approximately doubling in every 15 years. As per the IMF's *World Economic Outlook (April 2025),* the global GDP is forecasted to grow from $111 trillion in 2024 to $145 trillion by 2030, at a CAGR of 4.57% underscoring the optimistic outlook for the world economy over the medium term.

Figure 1.1 World Nominal GDP from 1980 to 2024 and forecast from 2025 to 2030 in trillion US dollars

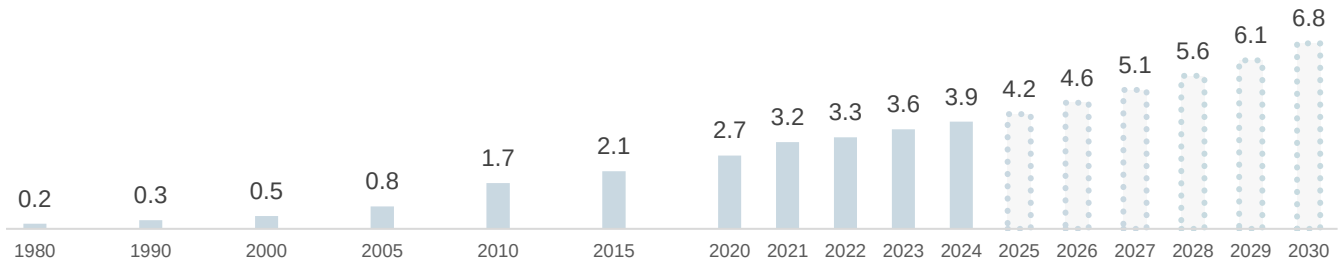


Source: International Monetary Fund (IMF) – World Economic Outlook (April 2025), IMF has forecasted till calendar year 2030

India's economy has undergone a transformative journey since the liberalization reforms of 1991, which have unleashed a period of rapid growth. Given the historical growth trajectory of India's economy, which has seen a significant expansion from about $0.2 trillion in 1980, $0.3 trillion in 1990, $0.5 trillion in 2000, $1 trillion in 2006, $2 trillion in 2014 and thereafter to $3.9 trillion in 2024 (nominal), driven by the country's rapid liberalization and integration into the global economy. India's GDP has doubled (approximately) in the last 9-10 years. The International Monetary Fund's (IMF) latest World Economic Outlook (April 2025) projects a steady expansion of the Indian economy, with the country's GDP anticipated to rise from $3.9 trillion in 2024 to $6.8 trillion by 2030, at 9.58% CAGR over the six-year period.

1 As per: International Monetary Fund (IMF) – World Economic Outlook (April 2025)

Figure 1.2 Indian Nominal GDP (Current Prices) from 1980 to 2030 in trillion US dollars



Source: International Monetary Fund (IMF) – World Economic Outlook (April 2025), IMF has forecasted till calendar year 2030 only

1.2 Real & Nominal GDP growth in India vs the world's major economies

1.2.1 Nominal GDP

Nominal GDP measures the total economic output of a country at current market prices, reflecting the value of goods and services produced within a given period without adjusting for inflation. In contrast, Real GDP adjusts Nominal GDP for changes in price levels, providing a more accurate depiction of an economy's growth by accounting for inflation or deflation.

Table 1.1 Country-wise nominal GDP data (annual percent change)

Nominal GDP	CY 19	CY20	CY21	CY22	CY23	CY24	5Y-CAGR
World	1.4%	-2.6%	14.1%	4.2%	4.4%	3.9%	4.7%
US	4.3%	-0.9%	10.9%	9.8%	6.6%	5.3%	6.3%
China*	3.3%	3.6%	20.4%	0.6%	-0.2%	2.6%	5.2%
Euro area	-2.1%	-2.5%	12.6%	-3.1%	9.2%	3.8%	3.8%
Japan	1.5%	-1.2%	-0.3%	-15.4%	-1.1%	-4.4%	-4.7%
United Kingdom (UK)	-0.8%	-5.4%	16.5%	-0.6%	7.9%	8.1%	5.0%
India*	**4.9%**	**-5.7%**	**18.4%**	**5.6%**	**8.7%**	**7.4%**	**6.6%**

*Note: CY- Calendar Year, *Emerging Economies*
Source: IMF – World Economic Outlook (April 2025)

1.2.2 Real GDP

As per the *IMF's World Economic Outlook (April 2025)*, real global GDP of world contracted 2.7% in pandemic year 2020, after that growing at 6.6% in 2021, 3.6% in 2022, 3.5% in 2023, and 3.3% in 2024. IMF forecasts global real GDP growth at approximately 2.8% in 2025 on account of greater-than-expected resilience in the US and several large emerging markets and developing economies, as well as fiscal support in China.

Table 1.2 Country-wise real GDP data (annual percent change)

Real GDP	CY 19	CY20	CY21	CY22	CY23	CY24	5Y-CAGR
World	2.9%	-2.7%	6.6%	3.6%	3.5%	3.3%	2.8%
US	2.6%	-2.2%	6.1%	2.5%	2.9%	2.8%	2.4%
China*	6.1%	2.3%	8.6%	3.1%	5.4%	5.0%	4.9%
Euro area	1.6%	-6.0%	6.3%	3.5%	0.4%	0.9%	0.9%
Japan	-0.4%	-4.2%	2.7%	0.9%	1.5%	0.1%	0.2%
United Kingdom (UK)	1.6%	-10.3%	8.6%	4.8%	0.4%	1.1%	0.7%
India*	**3.9%**	**-5.8%**	**9.7%**	**7.6%**	**9.2%**	**6.5%**	**5.3%**

*Note: CY- Calendar Year, *Emerging Economies*

Source: IMF – World Economic Outlook (April 2025)

1.3 Nominal & Real GDP forecast for world's major economies

1.3.1 Nominal GDP

As per the IMF's World Economic Outlook (April 2025), the nominal GDP forecast for various regions and countries is as follows: the world's nominal GDP is expected to grow at a rate of 2.9% in CY25, 4.7% in CY26, 4.9% in CY27, 5.1% in CY28 and 4.9% in CY29 and CY30. India's expected nominal GDP growth is 7.1% in CY25, 9.9% in CY 26, 10.2% in CY27, 10.2% in CY28, 10.1% in CY29 and 10.1% in CY30.

Table 1.3 Country-wise nominal GDP data forecast (annual percent change)

Nominal GDP	CY25P	CY26P	CY27P	CY28P	CY29P	CY30P	5Y CAGR
World	2.9%	4.7%	4.9%	5.1%	4.9%	4.9%	4.9%
US	4.5%	4.0%	3.9%	4.3%	4.0%	4.0%	4.0%
China*	2.6%	5.9%	6.5%	6.4%	5.9%	5.6%	6.1%
Euro area	2.6%	3.8%	3.3%	3.3%	3.3%	3.3%	3.4%
Japan	4.0%	4.5%	3.4%	4.2%	2.5%	3.5%	3.6%
UK	5.3%	5.3%	4.9%	5.1%	5.5%	5.4%	5.2%
India*	7.1%	9.9%	10.2%	10.2%	10.1%	10.1%	10.1%

*Note: CY- Calendar Year, *Emerging Economies*

Source: IMF – World Economic Outlook (April 2025)

1.3.2 Real GDP

According to the IMF's World Economic Outlook (April 2025), the global economy is projected to experience a moderate growth trajectory, with real GDP forecasts indicate an increase in 5-year CAGR to 3.1% from CY25 to CY30 compared

to the 5-year CAGR of 2.8% from CY19 to CY24, with a few regional variations. A closer examination of the regional forecasts reveals distinct trends. The United States is expected to experience a relatively moderate growth rate, with a 5- year CAGR of 2.0% from CY25 to CY30 which is slightly lower than the past i.e., 2.4%. In contrast, China's growth is slowing down, with a 5-year CAGR of 3.9% from CY25 to CY30, a decline from its previous growth rates i.e., 4.9%. The Euro area and Japan are also forecasted to experience sluggish growth, with 5-year CAGRs of 1.2% and 0.6%, respectively, from CY25 to CY30.

Table 1.4 Country-wise real GDP data forecast (annual percent change)

Real GDP	CY25P	CY26P	CY27P	CY28P	CY29P	CY30P	5Y CAGR
World	2.8%	3.0%	3.2%	3.2%	3.2%	3.1%	3.1%
US	1.8%	1.7%	2.0%	2.1%	2.1%	2.1%	2.0%
China*	4.0%	4.0%	4.2%	4.1%	3.7%	3.4%	3.9%
Euro area	0.8%	1.2%	1.3%	1.3%	1.2%	1.1%	1.2%
Japan	0.6%	0.6%	0.6%	0.6%	0.5%	0.5%	0.6%
UK	1.1%	1.4%	1.5%	1.5%	1.4%	1.4%	1.5%
India*	**6.2%**	**6.3%**	**6.5%**	**6.5%**	**6.5%**	**6.5%**	**6.4%**

*Note: CY- Calendar Year, *Emerging Economies*

Source: IMF – World Economic Outlook (April 2025)

The IMF believes India will remain the fastest-growing major economy over the next five years, with a growth rate of approximately 6.4% (CAGR) from CY2025 to CY2030 and subsequent years.

1.4 Major Structural Reforms by the Indian Government to Assist Economic and Real Estate Growth

The Indian government has been actively working towards transforming the country's economy and real estate sector through a series of structural reforms. These reforms aim to improve the business environment, increase transparency, and attract foreign investment, ultimately driving the economic growth and development.

1.4.1 Real Estate (Regulation and Development) Act, 2016 (RERA)

The Real Estate (Regulation and Development) Act, 2016 (RERA)[2] is a significant reform that has brought transparency and accountability to the real estate sector. The Act came into force on 1 May 2016 with 61 of 92 sections notified. The remaining provisions came into force on 1 May 2017. It seeks to protect home-buyers as well as help in boosting investments in the real estate sector by bringing efficiency and transparency in the sale/purchase of real estate. The Act establishes Real Estate Regulatory Authority (RERA) in each state for regulation of the real estate sector and also acts as an adjudicating body for speedy dispute resolution.

[2] *https://www.indiacode.nic.in/handle/123456789/2158*

1.4.2 Insolvency and Bankruptcy Code, 2016

The Insolvency and Bankruptcy Code (IBC), 2016 is an Indian law which creates a consolidated framework that governs insolvency and bankruptcy proceedings for companies, partnership firms, and individuals. For the real estate sector, where delays, fund diversion, and incomplete projects were common, Insolvency and Bankruptcy Code created a structural framework for resolution, protecting the interest of homebuyers, lenders and developers alike. Homebuyers are considered financial creditors under the IBC, enabling them to initiate Corporate Insolvency Resolution Process (CIRP) against a defaulting developer.

1.4.3 Special Economic Zones (Fifth Amendment) Rules, 2023

The Special Economic Zones Act, 2005, is a law that provides a framework for establishing, developing, and managing Special Economic Zones (SEZs) in India to promote exports and related activities. The Special Economic Zone (SEZ) Rules, 2006, define the framework for establishing and operating SEZs in India, which are designated areas offering incentives and streamlined regulations to attract foreign investment and boost economic growth. The SEZ Act, 2005 and the SEZ Rules, 2006 form the legal basis, specifying procedures for approval, administrative setup, and operational guidelines. These rules aim to simplify processes for developers and units, ensuring a conducive environment for businesses to thrive.

1.4.4 Goods and Services Tax

The Indian real estate sector, contributing about 7.3%[3] to GDP, has traditionally been riddled with complex taxation including VAT, service tax, excise duty, stamp duty, and registration charges. The implementation of Goods and Services Tax (GST) on 1st July 2017 replaced many indirect taxes and brought about structural changes. The GST reform aimed to improve transparency, reduce tax cascading, and improve compliance in real estate, which had often been informal and fragmented.

1.4.5 Pradhan Mantri Awas Yojana (PMAY)

Pradhan Mantri Awas Yojana (Urban) Mission[4] launched on 25th June 2015 which intends to provide housing for all in urban areas by year 2022. The Mission provides Central Assistance to the implementing agencies through States/Union Territories (UTs) and Central Nodal Agencies (CNAs) for providing houses to all eligible families/ beneficiaries against the validated demand for houses for about 1.12 crore.

1.4.6 National Infrastructure Pipeline (NIP)

The National Infrastructure Pipeline[5] (NIP) for FY 2019-25 is a first-of-its-kind, whole-of-government exercise to provide world-class infrastructure to citizens and improving their quality of life. It aims to improve project preparation and attract investments into infrastructure. To draw up the NIP, a High-Level Task Force was constituted under the chairmanship of the Secretary, Department of Economic Affairs (DEA), Ministry of Finance. The NIP has been made on a best effort basis by aggregating the information provided by various stakeholders including line ministries, departments, state governments and private sector across infrastructure sub-sectors, as identified in the Harmonized Master List of

[3] *https://www.ibef.org/industry/real-estate-india*
[4] *https://pmaymis.gov.in*
[5] *https://indiainvestmentgrid.gov.in/national-infrastructure-pipeline*

Infrastructure. All projects (Greenfield or Brownfield, under conceptualization or under implementation or under Development) of project cost greater than Rs. 1000 million per project were sought to be captured.

1.4.7 National Logistics Policy (NLP)

The National Logistics Policy (NLP) was launched by the Prime Minister of India on September 17, 2022, to drive economic growth and business competitiveness through an integrated, seamless, efficient, reliable, green, sustainable, and cost-effective logistics network. The policy aims to reduce logistics costs, improve the Logistics Performance Index (LPI) ranking, and create a data-driven decision-support mechanism for an efficient logistics ecosystem. The policy has set targets to reduce logistics costs, improve the Logistics Performance Index ranking, and create a data-driven decision support mechanism for an efficient logistics ecosystem.

1.5 Economic survey and Union Budget analysis

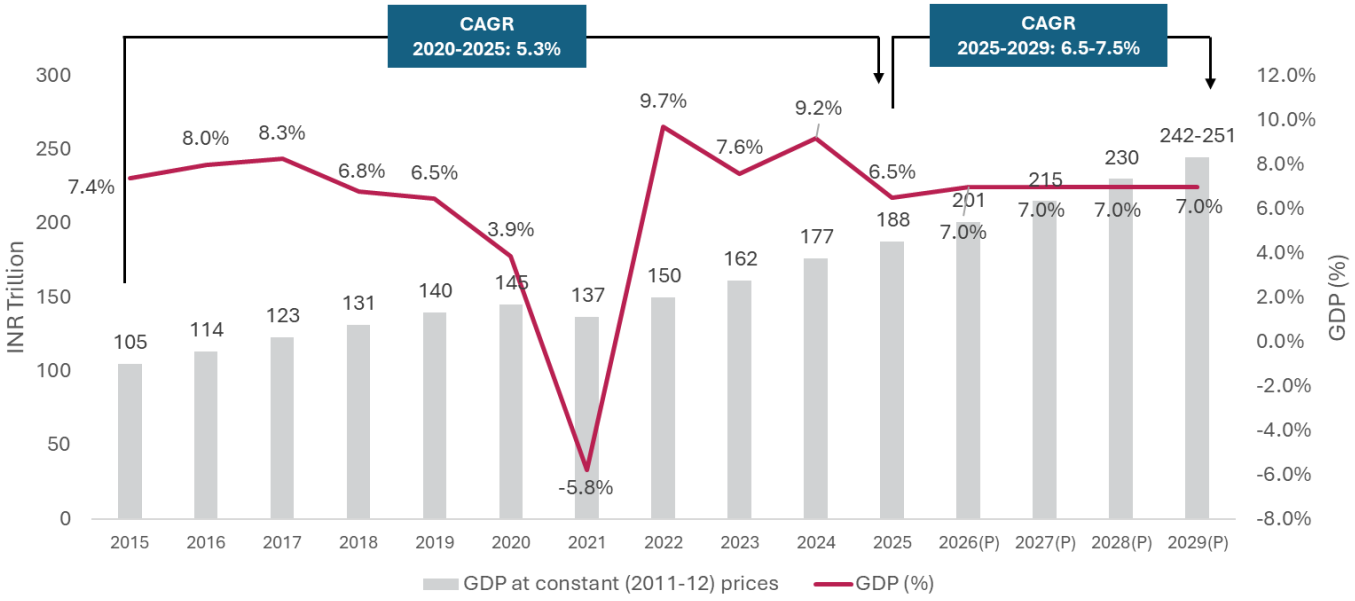
The *Economic Survey 2024* suggested adoption of gasification technology in India which can revolutionize the coal sector. This will reduce the dependence on imports for various resources made with the help of coal, such as natural gas, methanol, ammonia and other products. This will help India in meeting its net zero carbon emissions goal. Additionally, the government has launched several coal initiatives, such as *Coal Gasification Mission*, to gasify 100 MMT of coal by 2030 through surface coal or Lignite Gasification projects. The Union Budget 2025-26 has identified mining as one of the six key domain areas thereby recognizing the mining sector's importance which is a significant development as it acknowledges the sector's potential to contribute to India's economic growth and development. The Indian government's budget for the next fiscal year aims to support economic growth through a combination of steady capital expenditure and consumption boost, while tightening the fiscal belt. Fiscal deficit is budgeted to reduce to 4.4% of GDP, down from 4.8% in the current fiscal, with a focus on reducing revenue expenditure. Capital expenditure remains at 3.1% of GDP, while the effective capital expenditure, including budgetary and internal and extra-budgetary resources, increases to 5.5% of GDP to lift the domestic economy and crowd-in private capex. At Rs 11.2 lakh crore the allocation for capital expenditure in fiscal 2026 marks a 10% increase on year. This is expected to support the growth of infrastructure sectors such as roads, railways, and urban development.

1.6 India GDP trends

The fastest growing among major economies, India became the fifth largest economy in the world in 2022[6]. As per data published by the National Statistical Office (NSO), the Indian economy logged 4.4% CAGR (Real) between fiscal 2019 and 2024[7]. Economic growth was supported by crude oil prices, soft interest rates and low current account deficit. GDP declined to -5.8% year-on-year in fiscal 2021 on account of the pandemic- induced lockdowns. However, post-pandemic, period turned out to be positive for India, since GDP of India grew 9.7% and 7.6% year-on-year in fiscal 2022 and fiscal 2023, respectively. The growth was on the back of strong pent-up demand across the sectors, driven primarily by manufacturing and construction sectors.

[6] *According to the International Monetary Fund's ("IMF") World Economic Outlook (April 2025).*
[7] *India follows financial year April 1 to March 31. Hence, the data published by the Indian government/ RBI/NSO is different from that of the IMF, which publishes data as per the calendar year – January 1 to December 31.*

Figure 1.3: India's real GDP (in Rs. Trillion) trend and outlook (at constant 2011-12 prices)



Source: National Statistical Office (NSO), Crisil Intelligence -

According to the *NSO*, real GDP growth reached to 6.5% on-year in fiscal 2025 from 9.2% in fiscal 2024. In absolute terms, India's GDP reached Rs 188 trillion in fiscal 2025 compared with Rs 177 trillion in fiscal 2024.

1.7 Sector wise contribution to GVA for last 5 years from fiscal 2020

1.7.1 GVA share of sectors in India

Gross Value Added (GVA) is a measure of the total value of goods and services produced within a country or region, minus the cost of intermediate inputs. It represents the contribution of each sector to the overall economy and is a key indicator of economic growth and development.

The Indian economy is broadly classified into three sectors: Primary, Secondary, and Tertiary. The Primary Sector, which includes agriculture, animal husbandry, forestry, and mining, is the foundation of the Indian economy, contributing around 16% to the country's GDP. The Secondary Sector, comprising manufacturing, construction, and energy generation, contributes around 29% to the GDP and has been growing rapidly, with significant investments in industries such as automotive, pharmaceutical, and IT hardware. The Tertiary Sector, which includes financial services, professional services, transportation, communication etc. is the fastest-growing sector, contributing around 55% to the GDP and driving the country's economic growth.

Table 1.5: Gross value added (GVA) at basic prices (base year: fiscal 2012) constant prices (Rs trillion)

Industry	2023	2024	2025(F)	Growth in the real GVA	
				2024	2025
Primary Sector	**25.88**	**26.43**	**27.39**	**2.13%**	**3.65%**
Agriculture, Livestock, Forestry & Fishing	*22.72*	*23.05*	*23.92*	1.44%	3.76%
Mining & Quarrying	*3.15*	*3.38*	*3.47*	7.09%	2.86%

Industry	2023	2024	2025(F)	Growth in the real GVA	
				2024	2025
Secondary Sector	**41.59**	**45.62**	**48.57**	**9.69%**	**6.47%**
Manufacturing	*25.05*	*27.52*	*28.98*	9.86%	5.32%
Electricity, Gas, Water Supply & Other Utility Services	*3.48*	*3.74*	*4.00*	7.53%	6.84%
Construction	*13.06*	*14.36*	*15.59*	9.94%	8.57%
Tertiary Sector	**80.59**	**86.69**	**92.95**	**7.58%**	**7.22%**
Trade, Hotel, Transport, Communication & Service related to Broadcasting	*27.78*	*29.56*	*31.29*	6.41%	5.85%
Financial, Real Estate & Professional Services	*34.05*	*36.92*	*39.60*	8.40%	7.28%
*Public Administration, Defence & Other Services**	*18.75*	*20.22*	*22.06*	7.81%	9.13%
GVA at Basic Prices	**148.05**	**158.74**	**168.91**	**7.22%**	**6.41%**

Source: RBI – Handbook of Statistics on the Economy 2022-23, Crisil Intelligence; 2024 data estimates (Provisional by NSO India), https://www.pib.gov.in/PressReleasePage.aspx?PRID=2090875; All years are fiscal years, F: Forecasted

Table 1.6: Gross value added (GVA) at basic prices (base year: fiscal 2012) current prices (Rs trillion)

Industry	2023	2024	2025(F)	Growth in the real GVA	
				2024	2025
Primary Sector	**49.79**	**52.51**	**57.39**	**5.47%**	**9.29%**
Agriculture, Livestock, Forestry & Fishing	*44.84*	*47.25*	*52.00*	*5.37%*	*10.04%*
Mining & Quarrying	*4.95*	*5.26*	*5.40*	*6.32%*	*2.60%*
Secondary Sector	**63.19**	**68.67**	**73.41**	**8.67%**	**6.91%**
Manufacturing	*35.36*	*38.20*	*40.71*	*8.01%*	*6.57%*
Electricity, Gas, Water Supply & Other Utility Services	*6.04*	*6.63*	*6.82*	*9.81%*	*2.85%*
Construction	*21.79*	*23.84*	*25.88*	*9.42%*	*8.57%*
Tertiary Sector	**133.61**	**146.44**	**161.83**	**9.60%**	**10.51%**
Trade, Hotel, Transport, Communication & Service related to Broadcasting	*44.10*	*46.85*	*50.57*	*6.22%*	*7.96%*
Financial, Real Estate & Professional Services	*55.20*	*60.64*	*66.87*	*9.86%*	*10.27%*
*Public Administration, Defence & Other Services**	*34.30*	*38.95*	*44.39*	*13.55%*	*13.96%*
GVA at Basic Prices	**246.59**	**267.62**	**292.64**	**8.53%**	**9.35%**

Source: RBI – Handbook of Statistics on the Economy 2022-23, Crisil Intelligence; 2024 data estimates (Provisional by NSO India); https://www.pib.gov.in/PressReleasePage.aspx?PRID=2090875; All years are fiscal years, F: Forecasted

1.7.2 Index of Eight Core Industries

The Index of eight core industries measures the combined and individual performance of production of eight core industries viz. Coal, Crude Oil, Natural Gas, Refinery Products, Fertilizers, Steel, Cement and Electricity. The growth

rate of the core sector is a key indicator of a country's overall economic health, influencing industrial and economic performance. It has a multiplier effect on the entire economy, with core industries like steel, cement, and electricity being crucial for infrastructure development.

Table 1.7: Summary of the growth of Index of eight core industries (%)

Sectors	2019	2020	2021	2022	2023	2024	2025
Cement	13.3%	-0.9%	-10.8%	20.8%	8.7%	8.9%	6.3%
Coal	**7.4%**	**-0.4%**	**-1.9%**	**8.5%**	**14.8%**	**11.8%**	**5.1%**
Crude oil	-4.1%	-5.9%	-5.2%	-2.6%	-1.7%	0.6%	-2.2%
Electricity	5.2%	0.9%	-0.5%	8.0%	8.9%	7.1%	5.1%
Fertilizers	0.3%	2.7%	1.7%	0.7%	11.3%	3.7%	2.9%
Natural gas	0.8%	-5.6%	-8.2%	19.2%	1.6%	6.1%	-1.2%
Petroleum refinery products	3.1%	0.2%	-11.2%	8.9%	4.8%	3.6%	2.8%
Steel	5.1%	3.4%	-8.7%	16.9%	9.3%	12.5%	6.7%
Combined Index (Base year 2011-2012)	**4.4%**	**0.4%**	**-6.4%**	**10.4%**	**7.8%**	**7.6%**	**4.4%**

Source: Ministry of Commerce & Industries dated 21st April 2025, All years are fiscal years

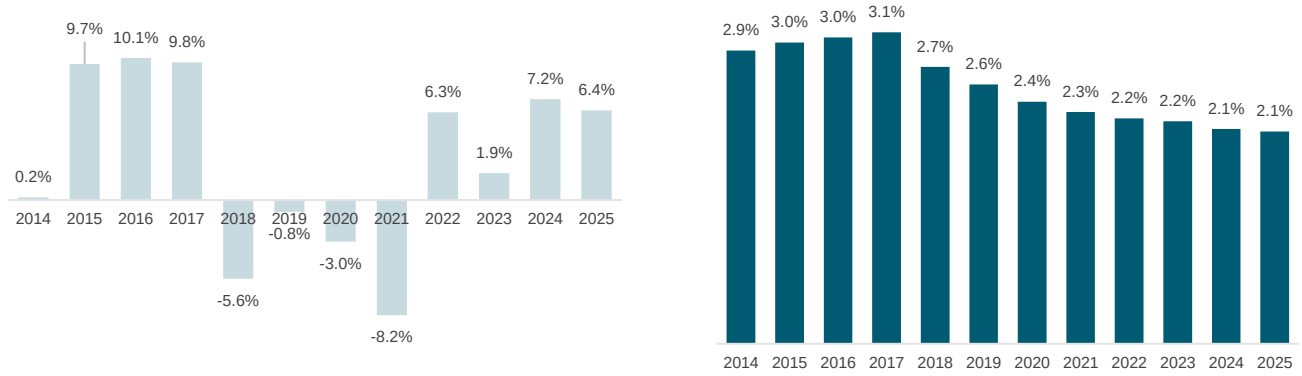
In terms of sectoral growth of the eight core industries, the coal sector grew (y-o-y) at 5.1% in fiscal 2025 as compared with 11.8% in fiscal 2024, among the Index of Eight Core Industries (ICI; base year 2011-12) as per Ministry of Commerce & Industries[9]. The combined Index of Eight Core Industries (ICI) increased 4.4% year-on-year in fiscal 2025.

1.8 Mining industry contribution to % of India's GDP in last 10 years

The mining and quarrying sector accounted for approximately 2.1% of the GVA (at constant prices) in fiscal 2025 i.e. Rs 3.47 trillion from Rs 3.17 trillion in fiscal 2019 (2.6% of GVA) recording a growth of 2.86% in 2025 over that in the previous fiscal. The last five-year CAGR was 1.83% (FY 2020- 2025).

[9] *Department for Promotion of Industry and Internal Trade, Office of Economic Advisor press release dated 21st April 2025; Office of Economic Advisor*

Figure 1.4: India's mining and quarrying GVA growth rate | Share of mining and quarrying in India's GVA



Source: Crisil Intelligence, RBI and NSO, Handbook of Statistics on Indian Economy- 2023, All years are fiscal years

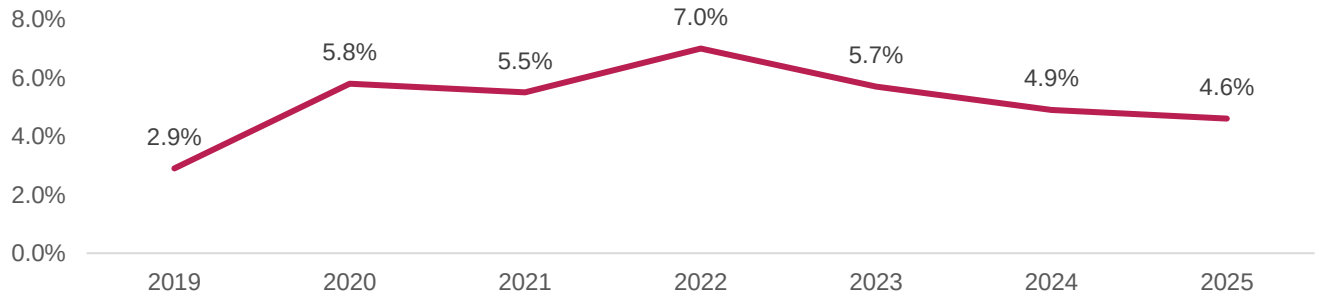
Note: The fiscal 2024 numbers are taken from the press note on provisional estimates of Indian GDP by Ministry of Statistics and Programme Implementation dated May 31, 2024

1.9 Trends of key macro-economic indicators across India

1.9.1 Consumer price index

India's average consumer price index (CPI) inflation rate was on the rise reaching 7.0% from 2.9% between fiscals 2019 and 2022. However, it decreased slightly to 5.7% in fiscal 2023. This rise is primarily led by surging food prices before moderating to an average of 4.6% in fiscal 2025. Although core and fuel inflation numbers have remained low, it is the food inflation that has been keeping CPI inflation above Reserve Bank of India's medium-level target rate of 4.0%. Going forward, CPI inflation is expected to moderate further to 4.3% on average in fiscal 2026 on the back of an expected dip in food inflation led by a favorable monsoon and high base effect[10].

