OVERVIEW OF ECL PRODUCTION & PRODUCTIVITY

MISSION VISION AND CORPORATE POLICY

VISION

To emerge from the position of domestic leader to leading global player in the energy sector by adopting best practices from mine to market with due care to environmental and social sustenance.

MISSION

The Mission of Coal India Limited is to produce & market planned quantity of coal & coal products efficiently and economically with due regard to safety, conservation and quality.

CORPORATE POLICY

For fulfilling the Long term objectives, following policies of CIL have been adopted:

- CIL's policy for Corporate Social Responsibility (CSR) – Modified
- Policy of Resettlement and rehabilitation - to meet increasing expectation of project affected people.
- CIL's Policy on Publicity / Advertisement and Grant
- CIL's Safety Policy
- Uniform Deposit Policy for CIL and its subsidiaries
- CIL's Marketing Policy
- CIL's Policy on Investment of Surplus Fund

Objectives

The major objectives of Eastern coalfields Limited

- Attain "Cost leadership" through strategic cost reduction in each business process in the coal business value-chain.
- To improve the quality of life of employees and discharge the corporate obligations to society at large and community around the coalfield in particular.
- Undertake continuous efforts to inculcate safe mining practices and promote safety management to reach Zero Accident Potential level.
- To lay due emphasis on afforestation, protection of environment and control of pollution.
- Ensure supply of coal to all linked power utilities and other consumers as per linkage.

Objectives

- Improve customer-relationship management and strengthen to reach the customers.
- Encourage and practice worker's participation in management in letter and spirit at all levels.
- Implement human capital development policy to provide supportive work environment through appropriate training inputs designed for making every employee to face the challenges and reap the benefit of opportunities of changing business environment.

Objectives

- To develop corporate image and brand equity commensurate to the size and complexity of operations as well strategic relevance of the company.
- To optimize generation of internal resources by improving productivity of resources, prevent wastage and to mobilize adequate external resources to meet the investment need.
- To modernize existing mines.

COMPANY PROFILE

Raniganj Coalfield is considered as the birth place of Indian Coal industry. Though Coal mining activities in this coalfield had started more than 200 years ago, the commercial scale mining activities had been recorded when first mining lease was granted by the Eastern India Company in 1774 and mining operation started by Summer and Heatly in the same year. Country's almost entire coal production was obtained from this coalfield till 1894 by underground mining by numerous private operators, big and small.

COMPANY PROFILE

Non-Coking coal mines were taken over by the Govt. of India in January 1973 and Coal Mines Authority Limited was incorporated to manage the taken over mines. ECL was incorporated on 1st November, 1975 by taking over 414 mines vested with Eastern Division of Coal Mines Authority Limited. With a view to streamlining the management and administration, these mines were amalgamated and regrouped to around 123 mines later on.

COMPANY PROFILE

Mining lease-hold area of ECL is about 753 Sq.KM out of which about surface right area is about 237 Sq.Km. It is situated in two States-West Bengal and Jharkhand. Area of Raniganj Coalfield is 1530 Sq.Kms spreading over Burdwan, Birbhum, Bankura and Purulia Districts in West Bengal. Saherjuri Coalfield in Deoghar District of Jharkhand is being an area of 10 Sq.Kms is being worked as SP Mines Area under ECL. Hura Coalfields in Godda District of Jharkhand is also under ECL having an area of 80 Sq.Kms. ECL's largest opencast mine Rajmahal is being operated here.

COMPANY PROFILE

Heart of Raniganj Coalfields is located on the north of Ajoy while Mejia and Parbelia are on south of Damodar River. In Dhanbad District, Mugma field lies on the west of Barakar River. Formation of coal seems has occurred mainly in two sequence at ECL- Raniganj measures & Barakar measures. Raniganj measures covers the entire coalfield of Raniganj-Pandaveswar, Kajora, Jhanjra, Bankola, Kenda, Sonepur, Kunustoria, Satgram, Sripur, Sodepur & Partly at Salanpur Areas. Barakar measures covers two areas Salanpur & Mugma Areas, SP_Mines & Rajmahal Areas are mainly related to Barakar measure & Talchair series.

