

|| Chapter - 3 ||

Production of Energy



CHAPTER 3

Production of Energy

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.

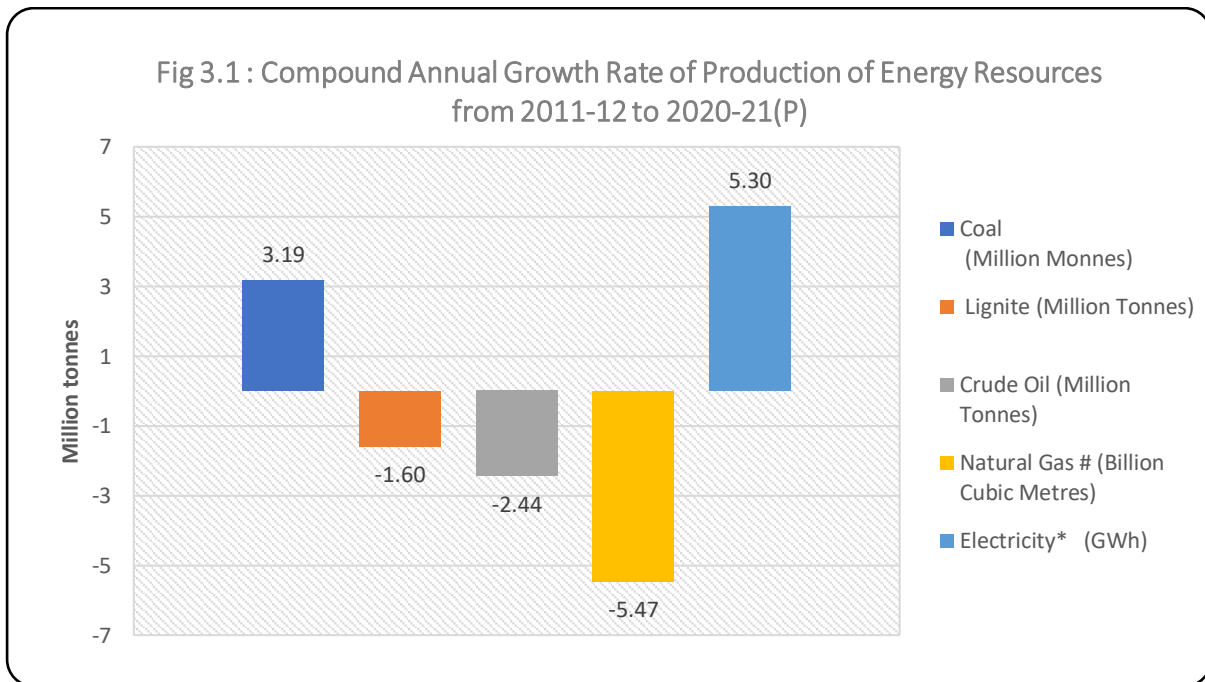
Primary production is the capture or extraction of fuels or energy from natural energy flows, the biosphere and natural reserves of fossil fuels within the national territory in a form suitable for use. Inert matter removed from the extracted fuels and quantities reinjected, flared or vented are not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

