3 Chapter

Production of Energy Resources

CHAPTER 3
Production of Energy Resources

Introduction

Energy production plays a critical role in shaping a nation's economic stability and growth. High-quality, detailed energy statistics equip policymakers with the information necessary to make informed decisions, including anticipating global price shocks in energy commodities. Additionally, data on energy production and stock changes are essential for monitoring national energy security. In a global energy landscape marked by evolving trade dynamics, consumption patterns, and stock levels, disruptions in national energy supply are often perceived as a threat to national independence—particularly when domestic energy resources do not meet the growing demand.

In Energy Statistics, production is defined as the capture, extraction or manufacture of fuels or energy 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 discusses the production of various energy resources, including coal, lignite, crude oil, natural gas, and electricity.

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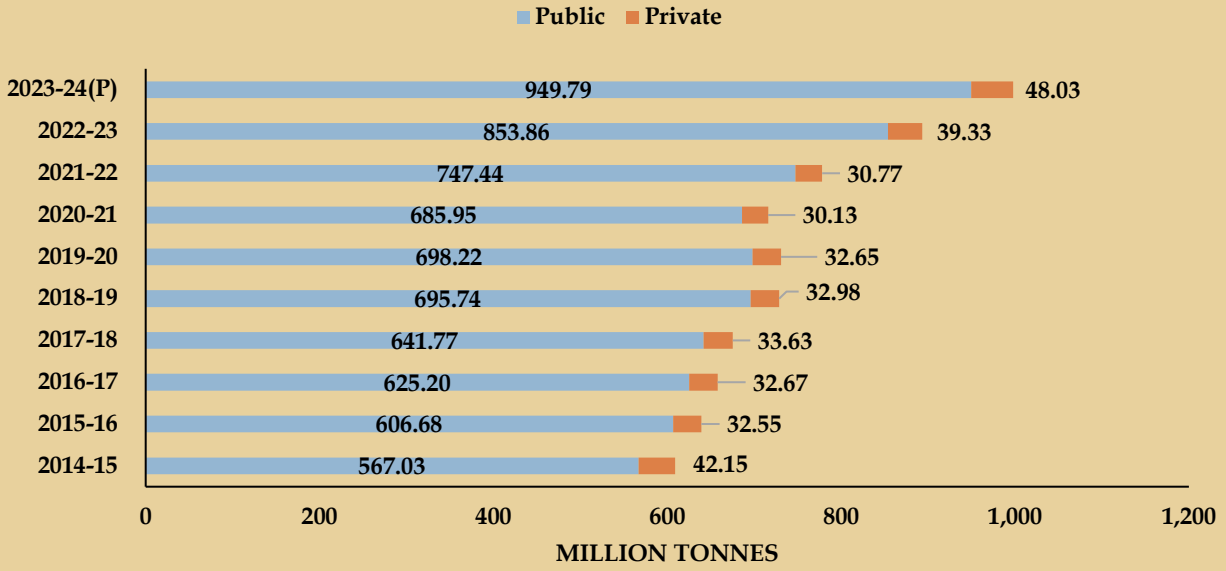
Highlights of Production of Energy Resources

3.1 Coal Production

During the FY 2023-24(P), coal production in India reached **997.83 million tonnes**, marking an increase of **11.71**% from **893.19 million tonnes** in FY 2022-23. The production of coal has shown a steady increase over the past decade, with a compound annual growth rate (CAGR) of 5.64% from FY 2014-15 to FY 2023-24(P). The exception to this upward trend occurred in FY 2020-21(Table 3.1). The public sector remains dominant in coal production, contributing nearly 95% of the total coal production in India during FY 2023-24. A scenario of performance made by Public and Private sector during past 10 years is shown in **figure 3.1**.

Fig 3.1: Share of Private and Public sector in Production of Coal in India



3.2 Lignite Production

In contrast to coal, lignite production saw a slight decrease in FY 2023-24(P), with total production recorded at **42.92 million tonnes**, down by **2.52**% from **44.03 million tonnes** in FY 2022-23(Table 3.1).

