



Indian Minerals Yearbook 2011

(Part- II)

50th Edition

COAL & LIGNITE

(ADVANCE RELEASE)

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

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Coal plays a pivotal role in sustainable development. It is the most widely used energy source for electricity generation and an essential input to most steel production. As estimated by the World Coal Association, coal currently fuels 41% of the world electricity and this proportion is set to remain static over the next 30 years. About 70% of the world's steel production is based on coal. 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 77% 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 532.04 million tonnes in 2009-10 increased marginally to 532.69 million tonnes in 2010-11. The production of lignite at 37.73 million tonnes in 2010-11 increased by 10.75% from 34.07 million tonnes in the previous year. India ranks 3rd in world coal production.

RESOURCES

Coal

The Indian coal deposits 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, 285.86 billion tonnes (including that estimated in Sikkim) coal resources to 1,200 m depth have been established in the country as on 1.4.2011. Out of these resources, 114 billion tonnes were proved reserves, 137.47 billion tonnes were indicated reserves and the remaining 34.39 billion tonnes were in inferred category. Of the total resources, prime-coking coal was 5.31 billion tonnes, medium-coking & semi-coking were 28.16 billion tonnes and non-coking coal including high sulphur was 252.39 billion tonnes. Statewise/coalfield-wise and statewise/typewise reserves of coal as on 1.4.2011 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 1.4.2011 were about 40.91 billion tonnes. About 80% reserves are located in Tamil Nadu with about 32.89 billion tonnes. Other states where lignite deposits have been located are Rajasthan, Gujarat, Jammu & Kashmir, Kerala, West Bengal and the Union Territory of Puducherry. Statewise/districtwise reserves of lignite as on 1.4.2011 are given in Table - 3.

**Table – 1 : Reserves of Coal as on 1.4.2011
(By States/Coalfields)**

(In million tonnes)

State/Coalfield	Proved	Indicated	Inferred	Total
All India : Total	114001.60	137471.10	34389.51	285862.21
Gondwana Coalfields*	113407.79	137371.76	33590.02	284369.57
Andhra Pradesh/ Godavari Valley	9296.85	9728.37	3029.36	22054.58
Assam/Singrimari	–	2.79	–	2.79
Bihar/Rajmahal	–	–	160.00	160.00
Chhattisgarh	12878.99	32390.38	4010.88	49280.25
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	849.15	765.55	–	1614.70
East Bisrampur	–	164.82	–	164.82
Lakhanpur	455.88	3.35	–	459.23
Panchbahini	–	11.00	–	11.00

(Contd.)

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Table - 1 (Contd.)

State/Coalfield	Proved	Indicated	Inferred	Total
Hasdeo-Arand	1369.84	3425.01	384.50	5179.35
Sendurgarh	152.89	126.32	–	279.21
Korba	4980.58	5936.50	838.58	11755.66
Mand-Raigarh	4177.90	17041.44	2552.72	23772.06
Tatapani-Ramkola	50.43	2392.72	202.19	2645.34
Jharkhand	39760.73	32591.56	6583.69	78935.98
Raniganj	1538.19	466.56	31.55	2036.30
Jharia	15077.57	4352.49	–	19430.06
East Bokaro	3351.87	3929.57	863.32	8144.76
West Bokaro	3629.03	1349.04	34.42	5012.49
Ramgarh	446.27	545.15	58.05	1049.47
North Karanpura	9499.42	5708.86	1864.96	17073.24
South Karanpura	2748.09	2048.56	1480.22	6276.87
Aurangabad	213.88	2279.82	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	2655.52	11751.26	1715.28	16122.06
Madhya Pradesh	8871.31	12191.72	2062.70	23125.73
Johilla	185.08	104.09	32.83	322.00
Umaria	177.70	3.59	–	181.29
Pench-Kanhan	1405.24	789.61	316.78	2511.63
Patharkhera	290.80	88.13	68.00	446.93
Gurgunda	–	47.39	–	47.39
Mohpani	7.83	–	–	7.83
Sohagpur	1725.91	4926.55	190.36	6842.82
Singrauli	5078.75	6232.36	1454.73	12765.84
Maharashtra	5489.61	3094.29	1949.51	10533.41
Wardha Valley	3426.98	1405.46	1424.07	6256.51
Kamthi	1276.14	1204.88	505.44	2986.46
Umrer	308.41	–	–	308.41
Nand Bander	468.08	483.95	–	952.03
Bokhara	10.00	–	20.00	30.00
Odisha	24491.71	33986.96	10680.21	69158.88
Ib-River	8057.54	8611.31	5847.64	22516.49
Talcher	16434.17	25375.65	4832.57	46642.39
Sikkim/Rangit Valley	–	58.25	42.98	101.23
Uttar Pradesh/Singrauli	866.05	195.75	–	1061.80
West Bengal	11752.54	13131.69	5070.69	29954.92
Raniganj	11638.27	7750.71	4443.91	23832.89
Barjora	114.27	–	–	114.27
Birbhum	–	5380.98	611.78	5992.76
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	31.23	40.11	12.89	84.23
Miao Bum	–	–	6.00	6.00

(Contd.)

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Table - 1 (Concl.d.)

State/Coalfield	Proved	Indicated	Inferred	Total
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
Jayant Hills	-	-	2.34	2.34
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, 2010-11, Coal Controller's Organisation, Kolkata.
* Including Sikkim.

Table - 2 : Reserves of Coal as on 1.4.2011
(By States/Types)

(In million tonnes)

State/Type of coal	Proved	Indicated	Inferred	Total
All India : Total	114001.60	137471.10	34389.51	285862.21
Prime-coking	4614.35	698.71	-	5313.06
Medium-coking	12572.52	1200132	1880.23	26454.07
Semi-coking	482.16	1003.29	221.68	1707.13
Non-coking	95738.76	123668.44	31488.11	250895.31
High sulphur	593.81	99.34	799.49	1492.64
Andhra Pradesh/Non-coking	9296.85	9728.37	3029.36	22054.58
Arunachal Pradesh/	31.23	40.11	18.89	90.23
High sulphur	-	-	-	-
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	12878.99	32390.38	4010.88	49280.25
Semi-coking	70.77	99.25	-	170.02
Non-coking	12808.22	32291.13	4010.88	49110.23
Jharkhand	39760.73	32591.56	6583.69	78935.98
Prime-coking	4614.35	698.71	-	5313.06
Medium-coking	12008.03	10422.71	1607.40	24038.14
Semi-coking	223.34	471.55	53.45	748.34
Non-coking	22915.01	20998.59	4922.84	48836.44
Madhya Pradesh	8871.31	12191.72	2062.70	23125.73
Medium-coking	354.49	1560.11	272.83	2187.43
Non-coking	8516.82	10631.61	1789.87	20938.30
Maharashtra/Non-coking	5489.61	3094.29	1949.51	10533.41
Meghalaya/High sulphur	89.04	16.51	470.93	576.48
Nagaland/High sulphur	8.76	-	306.65	315.41
Odisha/Non-coking	24491.71	33986.96	10680.21	69158.88
Sikkim/Non-coking	-	58.25	42.98	101.23
Uttar Pradesh/Non-coking	866.05	195.75	-	1061.80
West Bengal	11752.54	13131.69	5070.69	29954.92
Medium-coking	210.00	18.50	-	228.50
Semi-coking	188.05	432.49	168.23	788.77
Non-coking	11354.49	12680.70	4902.46	28937.65

Source: Coal Directory of India, 2010-11, Coal Controller's Organisation, Kolkata.

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**Table – 3 : Reserves of Lignite as on 1.4.2011
(By States/Districts)**

(In million tonnes)

State/District	Area/Lignite field	Proved	Indicated	Inferred	Total
All India : Total		6145.84	25794.26	8965.76	40905.86
Gujarat		1243.65	318.70	1159.70	2722.05
Kachchh	Panandhro & Panandhro Extn., Barkhan-Dam, Kaiyari Block-A & B, Mata-No-Madh, Umarsar, Lakhpat-Dhedadi, Akrimota, Jhularai-Waghapadar, Hamla-Ratadia, Pranpur.	300.61	91.40	33.09	425.10
Bharuch	Bhuri, Valia, Bhaga, Luna, Pansoli, Nani Pardi, Bhimpur, etc. Rajpardi (CGM) 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
Kannur	Madayi, Kadamkottumala, Kayyur and Nileswaram	–	–	9.65	9.65
Rajasthan		1166.96	2148.72	1519.61	4835.29
Bikaner	Palana, Barsingsar, Gurha East & West, Bholasar, Bithnok Main & East Extn., Gadiyala, Girirajsar, Raneri, Mandal Chaman, Hadda, 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.	558.73	226.59	295.66	1080.98
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 and South of Nimbla.	495.23	1861.56	1073.72	3430.51
Jaisalmer & Barmer	Kuuri	–	–	13.80	13.80
Nagaur	Kasnau-Igiar, Matasukh, Mokala, Nimbri-Chadawatan, Kaprion-ka-Dhani, Merta Road & Meeranagar, Indawar, Kuchera, Lunsara and Phalki.	113.00	60.57	60.35	233.92
Jalore	Sewara	–	–	76.08	76.08

(Contd.)

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Table - 3 (Concl'd.)

State/District	Area/Lignite field	Proved	Indicated	Inferred	Total
Tamil Nadu		3735.23	22900.05	6257.64	32892.92
Cuddalore	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
Ariyalur	Meensuruti Jayamkondamcholapuram, Michaelpatti of Nayveli Lignite Field	904.23	302.50	481.07	1687.80
Thanjavur & Thiruvavur	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	–	2290.71	72.66	2363.37
Thanjavur & Nagappattinam	Alangudi, Pandanallur, Tirumangaichcheri, Nachiyarkudi and Thirumangalam of Mannargudi Lignite Field	–	359.21	1108.24	1467.45
Ramanathapuram	Misal, Bogalur and Tiyanur of Ramanathapuram Lignite field	–	168.83	272.43	441.26
Puducherry	Bahur & West of Bahur of Neyveli Lignite Field	–	405.61	11.00	416.61
West Bengal	Rakshitpur, Mahalla	–	0.93	0.86	1.79

Source: Coal Directory of India, 2010-11, Coal Controller's Organisation, Kolkata.

* Both blocks cover parts of Tamil Nadu and Puducherry.

