

COAL & LIGNITE



Indian Minerals Yearbook 2013

(Part- III : Mineral Reviews)

52nd Edition

COAL & LIGNITE

(FINAL RELEASE)

**GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES**

Indira Bhavan, Civil Lines,
NAGPUR – 440 001

PHONE/FAX NO. (0712) 2565471
PBX : (0712) 2562649, 2560544, 2560648
E-MAIL : cme@ibm.gov.in
Website: www.ibm.gov.in

July, 2015

10 Coal & Lignite

Coal plays a pivotal role in sustainable development. It is the most widely used energy source for electricity generation and an essential input for steel production. Coal is an essential resource for meeting the challenges facing the modern world. As per Integrated Energy Policy Committee of Planning Commission, coal will remain India's most important energy source till 2031-32 and possibly beyond. In India, about 76% coal output is consumed in power sector. In addition, other industries like cement, fertilizer, chemical, paper and thousands of medium and small-scale industries are dependent on coal for their process and energy requirements. The production of coal at 539.95 million tonnes in 2011-12 increased by 3.0% to 556.40 million tonnes in 2012-13. The production of lignite at 46.45 million tonnes in 2012-13 increased by 9.7% from 42.33 million tonnes in the previous year. India ranks 3rd in world coal production.

RESOURCES

Coal

The coal deposits in India are primarily concentrated in the Gondwana sediments occurring mainly in the eastern and central parts of Peninsular India, although Gondwana coal deposits also occur in Assam and Sikkim in north eastern part of the country. The Tertiary coal-bearing sediments are found in Assam, Arunachal

Pradesh, Nagaland and Meghalaya. As a result of exploration carried out by GSI, CMPDI and other agencies; 298.91 billion tonnes (including that estimated in Sikkim) coal reserves up to 1,200 m depth have been established in the country as on 1.4.2013. Out of these reserves, 123.18 billion tonnes are proved reserves, 142.63 billion tonnes are indicated reserves and the remaining 33.10 billion tonnes are in inferred category. Of the total reserves, the share of prime-coking coal is 5.31 billion tonnes, medium-coking & semi-coking is 28.75 billion tonnes and non-coking coal including high sulphur is 264.85 billion tonnes. Statewise/coalfield-wise and statewise/typewise reserves of coal as on 1.4.2013 are given in Tables-1 & 2, respectively.

Lignite

Indian lignite deposits occur in the Tertiary sediments in the southern and western parts of peninsular shield particularly in Tamil Nadu, Puducherry, Kerala, Gujarat, Rajasthan and Jammu & Kashmir. The total known geological reserves of lignite as on 1.4.2013 is about 43.22 billion tonnes, of which 79% reserves are located in Tamil Nadu with about 34.35 billion tonnes. Other states where lignite deposits have been located are Gujarat, Jammu & Kashmir, Kerala, Rajasthan, West Bengal and the Union Territory of Puducherry. Statewise/districtwise reserves of lignite as on 1.4.2013 are detailed in Table - 3.

**Table – 1 : Reserves of Coal as on 1.4.2013
(By States/Coalfields)**

State/Coalfield	Proved	Indicated	Inferred	Total
All India : Total	123181.63	142631.64	33100.79	298914.06
Gondwana Coalfields*	122587.82	142532.30	32301.30	297421.42
Andhra Pradesh/ Godavari Valley	9604.46	9553.91	3048.59	22206.96
Assam/Singrimari	–	2.79	–	2.79
Bihar/Rajmahal	–	–	160.00	160.00
Chhattisgarh	14779.18	34106.61	3283.25	52169.04
Sohagpur	94.30	10.08	–	104.38
Sonhat	199.49	2463.86	1.89	2665.24
Jhilimili	228.20	38.90	–	267.10
Chirimiri	320.33	10.83	31.00	362.16
Bisrampur	1010.90	603.80	–	1614.70
East Bisrampur	–	164.82	–	164.82
Lakhanpur	455.88	3.35	–	459.23
Panchbahini	–	11.00	–	11.00
Hasdeo-Arand	1599.72	3665.40	263.70	5528.82
Sendurgarh	152.89	126.32	–	279.21
Korba	5651.14	5936.50	168.02	11755.66
Mand-Raigarh	5015.90	18484.07	2608.96	26108.93
Tatapani-Ramkola	50.43	2587.68	209.68	2847.79

(Contd.)

COAL & LIGNITE

Table - 1 (Contd.)

State/Coalfield	Proved	Indicated	Inferred	Total
Jharkhand	41155.36	32986.36	6559.47	80701.19
Raniganj	1538.19	466.56	31.55	2036.30
Jharia	15127.97	4302.09	–	19430.06
East Bokaro	3351.87	3929.57	863.32	8144.76
West Bokaro	3720.89	1308.71	33.66	5063.26
Ramgarh	710.59	495.30	58.05	1263.94
North Karanpura	9499.42	6914.61	1864.96	18278.99
South Karanpura	3042.31	2048.56	1480.22	6571.09
Aurangabad	352.05	2141.65	503.41	2997.11
Hutar	190.79	26.55	32.48	249.82
Daltongunj	83.86	60.10	–	143.96
Deogarh	326.24	73.60	–	399.84
Rajmahal	3211.18	11219.06	1691.82	16122.06
Madhya Pradesh	9817.61	12354.80	2888.76	25061.17
Johilla	185.08	104.09	32.83	322.00
Umaria	177.70	3.59	–	181.29
Pench-Kanhan	1465.78	878.66	692.13	3036.57
Patharkhera	290.80	88.13	68.00	446.93
Gurgunda	–	47.39	–	47.39
Mohpani	7.83	–	–	7.83
Sohagpur	1751.56	5304.25	190.18	7245.99
Singrauli	5938.86	5928.69	1905.62	13773.17
Maharashtra	5667.48	3186.35	2110.21	10964.04
Wardha Valley	3604.85	1497.52	1424.07	6526.44
Kamptee	1276.14	1204.88	505.44	2986.46
Umrer Makardhokra	308.41	–	160.70	469.11
Nand Bander	468.08	483.95	–	952.03
Bokhara	10.00	–	20.00	30.00
Odisha	27283.74	37110.19	9316.08	73710.01
Ib-River	9134.52	9512.61	5108.16	23755.29
Talcher	18149.22	27597.58	4207.92	49954.72
Sikkim/Rangit Valley	–	58.25	42.98	101.23
Uttar Pradesh/Singrauli	884.04	177.76	–	1061.80
West Bengal	13395.95	12995.28	4891.96	31283.19
Raniganj	13281.68	7273.84	4012.39	24567.91
Barjora	114.27	–	–	114.27
Birbhum	–	5721.44	864.57	6586.01
Darjeeling	–	–	15.00	15.00
Tertiary Coalfields	593.81	99.34	799.49	1492.64
Assam	464.78	42.72	3.02	510.52
Makum	432.09	20.70	–	452.79
Dilli-Jeypore	32.00	22.02	–	54.02
Mikir Hills	0.69	–	3.02	3.71
Arunachal Pradesh	31.23	40.11	18.89	90.23
Namchik-Namphuk	31.23	40.11	12.89	84.23
Miao Bum	–	–	6.00	6.00
Meghalaya	89.04	16.51	470.93	576.48
West Darangiri	65.40	–	59.60	125.00
East Darangiri	–	–	34.19	34.19
Balphakram-Pendenguru	–	–	107.03	107.03
Siju	–	–	125.00	125.00
Langrin	10.46	16.51	106.19	133.16
Mawlong Shelia	2.17	–	3.83	6.00
Khasi Hills	–	–	10.10	10.10
Bapung	11.01	–	22.65	33.66
Jayanti Hills	–	–	2.34	2.34

(Contd.)

COAL & LIGNITE

Table - 1 (Concl'd.)

State/Coalfield	Proved	Indicated	Inferred	Total
Nagaland	8.76	–	306.65	315.41
Borjan	5.50	–	4.50	10.00
Jhanzi-Disai	2.00	–	0.08	2.08
Tiensang	1.26	–	2.00	3.26
Tiru Valley	–	–	6.60	6.60
DGM	–	–	293.47	293.47

*Source: Coal Directory of India, 2012-13, Coal Controller's Organisation, Kolkata.
* Including Sikkim.*

**Table – 2 : Reserves of Coal as on 1.4.2013
(By States/Types)**

(In million tonnes)

State/Type of coal	Proved	Indicated	Inferred	Total
All India : Total	123181.63	142631.64	33100.79	298914.06
Prime-coking	4614.35	698.71	–	5313.06
Medium-coking	13269.12	11892.64	1879.47	27041.23
Semi-coking	482.16	1003.29	221.68	1707.13
Non-coking	104222.19	128937.66	30200.15	263360.00
High sulphur	593.81	99.34	799.49	1492.64
Andhra Pradesh/Non-coking	9604.46	9553.91	3048.59	22206.96
Arunachal Pradesh/ High sulphur	31.23	40.11	18.89	90.23
Assam	464.78	45.51	3.02	513.31
Non-coking	–	2.79	–	2.79
High sulphur	464.78	42.72	3.02	510.52
Bihar/Non-coking	–	–	160.00	160.00
Chhattisgarh	14779.18	34106.61	3283.25	52169.04
Semi-coking	70.77	99.25	–	170.02
Non-coking	14708.41	34007.36	3283.25	51999.02
Jharkhand	41155.36	32986.36	6559.47	80701.19
Prime-coking	4614.35	698.71	–	5313.06
Medium-coking	12364.21	10332.53	1606.64	24303.38
Semi-coking	223.34	471.55	53.45	748.34
Non-coking	23953.46	21483.57	4899.38	50336.41
Madhya Pradesh	9817.61	12354.80	2888.76	25061.17
Medium-coking	354.49	1560.11	272.83	2187.43
Non-coking	9463.12	10794.69	2615.93	22873.74
Maharashtra/Non-coking	5667.48	3186.35	2110.21	10964.04
Meghalaya/High sulphur	89.04	16.51	470.93	576.48
Nagaland/High sulphur	8.76	–	306.65	315.41
Odisha/Non-coking	27283.74	37110.19	9316.08	73710.01
Sikkim/Non-coking	–	58.25	42.98	101.23
Uttar Pradesh/Non-coking	884.04	177.76	–	1061.80
West Bengal	13395.95	12995.28	4891.96	31283.19
Medium-coking	550.42	–	–	550.42
Semi-coking	188.05	432.49	168.23	788.77
Non-coking	12657.48	12562.79	4723.73	29944.00

Source: Coal Directory of India, 2012-13, Coal Controller's Organisation, Kolkata.

COAL & LIGNITE

**Table – 3 : Reserves of Lignite as on 1.4.2013
(By States/Districts)**

(In million tonnes)

State/District	Area/Lignite field	Proved	Indicated	Inferred	Total
All India : Total		6180.90	26282.67	10752.29	43215.86
Gujarat		1278.65	283.70	1159.70	2722.05
Kachchh	Panandhro & Panandhro Extn., Barkhan-Dam, Kaiyari Block-A & B, Mata-No-Madh, Umarsar, Lakhpat-Dhedadi (Punahrajpur), Akrimota, Jhularai-Waghapadar, Hamla-Ratadia & Pranpur.	335.61	56.40	33.09	425.10
Bharuch	Bhuri, Valia, Bhaga, Luna, Pansoli, Nani Pardi, Bhimpur, Rajpardi (GMDC leasehold) by MECL and Rajpardi (GMDC leasehold) by MECL.	724.76	118.59	491.23	1334.58
Bhavnagar	Kharsalia, Rampur, Hoidad, Bhuteshwar, Surka, etc.	–	–	299.17	299.17
Surat	Tadkeswar, Dungra, East of Kamraj-Vesma, Nani Naroli, Tadkeswar block-Mongrol, Mandvi, Vastan, Ghala, etc.	218.28	108.71	336.21	663.20
Jammu & Kashmir		–	20.25	7.30	27.55
Kupwara	Nichahom, Nichahom-Budhasung	–	20.25	7.30	27.55
Kerala		–	–	9.65	9.65
Kannaur	Madayi, Kadamkottumala, Kayyur and Nileswaram	–	–	9.65	9.65
Rajasthan		1167.02	2671.93	1850.57	5689.52
Bikaner	Palana, Barsinghsar, Gurha East & West, Bholasar, Bithnok Main & East (Extn.), Gadiyala, Girirajsar, Raneri, Mandal Chaman, Hadda, Hadda north & west, Hadla, Badhnu, Hira-ki-Dhani, Chak-Vijaisinghpura, Kuchore (Napasar), Riri, Latamdesar Bada, East of Riri, Bania, Kuchaur-Athuni, Sarupdesar-Palana west, Palana East, Gigasar-Kesardesar, Ambasar-Gigasar, Girirajsar Extn., Bapeau, Bigga-Abhaysingpura, Diyatra, Pyau, Deshnok-Ramsar-Sinthal, Borana, Bangarsar-Jaimalsar and Kenya-Ki-Basti & South of Bhane-Ka-Gaon.	558.79	231.43	305.45	1095.67
Barmer	Kapurdi, Jalipa, Bothia (Jalipa N Ext.), Giral, Jogeswartala, Sonari, Sachcha-Sauda, Bharka, Bothia-Bhakra-Dunga, Sindhari East & West, Kurla, Chokla North, Mahabar-Shivkar, Mithra, Hodu, Nimbalkot, Nimbalkot North, Nagurda, Nagurda East, Munabao, Kawas Gravity Block, South of Nimbla and Magne-Ki-Dhani.	495.23	2379.94	1336.58	4211.75
Jaisalmer	Ramgarh	–	–	45.26	45.26
Jaisalmer & Barmer	Kuuri	–	–	13.80	13.80
Nagaur & Pali	Kasnau-Igiar, Matasukh, Mokala, Nimbri-Chadawatan, Kaprion-Ki-Dhani, Merta Road & Meeranagar, Indawar, Kuchera, Lunsara and Phalki.	113.00	60.57	73.39	246.96
Jalore	Sewara	–	–	76.08	76.08
Tamil Nadu		3735.23	22900.05	7712.43	34347.71
Cuddalore	Neyveli Lignite Corporation (NLC) Leasehold areas, South of Vellar (Srimushnam), Veeranam (Lalpettai), Eastern part of NLC leasehold area, Kullanchavadi, Kudikadu, Bhuvanagiri-Kullanchavadi, Eastern part of Neyveli, Bahur*, West of Bahur*.	2831.00	2530.74	1199.78	6561.52

(Contd.)

COAL & LIGNITE

Table - 3 (Concl'd.)