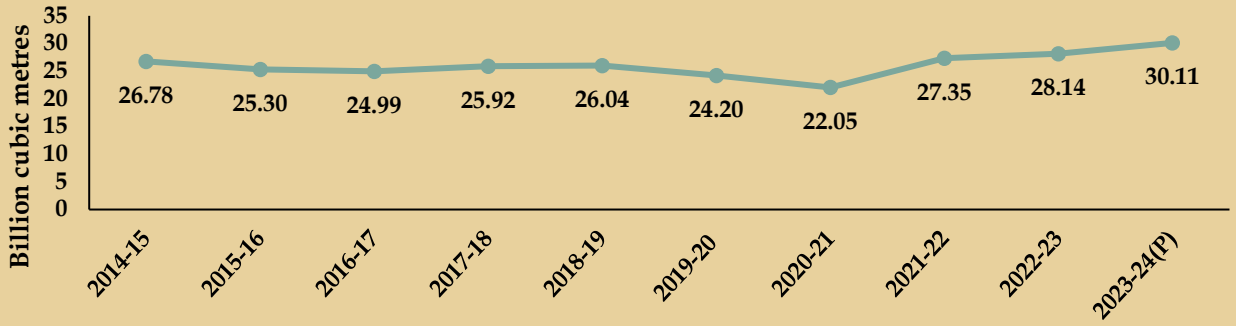
3.3 Crude Oil Production

Crude oil production in India experienced a marginal increase in FY 2023-24(P), reaching **29.36 million tonnes** compared to **29.18 million tonnes** in FY 2022-23, reflecting an increase of **0.61**% (Table 3.1).

3.4 Natural Gas Production

The net production of natural gas for consumption increased by **6.03%** in FY 2023-24(P), reaching **35.68 billion cubic meters (BCM)**, compared to **33.65 BCM** in FY 2022-23. Similarly, the net production of natural gas for sale also saw a growth of over 7%, increasing from **28.14 BCM** in FY 2022-23 to **30.11 BCM** in FY 2023-24(P). **T**he year wise net production of natural gas during the last 10 years is shown in below figure.

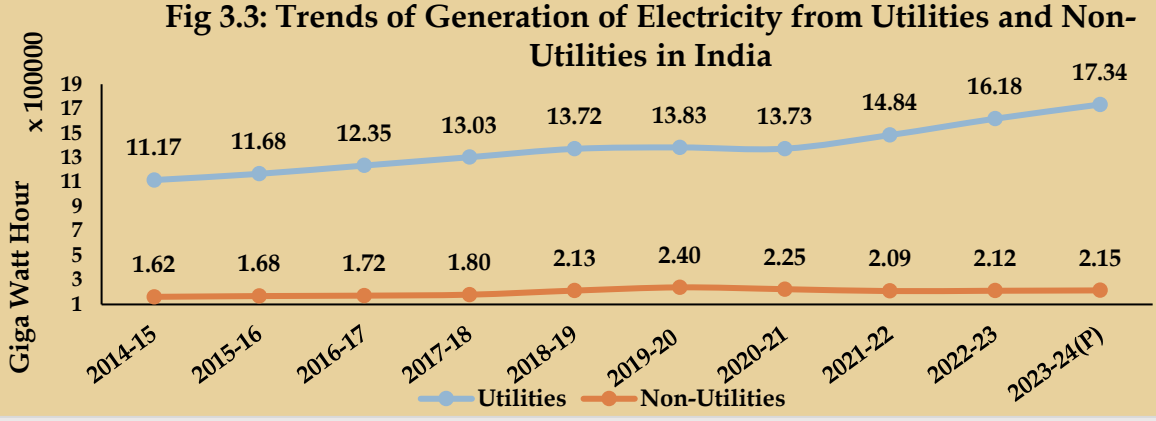
Fig 3.2 : Trend of Net production (for Sale) of Natural Gas in India



3.5 Electricity Generation Trends

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 5.01% in the last ten years from 2014-15 to 2023-24(P). The generation of electricity in India still depends heavily on Coal. During FY:2023-24(P) close to 76% of the electricity (from utilities and non-utilities) has been generated from Steam. However, the RES (Renewable Energy Resources other than Hydro for utility and non-utility) has shown some good signs as it has registered a growth of 11.15% during FY: 2023-24(P), as compared to 2022-23. The year wise generation of electricity from utilities and Non utilities from 2014-15 to 2023-24(P) is shown in below figure.