Figure 1.5: CPI inflation trend



Source: Ministry of Statistics and Programme Implementation (MoSPI), Crisil Intelligence; All years are fiscal years

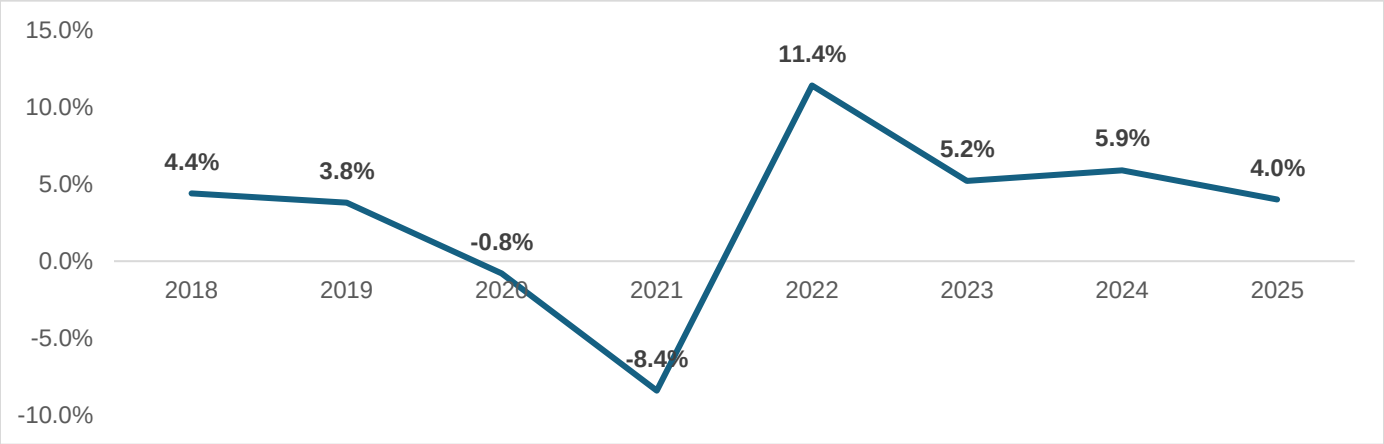
1.9.2 Index of Industrial Production

The Index of Industrial Production (IIP) growth averaged 2.3% between fiscal 2019 and fiscal 2023 before surging to 4.0% in fiscal 2025. The uptick was primarily led by a strong pick-up in sectors pertaining to the manufacturing of

[10] *Press Information Bureue issued by Ministry of Finance, Government of India, dated 22 July 2024.*

electrical equipment and basic metals. Further, there was an uptick in the consumer durables sector, which also supported the growth.

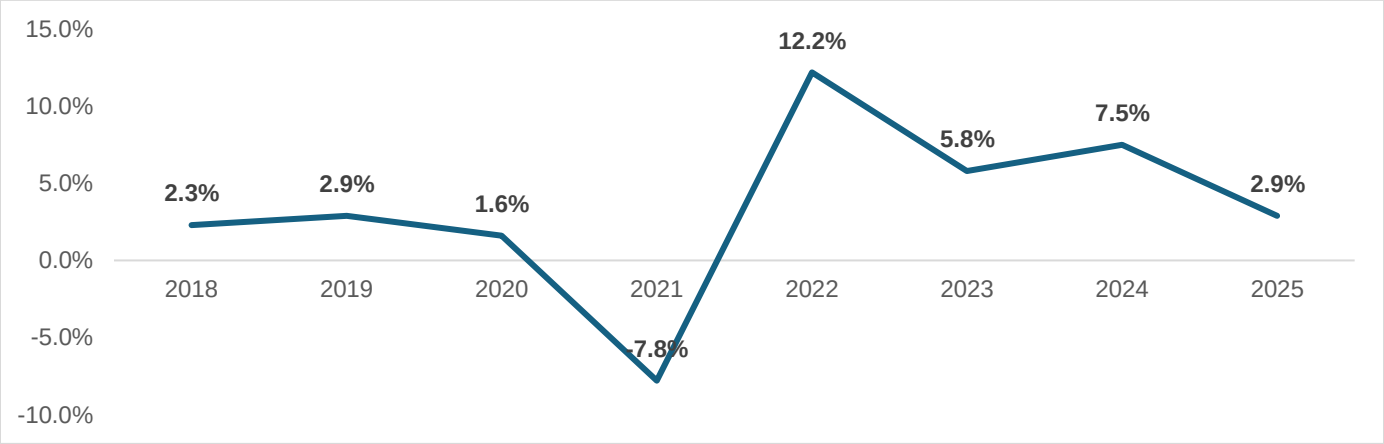
Figure 1.6: IIP growth trend for overall industry



Source: Ministry of Statistics and Programme Implementation (MoSPI), Crisil Intelligence; All years are fiscal years

The mining industry in the Index of Industrial Production (IIP) has witnessed a notable resurgence since fiscal year 2021, as it rebounded from the disruptions caused by the COVID-19 pandemic when the overall index fell by about 8.4% and mining sector index fell by 7.8% thereafter achieving a growth of 12.2% in fiscal 2022 and then gaining further momentum to reach 7.5% in fiscal 2024. This upward trajectory was largely fueled by a robust increase in the extraction of essential minerals, including coal, iron ore and limestone which saw a significant surge in demand from key sectors such as power, infrastructure, construction, and manufacturing.

Figure 1.7: IIP growth trend for mining sector



Source: Ministry of Statistics and Programme Implementation (MoSPI), Crisil Intelligence; All years are fiscal years

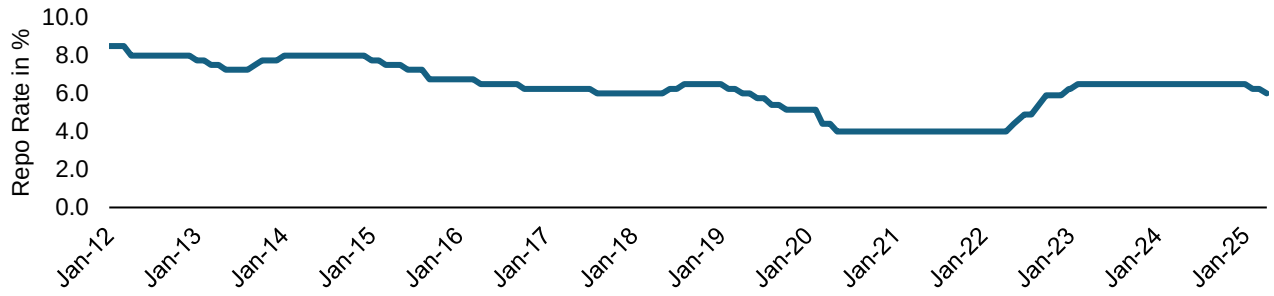
1.9.3 Interest Rates

Interest rates are a crucial component of a country's monetary policy, influencing borrowing costs, inflation, and economic growth. Across the world, in response to rapidly growing inflation, Central Banks have constricted the monetary policy by increasing the interest rates. However, few major Central Banks have reduced the interest rates

due to decrease in inflation rates. The United States has a federal funds rate of 4.25%-4.50%, while the European Central Bank has maintained an interest rate of 3.15% to encourage lending and investment.

In India, the Reserve Bank of India (RBI) has been actively managing interest rates to balance economic growth, inflation, and financial stability. As of December 2024, the repo rate was 6.5% thereafter it was reduced to 6.25% in February 2025. In April 2025 the repo rate was further reduced to 6.0%.

Figure 1.8: Repo rate in India in %

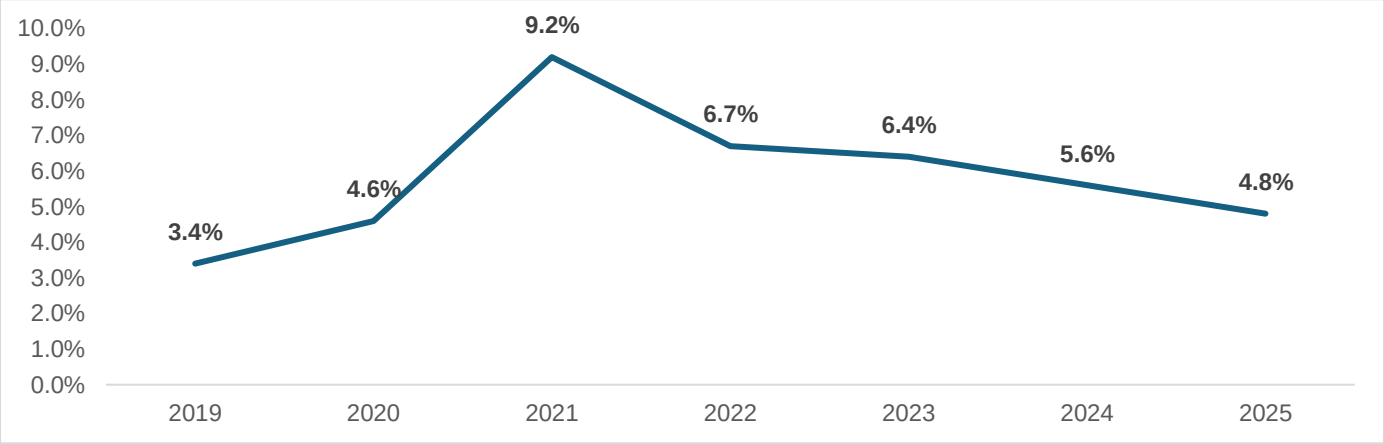


Source: Reserve Bank of India

1.9.4 Fiscal deficit

A fiscal deficit occurs when a government's total expenditures exceed its total revenues, resulting in a shortfall that must be financed through borrowing or other means. Fiscal deficit is generally caused by higher government spending and reduced tax revenues. A large fiscal deficit can cause excessive borrowing by the government to finance the fiscal deficit leading to inflation. A persistent fiscal deficit can lead to a reduction in the government's credit rating, making it more expensive to borrow in the future.

Figure 1.9: Fiscal deficit of India as a % of GDP



Source: Indian Budget documents, Economic survey, all years are fiscal

Over the past few years, India's fiscal deficit as a percentage of GDP has exhibited significant fluctuations, with a pre-pandemic level of 3.4% in fiscal 2019, increasing to 4.6% in fiscal 2020 and peaking at 9.2% in fiscal 2021 due to the COVID-19 pandemic. However, the government has since initiated fiscal consolidation efforts, with the deficit narrowing to 6.7% in fiscal 2022 and further reducing to 4.8% in fiscal 2025.

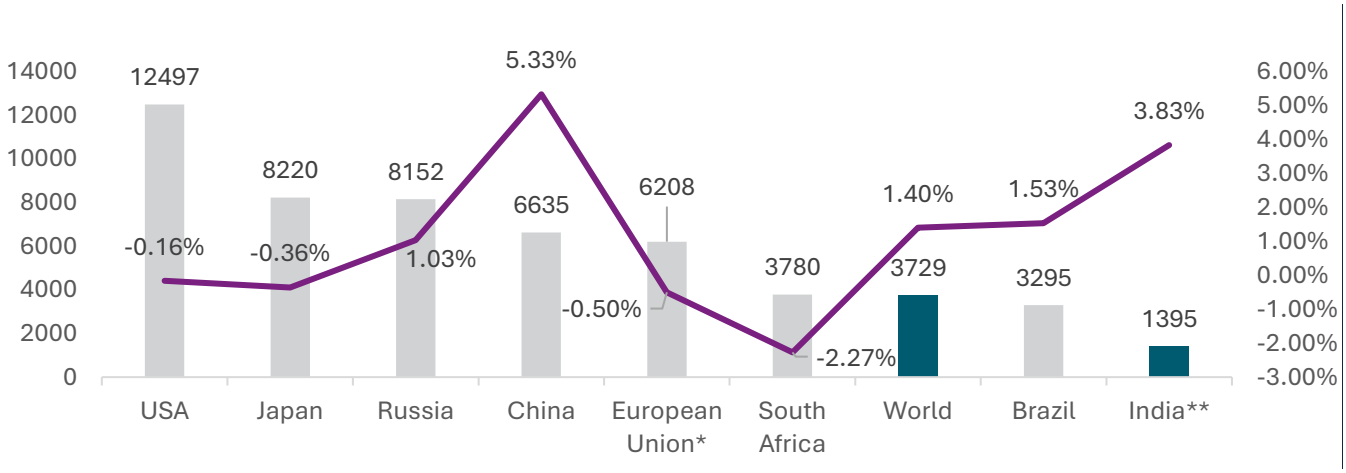
1.9.5 Overview of other demographic factors in India

1.9.5.1 Per capita Electricity Consumption

The world's electricity consumption has been steadily increasing over the years, driven by growing populations, urbanization, and industrialization. As of 2023, global electricity consumption stands at approximately 29,925[11] terawatt-hours (TWh). India, being the most populous country in the world, is a significant contributor to global electricity consumption. The country's electricity consumption has been growing at a rapid pace, driven by its expanding economy, increasing industrial activity, and rising household incomes. As of 2023, India's electricity consumption at 1958[12] TWh accounts for approximately 7% of the global total, making it the third-largest electricity consumer in the world, after China (32% of global share) and the United States (15% of global share).

In terms of per capita electricity consumption, India still lags behind many developed countries, with an annual consumption of 1,395[13] kWh per person as of fiscal 2024 and was 1331[14] kWh per person for fiscal 2023. However, this figure is expected to increase significantly in the coming years, driven by the government's efforts to electrify all households and promote economic growth. A comparison of electricity consumption patterns across major countries reveals growth potential for India. The United States, for instance, has a per capita electricity consumption of 12,497 kWh, which is almost ten times that of India's. China, on the other hand, has a per capita electricity consumption of 6635 kWh, which is five times that of India. In terms of growth percentage, India's per capita electricity consumption has increased significantly over the past decade, with a rise of 46% i.e., CAGR 3.83% from 2013 to 2023.

Figure 1.10 Per capita electricity consumption in CY2023 in kWh/ person and CAGR (10 year) from 2013 to 2023



*Source: BP (2024) Statistical Review of World Energy, Our World in Data, Crisil Intelligence, All India Electricity Statistics (General Review) by Central Electricity Authority, *European Union data is for 2022, **India's data is for fiscal 2024, growth rate is the CAGR in per capita electricity consumption from 2013 to 2023*

Between fiscals 2023 and 2026, India's per capita electricity consumption is expected to grow at approximately 6% CAGR[15]. Per capita electricity consumption is expected to gradually improve in the long term as well, as power demand picks up on the back of improvement in access to electricity, in terms of quality and reliability, rising per capita income,

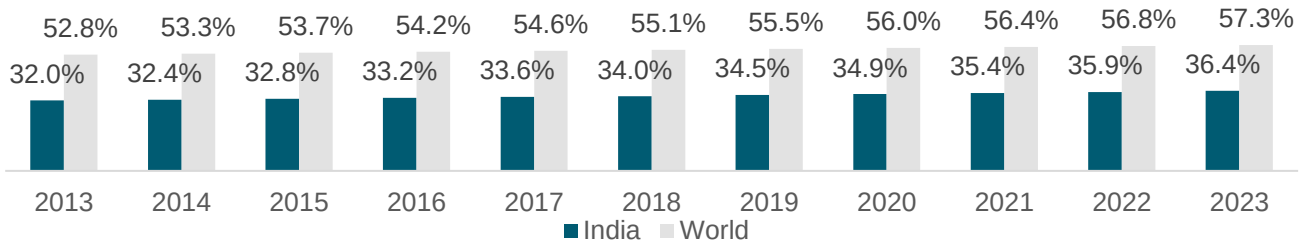
[11] *BP (2024) Statistical Review of World Energy*
[12] *BP (2024) Statistical Review of World Energy*
[13] *https://pib.gov.in/PressReleasePage.aspx?PRID=2089243*
[14] *All India Electricity Statistics (General Review) by Central Electricity Authority*
[15] *International Energy Agency*

increasing EV penetration, railway electrification, intensive rural electrification, resulting in realization of latent demand from the residential segment, increased penetration of consumer durables.

1.9.5.2 Urbanization

According to World Bank, India is undergoing rapid urbanization, with its towns and cities expected to be home to 400 million people, by 2030. This represents a significant increase from 32% of the total population in 2013, with urban areas projected to contribute almost 70% to GDP. The success of this urban transformation will be crucial in realizing India's ambition of becoming a developed country by 2047, the 100th year of independence. To create livable, climate-resilient, and inclusive cities that drive economic growth, it is essential to invest in necessary infrastructure. As of 2023, the urban population of India accounts for approximately 37% of the total population, with 523 million people living in urban areas. This represents a significant increase from 32% in 2013. In comparison to the rest of the world, India's urban population is one of the largest, with only China having a larger urban population at about 911 million people, about 60% of the population.

Figure 1.11 Share of urban population of India and the World from 2013 to 2023



Source: World Bank Group, all years are calendar year

1.9.6 Outlook on global GDP from 2023 to 2025

The ongoing US-led tariff actions are causing global trade and growth concerns, leading to uncertainty and financial market volatility. The ongoing trade war between the US and China has taken a dramatic turn, with the US announcing a 145% tax on imports, surpassing the initially stated 125% rate. China has retaliated against the US with tariffs, imposing a 125% tariff on US products, in a significant escalation of the trade war between the two countries. This move has sparked a strong response from China, which has unveiled countermeasures against the US, leading to a significant downturn in US stocks. The impact of the US government's fiscal support for its fiscal deficit and prospects of slower Fed cuts have also elevated 10-year US Treasury yields. Rising yield and interest rate differentials with emerging markets, and the concerns about global growth have heightened the uncertainty and financial market volatility world over.

1.10 Growth drivers for increase in GDP in India

The Indian government's total capital expenditure was at Rs 9.5 trillion[16] in fiscal 2024. Given the government's capex push (capital expenditure has tripled in past five years, from Rs 3.1 trillion in fiscal 2019 to Rs 9.5 trillion in fiscal 2024),

[16] *India Budget, Government of India*

India's investment prospects are optimistic. In fiscal 2026 Government of India has allocated Rs. 11.2[17] trillion capital expenditure, which is a 10% increase from previous fiscal year 2025 of Rs. 10.2 trillion.

1.10.1 Manufacturing

Indian real GDP growth has been mainly due to significant 9.9% growth in the manufacturing sector in fiscal 2024 over -2.2% in fiscal 2023 and 7.1% growth in the mining and quarrying sector in fiscal 2024 over 1.9% in fiscal 2023. The manufacturing sector has grown at an average annual rate 5.2% over the past 10 years, despite numerous disruptions. The main growth drivers in the sector have been chemicals, wood goods and furniture, transportation equipment, medicines, machinery and equipment.

1.10.2 Infrastructure

In recent years, the funding of large-scale infrastructure projects has been aided by buoyant public sector investment. Between fiscal 2014 and fiscal 2024, the average daily speed of national highway construction grew nearly three times, from 11.7 km to approximately 34 km. In the past five years, capital spending on railroads has surged 77%, primarily due to large investments in new-line construction, gauge conversion and doubling. The operationalization of new terminal buildings at 21 airports in fiscal 2024 has increased the capacity to handle 62 million more passengers annually overall.

India rose from 54 in 2014 to 38 in 2023 in the World Bank *Logistics Performance Index*. Between 2014 and 2023, India's clean energy sector received Rs 8.5 trillion[18] in new investments. The *National Monetization Pipeline* included assets with a monetization potential of Rs 6 trillion during the four-year period.

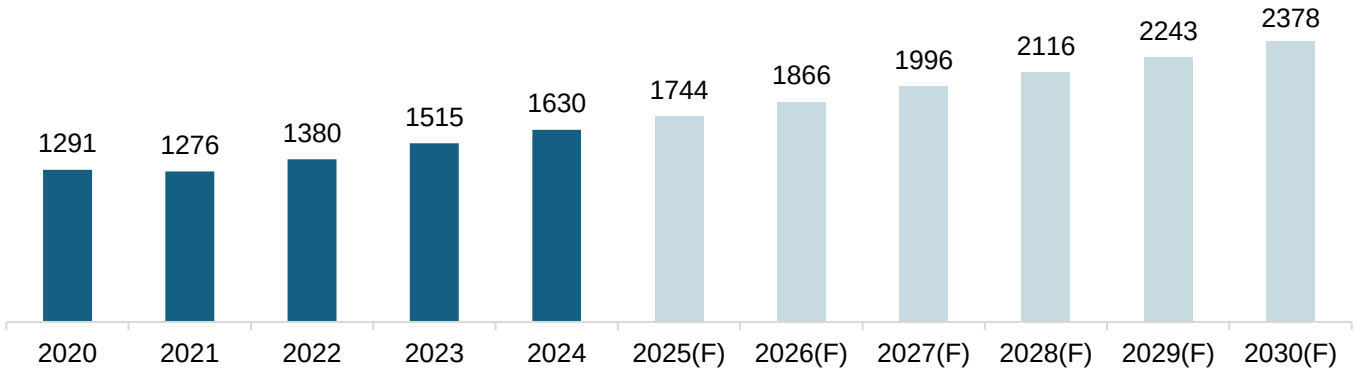
1.10.3 Services

The services sector's share of the total GVA has increased to 54.6% (fiscal 2024), the level observed before the epidemic. As of March 31, 2024, there were 1,691,495 active firms in India. In 2022, India's services exports made up 4.4% of all commercial services exported worldwide. About 73% of India's services exports were made up of business and computer services, which increased 9.6% on-year in fiscal 2024. India's percentage of the world's exports of digitally delivered services climbed from 4.4% in 2019 to 6.0% in 2023. In 2023, the tourism industry saw over 9.2 million foreign visitor visits, indicating a 43.5% on-year rise. With a 33% on-year gain and 0.41 million units sold in the top eight cities, residential real estate sales in India reached their highest level since 2013.[19]

1.11 Energy requirements and availability of India

[17] *Union Budget fiscal 2026*
[18] *Ministry of Finance, notified through Press Information Bureau dated 22nd July 2024*
[19] *As mentioned in the economic survey report*

Figure 1.12: India's electricity demand in Billion Units



Source: Central Electricity Authority- Annual Report of various years, Crisil Intelligence; All years are fiscal years, F: Forecast

India's energy demand is rapidly growing, driven by economic expansion and population growth. The demand in fiscal 2024 is expected to be 16,29,670 MU at a CAGR of 6.0% from fiscal 2020 to fiscal 2024, driven by continued economic growth. The demand is expected to continue growing at an accelerated rate, reaching 23,77,763 MU by 2030, with a CAGR of 6.4% from fiscal 2025 to fiscal 2030. The analysis of India's electricity demand from 2020 to 2030 shows a steady increase in demand, with an accelerating growth rate in the later years. The peak demand is the highest amount of electricity demanded by the grid at a given time which has been increasing steadily over the years, with a CAGR of around 6.9% from fiscal 2020 to fiscal 2024. The peak demand in fiscal 2020 was 1,83,804 MW, with a slight shortfall of 1,271 MW. The peak demand in fiscal 2021 was 1,90,198 MW, with a shortfall of 803 MW. The peak demand in fiscal 2022 was 2,03,014 MW, with a shortfall of 2,475 MW. The peak demand in fiscal 2023 was 2,15,888 MW, with a shortfall of 8,657 MW. The peak demand in fiscal 2023 was 2,15,888 MW, with a shortfall of 8,657 MW. The increasing peak demand highlights the need for additional power generation capacity to meet the growing demand.

Table 1.8: Peak Power Demand in India in MW

Fiscal Year	Peak Demand (MW)	Peak Demand (MW)	Demand not Met	
			MW	%
2020	1,83,804	1,82,533	1,271	0.7
2021	1,90,198	1,89,395	802	0.4
2022	2,03,014	2,00,539	2,475	1.2
2023	2,15,888	2,07,231	8,657	4.0
2024	2,40,174	2,39,978	196	0.1

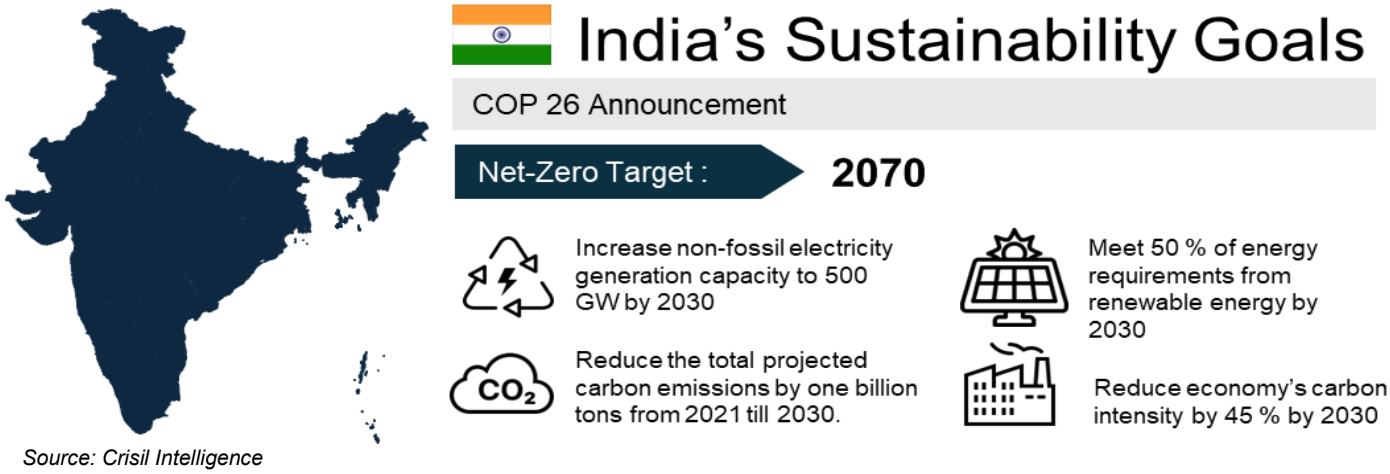
Source: Central Electricity Authority- Executive summary of various months

1.12 Outlook on Carbon Emission Reduction

As the world transitions towards a low-carbon economy, India's mining industry is poised to undergo a significant metamorphosis driven by the country's ambitious climate goals, mounting global pressure to adopt sustainable practices and the economic imperative to optimize energy consumption. The Indian government is committed to attain carbon neutrality by 2070.

1.12.1 India's Sustainability Targets

Figure 1.13: India's COP26 Targets



Source: Crisil Intelligence

India has been an active participant in global climate action initiatives, significantly contributing to international efforts under the United Nations Framework Convention on Climate Change (UNFCCC).

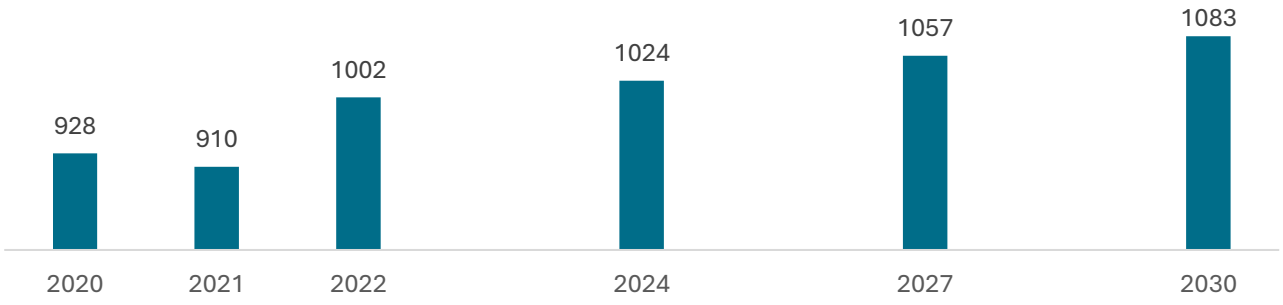
1.12.2 Emissions in the Power Sector

Coal is the largest source of carbon emissions from fossil fuels, accounting for approximately 41% of global CO_2 emissions[26]. The countries with the highest carbon emissions from coal in 2023[27] are 55.5% China (8,550 million tons CO_2), 13.2% India (2,031 million tons CO_2), 5.0% United States (776 million tons CO_2), 2.8% Russia (428 million tons CO_2), and 2.1% South Africa (330 million tons CO_2). The carbon emissions from coal in these countries are primarily due to the use of coal for electricity generation, industrial processes, and heating. The emissions from coal are not only a major contributor to climate change but also have significant health impacts, particularly in terms of air pollution.