State/District	Area/Lignite field	Proved	Indicated	Inferred	Total
Ariyalur	Meensuruti, Jayamkondamcholapuram, Michaelpatti of Neyveli Lignite Field	904.23	302.50	481.07	1687.80
Thanjavur & Thiruvarur	Mannargudi-central, Mannargudi-NE Mannargudi-NE Extn., Mannargudi SE, Melnattam-Araharam of Mannargudi Lignite Field	–	17248.06	3123.46	20371.52
Thanjavur	Mannargudi-NW & SW, Maharajapuram Orattanadu-Pattukottai, Vadaseri (Orattanadu-Pattukottai), Madukkur-Anaikkadu Veppanagulam-Kasangadu of Mannargudi Lignite Field	–	2290.71	72.66	2363.37
Thanjavur & Nagapattinam	Alangudi, Pandanallur, Tirumangaicheri, and Thirumangalam of Mannargudi Lignite Field	–	359.21	534.19	893.40
Thiruvarur & Nagapattinam	Nachiyarkudi of Mannargudi Lignite Field	–	–	574.05	574.05
Ramnad	Rajasing Mangalam of Mannargudi Lignite Field	–	–	964.97	964.97
Ramnad & Sivaganga	Settanur of Mannargudi Lignite Field	–	–	20.24	20.24
Ramanathapuram	Misal, Bogalur, Bogalur (East) and Tiyanur of Ramanathapuram Lignite Field	–	168.83	742.01	910.84
Puducherry	Bahur & West of Bahur of Neyveli Lignite Field	–	405.61	11.00	416.61
West Bengal	Rakshitpur, Mahalla & Dhobbanpur	–	1.13	1.64	2.77

Source: Coal Directory of India, 2012-13, Coal Controller's Organisation, Kolkata.

** Both blocks cover parts of Tamil Nadu and Puducherry.*

EXPLORATION & DEVELOPMENT

The agencies engaged in exploration for coal during 2012-13 were mainly GSI, CMPDIL, MECL and State Directorates of Geology & Mining. Lignite exploration was carried out by GSI, MECL, NLC, DMG, Rajasthan & Nagaland and GMDC Ltd.

GSI carried out exploration for coal in Gondwana basins of Andhra Pradesh, Assam, Chhattisgarh, Madhya Pradesh, Maharashtra, Odisha and West Bengal to identify additional resources of power-grade coal and superior-grade coking coal. As a result of exploration carried out, additional resources of 3,171.62 million tonnes coal were assessed in the states of Andhra Pradesh, Chhattisgarh, Madhya Pradesh, Maharashtra, Odisha and West Bengal during 2012-13 (as on 1.4.2013). GSI extensively continued its exploration for lignite in Rajasthan, Tamil Nadu and West Bengal, keeping in view the high demand for accelerated growth of power and industrial sectors. As a result of exploration carried out, additional resources of 483.60 million tonnes lignite were assessed in the states of Rajasthan, Tamil Nadu and West Bengal

during 2012-13 (as on 1.4.2013). Details of additional resource estimation and exploration activities for coal & lignite by GSI are furnished in Tables - 4 and 5, respectively.

MECL carried out exploration in the states of Chhattisgarh, Maharashtra and Andhra Pradesh during 2012-13. As a result, a total of 1132.80 million tonnes resources of non-coking coal and coking coal at Mand-Raigarh coalfield in Chhattisgarh, North Karanpura coalfield in Jharkhand and Wardha valley coalfield in Maharashtra have been established. MECL also carried out exploration for lignite in Rajasthan during 2012-13. A total of 768.51 million tonnes of lignite resources have been established in Rajasthan.

DGM, Chhattisgarh estimated 126 lakh tonnes coal resources during 2012-13 in Surguja and Korba districts. DGM, Maharashtra carried out exploration for coal during 2012-13 in Nagpur, Chandrapur and Yavatmal districts and estimated at about 26.19 million tonnes of resources. GMDC conducted exploration of lignite and estimated at about 12.04 million tonnes of geological resources during 2012-13 in Bhavnagar, Kachhch and

COAL & LIGNITE

Surat districts in Gujarat. Neyveli Lignite Corporation Ltd (NLC) also carried out exploration for lignite in Barmer, Jaisalmer & Nagaur districts in Rajasthan and Ramnad, Thanjavur & Nagapattinam districts in Tamil Nadu in 2012-13. Details on exploration carried out by the various state Directorates and state undertakings are provided in Table - 6.

CMPDI in its exploration programme for 2012-13 laid emphasis on proving power-grade and superior-grade non-coking coal in CIL and non-CIL blocks. CMPDI deployed its departmental resources for exploration of CIL/Non-CIL blocks whereas State Governments of Madhya Pradesh and Odisha deployed resources in CIL blocks only. Besides, five other contractual agencies have also deployed resources for detailed drilling/exploration in CIL/Non-CIL blocks. A total of 115 to 140 drills was deployed in 2012-13. Out of which, 53 were departmental drills. Apart from it, CMPDI continued the technical supervision of promotional exploration work. Under the Promotional (regional) Exploration Programme, MECL undertook promotional drilling (CIL & SCCL areas) in 11 blocks, namely, Mand Raigarh (3), Wardha Valley (1), Bander (1), Singrauli (1), Bisrampur (1) and Godavari valley (4) in coal sector. MECL achieved 30,594 m drilling as against 25,998 m in the previous year. CMPDI also monitored work of GSI in 10 blocks, namely, Raniganj CF (1), Talcher CF (2), Ib Valley (3), Sohagpur (3) and Tatapani Ramakola (1) while DGM (Nagaland) undertook one block in Northern Khar for promotional drilling in coal sector (CIL area) on behalf of Ministry of Coal.

In 2012-13, of the overall exploratory drilling of 6,08,664 m that was achieved. 5,62,908 m (3,35,200 m in CIL and 2,27,708 m in Non-CIL blocks) was achieved by CMPDI and 45,624 m of promotional drilling by MECL, GSI and DGM (Nagaland) in Coal Sector. CMPDI undertook 2,76,199 m of departmental drilling while the remaining 2,86,709 m drilling was conducted through outsourcing to concerned Departments of State Governments & MECL(MoU), as well as through tender notifications (CIL and non-CIL blocks).

During 2012-13, CMPDI and its contractual agencies conducted exploration in 102 blocks/mines spread over 22 coalfields situated in 6 states, namely, Raniganj (10 blocks/mines), Brahmani (1), Jharia (4), West Bokaro (2), East Bokaro (1), Ramgarh (2), South Karanpura (6), North Karanpura (4), Kampti (7), Nand-Bander (3), Wardha Valley(5), Katol Basin (1), Sohagpur (7), Johilla (1), Mand Raigarh (12), Korba (3), Bisrampur (4), Sonhat (1), Tatapani-Ramkola (3), Singrauli (7), Talcher (12) and Ib Valley (6). Out of the 102 blocks/

mines, 35 were Non-CIL/Captive blocks and 67 CIL blocks/mines. Departmental drills of CMPDI took up drilling activity in 63 blocks/mines, whereas contractual agencies drilled in 39 blocks/mines.

The Singareni Collieries Company Limited (SCCL) in its detailed exploration undertaken during 2012-13, drilled 1,20,105 m and established proved reserves of coal estimated at 45.63 million tonnes as against 390.24 million tonnes reported in the previous year. Thus, the total proved reserves rose to 9,923.31 million tonnes as on 31.3.2013 in Godavari Valley Coalfield, Andhra Pradesh.

Table – 4: Additional Resources Estimated by GSI for Coal and Lignite, 2012-13 (as on 1.4.2013)

State/Coalfield/Block	Additional resources
(In million tonnes)	
COAL	
Andhra Pradesh	14.25
A. Godavari Valley Coalfield	
Vutasamudram-Venkatapuram area	14.25
Chhattisgarh	646.82
A. Mand-Raigarh Coalfield	
(i) Nawagaon block	515.47
B. Hasdo Arand Coalfield	
(i) Korja block	131.35
Madhya Pradesh	648.54
A. Pench Valley Coalfield	
(i) Payalidhana sector	138.87
B. Singrauli Coalfield	
(i) Sarai (east) area	193.04
C. Sohagpur Coalfield	
(i) Amiliah block	54.49
(ii) Devanitoal block	262.14
Maharashtra	10.70
A. Wardha Valley	
(i) Dewala Mangli block	10.70
Odisha	1542.98
A. Talcher Coalfield	
(i) Simlisahi-Kunjabiharipur block	1542.98
West Bengal	308.33
A. Raniganj Coalfield	
(i) East of Bhabanigunj area	53.36
B. Birbhum coalfield	
(i) Dhobbanpur sector	74.19
(ii) Gazipur area	180.78
Total	3171.62
LIGNITE	
Rajasthan, Tamil Nadu & West Bengal	483.60

COAL & LIGNITE

Table – 5: Details of Exploration Activities conducted by GSI for Coal & Lignite, 2012-13

State/Coalfield/ Lignite Field	Area/Block	Exploration Activities
COAL		
Andhra Pradesh		
Godavari Valley Coalfield	Bugga-Khammamtogu area, Khammam district	Exploration and evaluation were conducted for coal resource potentiality of Barakar coal seams which were already established in the adjoining Manuguru Mining Block lying to the north-east. A total of 625.05 m was drilled in three boreholes. An area of 1.50 sq.km was mapped on 1:10,000 scale and 578 m GP logging was completed. Three Barakar coal/ carbonaceous shale bands varying in thickness from 0.50 m - 1.90 m were intersected between 537.85 m and 556.20 m depth in borehole BH-2 whereas nine coal/carbonaceous shale bands and six Barakar coal/ carbonaceous shale bands varying in thickness from 0.50 m - 2.00 m were intersected between 57.36 m and 371.60 m depths in borehole BH-4. The work is in progress.
	Bugga-Khammamtogu area in Pagaderu (west) sector, Khammam district	A total of 1,387.60 m was drilled in four boreholes. A total of 224 m GP logging was completed. Thirteen Lower Kamthi coal/carbonaceous shale bands and four Barakar coal/carbonaceous shale bands varying in thickness from 0.30 m - 2.10 m have been intersected between 15.90 m and 236.87 m depths in borehole BH-1. Fifteen coal/carbonaceous shale bands varying in thickness from 0.55 m - 1.96 m have been intersected between 196.95 m and 443.59 m depths in BH-2 whereas eight coal/ carbonaceous shale bands of Lower Kamthi Formation varying in thickness from 0.50 m to 1.35 m have been intersected within shallow depth range from 33.90 m - 86.00 m in borehole BH-3. Thirty coal/ carbonaceous shale bands varying in thickness from 0.50 m - 1.45 m have been intersected between 30.86 m and 373.18 m depths in borehole BH-4. The work is in progress.
	Vutasamudram- Venkatapuram area, Khammam & Godavari districts	Exploration and evaluation were conducted for coal potentiality of Barakar and Lower Kamthi Formations which were already established in northern adjoining Narayanpuram-Pattayagudem and Sitanagaram and to decipher the structural and stratigraphic set up of the area. A total of 67.70 m was drilled in one borehole and 390 m GP logging was completed. The borehole intersected Lower Kamthi Formation and the investigation was completed.
Assam		
Singrimari Coalfield	Sukchar-Singrimari block, Dhubri district at the border of Assam & Meghalaya	A total of 1387.60 m was drilled in three boreholes in the area. An area of 2.00 sq.km was mapped on 1:10,000 scale. Three Karharbari coal seams varying in thickness from 0.50 m - 1.25 m have been intersected between 161.90 m and 181.75 m depths in borehole SN-3. The work is in progress.
Chhattisgarh		
Mand-Raigarh Coalfield	Samarsingha block Raigarh district	Exploration studies were conducted to establish the continuity of the regional Barakar coal seams which were already established in the Nawagaon Block in the north and Sithra-Kurekela area in the west. A total of 2,788.75 m was drilled in six boreholes in the area. An area of 4 sq.km was mapped on 1:10,000 scale and 1,768.25 m of GP logging was completed. Twelve regional Barakar coal seams/zones and a few local coal seams ranging in cumulative thickness from less than a meter to 11.10 m were intersected within depth range from 16.30 m to 738.06 m. Coal Seam /Zone- I (4.70 m to 6.26 m), IV (3.26 m to 11.10 m), VI (1.01 m to 4.16 m) are important for their thickness and regional persistence. During the period, about 5 km strike extension and 2 km dip extension have been proved. The work is in progress.
	Teram block Raigarh district	Studies were undertaken to establish the continuity of the regional Barakar coal seams that were already intersected exploration of adjacent Kurumkela Block and also evaluation of additional coal resource in the area. A total 2,528.95 m was drilled in seven boreholes. An area of 4 sq.km was mapped on 1:10,000 scale and 999.36 m of GP logging was completed. Nine regional coal seams /zones and a few local coal seams ranging in cumulative thickness from less than a meter to 13 m were intersected within depth range from 162.23 m to 585.35 m. Coal Seam/Zone V (1.77 m to 11.32 m), VI (8.44 m to 13 m) & XI (3.41m to 5.19 m) are important considering their thickness and regional persistence. The regional continuity for coal seams was established for five km along strike and 2.5 km along dip direction. Exploration was completed in December, 2012 with a total of 5871.75 m of drilling taken up in eleven boreholes.

(Contd.)

COAL & LIGNITE

Table - 5 (Contd.)