As on 1.4.2014, the total coal reserve in ECL command area upto 600 metre depth is 49.93 Billion tone out of which 31.322 billion tone is in the State of West Bengal and 18.61 Billion tonne is in the State of Jharkhand. Total proved reserve in the state of West Bengal is 13.40 billion tonnes and 5.13 billion tonne is in the State of Jharkhand

There are 104 no of mines,out of which 66 Underground, 17 Opencast mines and 9 mixed mine as on 1.4.2015. Apart from this, 8 no of OC patches are being worked by outsourcing as on 1.4.2015. ECL is one of the best non-Coking coal producers in the country.

DISTRIBUTION OF MINES

Particulars	State	UG	OC	Mixed	Total
Producing	WB	59	10	8	77
Non-Producing	WB	07	03	0	10
Total	WB	66	13	8	87
Producing	Jharkhand	7	7	1	15
Non-Producing	Jharkhand	2	0	0	2
Total	Jharkhand	9	7	1	17
Grand Total		75	20	9	104

ORGANIZATIONAL STRUCTURE

CMD is the Chief Executive Officer of the Company. For operational convenience, CMD is assisted by Four Functional Directors, namely Director (Tech), Operation, Director(Tech) Project &Planning, Director(Personnel) and Director(Finance). There are fifteen nos of operational Areas including J.K.Rope ways.

Fifteen Areas are under the control of individual Chief General Manager/General Manager. Out of which Seven CGM/GMs report to Director (Technical) P&P division and rest Eight to Director (Technical) OP Division. Administration, HRD, Personnel/IR, Security, Legal, Manpower and Medical departments report to Director (Personnel) where as Finance and system departments report to Director (Finance) . The overall control is exercised by CMD with his central office at Sanctoria

MAJOR PRODUCTS

ECL is producing superior grade of non coking coal from Raniganj Coalfield and coal being produced from Mugma-Salanpur, Deoghar and Hura coalfields is of inferior quality. Major quantity of it is being sent to the power houses of the country. ECL is also producing small quantity of Semi Coking and non linked Washery Grade coal.

MAJOR CONSUMERS

Power sector is major consumer of ECL. Coal from ECL is also being supplied to sponge-iron sector, cement sector, SSF, BRK, LTC and others.

BOARD OF DIRECTORS:

FUNCTIONAL DIRECTORS

ECL is managed by its Board of Directors, with the Chairman-cum-Managing Director as the Chief Executive Officer of the Company. He is assisted by four full time Functional Directors i.e. Director (Technical) Projects & Planning, Director (Technical) Operations, Director (Personnel) and Director (Finance).

PART TIME DIRECTORS

There are two part-time Official Directors on the Board of Eastern Coalfields Limited - one from the Ministry of Coal, Govt. of India and one from the holding Company, Coal India Limited

INDEPENDENT DIRECTORS

There are five non-official part-time Directors, out of which one is Special Director nominated by BIFR.

PAST PERFORMANCE TREND

At the time of Nationalization, 414 Coal mines, almost wholly in Raniganj Coalfields, came under jurisdiction of ECL. These mines were later on amalgamated and regrouped to around 123 mines. Production from these mines was around 21 million tones at the time of nationalization(1973-74) of which 20.744 Mt was achieved from underground mines and the rest from manual quarries. Immediately after nationalization, efforts were made to improve the production level with addition of resources by way of short-term and long-term investments.

PAST PERFORMANCE TREND

As the mines had been starving of investment for a long period prior to Nationalization, even small short-term investment yielded substantial quick results from underground mines and the underground production rose to a level of 23.56 Mt by the year 1975-76. However, the rising trend of underground production could not be sustained for long and started declining over the years reaching a level of 7.37 Mt in the year 2010-11 & since then it is hovering around 7 MTe till 2014-15.

The underground productivity also reached the highest of 0.59 t in 1975-76 and then declined to around 0.45 tes in 2010-11 and is 0.53 tes during 14-15.

Underground production & productivity of CIL & ECL

The production of CIL during 1974-75 ie during the year of its formation was 78.99Mt out of which underground production was 58.22 Mte which is 73.70% of total production .The share of underground production gradually declined over the years and is 7.09% of total production during the year 2014-15. CILs target of coal production from underground for the year 2015-16 is fixed at 38.36 Mte and a road map has been drawn to achieve a production level of 52.20Mte by 2019-20. CIL operates 429 mines , out of which 237 are underground.

