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COAL AND LIGNITE

(FINAL RELEASE)

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

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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. With burial, the plant material was subjected to high temperatures and pressures. This caused physical and chemical changes in the vegetation, transforming it 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.

Over many more millions of years, the continuing effects of temperature and pressure produce further change in the lignite, progressively increasing its organic maturity and transforming it into the range known as 'sub-bituminous' coals.

Further chemical and physical changes occur until these coals became harder and blacker, forming the 'bituminous' or 'hard coals'. Under the right conditions, the progressive increase in the organic maturity can continue, finally forming 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 2016-17, about 82% coal and lignite 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 639.23 million tonnes in 2015-16 increased by about 3.7% to 662.79 million tonnes in 2016-17. The production of lignite at 45.23 million tonnes in 2016-17 increased by 3.17% from 43.84 million tonnes in the previous year. India, in 2016 ranked 2nd in the world coal production.

RESOURCES

Coal

The coal deposits in India are primarily concentrated in the Gondwana sediments occurring mainly in the eastern and central parts of Peninsular India, although Gondwana coal deposits also occur in 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, 315.149 billion tonnes (including that estimated in Sikkim) of geological coal reserves up to 1,200 m depth have been established in the country as on 1.4.2017. Out of these reserves, 143.058 billion tonnes are Proved reserves, 139.311 billion tonnes are Indicated reserves and the remaining 32.779 billion tonnes are in the Inferred category. Of the total reserves, the share of prime-coking coal is 5.313 billion tonnes, medium-coking & semi-coking is 29.221 billion tonnes and non-coking coal, including high sulphur is 280.615 billion tonnes. State-wise/coalfield-wise and state-wise/type-wise reserves of coal as on 1.4.2017 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 reserves of lignite as on 1.4.2017 is 44.698 billion tonnes, of which 80% reserves are located in Tamil Nadu with about 35.782 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 reserves of lignite as on 1.4.2017 are detailed in Table - 3.

EXPLORATION & DEVELOPMENT

Exploration and development details, if any, are given in the review on "Exploration & Development" in "General Reviews".

Table – 1 : Geological Reserves of Coal as on 1.4.2017 (By States/Coalfields)

(In million tonnes)

State/Coalfield	Proved	Indicated	Inferred	Total
All India : Total	**143058**	**139311**	**32780**	**315149**
Gondwana Coalfields*	**142464**	**139212**	**31885**	**313561**
Andhra Pradesh	-	1149	432	1581
Assam	-	14	-	14
Bihar	-	-	1354	1354
Chhattisgarh	19997	34462	2202	56661
Jharkhand	44341	31876	6223	82440
Madhya Pradesh	11269	12760	3645	27673
Maharashtra	7038	3158	2063	12259
Odisha	34810	34060	8415	77285
Telangana	10402	8542	2520	21464
Sikkim	–	58	43	101
Uttar Pradesh	884	178	-	1062
West Bengal	13723	12954	4990	31667
Tertiary Coalfields	**594**	**99**	**895**	**1588**
Assam	465	43	3	511
Arunachal Pradesh	31	40	19	90
Meghalaya	89	17	471	577
Nagaland	9	-	402	410

Source: *Provisional Coal Statistics, 2016-17, Coal Controller's Organisation, Kolkata.*
Note: * *Including Sikkim.* *Figures rounded off.*

Table – 2 : Geological Reserves of Coal as on 1.4.2017 (By States/Types)

(In million tonnes)

State/Type of coal	Proved	Indicated	Inferred	Total
All India : Total	**143058**	**139311**	**32779**	**315149**
Prime-coking	4614	699	–	5313
Medium-coking	13501	12133	1879	27513
Blendable/Semi-coking	519	995	193	1708
Non-coking	124423	125485	30706	280615

Source: *Provisional Coal Statistics, 2016-17, Coal Controller's Organisation, Kolkata.*
Note: *Figures rounded off.*

Table – 3 : Geological Reserves of Lignite as on 1.4.2017 (By States)

(In million tonnes)

State	Proved	Indicated	Inferred	Total
All India : Total	**6540.71**	**26014.39**	**12143.03**	**44698.13**
Gujarat	1278.65	283.70	1159.70	2722.05
Jammu & Kashmir	–	20.25	7.30	27.55
Kerala	–	–	9.65	9.65
Rajasthan	1168.53	2670.83	1896.60	5735.96
Tamil Nadu	4093.53	22632.87	9055.98	35782.38
Puducherry	–	405.61	11.00	416.61
West Bengal	–	1.13	2.80	3.93

Source: *Provisional Coal Statistics, 2016-17, Coal Controller's Organisation, Kolkata.*

PRODUCTION AND STOCKS

COAL

Production

The provisional total production of coal in 2016-17 was 662.79 million tonnes which was higher by 3.69% in comparison to that of the previous year. Chhattisgarh is the largest coal producing State with a share of about 21.7% followed by Odisha with contribution of 21.03%, to the national output. Next in order of share in the total production were Jharkhand (19.08%), Madhya Pradesh (15.84%), Telangana (8.98%), Maharashtra (6.12%), West Bengal (4.17%) and Uttar Pradesh 2.42 percent. The remaining 0.66% of coal production was accounted for from Assam, Jammu & Kashmir and Meghalaya (Table-4).

During the year 2016-17, coal mining was confined mainly to the Public Sector which contributed 94.9% to the national production. In 2016-17, out of the total production of coal, 9.3% was coking coal and the rest 90.7% was non-coking coal. As in the earlier years, bulk of the coking coal production, i.e., about 89.8% was reported from the Public Sector. Grade-wise analysis of coking coal in 2016-17 revealed that Washery Grade IV had the maximum share at 74.1%, followed by Washery Grade III (18%), Washery Grade II (5.6%) and Steel Grade II (1.6%). The remaining 0.7% production of coking coal was of Washery Grade I, Semi-coking Grade I and Steel Grade I. In coking coal, Metallurgical Grade accounts for 14.669 million tonnes (23.8%) and remaining 46.992 million tonnes (76.2%) for non-metallurgical grade. Out of the total production of coking coal in India, bulk quantity, i.e., 96.7% was produced in Jharkhand followed by West Bengal with 2.9 percent. The remaining 0.4% was contributed by Chhattisgarh and Madhya Pradesh (Table-5).

During 2016-17, except for a nominal quantity (4.6%), the balance production of non-coking coal (95.4%) came from the Public Sector. Out of the total production of non-coking coal grades, G11 grade accounted for 23.8% followed by G10 (16.3%), G12 (15.4%), G13 (15.1%), G9 (6.3%), G7 (6.0%), G8 (4.9%), G4 (2.9%), G6 (2.3%) and G5 (2.2%). The remaining 4.8% production was accounted for G1, G2, G3, G14, G15, G16, G17 and UNG grades of non-coking coal. Chhattisgarh was the largest producing State of non-coking coal in 2016-17 which alone accounted for 23.9% of the national output. Next in order were Odisha with a contribution of (23.2%), Madhya Pradesh (17.5%), Jharkhand (11.1%), Telangana (9.9%), Maharashtra (6.8%), West Bengal (4.3%) and Uttar Pradesh (2.3%). The remaining 1% production came from Assam, Jammu & Kashmir and Meghalaya (Tables-7 to 11).

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 - 6).

Despatches

Despatches of coal at about 650.32 million tonnes in 2016-17 were higher by around 2.8% as compared to that in the previous year. Odisha was the leading State in the despatches in 2016-17 and accounted for 22% of the total despatches. The States next in order were Chhattisgarh (21.4%), Jharkhand (18.6%), Madhya Pradesh (13.5%), Telangana (9.1%), Maharashtra (5.4%), Uttar Pradesh (5.1%) and West Bengal 4.2 percent. The remaining 0.7% despatches were from the States of Assam, Jammu & Kashmir and Meghalaya.

