कोयला मंत्रालय
MINISTRY OF
COAL
सत्यमेव जयते

Strategy Paper on Coal Import Substitution

Inter-Ministerial Committee Report

(Ministry of Coal)

March, 2024

Foreword

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Foreword

In the realm of India's energy landscape, coal stands as a cornerstone. With coal dominating as a major source of our energy mix, its significance cannot be understated. The persistent influx of coal imports, driven by various challenges in domestic production, necessitates urgent intervention to fortify our energy resilience. Huge amount of forex outgo is involved for imports of coal having huge economic impact, despite having abundant resources of coal in the country itself. To address this issue is a major area of focus of the Government.

Ministry of Coal, taking a step towards achieving energy security of the country, has set a vision to curb the import of coal and become Atma-Nirbhar. With this aim, Ministry of Coal constituted an Inter-Ministerial Committee (IMC) for making recommendations on import substitution.

This **Strategy Paper on Coal Import Substitution** has been prepared as a report of the IMC. It focuses on the present and proposed energy mix of the country, domestic coal production trends & projections, import trends, coal import substitution measures taken by the Government and the future roadmap towards coal import substitution. The report delves into this intricate issue, offering insights, strategies, and imperative actions to steer India towards reduced import dependency with enhanced domestic coal production.

It outlines a spectrum of measures, ranging from optimizing production of existing coal mines to unlocking the potential of commercial/captive coal mines, advancements in strategic initiatives of Mission Coking Coal, promotion of Underground Mining and Technology development roadmap. The significance of import substitution embodies a paradigm shift towards economic resilience and environmental stewardship.

As we embark on this transformative journey, I extend my gratitude and congratulate Inter-Ministerial Committee and Chairperson for the overall leadership, steadfast commitment and collaboration in realizing the vision of Import Substitution of Coal, thereby charting a course towards a more resilient and sustainable energy future for India.

5.3.24

(Amrit Lal Meena)
Secretary, Ministry of Coal

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List of Abbreviations

Abbreviations	Meaning
BT	Billion Tonne
CAGR	Compound Annual Growth Rate
CEA	Central Electricity Authority
CIL	Coal India Limited
CO_2	Carbon dioxide
DCB	Domestic Coal Based Power Plants
DRI	Direct-reduced Iron
FGDs	Flue-gas desulfurization
FY	Financial Year
GW	Giga Watt
ICB	Import Coal Based Power Plants
IMC	Inter-Ministerial Committee
kWh	kilowatt hour
MOC	Ministry of Coal
MGR	Merry-Go-round
MT	Million Tonne
MW	Mega Watt
MTPA	Million tonnes per annum
NRS	Non-Regulated Sector
NW	National Waterways
OC	Opencast
PCI	Pulverized Coal Injection
PRC	Peak Rated Capacity
thm	tonnes of hot metal
UG	Underground

Chapter:1 Background

1.1. Constitution of Inter-Ministerial Committee

The Indian economy is one of the fastest growing major economies of the world. Over the last seven years the GDP growth rate has averaged 7.3%, and is projected to be in the order of 7.9% over the coming seven years. In the Index of Eight Core Industries, Coal production increased by 18.4 per cent in October 2023 over October 2022. Its cumulative index increased by 13.1 per cent during April to October 2023-24 over corresponding period of the previous year. In current year, coal sector has 2nd highest growth i.e. 13.1% after the steel sector i.e. 14.5 % among the 8 core sectors of economy.

1.1.2. Coal is majorly consumed for electricity generation in India (about 64%), followed by steel (8%) and cement (5%) sectors. Coal is also consumed by various other industries such as paper, textile, fertilizers, railways, defense and other small and medium enterprises (SMEs). In FY 2023, India has produced ~893 MT of coal including 60 MT of coking coal and 833 MT of Non-coking coal to meet the demand of Power, Steel and Non-regulated sector. The demand of coal is projected as 1.6 BT by FY 2030 including 1.43 BT non-coking coal and 161 MT coking coal.

1.1.3. Despite the availability of huge resources of coal in the country, coal is being imported to bridge the gap between domestic demand and domestic supply. The genesis of coal import in the country commenced way back in 1980-81 when only 0.56 MT was imported. With increase in demand of coal for power and steel sector, import of coal reached to 73 MT in FY 2010 and 237 MT in FY 2023.

1.1.4. Ministry of Coal, taking a step towards energy security and to become Atma-Nirbhar by ensuring self-sufficiency in coal, has set a vision to curb the import of coal. With this aim, Ministry of Coal, Government of India, has constituted an Inter-Ministerial Committee (IMC), for the purpose of import substitution of coal by 2030 **[Annexure-1]** comprising of the following:

Table 1: List of Members of the IMC

S.No	Designation	
1	Additional Secretary, Ministry of Coal	Chairman
2	Joint Secretary, Ministry of Coal	Member
3	Economic Advisor, Ministry of Coal	Member
4	Representative, Ministry of Commerce	Member
5	Representative, Ministry of Power	Member
6	Representative, Ministry of Railways	Member
7	Representative, Ministry of Shipping	Member
8	Representative, Ministry of Mines	Member
9	Representative, Ministry of Steel	Member
10	Representative, NITI Aayog	Member
11	Representative, Department for Promotion of Industry and Internal Trade	Member
12	Representative, Ministry of Micro, Small & Medium Enterprises	Member
13	Director (Marketing), Coal India Limited	Member
14	Executive Director, Singareni Collieries Company Limited	Member
15	Representative, Central Electricity Authority	Member
16	Representative, Coal Controller Organization	Member
17	Chairman, Paradip Port Trust	Member
18	Chairman, Visakhapatnam Port Trust	Member
19	Chairman, Kolkata Port Trust	Member

1.2. Terms of Reference of Committee

The terms of reference of the IMC are as under:

(a) Analyze the overall coal import in the country and suggest supply side measures to eliminate substitutable coal import.

(b) Examine the logistic bottlenecks in the coal transportation through different routes (Rail, Sea, River, MGR, Belt, Road etc.) and suggest suitable long term and short-term measures for enabling coal import substitution.

(c) Engage with different coal consumers, associations etc. and provide sector specific recommendations, if any.

(d) Continuously monitor the coal imports in different sectors of the country and suggest course corrections for elimination of imports.

(e) To suggest measures so that the information regarding imported coal in NRS is made available within 15 days of the next month in which coal imports have taken place.

(f) Suggest leveraging of technology in eliminating coal imports

(g) Any other issue related to coal import substitution with the approval of Chairman of the IMC.

1.3. Proceedings of IMC

The committee had several deliberations to make suggestions/recommendations for import substitution of coal on several days.

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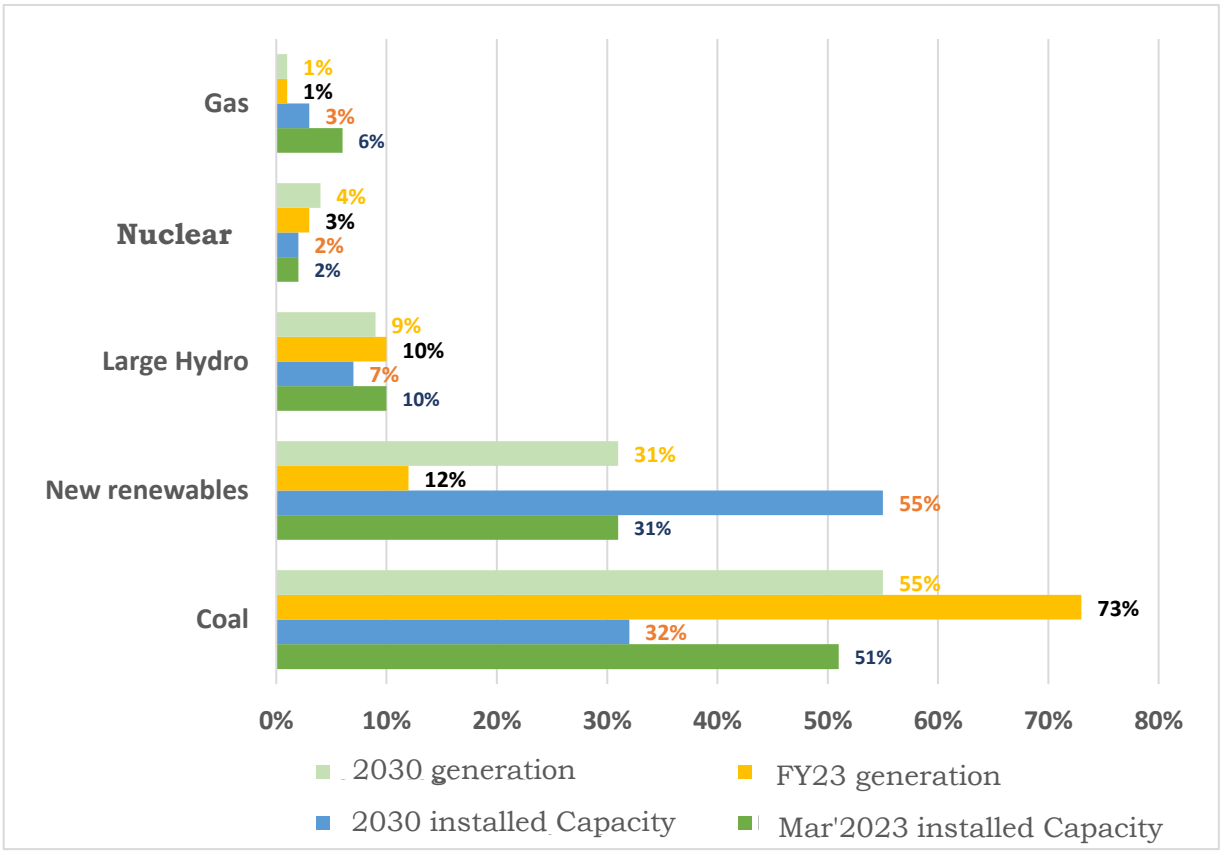
Chapter-2: Introduction

2.1. Role of coal in energy mix

Coal dominates India's energy consumption matrix, accounting for 56% of primary energy consumption. Coal also plays a crucial role in the generation of electricity accounting for 76% in the country. India has one of the largest proven coal reserves in the world. Though one of the objectives of India's energy mix has been to promote the production of energy through the use of renewable energy sources in accordance with climate, environment and macroeconomic considerations in order to reduce dependence on fossil fuels, ensure security of supply and reduce emissions of CO2 and other greenhouse gases, however, according to reports of CEA, coal will remain as major fuel for electricity generation as 55% share by FY2030.

Figure 1: Energy mix share for electricity generation in FY23 & FY30



Source: CEA[1]

[1] https://www.downtoearth.org.in/news/energy/coal-s-share-in-india-s-power-mix-to-decline-to-half-by-2030-renewables-to-meet-new-demand-cea-89222

2.1.1 India's Energy mix has been seeing a shift from more conventional resources of energy to renewable sources. The financial year 2021-22 has witnessed a growth of 16.4% over the previous year in the installed capacity of RES (Renewable Energy Sources, other than Hydro) under utility; while that of thermal sources grew only at 0.06%

2.1.2 The fact remains that India still depends heavily on coal as the major source of energy. During the FY23 energy generated from coal accounted for about 73% of the total generation of energy followed by electricity from Hydro, Nuclear and other Renewable energy sources (25%) and Natural Gas (1%). Besides power generation, coal is also used directly in the industry sector, both as fuel in industry, and a reactant in the production of steel (coking coal).

2.2. Coal Resources

India has rich deposits of coal in the world. Total estimated resources of coal as on 01-04-2023 was 378.20 billion tonnes, (including the resources mined out or sterilized) up to the maximum depth of 1200 m. In terms of percentage, there has been a growth of 4.70% in the total estimated coal resources during the year 2022-23 over 2021-22. The top three states with highest coal reserves in India are Odisha, Jharkhand, Chhattisgarh, which account for approximately 69% of the total coal resources in the country. Out of the total resources in the country, proven resources i.e. those available for extraction in terms of i.e. economically viability, feasibility study and geologically exploration level, account for almost 52% of the total.

2.2.2. As per National Coal Inventory as on 1.4.2023, out of the total resources, the Gondwana coalfields account for 376.55 BT (99.5%), while the Tertiary coalfields of Himalayan region contribute 1,655.54 Mt (0.43%) of coal resources. Type-wise and category-wise break-up of resources are given below:

Table 2: Type-wise and category-wise break-up of resources are given below:

Figures in billion tonne

Coal Type	Proved	Indicated	Inferred	Total	% share
Prime Coking	5.13	0.18	0.00	5.31	1.41
Medium Coking	16.50	10.26	1.76	28.53	7.54
Semi Coking	0.53	1.08	0.18	1.79	0.48
Sub-Total of Coking	**22.16**	**11.53**	**1.94**	**35.64**	**9.42**
Non-Coking	177.14	140.02	23.73	340.90	90.14
Tertiary Coal	0.59	0.12	940.56	1.65	0.44
Grand Total	**199.90**	**151.68**	**26.62**	**378.20**	**100.00**
% share	52.86	40.11	7.04	100.00	

2.2.3. This substantial reserve is a result of systematic exploration and assessment efforts conducted by Geological Survey of India (GSI), Central Mine Planning and Design Institute (CMPDI), Singareni Collieries Company Limited (SCCL), and Mineral Exploration Corporation Limited (MECL).