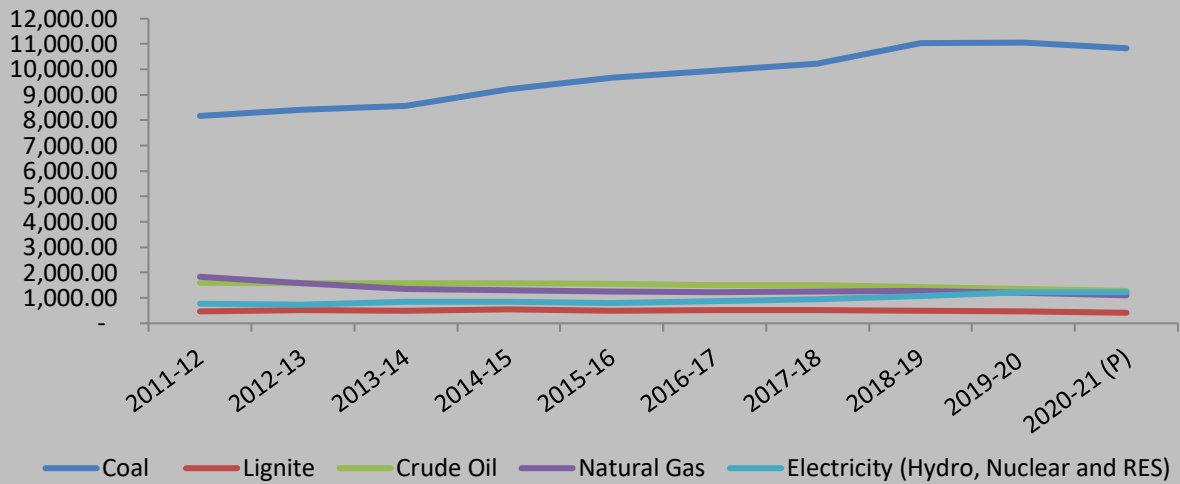
Highlights

- Coal production in the country during the year 2020-21(P) was 716.08 million tonnes as compared to 730.87 million tonnes during 2019-20. There is a decrease of 2.02% mainly because of COVID-19 pandemic. The overall trend of production in the last ten years i.e., 2011-12 to 2020-21 has shown a steady increase with a CAGR of 3.19% (Table 3.1).
- The Lignite production during 2020-21 (P) has been reduced to 36.61 million tonnes from the figure of 42.10 million tonnes in 2019-20; a decline of 13.04% over 2019-20.
- Similarly, Production of crude oil for 2020-21 (P) was 30.49 MT as compared to 32.17 MT in the previous year which is a fall of 5.21%.
- The CAGRs for natural gas and electricity (from Hydro, Nuclear and other Renewable energy sources) were (-) 5.47% and 5.30% respectively for the period 2011-12 to 2020-21 (P). Electricity showing the highest CAGR among all the resources of energy showing the remarkable growth of Renewable Energy in India.



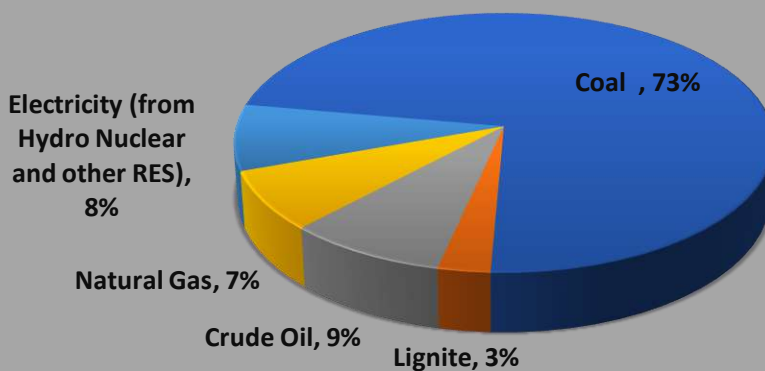
- To allow comparison among and aggregation of production by different sources of energy, production has been converted in terms of energy units, Petajoules. It may be seen that the total production of energy resources has decreased from 15,311.05 petajoules during 2019-20 to 14,857.98 petajoules during 2020-21(P), a decrease of 2.96% (Table 3.2).

Fig 3.2: Yearwise Production of Energy Resources in Energy Units(Petajoules) in India