During the year 2016-17, state-wise analysis revealed that there was increase in the despatches of coal from the States of Assam, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Telangana, Uttar Pradesh and West Bengal while the States of Jammu & Kashmir and Maharashtra showed fall in despatches as against that of the previous year. Meghalaya maintained the despatches both the years in 2015-16 & 2016-17.

Of the total despatches of raw coal effected in 2016-17, a sizeable share of 81.1% was made to the Electricity Sector. As much as 1.9% was made to the Steel Industry, 1% to the Cement Industry, 0.9% to the Sponge Iron Industry, 0.3 % to the Fertilizer Industry, 0.2% to the Paper & Pulp Industry and 0.1% to the Other Basic Metals. The remaining 14.5% was made for other priority sectors including Textile & Rayons, Cokeries, Chemical and Other Basic Metals.

From the total despatches of raw coal effected in 2015-16, a sizeable share of 79.4% was made to the Electricity Sector. As much as 2% was made to the Steel Industry, 1.4% to the Cement Industry, 1.2% to the Sponge Iron Industry, 0.4% to the Fertilizer and 0.3% to the Paper & Pulp Industry. The remaining 15.4% was made for other priority sectors including Textile & Rayons, Chemical, Bricks and Others (Tables-12 & 13).

Stocks

The mine-head stocks of coal at the end of the year 2016-17 were 77.3 million tonnes which increased by about 18.2 % 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 2016-17, 99.1% was confined mainly to the Public Sector and remaining 0.9 % to the Private Sector.

The mine-head stocks of coal at the end of the year 2015-16 were 65.4 million tonnes which increased by about 10.1 % from that of the stocks that were available at the beginning of the year. Bulk of the coal stocks (about 99.4%) at the end of the year was accounted for by the mines located in the states of Jharkhand, Odisha, Chhattisgarh, Maharashtra, Telangana, Madhya Pradesh, Uttar Pradesh and West Bengal (Tables-14 & 15).

LIGNITE

Production

During the year 2016-17, the provisional production of lignite at 45.2 million tonnes increased by about 3.2% in comparison to that of the previous year. The production from Tamil Nadu alone accounted for about 57.9%. The share of Gujarat in lignite production was 23.3% and that of Rajasthan was 18.8 % (Tables-16).

During the year 2015-16, the production of lignite at 43.8 million tonnes decreased by about 9.2% in comparison to that of the previous year. The production from Tamil Nadu alone accounted for 55.3%. The share of Gujarat in lignite production was 23.1% and that of Rajasthan was 21.6 % (Table-17).

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 - 18).

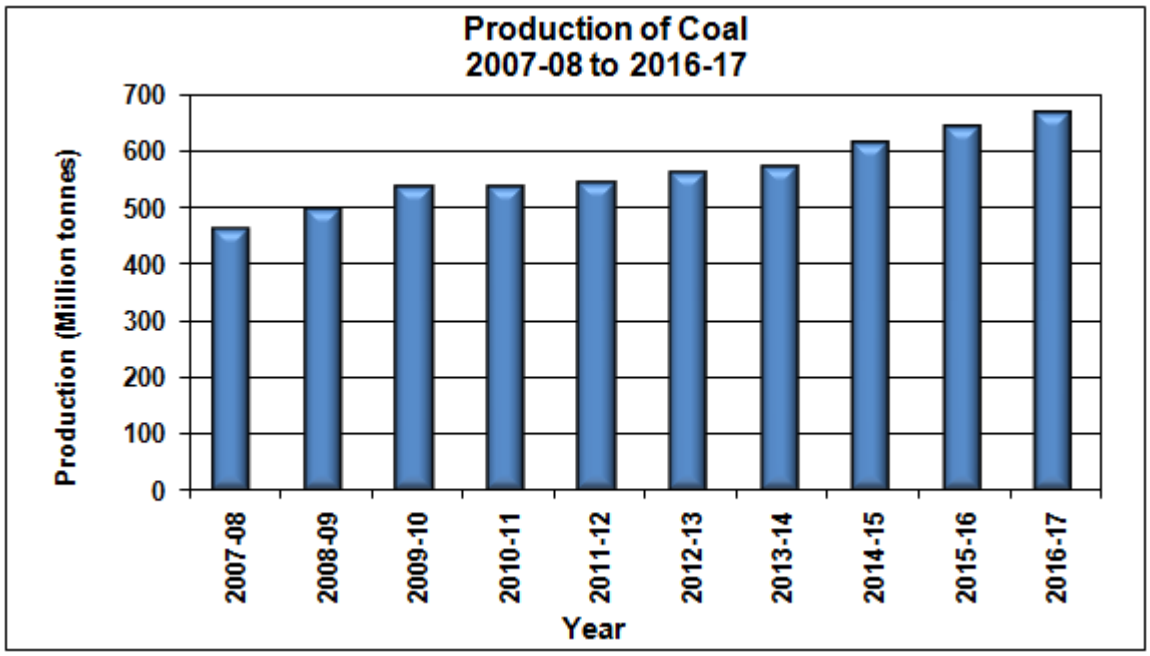
Despatches

The quantum of despatches of lignite was about 43.2 million tonnes during the year 2016-17, which increased by 2.24% as compared to that in the previous year (Table-19).

Of the total despatches of lignite effected in 2016-17, a sizeable share of about 90% was made to the Electricity Sector. As much as 3.4% to the Textile & Rayons industry and 3.2% to the Others. The remaining 3.4% was made for other priority sectors including Steel, Fertiliser, Pulp & Paper, Bricks, Chemical and Cement (Table-20).

Stocks

The mine-head stocks of lignite at the end of 2016-17 were 6,883 thousand tonnes which steeply increased by 43.1% from that of the stocks that were available at the beginning of the year. The bulk of the coal stocks (96.1%) at the end of the year was accounted for by the mines located in the State of Tamil Nadu (Table- 21).



