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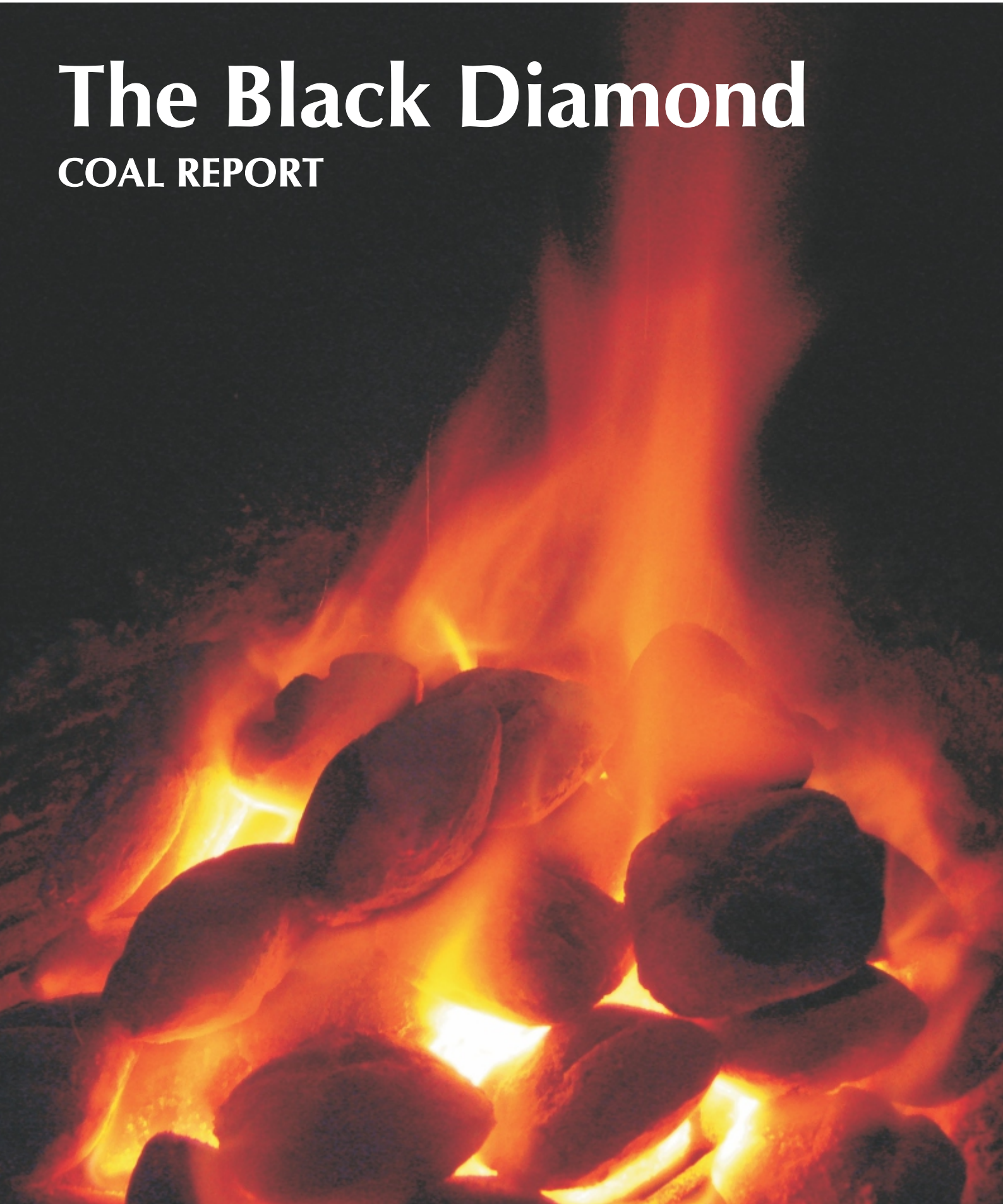
LSI Financial Services Pvt Ltd

The Black Diamond

COAL REPORT



LSI Financial Services Pvt Ltd

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It has successfully raised funds for companies through structured financial products, spanning various sectors. With in depth domain knowledge, LSI strives to add value to the client's financial supply chain ensuring an effective and efficient capital structure.

Our services include:

- Debt Syndication
- Private Equity Advisory
- Issue Management
- Mergers and Acquisitions
- Financial Restructuring
- Project Advisory Services

From The Managing Director's Desk

Mr. Raj Kajaria

Dear Readers,

LSI continues to be a one-stop financial service provider with a difference. The company in addition to its focus on Debt syndication, Issue Management (as a Category I Merchant Banker), PE Advisory, Financial Restructuring Advisory and M&A with a pan India presence, lays significant stress on creating knowledge pools on economically important topics. It is our belief that our robust research department is an enabler for dispersion of information and analysis which is of considerable importance to our esteemed readers.

As the Government of India aggressively targets self-sufficiency in coal and has set ambitious energy targets to be achieved by 2020, we have come out with a report on the Indian Coal and Mining industry, to track and understand this transformation.

Historically, coal has been the basis of energy for industrialization since 18th century. It continues to meet energy needs of the essential industries like power, steel, cement, paper etc. While India is reserve-rich in coal and minerals, the need for superior grades and political obstacles that had delayed allocation of coal blocks in the recent past necessitated significant imports to feed our industry. When imports had reached alarming proportions for the World's third largest coal producer, it's state run enterprises- that account for most of the coal production, have had to gear up to reverse the trend.

Globally, increased coal usage is restricted to China and India while the major suppliers are Australia and Indonesia. However, with climate change and the western countries shunning coal in favour of cleaner fuels, cleaner coal technologies could fire the Eastern Nations' never ending quest for coal and act asa game changer in the future.

Hope you find the contents useful and we look forward to your valuable feedback.

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1. Coal: An Introduction

Coal, the black diamond, is a combustible black or dark brown rock consisting chiefly of carbonized plant matter, found mainly in underground seams and used as fuel. This fossil fuel is extracted from the ground by mining, either underground through the seams or in open pits. Coal is primarily used as input to generate electricity, manufacture steel, cement and liquid fuels.

Coal is non-renewable in nature and the largest source of energy for the generation of electricity worldwide, as also the largest worldwide anthropogenic sources of carbon dioxide releases. Gross carbon dioxide emissions from coal usage are slightly more than those from petroleum and about double the amount from natural gas.

1.1 TYPES OF COAL AND THEIR USES

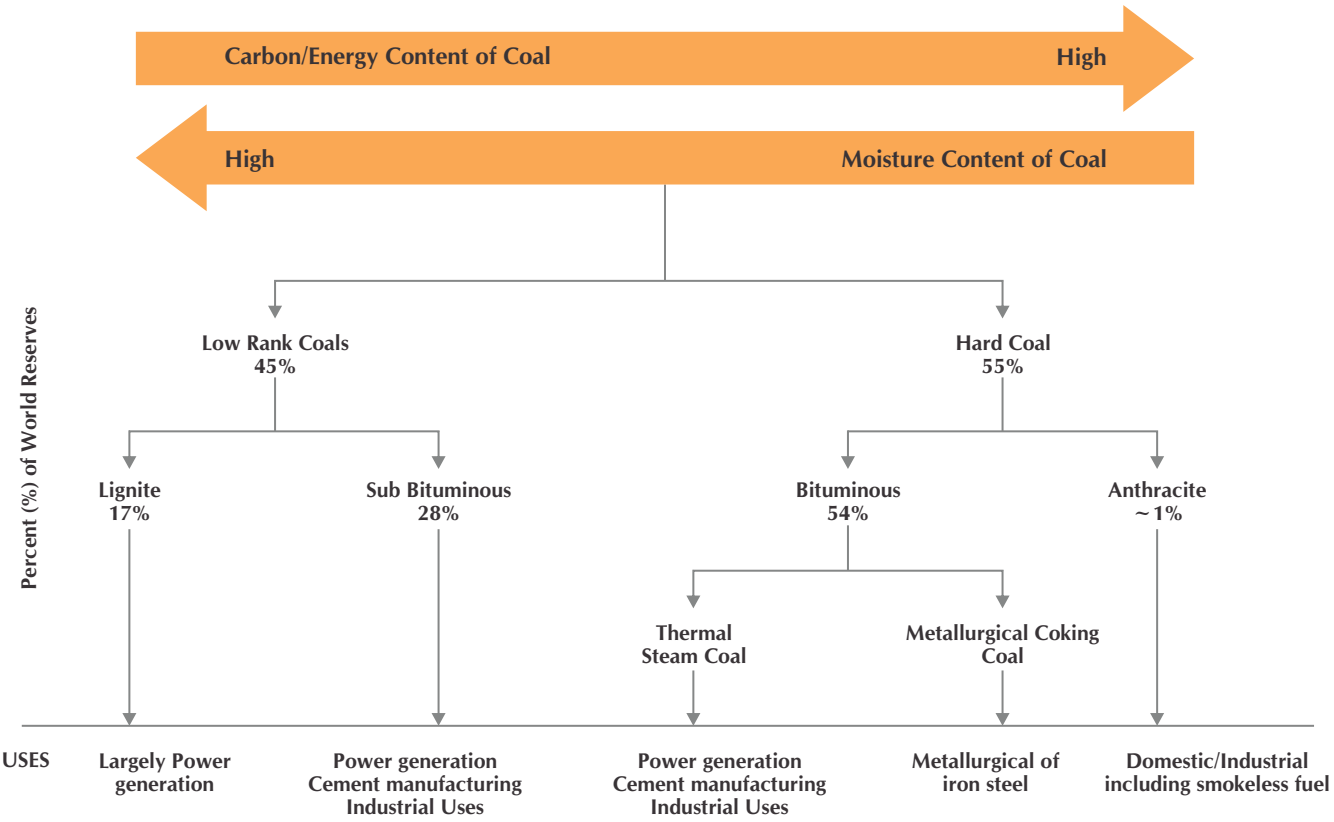
Based on its physical and chemical properties, coal is graded and ranked into lignite, sub-bituminous, bituminous and anthracite.

Table 1 : Coal Grade, its Usage and Carbon Content

Coal Grade	Primary Use	Carbon Content	Calorific Value (Kilo Joules per Kg)	Share of Global Reserves
Lignite or Brown Coal 	Power Generation	Low - 25 to 35%, high moisture content and low energy	17,435	17%
Sub-Bituminous 	Power Generation, Cement Plants and various industrial uses	Low-35 to 45%, high moisture, low energy	17,435-23,865	28%
Bituminous or Soft Coal 	Power generation, cement manufacture, iron and steel manufacture and industrial uses (Segmentation based on usage; Thermal (Steam) used for power generation, cement manufacture and industrial uses and Metallurgical (Coking) coal used in manufacturing of iron &steel)	Medium-45 to 86% and low moisture content	23,865 and above	54%
Anthracite or Hard Coal 	Domestic and industrial uses	High-86% and Above	23,865 and above	1%

Source: British Petroleum & LSI Research

Figure 1 : Types of Coal Classified by Usage and Moisture Content



Source: World Coal Association

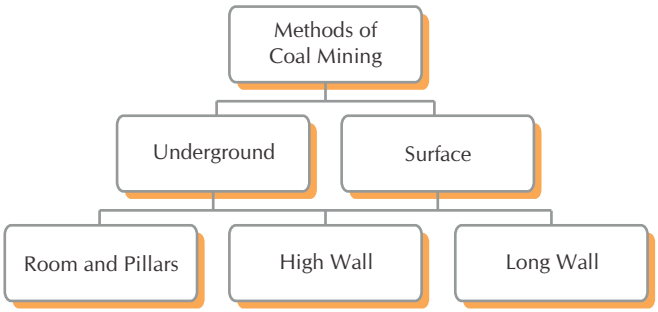
1.2 COAL MINING

Coal mining is done through two main methods:

- Underground or Deep Mining
- Surface or open castor Open Cut Mining
- High wall mining

The choice of method is largely determined by the geology of the coal deposit. At present, underground mining accounts for 60% of world coal production. Underground mining can be further segregated into two main segments i.e. Room-and-Pillar and long wall mining.

Figure 2 : Methods of Coal Mining



1.2.1 Underground or Deep Mining

- **Room-and-pillar mining** involves mining for coal deposits by cutting a network of rooms or panels into the coal seam and leaving behind pillars of coal to support the roof of the mine. The pillars normally account for up to 40% of the total coal seam. In this case, coal is mined from pillars when workers move out. The mine is then abandoned as the roof is collapsed after extracting coal from those pillars.
- **Long wall mining** is a popular method of mining under which coal is extracted from a section of seam through the help of mechanical shearers. The shearers cut coal from a wall face which falls on a conveyor belt for further processing. Long wall mining is suitable for deep mining, generally with a depth of more than 300 meters. Hence, extraction of coal is much more efficient in this case with the recovery of more than 75% of coal deposits. However, the cost of equipment used in long wall mining is steeper than the capital cost of room-and-pillar mining and thus, it is more suitable for large-scale mining.
- **High wall mining** is a hybrid technique between surface and underground mining in which while the machine is positioned on the surface, the cutter goes below the ground to extract coal without the need for manual entry into the coal mine. Being a safe mining technology, it is also versatile and can be applied to both opencast and underground mines that it may be otherwise economically unviable to mine. It therefore finds application in very thin layer seems lying at a shallow depth or exposed at the hill side. Another application may be at the ends of opencast workings where strip ratio has turned adverse. This method is highly prevalent in the USA and has been recently introduced in India also.

1.2.2 Surface/opencast Mining

This form of mining is used in cases where coal bed is located close to the surface. This method is applied in case of coal seam being available at a depth of less than 200 feet. Coal extraction is highest in surface mining and 90% or more of the deposits can be recovered from the coal block.

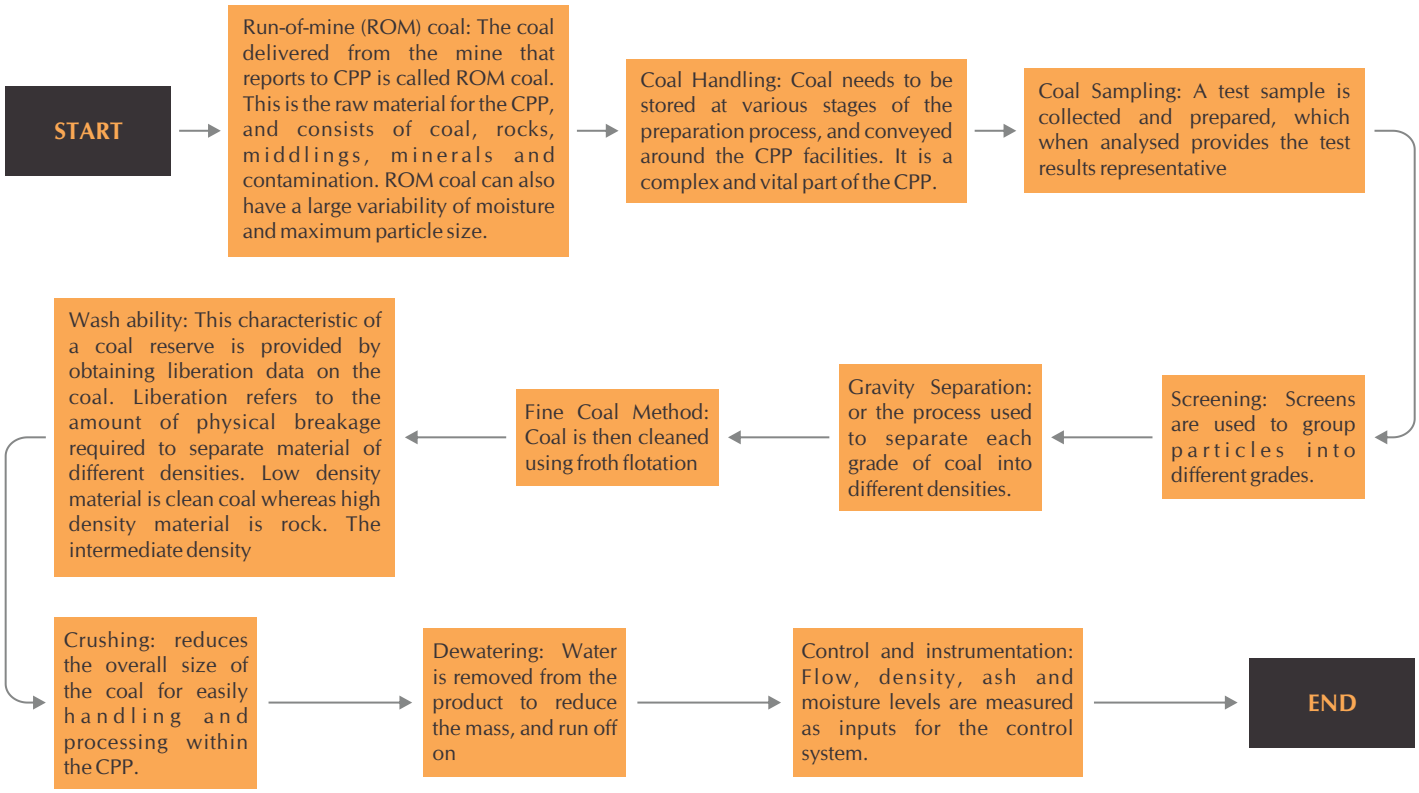
As mentioned earlier, high wall mining technology is useful in this type of mining. Worldwide there are two types of high wall mining technologies used. Both technologies are being operated in India by two different agencies. The details of the same are as detailed below:

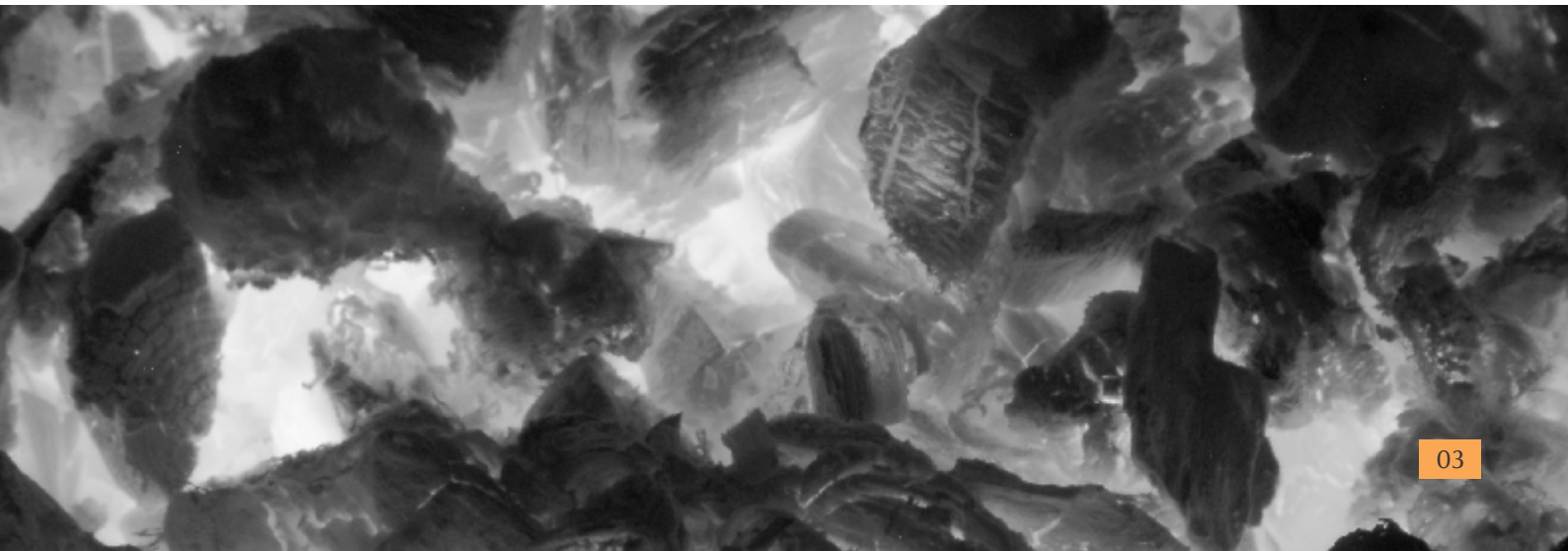
- **Add Car High Wall Mining Technology**: Operated by Advanced Mining Technologies Pvt. Ltd, a Hyderabad based company; it is a highly productive system that is capable of mining upto 1MT/year. However, it is constrained by the factor that it can be safely used only in mines with a strong roof as Add Car conveyers are open in design and if the roof of the mine collapses it is capable of damaging the conveying system.
- **Auger High Wall Mining Technology**: Operated by CBK (Coopram Bagdoria Limited) as Sharda High Wall Mining at Sohagpur Mine of SECL, a subsidiary of CIL, the auger high wall mining technology is considered less productive but safer than the Add Car technology as its augers (conveyer vehicles) are armoured and covered and can be safely applied under different conditions.

1.3. COAL PREPARATION

Coals extracted from both surface and underground mines require washing in a Coal Preparation Plant (CPP). A CPP is a facility that removes soil, rock and any other waste material from coal. With more of these materials removed from coal, its market value is enhanced. This whole process is called coal preparation.

Figure 3 : Steps in Coal Preparation





2. Mining – An Introduction

India mines 88 minerals under different groups, of which coal mining accounts for 80% and the balance 20% comprises various metals and raw materials such as gold, zinc, iron, lead, copper, bauxite and uranium. Of the 88 minerals produced, 4 are fuel minerals, 10 metallic, and 50 non-metallic and 24 minor minerals.

Table 2 : Indian Mineral Mining Industry

Minerals	Production		India's Rank
	World	India	
Metallic Minerals			
Bauxite	248.00	15.36	6th
Chromite	25.80	2.95	3rd
Iron ore	2,969.00	136	5th
Manganese ore	48.30	2.32	7th
Metals			
Aluminum	47.00	1.68	8th
Copper (refined)	20.30	0.49	10th
Steel (crude/liquid)	1,547.00	78.3	4th
Lead (refined)	10.50	0.12	15th
Zinc (slab)	12.60	0.70	3rd
Industrial			
Barites	9.70	1.74	2nd
Kyanize, Alusite & Sillimanite	0.41	0.05	4th
Magnetite	24.50	0.21	11th
Apatite & Rock Phosphate	215.00	2.13	13th
Talc/Steatite/ Pyrophyllite	7.80	1.18	2nd
Mica (crude)	0.32	0.001	16th
Mineral Fuels			
Coal & Lignite	7,691.00	604.00	3rd
Petroleum (crude)	4,008.00	38.00	25th

Source: Ministry of Mines

There are close to 3000 mines in India. Number of reporting mines during the last decade has been around 3000 to 3200. There are 560 Coal mines (19% of total number), 553 limestone mines (19% of total number) and 316 iron ore mines (11% of total number). They comprise about half of the total number of reporting mines. The number of mines engaged in extraction was also significant in cases of bauxite (189), manganese (141), dolomite (116) and Steatite (113).

The following table shows the state-wise share of key mining states by type of mineral in the country's mineral reserves.

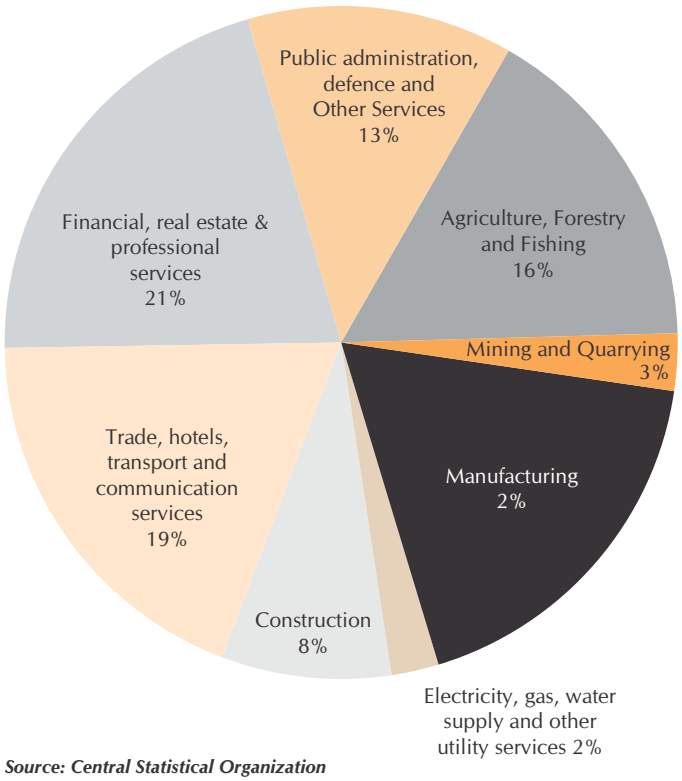
Table 3 : Share of Key Mining States in India's Mineral Reserves, by Volume

States	Coal	Iron Ore	Bauxite	Manga-nese	Lead and Zinc	Chro-mite
Jharkhand	29%	14%	-	-	-	-
Orissa	24%	17%	51%	35%	-	98%
Chhattisgarh	16%	10%	-	-	-	-
Madhya Pradesh	18%	-	-	10%	-	-
Andhra Pradesh	7%	7%	21%	-	1%	-
Rajasthan	-	-	-	-	90%	-
Karnataka	-	41%	-	29%	-	1%
Total	**94%**	**89%**	**72%**	**74%**	**91%**	**99%**

Source: The Federation of Indian Chambers of Commerce and Industry (FICCI)

Overall, the Mining and Quarrying sector contributed almost 3% to the Indian economy's GDP as of FY2014-15.