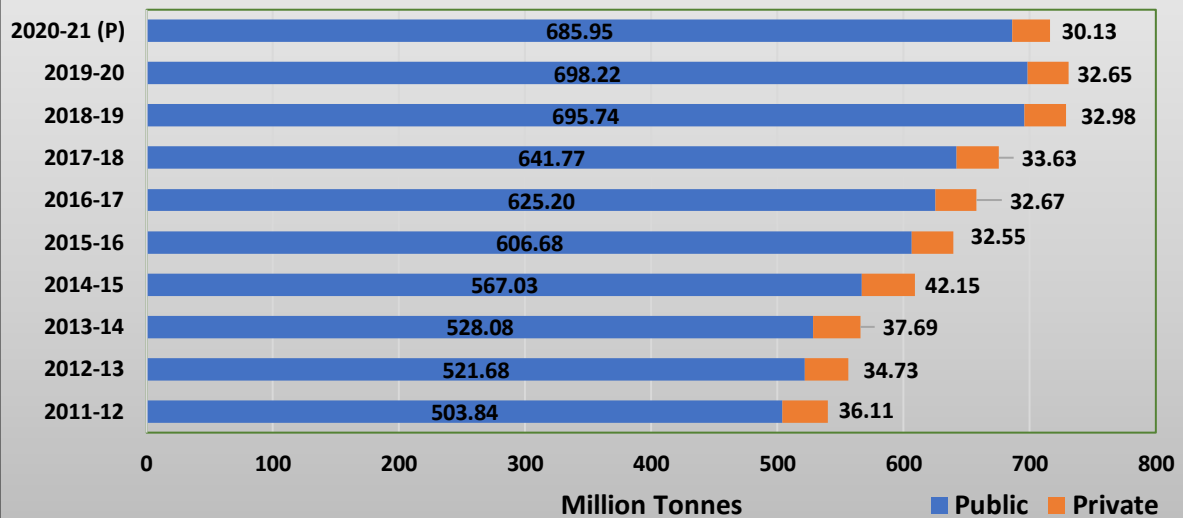
- India still depends heavily on Coal as the major source of energy. During the FY:2020-21(P) energy generated from Coal accounted for about 73% of the total generation of energy followed by Crude Oil (8.59%) and Electricity (from Hydro, Nuclear and other Renewable energy sources)(8%).

Fig 3.3: Share of Total Energy Generated from different commercial sources in India during FY : 2020-21(P)



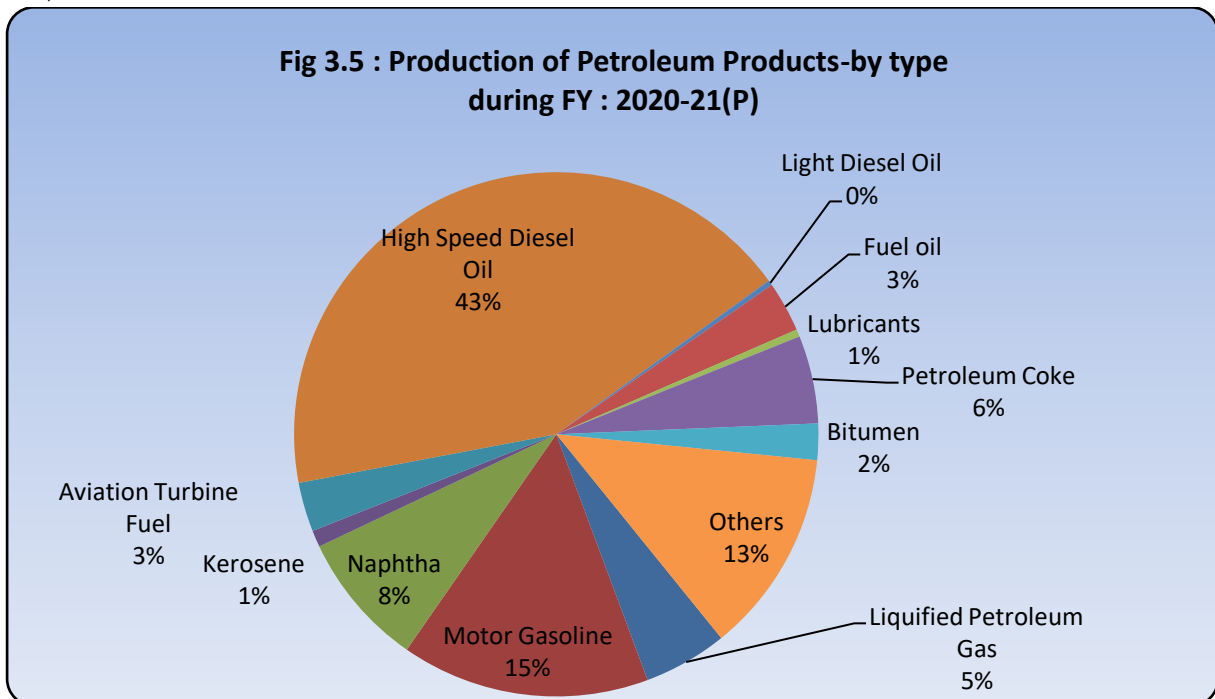
- Within Coal, Public sector has the dominating share in production. During FY: 2020-21 almost 96% of total production has come from public sector. A scenario of performance made by Public and Private sector during past 10 years has been given below,

