Indian Minerals Yearbook 2018

(Part- III : Mineral Reviews)

57th Edition

COAL AND LIGNITE

(ADVANCE 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, 2019

7 Coal & Lignite

Coal is a fossil fuel. It is a combustible, sedimentary, organic rock, which is composed mainly of carbon, hydrogen and oxygen. It is formed from vegetation, which has been consolidated between other rock strata and altered by the combined effects of pressure and heat over millions of years to form coal seams.

The build-up of silt and other sediments, together with movements in the earth's crust (known as tectonic movements) buried these swamps and peat bogs, often to great depths causing the plant material to be subjected to high temperatures and pressures. Million of years of deep burial engendered such physical and chemical changes that which transformed the vegetation into peat and then into coal.

The quality of each coal deposit is determined by temperature and pressure and by the length of time in formation, which is referred to as its 'organic maturity'. Initially the peat is converted into lignite or 'brown coal' – these are coal types with low organic maturity. In comparison to other coals, lignite is quite soft and its colour can range from dark black to various shades of brown.

Many more millions of years of continuious effects of temperature and pressure produced to further transformation of lignite, progressively increasing its organic maturity into the range known as 'sub-bituminous' coals.

Further chemical and physical changes have caused these coals to become harder and blacker, forming the 'bituminous' or 'hard coals'. Under the right conditions and progressive contrivance of organic maturity, finally result in the formation of anthracite.

Coal is vital for 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. India has a long history of commercial coal mining since 1774 and nationalisation of coal mines was put to effect on 01.05.1973. As per Integrated Energy Policy Committee of erstwhile Planning Commission, coal will remain India's most important energy source till 2031-32 and possibly beyond. In India, during the year 2017-18, about 84% coal got despatched to the 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 about 657.87 million tonnes in 2016-17 increased by about 2.7% to 675.40 million tonnes in 2017-18. The production of lignite at 46.26 million tonnes in 2017-18 increased by about 2.3% from 45.23 million tonnes in the previous year. India, in 2017 ranked 2nd in the world coal production.

RESOURCES

Coal

The coal deposits in India primarily are concentrated in the Gondwana sediments occurring mainly in the eastern and central parts of Peninsular India, although Gondwana coal deposits also are found to occur in the north-eastern part of the country mainly in Assam and Sikkim. 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, 319.020 billion tonnes (including that estimated in Sikkim) of geological coal resources up to 1,200 m depth have been established in the country as on 01.04.2018. Out of these resources, 148.787 billion tonnes are Proved resources, 139.164 billion tonnes are Indicated resources and the remaining about 31.069 billion tonnes are in the Inferred category. Of the total resources, the share of prime-coking coal is 5.313 billion tonnes, medium-coking & blendable/semi-coking is 29.209 billion tonnes and non-coking coal, including high sulphur (tertiary) is 284.498 billion tonnes. State-wise/Coalfield-wise and State-wise/Type-wise resources of coal as on 01.04.2018 are furnished 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 also in Jammu & Kashmir. The total known geological resources of lignite as on 01.04.2018 is about 45.664 billion tonnes, of which 79% resources are located in Tamil Nadu with about 36.135 billion tonnes. Other States where lignite deposits have been located are Gujarat, Jammu & Kashmir, Kerala, Rajasthan, West Bengal and the Union Territory of Puducherry. State-wise/District-wise resources of lignite as on 01.04.2018 are detailed in Table - 3.

EXPLORATION & DEVELOPMENT

Exploration and development details, if any, are covered in the Review on "Exploration & Development" in "General Reviews" i.e, Vol.I of the title.

Table – 1 : Geological Resources of Coal as on 01.04.2018 (By States/Coalfields)

(In million tonnes)

State/Coalfield	Proved	Indicated	Inferred	Total
All India : Total	**148787.43**	**139164.14**	**31068.76**	**319020.33**
Gondwana Coalfields*	**148193.62**	**139064.80**	**30174.23**	**317432.65**
Andhra Pradesh/ Godavari Valley	**0.00**	**1149.05**	**431.65**	**1580.70**
Assam/Singrimari	–	**14.49**	–	**14.49**
Bihar/Rajmahal	**161.11**	**813.49**	**392.15**	**1366.75**
Chhattisgarh	**20427.71**	**34576.26**	**2201.90**	**57205.87**
Sohagpur	94.30	10.08	–	104.38
Sonhat	364.83	2303.81	1.89	2670.53
Jhilimili	228.20	38.90	–	267.10
Chirimiri	320.33	10.83	31.00	362.16
Bisrampur	1335.92	612.80	5.15	1953.87
East Bisrampur	–	164.82	–	164.82
Lakhanpur	455.88	3.35	–	459.23
Panchbahini	–	11.00	–	11.00
Hasdeo-Arand	2032.28	3273.42	223.12	5528.82
Sendurgarh	152.89	126.32	–	279.21
Korba	5877.26	5783.70	168.02	11828.98
Mand-Raigarh	9515.39	19170.98	1563.04	30249.41
Tatapani-Ramkola	50.43	3066.25	209.68	3326.36
Jharkhand	**45563.36**	**31438.52**	**6149.80**	**83151.68**
Raniganj	1538.19	466.56	31.55	2036.30
Jharia	15603.71	3826.35	–	19430.06
East Bokaro	3497.43	3922.80	863.32	8283.55
West Bokaro	3800.99	1352.88	33.66	5187.53
Ramgarh	756.11	742.08	58.05	1556.24
North Karanpura	10341.38	6300.92	1864.96	18507.26
South Karanpura	5176.08	1312.28	1143.28	7631.64
Aurangabad	352.05	2141.65	503.41	2997.11
Hutar	190.79	26.55	32.48	249.82
Daltonganj	83.86	60.10	–	143.96
Deogarh	326.24	73.60	–	399.84
Rajmahal	3896.53	11212.75	1619.09	16728.37
Madhya Pradesh	**11958.28**	**12153.95**	**3874.67**	**27986.90**
Johilla	185.08	104.09	32.83	322.00
Umaria	177.70	3.59	–	181.29
Pench-Kanhan	1476.88	970.34	982.21	3429.43
Patharkhera	290.80	88.13	68.00	446.93
Gurgunda	–	84.92	53.39	138.31
Mohpani	7.83	–	–	7.83
Sohagpur	2129.18	5503.20	293.47	7925.85
Singrauli	7690.81	5399.68	2444.77	15535.26

Contd.

(Table-1, Concld)

(In million tonnes)

State/Coalfield	Proved	Indicated	Inferred	Total
Maharashtra	**7177.55**	**3073.55**	**2048.14**	**12299.24**
Wardha Valley	4439.18	1723.27	1467.90	7630.35
Kamthi	1817.90	858.10	399.54	3075.54
Umrer Makardhokra	308.41	–	160.70	469.11
Nand Bander	602.06	492.18	–	1094.24
Bokhara	10.00	–	20.00	30.00
Odisha	**37391.10**	**34164.54**	**7739.16**	**79294.80**
Ib-River	12933.35	11504.21	3636.57	28074.13
Talcher	24457.75	22660.33	4102.59	51220.67
Telangana	**10474.90**	**8576.13**	**2650.92**	**21701.95**
Godavari Valley	10474.90	8576.13	2650.92	21701.95
Sikkim/Rangit Valley	**–**	**58.25**	**42.98**	**101.23**
Uttar Pradesh/Singrauli	**884.04**	**177.76**	–	**1061.80**
West Bengal	**14155.57**	**12868.81**	**4642.86**	**31667.24**
Raniganj	13954.78	7125.31	3726.52	24806.61
Barjora	200.79	–	–	200.79
Birbhum	–	5743.50	901.34	6644.84
Darjeeling	–	–	15.00	15.00
Tertiary Coalfields	**593.81**	**99.34**	**894.53**	**1587.68**
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
Nagaland	**8.76**	**–**	**401.69**	**410.45**
Borjan	5.50	–	4.50	10.00
Jhanzi-Disai	2.00	–	95.12	97.12
Tiensang	1.26	–	2.00	3.26
Tiru Valley	–	–	6.60	6.60
DGM	–	–	293.47	293.47

Source: *Indian Coal & Lignite Resources-2018, Natural Energy Resources, Mission-IIB, 2018 (GSI).*

* *Including Sikkim.*

Table – 2 : Geological Resources of Coal as on 01.04.2018 (By States/Types)

(In million tonnes)

