

Chapter

3

Production of Energy Resources



CHAPTER 3

Production of Energy Resources

Production

Energy production and consequently its' availability directly affects future production, imports, exports and investment, all of which have a significant impact on a country's economy. Detailed and high-quality energy statistics provide policy makers with the information needed to make informed decisions and evaluate possible trade-offs including planning for global price shocks in energy commodities.

Data on production of energy commodities, and stock changes are also required for monitoring national energy security. In a rapidly changing energy scenario of the world in terms of trade, consumption and stock levels, problems with national energy supply often are perceived threatening to national independence, especially if national energy resources do not meet energy demands.

In Energy Statistics, production is defined as the capture, extraction or manufacture of fuels or energy informs that are ready for general use. Two types of production are distinguished, primary and secondary.

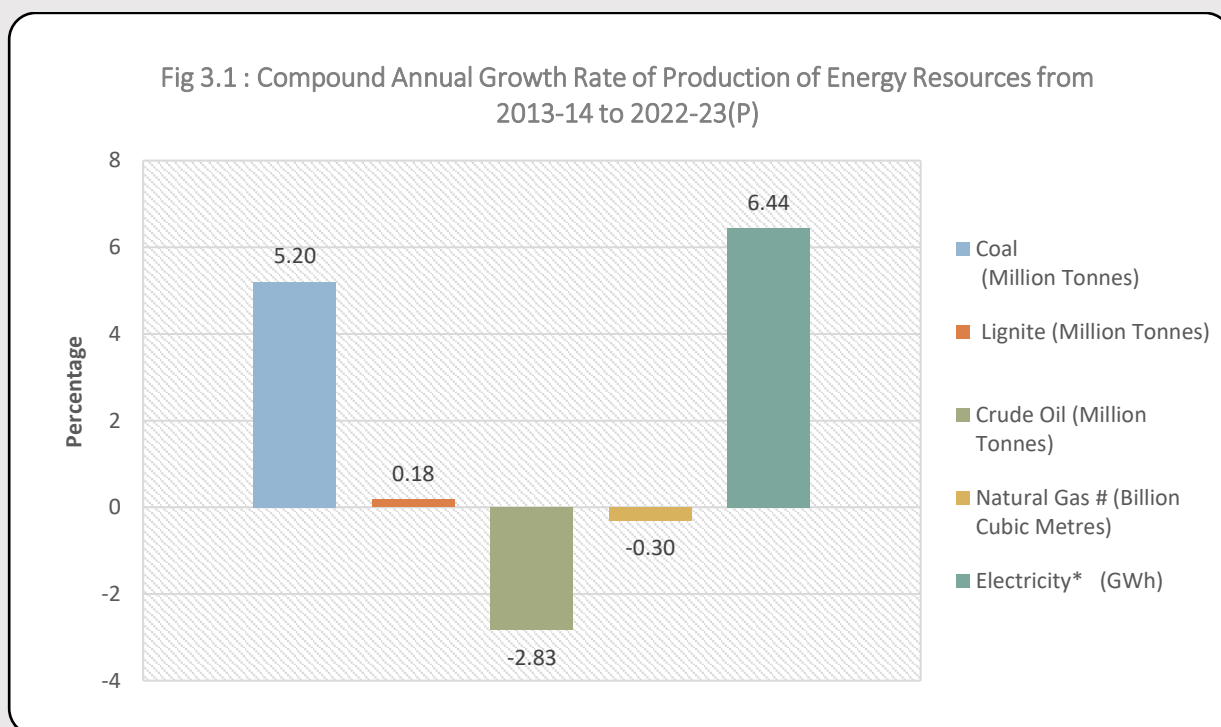
Primary production is the capture or extraction of fuels or energy from natural energy flows, the biosphere and natural reserves of fossil fuels within the national territory in a form suitable for use. Inert matter removed from the extracted fuels and quantities reinjected, flared or vented are not included.

Secondary production is the manufacture of energy products through the process of transformation of other fuels or energy, whether primary or secondary. The quantities of secondary fuels reported as production include quantities lost through venting and flaring during and after production.

This chapter presents the production of different energy resources and electricity.