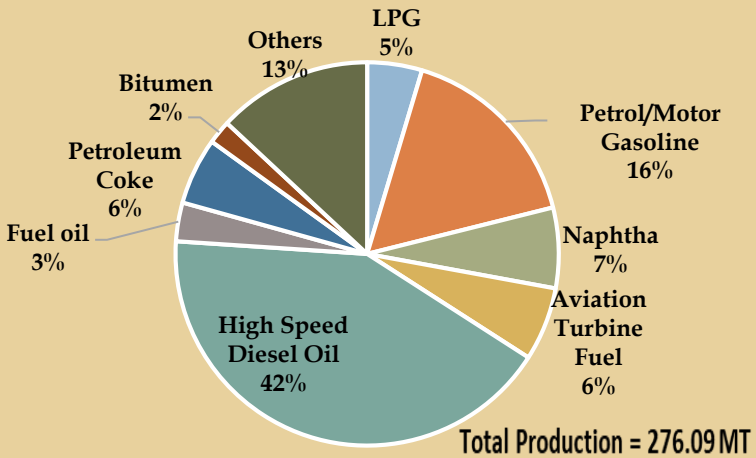
Fig 3.3: Trends of Generation of Electricity from Utilities and Non-Utilities in India



3.6 Petroleum Products Production

The production of petroleum products in India rose by 3.58% in FY 2023-24(P), with a total production of 276.09 million tonnes, compared to 266.54 million tonnes in FY 2022-23 (Table 3.4).

Fig 3.4 : Production of Petroleum Products by type during 2023-24 (P)

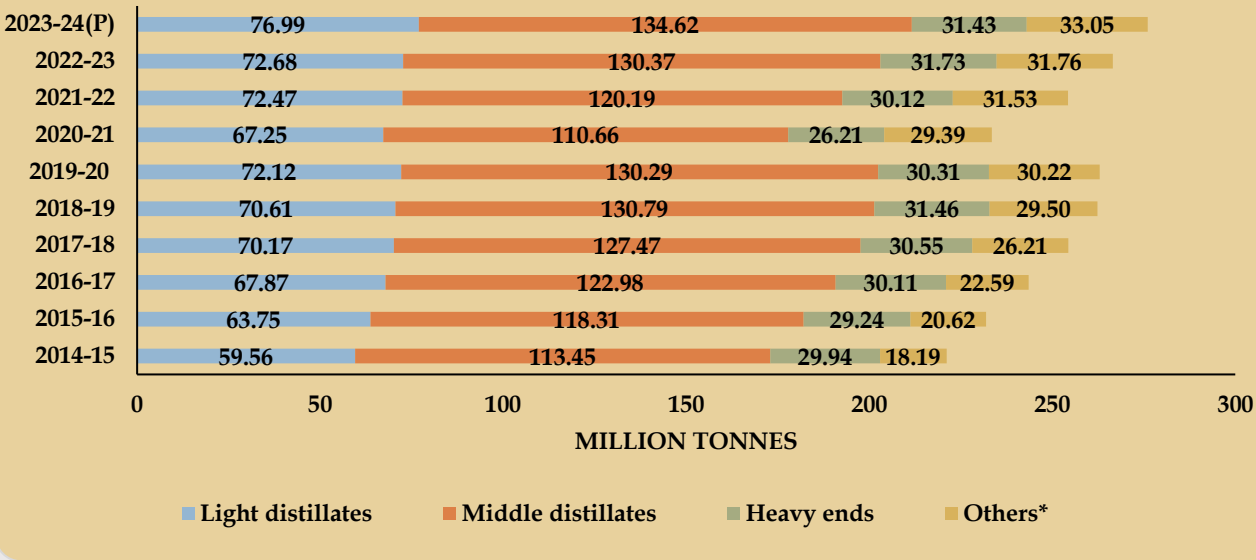


The High-speed diesel oil was the dominant petroleum product, accounting for 42% of total production, followed by petrol/motor gasoline at 16% as shown in **figure 3.4**.

Within the three main categories of petroleum products, middle distillates—such as Kerosene, Aviation Turbine Fuel (ATF), High speed Diesel (HSD) and LDO—constitute the largest share, accounting for 48.76% of India's petroleum production. These products experienced a growth of 3.26% in FY 2023-24(P) compared to the previous year.