Fig 3.4: Share of Private and Public sector in Production of Coal in India during FY : 2011-12 to FY : 2020-21(P)



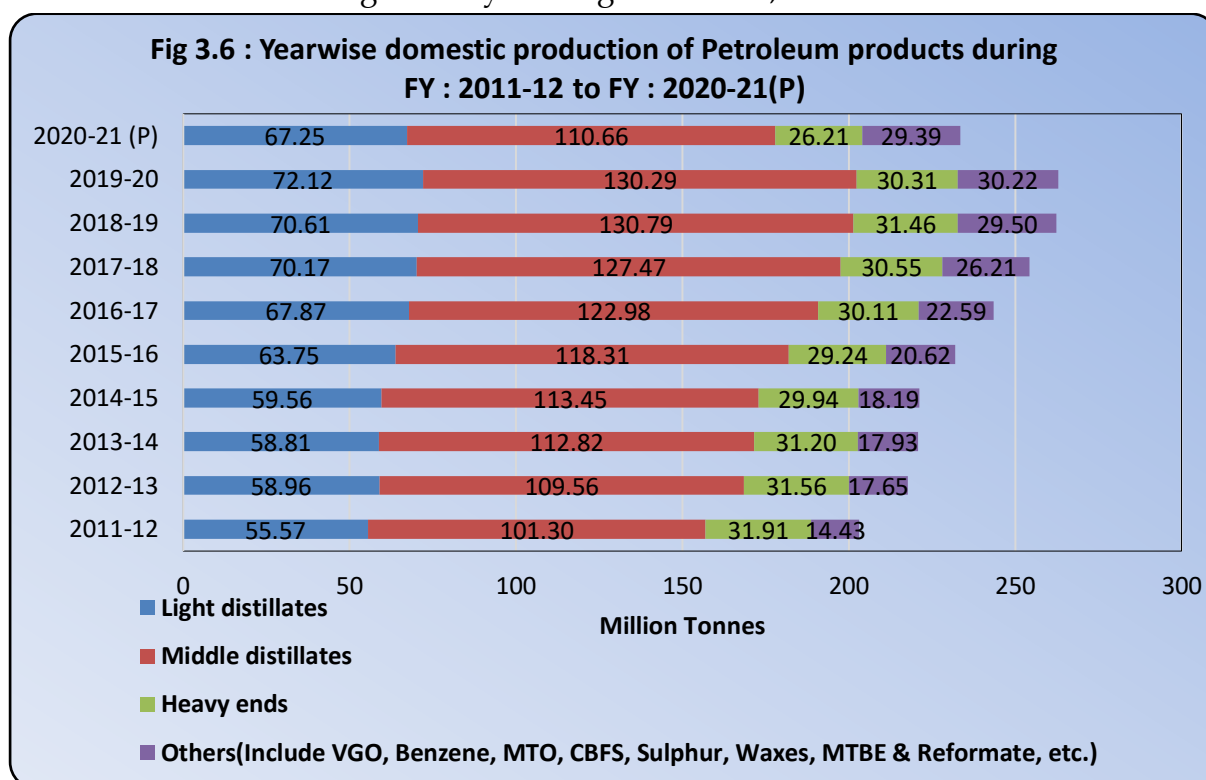
- In the year 2019-20, the production of Petroleum Products in the country was 262.94 MT as against 233.51 MT during 2020-21(P), a decrease of 11.19%. In the total production of Petroleum Products during 2020-21(P), High Speed Diesel Oil accounted for the maximum share (43%), followed by Motor Gasoline (15%). (Table 3.4).