Highlights

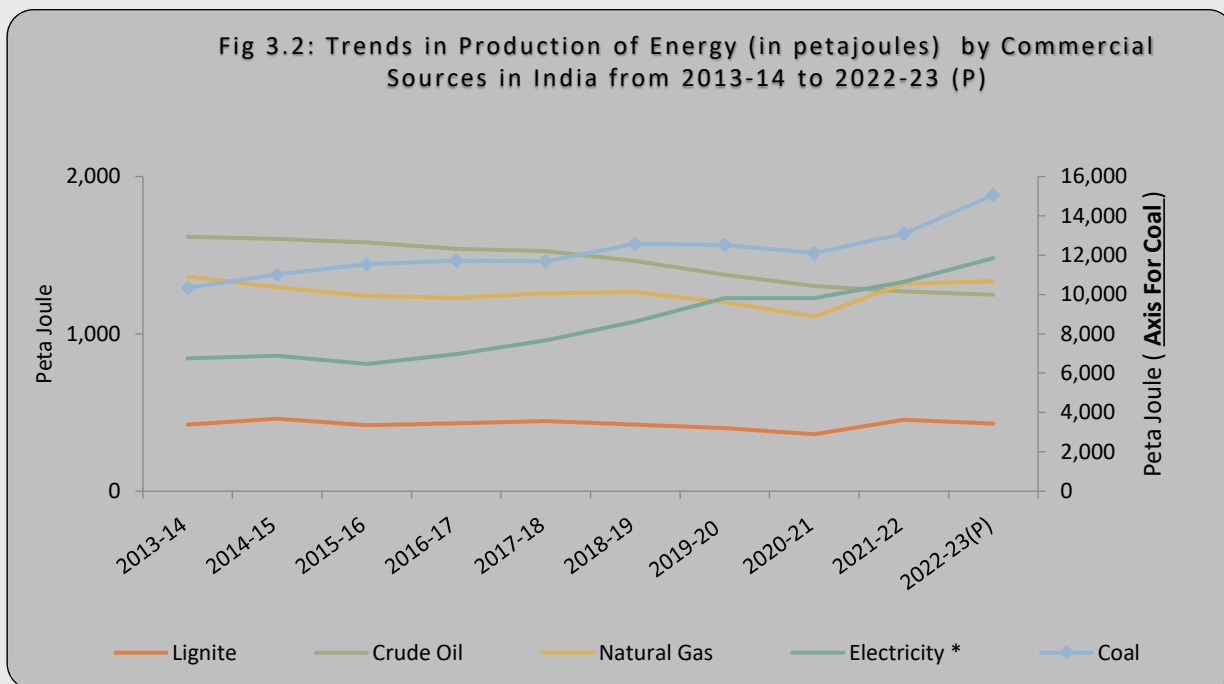
- Coal production in the country during the year 2022-23(P) was 893.19 million tonnes as compared to 778.21 million tonnes during 2021-22. There is an increase of 14.77%. The overall trend of production in the last ten years i.e. 2013-14 to 2022-23(P) has shown a steady increase, except 2020-21, with a CAGR of 5.20% (Table 3.1).
- The Lignite production during 2022-23(P) has been increased to 44.99 million tonnes from the figure of 47.49 million tonnes in 2021-22; a decrease of 5.27% over 2021-22 (Table 3.1).
- However, the production of crude oil for 2022-23 (P) came out to be 29.18 MT as compared to 29.69 MT during FY: 2022-23 which is a decline of 1.72% (Table 3.1).
- The CAGRs for Crude Oil and Natural Gas, w.r.t FY: 2013-14, are having negative CAGR of -2.83% and -0.30% respectively. Electricity (generated from Hydro, Nuclear and other Renewable energy sources) is having the highest CAGR of 6.44%, showing the remarkable growth of Renewable Energy in India (Table 3.1).



- To allow comparison among and aggregation of production by different sources of energy, production has been converted in terms of energy units, Petajoules. It may be seen that the total production of energy resources has increased from 17,464 petajoules during 2021-22 to 19,549 petajoules during 2022-23(P), an increase of 11.94% (Table 3.2).

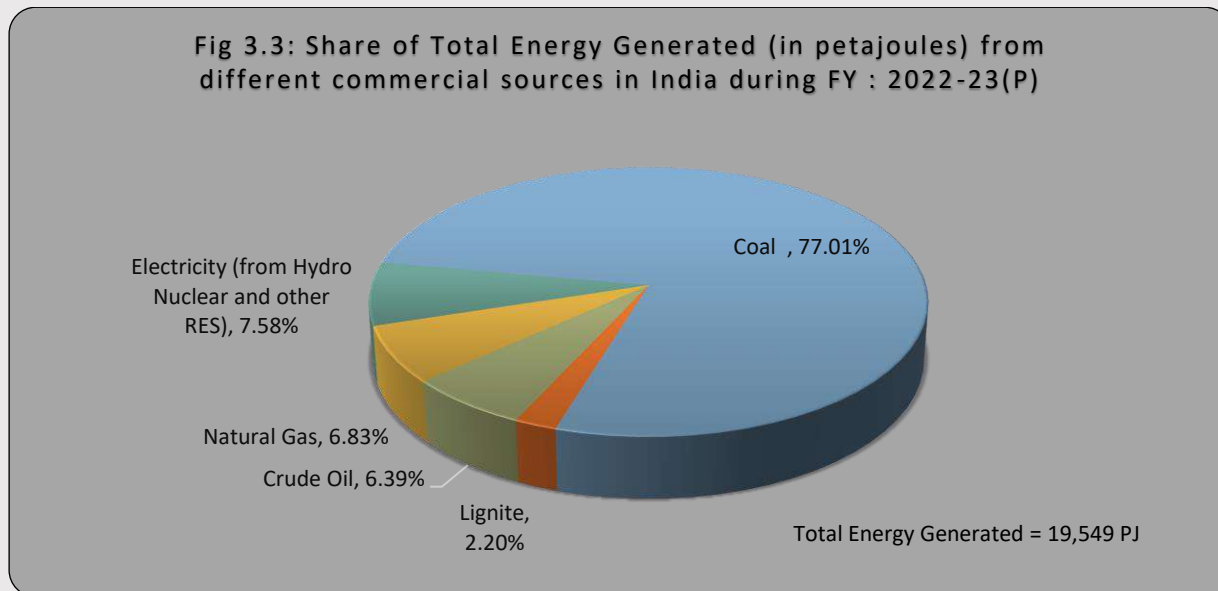
Chapter 3: Production of Energy Resources

Fig 3.2: Trends in Production of Energy (in petajoules) by Commercial Sources in India from 2013-14 to 2022-23 (P)



- India still depends heavily on Coal as the major source of energy. During the FY:2022-23(P) energy generated from Coal accounted for about 77.01% of the total generation of energy followed by Electricity (from Hydro, Nuclear and other Renewable energy sources) (7.58%) and Natural Gas (6.83%).