2.2.4. The depth-wise and category-wise break-up of Indian coal resources is as follows:

Table 3: Depth-wise & category-wise break-up of Indian coal resources:

Figures in billion tonne

Depth Range (m)	Proved	Indicated	Inferred	Total	% share
0-300	135.04	59.79	7.06	20.19	53.38
300-600	41.62	68.22	12.85	122.71	32.45
0=600 (for Jharia only)	15.22	0.02		15.25	4.03
600-1200	8.00	23.63	6.70	38.34	10.14
Sub-Total	**199.90**	**151.68**	**26.62**	**378.20**	**100**

2.2.5. Given the critical role coal plays in India's energy mix, the significance of these reserves affirms the Nation’s:

(i) **Energy Security:** The vast coal reserves contribute significantly to India's energy security, providing a stable and abundant source of fuel for power generation and industrial processes.

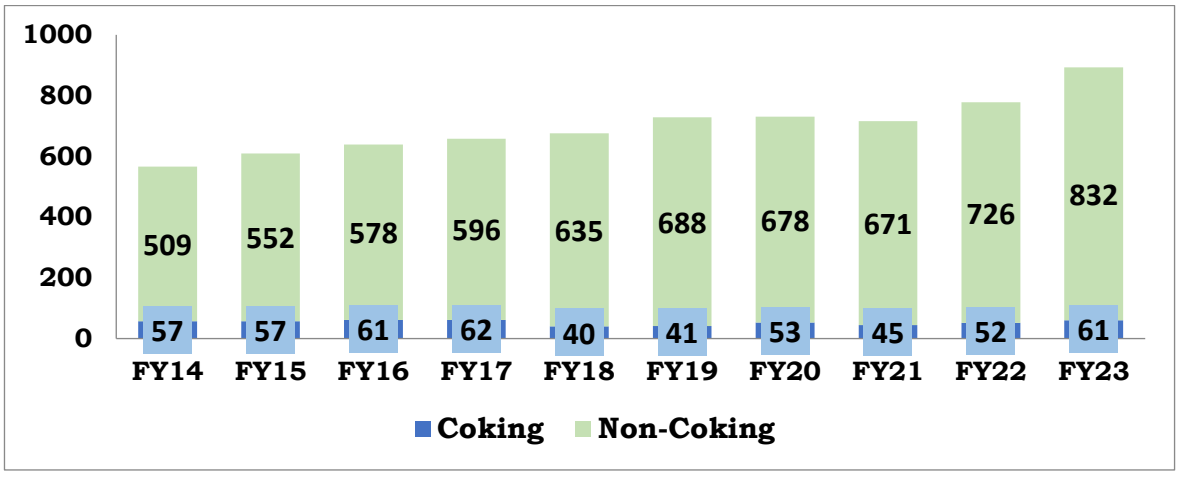
(ii) **Economic Development:** As coal remains a crucial resource for various industries, including power, steel, and cement, the availability of substantial reserves supports economic development and industrial growth.

(iii)**Job Creation:** The coal mining sector, driven by these reserves, is a major employer, contributing to job creation and livelihoods for a considerable portion of the population.

2.3. Coal Production and projection in FY 2030

Coal production in the country during the year 2022-23 was 893.19 million tonnes as compared to 778.19 million tonnes during 2021-22. There is an increase of 14.77%. The overall trend of production in the last ten years i.e.2013-14 to 2022-23 has shown a steady increase, except 2020-21, with a CAGR of 5.2%.

Figure 2: Domestic Coal production trend in last ten years (million tonne)



Source: Ministry of coal[2]

2.3.2. Coal India Limited (CIL) and its subsidiaries play a significant role in driving the overall coal production. In FY 21-22, CIL contributed 622.63 MT, reflecting a positive growth of 4.4% compared to the previous year's production of 596.22 MT. The upward trend continued in FY 22-23, with CIL

[2] https://coal.gov.in/sites/default/files/2021-01/productiondata_tenyear.pdf

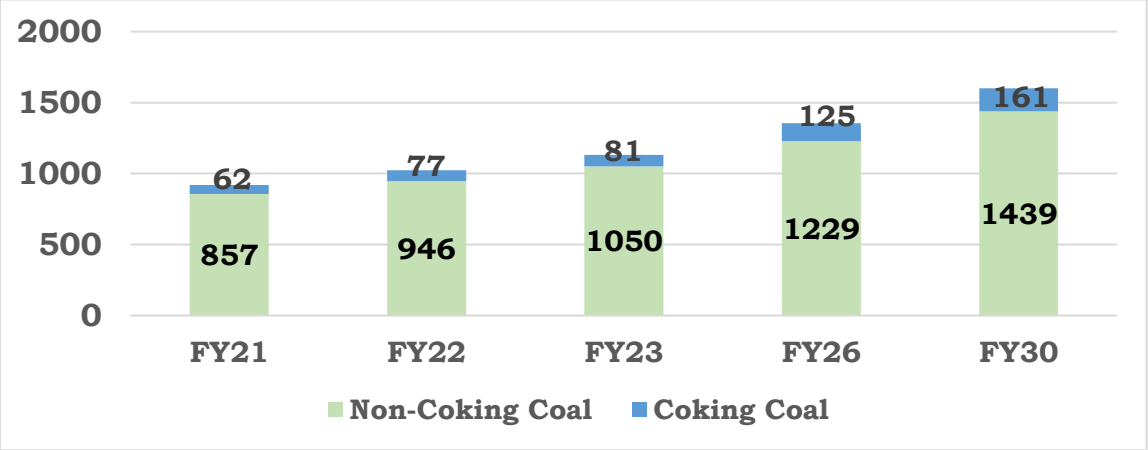
producing 703.20 MT of coal, indicating a substantial positive growth of 12.94%. Singareni Collieries Company Limited (SCCL) emerged as a crucial supplier of coal to the southern region. In FY 21-22, SCCL produced 65.02 MT, showcasing a significant increase from the 50.58 MT produced in the previous year. The positive growth trend persisted in FY 22-23, with SCCL contributing 67.14 MT of coal, reflecting a growth rate of 3.26%. Apart from CIL and SCCL, ~122MT is produced by Captive/Commercial players in country. While individually their contributions may be relatively modest compared to the major players, however collectively they contribute substantially to the diverse coal production landscape in India.

2.3.3. With its usage at 1 billion tonne (BT) annually, India is the second largest consumer of coal globally. The power sector (utilities and captive power plants or CPPs) accounts for almost 77% of the consumption, and thus, is central to the outlook for the coal sector in the country. Industrial sectors such as the cement industry, direct reduced iron (DRI), textiles, paper, brick manufacturing, etc., are other end-use sectors of coal. Lignite is also used in significant quantities primarily for power production. However, its production has largely remained constant for the past few years. Of late, coking coal consumption in the country has increased considerably, driven by the rapidly expanding steel sector. Sector-wise coal consumption is described in detail in the subsequent section.

2.3.4. With rapid economic growth, India's future energy requirements are expected to increase rapidly. Being the single largest consumer of coal, the power sector is likely to be one of the major segments shaping the demand for the fuel in future. In addition, demand from industries such as steel and cement, which are key to infrastructure development, will also see a rise in demand for coal.

2.3.5. Hence, the Ministry of Coal has set a goal to produce 1.3 billion tonnes of domestic coal by FY 2026 and 1.51 BT by FY 2030 to advance the vision of Atma-Nirbhar Bharat ensuring India's energy security by substituting imported coal with domestic coal. In FY 2023 India has produced ~893 MT. Demand of coal is likely to rise from 1131 MT in FY 2023 to 1.6 BT in FY 2030 for power, steel generation and Non-regulated sector. The following tables depict the industry-wise coal demand projected up to fiscal 2030.

Figure 3:Coal demand in India by FY2030: Coking & Non-Coking (MT)



Source: Ministry of Power [3], Coal Logistic Plan [4]and Mission Coking coal of MOC[5]

* **Note:** The coking coal demand projected above is at 10-12% ash which will include blending of domestic coal (25% at 18% ash) and imported coal.

Table 4: Coal requirement by Steel sector

	As per NSP-2017
Total coking coal requirement in 2030-31	161 MT Coke rate: 380kg/thm & PCI: 150kg/thm)
Washed coking coal requirement, (Ash content max 18 %), considering indigenous coking coal in blend @ 25% in case of stamp charged battery.	40.8 MT

Considering the demand of coal in FY 2030, Ministry of Coal has planned the company-wise production of coal as follows:

Table 5:Coal Supply in FY 2030

Type	**Company**	**FY24**	**FY26**	**FY30**
Non-Coking Coal	**CIL**	700	900	980
	SCCL	70	79	100
	Captive	162	241	291
	Sub Total	**932**	**1220**	**1371**
Coking Coal	**CIL: Sub Total**	**80**	**103**	**140**
Total		**1021**	**1323**	**1511**

Source: Ministry of Coal

[3] Annexure-3
[4] https://coal.nic.in/en/major-statistics/coal-evacuation-plan
[5] https://coal.nic.in/index.php/en/major-statistics/mission-coking-coal

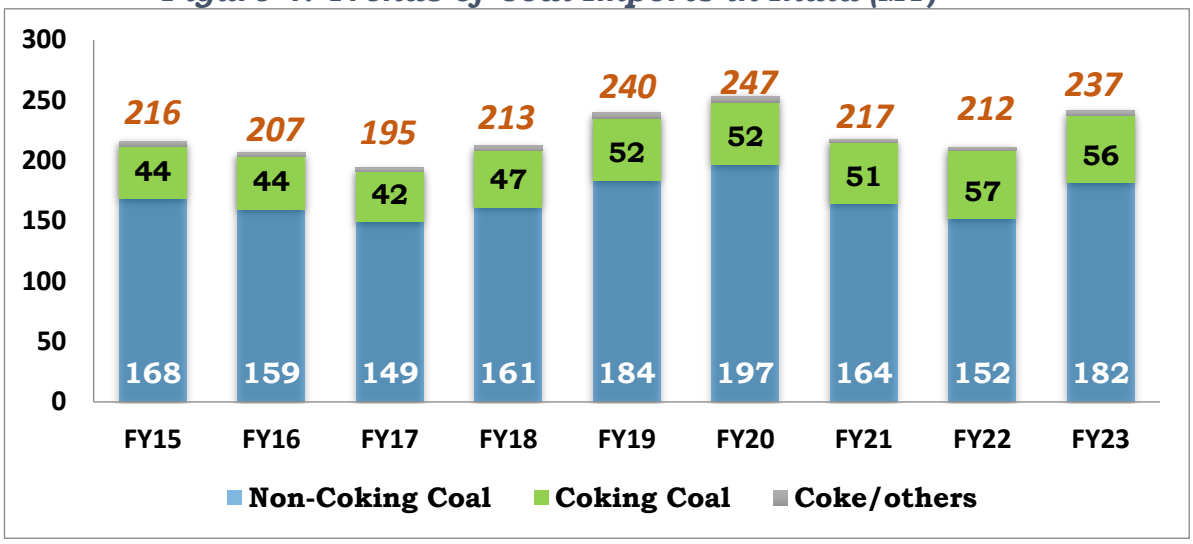
*__Note:__ The factor to be considered while assessing the use of coking coal is the ash percentage. Most of the coking coal produced domestically is of Washery Grade- IV & V i.e. (ash between 28 to 35 % and 35 to 42%). On the other hand, ash percentage in imported washed coking coal is less than 10%. Since, the ash percentage in domestic coking coal is more, therefore coking coal is imported. In the financial year 2022-23, 56.05 MT of coking coal was imported which was approximately 90 % of the total demand of the Steel Sector and the remaining requirement was met through domestically produced washed coking coal with ash content less than 18 %.

The gap in Coal demand (as projected in figure 3) and Domestic coal supply (as projected in Table 5) is primarily on account of Non-coking coal for Import based power plants (ICB) having boiler design based on imported coal and coking coal of higher quality for steel sector. This has been analyzed further in subsequent chapters.

2.4. Coal imports

India is the second largest importer of coal, with a share of ~18% of global non-coking coal imports. The country imported 237 MT of coal in FY 2023 costing 3.83 Lakh Crores (including ~181 MT of non-coking coal and ~56 MT of coking coal). Overall, coal imports over fiscals 2015-2023 has been in the range 195-247 MT including coking coal of average of ~52 MT and non-coking coal of average~168 MT. Much of the non-coking coal is imported from Indonesia and South Africa and coking coal from Australia. Demand for imported coal is from steel sector, captive power plants, domestic based power plants (DCB) and cement industries, which consume two-thirds of non-coking coal imports. Power utilities of Import coal-based power plants (ICB) along the coastline account for the balance.