Fig 3.5 : Production of Petroleum Products-by type during FY : 2020-21(P)

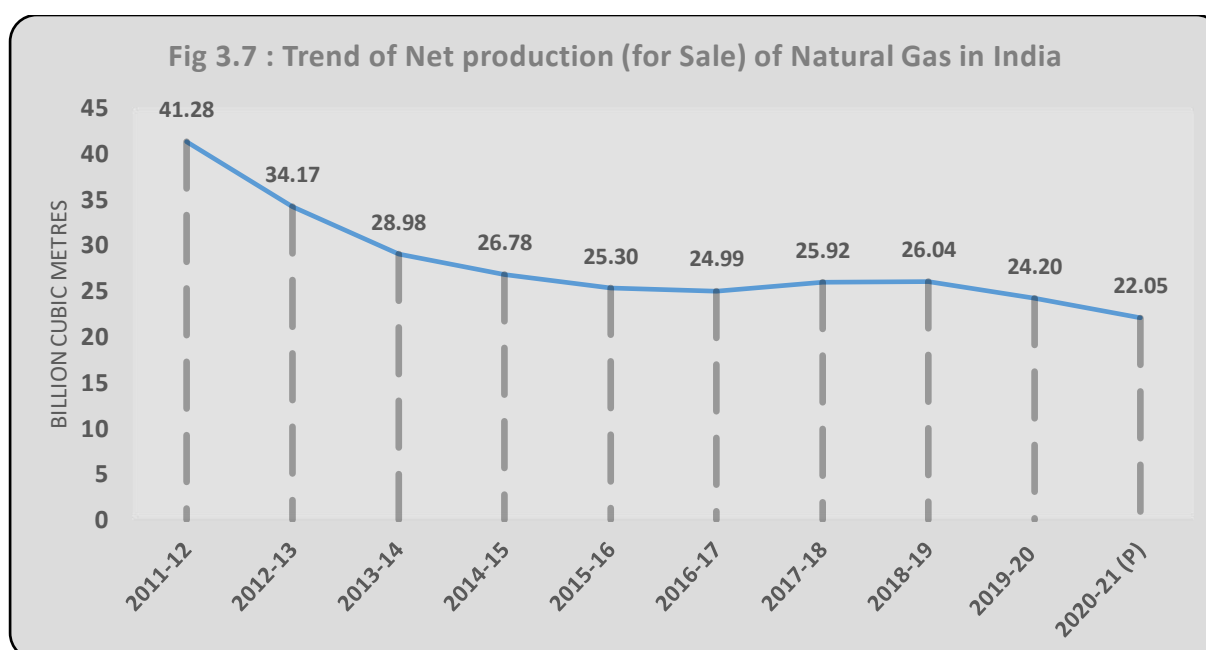


- Again, within the three (3) major categories of Petroleum Products, the *Middle Distillates* (which is having the dominant share of 47%, contains items like ATF, Diesel, Kerosene etc.) has experienced a major decline of 15.07% during 2020-21, over

past year. The Heavy Ends sector also has decreased by 13.53% over last year. A sectorial-overview during last 10 years is given below,



- Net production of Natural Gas for consumption decreased from to 30.26 Billion Cubic Meters (BCM) in 2019-20 to 27.78 BCM in 2020-21(P) registering a sharp decline of 8.17%. The Net-Production for sale has also experienced a decline over past 10 years. Whereas during FY: 2011-12 the amount was 41.28 Billion Cubic Meter but during FY:2020-21 the quantity has reduced to 22.05 BCM i.e., a reduction of almost 47%, in 10 years (Table 3.5).



- India has experienced a steady growth in terms of gross electricity generation (from Utility) over time. The CAGR grew at a rate of 4.52% in the last ten years from 2011-12 to 2020-21 (P).
- Also, in terms of year-on-year growth, from 2019-20 to 2020-21(P), gross generation of electricity from Hydro, Nuclear from Utilities declined by (-)3.51%, (-)7.41% respectively but for the Other Renewable Resources, it grew by 6.44%. Again, the gross generation of Electricity from Utility declined by (-0.74%) during 2020-21(P) over 2019-20 (Table 3.6(A))