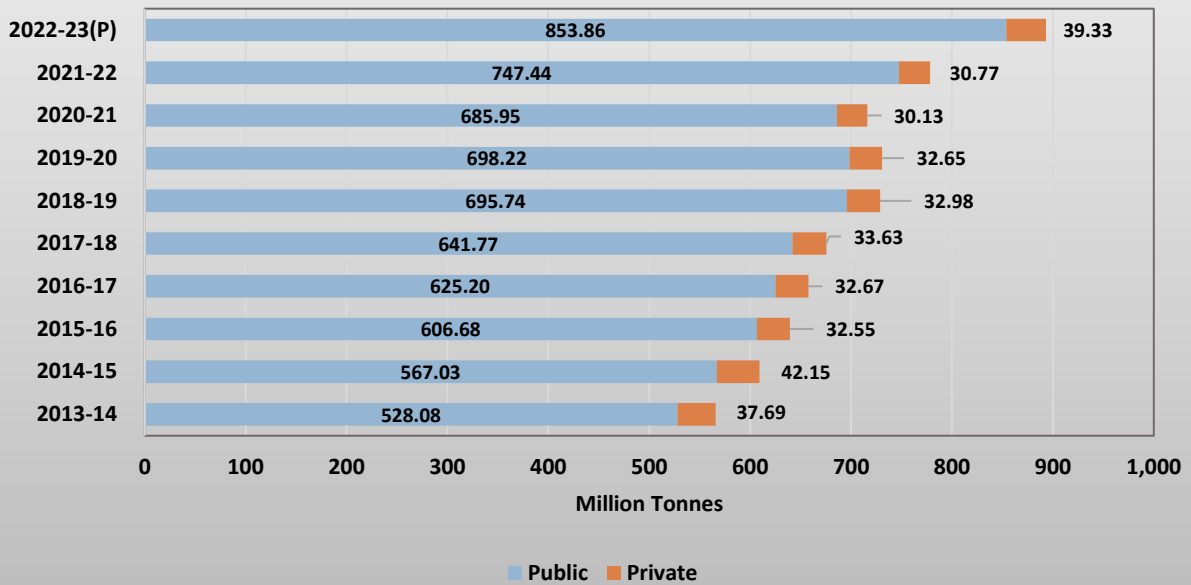
Fig 3.3: Share of Total Energy Generated (in petajoules) from different commercial sources in India during FY : 2022-23(P)



- Within Coal, Public sector has the dominating share in production. During FY: 2022-23(P) almost 96% of total production has come from public sector. A scenario of performance made by Public and Private sector during past 10 years has been given below,

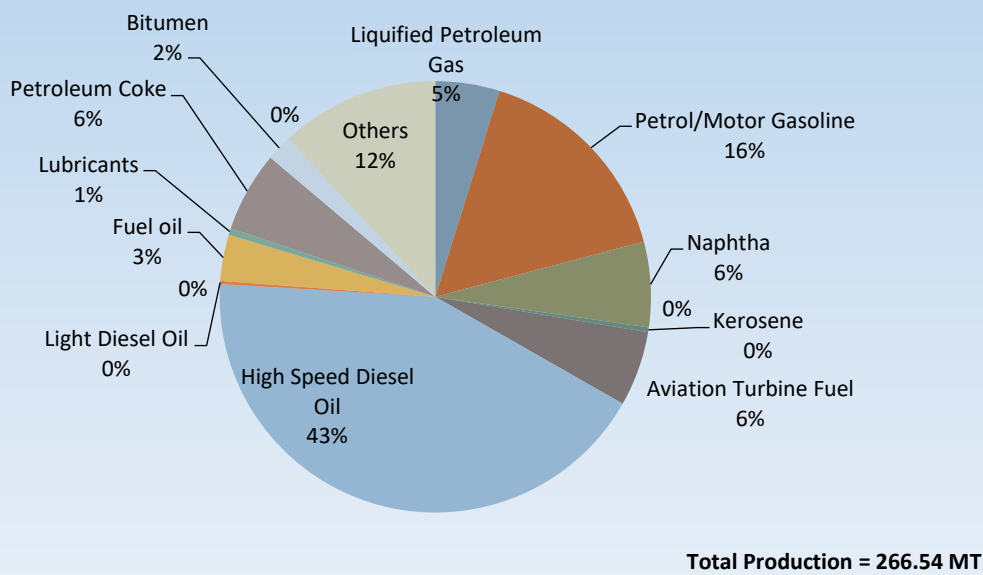
Chapter 3: Production of Energy Resources

Fig 3.4: Share of Private and Public sector in Production of Coal in India during FY : 2013-14 to FY : 2022-23(P)