A sectoral overview during last 10 years is shown in below figure:

Fig 3.5 : Yearwise domestic production of Petroleum products

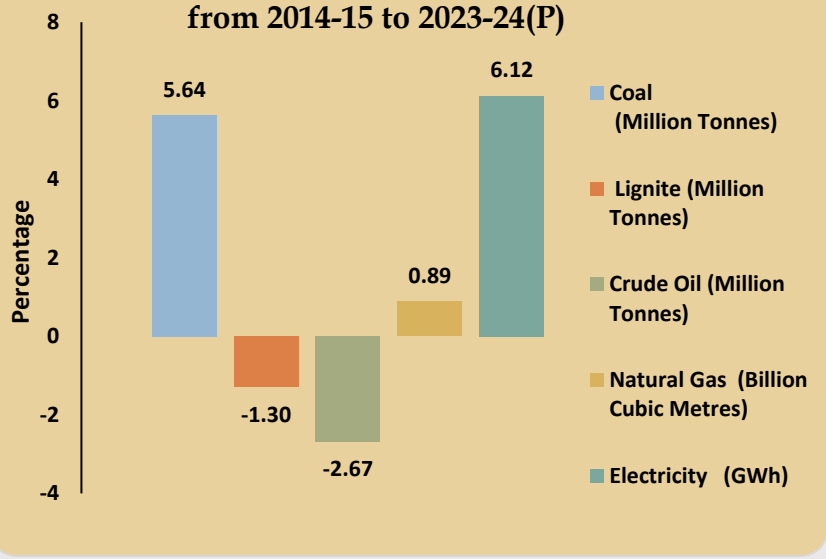


Others include VGO, Benzene, MTO, CBFS, Sulphur, waxes. MTBE& Reformate etc.

3.7 Compound annual growth rate of production of primary energy resources

The compound annual growth rates (CAGRs) of crude oil and natural gas production, relative to FY 2014-15, show a decline for crude oil at -2.67% and a modest growth for natural gas at 0.89%. Conversely, electricity generation from hydro, nuclear, and other renewable sources exhibited the highest CAGR of 6.12%, showing remarkable growth of renewable energy in India as shown in **figure 3.6**.

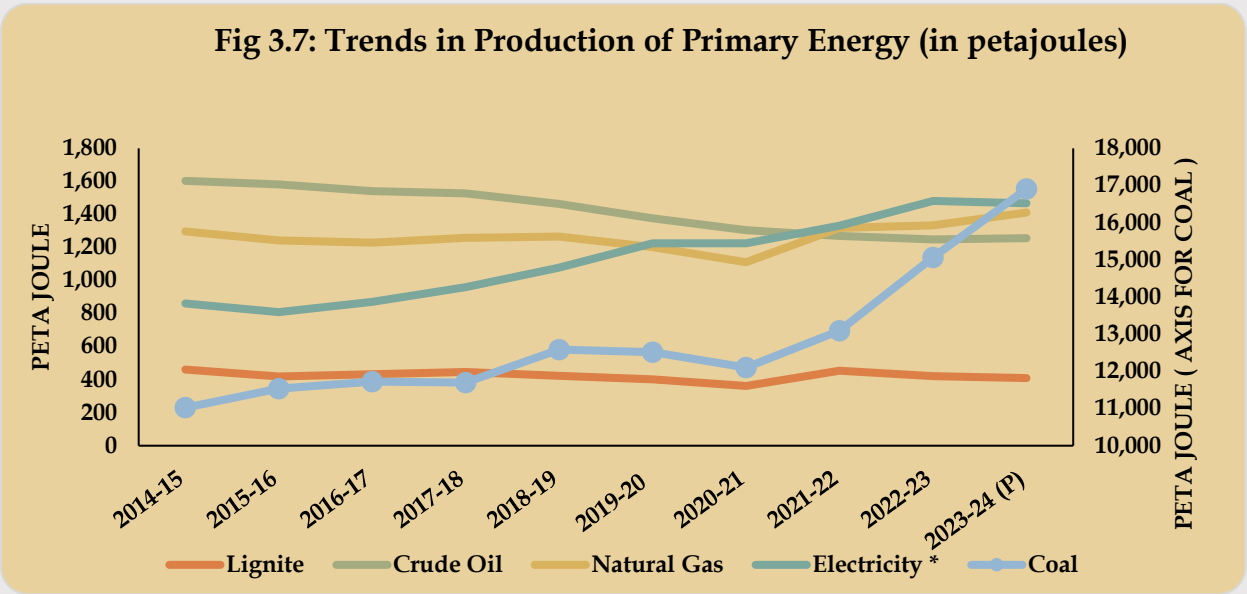
Fig 3.6 : Compound Annual Growth Rate of Production of Primary Energy Resources from 2014-15 to 2023-24(P)