India's National Electricity Plan (NEP) outlines a trajectory where absolute carbon dioxide emissions from electricity generation are projected to increase in the coming years reaching to about 1100 MMT in fiscal 2032. This rise is attributed to the growing energy demands of the nation. However, a significant reduction in CO_2 emissions per unit of electricity generated is anticipated, reflecting improvements in generation efficiency and a shift towards cleaner energy sources owing to the ambitious renewable energy goals set by Indian Government including achieving 50% of the nation's cumulative installed power capacity from renewable sources by 2030[28].

[26] *International Energy Agency (IEA)*
[27] *ourworldindata.org*
[28] *As per NDC submitted to UNFCCC in August 2022 as highlighted in PIB 13th November 2024*

Figure 1.14: Total Projected CO_2 Emissions (MT) from the power sector

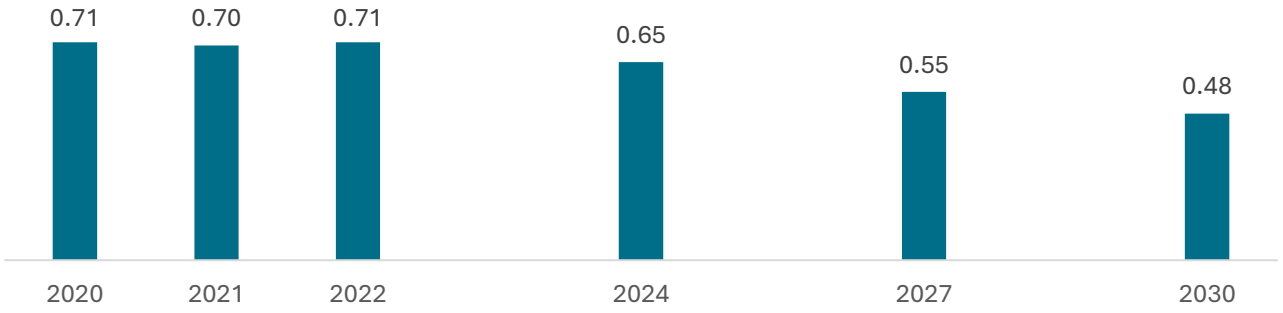


Source: National Electricity Plan 2022-32 by Central Electricity Authority, 2024 and 2030 numbers are interpolated, All years are fiscal years

According to NEP the share of non-fossil-based installed capacity is projected to increase from approximately 42.5% in April 2023 to 57.4% by fiscal 2027, and further to 68.4% by fiscal 2032.

This shift towards renewable energy sources plays a crucial role in decreasing emissions per unit of electricity generated. Ongoing improvements in power generation technologies and the implementation of energy-efficient practices contribute to lower emissions per kWh. The integration of cleaner technologies, such as supercritical and ultra-supercritical coal-fired power plants, enhances the efficiency of coal usage, thereby reducing emissions intensity, which is expected to reach to 0.42 kg CO_2/kWh_{net} by fiscal 2032.

Figure 1.15: Weighted Average Emission Rate ($kgCO_2/kwh_{net}$)



Source: National Electricity Plan 2022-32 by Central Electricity Authority, 2024 and 2030 numbers are interpolated, All years are fiscal years

1.12.3 Emissions in the Steel Sector

The steel sector in India emitted around 240 million tons of CO_2 in 2020, which is approximately 12% of the country's total CO2 emissions. The carbon emissions of the steel sector in India are expected to rise at a CAGR of 6.49% from 240 MMT of CO_2 emission in 2020 to 450 MMT of CO_2 emission in 2030. The carbon footprint of steel is significant, with the production of one ton of steel resulting in around 1.8-2.2 tons of carbon dioxide emissions. The main contributors to the carbon footprint of steel is through the DRI-EIF route of steel making in India, while the scrap-based EAF has the lowest emission intensity.

Table 1.9: Emission Intensity by Route-India (Fiscal 2024)

S. No.	Process Route	CO_2 Emission Intensity(tCO2/tcs)
1	Coal based DRI-EIF	2.70-3.10

S. No.	Process Route	CO_2 Emission Intensity(tCO2/tcs)
2	Syngas DRI-EAF	2.50-2.90
3	BF-BOF	2.20-2.60
4	Natural Gas based DRI-EAF	1.40-1.60
5	100% scrap-based EAF	0.55-0.65
Average emission intensity in India		2.54

DRI- Direct Reduced Iron, EIF- Electrical Induction Furnace, EAF- Electric Arc Furnace, BF- Blast Furnace, BOF- Basic Oxygen Furnace

Source: Ministry of Steel

The coal sector must balance economic imperatives with sustainability. While India's immediate energy security needs justify continued coal reliance, integrating technological advancements and policy-driven incentives can create a structured transition towards lower emissions without undermining industrial competitiveness. Addressing emissions is not about eliminating coal but about making its usage more efficient and environmentally responsible.

India plays a significant role in the global economy, driven by its diverse industrial base, growing consumer market, and strategic geopolitical position. As one of the fastest-growing major economies expecting a strong real growth of 6-7% in this decade, India's contribution to global GDP continues to rise. The mining sector remains crucial, contributing approximately 2.1% to India's GDP. Mining plays a vital role in India’s economy, providing raw materials for various industries such as power, steel, cement, and infrastructure.

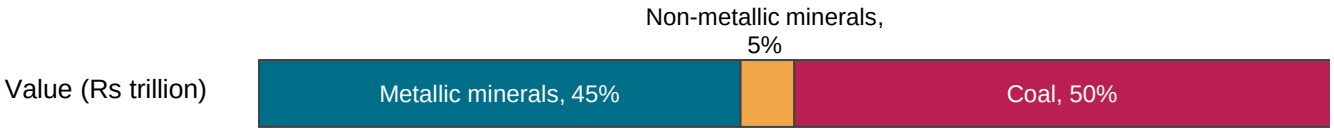
2 Indian Mining Industry Overview

2.1 Minerals at the Core

2.1.1 Coal, Iron Ore, and Limestone in India's Power and Infrastructure Sectors

The main minerals mined in India are coal, iron ore, and limestone, which are intricately linked to the country's power, steel, and cement industries. Coal, the primary source of fuel for India's thermal power plants, accounts for over 75% of the country's electricity generation.[29] The power sector, which is heavily reliant on coal, is also closely tied to the steel and cement industries, as electricity is a critical input for the production of steel and cement.

Figure 2.1: Value in Rs trillion of minerals in India distribution



Source: Ministry of Mines, Government of India, total value of mineral production is Rs 2.83 trillion for fiscal 2025.

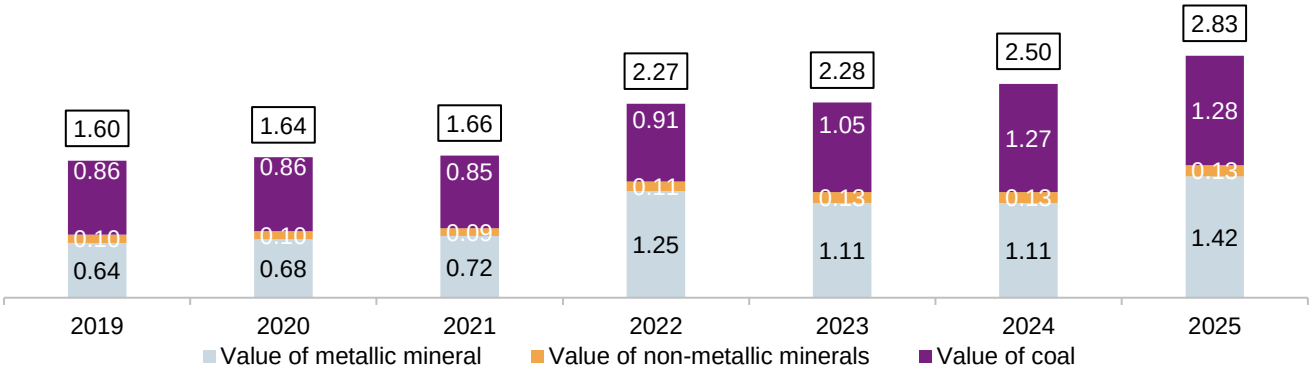
Coal and iron ore are the bedrock of India's mineral wealth, playing a critical role in driving the nation's industrial and economic progress. These minerals not only fuel the country's energy needs but also support the backbone of its manufacturing sector, particularly in steel production.

The value of minerals mined in India is approximately evenly split between the coal and non-coal minerals. Coal is undeniably the most crucial mineral for India, accounting for approximately 50%[30] of the total value of minerals mined in the country in fiscal 2025. Given India's large population (largest country by population in the world with approximately 1.44 billion people in 2024 according to IMF estimates) and rapidly growing economy (6.4% real GDP growth rate expected from CY2025 to CY2030, according to the IMF[31]), the demand for energy is ever-increasing, making thermal coal indispensable for ensuring energy security. The importance of coal is further underscored by its widespread use in various industries[32], from cement to chemicals, contributing significantly to India's industrial output.

Besides coal, metallic minerals contribute to the country's mineral wealth significantly, at approximately 45%[33] of the value of minerals mined in fiscal 2025. Iron ore, contributing approximately 34% to the total value of minerals mined in India, is another essential mineral that underpins India's economic framework. Approximately 76%[34] of the value generated by metallic minerals in India comes from iron ore, reflecting its importance. With India being the second largest producers of steel globally, the demand for high-quality iron ore is ever-growing. Given that the mining industry contributes approximately 2.1% to India's GVA, coal (50%) and iron ore (34%) contribute about 84% of the mining GVA.

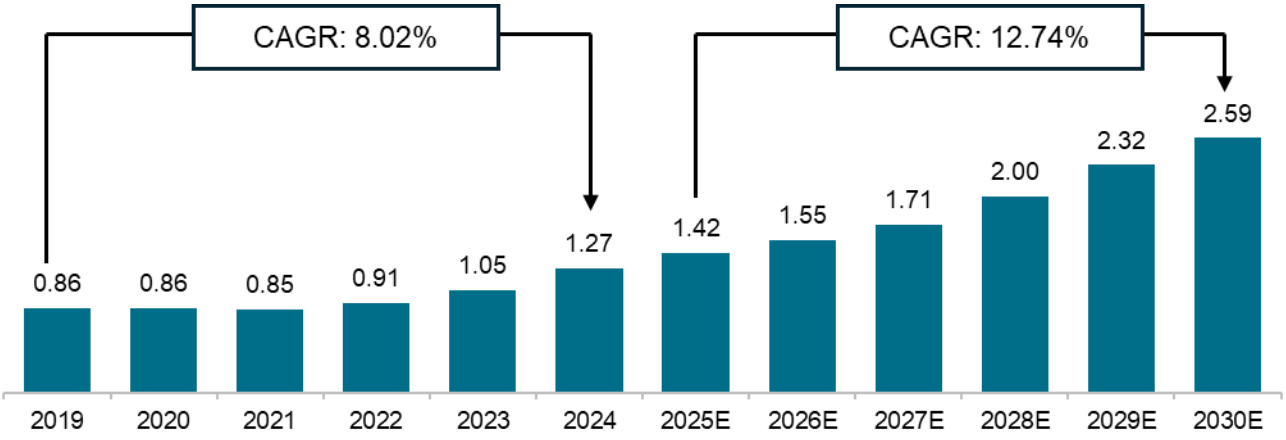
[29] *Central Electricity Authority (General Review)*
[30] *Ministry of Mines, Government of India, total Value of Mineral production*
[31] *As per International Monetary Fund (IMF)- World Economic Outlook (April 2025)*
[32] *Mentioned the share of coal demand in various sectors in detail in the coal demand & supply dynamics chapter*
[33] *Crisil Intelligence*
[34] *Ministry of Mines*

Figure 2.2: Value of minerals (coal and major minerals) in India (Rs trillion)



Source: Ministry of Mines and Crisil Intelligence, total value Rs approximately 2.83 trillion in fiscal 2025; All years are fiscal years

Figure 2.3: Value of coal produced in India and expected future value (Rs trillion)



Source: Ministry of Mines, Crisil Intelligence analysis assuming growth rate of 7.0% in coal supply growth; All years are fiscal years, E: Estimates

2.1.2 Mining policies and regulations

India's mining sector is a cornerstone of its economic strategy, playing a crucial role in ensuring security of energy and the critical mineral resources necessary for industrial growth. The country recognizes the importance of its vast mineral reserves in providing reliable and affordable energy essential for sustaining economic activities and driving industrialization. Additionally, with the growing geopolitical uncertainties and supply chain disruptions, India is strategically focusing on reducing its dependence of foreign sources for key minerals. By developing and safeguarding its domestic mineral resources, India aims to protect key industries, such as electronics, renewable energy and defense, from the vulnerabilities arising from global supply fluctuations.

2.1.2.1 Mines and Minerals (Development and Regulation) Act, 1957

The *MMDR Act* is the cornerstone of India's mining regulatory framework, governing all aspects of mineral development and regulation. The Act classifies minerals into major (coal being part of First Schedule, Part A of the Act) and minor, with different regulatory frameworks governing each. In 2015, the major amendments of the Act were approved with the introduction of a transparent, competitive bidding process for the allocation of mineral

blocks, replacing the earlier first-come, first-serve system. In addition, the amendments made post 2015 aimed to streamline the auction process, reduce bureaucratic delays and increase penalties for illegal mining activities.

2.1.2.2 National Mineral Policy, 2019

The National Mineral Policy (*NMP) 2019* was introduced to replace the policy of 2008, reflecting changes in the scenario of India's mineral resources. *NMP* is a comprehensive framework established by the government to guide the development and regulation of India's mineral resources. The policy aims to ensure the sustainable and efficient utilization of mineral resources. It promotes the adoption of modern technologies and practices that minimize environmental degradation, reduce waste and enhance resource efficiency. The policy advocates transparent and accountable governance in the mining sector and aims to attract both domestic and foreign investments in the exploration and mining sectors. The policy promotes value addition and mineral beneficiation within India, aiming to reduce the export of raw mineral and increase the export of value-added products.

2.1.2.3 Mineral Concession Rules, 1960 (MCR)

The *Mineral Concession Rules 1960* provide the procedural details for the grant of mineral concessions under the *MMDR Act*. This law defines the procedures for applying for reconnaissance permits, prospecting licenses and mining leases. It also outlines the rights and responsibilities of concession holders.

2.1.2.4 Mineral Conservation and Development Rules, 2017

The Mineral Conservation and Development Rules, 2017, were established under the *MMDR Act* to ensure the systematic and scientific exploitation of minerals. The rules aim to conserve minerals and ensure their proper utilization, with a focus on minimizing wastage and ensuring environmentally responsible mining practices. It provides guidelines for the sustainable development of mines, including proper closure plans, restoration of mined areas and measures to mitigate environmental impact. It also consists of regulations for the health and safety of workers.

2.1.2.5 Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules, 2016 (MCR)

The "Minerals (Other than Atomic and Hydro Carbons Energy Minerals) Concession Rules" govern the regulation of mineral concessions in India, excluding those related to atomic and energy minerals. The MCR 2016 is a law framed under the Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act). These rules replaced the older MCR 1960, aligning the mineral concession system with the 2015 MMDR Amendment, which introduced auction-based allocation of mining rights

2.1.2.6 Mineral Auction Rules, 2015

The Mineral (Auction) Rules, 2015 and subsequent amendments, primarily focus on establishing a fair and transparent bidding process for mineral blocks. These rules govern how mining leases (MLs) and composite licenses (CLs) are offered via auctions. They provide a transparent, fair and competitive bidding process for granting ML and CL. The Mineral Auction Rules define the auction parameters, including, reserve price, bid parameter, auction process, eligibility criteria, payment terms, penalties for default, etc. to ensure transparent and competitive allocation of mineral blocks.

2.1.2.7 Mines & Minerals (Contribution to District Mineral Foundation) Rules, 2015

The District Mineral Fund (DMF) is a non-profit body that works to benefit the people and areas impacted by mining, funded by contributions from mining concession holders. Section 9B of the MMDR Act empowers State Governments to establish DMFs in districts affected by mining activities. According to the Mines & Minerals (Contribution to District Mineral

Foundation) Rules, 2015, mining lease holder must pay an additional amount to the District Mineral Foundation (DMF) of the district where they operate, in addition to the royalty.

2.1.2.8 Offshore Mineral Concession Rules- 2006

The Offshore Areas Mineral Concession Rules, 2006, outline the procedures for obtaining permits, licenses, or leases for mining in India's offshore areas, including its territorial waters, continental shelf, and exclusive economic zone. These rules, enacted under the Offshore Areas Mineral (Development and Regulation) Act, 2002, govern the grant and renewal of concessions for mineral development in these maritime zones. The rules cover the grant of Reconnaissance Permits (RP), Exploration Licenses (EL), and Prospecting Licenses (PL) for mineral exploration and extraction.

2.1.2.9 National Steel Policy, 2017

The National Steel Policy, 2017, formulated by the Ministry of Steel, aims to enhance the growth and sustainability of the Indian steel industry. It seeks to boost domestic steel production, reduce reliance on imports, and establish India as a global steel powerhouse. The policy aims to make India self-reliant in steel production by enhancing capacity to 300 MT and increasing per capita consumption to 160 kg by 2030-31.

2.1.2.10 Mission Coking Coal, 2021

The Ministry of Coal has embarked on an ambitious mission *"Mission Coking Coal", aimed* at enhancing domestic coking coal production to reduce the country's reliance on imports. This initiative is driven by the growing demand for coking coal from the steel sector, which is expected to drive economic growth. The mission seeks to increase domestic raw coking coal production to 140 million tons (MT) by the financial year 2029-30. This mission aligns with broader initiatives like the National Steel Policy 2017, targeting reduced import dependency and securing a steady supply of coking coal through domestic exploration, beneficiation, and infrastructure development.

Recommendations by Inter-Ministerial Committee

Ministry of Coal, Govt. of India has assessed the sector-wise demand of coking coal and non-coking coal in the country by fiscal 2030 and likewise prepared coal logistic plan for effective and efficient evacuation of coal. Taking all these into consideration and to substitute the imports of coal the committee has come to the following recommendations for reducing coking coal imports:

i. Utilization of raw coking coal production by steel sector
ii. Adoption of Stamp-Charging Technology for steel making
iii. Enhancing Washing Capacity in the country
iv. Monetization of Old Washeries
v. Low ash thermal coal as PCI (Pulverized Coal injection) in Blast Furnace
vi. Enhancing Coal gasification based Direct reduced Iron (DRI)

2.1.2.11 Abandoned coal block auction policy[35]

To promote an optimum utilization of coal resources in the national interest, the Government is eager to include the private sector in operating closed/abandoned/discontinued mines through a mechanism that would benefit both the government and the private sector.

[35] *https://coal.nic.in/sites/default/files/2022-02/17-02-2022.pdf*

2.1.2.12 Environmental regulations

Environmental regulations play a critical role in ensuring responsible mineral extraction. *The Environment Protection Act, 1986, the Forest Conservation Act, 1980, and the Wildlife Protection Act, 1972* are key legislative frameworks that govern environmental aspects of mining. These laws mandate environmental impact assessments (EIA) for major mining projects, clearances for mining in forested areas and stringent measures to protect wildlife habitats.

2.1.2.13 Taxation on minerals

Royalty

As per Section 9 of the *MMDR Act*, the holder of a mining lease granted on or after the commencement of the Act has to pay royalty on any mineral removed or consumed by him or by his agent, manager, employee, contractor or sub-lessee from the leased area at the rate specified for that mineral in the *Second Schedule* of the Act.

District Mineral Fund

The District Mineral Foundation (DMF) was established as per Section 9B of the MMDR Act, to ensure that the benefits of mining extend to communities affected by these activities. Funded by contributions from mining leaseholders, the DMF focuses on the welfare of people in mining-affected areas, particularly in the fields of health, education, and infrastructure development.

National Mineral Exploration Trust Rules, 2015

The *National Mineral Exploration Trust Rules, 2015,* were established as per Section 9C of the MMDR Act to support mineral exploration activities in India, particularly for minerals that are crucial for national development but are under-explored. The mining companies are mandated to contribute 2% of the applicable royalty in the NMET fund.

State Specific Taxes

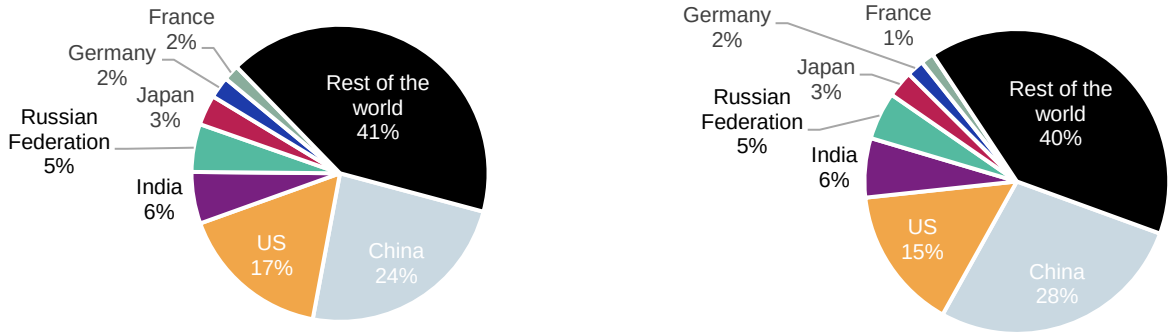
In addition to the statutory taxes such as GST and GST compensation cess, there are specific charges which are levied by states which impact the overall price of coal/ minerals. Some of the key states which levy such taxes include Chhattisgarh, Madhya Pradesh, Jharkhand, and West Bengal.

2.2 India’s energy requirements

India aspires to be a developed country by 2047, when it celebrates its 100th year of Independence. This includes achieving high per capita income with improved living standards. A rising population combined with the twin forces of urbanization and industrialization underpins growth in energy demand.

According to estimates by BP (2024) Statistical Review of World Energy, global energy consumption rose at a CAGR of 1.6% between 2010 and 2023 (from 506 exajoule or EJ to 620 EJ). The country-wise share of energy consumption with major economies are as shown below:

Figure 2.4 :World's energy consumption (EJ) by major countries in CY2018 and CY2023



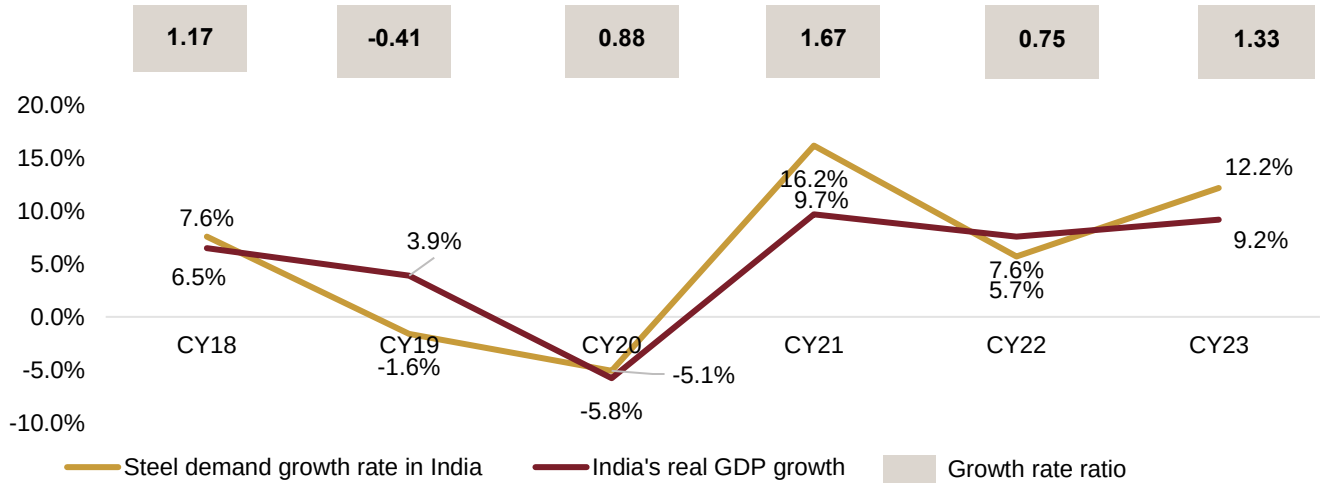
Source: BP (2024) Statistical Review of World Energy, CY- Calendar Year

2.3 Correlation of Major Sectors with the GDP growth

2.3.1 Steel sector with GDP growth

The demand growth of steel and GDP growth is highly correlated, with both following a similar trend since 2018[36]. When real GDP growth is high, steel demand growth tends to be high as well. The steel demand growth rate experienced a down cycle from CY19 to CY20, with a decline of -1.6% and -5.1%, respectively, due to the pandemic. The steel demand growth rate has been in an cyclical since CY21, with growth rates of 16.2%, 5.7%, and 12.2% in CY21, CY22, and CY23, respectively.

Figure 2.5: Growth in steel demand vs GDP in India



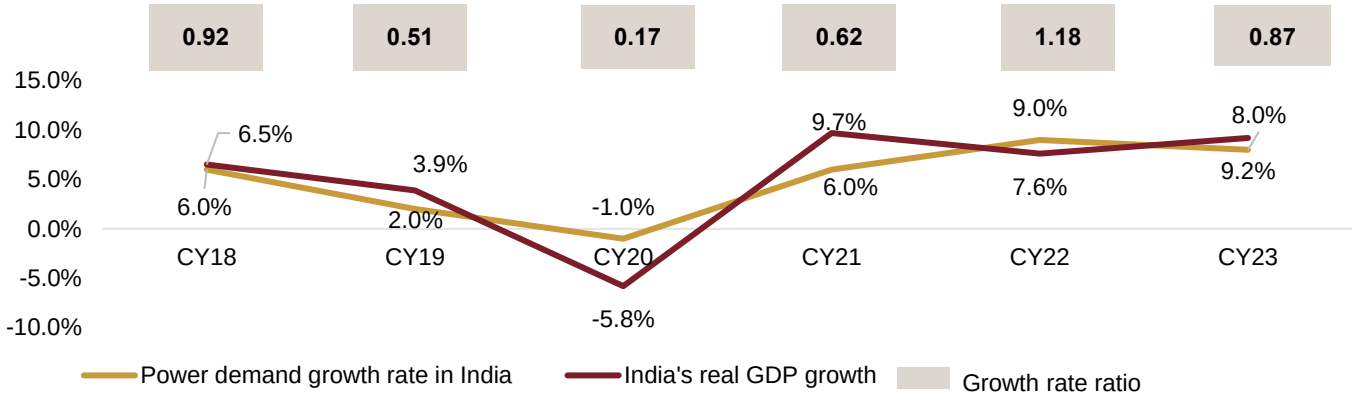
Note: All figures are adjusted to calendar year and the grey boxes represent the ratio of growth rate of India's steel demand and real GDP; the GDP growth rates are from IMF; CY- Calendar Year
Source: Crisil Intelligence, JPC report of various years, IMF

[36] *Note: All years in this section are calendar years unless otherwise mentioned*

2.3.2 Correlation of Power with GDP growth

The demand growth of power and GDP growth is highly correlated, with both following a similar trend since 2018[37]. During the pandemic, the demand for power as well as GDP declined till 2021, after which demand for power grew at 9.0% in 2022. In the subsequent year, demand for power grew by 8.0%. The growing multiple of GDP and power in the past four years is a sign of growing power demand with GDP and growing GDP with power demand. The projections of power demand for the future are also high considering growth rates of power in the past two years (year 2022 and 2023).