The actual Coal production achieved from underground mines of CIL from 2005-06 to 2014-15 vis a-vis total production achieved and target for 2015-16:

Coal Production Underground vis-a-vis Total production from CIL sources (Fig in Mt)											
Item	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 (BE)
UG	45.82	43.32	43.54	43.96	43.26	40.02	38.39	37.78	36.11	35.05	38.36
Total Coal	343.39	360.91	379.4	403.7	431.6	431.3	435.8	452.2	462.4	494.2	550.0

The underground productivity (OMS) of CIL vis-a vis overall productivity since 2005-06 to 2014-15 and projected 2015-16 is as follows :

	2005-06	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16 (BE)**
UG	0.71	0.71	0.73	0.76	0.78	0.77	0.75	0.77	0.76	0.78	0.85
OC	7.51	8.00	8.60	8.95	9.51	10.0	10.4	11.48	12.2	13.2	13.46
Overall	**3.26**	**3.54**	**3.79**	**4.09**	**4.47**	**4.73**	**4.89**	**5.32**	**5.62**	**6.21**	**6.63**

Production of ECL was around 21 Mte at the time of nationalization(1973-74) of which 20.744 Mt was achieved from underground mines and the rest from manual quarries. Percentage of underground production to total production of ECL at the time of nationalization was 98.49% which gradually declined to 18.23% during 2014-15.The underground production of ECL is hovering around 7 Mte since last five years.

The underground productivity of ECL reached the highest of 0.59 t in 1975-76 and then declined to around 0.45 tes in 2010-11 and is 0.53 tes during 14-15 .

Reasons for decline in underground production

Closure / suspension of activities of 42 ug units due to exhaustion of reserves in working seams and on uneconomical ground which were contributing around 5-6 Mt/ year. The above loss of production could have been made up to some extent by opening new mines which were planned but for resistance from local people demanding illegitimate employment leading to stoppage and delay extending to as much as 8-10 years in some cases.

There is gradual reduction of production from Caving operation which was 8.70 Mt in 1975-76 due to non-availability of land for demand of employment beyond Company's norms. As a result more and more pillars were formed and left standing without final extraction.

Shrinkage in caving production was replenished to some extent in early 80's but the trend could not be sustained as the sand gathering capacity reduced over the years due to lack of sand replenishment of nearby rivers as well as the depletion of ropeway capacity resulting in decline in sand stowing in underground mines.

Extraction percentage has also reduced due to restriction imposed by statutory authority emanating from presence of built up areas at surface and presence of old workings.

Even development production was not sustained due to various reasons like arduous working condition, decline in district productivity and reduction of underground loader strength over the years.
The working conditions have become more arduous as more and more difficult zones are being worked with the working places/ districts being at longer distances from the mine entry point.

No of district had reduced from the level of 360 in the year 1975-76 to around 153 in 2011-12 and now around144 in 2014-15 . Effect of decline of manual loaders could not be offset by introduction of intermediate technology and modern technology. Efforts were made but these were not very successful due to difficult geo-mining conditions.

Apart from introduction of intermediate technology by deploying SDL/LHD in loading operation,“Mass production technology deploying Continuous Miner combined with Shuttle car had already been deployed at Jhanjra and Sarpi project. In Jhanjra Project, the production achieved during 2014-15 from 2 no of Continuous Miners was 0.990 Mte. Production achieved from CM operation at Sarpi during 2014-15 was 0.407 Mt.