State/Coalfield/ Lignite Field	Area/Block	Exploration Activities
	Amlidhonda block Raigarh district	Studies were conducted to establish the continuity of the regional Barakar coal seams intersected in adjacent explored Kesarchuan-Lamdand block towards east and Gare area towards north. A total of 2,673.30 m was drilled in seven boreholes. An area of 4 sq.km was mapped on 1:10,000 scale and 1,902.01 m of GP logging was completed. Seven regional coal seams / zones and a few local coal seams varying in thickness from less than a meter to 18.87 m (cumulative thickness) were intersected between 118 m and 473.40 m depths. Coal seam/ zone X (cumulative thickness 3.21 m to 5.25 m), IX (cumulative thickness 1.85 m to 5.65 m) and combined coal seam zone VI and VII (cumulative thickness 10.63 m to 18.87 m) are important for their thickness and regional persistence. About 2 km strike extension and 2.5 km dip extension have been proved. The work is in progress.
Tatapani Ramkola Coalfield	Vijaynagar-Giddhi block, Surguja district	Studies in order a) to establish the structural disposition of the Lower Gondwana sequences, b) to establish the continuity of Barakar coal seams beneath the cover of Barren Measures and Raniganj Formation, c) to appraise the resource potentiality of Barakar coal seams and d) to generate CBM baseline data were taken up. A total of 3,151.80 m was drilled in seven boreholes in the area. An area of 3 sq km was mapped on 1:10,000 scale and 990.65 m of GP logging was completed. The boreholes intersected Barren Measures and Barakar Formation. Thirteen regional Barakar coal seams/ zones ranging in thickness from less than a meter to 18.94 m were intersected in the depth range from 102.05 m - 555.32 m Seam nos/zones III (cumulative thickness 5 m to 18.94 m), IV (maximum cumulative thickness 9.04 m) are important for their thickness and regional persistence. Besides these, a few local coal seams were also intersected in Barakar Formation, with thickness varying from less than a meter to 3.81 m, between depths 19.35 m and 508.65 m. The coal contents in Barakar Formation increase from eastern to western part of this block. The continuity of coal seams in Barakar Formation has been established over a strike length of about 6 km and 1.5 km along down dip direction. The work is in progress.
Madhya Pradesh Singrauli Coalfield	Sarai (West) area Singrauli district	A total of 2,259.30 m was drilled in five boreholes. An area of 5 sq km was mapped on 1:10,000 scale and 1527.79 m of Geophysical logging was completed. Three regional (R-I to R-III) and three Raniganj local seams (RL1 to RL3) with thickness varying from 0.54 m to 3.43 m, were intersected at very shallow depth (25.60 m to 146.11 m). Seven regional and a few local Barakar coal seams were intersected between depths of 288.12 m and 531.67 m. Thickness of individual coal section varies from 0.51 m to 2.40 m. The work is in progress.
	Sarai (East) area, Singrauli district	Reconnaissance stage (G-4) exploration was conducted. A total of 167 m was drilled in two boreholes viz. BH-4 and 6. A total of 1,082.87 m GP logging was completed.
Sohagpur Coalfield	Pachri block Shahdol district	During the period, a total of 917.65 m was drilled in four boreholes. An area of 10 sq km was mapped on 1:10,000 scale and 947.96 m GP logging was completed. Four regional Barakar coal seams ranging in thickness from 0.55 m - 6.15 m were intersected within the depth range from 79.80 m to 257 m. The investigation was completed.
	Maiki (North) block Shahdol district	Studies were conducted to a) to establish the developmental pattern of superior grade Barakar coal seams at shallow depth. b) decipher major structural set-up of the area. c) evaluate additional coal resources. A total of 2,911.95 m was drilled in seven boreholes. An area of 10 sq km was mapped on 1:10,000 scale and 3,015.89 m of GP logging was completed. Four regional Barakar coal seams were intersected within the depth range from 404 m - 579.50 m. Thickness of individual coal section varies from 0.30 m - 6.35 m. The work is in progress.
	Bihar block Shahdol district	Studies were conducted to a) establish developmental pattern of superior grade Barakar coal seams at shallow depth. b) decipher major structural set-up of the area. c) evaluate additional coal resources. A total of 487.15 m was drilled in two boreholes in the area. The block area is mostly covered by Lameta Formation. Four regional Barakar coal seams were intersected between depths of 141.80 m and 291.50 m. Thickness of individual coal section varies from 0.70 m to 3.50 m. The work is in progress.

(Contd.)

COAL & LIGNITE

Table - 5 (Contd.)

State/Coalfield/ Lignite Field	Area/Block	Exploration Activities
Sohagpur Coalfield	Malka block Shahdol district	Studies to a) establish developmental pattern of Barakar coal seams at moderate depths and a few Raniganj coal seams at shallower depths. b) decipher major structural set-up of the area. c) evaluate additional coal resources were conducted. A total of 89 m was drilled in one borehole. Three Raniganj coal seams varying in thickness from 0.50 m - 1.62 m were intersected at shallow depth range from 12.95 m - 41.32 m. The work is in progress.
Pench Valley Coalfield	Bhurkumdhana sector Chhindwara district	Exploration studies were conducted to establish the dip continuity of Barakar coal seams already recorded in Payalidhana sector to the south, below the Deccan Traps under favourable structural set up and to assess coal resource potentiality of the area. A total of 1,029.35 m was drilled in three boreholes. An area of 8 sq km was mapped on 1:25,000 scale and 373.88 m of GP logging was completed. Borehole BH-2 was closed in Barakar Formation after intersecting four regional seams within 420.95 m and 460.85 m depths. Individual coal sections in these seams vary in thickness from 0.50 m to 2.50 m. The work is in progress.
	Payalidhana sector Chhindwara district	Studies were conducted to establish the strike extension of Barakar coal seams below the Deccan Traps under favourable structural set up, already recorded in Bagbardiya sector to the south-west and Dhankasa area in the south-east and to assess the coal resource potentiality of the area. A total of 106.45 m was drilled in one borehole. A total of 341.16 m of GP logging was completed. Three regional Barakar coal seams varying in thickness from 1.50 m - 3.50 m were intersected between 289.76 m and 312.15 m depths. The investigation was completed.
Maharashtra Wardha Valley Coalfield	Jhamkola area Yavatmal district	Studies were conducted to establish Barakar coal seams below Deccan Traps, south-west of Parsoda-Ghonsa coal belt and to assess coal resource potentiality of the area. A total of 896 m was drilled in three boreholes. A total of 10 sq km was mapped on 1:25,000 scale. The borehole BH-1 intersected Deccan Traps, Motur Formation and Barakar Formation whereas the boreholes BH-2 and BH-3 intersected Deccan Traps and Motur Formation. The work is in progress.
	Dewala-Mangli block Yavatmal district	Studies to establish the strike continuity of Barakar coal seams, already recorded in Asthona-Kothurla-Mangli area in the north-west below the Deccan Traps under favourable structural set up and to assess the coal resource potentiality of the area were conducted. Two boreholes were drilled and one coal seam of 0.60 m in thickness was intersected at 459.40 m depth in Barakar Formation. The work is in progress.
Odisha Talcher Coalfield	Nuagaon North area Angul district	Studies to explore the down dip continuity of regional coal seams of Barakar and Karharbari Formations which has already been explored in adjacent Nuagaon-Telisahi and Kudanali north-east blocks were conducted. A total of 1,713.85 m was drilled in five boreholes viz. BH-7 to BH-11 and 1,796 m GP logging was completed. Five Barakar and one Karharbari seam (BH-8) to 37.67 m (Seam-III, BH-11) were intersected within the depth range of 350.25 m (BH-10) and 761.14 m (BH-8). Continuation of coal seams was established for 6 km along strike and 1.5 km along dip direction. Exploration was completed in 2013.
	Chadchadi block Deogarh & Sambalpur districts	A total of 327.50 m of drilling was accomplished in one borehole (BH-1). In addition to these, an area of 4 sq km was covered by large scale mapping in this block. Coal bearing Barakar Formation with thin coal and carbonaceous shale bands were intersected in this borehole. The work is under progress.

(Contd.)

COAL & LIGNITE

Table - 5 (Concl.d.)

State/Coalfield/ Lignite Field	Area/Block	Exploration Activities
Ib River Coalfield	Khariaparha block Jharsuguda district	Studies were conducted to explore the possible continuity of regional coal seam/seam zones of Raniganj and Barakar Formations towards north-east of already explored Kuraloi (A) North Block. The objective of this investigation was to assess the coal resource potentiality and to have preliminary appraisal of CBM potentiality of the area. A total of 814.20 m of drilling was done in two boreholes along with 971 m of Geophysical logging. Two coal seam zones of Raniganj (R-I & R-II) and five regional coal seam zones of Barakar Formations ranging in thickness from 2.38 m - 61.19 m were intersected between 23.48 m and 616.20 m depths. The Lajkura seam zone which is the thickest with cumulative coal thickness of 61.19 m has been intersected at roof depth of 381.20 m. R-II, R-I, Belpahar, Parkhani and Rampur seam zones showed maximum cumulative thickness of 3.98 m, 5.86 m, 24.79 m, 20.84 m and 45.98 m. The seam zone consists of two to nine splits ranging in thickness from 0.50 m - 27.25 m. Ib seam is impersistent in nature and has cumulative thickness of 2.38 m with 2 split sections. Extension of regional Barakar coal seam zones has been established for about 2.5 km along strike and 2 km along down dip direction. Coal seams are of power grade (E to G mainly) with superior grade coal (Grade A to E) occur only in Ib seam. The investigation was completed in 2012.
	Grindola block Jharsuguda district	With objective to explore the possible continuity of regional coal seam/seam zones of Raniganj and Barakar Formations encountered in already explored neighbouring Kuraloi (A) North block. Studies were conducted to assess the coal resources potentiality of the area. A total of 1,896.90 m was drilled in three boreholes. An area of 7 sq km was mapped on 1:10,000 scale and 457 m GP logging was completed. Four Raniganj coal seam zones and four regional Barakar coal seam zones ranging in thickness from 2.15 m - 57.67 m were intersected between 27.62 m and 655.54 m depths. Seam zones R-I (17.20 m to 22.48 m), Belpahar (16.31 m to 21.50 m), Parkhani (22.88 m to 31.81 m), Lajkura (18.94 m to 57.67 m) and Rampur (35.38 m) are important for their thickness and regional extension. The Raniganj seam zones were intersected at a very shallow depth range.
	Bandbahal block Jharsuguda district	Studies were conducted with objective a) to explore the possible continuity of the regional coal seam zones of Raniganj and Barakar Formations of ongoing Khariaparha block, b) to establish structural set up and stratigraphy of the area and c) to assess the coal resource potentiality of the area. A total of 771.20 m was drilled in one borehole. An area of 3 sq km was mapped on 1:10,000 scale. Four regional Raniganj coal seam zones and two regional coal seam zones of Barakar Formation with thickness varying between 1.75 m and 18.78 m were intersected between 66.92 m and 406 m depths. Seam zone R-I (cumulative coal thickness of 18.53 m to 18.78 m) are most important Raniganj seam for thickness and lateral persistence. The seam zone Belpahar (cumulative thickness 11.64 m to 12.27 m) is also important for thickness. CBM desorption study revealed the presence of 0.01cc/g of desorbed gas in regional seam zone R-I intersected in borehole BH-1. The work is in progress.
LIGNITE		
Tamil Nadu		
Ramnad-sub-basin in Ramanathapuram district	Uttarakosamangai sector	Exploration work has been taken up to a) delineate lignite bearing areas and b) assess the resource potentiality of the area. A total of 5,182.65 m was drilled in thirteen boreholes in the area. A total of 3,954.00 m of GP logging was completed. The boreholes intersected Quaternary sediments, Cuddalore/Tittacheri Formation and Neyveli Formation. The work is in progress.
Rajasthan		
Palana basin of Bikaner district	Kharicharnan south area	Studies were conducted to establish the stratigraphic set up in the north central part of Palana Basin. A total of 1,534 m was drilled in twelve boreholes and 937 m of GP logging was completed. The boreholes intersected Quaternary sediments, Marh Formation and Nagaur Formation. No lignite seam was intersected. The work is in progress.

COAL & LIGNITE

Table – 6 : Details of Exploration for Coal and Lignite by State Directorates of Geology & Mining and State Undertakings, 2012-13

Agency/State/ District	Location	Geological mapping		Drilling		Remarks Reserves/Resources estimated
		Area (sq km)	Scale	Boreholes	Meterage	
COAL						
DGM						
Chhattisgarh						
Korba	Saila block	-	1:50,000 1:4,000	04	832.45	Since commencement of work, a total of 51.15 million tonnes of coal resources were estimated. During the year resources were not estimated.
Surguja	Gotan-Birjupali area	340 1.76	1:50,000 1:4,000	-	-	Work under progress.
-do-	Saidu area	105 2.10	1:50,000 1:4,000	1	862.25	About 126 lakh tonnes of coal resources were estimated.
Maharashtra						
Nagpur	Dawa-Phukeshwar	-	-	-	281.65	About 1.23 million tonnes resources of coal were estimated (9.84 million tonnes so far).
-do-	Nand-Panjrepar	-	-	-	4082.95	About 2.18 million tonnes resources of coal were estimated (29.40 million tonnes so far).
Yavatmal	Adkoli-Khadakdon	-	-	-	1231.50	About 0.36 million tonnes resources of coal were estimated (3.02 million tonnes so far).
-do-	Ashtona Kothurna	-	-	-	673.00	About 0.85 million tonnes resources of coal were estimated so far.
Chandrapur	Nandori	-	-	-	1581.00	About 9.15 million tonnes resources of coal were estimated (188.70 million tonnes so far).
-do-	Wilson block	-	-	-	1096.00	About 11.14 million tonnes resources of coal were estimated (52.60 million tonnes so far).
-do-	Chalbardi	-	-	-	1422.00	About 1.28 million tonnes resources of coal were estimated.

(Contd.)

COAL & LIGNITE

Table - 6 (Concl.)

Agency/State/ District	Location	Geological mapping		Drilling		Remarks Reserves/Resources estimated
		Area (sq km)	Scale	Boreholes	Meterage	
GMDC, Gujarat						
Kachchh	N/V Panandhro	-	1:5,000	-	-	Balance reserves of lignite is approximately 6.85 million tonnes.
-do-	Mata-No-Madh	-	1:5,000	45	2647.00	About 5.19 million tonnes tentative reserves of lignite were estimated.
Surat	Tadkeswar	-	1:5,000 1:3,000	29	2207.00	The work is in progress.
Bhavnagar	Tagdi village	-	-	-	-	A total of 114.72 million tonnes of geological reserves (111) of lignite have been estimated in Block-A.
Neyveli Lignite Corp. Ltd (NLC)						
Rajasthan						
Barmer	Matasar Tala	-	-	4	1640.00	Exploration work underway..
-do-	Baytu	-	-	3	797.50	-do-
-do-	Bhurtiya	-	-	29	9805.60	-do-
Jaisalmer	Bandha	-	-	29	4943.00	Exploration completed.
-do-	Khuiyala	-	-	47	4875.00	-do-
-do-	Aslai-Soda	-	-	6	1313.00	Exploration work underway.
Nagaur	Phalodi, Gangardi & Uchara	-	-	39	8310.50	-do-
-do-	Deswal	-	-	32	6689.30	-do-
Tamil Nadu						
Ramnad	Sikkal	-	-	9	3156.00	Exploration work underway.
Thanjavur & Nagapattinam	Kadalangudi	-	-	49	17786.00	-do-

PRODUCTION, STOCKS & PRICES

COAL

Production

The provisional total production of coal in 2012-13 was around 556.40 million tonnes which was higher by 3% as compared to the previous year. Chhattisgarh continued to be the largest coal producing state with a share of about 21.2% followed closely by Jharkhand and Odisha with contributions of 20% and 19.8%, respectively, to the national output. Next in order of share in the total production were Madhya Pradesh (13.6%), Andhra Pradesh (9.6%), Maharashtra (7%), West Bengal (4.8%) and Uttar Pradesh 2.9 percent. The remaining 1.1% of coal production was accounted for by Arunachal Pradesh, Assam, Jammu & Kashmir and Meghalaya.