Figure 2.6: Growth in power demand vs GDP in India



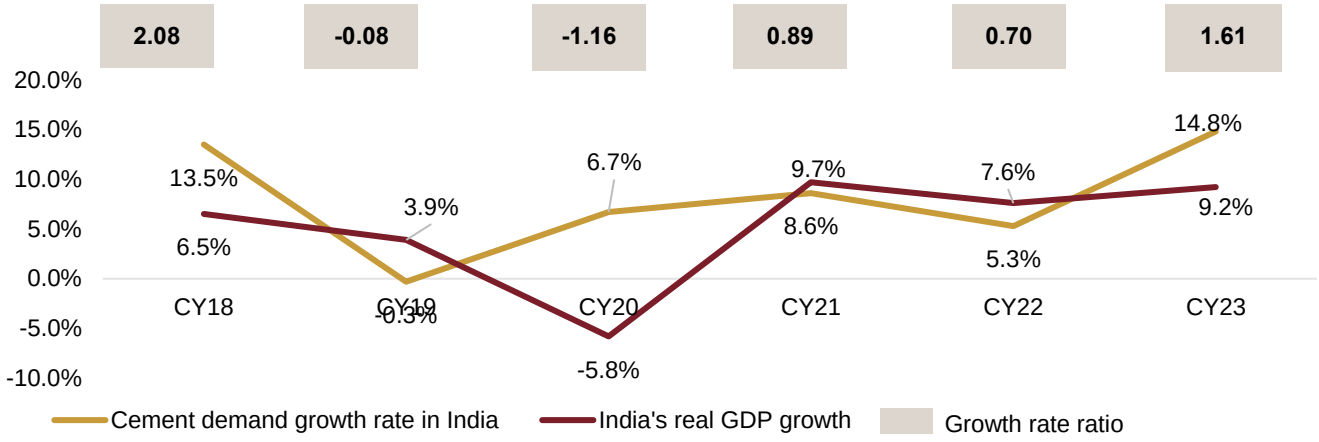
Note: All figures are adjusted to calendar year and the grey boxes represent the ratio of growth rate of India's power demand and real GDP; the GDP growth rates are from IMF; CY- Calendar Year
Source: Crisil Intelligence, Ministry of Power, IMF

2.3.3 Correlation of Cement with GDP growth

The growth of cement demand in India has been loosely tied to the country's GDP growth, with both exhibiting a similar trend over few years. Since 2018, cement demand has followed a pattern of growth, with some fluctuations, mirroring the trajectory of India's real GDP growth. During the pandemic, cement demand declined marginally in 2019 and grew at a slower pace in 2020, before rebounding in 2021 with an 8.6% growth rate. In the subsequent years, cement demand growth has continued to accelerate, with a notable 14.8% growth rate in 2023.

[37] *Note: All years in this section are calendar years unless otherwise mentioned*

Figure 2.7: Growth in cement demand vs GDP in India



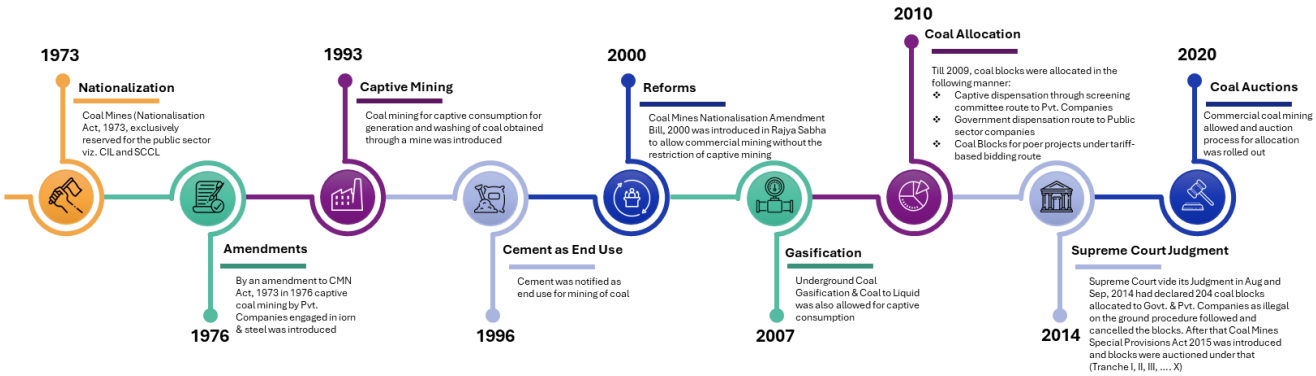
Note: All figures are adjusted to calendar year and the grey boxes represent the ratio of growth rate of India's cement demand and real GDP; the GDP growth rates are from IMF; CY- Calendar Year
Source: Crisil Intelligence, IMF

2.4 Coal's dominance in India's energy and power sectors

The growth in coal consumption parallels India's economic expansion over the past decade. The increased demand for energy, particularly from coal, highlights the country's industrial and infrastructural growth. As of 2023, India accounted for 13% of global coal consumption, standing as the second-largest consumer after China (which dominates with a 56% share). In terms of absolute figures, India's coal consumption, measured in EJ, has risen significantly. In 2013, India's coal consumption stood at 14.4 EJ. By 2023, this figure escalated to 21.9 EJ, underscoring a substantial increase in energy demand within the country.

2.5 Analysis of regulatory frameworks and policies governing coal sector

Figure 2.8: Coal sector: From nationalisation to commercialisation



Source: Crisil Intelligence

Participation in coal block auctions was no longer limited to captive users but open to any player, including international ones for mining and selling coal from India. In August 2020, 100% FDI was allowed, removing the last

significant vestige of regulation in the coal mining industry. Recently, existing captive allottees have been allowed to sell up to 50% of their coal production in the open market subject to meeting end use plant requirement. Subsequently, eleven rounds of commercial coal block auctions have been concluded so far, resulting in successful auctions of 125 blocks. The 12th round (Tranche XII) was launched with Notice Inviting Tender (NIT) on March 27, 2025, and is underway (as of May 2025).

Figure 2.9: Key policies influencing the coal market

National Coal Distribution Policy 2007	Guiding policy for sale and distribution of coal in India, introduced Letter of Assurance (LoA)-Fuel Supply Agreement (FSA) regime, sale via nominated agencies and e-auction of coal
CMSP Act 2015	Auctions for allocation of coal block to end-users introduced
Linkage Auction Policy 2016	Policy for allocation of linkages to non-regulated sectors via auctions, prior FSAs are not renewed after the policy
SHAKTI Policy 2017	Policy for allocation of linkages to power plants, objective of fading away of LoA-FSA regime
MMDR Amendment Act 2020	Coal block auctions opened up to commercial players as well and up to 50% of sale allowed from captive coal blocks

Source: Crisil Intelligence, Ministry of Coal

2.5.1 The National Coal Distribution Policy (NCDP), 2007

The overarching policy guiding coal distribution and sale in India is the National Coal Distribution Policy (NCDP), 2007 and the various amendments thereof. The NCDP guides the overall framework for allocation of coal linkages to different sectors, distribution to MSME sectors and e-auction schemes to be conducted by CIL subsidiaries. The NCDP seeks to facilitate supply of assured quantities of coal to various categories of consumers at predetermined prices, taking into consideration regulatory regimes governing the end-use sectors. It also envisages an enlarged role for state governments in the supply of coal to a large number of small and medium industries. Under this policy, e-auction sale of coal was re-introduced to encourage emergence of a proper coal market in the country.

2.5.2 The CMSP Act, 2015

It is the CMSP Act of 2015 that rang in reforms in the sector. The Act and the rules notified under it have laid down the method and process for auctioning coal blocks through a transparent and competitive bidding process. Similarly, the process for allotments (in case of PSUs/ UMPPs) has also been spelt out in the Act. After the Act came into effect, over January 2015-November 2019, the government conducted multiple rounds of coal block auctions and allotments.

2.5.3 Linkage Auction Policy

The MoC vide letter No. 23011/51/2015-CPD (Pt-I) dated February 15, 2016, issued policy guidelines for auction of linkages for the non-regulated sector. It was stipulated that all allocations of linkages/LOAs for the non-regulated sector, viz. cement, steel/sponge iron, aluminum and others [excluding fertilizer (urea sector)], including their CPPs, shall henceforth be auction-based. Also, there will be no renewal of existing FSAs of non-regulated sectors [except FSAs of

CPSEs and fertilizer (urea)]. CIL and SCCL have accordingly been conducting linkage auctions for the non-regulated sector, including for steel, cement and sponge iron, and FSAs are signed with successful bidders by the subsidiary coal companies of CIL and SCCL.

2.5.4 SHAKTI Policy

The Government of India introduced the SHAKTI (Scheme for Harnessing and Allocating Koyla (Coal) Transparently in India) policy in 2017. The policy provided a new system of coal allocation under which power 82 plants can be segregated into different categories based on existing power purchase agreements and fuel supply agreements or linkages. The participants under the scheme could participate and source coal for short- and long-term linkages. The overall objective of the scheme was to ensure supply to power plants, minimize risk to the banks exposed to non-performing assets, reduce electricity bills, and decrease imports.

2.5.5 Government policies

The Government policies significantly influence the energy sector, with recent initiatives focusing on reducing import dependency on coal and advancing sustainability. The major institutions which influence these policies are shown below:

2.5.6 Energy Policies

While India is making significant strides in renewable energy and green hydrogen, coal remains a critical component of the country's energy mix. To address the challenges and opportunities within the coal sector, the government has introduced several targeted policies. Additionally, the *Integrated Coal Logistics Plan for Coal Mines/Blocks*, introduced in February 2024, focuses on developing efficient and cost-effective coal logistics. This policy aims to streamline coal evacuation processes and enhance operational efficiency. The *Coal Blocks Allocation (Amendment) Rules,* 2023 further reflect the government's efforts to optimize the allocation, along with its plan to produce 1.5 BT (1,500 million tonne of coal) and management of coal resources, ensuring a more transparent and efficient process.

2.5.7 Effect of global events on the coal sector and focus on renewable power

The coal sector has been significantly impacted by global events leading to a decline in its dominance and a shift towards renewable energy sources. Here are some key events and trends that have influenced the coal sector and the growth of renewable energy:

Global events impacting the coal sector:

1. **Paris Agreement (2015)**: The Paris Agreement set a global goal to limit global warming to well below 2°C and pursue efforts to limit it to 1.5°C above pre-industrial levels. This agreement marked a significant shift towards reducing greenhouse gas emissions, which has led to a decline in coal demand.
2. **China's energy policy shift (2017)**: China, the world's largest coal consumer, announced plans to reduce coal consumption and increase renewable energy capacity. This shift has had a significant impact on global coal markets.
3. **European Union's climate policies (2019)**: The EU introduced the European Green Deal, aiming to become carbon neutral by 2050. This has led to a decline in coal-fired power generation and an increase in renewable energy investments.

4. **COVID-19 pandemic (2020)**: The pandemic led to a global economic downturn, resulting in reduced energy demand and a decline in coal prices. This accelerated the transition to renewable energy sources, as governments and companies sought to reduce costs and mitigate climate risks.
5. **Russia-Ukraine war (2022)**: Russia's invasion of Ukraine in February 2022 and the subsequent war continues to have a profound impact on global energy markets leading to imposition of sanctions on Russian producers thereby impacting the Russian coal trade flows, which would have significant implications for the global metallurgical coal market.

Factors influencing growth of renewable energy:

1. **Cost competitiveness**: The cost of renewable energy technologies, such as solar and wind power, has decreased dramatically, making them more competitive with fossil fuels. Since 2010, the cost of solar photovoltaic electricity has fallen 85%, and the costs of both onshore and offshore wind electricity have been cut by about half. Both of these renewable sources are now cost-competitive with fossil fuel electricity.
2. **Government policies and targets**: Policy support has been essential for the growth of renewable energy. Renewable energy tax credits and subsidies, feed-in tariffs, and competitive auctions have all helped reduce costs and spur deployment. Government investment in research and development has been essential in promoting innovation in renewable energy. China, Europe and the United States have become leaders in solar and wind through policy support, and worldwide, 165 countries have targets to increase renewable energy. India, in particular, has set ambitious targets through its Panchamrit Goals, which aim to reduce the country's carbon footprint and increase the share of non-fossil fuels in its energy mix.
3. **Technological advancements**: Improvements in energy storage, smart grids, and other technologies have enhanced the efficiency and reliability of renewable energy systems.
4. **Attracts Incentives and Subsidies:** The renewable energy sector attracts various incentives and subsidies that make it an attractive option for investors and developers. Incentives include tax credits, grants, and low-interest loans, which help to reduce the upfront costs of renewable energy projects.

The coal sector has been significantly impacted by global events, leading to a decline in its dominance and a shift towards renewable energy sources. As the world transitions to a low-carbon economy, the focus on renewable power will continue to grow, driven by declining costs, increasing investment, and government policies and targets.

2.6 Indian coal market overview and assessment

2.6.1 Coal market structure

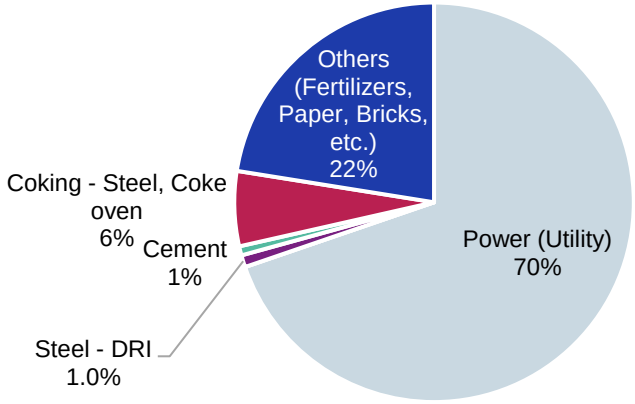
India's energy landscape also heavily depends on the fossil fuel, with the country consuming about 13% of the world's coal. Coal-based thermal power plants continue to dominate electricity generation in India, accounting for approximately 73% in fiscal 2024[38]. Coal production in India is majorly dominated by CIL (313 operating mines) and Singareni Collieries Company Ltd (SCCL; 40 operating mines) with production by other captive and commercial players. In fiscal 2024, the combined coal supply of CIL (78%) and SCCL (7%) accounted for approximately 85% of the total domestic coal supply by volume (approximately 843 MMT), with the remaining 15% supply (154 MMT) met via captive /other commercial blocks.

[38] *As per CEA reports*

2.6.2 Demand of coal

Coal is a useful source of energy not only for the power sector (utilities and CPPs) but also for others such as steel, direct reduced iron (DRI), sponge, cement and bricks. The power sector comprising power utilities and captive power plants (CPPs) accounted for approximately 70% of coal consumption in fiscal 2024[39] and, thus, is central to the outlook for coal in the country.

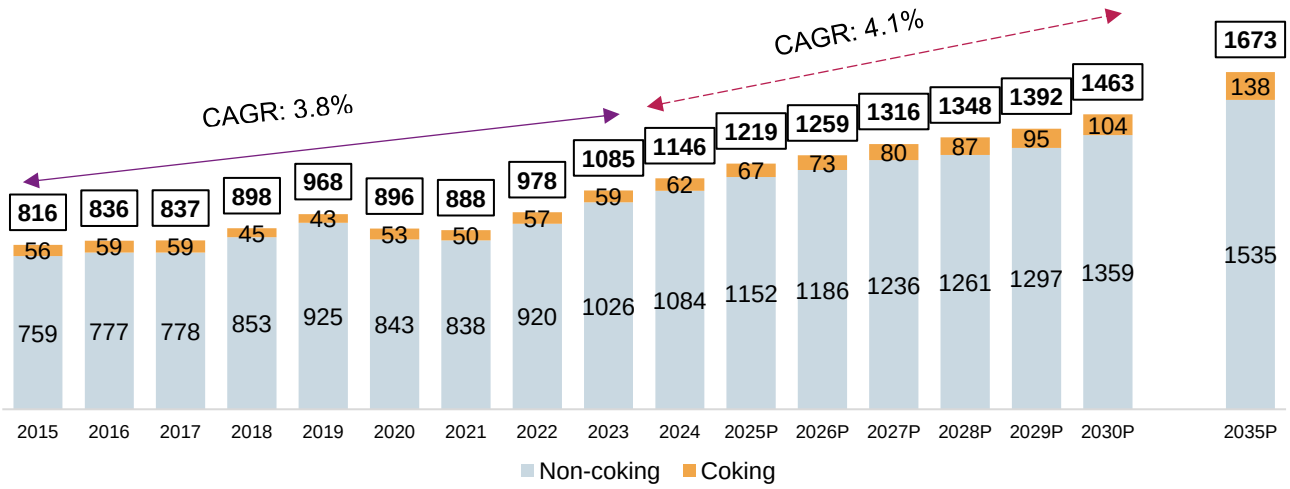
Figure 2.10 India's coal demand by end-use sectors fiscal 2024



Source: Ministry of Coal Annual Report 2024-25; Others include imports as well which are being used in Power, Power (Captive), Cement, Steel-DRI etc. and hence the actual share of these sectors will vary

Coal demand grew by 3.8%, a 9-year CAGR between fiscal 2015 and 2024 and is expected to grow by 4.1% at 6-year CAGR between fiscal 2024 and 2030, with more than 60% contribution from power sector (thermal and captive) by fiscal 2030. During demand estimation, coal with levelized grade of G10 has been considered. It may be noted that the actual demand for raw coal will be higher as the average produced grade of coal is G11 and going forward the grade is expected to further reduce. Only non-coking coal has been levelized in this case and coking coal has been considered at actual. The growth in coal demand will likely to continue till fiscal 2035.

Figure 2.11 Overall coal demand in India – thermal coal (non-coking) and coking coal (MMT)



Source: Crisil Intelligence; All years are fiscal years; P: Projected; Note: demand of coal is based on the G10 grade of coal

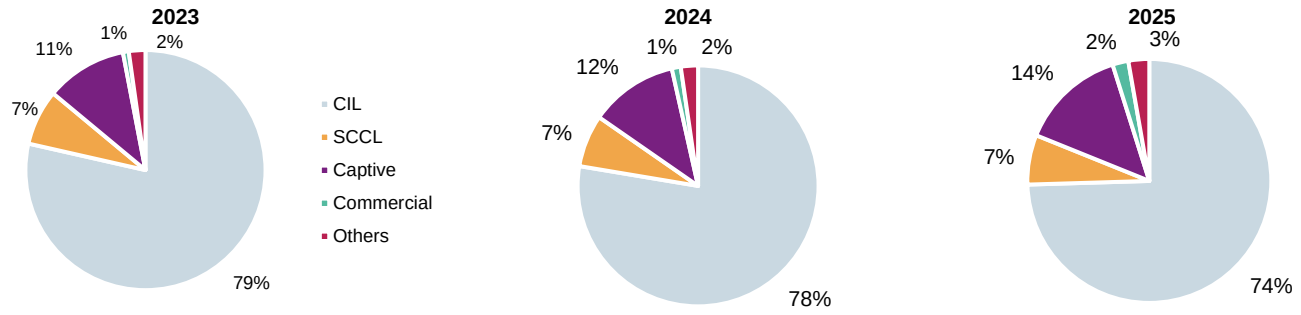
[39] *Actual demand as per Annual Report 2024-25 of Ministry of Coal*

The demand of coal is dynamic and is driven by different factors such as: power utilities demand increase, expansion of thermal power capacity; capital investments in steel, aluminium and cement due to infrastructure focus by the government. However, Coal will continue to play a major role in the India's energy sector at least for the next few years.

2.6.3 Supply of coal

On the supply side, a duopoly structure is present in India with two supply sources, namely domestic and imported coal sources. The domestic coal sources are dominated by Coal India Ltd and Singareni Collieries Company Ltd. both of which accounted for 81% of the coal production (850 MMT) and rest 19% (198 MMT) was from captive coal blocks, commercial coal blocks and other blocks in fiscal 2025. The total raw coal production in India in year 2025 was 1048 MMT i.e., 5.1% increase from 997 MMT in 2024.

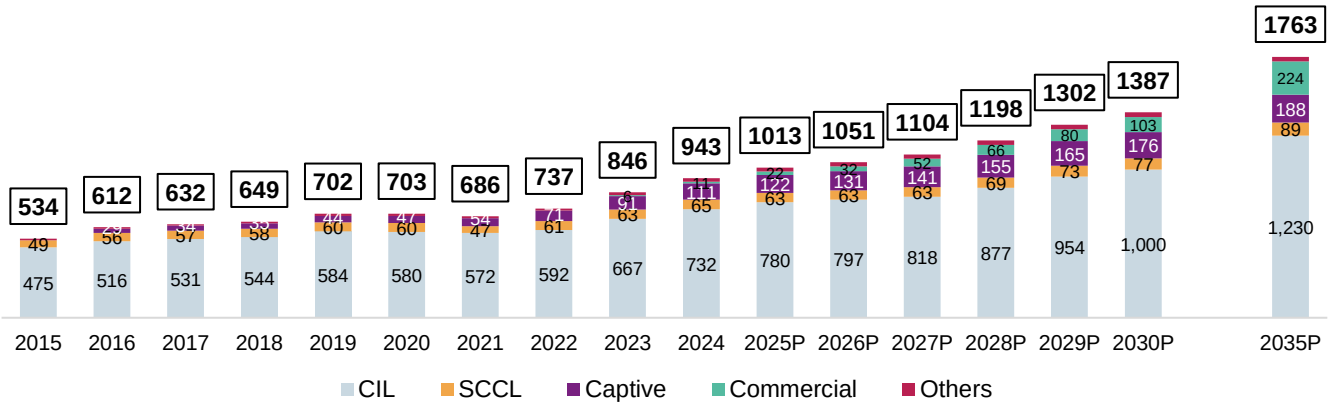
Figure 2.12 India's raw coal supply sources



Source: Ministry of Coal-Coal Directory of India for 2022-23, 2023-24; 2024- 25, Monthly Statistics for March 25 & Crisil Intelligence; All years are fiscal years

In order to draw a parallel with the coal demand estimated in the above section, the coal production has been levelized at the same grade of G10. Therefore, the estimated production in Fiscal 2025 is 1013 MMT in comparison to the actual production of 1048 MMT. Going ahead, the projected raw coal production in Fiscal 2035 will be 1763 MMT compared to a demand of 1673 MMT. Although, it appears to be supply surplus however, it is believed that market will adjust such that there is no oversupply in the market.

Figure 2.13 India's levelized raw coal production scenario from different sources (MMT)



Source: Past data as per Ministry of Coal-Coal Directory of India 2023-24, Projections as per Crisil Intelligence; Year is fiscal year; P: Projected

2.7 Outlook of other key commodities

2.7.1.1 Lignite

Indian lignite deposits occur in the Tertiary sediments in the southern and western parts of peninsular shield of India particularly in Tamil Nadu, Puducherry, Gujarat & Rajasthan also in Jammu & Kashmir and Odisha. The total known geological resources of lignite as on 01.04.2022 is about 46,204 MMT, of which 79% resources (36,561 MMT) are located in Tamil Nadu, Rajasthan (14%) and Gujarat (6%). Other States where lignite deposits have been located are West Bengal and Kerala with very sparse resources.

The production from Tamil Nadu accounts for around 50%, while share of Gujarat in lignite production has been around 26% and that of Rajasthan was 23%. During fiscal 2025, the reported production of lignite was 45 MMT which increased by around 6% in comparison to that of the previous fiscal year. Neyveli Lignite Corporation India Limited (NLCIL) accounted for more than 50% of the total lignite production (53%), followed by Gujarat Mineral Development Corporation Limited (GMDC) at 18%, Barmer Lignite Mining Company Limited (BLMCL) at 13%, Gujarat Industries Power Company Limited (GIPCL) at 8%, Gujarat State Petronet Ltd (GSPL) at 4% and remaining by others.

As of fiscal 2024, there were around 20 operating lignite mines of 8 companies including Government and private. Mainly there are two channels for lignite use, one is captive and another is commercial. Majority of Lignite. i.e., 65.5% of lignite has been consumed captively, whereas 34.5% of lignite has been sold in the market during fiscal 2018 to fiscal 2022.

Major use of lignite is in power generation, contributing around 1.80% till Q3 of fiscal 2025. Lignite is also being imported, solely from China, but is very less in terms of volume and value. The Ministry of Coal, Govt of India, has been conducting commercial coal auctions post 2020, which also include lignite blocks. A total of 11 lignite blocks have been put for auction till date, out of which 8 blocks are under G3 category, 2 blocks are under G2 category and 1 block under G1 category. 2 lignite blocks in the state of Rajasthan being auctioned in the ongoing 22nd tranche of CMSP Act/12th tranche of MMDR Act for auction of coal mines for sale of coal. However, no lignite blocks have been successfully auctioned. It can be seen that the majority of blocks (73%) are under G3 category, which require extensive exploration for probing up to G1 level. This poses a significant opportunity for CMPDIL in undertaking such exploration activities, leveraging its extensive experience in coal exploration.

2.7.1.2 Copper, Manganese, Bauxite & Graphite

Copper, manganese, bauxite and graphite are few other key minerals whose demand are estimated to grow profoundly considering their usage in diverse sectors which are contributing significantly towards the growth of the nation's economy.

India's refined copper demand stood at 1510 KT[40] in fiscal 2025 out of which primary copper contributed to 973 KT and secondary copper 537 KT. The primary copper is derived from copper ore. The major demand drivers for copper are the construction sector (26%), consumer durables (20%), automotives (21%), power sector (20%) and others (13%). The demand for refined copper is expected to grow at a CAGR of 7.5%-8.5% to reach approximately 2120 KT[41] by fiscal 2030.

Further, Indian aluminum demand[42] reached 5.5 MMT (primary aluminium- 3.3 MMT and secondary aluminium- 2.2 MMR) in fiscal 2025 while its Bauxite demand reached to about 19.8 MMT contributing to the demand of primary aluminium. India's aluminum and bauxite demand is forecasted to reach about approximately 4.4 MMT and approximately 26 MMT respectively by fiscal 2030. The demand of primary aluminum is posed to grow significantly in

[40] *Crisil Analyst Report- Copper, April 2025*
[41] *Crisil Analyst Report- Copper, April 2025*
[42] *Crisil Analyst Report- Aluminum, April 2025*

India owing to growth in power sector, supported by government initiatives like Make in India, Smart City Program and 100% rural electrification. The increased government spending on infrastructure improving housing demand and industrial construction boosts aluminum demand.

Manganese is primarily consumed in the steel sector. Therefore, the demand of manganese is primarily dependent on the demand from the steel industry. In India[43], the total manganese demand is expected to increase from 8.4 MMT in fiscal 2024 to 15.6 MMT in fiscal 2030, representing a CAGR of 9.2% over the next 7 years, considering the capacity augmentation mentioned in the National Steel Policy, 2017.

In fiscal 2024 the total graphite production in India is 307 KT out of which natural graphite is 168 KT and synthetic graphite production is 139 KT. The overall demand in India in fiscal 2024 is 416 KT where imports contribute about 26%. Graphite's demand is primarily driven by electrodes in EAF steelmaking (46%), refractories (27%), electric vehicles (6%), energy storage systems (6%), and other sectors (15%).

Table 2.1 Outlook on important mineral in India

Critical Mineral	India's Reserves	Demand FY 2025	Demand FY 2030(P)	Key Players
Copper Metal	12.19 MMT	1510 KT	**approximately 2120** KT	Hindustan Copper Limited
Bauxite	650 MMT	19.80 MMT	**approximately 26 MMT**	Vedanta, Hindalco
Manganese	504 MMT	8.4 MMT*	**15.6 MMT**	MOIL, Tata Steel
Graphite	212 MMT	416 KT*	**698 KT**	TAMIN

*Source: USGS MCS 2025, Crisil Intelligence, IBM Mineral Yearbook; *Demand available for fiscal 2024*

2.7.1.3 Critical minerals

India[44] identified 30 critical minerals in June 2023, including lithium, cobalt, nickel, rare earth elements, and others, which are essential for the green energy transition and various technological advancements. In August 2023, significant reforms were introduced in India's mining laws to boost the exploration and production of critical minerals. The MMDR Act, 1957 was amended to remove six minerals—lithium, beryllium, titanium, niobium, tantalum, and zirconium—from the list of atomic minerals, thus opening them to private sector participation. A new list of 24 critical and strategic minerals was added to the Act, and the Central Government was empowered to auction blocks for these minerals. A new concession type, the Exploration License (EL), was also introduced, allowing reconnaissance and prospecting of 29 minerals (including 23 critical ones) through auction. Separately, the Offshore Areas Mineral (Development and Regulation) Act, 2002 was also amended to allow auction-based allocation of offshore mineral blocks containing critical minerals like REEs, phosphorite, and polymetallic nodules. The amendment also led to the creation of the Offshore Areas Mineral Trust to support exploration, research, capacity building, and international cooperation. These policy reforms aim to secure critical mineral supply chains essential for clean energy, electronics, defense, and other high-tech sectors.