Figure 4: Trends of Coal Imports in India (MT)



Source: Ministry of coal[6]

2.4.2. India's import dependency is owing to various factors, including smaller and lower quality reserves of coking coal in India, less availability of high GCV coal, challenges in developing new coal mines related to land acquisition, delay on obtaining statutory clearance etc. and logistics constraints for evacuation. The Domestic coal production has significantly increased from ~556MT in FY13 to ~893 Mt in FY23 depicting a growth of 60% in last ten years, so also the demand has significantly grown from 733 MT to 1131 MT in the last 10 years depicting a growth of 54%. However domestic coal production has been unable to meet the demand due to above mentioned challenges and desired quality of coal over the last decade. Hence this gap was met by imports. Ministry of Coal however has taken several measures and efforts, to substitute coal imports, as discussed in the subsequent chapters of the report.

2.4.3. **Import Statistics (year on year):** The Table 6 showing coal import trends highlights that coal has been majorly imported by the Non-Regulated Sector. The sector wise trend of coal imports in last 5 years projects that the import of coal is either less or same in last 5 years due to increased domestic coal production.

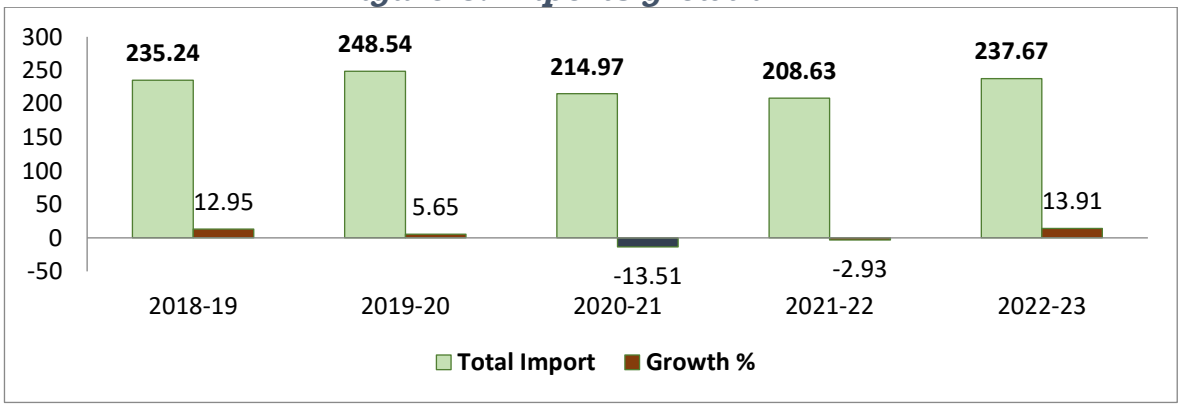
[6] https://coal.nic.in/en/major-statistics/import-and-export

Table 6: Coal Import Statistics

Year	Coking Coal	Growth (%)	Import Coal Based Plants	Growth (%)	Domestic Coal Based Plants	Growth (%)	Non-Regulated Sector	Growth (%)	Non-Coking	Growth (%)	Total	Growth (%)
FY19	51.84	10.30	40.29	2.34	21.37	25.41	121.74	16.10	183.40	13.72	235.24	12.95
FY20	51.83	-0.01	45.46	12.83	23.75	11.14	127.5	4.73	196.71	7.25	248.54	5.65
FY21	51.29	-1.04	35.08	-23	10.39	-56	118.21	-7.28	163.68	-16.79	214.97	-13.51
FY22	57.16	11.65	18.89	-46.15	8.11	-22.06	124.77	5.23	151.77	-7.49	208.63	-2.93
FY23	56.05	-1.94	20.53	8.68	35.10	332.79	125.99	-1.43	181.62	19.66	237.67	13.91

Source: Ministry of Coal[7]

Figure 5: Imports growth



Note: Negative growth is recorded due to covid-19 pandemic year

2.4.4. Imports are also driven by higher-grade requirements in some sectors such as cement which require coal of higher GCV value for clinker production; however, as supplies of high-grade coal in India are largely limited, it has led to cement plants largely looking towards imports for its usage. The cement industry is also a major importer of pet-coke.

2.4.5. Around 50-55 MT of annual imports continue to constitute import of coking coal due to lack of hard coking coal reserves in India, which can be utilized directly by steel mills in blast furnaces. India, despite having huge reserves of coal, has only a small part of it as coking coal, suitable for blast furnace

[7] Annexure: 4

operation. However, this coal is also characterized by relatively high ash content, low vitrinite, lower rank and inferior caking/coking properties. Therefore, under the present technology, they, at best can be utilized, as a blend to imported coking coals to some extent, and that too, after suitable washing. Due to the quality issue of Indian coking coal and also its limited availability in the country, Indian steel industries are highly dependent on low ash coking coal imports (on an average 85% and above).

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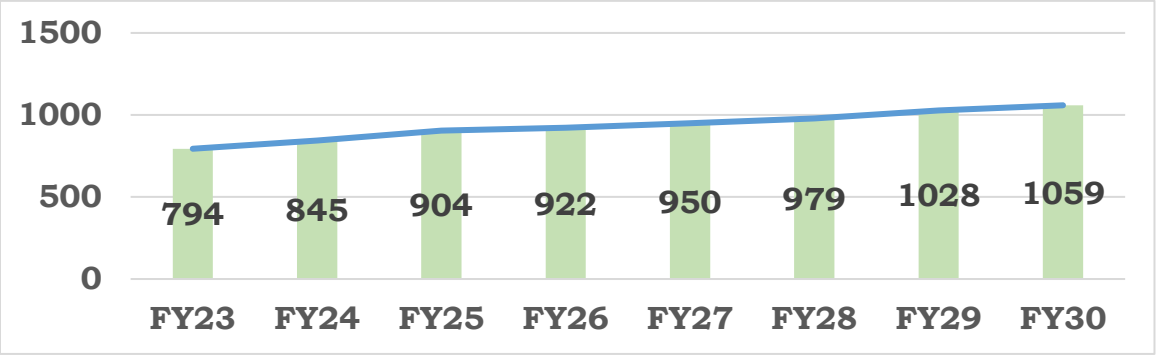
Chapter-3: Coal Import Analysis

3.1. Sector-wise coal demand analysis

3.1.1. Power sector

Power Sector is the single largest major consumer of coal in the country. Rise in per capita consumption with electrification and increased penetration of energy-intensive appliances like air conditioning systems, the per capita electricity consumption has risen from 914 kWh in fiscal 2012 to 1,508 kWh in the fiscal 2023 with a CAGR of ~4.6%, owing to increased power availability, investments in the power sector, reduction in transmission & distribution losses, and rising income of households. With consumption levels progressively converging towards those of higher income countries, demand for power will increase. Coal continues to be the major source of energy generation in the country and will continue to be so in the near future. The estimated coal requirement of the Power Sector during FY 2030 is 1059 MT. Coal consumption in the Power Sector is expected to grow at around 4 – 6 %. The present trend in the Power Sector shows that around 10 % of the coal consumed in the country is imported coal. Thus, most of the demand of the Power Sector is met through domestic sources.

Figure 6:Coal Demand projection from Power Sector by FY2030 (MT)



Source: Ministry of Power[8]

3.1.2. Non-Regulated Sectors (NRS):

The Coal requirement of the NRS is expected to be 380.56 MT in FY 2029-30. Coal consumption by the Captive Power Plants (CPPs) is expected to grow at

[8] Annexure-3

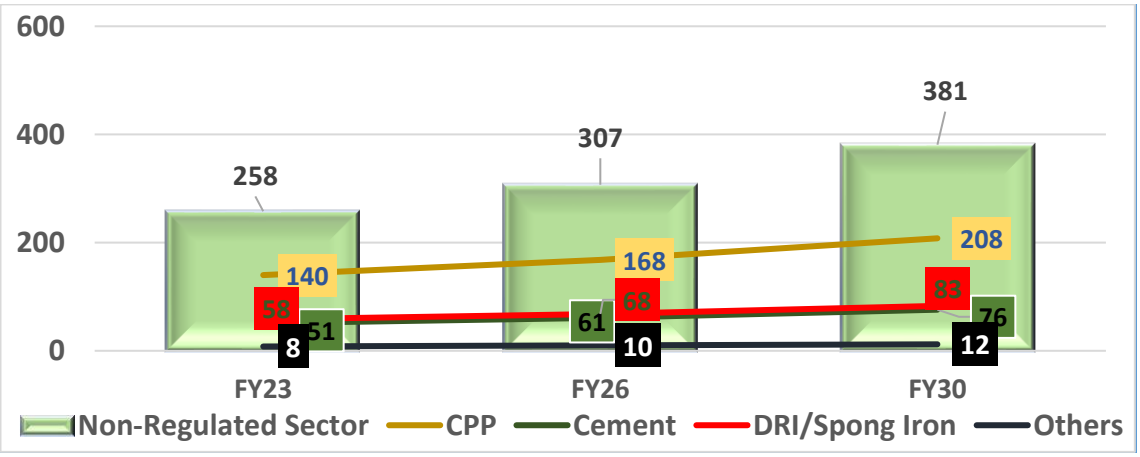
around 6 % and the coal requirement of the CPPs is expected to be 208.31 MT in FY 2029-30.

i. Besides power generation, coal is also used directly in industry as fuel and as a reactant in the production of steel (coking coal). Sectors such as aluminum and cement too use substantial quantities of coal. Coal finds application in manufacturing of steel and cement – two critical raw materials for country infrastructure development and the construction segment. Cement production increased to 391 MT in fiscal 2023 from 128 MTPA in fiscal 2010. Coal-based sponge iron production also rose from ~21 MT to ~35 MT over the past 10 years, which is a CAGR of 5.2%, driving demand for non-coking coal. The other major coal consuming sectors are Captive Power Plants, Cement manufacturing and Sponge Iron & Steel.

ii. Non-Coking coal consumption in the Steel & Sponge Iron Sector is expected to grow at around 5.42 % and the coal requirement of the Cement Manufacturing is expected to be 76.72 MT in FY 2029-30.

iii. Coal consumption in the other sectors is expected to grow at around 5.87 % and the coal requirement of the other sectors is expected to be 12.17 MT in FY 2029-30.

Figure 7: Coal Demand by Non-Regulated Sector by FY2030 (MT)



Source: Coal Logistic Plan, Ministry of Coal[9]

[9] https://coal.nic.in/en/major-statistics/coal-evacuation-plan

3.1.3. Steel sector

According to National Steel Policy 2017[10], to achieve steelmaking capacity of 300 MTPA (including 181 MTPA through blast furnace route) by FY 2030, huge volumes of coking coal (~161 MT of coking coal at 14 % ash) would be required. Indian steel industry fulfils ~90% of its coking coal requirements through imports at present. Growth in steel production is expected to push up demand for metallurgical coking coal of India. Consequently, Ministry of Coal launched Mission Coking Coal in Aug'2021 wherein the demand projected is 40 MT by FY 2030 for domestic coking coal considering 25% blending with imported coal for steel making.

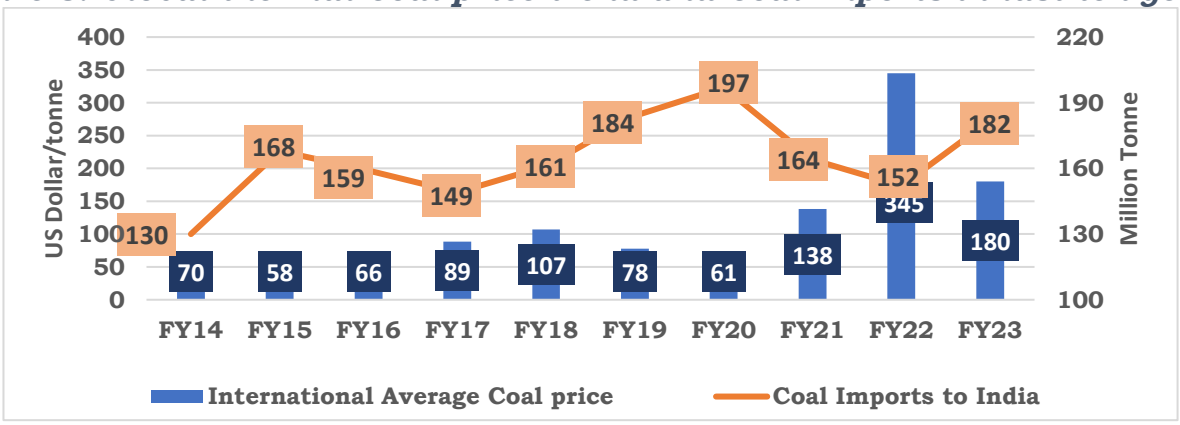
3.2. Impact of International coal price on coal imports

Import of coal in India is dependent various factors-

(a) Less availability of domestic coal (due to challenges in developing coal mines related to land acquisition, delay on obtaining statutory clearance etc and logistics constraints for evacuation) against the demand of coal in country or GDP growth of the country.
(b) Low quality of coal as per demand e.g. coking coal required for steel sector.
(c) Pricing of coal in international market.