Quantity of Production of Coal in different States in 2016-17

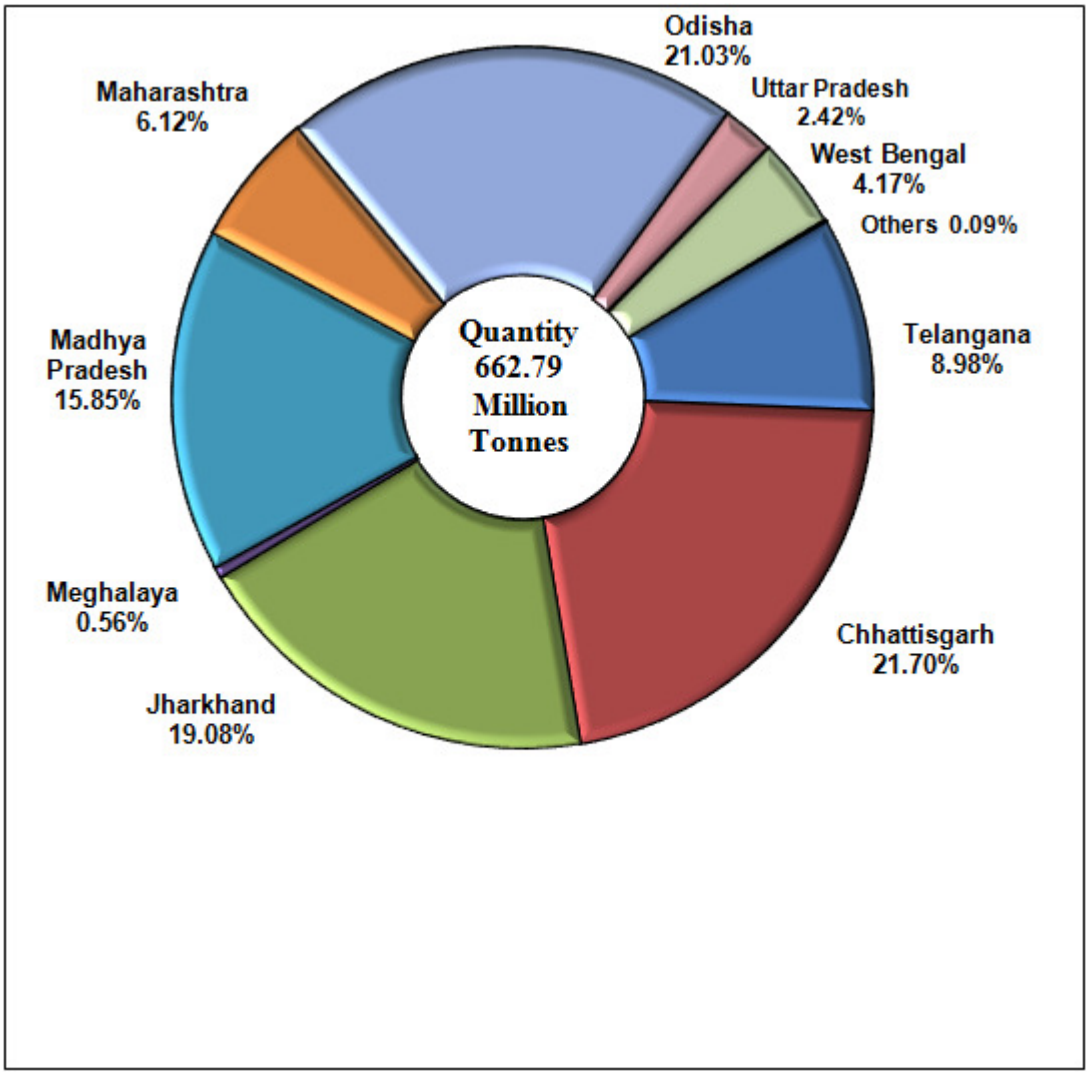


Table – 4 : Production of Coal, 2014-15 to 2016-17 (By Sectors/States)

(Quantity in '000 tonnes)

State	2014-15	2015-16	2016-17 (P)
India	**609179**	**639230**	**662792**
Public Sector	**567032**	**606677**	**628716**
Private Sector	**42147**	**32553**	**34076**
Assam	779	487	600
Chhattisgarh	134764	130605	143849
Jammu & Kashmir	13	13	10
Jharkhand	124143	121067	126435
Madhya Pradesh	87609	107714	105013
Maharashtra	38257	38351	40559
Meghalaya	2524	3712	3712
Odisha	123627	138461	139359
Telangana	52536	60380	59532
Uttar Pradesh	14957	12689	16056
West Bengal	29970	25751	27667

Source: *Provisional Coal Statistics, 2016-17, Coal Controller's Organisation, Kolkata.*

Table – 5 : Production of Coal, 2014-15 to 2016-17 (By Sectors/States)

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

State	2014-15		2015-16		2016-17 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value#
India	**609179**	**892871700**	**639230**	**883822100**	**662792**	
Public Sector	**567032**	**802886105**	**606677**	**833320400**	**628716**	
Private Sector	**42147**	**89985595**	**32553**	**50501700**	**34076**	
Assam	779	3819900	487	1711300	600	
Chhattisgarh	134764	139855400	130605	147436800	143849	
Jammu & Kashmir	13	27600	13	27600	10	
Jharkhand	124143	193135100	121067	187369900	126435	
Madhya Pradesh	87609	111478200	107714	132254900	105013	
Maharashtra	38257	67045400	38351	65340300	40559	
Meghalaya	2524	12670500	3712	18634200	3712	
Odisha	123627	158984300	138461	121010100	139359	
Telangana	52536	109642600	60380	122753500	59532	
Uttar Pradesh	14957	16186900	12689	14028100	16056	
West Bengal	29970	80025800	25751	73255400	27667	

Source: *1) Coal Directory of India, 2015-16, 2) Provisional Coal Statistics 2016-17*

#: *The 'value of fuel minerals' production is not received from source agency, hence not reflected for the year 2016-17.*

Table – 6 : Number of Coal Mines, 2015-16 & 2016-17 (By States)

State	No. of Mines	
	2015-16#	2016-17
India	**493**	**476**
Assam	4	4
Chhattisgarh	57	55
Jammu & Kashmir	4	4
Jharkhand	140	132
Madhya Pradesh	70	64
Maharashtra	60	57
Meghalaya	3	3
Odisha	29	29
Telangana	47	47
Uttar Pradesh	4	5
West Bengal	75	76

 # Relates to number of mines as last day of financial year.
***Note**: Coal Mines in the State of Meghalaya operate under the Private Sector.*
***Source:**Coal Directory of India 2016-17.*

Table – 7: Production of Coking Coal, 2016-17 (P) (By 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**	**314**	**3422**	**11084**	**45704**	**-**	**110**

***Source:** Provisional Coal Statistics,2016-17 Coal Controller's Organisation, Kolkata.*

Table –8: Production of Coking Coal, 2015-16 (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	**60887**	**37**	**1051**	**415**	**2493**	**12968**	**43788**	**-**	**135**
Chhattisgarh	135	-	-	-	-	-	-	-	135
Jharkhand	58548	37	1051	415	1859	11398	43788	-	-
Madhya Pradesh	209	-	-	-	209	-	-	-	-
West Bengal	1995	-	-	-	425	1570	-	-	-

Table – 9: Production of Coal, 2015-16 & 2016-17 (By Grades and Sectors)

(In '000 tonnes)

Grade	2015-16			2016-17 (P)		
	Total	Pub. Sec.	Pvt. Sec.	Total	Pub. Sec.	Pvt. Sec.
All Grades	**639230**	**606677**	**32553**	**662792**	**628716**	**34076**
Coking	**60887**	**54662**	**6225**	**61661**	**55345**	**6316**
ST-I	37	37	-	23	23	-
ST-II	1051	1051	-	1004	1004	-
W-I	415	415	-	314	314	-
W-II	2493	2359	134	3422	3306	116
W-III	12968	11919	1049	11084	9750	1334
W-IV	43788	38746	5042	45704	40838	4866
SC-I	135	135	-	110	110	-
SLV	-	-	-	-	-	-
Non-coking	**578343**	**552015**	**26328**	**601131**	**573371**	**27760**
G1	3831	119	3712	3832	120	3712
G2	341	341	-	309	309	-
G3	5189	5189	-	5279	5279	-
G4	17665	17665	-	17319	17319	-
G5	16302	16302	-	13112	13112	-
G6	13114	13114	-	14140	14140	-
G7	39038	39038	-	35961	35961	-
G8	33150	32985	165	29450	28741	709
G9	44579	44459	120	37769	37589	180
G10	82855	72117	10738	98074	91048	7026
G11	147460	136431	11029	143133	128020	15113
G12	90578	90575	3	92317	91873	444
G13	77619	77448	171	90838	90350	488
G14	1439	1049	390	7440	7377	63
G15	4073	4073	-	3540	3540	-
G16	418	418	-	7769	7769	-
G17	666	666	-	531	531	-
UNG	26	26	-	318	293	25