To secure a steady supply of critical minerals, the Government of India will support mapping and detailed exploration in resource-rich countries through entities like the Geological Survey of India (GSI), Public Sector Undertakings (PSUs),

[43] *Crisil Intelligence*
[44] *The National Critical Mineral Mission (NCMM)*

and other Indian organizations. These efforts aim to supply critical minerals to India, with the National Mineral Exploration Trust (NMET) expected to spend Rs. 1,600 crores by fiscal 2031 on overseas exploration.

The Government of India has embarked on a strategic initiative to bolster the recovery of critical minerals from secondary sources, including mine tailings, overburden, and other industrial by-products, with a dedicated allocation of Rs. 100 crores for pilot projects leveraging cutting-edge technologies such as hydrometallurgy and bioleaching. Furthermore, a lower revenue share model will be implemented to incentivize optimal recovery of critical minerals associated with major minerals. To enhance domestic processing capabilities, the government plans to establish mineral processing parks, with a budgetary allocation of Rs. 500 crores, which will facilitate research and development in beneficiation, critical mineral reagents, and other associated technologies.

While the country's domestic reserves partially cater to the demand for certain minerals like tin, rare earth elements, copper, silicon, and titanium, the overall production falls short of meeting the escalating demand. As a result, India's reliance on imports remains significant, with a complete dependence on foreign sources for a range of crucial minerals, including cobalt, beryllium, bismuth, indium, lithium, niobium, rhenium, strontium, tantalum, and tungsten.

In fiscal 2024, CIL set up a separate vertical for critical and strategic minerals and is aligning with the national decarbonization agenda. CIL has expressed interest in commercial mining of non-coal minerals, especially in collaboration with MECL, GSI, and state governments. In January 2025, CIL invited expressions of interest (EoI) from experienced consultants to conduct technical due diligence on lithium brine assets in Argentina. As the global focus shifts towards renewable energy and sustainability, the demand for consulting services related to these emerging commodities is expected to grow, driving the overall market expansion.

Rare Earth Elements

Rare Earth Elements (REEs) are a group of 17 chemically similar metallic elements in the periodic table. These include the 15 lanthanides from Lanthanum to Lutetium along with Yttrium and Scandium. Indian REE resource contain Light Rare Earth Elements while Heavy Rare Earth Elements are not available in extractable quantities. The principal sources of REE are bastnaesite, xenotime and loparite. In India, Monazite is the principal source of rare earths which occurs in the beach sand and inland placers. The resource estimates of Monazite is 11.93 MT[45] which comprises 55%- 65% of Rare Earth Oxides.

As of 2024[46], the total world reserves of Rare Earth Elements (REEs) are estimated to be 90 BMT, with the majority being held by countries such as China (approximately 49%), Brazil (approximately 23%), India (approximately 8%), Australia (approximately 6%), and others (approximately 14%). India's REE deposits are found in Andra Pradesh (approximately 26%), Odisha (approximately 25%), Tamil Nadu (approximately 19%), Kerela (approximately 14%), West Bengal (approximately 9%) and others (approximately 7%). Till date, 1 CL block and no ML block have been launched for auction and no blocks have been successfully auctioned. The world's REE production was 390 MMT in 2024, where China contributes approximately 69% (270 MMT), United States contributes approximately 12% (45 MMT), Canada contributes approximately 8% (31 MMT), and India contributes approximately 0.7% (2.9 MMT), with the remaining 10% coming from other countries. As REEs are found in traces within the host rocks, specialized exploration is required for proper delineation of REE concentration through geochemical and geophysical surveys. Till March 2020, GSI has generated significant baseline data covering 11.72 lakh sq.km[47], 7.66 lakh sq.km and 2.66 lakh sq. km through geochemical, geophysical and aero- geophysical survey respectively which will play a key role towards establishing REE resources in

[45] *Source: Report of the Committee on Identification of Critical Minerals, Ministry of Mines, June 2023*
[46] *Source: USGS MCS 2025*
[47] *Source: Strategic Plan for Enhancing REE Exploration in India*

the country. CMPDI being a PSU will be having a easier accessibility towards procuring such baseline data generated by GSI and leveraging upon its existing infrastructure can cash upon such opportunity and establish its position as position a market leader in such field.

Lithium

As of 2024[48], the total world reserves of lithium are estimated to be 30 BMT, with majority of the reserves being held by countries such as Chile at 9.3 BMT (approximately 31%), Australia at 7 BMT (approximately 23%), Argentina at 4 BMT (approximately 13%), and China at 3 BMT (approximately 10%) and others 6.7 BMT (approximately 22%). India's lithium resources are approximately 12.3[49] MMT, with significant deposits found in Jammu & Kashmir and Karnataka. Till date, 3 (CL- 3, ML-0) blocks have been launched for auction, with 1 block successfully auctioned.

As of 2024[50], the world's lithium production is estimated to be 240 MMT, where Australia contributes approximately 37% (88 MMT), Chile contributes approximately 20% (49 MMT), China contributes approximately 17% (41 MMT), Zimbabwe contributes approximately 9% (22 MMT) and remaining approximately 17% (40 MMT) from others. India, however, currently relies heavily on imports to meet its lithium requirements, presenting a vast opportunity for domestic players to establish themselves in the market.

India’s lithium deposits are primarily composed of lepidolite-bearing pegmatites and granites. Unlike brine deposits, which are commonly found in countries such as Chile and Argentina, such deposits require hard rock mining. These ores are processed to extract the desired minerals. This approach is more complex and capital-intensive than brine.

The global lithium market is expected to witness significant growth, driven by the increasing demand for lithium-ion batteries used in EVs, consumer electronics, and energy storage systems. India’s demand for lithium is poised to rise to 13,671[51] tonnes by fiscal 2030. The Indian government's plans to achieve 30%[52] e-mobility by fiscal year 2030 and the increasing focus on renewable energy sources are expected to drive the demand for lithium-ion batteries, thereby boosting the demand for lithium. Further, as part of diversification strategy, CIL is also looking for acquiring lithium blocks in Australia and Argentina. CMPDIL, with its expertise in mineral exploration and development, is well-positioned to capitalize on this trend and establish itself as a key player in the Indian lithium market. By leveraging its capabilities and investing in research and development, CMPDIL can help augment India's lithium resources, optimize mining and beneficiation costs, and contribute to the country's energy security and sustainability goals. By adapting its knowledge and skills to the lithium industry, CMPDIL can develop innovative solutions to optimize mining and beneficiation costs and establish itself as a leading player in the Indian and global lithium markets.

Table 2.2 Outlook on key critical mineral in India

Critical Mineral	Domestic Resource	Demand FY24 (kt)	Demand FY30P (kt)	Supply	End Use Industry
Rock Phosphate	311.25 million tonnes	11200–12400	16000–18400	Import dependence is 85%	Fertilizers, Chemicals, Additives
PGE	20.92 tonnes	0.015	0.019–0.021		Auto catalysts, Jewelry, Medicine, Electronics

[48] *Source: USGS MCS 2025*
[49] *https://pib.gov.in/PressReleasePage.aspx?PRID=2041804*
[50] *Source: USGS MCS 2025*
[51] *https://pib.gov.in/PressReleasePage.aspx?PRID=2041804*
[52] *http://psa.gov.in/mission/electric-vehicles/36*

Critical Mineral	Domestic Resource	Demand FY24 (kt)	Demand FY30P (kt)	Supply	End Use Industry
Tungsten	89–111 million tonnes	0.8	1.2–1.4	Import dependence is 100%	Alloys, Defense, Cutting Tools, Others
Antimony	18.683 million tonnes	1.44	1.8–2.2		Catalysts, Pigments, Flame Retardants
Beryllium	**approximately** 56 tonnes	0.018	0.024–0.026	Import dependence is 100%	Batteries, Alloys, Catalysts, Stabilizers, Ceramics
Hafnium	36.56 million tonnes	0.002	0.003		Automotive, Defense, Electronics
Silicon	**approximately** 60	106–140			Semiconductors, Superalloys, Others
Titanium	427 million tonnes	258–347	431–503	Significant import dependence on titanium dioxide, sponge and metal	Defense, Aerospace, Chemicals, Pigments, Polymers
Nickel	189–194 million tonnes	90–120	150–190	Import dependence is 100%	Stainless Steel, EV, ESS, Batteries
Cobalt	**approximately** 45 million tonnes	5.8–6.2	18–37	Import dependence is 100%	EV and ESS, Superalloys, Magnets, Pigments

Source: Recovery of Critical Minerals from Mine Tailings and Overburden- FICCI, P: Projected

The mining industry is an evolving industry and in order to address its specific needs in the field of exploration, mining, environment requirement of new high-end machinery and advanced software, including artificial intelligence and big data analytics are the need of the hour. The sheer scale of mining activity including machine, money and manpower makes a case for constant lookout to improve efficiency of operations.

3 Indian Mining Consultancy Overview

3.1 Overview of the Indian Mining consulting services industry

3.1.1 Mining Consultancy Market Outlook

The Consultancy services are defined as independent specialist and strategic advice or provision of expertise to organizations across industries for consideration and informed decision making. These consulting services help to make strategic decisions about capital project management, corporate strategy and expansions, performance improvement, digital transformation etc. The global mining consultancy market is projected to experience significant growth from 2024 to 2031. The mining consulting services are intricately linked to the mining sector, which has experienced a growth (CAGR) of 3.39% from 2018 to 2023[72]. The Indian mining consultancy sector is projected to witness significant growth, with revenues expected to reach Rs 40,071 million by fiscal 2030, representing a substantial increase from Rs 25,701 million in fiscal 2024., driven by increasing demand, favorable industry dynamics and technological advancements.

The growth in the mining consultancy market is further fueled by an increasing demand for sustainable mining practices, technological advancements, and heightened investment in mineral exploration and mining infrastructure. The integration of digital tools and data analytics in mining operations, alongside a rising emphasis on environmental compliance and sustainable resource management are pivotal factors fueling this market's expansion. As mining companies continue to face pressure to enhance operational efficiency while minimizing environmental impact, consulting services that provide innovative solutions and strategic insights have become indispensable.

In addition to environment consulting services, mining consulting firms play a significant role in data generation though geological, geophysical and geo-engineering exploration and thereafter preparation of various technical and commercial reports as well as project reports. To sustain the GDP growth and simultaneously meet the raw material demand from power, manufacturing and infrastructure sectors, it is crucial to augment the country's natural resource base. This can be achieved through exploration, which is essential for discovering new resources. Consulting firms play a vital role in establishing resource/ reserves of minerals through exploration. Further, consulting firms help to access technical & commercial feasibility of extracting resources and also prepare bankable reports to facilitate investment decisions.

Technological advancements in the mining sector also play a crucial role in driving the consulting services market. The adoption of digital technologies such as artificial intelligence (AI), internet of things (IoT), and big data analytics is revolutionizing mining industry, allowing companies to optimize resource management, enhance safety protocols and increase productivity. As these technologies become integral to mining strategies, consulting firms that offer expertise in digital transformation and technology integration are experiencing robust demand.

3.1.2 Service Type Analysis

The mining consulting service market can be segmented by service type into exploration, feasibility studies, environmental consulting, mine planning, and others.

[72] *https://www.globenewswire.com/news-release/2025/02/19/3028550/28124/en/3-7-Trillion-Mining-Market-Opportunities-and-Strategies-to-2033-BHP-Group-Leads-Fragmented-Global-Mining-Market-2-5-Followed-by-Glencore-Rio-Tinto-and-Vale.html*

3.1.2.1 Exploration

Exploration consulting services are critical in the early stages of mining projects, where the focus is on identifying, evaluating and establishing mineral resources. Consulting firms in this segment provide expertise in reconnaissance study involving geological mapping, pitting, trenching, geochemical analysis thereafter geophysical data generation and interpretation and finally drilling to assess the potentiality of the mining site. The demand for exploration services is expected to grow as mining companies intensify their efforts to discover new mineral deposits to meet the rising global demand.

3.1.2.2 Feasibility Studies

Feasibility studies represent another significant segment within the mining consulting service market. These studies are essential for evaluating the technical and economic viability of a mining project prior to large-scale investment. Consulting firms conduct comprehensive assessments covering various aspects such as market assessment, resource estimation, mine design, processing methods, financial modeling and risk analysis. The increasing importance of risk management and investment security in the mining sector is driving the demand for detailed feasibility studies.

3.1.2.3 Mine Planning and Design

Mine planning services are integral to the efficient development and operation of mining projects. Consulting firms in this segment provide expertise in mine design, scheduling, and optimization to maximize resource extraction and minimize operational costs. The increasing complexity of modern mining operations, coupled with the need for technological integration, is driving demand for mine planning services.

3.1.2.4 Environmental Consulting

Environmental consulting services have gained prominence as sustainability becomes a central concern for the mining industry. Consulting firms specializing in environmental assessments help mining companies comply with regulatory requirements and implement sustainable practices. These services include environmental impact assessments, remediation planning, waste management and biodiversity conservation.

3.1.2.5 Management services

Consulting firms offer comprehensive management and engineering support services to facilitate the successful implementation of projects, from conceptualization to commissioning (C2C). Their services encompass a range of activities, including, techno-economic evaluation, detailed design and efficiency optimization, energy auditing, site supervision and establishment of infrastructure.

3.1.2.6 Technology and other related services

Additionally mining consulting firms provide technical support for development and maintenance of data management systems for effective monitoring and tracking of progress such as the Mine Data Management System Portal (MDMS), which showcases key features of projects monitored by organizations such as CIL. This includes tracking the progress of coal projects, encompassing various aspects such as Environmental Clearance (EC), Forest Clearance (FC), Land Acquisition, Rehabilitation & Resettlement (R&R), financial metrics, HEMM procurement, production, and major infrastructure development, including Coal Handling Plants (CHP), silos, washeries, railway sidings, and more. CMPDIL's 5G Use Case Lab is a testing hub for 5G technology in the coal mining industry. It aims to develop and test 5G use cases to enhance mining operations, improving efficiency, safety, and sustainability.

3.1.2.7 Research and Development

Research and development activities in mining consultancy sector involves extensive usage of technologies in exploration, development and production of conventional and non-conventional energy resources like Coal Bed Methane (CBM) for improvement of productivity, safety, protection of environment and ecology etc. Some key R&D activities undertaken includes the following:

- Use of technology to analyze the performance of explosives in field conditions
- Effective design of barrier pillars for safety in underground mines
- Assessment of rare earth elements and other economic resources
- Development of indigenous IoT based technology for monitoring of mining activities in underground mines for improving safety and productivity
- Network for integrated voice, video and data communication in opencast coal mines

3.2 Market assessment of exploration and allied services related to coal/ consultancy

3.2.1 Key Commodity Outlook

The commodity segment of the mining consulting service market is categorized into coal, ferrous, non- ferrous and others.

3.2.1.1 Coal

Coal consulting services remain important due to the continued reliance on coal as a primary energy source in many regions. Despite a global shift towards cleaner energy, coal remains a critical commodity in several developing economies, necessitating consulting services for exploration, extraction, and environmental management.

3.2.1.2 Ferrous

The ferrous metals segment is a major driver in the mining consulting service market, including iron and its products like steel, stainless steel, cast iron, wrought iron etc. are essential for various industries, including construction, automobiles, and manufacturing. The global demand for ferrous metals is expected to increase, driven by infrastructure development and technological advancements. Consulting services in this segment focus on exploration, mine planning and feasibility studies to optimize the extraction and processing of minerals.

3.2.1.3 Non-Ferrous

Minerals consulting services cover a wide range of non-ferrous resources, including bauxite, copper, lead, zinc etc. The demand for these minerals is supported by their diverse applications in various end- used industries such as aluminum, ceramics, glass, and electronics. Consulting firms in this segment offer services related to exploration, reserve estimation, and processing technologies.

3.2.2 Regional Outlook

3.2.2.1 Asia Pacific

Regional outlook shows that the Asia Pacific region is expected to dominate the mining consulting service market, owing to its abundant mineral resources and the presence of major mining companies along with rising demand

from various end used industries. Rapid industrialization in countries like China and India is fueling demand for raw materials, subsequently increasing the need for consulting services.

3.2.2.2 Middle East & Africa and Latin America

The Middle East & Africa and Latin America are poised for moderate growth in the mining consulting service market. In the Middle East & Africa, ongoing exploration activities and investments in mining infrastructure are driving demand for consulting services. The region's rich mineral reserves and growing interest in resource diversification present opportunities for consulting firms specializing in exploration and feasibility studies. Latin America, with its abundant mineral resources, is also experiencing increased demand for consulting services.

3.2.2.3 North America and Europe

The North American and European mining consulting markets are significant due to strict environmental regulations and a focus on sustainable mining practices. Digital technology is increasingly being used to boost operational efficiency, with consulting firms supporting organizations in this effort. The market is driven by the need for miners to enhance efficiency, reduce their environmental impact, and ensure regulatory compliance.

3.2.3 Market assessment of Mining Consultancy

3.2.3.1 Overview of Mining Consultancy Market

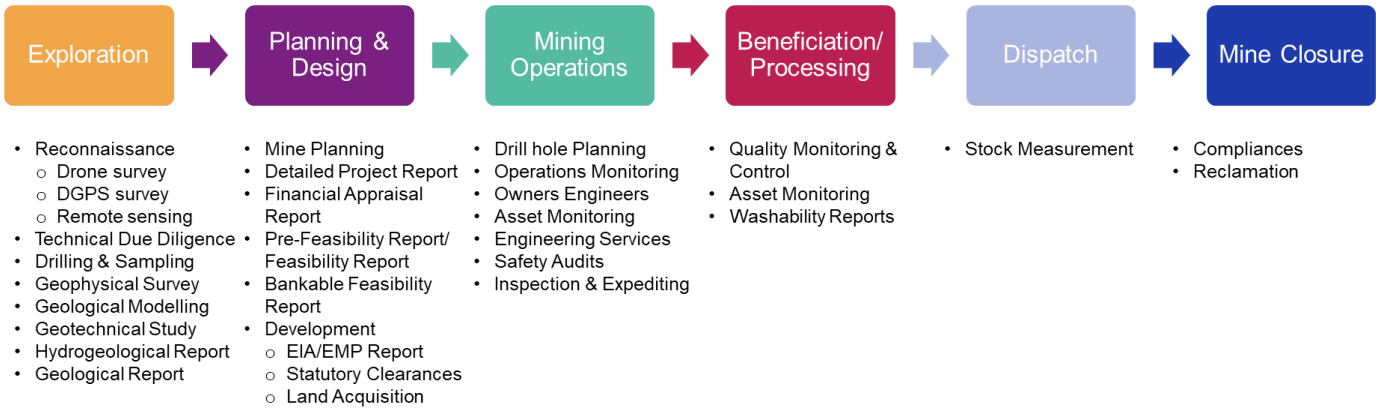
The mining industry is expected to grow significantly in the coming years, driven by the increasing GDP of India. The Indian government has also introduced several initiatives to boost the mining sector, such as the National Mineral Policy, 2019, and the Mines and Minerals (Development and Regulation) Amendment Act, 2020. CMPDIL has significant market opportunities in the areas of planning and design, geological exploration, environmental assessment, and digitalization and technology.

Mining consulting agencies with expertized in providing specialized services to support existing or prospective mining projects. Their primary goal is to add value to the project by optimizing operations, increasing efficiency, and mitigating risks. The Indian mining consultancy sector plays a pivotal role in the nation's mining industry, offering expertise in exploration, feasibility studies, environmental compliance, and technological integration. There are various stages involved in a mining project where mining consultancy is involved across the mining value chain. In India mining consultancy can be classified under the following key verticals:

1. Exploration
2. Mine Planning and Design
3. Infrastructure Engineering
4. Geomatics and Survey
5. Environment
6. Beneficiation
7. Contract Management

Out of the above verticals, Mine Planning and Design Services and Exploration Services constitute the major portion of the mining consultancy market, contributing approximately 70% of the total mining consultancy market revenue considering the fact that in India major mining players are requiring consultancy services for establishing resource/ reserve in the mining block and thereafter preparing various reports and plans for undertaking strategic decisions. Post operationalization major mining projects are being undertaken through outsourcing mode.

Figure 3.1: Value chain of mining process showing scope of consultancy services



Source: Crisil Intelligence Analysis

In fiscal 2024, India produced 997 MMT of raw coal. Coal supply has been growing at a 9-year CAGR of 6.7% since fiscal 2015 till fiscal 2024. Further, the raw coal production is expected to grow at 6-year CAGR of 7.5% over fiscals 2024-2030 to reach 1,514 MMT. By fiscal 2030, CIL will continue to enjoy the largest share by 73% followed by PSUs 12%, private players 9% and the remaining SCCL 5%.

Table 3.1: Estimated total coal production (MMT)

Particulars	2020	2021	2022	2023	2024	2025P	2026P	2027P	2028P	2029P	2030P
CIL	609	585	623	703	774	828	853	881	953	1,048	1,105
SCCL	64	51	65	67	70	68	68	68	74	78	82
PSU blocks	58	64	81	105	118	129	139	151	165	175	186
Private blocks	8	6	8	18	36	50	62	85	100	115	141
Total Coal (MMT)	**738**	**705**	**777**	**893**	**997**	**1,074**	**1,122**	**1,185**	**1,292**	**1,416**	**1,514**

Source: Crisil Intelligence Analysis; P: Projected; Year is fiscal year

Table 3.2: CIL year wise upcoming mines including expansion

Particulars	2025	2026	2027	2028	2029	2030	Total
ECL	-	3	1	-	5	1	**10**
BCCL	-	1	-	-	-	2	**3**
CCL	-	2	1	5	-	-	**8**
NCL	-	-	2	1	-	-	**3**
WCL	-	1	1	1	1	4	**8**
SECL	1	2	1	-	3	1	**8**

Particulars	2025	2026	2027	2028	2029	2030	Total
MCL	-	-	1	4	5	-	**10**
Total	**1**	**9**	**7**	**11**	**14**	**8**	**50**

Source: Monthly Statistical Report by MoC- March 2025; Year is fiscal year

CIL is expected to undertake a massive capacity augmentation drive with projected capacity enhancement of approximately 787 MT through opening and expansion of 50 mines which require significant support of mining consultancy services in terms of exploration, geomatics, planning and design, environment as well as closure related services for exhaustion of mines. Hence, CIL is expected to be the major player in contributing to the mining consultancy services.

To meet the growing demand of coal, the major focus is on exploration for identification of new coal blocks. The Ministry of Mines and Ministry of Coal have been actively promoting the growth and development of the mining sector in the country. In fiscal year 2024, Rs. 7300 million and Rs. 210 million were outlaid for exploration of coal and lignite respectively. In January 2025, the Union Cabinet, chaired by Prime Minister Narendra Modi, had approved the launch of the National Critical Mineral Mission (NCMM) with an expenditure of Rs. 1,63,000[73] million and expected investment of Rs. 1,80,000 million by PSUs and other entities. The mission aims to establish an effective framework for India's self-reliance in the critical mineral sector, recognizing the indispensable role of critical minerals in high-tech industries, clean energy, and defense. The National Critical Mineral Mission (NCMM) is expected to have a significant impact on the mining consulting sector in India, creating new business opportunities.

The Ministry of Coal's target to reach 1500 MMT (1.5 billion tonnes) of coal production by fiscal 2030, and Coal India Limited's (CIL) aim to produce 1000 MMT (1 billion tonnes) of coal by fiscal 2027, have opened up opportunities for CMPDIL. The Indian government's efforts to increase coal production and promote private sector participation in the mining sector have led to a surge in demand for consultancy services. Key initiatives include the Mineral Laws (Amendment) Act, 2020, which has opened up the sector to private companies. As a result, CMPDIL's services, such as exploration and mine planning, geological and geophysical services, mechanized coal loading and other engineering services, and environmental and social impact assessment, are in high demand, driving growth and expansion for the company. Further, other minerals are gaining momentum in India, with the Government of India initiating commercial auctions for both inland and offshore minerals and there is significant potential for the same internationally, particularly in Africa, South America, and Australia. CIL is actively seeking to acquire mineral assets overseas

The Indian consultancy market is a growing industry, driven by the country's rapid infrastructure development and increasing demand for specialized services. The market is expected to continue its upward trend, with a significant increase in demand for consultancy services in the coming years, with the market size expected to reach Rs.40,071 million by fiscal 2030 from Rs. 25,701[74] million in fiscal 2024.

The production from captive/commercial coal mines during the period of April 2024 – November 2024 (fiscal 2025) was 100 MMT whereas the total production during the same period in fiscal 2024 was 75 MMT indicating a year-on-year growth of 33%. With high production growth achieved from private players, expenditure on developing coal blocks is expected to increase, thereby increasing the share of coal mining consultancy. In India a total of 188 mineral blocks

[73] *https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2097308*

[74] *Crisil Intelligence*

(captive & commercial) had been auctioned till date out which only 53 coal blocks had been operationalized i.e., 27% and balance 73% blocks are at various stages of pre operationalization development. Further, out of 188 mineral blocks successfully auctioned, 41 blocks are partly explored i.e., 22%, which requires extensive exploration for preparation of a mining plan and other reports for undertaking strategic decisions which require significant contribution from mining consultancy firms.

Additionally, Ministry of Coal, Govt. of India in fiscal 2024, allocated a budget of Rs 7300 million for Exploration of Coal and Lignite. Out of which the expenditure was Rs 2751 million, which was done through NMET funds.[75] The Ministry is also promoting commercial mining, expediting production from allocated blocks, and enhancing regional exploration, which will further increase the market for mining consultancy services.

Geological Survey of India (GSI), set up in 1851 is a Government of India organization under the Ministry of Mines. The main functions of GSI are the creation, updating of national geoscientific information and mineral resource assessment. These objectives are achieved through ground surveys, air-borne and marine surveys, mineral prospecting and investigations, multi-disciplinary geoscientific, geo-technical, geo-environmental and natural hazards studies, glaciology, seismotectonic study, and carrying out fundamental research.

Initially Obvious Geological Potential (OGP) area of approximately 5.7 lakh sq. km had been established through baseline geoscience data creation. After the inception of National Mineral Exploration Policy, 2016 (NMEP), OGP area is being redefined based on latest exploration data acquisition and incorporation of new minerals. The mineral potential of geological terrains needs to be evaluated periodically by incorporating the latest basic geoscience data and exploration data as and when available. The concept of OGP is dynamic and needs to be revisited periodically with the updating of database for various mineral commodities.

In fiscal 2024, GSI demarcated 6.88 lakh sq. km as OGP area which is expected to be approximately 7 lakh sq. km by fiscal 2030[76]. This poses a real opportunity for accredited mining consulting companies to establish resources in coming years.

The mining consultancy market, being a highly fragmented market, has been estimated by mainly considering various expenditure centers such as consultancy expenditure of CIL, utilization of NMET funds for mineral exploration and development of commercial coal blocks. Firstly, CIL being the major contributor towards coal production, its expenditure towards mining consultancy has been considered. Secondly, NMET being a major body for promotion of mineral exploration in the country, its expenditure has been considered in estimating the mining consultancy market. Lastly, with the government's focus on commercial coal blocks auctions, mining consultancy would play a major role in its exploration and development.

Impact of National Mineral Exploration Trust (NMET)

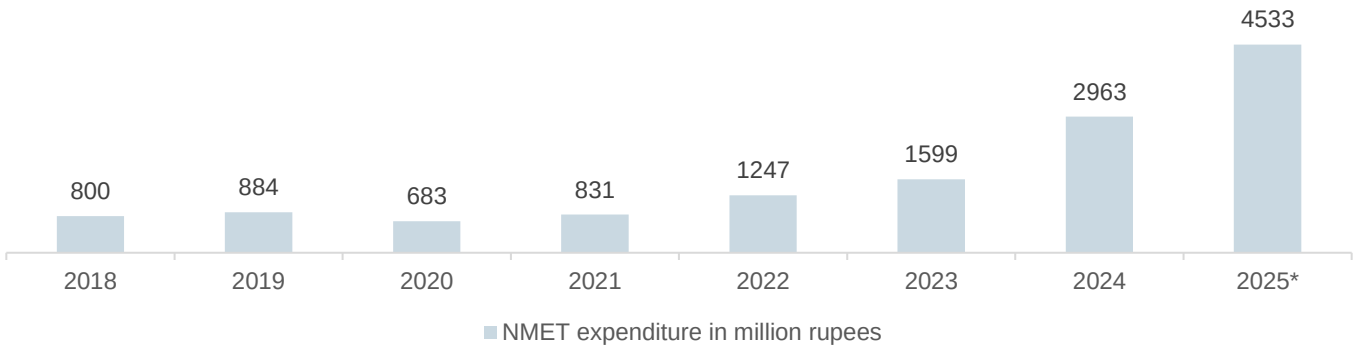
The National Mineral Exploration Trust (NMET) was established by the Government of India vide Gazette Notification G.S.R.633(E) of 14th August 2015, in pursuance of subsection (1) of Section 9C of the Mines and Minerals (Development and Regulation) Act, 1957, with the objective to expedite mineral exploration in the country. The NMET provides financial support to state governments, public sector undertaking, and private companies for undertaking mineral exploration activities. Since inception, 540 projects amounting to Rs 29235.5 million were sanctioned by NMET till 31st March 2025. This fund is used to support exploration activities, including drilling, sampling, and geological mapping. The NMET has been instrumental in promoting mineral exploration in the country, and its activities have led

[75] *PIB circular*
[76] *As per reports from Ministry of Mines*

to the discovery of several new mineral deposits. This, in turn, has created new opportunities for mining consultancies in India, as companies are now seeking expert advice on how to develop and extract these newly discovered mineral deposits.