Several studies (like PWC research) [11]suggest that the International coal price and Coal imports to India are inter-linked. To establish the correlation the committee has studied the last 10-year coal imports both for Coking and Non-Coking data along with average International coal prices.

Figure 8: Global thermal Coal price trend and Coal Imports in last ten years



Source: Statista[12] & Ministry of coal[13]

[10] https://steel.gov.in/en/national-steel-policy-nsp-2017

[11] https://www.pwc.in/research-and-insights-hub/coal.html

[12] https://www.statista.com/statistics/214236/thermal-coal-prices-since-2003/

[13] https://coal.nic.in/en/major-statistics/import-and-export

The above data depicts in year-on-year analysis that as average international coal price goes up i.e. in FY16, FY17, FY18, FY21, FY22, the imports of coal shows decreasing trend except for FY18 where the domestic coking coal production went very low as projected in figure:2 resulting in higher imports. However, when the average international coal price goes down i.e. in FY15, FY19, FY20, FY23, the imports of coal shows increasing trend in country.

3.2.2. The trend of dependency of coal imports on international price is because as per the current import policy, coal is kept under Open General License (OGL) and consumers are free to import coal from the source of their choice as per their contractual prices on payment of applicable duty. India's import of coal rose 21-23% year-on-year in fiscal 2023, after witnessing a consistent fall over the last three years.

3.2.3. The Indian coal consumers are taking coal via linkage route or e-auction route. Coal is supplied to linkage route consumers though FSA (Fuel Supply Agreement) at notified price of coal or at rates discovered in the auction. Coal to linkage holders in the NRS linkage auctions are supplied at higher of the Indexed Price and the prevailing notified price for NRS consumers plus the premium. Wholesale Price Index (WPI) is being used by CIL for indexing of the basic price of NRS Linkage auction.

3.2.4. Bulk of the coal in the country is imported by the Non-Regulated Sector (NRS). NRS coal consumers mostly procure their domestic coal requirement through participation in the NRS linkage auctions conducted by Coal India Limited. NRS linkage auctions are mine specific. Successful participation in these linkage auctions provides the NRS consumers an assured source of coal supplies, say for an initial tenure of 5 years / 10 years. However, at times when the international coal prices are low, NRS coal consumers tend to exit from the Fuel Supply Agreements executed with the coal companies and import coal to meet their requirements, leading to supply chain disruptions. In order to curb this premature exit, the Fuel Supply Agreements are now valid for the entire tenure of the agreement and any premature exit by the consumer except for reasons of exigencies / force majeure / operational issues faced by supplying coal company attracts forfeiture of EMDs / Bid

Security and debarment for participation in the next / subsequent tranche of linkage auctions.

3.3. Grade-wise coal requirements for import substitution

As per Table:6 ~238 MT coal is imported in FY 2023 in India including ~56 Mt of Coking coal, ~20 MT by import coal-based power plants (required superior quality of coal), 35 MT by Domestic based power plants and 125 MT by NRS sectors. Considering the inferior quality of Indian coal, import of Coking coal and import based power plant becomes essential. But to substitute the imports of non-coking coal by domestic coal-based power plants and by NRS Sector, grade-wise coal requirement is needed and there is a need to find out whether coal imports (by domestic coal based power plants and NRS sector) is done due to lack of domestic supply having logistic challenges or lack of desired quality or higher landed price of coal at the plant as coal has to travel from Eastern to Western/Northern part of country. All the Administrative Ministries of coal consuming industries need to work out genuine grade wise requirement of coal of their sector and share the details with Ministry of Coal so that demand aggregation can be done and a strategy can be effectively planned for coal import substitution.

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Chapter-4: Coal Import Substitution Measures

4.1. Government measures for coal import substitution

The Government has brought in a series of reforms and measures to address import substitution of coal. The critical points to be considered in import substitution are assured supply of quality and of quantity of coal by coal companies that will help in bridging the gap between the requirement and indigenous availability & to improve the quality. Ministry of Coal sets vision 2030 focusing on increasing domestic production of coal by FY 2030 to nearly double fold through following in order to reduce non-essential import in the country:

(a) Vision 2030: Increase in Coal and lignite production from CIL, SCCL, NLCIL, Captive and Commercial coal blocks
(b) Auction and operationalisation of more commercial/captive coal blocks.
(c) Formulated Coal Logistic Policy and coal evacuation plan for efficient evacuation of coal.
(d) Mission Coking coal.
(e) Underground Mining of coal.
(f) Technology Upgradation.

4.1.1. Vision 2030

By fiscal 2030, India's total coal output is projected at ~1.51 BT. CIL is the major coal producer and the single largest coal producer in the world. CIL accounts for more than 80% of coal production in the country. In FY 2022-23, CIL produced a total of 703.2 MT of coal. CIL is expected to remain a major supplier of coal in India, its share is estimated to decrease to74% in fiscal 2030 with increase in coal production from captive/commercial coal blocks in country. Apart from the CIL, coal production projection of 2030, Singareni Collieries Company Limited (SCCL) will contribute around 100MT and rest (Captives and Commercial) would contribute around 291 MT. The supply of coal production in FY 2030 is projected as:

Table 7: Year-Wise Company-wise coal production projection in country

Fig in MT

Years	Coal India Limited	SCCl	Captive & Others	Total
2023-24	780.00	70.00	162.14	1012.14
2024-25	838.00	72.00	170.00	1080.00
2025-26	915.00	75.00	203.39	1193.39
2026-27	1004.00	79.00	227.80	1310.80
2027-28	1043.00	80.00	255.14	1378.14
2028-29	1082.00	82.00	285.75	1449.75
2029-30	1131.00	82.00	320.04	1533.04

Source: Ministry of coal[14]

4.1.2. Auction of Coal Blocks/ private sector participation

To reduce the import of coal and to promote domestic production, the auction-based regime introduced in 2014 by Ministry of Coal and allowed private sector participation, however, it was limited to captive usage in its own end-use plants. The sector underwent a significant transformation and opened for commercial coal mining by private players in 2020. The first-ever successful auction of commercial mining was launched by the Hon'ble Prime Minister on 18.06.2020. The auctions have terms and conditions which are very liberal, allowing new companies to participate in the bidding process. Till now, 91 coal mines have been successfully auctioned. Since the launch of commercial auctions till FY 2022, CMPDAs were signed for 26 coal mines with cumulative PRC of 56.77 MTPA. In FY 22-23, the Ministry signed agreements for 51 coal mines with cumulative peak rated capacity (PRC) of 102.63 MTPA. Further, in the ongoing financial year i.e. FY 23-24, CMDPAs have been signed for 6 coal mines with cumulative PRC of 7 MTPA. This reflects a continued commitment to expanding coal production through a competitive and transparent process.

[14] https://coal.nic.in/en/major-statistics/coal-evacuation-plan

4.1.3. Mining Developers cum Operators (MDO)

Ministry of Coal has engaged reputed MDOs in coal mines, through open global tender, to ramp up domestic coal output and reduce import dependency to the extent possible. The contract period of engagement is for 25 years or life of mine whichever is less. The MDOs are mandated to excavate and deliver coal to coal companies in accordance with the approved mining plan. MDOs would bring to the table mutually beneficial technology infusion, economically viable operations and increased production

The state-owned coal miner is tracking a total of 30 greenfield projects for implementation through MDOs with investment component to the tune of around ~35,000 Crores largely spread on land acquisition, rehabilitation and resettlement issues, and in some cases on railway sidings.

Presently the total rated capacity is around 262 MT including 17 Opencast projects, 12 Underground projects and 1 mixed project. While the capacity of OC projects is 237 MTY, UG and mixed projects add up to the rest.

Coal India Limited so far has issued letters of acceptance for 13 coal projects to be pursued through engagement of Mine Developer cum operator mode. Cumulatively, these projects have production capacity of close to 140 million tonne per year. Out of these 4 projects having capacity 57.37MT have already started production.

4.1.4. Utilization of abandoned mines: Revenue Sharing Model

There are numerous abandoned mines with appropriate volumes with sufficient mineable reserve and suitable depths, which were previously used to extract coal. However, these mines were closed for various reasons, primarily due to unprofitable operations which posed hindrance in providing for the wages of the employees. Discontinued mines posed a national loss because large amounts of reserves were not extracted. As a policy initiative, Ministry of Coal has planned to offer these mines in Revenue Sharing model. The Ministry of Coal is envisaging private sector participation in order to bring these abandoned mines back into operation. The private sector is expected to bring in efficiency through lower overhead expenses and state-of-the art technology.

The Mine Operator would be responsible for reopening, developing, and operating the Mines, as well as excavating and extracting coal for delivery, for the duration of the Mine's life or as specified in the contract. The Mine Operator shall have full liberty to choose the mining method, requisite technology, and deployment of mining machinery for the Mine's functional operation.

Subsequently, CIL so far has offered 34 mines in Tranche-I, Tranche-II and Tranche-III to promote an optimum utilization of coal resources in the national interest.

4.1.5. Coal logistic Policy

Seamless evacuation of coal is essential for coal import substitution. To strengthen India's energy security and realize the vision of Atma Nirbhar Bharat by reducing the reliance on imported coal, Ministry of Coal has formulated Integrated Coal Logistics Policy and Plan with a vision to develop technologically enabled, integrated, cost effective, resilient, sustainable and trusted logistics ecosystem for coal evacuation. This strategic framework aims to propel accelerated demand and supply of coal sector in FY2030. Ministry of Coal sets following action plan for achieving the target coal evacuation in country which includes First Mile Connectivity through railway sidings near coal mines and the expansion of the Rail Network in Coalfields:

a. Developing infrastructure for 90% mechanized handling of coal.
b. To develop rail infrastructure as -New/Capacity enhancement Lines taken up by Ministry of Railways.
c. Enhance transportation of coal via coastal shipping to 120 MT by FY2030.
d. Enhance inland waterways transportation of coal to 8MT by FY2030.
e. Additional wagons requirement of 1 Lakh wagons for evacuation by FY2030.

First Mile Connectivity Projects: Ministry of Coal has formulated an integrated approach to eliminate road transportation of coal from mines and has initiated steps to upgrade mechanized coal transportation and loading systems under the 'First Mile Connectivity' projects. Coal Handling Plants (CHPs) and SILOs with Rapid Loading Systems offer benefits such as coal crushing, sizing, and speedy computer-aided loading. In view of this, 103

FMC projects costing nearly Rs. 24000cr, with 95- CIL, 5 - SCCL, and 3 - NLCIL, with a total capacity of 1051MTPA are planned. Currently, 31projects (29-CIL and 2-SCCL) with a capacity of 291 MTPA have been commissioned. The remaining 72 projects, are scheduled to be commissioned by FY 2029.

Railway Projects: The Ministry of Coal, in view of a cleaner environment in coal transportation, has given momentum to rail evacuation. In view of this Coal PSUs have taken up 8 railways projects costing ~10418 crores under Deposit/JV mode to expand mining projects in Brownfield and Greenfield areas across Chhattisgarh, Odisha, Jharkhand and Telangana, out of which 3 projects are already commissioned and remaining to be completed by FY26. To meet the coal demand across the country by FY2030, Ministry of Railways has taken up Energy Corridors projects, High Density projects and Rail-Sagar projects. These initiatives aim to enhance rail evacuation infrastructure, adding approximately 400 MTPA coal evacuation capacity to the Indian Railway Network by FY 25-26.

Coastal Shipping of coal: The Ministry of Coal has taken an initiative to integrate Rail-Sea-Rail (RSR) transportation with other modes for the efficient movement of domestic coal. This multimodal transportation system allows for the seamless transportation of coal from mines to ports and then to end-users, reducing transportation costs and improving logistic efficiency. The Ministry's efforts to promote Rail-Sea-Rail are yielding significant results as Rail-Sea-Rail transportation of coal has significant growth of around 50% over the past five years and with plan for 120 MT i.e.125% growth by FY 2030.

Inland Waterways: Coastal shipping (first leg transportation) has a great potential and MoPSW has taken the initiative to develop Inland Waterways NW-5 on Brahmani River for cargo transportation. Inland Waterways through NW-5 on Brahmani River from Talcher coalfield connecting Paradeep & Damra Port is proposed for first leg transportation of cost in cost effective manner. NW-5 is proposed to be developed through SPV and expects 8 MT evacuation of coal by FY2030. Transportation of coal though NW-5 will be cost effective and environment friendly.