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

***Source**: Provisional Coal Statistics, 2016-17, Coal Controller's Organisation, Kolkata.*

Table – 10 : Production of Non-coking Coal, 2015-16
(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	**578343**	**3831**	**341**	**5189**	**17665**	**16302**	**13114**	**39038**	**33150**	**44579**	**82855**	**147460**	**90578**	**77619**	**1439**	**4073**	**418**	**666**	**26**
Assam	487	119	247	-	121	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chhattisgarh	130470	-	-	1696	1761	6172	2035	755	1034	1141	1767	101011	10819	1	1049	1229	-	-	-
Jammu & Kashmir	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-
Jharkhand	62519	-	-	663	392	3693	2877	2546	4027	11820	12950	5981	2155	15401	-	-	-	-	14
Madhya Pradesh	107505	-	-	1837	1258	1523	6759	23496	5736	2171	54279	9129	1317	-	-	-	-	-	-
Maharashtra	38351	-	-	-	-	168	516	678	12845	20291	3853	-	-	-	-	-	-	-	-
Meghalaya	3712	3712	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Odisha	138461	-	-	-	-	73	-	-	130	921	-	11737	75265	49945	390	-	-	-	-
Telangana	60380	-	-	-	-	786	-	9387	2384	8235	4642	17725	1022	12272	-	2844	418	653	12
Uttar Pradesh	12689	-	-	-	-	119	212	-	6994	-	5364	-	-	-	-	-	-	-	-
West Bengal	23756	-	94	993	14133	3768	715	2176	-	-	-	1877	-	-	-	-	-	-	-

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

***Source**: Provisional Coal Statistics, 2016-17, Coal Controller's Organisation, Kolkata.*

Table-11: Production of Non-coking Coal, 2016-17 (P)
(By 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	**601131**	**3832**	**309**	**5279**	**17319**	**13112**	**14140**	**35961**	**29450**	**37769**	**98074**	**143133**	**92317**	**90838**	**7440**	**3540**	**7769**	**531**	**318**

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

***Source**: Provisional Coal Statistics, 2016-17, Coal Controller's Organisation, Kolkata.*

Table – 12: Despatches of Raw Coal, 2015-16 & 2016-17 (By States)

(In '000 tonnes)

State	2015-16	2016-17 (P)
India	**632442**	**650319**
Assam	342	777
Chhattisgarh	132040	139386
Jammu & Kashmir	12	11
Jharkhand	118072	120976
Madhya Pradesh	85205	87742
Maharashtra	36444	34954
Meghalaya	3712	3712
Odisha	140639	143287
Telangana	58687	59374
Uttar Pradesh	31815	33006
West Bengal	25474	27094

Table –13 : Despatches of Raw Coal, 2015-16 & 2016-17 (By Priorities)

(In '000 tonnes)

Priority	2015-16	2016-17 (P)
Total	**632442**	**650319**
Steel	12273	11845
Sponge Iron	7763	5677
Chemical	325	312
Cement	8985	6434
Paper & Pulp	1211	1184
Fertilizer	2296	2143
Textile & Rayons	267	243
Other Basic metal	440	651
Others	80790	93819
Power (Utility)	483124	470976
Power (Captive)	34645	56280
Steel (Boilers)	249	658
Chemical	325	312
Bricks	74	97

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

Table – 14: Mine-head Stocks of Coal, 2015-16
(By States)

(In '000 tonnes)

State	At the beginning of the year	At the end of the year
India	**59389**	**65361**
Assam	215	359
Chhattisgarh	11576	9444
Jammu & Kashmir	13	13
Jharkhand	15544	18355
Madhya Pradesh	4111	6854
Maharashtra	5370	7170
Odisha	12538	10330
Telangana	5348	7025
Uttar Pradesh	2484	3570
West Bengal	2190	2241

Source: *Coal Directory of India, 2015-16.*

Table – 15: 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**	**77285**
Assam	359	NA
Chhattisgarh	9444	NA
Jammu & Kashmir	13	NA
Jharkhand	18355	NA
Madhya Pradesh	6854	NA
Maharashtra	7170	NA
Odisha	10330	NA
Telangana	7025	NA
Uttar Pradesh	3570	NA
West Bengal	2241	NA

NA*: Data not available.*
Source *: Coal Directory of India 2015-16, Provisional Coal Statistics, 2016-17.*

Table – 16 : Production of Lignite, 2014-15 to 2016-17 (By Sector/States)

(Quantity in '000 tonnes)

	2014-15	2015-16	2016-17 (P)
India	**48270**	**43842**	**45230**
Public Sector	**47065**	**43133**	**44644**
Private Sector	**1205**	**709**	**586**
Gujarat	12317	10123	10546
Rajasthan	10763	9492	8480
Tamil Nadu	25190	24227	26204

***Source**: Provisional Coal Statistics, 2016-17, Coal Controller's Organisation, Kolkata.*

Table – 17 : Production of Lignite, 2014-15 to 2016-17 (By Sector/States)

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

	2014-15		2015-16		2016-17 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value#
India	**48270**	**81627000**	**43842**	**74994800**	**45230**	
Public Sector	**47065**	**80160511**	**43133**	**74139252**	**-**	
Private Sector	**1205**	**1466489**	**709**	**855548**	**-**	
Gujarat	12317	17914600	10123	14723500	10546	
Rajasthan	10763	12590000	9492	11103300	8480	
Tamil Nadu	25190	51122400	24227	49168000	26204	

***Source :**Provisional Coal Statistics, 2016-17, Coal Controller's Organisation, Kolkata.*
#: The 'value of fuel minerals' production is not received from source agency, hence not reflected for the year 2016-17.

Table – 18 : Number of Lignite Mines 2015-16 & 2016-17 (By States)

State	No. of Mines#	
	2015-16	2016-17 (P)
India	**19**	**19**
Gujarat	10	10
Rajasthan	6	6
Tamil Nadu	3	3

 # : Relates to no. of mines on the last day of financial year.
***Source**: Coal Directory of India, 2015-16, 2016-17*

Table – 19 : Despatches of Lignite 2015-16 & 2016-17 (By States)

(In '000 tonnes)

State	2015-16	2016-17 (P)
India	**42211**	**43155**
Gujarat	10135	10545
Rajasthan	9583	8445
Tamil Nadu	22493	24165

***Source**: i) Coal Directory of India, 2015-16.*
ii) Provisional Coal Statistics, 2016-17.

Table – 20: Despatches of Lignite, 2015-16 & 2016-17 (By Priorities)

(In '000 tonnes)

Priority	2015-16 (P)*	2016-17 (P)@
Total	**42211**	**43155**
Electricity	37555	38824
Textile & Rayons	1728	1464
Other Basic metal	1020	-
Paper & Pulp	427	526
Bricks	392	382
Chemical	227	199
Cement	225	291
Others	637	1469

Source: **: Coal Directory of India, 2015-16.*
@: Provisional coal Statistics, 2016-17.

Table – 21 : Mine-head Stocks of Lignite, 2016-17 (By States)

(In '000 tonnes)

State	At the beginning of the year	At the end of the year
India	**4809**	**6883**
Gujarat	11	12
Rajasthan	225	259
Tamil Nadu	4573	6612

Source: *Coal Directory of India, 2015-16.*
Provisional Coal Statistics, 2016-17.

MINING & MARKETING

Coal

Coal mining in the country is carried out by both opencast and underground methods. Opencast mining contributed about 93% of the total production, whereas the rest of the production (7%) came from underground mining during 2015-16. 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 31.3.2016, there were 493 operating mines for coal in the country out of which 210 were opencast, while 252 were underground mines. The remaining 31 were mixed collieries. There were 473 Public Sector mines and 20 mines in Private Sector (Table-22). Thrust is given on further increasing production from opencast mines where the gestation period is comparatively shorter. In 2016-17, the share of production of raw coal from opencast mines was 618.44 million tonnes (93.3%) against 44.35 million tonnes (6.7%) from underground mines (Table-23). Production of coal by different mining technologies employed is furnished in Table-24. The overall Output per Man Shift (OMS) in opencast and underground mines for CIL in 2016-17 was 7.86 tonnes as against 7.15 tonnes in 2015-16. The overall OMS

in opencast and underground mines for SCCL was maintained at 4.20 tonnes in both the years i.e. 2015-16 and 2016-17.