The National Mineral Exploration Trust (NMET) has witnessed a significant increase in expenditure over the years, from Rs. 800 million in fiscal 2018 to Rs. 4533 million in fiscal 2025 (Rs. 3183 million incurred during January to December 2024 and Rs 1350 million estimated for the period January to March 2025). This substantial rise in expenditure is a testament to the government's commitment to promoting mineral exploration in India. This increase in expenditure is expected to have a positive impact on the mining sector, as it will lead to more exploration activities, creation of new jobs, and increased investment in the sector.

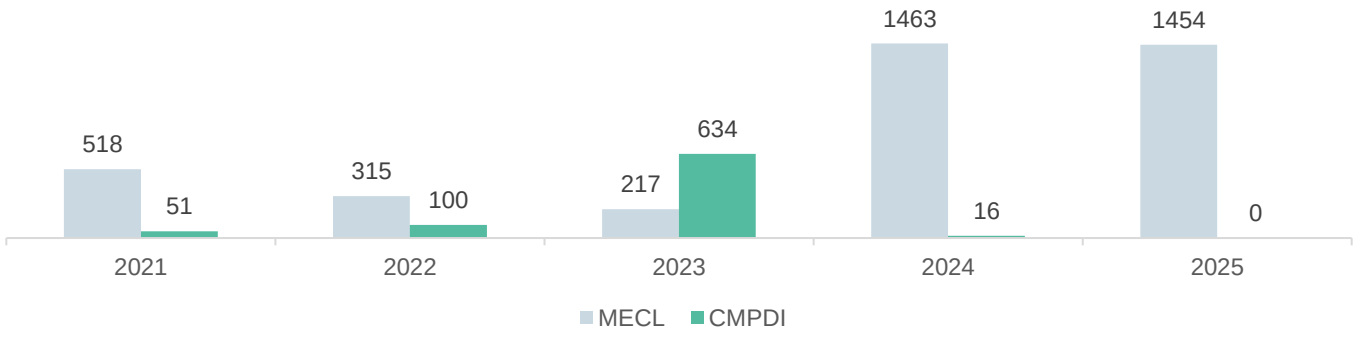
Figure 3.2: NMET expenditure in million rupees



*Source: Ministry of Mines, all years are fiscal years; *Rs. 3183 million incurred during January to December 2024 and Rs 1350 million estimated for the period January to March 2025*

Out of the 226 exploration projects sanctioned by NMET to MECL only 160 projects have been completed, 2 have been approved and 64 projects are in progress. Whereas for CMPDIL, NMET sanctioned 27 projects out of which 25 projects were for coal, out of these 27 projects 19 have been completed and 8 are in progress. The estimated costs for these projects in Rs. million are mentioned below:

Figure 3.3: NMET sanctioned projects estimated costs in million



Source: Ministry of Mines, all years are fiscal years,

Expansion of footprint with commercial coal block owners & international market

Since the opening up of coal sector for commercial mining after suitable amendments in MMDR Act 1957 in 2020 remarkable interest had been developed among the potential players resulted in 11 round of auctions thereby

successfully auctioning 125 coal blocks. Such auction processes has lead to a significant market opportunity in terms of identification of coal blocks, preparation of mine dossiers including studying of geological/ geotechnical factors, surface constraints etc.

The opening of the commercial space in coal allows the participation of multiple players (captive as well as merchant). This presents an enormous opportunity to the consulting organizations to leverage its knowledge base for extending its reliable consultancy services to them. Further, significant number of merchant players have limited exposure in coal mining, would require complete 'end to end' and customized solutions as per geo- mining conditions of blocks.

Another important area of expansion in the near future is extending the consultancy services overseas. Although coal is at an end in Europe and North America, and other major coal producing countries have their own well-established planning and consultancy wings however, coal will be a major energy source and growing sector for many African and Central Asian Countries. The consulting organizations can step up an engagement with these countries through relevant forums to market its dependable services which will also be at lower cost compared to other international established consultants.

Environment management in mining sector

With increased emphasis on sustainable growth in view of climate change and India's Nationally Determined Contributions (NDC) in COP of Climate change, environment management will be a key area of focus to balance growth and environment. Mining industry will keep growing to achieve the self-reliance and development of nation, so the environment management in mining operations will be tightened and regulatory compliance will increase. This proposes a significant market for providing environment management planning and ambient parameter routine monitoring along with the requirement of new solutions through technological innovations. Also, Mine Closure Planning and monitoring will also be a very crucial part of mining lifecycle where The consulting organizations have been providing such services and there is a lot of scope for further expansion with infusion of satellite imagery or drone surveys.

Alternate use of coal

Coal industry has generally been perceived as a polluting industry. India has huge reserves of coal which may last for 100 years or more. The primary use of coal in thermal power may decline in future with the establishment of renewable energy sources. If alternate ways of making end use of coal on large scale can be found, then sustenance of mining companies can be secured. The consulting organizations can take a lead in devising R&D cases or driving Pilot projects as Project Implementation Agency for alternate uses of coal such as Coal to Liquid or Coal to Gas. These end products may be used in other industries such as fertilizer, petro-chemicals, etc.

Underground Coal Gasification (UCG)

Underground Coal Gasification (UCG) is a technology to convert coal into syngas (a mixture of methane, hydrogen, CO, and CO_2) while it remains underground. Syngas can be used for Power Generation, fertilizers and as feedstock for other chemicals. UCG provides significant advantage through exploiting coal resources which are economically unviable with respect to the traditional mining methods. With reference to India's high import dependency of methanol, coal gasification offers a significant solution for embarking on the journey towards "Self Sufficiency". Ministry of Coal, Government of India has already approved a comprehensive policy framework for UCG in coal and lignite- bearing areas.

CMPDIL has already undertaken a pilot project with ECL and M/s Ergo Exergy Technologies Inc. in implementing an R&D pilot project at Kasta West Block of Jamtara District of Jharkhand. The 1st phase of the project commenced on 22nd June 2024 which primarily involves preparation of a Technical Feasibility Report through drilling of boreholes and core testing. The 2nd phase of the project focusses on coal gasification at a pilot scale.

As of April 1st, 2024, the geological resource of Indian coal have been estimated to be 389.42[78] billion metric tonnes (BMT) at various depths. The breakdown of these reserves by depth is as follows: 0-300 meters: 206.28 BMT (53%), 300-600 meters: 127.63 BMT (33%), 0- 600 meters: 15.41 BMT (4%) & 600-1200 meters: 40.10 BMT (10%). The coal reserves at depths of 300 meters and above are of particular interest for Underground Coal Gasification (UCG) because they are often difficult and expensive to extract using traditional mining methods. At such great depths, the coal seams are under immense pressure, and the rock surrounding the coal is harder, making it challenging to maintain a safe and stable mining environment. Mining coal at great depths is a costly affair, requiring specialized equipment and techniques to ensure safe and efficient extraction. UCG can help reduce these costs by eliminating the need for expensive mining equipment and labor. UCG can also reduce greenhouse gas emissions and improve efficiency at such high depths.

Coal Bed Methane

Coal Bed Methane (CBM) is a naturally occurring gas found in coal seams typically comprising mostly methane (CH_4) with lower proportions of ethane, propane, nitrogen, and carbon dioxide. It is generated during the process of coalification and adsorbed into the solid matrix of the coal. It is a valuable resource that can be extracted and used as a clean-burning fuel, reducing greenhouse gas emissions and dependence on other fossil fuels. The estimated CBM resources are of the order of 2,600 Billion Cubic Meters (BCM) or 91.8 Trillion Cubic Feet (TCF) spread over in 11 States in the country with Jharkhand contributing to the majority of the share.

CIL is actively participating in CBM exploration and development, leveraging its access to coal-bearing areas. CIL was allotted 2 CBM blocks[79]—Jharia and Raniganj—through government nomination, with efforts focused on commercializing CBM within its leasehold areas. The core functions of CMPDIL are given below:

1. **CBM specific data generation:** Clean Energy Department of CMPDIL has taken several initiatives for development of Coal Bed Methane. The department is generating CBM specific data under Promotional/Regional/Detailed Exploration Programme funded by Ministry of Coal (MoC) since Tenth Five Year Plan and creating CBM Data Bank for assessment of CBM potentiality in the coal basins of India.
2. **Principal Implementing Agency (PIA) for CIL subsidiaries:** Clean Energy Department is also Principal Implementing Agency (PIA) for Development of CBM Projects in CIL Subsidiaries i.e. BCCL, ECL and SECL. Jharia CBM Block-I (under BCCL Leasehold) has been delineated by CMPDIL and successfully awarded to CBM Developer for commercial exploitation of CBM. Presently, Jharia CBM Block-I is under Exploration Phase.
3. **Laboratory Studies for Coal Bed Methane and Shale Gas specific studies:** Clean Energy Department has a state-of-the-art Laboratory to provide services for CBM and Shale Gas specific analyses. These services include Gas Desorption Tests, Adsorption Isotherm Tests, Gas Composition Analysis, Rock Eval Pyrolysis, Total Organic Carbon (TOC), Helium Porosity & Permeability Tests, Mine Air Sample Analysis etc.

CMPDIL provides consultancy services related to CBM development including CBM specific Data generation, Coal Characterization Studies, Gas Initially in-Place (GIIP) assessment, Reservoir Simulation and Feasibility Studies. The

[78] *Coal Directory of India, 2023-24*
[79] *https://archive.pib.gov.in/release02/lyr2003/rfeb2003/06022003/r060220033.html*

extensive coal exploration related data bank of CMPDIL enables to provide authentic, reliable and expeditious services to meet customer's/client's requirements.

Clean Energy Department on behalf of CMPDIL works in co-ordination with Global Methane Initiative (GMI) and United States Environmental Protection Agency (USEPA) for Methane Abatement, Mitigation, Recovery and Utilization to reduce Green House Gas Emissions and promoting sustainable Mining Practices. India CBM/CMM Clearing House was established at CMPDIL HQ, Ranchi in 2008 in pursuance to Memorandum of Understanding (MoU) between Ministry of Coal (MoC) and USEPA in 2006.

Evolving renewable energy market

Renewable Energy is the future of electrical power at homes, industries and automobiles. It will replace both coal and oil. Among the Renewable Energy, India mostly has potential for Solar and Wind Power. To cater to the huge market for solar power infrastructure, CMPDIL has developed a Solar Cell and trained manpower in designing Solar Power Plants. It can help Coal India achieve its 3000 MW[80] target of Solar Power. Other consulting organizations should explore the market and reach out to other PSUs and clients for consultancy assignments in Solar Power.

Wind Power is another area that can be explored to gain expertise in design and engineering. It can be used in suitable conditions over OB Dumps or other feasible land sites. There is also constant evolution in Wind turbine applications making them compact and workable even in low-speed wind conditions.

Solar Powered Pump Storage system is another area that is being explored by CMPDIL for deployment in CIL mining areas for increasing net zero capability as well as gainful utilization of Mining Land where mining is finished. Renewable energy can also be a potential diversification avenue of CIL subsidiaries to gainfully utilize their huge land reserve resulting opening of a potential market for the consulting organizations for providing total Project Management Consultancy in such projects

Research & Development

Coal mining in India has traditionally been a labor-intensive industry making it extremely complex and difficult to manage due to socio-political conditions. This opens up a plethora of opportunities for new technology adoption and innovation in the coal as well as other mineral sector as well. This possesses a significant market in the field for adoption and implementation of niche products developed through continuous research and development efforts optimizing the mining most cost effective, automated, mechanized, safe and environmentally sustainable. Consulting organizations upon leveraging its significant knowledge base can collaborate with leading scientific institutes and present to them the challenges of mining sector and also coordinate with them during the development of solutions which can be technologically optimum, scalable and cost effective for deployment in mines.

3.2.3.2 Overview of Mining Consultancy Market

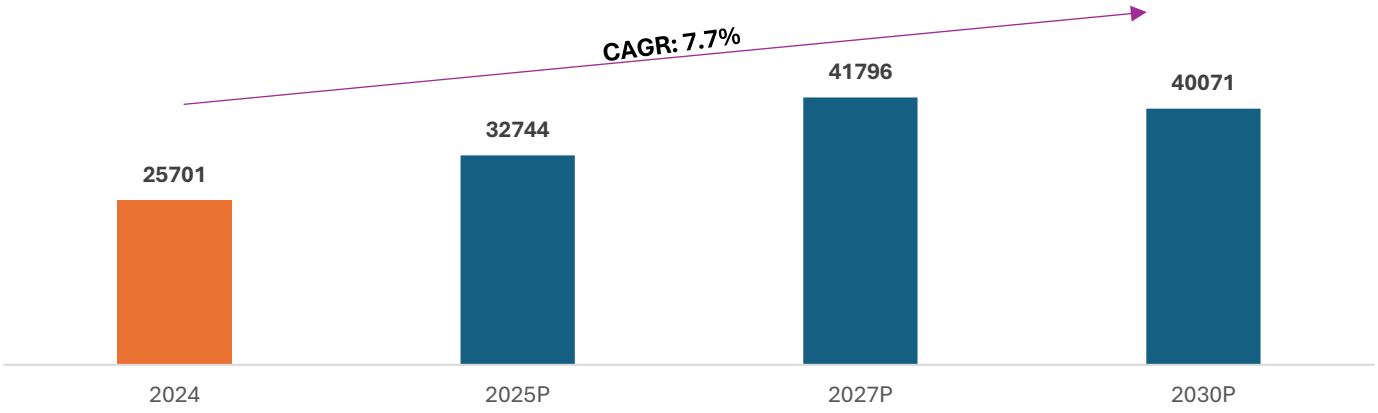
The mining consultancy market, characterized by its fragmented nature, has been estimated by analyzing key expenditure centers, including Coal India Limited's (CIL) consultancy expenses, the utilization of National Mineral Exploration Trust (NMET) funds for mineral exploration, and the development of commercial coal blocks. As the largest contributor to coal production, CIL's spending on mining consultancy services is a significant indicator of the market size. As a key promoter of mineral exploration in the country, NMET's allocation of funds for this purpose provides valuable

[80] *https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1945466*

insights into the market. With the government's emphasis on auctioning commercial coal blocks, mining consultancy services are expected to play a crucial role in their exploration and development, further influencing the market size.

Thus, the estimated market for mining consultancy in value terms was Rs 25,701 million in fiscal 2024 and is projected to grow to Rs 40,071 million by fiscal 2030, a 6-year CAGR of 7.7%.

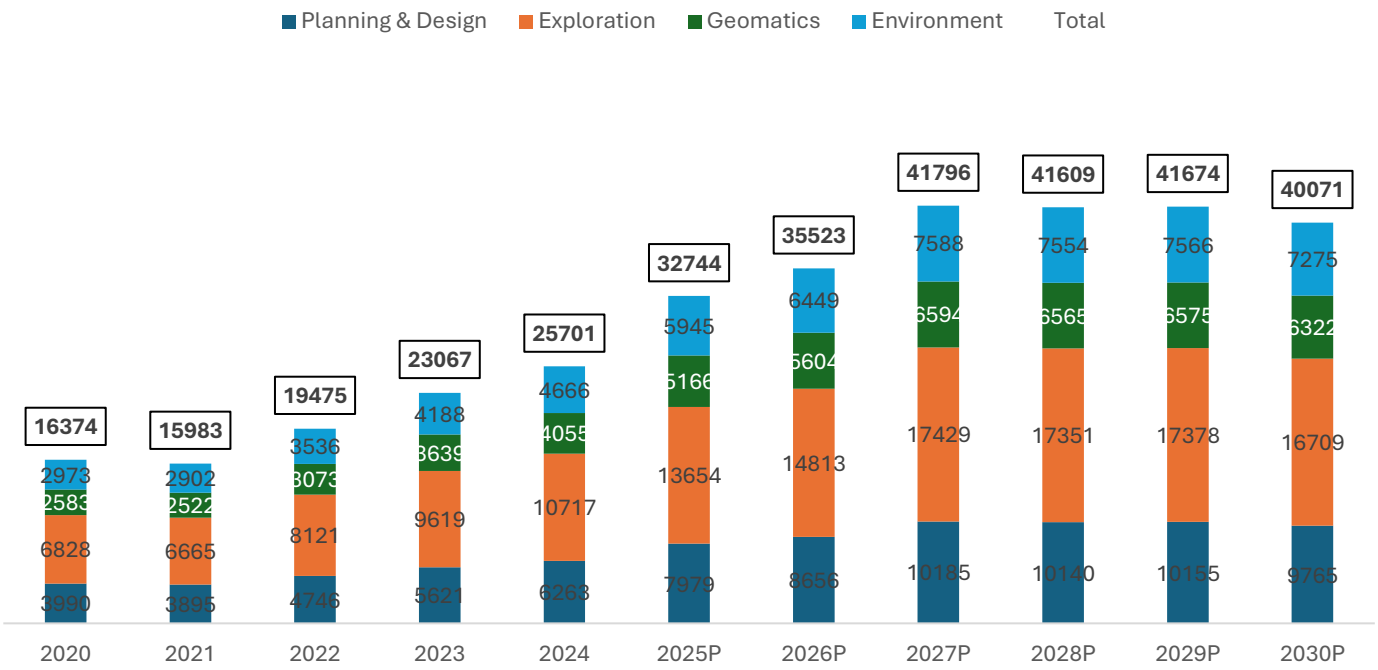
Figure 3.4 Estimated market for mining consultancy (Rs million)



Source: Crisil Intelligence Consulting; P: Projected; Year is fiscal year
Note: Consultancy market size has been estimated based on CIL expenditure, NMET fund utilization and development of commercial coal blocks

Considering the major verticals of CMPDIL, the estimated market for Planning & Design was Rs 6,263 million, Exploration was Rs 10,717 million, Geomatics was Rs 4,055 million and Environment was Rs 4,666 million in fiscal 2024. The market for Planning & Design, Exploration, Geomatics and Environment is expected to grow to Rs 9,765 million, Rs 16,709 million, Rs 6,322 million and Rs 7,275 million respectively by fiscal 2030.

Figure 3.5 Estimated sector wise market for mining consultancy (Rs million)



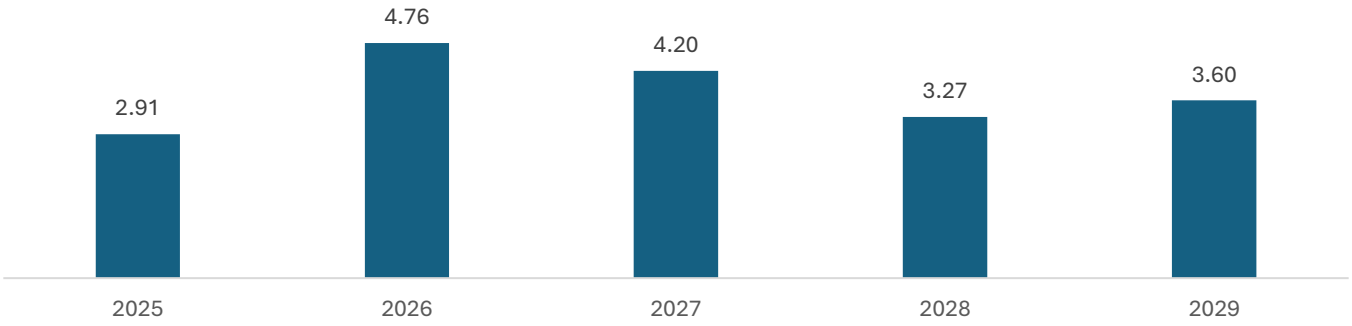
Source: Crisil Intelligence Consulting; P: Projected; Year is fiscal year
Note: Consultancy market size has been estimated based on CIL expenditure, NMET fund utilization and development of commercial coal blocks

3.2.4 Market assessment of Exploration and Resource Evaluation

Exploration and resource evaluation are critical stages in mining value chain. Resource evaluation involves estimating the quantity and quality of mineral resources, which is essential for determining the economic viability of a mining project. Exploration helps to reduce the risk associated with mining by providing a better understanding of geology and mineralization. The coal mining industry is a significant contributor to the global energy landscape, and India is one of the largest consumers of coal. The government's decision to auction coal blocks has opened up new opportunities for exploration followed by mining.

Considering the data such as the average borehole density and area of each block as published in the Mine Block summaries provided by MoC, Govt. of India through MSTC and “Modified Indian Standard Procedure for Coal Resource Estimation: 2022” the total number of boreholes likely required to be drilled for probing up to G1 level has been estimated along with tentative meterage. Till date, a total of 848 blocks had been put up for auction through various tranches out of which 130 blocks are successfully auctioned i.e., 15% of the total launched blocks. Within the 130 successfully auctioned blocks, 83 blocks are explored, and 47 blocks are under regionally explored i.e., 64% and 36% respectively.

Figure 3.6 Expected drilling market for commercial coal mines (in lakh meters) up to Tranche X of MMDR Act/ Tranche XX of CMSP Act



Source: Crisil Intelligence Consulting, all years are fiscal year

The future of the coal mining industry looks promising, with the government's initiatives to increase coal production and reduce imports. The auctioned coal blocks will play a significant role in meeting the country's coal demand.

From fiscal 2016 to fiscal 2025, a total of 1,296 non-coal major mineral blocks (excluding critical minerals) were put up for auctions by different states, with 206 mineral block put up for auctions in fiscal 2025, which were lower than last two years number of auctions which were 361 and 226 for fiscal 2024 and fiscal 2023. The auction data suggests that the mineral auction market has experienced significant growth, with some years witnessed substantial increases in the number of auctions held. Out of these 1296 launched blocks, 441 blocks have been successfully auctioned, out of which 146 are for composite license i.e., 33% and balance 67% for mining lease. Out of the 441 successfully auctioned blocks, massive/ stratified deposits contributed approximately 74% (iron ore- 29%, limestone- 36% and bauxite- 9%). Other minerals like gold, copper, manganese, diamond, rock phosphate, phosphorite etc. contributes remaining 26%.

A "composite license" (CL) is a two-stage concession that allows a holder to conduct both prospecting (exploration) and mining operations in a seamless manner, granted through e-auction. This is likely to lead to an increase in drilling activity, as companies will need to explore the mineral resources in the allocated blocks to determine their feasibility for mining.

Out of 146 blocks under CL which were successfully auctioned manganese contributes approximately 23%, Iron ore contributes approximately 25%, Gold blocks contributes approximately 10%, Limestone blocks contributes approximately 11%, bauxite contributes approximately 8% and others like phosphorite, copper, base metal, etc. The various types of surveys as per the Minerals (Evidence of Mineral Contents) Rules, 2015 as amended time to time are:

i. **Reconnaissance Survey (G4):** This stage identifies areas of enhanced mineral potential based on regional geological studies, airborne and indirect methods, preliminary field inspection, and geological inference. The objective is to identify mineralized areas worthy of further investigation.
ii. **Preliminary Exploration (G3):** This stage involves a systematic search for a mineral deposit, using methods such as surface geological mapping, pitting or trenching, and drilling. The objective is to establish the existence of a mineral deposit and estimate its quantity and grade.
iii. **General Exploration (G2):** This stage involves increasing the geological confidence level and understanding the style and mode of occurrence of mineralization. Methods used include surface geological mapping, pitting or trenching, and drilling, followed by sampling for evaluation of mineral quantity and quality.
iv. **Detailed Exploration (G1):** This stage involves a detailed examination of the mineral deposit to determine its size, shape, grade, and other relevant characteristics. The objective is to establish the main geological features of the deposit and estimate the quantity and grade of the mineral resource with a high degree of accuracy.

Critical minerals are essential for economic development, technological advancement and national security however due to lack of availability and processing difficulties lead to supply chain vulnerabilities. MoM, Government of India in June 2023 had published “Report of the Committee on Identification of Critical Minerals”, where considering various parameters like high economic importance, high supply risk had identified 30 minerals as critical minerals, which are lithium, cobalt, nickel, graphite, rare earth elements (REEs), titanium, etc. These critical minerals are vital for renewable energy, defense, semiconductors, battery technologies, etc. Further, MoM Government of India had launched 81 blocks over five tranches, out of which 24 blocks have been successfully auctioned. Out of the successfully auctioned blocks, 20 blocks have been auctioned as composite licenses, while the remaining 4 blocks for mining leases.

MoM Government of India had recently amended the MMDR Act, 1957 w.e.f. from 17th August 2023 where a new provision for grant of Exploration License has been introduced. As per the amended act, an exploration license may be granted in any area by the State Government for the purpose of undertaking reconnaissance or prospecting operations or both in respect of any minerals specified in the 7th Schedule of the Act. However, upon exercising the power conferred u/s 20A of the MMDR Act, 1957 on 21st October 2024, EL auction process will be conducted by the Central Government through Ministry of Mines, Govt. of India. Till date 13 blocks have been put for auction which are under process.

3.3 Market dynamics for mining consultancy sector

3.3.1 Key drivers and opportunities

- **Industrial growth and urbanization:** As industrialization and urbanization accelerate, demand for essential minerals like copper, aluminum, and lithium has surged, driving mining companies to expand operations and explore new sources, with consultancy services in high demand to navigate complexities and optimize resource management.

- **Changes in mining regulations and policies:** Frequent changes in mining regulations drive the consultancy market, as companies need expert guidance to adapt to new environmental, safety, and operational standards,

with governments like India's launching initiatives like the National Critical Mineral Mission to ensure mineral supply security and promote sustainable mining practices. Under this mission, the Geological Survey of India (GSI) has been tasked with conducting 1,200 exploration projects from fiscal 2025 to fiscal 2031. Under this mission, India will invest in exploring and acquiring critical mineral assets in resource-rich countries. PSUs and private firms will be supported through funding, guidelines, and inter-ministerial coordination.

- **Integration of digital technologies:** The mining sector is undergoing significant technological advancements through automation, data analytics, and artificial intelligence. As the demand for these innovations grows, the need for expertise in deploying and optimizing such technological advancements will drive the demand for mining consulting firms specialized in providing such services
- **New mining initiatives:** Implementation of new mining operations and an increase in exploratory efforts could be prompted by the growing demand for minerals. This tendency will be advantageous for consulting firms that specialize in project management, feasibility assessments, and geological surveys.
- **Technological changes-** The mining landscape of critical minerals is undergoing a significant transformation, driven by emerging technologies and regulatory changes. Consulting firms are well-positioned to help companies navigate this transformation, streamlining processes, improving efficiency, and reducing risks.
- **Environment sustainability-** Mining consulting firms can assist mining companies in reducing their environmental footprint by providing expertise in areas such as environmental impact assessments, sustainability reporting, and compliance with environmental regulations. They can also help companies develop and implement strategies for reducing energy consumption, water usage, and waste management.

3.3.2 Key restraints and challenges

- **High competition:** The mining consulting market has seen a significant rise in independent consulting firms, offering specialized services thereby increasing competition. This surge in competition drives down prices, squeezes margins, and makes it difficult for firms to maintain profitability. The increased competition also leads to a talent war, driving up salaries and benefits, and fragmenting the market, making it harder for clients to find the right firm. This poses a challenge for the consulting market as a whole, particularly for smaller and mid-sized firms.
- **Variable prices for commodities:** The performance of the mining sector, which is greatly impacted by the prices of commodities (coal, iron, copper, zinc etc.). These prices are extremely fluctuating due to multiple factors such as geo- politial tensions, sluggish demand, oversupply etc. These price fluctuations greatly impact the revenue of the mining sector which in turn is linked to the revenue of the mining consulting services.
- **Capital intensity:** Significant capital investments are frequently needed for mining enterprises. Securing funding for mining projects can become difficult during times of economic downturn or severe financial conditions, which can affect the need for mining consulting services generally.
- **Skilled manpower:** Considering the dynamicity of the mining industry with regular technological upgradations require continuous up- skilling of professional working in various consulting agencies to keep pace with the change. Continuous up-skilling is cost intensive, which sometimes becomes challenging for consulting houses to imbibe. Further, mining companies also intends to hire skilled professionals to reduce its reliance on external consulting agencies, creating in-house teams that compete with consulting firms. This can lead to a decline in demand for consulting services, making it challenging for firms to retain market share.