State/Type of coal	Proved	Indicated	Inferred	Total
All India : Total	**148787.43**	**139164.14**	**31068.76**	**319020.33**
Prime-coking	4648.87	664.19	–	5313.06
Medium-coking	13913.65	11708.76	1879.47	27501.88
Blendable/Semi-coking	519.44	994.87	193.21	1707.52
Non-coking (Incl. high sulphur)	129705.47	125796.32	28996.08	284497.87
Andhra Pradesh/Non-coking	**-**	**1149.05**	**431.65**	**1580.70**
Arunachal Pradesh/ High sulphur	**31.23**	**40.11**	**18.89**	**90.23**
Assam	**464.78**	**57.21**	**3.02**	**525.01**
Non-coking	–	14.49	–	14.49
High sulphur	464.78	42.72	3.02	510.52
Bihar/Non-coking	**161.11**	**813.49**	**392.15**	**1366.75**
Chhattisgarh	**20427.71**	**34576.26**	**2201.90**	**57205.87**
Semi-coking	70.77	99.25	–	170.02
Non-coking	20356.94	34477.01	2201.90	57035.85
Jharkhand	**45563.36**	**31438.52**	**6149.80**	**83151.68**
Prime-coking	4648.87	664.19	–	5313.06
Medium-coking	13008.74	10148.65	1606.64	24764.03
Semi-coking	223.34	471.55	53.45	748.34
Non-coking	27682.41	20154.13	4489.71	52326.25
Madhya Pradesh	**11958.28**	**12153.95**	**3874.67**	**27986.90**
Medium-coking	354.49	1560.11	272.83	2187.43
Non-coking	11603.79	10593.84	3601.84	25799.47
Maharashtra/Non-coking	**7177.55**	**3073.55**	**2048.14**	**12299.24**
Meghalaya/High sulphur	**89.04**	**16.51**	**470.93**	**576.48**
Nagaland/High sulphur	**8.76**	**–**	**401.69**	**410.45**
Odisha/Non-coking	**37391.10**	**34164.54**	**7739.16**	**79294.80**
Sikkim/Non-coking	**–**	**58.25**	**42.98**	**101.23**
Telangana/Non-coking	**10474.90**	**8576.13**	**2650.92**	**21701.95**
Uttar Pradesh/Non-coking	**884.04**	**177.76**	**–**	**1061.80**
West Bengal	**14155.57**	**12868.81**	**4642.86**	**31667.24**
Medium-coking	550.42	–	–	550.42
Semi-coking	225.33	423.68	139.76	788.77
Non-coking	13379.82	12445.13	4503.10	30328.05

Source: *Indian Coal & Lignite Resources-2018, Natural Energy Resources, Mission-IIB, 2018 (GSI).*

Table – 3 : Geological Resources of Lignite as on 01.04.2018 (By States/Districts)

(In million tonnes)

State/District	Area/Lignite field	Proved	Indicated	Inferred	Total
All India : Total		**6540.71**	**26388.80**	**12734.07**	**45663.58**
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 (CGM) 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		**1168.53**	**3029.78**	**2150.77**	**6349.08**
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, Lalamdesar, Lalamdesar Bada, East of Riri, Bania, Kuchaur-Athuni, Sarupdesar-Palana west, Palana East, Gigasar-Kesardesar, Khar Charan, Ambasar-Gigasar, Girirajsar Extn., Bapeau, Bigga-Abhaysingpura. Diyatra, Pyau, Deshnok-Ramsar-Sinthal, Borana, Bangarsar-Jaimalsar and Kenya-Ki-Basti & South of Bhane-Ka-Gao, etc.	560.30	230.33	309.19	1099.82
Barmer	Kapurdi, Jalipa, Bothia (Jalipa N Ext.), Giral, Jogeswartala, Sonari, Sachcha-Sauda, Bharka, Bothia-Bhakra-Dunga, Sindhari East & West, Kurla, Kurla East, 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	2509.46	1496.77	4501.46
Jaisalmer & Bikaner	Panna & Charanwala	–	–	11.47	11.47
Jaisalmer	Bhanda, Ramgarh & Khuiyala	–	–	70.44	70.44
Jaisalmer & Barmer	Khuri	–	–	13.80	13.80
Jalore	Sewara	–	–	76.08	76.08
Nagaur	Deswal, Gangardi, Indawar, Kaprion-Ki-Dhani, Kasnau-Igiar, Kuchera, Lunsara, Matasukh, Merta Road & Meeranagar, Mokala, Nimbri-Chadawatan and Ucharda,	113.00	289.49	154.33	556.82
Nagaur & Pali	Phalki, Phalki North and Phalodi	-	0.50	18.69	19.19

Contd.

Table - 3 (Concld.)

State/District	Area/Lignite field	Proved	Indicated	Inferred	Total
Tamil Nadu		**4093.53**	**22648.33**	**9392.85**	**36134.71**
Cuddalore	Neyveli Lignite Corporation (NLC) Leasehold areas, (Mine-I & expansion, Mine-IA, II & expansion, Mine-III, Block B, Mine-I, II & III and river), Devandgudi & 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*of Neyveli Lignite Field.	3189.30	2263.56	1302.23	6755.09
Ariyalur	Meensuruti, Jayamkondamcholapuram, Michaelpatti of Neyveli Lignite Field	904.23	302.50	512.37	1719.10
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	–	2306.17	156.33	2462.50
Thanjavur & Nagapattinam	Alangudi, Pandanallur, Tirumangaicheri, and Thirumangalam of Mannargudi Lignite Field	–	359.21	926.62	1285.83
Thiruvarur & Nagapattinam	Nachiyarkudi of Mannargudi Lignite Field	–	–	574.05	574.05
Ramanathapuram	Rajasing Mangalam of Mannargudi Lignite Field				
	Misal, Bogalur, Bogalur (East) & Tiyanur of Ramanathapuram Lignite Field	–	168.83	1812.58	1981.41
Ramanathapuram & Sivaganga	Settanur of Mannargudi Lignite Field	–	–	985.21	985.21
Puducherry	Bahur & West of Bahur of Neyveli Lignite Field	–	**405.61**	**11.00**	**416.61**
West Bengal		–	**1.13**	**2.80**	**3.93**
Bardhaman	Rakshitpur, Gaurangapur-Bankati	–	0.29	1.82	2.11
Birbhum	Mahalla, Dhobbanpur & Djara	–	0.84	0.98	1.82

Source: *Indian Coal & Lignite Resources-2018, Natural Energy Resources, Mission-IIB, 2018 (GSI).*

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

PRODUCTION AND STOCKS

COAL

Production

The provisional total production of coal in 2017-18 was 675.40 million tonnes which was higher by 2.7% in comparison to that of the previous year. Odisha is the largest coal producing State with a share of about 21.2% followed by Chhattisgarh with contribution of 21.1% to the national output. Next in order of share in the total production were Jharkhand (18.26%), Madhya Pradesh (16.6%), Telangana (9.18%), Maharashtra (6.25%), West Bengal (4.33%) and Uttar Pradesh (2.71%). The remaining 0.37% of coal production was accounted for from Assam, Jammu & Kashmir and Meghalaya. Coal mining was confined mainly to the Public Sector which contributed 95% to the national production (Table-4).

During the year 2017-18, out of the total production of coal, 5.9% was coking coal and the rest 94.1% was non-coking coal. As in the earlier years, bulk of the coking coal production, i.e., about 84.5% was reported from the Public Sector. Grade-wise analysis of coking coal in 2017-18 revealed that Washery Grade IV had the maximum share at 77.1%, followed by Washery Grade II (11.5%) and Washery Grade III (9.9%). The remaining 1.5% production of coking coal was of Semi-coking Grade I, Washery Grade I, Steel Grade I and Steel Grade II. In coking coal, Metallurgical Grade accounts for 12.978 million tonnes (32.3%) and remaining 27.169 million tonnes (67.7%) for non-metallurgical grade. Out of the total production of coking coal in India, bulk quantity, i.e., 96.6% was produced in Jharkhand followed by West Bengal with 2.5 percent. The remaining 0.9% was contributed by Chhattisgarh and Madhya Pradesh (Table-6 & 7).

During 2017-18, except for a nominal quantity (4.3%), the balance production of non-coking coal (95.7%) came from the Public Sector. Out of the total production of non-coking coal grades, G11 grade accounted for 28.3% followed by G13 (16%), G10 (14.3%), G12 (8.4%), G14 (7%), G7 (6.4%), G8 (6.1%), G9 (4%), G5 (2.4%), G4 (2.2%), G6 (1.8%) and G15 (1.2%). The remaining 1.9% production was accounted for G1, G2, G3, G16, G17 and UNG grades

Table – 4 : Production of Coal, 2015-16 to 2017-18 (P)
(By Sectors/States)

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

State	2015-16		2016-17 (R)		2017-18 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value#
India	**639230**	**883822100**	**657868**	**834671200**	**675400**	
Public Sector	**606677**	**833320400**	**625196**	**789342900**	**642574**	
Private Sector	**32553**	**50501700**	**32672**	**45328300**	**32826**	
Assam	487	1711300	600	2231900	781	
Chhattisgarh	130605	147436800	138525	104427500	142546	
Jammu & Kashmir	13	27600	10	59900	14	
Jharkhand	121067	187369900	126435	200571500	123296	
Madhya Pradesh	107714	132254900	105013	148372800	112127	
Maharashtra	38351	65340300	40559	64267700	42219	
Meghalaya	3712	18634200	2308	8585400	1529	
Odisha	138461	121010100	139359	103882900	143328	
Telangana	60380	122753500	61336	110294200	62010	
Uttar Pradesh	12689	14028100	16056	19731100	18309	
West Bengal	25751	73255400	27667	72246300	29241	

Source: *Coal Directory of India, 2016-17; Provisional Coal Statistics 2017-18.*

#: *The 'value of fuel minerals' production is not received from source agency, hence not reflected for the year 2017-18.*

of non-coking coal. Odisha was the largest producing State of non-coking coal in 2017-18 which alone accounted for 22.6% of the national output. Next in order were Chhatisgarh with a contribution of (22.4%), Madhya Pradesh (17.6%), Jharkhand (13.3%), Telangana (9.8%), Maharashtra (6.6%), West Bengal (4.4%) and Uttar Pradesh (2.9%). The remaining 0.4% production came from Assam, Jammu & Kashmir and Meghalaya (Tables-8 to 10).

A total of 476 coal mines (as on 31.03.2017) in India reported production in 2016-17. Out of these, Jharkhand accounted for 132 mines while West Bengal for 76 mines, Madhya Pradesh 64, Maharashtra 57, Chhattisgarh 55, Telangana 47 and Odisha 29. The remaining 16 mines were from Assam, Jammu & Kashmir, Meghalaya and Uttar Pradesh (Table - 5).

