

COAL MINING IN INDIA



A Presentation by

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Strategic Importance of COAL

- **Recoverable coal reserve is found in 70 countries in the world.**
- **Coal reserves are very large & readily available.**
- **Coal can be easily stored at power stations for use in emergencies.**
- **Coal based power is not dependent on weather.**
- **Coal does not need high pressure pipelines or dedicated supply routes.**
- **Coal supply routes do not need to be protected at enormous expense.**

Primary Energy Consumption in India (2009-10)

FUEL	SHARE
COAL	52.40%
OIL	31.70%
NATURAL GAS	10.00%
HYDRO	5.10%
NUCLEAR	0.80%

ALTERNATE ENERGY SOURCES FOR INDIA & ISSUES

Energy Source	Issues
Crude Oil	No significant finds within country. High import dependence. High cost of energy conversion.
Gas	Supply constraint and availability of trans-India national gas pipe line network.
Nuclear	High capital cost and longer gestation period.
Hydro Power	Long gestation period. Uncertain energy availability. Development challenges.
Renewable Energy	Unpredictable power.

Power Generation Capacity of INDIA

Source	Installed Capacity (31-03-2011)	
	MW	%age
HYDRO	37,567.40	22.64
THERMAL	1,12,824.48	64.98
Coal	93,918.38	54.09
Gas	17,706.35	10.20
Diesel	1,199.75	0.69
NUCLEAR	4,780.00	2.75
RENEWABLE	18,454.52	10.63
TOTAL	1,69,748.86	100.00

Power Generation in INDIA

Source	Power Generation (2010-11)	
	MU	%age
HYDRO	1,14,300	14.09
THERMAL	6,64,900	81.98
Coal	5,61,700	69.25
Gas	97,800	12.36
Diesel	3,000	0.37
NUCLEAR	26,300	3.20
Import(Bhuta)	5,610	0.69
TOTAL	811,100	100.00

Cost of Electricity Generation (Rs./Kwh)

Fuel Type	Variable Cost	Fixed Cost	Total
Captive Coal	0.8	1.2	2.00
Coal Linkages	1.2	1.2	2.40
Imported Coal	1.5	1.2	2.70
Hydro Electric	-	2.8	2.80
Gas	2.1	1.0	3.10

Objectives of Nationalisation of Coal Mines in India

- **Conservation of the scarce coal resources (particularly coking coal).**
- **Halting wasteful, selective & slaughter mining.**
- **Planned development of available coal resources.**
- **Improvement in safety standards.**
- **Ensuring adequate investment for optimal utilisation, consistent with growth needs.**
- **Improving the quality of the work force.**

COAL MINING IN INDIA

- **Coal is the most dominant energy source in India.**
- **India is the third largest coal producing company in the world after China & USA.**
- **CIL is the largest coal producing company in the world.**
- **CIL accounts for 81.9% of total coal production**
- **Coal meets 52.4% of India's primary energy requirement.**
- **There are 637 coal block spread over 25 coalfields of India.**
- **CIL operates 470 mines in 21 major coalfields under 07 subsidiary companies across 08 states in India.**
- **CIL Production (Non-Coking - 91.6%, Coking - 8.4%)**
- **CIL Coal Production (OC - 90%, UG - 10%)**

OVERVIEW OF COAL SECTOR

Items	2007-08	2008-09	2009-10	2011-12
Coal Demand(mt)	492.50	550.00	597.98	713.24
Indigenous Supply (mt)	454.49	490.02	514.58	629.91
Production(mt)	457.00	492.76	532.06	629.91
IMPORT (mt)	49.80	59.00	67.74	83.33
Coking	22.03	21.08	23.47	42.48
Non-Coking	27.77	37.92	44.28	40.85
Net Gap in Demand-Supply	(-) 11.79	(+) 0.98	(+) 15.66	NIL

COAL DEMAND IN INDIA (mt)

Sectors	2007-08	2008-09	2009-10	2010-11	2011-12
COKING COAL					
Steel/Coke Oven	40.01	40.84	40.30	50.51	68.50
NON-COKING COAL					
Power	332.09	361.78	351.10	434.00	473.00
Power(Captive)	31.58	29.92	35.36	43.00	47.00
Cement	19.32	21.01	14.60	30.00	33.35
Sponge Iron	20.92	19.33	22.60	35.20	28.96
Fertilizers, BRK & Others	60.29	75.98	73.08	61.00	62.43
Sub-Total	464.20	508.02	541.02	103.20	644.74
Grand Total	504.21	548.85	581.32	653.71	713.24

COAL SUPPLY IN INDIA (mt)

Company	2006-07	2007-08	2008-09	2009-10
CIL	361	379	404	431
SCCL	38	41	45	45
Others	32	37	45	53
Imports	43	50	59	68
Total	474	507	552	597

COAL PRODUCTION IN INDIA (mt)

Comp.	No. of Mines	2007-08	2008-09	2009-10	2010-11	2011-12 Target	2016-17 Target
ECL	110	24.06	28.13	30.07	30.81	33.20	48.00
BCCL	82	25.22	25.51	27.51	29.00	30.20	35.00
CCL	62	44.15	43.24	47.08	47.52	51.50	115.00
NCL	10	59.62	63.65	67.67	66.25	69.50	80.50
WCL	86	43.51	44.70	45.74	43.66	45.70	45.00
SECL	91	93.79	101.15	108.01	112.71	113.75	140.00
MCL	24	88.01	96.34	104.08	100.28	107.10	197.00
NEC	8	1.10	1.01	1.11	1.10	1.05	3.50
CIL	473	379.46	403.73	431.27	431.33	452.00	664.00
SCCL	50	40.60	44.54	44.50		47.00	
Others	38	37.02	44.68	56.29		58.28	13
TOTAL	561	457.08	492.95	532.06		557.28	

Raw Coal Offtake (2009-10)

Sector	%age Share
Power	80%
Small & Medium Industries	11%
Steel	5%
Cement	2%
Other Industries	2%