Figure 4 : Share of Mining and Quarrying in India's GDP, 2015



Source: Central Statistical Organization

2.1 GLOBAL MINING INDUSTRY

As of 2015, the outlook for the global metals and mining market remains subdued due to the combination of a slower rate of global economic growth, particularly in emerging markets, and signs of an oversupply of several commodities, most notably iron ore and coal. Lower crude oil prices and a stronger US dollar are proving beneficial for miners by helping them to lower operating costs. The uneven global economic recovery and divergent monetary policies continue to create uncertainty around medium-term supply and demand across the mining industry.

Since China accounts for as much as 40% to 50% of global commodity demand, a slowdown in China's economic growth, to around 7% from double-digit growth in recent years, is expected to weigh on the industry in the months to come. This slower growth has already had a major impact on demand for key steelmaking companies, namely iron ore and metallurgical coal. With potentially more weaknesses forecast by analysts in the global real estate market, as well as an overall lower pace of urbanisation, demand could weaken further.

2.1.1. Regulatory Changes Across The Global Mining Industry

Governments across the world will have to take tough decisions on adopting the best practices to regulate their respective mining sectors in a post commodity price boom era. Mineral prices have been in secular decline since 2011 and as they continue to remain depressed Governments' income from mineral royalty and tax revenues have come under pressure. Analysts expect regulatory outperformers and underperformers to be spread in a diverse manner across the world and a proactive regulatory environment emerges in countries including Chile, India, Peru, Cote d'Ivoire and Mongolia, while the mining sector is likely to face challenges for investors in countries including Zambia, China, Ukraine, Honduras, Cuba and the Philippines.

The key changes witnessed in regulatory environments - positive, negative and neutral developments in the past quarters of 2015 over the previous quarters - according to a summary by Business Monitor International (BMI) adjusted for views from LSI Research are presented below.

2.1.1.1 Global Mining Regulations 2014-15 – Key Developments

Figure 5 : Global Mining Regulations 2014-15 - POSITIVE Developments

Region	Country	Comment
Asia-Pacific	Australia	Western Australian Government is currently offering 50% rebate on royalties for mining projects with production below 20 MTPA, with the rebate to be paid back after two years.
	Myanmar	Reforms to Myanmar's 1994 mining law likely to open up the sector to foreign investors. However, the current status of the bill introduced in Parliament two years ago is that as of September 2015, the bill was yet to be passed into a law, for lack of consensus on resource sharing clauses in the bill. Despite the delay in the passing of the resolution, the bill is eagerly awaited by the Myanmar and global coal industries as a positive move for the industry.
	India	New Mines and Minerals Development Regulation (MMDR) ordinance amendment extends lives of mines. Mining and prospecting licences are now being issued by auctions which might speed up and render transparency to the issuance of mining licences. Mining royalties have also been increased to help boost state Government finances while encouraging mining. Miners are currently required to pay an extra 2%-35% of royalty payments.
	Mongolia	Formation of super coalition which will focus on resolving the Oyu Tolgoi mine expansion negotiation and speed up Tavan Tolgoi mine (comprising one of the largest untapped coking and thermal coal deposits in the world) auction. Mining accounts for one third of the economy's GDP.
	Indonesia	In October 2014, the Indonesian Government issued the third amendment to Government Regulation (GR) No.23 of 2010 regarding the Implementation of Mineral and Coal Mining Business Activities. In an apparent effort to foster underground mining and domestic processing and refining activities, the Indonesian Government has eased the divestment requirement for mining companies engaged in underground mining or which perform their own processing and refining activities. Under GR 77/2014, a maximum of 70% foreign capital is allowed in mining companies conducting underground mining (whether in whole or combined with open-pit mining). A maximum of 60% foreign capital is allowed for mining companies that perform their own processing and refining activities. Previously, foreign ownership for all mining companies in the operation production stage, regardless of mining method and commodities, was capped at 49%.
	Laos	Government currently reviewing a ban on new mining concessions that had been due to last until December 2015. As of June 2015, the Vientiane authorities also announced stricter controls as a means to force a number of non-performing companies to become more active in producing coal and other mineral extractions according to their agreement and the regulations and also to check tax evasion by mining companies. Although the Government suspended new applications for mining

Region	Country	Comment
		concessions until December 31, 2015, investment in Laos has remained stable. The value of Laos's mineral exports increased substantially after the expansion of excavation capacity by both domestic and foreign investors.
Americas (North & South)	Peru	Government is seeking to fast-track environmental impact studies and limit fines by environmental regulator. Foreign investors in Peru's mining sector have the same rights and obligations as Peruvian investors. Tax regime remains competitive.
	Canada	New regulatory framework under the Extractive Sector Transparency Measures Act came into force in June 2015 providing a new sense of optimism as miners can now enjoy a stable and predictable regulatory environment while illegal mining, illicit payments and corruption in the sector are likely to be curbed.
	Cuba	Cuba, the world's sixth largest nickel producer and one of the top 10 nickel mining countries, is experiencing a sudden, but still modest, investment rush triggered by an on-going reconciliation between the Caribbean nation and the U.S. The country, which also holds significant deposits of coal and other minerals as well as oil, has 246 projects hoping to attract capital and be developed, according to a U.S. Geological Survey report published in April 2015.
	Mexico	The Mexican mining sector has been highly deregulated since the 1980s with high scores in international ease of doing business rankings due to simplified regulatory environment for foreign investment, and participation up to 100% for foreign institutions as well as private players in areas earlier reserved for the public sector. However, the Government has imposed mining royalties of 7.5% on base metals and 8% on precious metals since 2014, while overall environment is likely to remain positive as a small cess would only serve as an irritant rather than a deterrent in the thriving and otherwise deregulated industry.
Europe	Germany	Though the stance of the Government toward coal mining is hostile in general, owing to its green energy policies, the authorities have approved lignite mine expansions on the understanding that the drive toward renewable power generation will need coal-fired power as a backup.

Source: BMI and LSI Research

Figure 6 : Global Mining Regulations 2014-15 - NEGATIVE Developments

Region	Country	Comment
Asia	China	A wave of increased mining taxes has been imposed over the past year in a bid to curb environmental pollution and conserve resources for long-term use.
	South Korea	FDI is welcome. Allow for 100% foreign ownership. South Korea increased its coal import taxes w.e.f July 1, 2015 by nearly 30%. The tax increases are expected to put further downward pressure on Indonesia's coal exports, as Korean buyers are likely to become more selective in coal quality in an oversupplied market. Additionally, the South Korean Government has announced its decision to cancel the development plans of four coal-fired power plants with a combined capacity of 3.74GW. These were initially due for completion from 2019 onwards.
Americas	United States	New EPA regulations to accelerate long-term decline of coal industry. Permitting times amongst longest in world. According to the Energy Information Administration (EIA) reports, nearly 16 GW of generating capacity is expected to retire in 2015, 81% of which (12.9GW) is coal-fired generation, primarily because of the implementation of the Environmental Protection Agency's Mercury and Air Toxics Standards (MATS) this year, although some units have been granted extensions to operate through April 2016. MATS, requires large coal- and oil-fired electric generators to meet stricter emissions standards by incorporating emissions control technologies in existing generating facilities. Some power plant operators have decided that retrofitting units to meet the new standards will be cost-prohibitive and are choosing to retire units instead.
	Honduras	New mining law implemented in Q1, 2013 after being stuck for seven years facing debate in its parliament, has begun to attract investment and aid from the World Bank. However, the new law has sparked unrest among environmental groups and local population due to fears over the adverse environmental impact associated with open-pit mining in 2014 and 2015. Activists and the population have also been making and declarations to make areas mining free in Honduras are on, making a mockery of the Mining law passed in 2013.

Region	Country	Comment
	Venezuela	Foreign firms remain locked out of sector.
Europe	Kazakhstan	Stricter environmental regulation ahead.
	Romania	Large state share in all mining projects. Government is tightening environmental regulation on mining companies.
	Ukraine	Corruption & elevated political risk remain major concerns. The Government has sharply raised taxes on the mining sector in a desperate attempt to avoid default. Ukraine, whose coal industry has been disrupted by the armed conflict with pro-Russian separatists in Donetsk and Luhansk regions, is also stepping up coal imports to accumulate enough coal for the winter.
Africa	Zambia	In Q4, 2013 the Government announced a 10% export duty on semi-processed base metals. The Government increased mining royalties from 6% to 20% on open-pit mining in Q4, 2014. After a lot of protest and controversy, in October 2014, Zambia approved a proposal to drop the controversial hike in mining royalties and it is returning to a tax system based on profit in a fresh effort to try solving a six-month standoff with miners over the increase. The Government has set mining royalties for both open-pit and underground mines at 9%. In January, Zambia had increased the levy for open pit mines from 6% to 20% and from 6% to 8% for underground operations. The cabinet also decided to return income taxes to 30% and set a 15% variable profit tax. The announced changes are effective from July 1, 2015.
	Mozambique	The Government seeks to raise its stake in new mining projects and has stated its intention for citizens to gain more from the extraction of the country's mineral resources. The Government has ruled out tax breaks for mining companies despite weak global coking coal prices. Just a few years ago, billions of dollars poured into Mozambique, one of the world's poorest nations, in a twin scramble for inland coal and offshore gas. The gas rush is intact, but the coal boom has come apart at the seams, hobbled by low prices, overblown expectations, and a rail and port network that remains woefully inadequate.

Source: BMI and LSI Research

Figure 7 : Global Mining Regulations 2014-15 - NEUTRAL Developments

Region	Country	Comment
Asia	Vietnam	Resource industry is largely state-led and heavily regulated by the Government.
	Thailand	Complex bureaucracy, only grants mineral rights to foreign miners under a special agreement or if the project is promoted by the Board of Investment.
	Malaysia	Malaysian mining sector is undergoing an overhaul with new focus areas being iron ore, gold and coal. In 2014, iron ore topped other major minerals in terms of production with 10.7 MT mined valued at RM2.02billion. That is followed by gold with 4.6 million gm (RM700.8million), coal at 2.95 MT (RM442.2million) and tin-in-concentrate at 3.66 MT (RM236.5million) respectively. The Government has now adopted a range of initiatives to entice investors away from Indonesia, its key mining competitor. These include tax holidays, centralised licence granting, low levies and no import duties.
Africa	Botswana	The Government cut taxes in 2012 and maintains a pro-business approach to mining taxation. Plans are underway to enhance the minerals legislative framework to attract non-diamond miners into the sector.
	South Africa	The long-awaited amendment to the Mineral and Petroleum Resources Development Act was ratified by Parliament in Q1, 2014 and was welcomed by mining companies as significantly improved from its first draft. The Government has delayed implementation of a carbon tax until 2016. Nevertheless, the Government is planning levies on acid mine water.
Europe	Czech Republic	Bill under discussion to amend the Mining Act to better compensate citizens living in the vicinity of coal mines.
	Bulgaria	Low tax rates favourable for foreign miners.

Region	Country	Comment
	Turkey	Relatively low tax burden and attractive investment tax credits.
Americas	Columbia	Potential restrictions on coal railway operations.
	Brazil	Government considering royalty hike to 4% and new concession-granting system.
	Argentina	Improving business environment, yet capital controls, high inflation, and local content requirements still create operational difficulties.

Source: BMI and LSI Research

2.2 MINING REGULATIONS IN INDIA

The regulatory environment for the Mining industry in India is recently undergoing a transformation with measures being undertaken to allow foreign investment, to regulate and check illegal mining and to create an environment that is globally competitive and feeds domestic industrial growth adequately.

2.2.1 FDI Policy In The Mining Industry

FDI up to 100% is allowed in exploration, mining, minerals processing and metallurgy under the automatic route for all non-fuel and non-atomic minerals including diamonds and precious stones. FDI up to 100% in mining and mineral separation of titanium-bearing minerals and ores, its value addition and integrated activities fall under the non-automatic or Government route of (requiring prior approval of the Foreign Investment Promotion Board). FDI in coal mining is allowed for captive consumption only.

Government Initiatives to boost the mining sector as of FY2015:

- The Basic Customs Duty (BCD) on ships imported for breaking up reduced from 5% to 2.5%.
- BCD on coal-tar pitch reduced from 10% to 5%.
- BCD on battery waste and battery scrap reduced from 10% to 5%.
- BCD on steel grade limestone and steel grade dolomite reduced from 5% to 2.5%.
- Full exemption from basic customs duty granted to pre-forms of precious and semi-precious stones.
- The variation level and the parameter of measurement with respect to re-import of cut and polished diamonds after certification/grading from a foreign laboratory/agency increased as a trade facilitation measure.
- Under the existing provisions of Section 35 AD of the Act, an investment – linked tax incentive is available by way of allowing deduction of the whole of any expenditure of capital nature (other than expenditure on land, goodwill and financial investment) incurred wholly and exclusively for purpose of the "specified business" during the previous year in which such expenditure was incurred.
- In order to promote investment in new sectors, few more businesses have been added under the above section. Those related to the mining sector are:
  - Laying and operating a slurry pipeline for the transportation of iron ore.
  - The above business shall have begun operations on or after 01.04.2014. It also has the condition of lock-in period of 8 years for use of assets.

2.2.2 Fiscal Incentives

- One-tenth of the expenditure on prospecting, extraction and production of certain minerals during five years ending with the first year of commercial production is allowed as a deduction from the total income.
- Export profits from specified minerals and ores are eligible for certain concessions.
- Minerals in their finished form are exempt from excise duty.
- There is low customs duty on capital equipment used for minerals on nickel, tin, pig iron and unwrought aluminium.
- Capital goods imported for mining under the EPCG scheme qualify for concessional customs duty subject to certain export obligations.

2.2.3 Other State Incentives

Each state in India offers additional incentives for industrial projects, related to specific sector. Incentives have been provided in areas such as subsidised land cost, the relaxation of stamp duty on the sale or lease of land, power tariff incentives, a concessional rate of interest on loans, investment subsidies and tax incentives, backward areas subsidies and special incentive packages for mega projects.

3. Global Coal Market at a Glance

Coal is the second largest source of fuel accounting for 3,881.8MT of oil equivalent (MTOE) consumption in CY2014. Share of coal in global fuel consumption has seen consistent growth over the last decade, largely at the expense of oil consumption. It has increased from 26.27% in CY2003 to 30% in CY2014. The International Energy Agency's (IEA) in its latest report, the World Energy Outlook 2014, has forecast that while coal's overall share in the energy mix could decline in the future, total demand by 2040 will actually rise by 15%. This will, of course, vary from region to region with non-OECD states, primarily in Southeast Asia, Africa, India and Brazil generating most of the demand.

The current growth in global consumption has been primarily due to substantial growth in the Asia-Pacific region, which accounted for 52.34% of total fuel consumption in the region in CY2014, led by China and India. This demand for coal has been triggered by the fact that, it is the cheapest source of fuel available.

Figure 1 : World Consumption by Fuel at the End of 2003 (MTOE)

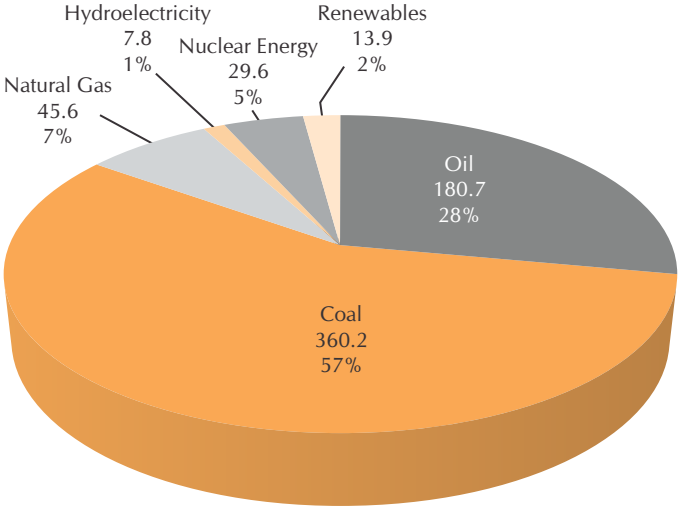
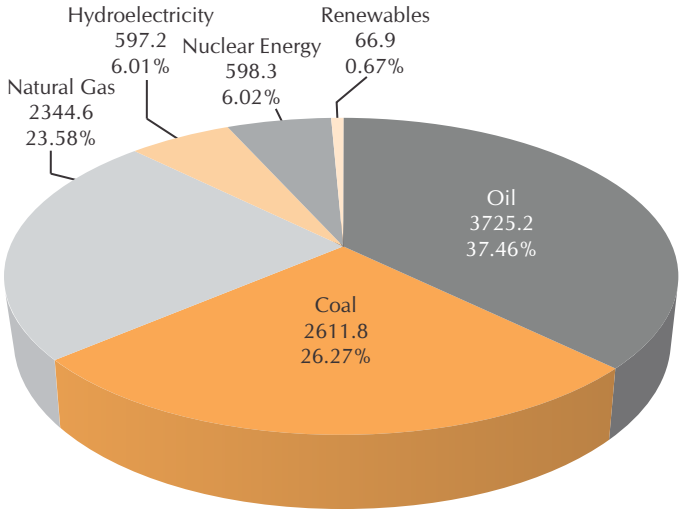


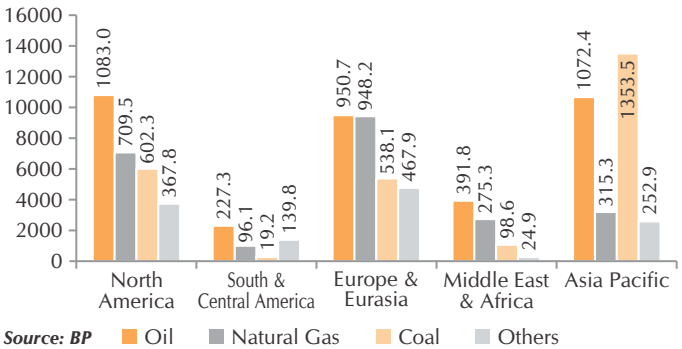
Figure 2 : World Consumption by Fuel at the End of 2014 (MTOE)



Source: British Petroleum (BP)

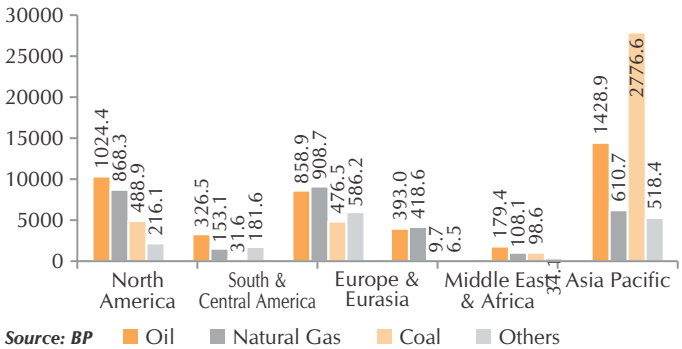
However, environmental issues have primarily forced regions like North America, Europe and the Soviet Union, to create a shift in their fuel consumption pattern. Countries in these regions have gradually moved from oil & coal to cleaner sources such as natural gas and hydropower.

Figure 8 : Region-wise Consumption by Fuel at the end of 2003 (MT Oil Equivalent)



Source: BP

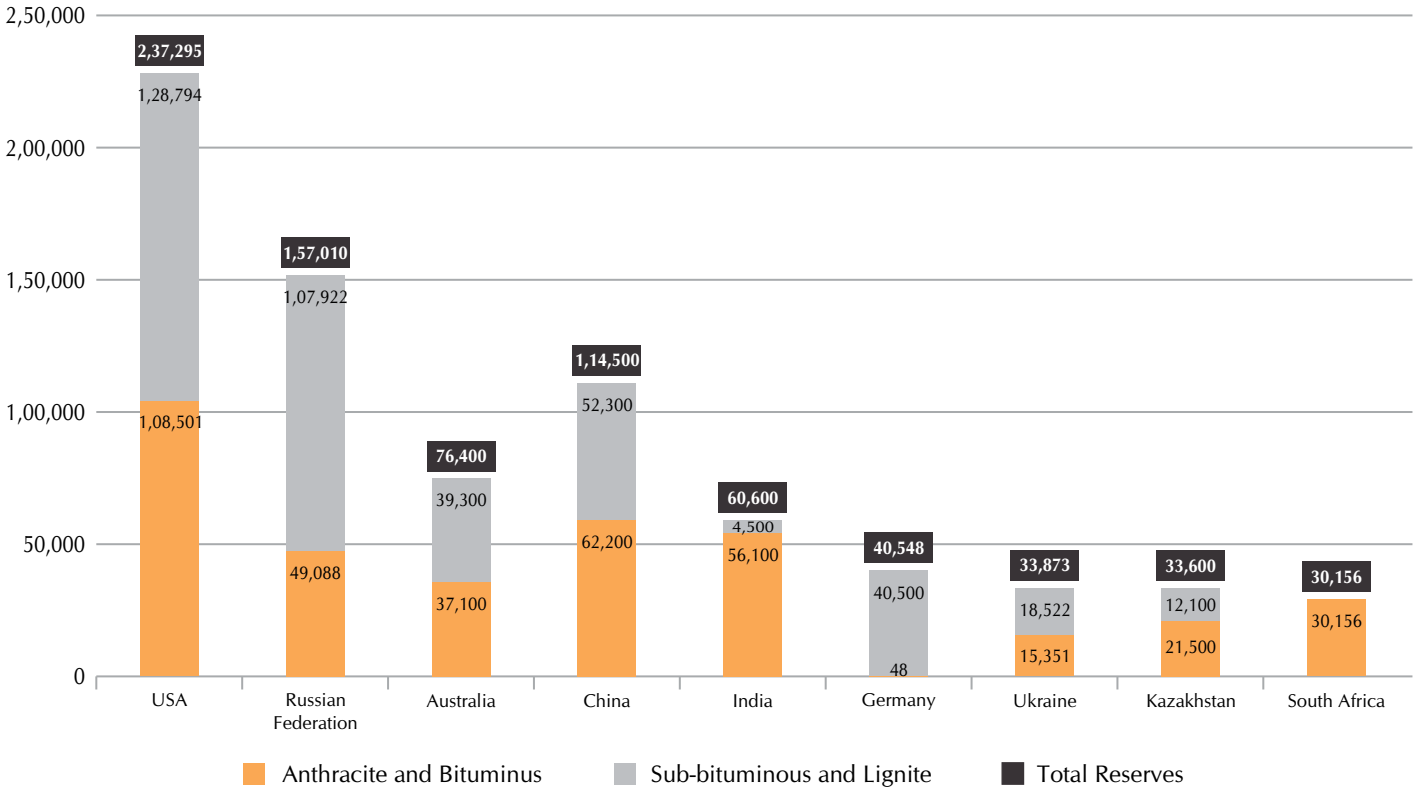
Figure 9 : Region-wise Consumption by Fuel at the end of 2014 (MT Oil Equivalent)



Source: BP

3.1. WORLD COAL RESERVES

Figure 10 : Estimated Coal Reserves at the end of 2014 of Leading Countries (MT)



*Source: British Petroleum * Difference in definition of proven reserves as per BP and Ministry of Coal, India are explained in the glossary at the end of the report.*

Based on the current level of production in USA, the country's proven reserves are expected to last for almost 266 years. Similarly for Russia, the reserves are going to last for over 452 years. At fifth position is India, accounting for 6.8% of the world's coal reserves and given its high domestic consumption needs its reserves are likely to last for less than a century.

> ***"Indian and Chinese companies are scouting for overseas buyers to ensure availability of coal for their domestic consumption"***

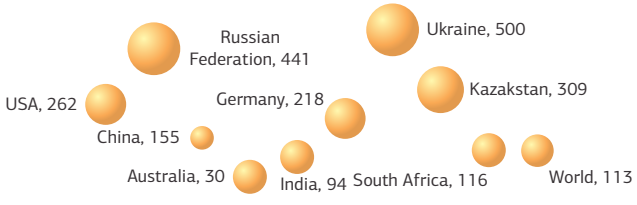
Similarly, China being the largest coal producer in the world, its resources too are getting depleted at a much faster rate than the rest of the world. The country's proven reserves at the end of 2014 was 114,500MT which is expected to last for only 155 years at the present rate of production.

