5 Chapter

Availability of Energy Resources

CHAPTER 5
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Introduction

The availability of energy resources is crucial for the economic and social development of a country, especially for poverty reduction and improving living standards. Timely and reliable data on energy availability is essential for sound decision-making and long-term planning. Monitoring energy resources, helps assess their availability and depletion over time. This is crucial for maintaining energy security and supporting sustainable development.

Importance of Energy Availability

Energy availability is a key enabler of improved quality of life, fostering economic growth, and addressing the energy needs of households and industries. For developing countries like India, tracking energy resources and their depletion is vital for assessing long-term sustainability. The push towards renewable and cleaner forms of energy has gained momentum in recent years, aiming to bridge the gap between energy demand and supply while minimizing environmental impact. Furthermore, energy access for all, particularly clean energy, has been recognized as a key goal in the Sustainable Development Goals (SDGs), with a target for 2030.

This chapter outlines the current status of energy availability in India, focusing on coal, crude oil, petroleum products, and electricity.

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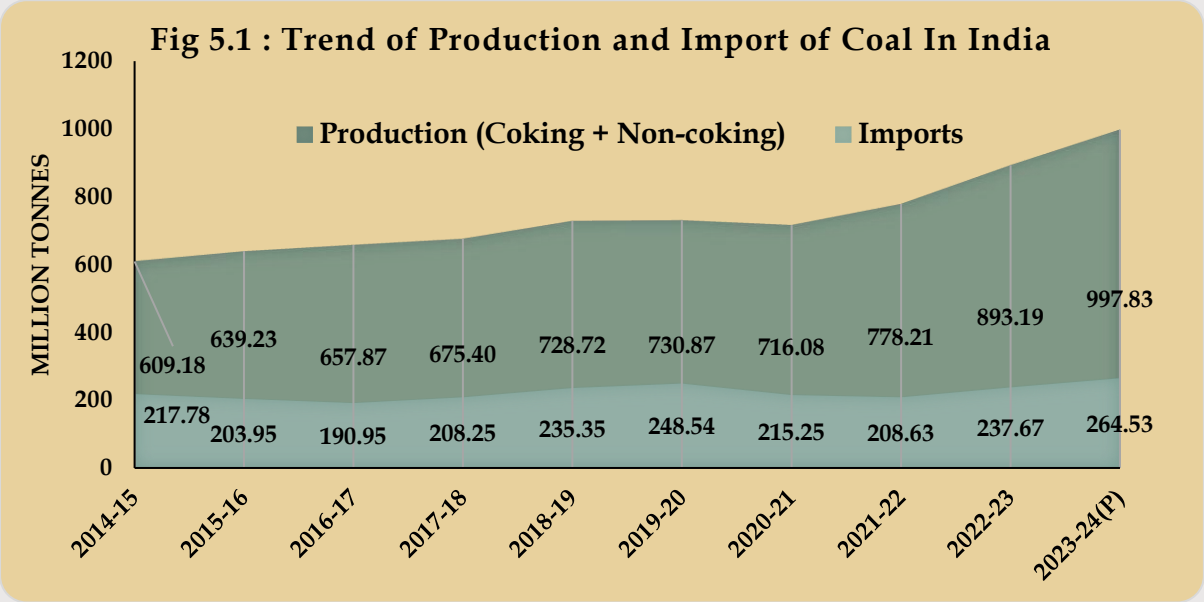
Key Highlights of Energy Availability

5.1 Availability of energy resources

Table 5.1 indicates that coal availability in India has shown consistent growth, with a notable **10.98%** increase in FY 2023-24 (P) compared to FY 2022-23, and a **CAGR of 4.64%** over the past decade, indicating a steady rise in domestic production over the years except in FY 2020-21. Conversely, lignite availability has declined by **6.38%**, reflecting a shift away from this resource, with a **CAGR of -1.06%** over the period. Crude oil availability has seen modest growth of **0.66%**, while natural gas availability has experienced a significant **12.54%** rise, with a **CAGR of 3.09%.**