COAL IMPORT (MT) IN INDIA

Type of Coal	2007-08	2008-09	2009-10	2011-12 (Tgt)
COKING	22.03	21.08	23.47	42.48
NON-COKING	27.77	37.92	44.28	40.85
TOTAL	49.80	59.00	67.74	83.33

Brief History of CIL

1774	First coal mine started in Raniganj Coalfield
1956	Formation of National Coal Development Corporation (NCDC).
01-05-1972	Nationalisation of Coking Coal Mines & formation of BCCL.
01-05-1973	Nationalisation of Non-Coking Coal Mines & formation of Coal Mines Authority Limited (CMAL).
01-11-1975	Formation of CIL with 5 subsidiaries BCCL, CCL, WCL, ECL & CMPDIL.
28-11-1985	NCL carved out of CCL & SECL carved out of WCL.
03-04-1992	MCL formed out of SECL
01-01-2000	Deregulation of Coal pricing & distribution.
2007	CIL & 5 subsidiaries (NCL, SECL, MCL, CCL & WCL) was accorded MINI-RATNA Cat-I.
29-05-2009	CMPDIL was accorded MINI-RATNA Cat-II status.
24-10-2008	CIL was accorded NAV-RATNA status.
11-04-2011	CIL was accorded MAHA-RATNA status.

Highlights of CIL

- **Largest Coal Producing Company in the World.**
- **Largest coal reserves holding company in the world.**
- **Second largest land owner in India.**
- **CIL Fuels 78 out of 81 Coal based Thermal Power Stations in India.**
- **5th. Company to get Maha-Ratna status on 11th.April 2011.**
- **CIL is the 5th. Company in India to get Maha-Ratna status**
- **Paid highest Dividend of Rs.2,210 Cr. in 2009-10.**
- **Gross Sales of Rs.60,245Cr. in 2010-11**
- **81 nos. areas, 470 nos. coal mines spread over 8 states & 21 coalfields.**
- **17 nos. coal washeries (Coking-12 & Non-Coking-5) with 39.40 MTA washing capacity.**
- **Produced 431.33mt coal in 2010-11 & Manpower is 3,83,932 as on 01-03-2011.**
- **Posted Net Profit of Rs.10,867Cr. in 2010-11.**

Mission of CIL

To produce the planned quantity of coal efficiently & economically with due regards to safety, conservation & quality.

Vision of CIL

Be the leading energy supplier in the country through best practices from mine to market.

Board of Directors of CIL (as on 01.04.2011)

EXECUTIVE DIRECTORS

- Sri NC Jha, Chairman
- Sri AK Sinha, Director(Fin.)
- Sri NC Jha, Director(Tech.)
- Sri R. Mohan Das, Director(P&IR)
- Dr. AK Sarkar, Director(Marketing)

GOVT. NOMINEE DIRECTORS

- Sri Alok Perti, Addl. Secy., MOC, New Delhi
- Smt. Anjali Anand Srivastava, Jt. Secy & Financial Advisor, MOC

INDEPENDENT DIRECTORS

- Dr. AK Rath
- Smt. Sheela Bhide
- Sri Kamal R. Gupta

PERMANENT INVITEES

- Sri DC Garg, CMD, WCL
- Sri AK Singh, CMD, CMPDIL
- Sri Pradeep Bhatnagar, Addl. Member (Traffic Transp.), Railway Board

Coalfields under CIL

Co.	Coalfields
ECL	Deogarh, Rajmahal & Raniganj
BCCL	Jharia & Raniganj
CCL	Daltonganj , East Bokaro, Bokaro, Giridih, Hutar , North Karanpura, Ramgarh, South Karanpura & West Bokaro
NCL	Singrauli
WCL	Kamptee, Pathakhera, PENCH-Kanhan, Umer Nand Bander & Wardha Valley
SECL	Bisrampur, Chirimiri, Jhilimili, Johila, Korba, Lakhanpur, Mand-Raigarh, Sundergarh, Sohagpur, Sonhat, Tatapani-Ramkola & Umaria
MCL	Ib-Valley, Talcher
NEC	Makum & Dilli-Jeypore

Coalfields currently not under Production

Coalfield	Comp	Reserve (MT)
Daltonganj	CCL	15.90
Hutar	CCL	00.00
Tattapani-Ramkola	SECL	478.80
Dilli-Jeypore	NEC(CIL)	18.90

SUBSIDIARIES OF CIL

- Eastern Coalfields Limited (ECL)
- Bharat Coking Coal Limited (BCCL)
- Central Coalfields Limited (CCL)
- Northern Coalfields Limited (NCL)
- Western Coalfields Limited (WCL)
- South Eastern Coalfields Limited (SECL)
- Mahanadi Coalfields Limited (MCL)
- Central Mine Planning & Design Institute Ltd (CMPDIL)
- Coal India Africana Limitada

FUNCTIONAL DIRECTORS (as on 01.04.2011)

Co.	CMD	D(T/O)	D(T/P&P)	D(F)	D(P)
BCCL	T.K. Lahiri	-	D.C. Jha	P.G. Nandy	P.E. Kachhap
ECL	Rakesh Sinha	S.K. Chakravarty	N.Kumar	-	S.K.Srivastava
CCL	R.K. Saha	T.K. Nag	-	A. Chatterjee	-
WCL	D.C.Garg	B.K. Saxena	Om Prakash	S.Behl	O.P.Miglani
NCL	V.K. Singh	O. P. Mishra	N. Das	S.K. Rawat	S. Sahu
SECL	A.K.Singh	P.K.Raichoudhury	G. Singh	A.R.Komawar	R.S.Singh
MCL	A.N. Sahay	A.K. Tiwari	A.K.Singh	K. Biswas	S.C.Padhy
CIL	N.C. Jha Chairman	N.C.Jha D(T/O)	Dr.A.K.Sarkar Dir(Mktg)	A.K.Sinha D(F)	R.Mohan Das D(P)
CMPDI	A.K.Singh CMD	-	N.Khurana, D(T)/(CRD)	A.K.Debnath, D(T)/(P&D)	S. K. Mitra, D(T)/(ES)

REGIONAL INSTITUTES (RI) OF CMPDIL

Regional Institute-I : ASANSOL (ECL)