EXPLORATION & DEVELOPMENT

The agencies engaged in exploration for coal during 2010-11 were mainly GSI, CMPDI, MECL and State Directorates of Geology & Mining. For lignite, exploration was carried out by GSI, MECL, NCL, DMG, Rajasthan and GMDC Ltd.

GSI carried out exploration for coal in Gondwana basins of Andhra Pradesh, 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 2,641.63 million tonnes coal were assessed in 2010-11 (as on 1.4.2011). GSI extensively continued its exploration for lignite in West Bengal, Rajasthan and Tamil Nadu, keeping in view the high demand for accelerated growth of power and industrial sectors. As a result of exploration carried out, additional resources of 125.759 million tonnes lignite were assessed in

2010-11 (as on 1.4.2011). Details of additional resource estimation and exploration activities for coal & lignite by GSI are given in Tables - 4(A) and 4(B), respectively.

MECL carried out 29,918.00 m exploratory drilling for coal on behalf of Ministry of Coal during the year 2010-11 in Andhra Pradesh, Maharashtra and Chhattisgarh and undertook about 133,047.00 m contractual drilling for coal on behalf of National Thermal Power Corporation (NTPC), Chhattisgarh Mineral Development Corporation (CMDC), CMPDI, APMDC-OMC and APMDC and established 3,246.203 million tonnes coal resources in 2010-11.

MECL conducted exploration for lignite in Neyveli Lignite Field in Tamil Nadu and Barmer, Bikaner and Jaisalmer Lignite Fields in Rajasthan on promotional basis on behalf of Ministry of Coal and completed 51,796.40 m drilling in

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2010-11. About 19.109 million tonnes lignite resources were established by MECL during 2010-11. Particulars of exploratory drilling carried out for coal & lignite and additional resources estimated by MECL are summarised in Tables - 5(A) and 5(B), respectively.

DGM, Maharashtra estimated 249.28 million tonnes coal resources in 2010-11 in Chandrapur, Wardha, Nagpur and Yavatmal districts. DGM, Chhattisgarh estimated 80.15 million tonnes coal resources of probable category during 2010-11 in Raigarh and Korba districts. Directorate of Geology, Jharkhand carried out exploration for coal during 2010-11 in Latehar and Ramgarh districts. DMG, Rajasthan carried out exploration for lignite during 2010-11 in Bikaner and Barmer districts and estimated 0.06 million tonnes of geological reserves. GMDC conducted exploration and estimated 107 million tonnes lignite geological resources in 2010-11. Directorate of Geology, Odisha carried out exploration for coal during 2010-11 in Angul, Jharsuguda and Sundergarh districts. WBMDTC also carried out exploration for lignite in Bardhaman district in West Bengal in the same period. Details on exploration carried out by the various state Directorates and state undertakings are given in Table-6.

CMPDI in its exploration programme for 2010-11 laid emphasis on proving power-grade and superior-grade non-coking coal in CIL and non-CIL blocks. A total of 4,91,791m of exploratory drilling was achieved by CMPDI and its contractual agencies during 2010-11 which includes 2,68,059 m in departmental drilling (that comprised 1,318 m in promotional blocks, 2,01,016 m in CIL blocks, 64,685 m in non-CIL/captive mining blocks and 1,040 m for consultancy work) and 2,23,732 m conducted through outsourcing to concerned Departments of State Governments & MECL(MoU), as well as through tender notifications (for CIL and non-CIL blocks). During 2010-11, CMPDI and its contractual agencies conducted exploration in 96 blocks/mines spread over 22 coalfields situated in 7 states namely, Raniganj (7 blocks/mines), Rajmahal (1), Jharia (4), West Bokaro (5), Ramgarh (2), Tawa valley/Patharkheda (6), Pench Kanhan (1), Kamptee (2), Nand-Bander (1), Wardha (8), Singrauli (7), Sohagpur (10), Sendurgarh (1), Johilla (1), Mand Raigarh (13), Korba (4), Hasdo-Arand (1), Bistrampur (5), Sonhat (1), Talcher (9), Ib valley (5) and Makum (2). Out of 96 blocks/mines, 18 were Non-CIL/Captive blocks, 2 promotional

blocks, one consultancy block and 75 CIL blocks/mines. Apart from it, promotional drilling has also been taken up in 21 blocks over 10 coalfields. CMPDI took up drilling activity in 65 blocks/mines while Contractual agencies awarded the job by way of tendering/MOU undertook drilling operations in 31 blocks/mines

SCCL in its detailed exploration undertaken during 2010-11, established proved reserves of coal that were estimated at 51.66 million tonnes as against 74.57 million tonnes reported in the previous year. Thus, the total proved reserves rose to 9,487.44 million tonnes as on 31.3.2011 in Godavari Valley Coalfield, Andhra Pradesh.

Table – 4 (A) : Additional Resources Estimated by GSI for Coal and Lignite, 2010-11 (as on 1.4.2011)

(In million tonnes)	
State/Coalfield/Block	Additional resources
COAL	
Chhattisgarh	522.70
A. Mand-Raigarh Coalfield	
(i) Phutamura	85.82
B. Tatapani-Ramkula Coalfield	
(i) Reonti	279.46
C. Hasdo Arand Coalfield	
(i) Saidu	157.42
Jharkhand	188.232
A. South Karanpura Coalfield	
(i) Binja	126.76
B. East Bokaro Coalfield	
(i) Muditoli	61.472
Madhya Pradesh	352.45
A. Sohagpur Coalfield	
(i) Merkhi	81.08
B. Singrauli Coalfield	
(i) Tendudol	271.37
Odisha	1476.17
A. Talcher Coalfield	
(i) Jamujhari-Brahmanbil	1476.17
West Bengal	102.08
A. Raniganj Coalfield	
(i) Nabasan	102.08
Total	2641.632
LIGNITE	
Rajasthan	0.50
A. West Coast Lignite field	
(i) Phalki	0.50
Tamil Nadu	124.624
A. East Coast Lignite field	
(i) Bogalur	124.624
West Bengal	0.635
A. Birbhum Coalfield	
(i) Mahalla	0.635
Total	125.759

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Table – 4 (B) : Details of Exploration Activities conducted by GSI for Coal & Lignite, 2010-11

State/Coalfield/ Lignite Field	Area/Block	Exploration details
COAL		
Andhra Pradesh		
Godavari Valley Coalfield	Narayanapuram-Pattayagudem	Two prominent coal carbonaceous shale zones (BH-7 and BH-8) of Lower Kamthi Formation namely BH-7 was intersected at 557.55 m depth. The cumulative coal content is about 4.98 m to 10 splits (ranging from 0.30 m to 1.00 m). Borehole BH-8 intersected (zone-C of 40.00 m thick and zone-B of 26.55 m thick) and Seam zone-A of Barakar Formation (72.60 m thick) having cumulative coal thickness of 25.50 m in 6 split sections between 414.00 m and 641.40 m depths.
	Bugga-Khamamtogu	Two regional interbanded coal-carbonaceous shale zones of Barakar Formation and Talchir Formation with cumulative thickness of 2.30 m and 7.31 m were recorded at very shallow depth between 23.40 m and 39.41 m. Three local seams of 0.70 m to 0.76 m thickness between 97.64 m and 103 m depths have been identified.
	Vutasamudram-Venkatapuram area	Two boreholes were drilled in Upper Kamthi Formation so far.
Chhattisgarh		
Mand-Raigarh Coalfield	Nawagaon block	Ten regional Barakar coal seam/zones (Seam I to X, in ascending order) have been intersected between the depths of 45.37 m and 457.18 m. The important seams are Seam I, IV, VI, VII and VIII with cumulative thickness of coal ranging from less than a metre to 10.46 m. Seam IV is the thickest seam and was intersected between the depths of 24.43 m and 425.04 m. Cumulative coal thickness of Seam I and IV varies from 2.35 m to 10.46 m.
	Teram block	In Barakar Formation, ten regional coal seams (Seam III to XII in ascending order) with cumulative thickness ranging from less than 0.50 m to 13.74 m were intersected between the depths of 202.88 m and 477.50 m. Among these, the important seams are Seam V, VI and IX. The thickest seam, seam VI, was intersected between the depths of 328.72 m and 424.54 m. The seam is highly banded in nature and its cumulative thickness ranges from 11.90 m to 13.74 m.
Hasdo-Arand Coalfield	Korja block	Four regional Barakar coal seams/zones (Seam III to VI in ascending order) have been intersected between depths of 97.10 m and 188.65 m within Barakar Formation. Coal Seam/zone IV and V are considered to be significant because of their cumulative coal thickness which ranges from 6.20 m to 7.75 m. Seams/zones IV and V are represented by Composite Section with coal split varying in thickness from 0.30 m to 4.10 m. Four local coal seams (Seam L1 to L4 in ascending order) have been recorded between depths of 258.95 m and 341.85 m within Lower Member of Barakar Formation. Thickness of individual split section varies from 0.15 m to 4.10 m.
Tatapani-Ramkola Coalfield	Reonti (West) block	Six regional Barakar coal seams (I to VI) and few local coal seams varying in cumulative thickness from less than a metre to 29.78 m were intersected between 491.77 m and 841.20 m depths. Seams I to V are important because of their thickness and persistence. The seams IV and V are represented by four to five split sections with the cumulative thickness being 29.78 m and 12.22 m, respectively.
Madhya Pradesh		
Singrauli Coalfield	Sarai (East) area	Seven regional coal seams of Barakar Formation ranging from 1.05 m to 3.35 m were intersected between 259.69 m and 493.13 m of shallow depths. Out of these, Seam VI and VII are relatively thick (3.35 m and 2.15 m, respectively).
Pench Valley Coalfield	Payalidhana Sector	Five regional Barakar coal seams with individual seam thickness ranging from 1.00 m to 3.05 m were intersected between 282.24 m and 319.44 m depth. Total cumulative coal thickness of coal is 13.79 m.
Sohagpur Coalfield	Merkhi block	To establish developmental pattern of superior grade Barakar coal seams at shallow depth.

(Contd.)

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Table - 4 (B) (Contd.)