- **Risk control:** Risks associated with mining ventures include operational, geopolitical, and geological risks. For mining firms trying to reduce uncertainty, consulting services that include risk assessment, management methods, and mitigation plans can be essential.

3.3.3 Key threats

- **Competitive landscape of the mining consultancy market:** The mining consulting market has become increasingly competitive, with new entrants and low-value assignments reducing profit margins, while rapid technological advancements and price fluctuations pose significant challenges, forcing firms to adapt to stay competitive and avoid becoming redundant.
- **Worldwide economic insecurity:** The viability of mining ventures can be impacted by global market circumstances, geopolitical tensions, and economic concerns. Uncertainties or economic downturns may result in less investment in the mining industry, which would affect the need for consulting services.

3.4 Industry concerns of mining consultancy services

3.4.1 Regulatory Hurdles

India's mining sector is governed by multiple laws and regulations, making it difficult for consultants to navigate. To start a mining project, miners need to obtain various clearances and approvals from different government agencies, including. Environmental clearance and Forest Clearance from the Ministry of Environment, Forest and Climate Change; Consent to Establish and Consent to Operate from State Pollution Control Boards; Mining lease from State Governments. These processes are extremely complicated and time consuming often results in delay in granting approvals thereby causing an overall delay in the scheduled timeline towards commencement of mining operations.

India's mining industry has faced numerous regulatory challenges that have significantly impacted various companies and projects. In 2011, the Karnataka government canceled 51 mining leases following a report by the Lokayukta (anti-corruption ombudsman) that exposed illegal mining activities. Vedanta Resources planned to mine bauxite from the Niyamgiri hills in Odisha for its alumina refinery. However, the project faced significant opposition from indigenous communities and environmental activists due to potential ecological and cultural impacts. In April 2013, the Supreme Court of India ordered an environmental referendum among the local tribal groups, who unanimously rejected the mining proposal, leading to the project's suspension. In 2012, the Supreme Court of India suspended all iron ore mining and transportation in Goa following a report by the Justice M.B. Shah Commission, which uncovered widespread illegal mining. The ban, lifted in 2015 with restrictions, severely affected companies like Sesa Goa (now Vedanta Limited), leading to significant financial losses and layoffs. In 2018, the Tamil Nadu government ordered the closure of Vedanta's Sterlite copper smelting plant in Thoothukudi following protests over environmental pollution concerns. These cases illustrate the complex regulatory environment in India's mining industry, where environmental concerns, legal compliance, and community opposition can profoundly affect business operations.

3.4.2 Market Volatility and Demand Uncertainty

Fluctuations in global demand for minerals introduce financial instability. The demand for minerals such as iron ore, copper, and coal are highly volatile, and even small changes in demand can have a significant impact on prices. For

instance, iron ore prices[81] ranged from about USD 38 / tonne in December 2015 to USD 218 / tonne in July 2021, while coal prices[82] ranged from about USD 50 / tonne in 2016 to about USD 440 / tonne in 2022. When demand is high, mining companies may rush to develop new projects, leading to an increase in demand for consulting services. However, when demand is low, mining companies may delay or cancel projects, resulting in a decrease in demand for consulting services. This can lead to financial instability for mining consultants, as they may struggle to maintain a steady workflow and revenue stream.

3.4.3 Liberalization of Mining Sector

The liberalization of the mining sector, with 100% FDI, may lead to market competition from other domestic or international consultancy service providers. The opening of the mining sector may lead to competition from other domestic or international consultancy service providers, which could impact the market share of mining consultancy services.

3.4.4 Rise of Renewable Energy

The shift to renewable energy may make coal less competitive, posing a threat to the business of mining consultancy services. As the world transitions to a more sustainable future, the mining consultancy sector is adapting by exploring alternative coal uses and developing expertise in renewable energy to stay relevant.

3.4.5 Restrictions in Exploration

Restrictions in exploration in forest areas and law and order problems may affect the operations and revenue of mining consultancy services.

3.4.6 Environment, Social and Governance (ESG) Compliance

The Securities and Exchange Board of India (SEBI) has introduced the Business Responsibility and Sustainability Report (BRSR) framework, mandating top-listed companies to disclose their ESG initiatives and undergo sustainability audits. Companies are required to disclose ESG information encompassing their value chains, including their top upstream and downstream partners. The BRSR framework aims to promote responsible and sustainable business practices by encouraging companies to disclose their ESG-related information in a structured manner. This move aims to enhance transparency and accountability in corporate ESG practices. While the path to ESG compliance in India's mining sector is fraught with challenges, it also presents significant opportunities for consultants to drive sustainable transformation.

[81] *https://tradingeconomics.com/commodity/iron-ore*
[82] *https://tradingeconomics.com/commodity/coal (Newcastle coal futures price)*

4 Competition Benchmarking across key players

4.1 Brief Profile of CMPDIL

The Central Mine Planning and Design Institute Limited (CMPDIL) is a wholly subsidiary of Coal India Limited, operating under the Ministry of Coal, Government of India. It was established in 1975, with its headquarters in Ranchi, Jharkhand. CMPDIL provides consultancy and engineering services in the fields of exploration, mining and environmental engineering. It has been a Mini Ratna (Category I) company since June 2019 and ISO 9001 certified since March 1998. CMPDIL has evolved as a pioneer in introducing new and suitable technology in the exploration and mining sectors. CMPDIL's parent company, CIL, is the largest coal producing company in the world as of March 31, 2025, and produced over 781 MMT of coal in fiscal 2025[93] thereby playing a pivotal role in India's energy generation and significantly contributes to the country's industrial growth.

CMPDIL is the largest coal and mineral consultancy in India in terms of market share in Fiscal 2025 and are the preferred consultant for Coal India Limited. CMPDIL's services span across the entire lifecycle of mining operations, ranging from initial exploration to closure of mines. CMPDIL assists the Ministry of Coal, Government of India in strategic decisions and initiatives relating to the coal sector at the national level, for instance, through maintaining inventories of coal deposits, coal mining potentials, and operations. Additionally, CMPDIL assists the Ministry of Petroleum and Natural Gas for matters related to Coal Bed Methane. CMPDIL being one of the leading consultants gives significant advantage in ensuring the success of major projects effectively achieving both strategic and operational goals. The services of CMPDIL fall under the following two broad heads.

(A) CMPDIL's core Business Functions: CMPDIL offers a wide range of services beyond mine planning, positioning it as a comprehensive service provider, including conducting large-scale consultancy and support for mineral exploration, mining, infrastructure engineering, environmental management, and management systems, especially to the mineral, mining and allied sectors, both within and outside the coal industry as well as the domestic and international market. The main services offered by this unit of CMPDIL include:

1. **Geological Exploration and Resource Evaluation**
2. **Mine Planning and Design Services**
3. **Environmental Services**
4. **Geomatics and Survey Services**

(B) Other Services: Includes laboratory, research & development, information & communication technology and specialized services.

CMPDIL is equipped with advanced infrastructure to support its diverse range of activities including possession of one of the largest fleets of exploratory drills for coal and minerals in India, as of March 31, 2025. The major services offered by CMPDIL can be broadly categorized into the following verticals, along with their revenue contribution in percentage in fiscal 2025: planning and design (21.18%), exploration (46.17%), geomatics (15.55%), and environment management (17.11%). CMPDIL is a major player in the mining consulting for coal.

To comprehensively benchmark CMPDIL's performance, it is essential to compare its operations with organizations that provide analogous services in mining and infrastructure sectors, particularly those with dedicated research subsidiaries or those engaged in mining consulting.

[93] *MoC, Govt. of India*

Table 4.1 Service offerings and companies considered for benchmarking

Sr. No.	Service offerings	Organizations offering similar services
1.	Planning and Design	MECON Limited, DMT Consulting Private Limited, SRK Consulting
2.	Exploration	MECL
3.	Geomatics	ISRO
4.	Environment Management	Engineers India Limited, MECON Limited

Source: Crisil Intelligence

Planning and Design: CMPDIL's planning and design division focuses on creating efficient and sustainable mining plans. The Scheme for Accreditation of Prospecting/Exploration Agency (APA) and Mining Plan Preparation Agency (MPPA) was introduced by the Ministry of Coal and accordingly, QCI – NABET has developed the Scheme of Accreditation for Prospecting/ Exploration Agency (APA) and Mining Plan Preparation Agency/ organization (MPPA). The list of companies who have been accredited are as follows:

Table 4.2 Mining Plan Preparing Agency (MPPA)

Sr. No.	Name of Company	Location	Scope
1.	**Central Mine Planning and Design Institute Limited**	**Ranchi**	**MPPA**
2.	Indian Mine Planners & Consultants	Kolkata	APA & MPPA
3.	Adani Enterprises Ltd.	Ahmedabad	MPPA
4.	Min Mec Consultancy Private Limited	Delhi	MPPA
5.	Matrix Mining Solutions Private Limited	Gurgaon	MPPA
6.	United Exploration India Pvt. Ltd.	Kolkata	APA & MPPA
7.	Natural Resources Division-Tata Steel Limited	East Singhbhum	APA & MPPA
8.	DMT Consulting Private Limited	Kolkata	MPPA
9.	JMS Mining Private Limited	Kolkata	MPPA
10.	The Singareni Collieries Company Limited (A Government Company)	Khammam	MPPA
11.	MECON Limited	Ranchi	MPPA
12.	Geo Technical Mining Solutions	Dharmapuri	APA & MPPA
13.	Novomine India Private Limited	East Khasi Hills	APA & MPPA
14.	Surmine Consulting Private Limited	Delhi	APA & MPPA

Source: National Accreditation Board for Education and Training (NABET), APA- Accredited Prospecting/Exploration Agency, MPPA- Mining Plan Preparing Agency

Exploration: In the realm of exploration, agencies like CMPDIL and Mineral Exploration Consulting Limited (MECL) conduct geological mapping, surveys and resource assessments. The Ministry of Mines has introduced a Scheme for Accreditation of Agencies for Mineral Exploration, as per the notification dated 12th August 2021. The Quality Council of India - National Accreditation Board for Education and Training (QCI-NABET) has developed this scheme, which aims to accredit agencies undertaking mineral exploration and preparation of Geological Reports (GR). In India, the National Accreditation Board for Education and Training (NABET) accredits mineral exploration agencies.

After the amendment in the Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act) in 2023, which empowered the Central Government to exclusively auction Composite License and Mining Lease for critical and strategic minerals listed in Part D of the first Schedule of the MMDR Act, a scheme for engagement of Notified Private Exploration Agencies (NPEAs) in mineral exploration directly through the National Mineral Exploration Trust (NMET) was notified.

Geomatics: CMPDIL's geomatics services involve the application of geospatial technologies for mining operations. The Indian Space Research Organization (ISRO), through its National Remote Sensing Centre (NRSC), offers comparable geospatial data services, aiding various sectors, including mining.

Environment Management: Addressing environmental concerns, CMPDIL's environment management division ensures compliance with environmental standards and implements sustainable practices. A total of 219 EIA Consulting Companies have been accredited by MoEF&CC, GoI (as on March 5, 2025). A few of the important companies are listed below:

Table 4.3 List of Accredited EIA Consultant Organisations

Sr. No.	Name of Company
1	**Central Mine Planning & Design Institute Limited***
2	**Engineers India Limited (EIL)***
3	**MECON Limited***
4	**Min Mec Consultancy Private Limited**
5	**B. S. Envi-Tech Pvt Ltd**

*Source: National Accreditation Board for Education and Training (NABET), * are government companies*

Furthermore, government-affiliated companies with research subsidiaries play a significant role in infrastructure consulting. For instance, RITES Limited, a public sector enterprise under the Ministry of Railways, offers comprehensive engineering consultancy services, including transport infrastructure and related technologies. Similarly, WAPCOS Limited, under the Ministry of Jal Shakti, provides consultancy in water resources, power, and infrastructure sectors, supported by its research and development initiatives.

In conclusion, benchmarking CMPDIL involves analyzing its services in relation to both public and private sector organizations engaged in similar domains. This comparative analysis not only highlights CMPDIL's strengths but also identifies areas for potential growth and improvement, ensuring it remains at the forefront of the mining consultancy industry in India. A comprehensive peer comparison of CMPDIL with RITES Limited and EIL, which are listed entities can provide valuable insights into the company's performance, given their similar business profiles and operations in the engineering, consulting, and infrastructure development sectors. Further, a comparison with MECL and MECON Limited, as both these companies are also into the mining consultancy business with mainly government clientele can bring a better comparison for CMPDIL’s overall financial and operational parameters.

RITES Limited: RITES, a Navratna Central Public Sector Enterprise, is a multidisciplinary consultancy organization in the fields of transport, infrastructure, and related technologies. Its expertise in infrastructure development and project management presents competition, particularly in projects related to transportation and infrastructure.

Engineers India Limited (EIL): EIL is a leading engineering consultancy and Project Management company in India, primarily serving the petroleum, petrochemical, and natural gas sectors. EIL has also diversified into sectors like infrastructure, water and waste management, solar & nuclear power and fertilizers to leverage its strong technical competencies and track record.

Mineral Exploration & Consulting Limited (MECL): MECL specializes in the exploration of mineral resources, including coal, lignite, and other minerals. Its proficiency in geological exploration and resource assessment positions it as a direct competitor to CMPDIL in the field of mineral exploration.

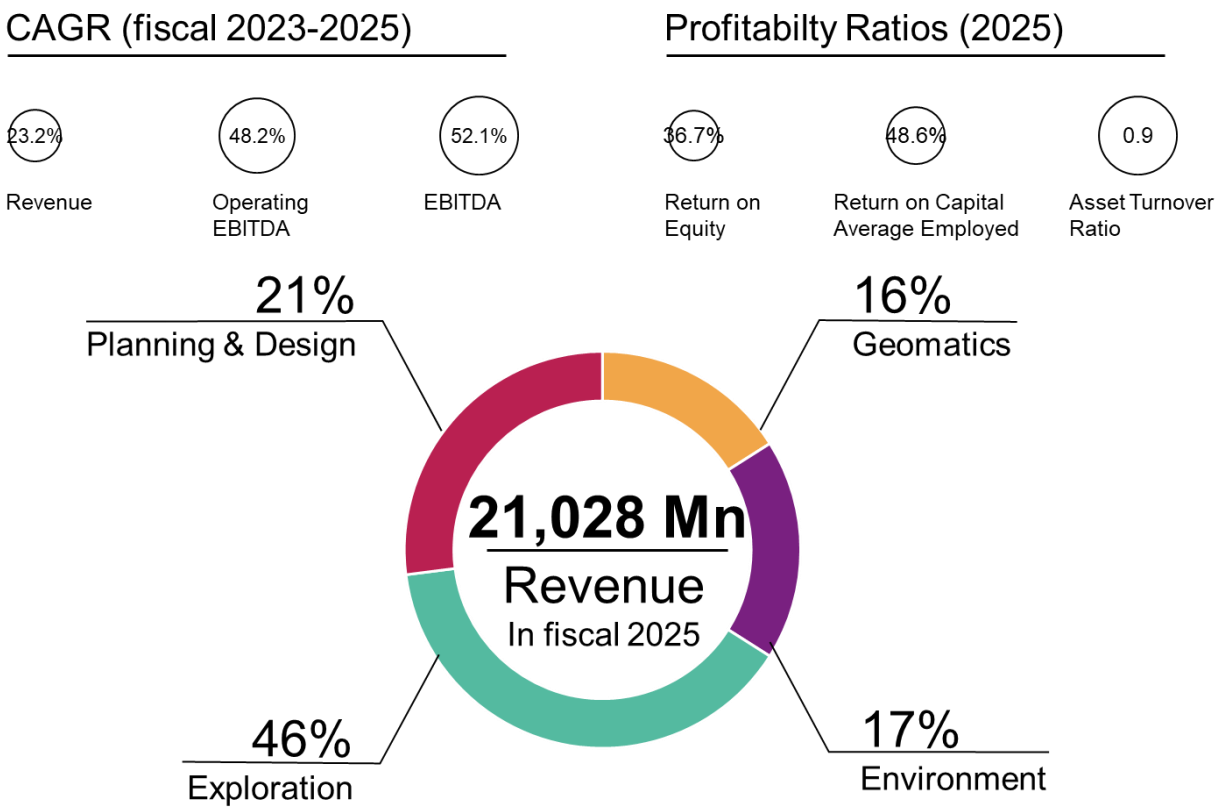
MECON Limited: MECON, formerly known as Metallurgical & Engineering Consultants (India) Limited and a central public sector undertaking, offers a wide range of services, including engineering, consultancy, and project management across various sectors such as metals, power, and oil & gas. Its multidisciplinary approach and experience in large projects make it a formidable competitor in engineering consultancy.

In order to undertake competition benchmarking, it is required to benchmark with listed companies of similar line of business and size in terms of revenue generation. However, in comparison with CMPDIL, RITES and EIL may be considered to a limited extent except these are listed Central Public Sector Enterprises providing consultancy services catering to different industries. MECL and MECON Limited although being non-listed entities have been considered as these entities are involved in a similar line of business catering to the mining & commodity industry.

4.2 Financial benchmarking

CIL plays a pivotal role in India's energy generation and significantly contributes to the country's industrial growth. CMPDIL's relationship with CIL provides the company with a solid foundation and extensive resources that are pivotal to its success in the mining and allied sectors. As an instrumental subsidiary of CIL, CMPDIL is the largest consultancy service provider in the coal and mineral sector in India leading to CMPDIL’s competitive edge over its peers. CMPDIL, RITES, EIL, MECL, and MECON are all government-affiliated consultancy and engineering firms, in distinct sectors. A direct comparison of financial parameters without adjusting for business models, revenue sources, and sector dynamics can be misleading. Instead, a structured approach is required to derive meaningful insights. CMPDIL and MECL are service providers with project-based revenues tied to coal and mineral exploration, dependent on government contracts. RITES and EIL have a mix of consultancy and project execution in infrastructure, transport, and oil & gas, which brings higher revenue but also more volatility. MECON serves both mining and metallurgical industries, making its performance dependent on the steel and metals sector.

Figure 4.1: Snapshot of CMPDIL's financial performance in fiscal 2025



Source: CMPDIL, Crisil Intelligence

4.2.1 Revenue from Operations

Benchmarking the revenues from operations[96] of CMPDIL against its competitors provides valuable insights into its market position and financial performance. Below is a comparative overview of the revenue from operations of CMPDIL with its peers - RITES Limited, Engineers India Limited (EIL), Mineral Exploration Consulting Limited (MECL), and MECON Limited.

Table 4.4 Total Revenue from Operations (Rs million) and CAGR 2023-25 (%)

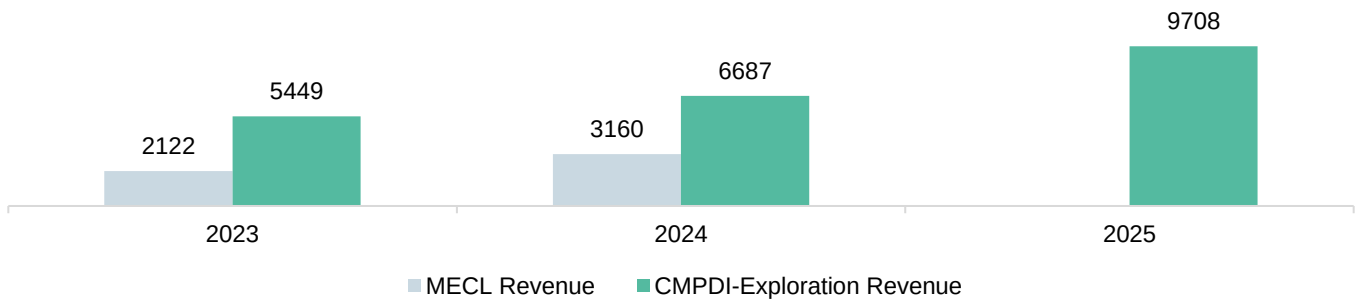
Company	2023	2024	2025	CAGR[97]
CMPDIL	**13,861**	**17,327**	**21,028**	**23.2%**
RITES	**26,283**	**24,529**	**22,178**	**-8.1%**
EIL	**33,301**	**32,809**	**NA**	**-1.5%**
MECL	**2,122**	**3,160**	**NA**	**48.9%**

[96] *Revenue from operations means the revenue from operations as appearing in the Financial Statements of the companies*
[97] *Revenue CAGR for CMPDIL and RITES is calculated by dividing the Revenue from operations for fiscal 2025 by the Revenue from operations for fiscal 2023, raising it to the power of one divided by the number of compounding periods i.e. 2 years, and subtracting by one, while for EIL, MECL and MECON, it is calculated by dividing the Revenue from operations for fiscal 2024 by the Revenue from operations for fiscal 2023, raising it to the power of one divided by the number of compounding periods i.e. 1 years, and subtracting by one*

Company	2023	2024	2025	CAGR[97]
MECON	**8,895**	**10,128**	**NA**	**13.9%**

Source: Company Annual Reports, Annual Report of Ministry of Mines; all years are fiscal, NA- Not Available

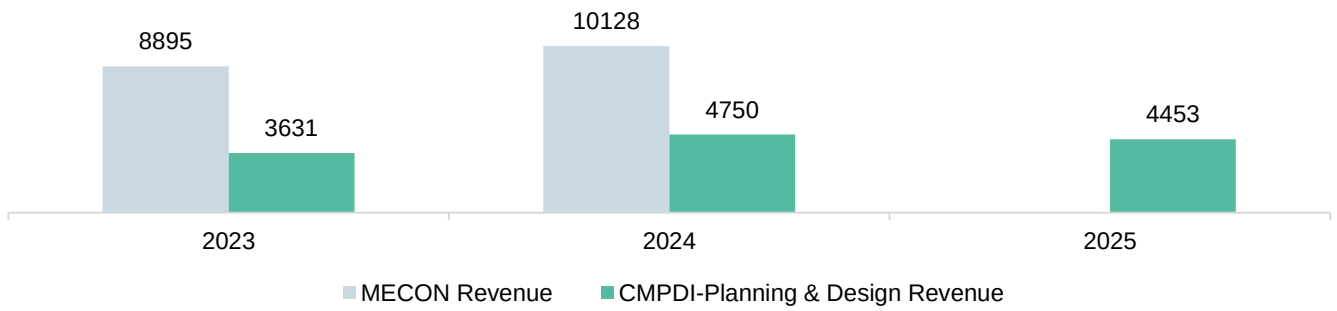
Figure 4.2: Revenue (in million rupees) from exploration for CMPDIL and Revenue of MECL



Source: Company Annual Reports; Revenue from Operations of MECL for fiscal 2025 is not available

The exploration vertical of CMPDIL can be compared with MECL, a leading mineral exploration company in India. A review of the financial performance of MECL reveals that its revenue from operations grew by approximately 48.9% annually from fiscal 2023 to 2024. Similarly, CMPDIL's exploration vertical also witnessed a growth in revenue, albeit at a slightly lower pace of 22.7%.However, in fiscal 2025, CMPDIL's revenue from exploration has witnessed a significant growth y-o-y growth of 45% from fiscal 2024.

Figure 4.3: Revenue (in million rupees) from planning and design for CMPDIL and Revenue of MECON



Source: Company Annual Reports; Revenue from Operations of MECON for fiscal 2025 is not available

The planning and design vertical of CMPDIL can be compared with MECON. A review of the financial performance of MECON reveals that its revenue from operations has been growing steadily, with a compound annual growth rate (CAGR) of 13.9% from fiscal 2023 to 2024. In comparison, CMPDIL's planning and design revenue has also shown significant growth, with a CAGR of 30.8% during the same period. The higher growth rate of CMPDIL's planning and design revenue compared to MECON suggests that CMPDIL has been able to capitalize on emerging opportunities in the market. However, in fiscal 2025 CMPDIL's revenue fell by 6% from fiscal 2024.

4.2.2 Operating EBITDA

The Indian consulting and engineering sector is expected to continue growing, driven by various government initiatives and increasing demand for infrastructure development. In terms of the operating EBITDA[98], CMPDIL has a strong operating income focusing on the company's core business performance, which is witnessed from the high CAGR of 48.2% over fiscal 2023-2025. In fiscal 2025, CMPDIL's operating EBIDTA stood at Rs 8,409 million, followed by RITES at Rs 5,272 million.

Table 4.5 Operating EBITDA (Rs million) and CAGR 2023-25 (%)

Company	2023	2024	2025	CAGR[99]
CMPDIL	**3,830**	**7,270**	**8,409**	**48.2%**
RITES	**7,459**	**6,496**	**5,272**	**-15.9%**
EIL	**3,083**	**2,971**	**NA**	**-3.6%**
MECL	**153**	**926**	**NA**	**505.3%**
MECON	**-128**	**170**	**NA**	**-233.2%**

Source: Company Annual Reports, all years are fiscal, NA- Not Available

4.2.3 Operating EBITDA Margins

CMPDIL has consistently demonstrated strong financial performance, with its operating EBITDA margins[100] showing a significant upward trend, increasing from 28% in 2023 with surging to 42% in 2024 and finally 40% in 2025. In comparison, RITES' margins have declined from 28% in 2023 to 24% in 2025 while EIL's margins have remained stable at 9% in 2023 and 2024. MECL's margins have grown significantly from 7% in 2023 to 29% in 2024. Similarly, MECON's margins have increased from -1% in 2023 to 2% in 2024.

Table 4.6 Operating EBITDA margins (% of Revenue from Operations)

Company	2023	2024	2025
CMPDIL	**28%**	**42%**	**40%**
RITES	**28%**	**26%**	**24%**
EIL	**9%**	**9%**	**NA**
MECL	**7%**	**29%**	**NA**
MECON	**-1%**	**2%**	**NA**

Source: Company Annual Reports, all years are fiscal, NA- Not Available

[98] Operating EBITDA is calculated as profit / (loss) for the period / year, plus finance costs, total taxes, and depreciation and amortisation expense less other income
[99] Operating EBITDA CAGR for CMPDIL and RITES is calculated by dividing the Operating EBITDA for fiscal 2025 by the Operating EBITDA for fiscal 2023, raising it to the power of one divided by the number of compounding periods i.e. 2 years, and subtracting by one, while for EIL, MECL and MECON, it is calculated by dividing the Operating EBITDA for fiscal 2024 by the Operating EBITDA for fiscal 2023, raising it to the power of one divided by the number of compounding periods i.e. 1 years, and subtracting by one
[100] Operating EBITDA margin (%) is calculated as EBITDA divided by Revenue from operations

4.2.4 EBITDA

In the fiscal year 2024, CMPDIL emerged as the leader in terms of EBITDA[101], surpassing its competitors EIL and RITES, which had been ahead in the previous five years. CMPDIL's EBITDA stood Rs 9,157 million (CAGR of 52.1% from fiscal 2023-2025), followed by RITES at Rs 6,329 million in fiscal 2025.

Table 4.7 EBITDA (Rs million) and CAGR 2023-25 (%)

Company	2023	2024	2025	CAGR[102]
CMPDIL	**3,957**	**7,644**	**9,157**	**52.1%**
RITES	**8,476**	**7,357**	**6,329**	**-13.6%**
EIL	**4,727**	**5,162**	**NA**	**9.2%**
MECL	**334**	**1,197**	**NA**	**257.9%**
MECON	**437**	**675**	**NA**	**54.5%**

Source: Company Annual Reports, all years are fiscal, NA- Not Available

4.2.5 EBITDA Margins

CMPDIL has consistently demonstrated strong financial performance, with its EBITDA margins[103] showing a significant upward trend, increasing from 28% in 2023 to 43% in 2024 and to 42% in 2025. In comparison, RITES' margins have declined from 31% in 2023 to 27% in 2025 while EIL's margins have remained relatively stable, ranging from 14% in 2023 to 15% in 2024. MECL's margins have also increased from 15% in 2023 to 35% in 2024. Similarly, MECON's margins have slightly increased from 5% in 2023 to 6% in 2024.