Regional Institute-II : DHANBAD (BCCL)

Regional Institute-III : RANCHI (CCL)

Regional Institute-IV : NAGPUR (WCL)

Regional Institute-V : BILASPUR (SECL)

Regional Institute-VII : SINGRAULI (NCL)

Regional Institute-VII : BHUBANESHWAR(MCL)

AREAS & MINES OF CIL (1st.April 2009)

Co.	Coal Reserve (bt)	No.of Areas	No. of mines			
			OC	UG	Mix.	Total
ECL	45.04	14	21	82	7	110
BCCL	19.43	13	18	47	17	82
CCL	40.73	11	36	24	2	62
NCL	13.478	10	10	-	-	10
WCL	13.086	10	39	43	4	86
SECL	50.116	13	21	69	1	91
MCL	65.227	9	15	9	0	24
NEC	1.177	1	3	5	0	8
CIL	248.28	81	163	279	31	473

MANPOWER OF CIL (as on 1st.November 2010)

Company	Executive	Supervisor	Workmen	Total
ECL	2,144	6,743	73,590	82,477
BCCL	2,012	6,603	60,525	69,140
CCL	2,285	3,700	46,984	52,969
WCL	2,249	5,923	51,340	59,512
SECL	2,712	8,577	67,089	78,378
MCL	1,345	2,910	17,154	21,409
NCL	1,351	1,993	12,967	16,311
NEC	100	449	2,112	2,661
CMPDI	842	752	1,560	3,154
DCC	35	96	462	593
CILHQ	356	109	576	1,041
Total	15,431	37,855	3,34,359	3,87,645

Top 10 Areas of CIL (2009-10)

S.N.	Areas	Comp.	Prod(mt)
1	Gevra	SECL	35.00
2	Dipka	SECL	24.10
3	Jagannath	MCL	22.52
4	Lakhanpur	MCL	20.21
5	Piparwar	CCL	17.20
6	Kusmunda	SECL	14.20
7	Jayant	NCL	13.35
8	Dudhichua	NCL	13.31
9	Lingraj	MCL	13.00
10	Hingula	MCL	12.43²⁷

Top 10 Mines of CIL (2009-10)

S.N.	Mines	Comp.	Prod(mt)
1	Gevra	SECL	35.00
2	Dipka	SECL	24.10
3	Jayant	NCL	13.35
4	Dudhichua	NCL	13.31
5	Lakhanpur	MCL	13.06
6	Lingraj	MCL	13.00
7	Ananta	MCL	12.82
8	Nigahi	NCL	12.36
9	Rajmahal	ECL	11.26
10	Kusmunda	SECL	11.20

Expansion of Big OCP

Mines	Comp.	Cap.(mt)
Gevra	SECL	35
Dipka	SECL	25
Talabira	MCL	20
Rajmahal	ECL	17
Lingraj	MCL	16
Amrapali	CCL	12
Pelma	SECL	10
Khadia	NCL	10
Magadh	CCL	08

Coal Reserves under CIL as on 1st.April 2010 (bt)

Coal Reserves	INDIA	CIL
Proved	110	53
Indicated	131	10
Inferred	36	2
Total	277	65
Extractable	NA	22

Cost of Coal Production in CL

Year	Cost of Production (Rs./tonne)	
	OC	UG
2006-07	447	2,254
2007-08	476	2,584
2008-09	507	2,660
2009-10	520	2,796

Modewise Coal Transportation (2009-10)

MODE	% Share	
	INDIA	CIL
RAIL	46.34%	46.70%
ROAD	28.70%	29.50%
MGR	18.95%	20.80%
OTHER	6.00%	3.00%

CIL PERFORMANCE AT A GLANCE

S. N.	Description	Unit	2009-10			2008-09			
			UG	OC	O/all	UG	OC	O/all	
1	Coal Production	mt	43.25	388.01	431.26	43.96	359.77	403.73	
4	Coking Coal	mt				36.13			26.54
5	Non-Coking Coal	mt				395.13			377.19
6	Washed Coal	mt				14.58			14.96
7	OBR	mcum				682.03			645.13
8	Offtake	mt				415.88			401.46
9	Despatch	mt				415.22			400.74
10	OMS	te	0.78	9.51	4.47	0.76	9.07	4.16	
13	Manpower	Lakh				3.97			4.12
14	Profit	Rs.cr				13,964.93			5,744.10
15	Cap.Utilisation	%	86.80	91.39	90.25	85.10	95.01	94.67	

PERFORMANCE OF CIL (2009-10)

Co.	Man-power	Coal (mt)	OBR (mcum)	OMS (te.)	Cap.Utz. (%age)	Cap.Ex. (Rs. Cr.)	Profit (Rs.Cr.)
ECL	85,239	30.06	49.74	1.46	97.71	165.02	152.36
BCCL	71,422	27.51	61.63	1.85	94.96	293.35	402.29
CCL	53,732	47.08	56.05	3.66	91.71	321.31	1,500.26
NCL	16,370	67.67	177.98	13.19	80.27	545.45	3,766.30
WCL	60,674	45.74	133.97	2.64	112.89	252.34	601.04
SECL	79,468	108.01	129.80	5.96	98.30	770.67	2,743.32
MCL	20,988	104.08	66.07	14.66	80.34	404.19	3,010.00
NEC	2,779	1.11	6.79	2.00	66.08	-	3,502.74
CIL	3,95,464	431.26	682.03	4.47	91.23	2809.99	12,369.47

Performance of CIL (2010-11)

Comp	Coal Production (mt)			OB (Mcum)	Off-take (mt)
	UG	OC	Total		
ECL	7.372	23.432	30.804	56.246	29.744
BCCL	3.696	25.308	29.004	83.226	29.341
CCL	1.270	46.250	47.520	62.520	46.230
NCL	-	66.253	66.253	182.216	64.208
WCL	8.704	34.950	43.654	115.824	42.560
SECL	16.803	95.902	112.705	137.565	109.020
MCL	2.167	98.113	100.280	88.702	102.092
NEC	0.001	1.099	1.100	5.809	1.102
CIL	40.013	391.307	431.320	732.108	424.297