Despatches

The provisional despatches of coal at about 687.83 million tonnes in 2017-18 were higher by around 6.5% as compared to that in the previous year. Chhattisgarh was the leading State in the despatches in 2017-18 and accounted for 21.3% of the total despatches. The States next in order were Odisha (20.1%), Jharkhand (18.4%), Madhya Pradesh (14.2%), Telangana (9.1%), Maharashtra (6.4%), Uttar Pradesh (5.7%) and West Bengal (4.4%). The remaining 0.4% despatches were from the States of Assam and Meghalaya.

During the year 2017-18, state-wise analysis revealed that there was increase in the despatches of coal from the States of Assam, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Telangana, Uttar Pradesh and West Bengal while the States of Jammu & Kashmir, Meghalaya and Odisha showed fall in despatches as against that of the previous year.

Of the total provisional despatches of raw coal effected in 2017-18, a sizeable share of 83.8% was made to the Electricity Sector. As much as 1.6% was made to the Steel Industry, 1.2% to the Sponge iron Industry, 1.1% to the Cement Industry, 0.3 % each to the other basic metal & Fertilizer industry, 0.2% to the Paper & Pulp Industry and 0.1% to the Steel (Boilers). The remaining 11.4% was made for other priority sectors including Chemical, Textile & Rayons, Bricks and Others (Table-12).

Stocks

The mine-head stocks of coal at the end of the year 2017-18 were 60.98 million tonnes which decreased by about 19.7 % from that of the stocks that were available at the beginning of the year. Out of the total mine-head stocks of coal during the year 2017-18, 98.4% was confined mainly to the Public Sector and remaining 1.6 % to the Private Sector.

Similarly, the mine-head stocks of coal at the end of the year 2016-17 were 75.95 million tonnes which increased by about 16.2 % from that of the stocks that were available at the beginning of the year. Bulk of the coal stocks (about 99.7%) at the end of the year was accounted for by the mines located in the states of Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Telangana, Uttar Pradesh and West Bengal (Tables-13 & 14).

LIGNITE

Production

During the year 2017-18, the provisional production of lignite at 46.25 million tonnes increased by about 2.27% in comparison to that of the previous year. The production from Tamil Nadu alone accounted for about 50.95%. The share of Gujarat in lignite production was 28.95% and that of Rajasthan was 20.10 % (Tables-15).

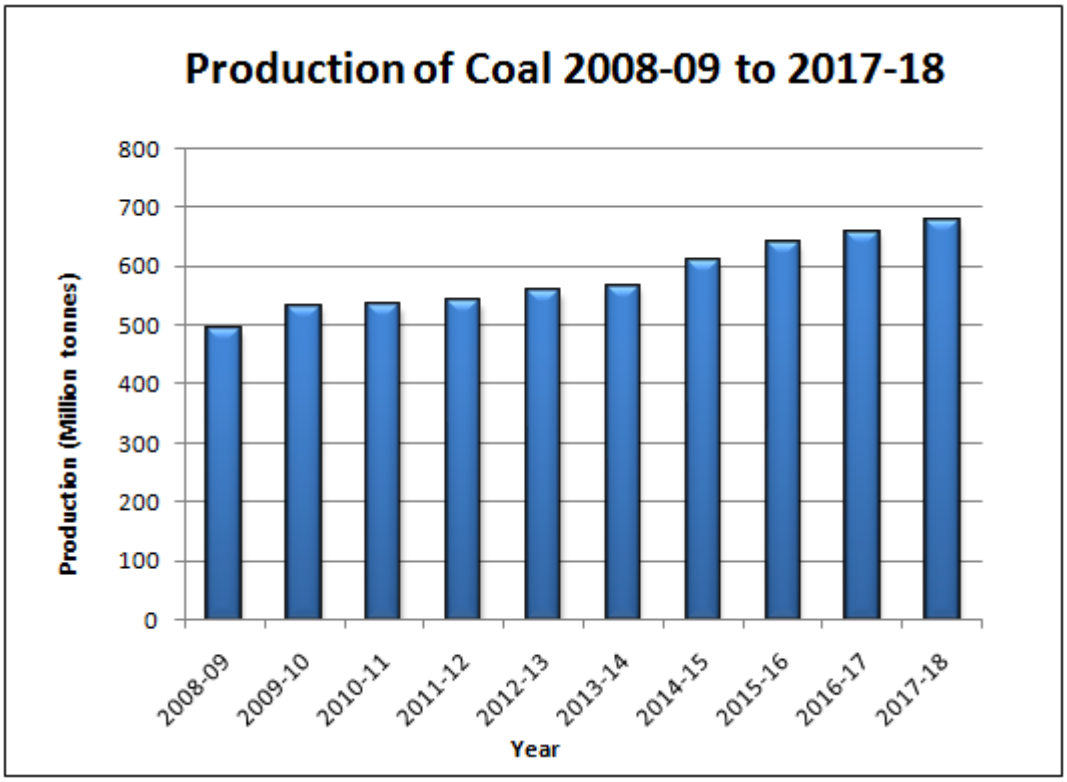
Out of the total 19 mines that reported lignite production in 2016-17, ten are located in Gujarat, six in Rajasthan and the remaining three in Tamil Nadu (Table - 16).

Despatches

The provisionally quantum of despatches of lignite was about 45.93 million tonnes during the year 2017-18, which increased by 6.43% as compared to that in the previous year (Table-17).

Stocks

The mine-head stocks of lignite at the end of 2017-18 were 7,210 thousand tonnes which increased by 4.7% from that of the stocks that were available at the beginning of the year. (Table- 18).


Production of Coal 2008-09 to 2017-18
Production (Million tonnes)
800
700
600
500
400
300
200
100
0
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
2017-18
Year

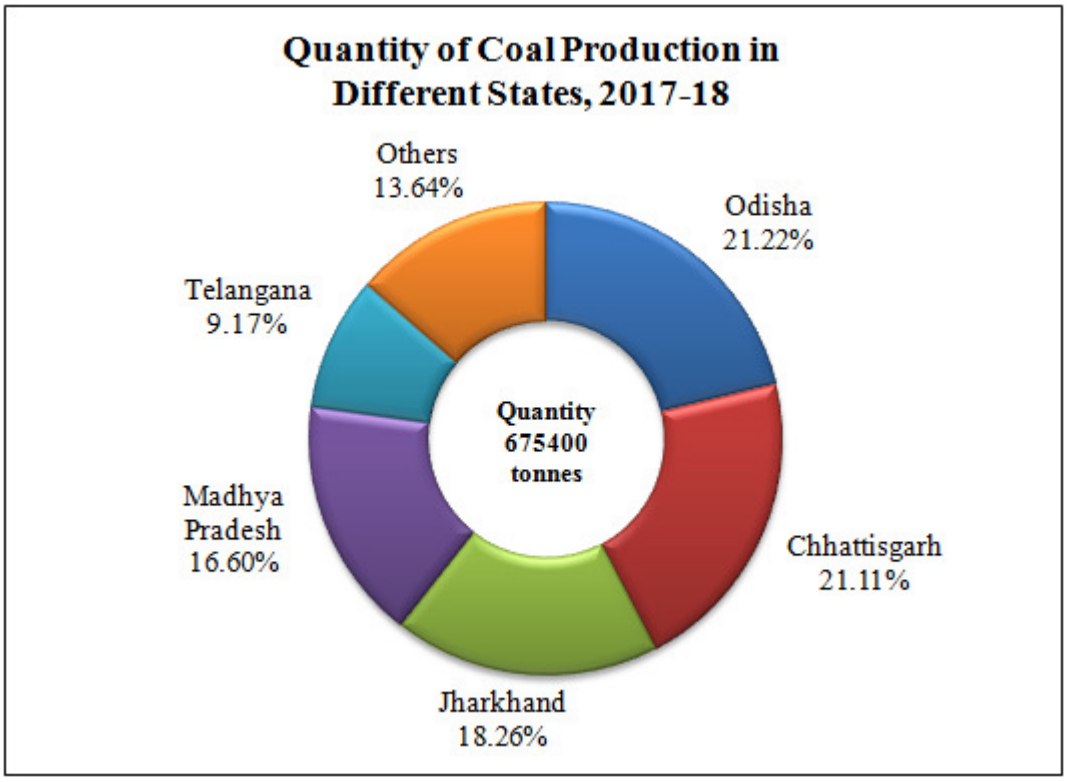

Quantity of Coal Production in Different States, 2017-18
Others 13.64%
Odisha 21.22%
Telangana 9.17%
Quantity 675400 tonnes
Madhya Pradesh 16.60%
Chhattisgarh 21.11%
Jharkhand 18.26%

Table – 5 : Number of Coal Mines, 2016-17 & 2017-18 (P) (By States)

State	No. of Mines	
	2016-17[1#]	2017-18[2]
India	**476**	**NA**
Assam	4	NA
Chhattisgarh	55	NA
Jammu & Kashmir	4	NA
Jharkhand	132	NA
Madhya Pradesh	64	NA
Maharashtra	57	NA
Meghalaya	3	NA
Odisha	29	NA
Telangana	47	NA
Uttar Pradesh	5	NA
West Bengal	76	NA

 # Relates to number of mines as on last day of the financial year 2016-17.
***Note**: Coal Mines in the State of Meghalaya operate under the Private Sector.*
***Source:** 1.Coal Directory of India 2016-17. 2.Provisional Coal Statistics, 2017-18*