During the year 2012-13 coal mining was confined mainly to the public sector which contributed 91.5% to the national production. In 2012-13, out of the total production of coal, 9.3% was coking coal and the rest 90.7% was non-coking coal. As in the earlier years, bulk of the coking coal production i.e. about 85.8% was reported from the public sector. Gradewise analysis of coking coal in 2012-13 revealed that washery grade IV had the maximum share at 69.1%, followed by washery grade III (24%), washery grade II (3.3%) and washery grade I (0.5%). The remaining 3.1% production of coking coal was of steel grade I, steel grade II, semi-coking grade I and SLVI. Out of the total production of coking coal in India, bulk quantity i.e. 99% was produced in Jharkhand followed by Madhya Pradesh with 0.6 percent. The remaining 0.4% was contributed by Chhattisgarh and West Bengal.

During 2012-13, barring a nominal quantity (7.9%), the balance entire production of non-coking coal (92.1%) came from the public sector. Out of the total non-coking coal production, 23.9% was of G11 grade, followed by 16.1% of

G13 grade, 13.2% of G9 grade, 11.7% of G10 grade, 7.3% of G12 grade, 6.9% of G7 grade, 4.8% of G8 grade, 4.5% of G6 grade, 3.5% of G4 grade and 3.0% of G5 grade. The remaining 5.1% production was contributed by G1, G2, G3, G14, G15, G16 and G17 grades of non-coking coal. Chhattisgarh was the largest producing state of non-coking coal in 2012-13 which alone accounted for 23.3% of the national output. Next in order were Odisha with a contribution of (21.8%), Madhya Pradesh (15%), Jharkhand (11.9%), Andhra Pradesh (10.5%), Maharashtra (7.8%), West Bengal (5.3%) and Uttar Pradesh (3.2%). The remaining 1.2% production came from the states of Assam, Arunachal Pradesh, Jammu & Kashmir and Meghalaya.

A total of 559 coal mines (as on 31.03.2013) in India reported production in 2012-13. Out of these, Jharkhand accounted for 176 mines while West Bengal for 101 mines, Madhya Pradesh (71), Chhattisgarh (60), Maharashtra (58), Andhra Pradesh (50) and Odisha (28). The remaining 15 mines have been from the states of Arunachal Pradesh, Assam, Jammu & Kashmir, Meghalaya and Uttar Pradesh. In 2010-11, there were 11 large mines each producing more than 10 lakh tonnes of coal during the year. The bulk of the production was contributed by 142 mines with annual output ranging between 5,00,001 to 10 lakh tonnes. There were 283 mines whose individual production varied between 50,001 to 5 lakh tonnes. About 123 small mines of which each with production up to 50,000 tonnes (Tables-7 to 10, Tables-11 (A & B) and 12 (A & B)).

Despatches

Despatches of raw coal at 567.1 million tonnes in 2012-13 were higher by around 5.9% as compared to those in the previous year. Chhattisgarh was the leading state in the despatches in 2012-13 and accounted for 21.3% of the total despatches. The states next in order were Jharkhand (21%), Odisha (20.1%), Madhya Pradesh (10.7%), Andhra Pradesh (9.2%), Maharashtra (6.8%), Uttar Pradesh (5.1%) and West Bengal (4.7%). The remaining 1.1%

COAL & LIGNITE

despatches were shared by Meghalaya, Assam, Arunachal Pradesh and Jammu & Kashmir.

During the year 2012-13, statewise analysis revealed that despatches of coal increased in the states of Andhra Pradesh, Chhattisgarh, Jharkhand, Maharashtra, Odisha, Uttar Pradesh and West Bengal. The remaining states of Assam, Arunachal Pradesh, Jammu & Kashmir, Madhya Pradesh and Meghalaya were decreased as compared to that in the previous year (Table - 13).

Of the total despatches of raw coal effected in 2012-13, a sizeable share of 76.4% was made to the Electricity Sector. As much as 2.8% was made to the Steel Industry, 2.6% to the Sponge Iron Industry, 2.3% to the Cement Industry, 0.4% each to the Fertilizer and Paper & Pulp Industry. The remaining 15.1% was made for other priority sectors including Textile & Rayons, Cokerries, Chemical and Other Basic Metals.

During the year 2011-12, the total despatches of raw coal, a sizeable share of 75% was made to the electricity sector. As much as 3% each was made to the steel industry and sponge iron industry, 2.4% to the cement industry, 0.5% to the fertilizer, 0.4% to the paper & pulp industry. The remaining 15.7 % was made for other priority sectors including chemical, cokerries textile & rayons and other basic metals (Table - 14).

Stocks

The mine-head stocks of coal at the end of the year 2012-13 were 63 million tonnes which was 14.8% less than that at the beginning of the year. Bulk of the coal stocks (about 99.8%) at the end of the year was accounted for by the mines located in the states of Odisha, Jharkhand, Madhya Pradesh, Maharashtra, Chhattisgarh, Uttar Pradesh, Andhra Pradesh and West Bengal (Tables - 15 A & B).

Prices

Domestic prices of coal during 2010-11 to 2012-13 are furnished in the General Review on 'Prices'.

LIGNITE

Production

During the year 2012-13, the production of lignite at 46.5 million tonnes increased by 9.7% in comparison to that of the previous year. The production from Tamil Nadu alone accounted for 53.5%. The share of Gujarat in lignite production was 31.3% and that of Rajasthan was 15.2 percent (Table - 16).

Out of the total 16 mines for lignite that reported production in 2012-13, seven are located in Gujarat, six in Rajasthan and remaining three in Tamil Nadu (Tables - 17).

Despatches

The quantum of despatches of lignite was 46.3 million tonnes during the year 2012-13, which was higher by 10.6% as compared to that in the previous year (Table - 18).

Stocks

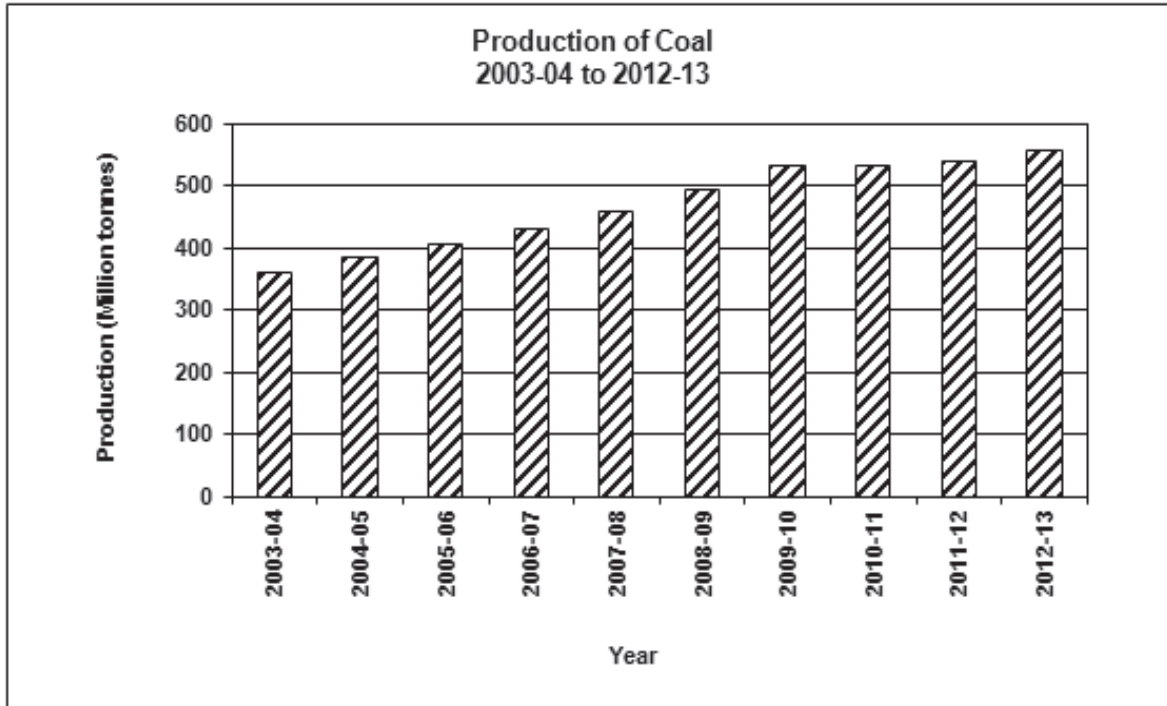
The mine-head stocks of lignite at the end of 2012-13 were 1,493 thousand tonnes which was 42.06% more than that at the beginning of the year. The bulk of the coal stocks (75.08%) at the end of the year was accounted for by the mines located in the state of Tamil Nadu (Tables - 19 A & B).

**Table – 7 : Number of Coal Mines
2011-12 & 2012-13
(By States)**

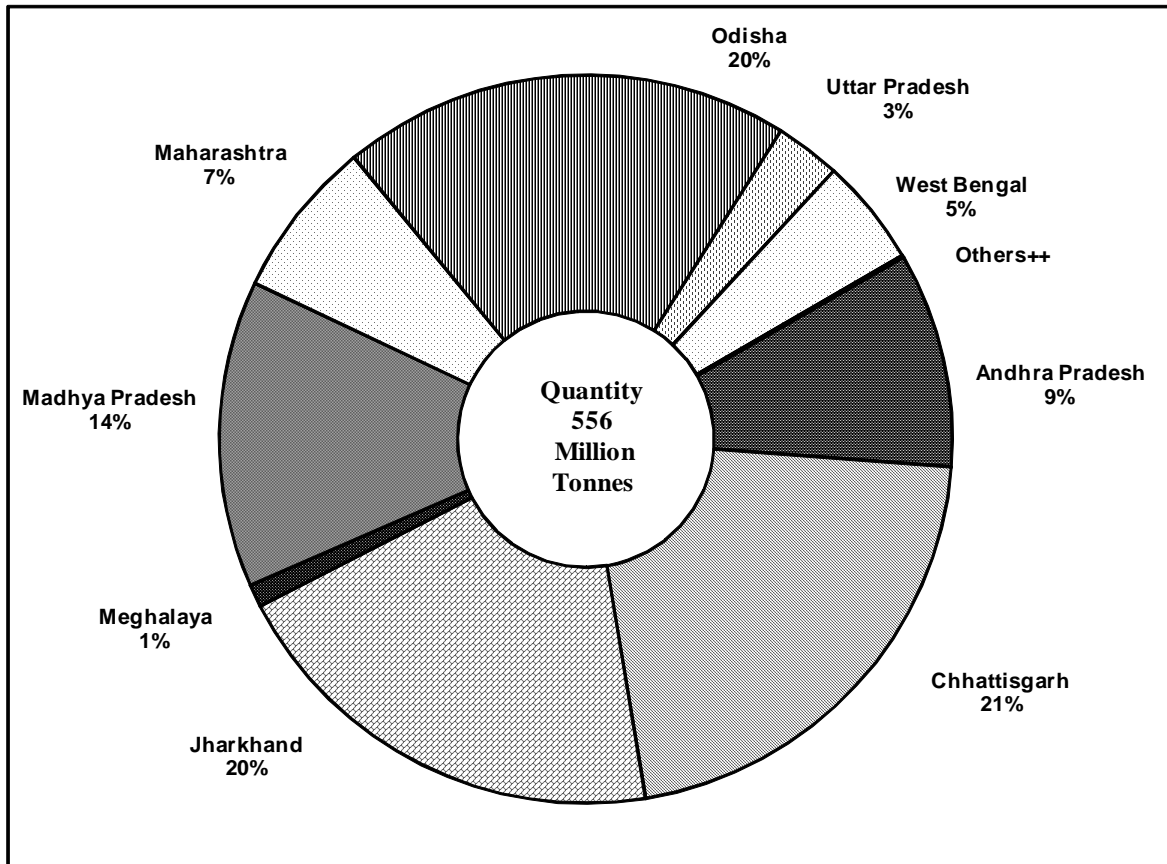
State	No. of Mines	
	2011-12	2012-13 #
India	559	559
Andhra Pradesh	50	50
Arunachal Pradesh	1	1
Assam	7	6
Chhattisgarh	61	60
Jammu & Kashmir	7	4
Jharkhand	172	176
Madhya Pradesh	71	71
Maharashtra	57	58
Meghalaya	1	0
Odisha	28	28
Uttar Pradesh	4	4
West Bengal	100	101

Relates to number of mines as on 31.03.2013.

COAL & LIGNITE



Quantity of Production of Coal in Different States in 2012-13



Value of Production of Coal in Different States in 2012-13

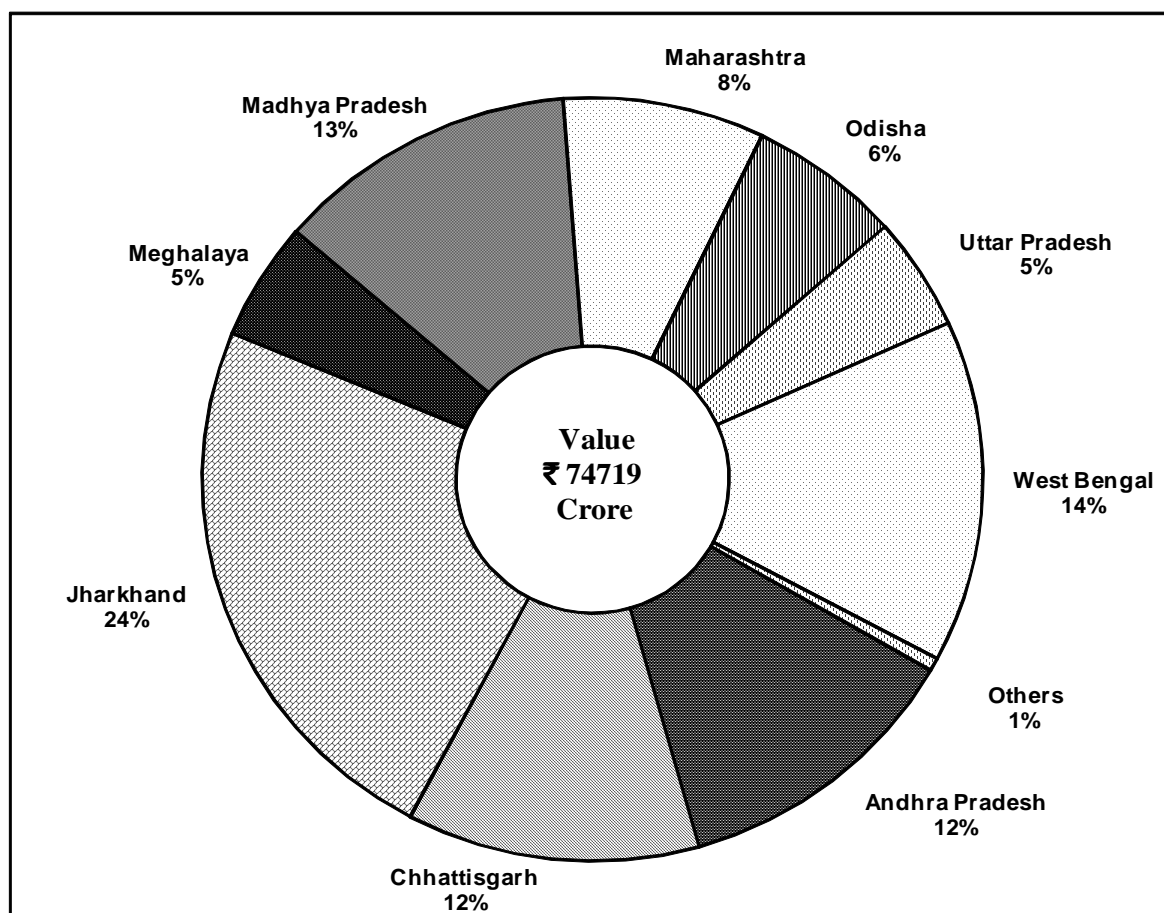


Table – 8 : Production of Coal, 2010-11 to 2012-13
(By Sectors/States)