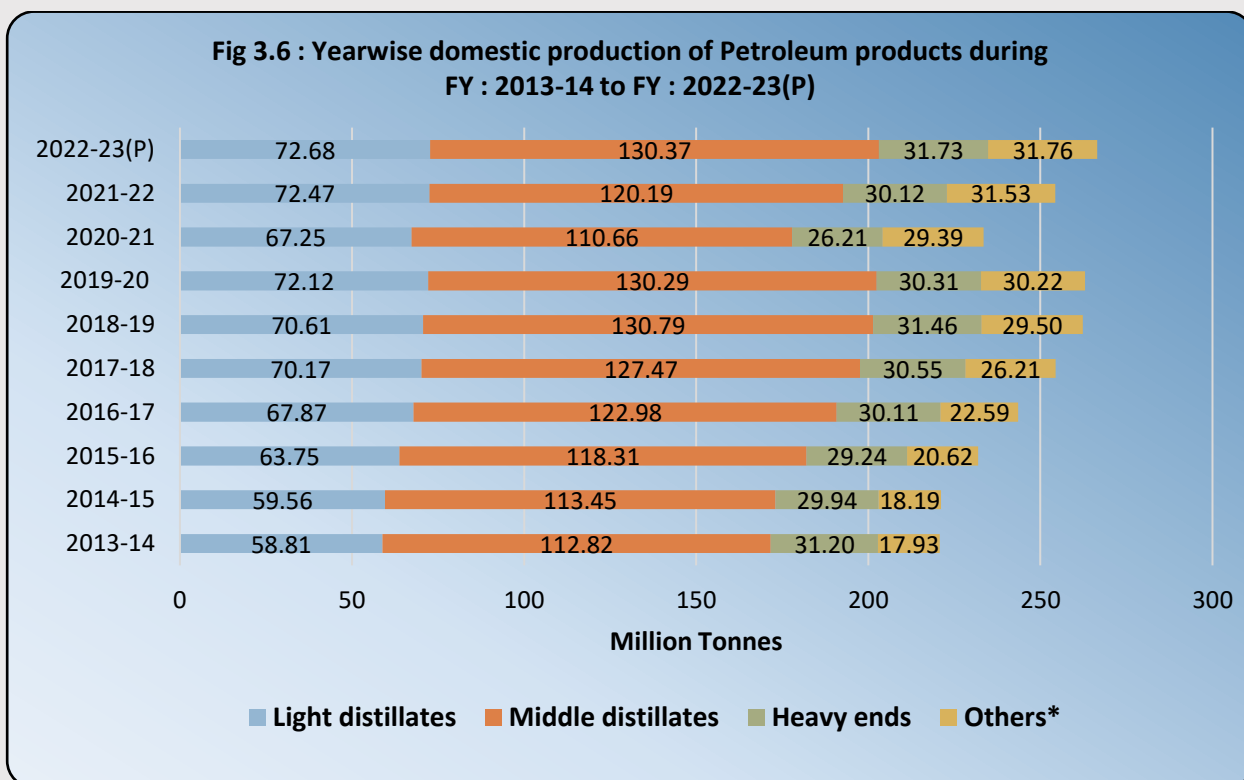
- In the year 2022-23(P), the production of Petroleum Products in the country was 266.54 MT as against 254.31 MT during 2021-22, an increase of 4.81%. In the total production of Petroleum Products during 2022-23 (P), High Speed Diesel Oil accounted for the maximum share (43%), followed by Motor Gasoline (16%). (Table 3.4).

Fig 3.5 : Production of Petroleum Products by type during 2022-23 (P)



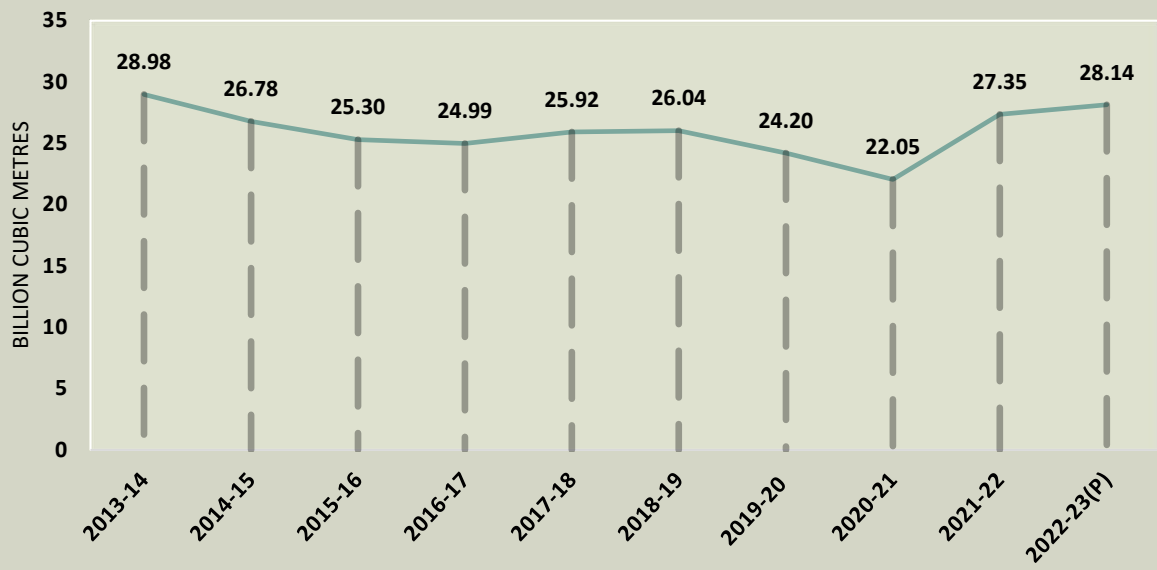
Chapter 3: Production of Energy Resources