State/Coalfield/ Lignite Field	Area/Block	Exploration details
Sohagpur Coalfield	Devanitola block	Four regional Barakar coal seams (I to IV) and two local coal seams (L1 and L2) varying in thickness from 0.63 m to 7.25 m were intersected between 101.90 m to 285.15 m depths. Cumulative thickness of the regional and local seams ranges from 11.90 m to 16.31 m. Out of these four seams, seam III is the thickest with maximum cumulative thickness of 7.25 m.
	Amiliha block	Four regional Barakar coal seams (I to IV) varying in thickness from 0.30 m to 3.75 m were intersected between 178.45 m and 343.70 m depths. The thickest seam III varying in thickness from 2.56 m to 3.75 m was intersected between 145.75 m and 285.95 m depths. Seam III is used as a key horizon for correlation of coal seams. Cumulative thickness of the seams so far recorded in two boreholes varies from 4.52 m to 9.79 m and occurs between 178.45 m and 351.55 m depths.
	Pachri block	Four regional Barakar coal seams (I to IV with few local seams) varying in individual seam thickness from 0.35 m to 3.30 m were intersected between 138.60 m and 328.70 m depths. Seam III is the thickest with two split sections having a cumulative thickness ranging from 2.47 m to 3.30 m. Cumulative thickness of all the coal seams vary from 7.00 m to 8.50 m and coal resource of 200 million tonnes from this block is prognosticated. Seam III being thickest and composite in nature, generally occurs 80 m to 100 m below.
Johilla Coalfield	Naurozabad (North) area	The contact between Parsora Formation and Pali Formation is in progress.
Maharashtra Wardha Valley Coalfield	Dewala-Mangli block Yavatmal	Two boreholes were drilled in Barakar Formation. The work is in progress.
Odisha Talcher Coalfield	Simlisahi- Kunjabiharipur	Ten regional coal seam zones of Barakar Formation (II to XI) with cumulative thickness ranging from 2.65 m to 56.09 m were intersected between 278.70 m to 638.78 m depths. Coal zone III and IX are prominent and Seam III is the thickest seam zone having a cumulative coal thickness varying from 38.36 m to 56.09 m.
	Harichandrapur block	Ten regional coal seam zones of Barakar Formation (II to IX) varying in cumulative thickness from 0.92 m to 56.19 m were intersected between 13.95 m to 386.89 m depths. Coal seam zone II is thickest having cumulative thickness ranging from 26.52 m to 56.19 m.
	Nuagaon North area	Five regional Barakar coal seam zones (II, III and VI to VIII block combined) seam zone I of Karharbari Formation were intersected from 161.49 m and 363.60 m depths. Coal seam zone III is the thickest with a cumulative thickness of 19.94 m. The cumulative thickness of seam II is 15.78 m and seam I of Karharbari is 3.21 m.
	Korara-Danara sector	One borehole of Karharbari Formation drilled to a depth of 313.50 m intersected the basal Barakar conglomerate zone. Work is in progress.
Ib River Coalfield	Piplimal-Khairkuni block	Two regional Barakar coal seam zones namely, Rampur and Ib with cumulative coal thickness varying from 35.40 m and 4.47 m were intersected between 410.54 m and 472.00 m roof depths. Investigation was completed.

(Contd.)

COAL & LIGNITE

Table - 4 (B) (Concl'd.)

State/Coalfield/ Lignite Field	Area/Block	Exploration details
West Bengal		
Raniganj Coalfield	Bhabaniganj east area	One borehole progressed from 328.50 m to 497.20 m and intersected the Barren Measure/Barakar and Barakar/basement contacts at 402.30 m and 486.90 m depth, respectively. In this borehole, one coal seam of 5.60 m thickness has been intersected at 464.30 m depth. Another borehole progressed to 341.70 m and intersected the Raniganj Formation/Barren Measure contact at 83.55 m depth.
	South of Hingla River	One borehole intersected the Barren Measure/Barakar and Barakar/basement contacts at 202.60 m and 266.05 m depths, respectively. One coal seam of 1.85 m thickness was intersected at 254.95 m depth. Second borehole progressed to 363.65 m depth and intersected Barren measure/Barakar contact at 323.95 m depth.
Birbhum Coalfield	Dhobbanpur sector	Two boreholes have been completed. The first borehole intersected five Barakar coal seams (0.70 m to 4.70 m thick) with a cumulative thickness of 11.65 m at depths ranging from 440.75 m to 512.45 m. The second borehole intersected Tertiary claystone and fine grained sandstone followed downwards by Rajmahal and Barakar Formations.
	Gazipur area	A total of 737.70 m of drilling has been completed in two boreholes. The second borehole intersected ten Barakar coal seams ranging in thickness from 0.50 m to 2.50 m (cumulative thickness 10.30 m) in the depth range from 479.95 m to 615.65 m. The third borehole recorded 235.15 m of Tertiaries and 180.70 m of Rajmahal Trap.
LIGNITE		
Tamil Nadu		
Ramnad-sub-basin in Ramanathapuram district	Bogalur east block	Two regionally persistent lignite seams, viz, seam I and seam II with maximum thickness of 17.5 m and 4.6 m, respectively were identified. A tentative inferred resource of 180 million tonnes was estimated within 400 m depth.
	Uttarakosamangai block	Exploration work is scheduled to be taken up during Oct. 2011 to delineate lignite bearing areas and to assess the resource potentiality.
Rajasthan		
Nagaur south sub-basin in Nagaur district	Phalki north area	Three lignite seams varying in thickness from 0.20 m to 3.50 m were intersected between 176.50 m and 205.50 m depths. The grade belongs to lignite 'B' category. The work is in progress.

COAL & LIGNITE

Table – 5 (A) : Exploration of Coal & Lignite by

MECL, 2010-11		
State/Coalfield	Block	Drilling (m)
COAL		
(A) Promotional on behalf of Ministry of Coal		Total 29918.00
Andhra Pradesh		Total 9637.45
Godavari Valley Coalfield	Dip side of Venkatapuram	9637.45
Chhattisgarh		Total 14271.00
Mand Raigarh Coalfield	Bhalumura	1269.90
	Dolesara	4748.50
	Basin Patherpur(SE)	4914.40
	Karichapar	3338.20
Maharashtra		Total 6009.55
(i) Umrer Coalfield	Khapri	689.10
	Gumgaon	2929.25
	Sukuli	607.20
(ii) Wardha Coalfield	Temurda	1784.00
(B) Contractual		Total 133047.00
Chhattisgarh		Total 111937.20
A. Mand Raigarh Coalfield		
(i) On behalf of CMPDI	Sayang(C)A	4053.80
(ii) On behalf of CMPDI	Sayang(E)A	3802.85
(iii) On behalf of CMPDI	Chirra NE A	4120.45
(iv) On behalf of CMDC	Gare Pelma	12179.15
(v) On behalf of CMPDI	Boro-Sayang (E)	9860.80
(vi) On behalf of CMPDI	Chirra NE B	7870.20
(vii) On behalf of M/s Mahatamil	Gare Palma Sec-II	29503.30

(Contd.)

Table - 5 (A) (Concl.)

State/Coalfield	Block	Drilling (m)
B. Bishrampur Coalfield		
(i) On behalf of CMPDI	Ghugra	11486.15
C. Singrauli Coalfield		
(i) On behalf of CMPDI	Dongrital	2076.00
(ii) On behalf of CMPDI	Patpaharia	1936.00
(iii) On behalf of CMPDI	Makri Burka	9074.00
(iv) On behalf of APMDC	Suliyari	15974.50
Odisha		Total 21109.80
A. Jharia Coalfield		
(i) On behalf of CMPDI	Kapuriya	6841.50
(ii) On behalf of CMPDI	Singra	7204.40
(iii) On behalf of CMPDI	Nagda	520.00
(iv) Production support On behalf of CMPDI		3067.80
(v) On behalf of NTPC	Pakri-Burwadi	2871.80
B. Talcher Coalfield		
On behalf of APMDC-OMC	Nuagaon-Telishahi	604.30
LIGNITE		
(A) Promotional on behalf of Ministry of Coal		Total 51796.40
Rajasthan		Total 36714.40
Barmer Lignite field		
	North Kurla-Magni-ki-Dhani	3877.30
	Kurla East	9446.60
Bikaner Lignite field		
	Kolasar Gravity block	11834.40
	Bangarsar-Jaimalsar	1108.10
Jaisalmer Lignite field		
	Jaisalmer	10448.00
Tamil Nadu		Total 15082.00
Neyveli Lignite field		
	Sattanur	678.00
	Ramnad (Rajsingmangalam)	9467.00
	Sikkal	4937.00

COAL & LIGNITE

Table – 5(B) : Additional Resources Estimated by MECL for Coal & Lignite, 2010-11

(In million tonnes)

State/Coalfields/District/Block	Additional Resources
COAL	Total 3246.203
Chhattisgarh	Total 1750.992
Mand Raigarh Coalfield	
Garepelma Sec-I, Dist. Raigarh	1122.276
Banai block, Dist. Raigarh	628.716
Maharashtra	Total 160.715
Umrer Katol Sub Basin	
Khapri block, Dist. Nagpur	48.406
Sukli block, Dist. Nagpur	59.814
Gumgaon, Dist. Nagpur	52.495
Madhya Pradesh	Total 144.766
Sohagpur Coalfield	
Chaka North block, Dist. Shahdol	144.766

(Contd.)

Table - 5(B) (Concl'd.)

State/Coalfields/District/Block	Additional Resources
Odisha	Total 904.597
Talcher Coalfield	
Nagaon-Telisahi block, Dist. Angul	904.597
West Bengal	Total 285.133
Ranigaj Coalfield	
Kulti block, Dist. Bardhaman	172.980
Sitarampur, Dist. Bardhaman	112.153
LIGNITE	Total 19.109
Rajasthan	Total 19.109
Bikaner	
Bangarsar-Jalmalsar block	19.109

Table – 6 : Details of Exploration for Coal and Lignite by State Directorates of Geology & Mining and State Undertakings, 2010-11

Agency/State/ District	Location	Geological mapping		Drilling		Remarks Reserves/resources estimated
		Area (sq km)	Scale	Boreholes	Meterage	
COAL						
DGM						
Chhattisgarh						
Raigarh	Dhaurabhata Gare sector 1A	50	1:50,000	06	1535.25	About 29 million tonnes of resources were estimated of C to G grade.
Korba	Saila block	250 2.0	1:50,000 1:4,000	08	1191.85	Since commencement of work, a total of 51.15 million tonnes of resources were estimated.
Dte. of Geology						
Jharkhand						
Latehar	Jalta-Parsahi (Latehar Coal block)	–	1:4,000	08	2248.50	–
Ramgarh	Burhakhap (Ramgarh Coalfield)	0.58	1:4,000	06	1270.50	Resources yet to be established.
DGM						
Maharashtra						
Chandrapur	Takli	–	1:5,000	–	1416.00	About 37.39 million tonnes of resources were estimated so far.
-do-	Wislon block	–	1:5000	–	1102.50	About 9.49 million tonnes of resources were estimated (total 21.30 million tonnes so far).