(Quantity in '000 tonnes; Value in ₹'000)

State	2010-11		2011-12		2012-13(P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	532694	620210400	539950	701719100	556402	747186600
Public sector	485061	525347400	490755	594510600	509240	629747000
Private sector	47633	94863000	49195	107208500	47162	117439000
Andhra Pradesh	51333	81106100	52211	90008100	53190	91695800
Arunachal Pradesh	299	1106000	221	1464100	73	483600
Assam	1101	4072600	602	3988000	605	3591200
Chhattisgarh	113824	58256200	113958	70740300	117830	90750700
Jammu & Kashmir	24	22400	20	42500	19	40400
Jharkhand	108949	185716200	109566	139887600	111274	175665400
Madhya Pradesh	71104	93673600	71123	83305500	75948	93737900
Maharashtra	39336	53628800	39159	53112600	39134	62356800
Meghalaya	6974	25796800	7206	47739800	5640	37365000
Odisha	102565	73545300	105476	96399000	110132	47256800
Uttar Pradesh	15526	15122300	16178	34369500	16090	35844200
West Bengal	21659	28164100	24230	80662100	26467	108398800

Source: Coal Directory of India, 2012-13, Coal Controller's Organisation, Kolkata.

COAL & LIGNITE

**Table – 9 : Production of Coal, 2009-10 to 2010-11
(By Frequency Groups)**

Production group (tonnes)	No. of mines #		Production for the group (‘000 tonnes)#		Percentage in total production #		Cumulative percentage	
	2009-10 ^s	2010-11 ^s	2009-10	2010-11	2009-10	2010-11	2009-10	2010-11
All Groups	560	559	526276	525720	100.00	100.00	100	100
0-10000	48	51	54	24	0.01	0.01	0.01	0.01
10001-25000	19	25	356	459	0.07	0.09	0.08	0.10
25001-50000	46	47	1638	1777	0.31	0.34	0.39	0.44
50001-100000	74	71	5496	5209	1.04	0.99	1.43	1.43
100001-300000	157	144	30507	26845	5.80	5.11	7.23	6.54
300001-500000	57	68	22082	26402	4.20	5.02	11.43	11.56
500001-1000000	147	142	284968	290483	54.15	55.24	65.58	66.80
1000001 & above	12	11	181175	174521	34.42	33.20	100.00	100.00

Excluding Meghalaya. \$ Relates to mines as on 31.03.2011.

Source: Office of the Coal Controller's Organisation.

**Table – 10 : Production of Coal, 2011-12 & 2012-13
(By Grades and Sectors)**

(In '000 tonnes)

Grade	2011-12			2012-13(P)			
	Total	Pub. Sec.	Pvt. Sec.	Total	Pub. Sec.	Pvt. Sec.	
All Grades	539950	490755	49195	556402	509240	47162	
Coking	51660	44160	7500	51582	44274	7308	
ST-I	83	83	–	72	72	–	
ST-II	1135	1135	–	1370	1370	–	
W-I	246	246	–	260	260	–	
W-II	1815	1815	–	1711	1608	103	
W-III	13147	10619	2528	12346	10400	1946	
W-IV	35035	30063	4972	35656	30397	5259	
SC-I	199	199	–	167	167	–	
SLV1	–	–	–	–	–	–	
Non-coking	488290	446595	41695	504820	464966	39854	
A	14942	7736	7206	G1	5899	259	5640
B	59312	59309	3	G2	480	480	–
C	28918	21262	7656	G3	5622	5622	–
D	77109	69367	7742	G4	17619	17619	–
E	78257	72718	5539	G5	15162	15155	7
F	205194	199919	5275	G6	22708	16671	6037
G	13712	13154	558	G7	34842	34365	477
SLV2	–	–	–	G8	24189	20637	3552
Ungraded	10846	3130	7716	G9	66817	61659	5158
				G10	59118	58981	137
				G11	120369	116963	3406
				G12	36932	33443	3489
				G13	81090	79505	1585
				G14	3168	–	3168
				G15	3968	2213	1755
				G16	1630	–	1630
				G17	5207	1394	3813

Note: Meghalaya Coal has not been graded by Coal Controller. For statistical purpose, grade may be treated as 'A'/'B' non-coking coal.

COAL & LIGNITE

**Table – 11 (A) : Production of Coking Coal, 2011-12
(By States and Grades)**

(In '000 tonnes)

State	All-Grades	ST-I	ST-II	W-I	W-II	W-III	W-IV	SLV1	SC-I
India	51660	83	1135	246	1815	13147	35035	–	199
Chhattisgarh	189	–	–	–	–	–	–	–	189
Jharkhand	51108	49	1135	246	1496	13147	35035	–	–
Madhya Pradesh	319	–	–	–	319	–	–	–	–
West Bengal	44	34	–	–	–	–	–	–	10

Source: Coal Directory of India, 2012-13.

**Table – 11 (B) : Production of Coking Coal, 2012-13
(By States and Grades)**

(In '000 tonnes)

State	All-Grades	ST-I	ST-II	W-I	W-II	W-III	W-IV	SLV1	SC
India	51582	72	1370	260	1711	12346	35656	–	167
Chhattisgarh	157	–	–	–	–	–	–	–	157
Jharkhand	51065	52	1370	260	1381	12346	35656	–	–
Madhya Pradesh	330	–	–	–	330	–	–	–	–
West Bengal	30	20	–	–	–	–	–	–	10

Source: Coal Directory of India, 2012-13.

**Table – 12 (A) : Production of Non-coking Coal, 2011-12
(By States and Grades)**

(In '000 tonnes)

State	All-Grades*	A	B	C	D	E	F	G	Ungraded
India	488290	14942	59312	28918	77109	78257	205194	13712	10846
Andhra Pradesh	52211	34	616	–	6678	13191	15629	13154	2909
Arunachal Pradesh	221	–	–	–	–	–	–	–	221
Assam	602	602	–	–	–	–	–	–	–
Chhattisgarh	113769	1195	6725	5259	5019	8297	81493	555	5226
Jammu & Kashmir	20	–	–	–	–	20	–	–	–
Jharkhand	58458	353	332	9203	30621	6177	11705	–	67
Madhya Pradesh	70804	2491	7352	7317	23281	30363	–	–	–
Maharashtra	39159	2396	32494	1851	–	2349	–	3	66
Meghalaya	7206	7206	–	–	–	–	–	–	–
Odisha	105476	–	200	218	1863	8216	92622	–	2357
Uttar Pradesh	16178	–	–	–	7475	8703	–	–	–
West Bengal	24186	665	11593	5070	2172	941	3745	–	–

Source: Office of the Coal Controller's Organisation.

* The details of grades are given in Table-28 and at Page No. 30.

**Table – 12 (B) : Production of Non-coking Coal, 2012-13
(By States and Grades)**

(In '000 tonnes)

State	All-Grades*	Grades																
		G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17
India	504820	5899	480	5622	17619	15162	22708	34842	24189	66817	59118	120369	36932	81090	3168	3968	1630	5207
Andhra Pradesh	53190	-	34	-	-	686	-	7270	-	13102	172	15958	-	12522	-	2144	-	1302
Arunachal Pradesh	73	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	73
Assam	605	259	279	-	67	-	-	-	-	-	-	-	-	-	-	-	-	-
Chhattisgarh	117673	-	-	1742	2865	4537	2623	1100	1141	1365	9403	72079	11593	-	2454	1414	1630	3727
Jammu & Kashmir	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19
Jharkhand	60209	-	77	1291	676	3836	6970	1601	4810	20431	3080	17282	-	-	-	69	-	86
Madhya Pradesh	75618	-	-	1601	1711	2494	7218	21716	2870	1436	36295	277	-	-	-	-	-	-
Maharashtra	39134	-	-	-	-	284	890	1325	7168	29064	-	-	-	62	-	341	-	-
Meghalaya	5640	5640	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odisha	110132	-	-	-	-	118	-	35	229	1307	2240	11644	25339	68506	714	-	-	-
Uttar Pradesh	16090	-	-	-	-	158	122	-	7882	-	7928	-	-	-	-	-	-	-
West Bengal	26437	-	90	988	12300	3049	4885	1795	89	112	-	3129	-	-	-	-	-	-

* The details of grades are given in Table-28 and at Page No. 30.

COAL & LIGNITE

10-20

COAL & LIGNITE

**Table – 13 : Despatches of Coal
2011-12 & 2012-13
(By States)**

State	(In '000 tonnes)	
	2011-12	2012-13(P)
India	535299	567136
Andhra Pradesh	51389	52025
Arunachal Pradesh	322	55
Assam	800	618
Chhattisgarh	114610	121058
Jammu & Kashmir	23	14
Jharkhand	109792	119276
Madhya Pradesh	69560	60411
Maharashtra	38108	38316
Meghalaya	7206	5640
Odisha	104819	114213
Uttar Pradesh	15467	28824
West Bengal	23203	26686

Source: Office of the Coal Controller's Organisation .

**Table – 15 (A) : Mine-head Stocks of Coal
2011-12
(By States)**

State	(In '000 tonnes)	
	At the beginning of the year	At the end of the year
India	72192	74040
Andhra Pradesh	2413	3038
Arunachal Pradesh	104	4
Assam	293	95
Chhattisgarh	9731	8732
Jammu & Kashmir	4	3
Jharkhand	27128	24684
Madhya Pradesh	4391	6265
Maharashtra	3793	4841
Odisha	21611	22261
Uttar Pradesh	798	1509
West Bengal	1926	2608

**Table –14 : Despatches of Raw Coal
2011-12 & 2012-13
(By Priorities)**

Priority	(In '000 tonnes)	
	2011-12	2012-13 (P)
Total	535299	567136
Steel	15833	15988
Sponge Iron	15999	14971
Chemical	369	350
Electricity	401211	433621
Cement	12880	12813
Cokeries	221	157
Paper & pulp	2026	2118
Fertilizer	2821	2511
Textile & Rayons	258	304
Other Basic metal	240	568
Others	83441	83735

Note: Steel includes direct feed & coking washery for metallurgical use and steel (boilers); non-coking washery and bricks included in others.

**Table – 15 (B) : Mine-head Stocks of Coal,
2012-13
(By States)**

State	(In '000 tonnes)	
	At the beginning of the year	At the end of the year
India	74040	63049
Andhra Pradesh	3038	3020
Arunachal Pradesh	4	22
Assam	95	82
Chhattisgarh	8732	5639
Jammu & Kashmir	3	5
Jharkhand	24684	17796
Madhya Pradesh	6265	7318
Maharashtra	4841	5656
Odisha	22261	18175
Uttar Pradesh	1509	3224
West Bengal	2608	2112

COAL & LIGNITE

**Table – 16 : Production of Lignite, 2010-11 to 2012-13
(By Sector/States)**

(Quantity in '000 tonnes; Value in ₹'000)

	2010-11		2011-12		2012-13(P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	37733	43307200	42332	53376500	46453	55114100
Public sector	36780	42213416	41095	51816764	46156	54761725
Private sector	953	1093784	1237	1559736	297	352375
Gujarat	13064	13480300	14779	15249900	14528	14990900
Rajasthan	1525	1071600	2963	1161800	7081	2776600
Tamil Nadu	23144	28755300	24590	36964800	24844	37346600

**Table – 17 : Number of Lignite Mines
2011-12 & 2012-13
(By States)**

State	No. of Mines	
	2011-12	2012-13
India	14	16
Gujarat	7	7
Rajasthan	4	6
Tamil Nadu	3	3

**Table – 19 (B) : Mine-head Stocks of
Lignite, 2012-13
(By States)**

State	(In '000 tonnes)	
	At the beginning of the year	At the end of the year
India	1051	1493
Gujarat	462	320
Rajasthan	–	52
Tamil Nadu	589	1121

**Table – 18 : Despatches of Lignite
2011-12 & 2012-13
(By States)**

State	(In '000 tonnes)	
	2011-12	2012-13
India	41883	46313
Gujarat	14448	14670
Rajasthan	2963	7331
Tamil Nadu	24472	24312

Source: Coal Directory of India, 2012-13.

**Table – 19 (A) : Mine-head Stocks of
Lignite, 2011-12
(By States)**

State	(In '000 tonnes)	
	At the beginning of the year	At the end of the year
India	610	1051
Gujarat	139	462
Rajasthan	–	–
Tamil Nadu	471	589

Source: Coal Directory of India, 2012-13.

MINING & MARKETING

Coal

Coal mining in the country is carried out by both opencast and underground methods. Opencast mining contributes over 90% of total production whereas rest of the production (about 10%) comes from underground mining. Most mines are either semi-mechanised or mechanised. The machinery commonly deployed is drill machines, load-haul-dumper (LHD), ventilation fans, pumps for dewatering, haulage for transport, etc. In order to arrest the decline in production from a few underground mines, "mass production technology" by introducing 'continuous miner' is being practised. Modern roof-bolting technology with "flexibolts" up to 5 m length; 'smart bolting' for cost reduction of roof support; introduction of mechanised roof bolting using hydraulic bolts for difficult roof are new technology absorptions in Indian Underground Coal Mining. Mechanised Long wall mining (long wall powered support) has also been introduced in a limited scale which yields higher output with high percentage recovery (70-80%). In opencast mines, machinery like draglines, dozers, shovels, dumpers and graders are deployed for various operations.

COAL & LIGNITE

The latest policy pursued by CIL is to encourage technology upgradation through Global Tender. Global tender approach has been used towards introduction of high productivity with the use of Continuous Miners, at SECL and WCL.