Table –6: Production of Coking Coal, 2016-17 (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	**61661**	**23**	**1004**	**315**	**3420**	**10796**	**45993**	**-**	**110**
Chhattisgarh	110	-	-	-	-	-	-	-	110
Jharkhand	59604	23	1004	315	3156	9113	45993	-	-
Madhya Pradesh	131	-	-	-	131	-	-	-	-
West Bengal	1816	-	-	-	133	1683	-	-	-

***Source:** Coal Directory of India 2016-17.*

Table –7: Production of Coking Coal, 2017-18 (P) (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	**40147**	**155**	**51**	**176**	**4627**	**3991**	**30965**	**-**	**182**
Chhattisgarh	182	-	-	-	-	-	-	-	-
Jharkhand	38767	-	-	-	-	-	-	-	-
Madhya Pradesh	180	-	-	-	-	-	-	-	-
West Bengal	1018	-	-	-	-	-	-	-	-

***Source:** Provisional Coal Statistics, 2017-18,*
***Note**: Gradewise figures vis-a-vis states not available.*

Table – 8: Production of Coal, 2016-17& 2017-18 (P) (By Grades and Sectors)

(In '000 tonnes)

Grade	2016-17 (R) [1]			2017-18 (P) [2]		
	Total	Pub. Sec.	Pvt. Sec.	Total	Pub. Sec.	Pvt. Sec.
All Grades	**657868**	**625196**	**32672**	**675400**	**641774**	**33626**
Coking	**61661**	**55345**	**6316**	**40147**	**33923**	**6224**
ST-I	23	23	-	155	155	-
ST-II	1004	1004	-	51	51	-
W-I	315	315	-	176	176	-
W-II	3420	3305	115	4627	4357	270
W-III	10796	9750	1046	3991	3595	396
W-IV	45993	40838	5155	30965	25407	5558
SC-I	110	110	-	182	182	-
SLV	-	-	-	-	-	-
Non-coking	**596207**	**569851**	**26356**	**635253**	**607851**	**27402**
G1	2418	110	2308	1710	181	1529
G2	309	309	-	264	264	-
G3	5279	5279	-	3512	3512	-
G4	17319	17319	-	13905	13905	-
G5	13600	13600	-	15521	15521	-
G6	14140	14140	-	11693	10893	800
G7	35574	35574	-	40775	40175	600
G8	29574	28840	734	38691	38421	270
G9	38924	38744	180	25295	25295	-
G10	98175	91149	7026	91078	81983	9095
G11	143233	128120	15113	179974	165838	14136
G12	91786	91342	444	53417	52715	702
G13	90937	90449	488	101742	101739	3
G14	6419	6356	63	44639	44372	267
G15	3263	3263	-	7894	7894	-
G16	4505	4505	-	3544	3544	-
G17	459	459	-	1454	1454	-
UNG	293	293	-	145	145	-

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

***Source**: 1. Coal Directory of India, 2016-17, Coal Controller's Organisation, Kolkata.*

2. Provisional Coal Statistics, 2017-18, Coal Controller's Organisation, Kolkata.

Table – 9 : Production of Non-coking Coal, 2016-17
(By States and Grades)

(In '000 tonnes)

State	Grades																		
	All-Grades	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G14	G15	G16	G17	UNG
India	**596207**	**2418**	**309**	**5279**	**17319**	**13600**	**14140**	**35574**	**29574**	**38924**	**98175**	**143233**	**91786**	**90937**	**6419**	**3263**	**4505**	**459**	**293**
Assam	600	110	309	-	181	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chhattisgarh	138415	-	-	2118	1206	3900	3000	2127	1871	1025	1858	105009	4621	3905	3708	326	3658	83	-
Jammu & Kashmir	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	-
Jharkhand	66831	-	-	1451	390	2097	2466	2017	1494	10590	16168	9526	6225	14381	-	-	-	-	26
Madhya Pradesh	104882	-	-	646	1749	977	6957	22489	2372	2816	51924	12906	2046	-	-	-	-	-	-
Maharashtra	40559	-	-	-	-	97	327	656	10707	16453	9727	2592	-	-	-	-	-	-	-
Meghalaya	2308	2308	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odisha	139359	-	-	-	-	-	-	174	-	383	468	-	77080	61191	63	-	-	-	-
Telangana	61336	-	-	-	-	912	-	6196	4042	7657	10732	11458	1814	11460	2648	2937	847	366	267
Uttar Pradesh	16056	-	-	-	-	71	99	-	8588	-	7298	-	-	-	-	-	-	-	-
West Bengal	25851	-	-	1064	13793	5546	1291	1915	500	-	-	1742	-	-	-	-	-	-	-

***Note**: Meghalaya coal has not been graded. For Statistical purpose grade may be treated as "A"/"B" non-coking coal.*

Source: Coal Directory of India, 2016-17, Coal Controllers' Organisation, Kolkata.

Table-10: Production of Non-coking Coal, 2017-18 (P)

(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	UNG
India	**635253**	**1710**	**264**	**3512**	**13905**	**15521**	**11693**	**40775**	**38691**	**25295**	**91078**	**179974**	**53417**	**101742**	**44639**	**7894**	**3544**	**1454**	**145**
Assam	781	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chhattisgarh	142364	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jammu & Kashmir	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jharkhand	84529	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Madhya Pradesh	111947	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Maharashtra	42219	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Meghalaya	1529	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odisha	143328	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Telangana	62010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uttar Pradesh	18309	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
West Bengal	28223	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

***Note**: Meghalaya coal has not been graded. For Statistical purpose grade may be treated as "A"/"B" non-coking coal; Gradewise figures vis-a-vis states not available.*

Source: Provisional Coal Statistics, 2017-18, Coal Controller's Organisation, Kolkata.

Table – 11: Despatches of Raw Coal, 2016-17 & 2017-18 (P) (By States)

(In '000 tonnes)

State	2016-17 (R) [1]	2017-18 (P) [2]
India	**645978**	**687831**
Assam	777	895
Chhattisgarh	135268	146656
Jammu & Kashmir	11	21
Jharkhand	120739	126564
Madhya Pradesh	87743	97377
Maharashtra	34954	44070
Meghalaya	2308	1529
Odisha	143287	138538
Telangana	60791	62890
Uttar Pradesh	33006	39341
West Bengal	27094	29950

Source: 1. Coal Directory of India, 2016-17; 2. Provisional Coal Statistices, 2017-18.

Table –12 : Despatches of Raw Coal, 2016-17 & 2017-18 (By Priorities)

(In '000 tonnes)

Priority	2016-17(R) [1]	2017-18 (P) [2]
Total	**645978**	**687831**
Power (Utility)	490987	504719
Power (Captive)	44057	71471
Steel	10131	10773
Cement	6356	7698
Sponge Iron	5557	8507
Fertilizer	2135	1883
Paper & Pulp	1181	1510
Other Basic metal	5038	1975
Steel (Boilers)	205	722
Chemical	312	277
Textiles & Rayons	243	236
Bricks	99	114
Others	79677	77946

Note: *Steel includes direct feed & coking washery for metallurgical use and steel (boilers); Others include non-coking washery and Bricks.*

Source: 1. Coal Directory of India, 2016-17; 2. Provisional Coal Statistices, 2017-18.

Table – 13: Mine-head Stocks of Coal, 2016-17
(By States)

(In '000 tonnes)

State	At the beginning of the year	At the end of the year
India	**65361**	**75952**
Assam	359	183
Chhattisgarh	9444	12147
Jammu & Kashmir	13	12
Jharkhand	18355	24002
Madhya Pradesh	6854	8609
Maharashtra	7170	12771
Odisha	10330	6393
Telangana	7025	6544
Uttar Pradesh	3570	2684
West Bengal	2241	2607

Source: *Coal Directory of India, 2016-17, Coal Controller Organisation, Kolkata.*

Table – 14: Mine-head Stocks of Coal, 2017-18 (P)
(By States)

(In '000 tonnes)

State	At the beginning of the year	At the end of the year
India	**75952**	**60984**
Assam	183	NA
Chhattisgarh	12147	NA
Jammu & Kashmir	12	NA
Jharkhand	24002	NA
Madhya Pradesh	8609	NA
Maharashtra	12771	NA
Odisha	6393	NA
Telangana	6544	NA
Uttar Pradesh	2684	NA
West Bengal	2607	NA

Source *: Coal Directory of India 2016-17; Provisional Coal Statistics, 2017-18.*

Table – 15 : Production of Lignite, 2015-16 to 2017-18 (P) (By Sector/States)

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

	2015-16		2016-17 (R) [1]		2017-18 (P) [2]	
	Quantity	Value	Quantity	Value	Quantity	Value#
India	**43842**	**74994800**	**45230**	**75435000**	**46255**	**NA**
Public Sector	**43133**	**74139252**	**44644**	**NA**	**45772**	**NA**
Private Sector	**709**	**855548**	**586**	**NA**	**483**	**NA**
Gujarat	10123	14723500	10546	13628100	13392	NA
Rajasthan	9492	11103300	8480	9815100	9294	NA
Tamil Nadu	24227	49168000	26204	51991800	23569	NA

***Source**: 1. Coal Directory of India, 2016-17, Coal Controller's Organisation, Kolkata.*

2. Provisional Coal Statistics, 2017-18, Coal Controller's, Organisation, Kolkata.

#: The 'value of fuel minerals' production is not received from source agency, hence not reflected for the year 2017-18.