(Contd.)

COAL & LIGNITE

Table - 6 (Contd.)

Agency/State/ District	Location	Geological mapping		Drilling		Remarks Reserves/Resources estimated (in million tonnes)
		Area (sq km)	Scale	Boreholes	Meterage	
Chandrapur	Nandori	-	1:5,000	-	2179.50	About 170.95 million tonnes of resources were estimated (total 180 million tonnes in reserves so far).
-do-	Panewadala block	-	1:5,000	-	242.10	About 14.19 million tonnes of resources were estimated so far.
-do-	Chalbardi	-	1:5,000	-	343.00	About 1.28 million tonnes of resources were estimated.
Wardha	Shekapur	-	1:5,000	-	738.00	About 8.16 million tonnes of resources were estimated so far.
Nagpur	Makardhokda block-V (Davha-Phukeshwar)	10.00	1:5,000	-	900.70	About 1.23 million tonnes of resources were estimated (total 8.97 million tonnes so far).
-do-	Nand-Panjrepar	4.00	1:5,000	-	3261.41	About 5.10 million tonnes of resources were estimated. (total 24.98 million tonnes so far).
Yavatmal	Ashtona Kothurna	22.00	1:5,000	-	677.35	About 0.99 million tonnes of resources were estimated.
-do-	Dara-Parsoda	11.00	1:5,000	-	1310.80	About 0.50 million tonnes of resources were estimated (total 8.56 million tonnes so far.)
Dte. of Geology						
Odisha						
Angul	ALB blocks of Talchir Coalfield	-	-	13	2077.70	-
-do-	North of Arakhpal & Shirampur blocks of Talchir Coalfield	-	-	02	372.30	-
Jharsuguda	Madhupur block of Ib River Coalfield	-	-	11	2103.80	-
-do-	Kudopalli village, Himgir-Rampur Colliery of Ib River Coalfield	-	-	03	279.60	-
Sundergarh	Manoharpur block of Ib River Coalfield	-	-	06	1205.00	-

(Contd.)

COAL & LIGNITE

Table - 6 (Concl'd.)

Agency/State/ District	Location	Geological mapping		Drilling		Remarks Reserves/Resources estimated (in million tonnes)
		Area (sq km)	Scale	Boreholes	Meterage	
West Bengal Mineral Dev. & Trading Corpn. Ltd. (WBMDTCL)						
Bardhaman	Kulti coal block of Raniganj	8.75	1:2,000	12	14253.40	Exploration is under progress.
-do-	Sitarampur coal block	2.00	1:2,000	14	8249.45	-do-
-do-	Ichhapur coal block	2.00	1:2,000	29	25141.90	-do-
LIGNITE						
DMG, Rajasthan						
Bikaner	N/V Kenya-Ki-Basti	250.00	1:50,000	01	162.00	About 0.06 million tonnes of resources were estimated on the basis of visual estimation of core.
-do-	Surpura	-	1:50,000	01	24.00	Lignite was not encountered in borehole.
Barmer	Bandra	5.50	1:50,000	-	-	Not computed.
GMDC, Gujarat						
Kachchh	N/V Panandhro	-	1:50,000	-	-	Resources were not estimated (Balance of reserves of lignite is approximately 12.30 million tonnes).
Bhavnagar	Surka (N)	-	-	15	2553.00	About 107 million tonnes of lignite resources were estimated.
Neyveli Lignite Corpn. Ltd. (NLC)						
Rajasthan						
Barmer	Kurla east	-	-	27	9446.60	Exploration is underway.
-do-	Magne-Ki-Dhani	-	-	13	3877.30	-do-
Bikaner	Kolasar gravity block	-	-	46	12941.80	-do-
Jaisalmer	Ramgarh	-	-	51	10447.70	-do-
Tamil Nadu						
Ramnad	Rajasingmangalam	-	-	28	9467.00	Work is completed. The reserves available in this block are suitable for UCG/CBM study.
-do-	Sattaur	-	-	2	678.0	Work is completed. Block has not mineral potentials one.
-do-	Sikkal	-	-	9	4937.00	Work is completed. This block has got substantial lignite resources.

Production, Stocks and Prices

COAL

Production

The provisional total production of coal in 2010-11 was around 532.7 million tonnes which was higher by 0.1% as compared to the previous year. Chhattisgarh continued to be the largest coal producing state with a share of about 21.4% followed closely by Jharkhand and Odisha with contributions of 20.4% and 19.3%, respectively, to the national output. Next in order of share in the total production were Madhya Pradesh (13.3%), Andhra Pradesh (9.6%), Maharashtra (7.4%), West Bengal (4.1%) and Uttar Pradesh 2.9%. The remaining (1.6%) coal production was accounted for by Arunachal Pradesh, Assam, Jammu & Kashmir and Meghalaya.

During the year 2010-11, coal mining was confined mainly to the public sector which contributed 91% to the national production. In 2010-11, 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 2010-11 revealed that washery grade IV had the maximum share at 71.4%, followed by washery grade III (20.5%), washery grade II (3.5%) and steel grade II (3.1%). The remaining 1.5% production of coking coal was of steel grade I, washery grade I and semi-coking grade I. Out of the total production of coking coal in India, bulk quantity i.e. 98.8% was produced in Jharkhand followed by Madhya Pradesh with 0.8%. The remaining 0.4% was contributed by Chhattisgarh and West Bengal.

During 2010-11, excepting 8.4% production, the balance entire production of non-coking coal (91.6%) came from the public sector. Out of the total non-coking coal production, 44% was of F grade, followed by 25.1% of E grade, 11.5% of C grade, 9.5% of D grade and 5.0% of B grade. The remaining 4.9% production was contributed by A grade, G grade and ungraded varieties of non-coking coal. Chhattisgarh was the largest producing state of non-coking coal in 2010-11

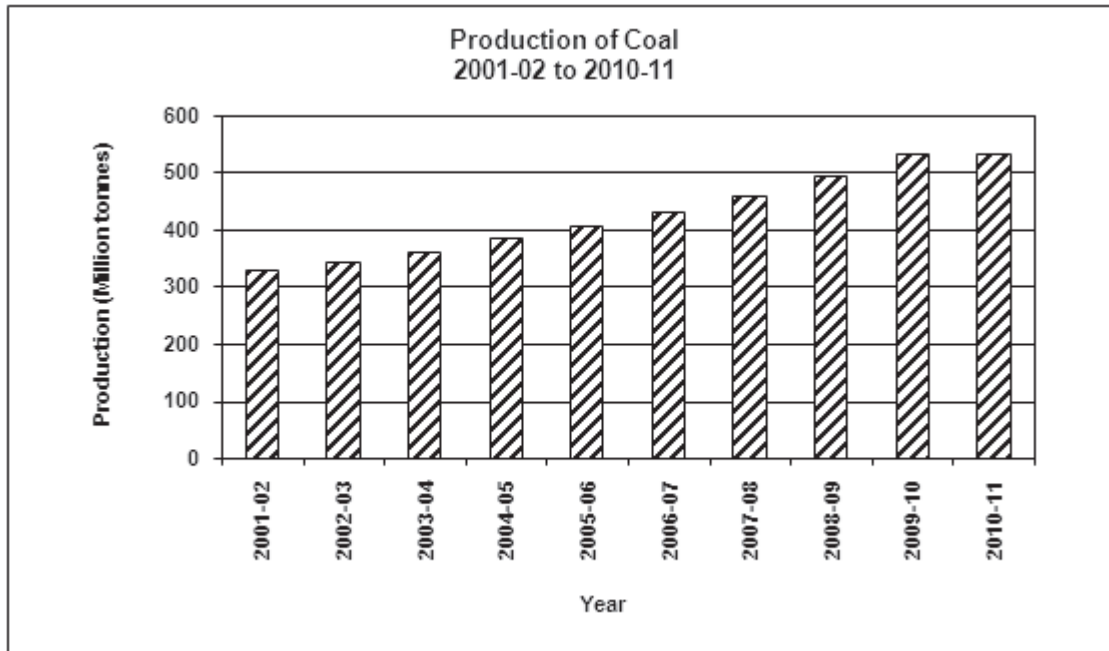
which alone accounted for 23.5% of the national output. Next in order were Odisha with a contribution of (21.2%), Madhya Pradesh (14.6%), Jharkhand (12.4%), Andhra Pradesh (10.6%), Maharashtra (8.1%), West Bengal (4.5%) and Uttar Pradesh (3.2%). The remaining 1.9% production came from the states of Assam, Arunachal Pradesh, Jammu & Kashmir and Meghalaya,

There were 559 coal mines (as on 31.03.2011) in India which reported production in 2010-11. Out of these, 174 mines were located in Jharkhand, West Bengal had 98 mines, Madhya Pradesh (71), Chhattisgarh (62), Maharashtra (55), Andhra Pradesh (50) and Odisha (28). The remaining 21 mines were located in the states of Arunachal Pradesh, Assam, Jammu & Kashmir, Meghalaya and Uttar Pradesh. In 2009-10, there were 12 large mines each producing more than 10 lakh tonnes of coal during the year and these mines accounted for 34.4% of the total production. The bulk of the production i.e. 54.1% was contributed by 147 mines with annual output ranging between 5,00,001 to 10 lakh tonnes. About 11% of the total coal production was shared by 288 mines whose individual production per year varied between 50,001 to 5 lakh tonnes. Only 0.4% of the production was contributed by 113 small mines each producing up to 50,000 tonnes per annum (Tables - 7 to 12).