Table 4.8 EBITDA margins (% of Total Income)

Company	2023	2024	2025
CMPDIL	**28%**	**43%**	**42%**
RITES	**31%**	**29%**	**27%**
EIL	**14%**	**15%**	**NA**
MECL	**15%**	**35%**	**NA**
MECON	**5%**	**6%**	**NA**

Source: Company Annual Reports, all years are fiscal, NA- Not Available

4.2.6 Profit After Tax (PAT)

CMPDIL's ability to grow at a CAGR of 49.9% from fiscal 2023 to 2025 is a testament to its strong financial performance. While the PAT[104] has been declining for majority of the peers in fiscal 2024 and for RITES in fiscal 2025,

[101] EBITDA refers to Earnings Before Interest, Tax, Depreciation, and Amortization, excluding exceptional/ extraordinary or prior period items
[102] EBITDA CAGR for CMPDIL and RITES is calculated by dividing the EBITDA for fiscal 2025 by the EBITDA for fiscal 2023, raising it to the power of one divided by the number of compounding periods i.e. 2 years, and subtracting by one, while for EIL, MECL and MECON, it is calculated by dividing the EBITDA for fiscal 2024 by the EBITDA for fiscal 2023, raising it to the power of one divided by the number of compounding periods i.e. 1 years, and subtracting by one
[103] EBIDTA Margin (%) is calculated as EBITDA divided by Total Income Total Income comprises Revenue from Operations and Other Income.
[104] Profit after tax (PAT) means profit / (loss) for the period/financial year as appearing in the Financial Information of the companies

the PAT of CMPDIL has been on an upward trend making it the most consistent performer with a significant increase in profitability over the past five years.

Table 4.9 Profit After Tax (PAT) (Rs million)

Company	2023	2024	2025
CMPDIL	**2,967**	**5,032**	**6,669**
RITES	**5,710**	**4,952**	**4,237**
EIL	**3,463**	**4,453**	**NA**
MECL	**140**	**800**	**421***
MECON	**310**	**245**	**NA**

Source: Company Annual Reports, Annual Report of Ministry of Mines; all years are fiscal
**up to Dember 2024*

CMPDIL's PAT growth shows resilience in the coal consultancy sector, potentially due to increased domestic coal production and the government's push for the development of coal sector. Mining-focused firms like MECL and MECON experience higher volatility due to fluctuating exploration demand. Infrastructure-linked firms like RITES and EIL have seen declining profits, possibly due to economic changes. CMPDIL's strong PAT growth while its peers struggle indicate critical role of coal in India's energy needs which is evident from the strong PAT margins of 31% in fiscal 2025.

4.2.7 PAT Margins

CMPDIL has demonstrated a strong improvement in its profitability, with its PAT margins[105] increasing from 21% in 2023 to 28% in 2024 and 31% in 2025. This significant growth in PAT margins is a testament to the company's efficient operations and effective cost management. In comparison, RITES' PAT margins have declined from 21% in 2023 to 18% in 2025, while EIL's PAT margins have increased from 10% in 2023 to 13% in 2024. MECL's PAT margins have significantly increased from 6% in 2023 to 23% in 2024, while MECON's margins have decreased from 3% in 2023 to 2% in 2024. Overall, CMPDIL's strong PAT margin growth demonstrates its ability to maintain profitability and drive growth in a competitive market.

Table 4.10 PAT margins (% of Total Income)

Company	2023	2024	2025
CMPDIL	**21%**	**28%**	**31%**
RITES	**21%**	**20%**	**18%**
EIL	**10%**	**13%**	**NA**
MECL	**6%**	**23%**	**NA**
MECON	**3%**	**2%**	**NA**

Source: Company Annual Reports, all years are fiscal, NA- Not Available

[105] *PAT margin (%) is calculated as PAT divided by Total Income*

4.2.8 Return on Equity (ROAE)

CMPDIL has delivered a strong return on equity, with its ROAE[106] increasing from 27% in 2023 to 36% in 2024 and then to 37% in 2025. This impressive return on equity demonstrates the company's ability to generate strong profits from its shareholders' capital. In comparison, RITES' ROAE has declined from 21% in 2023 to 15% in 2025, while EIL's ROAE has increased from 19% in 2023 to 21% in 2024. MECL's ROAE significantly increased from 2% in 2023 to 11% in 2024, while MECON's ROAE has decreased from 8% in 2023 to 6% in 2024. Overall, CMPDIL's strong ROAE demonstrates its ability to create value for its shareholders and maintain a competitive edge in the industry.

Table 4.11 Return on Equity (ROAE) (%)

Company	2023	2024	2025
CMPDIL	**27%**	**36%**	**37%**
RITES	**21%**	**18%**	**15%**
EIL	**19%**	**21%**	**NA**
MECL	**2%**	**11%**	**NA**
MECON	**8%**	**6%**	**NA**

Source: Company Annual Reports, all years are fiscal, NA- Not Available

CMPDIL's strong ROAE highlights its ability to generate substantial value from shareholder capital, reflecting operational efficiency and financial prudence.

4.2.9 Return on Capital Average Employed (RoACE)

The RoACE[107] for CMPDIL has increased, with some fluctuations. In fiscal 2023, the RoACE was 33%, which increased to 52% in fiscal 2024 and finally settled to 49% in fiscal 2025. The RoACE for RITES has declined from 29% in 2023 to 21% in fiscal 2025. The RoACE for EIL has been relatively stable, with the ratio being 24% in 2023 to 23% in fiscal 2024. The ratio for MECL has significantly increased from 3% in 2023 to 15% in fiscal 2024. The ratio for MECON also increased from 4% in 2023 to 14% in fiscal 2024.

Return on Capital Average Employed provides how efficiently the company generates earnings from the capital employed in the business. RoACE of CMPDIL is significantly higher than that of its peers, thereby indicating that the company is better at generating returns for capital employed, suggesting a strong profitability and operational efficiency compared to its peers.

Table 4.12 Return on Capital Average Employed (RoACE) (%)

Company	2023	2024	2025
CMPDIL	**33%**	**52%**	**49%**
RITES	**29%**	**25%**	**21%**

[106] Return on Equity (ROAE) (%) refers to Profit after tax divided by Average total equity for the year/period. Average total equity is the sum of opening and closing total equity divided by two.
[107] Return on Capital Average Employed (RoACE) is calculated by dividing EBIT by Average capital employed (from the balance sheet),and then multiplying by 100. EBIT refers to Earnings Before Interest and Taxes. Capital Employed is the sum of Paid-up Share Capital, Other Equity and Non-Current Borrowings. Average Capital Employed is the simple average of the opening and closing Capital Employed figures.

Company	2023	2024	2025
EIL	**24%**	**23%**	**NA**
MECL	**3%**	**15%**	**NA**
MECON	**4%**	**14%**	**NA**

Source: Company Annual Reports, all years are fiscal, NA- Not Available

4.2.10 Employee Benefit Expenses per Revenue from Operations

The Employee Benefit Expenses per Revenue from Operations[108] for CMPDIL is relatively higher compared to its peers ranging from 50% in 2023, then to 37% in 2024 and to 29% in 2025. While the ratio for RITES ranges from 19% in 2023 to 23% in 2025. The ratio for EIL ranges from 29% in 2020 to 30% in 2024. The ratio for MECL ranges from 50% in 2023 to 34% in 2024. The ratio for MECON ranges from 38% in 2023 to 33% in 2024. The ratio helps in evaluating how much a company is spending on employee benefits relative to its revenue.

Table 4.13 Employee Benefit Expenses per Revenue from Operations (%)

Company	2023	2024	2025
CMPDIL	**50%**	**37%**	**29%**
RITES	**19%**	**20%**	**23%**
EIL	**29%**	**30%**	**NA**
MECL	**50%**	**34%**	**NA**
MECON	**38%**	**33%**	**NA**

Source: Company Annual Reports, all years are fiscal, NA- Not Available

4.2.11 PAT per Employee Expenses

CMPDIL's PAT per employee expenses[109] have increased significantly, from 0.4 in 2023 to 1.1 in 2025. In contrast, RITES' PAT per employee expenses have declined, from 1.1 in 2023 to 0.8 in 2025, while EIL's PAT per employee expenses have remained stable at 0.4 in 2023 to 0.5 in 2024. MECL's PAT per employee expense has experienced a growth, from 0.1 in 2023 to 0.8 in 2024. MECON's PAT per employee expense also remained stable at 0.1 in 2023 and 2024. The ratio helps in assessing the company's ability to generate profit for every rupee spent on employee expenses during the financial year. These trends suggest that companies are focusing on improving profitability and efficiency, with CMPDIL being successful in this regard. The trend of slight decline in Revenue per employee initially and steady rise in PAT per employee while the overall manpower falling suggest that the productivity per employee has been on the rise.

Table 4.14 PAT per Employee Expenses

Company	2023	2024	2025
CMPDIL	**0.4**	**0.8**	**1.1**
RITES	**1.1**	**1.0**	**0.8**

[108] *Employee Benefit Expenses per Revenues refers Employee Benefit Expenses divided by Revenue from Operations*
[109] *PAT per Employee Expenses refers Profit after tax divided by Employee Expenses*

Company	2023	2024	2025
EIL	**0.4**	**0.5**	**NA**
MECL	**0.1**	**0.8**	**NA**
MECON	**0.1**	**0.1**	**NA**

Source: Company Annual Reports, all years are fiscal, NA- Not Available

4.2.12 Asset Turnover Ratio

The Asset Turn Over Ratio[110] for CMPDIL is relatively higher compared to its peers ranging from 0.8 in 2023, then to 0.9 in 2024 and in 2025. While the ratio for RITES declined from 0.5 in 2023 to 0.4 in 2025. The ratio for EIL remained stable at 0.8 in 2023 and 2024. The ratio for MECL grew from 0.3 in 2023 to 0.4 in 2024. The ratio for MECON also remained stable from 0.6 in 2023 to 0.7 in 2024. The asset turnover ratio is a measurement that shows how efficiently a company is using its owned resources to generate revenue or sales.

Table 4.15 Asset Turnover Ratio

Company	2023	2024	2025
CMPDIL	**0.8**	**0.9**	**0.9**
RITES	**0.5**	**0.4**	**0.4**
EIL	**0.8**	**0.8**	**NA**
MECL	**0.3**	**0.4**	**NA**
MECON	**0.6**	**0.7**	**NA**

Source: Company Annual Reports, all years are fiscal, NA- Not Available

4.2.13 Net Asset Value per Share

Net asset value per Equity Share[111] reflects the intrinsic value of a company's equity, helping in assessing the company's financial health.

Table 4.16 Net Asset Value per Share

Company	2023	2024	2025
CMPDIL	**17.1**	**22.3**	**28.6**
RITES*	**56.6**	**56.6**	**57.2**
EIL	**34.9**	**40.1**	**NA**
MECL	**5542.3**	**6161.1**	**NA**
MECON	**98.3**	**109.6**	**NA**

Source: Company Annual Reports, all years are fiscal, NA- Not Available

[110] *Asset Turnover Ratio (%) is calculated by Total Income divided by Average Total Assets*
[111] *Net Asset value per Equity Share refers to Net worth as attributable to owners of the Company at the end of the period divided by number of equity shares outstanding at the end of the period*

** RITES Ltd. announced a 1:1 bonus share issue, meaning shareholders received one bonus share for every one share they held as of the record date. The ex-date for the bonus issue was September 20, 2024, hence the Net Asset value per Share has been adjusted accordingly.*

4.2.14 Earnings per Share (EPS)

EPS indicates the company's profitability by showing how much money a business makes for each share.

Table 4.17 Earning per Share (EPS – Basic & Diluted)

Company	2023	2024	2025
CMPDIL	**4.2**	**7.0**	**9.3**
RITES*	**11.3**	**9.5**	**8.0**
EIL	**6.2**	**7.9**	**NA**
MECL	**117.5**	**669.2**	**NA**
MECON	**7.7**	**6.1**	**NA**

Source: Company Annual Reports, all years are fiscal, NA- Not Available
** RITES Ltd. announced a 1:1 bonus share issue, meaning shareholders received one bonus share for every one share they held as of the record date. The ex-date for the bonus issue was September 20, 2024, hence the Earnings per Share has been adjusted accordingly.*

4.3 Operational benchmarking

4.3.1 Exploration Activities

CMPDIL possesses a range of equipment to enhance the efficiency and performance of drilling in challenging geological conditions. Its inventory includes hydrostatic drills, geophysical loggers, seismographs, gravimeters, seismic vibrator, magnetometers, Ground-Penetrating Radar (“GPR”), spectral enhancement, Res2DINV, Res3DINV, RADAN, and resistivity imaging systems. These advanced tools enable CMPDIL to implement specific techniques that maximize drilling performance and ensure successful exploration outcomes. CMPDIL's infrastructure is complemented by its laboratory facilities, including chemical and petrography laboratories, for the characterization of coal and other minerals. The organization utilizes sophisticated software such as Minex and Vulcan for resource modeling of coal and ore, AutoCAD and ArcGIS for geospatial data management, Paradigm, Geosoft, and wellCAD for geophysical analysis, and MODFLOW for hydrogeological modeling. These tools, combined with CMPDIL's baseline data generation capabilities, ensure comprehensive and accurate resource evaluation. CMPDIL's exploration division collaborates closely with the remote sensing and survey department. Through advanced technologies and data analysis, these departments work together to provide a comprehensive approach to coal exploration. The organization's proven track record is a result of its focus on delivering tangible results and efficiently managing all stages of projects, from planning to completion, with attention to timelines, budgets, and quality. Overall, it can be highlighted that CMPDIL has one of the largest infrastructure for coal exploration in India. By utilizing such infrastructure in terms of advanced tools, technology, and facilities, CMPDIL has become the preferred expert consultant for companies engaged in the mining business. This enables CMPDIL to provide differentiated, high-quality services to its clients.

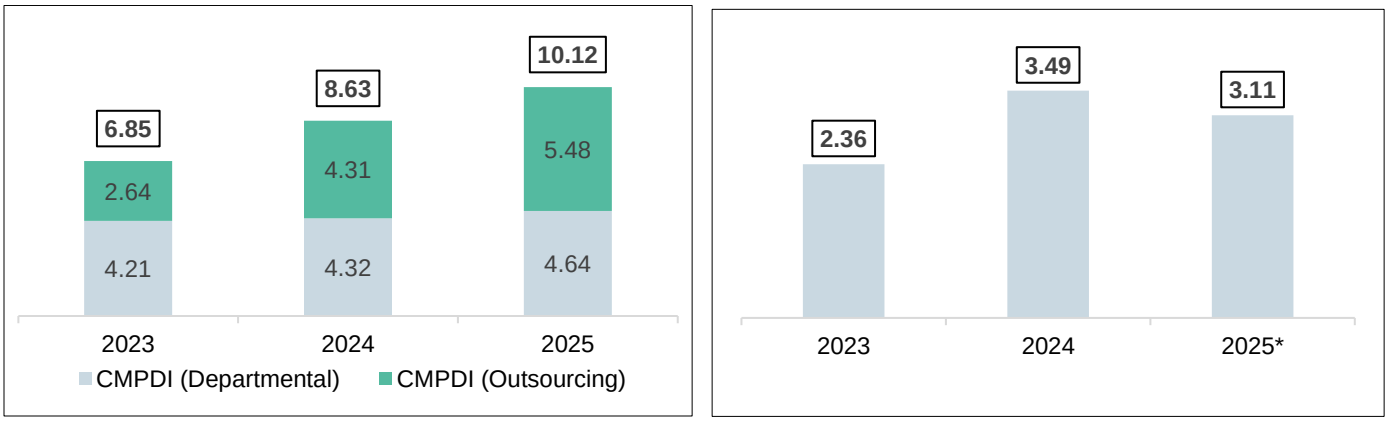
In the fiscal 2025, CMPDIL undertook extensive exploratory drilling across 136 blocks/mines in 29 coalfields, 3 lignite fields (2 state i.e., Tamil Nadu and Rajasthan) and 01 non- coal field spread across 12 states. The coal exploration included 43 non- CIL blocks, 45 CIL blocks/mines, 31 promotional blocks, 4 NMET-funded blocks and 8 blocks of private entities. Further, lignite exploration included 02 non- CIL blocks and 02 promotional blocks. CMPDIL has carried out

exploration in 01 bauxite block through NMET funding the state of Jharkhand. Additionally, production support drilling was undertaken in 6 other CIL mines. CMPDIL has successfully executed several key projects for various domestic and international clients. Notable projects include the reformation and optimization of operations for the turnaround of the Benga Coal Project in Mozambique, the detailed project report for the Zambeze coking coal project, and conceptual and feasibility reports for Banai and Bhalumuda coal blocks. Between 2021-2023, CMPDIL delivered 33 first mile connectivity projects under the Atma Nirbhar Bharat Abhiyaan, with a total mechanized coal handling capacity of 382.5 metric tonnes per year. Additionally, CMPDIL conducted scientific sand replenishment studies for four rivers in Bihar, 25 districts in Uttar Pradesh, and various rivers in Rajasthan. These projects demonstrate CMPDIL's capabilities and expertise in providing comprehensive services to its clients in the mining sector.

4.3.1.1 Drilling meterage

MECL, State Governments, CMPDIL and other contractual agencies of CMPDIL conducted Promotional Exploration under the Ministry of Coal's Plan scheme of "Promotional Exploration for Coal & Lignite". CMPDIL has maintained a consistent level of drilling for CIL blocks. CMPDIL's consistent drilling efforts for CIL blocks underscore its commitment to supporting Coal India Limited's production targets. The drilling activities undertaken by CMPDIL departmentally are increasing by CAGR 5% from fiscal 2023-2025, similarly, in case of drilling activities undertaken through outsourced agencies have also increased by CAGR 44% during the similar period. In fiscal 2023, 2024 and 2025, CMPDIL undertook 6.85, 8.63 and 10.12 lakhs meters of exploratory drilling respectively followed by data acquisition of 609, 234.60 and 437.95 line km through 2D/3D seismic survey respectively in the same fiscal years.

Figure 4.4: Details of drilling by CMPDIL in Lakh Meters | Details of drilling in by MECL in Lakh Meters



Source: CMPDIL,, MECL annual report; Annual Report of Ministry of Mines
**Up to December 2024*

The meterage of drilling by MECL has increased from fiscal 2023 when it was 2.36 lakhs m to 3.49 lakhs m in fiscal 2024 and 3.11 lakhs m in fiscal 2025 (up to December 2024). This increase was also reflected in MECL's revenue and MECL's PAT, which grew from Rs. 2,122 million in fiscal 2023 to Rs. 3,160 million fiscal 2024 and from Rs. 140 in fiscal 2023 to Rs. 800 in fiscal 2024. The share of departmental drilling has been about 92-93%, which increased to about 96% in fiscal 2024.

Further, CMPDIL has also undertaken overburden measurements of 1130 MCuM, 1656 MCuM and 1975 MCuM in fiscal 2023, 2024 and 2025 respectively and also tested 167123, 183497 and 210603 number of samples (air/ water/ noise) in the same fiscal 2023, 2024 and 2025 respectively.

4.3.1.2 Resource Augmentation

A comparative analysis of the coal resources established by CMPDIL and MECL reveals a notable trend, with CMPDIL consistently demonstrating a stronger track record of coal resource discoveries over the years, underscoring its expertise and capabilities in exploration and mining of coal. However, in other minerals CMPDIL is undertaking exploration in 3 bauxite blocks in Jharkhand funded through NMET. About approximately 90% of new resource established by MECL was coal however, overall it was about half of the coal resource established by CMPDIL.

Table 4.18 Details of coal resources established by CMPDIL in MMT

Mineral	2023	2024	2025
Coal	**17,900**	**23,000**	**14,975**

Source: CMPDIL Annual Reports, all years are fiscal year

Table 4.19 Mineral wise details of resources established by MECL in MMT

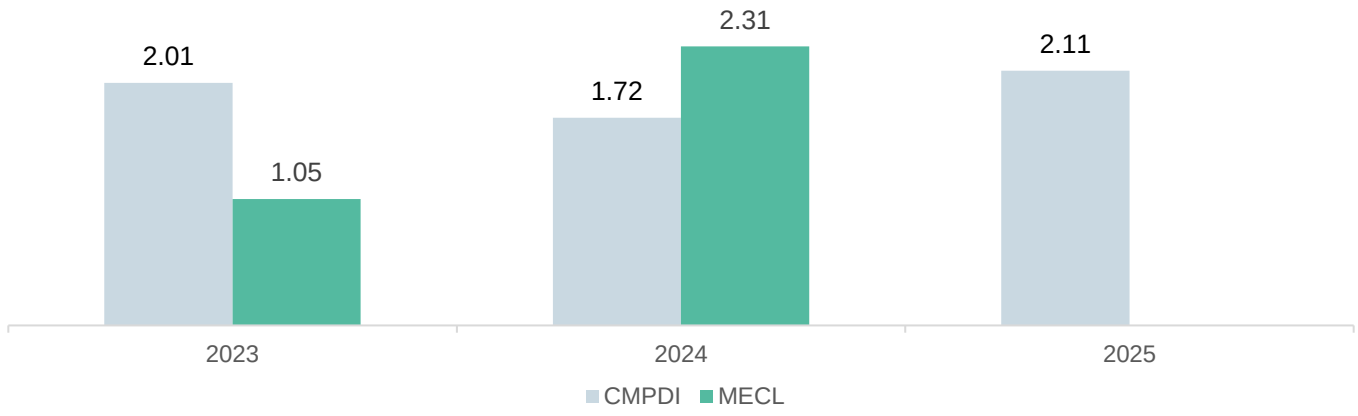
Mineral	2023	2024	2025
Coal	**7,032**	**9,220**	NA
Lignite	225	**815**	NA
Iron Ore	297	**188**	NA
Limestone	30	**3,959**	NA
Potash	143	**84**	NA
Bauxite	0	**0**	NA
Manganese	0	**0**	NA
Others	7	**2,024**	NA
Total	**7,734**	**16,290**	**NA**

Source: MECL Annual Reports, all years are fiscal years

4.3.1.3 Borehole Geophysics

CMPDIL and MECL have also undertaken geophysical logging. In fiscal 2023 and 2024, CMPDIL has undertaken geophysical logging achieving 2.01 and 1.71 lakhs meters in comparison MECL has achieved 1.05 and 2.31 lakhs meters respectively. In fiscal 2025 CMPDIL achieved geophysical logging of 2.11 lakhs meters which is 22% increase from fiscal 2024. This further proves CMPDIL dominance in exploration.

Figure 4.5: Details of geophysical logging carried out by CMPDIL and MECL in Lakh Meters



Source Annual Report; data shared by CMPDIL; Geophysical logging details of MECL for fiscal 2025 is not available

4.3.1 Manpower strength

The number of employees in CMPDIL, EIL, MECL, MECON, and RITES, has been declining over the past three years. CMPDIL's employee count has decreased from 2863 in 2023 to 2721 in 2025, representing a 5% decline. RITES' employee count has increased from 2562 in 2023 to 2728 in 2024, a 6% increase. EIL's employee count has remained stable from 2656 in 2023 to 2658 in 2024. MECL's employee count has declined from 869 in 2023 to 840 in 2024, a 3% decrease. MECON's employee count has decreased from 1066 in 2023 to 1012 in 2024, a 5% decline.

Table 4.20 Manpower in terms of number of employees

Company	2023	2024	2025
CMPDIL	**2863**	**2764**	**2721**
RITES	2562	2728	**NA**
EIL	2656	2658	**NA**
MECL	869	840	**NA**
MECON	1066	1012	**NA**

Source: Company Annual Reports, all years are fiscal

4.3.2 Revenue per Employee

CMPDIL witnessed a steady increase in revenue per employee[113], from Rs. 4.8 million per employee in 2023 to Rs. 7.7 million per employee in 2025. RITES' revenue per employee has also remained stable at Rs. 10.3 million in 2023 to Rs. 9.0 million in 2024. While EIL's revenue per employee has also remained relatively stable at Rs. 12.5 million in 2023 to Rs. 12.3 million in 2024. MECL's revenue per employee declined from Rs. 2.4 million per employee in 2023 to Rs. 3.8 million in 2024. MECON's revenue per employee has grown from Rs. 8.3 million in 2023 to Rs. 10.0 million in 2024.

Table 4.21 Revenue per Employee in million rupees per employee

Company	2023	2024	2025
CMPDIL	**4.8**	**6.3**	**7.7**
RITES	10.3	9.0	**NA**
EIL	12.5	12.3	**NA**
MECL	2.4	3.8	**NA**
MECON	8.3	10.0	**NA**

Source: Company Annual Reports, all years are fiscal, Crisil Intelligence

4.3.3 PAT per employee

CMPDIL's PAT per employee[114] has increased significantly, from Rs. 1.0 million per employee in 2023 to Rs. 2.5 million per employee in 2025. In contrast, RITES' PAT per employee declined, from Rs. 2.2 million per employee in 2023 to

[113] *Revenue per Employee is calculated as Revenue from operations divided by Number of Employees during the fiscal year/period*
[114] *PAT per Employee is calculated as Profit after tax divided by Number of Employees during the fiscal year/period*

Rs. 1.8 million per employee in 2024, while EIL's PAT per employee has slightly increased from Rs. 1.3 million per employee in 2020 to Rs. 1.7 million per employee in 2024. MECL's PAT per employee has grown from Rs. 0.2 million per employee in 2023 to Rs. 1.0 million per employee in 2023. MECON's PAT per employee has also declined from Rs. 0.3 million per employee in 2023 to Rs. 0.2 million per employee in 2024. These trends suggest that companies are focusing on improving profitability and efficiency, with CMPDIL being successful in this regard.

Table 4.22 PAT per Employee in Rs. Million per employee

Company	2023	2024	2025
CMPDIL	**1.0**	**1.8**	**2.5**
RITES	2.2	1.8	**NA**
EIL	1.3	1.7	**NA**
MECL	0.2	1.0	**NA**
MECON	0.3	0.2	**NA**

Source: Company Annual Reports, all years are fiscal, Crisil Intelligence

4.4 Key Observations

CMPDIL, a subsidiary of Coal India Limited (CIL) with Miniratna Ratna (Category I) status is a leading mining consultancy organization. It provides consultancy and engineering services in the fields of exploration, mining, environmental engineering and environment management. CMPDIL operates through its headquarters at Ranchi and seven Regional Institutes strategically located to cater to the demand of CIL. The company's total revenue grew at a CAGR of 23.2% from fiscal 2023 to 2025 and the net profit margin has improved to 30.6% in fiscal 2025. CMPDIL is well positioned to facilitate a wide array of coal consultancy services, starting for exploration to final closure ensuring a holistic approach to mining operations leveraging its experience and robust infrastructure.

The key observations on CMPDIL are given below:

1. **Government Backing**

   India's power and energy requirement will continue to grow over the next few years and the coal requirement is estimated to be 1,253 million tonnes in India in fiscal 2025. CMPDIL benefits from the direct support from CIL, which is one of the world's largest coal producers. This ensures stability in revenue generation, long-term contracts, and continued investment in research and infrastructure. CMPDIL works closely with Ministry of Coal (MoC), Government of India and other government agencies, allowing it to align its services with national energy security goals and demands. CMPDIL is the primary technical consultant for the coal block allocations, mine planning, and coal exploration, reinforcing its dominance in India's coal sector.

2. **Established Research Facilities**

   CMPDIL is the nodal agency for coordinating research activities in the coal sector, funded by the Ministry of Coal and CIL's research and development board. CMPDIL's chemical laboratory has been accredited by the National Accreditation Board for Testing and Calibration Laboratories ("NABL") in accordance with the ISO/IEC 17025:2017 standard and the coal petrographers in the petrography laboratory unit of its coal characterization laboratory are accredited by the International Committee of Coal & Organic Petrology ("ICCP"). The organization undertakes research in key areas such as coal exploration, coal-based energy resources, and clean coal technology. As on 31st March 2025, CMPDIL is operating a network of eight well equipped laboratories located across various coalfields. These laboratories are dedicated to monitoring air, water, and noise parameters,

ensuring that our operations meet the highest environmental standards. CMPDIL is a leader in scientific mine planning, incorporating modern techniques such as numerical modeling, hydrogeological studies, and coal quality analysis to improve resource efficiency. CMPDIL has been instrumental in developing CBM extraction techniques in India, especially in the Raniganj and Jharia coalfields. CMPDIL is currently executing 43[115] research projects in collaboration with renowned organizations like IIT, Bombay; IIT-ISM, Dhanbad etc. Further, CMPDIL in collaboration with various prestigious institutes of the country has patents on various technologies. The organization also hosted a "Hackathon on R&D" to promote start-ups in the coal and lignite sector under the "Make in India" initiative.

3. **Extensive Geospatial Data**

CMPDIL is the dedicated custodian of the country's coal and lignite data, making it the go-to institution for coal resource/reserve assessment. With its extensive repository of geospatial data, CMPDIL may gain significant advantage in providing cutting-edge services to its clients. Further, accessibility of such critical data also creates a substantial entry barrier for other entities which helps in positioning CMPDIL to provide superior quality services compared to others.

4. **Existing footprint across India**

CMPDIL operates through its headquarters at Ranchi and seven Regional Institutes designated as RI-I to RI-VII located at Asansol, Dhanbad, Ranchi, Nagpur, Bilaspur, Singrauli and Bhubaneswar.

[115] *CMPDIL Annual report*

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