- Again, within the three (3) major categories of Petroleum Products, the *Middle Distillates* (which is having the dominant share of 48.91%, contains items like ATF, Diesel, Kerosene etc.) has experienced a growth of 8.47% during 2022-23, over past year. A sectorial-overview during last 10 years is given below,



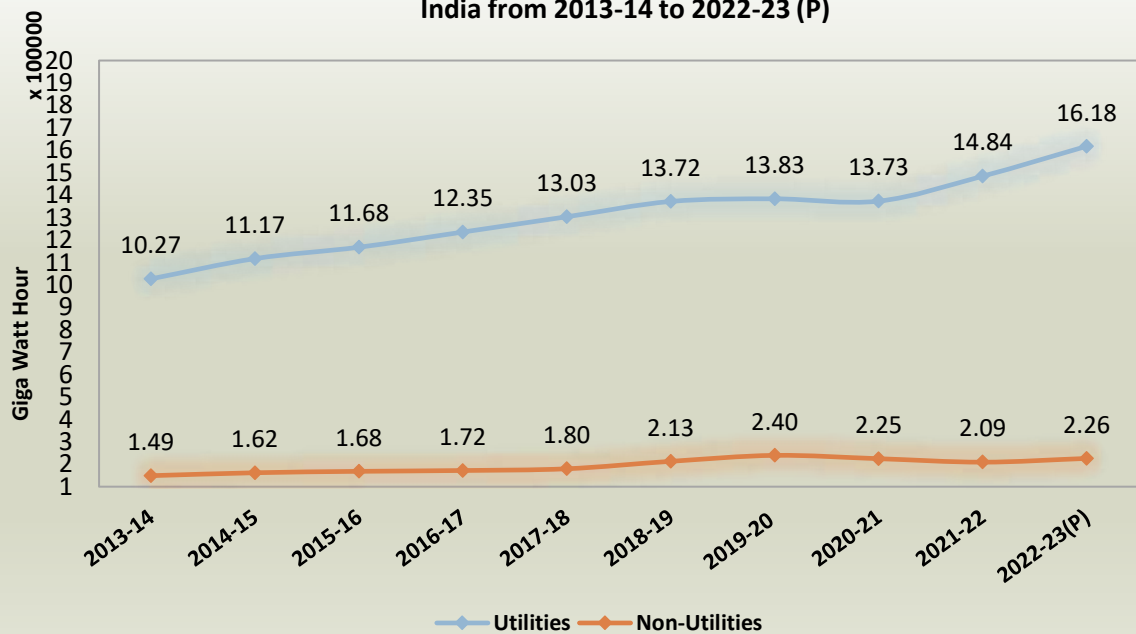
- Net production of Natural Gas for consumption increased from to 33.12 Billion Cubic Meters (BCM) in 2021-22 to 33.65 BCM in 2022-23(P) registering an increase of 1.61%. The Net-Production for sale has also experienced a growth of over 2.88% in comparison to the last FY. After having a steady decline from the FY: 2013-14 to 2016-17, the Net-Production for sale of Natural Gas has increased to 28.14 BCM during FY: 2022-23(P) as compared to 27.35 BCM during FY: 2021-22.

Fig 3.7 : Trend of Net production (for Sale) of Natural Gas in India during FY: 2013-14 to FY: 2022-23(P)



- India has experienced a steady growth in terms of gross electricity generation (from Utility) over time except 2020-21. The CAGR grew at a rate of 5.18% in the last ten years from 2013-14 to 2022-23(P).
- The generation of electricity in India still depends heavily on Coal. During FY:2022-23(P) close to 75% of the electricity has been generated from Steam. However, the RES (Renewable Energy Resources other than Hydro) has shown some good signs as it has registered a growth of 19.54% during FY: 2022-23(P), as compared to 2021-22.

Fig 3.8: Trends of Generation of Electricity from Utilities and Non-Utilities in India from 2013-14 to 2022-23 (P)



Chapter 3: Production of Energy Resources

Table 3.1: Year wise Production of Energy Resources in Physical Units

Year	Coal (Million Tonnes)	Lignite (Million Tonnes)	Crude Oil (Million Tonnes)	Natural Gas # (Billion Cubic Metres)	Electricity* (GWh)
1	2	3	4	5	6
2013-14	565.77	44.27	37.79	35.41	2,34,595
2014-15	609.18	48.27	37.46	33.66	2,38,908
2015-16	639.23	43.84	36.94	32.25	2,24,571
2016-17	657.87	45.23	36.01	31.90	2,41,842
2017-18	675.40	46.64	35.68	32.65	2,66,308
2018-19	728.72	44.28	34.20	32.87	2,99,465
2019-20	730.87	42.10	32.17	31.18	3,40,579
2020-21	716.08	37.90	30.49	28.67	3,40,576
2021-22	778.21	47.49	29.69	34.02	3,69,652
2022-23(P)	893.19	44.99	29.18	34.45	4,11,512
Growth rate of 2022-23 over 2021-22 (%)	14.77	-5.27	-1.72	1.25	11.32
CAGR 2013-14 to 2022-23(%)	5.20	0.18	-2.83	-0.30	6.44