4.1.6. Mission Coking Coal:

Ministry of Coal has launched 'Mission Coking Coal' in August 2021, aiming to create a roadmap for augmenting the production and utilization of domestic coking coal in India by 2030. Transformative measures taken by Ministry of Coal under 'Atmanirbhar Bharat' initiative of Hon'ble PM, to substitute the coking coal imports. Following are the actions envisaged under mission coking coal to reduce coal imports:

a. To enhance domestic coking coal blending for steel making from present 10% to 30%.
b. To enhance domestic raw Coking Coal production to 140 MT by 2030.
c. To enhance the washing capacity in country to 61 MT by FY2030 to produce 23 MT Washed coal at 18% ash.
d. The mission focuses on key areas, including new exploration, production enhancement, increased washing capacity, and the auction of new coking coal mines.

Setting –up Washeries: CIL is adopting clean coal technology with the construction of 9 new washeries with a capacity of 26.5 MTPA. This will help in reducing environmental impact at the same time meeting industry demands. Additionally, CIL is also planning the monetization of old washeries, with an aim towards resource optimization and sustainability in coal processing operations.

With launch of mission coking coal, the coking coal production is planned to be increased to 140 MT by FY 2030. However, to substitute imports the following measures needs to be taken:

i. Increase in domestic blending percentage of coking coal for steel-making to 30 % will be feasible only with the use of Stamp Charging battery technology. **Therefore, Ministry of Steel has to assure the implementation of stamp charging technology by FY2030 in top priority.**

ii. As Indian coking coal is inferior in quality for steel making, it needs to be blended with imported coal. Hence, raw coking coal to be completely washed and supplied to steel sector to substitute imports. **Therefore, washing capacity in country needs to be increased from 61 MT to 140 MT by 2030 to meet the demand of steel sector and substitute imports.**

iii. In FY 2023 out of ~ 60 MT domestic coking coal productions in country, only ~11 MT coking is being washed and supplied to steel sector, remaining is being supplied to power houses. Hence **Coal Companies should supply the complete domestic coking coal to steel sector in order to reduce coking coal imports and Ministry of Steel to ensure consumption of domestic coking coal by steel sector.**

4.1.7. Underground Coal Mining

To boost the coal production from underground coal mining i.e. high GCV coal in the country, Ministry of Coal has set a target of achieving 100 MT by FY2030. Ministry of Coal has planned to introduce of Mass Production Technology in underground coal mines recognizing the significance of underground mining in enhancing production capabilities, CIL has introduced 25 Continuous Miners across 18 underground mines.

4.1.8. Technology Upgradation

The Indian mining sector has long played a vital role in the country's economic development. Following Technology Upgradation in coal sector are proposed to assure the coal production of 1.51BT by 2030:

i. **Coal Sector Digitalization**: In the rapidly evolving landscape of the Indian mining sector, digitalization has emerged as a pivotal force driving transformative change. With the advent of advanced technologies, the digitalization of mines has become a cornerstone in modernizing mining operations and ensuring their long-term sustainability. This strategic shift,

marked by the integration of cutting-edge data analytics, automation, and the Internet of Things (IoT), has the potential of redefining the way mining companies operate and manage their resources. As India grapples with the dual challenges of increasing demand for minerals and the imperative to reduce environmental impact, embracing digitalization becomes not just a choice but a necessity. It empowers the sector to boost productivity, improve safety, and enhance environmental stewardship while laying the foundation for a more efficient and sustainable mining industry.

The various attributes for the digitalization on the mining sector includes:

a. **Smart Coal Analytics dashboard**

Ministry of Coal has planned to develop smart coal analytics dashboard i.e. centralized platform for **real-time reporting and analytics** on coal production, demand and logistics. Key modules of proposed dashboard are-

- Data exchange between the stakeholders
- Realtime Alert generation & decision making
- Realtime / historical report generation
- Prescriptive & predictive analytics
- RSR/RCR multi-modal Track & trace
- Compliance and Environmental Sustainability Index

Ministry of Coal has formed Inter-Ministerial Committee for creation of smart coal analytics dashboard.

b. **Application of Drones/GIS/Remote Sensing in Mining:**

The mining industry in India is increasingly turning to cutting-edge technologies like drones, Geographic Information Systems (GIS), and remote sensing to optimize operations. Drones equipped with high-resolution cameras and LiDAR technology are being used for aerial surveys, helping miners obtain accurate topographical data and monitor mining progress. GIS and remote sensing are valuable tools for managing spatial data, allowing for better decision-making in site selection, land use planning, and environmental monitoring. These technologies streamline operations, enhance safety, and contribute to sustainable mining practices.

c. **Drill and Blast Optimization:**

In the quest for more efficient and sustainable mining operations, drill and blast optimization have gained significant importance. Miners are leveraging advanced algorithms and data analytics to fine-tune drilling and blasting processes. This optimization not only improves fragmentation, which eases material handling and reduces wear and tear on equipment, but also minimizes environmental impacts. By optimizing drill and blast operations, the mining sector can significantly enhance productivity, reduce energy consumption, and mitigate negative effects on local ecosystems.

d. **Application of Video/Image Analytics in Mining:**

Video and image analytics have emerged as invaluable tools in enhancing safety and efficiency in mining. By employing advanced image processing techniques, mining companies can monitor real-time operations, conduct preventive maintenance, and ensure the safety of workers. Video analytics can also be used for monitoring high-risk areas and identifying potential hazards. These technologies not only improve worker safety but also optimize production processes, making mining operations more cost-effective and sustainable.

e. **Application of Virtual/Augmented Reality in Mining:**

Virtual and augmented reality is revolutionizing training, safety, and productivity in the mining sector. Virtual reality simulations allow miners to train in a risk-free environment, preparing them for real-world scenarios. Augmented reality applications enable on-site workers to access essential information and guidance through smart glasses or other devices, improving task efficiency. These immersive technologies contribute to higher safety standards, reduced human error, and increased operational efficiency.

f. **Wireless Communication in Underground Mining:**

In the challenging environment of underground mines, wireless communication systems are essential for both safety and efficiency. These systems enable real-time tracking of workers, machinery, and assets,

ensuring quick response to emergencies. They also support data transmission for remote monitoring and control of mining equipment. Reliable wireless communication enhances safety, optimizes productivity, and paves the way for future automation and digitalization in underground mining.

g. **Real-Time Coal Quality Monitoring:**

Real-time quality monitoring is an essential practice in the Indian mining sector, especially in coal mining. Online analyzers and sensors allow miners to continuously monitor coal quality, enabling rapid adjustments to the mining and processing processes. This real-time data ensures that coal products meet quality standards and can be tailored to customer requirements, reducing waste, and improving overall productivity.

h. **Smart/Connected Worker:**

The concept of the smart and connected worker involves equipping miners with wearable technology and communication devices. These devices not only enhance worker safety through real-time tracking and communication but also collect data on worker activities and environmental conditions. This data can be used for performance optimization, hazard prevention, and ensuring a more efficient and secure work environment.

i. **Predictive Maintenance of Heavy Earth Moving Machinery (HEMM):**

Predictive maintenance is gaining traction in the mining sector to reduce downtime and enhance the lifespan of heavy machinery. Using data from sensors and IoT devices, maintenance teams can predict when equipment is likely to fail and schedule maintenance proactively. This approach optimizes maintenance schedules, minimizes unplanned downtime, and lowers maintenance costs, contributing to operational efficiency.

j. **Coal Supply and Logistic Optimization:**

The logistics and supply chain in the coal mining sector are intricate due to the vast distances and varying quality of coal. Advanced optimization software and data analytics are used to streamline coal supply chains. These tools help in route optimization, inventory management, and demand

forecasting, ensuring that the right quantity and quality of coal reaches consumers on time. Efficient logistics not only reduce costs but also minimize the environmental footprint associated with coal transportation.

The application of these advanced technologies and practices in the Indian mining sector showcases a commitment to sustainable, efficient, and safer mining operations. By harnessing these innovations, the industry can align with India's goals of reducing environmental impact while enhancing productivity and safety standards.

In conclusion, the Indian mining sector stands at a pivotal juncture where it must confront challenges, champion sustainability, and embrace digitalization to secure its future. The path ahead is marked by both promise and complexity, with the urgent need for responsible mining practices, the preservation of local ecosystems, and the well-being of communities at its heart. By harnessing the power of cutting-edge technologies and adopting sustainable methodologies, the sector can not only enhance its efficiency but also contribute to a cleaner, safer, and more sustainable future. In the digital transformation of mines, we find the key to sustainable mining - a future where the nation's mineral wealth coexists harmoniously with the environment and where economic prosperity thrives alongside the well-being of its people.

4.2. Policy and Regulatory framework

Under the 'Atmanirbhar Bharat' mission, Government has been taking proactive policy measures in order to substitute non-essential coal imports. Some of the measures are as under:

i. Enactment of Mines and Minerals (Development and Regulation) Amendment Act, 2021 for enabling captive mines owners (other than atomic minerals) to sell up to 50% of their annual mineral (including coal) production in the open market after meeting the requirement of the end use plant linked with the mine in such manner as may be prescribed by the Central Government on payment of such additional amount.

ii. Single Window Clearance portal for the coal sector to speed up the operationalization of coal mines. Project Monitoring Unit for hand-holding of coal block allottee for obtaining various approvals / clearances for early operationalization of coal mines.

iii. Auction of commercial mining on revenue sharing basis launched in 2020. Under commercial mining scheme, rebate of 50 % on final offer would be allowed for the quantity of coal produced earlier than scheduled date of production. Also, incentives on coal gasification or liquefaction (rebate of 50 % on final offer) have been granted.

iv. As far as supplies to the Power sector is concerned, the Annual Contacted Quantity (ACQ), pertaining to supply of coal has been increased up to 100% of the normative requirement of the Power Plant, in the cases where the ACQ was either reduced to 90% of normative requirement (non-coastal) or where the ACQ was reduced to 70% of normative requirement (coastal power plants). Increase in the ACQ would result in more domestic coal supplies to the Power Plants, thereby, reducing the import dependency.

v. Under the provisions of Para B (viii) (a) of SHAKTI Policy, coal linkage is provided for short term for sale of power generated through that linkage through any product in Power Exchanges or in short term through a transparent bidding process through DEEP portal. In addition, with the amendment to the NRS linkage auction policy introduced in 2020, the tenure of coking coal linkages in the NRS linkage auction has been revised for a period up to 30 years. The coal offered for short term to the Power Plants under the amended provisions of SHAKTI Policy as well as increase in the tenure of the coking coal linkages in the Non-Regulated Sector linkage auction for a period up to 30 years is expected to have a positive impact towards coal imports substitution.

vi. Government has decided in 2022 that the coal to meet the full PPA requirement of all the existing linkage holders of Power Sector shall be made available by the coal companies irrespective of the trigger level and Annual Contracted Quantity levels. Thus, decision of the Government of

meeting the full PPA requirement of the linkage holders of the Power Sector shall further reduce the dependence on the imports.

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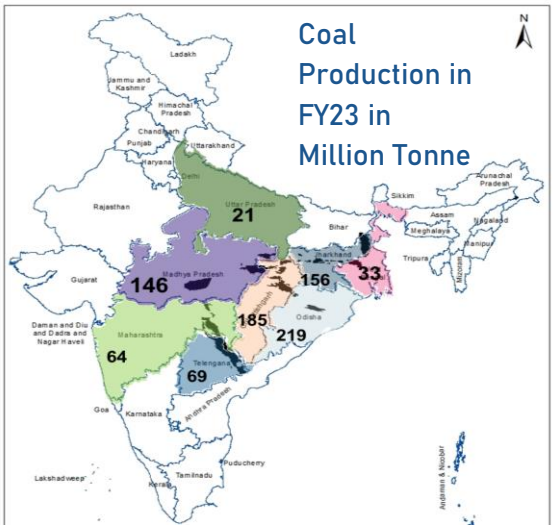
Chapter-5: Logistic Challenges in movement of Coal

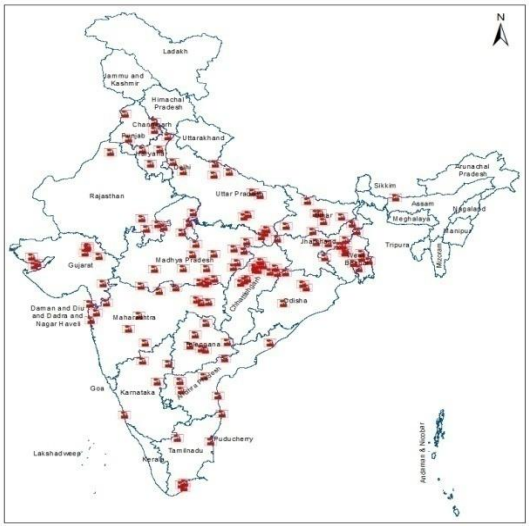
5.1 Location of coalfields and power plants in country

The coal production centers are located majorly towards the eastern part of country and the power houses are located pan India.