China and India have already become net importers of coal in a couple of years. The requirement for their ever expanding Power & Steel sectors has forced these nations to begin scouting for overseas buys. In early 2015, it was firmly believed by analysts that India, with its coal bloc auctions staggered due to political, environmental and other hurdles, and the inability of the domestic industry to scale up production with its outdated technologies and operational

> ***"Coal will be available for next 110 years as compared to 52.5 years and 54 years for oil and natural gas industry"***

delays in functioning of the coal mines, could well surpass China in import of coal. India's coal imports are rising steeply amid falling prices, while Chinese imports of coal, in contrast, have fallen steeply, as China took stringent measures to step up the substitution of renewable sources of energy for coal and other non-renewable ones to fuel its growing industrial needs. While India has also renewed its focus toward building a non-renewable energy base with large scale investment in solar and other renewable sources of energy, in the short-term, the heavy reliance on coal as the primary fuel source to feed industries is likely to push up its position as a large coal importer in the global marketplace.

Figure 11 : Years Up to which the Coal Reserves Will Last at Present Production Levels



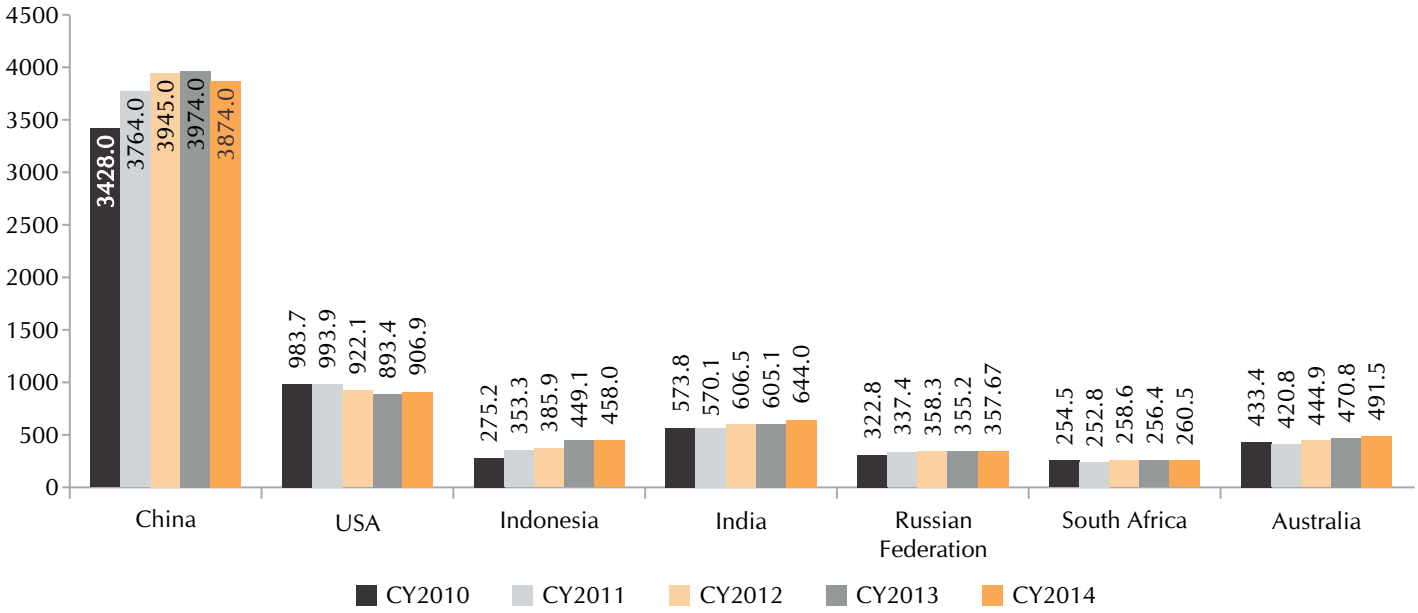
Source: British Petroleum

In the long-run, however, in 2020, India has targeted coal production of 1 billion tonne for which the coal production is being scaled up and bottlenecks and issues being ironed out by the Government. This could result in a fall in India's share of coal imports.

3.2 GLOBAL COAL PRODUCTION

Global Coal production witnessed a decline of 0.7% y-o-y to 8164.9MT in CY2014 amid steeply falling prices primarily on account of the fall in the coal output of China, the largest producer, and sluggish demand among developed nations such as Germany, Japan and the US in a move toward other cleaner and renewable sources. However, trends in the Asia-Pacific region continue to witness an increasing trajectory as it is believed that the power and industrial sectors of these countries are on an expansion mode and despite relying on alternative sources of energy to feed this rapid expansion, coal is likely to be the main fuel that will support the expansion and growth plans of the region.

Figure 12 : Historical Trend in Coal Production by Leading Countries (MT), 2014

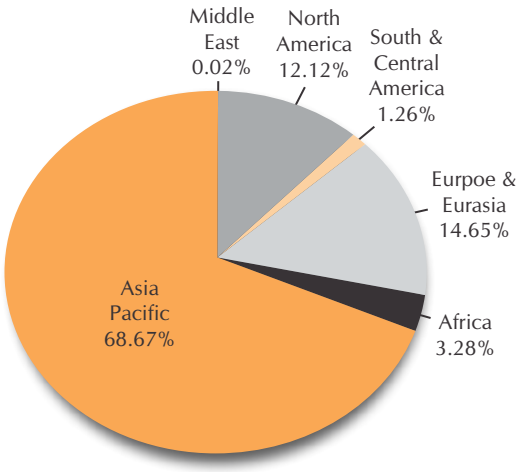


Source: British Petroleum

China, the largest global producer of coal, had an output of 3,874MT in CY2014 as against 3,974MT in the previous year, sporting a decline of 2.6% y-o-y as the country continued to take significant steps to consciously reduce coal consumption and imports as a part of a Clean Energy policy aimed at reducing emissions. It accounted for 46.9% of total world coal production in CY2014. However, in the long term, analysts believe China would continue to increase production though at a slower pace as compared to previous years. During the last 5 years (CY2010-14), China's coal production grew at a CAGR of 2.48%. India, the fifth largest coal producer in CY2014, produced 644MT of coal; representing a y-o-y growth of 6.4%. Production in India, during the last 5 years (CY2010-14) has increased at a CAGR of 2.33%. Apart from China and India, Indonesia also posted significant growth in coal production with a CAGR of 10.73% during the period 2010-14.

> ***"China's investment in infrastructure sector will increase and henceforth the demand for coal will also continue to rise"***

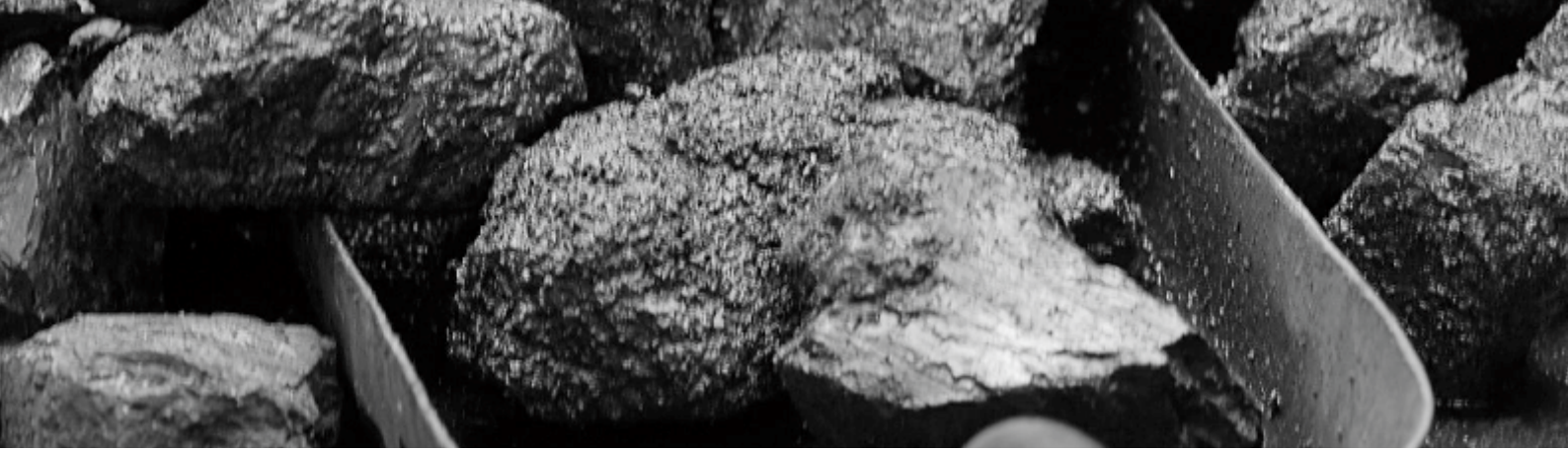
Figure 13 : Global Coal Production Shares by Region, 2014



Source: WCA

3.2.1 Forecast: Global Coal Production

Global demand for coal over the next five years will continue marching higher, breaking the 9-billion-tonne level by 2019, as assessed by the International Energy Agency (IEA) in its annual Medium-Term Coal Market Report, December 2014. According to the IEA, despite China's efforts to moderate its coal consumption, it will still account for three-fifths of demand growth during the outlook period. Moreover, China



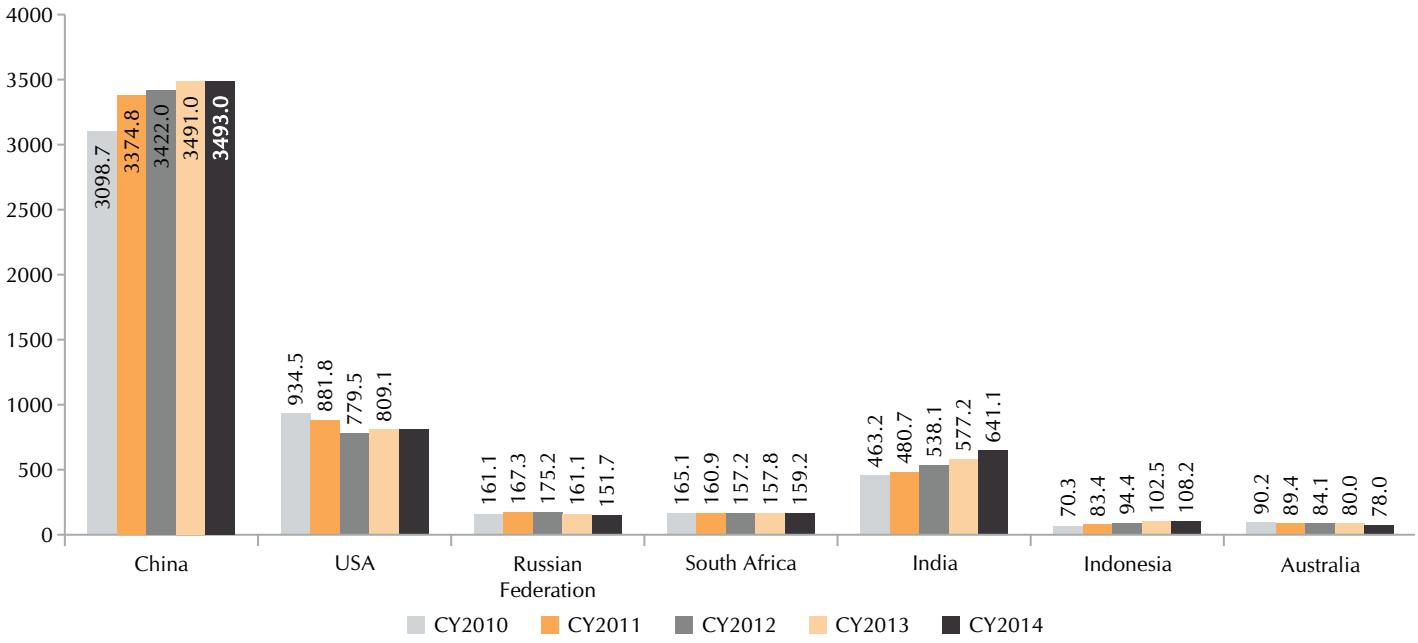
will be joined by India, ASEAN countries and other countries in Asia as the main engines of growth in coal consumption, offsetting declines in Europe and the United States.

3.3. GLOBAL COAL CONSUMPTION: PARADIGM SHIFT FROM DEVELOPED TO DEVELOPING NATIONS

Global coal consumption increased by 1.46% y-o-y to 7,742.07MT in CY2014 mainly due to the rise in coal consumption in the Asia pacific region. The growth in share of Asia-Oceania region was primarily due to the growing demand for coal in leading Asian countries such as China and India.

In CY2014, China accounted for 50.6% of the total global consumption due to its industrial requirement, with India consuming another 9.3%. Coal consumption in theworld during the last five years grew at a CAGR of 3.39%. During the same period; China had a relatively lower growth of 2.82%.

Figure 14 : Historical Trend in Coal Consumption by Leading Countries (MT), 2010-2014



Country	China	USA	Russian Federation	South Africa	India	Indonesia	Australia
CAGR% (2010-2014)	2.30	(3.64)	(2.57)	(2.43)	1.82	1.07	(2.65)

Source: British Petroleum

3.3.1 Forecast: Global Coal Consumption Trends

Due to environment issues, countries like the USA, South Africa, Russia, Germany and Japan have already moved to other sources of energy keeping their demand for coal almost stagnant. However, Asian giants, China and India, are still glued to cheaper sources of fuel like coal. As more infrastructure projects head toward completion and begin operations in China and India, the demand for coal in these two countries is expected to generally grow.

Moreover, with India's most recent push to expand coal production and reach a target of 2.5BT by 2020, analysts predict a scenario, where India could well turn into a coal surplus country. However, with the slowing trends in the global market toward alternative cleaner fuel it could end up in a situation where the exports would not find a market. Analysts though believe that the developing nations such as India and the others in the Asia-Pacific region would become the demand generators, as they plan massive expansions of their road infrastructure, real estate and power generation

and transmission, which are likely to result in a massive spurt in demand from, steel, cement and coal fired power generation sectors, sustaining domestic demand in the long run.

3.4 GLOBAL COAL EXPORTS

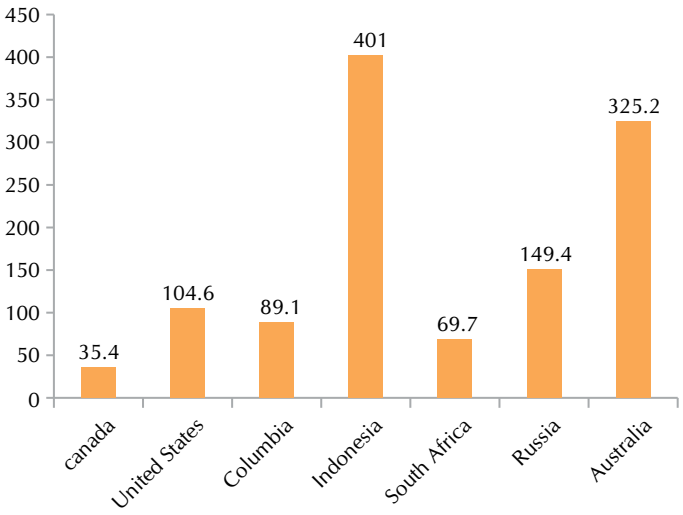
In 2014, the value of coal exports by the top 15 countries totalled to US$ 99,880,461,000, a 5.8% decline from 2010 and is down 13.2% from 2013. The listed 15 countries shipped 97.9% of all coal exported in 2014. The top five countries namely Australia, Indonesia, Russia, United States, Columbia alone exported 79.7% of coal in the world in the FY2014.

Australia and Indonesia are the top coal exporters of the world, exporting 34.5% and 18.7% of the world's total coal exports. Australia exported around 325.2MT of coal in FY 2014 and is expected to export 364MT by the end of FY2015. Indonesia has been more sensitive to global price changes than Australia when it comes to cutting coal output and exports in the face of persistently weak prices as Australian companies are bound by rail and road transport agreements that require regular fixed costs to be incurred which prevent them from stopping mining in the face of declining prices. Moreover, as large Australian companies such as Peabody and Glencore announced production cuts, smaller miners were willing to keep producing and make up for losses from the cuts made by the larger players, thus keeping overall output steady for Australia. Moreover, while Indonesia primarily relies on China for its main market, Australian coal is exported to a diversified lot thereby reducing the risk from individual cuts in import by large countries. The main export destinations countries for Indonesian coal are China, India, Japan and Korea, most of whom had faced internal upheavals on their domestic coal production in 2014, causing erratic demand fluctuations for Indonesian coal imports. Coal has a clear importance for Indonesia's state revenue as the commodity accounts for around 85% of mining revenue.

US thermal coal exports are forecast to fall 16% y-o-y to 74MT in 2015 and stay at this level in 2016, as no significant change in global market conditions are expected, according to the US Energy Information Administration (EIA) 's Short-term Energy Outlook as of February 2015.

Coal exports of US were estimated at 88MT in 2014, a 17% decline from 2013. The fall was primarily a result of slowing global coal demand growth, lower international coal prices and increasing coal output in other coal-exporting countries.

Figure 15 : Global Coal Exports by Leading Countries (MT), 2014



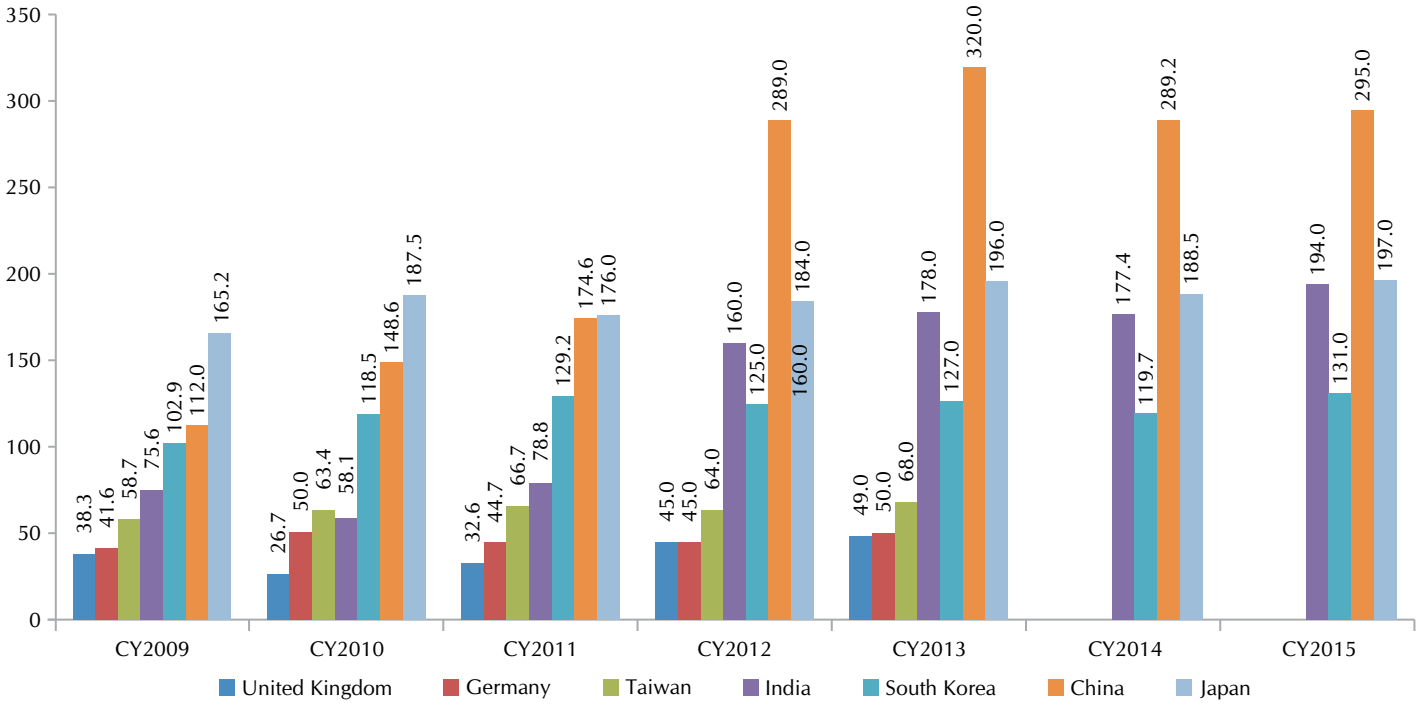
Source: EIA, European Association of Coal & Lignite, World Coal Association

Among the few countries that export coal, the fastest growing coal exporters since 2010 were, South Korea, Russia and Netherlands. The decliners were led by China, Vietnam and Canada. The decline in China's coal exports is taken by analysts as an early sign of China's success in joining countries around the world in promoting clean energy and also the country capitalizing on falling oil and gas prices to switch to alternate energy sources. China has not only set ambitious targets on energy and carbon intensity, it is also planning to cap coal use by 2020. In this way China is taking a step ahead to check carbon emissions by 2030.

3.5 GLOBAL COAL IMPORTS

The top 10 coal consuming countries account for 85% of the world's coal consumption, with China alone consuming as much as rest of the world put together. The following table represents the trend in global imports of coal by leading importers from 2009 to 2015.

Figure 16 : Trend in Global Coal Exports of Leading Countries (MT), 2009-2015



Sources: EIA, World Coal Association

China, which was still a net exporter in 2008, became the world's leading coal importer in the year 2011. China imported 289.2MT of coal in the year 2014 and is expected to import 295MT of coal by the end of 2015. Although China is the world's largest coal producer, several factors have contributed to the sudden rise in its imports, including the higher cost of domestic coal relative to international prices and bottlenecks in transporting domestic coal to South-Eastern provinces.

Japan became the second highest importer of coal with total imports reaching 188.5MT in the year 2014 and is expected to import 197MT in the year 2015. While China has retained the attention of all exporters, India appeared to join the list to become the third largest importer with surging coal imports as of 2014. During the year 2014, India imported 177.4MT of coal.

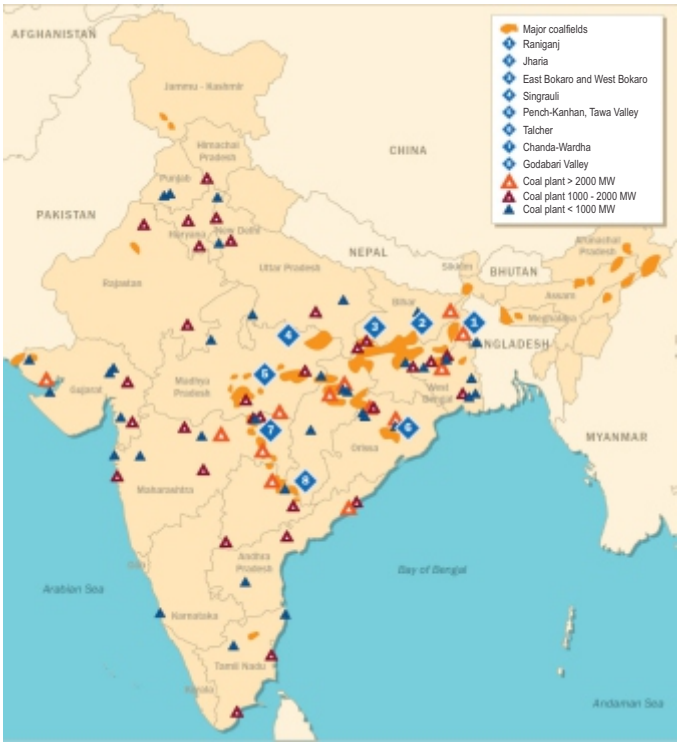
The future outlook for the Indian coal imports is mixed among analysts. Globally, analysts are of the view that India is expected to overtake China as the world's top coal importer by the end of 2015. According to analyst estimates of India's rising demand and the country's inability to scale up domestic production to meet the shortfall in the short-term, its coal imports are likely to rise to around 200MT in 2015 from around 180MT in 2014. Simultaneously, Chinese imports and prices too have gone down by over 35% from January to June 2015 to 16.6MT, according to customs data from the country, contributing to this trend.

However, The Coal and Mining Ministry and analysts tracking the strong rebound in the coal sector in recent months, forecast a gradual drop in Indian imports over the years. India's primary coal producer, state owned Coal India's April-June 2015 output rose 12% to 121.3MT as it opened new mines and received environmental approvals to expand existing ones. The government already has a road map in place to double the company's output to 1BT by 2020. With concentrated effort of the Government's measures to revive the sector alongside legislative reforms and to remove bottlenecks for key players to achieve targeted production, analysts find the target achievable.

4. Indian Coal Industry at The Crossroads

Coal is one of the most widely available and primary sources of fuel in India. The importance of coal and lignite is evident from the fact that it accounts for more than 57% of the total power generation in India.