(P): Provisional

For Natural Gas Gross Production is reported

* Electricity from Hydro, Nuclear and other Renewable energy sources (Utility)

Sources:

1. Ministry of Coal
2. Ministry of Petroleum & Natural Gas
3. Central Electricity Authority

Chapter 3: Production of Energy Resources

Table 3.2: Year wise Production of Energy Resources in Energy Units

(in Petajoules) @

Year	Coal	Lignite	Crude Oil	Natural Gas	Electricity *	Total
1	2	3	4	5	6	7= 2 to 6
2011-12	10,401	404	1,630	1,832	770	15,037
2012-13	10,182	443	1,620	1,567	735	14,546
2013-14	10,335	423	1,617	1,364	845	14,583
2014-15	11,024	461	1,603	1,296	860	15,244
2015-16	11,539	419	1,581	1,242	808	15,589
2016-17	11,722	432	1,541	1,229	871	15,794
2017-18	11,695	445	1,527	1,258	959	15,884
2018-19	12,587	423	1,464	1,266	1,078	16,818
2019-20	12,521	402	1,377	1,201	1,226	16,726
2020-21	12,105	362	1,305	1,111	1,226	16,109
2021-22	13,091	453	1,270	1,318	1,331	17,464
2022-23(P)	15,055	429	1,249	1,334	1,481	19,549
Growth rate of 2022-23 over 2021-22 (%)	15.00	-5.27	-1.72	1.25	11.32	11.94
CAGR 2013-14 to 2022-23(%)	4.27	0.18	-2.83	-0.24	6.44	3.31

(P): Provisional

* Electricity from hydro, Nuclear and other Renewable energy sources (utility)

@ Conversion factors have been applied to convert production of primary sources of energy into petajoules

Sources:

1. Ministry of Coal
2. Ministry of Petroleum & Natural Gas
3. Central Electricity Authority

Table 3.3: Year wise Production of Coal – Type-wise and Sector-wise

(Million Tonnes)

Year	Coal			Public	Private	Total
	Coking	Non-coking	Total			
1	2	3	4=2+3	5	6	7=5+6
2013-14	56.82	508.95	565.77	528.08	37.69	565.77
2014-15	57.45	551.73	609.18	567.03	42.15	609.18
2015-16	60.89	578.34	639.23	606.68	32.55	639.23
2016-17	61.66	596.21	657.87	625.20	32.67	657.87
2017-18	40.15	635.25	675.40	641.77	33.63	675.40
2018-19	41.13	687.59	728.72	695.74	32.98	728.72
2019-20	52.94	677.94	730.87	698.22	32.65	730.87
2020-21	44.79	671.30	716.08	685.95	30.13	716.08
2021-22	51.70	726.51	778.21	747.44	30.77	778.21
2022-23(P)	60.76	832.43	893.19	853.86	39.33	893.19
Growth rate of 2022-23 over 2021-22 (%)	17.52	14.58	14.77	14.24	27.82	14.77
CAGR 2013-14 to 2022-23(%)	0.75	5.62	5.20	5.48	0.48	5.20

(P): Provisional Source: Ministry of Coal

Chapter 3: Production of Energy Resources

Table 3.3 A: Grade Wise Production of Coking Coal by Sector during 2021-22 & 2022-23

(Million Tonnes)

Grade of Coking Coal	Public		Private		All India		Change in production (%)
	2021-22	2022-23 (P)	2021-22	2022-23 (P)	2021-22	2022-23 (P)	
Steel-I	0.23	0.00	0.00	0.00	0.23	0.00	-
Steel-II	0.00	0.06	0.00	0.00	0.00	0.06	-
SC- I	0.00	0.25	0.00	0.00	0.00	0.25	-
Wash-I	0.23	0.17	0.00	0.00	0.23	0.17	-26.56
Wash-II	1.90	3.45	0.60	0.34	2.50	3.78	51.27
Wash-III	1.27	2.31	0.27	0.33	1.54	2.64	71.32
Wash-IV	21.93	26.10	3.81	5.11	25.74	31.21	21.26
Wash-V	20.17	22.48	0.00	0.00	20.17	22.48	11.46
Wash-VI	1.29	0.17	0.00	0.00	1.29	0.17	-87.23
Washery Feed	0.00	0.00	0.00	0.00	0.00	0.00	-
SLV1	0.00	0.00	0.00	0.00	0.00	0.00	-
All India Total	47.02	54.99	4.68	5.77	51.70	60.76	17.52
Met. Coal	32.23	37.60	4.68	5.77	36.91	43.37	17.50
Non-Met	14.80	17.40	0.00	0.00	14.80	17.40	17.57
All India Total	47.02	54.99	4.68	5.77	51.70	60.76	17.52