Under the Colliery Control Order, 1945, the Central Government was empowered to fix the prices of coal grade-wise and colliery-wise. As per recommendations of the Bureau of Industrial Costs and Prices and the Committee on Integrated Coal Policy, prices of different grades of coal had been subjected to de-regulation since 22.3.1996, in a phased manner. As the prices of all grades of coking coal were 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 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 – 23 : Production of Raw Coal

(In million tonnes)

Year	Production from open-cast mines (% share)	Production from under-ground mines (% share)	Total production
2014-15	560.667 (92%)	48.512 (8%)	609.179
2015-16	592.822 (92.7%)	46.408 (7.3%)	639.230
2016-17	618.445 (93.3%)	44.347 (6.7%)	662.792

Source: *Provisional Coal Statistics, 2016-17, Coal Controller's Organisation, Kolkata.*

Table – 22 : Number* of Coal Mines, 2015-16 (By Sectors/States)

State	No. of collieries			
	OC	UG	Mixed	Total
All India	**210**	**252**	**31**	**493**
Public sector	198	244	31	473
Private sector	12	8	–	20
Assam	3	1	–	4
Chhattisgarh	20	36	1	57
Jammu & Kashmir	–	4	–	4
Jharkhand	72	47	21	140
Madhya Pradesh	22	46	2	70
Maharashtra	38	22	–	60
Meghalaya	3	–	–	3
Odisha	19	10	–	29
Telangana	16	31	–	47
Uttar Pradesh	4	–	–	4
West Bengal	13	55	7	75

Source: *Coal Directory of India, 2015-16, Coal Controller's Organisation, Kolkata.*
** Relates to no. of mines as last day of financial year (As on 31.3.2016)*
Note: *OC - Opencast UG - Underground.*

Table – 24 : Production of Coal, 2015-16 (By Technologies)

(In million tonnes)

Technology adopted	Production	Percentage of total
All India : Total	**639.23**	**100**
Opencast (Total)	***592.822***	***92.70***
Mechanised	592.582	99.96
Manual	0.240	0.04
Underground (Total)	***46.408***	***7.30***
Conventional B&P	1.584	3.40
Mechanised B&P	38.867	83.80
Conventional LW	0.021	0.00
Mechanised LW	1.868	4.00
Other methods	4.068	8.80

Source: *Coal Directory of India, 2015-16, Coal Controller's Organisation, Kolkata.*

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

Lignite

As on 31.03.2016, 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. The NLC operates three opencast mines at Neyveli, Tamil Nadu and one opencast mine at Barsingsar, Rajasthan. The present installed capacity 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, Bithnok Lignite Mine (2.25 MTPA), Hadla Mine (1.9 MTPA), Barsingsar expansion (0.40 MTPA) and expansion of Mine-I A (4.0 MTPA) are under implementation. In addition to the above, augmentation of Mine-II by 3.75 MTPA and setting up of Mine-III of 9.0 MTPA capacities to exploit 380 MT of lignite reserves available to the south of Mine-II as fuel linkage to the second expansion of TPS-II are in pipeline. Further, it has also plans to develop a lignite mine of 5.0 MTPA at Jayamkondam,Tamil Nadu. The total lignite mining capacity of all NLC mines would increase to 56.9 MTPA at the end of the year 2022. The production of lignite for all NLC mines was 254.51 lakh tonnes during 2015-16 which decreased by 4.1% from 265.43 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, with the commissioning of TPS-II expansion in June 2015, 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 3240 MW (viz. TPS-I with 600 MW, TPS expansion with 420 MW, TPS-II with 1470 MW & 500 MW (expansion), Barsingsar with 250 MW). In addition, NLC's wind power unit of 51 MW is under construction and solar power generation of 10 MW is under implementation. The total installed capacity would then rise to 3,301 MW. The project proposals of NLC that are at various stages of implementation include a 1000 MW of Neyveli New Thermal Power Project (in replacement of the existing TPS-I of 600 MW), 250 MW Barsingsar Extension TPS and 250 MW Bithnok TPS. Besides, solar power project of 130 MW each in Neyveli and Barsingsar is under active consideration. These projects which are presently under implementation, when completed would enhance NLCs power generating capacities to 4,461 MW. Further, power generation capacity building plans of NLC over a period of next 10 years include setting up of 100 MW TPS-II second expansion project, Jayamkondam project of 500 MW, coal-based power generation of 3,960 MW in Sirkali in phases, acquisition of power assets of 3000 MW and green energy projects such as solar and wind based power generation projects that include 51 MW solar project at Andaman and Nicobar Islands aggregating to 3,930 MW. All these projects would increase the power generating capacity to 16,851 MW at the end of year 2025 and taking into account the generation capacity of NLC subsidiaries viz., NTPL (1,000 MW) & NUPPL (1,980 MW), the total power generating capacity would be 19,831 MW.

As regards coal mining, Talabira-II & III (containing mineable coal reserves of about 550 million tonnes) with coal mine capacity of 20.5 MTPA in Odisha state has been allotted to NLC while Pachwara south block in Jharkhand with a capacity of 11.0 MTPA has been allotted to Neyveli Uttar Pradesh Power Ltd (NUPPL), a subsidiary of NLC. The total coal mine capacity of these projects would add up to 31.5 MTPA at the end of the year 2022.

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 finalized 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 in respect of allotment of Captive Coal blocks was adopted by the Government of India in 1993 and accordingly, 218 coal blocks were allocated during 2013-14. Out of these, 80 coal blocks were de-allocated. During the year 2014-15 by virtue of the Hon'ble Supreme Court's judgement dated 25th

August, 2014 read with Order dated 24.09.2014, out of 218 coal blocks, allocation of 204 coal blocks was cancelled while allocation of 12 coal blocks for UMPPs and one coal block each allocated to NTPC and SAIL were exempted.

Further, allocation of four coal blocks for UMPPs, namely, Chhatrasal coal block cancelled on 07.05.2015 and Meenakshi, Meenakshi B and Dip side of Meenakshi blocks of UMPP cancelled on 15.12.2015. As such, as on date, 10 coal blocks stand allocated through earlier dispensations.

Subsequent to the order of the Hon'ble Supreme Court, 42 nos. of producing coal blocks (Schedule II Coal Mines (Special Provision) Ordinance, 2014 replaced by Coal Mines (Special Provision) Act, 2015) were allowed to produce coal up to 31.03.2015. Thus, 52 blocks stand allocated from 25.09.2014 to 31.03.2015.

As per Coal Mines (Special Provisions) Act, 2015, allocation of Schedule-I coal mines started by way of Public Auction or on the basis of Competitive Bids for Tariff. During 2016-17, captive coal block has only been allotted to different companies in Power, Ultra Mega Power Project (UMPP), Non-regulator Sector (NRS) and Government Commercial.

Up to 31.03.2017, re-allocation (either vested or allotted) was done in respect of 99 coal blocks. Seven coal blocks have been given to Coal India Limited. Out of 7 coal blocks given to CIL, 3 blocks were producing coal during the period, these are Gare Palma IV/2 & 3 and Gare Palma IV/ 1. Moher and Moher Amlori coal blocks of Sasan Power Ltd and Pakri Burwadih of NTPC Ltd, allocations of which were not cancelled by the Supreme Court, produced coal in 2016-17. Another 13 coal blocks vested/ allotted including 3 blocks under CIL started production. From these total 16 coal blocks production of coal was 37.867 MT in 2016-17.