There are eight coal producing companies in the public sector. Out of these, Eastern Coalfields Limited (ECL), Bharat Coking Coal Limited (BCCL), Central Coalfields Limited (CCL), Western Coalfields Limited (WCL), South-Eastern Coalfields Limited (SECL), Mahanadi Coalfields Limited (MCL), Northern Coalfields Limited (NCL) and North-Eastern Coalfields Limited (NEC) are subsidiary companies of Coal India Ltd (CIL), a Government of India undertaking. The Singareni Collieries Company Limited (SCCL) is a joint venture between Government of India and Government of Andhra Pradesh. CMPDI is a subsidiary of CIL which is engaged in surveying, planning and designing work with a view to optimise coal production.

BCCL is the major producer of prime-coking coal (raw and washed). Medium-coking coal is also produced in Mohuda and Barakar areas. In addition to production of hard coke and soft coke, BCCL operates a number of sand gathering plants, a network of aerial ropeways for transport of sand and nine coal washeries, namely, Dugda-I, Dugda-II, Bhojudih, Patherdih, Mahuda, Sudamdih, Barora, Moonidih and Madhuband.

CCL operates mines in Bokaro, Ramgarh, Giridih and North & South Karanpura Coalfields in Jharkhand and four coal washeries, namely, Kathara, Swang, Rajrappa and Kedla. Its products included medium-coking coal (raw and washed), non-coking coal, soft coke and hard coke.

WCL operates coal mines located in Pench, Kanhan and Patharkheda Coalfields in Madhya Pradesh and Wardha Valley & Kamthi Coalfields in Maharashtra. This company largely meets the requirements of industries and power stations in the western region of the country.

ECL covers Raniganj Coalfields in West Bengal and Mugma & Rajmahal Coalfields in Bihar. It produces and supplies coal to the local and other industries which require relatively higher grades of coal.

The coalfields of Chhattisgarh, viz, Korba (East & West), Baikunthpur, Chirimiri, Hasdeo,

Sohagpur, Jamuna-Kotma and Johilia are under SECL. This subsidiary continued to be the leading producer of CIL.

NEC is responsible for development and production of coal in the North-Eastern States. The present mining activities are confined to Arunachal Pradesh, Assam and Meghalaya. The area has large proven reserves of low ash, high calorific value coal but because of its high sulphur content, it cannot be used directly as metallurgical coal.

SCCL operates coal mines in Andhra Pradesh producing non-coking coal. The coal requirements of consumers in south are mostly met by this company.

MCL had been incorporated as another subsidiary company of CIL. Its area of jurisdiction comprises Talcher and Ib Valley Coalfields of Odisha.

NCL covers the entire Singrauli Coalfields situated in Madhya Pradesh and Uttar Pradesh.

Jharkhand State Mineral Development Corporation Ltd (JSMDC) and Jammu & Kashmir Minerals Ltd (JKML) are the State Government undertakings and Damodar Valley Corporation (DVC) is the Central Public Sector undertaking are engaged in coal mining. IISCO steel plant of SAIL is the only public sector steel unit operating captive mines for coal. Bengal Emta Coal Mines Ltd (BECML), Jindal Steel & Power Ltd (JSPL), Hindalco and Tata Steel are the companies, operating captive mines in the private sector.

As on 31.3.2013, there were 559 operating mines for coal in the country, out of which 215 were opencast while 320 were underground mines. The remaining 24 were mixed collieries. There were 530 public sector mines and 29 mines in private sector (Table-20). Thrust is now given to further increase production from opencast mines where the gestation period is comparatively shorter. In 2012-13, the share of production of raw coal from opencast mines was 504.19 million tonnes (90.6%) against 52.21 million tonnes (9.4%) from underground mines (Table-21). Production of coal by different mining technologies employed is furnished in Table-22. The overall Output per Man Shift (OMS) for CIL in 2012-13 was 5.32 tonnes as against 4.92 tonnes in 2011-12.

COAL & LIGNITE

**Table – 20 : Number* of Coal Mines, 2012-13
(By Sectors/States)**

State	No. of collieries			
	OC	UG	Mixed	Total
All India	215	320	24	559
Public sector	193	313	24	530
Private sector	22	7	–	29
Andhra Pradesh	15	35	–	50
Arunachal Pradesh	1	–	–	1
Assam	3	3	–	6
Chhattisgarh	22	37	1	60
Jammu & Kashmir	–	4	–	4
Jharkhand	76	79	21	176
Madhya Pradesh	22	48	1	71
Maharashtra	35	23	–	58
Meghalaya	–	–	–	–
Odisha	17	11	–	28
Uttar Pradesh	4	–	–	4
West Bengal	20	80	1	101

Source: Coal Directory of India, 2012-13, Coal Controller's Organisation, Kolkata.

* As on 31.3.2012

Note: OC - Opencast UG - Underground.

Table – 21 : Production of Raw Coal

(In million tonnes)

Year	Production from opencast mines (% share)	Production from underground mines (% share)	Total production
2010-11	477.839 (89.7%)	54.855 (10.3%)	532.694
2011-12	487.993 (90.4%)	51.957 (9.6%)	539.950
2012-13	504.195 (90.6%)	52.207 (9.4%)	556.402

Source: Coal Directory of India, 2012-13 Coal Controller's Organisation, Kolkata.

**Table – 22 : Production of Coal, 2012-13
(By Technologies)**

(In million tonnes)

Technology adopted	Production	Percentage of total
All India : Total	556.402	100
Opencast (Total)	504.195	90.62
Mechanised	503.784	99.92
Manual	0.411	0.08
Underground (Total)	52.207	9.38
Conventional B&P	4.023	7.70
Mechanised B&P	42.119	80.68
Conventional LW	0.097	0.18
Mechanised LW	0.603	1.16
Other methods	5.365	10.28

Source: Coal Directory of India, 2012-13, Coal Controller's Organisation, Kolkata.

Note: B&P - Board-and-pillar; LW - Longwall.

As coking coal was deregulated with effect from 1.4.1996, distribution is done by CIL/coal companies. The Government of India has amended provisions of Colliery Control Order 1945 and Colliery Control Order 2000 has been notified, according to which, the price & distribution of all grades of coal with effect from 1.1.2000 have been de-regulated.

Coal movements by coastal shipment to southern and western regions through Haldia, Paradip and Vizag ports continued the same way. Major portion of the despatches was achieved through railways, followed by roads, Merry-Go-Round System, belt conveyor, ropeways and sea route.

Lignite

Out of the sixteen opencast working mines, four are owned by Neyveli Lignite Corporation (NLC), five by Gujarat Mineral Development Corporation Ltd (GMDCL), three by Rajasthan State Mines & Minerals Limited (RSMML), and one mine each by Gujarat Industries Power Co. Ltd (GIPCL), Gujarat Heavy Chemicals Ltd (GHCL), Barmer Lignite Mining Company Limited (BLMCL) & V S Lignite Power Pvt. Ltd (VSLPPL). Sectorwise, fifteen mines are under public sector and the remaining one is under private sector i.e. GHCL. NLC reported maximum production during the period under review. The present

installed capacity of all NLC mines stands at 30.6 MTPA (viz. mine-I (10.5 MTPA+mine-IA in 3.0 MTPA+mine-II in 15.0 MTPA+Barsingar in 2.1 MTPA) as on 31.3.2013 and the production of lignite for all mines was 262.23 lakh tonnes during 2012-13 which increased by 6.64% from 245.90 lakh tonnes in the previous year. The NLC's mines are highly mechanised. The present installed capacity of Thermal Power Plants is 2740 MW (viz. TPS-I in 600 MW+TPS expansion in 420 MW+TPS-II in 1470 MW+Barsingar in 250 MW). Capacity increase of Mine-II from 10.5 million tpy to 15 million tpy with the installation of 2x250 MW units has been approved by the Ministry of Coal. The new Barsingar Thermal-cum-Mine Project of NLC in Bikaner district in Rajasthan will have 2.1 million tpy lignite capacity to feed the 2x125 MW thermal project. Electric-powered equipment like bucket-wheel excavators, fabric & steel cord belt conveyors, tippers and spreaders are used in NLC's opencast mines for excavation, transportation and refilling of overburden. The Neyveli Lignite Mine is the largest opencast mine in the country with eco-friendly technology. Hydraulic shovels & dumpers are used only for auxiliary works. Mobile Transfer Conveyor (MTC) of capacity 4420 cu m/ha, stacker of 4000 t/ha capacity and reclaimer of 2000 t/ha capacity are also deployed.

Policy–Captive Coal and Lignite Block Allocation

Under the Coal Mines (Nationalisation) Act, 1973, coal mining was originally reserved for the public sector exclusively. The said Act was amended from time to time to allow: (a) captive mining by private companies engaged in production of iron and steel and sub-lease for coal mining to private parties in isolated small pockets not amenable to economic development and not requiring rail transport (amended in 1976); (b) private sector participation in coal mining as linkage for power generation, for washing of coal obtained from a mine or for other end-uses to be notified by Government from time to time (amended on 9.6.1993), in addition to existing provision for the production of iron and steel; (c) mining of coal for production of cement (amended on 15.3.1996) and (d) mining of coal for production of syn-gas obtained through coal gasification (underground and surface) and coal liquefaction (amended on 12.7.2007).

A Government Company (including a State Government company), a Corporation owned, managed and controlled by the Central Government, can undertake coal mining without the restriction of captive use.

The allocation of coal blocks to private parties is done through the mechanism of an Inter-Ministerial and Inter-Governmental body called Screening Committee.

As regards allocation of small and isolated blocks are concerned, a new policy is being formulated in consultation with the Ministry of Law and Justice and the stakeholders for allocation of such blocks.

There has been an exponential rise in the demand for coal. With progressive allocation of coal blocks, the number of coal blocks available for allocation has considerably declined while the number of applicants per block is on the rise. The processes adopted, therefore, for judicious selection of applicants in respect of coal blocks encountered inadequacies and have become vulnerable to criticism on the ground of lack of transparency and objectivity.

While efforts are on to continuously add blocks to the captive list, it is also expected that the demand for blocks would remain far ahead of supply. Therefore, there is an urgent need to bring in a process of selection that is not only objective but also demonstrably transparent. Auctioning through competitive bidding is one such acceptable selection process.

With a view to bringing in more transparency, the Mines and Minerals (Development and Regulation) Amendment Act, 2010 for introduction of competitive bidding system for allocation of coal blocks for captive use, has been passed by the both Houses of Parliament and it has been notified in Gazette of India (Extraordinary) on 9th September, 2010. The Amendment Act seeks to provide for grant of reconnaissance permit, prospecting licence or mining lease in respect of an area containing coal and lignite through auction by competitive bidding, on such terms and conditions as may be prescribed. This, would however, not be applicable in the following cases: where such area is considered for allocation to a Government company or corporation for mining or such other specified end use; where such area is considered for allocation to a company or corporation that has been awarded a power project

on the basis of competitive bids for tariff (including Ultra Mega Power Projects).

The Government has finalised rules for allocation of blocks through competitive bidding and the same have been notified on 2.2.2012. The commencement of the Amendment Act has been notified on 13.2.2012.

At present, captive coal blocks are only allotted to different companies in power, iron & steel, Government commercial, private commercial & cement and coal to oil sectors. Till 31.3.2013, a total of 178 coal blocks with 40,255.20 million tonnes geological reserves have been allotted in various states (Table - 23). Of which, 79 blocks with 21,199.80 million tonnes are under public sector and the remaining 99 blocks with 19,055.40 million tonnes are under private sector. Of these, 82 blocks (24,855.40 million tonnes) are allocated for power, 55 blocks (6,499.80 million tonnes) for iron & steel, and 41 block (8,900 million tonnes) for commercial mining, cement and coal to oil. Similarly, 27 captive lignite blocks with 1,996.8 million tonnes geological reserves have been allocated in Gujarat (12) and Rajasthan (15) till 31.3.2013. In Gujarat, 5 blocks (701.70 million tonnes) are allocated for power generation and 7 blocks (343.60 million tonnes) for commercial end use. In Rajasthan, the allocation of 10 blocks (654.50 million tonnes) is for power and 5 blocks (297.10 million tonnes) for commercial end use.

**Table – 23 : Allotment of Captive Coal Blocks
(Till 31.3.2013)
(Statewise)**

(In million tonnes)

State	No. of Coal Blocks	Geological Reserves
Total	178	40255.2
Arunachal Pradesh	1	27.0
Andhra Pradesh	1	61.3
Chhattisgarh	39	8726.1
Jharkhand	48	11860.5
Madhya Pradesh	23	3068.2
Maharashtra	20	859.3
Odisha	28	12088.0
West Bengal	18	3564.8

Source: Coal Directory of India, 2012-13 Coal Controller's Organisation, Kolkata. (except totals).

Coal Bed Methane (CBM) and Underground Coal Gasification (UCG)

As per the Govt. of India, CBM Policy 1997, the consortium of CIL and ONGC has been allotted 2 blocks—one each in Raniganj and Jharia coalfield for development of Coal Bed Methane. So far, 26 CBM blocks have been allotted to various operations for exploration and exploitation of CBM. Ten more blocks were offered in the 4th round of bidding concluded in October, 2009.

Under the guidelines for conducting underground coal gasification and allocation of blocks issued on 13.7.2009, five lignite blocks and two coal blocks have been identified for allocation.

FOREIGN COLLABORATION

To meet the country's growing demand for coal, Coal India Limited (CIL) has expressed intent for foreign collaboration with the following objectives:

(a) bringing in proven technologies and advanced management skills for running underground (UG) and opencast (OC) mines and in coal preparation for efficient management of the Indian Coal Industry and development of necessary skills by way of appropriate training, etc.;

(b) exploration and exploitation of coal bed methane and in situ gasification of coal;

(c) locating overseas companies, interested in joint ventures for overseas operations, in the field of coal mining with special thrust on coking coal mining; and

(d) exploring financial assistance for import of equipment and other investment needs for coal industry.

To fulfil these objectives, a Joint Working Group on coal had been set up with a number of countries, such as, UK, France, Russia, USA, Poland, Germany, Australia and China. The priority areas, inter alia, include acquiring modern technology for mass production through underground and opencast mining, innovative methodology for underground mining in difficult geological conditions including steep seams, fire and subsidence control, mines safety, coal preparation, use of washery rejects for power generation, exploitation of coal bed methane from working mines & abandoned mines, coal gasification, application of geographical information system (GIS), environmental mitigation & emission trading, overseas ventures for sourcing coking coal, etc. Training of CIL personnel for effective

COAL & LIGNITE

adaptation of the state-of-the-art technologies, available with the developed countries, is also a prime subject of focus.