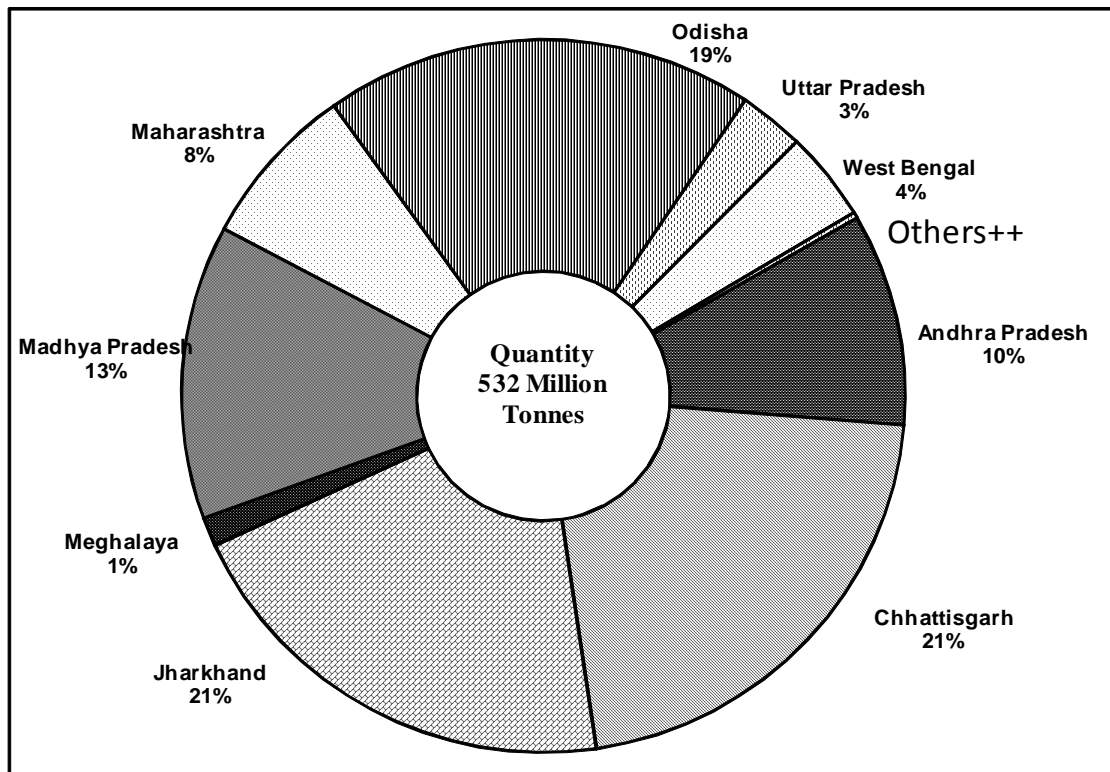
Despatches

Despatches of raw coal at 523.5 million tonnes in 2010-11 were higher by around 1.9% as compared to those in the previous year. Chhattisgarh was the leading state in the despatches in 2010-11 and accounted for 20.9% of the total despatches. The states next in order were Jharkhand (20.4%), Odisha (19.9%), Madhya Pradesh (13.3%), Andhra Pradesh (9.6%), Maharashtra (7.3%), West Bengal (4.1%) and Uttar Pradesh (2.9%). The remaining 1.6% despatches was shared by Assam, Arunachal Pradesh, Jammu & Kashmir and Meghalaya.

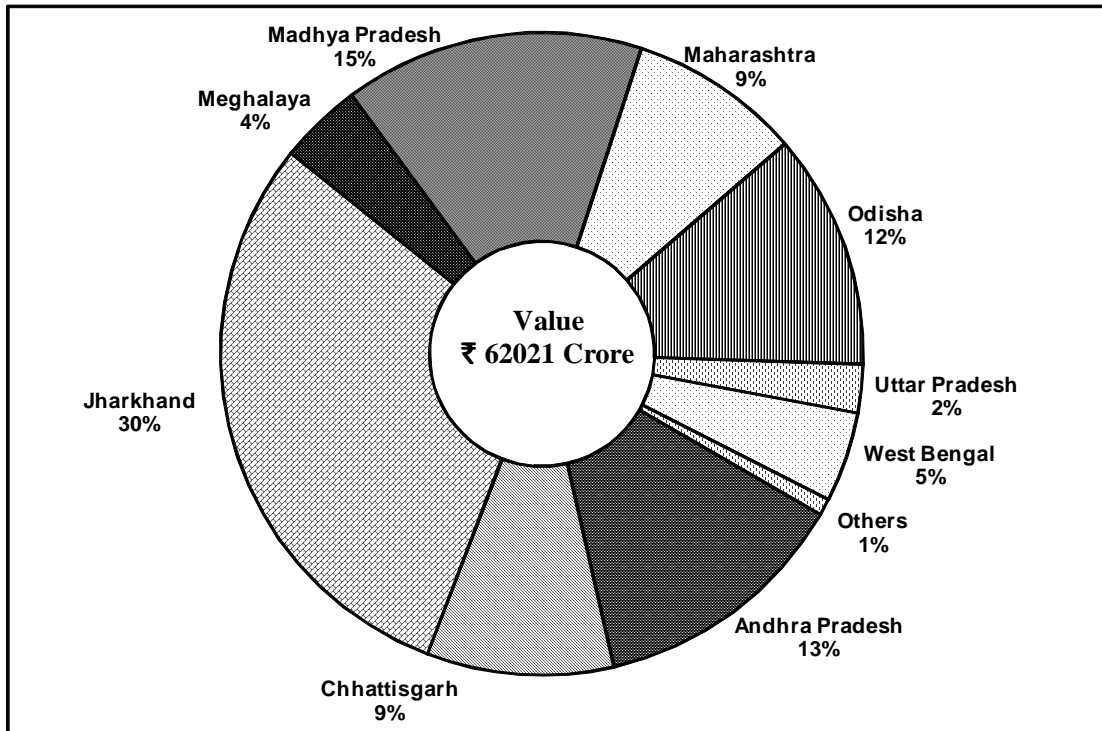
COAL & LIGNITE



Quantity of Production of Coal in Different States in 2010-11



Value of Production of Coal in Different States in 2010-11



COAL & LIGNITE

Statewise analysis revealed that despatches except from Madhya Pradesh, Maharashtra and West Bengal, increased in 2010-11 as compared to the previous year (Table-13).

Of the total despatches of raw coal effected in 2010-11, a sizable share of 73% was made to the electricity sector. As much as 3.3% was made to the steel industry, 3.2% to the sponge iron industry, 2.7% to the cement industry, 0.6% to the fertilizer, 0.5% to the paper & pulp industry, 0.3% to the cokeries and 0.2% to other basic metal sector. The remaining 16.2% was made for other priority sectors including textile & rayons and chemical (Table-14).

Stocks

The mine-head stocks of coal at the end of the year 2010-11 were 72.2 million tonnes which was 11.3% more than that at the beginning of the year. Bulk of the coal stocks (about 98.4%) at the end of the year was accounted for by the mines located in the states of Jharkhand, Odisha, Chhattisgarh, Maharashtra, Madhya Pradesh, Andhra Pradesh and West Bengal (Table - 15).

Prices

Domestic prices of coal during 2007-08 to 2010-11 are furnished in the General Review on 'Prices'.

LIGNITE

Production and Despatches

During the year 2010-11, the production of lignite at 37.73 million tonnes increased by 10.7% in comparison to that of the previous year. The production from Tamil Nadu accounted for 61.3%. The share of Gujarat in lignite production was 34.6% and that of Rajasthan was 4.1%.

Out of total 14 mines of lignite that were in operation during 2010-11, seven are located in Gujarat and three in Tamil Nadu and four in

Rajasthan (Tables - 16 and 17).

The quantum of despatches of lignite was 37.7 million tonnes undertaken during the year 2010-11 which was higher by around 9.5% as compared to that in the previous year (Table - 18).

Stocks

Stocks of lignite at the end of 2010-11 were 610 thousand tonnes as against 565 thousand tonnes at the beginning of the year (Table- 19).

**Table – 7 : Number of Coal Mines,
2009-10 & 2010-11
(By States)**

State	No. of Mines	
	2009-10 #	2010-11 \$
India	560	559
Andhra Pradesh	49	50
Arunachal Pradesh	1	1
Assam	7	7
Chhattisgarh	60	62
Jammu & Kashmir	7	7
Jharkhand	174	174
Madhya Pradesh	75	71
Maharashtra	55	55
Meghalaya	1	1
Odisha	26	28
Uttar Pradesh	5	5
West Bengal	100	98

Relates to number of mines as on 31.3.2010.

\$ Relates to number of mines as on 31.3.2011.

COAL & LIGNITE

**Table – 8 : Production of Coal, 2008-09 to 2010-11
(By Sectors/States)**

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

State	2008-09		2009-10		2010-11(P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	492757	455370200	532042	513182500	532694	620210400
Public sector	450115	418973800	484040	461918400	485061	525347400
Private sector	42642	36396400	48002	51264100	47633	94863000
Andhra Pradesh	44546	55682500	50429	67373100	51333	81106100
Arunachal Pradesh	142	323800	251	894300	299	1106000
Assam	1009	2707900	1113	3965200	1101	4072600
Chhattisgarh	101922	67873600	109953	50308300	113824	58256200
Jammu & Kashmir	11	57800	23	18600	24	22400
Jharkhand	96272	96741700	105917	140529500	108949	185716200
Madhya Pradesh	71325	78404100	74074	84933100	71104	93673600
Maharashtra	38705	47850300	41005	50887500	39336	53628800
Meghalaya	5489	12514900	5767	20545600	6974	25796800
Odisha	98402	51725700	106409	58751300	102565	73545300
Uttar Pradesh	12029	8747200	13968	15067800	15526	15122300
West Bengal	22905	32740700	23133	19908200	21659	28164100

Source: Coal Directory of India, 2010-11, Coal Controller's Organisation, Kolkata.

**Table – 9 : Production of Coal, 2008-09 & 2009-10(U)
(By Frequency Groups)**

Production group (tonnes)	No. of mines #		Production for the group ('000 tonnes)#		Percentage in total production #		Cumulative percentage	
	2008-09\$	2009-10\$	2008-09	2009-10	2008-09	2009-10	2008-09	2009-10
All Groups	561	560	487268	526276	100.00	100.00	100	100
0-10000	55	48	63	54	0.01	0.01	0.01	0.01
10001-25000	16	19	310	356	0.06	0.07	0.07	0.08
25001-50000	52	46	1916	1638	0.39	0.31	0.46	0.39
50001-100000	71	74	5513	5496	1.13	1.04	1.59	1.43
100001-300000	156	157	29676	30507	6.09	5.80	7.68	7.23
300001-500000	66	57	25418	22082	5.22	4.20	12.90	11.43
500001-1000000	133	147	251563	284968	51.63	54.15	64.53	65.58
1000001 & above	12	12	172809	181175	35.47	34.42	100.00	100.00

Excluding Meghalaya. \$ Relates to mines as on 31.03.2010.