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

Therefore, as on 31.03.2017, numbers of coal blocks stand exist was 99 (vested/ allotted for 69, Custodian for 7, Under Auction by Competitive Bidding Rules, 2012 for 13 and blocks not cancelled for 10).

Till 31.03.2017, a total of 99 coal blocks with 14,245.20 million tonnes geological reserves have been allotted in various States (Table 25). Of these, 62 blocks (including 13 blocks Auction by Competitive Bidding Rules, 2012) with 9,609.62 million tonnes are under Public Sector Undertakings (PSU) and the remaining 37 blocks with 4,635.58 million tonnes are under Private Sector. Among these, 57 blocks (including 13 blocks Auction by Competitive Bidding Rules, 2012) with 8,638.43 million tonnes have been allocated for power, 26 blocks (909.37 million tonnes) for non- regulated sector, 8 blocks (3,730.54 million tonnes) for UMPP and 8 blocks (966.86 million tonnes) for commercial mining.

Similarly, 21 captive lignite blocks with 1,548.20 million tonnes geological reserves have been allocated till 31.3.2017. Of these, 19 blocks with 1,495.70 million tonnnes are under Public Sector Undertakings (State PSU) and remaining 2 blocks under Private Sector with 52.50 million tonnes. By state-wise, 11 blocks with 755.70 million tonnes are in Gujarat while 10 blocks with 792.50 million tonnes are in Rajasthan. By sectors, in Gujarat, 4 blocks (404.20 million tonnes) have been allocated for power generation and 7 blocks (351.50 million tonnes) for commercial end use. In Rajasthan, the allocation of 11 blocks (673.80 million tonnes) is for power and 3 blocks (118.70 million tonnes) for commercial end use.

Table – 25 : Allotment of Captive Coal Blocks stand Allocated/Vested/Under Custodian excluding Blocks Allotted Under Auction by Competitive Bidding Rules, 2012 till 2016-17 (State-wise)

(In million tonnes)

State	No. of blocks	Geological Reserves
Arunachal Pradesh	1	4.79
Andhra Pradesh	1	45.36
Chhattisgarh	19	4360.13
Jharkhand	25	6116.11
Madhya Pradesh	10	1182.71
Maharashtra	13	247.93
Odisha	7	1986.96
West Bengal	10	301.21
	86	**14245.20**
Power (Auction by Competitive Bidding Rules, 2012)	13	-
Total	**99**	**14245.20**

Source: *Provisional Coal Statistics, 2016-17, Coal Controller's Organisation, Kolkata.*

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, 20 coal washeries (16 in Public Sector and 4 in Private Sector) with 35.90 million tonnes per annum (MTPA) capacity produced about 6.179 million tonnes of coking coal in 2015-16. Production of washed coking coal during 2015-16 was about 2.732 million tonnes in Public Sector and 3.447 million tonnes in Private Sector. Under Public Sector, BCCL operates 9 coking coal washeries (Dugda II, Bhojudih, Patherdih, Sudamdih, Barora, Moonidih, Mahuda, Madhuban and Dugda-I), 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, 39 coal washeries with 137.92 million tonnes per annum capacity produced about 42.89 million tonnes non-coking coal during the year. Of these, about 11.77 million tonnes has been under Public Sector and 31.12 million tonnes under Private Sector. Under Public Sector, 5 non-coking coal washeries (two each in BCCL & CCL and one in NCL) were operational, whereas under Private Sector, 34 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 - 26 to 29, respectively.

Table – 26 : Production of Washed Coking Coal, 2014-15 & 2015-16 (Sector-wise/Company-wise)

(In '000 tonnes)

	2014-15	2015-16
All India : Total	**6072**	**6179**
Public Sector	**2627**	**2732**
BCCL	387	599
CCL	1648	1471
WCL	75	81
SAIL	517	581
Private Sector	**3445**	**3447**
Tata Steel Ltd	3267	3447
ESCL	178	-

Source: *Coal Directory of India, 2015-16, Coal Controller's Organisation, Kolkata.*

Table – 27 : Capacity of Washed Coking Coal, 2015-16 (Sector-wise/Company-wise)

Coalfield/Washery	State	Raw Coal Capacity (In '000 tpy)
Grand Total		**35900**
Public Sector	**Total**	**29700**
BCCL		**15030**
Dugda-I	Jharkhand	2500
Dugda-II	-do-	2000
Bhojudih	-do-	1700
Patherdih	-do-	1600
Sudamdih	-do-	1600
Barora	-do-	420
Moonidih	-do-	1600
Mahuda	-do-	630
Madhuban	-do-	2500
CCL		**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**	**6200**
Tata Steel Ltd		**6200**
West Bokaro-II	Jharkhand	1800
West Bokaro-III	-do-	2100
Jamadoba	-do-	1300
Bhelatand	-do-	1000

(Contd..)

Table 27 (Concld.)

Source: *Coal Directory of India, 2015-16, Coal Controller's Organisation, Kolkata (except totals).*
 # : Total may not tally.

Table – 28 : Production of Washed Non-coking Coal : 2014-15 & 2015-16 (Sector-wise/Company-wise)

(In '000 tonnes)

Sector/Company	2014-15	2015-16
All India : Total	**41072.09**	**42887.84**
Public Sector	**10805.00#**	**11767.61**
BCCL*	83.00	-
CCL	6689.00	8652.57
NCL	3441.00	3115.04
Private Sector	**30267.09**	**31120.23**
Adani Enterprises Ltd	3004.57	5351.11
BLA Ind. Pvt. Ltd	314.47	-
Aryan Coal Beneficiation Pvt. Ltd	14975.65	14343.53
Aryan Energy Pvt. Ltd	441.52	860.21
Bhatia Coal Washeries Ltd	112.70	-
Global Coal & Mining Pvt. Ltd	1808.71	1833.81
Kartikey Coal Washeries Pvt. Ltd	47.51	-
Sarda Energy & Minerals Ltd	317.41	-
Jindal Power Ltd	1261.61	259.59
Jindal Steel & Power Ltd	2171.82	-
Spectrum Coal & Power Ltd	5811.13	8471.98

Source: *Coal Directory of India, 2015-16, Coal Controller's Organisation, Kolkata.*

*Note: *: Jhama is also recycled in Madhuband washery. So it is not reported.*
 # : Total may not tally.

Table – 29 : Capacity of Washed Non-coking Coal, 2015-16 (Sector-wise/Company-wise)

Washery/Location	Coalfield	State	Raw Coal Capacity (In '000 tpy)
Grand Total			**137920**
Public Sector	**Total**		**14980**
BCCL			
Jharia Coalfield, Jharkhand			**1480**
Dugda-I	Jharia	Jharkhand	1000
Lodna	-do-	-do-	480
CCL			
East Bokaro Coalfield, Jharkhand			**9000**
Gidi	East Bokaro	Jharkhand	2500
Piparwar	N. Karanpura	-do-	6500
NCL			**4500**
Bina Deshelling Plant	Bina	Uttar Pradesh	4500
Private Sector	**Total**		**122940**
Jindal Steel & Power Ltd			**6000**
Pit Head Washery (JSPL)	Mand Raigarh	Chhattisgarh	6000
BLA Industries Pvt. Ltd			**300**
BLA Washery	Dharmasthal	Madhya Pradesh	300
Aryan Coal Beneficiation Pvt. Ltd			**29960**
Chakabuwa	Korba	Chhattisgarh	4000
Dipka	-do-	-do-	12000
Pander Pauni	Ballarpur	Maharashtra	3000
Gevra	Korba	Chhattisgarh	5000
Binjhri	-do-	-do-	960
Himgir	Hemgir	Odisha	5000
Aryan Energy Pvt. Ltd			**3600**
Indaram	Ramagundam	Andhra Pradesh	600
Talcher	Talcher	Odisha	2000
RKP	Mandamarri	Telangana	1000
Bhatia International Ltd			**10190**
Wani	Wardha	Maharashtra	3730
Ghugus	-do-	-do-	4000
Jharsuguda	Chhualiberna	Odisha	1500
Pander Pauni	Pander Paunit	Maharashtra	960
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
Gupta Coal field & Washeries Ltd			**13920**
Sasti	Wardha	Maharashtra	2400
Ramagundam	Ramagundam	Andhra Pradesh	2400
Ghugus	Wardha	Maharashtra	2400
Gondegaon	Kamptee	-do-	2400
Majri	Wardha	-do-	2400
Wani	-do-	-do-	1920
Kartikay Coal Washeries Pvt. Ltd			**2500**
Wani	Wardha	Maharashtra	2500

(Contd.)