Technology-wise actual Production achieved from Underground operation during the year 2010-11 ,2011-12, 2012-13 , 2013-14 and 2014-15 in ECL is as follows : (fig.in Mte)

SL No	Technology	2010-11	2011-12	2012-13	2013-14	2014-15
1	Conventional Bord and Pillar	3.029	2.075	1.563	1.411	0.539
2	Conventional Longwall	0.000	0.000	0.000	0.000	0.000
3	Mechanized Bord and Pillar (SDL and LHD)	3.626	3.971	4.328	4.452	5.335
4	Mechanized Longwall (incl Road header	0.037	0.007	0.017	0.021	0.025
5	Continuous Miner	0.679	0.780	0.941	0.987	1.397
	Total	7.371	6.833	6.849	6.871	7.296

Constraints with mechanization(Mass Production Technology) UG mines

Legacy of extensive mining at shallow depth by erstwhile private owners has led to waterlogging of upper seams, fires , unstable areas/ unplanned subsidence. As such introduction of Mass Production technology in lower horizons seams to be difficult proposition for increase in volume particularly in Existing Mines.

Many mines were operating in sub optimal leasehold with multiple opening of small diameter shafts equipped with old steam winder.

Coal of Raniganj measures are susceptible to spontaneous heating , incubation period being 3-6 months only.

Some of the mines are deep seated and gassy with problems of rockburst, strata control , high temperature and humidity etc.

Presence of important surface features and multiple coal horizons with wide range of variation in thickness of seams .

Some mines are steeply deeping coal seams having gradient steeper than 1 in 6.

Land acquisition problem for caving operation.

Extarction of thick seams having thickness more than 6 mtr with CM/Longwall.

Initiatives undertaken by ECL to improve UG production

1. Introduction of more no of CMs.

2. Introduction of PSLW at Jhanjra R-VI Seam with a capacity of 1.70MTY

3. Introduction of High-wall Mining

4. Technological up-gradation and Modernization of existing UG mines of ECL

5. Introduction of Man-riding System

6. High speed Incline drivage

Following UG mines have been identified for introduction of mass production technology deploying Continuous Miner with Shuttle Car in XII/XIII Plan

Sl. No	Name of Mine/Project	Capacity(MTY)	Capital Investment in Rs. Cr.
1	Kumardih-B CM	1.02	117.90
2	Jhanjra LHCM	0.72	114.23
3	Tilaboni UG	1.86	727.40
4	Siduli UG	OC: 1.00 UG: 1.02	605.78
5	Shankarpur	OC: 2.00 UG: 1.163	401.43
6	Parasea-Belbaid UG	1.83	886.41
7	Naba-Kajora Madhabpur UG	1.08	1310.60
8	Khottadih CM	1.00	127.17

Introduction of High-wall Mining: Following two sites have been identified for introduction of Highwall Mining

SL No	Name of the Block/Seam	Estimated extractable reserve (Mte) for maximum drivage length of		Land required (Ha)
		300 metre	250 metre	
1	Sripur /Taltore (R-I)	0.86	0.81	81.61
2	Nimcha/(R-IXA)	1.84	1.66	120.90

ESC of CIL Board in its 83rd meeting held on 21.10.2014 approved the proposal for extraction of coal by Highwall Mining at Nimcha and Sripur Blocks for a Capital investment of Rs 36.65 crores for a capacity of 0.50Mty under outsourcing mode. Tender document is prepared & will be published shortly.

Continuous Miner Technology: *At Present, 8 Continuous Miners are deployed in the following under ground mines of CIL*

Subsidiary Co.	No of mines (CMs)	Name of the mines, CM Capacity (Mty)
ECL	2 (3)	Jhanjra (0.95 – 2 CMs) and Sarpi (0.46)
WCL	1 (1)	Tandsi (0.51)
SECL	4 (4)	NCPH/Kapildhara*(0.43), Sheetal Dhara – Kurja (0.42), Pinoura (0.40) and Rani – Atari(0.18)
Total CIL	7 (8)	Total Planned Capacity: 3.35 Mty

Followings are the list of mines deploying continuous miner/miners for which Project Report has been prepared and approved.