TARGETS FOR CIL (2011-12)

Co.	Sp. Density	Coal Prodn (mt)	Coal Offtake (mt)	Coal Desp (mt)	OBR (mcum)	OMS (O/All) (te)	Cap. Utlz. (%)
ECL	1.59	33.20	34.10	33.70	61.00	4.73	102
BCCL	1.53	30.20	36.20	36.04	84.00	2.20	116
CCL	1.60	51.50	56.05	56.04	63.00	4.51	98
NCL	1.55	69.50	70.50	70.50	239.00	17.68	86
WCL	1.55	45.70	46.50	46.80	127.00	2.55	100
SECL	1.62	113.75	116.92	116.90	153.00	6.29	112
MCL	1.66	107.10	115.68	115.68	100.00	15.84	91
NEC	1.40	1.05	1.05	1.05	8.00	2.17	88
CIL	1.60	452.00	477.00	476.39	835.00	4.97	3698

Coking & Non-Coking Coal Production

Comp	COKING COAL		NON-COKING COAL		TOTAL	
	2009-10	2008-09	2009-10	2008-09	2009-10	2008-09
ECL	0.06	0.04	30.00	28.09	30.06	28.13
BCCL	19.16	13.08	8.35	12.43	27.51	25.51
CCL	16.21	12.54	30.87	30.70	47.08	43.24
NCL	-	-	67.67	63.65	67.67	63.65
WCL	0.55	0.73	45.19	43.97	45.74	44.70
SECL	0.15	0.15	107.86	101.00	108.01	101.15
MCL	-	-	104.08	96.34	104.08	96.34
NEC	0.00	0.00	1.11	1.01	1.11	1.01
CIL	36.13	26.54	395.13	377.19	431.26	403.73

UG & OC Production

Comp	UNDERGROUND		OPENCAST		TOTAL	
	2009-10	2008-09	2009-10	2008-09	2009-10	2008-09
ECL	8.23	8.39	21.83	19.74	30.06	28.13
BCCL	3.90	4.13	23.61	21.38	27.51	25.51
CCL	1.47	1.56	45.61	41.68	47.08	43.24
NCL	-	-	67.67	63.65	67.67	63.65
WCL	9.62	10.11	36.12	34.59	45.74	44.70
SECL	17.83	17.57	90.18	83.58	108.01	101.15
MCL	2.20	2.15	101.88	94.19	104.08	96.34
NEC	0.00	0.05	1.11	0.96	1.11	1.01
CIL	43.25	43.96	388.01	359.77	431.26	403.73

OUTPUT PER MANSHIFT (tes.)

Comp	UNDERGROUND		OPENCAST		TOTAL	
	2009-10	2008-09	2009-10	2008-09	2009-10	2008-09
ECL	0.47	0.46	7.29	6.42	1.46	1.33
BCCL	0.39	0.41	4.85	2.91	1.85	1.22
CCL	0.35	0.36	5.24	4.65	3.66	3.27
NCL	-	-	13.19	14.58	13.19	14.58
WCL	1.12	1.14	4.12	3.99	2.64	2.55
SECL	1.33	1.26	18.89	15.76	5.96	5.26
MCL	1.29	1.25	18.89	23.06	14.66	16.60
NEC	0.00	0.10	7.85	7.83	2.00	1.77
CIL	0.78	0.76	9.51	8.95	4.47	4.09

COST OF PRODUCTION (Rs./tonne)

Comp	OC	UG	OVERALL
ECL	792.32	4,930.41	1,984.67
BCCL	927.51	6,480.00	1,794.40
CCL	663.59	5,652.13	842.72
NCL	601.06	-	601.06
WCL	821.20	2,123.20	1,115.76
SECL	378.67	1,963.78	652.38
MCL	324.00	1,664.06	353.84
CIL	536.13	3,114.36	812.71 ₄₀

SALE VALUE (Rs./tonne)

Comp	OC	UG	OVERALL
ECL	1,169.77	1,936.04	1,390.57
BCCL	1,224.30	1,626.82	1,287.15
CCL	958.21	1,494.07	977.45
NCL	1,010.07	-	1,010.07
WCL	1,188.27	1,435.90	1,244.31
SECL	708.30	1,411.32	829.69
MCL	550.47	926.62	558.84
CIL	856.99	1,514.11	927.48 ₄₁

OB Removal (Mcum) in CIL

Comp	2010-11	2009-10	2008-09
ECL	56.54	49.74	43.07
BCCL	83.45	61.63	53.60
CCL	62.52	56.05	55.63
NCL	186.52	177.98	202.75
WCL	115.82	133.97	126.66
SECL	138.43	129.80	107.00
MCL	88.70	66.07	51.84
NEC	6.16	6.79	4.58
CIL	738.16	682.03	645.13 ⁴²

MANPOWER OF COAL INDIA

Comp.	31.03.2009 (Actual)	31.03.2010 (Actual)	31.03.2011 (Estimated)	31.03.2012 (BE)
ECL	90,470	85,617	81,331	77,541
BCCL	76,369	71,838	68,180	65,234
CCL	56,553	54,057	51,117	48,475
NCL	16,450	16,373	16,661	17,025
WCL	62,492	60,870	63,310	64,273
SECL	82,054	80,381	78,676	76,944
MCL	20,869	20,978	22,275	23,643
NEC	2,962	2,820	2,694	2,649
CMPDI	3,065	3,156	3,565	3,565
CIL-HQ	1,056	1,048	1,015	1,001
CIL	4,12,350	3,97,138	3,88,724	3,80,350

PROFIT (Rs.Cr.) OF CIL

Comp.	2008-09	2009-10
ECL	-2,105.70	+333.40
BCCL	-1,376.99	+793.93
CCL	+763.80	+1533.05
NCL	+3,131.01	+3,766.30
WCL	+516.12	+931.02
SECL	+1,817.93	+3,063.57
MCL	+2,580.25	2,953.90
CMPDIL	+6.74	+19.61
CIL/NEC	+3,657.68	+3,870.40
Overall	+5,744.10	+13,964.93