Table - 29 (Concld.)

Washery/Location	Coalfield	State	Raw Coal Capacity (In '000 tpy)
Spectrum Coal & Power Ltd			**22000**
Ratija	Korba	Chhattisgarh	11000
Talcher	Bharatpur	Odisha	11000
Indo Unique Flames Ltd			**4800**
Punwat	Wardha	Maharashtra	2400
Wani	-do-	-do-	2400
Earth Minerals Company Ltd			**4000**
Jharsuguda	Talcher	Odisha	4000
Sarda Energy & Mineral Division			**960**
Karwahi Coal Washery Divn.	Raigarh	Chhattisgarh	960
Jindal Power Ltd			**4750**
JPL	Raigarh	Chhattisgarh	4750
Adani Enterprises Ltd			**10000**
AEL	Parsa	Chhattisgarh	10000

Source: *Coal Directory of India, 2015-16, 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 - 30.

Table – 30 : 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, therefore, on 16.01.2011 the Ministry of Coal notified the switch over. As per the new system, the following nomenclature has been introduced for gradation of non- coking coal:

Grades	GCV Range (kcal/kg)
G1	GCV exceeding 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 a domestic fuel. Data regarding consumption in these sectors is not available. However, industry-wise despatches of coal are depicted in Table - 31.

Table – 31 : Despatches* of Coal 2014-15 to 2016-17 (By Industries)

(In million tonnes)

Industry	2014-15	2015-16	2016-17 (P)
Total	**603.77**	**632.44**	**650.32**
Iron & steel[1]	12.34	12.36	12.50
Sponge iron	12.05	7.76	5.68
Fertilizer	2.29	2.30	2.14
Cement	11.06	8.98	6.43
Electricity	485.95	502.28	527.26
Others (Chemical, base metals, cokeries, paper & pulp, textile & rayon, bricks, etc.)	80.08	98.76	96.31

Source: *Coal Directory, 2014-15, 2015-16 and Provisional Coal Statistics, 2016-17.*

* *Data on consumption is not available.*

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

DEMAND & SUPPLY

As per the Report of the Working Group for coal & lignite in the terminal year of XII Plan (2016-17), the total demand of coal in different projections was at 980.50 million tonnes. Of these, the demand for non-coking is assessed at 913.30 million tonnes and coking coal at 67.20 million tonnes. As against these demands the production of non-coking coal are projected at 683.30 million tonnes and coking coal at 31.70 million tonnes in the terminal year of XIIth Plan. The total supply projection of coal through various sources i.e. CIL in 556.40 million tonnes (coking coal are in 15.74 million tonnes and non-coking in 540.66 million tonnes); SCCL in 57 million tonnes under non-coking coal and others are in 101.60 million tonnes (15.96 million tonnes are in coking coal and 85.64 million tonnes in non-coking coal). This leaves a gap of 265.50 million tonnes between demand and indigenous availability comprising of 35.50 million tonnes of coking coal and 230.00 million tonnes of non-coking coal is to be met through imports.

In sector-wise demand projection of coal in the terminal year of XII Plan (2016-17), a sizeable share of 738.44 million tonnes is in Power Sector (682.08 million tonnes in power utility and 56.36 million tonnes in power captive) followed by 67.20 million tonnes are in Steel Sector, 50.33 million tonnes are in sponge iron, 47.31 million tonnes are in Cement Industry. The remaining 77.22 million tonnes are others in e-auction, open to all consuming sector including power, CPP, sponge iron, etc.

XIIth Plan Demand Projections

(In million tonnes)

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

XII Plan Supply Projections

(In million tonnes)

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

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

WORLD REVIEW

World proved coal reserves were estimated at 1,139.331 billion tonnes at the end of 2016 of which 816.214 billion tonnes (72%) is classified as anthracite & bituminous coal and 323.117 billion tonnes (28%) as sub-bituminous coal & lignite (Table-32). World production of coal and lignite decreased from about 7.925 billion tonnes in 2015 to 7.39 billion tonnes in 2016. China continued to be the largest producer of coal & lignite in 2016 with about 46% share in total world production, followed by India (10%), Australia (7%) and Indonesia (6%) (Table-33). Global primary energy consumption fell by 1.1% over that of the preceding year. Countries of the Asia Pacific Region and the Middle East have increased coal consumption during the year under review.

Table – 32 : World Proved Coal Reserves at the end of 2016 (By Principal Countries)

(In million tonnes)

Country	Anthracite and bituminous coal	Sub-bituminous coal and lignite	Total
World : Total	**816214**	**323117**	**1139331**
Australia	68310	76508	144818
Brazil	1547	5049	6596
Canada	4346	2236	6582
China	230004	14006	244010
Colombia	4881	-	4881
Germany	12	36200	36212
India*	89782	4987	94769
Indonesia	17326	8247	25573
Kazakhstan	25605	-	25605
Poland	18700	5461	24161
Russian Federation	69634	90730	160364
Serbia	402	7112	7514
South Africa	9893	-	9893
Turkey	378	10975	11353
Ukraine	32039	2336	34375
USA	221400	30182	251582
Other countries	21955	29088	51043

Source: *BP Statistical Review of World Energy, June 2017.*

* *India's reserves of coal as on 1.4.2017 are estimated at about 315.15 billion tonnes to a depth of 1,200 m and those of lignite at about 44.70 billion tonnes.*

Table – 33 : World Production of Coal and Lignite (By Principal Countries)

(In million tonnes)

Country	2014	2015	2016
World : Total	**8164**	**7925**	**7388**
Australia			
Bituminous[1]	442	441	444
Brown coal	58	61	60
Bosnia & Herzegovina			
Brown coal & lignite	12	12	13
Bulgaria			
Brown Coal & lignite	31	36	31
Canada			
Coal	69	62	61
China			
Coal	3874	3747	3364
Colombia			
Bituminous	89	86	91
Czech. Rep.			
Bituminous	8	8	6
Brown Coal	38	38	39
Germany			
Anthracite & Bituminous	8	7	4
Brown coal	178	178	172
Greece			
Lignite	50	46	33
India*			
Bituminous	609	639	660
Lignite	48	44	45
Indonesia			
Anthracite & Bituminous	458	462	456
Kazakhstan			
Bituminous coal	108	102	97
Lignite	7	6	5
Korea, Dem. Rep. of			
Coal[e]	41	41	41
Mexico			
Bituminous	16	9	9[e]
Mongolia			
Brown coal & Lignite	24	24	35
Poland			
Bituminous	66	65	66
Lignite	64	63	60
Romania			
Anthracite & Bituminous	2	1	1e
Lignite	23	25	23
Russia			
Coal	356	372	385
Serbia			
Lignite	29	37	39
South Africa			
Anthracite & Bituminous	261	252	251
Thailand			
Lignite	18	15	17
Turkey			
Anthracite	2	2	2e
Lignite	71	58	58e
USA			
Hard coal	835	749	594
Lignite	72	65	66
Ukraine			
Bituminous	46	30	30e
UK			
Bituminous d	12	9	4
Vietnam			
Anthracite	41	42	39
Other countries			
Coal & Lignite	97	92	85