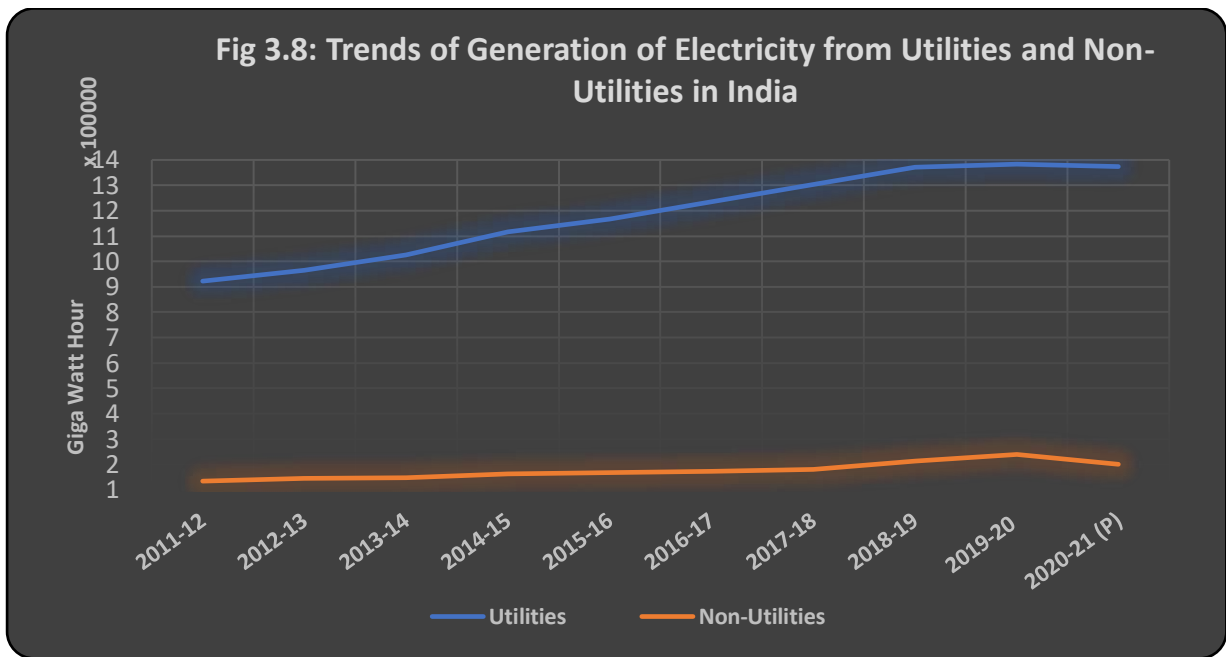


Table 3.1 : Yearwise Production of Energy Resources in Physical Units

Year	Coal (Million Tonnes)	Lignite (Million Tonnes)	Crude Oil (Million Tonnes)	Natural Gas # (Billion Cubic Metres)	Electricity* (GWh)
1	2	3	4	5	6
2011-12	539.95	42.33	38.09	47.56	2,14,024
2012-13	556.40	46.45	37.86	40.68	2,04,035
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(P)	716.08	36.61	30.49	28.67	3,40,576
Growth rate of 2020-21 over 2019-20 (%)	-2.02	-13.04	-5.21	-8.05	0.00
CAGR 2011-12 to 2020-21(%)	3.19	-1.60	-2.44	-5.47	5.30

(P): provisional

* Electricity from Hydro, Nuclear and other Renewable energy sources.

#For Natural Gas Gross Production is reported

Sources:

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

Table 3.2 : Yearwise 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	8,169.44	481.31	1,594.83	1,832.01	770.49	12,848.08
2012-13	8,418.36	528.17	1,585.20	1,566.99	734.53	12,833.25
2013-14	8,560.02	503.36	1,582.20	1,363.87	844.54	12,854.00
2014-15	9,216.88	548.83	1,568.49	1,296.48	860.07	13,490.76
2015-16	9,671.55	498.48	1,546.75	1,242.24	808.46	13,767.48
2016-17	9,953.54	514.27	1,507.69	1,228.66	870.63	14,074.79
2017-18	10,218.80	530.34	1,494.10	1,257.65	958.71	14,459.61
2018-19	11,025.50	503.50	1,432.09	1,266.28	1,078.07	14,090.50
2019-20	11,058.11	478.71	1,346.93	1,201.22	1,226.08	15,311.05
2020-21 (P)	10,834.35	416.30	1,276.79	1,104.47	1,226.07	14,857.98
Growth rate of 2020-21 over 2019-20 (%)	-2.02	-13.04	-5.21	-8.05	0.00	-2.96
CAGR 2011-12 to 2020-21(%)	3.19	-1.60	-2.44	-5.47	5.30	1.63

(P): provisional

* Electricity from hydro, Nuclear and other Renewable energy sources.