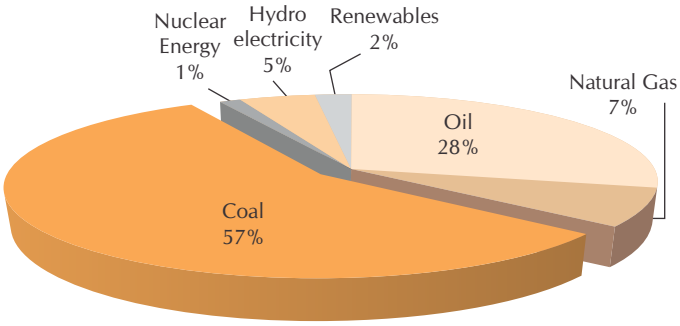
Figure 17 : India: Coal Fields and Coal Fired Generation Plants



Source: IEA

India is the sixth-largest producer and third largest consumer of coal in the world as of 2015.

Figure 18 : Power Consumption by Fuel in India during 2014 (MT Oil Equivalent)



Source: Ministry of Coal, Annual Reports, 2014-15

The overall long-term demand of coal is closely linked to the performance of the end-use sectors. In India, the end-use sectors of coal mainly include electricity, iron and steel and cement. Demand from the unorganised small scale sector comprising primarily of the brick and ceramic industry is also relatively large. Other industries using coal have

Figure 19 : India: Estimated Sector-wise Coal Consumption in India (2016-17)

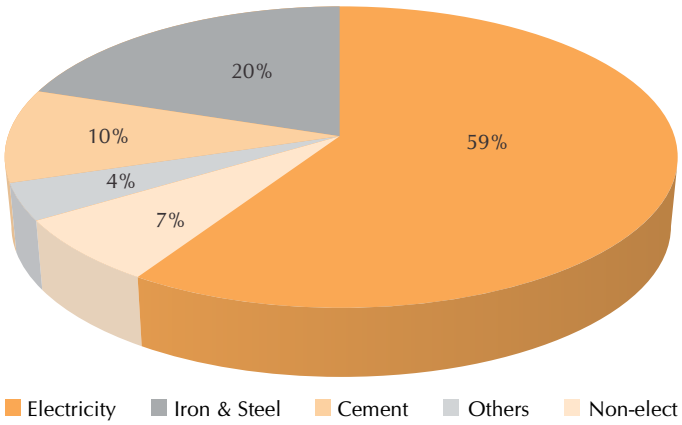
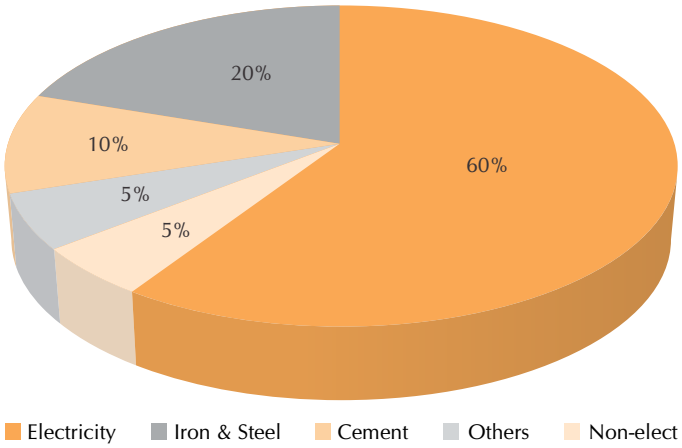


Figure 20 : Estimated Sector-wise Coal Consumption in India (2031-32)



Source: India Energy Book 2012, (World Energy Council, Indian Member Committee)

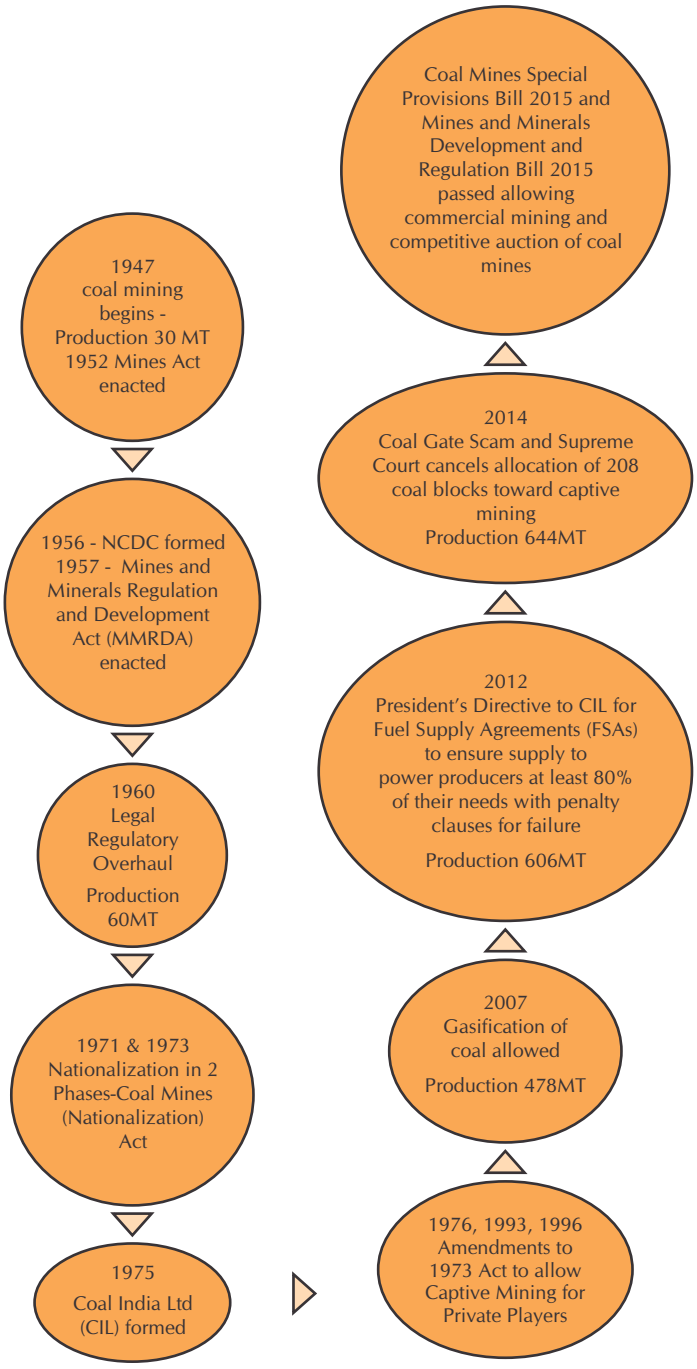
The power sector accounts for more than 70% of India's coal use and supported a five-fold increase in coal use in electricity generation over the past few decades. As such, the power sector is clearly central to the coal outlook in India. India's steel production has increased by around 25% over the past five years to around 83MT in 2014. The cement

industry, the second largest globally after China, is also a major coal user, accounting for around 5% of total coal use. Other industrial sectors, including brick manufacture, consume small quantities of coal.

4.1 EVOLUTION OF INDIAN COAL MINING INDUSTRY

Commercial Coal mining started in India in 1774 by M/s Sumner and Heatly of East India Company in the Raniganj coalfield. India has come a long way since its production level of just 30MT in 1946 to 644.6MTduring FY2014-15. Coal India Limited (CIL) and Singareni Collieries Company Limited (SCCL), are two companies that account for more than 90% of coal production in India. Private participation in coal mining in India is mainly restricted to captive mining. Seven of the subsidiaries of CIL (i.e. Bharat Coking Coal Ltd, Central Coalfields Ltd, Eastern Coalfields Ltd, Mahanadi Coalfield Ltd, Northern Coalfield Ltd, South-Eastern Coalfield Ltd, and Western Coalfields Ltd) are coal producing companies engaged in raising & distribution of coal. The eighth subsidiary i.e. Central Mine Planning and Design Institute Ltd (CMPDIL) is solely engaged in mine planning and designing in the coal sector and rendering mining and engineering consultancy services. Ministry of Coal (MoC), which has the overall responsibility for developing policies and strategies for the coal sector, exercises its functions through CIL & its subsidiaries, and another public sector undertaking called Singareni Collieries Company Limited (SCCL) [which is jointly managed by Telangana Government and the Central Government (equity sharing is 51:49)].

Figure 21 : Trend in Evolution of Indian Coal Mining Industry



4.2 COAL INDUSTRY CHARACTERISTICS IN INDIA

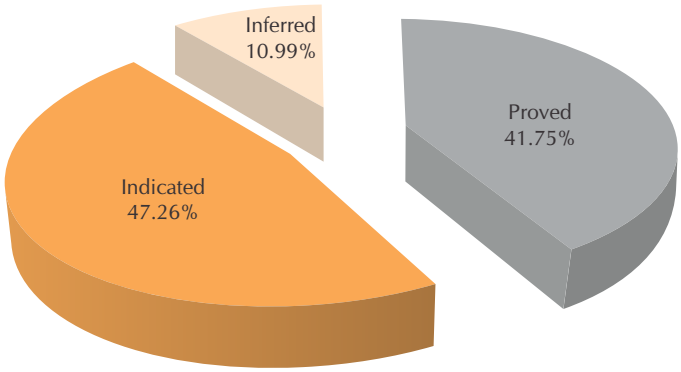
The Indian Coal Industry is characterized by the following features:

- **Highly regulated**: The coal industry in India is highly regulated by Government bodies. Number of coal mines to be allotted, amount of coal production as well as consumption by steel, power and cement industries is decided by the Government of India.
- **Monopolistic**: High regulation gives it a monopolistic character. Only Government owned/managed/controlled companies are eligible to mine and trade coal without the restriction of captive consumption. Public Sector Units like CIL and SCCL accounts for more than 90% of coal production in India.
- **Inelastic demand**: In India major coal consuming sectors like power, steel and cement are coal-based; hence, the demand for it is inelastic in nature.
- **Seasonal supply**: The supply of coal decreases during the monsoon season due to the possibility of coal becoming wet. Coal with high moisture content has high burning time, which is unacceptable to all industries.
- **High Risk**: Coal mining is fraught with high risk of labourers. Thus, safety issues are critical for the industry.
- Environmental issues: With growing global awareness on the adverse impact of coal mining on the environment and the resultant emissions of methane, sulphur-dioxide, oxides of nitrogen and carbon-monoxide in the environment, environmental clearances have become an integral part of the industry. Recently, Indian companies have been known to have their projects cancelled while acquiring coal mining fields globally as also from green activists raising objections to mining. Mining companies now have to ensure a careful balance and assure that ecological balance is maintained and compensatory measures to restore the environment are made while undertaking a coal mining project.
- **Frequent Strikes**: Frequent strikes called by trade unions are taking a toll output performance of coal companies. CIL, the largest state owned coal manufacturer in India has consistently been known to underperform and miss its coal production targets, with one of the reasons cited as disruption in work due to frequent strikes. However, with the ushering in of private players and more advanced technologies, this scenario is likely to change gradually over the next few years.

4.3 COAL RESERVES IN INDIA

According to the Geological Survey of India (GSI), Central Mine Planning and Design Institute (CMPDI) and Mineral Exploration Corporation Limited (MECL), India's cumulative geological resources of coal, including proved, indicated and inferred reserves, is estimated to be 301.5BT as on April 1, 2014.

Figure 22 : India's Coal Reserves by Category, April 2014



Source: Ministry of Coal

The Coal resources of India are available in older Gondwana Formations of peninsular India and younger tertiary formations of north-eastern region. Based on the results of regional/ promotional exploration, where the boreholes are normally placed 1-2 Km apart, the resources are classified into 'Indicated' or 'Inferred' category. Subsequent detailed exploration in selected blocks, where boreholes are less than 400 meter apart, upgrades the resources into more reliable 'Proved' category. Total proved, indicated and inferred reserves are estimated at 125.9BT, 142.5BT and 33.1BT respectively.

Table 4 : India - Coal Reserves (MT) by Type, April 2014

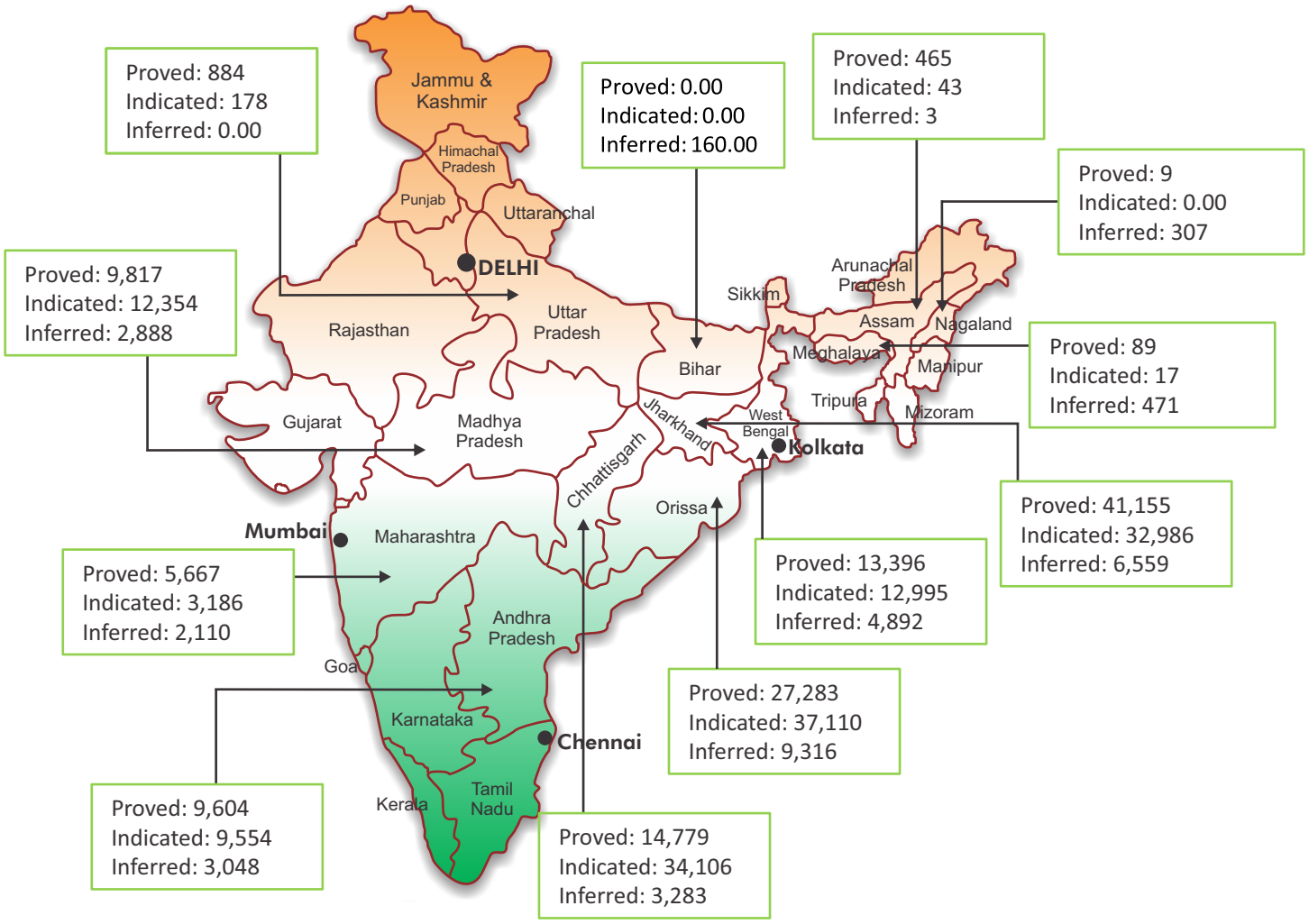
Type of Coal	Proved (MT)	Indicated (MT)	Inferred (MT)	Total (MT)
Prime coking	4,614	699	0	5,313
Medium coking	13,303	11,867	1,879	27,049
Semi coking	482	1,004	222	1708
Sub-total of Coking	18,400	13,569	2,101	34,070
Non-coking	106,916	128,838	30,249	266,002
Tertiary coal	594	99	799	1,493
Total all types	**125,909**	**142,506**	**33,149**	**301,564**

Formation	Proved (MT)	Indicated (MT)	Inferred (MT)	Total (MT)
Gondwana Coals	125,315	142,407	32,350	300,072
Tertiary Coals	594	99	799	1,493
Total	125,909	142,506	33,149	301,564

Source: Ministry of Coal Difference in definition of proven reserves as per BP and Ministry of Coal, India are explained in the glossary at the end of the report.*

4.3.1 State-wise Coal Reserves in India

Non-coking coal in India is available in abundant but more than 70% of it is of inferior quality. However, a substantial portion of it was available at a depth of up to 300 meters which makes mining easier. Non-coking coal is normally divided into seven grades from A to G with Grades A to C categorized as superior quality coal and others as inferior quality coal.



Source: Ministry of Coal Annual report 2013-14

Superior quality coal has low ash content, provides high heat content and hence higher power generation, therefore, requiring less amount of coal. Proven superior quality coal reserves available in India are only 125.9BT, out of which 10.64% deposits are in West Bengal. Raniganj coalfield, which covers the States of West Bengal and Jharkhand, has the largest deposits of superior coal in India.

Lignite Reserves in India is presently estimated at 43.21BT as per survey undertaken in April 2014. Tamil Nadu along with Pondicherry accounts for around 80.44% of the total lignite coal reserves. Rajasthan and Gujarat have large deposits of lignite of 5.69BT and 2.72BT and respectively.

4.4 MINING OPERATIONS IN INDIA: DOMINATED BY OPENCAST METHOD

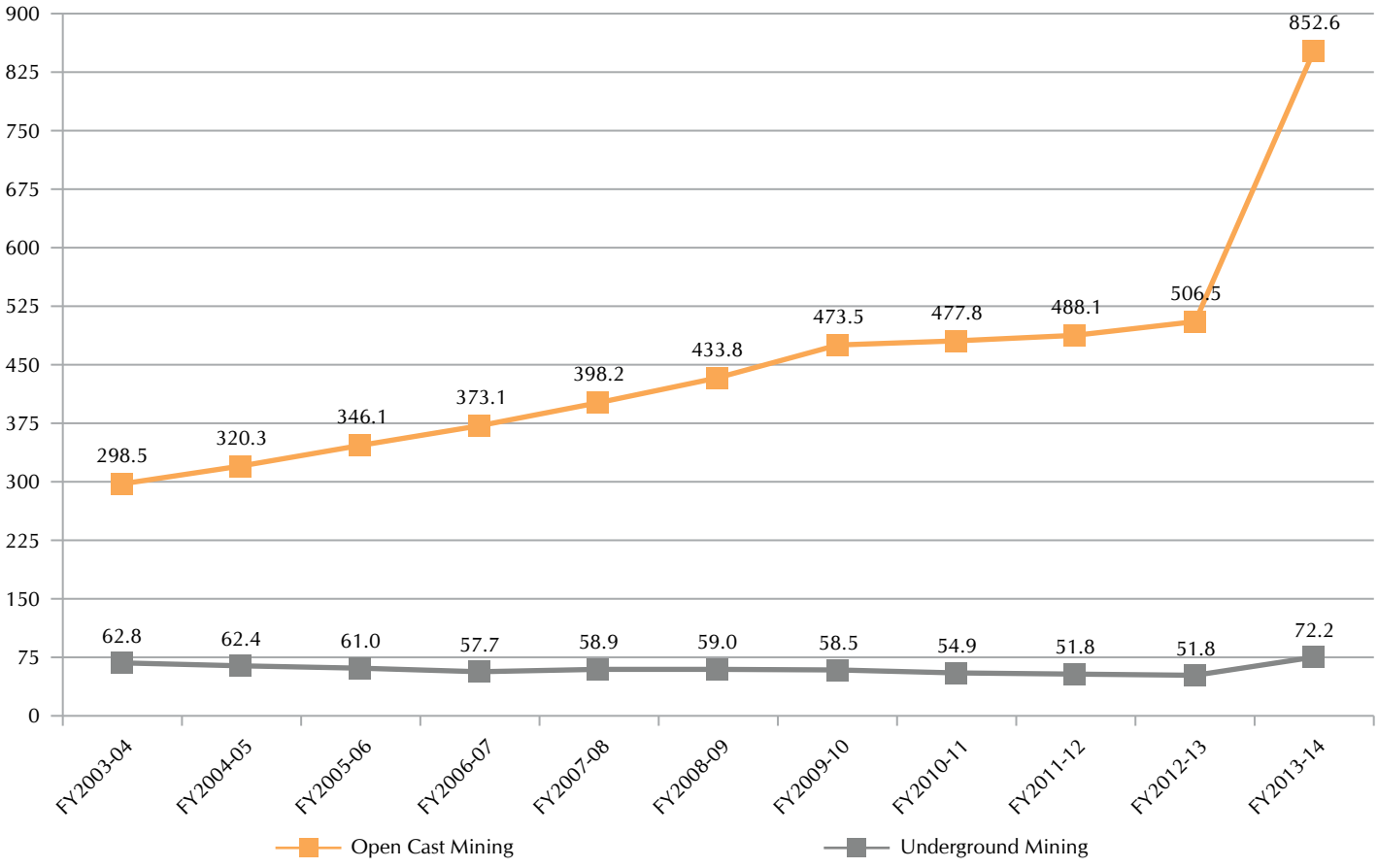
The mining technique to be used in a particular mine, depends on the geology of the coal deposits. Globally, underground mining accounts for about 60% of world coal production. However, in India, Opencast or Surface mining accounts for 88.8% of overall mining. Open cast or surface mining are economical in case where coal seam is near the surface or top. Underground mining has yet to take off in India. In India, around 35-40% of proven, indicated and inferred reserves are found at a depth of more than 300 metres, which can be mined economically using superior underground mining technology.

The Government has consistently been pushing toward adopting global practices. In a bid to boost coal production and achieve the ambitious target of 1.5BT by 2020, underground mining is being encouraged. However, the lack of technology, relevant machinery and resources is hindering the development of this trend.

The share of underground coal mining in India has slumped from 16.3% to 8.8% in the last decade. The primary reason cited by the Central Mine Planning and Design Institute is the rise in production from opencast mines, which is increasing at a greater rate than underground mines with some potential underground mines also being converted to opencast mines. The most efficient way to carry out underground mining is to extract long panels of coal with the use of massive shearers and a roof support system through long wall mining. A typical long wall machine moves along the coalface cutting coal slices while the roof is allowed to collapse.

This mining technique hasn't been successful in India because, India does not have large areas of continuous coal deposits underground. This makes estimation and implementation of mining very difficult. Ambitious projects in the 1970s and 1980s failed after trying this technique out under Indian conditions. In China or the US, large deposition of coal seam is available free from any geo-mining disturbance, which makes long wall mining feasible. However, a renewed push has been made with the inculcation of advanced technologies in a bid to improve production levels.

Figure 23 : Trends in Production of Coal (Except Lignite Coal) From Opencast and Underground Mining (MT), 2003-2004 to 2013-2014



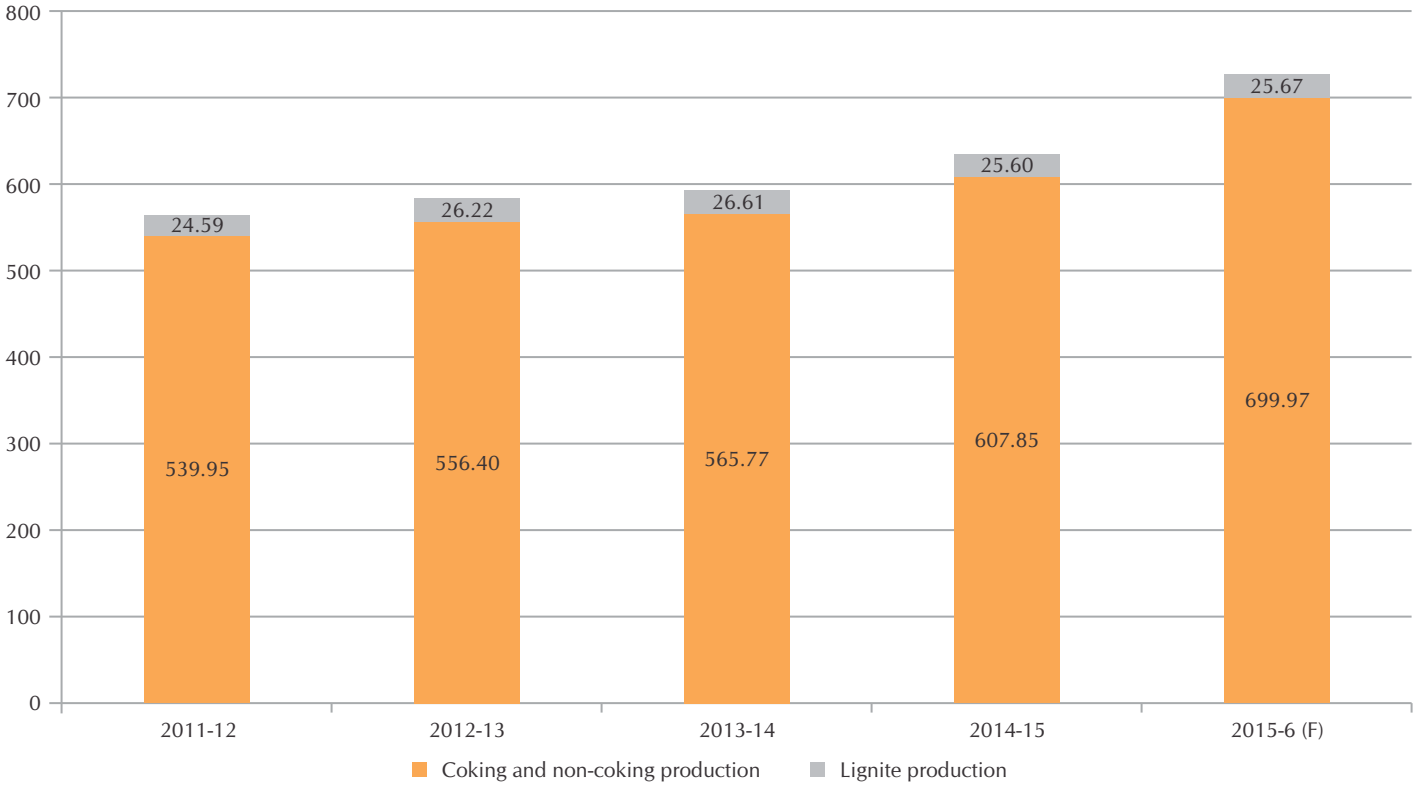
Source: mjunction, Coal India Ltd

4.5 INDIA – COAL PRODUCTION

At the end of FY2014-15, India produced a total of 644MT of coal, registering a five year CAGR of 8% in order to cater to the demand from the power plants. Around 70% of India's coal production is used for power generation, with the remainder being used by heavy industries and public use.