Source: *World Mineral Production, 2012-2016, BGS. Hard coal – Including anthracite, bituminous & sub-bituminous coal. Coal- All ranks of coal. e-estimated, d- including anthracite, 1- including sub-bituminous. *India's production of coal and lignite during 2016-17 was 662.79 million tonnes and 45.23 million tonnes, respectively.*

As estimated by the 'World Coal Association', coal provides around 30% of global primary energy needs and generates about 41% of the world's electricity and this proportion is expected to remain static for the next 30 years. About 70% of the world's steel production is based on coal. Without targeted global action, the International Energy Agency (IEA) estimates that in 2035, there will still be one billion people without access to electricity and 2.7 billion without access to clean cooking fuels. The World Coal Institute in its report "Coal Meeting the Climate Challenge: Technology to reduce Greenhouse Gas Emission" released in 2007, outlined two primary ways of reducing CO_2 emission from coal use. The first is by Carbon Capture and Storage (CCS) which can reduce 80-90% CO_2 emission into atmosphere and second is storing CO_2 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 emphasized 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.

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. The decrease in coal output and consumption was attributable to China's strategic decision to mitigate environmental effects by reducing high-emission and high-pollution energy. China's coal production capacity exceeded 4 Gt in 2014 and about 10 Mt of capacity was under construction.

Indonesia

Indonesia was the world's second ranked exporter and leading producer of coal.

Russia

Russia is the leading producer of coal. The Coal Industry in Russia was mostly privately owned and joint-stock companies (often consolidated into large holdings) dominated 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) increased by 12% to 1.77 million tonnes in 2016-17 from 1.57 million tonnes in the previous year. Exports of coke decreased by 14% to 77.64 thousand tonnes in 2016-17 from 89.85 thousand tonnes in 2015-16. Coal was mainly exported to Bangladesh (59%), Nepal (36%) and Bhutan & UAE (2% each). Coke was exported predominantly to Bhutan (46%), Nepal (43%), Pakistan (4%) and Oman (5%). Exports of lignite increased to two thousand tonnes in 2016-17 from negligible quantity in the previous year, while exports of coal water gas were decreased to negligible quantity in 2016-17 from one tonnes in the previous year. Coal Water Gas was exported solely to Bangladesh (Tables - 34 to 37).

Imports

Imports of coal (Excl. lignite) decreased by about 6% to 191 million tonnes in 2016-17 from 204 million tonnes in the previous year. Imports of coke increased by 45% to about 4.37 million tonnes in 2016-17 from 3.02 million tonnes in the previous year. Coal was mainly imported from Indonesia (48%), Australia (24%), South Africa (18%) and USA (3%), whereas coke was imported mainly from China (51%), Poland (17%), Australia (14%), Japan (9%) and Colombia (5%). Imports of lignite were of negligible quantity during both the years 2015-16 & 2016-17. Imports of Coal water gas were reported nil during 2016-17 as compared to negligible quantity in 2015-16 (Tables - 38 to 41).

Table – 34 : Exports of Coal (Excl. Lignite) (By Countries)

Country	2015-16 (R)		2016-17 (P)	
	Qty ('000 t)	Value (₹'000)	Qty ('000 t)	Value (₹'000)
All Countries	**1576**	**9006274**	**1772**	**9669603**
Bangladesh	816	4424849	1051	4926128
Nepal	559	3146590	639	4223154
Bhutan	69	532097	39	349805
UAE	67	230282	37	126723
Equtl. Guinea	-	-	5	16867
Saudi Arabia	++	727	1	16471
Malaysia	++	2366	++	2923
Madagascar	++	2805	++	2706
Singapore	-	-	++	1306
Oman	++	191	++	1112
Other countries	65	666367	++	2408

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

Country	2015-16 (R)		2016-17 (P)	
	Qty ('000 t)	Value (₹'000)	Qty ('000 t)	Value (₹'000)
All Countries	**++**	**2753**	**2**	**251598**
Saudi Arabia	-	-	2	167103
Oman	-	-	++	31015
Thailand	-	-	++	18978
Russia	-	-	++	11985
Singapore	-	-	++	11782
Pakistan	++	2252	++	7735
Azerbaijan	-	-	++	2369
USA	-	-	++	438
UAE	++	501	++	193

Table – 36 : Exports of Coke (By Countries)

Country	2015-16 (R)		2016-17 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**89847**	**1073159**	**77642**	**992815**
Bhutan	22449	421388	35377	601390
Nepal	22363	148434	33011	230958
Pakistan	4491	71390	3043	47938
Oman	1119	15648	1950	38096
Bangladesh	2962	23468	1931	25374
UAE	1257	22086	564	11164
Sri Lanka	494	11733	352	8606
Saudi Arabia	891	19622	390	8501
Jordan	177	2884	361	8052
South Africa	259	7814	144	4790
Other countries	33385	328692	519	7946

Table – 37 : Exports of Coal, Water Gas, etc. (Except Gaseous Hydrocarbons) (By Countries)

Country	2015-16 (R)		2016-17 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**1**	**99**	**++**	**95**
Bangladesh	++	78	++	95
Nepal	1	21	--	--

Table – 38 : Imports of Coal : Lignite (By Countries)

Country	2015-16 (R)		2016-17 (P)	
	Qty ('000 t)	Value (₹'000)	Qty ('000 t)	Value (₹'000)
All Countries	**++**	**5519**	**++**	**652**
USA	++	5096	++	606
China	++	423	++	46

Table – 39: Imports of Coal (Excl. Lignite) (By Countries)

Country	2015-16 (R)		2016-17 (P)	
	Qty ('000 t)	Value (₹'000)	Qty ('000 t)	Value (₹'000)
All Countries	**204000**	**861073456**	**191014**	**1003162924**
Australia	48893	294756289	46653	426139697
Indonesia	97513	320109183	91012	318513100
South Africa	36901	142115520	34284	142560369
USA	5815	32399335	5097	31465779
Canada	1551	9329920	2377	24269640
Russia	3822	20199668	4200	22301993
Mozambique	2780	14217599	3708	20749155
Colombia	++	8639	2000	7428924
New Zealand	681	4375851	475	4429422
Chile	773	2173788	737	2179171
Other countries	5271	21387664	471	3125674

Table – 40 : Imports of Coal Water Gas (By Countries)

Country	2015-16 (R)		2016-17 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**++**	**75**	**-**	**-**
France	++	75	-	-

Table – 41: Imports of Coke
(By Countries)

Country	2015-16 (R)		2016-17 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**3019502**	**31956109**	**4368063**	**54356105**
China	2156034	21985869	2243164	26595888
Poland	353486	4234041	739642	8803691
Australia	192646	2099787	623217	8579254
Japan	175829	1904014	374628	4460920
Colombia	62426	796343	225641	3421909
Russia	74874	904242	114001	1580167
Ukraine	1249	11015	47367	903151
Italy	-	-	308	7859
UK	153	4804	92	3139
Germany	-	-	2	112
Other countries	2805	15994	1	15

FUTURE OUTLOOK

The XIIth Plan Working Group for Coal & Lignite has assessed a coal demand of 980.50 million tonnes by terminal year, i.e., 2016-17. The indigenous coal supply projection in the terminal year is projected to be 715 million tonnes. The demand-supply gap emerging from these projections would be 265.50 million tonnes, which would have to be met by imports of 35.50 million tonnes of coking coal and 230 million tonnes of non-coking coal.

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.