Table – 16 : Number of Lignite Mines 2016-17 & 2017-18 (By States)

State	No. of Mines#	
	2016-17 [1]	2017-18 [2]
India	**19**	**NA**
Gujarat	10	NA
Rajasthan	6	NA
Tamil Nadu	3	NA

 # : Relates to no. of mines on the last day of financial year.

***Source**:1. Coal Directory of India, 2016-17.*

2. Provisional Coal Statistics, 2017-18.

Table – 17 : Despatches of Lignite 2016-17 & 2017-18 (By States)

(In '000 tonnes)

State	2016-17(R)	2017-18(P)
India	**43155**	**45929**
Gujarat	10545	13390
Rajasthan	8445	9141
Tamil Nadu	24165	23398

***Source**: Provisional Coal Statistics, 2016-17.*

Table – 18 : Mine-head Stocks of Lignite, 2017-18 (By States)

(In '000 tonnes)

State	At the beginning of the year [1]	At the end of the year [2]
India	**6883**	**7210**
Gujarat	12	NA
Rajasthan	259	NA
Tamil Nadu	6612	NA

***Source:** 1. Coal Directory of India, 2016-17*

2. Provisional Coal Statistics, 2017-18.

MINING & MARKETING

Coal

Coal mining in the country is carried out by both opencast and underground methods. Opencast mining contributed 93.7% of the total provisional production, whereas the rest of the production (6.3%) came from underground mining during 2017-18. Most mines are either semi-mechanised or mechanised. The machinery commonly deployed are 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; and 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.

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 NEC (North Eastern Coalfield) are subsidiary companies of Coal India Ltd (CIL), a Government of India undertaking. The coal mines in Assam and its neighbouring areas are controlled directly by CIL under the unit North Eastern Coalfields Ltd (NEC). CMPDIL is a subsidiary of CIL which is engaged in surveying, planning and designing work with a view to optimise coal production.The Singareni Collieries Company Limited (SCCL) is a Joint venture between Government of India and Government of Telangana.

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 thermal power plant and industries 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 Telangana state which produces 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 (JSMDCL), Jammu & Kashmir Minerals Ltd (JKML) and Rajasthan Rajya Vidyut Utpadan Nigam Limited (RVUNL) are the State Government undertakings and Damodar Valley Corporation (DVC) is the Central Public Sector undertaking that 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 31.3.2017, there were 476 operating mines for coal in the country out of which 215 were opencast, while 236 were underground mines. The remaining 25 were mixed collieries. There were 455 Public Sector mines and 21 mines in Private Sector (Table-19). Thrust is given on further increasing production from opencast mines where the gestation period is comparatively shorter. In 2017-18, the share of provisional production of raw coal from opencast mines was 632.770 million tonnes (93.7%) against 42.630 million tonnes (6.3%) from underground mines (Table-20). Production of coal by different mining technologies employed during 2016-17 is furnished in Table-21. The overall Output per Man Shift (OMS) in opencast and underground mines for CIL in 2017-18 was 7.72 tonnes as against 7.48 tonnes in 2016-17. The overall OMS in opencast and underground mines for SCCL was maintained at 4.89 tonnes in 2017-18 as against 4.74 tonnes in 2016-17.

Under the Colliery Control Order, 1945, the Central Government was empowered to fix the prices of coal gradewise and collierywise. As per recommendations of the Bureau of Industrial Costs & Prices and the Committee on Integrated Coal Policy, prices of different grades of coal were subjected to deregulation since 22.3.1996, in a phased manner. As the prices of all grades of coking coal got deregulated with effect from 1.4.1996, distribution fell under the purview of CIL/coal companies. The Government of India amended the provisions of Colliery Control Order 1945 and Colliery Control Order 2000 was 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 continued as usual. Major portion of the despatches was achieved through railways, followed by roads, Merry-Go-Round System, belt conveyor, ropeways and sea route.

Table – 19 : Number* of Coal Mines, 2016-17 (By Sectors/States)

State	No. of collieries			
	OC	UG	Mixed	Total
All India	**215**	**236**	**25**	**476**
Public sector	202	228	25	455
Private sector	13	8	–	21
Assam	3	1	–	4
Chhattisgarh	23	32	-	55
Jammu & Kashmir	–	4	–	4
Jharkhand	73	43	16	132
Madhya Pradesh	20	42	2	64
Maharashtra	36	21	-	57
Meghalaya	3	–	–	3
Odisha	19	10	–	29
Telangana	18	29	–	47
Uttar Pradesh	5	–	–	5
West Bengal	15	54	7	76

Source: *Coal Directory of India, 2016-17, Coal Controller's Organisation, Kolkata.*
** Relates to no. of mines as on last day of the financial year (As on 31.3.2017).*
Note: *OC - Opencast UG - Underground.*

Table – 20 : Production of Raw Coal

(In million tonnes)

Year	Production from open-cast mines (% share)	Production from under-ground mines (% share)	Total production
2015-16	592.822 (92.7%)	46.408 (7.3%)	639.230
2016-17	613.518 (93.3%)	44.350 (6.7%)	657.868
2017-18 (P)	632.770 (93.7%)	42.630 (6.3%)	675.400

Source: *Provisional Coal Statistics, 2017-18, Coal Controller's Organisation, Kolkata.*

Table – 21 : Production of Coal, 2016-17 (By Technology)

(In million tonnes)

Technology adopted	Production	Percentage of total
All India : Total	**657.868**	**100**
Opencast (Total)	***613.518***	***93.3***
Mechanised	613.518	100
Manual	-	-
Underground (Total)	***44.350***	***6.7***
Conventional B&P	1.123	2.5
Mechanised B&P	34.241	77.2
Conventional LW	0.126	0.3
Mechanised LW	2.616	5.9
Other methods	6.244	14.1

Source:*Coal Directory of India, 2016-17, Coal Controller's Organisation, Kolkata.*
Note: *B&P - Board-and-pillar; LW - Longwall*

Lignite

As on 31.03.2017, the total number of operating lignite mines was 19 and all are worked by opencast method. Out of these, fifteen are captive and the remaining four are non-captive. Four mines are owned by Neyveli Lignite Corporation (NLC), six by Gujarat Mineral Development Corporation Ltd (GMDCL), three each by Rajasthan State Mines & Minerals Limited (RSMML) and Gujarat Industries Power Co. Ltd (GIPCL), one each by Gujarat Heavy Chemicals Ltd (GHCL), Barmer Lignite Mining Company Limited (BLMCL) & V S Lignite Power Pvt. Ltd (VSLPPL). Sector-wise, seventeen mines are under Public Sector and the remaining two are under Private Sector, i.e., GHCL & VSLPPL.

NLC reported maximum production during the period under review. The Neyveli Lignite Mine is the largest opencast mine in the country with eco-friendly technology. To increase the power demand and to manage both social and environmental externalities, NLC has now diversified into coal mining, coal-based power generation and green energy. NLC operates three opencast mines at Neyveli, Tamil Nadu and one opencast mine at Barsingsar, Rajasthan. The present installed capacity in lignite mining of all NLC mines stands at 30.6 MTPA viz. Mine-I with 10.5 MTPA, Mine-IA with 3.0 MTPA, Mine-II with 15.0 MTPA, Barsingsar with 2.1 MTPA. Besides, additional planned capacity of lignite mining of 31.55 MTPA viz. Bithnok Lignite Mine (2.25 MTPA), Hadla Mine (1.9 MTPA), Barsingsar expansion (0.40 MTPA), expansion of Mine-I A (4.0 MTPA), Mine-III project (11.50 MTPA) and South of Vellar & Palayamkottai lignite blocks (11.50 MTPA) is under implementation. The planned capacity of coal mining of 31.00 MTPA viz. Talabira II & III block (20.00 MTPA) in the State of Odisha and Pachwara South Coal block (11.00 MTPA) in the State of Jharkhand is under implementation.. The production of lignite for all NLC mines was 251.53 lakh tonnes during 2017-18 which decreased by 8.9% from 276.17 lakh tonnes in the previous year. The NLC's mines are highly mechanised. Presently, these mines are linked to three thermal power stations.

In Power Sector, NLC has presently five thermal power stations, four at Neyveli, Tamil Nadu and one thermal power station at Barsingsar, Rajasthan with a total power generation capacity of 3,240 MW (viz. TPS-I with 600 MW, TPS-I expansion with 420 MW, TPS-II with 1,470 MW, TPS-II expansion with 500 MW & Barsingsar with 250 MW and taking into account the renewable energy projects of 491 MW viz. solar (440 MW) & Wind (51 MW), commissioned so far, the total installed capacity is 3,731 MW on standalone basis and including its subsidiary, the total power generating capacity is 4,731 MW.

The Corporate Plan Document envisages increase in overall lignite production by 62.15 million tonnes, coal production by 31.00 million tonnes and power generation upto 21,011 MW by the year 2025.

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

syngas 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.

With regard to small and isolated blocks, 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, whereas 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 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 the amendment for introduction of competitive bidding system for allocation of coal blocks for captive use has been passed by both the 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. Further, the Government has notified the "Auction by Competitive Bidding of Coal Mines (Amendment) Rules, 2012" on 27th December, 2012 for allocation of coal blocks to Government Companies. It contains detailed terms and conditions for selection of Government Company for allocation on the basis of pre-determined criteria for utilisation of coal.

Coal mining is kept under the purview of Public Sector except captive mining for the approved end-use industries viz. Iron & Steel, Power, Cement, Washing of Coal and Coal Gasification & liquefaction. Further, the Government decided in its new mining policy to allow the State Government companies and undertakings to go for coal and lignite mining without the earlier restriction of isolated small pockets only.