Comp	No of Mines (CMs)	Name of Mines (Capacity, Mty)
ECL	2 (3)	Kumardih B (1.02 – 2 CMs); Kottadih (0.51)
BCCL	1 (1)	Block-II (0.45)
CCL	4 (5)	Churi-Benti (0.50); Parej East(0.51); Piparwar-Mangardaha (1.02- 2 CMs.), Amlo-Dhori (0.30)
WCL	4 (6)	Jamunia (0.84 – 2 CMs), Tawa-II (0.36), Gandhigram(1.17 – 2 CMs), Dhau-North UG (0.36)
SECL	5 (6)	Churcha Re-organisation (1.00 – 2 CMs), Khairaha (0.465), Haldibari (0.42), Ketki (0.30) & Vijay (West)(0.42)
MCL	2 (2)	Talcher (West)(0.52) & Natraj(0.52)
Total CIL	18 (23CMs)	Total Planned Capacity: 10.685 Mty

Plan for enhancement of production from UG mines

Continuous Miner Technology

- *In addition, there are mines deploying continuous miner/miners for which Project Report has been prepared but not approved. The lists of these mines are as below:*

Subsidiary Company	No. of Mines (CMs)	Name of Mines (CM Capacity , Mty)
ECL	6 (15)	Jhanjra LHCM (0.72 – 2 CMs), Tilaboni (1.86 – 4 CMs), Shankarpur (1.163 – 2 CMs), Pandabeswar-Dalurband (1.17 – 2 CMs), Rangamati A (Gourbazar Sector) (0.855 -2 CMs), Rangamati B (Tumni & Kanchanpur Sector (1.08 – 3 LHCMs)
SECL	1(2)	Pathakpur (0.72 -2 CMs)
Total CIL	7 (17 CMs)	Total Possible Capacity: 7.568 Mty

Grand Total (Continuous Miner): 21. 998 Mty

Plan for enhancement of production from UG mines

Long-wall Technology:

- *At present in CIL, no PSLW face is in operation. However, one shortwall face at Balarampur mine at SECL is in operation.*
- *Work orders have already been issued for operating five mines (Jhanjra in ECL, Kapuria, Moonidih (both XV & XVI seam), and Muraidih in BCCL) by **long-wall technology**.*
- *Likely capacity addition from these mines will be around 8.9 Mty. The lists of these mines are as below:*

Subsidiary	Name of the Mines	Capacity (Mty)
BCCL	Moonidih XVI	**0.7**
BCCL	Moonidih XV	**2.5**
BCCL	Kapuria	**2.0**
BCCL	Muraidih	**2.0**
ECL	Jhanjra	**1.7**
	Total	**8.9**

Moreover, three mines namely, Nand, Murpar and Borda of WCL have been identified for deployment of PSLW technology. The NIT document for Murpar and Borda mines approved by WCL Board & global bidding is under process. The NIT document of Nand mine is under finalization.

HIGHWALL MINING

Introduction

- ✓ Highwall/Trench mining is a remote controlled mining method which extracts coal from the base of an exposed highwall via a series of parallel entries driven to a significant depth within the coal horizon.
- ✓ It allows recovery of coal from surface pits that have reached final highwall position, or in areas where coal has become sterilized, e.g. in-service corridors.
- ✓ A trench of suitable dimension is dug centrally where Highwall is not available, and parallel drivages are made in both directions along dip as well as along rise.

HIGHWALL MINING

- ✓ The technology may have wide application in extracting reserves of thin seams (0.8m to 1.5m) which otherwise cannot be extracted economically.
- ✓ The method is capable of accessing these reserves for substantially less capital cost and lead time than a full underground mine, while being able to produce over 0.6 MT to over one million tonnes of coal per year per system depending on the thickness of seam and depth of Highwall.
- ✓ Highwall/Trench Mining also has a significant operation cost advantage over underground mining, because it is less labour intensive.

Highwall Mining in CIL

- Presently highwall mining is in operation in Sharda OC Project of SECL.
- Other potential areas/ mines of CIL subsidiaries for the application of highwall mining technology are:
  - Bishrampur, SECL
  - Bhatgaon, SECL
  - Tilaboni, ECL
  - Sripur, ECL
  - Nimcha, ECL

Action Plan for major activities

- For the purpose of achieving the projected production, following major activities have been identified by production subsidiaries and respective regional institutes with implementation schedule:
  - Construction of shafts, inclines, drifts, etc. and other required infrastructure facilities;
  - Procurement of equipment for mass production technology for identified mines;
  - Procurement of SDLs/ LHDs as programmed;
  - Strengthening of transport and ventilation system;
  - Installation of man-riding facilities; etc.

THANK YOU