Figure 9:Coal Production and consumption center location



Coal Production Center



Thermal coal consumption center

5.1.1. The above pictures project that thermal coal has to travel East to West, East to South and East to North in the country entailing logistic challenges and transportation cost factor. Creating coal transport infrastructure and managing logistics to transport targeted coal produced from point of origin to consumption centers are major challenges for the sustainable development of coal sector in the country. To transport high coal volume of 1.5 BT by FY 2030, necessary evacuation capacity creation is required.

5.1.2. Subsequently, Ministry of Coal prepared Coal Logistic Policy and Plan to meet requirement of coal evacuation in FY 2030 for country. As mentioned in para 4.1.4, Ministry of Coal has taken initiative to develop infrastructure like railway projects, Rail-Sea-Rail transport, First-Mile connectivity, Inland Waterways.

5.1.3. In FY23 ~55 % of Coal has been evacuated through rail and it is likely to increase to 75% by FY2030.Out of 55% rail transportation of coal in FY23, ~4.6% coal has been evacuated through coastal shipping (RS/RSR route).

5.1.4. The primary mode of coal evacuation in the future is expected to remain with railways, with a goal to increase its current modal share to 75% by FY 2030. Simultaneously, to avoid congestion in the All-Rail Route for coal evacuation, there is a need to enhance alternative routes, such as Rail-Sea/Rail-Sea-Rail by FY 2030.

5.2 Steps taken to promote Coastal shipping of coal

5.2.1. Ministry of Coal has concluded Inter-Ministerial Committee on long-term plan for movement of coal through Ports & Waterways and projected demand of 120 MT coastal shipping of coal by FY2030 majorly from Talcher coal field of Mahanadi Coalfields Limited (MCL).

5.2.2. MoPSW has taken the initiative to develop Inland Waterways NW-5 on Brahmani River for cargo transportation. NW-5 is proposed to be developed by FY 2030 through SPV. An SPV has been decided to be formed with the participation of the Ministry of Coal/Coal India Limited, Ministry of Ports, Shipping and Waterways/Inland Waterways Authority of India, Ministry of Power, State Government, and willing Gencos. Transportation of coal though Inland waterways will reduce Port handing charges.

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Chapter 6: Business case and way forward

6.1. Recommendations and roadmap

Ministry of Coal has assessed the sector-wise demand of coking coal and non-coking coal in the country by FY2030 and like-wise 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 after detailed deliberations:

6.1.1. Logistic Constraints removal

Committee has recommended that adequate infrastructure has to be developed by coal companies as well as Railways (including Rail network, First-mile connectivity, MGR, Conveyors and road network) to facilitate supply of coal of 1.5 BT by FY2030 to meet the country's demand. The focus would be to ensure that the import of coal should not be on account of logistics constraint in the country. It is recommended to implement the Coal Logistic Plan as high-priority and in a time-bound manner.

6.1.2. Rationalization of coal linkages is a policy initiative of Ministry of Coal in order to reduce the distance in transportation of coal from the coal mines to the consumer. Coal linkage rationalization in power sector has resulted in decrease in transportation cost from the mines to the power plants leading to more efficient coal-based power generation. The purpose of this initiative was to help reduce the load on the transportation infrastructure, easing the evacuation constraints as well as reduction in landed cost of coal. Linkage rationalization exercise is being carried out by the coal companies on a regular basis. Rationalization of coal linkages by shifting of the source of coal to a nearer distance will encourage coal consumers to procure domestic coal, thus leading to import substitution. The Committee recommends that this exercise should be an ongoing one with active participation of all the stakeholders.

6.1.3. Reducing Coking Coal imports

i. Utilization of raw coking coal production by steel sector

In FY23 out of ~ 60 MT domestic coking coal production in the country, only ~11 MT coking is being washed and supplied to steel sector, remaining ~6 MT was supplied to power houses. Committee recommends that the domestic coking coal should be supplied to the steel sector in order to reduce coking coal imports. The Ministry of Steel to ensure consumption of domestic coking coal by steel sector.

ii. Adoption of Stamp-Charging Technology for steel making

Committee recommends that to increase the present level of 10% domestic blending percentage of coking coal for steel-making to 30 % the use of Stamp Charging battery technology should be adopted. Therefore, Ministry of Steel needs to ensure the implementation of Stamp Charging Technology by FY2030.

iii. Enhancing Washing Capacity in country

It is recommended that as Indian coking coal is inferior in quality for steel making, it needs to be blended with imported coal. Hence, raw coking coal to be completely washed and supplied to steel sector to substitute imports. Therefore, washing capacity in country needs to be planned by coal companies/ steel companies to increase from 61 Mt to 140 MT by 2030 to meet the demand of steel sector and substitute imports.

In the year 2020, report of High-Level Committee (HLC) of NITI Aayog on Coal Sector in its report had stated “there is going to be demand for washed coking coal as well as shortfall in CIL's washing capacity. This provides ample scope for establishing private washeries. However, these can only be established if these private washeries receive assured linkage on a long-term basis (at least 30 years) and are provided for adequate quantities (at least 3 MT/annum). Moreover, the domestic steel industry should be encouraged to give up its

inertia for acceptance of domestically produced and washed coking coal." The recommendation of the HLC were

- Coking coal linkage should be auctioned on a long term, at least for 30 years with adequate quantity (3 MT/annum) to enable setting up of new private washeries
- Privatization of old Washeries at suitable terms is recommended.

In terms of the recommendation of the HLC, the tenure of coking coal linkages in the NRS linkage auctions has been revised for the period up to 30 years. Therefore, as per the report of the HLC, assured coking coal linkage for the period of 30 years to encourage investments in the washeries has already been enabled. Linkage auctions on this account needs to be conducted on the regular basis for the extended tenure.

iv. Monetization of Old Washeries

Ministry of coal has planned to monetize four coking coal washeries of BCCL in FY 2025 to the steel players of country to increase the washing capacity in country. Similar action may be considered for those coking coal washeries which have either outlived or having very poor capacity utilization and performance, to steel players resulting in increase in washed coking coal supply to steel sector.

v. Low ash thermal coal as PCI (Pulverized Coal injection) in Blast Furnace

National Steel Policy 2017 [15]has projected demand of PCI coal by 2030 for steel-making as 30 MT. The average PCI Injection in blast furnace is considered as 150 kg/thm. Furthermore, in Blast Furnace for steel making, the amount of coke used can be reduced if substantial amount of pulverized coal is injected. Pulverized Coal Injection (PCI) systems are used in order to lower production costs as well as extend the life cycle of coke ovens. At present PCI coal is imported in country.

[15] https://steel.gov.in/en/national-steel-policy-nsp-2017

It is recommended that Integrated Steel Plants (with PCI) may be enhanced to enable reduction of their coking coal consumption at par with global best practices by resorting to auxiliary fuel injection technologies like Pulverized Coal Injections (PCI). Furthermore, increased use of prepared burden in charge mix and greater use of PCI in blast furnaces needs to be promoted. Pulverized Coal Injection (PCI) system can be installed even if there is only limited space around the blast furnace. Low ash thermal coal produced in FY23 is ~30 MT and it is expected to be ~60MT which may be utilized by steel sector after beneficiation for steel-making to reduce imports of PCI coal.

vi. Enhancing Coal gasification based Direct reduced Iron (DRI)

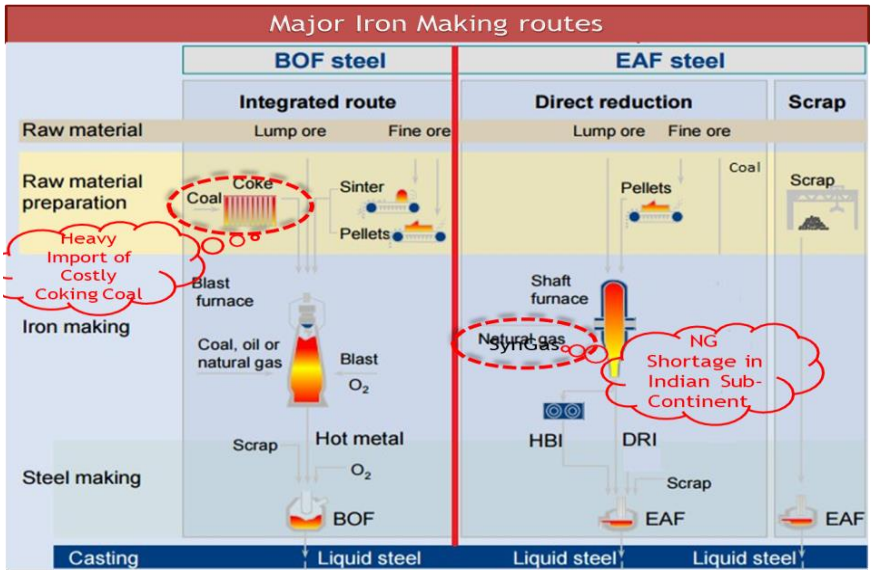
National Steel Policy 2017 has projected demand of DRI by 2030 as 105 MT. At present 70 % DRI is coal-based route and balance is through gas based.

Gas based DRI-Given the future potential of gas-based technology, in terms of up-gradation of coal based DRI capacities in the MSME sector to gas-based route, need for captive gas-based power plants for the sector and the alternative of injecting natural gas in blast furnace to reduce dependence on imported metallurgical coal (both coking and PCI), ensuring firm supply of natural gas is imperative to boost the confidence and investment in the gas-based steel-making technology. Improving the techno-economic performance of steel units is crucial to improving competitiveness of the industry.

Coal based DRI- Coal Gasification converts any Carbon containing material into Synthetic gas, composed primarily of Carbon monoxide and Hydrogen. It uses high pressure combined with Oxygen or air & steam to convert carbon-based materials directly into Syngas by partial oxidation. Gasification process breaks carbon-based materials down to the molecular level, so impurities can be relatively easily and inexpensively removed.

5400 TPD coal gasification plant is in operation at the JSPL Angul[16] Plant, where steel making is done through DRI- (syngas/COG PAS route) which substitutes coke with Bio mass. It is utilizing 270 tonnes/hr coal and produce 2,25000Nm^3/h of Syn-gas with Calorific value of 3450 kcal/Nm^3. This plant is based on SLTC, S Africa & Lurgi Germany technology.

[16] https://coal.gov.in/sites/default/files/ncgm/pmicg-ds.pdf



It is recommended that to enhance coal gasification in country to produce synthetic gas to use DRI for steel making. If DRI is increased in country the coal-based blast furnace will be reduced and which would reduce imports of coking coal in the country.

6.1.4 Reducing Non-Coking Coal imports

i. Integration of CIMS with ICEGATE

Coal Import Monitoring System has been developed by Ministry of Coal to enable the Ministry to track the imports of coal in country. Grade wise coal imports data is not available from the information received from DGCIS. There is still a time lag of 2 months in receiving the information regarding the coal imported which precludes timely corrective action. Hence, Integration of CIMS with Indian Customs EDI Gateway (ICEGATE) through Unified Logistics Interface Platform (ULIP) would reduce the present lag in getting data on coal imports. Further, creation of additional HS Codes for each of the 17 Grades of Non-Coking coal and 8 Grades of Coking coal in the bills of entry shall enable Ministry of Coal to plan domestic production for reducing / eliminating import of substitutable non-coking coal.

ii. Reduction in coal imports by Import Coal based power plants

There is a high degree of uncertainty regarding supply of Power by the ICB Plants. The Power Purchase Agreements (PPAs) signed by these plants do not provide for escalation in power price due to steep rise in international coal prices as has been witnessed in 2021 and 2022 in Figure 8. This leads to disruptions in the power markets including the coal demand-supply balance. The SHAKTI policy of 2017 (Para B(vii)) has provision for supply of domestic coal to these power plants, provided the benefit of low-cost domestic coal is passed on to the consumers.