The policy of the allotment of Captive Coal Blocks was adopted by the Government of India in the year 1993 and as per this policy by the end of 2013-14, out of total allocated 218 coal blocks, 80 coal blocks were de-allocated. Thus at the end of 2013-14, 138 coal blocks and 28 lignite blocks remained allocated under the category of Captive Coal Block. During the year 2014-15 by virtue of the judgement dated 25.08.2014 read with the Order dated 24.09.2014 of the Hon'ble Supreme Court of India, out of 218 captive coal blocks, allocation of 204 coal blocks was cancelled except allocation of 12 coal blocks for UMPPs and one coal block each allocated to NTPC and SAIL.

Further, allocation of four coal blocks for UMPPs, i.e., Chhatrasal coal block and that Meenakshi, Meenakshi B & Dip side of Meenakshi blocks of UMPP was cancelled on 07.05.2015 and 15.12.2015, respectively. As such, as on 31.3.2018, only 10 coal blocks (allocated through earlier dispensations) remained allocated.

Subsequent to the order of the Hon'ble Supreme Court of India, 42 nos. of producing coal blocks [Schedule II coal mines as per the Coal Mines (Special Provisions) Ordinance, 2014 replaced by the Coal Mines (Special Provision) Act, 2015] were allowed to produce coal up to 31.03.2015. Thus, the total number of blocks that stood allocated from 25.09.2014 to 31.03.2015 was 52 (42 + 10 earlier coal blocks).

In 2017-18 Marki Mangli-I captive coal block of Topworth Urja & Metals Ltd started coal production. Another 14 coal blocks that were vested/ allotted including 3 blocks under CIL as custodian produced coal. From these of total 18 coal blocks, production of 41.620 million tonnes of coal was reported in 2017-18.

Under the "Auction by Competitive Bidding Rules, 2012", 13 regionally explored coal blocks have been allotted to Central/State Government companies up to 31.03.2018. In addition, 04 regionally explored lignite blocks have also been allotted to Government companies of Government of Gujarat.

Therefore, as on 31.03.2018, the total number of 107 coal blocks that existed, 77 blocks were vested/ allotted which accounted for 10,640.398 million tonnes; 7 blocks were that of Custodian with 364.863 million tonnes; 13 blocks were under Auction by Competitive Bidding Rules, 2012 with 5,684.84 million tonnes and 10 blocks with 5,418.42 million tonnes remained as not cancelled by the Hon'ble Supreme Court.

During 2017-18, a total of 107 coal blocks with 22,108.52 million tonnes geological/extractable reserves have been allotted in various States (Table 22). Of these, 73 coal blocks with 17,623.27 million tonnes are under Public Sector Undertakings (PSU) and the remaining 34 blocks with about 4,485.25 million tonnes are under Private Sector companies. Among these, 58 blocks with 15,550.76 million tonnes have been allocated for Power, 26 blocks with 930.41 million tonnes for Non- regulated sector (NRS), 8 blocks with 3,730.54 million tonnes for Ultra Mega Power Project (UMPP) and 15 blocks with 1,896.81 million tonnes for Commercial mining.

Similarly, 21 captive lignite blocks with 1,542.50 million tonnes geological/extractable reserves have been allocated during 2017-18. Of these, 19 blocks with 1,490.00 million tonnnes are under Public Sector Undertakings (State PSU) and the remaining 2 blocks are under Private Sector with 52.50 million tonnes. By sectors, 11 blocks with 1,072.30 million tonnes have been allocated for power generation and 10 blocks with 470.20 million tonnes for commercial end-use.

Table – 22 : Statewise Allotment of Captive Coal Blocks Allocated/Vested/Under Custodian including blocks allotted Under Auction by Competitive Bidding Rules, 2012 during 2017-18

(In million tonnes)

State	No. of blocks	Geological/ extractable Reserves
Coal		
Arunachal Pradesh	1	4.79
Chhattisgarh	23	5974.33
Jharkhand	29	6697.11
Madhya Pradesh	10	1758.36
Maharashtra	14	587.93
Odisha	16	6450.56
Telangana	2	156.23
West Bengal	12	479.21
Total	107	22108.52

Source: *Provisional Coal Statistics, 2017-18, Coal Controller's Organisation, Kolkata.*

Note: *Extactable reserves have been shown against the newly allocated/vested coal blocks as per CM(SP) Act, 2015.*

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, appropriate training for development of necessary skills for efficient management of the Indian Coal Industry;

(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 undergound mining in difficult Geological conditions including steep seams; fire & 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 adaptation of the state-of-the-art technologies, available with the developed countries, is also a prime subject of focus.

COAL WASHERIES

Presently, 17 coal washeries (13 in Public Sector and 4 in Private Sector) with 32.490 million tonnes per annum (MTPA) capacity produced about 6.413 million tonnes of coking coal in 2016-17. Production of washed coking coal during 2016-17 was about 3.074 million tonnes in Public Sector and 3.339 million tonnes in Private Sector. Under Public Sector, BCCL operates 6 coking coal washeries (Dugda II, Bhojudih, Sudamdih, Moonidih, Mahuda and Madhuban), CCL operates 5 washeries (Kathara, Swang, Rajrappa, Kedla and Kargali), WCL operates one (Nandan) and SAIL too has one (Chasnala), whereas 4 washeries (West Bokaro-II, West Bokaro-III, Jamadoba and Bhelatand) are operated by Tata Steel Ltd (TSL) in Private Sector. Similarly, 20 coal washeries with 105.240 million tonnes per annum capacity produced about 45.122 million tonnes non-coking coal during the year. Of these, about 12.097 million tonnes has been under Public Sector and about 33.025 million tonnes under Private Sector. Under Public Sector, 3 non-coking coal washeries (two in CCL and one in NCL) were operational, whereas under Private Sector, 17 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 are shown in Tables - 23 to 26, respectively.

Table – 23 : Production of Washed Coking Coal, 2015-16 & 2016-17 (Sector-wise/Company-wise)

(In '000 tonnes)

	2015-16	2016-17
All India : Total	**6179**	**6413**
Public Sector	**2732**	**3074**
BCCL	599	1182
CCL	1471	1139
WCL	81	41
SAIL	581	712
Private Sector	**3447**	**3339**
Tata Steel Ltd	3447	3339

Source: *Coal Directory of India, 2016-17, Coal Controller's Organisation, Kolkata.*

Table – 24 : Capacity of Washed Coking Coal, 2016-17 (Sector-wise/Company-wise)

Coalfield/Washery	State	Raw Coal Capacity (In '000 tpy)
Grand Total		**32490**
Public Sector	**Total**	**24700**
BCCL		**10030**
Dugda-II	Jharkhand	2000
Bhojudih	-do-	1700
Sudamdih	-do-	1600
Moonidih	-do-	1600
Mahuda	-do-	630
Madhuban	-do-	2500
CCL		**12070**
Kathara	Jharkhand	3000
Swang	-do-	750
Rajrappa	-do-	3000
Kedla	-do-	2600
Kargali	-do-	2720
WCL		**1200**
Nandan (Pench-Kanhan)	Madhya Pradesh	1200
SAIL		**1400**
Chasnala	Jharkhand	1400
Private Sector	**Total**	**7790**
Tata Steel Ltd		**7790**
West Bokaro-II	Jharkhand	2410
West Bokaro-III	-do-	3080
Jamadoba	-do-	1300
Bhelatand	-do-	1000

Source: *Coal Directory of India, 2016-17, Coal Controller's Organisation, Kolkata (except totals).*

Table – 25 : Production of Washed Non-coking Coal : 2015-16 & 2016-17 (Sector-wise/Company-wise)

(In '000 tonnes)

Sector/Company	2015-16	2016-17
All India : Total	**42887.84**	**45121.92**
Public Sector	**11767.61**	**12097.29**
CCL	8652.57	8942.00
NCL	3115.04	3155.29
Private Sector	**31120.23**	**33024.63**
Adani Enterprises Ltd	5351.11	7414.91
Aryan Coal Beneficiation Pvt. Ltd	14343.53	11862.73
Aryan Energy Pvt. Ltd	860.21	1284.58
Global Coal & Mining Pvt. Ltd	1833.81	3082.98
Jindal Power Ltd	259.59	379.26
Spectrum Coal & Power Ltd	8471.98	9000.17

Source: *Coal Directory of India, 2016-17, Coal Controller's Organisation, Kolkata.*

Import Policy of Coal

The present import policy of coal allows imports to be carried out freely under Open General Licence by the consumers themselves considering their needs. Coking coal is imported by Steel Sector and coke manufacturers mainly on availability and quality consideration. Coal-based power stations and cement plants are also importing non-coking coal on consideration of transport logistics and commercial precedence. In spite of hardening prices of both coking and non-coking coal internationally and increase in ocean freight, large amounts of coal continue to be imported.

FDI Policy

Indian Government permits 100% automatic FDI approval for coal & lignite mining only for captive consumption by power projects, iron & steel and cement units and other eligible activities permitted under and subject to the provisions of Coal Mines (Nationalisation) Act, 1973. This is in addition to the existing stipulated policy applied for the Power Sector.

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 - 27.

Table – 26 : Capacity of Washed Non-coking Coal, 2016-17 (Sector-wise/Company-wise)

Washery/Location	Coalfield	State	Raw Coal Capacity (In '000 tpy)
Grand Total			**105240**
Public Sector	**Total**		**13500**
CCL			
East Bokaro Coalfield, Jharkhand			**9000**
Gidi	East Bokaro	Jharkhand	2500
Piparwar	N. Karanpura	-do-	6500

Contd.

Table - 26 (Concld.)