The following figure depicts the trends and forecasts for India's coal production between FY2012 and FY2016 by category.

Figure 23 : India - Coal Production (Coking, Non-Coking and Lignite) (MT), 2011-12 to 2015-16(F)



*Source: Ministry of Coal, Annual Report 2014-15. Note: *represents: CAGR*

Coal India Limited (CIL) is the largest producer of coal in India. CIL has produced 494.23MT during the FY2014-15, registering a production growth of 7% and in the process, accounted for approximately 81.90% of domestic production. The second largest player is Singareni Collieries Company Limited (SCCL), an undertaking of Telangana State Government and Government of India has produced 52.54MT of coal during the FY2014-15. CIL missed its production target in 2013–2014 by 20MT. It produced 176MT of coal in the first five months of 2014–2015, 7.5MT lower than the targeted amount. CIL is expecting total production for 2014–2015 to be at 507MT, up from 462.53MT in 2013–2014.

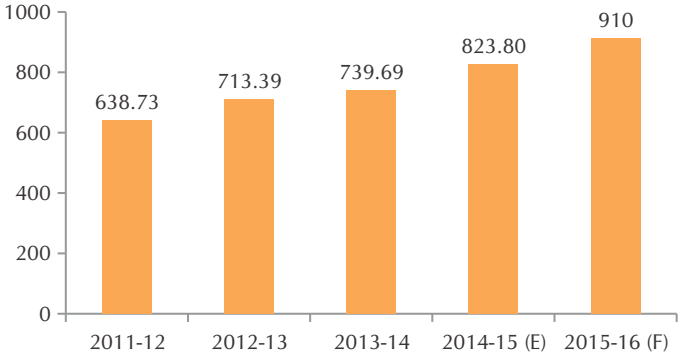
In 2015, the Government has given out a mandate to the Coal industry to target an increase in coal production to 1 billion metric tons by 2020. Toward achieving this goal, the primary coal producers, CIL and SCCL have set themselves a road map to scale up production so as to achieve the target. Given the massive push provided to infrastructure growth in the 12th five year plan and the ruling Government having scaled up targets for power generation, demand for coal is expected to reach 1.6BT in 2020 according to Government estimates. As per the Government's ambitious targets, of this spurt in demand, at least 1 billion metric tons is planned to be met from CIL and its subsidiaries, and the rest through private ventures and as a last option, resort to imports to make up the

shortfall. Although public sector companies account for major chunk of production in the country, private sector companies have also seen their production increase substantially over the years.

4.6 INDIA – COAL CONSUMPTION

Coal demand in India continues to grow spurred by the power, steel and cement industries. Total coal consumption increased from 463.16MT during FY2010-11 to 641.16MT during FY2014-15 growing at a CAGR of 7% during the period.

Figure 25 : Trends in India Domestic Coal Consumption (MT), 2011-2016(F)



Source: Annual Report 2014-15 Ministry of Coal; Note: E - Estimates, F - Forecasts

Domestic coal production, despite growing at a faster pace, has been unable to keep up with the high rates of coal consumption, necessitating imports that have been growing in recent years.

4.7 GOVERNMENT POLICY AND EFFORTS TO RAISE PRODUCTION, CHECK IMPORTS

4.7.1 Mining Rules & Regulations

Coal is a mineral listed in the First Schedule of the Mines and Minerals (Regulation & Development) (MMRD) Act, 1957, hence State Governments can grant coal mining leases only with the previous approval of the Central Government accorded under the proviso to Section 5 (1) of MMRD Act. The Central Government provides approval to the coal mining companies for mining only after the mining plan for the proposed coal mining area are approved by them. The coal mining leases under the MMRD act are primarily given for duration of 20 to 30 years and can be further renewed for a period of 20 years with the approval from the Central Government. It is to be noted that coal mining leases are ordinarily subject to a ceiling of 10 square kms of area.

Coal mining was mostly reserved for the public sector under the Coal Mines (Nationalisation) Act 1973, however with an amendment in the act, captive mining for certain industries were allowed under the private sector. More recently, with the passage of the Coal Mines (Special Provisions) Bill 2015, the industry was further opened up to the private sector and transparency ushered in, with regard to the process of coal auctions and allocation of coal blocks.

As per the original Coal Mines Act, the parties eligible to do coal mining in India without the restriction of captive consumption are:-

- The Central Government, a Government company (including a State Government), a corporation owned, managed and controlled by the Central Government.
- A person to whom a sub-lease has been granted by the above mentioned Government, company or corporation having a coal mining lease, subject to the conditions that the coal reserves covered by the sub-lease are in isolated small pockets or are not sufficient for scientific and economic development in a coordinated manner and that the coal produced by the sub-lessee will not be required to be transported by rail.

Apart from the above, company engaged in the following activities can do coal mining in India only for captive consumption:

- Production of iron & steel
- Power generation
- Washing of coal obtained from a mine
- Such other end use as the Central Government may, by notification, specify

As of March 2015, the Indian Parliament has passed the Coal Mines (Special Provisions) Bill, 2015, replacing the Coal Mines (Special Provisions) second ordinance, 2014. The bill has provisions for allocation of coal mines through a transparent bidding process or e-auction. The e-auction of coal blocks will ensure continuity in coal mining operations and promoting optimum utilization of coal resources and facilitate e-auction of coal blocks for private companies for captive use. Allotment of mines would also directly be made to state and central Public Sector Undertakings (PSUs). It has provisions that propose strong measures for rehabilitation and compensation for displaced persons. The bill also provides for vesting of the right, title and interest over the land and mine infrastructure together with mining leases to successful bidders.

The coal and mining industry has been facing a need for an independent regulatory authority to adjudicate disputes, declare the quality of coal, monitor and enforce closure of mines and specify methodologies for price determination of coal in recent years. After months of debate, the Government set up an authority to advise the Government on principles and methodologies for price determination, while state-owned Coal India Ltd (CIL) will continue to fix prices, subject to the coal ministry's approval. The Government had approved the decision to set up a regulator back in June 2013, itself, through the Coal Regulatory Authority (CRA) Bill, introduced in Parliament by the Ministry in December 2014. The bill had proposed the following as the key functions of the CRA, which was primarily to advise the Government on:

- Formulation of principles and methodologies for determination of price of raw coal, washed coal or any other by product of washing
- Procedure for automatic coal sampling
- Standards of performance of norms and operational efficiencies, except for the area related to mines safety

- Formulation of policies in coal sector, including allotment or earmarking of coal blocks for any purpose, through any mode, and coal linkage
- Promotion of competition, efficiency and economy in the coal industry
- Development of mining technologies, beneficiation methods to improve mining and conservation of coal resources

Though the authority was set up through an executive order, it is still advisory rather than regulatory in nature with no statutory powers or independence to monitor and regulate the industry as a whole. The Government is still in the process of ironing out the details of the coal auctioning and putting the production of coal back on target so as to reduce the imports by 2020 and is yet to finalize a complete and comprehensive Coal Regulatory Authority as envisaged in the Coal Regulatory Authority Bill of 2013.

4.7.2 Coal Distribution Policy

New Coal Distribution Policy (NCDP) was introduced by Government of India in October 2007, under which a comprehensive framework for distribution of coal was conceived. Under the policy, all the valid linked customers as on the date of introduction of NCDP were entitled to enter into long term Fuel Supply Agreement (FSA) with coal companies in accordance with applicable model of FSA. Coal would be allocated to new consumers through a Letter of Assurance (LOA) under which the consumers would have to meet project milestones within a specified time period as mentioned in LOA.

Policy, distribution and pricing of coal and subsequent amendments to the same till date are mentioned below:

- Requirements of defence and railways will be met in full at notified prices.
- Since July 2013, the Government has approved a revised arrangement for supply of coal to the identified thermal power stations (TPPs) of 78,000MW. Taking into account the overall domestic availability and the likely actual requirements of these TPPs, it has been decided that FSAs will be signed for the domestic coal quantity of 65%, 67% and 75% for ACQ (annual contracted quantity) for the remaining four years of the 12th Plan up to 2016-17.
- Other consumers will receive 75% of their normative requirement through FSA, while the balance will have to be sourced by them through e-auctions or imports, whichever mode is preferred by them.
- Existing consumers with coal requirements of less than 4,200 tonnes can enter into FSA with CIL or through State Nominated Agencies. In case of new consumers, coal requirement will be met though State Nominated Agencies only.

Coal customers of CIL can be classified into 3 types. Types of customers and the procedure to be followed for purchase of coal are as under:

Figure 26 : India Coal Customers by Type and Requisite Procedure for Purchase of Coal

Nature of customer	Procedure of purchase of coal
Power Utilities including Independent Power Producers (IPPs) and Captive Power Plants (CPPs), cement and sponge iron including Steel	Supply of coal through legally enforceable Fuel Supply agreements (FSA). New consumer will have to approach existing Standing Linkage Committee (LT) under Ministry of Coal for recommendation for issue of Letter of Assurances (LOA) by Coal companies as per provision of NCDP (NEW COAL DISTRIBUTION POLICY) and recommendation of Administrative Ministry. LOA is issued on furnishing Commitment Guarantee (CG) followed by execution of FSA on fulfilment of LOA conditions in the stipulated period of time.
Fertilizer	Coal will be supplied by coal companies through FSA.
Defense	As per Government order.
Customers belonging to sectors other than what has been mentioned above (requiring coal beyond 4200 MTPA)	Customers to get coal under FSA through Letter of Assurance (LOA) route as per laid down procedure.
Customers having requirement of coal less than and up to 4200 MTPA	Such consumers may buy coal from the state nominated agencies. Such nominated agencies get coal through FSA with the coal supplying companies.
Trader	Coal can be purchased only through Spot E-Auction- Scheme.

Source: Coal India

4.7.3 Past Policy and Efforts to Boost Coal Production

Production from captive mines remained low over the years. As of 2009, only 14 of the 200 allocated blocks had started production and the number had remained the same for the past few years (ORF 2009). Statistics of the more recent years also indicate a similar lag. Out of 86 coal blocks with targeted coal production of 73MT which were scheduled to be produced in the XI plan, only 28 blocks started production as of March 2011.

Production from captive mines in 2010 was estimated at only 35MT as against the target of 73MT. The Government's failed attempts at enhancing production are enlisted below:

- Coal Mines (Nationalization) Amendment Bill 2000 attempt to introduce private participation and commercial mining.

- The process of allocation of captive coal blocks had been through a screening committee headed by a Secretary of coal and comprising of representatives from various ministries, state owned corporations, and state Governments. This induced subjectivity in the process of allocation and has been a source of controversies in the sector. Although competitive bidding of coal blocks is a part of the Mines and Minerals (Development and Regulation) Bill 2011, the delays in switching from opaque to a more transparent policy for allocation has caused huge amounts of losses. As per the report released by Comptroller and Auditor General (CAG) of India in 2012, huge losses have accrued due to the inefficient allocation of blocks during 2004-09. The loss to the exchequer owing to the flawed policy has been estimated at Rs. 1.86 lakh crore.

4.7.4 E-Auctions

As of 2015, the problem of coal availability to feed the industries such as power and steel has become acute and a huge supply shortage has arisen after the cancellation of 204 coal blocks in 2013 by the Supreme Court. With CIL being unable to step up production enough to meet the acute demand shortage, the Centre came up with a plan to roll out two separate e-auction windows to ensure supply of coal to power plants that are struggling with shortage of coal in the absence of a coal block or linkages.

A total of 10MT of coal from CIL has been proposed to be auctioned to the power sector under the plan. The floor prices of these two e-auction windows were to be different and linked to Coal India's notified price. The prices would depend on the status of the Power Purchase Agreement (PPA) that the generating utilities possess. To make the mechanism more transparent, the Union Ministry for Coal, Power and Renewable Energy, has assured that both windows would be transparent processes through which an equal opportunity to all the players would be provided.

The Centre is to bring about these e-auction windows (for coal) for serving two categories. One window will cater to power plants that have PPAs and other will serve those who do not have PPAs. The floor price for e-auction of coal for power companies without a PPA will be 40% above the CIL notified price and they would be allowed to sell power in the market. The companies with PPAs but without a letter of assurance (for coal supply) will have to bid at 20% above the CIL price. The minister said that each of these categories would get an initial amount of five million tonne of coal as the Ministry will bring its new auction-based coal linkage policy.

Since the Government has put forth the draft mechanism for this new e-auction window for discussion and approval of all stakeholders, with the aim of process of devising a transparent mechanism to ensure equal availability of coal for power and non-regulated sector, in the interim period it will continue to supply coal to all coal linkage holders, Those who have got coal linkage as per the CCEA (Cabinet Committee on Economic Affairs) order of 2013, will continue to get coal till the new framework comes into place. The move will ensure coal supply to all power companies till March 2016 within which a (linkage) Bill will be formulated.

The Centre is likely to cancel all the existing fuel supply agreements (FSA) once the new linkage policy framework is finalized. The Coal Ministry is in favour of auctioning coal linkages for all rather than category specific allocations, as it would ensure a more equitable distribution. Companies of regulated (power) and non-regulated sector (cement, steel, aluminium, etc.) have to participate in the auction to get assured fuel supply from CIL.

The policy for coal linkage auction has been put forth for comments from stakeholders on the draft auction methodology that the Government has prepared. In order to conduct the auction of the coal linkages to the non-regulated sector such as cement, sponge iron, captive power and others through competitive bidding, the Ministry has prepared a draft auction methodology and also an approach paper for public consultation as of August 2015.

4.7.4.1 Proposed Common Trading Platform For CIL, Private Players And Imports

As of August 2015, the Government is also working on a common coal trading platform for CIL and private companies which are likely to be offered lucrative blocks with prior clearances for commercial mining. The electronic platform is likely to be an extension of the spot sale practice of Coal India called 'e-auction' where all the coal mined in the country, excluding from captive blocks, will be traded.

4.7.5 Recent Efforts - Privatization and Revised Coal Block Allocations

In March 2015, the new Government passed two landmark bills that resulted in a gamut of changes across the coal industry and how coal allocations would be made henceforth. These bills have direct and indirect implications for commercial mining, the exchequer and the key feeder industries such as power, steel, and cement among others. The Coal Mines (Special Provisions) Bill 2015 and Mines and Minerals Development and Regulation Bill 2015 have

opened up the coal industry potentially ending over 40 years of Government monopoly in the sector, though the Government is not in a hurry to privatize, assuring CIL employees their jobs would not be displaced.

4.7.5.1 Allocation Criteria Prior to 2011

Till 1993, there were no specific criteria for the allocation of captive coal blocks. Captive mining for coal was allowed in 1993 by amendments to the Coal Mines Act. In 1993, a Screening Committee was set up by the Ministry of Coal to provide recommendations on allocations for captive coal mines. All allocations to private companies were made through the Screening Committee. For Government companies, allocations for captive mining were made directly by the Ministry. Certain coal blocks were allocated by the Ministry of Power for Ultra Mega Power Projects (UMPP) through tariff based competitive bidding (bidding for coal based on the tariff at which power is sold). Between 1993 and 2011, 218 coal blocks were allocated to both public and private companies under the Coal Mines Act.

4.7.5.2 Allocations Planned after Amendments to the MMDRA and CMSP Act in 2015

In September 2014, the Supreme Court declared all allocations of coal blocks, made through the Screening Committee and through Government Dispensation route since 1993, as illegal. It cancelled the allocation of 204 out of 218 coal blocks. Following the cancellation of the coal blocks, concerns were raised about further shortage in the supply of coal, resulting in more power supply disruptions. The 2015 Bill primarily seeks to allocate the coal mines that were declared illegal by the Supreme Court.

The Bill creates three categories of mines, Schedule I, II and III.

- Schedule I consists of all the 204 mines that were cancelled by the Supreme Court.
- Of these mines, Schedule II consists of all the 42 mines that are under production; and
- Schedule III consists of 32 mines that have a specified end-use such as power, iron and steel, cement and coal washing.

Schedule I mines can be allocated by way of either public auction or allocation. For the public auction route any Government, private or joint-venture company can bid for the coal blocks. They can use the coal mined from these blocks for their own consumption, sale or for any other purpose as specified in their mining lease. The Government may also choose to allot Schedule I mines to any Government company or any company that was awarded a power plant project through competitive bidding. In such a case, a Government company can use the coal mined for own consumption or sale. However, the Bill does not provide clarity on the purpose for which private companies can use the coal.

Schedule II and III mines are to be allocated by way of public auction, and the auctions have to be completed by March 31, 2015. Any Government company, private company or a joint venture with a specified end-use is eligible to bid for these mines. In addition, the Bill also provides details on authorities that would conduct the auction and allotment and the compensation for prior allottees. Prior allottees are not eligible to participate in the auction process if: (i) they have not paid the additional levy imposed by the Supreme Court; or (ii) if they are convicted of an offence related to coal block allocation and sentenced to imprisonment of more than three years.

The following tables provide the list of the coal block auctions by sector and their results. The auctions have been carried out since December 2014 with the latest round concluding in August 2015. For detailed timeline of Coal block allocations please refer Annexure at the end of the report.

COAL BLOCK AUCTION RESULTS

Table 5 : List of Coal Mines for Allotment to Government Companies

Sl. No.	Coal Mine	Specified End Use
1	Parsa East	Power*
2	Kanta Basan	
3	Pachhwara Central	Power
4	Pachhwara North	Power
5	Baranj I	Power*
6	Baranj II	
7	Baranj III	
8	Baranj IV	
9	Manora Deep	
10	Kiloni	
11	Barjora (North)	Power
12	Kagra Joydev	Power
13	Tara (East)	Power*
14	Tara (West)	
15	Gangaramchak	Power*
16	Gangaramchak -Bhadulia	

Sl. No.	Coal Mine	Specified End Use
17	Barjora	Power
18	Gare Palma Sector III	Power
19	Talaipalli	Power
20	Chatti Bariatu	Power*
21	Chatti Bariatu South	
22	Kerandari	Power
23	Badam	Power
24	Dulanga	Power
25	Manoharpur	Power*
26	Dipside Manoharpur	
27	Sitanala	Steel (Coking Coal)
28	Parsa	Power
29	Gare Palma Sector II	Power
30	Mahanadi	Power*
31	Machchhakata	
32	Chendipada	Power*

Table 5 Contd...

Sl. No.	Coal Mine	Specified End Use
33	Chendipada II	Power*
34	Tadicherla-I	Power
35	Gidhmuri	Power*
36	Paturia	
37	Banhardih	Power
38	Kasta (East)	Power
39	Rajbar E & D	Power
40	Gare Palma - I	Power
41	Naini	Power
42	Saharpur Jamarpani	Power
43	Mara II Mahan	Power

*Source: Ministry of Coal and MSCTC Limited Note: *Merged for the purpose of Allotment, Note: The above list is indicative. Mines may be added / deleted from the list*

Table 6 : List of Schedule II Coal Mines for E-auction

Sl. No.	Coal Mine	State
1	Ardhagram	West Bengal
2	Belgaon	Maharashtra
3	Bicharpur	Madhya Pradesh
4	Chotia	Chhattisgarh
5	Gare-Palma-IV/1	Chhattisgarh
6	Gare-Palma-IV/4	Chhattisgarh
7	Gare-Palma-IV/5	Chhattisgarh
8	Gare-Palma-IV/7	Chhattisgarh
9 & 10	Gotitoria (East) & (West)	Madhya Pradesh
11	Kathautia	Jharkhand
12	Mandla North	Madhya Pradesh
13	Marki Mangli-I	Maharashtra
14	Marki Mangli-III	Maharashtra
15	Parbatpur Central	Jharkhand
16	Sial Ghoghri	Madhya Pradesh
17	Amelia (North)	Madhya Pradesh
18 & 19	Gare-Palma-IV/2 & IV/3	Chhattisgarh
20	Sarisatolli	West Bengal
21	Talabira-I	Orissa
22	Tokisud North	Jharkhand
23	Trans Damodar	West Bengal

Source: Ministry of Coal and MSCTC Ltd Note:
**Merged for the purpose of Allotment, Note: The above list is indicative. Mines may be added / deleted from the list*

Table 7 : List of Schedule II Coal Mines for E-auction – Tranche III

Sl. No.	Coal Mine	State
1	Marki Mangli I	Maharashtra
2	Parbatpur Central	Jharkhand

Source: Ministry of Coal and MSCTC Ltd

Table 8 : List of Schedule III Mines Earmarked for Auction

Sl. No.	Block Name	Specified End Use
1	Durgapur II/Taraimar and Durgapur II/Sariya	Power
2	Utkal-B1and Utkal B2	Power
3	Mandakini	Power
4	Utkal-C	Power
5	Jitpur	Power
6	Ganeshpur	Power
7	Tara	Power
8	Moitra	Iron & Steel, Cement & CPP
9	Rohne	Iron & Steel, Cement & CPP
10	Gare-Palma Sector-IV/8	Iron & Steel, Cement & CPP
11	Mandla-South	Iron & Steel, Cement & CPP
12	Dongeri Tal-II	Iron & Steel, Cement & CPP
13	KosarDongergaon	Iron & Steel, Cement & CPP
14	Nerad Malegaon	Iron & Steel, Cement & CPP
15	MarkiMangli-IV	Iron & Steel, Cement & CPP
16	Jamkhani	Iron & Steel, Cement & CPP
17	Brinda and Sasai	Iron & Steel, Cement & CPP
18	Meral	Iron & Steel, Cement & CPP
19	Dumri	Iron & Steel, Cement & CPP
20	Lohari	Iron & Steel, Cement & CPP

Source: Ministry of Coal and MSCTC Ltd Note:
**Merged for the purpose of Allotment,*
Note: The above list is indicative. Mines may be added / deleted from the list

Table 9 : List of Schedule III Coal Mines for E-auction – Tranche III

Sl. No.	Coal Mine	State
1	Bhaskarpara	Chhattisgarh
2	Sondiha	Chhattisgarh
3	Chitarpur	Jharkhand
4	Dongeri Tal II	Madhya Pradesh
5	Kosar Dongergaon	Maharashtra
6	Majra	Maharashtra
7	Marki Mangli IV	Maharashtra
8	Jamkhani	Orissa

Source: Ministry of Coal and MSCTC Ltd
Note: The above list is indicative. Mines may be added / deleted from the list

COAL BLOCK AUCTION RESULT

Table 10 : List of Allottees Schedule II Coal Mines

Sl. No.	Allotees	Name of Coal Mine
1	Damodar Valley Corporation	Khagra Joydev
2	Karnataka Power Corporation Ltd	Baranj I to IV, Kiloni, Manora Deep
3	Punjab State Power Corporation Ltd	Pachhwara Central
4	Rajasthan Rajya Vidyut Utpadan Nigam Ltd	Parsa East, Kanta Basan
5	West Bengal Power Development Corporation Ltd	Barjora North
6	West Bengal Power Development Corporation Ltd	Barjora
7	West Bengal Power Development Corporation Ltd	Gangaramchak, Gangaramchak - Bhadulia
8	West Bengal Power Development Corporation Ltd	Tara (East) & (West)
9	West Bengal Power Development Corporation Ltd	Pachhwara North

Source: Ministry of Coal and MSCTC Ltd

Table 11 : Schedule II Coal Mines - List of Successful Bidders Mines Earmarked for Iron & Steel, Cement and Captive Power Sector

Sl. No.	Name of the Coal Mine	Name of the Successful Bidder
1	Marki Mangli III	B.S. Ispat Ltd

Source: Ministry of Coal and MSCTC Ltd

Table 12 : Schedule III Coal Mines - List of Successful Bidders: Mines Earmarked for Iron & Steel, Cement and Captive Power Sector

Sl. No.	Name of the Coal Mine	Name of the Successful Bidder
1	Mandla South	Jaypee Cement Corporation Ltd
2	Brinda and Sasai	Usha Martin Ltd
3	Dumri	Hindalco Industries Ltd
4	Meral	Trimula Industries Ltd

Source: Ministry of Coal and MSCTC Ltd

Table 13 : Results of E-Auction for Coal Mines under Tranche III

Sl. No.	Coal Mine	Close of Auction	Closing bid submitted by	Closing bid (Rs/MT)	Mode of e-Auction
1	Marki Mangli-I	11.08.2015	Topworth Urja and Metals Ltd	715	Forward e-Auction
2	Bhaskarpara	11.08.2015	Crest Steel and Power Ltd	755	Forward e-Auction
3	Majra	13.08.2015	Jaypee Cement Corporation Ltd	1230	Forward e-Auction

Source: Ministry of Coal and MSCTC Ltd

4.7.5.3 Coal Block Auctions in Practice – Key Hurdles and Apprehensions

For the auctions, the coal blocks were divided into two categories – regulated and unregulated. Power projects fall in the regulated category. Eleven blocks have been auctioned in this category through reverse bidding, where bidders had to compete on the discount they would give electricity boards on their cost of mining. In India, the cost of coal is passed down to the end customer. In other words, if cost of mining for two companies is Rs.500 per ton and one of them offers to charge the electricity board Rs.350, while the other wants to charge Rs.400, the first one will win.