ICB plants may need to carry out certain design changes in the boilers and the plant to adjust to use of domestic coal. Therefore, in order to remove dependence on the imported coal with volatile prices, Ministry of Power may consider mandating the ICB plants to retrofit their boilers to make them compatible with the Indian thermal coal specifications and any cost in carrying out the same may be passed on to the consumers (in a manner similar to that of installation of FGDs).As domestic coal is lower priced than the landed cost of the imported coal, the resultant cost of Power, even after retrofit, may not be high. On the other hand, nearly 17 GW of this capacity, which is 8 % of total thermal capacity of 204 GW in the country may become fully deployed and also create a demand for nearly 70 Mt of domestic coal which can be met.

iii. Export of Power

Guidelines dated 18.12.2018 (subsequently amended in 2019) of Ministry of Power for Import / Export (Cross Border) of electricity 2018 provides that the generating companies / distribution companies of India may export electricity generated by coal or renewable energy or hydropower, to entities of neighboring country (ies) directly or through trading licensee (s) of India, after taking approval of the Designated Authority. However, in case of electricity generated from coal based generating plants, exports of electricity from India by a generating company / distribution licensee directly or through trading licensee shall be allowed only where such electricity is generated utilizing imported coal or spot e-auction coal or coal obtained from commercial mining. Few of the power plants in the country utilize imported coal for generation of electricity for the purpose of export and the

electricity is supplied at a tariff which is competitively discovered. Therefore, supplying of domestic coal to such power plants which are exporting electricity may be explored by both Ministry of Power as well as Ministry of Coal. Allowing access to domestic coal to these power plants may lead to substitution of coal import.

iv. Reduction in Coal imports by Domestic based coal power plants

Committee has recommended that with adequate supply and no logistic constraint of domestic coal with implementation of vision 2030 of Ministry of Coal of reaching 1.51 BT coal production by FY2030, Ministry of Power may need to mandate the DCBs for using domestic coal instead of imported coal.

v. Reduction in coal imports by Non-Regulated Sector imports

All the Administrative Ministries of coal consuming industries need to work out genuine grade wise requirement of coal of their sector and share the details with Ministry of Coal so that demand aggregation can be done and a strategy can be effectively planned for coal import substitution.

vi. Promoting RSR transport: Financial incentives

a. Coal companies may consider offering **concessional rates** to coal shipped through Ports along with MoC and MoPSW reviewing their freight tariffs and port charges.
b. **Telescopic benefits for RSR movement of coal**: Transportation of coal through coastal shipping involves two legs of rail transportation, one leg from mines to loading Port by rail and another leg from unloading port to the thermal power plant. Presently, the tariff is charged by Railways as a spilt fare, which is higher than the telescopic fare for the total distance of both legs of transportation. The telescopic fare would reduce the rail transportation cost ranging from Rs.306/ton to Rs.408/ton depending upon the distance of transportation and which will also reduce the cost of generation by Rs.0.21/kWh to Rs.0.28/kWh.
c. The coal movement through RSR mode is expected to be around 2 % of the total coal production in the country. The waiver of GST compensation cess on this quantity would help in reduction of imported

coal as the movement of domestic coal would become cheaper and would also give boost to the make in India initiative.

vii. Installation of Pit-head Power houses:

To reduce the logistic cost and logistic constraints there is a felt need for installation of pit-head power houses as much as possible and feasible. A coal pithead is located close to a coal mine and is an area where the mined coal is kept before being transported to power plants. Locating a thermal power plant close to a pithead allows quick availability of coal as no to minimum transportation is involved, which also makes coal cheaper for the power generation company. Supercritical thermal power plants are the standard for new coal power plants, as their efficiencies can reach around 44 percent, compared to older coal power plants that operate around 33 percent. Improved efficiency corresponds to fewer greenhouse gas emissions, as well as pollutants like NOx, SOx, and particulate matter. According to the World Coal Association, a supercritical coal plant (as opposed to a traditional coal plant) will decrease waste heat produced by 25 percent, and cut pollution and CO2 by roughly the same amount.

CIL's plan to set up two pithead supercritical thermal power plants, one of 660 MW in MP & another of 1,600 MW in Odisha, through SECL & MCL.

"The Cabinet Committee on Economic Affairs chaired by the Prime Minister Shri Narendra Modi today approved proposal for equity investment by (i) South Eastern Coalfields Limited (SECL) for setting-up 1×660 MW Thermal Power Plant through JV of SECL and MPPGCL; and (ii) Mahanadi Coalfields Limited (MCL) for setting-up 2x800 MW Thermal Power Plant through Mahanadi Basin Power Ltd (MBPL - a subsidiary of MCL)". The SECL plant is a single unit coming up at Madhya Pradesh Power Generation Company Limited's (MPPGCL) Amarkantak Thermal Power Station in Village Chachai, Anuppur district, Madhya Pradesh. It will be a 660-MW Supercritical Coal-Based TPP. The MCL plant is coming up in Sundargarh district, Odisha, and will be a 2×800 MW (1,600 MW) Supercritical Thermal Power Plant.

viii. Rationalization of the GST compensation Cess on the coal.

One of the main reasons for higher import of coal in the country is the nature of GST compensation cess, which is presently being charged at the flat rate of Rs 400/ton irrespective of quality, price and source (domestic/imported) of coal. GST Compensation Cess is based on tonnage and not on the GCV value of coal. Imported coal being the high GCV value (5000-6000 Kcal) in comparison to domestically supplied coal (3000-3500 Kcal), the tax incidence on imported coal on per Kcal basis is less in comparison to domestic coal.

As indicated in Figure 8 that average international coal price goes up, the imports of coal shows decreasing trend and vise-versa. Hence, GST Compensation Cess may be imposed on ad-valorem basis wherein the Cess would be directly related to the price and quantity of the coal, instead of the present levy of a fixed amount of Rs 400 per tonne (analysis at Annexure -2).

ix. Early operationalization of Captive/Commercial coal blocks

To achieve the target coal production of 1.51 BT in country by FY2030, operationalization of coal blocks plays a critical role as has 20% share. Hence, it is recommended to monitor the early operationalization of captive/commercial coal blocks in country.

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Annexures

Annexure-1: Constitution of Inter-Ministerial Committee

1071/111

CLD-35011/1/2018-CLD

2547897/2023/CPD CLD-35011/1/2018-CLD

I/32668/2023

No.CLD-35011/1/2018-CLD
Government of India
(भारत सरकार)
Ministry of Coal
(कोयला मंत्रालय)
*****

Shastri Bhawan, New Delhi
Dated the 13th July, 2023

OFFICE MEMORANDUM

Subject: Inter-Ministerial Committee constituted for the purpose of coal import substitution

The undersigned is directed to refer to Ministry of Coal O.M No. CLD-35011/1/2018-CLD -Part(1) dated 29.05.2020 (*copy enclosed*) vide which an Inter-Ministerial Committee (IMC) for the purpose of coal import substitution was constituted.

2. It has been decided to include a representative from NITI Aayog and Coal Controller Organization (not below the rank of Joint Secretary) as member of the IMC. The composition of the IMC stands modified to that effect.

This issues with the approval of the Competent Authority.

Encl: (1)

(Hitlar Singh)
Under Secretary to the Government of India

To

i. Secretary, Ministry of Commerce, Udyog Bhavan, New Delhi
ii. Secretary, Ministry of Power, Shram Shakti Bhawan, New Delhi
iii. Chairman, Railway Board, Ministry of Railways, Rail Bhavan, New Delhi
iv. Secretary, Ministry of Shipping, Transport Bhavan, New Delhi
v. Secretary, Ministry of Mines, Shastri Bhavan, New Delhi
vi. Secretary, Ministry of Steel, Udyog Bhavan, New Delhi
vii. Secretary, Ministry of Micro, Small and Medium Enterprises, Udyog Bhavan, New Delhi
viii. Chief Executive Officer, NITI Aayog, New Delhi, 110001
ix. Secretary, Department for Promotion of Industry and Internal Trade, Udyog Bhavan, New Delhi
x. Chairman-cum-Managing Director, Coal India Limited, Kolkata
xi. Chairman-cum-Managing Director, Singareni Collieries Company Limited, Hyderabad, Telangana
xii. Coal Controller, Coal Controller Organization, Kolkata

2547897/2023/CPD

CLD-35011/1/2018-CLD

I/32668/2023

xiii. Chairperson, Central Electricity Authority, Sewa Bhawan, R.K Puram, New Delhi
xiv. Chairman, Paradip Port Trust, Paradip, Odisha
xv. Chairman, Visakhapatnam Port Trust, Visakhapatnam, Andhra Pradesh
xvi. Chairman, Kolkata Port Trust, Kolkata

Copy to:

i. Director (Marketing), Coal India Limited
ii. Executive Director, SCCL

Copy also to:

i. PS to Hon'ble Minister of Coal
ii. PS to Hon'ble MoS, Coal
iii. Advisor to Secretary (Coal)
iv. PPS to AS (Coal)
v. PPS to JS (Coal)
vi. PS to Director (EA)
vii. PS to DS (CPD)

File No. CLD-35011/1/2018-CLD-Part(1)
Government of India
Ministry of Coal

Shastri Bhawan, New Delhi
Dated the 29th May, 2020

OFFICE MEMORANDUM

Subject: Constitution of an "Inter-Ministerial Committee" for the purpose of coal import substitution

The undersigned is directed to say that with the approval of the Competent Authority, it has been decided to constitute an Inter-Ministerial Committee (IMC) for the purpose of coal import substitution.

2. The IMC shall have following composition (representative of the Ministries / Departments not below the rank of Joint Secretary):

1.	Additional Secretary, Ministry of Coal	Chairman
2.	Joint Secretary, Ministry of Coal	Member
3.	Economic Advisor, Ministry of Coal	Member
4.	Representative, Ministry of Commerce	Member
5.	Representative, Ministry of Power	Member
6.	Representative, Ministry of Railways	Member
7.	Representative, Ministry of Shipping	Member
8.	Representative, Ministry of Mines	Member
9.	Representative, Ministry of Steel	Member
10.	Representative, Ministry of Micro, Small & Medium Enterprises	Member
11.	Representative, Department for Promotion of Industry and Internal Trade	Member
12.	Director (Marketing), Coal India Limited	Member
13.	Executive Director, Singareni Collieries Company Limited	Member
14.	Representative, Central Electricity Authority	Member
15.	Chairman, Paradip Port Trust	Member
16.	Chairman, Visakhapatnam Port Trust	Member
17.	Chairman, Kolkata Port Trust	Member

3. The terms of reference of the IMC are as under:

(a) Analyse the overall coal import in the country and suggest supply side measures to eliminate substitutable coal import.
(b) Examine the logistic bottlenecks in the coal transportation through different routes (Rail, Sea, River, MGR, Belt, Road etc) and suggest suitable long term and short term measures for enabling coal import substitution.
(c) Engage with different coal consumers, associations etc and provide sector specific recommendations, if any.
(d) Continuously monitor the coal imports in different sectors of the country and suggest course corrections for elimination of imports.
(e) To suggest measures so that the information regarding imported coal in NRS is made available within 15 days of the next month in which coal

imports have taken place.
(f) Suggest leveraging of technology in eliminating coal imports
(g) Any other issue related to coal import substitution with the approval of Chairman of the IMC.

4. The IMC may have separate meetings for regulated Sector (Power sector) and Non-Regulated Sector (NRS) so as to make the discussions and objectives more focused and meaningful. The IMC may, if required, further sub-divide the meetings for each sub-sector. The IMC would not only make suggestions/recommendations for import substitution but shall also monitor the same throughout the year.

5. All the Ministries are requested to forward the names and designation of the representatives in the IMC from each Ministry.