Manpower vs OMS of CIL

Comp.	Prodn (MT)	Manpower (Year End)	OMS (UG)	OMS (OC)	OMS (O/All)
2000-01	268.14	5,42,051	0.63	5.90	2.29
2001-02	279.65	5,19,922	0.64	6.08	2.45
2002-03	290.69	5,01,419	0.69	6.30	2.67
2003-04	306.36	4,84,703	0.68	6.67	2.82
2004-05	323.58	4,68,450	0.69	7.18	3.05
2005-06	343.39	4,52,287	0.71	7.51	3.26
2006-07	360.91	4,39,343	0.71	8.00	3.54
2007-08	379.46	4,26,077	0.73	8.60	3.79
2008-09	403.73	4,12,350	0.76	8.95	4.09
2009-10	431.26	3,97,138	0.78	9.51	4.45

Share of UG & OC Production in CIL

Year	Coal Production (MT)			Share (%)	
	UG	OC	Total	UG	OC
1974-75	58.22	20.77	78.99	73.71	26.29
1984-85	60.50	70.31	130.81	46.25	53.75
1994-95	55.60	167.46	223.06	24.93	75.07
2000-01	50.56	217.58	268.14	18.86	81.14
2004-05	47.04	276.54	323.58	14.54	85.46
2005-06	45.82	297.57	343.39	13.34	86.66
2006-07	43.32	317.59	360.91	12.00	88.00
2007-08	43.54	335.92	379.46	11.50	88.50
2008-09	43.96	359.77	403.73	10.90	89.10
2009-10	43.25	388.01	431.26	10.20	89.80
2010-11	40.02	391.31	431.33	9.28	90.72

FINANCIAL PERFORMANCE OF CIL

Description	Unit	2006-07	2007-08	2008-09	2009-10
Coal Prodn.	mt	360.91	379.46	403.73	431.26
Coal Off take	mt	375.33	375.33	401.46	415.96
Gross Sales	Rs.Cr.	35,129.17	38,865.70	46,131.24	52,187.79
Gross Profit	Rs.Cr.	8,687.40	8,888.39	5,900.60	14,101.39
Capital Employed	Rs.Cr.	16,223.74	17,108.20	16,963.98	23,450.74
Net Worth	Rs.Cr.	17,889.30	19,342.36	19,165.04	25,793.68
Profit before Tax	Rs.Cr.	8,602.47	8,738.46	5,744.10	13,964.93
Profit after Tax	Rs.Cr.	5,708.73	5,243.27	2,078.69	9,622.45

CIL's Coal Sales Mechanism

FUEL SUPPLY AGREEMENT (FSA)

- Post the implementation of New Coal Distribution Policy (NCDP), 2007, CIL issues Letter of Assurance (LOA) on the basis of recommendation made by the inter-ministerial Standing Linkage Committee for supply of coal.

E-AUCTION Route

- CIL can sell around 10% of its production through E-Auctions at market determined prices.

MOUs

- CIL sells higher grade non-coking coal (A, B, C grade) & beneficiated coking and non-coking coal under specific MOUs with the clients

Producer's share in destination price of coal

(CCL grade E Coal for a haul distance of 750km as on 01.04.2010)

Description	Share	
	Rs./Te	%age
CIL	834.00	50.00
Railway	677.30	40.60
Govt.	157.64	9.40

TYPES OF COAL

LIGNITE(Brown Coal)

- Largely Power Generation

BITUMINOUS

- THERMAL COAL (Steam Coal/Non-Coking Coal)
 - Power Generation.
 - Cement Manufacture.
 - Industrial Uses.
- METALLURGICAL COAL(Coking Coal)
 - Manufacture of Iron & steel.

ANTHACITE

- Domestic fuel.
- Industrial use.
- Smokeless fuel.

GLOBAL

COAL

CARBON/ENERGY CONTENT

HIGH

HIGH

MOISTURE CONTENT

% of World Reserves

LOW RANK COALS

48%

HARD COAL

52%

LIGNITE

20%

SUB-BITUMINOUS

28%

BITUMINOUS

51%

ANTHRACITE

~1%

THERMAL
Steam coal

METALLURGICAL
Coking coal

USES

Largely power generation

Power generation
Cement manufacture
Industrial uses

Manufacture of iron and steel

Domestic/ industrial including smokeless fuel

USEFUL HEAT VALUE (HUV)

- **HU in Kilocalorie/Kg = 8900 - 138 (A +M)**
- **Where A is Ash Content in %age**
- **M is Moisture Content in %age**
 - **In case of coal having moisture less than 2% & volatile content less than 19%, the useful heat value shall be the value arrived at as above reduced by 150 kCal/Kg for each 1% reduction in volatile content below 19% fraction pro-rata.**
- **Both moisture & ash shall be determined after equilibrating at 60% Relative Humidity & 40 degree temperature as per revelant clauses of Indian Specifications No. IS : 1350 – 1959.**

Categorisation of Non-Coking Coal

Grade	UHV (kcal/kg) UHV=8900-138(A+M)	GCV (kcal/kg) at 5% moisture level
A	Exceeding 6,200	Exceeding 6,454
B	Exceeding 5,600 but not Exceeding 6200	Exceeding 6,049 but not Exceeding 6,454
C	Exceeding 4,940 but not Exceeding 5,600	Exceeding 5,597 but not Exceeding 6,049
D	Exceeding 4,200 but not Exceeding 4,940	Exceeding 5089 but not Exceeding 5597
E	Exceeding 3,360 but not Exceeding 4,200	Exceeding 4324 but not Exceeding 5089
F	Exceeding 2,400 but not Exceeding 3,360	Exceeding 3865 but not Exceeding 4324
G	Exceeding 1,300 but not Exceeding 2,400	Exceeding 3,113 but not Exceeding 3,865

Categorisation of Coking Coal

GRADE	ASH CONTENT
Steel Grade I	Not exceeding 15%
Steel Grade II	Exceeding 15% but not exceeding 18%
Washey Grade I	Exceeding 18% but not exceeding 21%
Washery Grade II	Exceeding 21% but not exceeding 24%
Washery Grade III	Exceeding 24% but not exceeding 28%
Washery Grade IV	Exceeding 28% but not exceeding 35%

Categorisation of Semi-Coking Coal

GRADE	ASH + MOISTURE Content
Semi Coking Grade I	Not exceeding 19%
Semi Coking Grade II	Exceeding 19% but not exceeding 24%

Categorisation of NEC Coal

Grade	UHV (kcal/kg)
A	6,200 – 6,299
B	5,600 – 6,199

What is COKE ?