Steel, cement, aluminium and captive power plants fall in the unregulated category where blocks were auctioned through forward bidding. Here, whoever was willing to pay the most got the block. Twenty blocks were auctioned in this category. Table 13 above details the list of mines earmarked under Schedule III for auction under this category.

The auctions were conducted in two stages. The first stage – the technical bid – was open to all companies. In the second stage, 50% of all technically qualified bidders or five bidders, whichever was higher, were selected for the electronic auction. What shrunk the pool further was that companies were allowed to place bids in two ways – either as a single bid for the company, or on behalf of their individual power plants. There are apprehensions that the two conditions have resulted in shallow auctions, with few participants.

Coal Block Allocations in Practice

In practice, while the timelines for the auctions have been staggered and a number of concerns have been raised on the allocations:

- The Government has to clear the coal blocks for auction after examining its viability and feasibility for mining before putting it up for auction. This is a time consuming process, which is delaying the auction process. The Ministry of Coal has set itself a target of 101 of the 204 mines cancelled by the Supreme Court to be reallocated by auction by this financial year.
- Some coal blocks are mired in controversy due to objections raised by environmental activists and resident population around the area designated for mining. Some auctions had to be cancelled due to the unrest.

- The aggressive bidding by private mining companies has raised scepticism amongst the Coal Ministry officials as to whether the bidders would be able to recoup their investment, given the overbids and the debt burden that they will have to bear as a result. The end user companies such as in the metals and cement sectors have been allowed to bid coal blocks to meet requirements upto 50% of their planned expansion capacities.

4.8 COAL INDIA TARGET PLAN FOR 1 BILLION PRODUCTION BY 2019-20

In terms of coal production, CIL is the largest player worldwide which caters largely to Indian domestic market with 494.23MT of coal produced during the FY2014-15. The company commands around 81% share of India's domestic production, supplying coal to 97 of the 100 coal fired power stations in the country. Coal India has seen consistent growth in production over the years and will continue to be the leading supplier of coal in India. 78% of Coal India's off take is consumed by the power sector and CIL meets over 40% of the country's primary energy needs.

The Government has made significant efforts to increase coal production, providing Coal India a mandate of 1 billion metric tons by 2020 as demand for coal is likely to hit 1.215BT by the said period. CIL has embarked on an action plan in 2013 that have already begun to witness results. In FY2014-15 alone the company made record progress by increasing production by 32MT from the previous year, as against 31MT in the entire period between FY2009-10 and FY2013-14. Supply to power utilities improved by 8% in FY2014-15 as per the action plan.

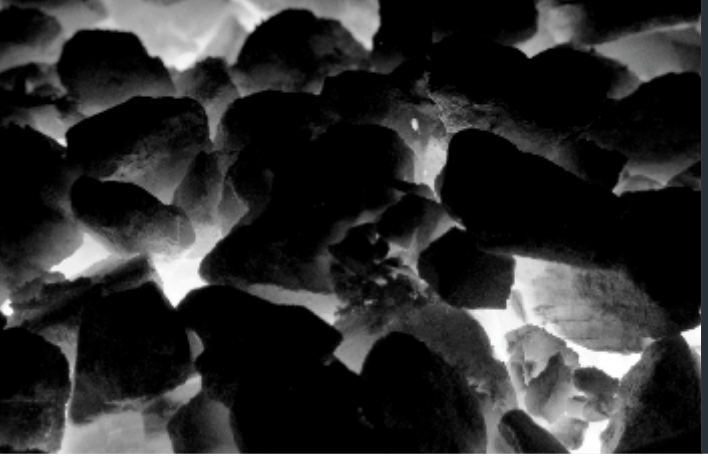
Toward achieving its ambitious target of 1 billion metric tons there have been concentrated efforts from CIL and its subsidiaries. A new mega opencast coal mine of CCL Ranchi became operational in 2014 contributing to the increased production by 12MT per annum. In the meanwhile, Eastern Coalfields has come out of BIFR, 3 coalfields belonging to Western Coalfields, and one belonging to South Eastern Coalfields, have also become operational, further aiding the achievement of CIL's target.

Till date 149 projects are under various stages of implementation. Further, 126 new projects are also identified to be taken up in future. Cash rich CIL, has proposed a capital outlay of Rs.25,400 crore during 12th Five Year Plan plus an ad-hoc provision of Rs.35,000 crore for acquisition of assets abroad and development of the acquired coal blocks in Mozambique. The capital expenditure for FY2014-15 stood at Rs.5,225.00 crore plus additional ad-hoc provision of Rs.4, 500 crore for acquisition of coal assets abroad and development of coal blocks in Mozambique.

CIL has also begun to monitor production on a continuous basis at various levels to increase operational efficiency parameters and improved technologies and methods such as large scale contract mining through Mine Developer Operators (MDO), speeding up land acquisition and improving infrastructure at coal fields are being adopted. CIL has identified the projects that would generate up to 908BT of the production target, of which 164.96MT would be from existing projects, 561.48MT from those under implementation and the balance 181.66MT from future projects. CIL is still in the process of identification of the balance projects to meet the remaining amount required to reach the targeted production of 1 billion metric tons. The required infrastructure that has been planned to be put in place to achieve this ambitious target is as follows:

- Three critical railway lines are coming up as nearly 55% of CIL's coal production is evacuated via rail links
- To expedite the same, a Special Purpose Vehicle (SPV) has been formed with equal stakes from the Ministry of Railways, Ministry of Coal and the respective state Governments
- Switching over to full mechanization and latest technology adoption
- Large scale contract mining
- Upgrading skills of employees and deployment of sufficient manpower
- Speeding up land acquisitions
- Expediting environmental clearances
- Speedy State level clearances

The first four months of 2015 have shown that CIL's efforts are beginning to pay off. CIL supplied 156.15MT in the four months ended July 31, 2015, a 10.5% boost compared with the previous year and more than double the increase for the same period in 2014. The company has been able to acquire 2,000 hectares of land in the past year and has received approvals for more than 40 new mining projects.



5. Demand-Supply Scenario and Market Outlook

Coal as a fuel has been an integral part of India's energy mix in the past with India figuring prominently among the world's top producers of coal. Though the quality of Indian coal is low, necessitating imports to a small extent, India has managed to meet domestic demand of the fuel over the years almost entirely from domestic production and primarily from the state run CIL, SCCL and their subsidiaries. With the opening up of the Indian economy in the 1990s and the concentrated efforts of the Government to improve infrastructure and development, demand for coal shot up, pushing up imports. The state-run enterprises were unable to scale up production to meet the growing demand as they were embroiled in out dated technologies, bureaucratic hurdles such as lack of environmental and land acquisition clearances and poor rail infrastructure to transport coal. The situation worsened late in 2013, when the Supreme Court cancelled licenses of 204 coal mines in 2013, the situation worsened and India began to head toward steep import of coal from international markets.

However, with firm policy direction and ambitious targets in place to try and reverse the trend by 2020, the Government has helped through policy and detailed road maps helped in clearing the obstacles associated with building the domestic capability of the industry. These are likely to help improve the demand supply situation in the long-run.

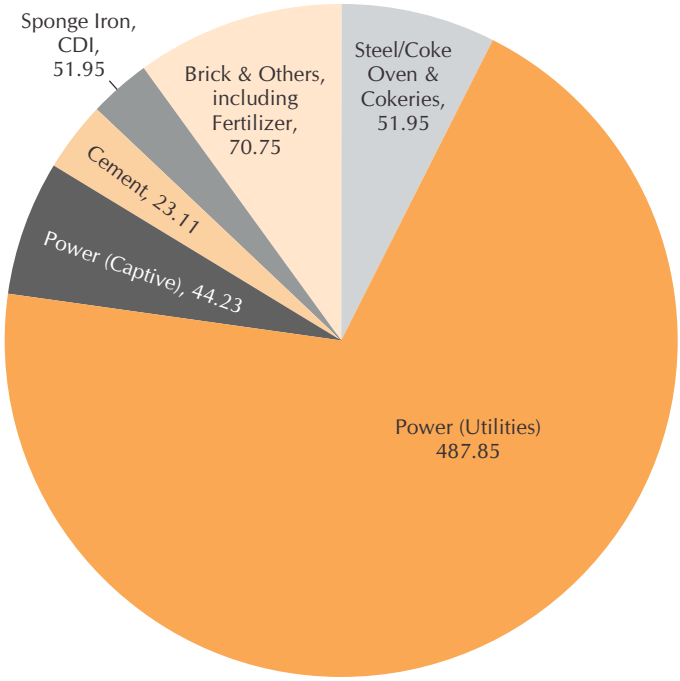
5.1 DEMAND AND SUPPLY OF COAL IN INDIA

As per the Ministry of Coal, the demand for coking and non-coking coal (excluding lignite coal) for the FY2014-15 was estimated at 698.97MT.

Consumption of coking coal increased from 47.33MT during the FY2011-12 to 51.95MT in FY2014-15. Virtually, all of the coking coal in India is being consumed by the steel/ coke oven industry. During the same period, consumption of non-coking coal, mainly by the power sector, increased from 591.40MT to 647.03MT.

Power Utilities, and, power plants for captive use, are the major consumers of coal accounting for almost three-fourth of total non-coking coal consumption in India. Power Utilities consumed 487.85MT of coal during the FY2014-15 as compared to 412.44MT during the FY2011-12. During the same period, consumption by captive power plants fell to 44.22MT from 46.51MT. The captive power plants were hit by the cancellation of coal blocks and the subsequent delays in reallocation that resulted in major shortfall in supply of critical raw material to these companies.

Figure 27 : India Coal Demand by Sector (MT), 2014



Source: Annual Plan, Ministry of Coal 2014-15, Coal Controller Organisation

Coal consumption by the cement industry increased to 23.10MT in FY2014-15 from 22.57MT in FY2011-12, after a marginal fall in 2013-14. One of the prime factors for lower than expected demand from this sector, was the impact of the global crisis and the slowing real estate sector, resulting in sluggish demand for cement during the period.

Table 14 : India - Sector-wise Coal Demand (MT), 2011-12 to 2014-15

Sl. No.	Sector	2011-12	2012-13	2013-14	2014-15
I	**Coking Coal**				
1	Steel / Coke Oven & Cokeries (Indigenous)	15.53	16.9	23.13	15.12
2	Steel (Import)	31.8	35.56	37.19	36.83
	Sub - Total	47.33	52.46	60.32	51.95
II	**Non - Coking Coal**				
3	Power (Utilities)	412.44	457.43	482.33	487.85
4	Power (Captive)	46.51	55.05	42.41	44.23
5	Cement	22.57	22.39	23.85	23.11
6	Sponge Iron/ CDI	21.69	20.9	15.12	21.1
7	Brick & Others .including Fertilizer	88.19	107.95	115.66	70.75
	Sub Total	591.4	662.94	679.37	647.02
	Total Raw Coal	638.73	713.39	739.69	698.97

Source: Ministry of coal-Annual Report 2014-15.
Note: The data of 2014-15 (April – November) has been annualised.
****CDI: Coal Dust Injection to reduce coking coal usage in Blast furnaces***

As per the Ministry of Coal, demand for coal during the FY2013-14 and the FY2014-15 was 739.69MT and 698.97MT respectively.

Table 15 : Coal Supply and Demand in India (MT), 2013-2014 to 2014-2015 (E)

	2013-14 Target/Estimate	2013-14 Actual	2014-15 (E)
CIL	493	471.5	414.27
SCCL	56	47.94	44.67
Others	66.55	51.56	56.27
Total Indigenous Supply	614.55	571	515.47
Import - Estimated/ Actual	155.14	168.5	183.47
Demand Projected/ Actual Supply (Domestic + Import)	769.69	739.5	698.93

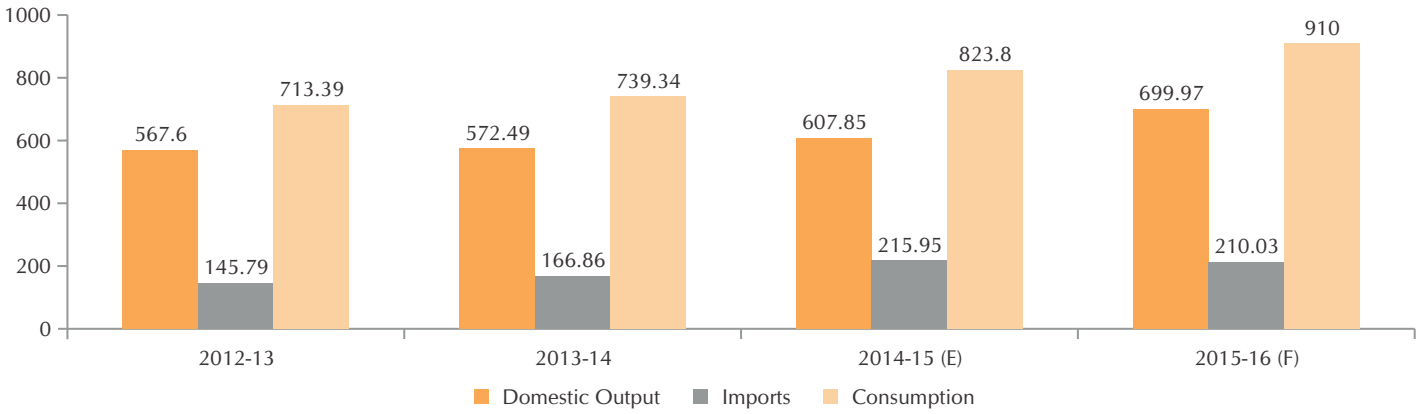
Source: Ministry of Coal, Annual Report 2014-15 Note: The data of 2014-15 (April – November) has been annualised

The Ministry of Coal estimated the demand for coal for FY 2014, at 739.5MT, whereas the indigenous availability was only 571MT, necessitating imports to the extent of 168.5MT. Similarly in FY2015, the trend for the first eight months of 2015 indicates that while domestic production has been stepped up, production is still likely to fall far short of the projected demand for the year. CIL's growth production increased by 12% in the April to June quarter of 2015, as compared to the same period the previous fiscal year. Domestic supplies are estimated to be 700MT for FY2015, 15% more than FY2014. Coal requirements are estimated to grow by 10% to 910 resulting in a shortfall in supply of nearly 210MT. This shortfall can partly be attributed to domestic constraints on production, such as the delays in the reallocation of coal blocks, environmental clearances and the technological constraints faced by CIL and its subsidiaries and SCCL in ensuring that supply of coal is scaled up to meet the demand.

5.2 INDIA-COAL OUTPUT, DOMESTIC CONSUMPTION AND IMPORTS: FUTURE OUTLOOK AND FORECASTS

Forecasts by the Ministry of Coal, Power and Renewable Energy as of 2015 indicate that domestic supply will continue to fall short of demand, despite efforts to scale up production, necessitating imports to the tune of 910MT, continuing the upward trend into FY2016. The following figure presents the trend in consumption, domestic output and imports in recent years.

Figure 28 : India - Domestic Output, Imports and Consumption Trends and Forecast (MT), 2012-2016 (F)



Source: Ministry of Coal, Annual reports, 2014-15

With India poised for growth and RBI forecasting growth at 7.6% for FY2016, ambitious efforts are being made by the Ministry of Coal, Power and Renewable Energy to further step up coal production, reduce imports, speed up allocations and restore normalcy in coal markets. It is therefore likely that coal imports could be reduced in subsequent years as policy and technology roadblocks are ironed out. However, in the medium term, India would continue to rely on imported coal to meet its domestic needs. The key reason is that demand is likely to witness a clear spurt due to the vast investments happening in power infrastructure and real estate sectors. Schemes such as *Housing for All* and ambitious power sector targets are likely to translate into higher coal demand from the cement and power sectors.

5.2.1 Short-term Demand Bottlenecks

As per the most recent update by the Ministry of Coal, the average availability of coal stock at power plants increased in recent months. Measured in terms of number of days of stock, coal availability has increased from 6 days on September 25, 2014, to a record high of 26 days on August 25, 2015 and 22 days on September 25, 2015, according to daily data released by the Central Electricity Authority (CEA).

CIL's renewed production boost has resulted in the company achieving 98% of its targeted production targets and 96% of its off take for the period April to August 2015. India's coal imports Coal imports fell 11% to 19.3MT in July 2015 from a year earlier - the sharpest and the first drop in more than a year - as local supplies rose and money losing power generators held up purchases. Power distribution companies (Discoms) have begun to face huge losses on account of huge transmission losses, sluggish short – term demand and poor purchasing capacities (to the tune of Rs.2 lakh crore as of 1 September 2015), that have resulted in their wanting to cut down coal procurement. The poor financials (of distribution companies) that reduced their purchasing capacity is also one of the reasons for lower-than-expected electricity generation. India, the world's third largest buyer of foreign coal, imported 20% less of thermal coal used in power generation in July from a year ago, according to provisional data from mjunction, a private enterprise that tracks coal numbers.

In short, there is now enough coal and a power generation capacity of 275,000MW but no demand for the surplus power. The poor health of the Discoms is likely to result in slower off-take of coal due to demand side bottlenecks in the short-term. Once the infrastructure and real estate demand pick up along with the economy's ambitious growth plans and trajectory, coal off-take is likely to improve.

Despite the sluggishness being witnessed in the steel market, demand for coal from the primary feeder sectors is likely to pick up at a rapid pace spurred by expected economic growth of greater than 7% beyond 2016. As per the Central Electrical Authority estimates, almost 44,500MW of coal based power plants are expected to begin operation in Twelfth Five Year Plan (2012-17).

The key drivers to the growth of the coal sector in India over the next few years are dependent on the improved performance of the end user demand sectors. These are likely to result from successful implementation of key policy implementations as listed below:

- Increased demand for rural electrification necessitating upgrades in power capacities.
- Make in India campaign increasing industrialization and demand from related sectors.
- Plans for ensuring 24 × 7 power supply to all.
- Government target of housing for all that could help revival of the real estate sector and cement and steel industries.
- Government's efforts to revive the ailing steel sector.
- Efforts by the Government to push the state Discoms to clean up their balance sheets and check theft of power and other losses from transmission, improving demand side bottlenecks for the power sector.
- Revival of agricultural sector with improved monsoon reviving fertilizer production.
- Work is also under way to build three new railway lines connecting untapped mines that hold the potential to produce 300MT of coal every year. These lines should be ready by the end of 2017. Coal India along with Indian Railways and respective state governments in the coal-

6. Coal Prices

Coal prices have historically been lower and more stable than oil and gas prices. Coal is likely to remain the most affordable fuel for power generation in many developing and industrialised countries for decades. In countries with energy intensive industries such as India and China, the impact of increase in fuel and electricity prices is compounded. High prices of coal and other fuels can lead to a loss of competitive advantage and in prolonged cases, obliteration of the industry altogether. In such cases, countries with access to indigenous energy supplies, or those able to negotiate import of coal and feeder fuels at affordable prices from the world market, can avoid these risks associated with price increase, enabling further economic development and growth.

Similarly, in the case of falling prices of coal, as has been the prevailing trend over the first three quarters of 2015, domestic industry faces tough competition from cheaper coal imports and a compulsion to upgrade faster to stay competitive. Global exporters also need to monitor and alter their production and stocks carefully to prevent gluts. Global coal futures play an important role in hedging against these risks as well.

6.1 COAL PRICES - INDIA

The Government of India deregulated coal prices with effect from 1st January 2000 and coal producing companies are free to periodically fix the prices of all grades of coal in relation to the market prices. In general, the coal prices are fixed based upon input cost for coal production, demand-supply equation, inflationary pressures, wage costs, market capacity to absorb the coal prices, acceptance and rejection level of the consumers, and landed cost of imported coal as well as financial viability of the new coal projects.

Coal is primarily sold under the long term fuel supply agreements or under the E-Auction scheme. Fuel supply agreements are coal supply contracts required to be signed with power companies. CIL's first priority is to supply coal to the power sector to ensure the largest consumers of coal are not left with a shortage to meet their power generation needs. It can offer coal on e-auction only if it has adequate volumes after meeting the power companies' requirements. Between April 2013 and January 2014, CIL sold close to 47MT through the electronic auction (e-auction) platform. In FY2014-15, CIL managed to make available 33MT of coal during the first 10 months. Income from coal sold through e-auction is a sizeable portion of CIL's profits.

The Standing Committee on Coal and Steel that presented its 49th report on the determination of coal prices and royalties on February 6, 2014, had also noted that it would hinder the interest of the end user small scale industries as these e auctions benefited the large players, which could form cartels amid the severe coal shortage that arose as a result of the cancellation of 204 mines and the global power industry. The crucial aspect of coal pricing in practice should involve striking a balance between inflation, market prices and interests of the end-consumers. In this context the end users of coal were broadly categorized into:

- Consumers of coal in the regulated sector (Power Utilities, Fertilizer and Defence) and
- Consumers in the non-regulated sector (Cement, Sponge iron, Paper, Rubber, Engineering industry etc.)

Steel sector is also a deregulated sector but prices of washed coking coal supplied to integrated steel plant is decided based on negotiation between CIL and SAIL on import parity basis. Since the price of end products of the coal consuming industries in the non-regulated sector are driven by demand and supply scenario, prices of coal for supply to the consumers in the non-regulated sector were kept at 30% higher than the price of coal for supply to the consumer in regulated sector.

Coal prices, are notified from time to time by the Coal Ministry in consultation with CIL & SCCL for the regulated sectors. The price is determined on the basis of cost incurred in Coal Production from different mines. The pricing of the coal was done on useful heat value (UHV) basis till December 2011 and from January 2012, the pricing mechanism changed to the Gross Calorific value (GCV) basis in order to represent coal in a more efficient manner. According to the GCV basis, notified prices vary according to the grade of coal, which in turn is based on the coal's gross calorific value, or the heat generated when the coal burns. The greater the heat generated, the higher the grade of coal, and the higher its price.

Taking into account rise in international coal prices in 2013, CIL had increased the coal prices with affect from December 16, 2013. Subsequently, CIL has been issuing notifications during changes in prices for various categories of coal based on specific usage according to market conditions, demand and supply and international market changes, on a regular basis on the Ministry of Coal.

6.1.1 Issues in Coal Pricing & Royalties in India Post-deregulation

The Ministry/CIL is yet to work on the modalities of pricing of coal under the new deregulated regime where private players will be allowed to mine coal for commercial purposes, though it has submitted a few guidelines to the Standing Committee on Coal and Steel that was constituted to review issues relating to coal pricing and royalties. These were:

a) In a deregulated regime, the basic objective of CIL is to supply coal at a reasonable price covering the fixed and variable cost including concurrent and future investments required for sustained operations.

b) Coal price to remain within general level of inflation and also to be guided by the market forces coupled with the need for generating internal resources to enable sustainable growth.

c) To ensure that the landed cost of domestic coal at different consuming points remains competitive vis-à-vis landed cost of imported coal at the same place.

d) Integrated Energy Policy (IEP) provides for selling high quality coal at a 15% discount on the import parity price.