Source: Coal Controller's Organisation, Kolkata.

COAL & LIGNITE

**Table – 10 : Production of Coal, 2009-10 & 2010-11
(By Grades and by Sectors)**

(In '000 tonnes)

Grade	2009-10			2010-11(P)		
	Total	Pub. Sec.	Pvt. Sec.	Total	Pub. Sec.	Pvt. Sec.
All Grades	532042	484040	48002	532694	485061	47633
Coking	44413	37200	7213	49547	42510	7037
ST-I	109	109	–	263	263	–
ST-II	1380	1380	–	1558	1558	–
W-I	297	297	–	235	235	–
W-II	1868	1589	279	1757	1752	5
W-III	10068	8135	1933	10165	8016	2149
W-IV	30524	25523	5001	35399	30516	4883
SC-I	167	167	–	170	170	–
SLV1	–	–	–	–	–	–
Non-coking	487629	446840	40789	483147	442551	40596
A	10692	4925	5767	12182	5208	6974
B	25827	24836	991	24023	24017	6
C	56147	51902	4245	55581	50293	5288
D	50518	44179	6339	45710	39737	5973
E	117855	113115	4740	121227	117231	3996
F	219097	206141	12956	212693	203228	9465
G	7099	1348	5751	10612	1718	8894
Ungraded	394	394	–	1119	1119	–

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

**Table – 11 (A) : Production of Coking Coal, 2009-10
(By States and by Grades)**

(In '000 tonnes)

State	All-Grades	ST-I	ST-II	W-I	W-II	W-III	W-IV	SLV1	SC-I
India	44413	109	1380	297	1868	10068	30524	–	167
Chhattisgarh	150	–	–	–	–	–	–	–	150
Jharkhand	43666	74	1380	297	1323	10068	30524	–	–
Madhya Pradesh	545	–	–	–	545	–	–	–	–
West Bengal	52	35	–	–	–	–	–	–	17

COAL & LIGNITE

**Table – 11 (B) : Production of Coking Coal, 2010-11
(By States and by Grades)**

(In '000 tonnes)

State	All-Grades	ST-I	ST-II	W-I	W-II	W-III	W-IV	SLV1	SC-I
India	49547	263	1558	235	1757	10165	35399	–	170
Chhattisgarh	163	–	–	–	–	–	–	–	163
Jharkhand	48945	234	1558	235	1354	10165	35399	–	–
Madhya Pradesh	403	–	–	–	403	–	–	–	–
West Bengal	36	29	–	–	–	–	–	–	7

**Table – 12 (A) : Production of Non-coking Coal, 2009-10
(By States and by Grades)**

(In '000 tonnes)

State	All-Grades	A	B	C	D	E	F	G	Ungraded
India	487629	10692	25827	56147	50518	117855	219097	7099	394
Andhra Pradesh	50429	34	729	7394	9444	17377	13795	1285	371
Arunachal Pradesh	251	251	–	–	–	–	–	–	–
Assam	1113	1113	–	–	–	–	–	–	–
Chhattisgarh	109803	1252	8259	4413	2847	–	89003	4029	–
Jammu & Kashmir	23	–	–	–	–	–	–	–	23
Jharkhand	62251	193	658	9611	9495	25475	16756	63	–
Madhya Pradesh	73529	1249	2843	27271	9758	32408	–	–	–
Maharashtra	41005	–	407	2262	12065	26271	–	–	–
Meghalaya	5767	5767	–	–	–	–	–	–	–
Odisha	106409	–	232	238	1734	6153	96330	1722	–
Uttar Pradesh	13968	–	–	100	4336	9532	–	–	–
West Bengal	23081	833	12699	4858	839	639	3213	–	–

COAL & LIGNITE

**Table –12 (B) : Production of Non-coking Coal, 2010-11
(By States and by Grades)**

(In '000 tonnes)

State	All-Grades	A	B	C	D	E	F	G	Ungraded
India	483147	12182	24023	55581	45710	121227	212693	10612	1119
Andhra Pradesh	51333	051	695	8155	11068	16830	11775	1718	1041
Arunachal Pradesh	299	299	–	–	–	–	–	–	–
Assam	1101	1101	–	–	–	–	–	–	–
Chhattisgarh	113661	1244	8149	3870	2797	–	88707	8894	–
Jammu & Kashmir	24	–	–	–	–	–	–	–	24
Jharkhand	60004	289	493	8929	5970	26233	18090	–	–
Madhya Pradesh	70701	1503	2807	27054	8867	30470	–	–	–
Maharashtra	39336	–	340	2107	8676	26836	1377	–	–
Meghalaya	6974	6974	–	–	–	–	–	–	–
Odisha	102565	–	210	222	1790	10528	89815	–	–
Uttar Pradesh	15526	–	–	228	5868	9430	–	–	–
West Bengal	21623	721	11329	5016	674	900	2929	–	54

**Table – 13 : Despatches of Raw Coal, 2009-10 & 2010-11
(By States)**

(In '000 tonnes)

State	2009-10	2010-11(P)
India	513792	523465
Andhra Pradesh	49266	50046
Arunachal Pradesh	226	245
Assam	1071	1102
Chhattisgarh	106921	109562
Jammu & Kashmir	17	25
Jharkhand	99863	106637
Madhya Pradesh	73481	69443
Maharashtra	40743	38240
Meghalaya	5767	6974
Odisha	100591	104359
Uttar Pradesh	13587	15393
West Bengal	22259	21439

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**Table –14 : Despatches of Raw Coal, 2009-10 & 2010-11
(By Priorities)**

Priority	(In '000 tonnes)	
	2009-10	2010-11 (P)
Total	513792	523465
Steel	18359	17199
Sponge Iron	17259	17019
Chemical	578	509
Electricity	378242	382119
Cement	14362	14182
Cokeries	215	1427
Paper & pulp	2335	2432
Fertilizer	2626	2942
Textile & Rayons	272	275
Other Basic metal	742	1166
Others	78802	84195

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

**Table – 15 : Mine-head Stocks of Coal, 2010-11
(By States)**

State	(In '000 tonnes)	
	At the beginning of the year	At the end of the year
India	64863	72192
Andhra Pradesh	1224	2413
Arunachal Pradesh	49	104
Assam	294	293
Chhattisgarh	7015	9731
Jammu & Kashmir	8	4
Jharkhand	24933	27128
Madhya Pradesh	2498	4391
Maharashtra	2701	3793
Odisha	23409	21611
Uttar Pradesh	664	798
West Bengal	2068	1926

**Table – 16 : Production of Lignite, 2008-09 to 2010-11
(By Sector/States)**

	(Quantity in '000 tonnes; value in ₹'000)					
	2008-2009		2009-10		2010-11(P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	32421	36877900	34071	37756000	37733	43307200
Public sector	32140	36558271	33760	37411363	36780	42213416
Private sector	281	319629	311	344637	953	1093784
Gujarat	10114	8926300	10526	7013700	13064	13480300
Rajasthan	999	1160000	1207	479400	1525	1071600
Tamil Nadu	21308	26791600	22338	30262900	23144	28755300

**Table – 17 : Number of Lignite Mines
2009-10 & 2010-11
(By States)**

State	No. of Mines	
	2009-10	2010-11
India	13	14
Gujarat	7	7
Rajasthan	3	4
Tamil Nadu	3	3

**Table – 18 : Despatches of Lignite
2009-10 & 2010-11
(By States)**

State	(In '000 tonnes)	
	2009-10	2010-11
India	34430	37685
Gujarat	10411	13079
Rajasthan	1207	1525
Tamil Nadu	22812	23081

**Table – 19 : Mine-head Stocks of
Lignite, 2010-11
(By States)**

State	(In '000 tonnes)	
	At the beginning of the year	At the end of the year
India	565	610
Gujarat	155	139
Rajasthan	–	–
Tamil Nadu	410	471

MINING & MARKETING

Coal

Coal mining in the country is being carried out by opencast and underground methods. Opencast mining contributed over 90% of total production whereas rest of the production (about 10%) comes from underground mining. These mines are mostly 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 yield higher output with high percentage recovery (70-80%). In opencast mines, machinery like draglines, dozers, shovels, dumpers and graders are deployed for various operations.

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 of the Government of India and the 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 and South Karanpura Coalfields

COAL & LIGNITE

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 and Rajmahal Coalfields in Bihar. It produced and supplied coal to the loco and other industries which required 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), Damodar Valley Corporation (DVC) and Jammu & Kashmir Minerals Ltd (JKML) are the State Government undertakings engaged in coal mining. IISCO steel plant of SAIL is the only public sector steel unit operating captive mines for coal. Bengal Emla 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 31.3.2011, there were 559 operating mines for coal in the country, out of which 203 were opencast while 325 were underground mines. The remaining 31 were mixed collieries. There were 533 public sector mines and 26 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 2010-11, share of production of raw coal from opencast mines was 89.7% against 10.3% 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) in 2010-11 was 4.74 tonnes as against 4.48 tonnes in 2009-10.

**Table – 20 : Number* of Coal Mines, 2010-11
(By Sectors/States)**

State	No. of collieries			
	OC	UG	Mixed	Total
All India	203	325	31	559
Public sector	184	318	31	533
Private sector	19	7	–	26
Andhra Pradesh	14	36	–	50
Arunachal Pradesh	1	–	–	1
Assam	3	4	–	7
Chhattisgarh	21	40	1	62
Jammu & Kashmir	–	7	–	7
Jharkhand	72	75	27	174
Madhya Pradesh	21	48	2	71
Maharashtra	32	23	–	55
Meghalaya	–	1	–	1
Odisha	17	11	–	28
Uttar Pradesh	5	–	–	5
West Bengal	17	80	1	98

Source: Coal Directory of India, 2010-11, Coal Controller's Organisation, Kolkata.

** As on 31.3.2011*

Note: OC - Opencast UG - Underground.