- **Coking Coal is converted to coke by driving off impurities to leave almost pure carbon.**
- **The physical properties of coking coal cause the coal to soften, liquefy & then re-solidify into hard but porous lumps when heated in the absence of air.**
- **The coking process consists of heating coal to around 1,000-1,100 degree C in the absence of oxygen to drive-off the volatile compound (pyrolysis).**
- **This process results in a hard porous material – Coke.**
- **The coking process takes between 12 to 36 hours.**

Categorisation of Coke

HARD COKE

- It is produced by high temperature carbonisation process.
- It is used in blast furnace for steel making.
- It is hard.

SOFT COKE

- It is produced by low temperature carbonisation process.
- It is used as domestic fuel.
- It is soft.

COAL BENEFICIATION

- It is the process of coal washing resulting in value addition of coal due to reduction in ash percentage.

ADVANTAGES OF COAL BENEFICIATION

- Reduction in emission in to the atmosphere by end user industries.
- Reduction in ash handling and disposal cost.
- Reduction in load on transportation system.
- Increase in in thermal efficiency.

COAL WASHING TECHNOLOGY

Size Fraction	Washing Technique Used
COARSE COAL (100/75/50 – 25/15mm)	Coarse Coal Jig, Fine Coal Jig, Dense media bath, Cyclone, Barrel washer.
SMALL COAL (15-0.5mm)	Small coal jig, DM Cyclone, FBC
FINE COAL (-0.5mm)	Froth flotation, spiral concentrator, water only cyclone
Dewatering	Vacuum filters, High frequency screen, centrifuge, Belt press filter

NEED FOR BENEFICIATION OF COAL

- **Less quantity of high quality coal reserves**
- **Huge reserves of poor quality coal in the country (65 % of non-coking coal reserve is of inferior grade 'E to G').**
- **MOEF's mandatory requirements**
- **Varying customers' needs**
- **Environmental threat**
- **Increased demand of lower ash coal i.e. high calorific value**
- **High cost of transportation of dirt along with coal and consequent disposal of ash**

