

Indian Coal: Production and Ways to Increase Coal Supplies

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Abstract- In this paper the availability of Indian coal its production in (1955 to 2011-12) , present production , production challenges, supply constraints is discussed.

Index Terms- Ash, Coal, and Coal production.

I. INTRODUCTION

India is the third largest producer of coal in the world (Source Coal India Limited). Coal in India is considered as the black

gold. It is widely used in Indian power industry to generate electricity, it has rapid contribution in industrialization , it contribute a total of 55% of commercial energy production of India(Source Ministry of Coal Government of India); India has 2, 93,497 Million Tones (Source Ministry of coal, Govt. of India) of geological resource of coal estimation from whole country. The Lignite reserve in the country has been estimated at around 40.91 billion tones (Annual report 2011-12, Ministry of Coal, Government of India) as on 01.04.2011.

As on	Geological Resources of Coal			
	Proved	Indicated	Inferred	Total
1.4.2007	99060	120177	38144	257381
1.4.2008	101829	124216	38490	264535
1.4.2009	105820	123470	37920	267210
1.4.2010	109798	130654	36358	276810
1.4.2011	114992	137471	34390	285862

Figure 1: The estimates of coal resources in the country during last 5 years (in Million Tones) Source (Ministry of Coal, Government of India)

Type of Coal	Proved	Indicated	Inferred	Total
(A) Coking :-				
-Prime Coking	4614.35	698.71	0	5313.06
-Medium Coking	12836.84	11951.47	1880.23	26668.54
-Semi-Coking	482.16	1003.29	221.68	1707.13
Sub-Total Coking	17933.35	13653.47	2101.91	33688.73
(B) Non-Coking:-	99617.65	128416.04	30282.09	258315.78
(C) Tertiary Coal	593.81	99.34	799.49	1492.64
Grand Total	118144.81	142168.85	33183.49	293497

Figure 2: The Type and category wise coal resource in India as on 01-04- 2012(in Million Tones). Source (Ministry of Coal, Government of India)

Coal India a major player in mining of coal produce 431.32 Million Tones at financial year ending 2011 and targeted 452 Million Tones of at 2012 financial year ending (Source Coal India Limited). Coal/Lignite based thermal power plant is 88 Number with installed capacity 80458 MW (Source Central Electricity Authority, 2010) which consumed 407.61 Million

Tones (Source Central Electricity Authority, 2010) of coal. While in 2012, 90 numbers of Coal/lignite based thermal power plant with installed capacity of 83797MW production (Source Central Electricity Authority, 2012). The annualized production of coal is shown

Plan Period	Terminal Year	Production (Mty)	CAGR (%)
I Plan	1955-56	38.40	
II Plan	1960-61	55.72	7.73
III Plan	1965-66	70.30	4.76
IV Plan	1973-74	78.18	1.24
V Plan	1978-79	102.02	5.47
VI Plan	1984-85	147.44	7.24
VII Plan	1989-90	203.36	6.64
VIII Plan	1996-97	289.32	4.76
IX Plan	2001-02	327.79	2.53
X Plan	2006-07	430.83	5.62
XI Plan (P)	2011-12	554.00	5.16

Figure 3: Plan period-wise coal production trend and annualized growth rate (CAGR)

Source (Coal Controller's Organization)

II. INDIAN COAL

Indian coal has high ash content. The average ash content in Indian coal is 35-38 per cent while imported coal ash content 10-15%. In this regard, washing will help reduce the ash content by 7-8 per cent (Source, the Indian Express, 2011). In addition, over time the calorific value and the ash content of thermal coals in India have deteriorated as the better quality coal reserves are depleted and surface mining and mechanization expand. This poses significant challenges. Transporting large amounts of ash-forming minerals wastes energy and creates shortages of rail cars and port facilities. A low-quality, high-ash coal also creates problems for power stations, including erosion in parts and materials, difficulty in pulverization, poor emissivity and flame temperature, low radioactive transfer, and excessive amounts of fly ash containing large amounts of unburned carbons (Zamuda and Sharpe, 2007). Indian coal is characterized by the following quality aspects:

- (i) Lower to medium grade coal
- (ii) Ash content is high
- (iii) Moisture content is low
- (iv) Sulphur content is low

A wide area of coal usage, ranging from power generation to steel production to infrastructure and commercial usage, the quality of coal can be improved by washing.

Coal washing is being promoted in India as a number of studies have shown that washed coal has higher calorific value than unwashed coal, translating into better power generation efficiency. The lower ash content of washed coal results in lower

emissions as well. India will setup 20 new washeries with annual capacity of 111 Million Tones to help better realize of its produce. The CFRI has developed the following:

- (i) Improved froth floatation process
- (ii) Oleo floatation process
- (iii) Oil agglomeration process

III. WAYS TO INCREASE COAL SUPPLIES IN INDIA

- (i) Exploration is a specialized job and is considered a risky venture. So investment should be encouraged in this sector through proper incentive and security of tenure.
- (ii) Performance improvement ways in mining operations may be explored and implemented in Indian mines.
- (iii) Mining applications pending at different levels with the state and centre. This is a deterrent for future investments. For this state or centre may take action on these applications within a time-bound manner.
- (iv) To streamline the entire approvals process and bringing about speed and consistency in decision-making a single window committee will help.
- (v) Online web portals through filling of returns should be considered by state or central government. Online payment mechanism for royalty can also be explored.
- (vi) In the past lot of mining leases have been provided comprising small areas to individuals. The mine owners are not able to mine scientifically while complying to all the environmental norms and would like to dispose of the areas or develop them through forming a joint

venture. States may allow transferring these assets at a premium so that these dormant assets can be developed to increase supply in domestic market, leading to the utilization of dormant resources.

- (vii) The exploration and exploitation for minerals requiring huge capital should be extended the same benefits and incentives which are available to the oil and gas sector under the new exploration licensing policy (NELP).

IV. WAYS TO IMPROVE COAL TRANSPORT

- (viii) Doubling of railway routes at places where coal movement is higher.
- (ix) Mismatch between the demand and supply of railway wagons.
- (x) Restructuring and/or reallocation of railway networks to connect with the coal bearing areas.
- (xi) Enhancing port capacities as well as evacuation efficiency and augmenting the existing capacities from existing ports.

V. FUTURE OF INDIAN COAL

In 2030 total power generation from the coal is likely to 161 Giga-watts, with associated projected increase in coal production to 750 Million Tones (Zamuda and Sharpe, 2007).

The country's coal demand is likely to touch 1,000 million tons (MT) by 2016-17, much higher than estimated supply of 750 million (The planning commission of India, 2012).

VI. CONCLUSION

The Indian coal reserve is enormous and production is very less due to many constraints in coal production and its supply, proper supply and introduction to private players also making them feasible in mining would cater this production and supply gap. Various ways to improve supply if implemented properly for coal would definitely fulfill the upcoming demand scenario of Indian coal

REFERENCES

- [1] Craig. D. Zamuda, "A Case for enhanced used for clean coal in India: An Essential Step towards Energy Security and Environmental Protection" Mark A. Sharpe, 2007.
- [2] Annual Report 2011, Ministry of Coal Government of India.
- [3] Annual Report 2010, Ministry of Coal Government of India.
- [4] India Energy Book 2012, (World Energy Council, Indian Chamber Committee)
- [5] Annual Report on Flyash utilization, CEA 2010
- [6] Annual Report on Flyash utilization, CEA 2011.
- [7] Annual report planning commission of India 2011.
- [8] The Indian Coal Sector: Challenges and future outlook, Indian Chamber of Commerce, 2012.

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