Table – 21 : Production of Raw Coal

(In million tonnes)

Year	Production from open-cast mines (% share)	Production from under-ground mines (% share)	Total production
2008-09	433.79 (88%)	58.97 (12%)	492.76
2009-10	473.52 (89%)	58.52 (11%)	532.04
2010-11	477.84 (89.7%)	54.85 (10.3%)	532.69

*Source: Coal Directory of India, 2010-11
Coal Controller's Organisation, Kolkata.*

**Table – 22 : Production of Coal, 2010-11
(By Technologies)**

(In million tonnes)

Technology adopted	Production	Percentage of total
All India : Total	532.694	100
Opencast (Total)	477.839	89.70
Mechanised	470.460	98.50
Manual	7.379	1.50
Underground (Total)	54.855	10.30
Conventional B&P	8.045	14.70
Mechanised B&P	42.501	77.50
Conventional LW	-	-
Mechanised LW	1.048	1.90
Other methods	3.261	5.90

*Source: Coal Directory of India, 2010-11,
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 deregulated.

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

Lignite

Out of the fourteen opencast working mines, three 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) & VSLPPL. Sectorwise, thirteen mines are under public sector and the remaining one is under private sector i.e. GHCL. NLC shared maximum production during the period under review. The NLC mines are a part of an integrated complex consisting of three opencast lignite mines (10.5 million tpy + 10.5 million tpy + 3 million tpy), 3 thermal power plants (600 MW+ 420 MW+1470 MW) and a carbonisation and briquetting plant (262,000 tpy) producing carbonised briquettes, commercially called "Leco". The third mine having 3 million tpy capacity feeds an independent power project of 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 Barsingsar 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. The mine is expected to produce 1.79 million tonnes lignite per annum by 2012-13. The NLC's mines are highly mechanised. Electric-powered equipment like bucket-wheel excavators, fabric & steel cord belt conveyors, tippers and spreaders are used in their opencast mines for excavation, transportation and refilling of overburden. The Neyveli Lignite Mines is the largest opencast mine in the whole country with eco-friendly technology. Hydraulic shovels & dumpers are used only for auxiliary works. Mobile Transfer Conveyor (MTC) of capacity 4420 cu m/hr, stacker of 4000 t/hr capacity and reclaimer of 2000 t/hr 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).

The Central Government, 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 stake holders for allocation of such blocks.

With the progressive allocation of coal blocks, the number of coal blocks available for allocation is declining, while the number of applicants per block is increasing, as the demand for coal keeps increasing. This has made selection of an applicant in respect of a block difficult and vulnerable to criticism on the ground of lack of transparency and objectivity.

While efforts are on hand 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 the competitive bidding and same are notified on 2.2.2012. The commencement of the Amendment Act has been notified on 13.2.2012.

The Ministry of Power proposes to set up four Ultra Mega Power Projects (UMPP) with capacity of 4000 MW each, through tariff-based competitive bidding. The Ministry of Coal has allocated at Moher, Moher-Amlori Extension and Chhatrasal coal blocks (750 million tonnes) for the proposed UMPP to be set up at Sasan in Madhya Pradesh; Meenakshi, Meenakshi-B and dip side of Meenakshi coal blocks (885.24 million tonnes) for the proposed UMPP and Bankhui (800 million tonnes) for the proposed first additional UMPP to be set up in Odisha; Kerandari BC coal block (972 million tonnes) for the proposed UMPP to be set up in Jharkhand and Puta Parogia (692.16 million tonnes) and Pindrakhi (421.51 million tonnes) coal blocks for the proposed UMPP to be set up in Chhattisgarh.

At present, captive coal blocks are only allotted to companies in power, iron & steel, Government commercial, private commercial & cement and coal to oil sectors. Till 31.3.2011, a total of 206 coal blocks with 49,258 million tonnes geological reserves have been allotted in various states (Table-23). Similarly, 27 captive lignite blocks with 1,996.8 million tonnes geological reserves have been allocated in Gujarat (12) and Rajasthan (15) till 31.3.2011. Of these, 5 blocks are allocated for power generation and 7 blocks for commercial end use in Gujarat. In Rajasthan, the allocation of 10 blocks is for power and 5 for commercial end use.

**Table – 23 : Allotment of Captive Coal Blocks,
(Till 31.3.2011)
(Statewise)**

(In million tonnes)		
State	No. of Coal Blocks	Geological Reserves
Total	206	49258.0
Arunachal Pradesh	1	27.0
Andhra Pradesh	4	237.2
Chhattisgarh	39	8954.7
Jharkhand	58	15175.5
Madhya Pradesh	25	3352.4
Maharashtra	26	1090.0
Odisha	33	16267.1
West Bengal	20	4154.2

*Source: Coal Directory of India, 2010-11,
Coal Controller's Organisation, Kolkata.*

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

In terms of Govt. of India, CBM Policy 1997, 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) is looking 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.

Keeping these objectives in view, 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 in underground and opencast mining, methodology of 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 and abandoned mines, coal gasification, application of geographical information system (GIS), environmental mitigation and emission trading, overseas ventures for sourcing coking coal, etc. Training of CIL personnel for effective 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 6.96 million tonnes of coking coal in 2010-11. Similarly, 35 coal washeries with 111.61 million tonnes capacity produced about 21.38 million tonnes non-coking coal during the year. In public sector, BCCL operates 9 coking coal washeries (Dugda II, Bhojudih, Patherdih, Sudamdih, Barora, Moonidih, Mahuda, Madhubann and Dugda-I), CCL operates 4 washeries (Kathara, Swang, Rajrappa and Kedla), WCL one (Nandan) and SAIL operates one (Chasnala) whereas 4 washeries (West Bokaro-II, West Bokaro-III, Jamadoba and Bhelatand) were operated by Tata Steel Ltd, in private sector. In public sector, 9 non-coking coal washeries (three each in BCCL & CCL, two in SCCL and one in NCL) were operational, whereas in private sector, 26 non-coking coal washeries were in operation. Production of washed coking coal during 2010-11 was about 3.79 million tonnes in Public Sector and 3.17 million tonnes in Private Sector.

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.

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Table – 24 : Production of Washed Coking Coal, 2009-10 & 2010-11 (Sectorwise/Companywise)

	(In '000 tonnes)	
	2009-10	2010-11
All India : Total	6547.0	6955.0
Public Sector	3499.0	3785.0
BCCL	1329.0	1549.0
CCL	1396.0	1453.0
WCL	248.0	191.0
SAIL	526.0	592.0
Private Sector	3048.0	3170.0
Tata Steel Ltd	3048.0	3170.0

Source: Coal Directory of India, 2010-11, Coal Controller's Organisation, Kolkata.

Table – 25 : Capacity of Washed Coking Coal, 2010-11 (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
Madhubann	-do-	2500
CCL		9350
Kathara	-do-	3000
Swang	-do-	750
Rajrappa	-do-	3000
Kedla	-do-	2600

(Contd.)

Table - 25 (Concl.)

Coalfield/washery	State	Raw coal capacity (In '000 tpy)
WCL		1200
Nandan (Pench-Kanhan)	Madhya Pradesh	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, 2010-11, Coal Controller's Organisation, Kolkata (except totals).

Table – 26 : Production of Washed Non-coking Coal : 2009-10 & 2010-11 (Sectorwise/Companywise)

	(In '000 tonnes)	
	2009-10 (R)	2010-11
All India : Total	39028.9	21384.7
Public Sector	11247.0	12367.0
BCCL	301.0	314.0
CCL	7424.0	8063.0
NCL	3522.0	3339.0
SCCL	-	651.0
Private Sector	27781.9	9017.7
JSPL	1766.4	1927.0
BLA Ind. Ltd	293.6	256.0
Aryan Coal Beneficiation Pvt. Ltd	14959.6	1527.0
Aryan Energy Pvt. Ltd	61.0	50.0
Bhatia International Ltd	2467.0	1700.0
Global Coal & Mining Pvt. Ltd	2239.7	2540.0
Kartikey Coal Washeries Pvt. Ltd	782.3	900.0
Spectrum Coal & Power Ltd	5145.2	-
Earth Minerals Co. Ltd	67.1	117.7

Source: Coal Directory of India, 2010-11, Coal Controller's Organisation, Kolkata.

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**Table – 27 : Capacity of Washed Non-coking Coal, 2010-11
(Sectorwise/Companywise)**

Washery/Location	Coalfield	State	Raw Coal Capacity (In '000 tpy)
Grand Total			111610
Public Sector	Total		23200
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	Bina	Uttar Pradesh	4500
SCCL			3000
Manuguru	Khammam	Andhra Pradesh	1500
Ramagundam	Khammam	Andhra Pradesh	1500
Private Sector	Total		88410
Jindal Steel & Power Ltd			6000
Pit Head Washery (JSPL)	Mand Raigarh	Chhattisgarh	6000
BLA Industries Pvt. Ltd			330
BLA Washery	Dharmasthal	Madhya Pradesh	330
Aryan Coal Beneficiation Pvt. Ltd			26960
Chakabuwa	Korba	Chhattisgarh	6000
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			6000
Wani	Wardha	Maharashtra	2000
Ghugus	Wardha	Maharashtra	4000
Global Coal & Mining Pvt. Ltd			5000
Ib Valley	Ib Valley	Odisha	1500
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			13000
Wani	Wardha	Maharashtra	13000
Spectrum Coal & Power Ltd (ST-CLI)			5200
Korba	Korba	Chhattisgarh	5200

Contd.

COAL & LIGNITE

Table -27 (Concl'd.)

Washery/Location	Coalfield	State	Raw Coal Capacity (In '000 tpy)
Indo Unique Flames Ltd			5400
Nagpur	Wardha	Maharashtra	600
Punwat	Wardha	Maharashtra	2400
Wani	Wardha	Maharashtra	2400
Earh Minerals Company Ltd			4000
Talcher	Jharsuguda	Odisha	4000

Source: Coal Directory of India, 2010-11, Coal Controller's Organisation, Kolkata (Except totals).

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 given in Table - 28. Changing, 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 3360 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% Ash content not exceeding 15%.
3.	Coking coal	Steel Grade I	Ash content exceeding 15% but not exceeding 18%.
		Steel Grade II	Ash content exceeding 18% but not exceeding 21% .
		Washery Grade I	Ash content exceeding 21% but not exceeding 24%.
		Washery Grade II	Ash content exceeding 24% but not exceeding 28%.
		Washery Grade III Washery Grade IV	Ash content exceeding 28% but not exceeding 35%.
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%.