Despite these objectives, domestic coal continues to be priced higher than imported coal, as quality and logistics issues make imported coal cheaper and easier to use for the end use consumers. Coking Coal is imported by Steel Authority of India Limited (SAIL) and other Steel manufacturing units mainly to bridge the gap between the requirement and indigenous availability as well as to improve the quality. Coal based power plants, cement plants; captive power plants, sponge iron plants, industrial consumers and coal traders import non-coking coal. Coke is imported mainly by Pig-Iron manufacturers and Iron & Steel sector consumers using mini-blast furnace. Even some of the India's large power producers have shown a greater tendency to rely on imported coal to an extent despite the fact that domestic coal blocks have been allotted to most of their projects. While steps have been taken to improve the quality of coal and bridge this discrepancy, in the short run, coal pricing in India remains a complex affair.

Table 16 : Domestic Coal Prices in India as on 22/01/2015

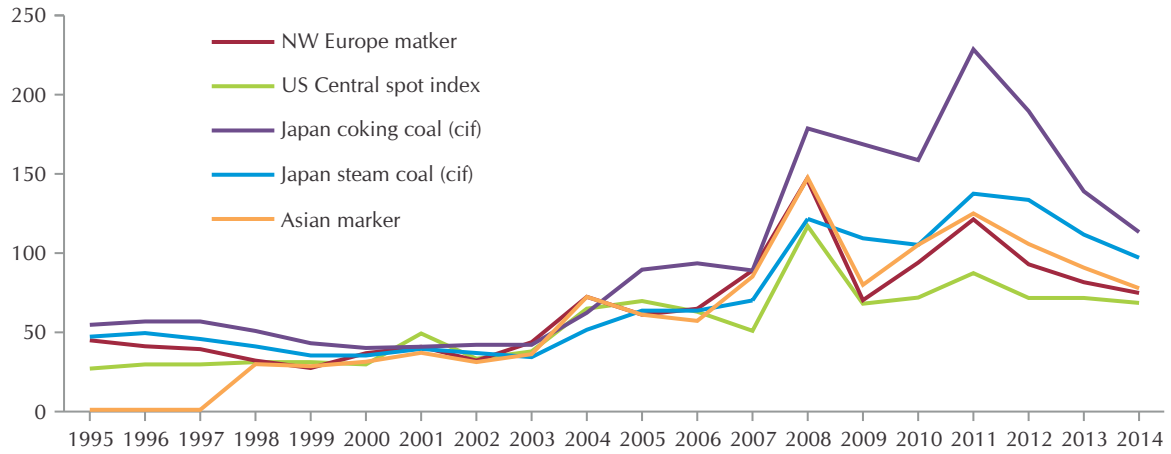
Rate Format	Grade	Rate in INR/Ton	Price in (US$/Ton)
Ex-Mine	Above 7000	5050 - 5050	76 - 76
Ex-Mine	6700-7000	4870 - 4870	74 - 74
Ex-Mine	6400-6700	3890 - 3890	59 - 59
Ex-Mine	6100-6400	3490 - 3490	53 - 53
Ex-Mine	5800-6100	2800 - 2800	42 - 42
Ex-Mine	5500-5800	1600 - 2150	24 - 32
Ex-Mine	5200-5500	1400 - 1890	21 - 29
Ex-Mine	4900-5200	1250 - 1690	19 - 26
Ex-Mine	4600-4900	970 - 1310	15 - 20
Ex-Mine	4300-4600	860 - 1160	13 - 18
Ex-Mine	4000-4300	700 - 950	11 - 14
Ex-Mine	3700-4000	660 - 890	10 - 13
Ex-Mine	3400-3700	610 - 820	9 - 12
Ex-Mine	3100-3400	550 - 740	8 - 11
Ex-Mine	2800-3100	510 - 680	8 - 10
Ex-Mine	2500-2800	450 - 610	7 - 9
Ex-Mine	2200-2500	400 - 540	6 - 8

Source: Ore Team

6.2 International Coal Prices

Through 2014 and 2015, Coal output from exporting countries like Australia increased, while major importers such as the United States and Europe sharply reduced their imports, in a shift toward cleaner fuels and other alternatives such as shale gas and natural gas. China and India, the two prime global importers of coal, have also individually stepped up domestic production in a bid to reduce imports. Shaped by these trends, international contract prices for thermal coal during CY2014-15 fell to 12 year lows.

Figure 29 : Global Coal Prices ($/Tonne), 1987-2014



Source: BP.com

The above figure clearly indicates the downward trend in international coal prices in 2014 and 2015 as coal demand took a drastic fall. India meets most of its coking coal requirements from Australia and Indonesia and tracking the major indices for Indonesia which sets its coal price based on an average of the major global coal indices, it is seen that the prices of international coal have consistently witnessed a fall in recent months.

Illustrated below are the key coal price trends and indices published by Platts, a global energy research body tracking coal prices. Platts publishes six daily price assessments that reflect the transactable value for three standard calorific values, delivered within a 90-day forward period on a cost and freight (CFR) basis to specific ports on the east and west coasts of India. Alongside the six new price assessments, Platts publishes four corresponding freight rates for thermal coal shipped on a standard shipment from Richards Bay terminal in South Africa to specified ports on the East and West Coasts of India and from Kalimantan to specified ports on the East and West Coasts of India.

The new price assessments provide power producers, cement manufacturers, coal traders and ship brokers with an independent, transparent source of India-related open-market spot prices for imported thermal coal.

Table 17 : Coking Coal Prices in India as on 22/01/2015

Country	Rate Format	Grade	Rate in USD/Ton
Australia	CFR India	Mid-Volatility Hard Coking Coal (HCC)	115.5
Australia	CFR India	Premium Low Volatility HCC	124.5
Australia	CFR India	Met-Coke (62% Coke Strength after Reaction (CSR))	196
Australia	CFR India	Pulverized Coal Injection (PCI)	103
Indonesia	CFR India	Mid-Volatility HCC	111
Indonesia	CFR India	PCI	98
Russia	CFR India	Met-Coke (64% CSR)	0
US	CFR India	Premium Low Volatility HCC	0
Canada	CFR India	Mid-Volatility HCC	140

Source: Ore Team

In 2015, Indonesia's Ministry of Energy and Mineral Resources set its August thermal coal reference price, also known as Harga Batubara Acuan (HBA), at $59.14/MT FOB, the lowest ever since its inception in January 2009. The August HBA price is 0.03% lower from July's price of $59.16/MT. The HBA is a monthly average price based 25% on Platts Kalimantan 5,900 kcal/kg Gross As Received (GAR) assessment, 25% on Argus-Indonesia Coal Index 1 (6,500 kcal/kg GAR), 25% on the Newcastle Export Index – formerly the Barlow-Jonker index (6,322 kcal/kg GAR) of Energy Publishing, and 25% on the global COAL Newcastle (6,000 kcal/kg Net as Received (NAR)) index.

Table 18 : Thermal Coal Import Prices in India as on 22/01/2015

Country	Rate Format	Grade	Rate in INR/Ton
Indonesia, ECI*	Ex-Plot	5,800 GAR*, TM* 16%	4,300.00
South Africa, ECI	Ex-Plot	6000 NAR*, TM 14-20%	5,050.00
Australia, ECI	Ex-Plot	5500 NAR, TM 18-25%	4,400.00
Indonesia, WCI*	Ex-Plot	5,800 GAR, TM 16%	4,550.00
South Africa, WCI	Ex-Plot	6000 NAR, TM 14-20%	5,000.00
Australia, WCI	Ex-Plot	5500 NAR, TM 18-25%	4,450.00

Source: Ore Team Glossary:
****ECI-Exporting Commodities International,***
WCI –World Coal Institute, GAR- Gross as Received,
NAR- Net as Received TM-Total Moisture

7. Import – Export of Coal in India

With the surging demand for coal in India in recent years and domestic production unable to scale up fast enough to meet the surging demand, the country has become a big importer of the fossil fuel. Prices and global trends in the coal market too have played an important role in shaping the trend in imports of the fuel.

7.1 INDIA COAL IMPORTS

India imported a total of 215.95MT of coal during the FY2014-15 as compared to 166.86MT in the previous year. There has been a continuous rise in imports in the recent past largely due to incapability of domestic players to meet the growing demand from Power and Steel industries in the country.

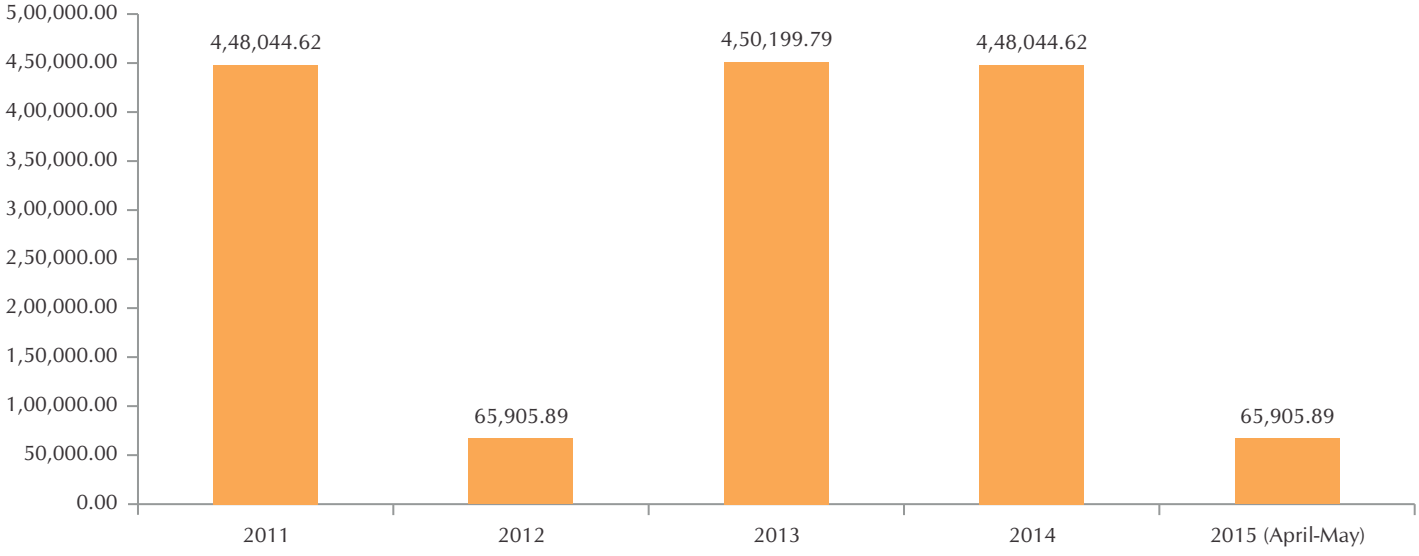
The reasons for coal shortages in India, resulting in higher imports are:

- Cancellation of mining licenses for 204 mining blocks by the Supreme Court in 2013 and the subsequent delay in reallocation of the said blocks, disrupting existing production levels
- Delay in environment and forest clearance of major projects
- Delay in land acquisition of the projects
- Law and order problems of states arising from issues in implementation in the Resettlement and Rehabilitation (R&R) policy of CIL

As per the present policy, coal can be imported (under Open General License) by the consumers themselves as per their requirements. Coking coal is imported primarily by steel companies for the purpose of meeting their requirements as well as to blend it with poor quality domestic coal. Non coking coals, in particular, low ash contents, are mainly imported by Coast based power plants, cement plants, captive power plants, sponge iron plants, industrial consumers and coal traders.

Global steel industry in particular European Union, North America, South America and Commonwealth of Independent States witnessed decline in production leading to a fall in demand of coal as well as in international prices. This along with the inability of domestic coal supplier Coal India being unable to sufficiently scale up production to meet the demand from the domestic sectors have also accentuated the import trend in recent years.

Figure 30 : Import of Coke, Coal, Briquettes Etc. in India (MT), 2011-2015

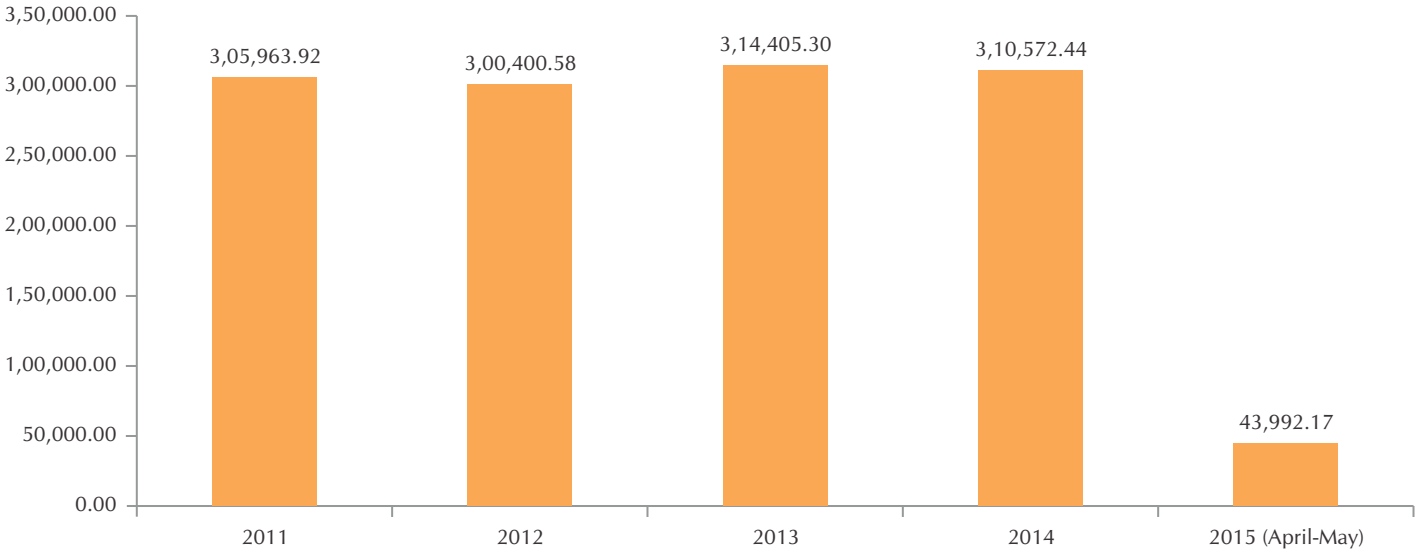


Source: Ministry of Commerce, Government of India

7.2 INDIA COAL EXPORTS

India exports very small amounts of coal to countries such as Bangladesh and Nepal. Bangladesh and Nepal accounted for 60.6% and 32.1% of total coal exported by India.

Figure 30 : Import of Coke, Coal, Briquettes Etc. in India (MT), 2011-2015



Source: Ministry of Commerce, Government of India

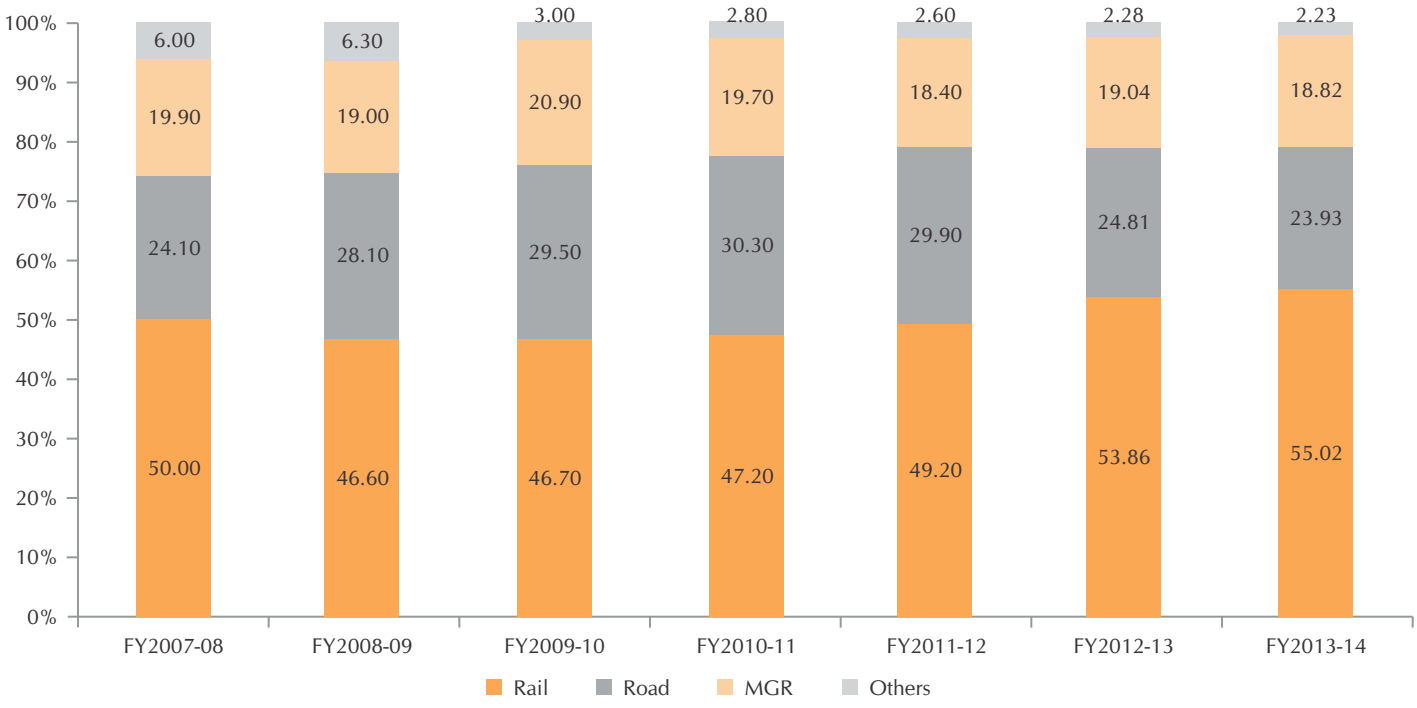
8. Coal Logistics in India

Indian Railways is the largest transporter of coal in the country, having accounted for 55.02% of total raw coal dispatches by coal producing companies in India during the FY2013-14. Improved infrastructure and well-connected highways have made roads a viable option for long distance transportation. Its share in coal despatches stood at 23.93% of total raw coal despatched during the FY2013-14.

MGR (Merry-go-round train) System is another key source of transporting coal. It is a block train of hopper wagons, which both loads and unloads its cargo while moving. MGR system accounted for 18.82% of the total coal despatches.

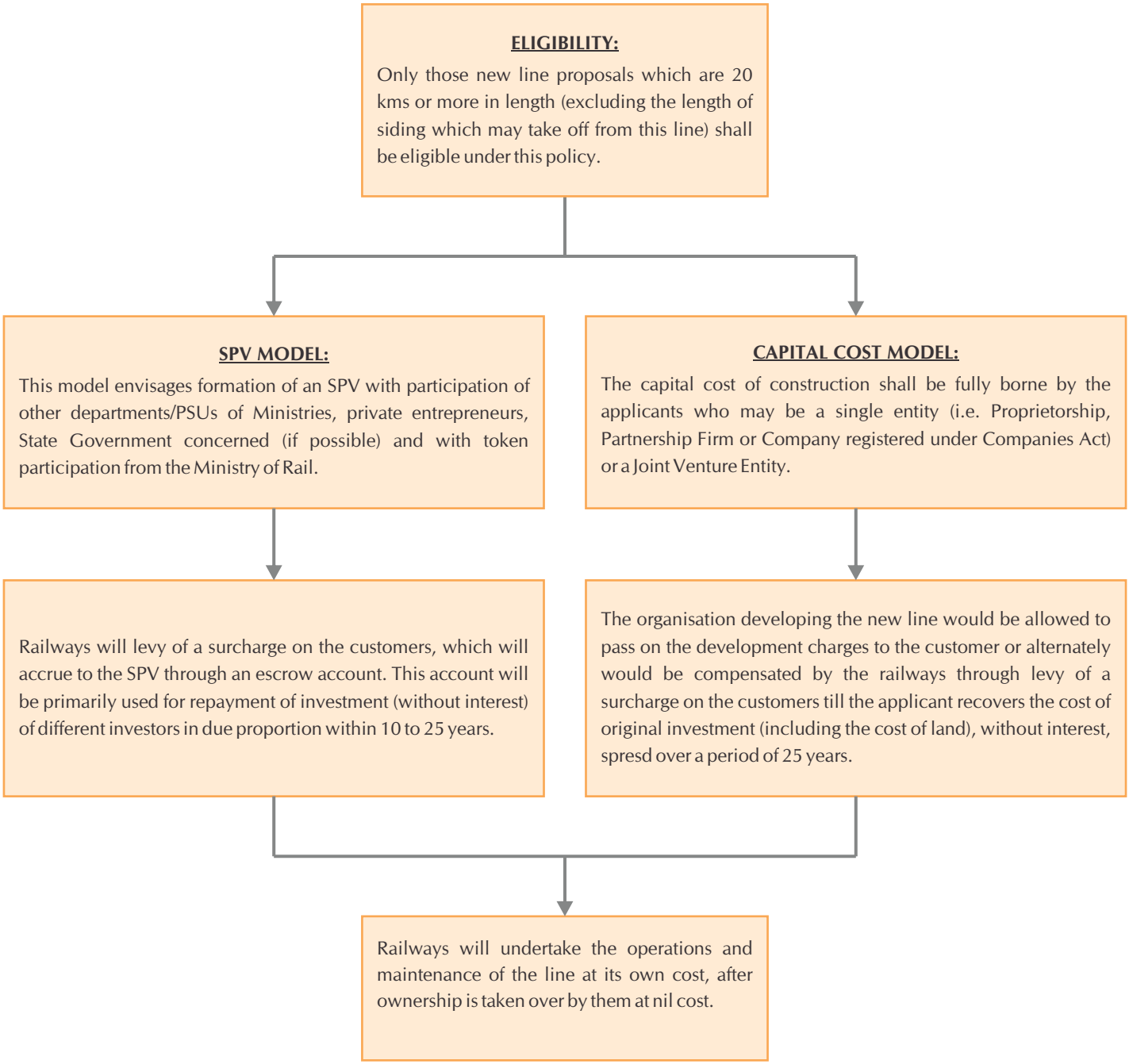
Ports are also used for coal logistics in India. Paradip port is the largest handler of coal traffic, accounting for a quarter of the shipment of the same. Other major ports with substantial coal traffic are Vishakhapatnam, Ennore and Haldia port, respectively.

Figure 32 : Source-wise Break-Up of Transport (MT), 2007-2008 to 2013-2014

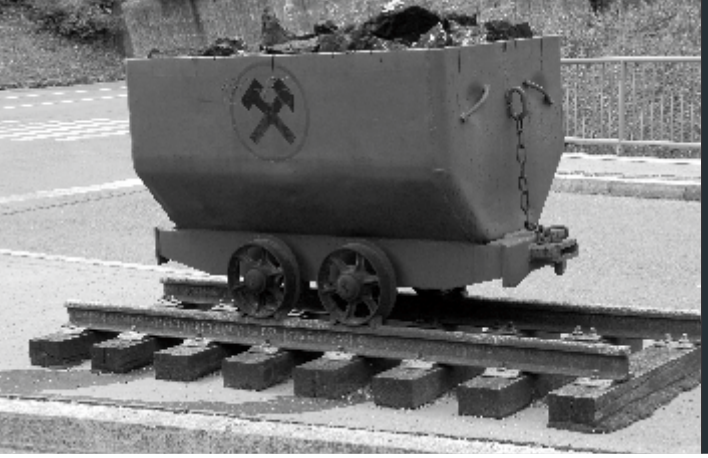


Source: Coal India Ltd Annual report 2013-14

8.1 R2CI: POLICY FOR RAIL CONNECTIVITY TO COAL MINES



Source: Ministry of Commerce, Government of India



9. SWOT Analysis

SWOT ANALYSIS

STRENGTHS

The Government offers a wide range of concessions to the investors in India, engaged in mining activity, such as: :

- Tax holiday for mining in backward areas up to 5 years
- 30% tax holiday for 5 years thereafter and depreciation concessions for environmentally friendly equipment usage
- 1/10th of the expenditure on prospecting or extracting or production of certain minerals during 5 years ending with the first year of commercial production allowed as a deduction from the total income

Ease of availability, low labour and conversion cost

Vast reserves of coal, estimated to be 301.5BT as on April 1, 2014

WEAKNESS

Poor labour productivity and large instances of labour unrest, unskilled and inexperienced labour dominant

Environmental Disregard - Historically, opencast mining has been favoured over underground mining, This has led to land degradation, environmental pollution and redyced quality of coal

Outdated Technology - India has still not been able to develop a comprehensive solution to deal with the fly ash generated at coal power stations through use of Indian coal. Clean coal technologies, are available, but these are expensive and need modification to suit Indian coal specifications. Mining technology is also outdated

High incidence of illegal mining which has been failed to be checked despite recent strict regiulations

OPPORTUNITIES

A fast growing economy offers a huge domestic market (with relatively inelastic demand) for coal

Power generation is predominantly coal based and likely to remain so. Ambitious power generation targets and upgrades to power generation infrastructure have been planned over the next few years

The Government has passed landmark bill ushering in privatisation and opening up of the coal sector in the near future, bringing in transparency in coal block allocations and improving the efficiency of the coal and mining sectors

Government plans and schemes such as Power for All, Housing for All, Make in India to help boost demand

THREATS

Demand growth likely to be erratic due to poor performance of end use sectors -

- Power sector facing bottlenecks due to poor financial health of Discoms
- Poor performance of the agricultural sector due to monsoon likely to hit fertilizer demand
- Steel industry is ailing and in huge debt with its effect on the demand from this segment

Delay in the development of coal blocks alotted to new players (both public and private sector) would place intense pressure on public sector companies

Opposition from various quarters to the opening up of coal sector to private sector investments for commercial mining will impede speedier growth of the sector

Mining companies and equipment suppliers are under the constant threat of being taken over by foriegn companies

A heavy tax burden discourages further investment

10. New Coal Mining Technologies

10.1 CLEAN COAL TECHNOLOGY: REQUIREMENT IN INDIA

Clean Coal Technology (CCT) is a term used to describe various technologies that can be employed to reduce the environmental impacts associated with the use of coal. The US is a front-runner in the research and development of such technologies. Technologies have been developed to remove or prevent the formation of sulphur dioxide (SO2) and NOx (gas produced from the reaction of nitrogen and oxygen in the air during combustion, especially at high temperatures), which is formed when coal is burned at conventional PC (Pulverized Coal) power stations.