Washery/Location	Coalfield	State	Raw Coal Capacity (In '000 tpy)
NCL			**4500**
Bina Deshelling Plant	Bina	Uttar Pradesh	4500
Private Sector	**Total**		**91740**
Adani Enterprises Ltd			**10000**
AEL	Parsa	Chhattisgarh	10000
Aryan Coal Beneficiation Pvt. Ltd			**35670**
Chakabuwa	Korba	Chhattisgarh	7500
Dipka	-do-	-do-	14500
Pander Pauni	Ballarpur	Maharashtra	2620
Gevra	Korba	Chhattisgarh	6250
Binjhri	-do-	-do-	4800
Aryan Energy Pvt. Ltd			**8340**
Hemgir	Hemgir	Odisha	5000
Talcher	Talcher	Odisha	2340
RKP	Mandamarri	Telangana	1000
Global Coal & Mining Pvt. Ltd			**9960**
Ib Valley	Ib Valley	Odisha	4000
Ramagundam	Ramagundam	Andhra Pradesh	1000
Talcher	Talcher	Odisha	4000
Manuguru	Manuguru	Andhra Pradesh	960
Jindal Power Ltd			**4750**
JPL	Raigarh	Chhattisgarh	4750
Kartikay Coal Washeries Pvt. Ltd			**2500**
Wani	Wardha	Maharashtra	2500
Spectrum Coal & Power Ltd			**20520**
Ratija	Korba	Chhattisgarh	11000
Talcher	Bharatpur	Odisha	9520

Source: *Coal Directory of India, 2016-17, Coal Controller's Organisation, Kolkata.*

Table – 27 : 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 6,200 kcal per kg.
		B	Useful Heat Value exceeding 5,600 kcal per kg but not exceeding 6,200 kcal per kg.
		C	Useful Heat Value exceeding 4,940 kcal per kg but not exceeding 5,600 kcal per kg.
		D	Useful Heat Value exceeding 4,200 kcal per kg but not exceeding 4,940 kcal per kg.
		E	Useful Heat Value exceeding 3,360 kcal per kg but not exceeding 4,200 kcal per kg.
		F	Useful Heat Value exceeding 2,400 kcal per kg but not exceeding 3,360 kcal per kg.
		G	Useful Heat Value exceeding 1,300 kcal per kg but not exceeding 2,400 kcal per kg.
2.	Non-coking coal produced in Arunachal Pradesh, Assam, Meghalaya and Nagaland	A	Useful Heat Value between 6,200 and 6,299 kcal per kg and corresponding ash plus moisture content between 18.85 and 19.57%.
		B	Useful Heat Value between 5,600 and 6,199 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%.
		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%.

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, consequently, 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 7,000
G2	GCV exceeding 6,701 but not above 7,000
G3	GCV exceeding 6,401 but not above 6,700
G4	GCV exceeding 6,101 but not above 6,400
G5	GCV exceeding 5,801 but not above 6,100
G6	GCV exceeding 5,501 but not above 5,800
G7	GCV exceeding 5,201 but not above 5,500
G8	GCV exceeding 4,901 but not above 5,200
G9	GCV exceeding 4,601 but not above 4,900
G10	GCV exceeding 4,301 but not above 4,600
G11	GCV exceeding 4,001 but not above 4,300
G12	GCV exceeding 3,701 but not above 4,000
G13	GCV exceeding 3,401 but not above 3,700
G14	GCV exceeding 3,101 but not above 3,400
G15	GCV exceeding 2,801 but not above 3,100
G16	GCV exceeding 2,501 but not above 2,800
G17	GCV exceeding 2,201 but not above 2,500

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 2015- 16,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 domestic fuel. Data regarding consumption in these sectors is not available. However, industry-wise despatches of coal are depicted in Table - 28.

Table – 28 : Despatches* of Coal 2015-16 to 2017-18 (By Industries)

(In million tonnes)

Industry	2015-16	2016-17	2017-18 (P)
Total	**632.44**	**645.98**	**687.83**
Electricity	502.28	535.04	576.19
Iron & steel[1]	12.36	10.34	11.49
Sponge iron	7.76	5.56	8.51
Fertilizer	2.30	2.13	1.88
Cement	8.98	6.36	7.70
Others (Chemical, otherbase metals, cokeries, paper & pulp, textile & rayon, bricks, others,etc.)	98.76	86.55	82.06

Source: *Coal Directory, 2015-16, 2016-17 and Provisional Coal Statistics, 2017-18.*

* *Data on consumption is not available.*

1 Includes direct feed, coking washery and steel (boilers).

DEMAND & SUPPLY

To comprehend the requirement of coal in real term, the erstwhile Planning Commission of India did maintain the practice of estimating demand for each year in advance. However, the actual supply (Despatch + Import – Export) did show variance from the projected estimates. Against the estimated demand of coking coal and non-coking coal the actual despatch, import and export of coal (coking coal and non-coking coal) during 2016-17 and 2017-18 are provided in Table -29.

Table – 29 : Demand-Supply of Coal, 2016-17 & 2017-18 (P)

(In million tonnes)

Year	Demand*	Actual Supply			
		Despatch	Import	Export	Total
2016-17	884.87	645.978	191.014	1.772	835.220
2017-18 (P)	908.40	687.831	208.279	1.502	894.608

Note*: *: Annual Plan, Ministry of Coal.*

Source*: Provisional Coal Statistics,2017-18.*

WORLD REVIEW

World proved coal reserves were estimated at 1,035.012 billion tonnes at the end of 2017 of which 718.310 billion tonnes (69%) is classified as anthracite & bituminous coal and 316.702 billion tonnes (31%) as sub-bituminous coal & lignite. USA has the largest coal reserves with 24% share of the total world reserves followed by Russian Federation (15%), Australia (14%) and China (13%) (Table-30) .

World production of coal and lignite increased by about 2.2.% from about 7.469 billion tonnes in 2016 to 7.632 billion tonnes in 2017. China continued to be the largest producer of coal & lignite in 2017 with about 45% share in total world production, followed by India (9.5%), USA (9.2%), Australia (6.4%) and Indonesia (6%) (Table-31).

Table – 30 : World Proved Coal Reserves at the end of 2017 (By Principal Countries)

(In million tonnes)

Country	Anthracite and bituminous coal	Sub-bituminous coal and lignite	Total
World : Total	**718310**	**316702**	**1035012**
Australia	68310	76508	144818
Brazil	1547	5049	6596
Canada	4346	2236	6582
China	130851	7968	138819
Colombia	4881	-	4881
Germany	8	36100	36108
India*	92786	4942	97728
Indonesia	15068	7530	22598
Kazakhstan	25605	-	25605
Poland	19808	6003	25811
Russian Federation	69634	90730	160364
Serbia	402	7112	7514
South Africa	9893	-	9893
Turkey	378	10975	11353
Ukraine	32039	2336	34375
USA	220800	30116	250916
Other countries	21954	29097	51051

Source: *BP Statistical Review of World Energy, 2018.*

* *India's resources of coal as on 1.4.2018 are estimated at about 319.020 billion tonnes to a depth of 1,200 m and those of lignite are estimated at about 45.66 billion tonnes.*

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

(In million tonnes)

Country	2015	2016	2017
World : Total	**7931**	**7469**	**7632**
Australia			
Bituminous[1]	441	443	436
Brown coal	61	60	56
Bosnia & Herzegovina			
Brown coal & lignite	12	13	14
Bulgaria			
Brown Coal & lignite	36	31	35
Canada			
Coal	62	61	60
China			
Coal	3747	3411	3445
Colombia			
Bituminous	87	91	91
Czech. Rep.			
Bituminous	8	6	5
Brown Coal	38	39	39
Germany			
Anthracite & Bituminous	7	4	4
Brown coal	178	172	171
Greece			
Lignite	46	33	38
India*			
Bituminous	639	658	679
Lignite	44	45	48
Indonesia			
Anthracite & Bituminous	462	456	461
Kazakhstan			
Bituminous coal	102	97	106
Lignite	6	6	5
Korea, Dem. Rep. of			
Coal[e]	28	31	31
Mexico			
Bituminous	16	14	13
Mongolia			
Brown coal & Lignite	24	35	49
Poland			
Bituminous	73	71	66
Lignite	63	60	63
Romania			
Anthracite & Bituminous	1	1	1
Lignite	25	22	28
Russia			
Coal	372	385	410
Serbia [d]			
Lignite & brown coal	38	39	39[e]
South Africa			
Anthracite & Bituminous	252	251	252
Thailand			
Lignite	15	17	15
Turkey			
Anthracite	2	2	2
Lignite	59	78	84
USA			
Hard coal	749	594	641
Lignite	65	66	61
Ukraine			
Bituminous	30	32	35
UK			
Bituminous & Antracite	9	4	3
Vietnam			
Anthracite	42	39	38
Other countries			
Coal & Lignite	92	102	108

Source: *World Mineral Production, 2013-2017, BGS. Hard coal – Including anthracite, bituminous & sub-bituminous coal. Coal- All ranks of coal. d- excluding production in Kosovo, 1- including sub-bituminous. *India's production of coal and lignite during 2017-18 was 675.40 million tonnes and about 46.26 million tonnes, respectively.*

Global production of coal, of which China accounts for more than 40 percent, is expected to increase. Data from the IEA noted that in 2018, coal was the largest single source of electricity, contributing over 38 per ent to the world's electricity needs. Coal use in the power sector grew by 1.9 percent and was responsible for 40 percent of the additional power generation worldwide.