3.8 Energy Production in Petajoules

Energy production in terms of Petajoules (PJ) increased by 9.73% from 19,549 PJ in FY 2022-23 to 21,452 PJ in FY 2023-24(P). This growth indicates a general expansion of energy production across various sources (Table 3.2). The production of primary energy sources in India during last 10 years is shown in below figure:

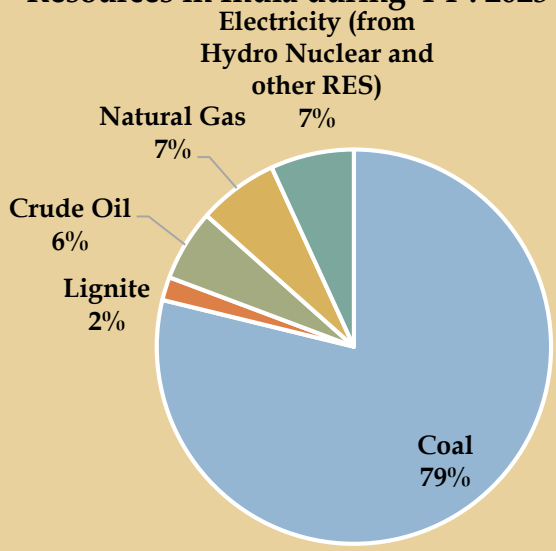
Fig 3.7: Trends in Production of Primary Energy (in petajoules)



3.9 Dependency on Coal for Primary Energy Generation

India continues to rely heavily on coal for energy generation. In FY 2023-24(P), coal contributed to about **79%** of the total primary energy generation, followed by electricity from hydro, nuclear, and other renewable sources (7%) and natural gas (7%). The share of total energy generated from different commercial sources in India during FY 2023-24 is shown in below figure:

Fig 3.8: Share of Total Energy Generated from Primary Energy Resources in India during FY : 2023-24(P)



Total Energy Generated = 21,452 PJ

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Table 3.1 : Yearwise Production of Primary 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
2014-15	609.18	48.27	37.46	33.66	238,908
2015-16	639.23	43.84	36.94	32.25	224,571
2016-17	657.87	45.23	36.01	31.90	241,842
2017-18	675.40	46.64	35.68	32.65	266,308
2018-19	728.72	44.28	34.20	32.87	299,465
2019-20	730.87	42.10	32.17	31.18	340,579
2020-21	716.08	37.90	30.49	28.67	340,576
2021-22	778.21	47.49	29.69	34.02	369,652
2022-23	893.19	44.03	29.18	34.45	411,514
2023-24(P)	997.83	42.92	29.36	36.44	407,826
Growth rate of 2023-24 over 2022-23 (%)	**11.71**	**-2.52**	**0.61**	**5.77**	**-0.90**
CAGR 2014-15 to 2023-24(%)	**5.64**	**-1.30**	**-2.67**	**0.89**	**6.12**

(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*

Table 3.2 : Yearwise Production of Primary Energy Resources in Energy

(in Petajoules) @

Year	Coal	Lignite	Crude Oil	Natural Gas	Electricity *	Total
1	2	3	4	5	6	7= 2 to 6
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	15,064	420	1,249	1,334	1,481	19,549
2023-24 (P)	16,906	410	1,256	1,411	1,468	21,452
Growth rate of 2023-24 over 2022-23 (%)	**12.23**	**-2.52**	**0.61**	**5.77**	**-0.90**	**9.73**
CAGR 2014-15 to 2023-24(%)	**4.87**	**-1.30**	**-2.67**	**0.95**	**6.12**	**3.87**

(P): Provisional

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

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

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

Table 3.3 : Yearwise Production of Coal - Typewise and Sectorwise

(Million Tonnes)

Year	Coal			Public	Private	Total
	Coking	Non-coking	Total			
1	2	3	4=2+3	5	6	7=5+6
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	60.76	832.43	893.19	853.86	39.33	893.19
2023-24(P)	66.82	931.01	997.83	949.79	48.03	997.83
Growth rate of 2023-24 over 2022-23 (%)	**9.98**	**11.84**	**11.71**	**11.23**	**22.13**	**11.71**
CAGR 2014-15 to 2023-24(%)	**1.69**	**5.99**	**5.64**	**5.90**	**1.46**	**5.64**

(P): Provisional

Source : Ministry of Coal

Table 3.3 A: Grade Wise Production of Coking Coal by Sector during 2022-23 & 2023-24