Categorisation of Coal as per size

R.O.M. Coal

- **Unscreened coal of all sizes.**

Slack Coal

- **0 to 50 mm**

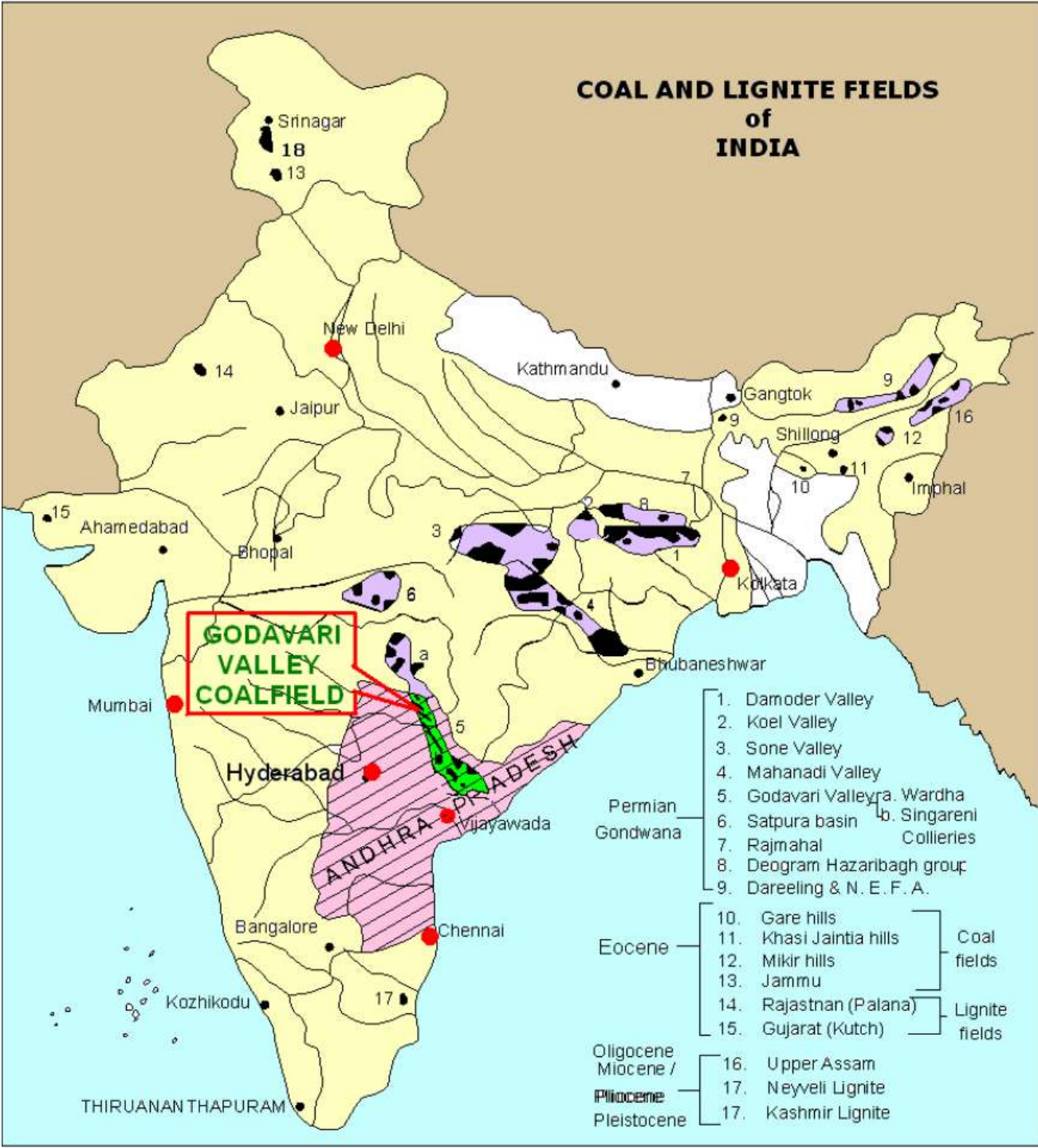
Rubble Coal

- **25 to 50 mm**

Steam Coal

- **50 to 200 mm & above**

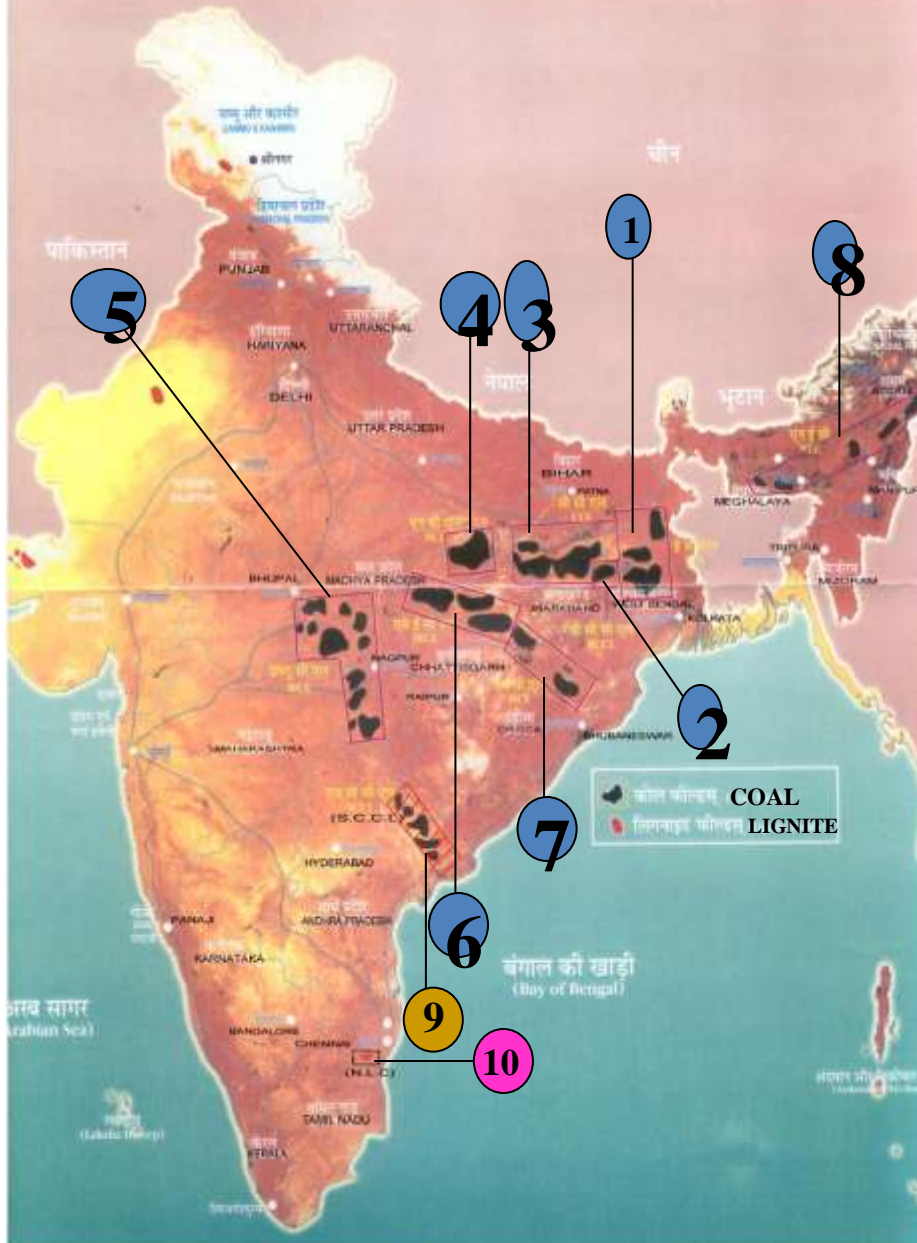
COAL AND LIGNITE FIELDS of INDIA



**GODAVARI
VALLEY
COALFIELD**

- | | | |
|---|---|---|
| Permian
Gondwana | <ul style="list-style-type: none"> 1. Damoder Valley 2. Koel Valley 3. Sone Valley 4. Mahanadi Valley 5. Godavari Valley 6. Satpura basin 7. Rajmahal 8. Deogram Hazaribagh group 9. Dareeling & N. E. F. A. | |
| Eocene | <ul style="list-style-type: none"> 10. Gare hills 11. Khasi Jaintia hills 12. Mikir hills 13. Jammu 14. Rajastnan (Palana) 15. Gujarat (Kutch) | <ul style="list-style-type: none"> Coal fields Lignite fields |
| Oligocene
Miocene /
Pliocene
Pleistocene | <ul style="list-style-type: none"> 16. Upper Assam 17. Neyveli Lignite 17. Kashmir Lignite | |

COAL AND LIGNITE RESOURCES IN INDIA



MAJOR COAL PRODUCING COMPANIES IN INDIA

- A) **COAL INDIA LTD.**
- EASTERN COALFIELDS LTD.** (1)
- BHARAT COKING COAL LTD.** (2)
- CENTRAL COALFIELDS LTD.** (3)
- NORTHERN COALFIELDS LTD.** (4)
- WESTERN COALFIELDS LTD.** (5)
- SOUTH EASTERN COALFIELDS LTD.** (6)
- MAHANADI COALFIELDS LTD.** (7)
- NORTH EASTERN COALFIELDS.** (8)
- CENTRAL MINE PLANNING & DESIGN INSTITUTE**
- B) **SINGARENI COLLIERIES CO. LTD.** (9)
- C) **NEYVELI LIGNITE CORPORATION** (10)