Firing this demand is India, Korea and South-East Asia, while China's coal consumption increased in 2017, using 2,743 million tonnes (more than a third of the world's total consumption).

However, it is India that is the primary driver of this increase, as it looks to deliver power to its 1-billion-strong population. The country became the world's second largest consumer of coal in 2015 – overtaking the United States – and has continued to grow. India has seen a 4.4 percent rise in usage and by 2023, it is predicted that its demand will see an increase of another 150 million tonnes of coal.

A glance across South East Asia also sees demand growing in Indonesia, the Philippines and Vietnam as new coal-fired power plants to support economic development are being built. Growth in the region is expected to rise by 5.7 percent through 2023, as per IEA forecasts.

Coal will continue to be a major component of global fuel supplies and will be key in powering up several different economies around the world – the IEA predicts that the future of energy growth will be led by non-OECD countries, such as, India, Bangladesh, Pakistan, Southeast Asia and China.

A significant challenge for countries is to balance their fast-growing electricity demand while simultaneously pursuing climate change aims, reducing their emissions in line with the goals of the Paris Agreement.

Recognising that coal is going to remain a major fuel source for power generation (fossil fuels, including coal, will still make up 75% of the global energy mix in 2040 according to recent projections), countries need to take the necessary steps to develop and promote utilisation of low emissions technologies, including carbon capture use and storage (CCUS).

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.

China

China was the world's largest producer of coal. 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.

Indonesia

Indonesia was the world's second ranked exporter and leading producer of coal. To secure domestic supplies, the Indonesian Ministry of Energy and Mineral Resources has issued order to coal producers to reserve a specific amount of their production for domestic consumption (domestic market obligation). Moreover, the government can adjust its export tax to discourage coal exports. The government aims for more domestic consumption of coal as it wants coal to supply around 30 percent of the country's energy mix by 2025.

Russia

Russia is the leading producer of coal. The Coal Industry in Russia are mostly privately owned and joint-stock companies (often consolidated into large holdings) and they dominate the Industry. Siberian Coal Energy Co. (SUEK) was the largest coal producer in Russia in terms of annual production. In February 2011, Russia adopted a new programme for development of the Coal Industry by 2030. According to forecasts by the Ministry of Energy, annual coal production could increase to about 450 Mt by 2030. The Ministry of Energy projected that Russia would construct more than 100 new coal enterprises within the next 20 years.

FOREIGN TRADE

Exports

Exports of coal (Excl. lignite) decreased by 15% to 1.5 million tonnes in 2017-18 from 1.77 million tonnes in the previous year. Exports of coke increased by 17% to about 90.75 thousand tonnes in 2017-18 from

77.64 thousand tonnes in 2016-17. Coal was mainly exported to Bangladesh (50%), Nepal (46%), and Bhutan (3%). Coke was exported predominantly to Bhutan (61%), Nepal (31%), Pakistan (4%) and Oman (1%). Exports of lignite decreased to one thousand tonne in 2017-18 from 2 thousand tonnes in the previous year, while exports of coal water gas (except gaseous hydrocabons) increased to 37 tonnes in 2017-18 from negligible quantity in the previous year. Coal Water Gas was exported to Nepal and Ethiopia (Tables - 32 to 35).

Imports

Imports of coal (Excl. lignite) increased by 9% to 208 million tonnes in 2017-18 from 191 million tonnes in the previous year. Imports of coke increased by 5% to about 4.59 million tonnes in 2017-18 from about 4.37 million tonnes in the previous year. Coal was mainly imported from Indonesia (46%), Australia (22%), South Africa (18%), USA (6%) and Mozambique (3%), whereas coke was imported mainly from China (40%), Poland (16%), Japan & Colombia (13% each) and Australia (11%). Imports of lignite were of negligible quantity during both the years 2016-17 & 2017-18. Imports of Coal water gas (except gaseous hydrocarbons) were reported as 2 tonnes during 2017-18 as compared to nil in 2016-17. Coal water gas was mainly imported from China (Tables - 36 to 39).

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

Country	2016-17		2017-18	
	Qty ('000 t)	Value (₹'000)	Qty ('000 t)	Value (₹'000)
All Countries	**1772**	**9669603**	**1502**	**8777023**
Bangladesh	1051	4926128	758	3215398
Nepal	639	4223154	696	4986988
Bhutan	39	349805	44	508861
UAE	37	126723	2	28266
Oman	++	1112	1	12344
Philippines	-	-	++	10797
Nigeria	-	-	++	2230
Saudi Arabia	1	16471	++	1709
Baharain	-	-	++	1531
Unspecified	-	-	1	4045
Other countries	5	26210	++	4854

Table – 33 : Exports of Coal, Water Gas, etc.
(Except Gaseous Hydrocarbons)
(By Countries)

Country	2016-17		2017-18	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**++**	**95**	**37**	**1122**
Ethiopia	-	-	15	947
Nepal	-	-	22	175
Bangladesh	++	95	-	-

Table – 34 : Exports of Coke (By Countries)

Country	2016-17		2017-18	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**77642**	**992815**	**90748**	**1628416**
Bhutan	35377	601390	55196	1261234
Nepal	33011	230958	28518	209698
Pakistan	3043	47938	3189	76114
Oman	1950	38096	1267	22993
Bangladesh	1931	25374	789	12605
Saudi Arabia	390	8501	579	14821
Sri Lanka	352	8606	364	10006
Jordan	361	8052	342	9692
South Africa	144	4790	159	5240
Sudan	200	3129	100	2050
Other countries	883	15981	245	3963

Table – 35 : Exports of Coal : Lignite (By Countries)

Country	2016-17		2017-18	
	Qty ('000 t)	Value (₹'000)	Qty ('000 t)	Value (₹'000)
All Countries	**2**	**251598**	**1**	**263660**
Saudi Arabia	2	167103	1	76181
Oman	++	31015	++	64009
Russia	++	11985	++	28904
USA	++	438	++	14412
Singapore	++	11782	++	12059
Azerbaijan	++	2369	++	11493
Mexico	-	-	++	9118
UAE	++	193	++	7639
Netherlands	-	-	++	6854
Malaysia	-	-	++	6851
Other countries	++	26713	++	26140

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

Country	2016-17		2017-18	
	Qty ('000 t)	Value (₹'000)	Qty ('000 t)	Value (₹'000)
All Countries	**++**	**652**	**++**	**1335**
China	++	46	++	771
USA	++	606	++	564

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

Country	2016-17		2017-18	
	Qty ('000 t)	Value (₹'000)	Qty ('000 t)	Value (₹'000)
All Countries	**191014**	**1003162924**	**208279**	**1384845576**
Indonesia	91012	318513100	95814	400991857
Australia	46653	426139697	46145	538244476
South Africa	34284	142560369	38493	197041967
USA	5097	31465779	12031	103550184
Mozambique	3708	20749155	5914	48685156
Russia	4200	22301993	4298	33991078
Canada	2377	24269640	3562	42690532
New Zealand	475	4429422	602	7543390
China	23	399249	232	3934493
Vietnam	54	637554	210	2378742
Other countries	3131	11696966	978	5793701

Table – 38 : Imports of Coal Water Gas (Except Gaseous Hydrocarbons) (By Countries)

Country	2016-17		2017-18	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**-**	**-**	**2**	**30**
China	-	-	2	15
Switzerland	-	-	++	15

Table – 39: Imports of Coke
(By Countries)

Country	2016-17		2017-18	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**4368063**	**54356105**	**4589015**	**91542188**
China	2243164	26595888	1827428	37468543
Poland	739642	8803691	729516	15543107
Japan	374628	4460920	604306	12506609
Colombia	225641	3421909	580522	9416431
Australia	623217	8579254	490700	9527740
Russia	114001	1580167	136836	2996060
Egypt	-	-	112736	2298646
Mexico	-	-	49286	918642
Chile	-	-	27111	320798
Korea, Rep. of	-	-	16314	400066
Other countries	47770	914276	14260	145546

FUTURE OUTLOOK

Coal is the backbone on which modern electricity generation rests. Coal currently supplies around 30% of primary energy and 41% of global electricity generation. The forecast for coal-use is that, it would rise to over 50% by 2030, with developing countries being responsible for 97% of this increase, primarily to meet their futuristic electrification targets.

The International Energy Agency (IEA) forecasts that demand for coal will grow by one percent over the next five years, fuelled by growth in Asia. Driven by strong coal-power-generation in China and India, coal demand is expected to grow even further in 2018.

To meet the country's growing demand for coal, foreign collaborations with advanced coal producing countries are also being considered by the Government with an aim to bring in new technologies both in underground and opencast sectors for efficient management of the Coal Industry along with building adequate support mechanism through comprehensive skill development and training activities.

As per the draft National Energy Policy (NEP), (version as on 27.06.2017) formulated by the Niti Aayog, India Vision 2040 envisages demand-driven provision of energy at affordable prices, high per capita consumption of electricity, access to clean cooking energy & electricity with universal coverage, low emission and security of supply as criteria that would characterise the energy parameters of India in 2040.

The installed coal-based electricity generation capacity is expected to grow to 330- 441 GW by 2040. This is likely to translate into a coal demand of 1.1-1.4 billion tonnes. The known levels of proven coal reserves (138 billion tonnes as of 31.03.2016) may only be able to support an annual peak production of 1.2-1.3 billion tonnes till 2037, with a gradual decrease thereafter. This fact calls for intensifying exploration to enhance the proven coal reserves. Multiple institutions, such as, GSI and CMPDI are responsible for exploration of coal in India. There is a need to synergise the efforts of all these agencies to undertake 100% resource mapping of coal.