(Sujeet Kumar)
Under Secretary to the Government of India

To

i. Secretary, Ministry of Commerce, Udyog Bhavan, New Delhi
ii. Secretary, Ministry of Power, Shram Shakti Bhawan, New Delhi
iii. Chairman, Railway Board, Ministry of Railways, Rail Bhavan, New Delhi
iv. Secretary, Ministry of Shipping, Transport Bhavan, New Delhi
v. Secretary, Ministry of Mines, Shastri Bhavan, New Delhi
vi. Secretary, Ministry of Steel, Udyog Bhavan, New Delhi
vii. Secretary, Ministry of Micro, Small and Medium Enterprises, Udyog Bhavan, New Delhi
viii. Secretary, Department for Promotion of Industry and Internal Trade, Udyog Bhavan, New Delhi
ix. Chairman-cum-Managing Director, Coal India Limited, Kolkata
x. Chairman-cum-Managing Director, Singareni Collieries Company Limited, Hyderabad, Telangana
xi. Chairperson, Central Electricity Authority, Sewa Bhawan, R.K Puram, New Delhi
xii. Chairman, Paradip Port Trust, Paradip, Odisha
xiii. Chairman, Visakhapatnam Port Trust, Visakhapatnam, Andhra Pradesh
xiv. Chairman, Kolkata Port Trust, Kolkata

Copy to:

i. PS to Hon'ble Minister of Coal
ii. PSO to Secretary, Coal
iii. PPS to AS (Coal)
iv. Sr. PPS to JS (Coal)
v. PPS to Economic Advisor, Coal
vi. PS to Director (CLD)

Signature Not Verified

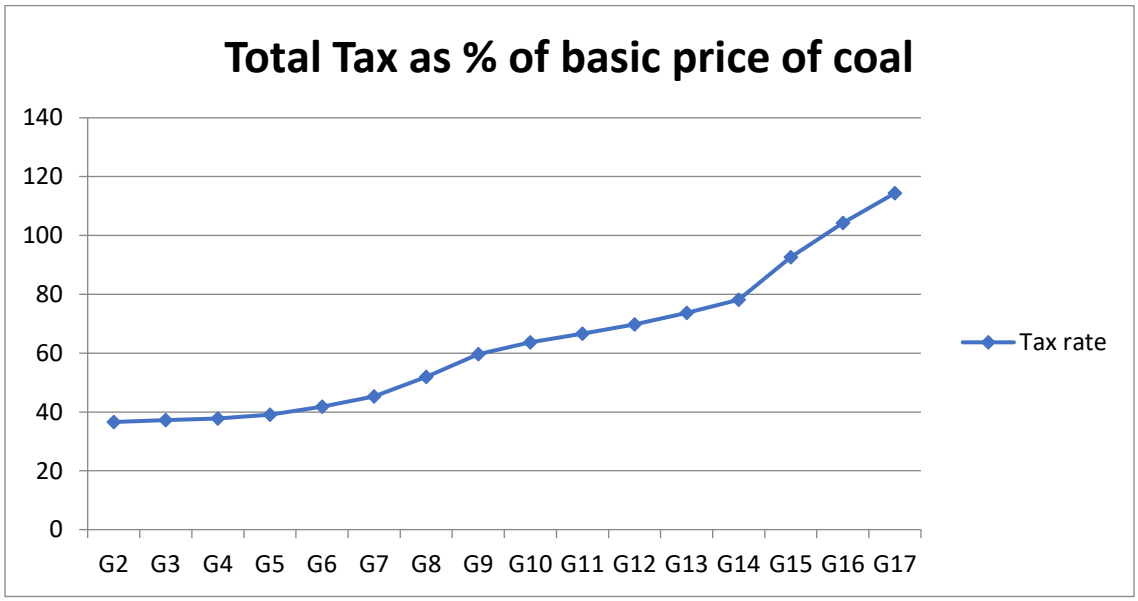
Digitally signed by SUJEET KUMAR
Date: 2020.05.29 15:09:45 IST

Annxure-2: An analysis of the impact of GST Compensation Cess

i. Impact on Lower grade Coal

a. GST Compensation Cess is levied on per ton basis irrespective of the quality or the price of the coal. The impact of this Cess, for the same quantity of coal, becomes much higher for coal with lower GCV when compared with coal having higher GCV. In percentage terms the proportionate impact of the Cess on final price of coal is much higher in case of lower GCV domestic coal.

b. In terms of percentage, total taxes come from 37% to 52% of value of coal in case of higher GCV domestic coal and from 60% to 115% in case of lower grade domestic coal. It has resulted in a kind of regressive taxing regime.. A graphical representation can be seen from the following graph:



c. It may not be out of place to mention that around 85% to 90% of domestic coal sold in India has GCV grade of G8 and lower, which is currently priced at around Rs 1500/- per ton or lower for the regulated sector (power, fertilizer). **Hence charging of a fixed Cess per ton of coal, is adversely impacting the marketability of domestic coal.**

ii. Impact on Domestic Coal as compared to Imported Coal

a. Sponge iron associations have been consistently raising the point that they use two tons domestic coal of 3500 Kcal for producing one ton of sponge iron. For this the coal compensation cess payable is Rs 800. However, if

imported coal with higher GCV is used, one ton would be required for producing 1 ton of sponge iron and coal compensation cess payable would be only Rs 400 for every ton of sponge iron produced.

b. As GST Compensation Cess is levied on per ton basis without considering the quality and price of the coal, it results in increasing price of the domestic coal having lower GCV than that of the imported coal having higher GCV. Through this import of coal is being favoured. India is 2nd largest importer of coal in the world despite having 5th largest reserves of Coal in the world and being the 2nd largest producer of the coal in the word.

c. During FY 2021-22, GST Compensation Cess collected on import of coal was around Rs 8359.15 crores (Rs 400/- per ton X 208.97 MT of coal import) against the total import value of Rs 228742.44 Crores translating into the GST Compensation Cess incidence of 3.65%.

d. While during the same period, GST Compensation Cess collected on domestic coal (CIL & SCCL) was around Rs 29096.8 crores (Rs 400/- per ton X 727.42 MT of domestic coal sales) against the approx. value of Rs 117251.40 Crores translating into the GST Compensation Cess incidence of 24.82%.

iii. Impact on Power Sector

a. Being a welfare State, the objective of the Government is to make cheaper power available to the consumers to achieve the goal of 24 X 7 "Power for All".

b. The share of taxes as a proportion of final landed price of coal is already very high.

c. As a thumb rule, every Rs 100 per ton increase in price of coal makes power costlier by approximately Rs. 0.06 per unit of electricity. So, the GST Compensation Cess alone is increasing the price of power by around Rs 0.24 per unit.

d. Power Sector generally consumes coal with lower GCV, which has relatively high % of taxes due to fixed Rs 400/- per ton charge of GST Compensation Cess.

Recommendation/suggestions

It is thus imperative that rationalising the GST Compensation Cess shall be considered for correct the market distortion that favours coal imports so that import of coal can be reduced, and we become 'Atmanirbhar Bharat'. It is thus proposed that:

On Long Term Basis: GST Compensation Cess may be imposed on **ad-valorem basis** wherein the Cess would be directly related to the price and quality of the coal, instead of the present levy of a fixed amount of Rs 400 per tonne.

- It is pertinent to mention here that in addition to GST Compensation Cess, various other charges/ levies are imposed on coal on an ad valorem/percentage basis. For instance, Royalty is charged @ 14% ad valorem (except fixed rate in the state of West Bengal), for mines auctioned under commercial coal mines auction, royalty is 14% of higher of Notional Price or Actual Price, contribution to NMET is 2% of royalty, contribution to DMF is 10% of royalty, GST is 5% on the total value and other State Specific Taxes such as Forest Taxes and other Local Taxes. As can be seen most of the levies are charged as a percentage (proportion) to a value, whereas GST Compensation Cess is levied at the flat rate of Rs 400/- per tonne which distorts the pricing of coal.

- Imposition of GST Compensation Cess on ad-valorem basis would also give benefit of any future increase in price of coal to the exchequer.

- The appropriate percentage of GST Compensation Cess on coal may accordingly be decided so that the same can be revenue neutral and there is no loss to the exchequer.

In view of above, it is felt that if the above options are considered then it would benefit the domestic coal sector by making the domestic coal more competitive and would go a long way in import substitution for a "Atmanirbhar Bharat".

Annexure-3: Inputs from Ministry of Power for future demand of coal

Future scenario

3.1 Planning Studies

As per 20th Electric Power Survey (EPS), the projected All India peak and electricity energy demand for the year 2029-30 and 2031-32 is given in the table below:

Year	Peak Demand (MW)	Energy requirement (BU)
2029-30	334.8	2279.7
2031-32	366.4	2473.8

To meet the projected demand as per the 20th EPS, Central Electricity Authority (CEA) has carried out generation expansion studies up to year 2031-2032 and has notified the National Electricity Plan (Generation Volume-I) in May 2023 and published a report on Optimal Generation Mix 2030 Version 2.0 in April, 2023.

Based on generation expansion studies carried out by CEA, to meet the peak and electricity demand of the corresponding year, the installed Capacity for the year 2029-30 is likely to be 777,144 MW comprising of 291,987 MW of Conventional capacity (Coal-251,683 MW, Gas–24,824MW, Nuclear-15,480MW) and 485,157 MW of Renewable based Capacity (Large Hydro-53,860 MW, Solar-292,566 MW, Wind-99,895MW, Small Hydro-5350MW, Biomass-14,500 MW, PSP-18,986MW; excluding 5856 MW of likely Hydro based Imports) along with BESS capacity of 41,650MW/208,250 MWh.

Similarly, the installed Capacity for the year 2031-32 is likely to be 900,422 MW comprising of 304,147 MW of Conventional capacity (Coal-259,643 MW, Gas–24,824MW, Nuclear-19,680MW) and 596,275MW of Renewable based Capacity (Large Hydro-62,178 MW, Solar-364,566MW, Wind-121,895MW, Small Hydro-5450MW, Biomass-15,500 MW, PSP-26,686MW; excluding 5856 MW of likely Hydro based Imports) along with BESS capacity of 47,244MW/236,220MWh.

As per the studies, the share of coal-based capacity in the total installed capacity is likely to reduce from the present 50% to 32.4 % and 28.9% by 2029-30 and 2031-32, respectively. However, in absolute terms, the installed capacity of coal plants will increase from present 212 GW to around 260 GW by the year 2032 in spite of increasing share of non-fossil fuel-based generation capacity in the total installed capacity of the country from around 43.8% as of 30.09.2023 to around 68.4 % by 2031-32.

3.2 Alternate Resilient Scenario (Stress Scenario)

Central Electricity Authority, while doing generation expansion planning studies for the National Electricity Plan, ran a scenario (Alternate Resilient Scenario) wherein the peak and energy demand was increased by 5% from the values projected by 20th

EPS (for the year 2031-32 Peak demand- 384.72 MW and Energy demand- 2597.5 BU) and the commissioning dates of all the upcoming capacities viz. Coal, Hydro and RE were delayed by one or two years. In that scenario, the likely coal based installed capacity required to meet the demand in 2031-32 **is 283 GW** against the coal based installed capacity of 259.6 GW as projected in the base case.
At present, around 27 GW of coal-based capacity is currently under construction. Coal based thermal power projects of about 31 GW are in advance stages of planning. In addition, a coal based capacity totaling to around 28.4 GW has been identified which can be taken up for development in future if required.

3.3 Future requirement coal-based plants despite large capacity addition from RE sources

1. The share of coal + lignite in energy generation is likely to be around 54.5 % of the total generation mix by 2029-30 and 50.1 % by 2031-32. The PLF of coal-based power plants is likely to be 60.3% in 2029-30 and 58.7% in 2031-32. This reflects that coal-based plants are likely to play a major role in fulfilling the increasing demand (both peak and energy) of the country in the future years.

2) At present, storage technology like battery energy storage systems is also not economical. RES, being a non-dispatchable energy source, would require flexible coal generation to absorb RE generation variability and intermittency to ensure grid security.
3) Also, abundant coal resources are available in the country. To ensure reliable energy supply and energy security, Coal-based plants are best suited.
4) India is having installed capacity of gas-based plants of about 25 GW which is a better option to cater to the intermittent and variable nature of generation from renewable energy sources. However due to severe scarcity of domestic natural gas and imported gas being highly costly, support of these plants are very limited to cater to the need of the Grid. During high demand period, the support from gas based generating plants has been around 10 GW.

Need for Thermal Capacity

The generation profile of wind and hydro is such that it is available only for 5 months (ie monsoon period – May to September) and for rest of the months, it reduces to very minimal to say 10- 20 % depending upon the zone.

So critical time for the country is during the Non-windy, Non-Hydro months and the non-solar hours especially evening hours. During this period, we depend upon the fossil fuel based generation sources.

Due to non-availability of domestic Gas in the country for the power sector, the gas based plants are import dependent. The cost of generation becomes a challenge. Cost of gas is such that the generation cost is of the order of 14 to 18 rupees per unit or more.

In the above scenario, in order to maintain the energy security and security of supply to the electricity consumers, we have to continue our dependence on the coal based generation at least till we have the alternative cost effective solutions. The storage capacity as of now is costly.

Domestic coal Requirement from 2024-25 up to 2031-32 has been worked out and is as under:-

Year	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32
Domestic Coal Requirement (MT)	874	892	920	949	998	1029	1071	1113

In addition to above 30 MT demand of Import coal based power house is consider for every year.

Annexure-4: Coal Import Scenario of last 5 years and current year

Coal Import Scenario of last 5 years and current year

(In Million Tonne)

Year	Coking Coal	ICB	DCB	Total Power	NRS	Total Import	Total consumption	% share
2018-19	51.84	40.29	21.37	61.66	121.85	**235.35**	968.14	**24.31**
2019-20	51.83	45.47	23.75	69.22	127.48	**248.54**	955.71	**26.01**
2020-21	51.2	35.06	10.41	45.47	118.58	**215.25**	906.14	**23.75**
2021-22	57.16	18.89	8.11	27.00	124.77	**208.93**	1027.93	**20.33**
2022-23	56.05	20.53	35.1	55.63	125.99	**237.67**	1115.04	**21.31**
2022-23 (Apr-Sept.)	28.71	11.77	22.53	34.30	68.85	**131.86**	548.50	**24.04**
2023-24 (Apr-Sept.)	29.39	17.08	10.70	27.78	68.04	**125.21**	587.53	**21.31**
% Growth	2.36	45.11	-52.50	-19.01	-1.17	**-5.04**	7.11	**-11.35**

Import by Power sector in 2023-24 from Apr-Oct: ICB= 21.71 MT, DCB= 13.57 MT & Total=35.28 MT

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