COAL RESERVES IN INDIA as on 1st.April 2010 (mt)

Type of Coal	Proved	Indicated	Inferred	Total	%age Share
Prime Coking	4,614	699	0	5,313	1.92
Medium Coking	12,573	11,940	1,880	26,393	9.53
Semi-coking	482	1,003	222	1,707	0.62
Non-Coking	92,129	117,012	34,257	243,398	87.93
Total	109,798	130,654	36,359	276,810	100

State wise Coal Reserves (1st.April 2010)

State	Reserve(bt)
Chhattisgarh	46.682
Orissa	66.307
Jharkhand	76.964
Madhya Pradesh	21.988
Andhra Pradesh	22.016
Maharashtra	10.3988
West Bengal	29.853
Uttar Pradesh	1.062
Meghalaya	0.576
Assam	0.385
J&K	-
Arunachal Pradesh	0.090
TOTAL	276.81

Coal Mines in India (31st.March 2009)

State	OC	UG	Mixed	Total
Chhattisgarh	18	42	1	61
Orissa	16	9	0	25
Jharkhand	68	84	21	173
Madhya Pradesh	21	50	4	75
Andhra Pradesh	13	37	0	50
Maharashtra	33	22	0	55
West Bengal	19	76	6	101
Uttar Pradesh	5	0	0	5
Meghalaya	-	-	-	-
Assam	16	9	0	25
J&K	0	7	0	7
Arunachal Pradesh	1	0	0	1
TOTAL	197	332	32	561

State wise Coal Production (2009-10)

State	Production(mt)
Chhattisgarh	109.959
Orissa	106.409
Jharkhand	105.933
Madhya Pradesh	74.074
Andhra Pradesh	50.425
Maharashtra	41.005
West Bengal	23.1035
Uttar Pradesh	13.969
Meghalaya	5.767
Assam	1.113
J&K	0.023
Arunachal Pradesh	0.250
TOTAL	532.062

Coalfield wise Reserves (1st.April 2010)

Coalfield	State	Company	Reserve (mt)
1. RANIGANJ	WB/JH	ECL/BCCL	25,766
2. RAJMAHAL GROUP	JH/BH	ECL	14,498
3. JHARIA	JH	BCCL	19,430
4. EAST & WEST BOKARO	JH	CCL	13,096
5. NORTH & SOUTH KARANPURA	JH	CCL	23,223
6. SINGRAULI	MP/UP	NCL	13,478
7. TALCHER	ORISSA	MCL	43,859
8. IB VALLEY	ORISSA	MCL	22,448
9. KORBA-MAND/RAIGARH	CG	SECL	33,883
10. CENTRAL INDIA COALFIELD (CIC)	MP/CG	SECL	10,955
11. WARDHA	MS	WCL	6,044
12. KAMPTEE	MS	WCL	2,973
13. PENCH-KANHAN-TAWA VALLEY-PATHAKHERA	MP	WCL	2,939
14. GODAWARI	AP	SCCL	22,016
15. MAKUM	ASSAM	NEC	⁶⁸ 327

Coalfieldwise Production (2009-10)

Coalfield	State	Company	Prodn.(mt)
1. RANIGANJ	WB/JH	ECL/BCCL	15.29
2. RAJMAHAL GROUP	JH/BH	ECL	14.83
3. JHARIA	JH	BCCL	27.45
4. EAST & WEST BOKARO	JH	CCL	18.44
5. NORTH & SOUTH KARANPURA	JH	CCL	27.54
6. SINGRAULI	MP/UP	NCL	67.67
7. TALCHER	ORISSA	MCL	59.74
8. IB VALLEY	ORISSA	MCL	44.34
9. KORBA-MAND/RAIGARH	CG	SECL	83.29
10. CENTRAL INDIA COALFIELDS (CIC)	MP/CG	SECL	24.72
11. WARDHA	MS	WCL	29.32
12. KAMPTEE	MS	WCL	5.03
13. PENCH-KANHAN-TAWA VALLEY-PATHAKHERA	MP	WCL	11.39
14. GODAWARI	AP	SCCL	44.50
15. MAKUM	ASSAM	NEC	⁶⁹ 1.11

ABBREVIATIONS

- **SDL** : **Side Discharge Loader**
- **LHD** : **Low Haul Dump**
- **UHV** : **Useful Heat Value**
- **GCV** : **Gross Calorific Value**
- **CBM** : **Coal Bed Methane**
- **ROM** : **Run of mine**
- **PSLW** : **Power Support Longwall**
- **MGR** : **Merry Go Round**
- **MARC** : **Maintenance And Repair Contract**
- **LCCM** : **Low Cost Continuous Miner**
- **UDM** : **Universal Drilling Machine**
- **UCG** : **Underground Coal Gasification**
- **NCDP** : **New Coal Distribution Policy**
- **BWE** : **Bucket Wheel Excavator**
- **FSA** : **Fuel Supply Agreement**
- **HEMM** : **Heavy Earth Moving Machinery**

TERMINOLOGY

- **BEFECIATION** : Process for cleaning of coal
- **CALORIFIC VALUE** : Amount of heat released during the combustion of a material.
- **COKE** : Solid carbonaceous material derived from destructive distillation of low ash & low sulphur bituminous coal
- **ASH** : The incombustible residue from mineral matter inherent within the coal
- **FEEDER BREAKER** : Coal crushing Equipment
- **MIDDINGS** : By-product obtained from washing of coking coal.
- **SHORTWALL** : An UG mining method in which small areas are worked.
- **OVERBURDEN(OB)** : The material of any nature that overlies a deposit.

TERMINOLOGY

- **LONGWALL MINING** : A form of UG coal mining method, employs a steal plow or rotating drum, which is pulled mechanically back & forth across a face of coal that is usually several hundred feet long.
- **COAL** : A readily combustible rock containing more than 50% by weight & 70% by volume of carbonaceous material, including inherent moisture. It is formed from plant remains that have been compacted, indurated, chemically altered and metamorphosed by heat & pressure during geological time.
- **LIGNITE** : Low rank coal with a relatively high moisture content & low heat energy content available in colours ranging from black to brown.