CONSUMPTION

Thermal power plants, Iron & Steel 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 given in Table - 29.

**Table – 29 : Despatches* of Coal
2008-09 to 2010-11
(By Industries)**

(In million tonnes)			
Industry	2008-09	2009-10	2010-11
Total	489.17	513.79	523.46
Iron & steel ¹	17.77	18.57	18.63
Sponge iron	19.78	17.26	17.02
Fertilizer	2.43	2.63	2.94
Cement	13.12	14.36	14.18
Electricity	377.27	378.24	382.20
Others (Chemical, base metals, paper & pulp, textile & rayon, bricks, etc.	58.80	82.73	88.49

Source: Coal Directory, 2008-09, 2009-10 and 2010-11.

* Data on consumption is not available.

1 Includes direct feed, cokeries and boilers.

DEMAND & SUPPLY

XIIth Plan Demand Projections

(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

(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 XII Plan.

WORLD REVIEW

World proved coal reserves were estimated at 860.94 billion tonnes at the end of 2011 of which, 404.76 billion tonnes (47%) is classified as anthracite & bituminous coal and 456.18 billion tonnes (53%) as sub-bituminous coal & lignite (Table-30). World production of coal and lignite increased from about 6.85 billion tonnes in 2009 to 7.15 billion tonnes in 2010. China continued to be the largest producer of coal and lignite in 2010 with about 45% share in total world production, followed by USA (13%), India (7%), Australia (6%) and Russia & Indonesia (4% each). The remaining 21% of the total world coal production was from other producing countries (Table-31). Global primary energy consumption fell by 1.1% over the preceding year. Asia Pacific and the Middle East has increased coal consumption during the year.

**Table – 30 : World Proved Coal Reserves
at the end of 2011
(By Principal Countries)**

(In million tonnes)			
Country	Anthracite and bituminous coal	Sub-bituminous coal and lignite	Total
World : Total	404762	456176	860938
Australia	37100	39300	76400
Brazil	–	4559	4559
Canada	3474	3108	6582
China	62200	52300	114500
Colombia	6366	380	6746
Germany	99	40600	40699
India*	56100	4500	60600
Indonesia	1520	4009	5529
Kazakhstan	21500	12100	33600
Poland	4338	1371	5709
Russian Federation	49088	107922	157010
South Africa	30156	–	30156
Ukraine	15351	18522	33873
USA	108501	128794	237295
Other countries	8969	38711	47680

Source: BP Statistical Review of World Energy, June 2012.

* India's reserves of coal as on 1.4.2011 are estimated at 285.86 billion tonnes to a depth of 1,200 m and those of lignite at 40.91 billion tonnes.

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

(In Million tonnes)			
Country	2008	2009	2010
World : Total	6815	6849	7153
Australia			
Hard coal	333	350	356
Brown coal	66	68	69
Bulgaria			
Brown Coal & lignite	29	27	29
Canada			
Hard coal	58	52	58
Lignite	10	11	10
China			
Hard coal	2802	2973	3240
Colombia			
Hard coal	74	73	74
Czech. Rep.			
Bituminous coal	12	11	11
Brown Coal	47	45	44
Germany			
Hard coal	19	15	14
Brown coal	175	170	169
Greece			
Lignite	65	62	54
India			
Hard coal	493	532	499
Lignite	32	34	35
Indonesia			
Hard coal	240	255	275
Kazakhstan			
Hard coal	106	87	90
Korea Democratic Rep.			
Coal all form	25	25	25
Mexico			
Bituminous coal	16	13	16
Poland			
Hard coal	84	78	76
Lignite	60	57	57
Romania			
B. Coal & lignite	35	29	29
Russia			
Hard coal	326	298	317
South Africa			
Hard coal	252	251	255
Thailand			
Lignite	18	16	18
Turkey			
Hard coal	3	4	4
Lignite	86	82	74
Ukraine			
Hard coal	78	55	55
United Kingdom			
Bituminous coal	18	18	18
USA			
Hard coal	997	895	893
Lignite	69	66	65
Vietnam			
Anthracite	40	44	44
Other Countries	147	153	180

Source: World Mineral Production, 2006-2010.

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

* India's production of coal and lignite during 2010-11 was 532.7 million tonnes and 37.7 million tonnes, respectively.

As estimated by the 'World Coal Association', coal currently fuels 41% of the world electricity and this proportion is set to remain static over the next 30 years. About 70% of the world's steel production is based on coal. 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 States; 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 to come for 2014. At Newcastle, New South Wales, Port Waratah Coal Services expanded its Kooragang Terminal capacity by 13 million tonnes per year to 102 million tonnes per year and planned a further increase to 113 million tonnes per year. The Newcastle

Coal Infrastructure Group planned to add a 30 million tonnes per year terminal in 2010. The total combined terminal capacity in the states of New South Wales and Queensland would be 448 million tonnes per year.

China

Coal consumption had increased to meet the high demand for industrial and power generation. Coal was the primary source of energy and two-thirds of the country's electricity was produced by coal-fired plants. About 50% of the country's total coal output was consumed by the power sector. China's coal production continued to increase in 2010 because of an increase in demand for coal in industrial sector. However, owing to high coal and coking coal prices in the domestic market and weak international coal prices, coastal coking coal producers imported a large volume of coal. The Government continued to close small coal mines to reduce fatalities. In the long-term, several large companies are expected to produce coal along with small mines.

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. Operations at the Jorong coal mine on Kalimantan Island were resumed in August 2010 by PT Indo Tambangraya Megah Tbk.

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 2010-11, exports of coal increased about 75% to 4.33 million tonnes from 2.47 million tonnes in the previous year. Exports of coke also increased to 0.65 million tonnes in 2010-11 from 0.13 million tonnes in 2009-10. Coal was mainly exported to China (53%), Bangladesh (27%), Nepal (16%) and Japan (4%). Coke was exported predominantly to Brazil (50%), Bhutan (20%), Turkey (12%) and USA (6%). Exports of lignite were negligible and there was no export of coal gas in 2010-11 (Tables - 32 to 35).

Imports

Imports of coal decreased slightly by 6% to 69 million tonnes in 2010-11 from 73 million tonnes in the previous year. Imports of coke also decreased by 37% to 1.49 million tonnes in 2010-11 from 2.36 million tonnes in the previous year. Coal was mainly imported from Indonesia (52%), Australia (25%) and South Africa (16%) whereas coke was imported mainly from China (47%), Australia (15%), USA (12%) and Russia & Japan (6% each). Imports of lignite were negligible while imports of briquettes of coke/semi-coke were 100 tonnes in 2010-11 (Tables - 36 to 39).

COAL & LIGNITE

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

Country	2009-10		2010-11	
	Qty (‘000 t)	Value (₹’000)	Qty (‘000 t)	Value (₹’000)
All Countries	2471	5208101	4327	11516365
China	55	186610	2301	7024285
Bangladesh	1449	3339022	1159	2462446
Nepal	794	753265	681	1201472
Japan	++	2	178	803884
Bhutan	55	194618	8	19970
UAE	++	830	++	1847
Saudi Arabia	-	-	++	1010
Germany	++	6	++	379
UK	++	26	++	342
N. Mariana Is	-	-	++	214
Other countries	118	733722	++	516

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

Country	2009-10		2010-11	
	Qty (t)	Value (₹’000)	Qty (t)	Value (₹’000)
All Countries	127251	2057266	650394	9912439
Brazil	38500	673869	322500	6041576
Turkey	-	-	79500	1466169
USA	1	18	36000	692982
Bhutan	21823	222845	132336	480002
Pakistan	15770	254097	20249	372486
Netherlands	-	-	19800	357291
Bahrain	6055	83184	14243	185576
Korea Rep. of	200	3364	6401	129949
South Africa	1833	34809	4366	92476
Nepal	428	6605	10190	23579
Other countries	42641	778475	4809	70353

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

Country	2009-10		2010-11	
	Qty (‘000 t)	Value (₹’000)	Qty (‘000 t)	Value (₹’000)
All Countries	++	6397	++	9834
Egypt	-	-	++	3991
UAE	++	4738	++	2108
Iran	-	-	++	1181
Myanmar	-	-	++	1123
Indonesia	-	-	++	738
Turkey	-	-	++	443
El Salvador	-	-	++	172
Bangladesh	-	-	++	76
Germany	-	-	++	2
Other countries	++	1659	-	-

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

Country	2009-10		2010-11	
	Qty (‘000 t)	Value (₹’000)	Qty (‘000 t)	Value (₹’000)
All Countries	73257	391798228	68918	415494801
Australia	22837	183802972	17273	181449036
Indonesia	32165	115473599	35944	134788133
South Africa	14492	62269478	11214	57272632
USA	1400	13303028	1770	19829296
New Zealand	1059	9976882	795	7703847
Russia	146	1382492	424	4216902
Vietnam	188	1694285	241	2580766
China	45	235500	242	1752587
Philippines	671	2235122	261	801774
Unspecified	-	-	333	1783374
Other countries	254	1424870	421	3316454

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

Country	2009-10		2010-11	
	Qty (t)	Value (₹’000)	Qty (t)	Value (₹’000)
All Countries	8621	412734	-	-
Other countries	8621	412734	-	-

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

Country	2009-10		2010-11	
	Qty (‘000 t)	Value (₹’000)	Qty (‘000 t)	Value (₹’000)
All Countries	++	1053	++	310
Canada	++	1053	++	310

COAL & LIGNITE

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

Country	2009-10		2010-11	
	Qty (t)	Value (₹.'000)	Qty (t)	Value (₹.000)
All Countries	2355535	33310985	1490210	31203551
China	86146	1794164	700574	16211830
Australia	305417	4305050	222309	3910751
USA	94395	1254991	176142	3069805
Russia	587398	8516623	89619	1748398
Japan	281043	4004989	85975	1330033
Poland	384121	5131822	43730	1061862
Vietnam	18614	307955	41092	942376
Colombia	176962	2594249	36527	826659
Bosnia-Hrzgovin	-	-	29083	656986
UK	477	8663	29071	643591
Other countries	420962	5392479	36088	801260

FUTURE OUTLOOK

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

Country	2009-10		2010-11	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹ '000)
All Countries	23	581	100	685
Mozambique	-	-	100	685
Other countries	23	581	-	-

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 will be met by imports of 35.50 million tonnes of coking coal and 230 million tonnes of non-coking coal.