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

Sources:

1. Office of Coal Controller, 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)
2011-12	51.66	488.29	539.95	503.84	36.11	539.95
2012-13	51.58	504.82	556.40	521.68	34.73	556.40
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 (P)	44.79	671.30	716.08	685.95	30.13	716.08
Growth rate of 2020-21 over 2019-20 (%)	-15.39	-0.98	-2.02	-1.76	-7.71	-2.02
CAGR 2011-12 to 2020-21(%)	-1.57	3.60	3.19	3.49	-1.99	3.19

(P): Provisional

Source : Office of Coal Controller of India

**Table 3.3 A: Grade Wise Production of Coking Coal by Companies
in 2019-20 & 2020-21**

(Million Tonnes)

Grade of Coaking Coal	Public		Private		All India		Percentage Change
	2019-20	2020-21	2019-20	2020-21	2019-20	2020-21	
Steel-I	0.02	0.00	0.00	0.00	0.02	0.00	-100.00
Steel-II	0.13	0.01	0.00	0.00	0.13	0.01	-93.94
SC-1	0.25	0.42	0.00	0.00	0.25	0.42	68.40
Wash-I	0.03	1.41	0.11	0.00	0.14	1.41	937.50
Wash-II	1.86	1.39	0.44	0.65	2.30	2.04	-11.46
Wash-III	6.47	14.19	0.89	0.39	7.36	14.58	98.00
Wash-IV	28.32	14.77	4.78	4.81	33.09	19.59	-40.81
Wash-V	9.64	6.70	0.00	0.00	9.64	6.70	-30.44
SLV1	0.01	0.04	0.00	0.00	0.01	0.04	485.71
All India Total	46.73	38.93	6.21	5.85	52.94	44.79	-15.40
Met.Coal	29.24	26.42	6.21	5.85	35.45	32.28	-8.96
Non Met	17.49	12.51	0.00	0.00	17.49	12.51	-28.45
All India Total	46.73	38.93	6.21	5.85	52.94	44.79	-15.39

Source: Office of Coal Controller of India

**Table 3.3 B: Grade Wise Production of Non-Coking Coal by Companies
in 2019-20 & 2020-21**

(Million Tonnes)

Grade of Non-Coaking Coal	Public		Private		All India		Percentage Change
	2019-20	2020-21	2019-20	2020-21	2019-20	2020-21	
G1	0.02	0.00	0.00	0.00	0.02	0.00	-85.71%
G2	0.29	0.03	0.00	0.00	0.29	0.03	-90.63%
G3	3.23	2.78	0.00	0.00	3.23	2.78	-13.93%
G4	14.47	14.22	0.00	0.00	14.47	14.22	-1.73%
G5	14.63	9.82	0.00	0.00	14.63	9.82	-32.91%
G6	4.55	4.29	0.06	0.05	4.61	4.34	-5.84%
G7	40.72	42.69	0.17	0.00	40.89	42.69	4.39%
G8	44.11	47.49	1.44	0.44	45.55	47.93	5.23%
G9	37.87	32.71	0.00	0.00	37.87	32.71	-13.63%
G10	68.45	59.56	9.69	10.33	78.14	69.89	-10.56%
G11	179.69	178.86	14.18	13.33	193.87	192.03	-0.95%
G12	70.72	72.88	0.91	13.18	71.63	73.17	2.15%
G13	86.86	79.07	0.00	0.29	86.86	79.07	-8.98%
G14	58.80	63.62	0.00	0.00	58.80	63.62	8.21%
G15	17.60	31.39	0.00	0.00	17.60	31.39	78.37%
G16	4.03	7.22	0.00	0.00	4.03	7.22	79.05%
G17	5.28	0.26	0.00	0.00	5.28	0.26	-95.17%
UNG	0.18	0.15	0.00	0.00	0.18	0.15	-13.14%
Total Non-Coaking Coal	651.50	647.02	26.44	24.28	677.94	671.30	-0.98%

Source: Office of Coal Controller of India

Table 3.4: Yearwise Domestic Production of Petroleum Products

(Million Tonnes)