(Million Tonnes)

Grade of Coaking Coal	Public		Private		All India		Change in production (%)
	2022-23	2023-24 (P)	2022-23	2023-24 (P)	2022-23	2023-24 (P)	
Steel-I	0.00	0.00	0.00	0.00	0.00	0.00	-
Steel-II	0.06	0.10	0.00	0.00	0.06	0.10	-
SC-1	0.25	0.22	0.00	0.00	0.25	0.22	-
Wash-I	0.17	1.23	0.00	0.00	0.17	1.23	-
Wash-II	3.45	2.95	0.34	0.49	3.78	3.44	-9.12
Wash-III	2.31	4.31	0.33	0.29	2.64	4.60	74.37
Wash-IV	26.10	30.41	5.11	5.15	31.21	35.55	13.90
Wash-V	22.48	21.21	0.00	0.00	22.48	21.21	-5.64
Wash-VI	0.17	0.48	0.00	0.00	0.17	0.48	-
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	**54.99**	**60.90**	**5.77**	**5.92**	**60.76**	**66.82**	9.98
Met.Coal	**37.60**	**43.50**	**5.77**	**5.92**	**43.37**	**49.42**	13.96
Non Met	**17.39**	**17.40**	**0.00**	**0.00**	**17.39**	**17.40**	0.05
All India Total	**54.99**	**60.90**	**5.77**	**5.92**	**60.76**	**66.82**	9.98

(P): Provisional

Source: Ministry of Coal

Table 3.3 B: Grade Wise Production of Non-Coking Coal by Sector during 2022-23 & 2023-24

(Million Tonnes)

Grade of Non-Coaking Coal	Public		Private		All India		Change in production (%)
	2022-23	2023-24 (P)	2022-23	2023-24 (P)	2022-23	2023-24 (P)	
G1	0.02	0.05	0.00	0.00	0.02	0.05	-
G2	0.08	0.09	0.00	0.00	0.08	0.09	-
G3	1.70	2.59	0.00	0.00	1.70	2.59	-
G4	16.10	18.01	0.00	0.00	16.10	18.01	11.84
G5	9.90	8.95	0.00	0.18	9.90	9.13	-7.81
G6	6.43	7.30	0.13	0.15	6.55	7.45	13.64
G7	45.80	54.63	0.61	0.88	46.41	55.51	19.63
G8	53.20	57.81	0.46	0.00	53.66	57.81	7.73
G9	53.13	67.46	0.00	10.95	53.13	78.41	47.58
G10	63.28	68.36	9.95	1.17	73.23	69.53	-5.06
G11	236.80	267.67	10.84	4.28	247.64	271.96	9.82
G12	99.45	108.44	4.11	12.79	103.56	121.23	17.06
G13	99.05	112.40	1.07	2.87	100.12	115.27	15.13
G14	92.16	89.35	0.43	3.80	92.59	93.15	0.60
G15	17.18	24.49	0.75	0.10	17.93	24.59	37.10
G16	4.28	0.00	0.00	4.32	4.28	4.32	1.08
G17	0.23	1.30	5.21	0.61	5.43	1.91	-
UNG	0.09	0.00	0.00	0.00	0.09	0.00	-
All India Total	**798.87**	**888.90**	**33.56**	**42.11**	**832.43**	**931.01**	11.84

(P): Provisional

Source: Ministry of Caol

Table 3.4 : Yearwise Domestic Production of Petroleum Products

(Million Tonnes)

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	Total		
1	2	3	4	5	6	7	8	9	10	11	12	12	14	15	16	17
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	221.14
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	231.92
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	243.55
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	254.40
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	262.36
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	262.94
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	233.51
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	254.31
2022-23	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	266.54
2023-24(P)	12.78	45.48	18.74	76.99	0.98	17.11	115.87	0.66	134.62	9.02	1.35	15.56	5.49	31.43	33.05	276.09
Growth rate of 2023-24 over 2022-23(%)	**-0.43**	**6.22**	**9.97**	**5.93**	**3.71**	**14.08**	**1.84**	**1.70**	**3.26**	**-2.40**	**3.87**	**-3.01**	**6.76**	**-0.97**	**4.08**	**3.58**
CAGR 2014-15 to 2023-24 (%)	**2.94**	**3.87**	**0.83**	**2.89**	**-20.28**	**4.92**	**2.30**	**6.99**	**1.92**	**-3.05**	**4.05**	**2.51**	**1.91**	**0.54**	**6.86**	**2.50**

(P): Provisional LPG=Liquified Petroleum Gas, MG= Motor Gasoline, ATF= Aviation Turbine Fuel, Lubes= Lubricant, Pet.Coke= Petroleum Coke

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

Source : Ministry of Petroleum & Natural Gas.