Some of the CCTs are:

Coal Washing: Due to growing environmental concerns, processes such as coal washing have been added onto conventional coal power plants to help curb NOx and SO2 emissions. Coal washing helps in the removal of minerals in raw coal before it is combusted. Washing coal is a water based process where the denser materials (rocks and high ash coal particles) are separated and removed from coal. Coal washing involve grinding coal into smaller pieces and passing it through a process called gravity separation. Gravity separation methods make use of the different relative densities of different grades of coal, to cull out the reject material.

Typically, density separation is used to clean coarse coal while surface property-based methods are preferred for fine coal cleaning. In the density based processes, coal particles are added to a liquid medium and then subjected to gravity or centrifugal forces to separate the organic-rich (float) phase from the mineral-rich (sink) phase. Density-based separation is the most common coal cleaning method and is commercially accomplished by the use of jigs, mineral spirals, concentrating tables, hydrocyclones, and heavy media separators. The performance of density-based cleaning circuits is estimated by using laboratory float-sink (F-S) tests. In the surface property-based processes, ground coal is mixed with water and a small amount of collector reagent is added to increase the hydrophobicity of coal surfaces. Subsequently, air bubbles are introduced in the presence of a frother to carry the coal particles to the top of the slurry, separating them from the hydrophilic mineral particles. Commercial surface property-based cleaning is accomplished through froth or column flotation. To estimate the performance of flotation devices, a laboratory test called release analysis is used.

The product from this process, cleaned or washed coal, has less ash and more moisture than the raw coal product. The coal is then pulverized and prepared for burning. While Coal washing is quite widespread around the world, the world largest coal manufacturer, CIL washes only about 30% of its coal production from 17 washeries with a capacity of 39.4MT per annum. The company has initiated action through global tenders to establish 16 new coal washeries with an aggregate capacity of 100.6MT per annum out of which 6 are coking coal washeries with a total capacity of 18.6MT per year and 10 non-coking coal washeries with a capacity of 82.0MT per year. Construction works of 3 washeries are in progress and the tenders for 2 washeries have been awarded. Contract work for other washeries is in different stages of evaluation.

Gasification of Coal: The Integrated Gasification Combined Cycle (IGCC) is a cleaner alternative to coal fired power plant where coal is gasified by reacting it with oxygen at a high temperature to form a syn-gas, a mixture composed primarily of hydrogen, carbon monoxide and other gaseous constituents. The syn-gas is then treated for the removal of hydrogen sulphide, ammonia and particulate matter. It is then burned in a gas turbine to generate electricity, which in turn is used to produce steam to power a steam turbine. Residual heat in the exhaust gas from the gas turbine is recovered in a heat recovery boiler as steam, which can be used to produce additional electricity in a steam turbine generator. This dual system is commonly known as a combined cycle, which allows for a more efficient process of generation. This higher efficiency leads to an increase in financial savings, as well as reduces the waste of coal resources.

CO2 Capture and Storage (CCS): Efficiency improvements in coal fired power plants will definitely help towards lowering Carbon dioxide (CO2) emissions through CCS which offers a longer term option for achieving near zero CO2 emissions. This technology basically involves stripping out CO2 from the exhaust streams of coal combustion or gasification processes and geologically disposing it off, so that it does not enter the atmosphere. Some of the methods that can be used for CO2 capture are pre-combustion capture, oxyfuel combustion and chemical looping

combustion. The first method is feasible if it is used in conjunction with a modified IGCC plant where hydrogen is produced along with CO2 rather than carbon monoxide, produced in gasification. The hydrogen is then combusted in a gas turbine and the CO2 is captured for storage. The second, oxyfuel combustion, basically involves burning coal in an oxygen-rich process to produce CO2, which is then transported to the sequestration site and stored. Last but not the least; the third method involves indirectly combusting coal via chemical looping, where metal oxide particles react with a solid, liquid or gaseous fuel, to produce solid metal particles and a mixture of carbon dioxide and water vapour. The water vapour is condensed, leaving pure CO2, which can then be sequestered.

Coal Bed Methane (CBM): It is simply methane found in coal seams. Often a coal seam is saturated with water, with methane held in the coal by water pressure. The methane is released when the coal seam is depressurized. To economically retrieve reserves of methane, wells are drilled into the coal seam, which is dewatered and then the methane is extracted from the seam, compressed and piped to market. The decrease in pressure allows methane to deabsorb from the coal and flow as a gas up the well to the surface. Methane is important for electric generation by burning it as a fuel in a gas turbine or steam boiler. Compared to other hydrocarbon fuels, burning methane produces less CO2 for each unit of heat released. Currently, CIL has offered 26 blocks for CBM exploration covering 13,600 sq. km. of area with estimated CBM reserves of 1,374 billon cu.m. The first CBM recovery was demonstrated in 2009 with the Great Eastern Energy Corporation Ltd. (GEECL), an energy company signing contract for commercial production from the Raniganj coalfields near Burnpur.

Coal to Oil or Coal to Liquids (CTL): Conversion of coal into oil will have two benefits. Firstly, to a certain extent it will reduce dependency on oil which is highly volatile, and secondly, it will have lesser negative impact on environment than coal. During the World War II, Germany produced some quantity of oil from coal and thereafter, South Africa (Sasol) was the major country to produce oil from coal to meet its energy needs during its period of isolation under Apartheid.

11. The Way Forward

11.1 TECHNOLOGY INNOVATION

It is evident that India at present is short of all other energy resources, particularly coal, compared to other leading countries and that the country needs to expand its resources through new mining exploration techniques other than the open-cast method.

We believe that coal use will increase under any foreseeable scenario because it is cheap and abundant compared to other renewal energy sources. However, the environmental impact of coal is of growing concern in the global economy. It is necessary that the demand of energy in the country is met in an environment-friendly and sustainable manner, for which India should go for enhanced technology where there will be less emissions of carbon dioxide and other greenhouse gases.

Underlining the importance of environment friendly coal technologies, the Ministry of Coal is focusing on development of CCT and many other initiatives in this direction. Recently, India has sought co-operation with South Africa in the field of CCT like CTL, Underground Coal gasification and Coal Beneficiation besides modern technology for underground coal mining. India has already planned to introduce CTL technology in two of its coal blocks, each having capacity of 1.5 million coal reserves. Both the countries also agreed to exchange R&D initiatives in the area of extraction CBM before exploiting coal resources. Moreover, 16 new washeries are being taken up by CIL are in different stage of evaluation.

11.2 SOURCING OF COAL IMPORTS

Even though India is the world's third largest coal producer, the country has been grappling with acute shortage of the dry fuel, which is hurting the power and fertilizer sectors. Plans have been made to boost domestic production and curb imports though its effects are likely to be felt only in the long-term. The Government has stepped in with measures to augment domestic coal production with an ambitious target of 1 billion metric tons of coal production by 2020. To that effect, CIL is undertaking a massive overhaul and fine tuning of its operations that would result in a big boost in its production capabilities. These plans are further likely to receive a shot in the arm from the successful auction of coal blocks to public sector and private companies which were held in a streamlined and transparent manner in mid-2015.

For FY2016-17, the growth rate of demand of coal in India has been envisaged at 7.09% (980.50MT). In the FY2015-16, demand of coal in India has been estimated to the tune of 787.03MT as against 769.69MT in the FY2014-15. The envisaged indigenous coal production is 795.00MT in the terminal year of 12th Five Year Pan (2016-17) and 1 Billion metric tons by 2020. Of this production target, the share of CIL is expected to be 615MT (77% share of total production) with an envisaged growth rate of 7.12%. A share of 30.20% of the coal production is expected to come from existing mines, 54.20% from projects under implementation and 15.60% from new projects to be taken up.

However, while domestic capabilities are enhanced, in the medium term India's coal demand is likely to continue to outpace its domestic production capabilities, necessitating a sustained increase in imports. India will have to depend on nearby foreign countries to meet the demand-supply gap in the country. There can be various sources of coal import, but owing to the location and estimated reserves, Australia, Indonesia, South Africa, and Russia can be the ideal sources of import for India. Currently, Indonesia and Australia contribute about 77% of India's coal imports.

Indonesia:

Indonesian suppliers have been able to resist the demand from Indian consumers for better prices by selling their coal in the spot market. Regulation passed by the Indonesian Government during CY2011 forbids coal firms from exporting their produce at rates lower than international benchmarks, making Indian companies look for cheaper coal. Indian buyers have reduced imports from top thermal coal exporters in Indonesia and are seeking to renegotiate contracts as a sharply lower rupee has driven up their import costs.

To add to the vicious cycle, the fall in purchases from India is forcing Indonesian suppliers to seek other buyers or dump cargoes into the spot market, putting further pressure on international benchmark prices that are already near their lowest in four years. Going forward, another concern for coal producers in Indonesia could be a proposal by the Indian government to ban purchases of coal with a heating value below 4,540 kcal a kilogram, sulphur content above 1% and with ash content higher than 25%.

Australia:

India has been in a better position in the coal market negotiations with Australia in recent years due to the slump

in demand that Australia is facing from other nations. Global coal producers are shifting towards cleaner fuel sources in China, the world's largest importer. The Communist nation has been rapidly establishing hydro-power generation capacities as well as gas-fired thermal plants as it tries to mitigate high air pollution levels. Moreover, Australian companies have been unable to quickly adjust output to falling demand bound by mining regulatory and legislative issues unlike its Indonesian counterpart.

11.3 GOVERNMENT ACTION

Government authorities have been urged to speed up coal block allocations and ecological clearances process. They also need to give subsidies on new mining technologies and encourage technology and knowledge transfer by ushering in greater tie ups with international coal mining companies. In order to boost domestic production, an inter-ministerial group will prepare a Public-Private Partnership (PPP) for coal mining sector. The Government hopes that such private involvement in coal production will help augment capacity.

Moreover, hold-ups and roadblocks that are sector specific in nature need to be resolved to ensure the coal produced not only reaches the consuming sectors, but also the end-use sectors continue to function smoothly without disruptions in their demand due to inherent bottlenecks in their supply chains. Primary issue with coal's final consumer, the power sector, is with the indebtedness problem of state Discoms. The 'sick' status of the Discoms is holding up power generation companies from selling more power, despite availability of surplus fuel. Despite 275,000MW of installed capacity, India suffers from peak power deficit of 3%, in north and east it's as high as 6% and 11%.

Similarly, another end use sector that is ailing is the Indian steel industry that uses coal as a primary input. Helping the steel industry with improvements in logistics such as improvements in rail infrastructure to improve coal off-take and measures to curb steel imports to protect the ailing steel industry, have also been taken up by the Government as a proactive measure to boost demand for coal from this sector.

The revenues from coal block auctions and measures to hive off the stake in Coal India have ensured that the Government has also been able to fund ambitious technology upgrade and productivity boosting schemes for the coal industry. Monitoring of coal production along with a detailed inspection of coal blocks before reallocation are some measures to ensure there are no future disruptions in the mining of coal in India and the industry is able to smoothly achieve its targets of reducing coal imports and reach self-sufficiency in coal supply in a few years' time. The strong growth fillip provided by the Government in combination with legislative reform is likely to result in a huge growth trajectory for the industry in the long-term.

Annexure

TIMELINE FOR COAL AUCTIONS

Table 19 : Schedule of the Tender Process of Schedule II Coal Mines (Updated)

Sl. No.	Event Description	Estimated Date	
1.	Registration and Publication of notice inviting tender in one English and Hindi national newspaper.	T_0	Thursday, December 25, 2014
2.	Commencement of sale of Tender Document at the website of MSTC.	T_0 + 2	Saturday, December 27, 2014
3.	Last date for sale of Tender Document at the website of MSTC.	T_0 + 35	Thursday, January 29, 2015
4.	Last date of receiving queries from Bidders.	T_0 + 11	Monday, January 5, 2015
5.	Pre-bid meeting.	T_0 + 16	Saturday, January 10, 2015
6.	Last date for responses to queries by the Nominated Authority.	T_0 + 23	Saturday, January 17, 2015
7.	Bid Due Date.	T_0 + 40	12:00 noon Tuesday, February 03, 2015
8.	Opening of the Technical Bid(s).	T_0 + 40	14:00 hours on Tuesday, February 03, 2015
9.	Start date for examination of the Technical Bid(s).	T_0 + 40	Tuesday, February 03, 2015
10.	Announcement of the Qualified Bidders.	T_0 + 49	Thursday, February 12, 2015
11.	Conduct of electronic auction (Financial Bid) for the Qualified Bidders.	T_0 + 51 - 59	Saturday, February 14, 2015 - Sunday, February 22, 2015
12.	Recommendation by the Nominated Authority to the Central Government for selection of Successful Bidder.	T_0 + 61	Tuesday, February 24, 2015
13.	Intimation to the Successful Bidder (subject to receipt of instruction from the Central Government).	T_0 + 64	Friday, February 27, 2015 Monday, March 2, 2015
14.	Execution of the Agreement between the Successful Bidder and Nominated Authority.	T_0 + 67	
15.	Last date for furnishing of Performance Security and payment of Fixed and Upfront Amount by the Successful Bidder.	T_0 + 85	Friday, March 20, 2015
16.	Issuance of Vesting Order by Nominated Authority.	T_0 + 88	Monday, March 23, 2015

Source: Ministry of Coal and MSTC.

Table 20 : Calendar for E auction of Schedule II Coal Mines Earmarked for Power Sector

Date	Mine	Schedule Start	Schedule End
14 February 2015	Talabira-I	11:00 AM	1:00 PM
15 February 2015	Sarisatolli	11:00 AM	1:00 PM
16 February 2015	Trans Damodar	11:00 AM	1:00 PM
17 February 2015	Amelia North	11:00 AM	1:00 PM
18 February 2015	Tokisud North	11:00 AM	1:00 PM
19 February 2015	Gare Palma IV/2&3	11:00 AM	1:00 PM

Source: Ministry of Coal and MSTC.

Table 21 : Calendar for E auction of Schedule II Coal Mines Earmarked for Non Power Sector

Date	Mine(s)		Schedule Start	Schedule End
14 February 2015	Sial Ghoghri		11:00 AM	1:00 PM
15 February 2015	Belgaon	Kathautia	11:00 AM	1:00 PM
16 February 2015	Mandla North	Marki Mangli III	11:00 AM	1:00 PM
17 February 2015	Ardhagram	Chotia	11:00 AM	1:00 PM
18 February 2015	Gare Palma IV-5		11:00 AM	1:00 PM
19 February 2015	Bicharpur		11:00 AM	1:00 PM
20 February 2015	Gare Palma IV-4		11:00 AM	1:00 PM
21 February 2015	Gare Palma IV-1		11:00 AM	1:00 PM
22 February 2015	Gare Palma IV-7		11:00 AM	1:00 PM

Source: Ministry of Coal and MSTC.

Table 22 : Schedule of the Tender Process for Tranche III of Auction of Coal Mines (Schedule II & Schedule III) (Updated on August 7, 2015)

Sl. No.	Event Description	All Schedule II and III Mines except Dongeri Tal-II Estimated Date		Dongeri Tal - II (Schedule III Coal Mine) Estimated Date	
1.	Registration and Publication of notice inviting tender in one English and Hindi national newspaper.	T_0	Monday, 08 June 2015	T_0	Monday, 08 June 2015
2.	Commencement of sale of Tender Document at the website of MSTC.	T_0	Monday, 08 June 2015	T_0	Monday, 08 June 2015
3.	Last date of receiving requests for Site Visit/ Land Document Inspection.	$T_0 + 26$	1700 hours on Saturday, 04 July 2015	$T_0 + 26$	1700 hours on Saturday, 04 July 2015
4.	Pre-bid meeting.	$T_0 + 28$	Monday, 06 July 2015	$T_0 + 28$	Monday, 06 July 2015
5.	Last date of receiving queries from Bidders.	$T_0 + 30$	1700 hours on Wednesday, 08 July 2015	$T_0 + 30$	1700 hours on Wednesday, 08 July 2015
6.	Last date for responses to queries by The Nominated Authority.	$T_0 + 37$	Wednesday, 15 July 2015	$T_0 + 37$	Wednesday, 15 July 2015
7.	Last date for sale of Tender Document at the website of MSTC.	$T_0 + 41$	Sunday, 19 July 2015	$T_0 + 44$	Wednesday, 22 July 2015
8.	Bid Due Date.	$T_0 + 46$	1400 hours on Friday, 24 July 2015	$T_0 + 46$	1400 hours on Friday, 24 July 2015
9.	Opening of the Technical Bid(s).	$T_0 + 49$	Monday, 27 July 2015	$T_0 + 49$	Monday, 27 July 2015
10.	Start date for examination of the Technical Bid(s).	$T_0 + 49$	Monday, 27 July 2015	$T_0 + 49$	Monday, 27 July 2015
11.	Announcement of the Technically Qualified Bidders.	$T_0 + 61$	Saturday, 08 August 2015	$T_0 + 61$	Saturday, 08 August 2015
12.	Start of electronic auction (Financial Bid) for the Qualified Bidders.	$T_0 + 64$	Tuesday, 11 August 2015	$T_0 + 64$	Tuesday, 11 August 2015
13.	End of electronic auction (Financial Bid) for the Qualified Bidders.	$T_0 + 70$	Monday, 17 August 2015	$T_0 + 70$	Monday, 17 August 2015
14.	Recommendation by the Nominated Authority to the Central Government for selection of Successful Bidder.	$T_0 + 73$	Thursday, 20 August 2015	$T_0 + 73$	Thursday, 20 August 2015
15.	Intimation to the Successful Bidder (Subject to receipt of instruction from the Central Government).	$T_0 + 80$	Thursday, 27 August 2015	$T_0 + 80$	Thursday, 27 August 2015
16.	Execution of the Agreement between the Successful Bidder and Nominated Authority.	$T_0 + 84$	Monday, 31 August 2015	$T_0 + 84$	Monday, 31 August 2015

Table 22 Contd...

Sl. No.	Event Description	All Schedule II and III Mines except Dongeri Tal-II Estimated Date		Dongeri Tal - II (Schedule III Coal Mine) Estimated Date	
17.	Last date for furnishing of Performance Security and payment of Fixed and Upfront Amount by the Successful Bidder	T_0 +109	Friday, 25 September 2015	T_0 +109	Friday,25 September 2015
18.	Issuance of Vesting Order by Nominated Authority	T_0 +114	Wednesday, 30 September 2015	T_0 +114	Wednesday, 30 September 2015

Source: Ministry of Coal and MSTC

Table 23 : Updated Calendar for E-auction of Schedule II & Schedule III Coal Mines - Auction Tranche III (Updated on August 11, 2015)

Date	Coal Mine		Schedule Start	Schedule End
11 August 2015	Marki Mangli-I	Bhaskarpara	11.00 AM	1.00 PM
13 August 2015	Majra		11.00 AM	1.00 PM

Source: Ministry of Coal and MSTC

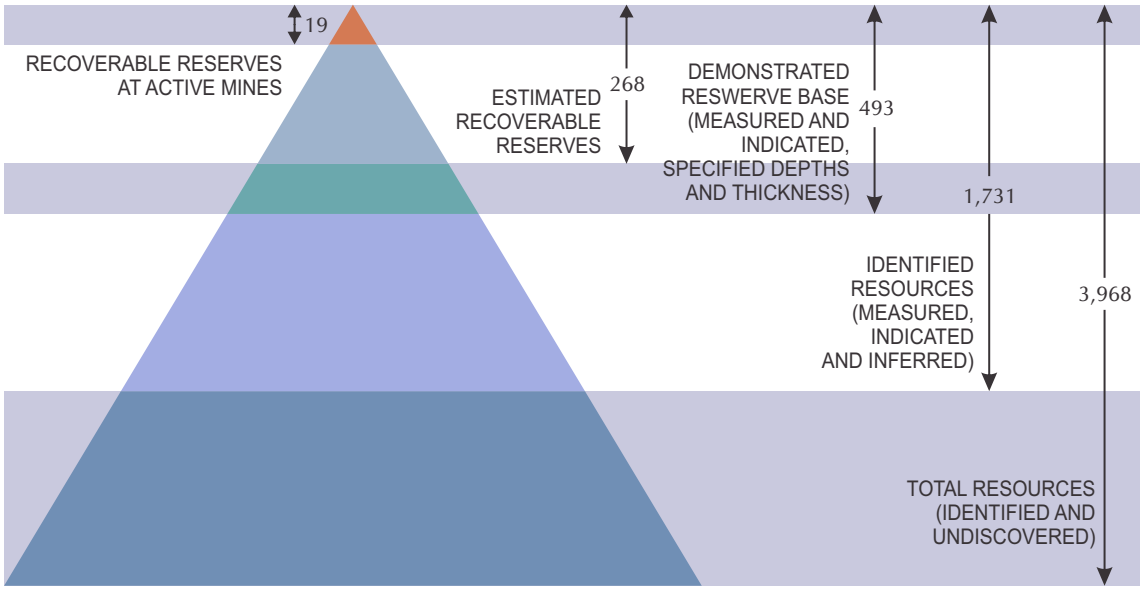
1. Pursuant to the Delhi High Court case, the schedule for e-auction of Jamkhani Coal Mine shall be announced at a later date.
2. Consequent to hearing dated 11.08.2015 in W.P.(C) 7630/2015 (Kolkata Glass and Ceramics Private Limited. vs. UOI.) before Hon'ble High Court of Delhi, the schedule for e-auction of Chitarpur Coal Mine shall be announced at a later date. Scheduled Start for all e-auctions will be 11:00 AM and Scheduled End will be 1:00 PM.

GLOSSARY OF TERMS

MT	Million Tonnes	PC	Pulverized coal
BT	Billion Tonnes	SPV	Special Purpose Vehicle
BtU	British Thermal Units	ECI	Exporting Commodities International,
MW	Mega Watts	WCI	World Coal Institute
GW	Giga Watts	GAR	Gross as Received
MTPA	Million Tonnes Per Annum	NAR	Net as Received
CAGR	Compound Annual Growth Rate	TM	Total Moisture
RoM coal	Run of Mine Coal	HCC	Hard Coking Coal
BCD	Basic Customs Duty	PCI	Pulverized Coal Injection
CIL	Coal India Limited	CSR	Coke Strength after Reaction
SCCL	Singareni Collieries Company Limited	CFR	Cost and Freight Basis
FSA	Fuel Supply Agreements	Cif	Cost including freight
CTL	Coal to Liquid	UHV	Useful Heat value
CCL	Clean Coal Technology	GCV	Gross Calorific value
CCS	CO2 Capture and Storage	HBA	Harga Batubara Acuan
CBM	Coal Bed Methane		

Explanatory notes for differences in definition of World Coal Reserves according to BP and Ministry of Coal, India. Refer Figure 10 and Table 4 for Coal Reserves.

Figure 33 : Differences in Definition of Coal Reserves Estimates



Source: Energy Information Administration (EIA) and Manicore
http://www.manicore.com/anglais/documentation_a/oil/coal_reserve.html

The term 'proved reserves' is often defined by different organizations using different parameters of estimation. The figure below clearly explains how reserves which are recoverable may be estimated based on how much is commercially recoverable, after it has been discovered and inferred.

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