Year	Light distillates			Middle distillates			
	LPG	Petrol/MG	Naphtha	Kerosene	ATF	HSD	LDO
1	2	3	4	5	6	7	8
2011-12	9.55	27.19	18.83	7.86	10.06	82.88	0.50
2012-13	9.82	30.12	19.02	7.97	10.09	91.10	0.40
2013-14	10.03	30.28	18.51	7.42	11.22	93.76	0.42
2014-15	9.84	32.33	17.39	7.56	11.10	94.43	0.36
2015-16	10.57	35.32	17.86	7.50	11.79	98.59	0.43
2016-17	11.33	36.59	19.95	6.04	13.83	102.48	0.63
2017-18	12.38	37.78	20.01	4.41	14.59	107.90	0.56
2018-19	12.79	38.04	19.79	4.07	15.48	110.53	0.70
2019-20	12.82	38.62	20.68	3.21	15.24	111.22	0.62
2020-21 (P)	12.07	35.78	19.40	2.39	7.09	100.44	0.73
Growth rate of 2020-21 over 2019-20(%)	-5.86	-7.35	-6.17	-25.46	-53.46	-9.69	17.46
CAGR 2011-12 to 2020-21 (%)	2.64	3.10	0.33	-12.38	-3.81	2.16	4.27

(p) : Provisional LPG=Liquified Petroleum Gas, MG= Motor Gasoline, ATF= Aviation Turbine Fuel
HSD= High Speed Diesel Oil, LDO= Light Diesel Oil

Source : Ministry of Petroleum & Natural Gas.

Table 3.4 (Contd.): Yearwise Domestic Production of Petroleum Products

(Million Tonnes)

Year	Heavy ends				Others*	Total
	Fuel oil	Lubes	Pet. Coke	Bitumen		
1	9	10	11	12	13	14 (sum of 2 to 13)
2011-12	18.43	1.03	7.84	4.61	14.43	203.20
2012-13	15.05	0.90	10.94	4.67	17.65	217.74
2013-14	13.41	0.94	12.07	4.79	17.93	220.76
2014-15	11.92	0.95	12.45	4.63	18.19	221.14
2015-16	9.73	1.04	13.32	5.16	20.62	231.92
2016-17	9.96	1.03	13.94	5.19	22.59	243.55
2017-18	9.49	1.04	14.75	5.28	26.21	254.40
2018-19	10.03	0.95	14.68	5.80	29.50	262.36
2019-20	8.61	0.93	15.53	5.24	30.22	262.94
2020-21(P)	7.24	1.07	12.66	5.25	29.39	233.51
Growth rate of 2020-21 over 2019-20(%)	-15.88	14.76	-18.50	0.02	-2.74	-11.19
CAGR 2011-12 to 2020-21 (%)	-9.86	0.44	5.47	1.44	8.23	1.56

(P): Provisional Lubes= Lubricant, Pet.Coke= Petroleum Coke

\$: Includes other Light distillates from 2006-07

* 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
2011-12	47.56	5.28	0.97	0.03	46.56	41.28
2012-13	40.68	5.40	1.08	0.03	39.57	34.17
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 (P)	28.67	5.73	0.82	0.07	27.78	22.05
Growth rate of 2020-21 over 2019-20(%)	-8.05	-5.31	-4.48	-0.62	-8.17	-8.89
CAGR 2011-12 to 2020-21 (%)	-5.47	0.91	-1.80	9.33	-5.58	-6.73

Note:

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=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 (P)	9,81,443	224	50,944	10,32,611	1,50,300	43,029	1,47,248	13,73,187
Growth rate of 2020-21 over 2019-20(%)	-1.28	12.60	5.16	-0.98	-3.51	-7.41	6.44	-0.74
CAGR 2011-12 to 2020-21(%)	4.83	-21.90	-5.87	3.84	1.42	2.91	11.14	4.06

(P)-Provisional

* RES: Renewable Energy Sources excluding hydro

Source : Central Electricity Authority.

Table 3.6 (B) : Yearwise 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 (P)	1,69,138	2,002	21,241	1,92,381	351	7,268	2,00,000	15,73,187
Growth rate of 2020-21 over 2019-20(%)	-17.71	4.32	-16.52	-17.40	0.72	15.18	-16.52	-3.07
CAGR 2011-12 to 2020-21(%)	5.46	-11.87	-0.38	4.18	11.53	22.41	4.52	4.52

(P)-Provisional

* RES: Renewable Energy Sources excluding hydro

Source : Central Electricity Authority.