Table 3.5 : Yearwise 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)
1	2	3	4	5	6=2-4-5	7 = 6 - 3
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	34.45	5.51	0.69	0.11	33.65	28.14
2023-24(P)	36.44	5.57	0.65	0.11	35.68	30.11
Growth rate of 2023-24 over 2022-23(%)	**5.77**	**0.98**	**-6.60**	**3.26**	**6.03**	**7.02**
CAGR 2014-15 to 2023-24 (%)	**0.89**	**-0.66**	**-3.17**	**1.05**	**0.98**	**1.31**

(P) : Provisional

Total may not tally due to rounding off.

Source : Ministry of Petroleum & Natural Gas.

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

(Giga Watt hour=10^6 Kilo Watt hour)

Year	Utilities							
	Thermal				Large Hydro	Nuclear	RES*	Total
	Steam	Diesel	Gas	Total				
1	2	3	4	5	6	7	8	9
2014-15	835,291	1,576	41,075	877,941	129,244	36,102	73,563	1,116,850
2015-16	895,340	551	47,122	943,013	121,377	37,414	65,781	1,167,584
2016-17	944,022	401	49,094	993,516	122,378	37,916	81,548	1,235,358
2017-18	986,591	348	50,208	1,037,146	126,123	38,346	101,839	1,303,455
2018-19	1,022,265	215	49,834	1,072,314	134,894	37,813	126,759	1,371,779
2019-20	994,197	199	48,443	1,042,838	155,769	46,472	138,337	1,383,417
2020-21	981,443	224	50,944	1,032,611	150,300	43,029	147,248	1,373,187
2021-22	1,078,581	214	36,016	1,114,811	151,627	47,112	170,912	1,484,463
2022-23	1,182,096	409	23,885	1,206,390	162,099	45,861	203,555	1,617,904
2023-24(P)	1,294,852	401	31,296	1,326,549	134,054	47,937	225,835	1,734,375
Growth rate of 2023-24 over 2022-23(%)	**9.54**	**-2.06**	**31.03**	**9.96**	**-17.30**	**4.53**	**10.95**	**7.20**
CAGR 2014-15 to 2023-24(%)	**4.99**	**-14.12**	**-2.98**	**4.69**	**0.41**	**3.20**	**13.27**	**5.01**

(P):Provisional * RES: Comprising of Solar, Wind, Bio-Power and Small Hydro Power

Source : Central Electricity Authority.

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

(Giga Watt hour= 10^6 x Kilo Watt hour)

Year	Non-Utilities							Grand Total
	Thermal				Large Hydro	RES*	Total	
	Steam	Diesel	Gas	Total				
1	10	11	12	13	14	15	16	17
2014-15	128,401	9,720	21,135	159,256	145	2,656	162,057	1,278,907
2015-16	136,721	8,412	21,083	166,216	110	2,046	168,372	1,335,956
2016-17	137,588	9,182	22,855	169,625	144	2,277	172,046	1,407,404
2017-18	143,868	8,107	25,362	177,337	112	2,328	179,777	1,483,232
2018-19	184,250	5,334	19,545	209,130	270	3,674	213,074	1,584,853
2019-20	205,546	1,919	25,443	232,908	348	6,310	239,567	1,622,983
2020-21	193,143	2,504	21,684	217,330	339	7,158	224,827	1,598,014
2021-22	179,235	2,105	20,801	202,141	357	6,813	209,311	1,693,774
2022-23	179,831	2,035	21,087	202,953	291	8,688	211,932	1,829,836
2023-24(P)	180,500	2,150	21,500	204,150	351	10,080	214,581	1,948,956
Growth rate of 2023-24 over 2022-23(%)	**0.37**	**5.63**	**1.96**	**0.59**	**20.74**	**16.02**	**1.25**	**6.51**
CAGR 2014-15 to 2023-24(%)	**3.86**	**-15.43**	**0.19**	**2.80**	**10.35**	**15.97**	**3.17**	**4.79**

(P): Provisional * RES: Comprising of Solar, Wind, Bio-Power and Small Hydro Power

Source : Central Electricity Authority.