COAL WASHERIES

Presently, 19 coal washeries (15 in Public Sector and 4 in Private Sector) with 32.80 million tonnes per annum capacity produced about 6.54 million tonnes of coking coal in 2012-13. Production of washed coking coal during 2012-13 was about 3.16 million tonnes in Public Sector and 3.38 million tonnes in Private Sector. In Public Sector, BCCL operates 9 coking coal washeries (Dugda II, Bhojudih, Patherdih, Sudamdih, Barora, Moonidih, Mahuda, Madhuban and Dugda-I), CCL operates 4 washeries (Kathara, Swang, Rajrappa and Kedla), WCL one (Nandan) and SAIL one (Chasnala) whereas 4 washeries (West Bokaro-II, West Bokaro-III, Jamadoba and Bhelatand) are operated by Tata Steel Ltd, in Private Sector. Similarly, 38 coal washeries with 107.40 million tonnes per annum capacity produced about 32.37 million tonnes non-coking coal during the year. Of these, 11.28 million tonnes have been under Public Sector and 21.09 million tonnes under Private Sector. In Public Sector, 7 non-coking coal washeries (three each in BCCL & CCL and one in NCL) were operational, whereas in Private Sector, 31 non-coking coal washeries were in operation.

By and large, ash content in raw coal used by washeries varied between 24 and 33%. The ash content in the washed coal and middlings produced by washeries ranged from 19 to 22% and 35 to 40%, respectively. The rejects in most washeries contained over 50% ash. The capacity and production of washed coking/non-coking coal is shown in Tables - 24 to 27, respectively.

Table – 24 : Production of Washed Coking Coal, 2011-12 & 2012-13 (Sectorwise/Companywise)

	(In '000 tonnes)	
	2011-12	2012-13
All India : Total	6444	6541
Public Sector	3230	3160
BCCL	1421	1329
CCL	1334	1239
WCL	137	144
SAIL	338	448
Private Sector	3214	3381
Tata Steel Ltd	3214	3381

Source: Coal Directory of India, 2012-13, Coal Controller's Organisation, Kolkata.

Table – 25 : Capacity of Washed Coking Coal 2012-13 (Sectorwise/Companywise)

Coalfield/Washery	State	Raw Coal Capacity (In '000 tpy)
Grand Total		32800
Public Sector Total		27140
BCCL		14550
Dugda-I	Jharkhand	2500
Dugda-II	-do-	2000
Bhojudih	-do-	1700
Patherdih	-do-	1600
Sudamdih	-do-	1600
Barora	-do-	420
Moonidih	-do-	1600
Mahuda	-do-	630
Madhuban	-do-	2500
CCL		9350
Kathara	Jharkhand	3000
Swang	-do-	750
Rajrappa	-do-	3000
Kedla	-do-	2600
WCL		1200
Nandan	Madhya Pradesh (Pench-Kanhan)	1200
SAIL		2040
Chasnala	Jharkhand	2040
Private Sector	Total	5660
Tata Steel Ltd		5660
West Bokaro-II	Jharkhand	1800
West Bokaro-III	-do-	2100
Jamadoba	-do-	900
Bhelatand	-do-	860

Source: Coal Directory of India, 2012-13, Coal Controller's Organisation, Kolkata (except totals)..

COAL & LIGNITE

**Table – 26 : Production of Washed Non-coking Coal : 2011-12 & 2012-13
(Sectorwise/Companywise)**

(In '000 tonnes)		
Sector/Company	2011-12	2012-13
All India : Total	31406.50	32372.05
Public Sector	12357.00	11282.00
BCCL	138.00	108.00
CCL	8555.00	7217.00
NCL	3664.00	3957.00
Private Sector	19049.50	21090.05
BLA Ind. Ltd	277.80	283.79
Aryan Coal Beneficiation Pvt. Ltd	14934.70	13609.29
Aryan Energy Pvt. Ltd	19.90	264.78
Global Coal & Mining Pvt. Ltd	2743.30	2954.56
Kartikey Coal Washeries Pvt. Ltd	344.10	123.07
Earth Minerals Co. Ltd	580.50	223.06
Sarda Energy & Mineral	149.20	287.41
Jindal Steel & Power Ltd	-	740.07
Tata Steel Ltd	-	1801.59
Tata Bhelatand	-	354.62
IISCO	-	447.81

Source: Coal Directory of India, 2012-13, Coal Controller's Organisation, Kolkata.

**Table – 27 : Capacity of Washed Non-coking Coal, 2012-13
(Sectorwise/Companywise)**

Washery/Location	Coalfield	State	Raw Coal Capacity (In '000 tpy)
Grand Total			107400
Public Sector Total			20200
BCCL			
Jharia Coalfield, Jharkhand			3980
Dugda-I	Jharia	Jharkhand	1000
Lodna	Jharia	Jharkhand	480
Madhuban	Jharia	Jharkhand	2500
CCL			
East Bokaro Coalfield, Jharkhand			11720
Gidi	East Bokaro	Jharkhand	2500
Piparwar	N. Karanpura	Jharkhand	6500
Kargali	S. Karanpura	Jharkhand	2720
NCL			4500
Bina Deshelling Plant	Bina	Uttar Pradesh	4500
Private Sector Total			87200
Jindal Steel & Power Ltd			6000
Pit Head Washery (JSPL)	Mand Raigarh	Chhattisgarh	6000

(Contd.)

COAL & LIGNITE

Table - 27 (Concl'd.)

Washery/Location	Coalfield	State	Raw Coal Capacity (In '000 tpy)
BLA Industries Pvt. Ltd			330
BLA Washery	Dharmasthal	Madhya Pradesh	330
Aryan Coal Beneficiation Pvt. Ltd			24960
Chakabuwa	Korba	Chhattisgarh	4000
Dipka	Korba	Chhattisgarh	12000
Pander Pauni	Ballarpur	Maharashtra	3000
Gevra	Korba	Chhattisgarh	5000
Binjhri	Korba	Chhattisgarh	960
Aryan Energy Pvt. Ltd			2600
Indaram	Ramagundam	Andhra Pradesh	600
Talcher	Talcher	Odisha	2000
Bhatia International Ltd			7730
Wani	Wardha	Maharashtra	3730
Ghugus	Wardha	Maharashtra	4000
Global Coal & Mining Pvt. Ltd			7500
Ib Valley	Ib Valley	Odisha	4000
Ramagundam	Ramagundam	Andhra Pradesh	1000
Talcher	Talcher	Odisha	2500
Gupta Coal field & Washeries Ltd			13920
Sasti	Wardha	Maharashtra	2400
Ramagundam	Ramagundam	Andhra Pradesh	2400
Ghugus	Wardha	Maharashtra	2400
Gondegaon	Kamptee	Maharashtra	2400
Majri	Wardha	Maharashtra	2400
Wani	Wardha	Maharashtra	1920
Kartikay Coal Washeries Pvt. Ltd			2500
Wani	Wardha	Maharashtra	2500
Spectrum Coal & Power Ltd (ST-CLI)			5200
Korba	Korba	Chhattisgarh	5200
Indo Unique Flames Ltd			5400
Nagpur	Wardha	Maharashtra	600
Punwat	Wardha	Maharashtra	2400
Wani	Wardha	Maharashtra	2400
Earth Minerals Company Ltd			4000
Talcher	Jharsuguda	Odisha	4000
Sarda Energy & Mineral Division			960
Karwahi Coal Washery Divn.	Raigarh	Chhattisgarh	960
Tata Steel Ltd.			3900
Washery No. 2	W. Bokaro	Jharkhand	1800
Washery No. 3	W. Bokaro	Jharkhand	2100
Tata Bhelatand			800
Bhetaland	W. Bokaro	Jharkhand	800
IISCO			1400
Chasnalla	Dhanbad	Jharkhand	1400

Source: Coal Directory of India, 2012-13, Coal Controller's Organisation, Kolkata.

CLASSIFICATION AND GRADES

Indian coal is classified into two main categories, namely, coking and non-coking. Coking coal is a type of coal from which, on carbonisation, coke suitable for use in metallurgical industries, particularly in iron and steel industries, can be produced. Parameters determining coking property of coal are coking index, volatile matter (VM %), vitrinite %, crucible swell no., fluidity, reflectance, etc. Although for commercial gradation, ash percentage is the sole criterion, for semi-weakly-coking coal, along with ash percentage, moisture percentage too is considered as an added criterion. For non-coking

coal, an empirical formula is used to determine Useful Heat Value (UHV) of coal in kcal/kg.

The classification of coal as per the Ministry of Coal is reflected in Table - 28. Grading and pricing of thermal coal from the existing Useful Heat Value (UHV) system to the international practice of Gross Calorific Value (GCV) system is under consideration of Ministry of Coal. A Pilot Study on migration from UHV to GCV-based gradation of coal has been completed by CFRI. The draft report is being overviewed by a Committee comprising members from Ministry of Coal, CEA, NTPC, CIL and CFRI.

Table – 28 : Classification of Coal

Sl. No	Class	Grade	Grade/Specification
1.	Non-coking coal produced in all states other than Assam, Arunachal Pradesh, Meghalaya and Nagaland	A	Useful Heat Value exceeding 6200 kcal per kg.
		B	Useful Heat Value exceeding 5600 kcal per kg but not exceeding 6200 kcal per kg.
		C	Useful Heat Value exceeding 4940 kcal per kg but not exceeding 5600 kcal per kg.
		D	Useful Heat Value exceeding 4200 kcal per kg but not exceeding 4940 kcal per kg.
		E	Useful Heat Value exceeding 3360 kcal per kg but not exceeding 4200 kcal per kg.
		F	Useful Heat Value exceeding 2400 kcal per kg but not exceeding 3360 kcal per kg.
		G	Useful Heat Value exceeding 1300 kcal per kg but not exceeding 2400 kcal per kg.
2.	Non-coking coal produced in Arunachal Pradesh, Assam, Meghalaya and Nagaland	A	Useful Heat Value between 6200 and 6299 kcal per kg and corresponding ash plus moisture content between 18.85 and 19.57%.
		B	Useful Heat Value between 5600 and 6199 kcal per kg and corresponding ash plus moisture content between 19.58 and 23.91%
3.	Coking coal	Steel Grade I	Ash content not exceeding 15%.
		Steel Grade II	Ash content exceeding 15% but not exceeding 18%.
		Washery Grade I	Ash content exceeding 18% but not exceeding 21% .
		Washery Grade II	Ash content exceeding 21% but not exceeding 24%.
		Washery Grade III	Ash content exceeding 24% but not exceeding 28%.
4.	Semi-coking and weakly-coking coal	Semi-coking Grade I	Ash plus moisture content not exceeding 19%.
		Semi-coking Grade II	Ash plus moisture content exceeding 19% but not exceeding 24%.
5.	Hard coke	By-product Premium	Ash content not exceeding 25%.
		By-product Ordinary	Ash content exceeding 25% but not exceeding 30%.
		Beehive Premium	Ash content not exceeding 27%.
		Beehive Superior	Ash content exceeding 27% but not exceeding 31%.
		Beehive Ordinary	Ash content exceeding 31% but not exceeding 36%.

COAL & LIGNITE

In order to adopt the best international practices, India decided to switch over from the grading based on Useful Heat Value (UHV) to the grading based on Gross Calorific Value (GCV); and, therefore, on 16.01.2011 the Ministry of Coal notified the switch over. As per the new system, the following nomenclature has been introduced for gradation of non-coking coal:

Grades	GCV Range (kcal/kg)
G1	GCV exceeding 7000
G2	GCV exceeding 6701 and 7000
G3	GCV exceeding 6401 and 6700
G4	GCV exceeding 6101 and 6400
G5	GCV exceeding 5801 and 6100
G6	GCV exceeding 5501 and 5800
G7	GCV exceeding 5201 and 5500
G8	GCV exceeding 4901 and 5200
G9	GCV exceeding 4601 and 4900
G10	GCV exceeding 4301 and 4600
G11	GCV exceeding 4001 and 4300
G12	GCV exceeding 3701 and 4000
G13	GCV exceeding 3401 and 3700
G14	GCV exceeding 3101 and 3400
G15	GCV exceeding 2801 and 3100
G16	GCV exceeding 2501 and 2800
G17	GCV exceeding 2201 and 2500

Source: Coal Directory 2012-13, Coal Controller's Organisation Kolkata.

Based on the GCV ranges of proposed gradation and erstwhile gradation, a Concordance Table has been generated for better understanding. However, it may be noted that this concordance does not depict exact one-to-one relation between the two systems.

Concordance Table

Old grading based on UHV	New grading based on GCV
A	G1, G2, G3
B	G4, G5
C	G6
D	G7, G8
E	G9, G10
F	G11, G12
G	G13, G14
Non-coking coal Un-graded	G15, G16, G17

Source: Coal Directory 2012-13, Coal Controller's Organisation, Kolkata.

CONSUMPTION

Thermal power plants, iron & steel, sponge iron and cement continued to be the major consuming industries for coal in India. Sizeable quantities are also consumed by the railways, collieries and as a domestic fuel. Data regarding consumption in these sectors are not available. However, industrywise despatches of coal are depicted in Table - 29.

**Table – 29 : Despatches* of Coal
2010-11 to 2012-13
(By Industries)**

Industry	(In million tonnes)		
	2010-11	2011-12	2012-13(P)
Total	523.46	535.30	567.14
Iron & steel ¹	18.63	15.84	15.99
Sponge iron	17.02	16.00	14.97
Fertilizer	2.94	2.82	2.51
Cement	14.18	12.88	12.81
Electricity	382.20	401.21	433.62
Others (Chemical, base metals, paper & pulp, textile & rayon, bricks, etc.)	88.49	86.55	87.24

Source: Coal Directory, 2010-11, 2011-12 and 2012-13.

* Data on consumption is not available.

¹ Includes direct feed, cokeries and boilers.

COAL & LIGNITE

DEMAND & SUPPLY

XIIth Plan Demand Projections

(In million tonnes)

Sl. No.	Sector	2016-17
1.	Steel & Coke Oven	67.20
2.	Power (Utility)	682.08
3.	Power (Captive)	56.36
4.	Cement	47.31
5.	Sponge Iron	50.33
6.	Others	77.22
Total		980.50

XII Plan Supply Projections

(In million tonnes)

Source	2016-17
CIL	556.40
SCCL	57.00
Others	101.60
Total Indigenous Supply	715.00
Import Coking	35.50
Non-coking	230.00
Total Imports	265.50

Source : Report of the Working Group for Coal & Lignite for XIIth Plan.

WORLD REVIEW

World proved coal reserves were estimated at 891.53 billion tonnes at the end of 2013 of which, 403.20 billion tonnes (45%) is classified as anthracite & bituminous coal and 488.33 billion tonnes (55%) as sub-bituminous coal & lignite (Table - 30). World production of coal and lignite increased from about 7.69 billion tonnes in 2011 to 7.92 billion tonnes in 2012. China continued to be the largest producer of coal and lignite in 2012 with about 46% share in total world production, followed by USA (12%), India (8%), Australia (6%), Indonesia (5%), Russia (4%) and South Africa (3%). The remaining 16% of the total world coal production was from other producing countries (Table - 31). Global primary energy consumption fell by 1.1% over that of the preceding year. Asia Pacific and the Middle East has increased coal consumption during the year under review.