(P): Provisional

Source: Ministry of Coal

Table 3.3 B: Grade Wise Production of Non-Coking Coal by Sector during 2020-21 & 2021-22

(Million Tonnes)

Grade of Non-Coking Coal	Public		Private		All India		Change in production (%)
	2021-22	2022-23 (P)	2021-22	2022-23 (P)	2021-22	2022-23 (P)	
G1	0.00	0.02	0.00	0.00	0.00	0.02	-
G2	0.01	0.08	0.00	0.00	0.01	0.08	-
G3	2.01	1.70	0.00	0.00	2.01	1.70	-15.47
G4	13.05	16.10	0.00	0.00	13.05	16.10	23.39
G5	8.66	9.90	0.00	0.00	8.66	9.90	14.37
G6	5.13	6.43	0.37	0.13	5.49	6.55	19.35
G7	40.21	45.80	0.53	0.61	40.74	46.41	13.90
G8	46.24	53.20	0.17	0.46	46.40	53.66	15.64
G9	43.60	51.52	0.00	0.00	43.60	51.52	18.18
G10	53.15	64.88	9.27	9.95	62.43	74.83	19.87
G11	209.27	236.81	13.82	12.64	223.09	249.45	11.82
G12	76.93	88.78	0.70	2.32	77.63	91.09	17.35
G13	99.99	102.58	0.37	1.82	100.36	104.40	4.03
G14	80.68	92.79	0.50	5.36	81.18	98.15	20.89
G15	14.05	23.70	0.00	0.00	14.05	23.70	68.69
G16	7.44	4.28	0.00	0.00	7.44	4.28	-42.53
G17	0.01	0.23	0.36	0.28	0.37	0.51	35.79
UNG	0.00	0.09	0.00	0.00	0.00	0.09	-
All India Total	700.42	798.87	26.09	33.56	726.51	832.43	14.58

(P): Provisional

Source: Ministry of Coal

Table 3.4 : Yearwise Domestic Production of Petroleum Products

Year	Light distillates				Middle distillates				Heavy ends				Others*	Total		
	LPG	Petrol/MG	Naphtha	Total	Kerosene	ATF	HSD	LDO	Total	Fuel oil	Lubes	Pet. Coke			Bitumen	
	2	3	4	5	6	7	8	9	10	11	12	14			15	
2011-12	9.55	27.19	18.83	55.57	7.86	10.06	82.88	0.50	101.30	18.43	1.03	7.84	4.61	31.91	14.43	17
2012-13	9.82	30.12	19.02	58.96	7.97	10.09	91.10	0.40	109.56	15.05	0.90	10.94	4.67	31.56	17.65	(sum of 2 to 13)
2013-14	10.03	30.28	18.51	58.81	7.42	11.22	93.76	0.42	112.82	13.41	0.94	12.07	4.79	31.20	17.93	203.21
2014-15	9.84	32.33	17.39	59.56	7.56	11.10	94.43	0.36	113.45	11.92	0.95	12.45	4.63	29.94	18.19	217.73
2015-16	10.57	35.32	17.86	63.75	7.50	11.79	98.59	0.43	118.31	9.73	1.04	13.32	5.16	29.24	20.62	220.76
2016-17	11.33	36.59	19.95	67.87	6.04	13.83	102.48	0.63	122.98	9.96	1.03	13.94	5.19	30.11	22.59	221.14
2017-18	12.38	37.78	20.01	70.17	4.41	14.59	107.90	0.56	127.47	9.49	1.04	14.75	5.28	30.55	26.21	231.92
2018-19	12.79	38.04	19.79	70.61	4.07	15.48	110.53	0.70	130.79	10.03	0.95	14.68	5.80	31.46	29.50	243.55
2019-20	12.82	38.62	20.68	72.12	3.21	15.24	111.22	0.62	130.29	8.61	0.93	15.53	5.24	30.31	30.22	254.40
2020-21	12.07	35.78	19.40	67.25	2.39	7.09	100.44	0.73	110.66	7.24	1.07	12.66	5.25	26.21	29.39	262.36
2021-22	12.24	40.24	19.99	72.47	1.92	10.29	107.17	0.81	120.19	8.33	1.17	15.51	5.11	30.12	31.53	262.94
2022-23(P)	12.83	42.82	17.04	72.68	0.95	15.00	113.77	0.65	130.37	9.24	1.30	16.04	5.14	31.73	31.76	233.51
Growth rate of 2022-23 over 2021-22(%)	4.85	6.41	-14.79		-50.53	45.72	6.16	-19.72		10.99	10.90	3.45	0.65		0.73	4.81
CAGR 2013-14 to 2022-23 (%)	2.77	3.93	-0.91		-20.44	3.28	2.17	4.83		-4.05	3.67	3.22	0.81		6.56	2.12

(P): Provisional

LPG=Liquid Petroleum Gas, MG= Motor Gasoline, ATF= Aviation Turbine Fuel

* Others include VGO, Benzene, MTO, CBFS, Sulphur, Waxes, MTBE & Reformate, etc.

Source : Ministry of Petroleum & Natural Gas.