Table – 30 : World Proved Coal Reserves at the end of 2013 (By Principal Countries)

(In million tonnes)

Country	Anthracite and bituminous coal	Sub-bituminous coal and lignite	Total
World : Total	403199	488332	891531
Australia	37100	39300	76400
Brazil	-	6630	6630
Canada	3474	3108	6582
China	62200	52300	114500
Colombia	6746	-	6746
Germany	48	40500	40548
India*	56100	4500	60600
Indonesia	-	28017	28017
Kazakhstan	21500	12100	33600
Poland	4178	1287	5465
Russian Federation	49088	107922	157010
South Africa	30156	-	30156
Turkey	322	8380	8702
Ukraine	15351	18522	33873
USA	108501	128794	237295
Other countries	8435	36972	45407

Source: BP Statistical Review of World Energy, June 2014.

* India's reserves of coal as on 1.4.2013 are estimated at about 298.91 billion tonnes to a depth of 1,200 m and those of lignite at about 43.22 billion tonnes.

Table – 31 : World Production of Coal and Lignite (By Principal Countries)

(In million tonnes)

Country	2010	2011	2012
World : Total	7250	7691	7924
Australia			
Bituminous coal	357	350	380
Brown coal	69	67	67 ^e
Bosnia & Herzegovina			
Brown coal & lignite	11	13	12
Bulgaria			
Brown Coal & lignite	29	37	34
Canada			
Bituminous & Sub-bituminous	58	57	57
Lignite	10	10	9
China			
Hard coal	3235	3520	3660
Colombia			
Hard coal	74	86	89
Czech. Rep.			
Bituminous coal	11	11	11
Brown Coal	44	47	44
Germany			
Hard coal	14	13	11
Brown coal	169	177	185

(Contd.)

COAL & LIGNITE

Table-31 (Concl.d.)

Country	2010	2011	2012
Greece			
Lignite	54	58	62
India *			
Hard coal	533	540	557
Lignite	38	43	46
Indonesia			
Hard coal	275	353	380 ^e
Kazakhstan			
Hard coal	104	108	113
Lignite	7	8	8
Korea, Dem. People's Rep. of			
Coal all form	41	41	41
Mongolia			
Brown coal & lignite	25	32	28
Mexico			
Bituminous coal	16	21	16
Poland			
Hard coal	77	76	80
Lignite	57	63	64
Romania			
Hard Coal	-	2	2
Brown Coal & lignite	29	34	31
Russia			
Hard coal	317	334	354
Serbia			
Lignite	38	40	38
South Africa			
Hard coal	257	253	258
Thailand			
Lignite	18	21	19
Turkey			
Hard coal	6	6	6 ^e
Lignite & Bituminous	87	83	83 ^e
Ukraine			
Hard coal	55	63	65
United Kingdom			
Bituminous coal	18	19	17
USA			
Hard coal	913	897	891 ^e
Lignite	71	73	73 ^e
Vietnam			
Anthracite	45	47	42
Other Countries	88	88	91

Source: World Mineral Production, 2008-2012.

Hard coal – Including anthracite, bituminous & sub-bituminous coal.

* India's production of coal and lignite during 2012-13 were 556.40 million tonnes and 46.45 million tonnes, respectively.

As estimated by the 'World Coal Association', coal provides around 30% of global primary energy needs and generates about 41% of the world's electricity and this proportion is expected to remain static for the next 30 years. About 70% of the world's steel production is based on coal. Without targeted global action, the International Energy Agency (IEA) estimates that in 2035 there will still be one billion people without access to electricity and 2.7 billion without access to clean cooking fuels. The World Coal Institute in its report "Coal Meeting the Climate Challenge: Technology to reduce Greenhouse Gas Emission" released in 2007, outlined two primary ways of reducing CO₂ emission from coal use. The first is by carbon capture and storage (CCS) which can reduce 80-90% CO₂ emission into atmosphere and second is storing CO₂ in geological formations. CCS is now acknowledged as the only technology that can significantly reduce emissions from fossil fuel power stations and other industrial plants. International Energy Agency has emphasised need to install CCS on coal-fired plants by 2030. With the widespread deployment of CCS, fossil fuels will become an important part of solution rather than part of the problem.

Australia

Australia is the world's fourth largest producer and world's leading exporter of coal. Queensland and New South Wales were Australia's leading coal producing States and accounted for more than 95% of the country's total output. New South Wales and Queensland are its major coal exporting State, however, to sustain export growth, the country's infrastructure would require significant expansion and upgrading so that minerals for export could be transported from inland to port terminals. A carbon tax and mineral resource rent tax would not affect Australian mineral investment significantly. Australia is expected to remain a major mineral and fuel exporting country. The infrastructure bottlenecks held back Australia's mineral exports, especially coal, while a number of new infrastructure projects were underway. One additional 90 million tonnes per year of new coal terminal port capacity has been scheduled for 2014. Domestic coal consumption was about 70 Mt, of which the power sector accounted for about 85% of total domestic consumption, followed by steel, 6.7%; cement, 1.3%; and others, 7%. Owing to increased demand from other countries in the Asia and in the Pacific

region, such as China and India, Australia's metallurgical coal exports are expected to increase during the next several years. BHP Billiton approved funding for the development of the Caval Ridge project and the expansion of the Peak Downs Mine in the Bowen basin in Queensland. The total investment for which would be \$4.2 billion, of which BHP Billiton's share would be \$2.1 billion. BHP Billiton's partner, Mitsubishi Development Pty Ltd of Japan will provide for the remaining funds. The Caval Ridge Mine would have the capacity to produce 5.5 Mt/yr of metallurgical coal, and the capacity of the Peak Downs Mine would increase by 2.5 Mt/yr with mine life that is expected to be more than 60 years. BHP Billiton subsequently decided to defer the development of the Peak Downs Mine but the construction of the Caval Ridge Mine is reported to be on schedule and is expected to be completed in 2014. The Caval Ridge project was one of the four components of BHP Billiton Mitsubishi Alliance Coal Operations Pty Ltd's coal growth project in the Bowen basin. The Daunia Mine, a new open pit coal mine with coal handling preparation plant, was scheduled for completion in 2013; the plant would have the capacity to produce 4 Mt/yr of coal for 21 years.

China

Coal consumption saw unprecedented highs attributable to the high demand from Industrial and Power-generation Sectors. Coal was the primary source of energy and two-thirds of the country's electricity was produced by coal-fired power plants. About 50% of the country's total coal output was consumed by the Power Sector. However, owing to high coal and coking coal prices in the domestic market and weak international coal prices, coastal coking coal producers imported large volumes of coal. The Government continued to close small coal mines to reduce fatalities. However, in the long-term, several large companies are expected to produce coal along with small mines. In 2015, the country's coal output capacity is expected to be 4.1 Gigatonnes (Gt), and coal production and consumption would moderate at 3.9 Gt. The Government intended to add 740 million tonnes per year of new output capacity by 2015, of which the western part of the country would build 530 million tonnes per year; the central part 185 million tonnes per year and the eastern part

25 million tonnes per year. In 2015, the distribution of coal output in the western part would be 2.09 Gt; in central part it would be 1.35 Gt and in the eastern part 460 million tonnes. In 2012, the country consumed about 3.7 Gt of coal. China's coal-fired power plant producers were sensitive to overseas coal prices. Major coal-producing provinces were located in the northern and northwestern parts of the country and coal consumers were located in the southern and in the coastal Provinces. The Government planned to develop more reliable coal transportation system to ease the constraint during the next few years.

Indonesia

Indonesia was the world's second ranked exporter and leading producer of coal. Central Kalimantan Province held reserves of 1,400 million tonnes of high-quality metallurgical coal. The Province produced 1.5 million tonnes per year of high-grade coal from 15 coal mining companies.

BHP Billiton planned to develop the 774-million tonnes of Maruwai deposit in East and Central Kalimantan Provinces to produce 6 million tonnes per year of combined thermal and coking coal by 2014 and to expand output to between 15 and 20 million tonnes per year. PT Marunda Graha Mineral planned to increase production at its MGM coking coal mine by 25% to 2 million tonnes per year. Minerals Energy Commodities Holdings (MEC) of the United Arab Emirates expected a coal railway to start operating at the end of 2012 when its coal mine in East Kalimantan Province begins producing at a rate of 1 million tonnes per year of coal; the company planned to begin exporting 14 million tonnes of coal to Chinese and Indian power producers beginning in 2013.

FOREIGN TRADE

Exports

In 2012-13, exports of coal increased about 46% to 2.95 million tonnes from 2.03 million tonnes in the previous year. Exports of coke also increased 83% to 1.12 million tonnes in 2012-13 from 0.61 million tonnes in 2011-12. Coal was mainly exported to Bangladesh (50%), Nepal (39%) and Bhutan & UAE (3% each). Coke was exported predominantly to Bhutan (56%), Nepal

COAL & LIGNITE

(17%), Brazil (12%) and Malaysia (7%). Exports of lignite increased hugely to 36 thousand tonnes in 2012-13 from one thousand tonnes in the previous year and was mainly to Nepal. The exports of coal gas at 83 tonnes showed an increase of about 41% during 2012-13 from 59 tonnes that was reported in 2011-12 and was mainly to Congo Republic (Tables - 32 to 35).

Imports

Imports of coal increased by 34% to about 138 million tonnes in 2012-13 from 103 million tonnes in the previous year. Imports of coke also increased by about 31% to 3.08 million tonnes in 2012-13 from 2.36 million tonnes in the previous year. Coal was mainly imported from Indonesia (58%), Australia (20%) and South Africa (13%), whereas coke was imported mainly from Ukraine (29%), Japan (22%), Poland (13%), Russia (12%), Colombia (10%) and China (3%). Imports of lignite were negligible while imports of briquettes of coke/semi-coke decreased to 25 tonnes in 2012-13 from 10769 tonnes in the previous year and mainly from South Africa (Tables - 36 to 39).

**Table – 33 : Exports of Coal : Lignite
(By Countries)**

Country	2011-12		2012-13	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	1	14583	36	321881
Nepal	-	-	36	225530
USA	-	-	++	38677
Oman	-	-	++	14060
Italy	-	-	++	8892
Indonesia	++	7683	++	8733
Tanzania,	-	-	++	4073
Albania	-	-	++	4062
UK	-	-	++	3955
Netherlands	-	-	++	2681
Iraq	-	-	++	2370
Other countries	1	6900	++	8848

**Table – 32 : Exports of Coal (Excl. Lignite)
(By Countries)**

Country	2011-12		2012-13	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	2025	5869603	2950	8710267
Bangladesh	1216	3091507	1471	5176730
Nepal	676	2349089	1148	1983659
Bhutan	113	328788	96	428098
UAE	1	5571	89	399911
Pakistan	++	100	61	296249
China	++	1370	60	287559
Djibouti	-	-	14	68166
Malaysia	++	942	1	15143
Saudi Arabia	1	6309	++	3431
Unspecified	17	77186	9	42863
Other countries	1	8741	1	8458

**Table – 34 : Exports of Coal Gas water, etc.
(Except Gaseous Hydrocarbons)
(By Countries)**

Country	2011-12		2012-13	
	Qty (t)	Value (₹‘000)	Qty (t)	Value (₹‘000)
All Countries	59	365	83	814
Congo, Dem. Rep. of	-	-	73	612
Bangladesh	++	79	10	196
Nepal	56	255	++	6
Other countries	3	31	-	-

COAL & LIGNITE

**Table – 35 : Exports of Coke
(By Countries)**

Country	2011-12		2012-13	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	611517	11487428	1119259	5646286
Brazil	368500	7737809	139001	2502388
Malaysia	34000	570294	81000	1282300
Bhutan	30571	304075	632292	475111
Nepal	40898	123708	185009	442013
Chinese Taipei/Taiwan	-	-	12000	232847
Djibouti	20	568	47500	229425
Pakistan	24791	615586	10186	224753
Bahrain	5598	117997	3880	70843
Kuwait	-	-	2000	42988
Korea, Rep. of	2923	73343	1725	40671
Other countries	104216	1944048	4666	102947

**Table – 36 : Imports of Coal (Excl. Lignite)
(By Countries)**

Country	2011-12		2012-13	
	Qty ('000 t)	Value (₹'000)	Qty ('000 t)	Value (₹'000)
All Countries	102841	788268785	137561	810178496
Indonesia	55260	258417122	80304	321736466
Australia	27792	366256380	26999	282348338
South Africa	12207	77000793	17641	98370694
USA	2973	39745018	6097	52671920
Canada	230	3157153	983	10571367
New Zealand	960	12985853	971	10480387
Mozambique	49	492492	915	9778715
Russia	1194	9885259	420	4013383
Ukraine	367	3578583	259	2509163
Unspecified	232	1650080	1909	10106458
Other countries	1577	15100052	1063	7591605

COAL & LIGNITE

**Table – 37 : Imports of Coal : Lignite
(By Countries)**

Country	2011-12		2012-13	
	Qty (‘000 t)	Value (₹‘000)	Qty (‘000 t)	Value (₹‘000)
All Countries	++	474	++	5407
Turkey	-	-	++	4298
USA	++	474	++	1109

**Table – 38 : Imports of Coke
(By Countries)**

Country	2011-12		2012-13	
	Qty (t)	Value (₹‘000)	Qty (t)	Value (₹‘000)
All Countries	2364688	47584537	3077258	56872490
Ukraine	299613	6506312	905858	16288365
Japan	423114	8557407	663156	12820438
Poland	85043	1972992	409433	7760713
Russia	300083	4645496	369207	6765065
Colombia	127001	2756825	298381	4891191
China	717340	16895354	104311	2422113
Vietnam	16185	320388	99432	1882062
Bosnia-Herzegovina	-	-	42477	763298
Australia	208199	3564203	43871	721077
Indonesia	-	-	36202	647986
Other countries	188110	2365560	104930	1910182

**Table – 39 : Imports of Briquettes of coke, semi-coke of Coal
(By Countries)**

Country	2011-12		2012-13	
	Qty (t)	Value (₹‘000)	Qty (t)	Value (₹‘000)
All Countries	10769	106569	25	717
China	1	8	7	265
Australia	-	-	1	248
South Africa	10765	106369	17	204
Other countries	3	192	-	-

FUTURE OUTLOOK

The XII Plan Working Group for Coal & Lignite has assessed a coal demand of 980.50 million tonnes by terminal year i.e. 2016-17. The indigenous coal supply projection in the terminal year is projected to

be 715 million tonnes. The demand-supply gap emerging from these projections would be 265.50 million tonnes, which would have to be met by imports of 35.50 million tonnes of coking coal and 230 million tonnes of non-coking coal.