Chapter 3: Production of Energy Resources

Table 3.5: Year wise Gross and Net Production of Natural Gas

(in Billion Cubic Metres)

Year	Gross Production	Internal Consumption	Flared	Losses	Net Production (For Consumption)	Net Production (For Sales)
2013-14	35.41	5.59	0.77	0.07	34.57	28.98
2014-15	33.66	5.91	0.87	0.10	32.69	26.78
2015-16	32.25	5.83	1.01	0.12	31.12	25.30
2016-17	31.90	5.86	0.98	0.07	30.85	24.99
2017-18	32.65	5.81	0.82	0.09	31.73	25.92
2018-19	32.87	6.02	0.73	0.09	32.05	26.04
2019-20	31.18	6.05	0.86	0.07	30.26	24.20
2020-21	28.67	5.73	0.82	0.07	27.78	22.05
2021-22	34.02	5.77	0.81	0.09	33.12	27.35
2022-23(P)	34.45	5.51	0.69	0.11	33.65	28.14
Growth rate of 2022-23 over 2021-22(%)	1.25	-4.43	-14.48	13.52	1.61	2.88
CAGR 2013-14 to 2022-23 (%)	-0.30	-0.15	-1.12	5.40	-0.30	-0.33

(P): Provisional

Total may not tally due to rounding off.

Source: Ministry of Petroleum & Natural Gas.

Chapter 3: Production of Energy Resources

Table 3.6 (A): Year wise Gross Generation of Electricity from Utilities

(Giga Watt hour=10⁶ Kilo Watt hour)

Year	Utilities							
	Thermal				Hydro	Nuclear	RES*	Total
	Steam	Diesel	Gas	Total				
1	2	3	4	5	6	7	8	9
2011-12	6,12,497	2,649	93,281	7,08,427	1,30,511	32,287	51,226	9,22,451
2012-13	6,91,341	2,448	66,664	7,60,454	1,13,720	32,866	57,449	9,64,489
2013-14	7,45,533	1,998	44,522	7,92,054	1,34,848	34,228	65,520	10,26,649
2014-15	8,35,291	1,576	41,075	8,77,941	1,29,244	36,102	73,563	11,16,850
2015-16	8,95,340	551	47,122	9,43,013	1,21,377	37,414	65,781	11,67,584
2016-17	9,44,022	401	49,094	9,93,516	1,22,378	37,916	81,548	12,35,358
2017-18	9,86,591	348	50,208	10,37,146	1,26,123	38,346	1,01,839	13,03,455
2018-19	10,22,265	215	49,834	10,72,314	1,34,894	37,813	1,26,759	13,71,779
2019-20	9,94,197	199	48,443	10,42,838	1,55,769	46,472	1,38,337	13,83,417
2020-21	9,81,443	224	50,944	10,32,611	1,50,300	43,029	1,47,248	13,73,187
2021-22	10,78,581	214	36,016	11,14,811	1,51,627	47,112	1,70,912	14,84,463
2022-23(P)	11,82,096	320	23,885	12,06,301	1,62,099	45,861	2,03,552	16,17,813
Growth rate of 2022-23 over 2021-22(%)	9.60	49.53	-33.68	8.21	6.91	-2.66	19.10	8.98
CAGR 2013-14 to 2022-23(%)	5.26	-18.42	-6.69	4.79	2.07	3.30	13.42	5.18

(P): Provisional

* RES: Renewable Energy Sources excluding hydro

Source: Central Electricity Authority.

Table 3.6 (B): Year wise Gross Generation of Electricity from Non-Utilities

(Giga Watt hour= 10⁶ x Kilo Watt hour)

Year	Non-Utilities							Grand Total
	Thermal				Hydro	RES*	Total	
	Steam	Diesel	Gas	Total				
1	10	11	12	13	14	15	16	
2011-12	1,04,863	6,244	21,972	1,33,079	131	1,178	1,34,388	10,56,839
2012-13	1,13,167	8,205	20,769	1,42,141	118	1,750	1,44,010	11,08,499
2013-14	1,18,178	8,866	19,912	1,46,957	129	1,903	1,48,988	11,75,637
2014-15	1,28,401	9,720	21,135	1,59,256	145	2,656	1,62,057	12,78,907
2015-16	1,36,721	8,412	21,083	1,66,216	110	2,046	1,68,372	13,35,956
2016-17	1,37,588	9,182	22,855	1,69,625	144	2,277	1,72,046	14,07,404
2017-18	1,43,868	8,107	25,362	1,77,337	112	2,328	1,79,777	14,83,232
2018-19	1,84,250	5,334	19,545	2,09,130	270	3,674	2,13,074	15,84,853
2019-20	2,05,546	1,919	25,443	2,32,908	348	6,310	2,39,567	16,22,983
2020-21	1,93,143	2,504	21,684	2,17,330	339	7,158	2,24,827	15,98,014
2021-22	1,79,235	2,105	20,801	2,02,141	357	6,813	2,09,311	16,93,774
2022-23(P)	1,92,900	2,300	21,500	2,16,700	400	8,900	2,26,000	18,43,813
Growth rate of 2022-23 over 2021-22(%)	7.62	9.29	3.36	7.20	12.15	30.63	7.97	8.86
CAGR 2013-14 to 2022-23(%)	5.60	-13.92	0.86	4.41	13.39	18.70	4.74	5.13

(P): Provisional

* RES: Renewable Energy Sources excluding hydro

Source: Central Electricity Authority.