5.2 Coal Availability

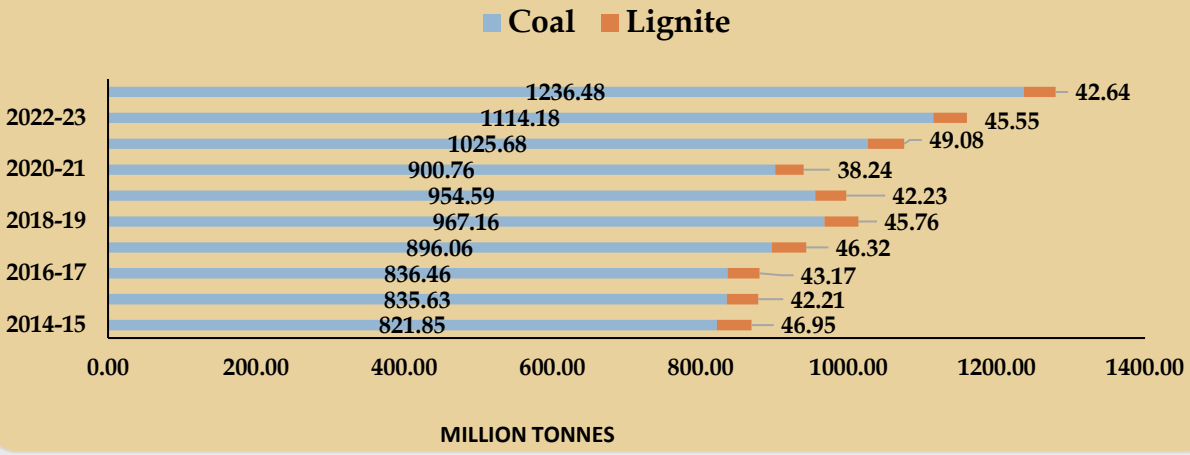
Table 5.2 indicates that India's coal production has seen a steady rise (except in FY 2020-21), reaching **997.83 MT** in FY 2023-24 (P), reflecting an **11.71%** increase from the previous year, indicating a growing capacity to meet domestic energy needs. Coal imports also rose by **11.30%** to **264.53 MT**, highlighting the continued dependence on external sources to supplement domestic production and meet rising demand. The year wise trend in production and import of coal in India is shown in below figure:



However, Exports of coal remained stable, with an increase to **1.55 MT**. The **change in vendible stock** is 24.33 **MT**. As a result, the **availability for consumption** reached

1236.48 MT, a **10.98**% increase from the previous year. The Lignite availability in India has shown a downward trend, with production in FY 2023-24 (P) falling by **-2.52**% to **42.92 MT**, compared to **44.03 MT** in FY 2022-23. Imports have remained minimal, and exports of lignite have been negligible, in FY 2023-24 (P). As a result, the **availability for consumption** of lignite decreased by **6.38**% to **42.64 MT** in FY 2023-24 (P). The year wise availability of Coal and Lignite is shown in below figure:

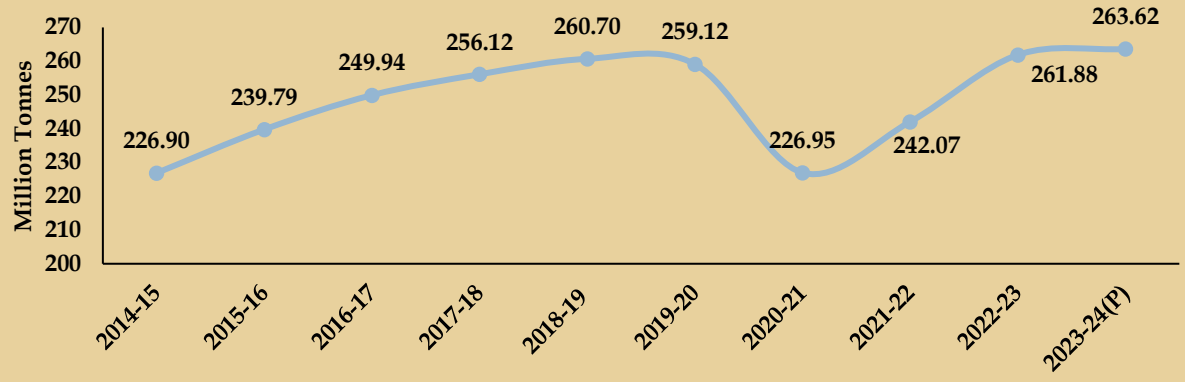
Fig 5.2: Yearwise Total Availability of Coal and Lignite in India



5.3 Crude Oil Availability

Table 5.3 indicates that the Crude oil production in India has been steadily declining, with a marginal **0.61**% increase in FY 2023-24 (P), reaching **29.36 MT**, but over the long term, the compound annual growth rate (CAGR) is **-2.67**%, signaling a consistent decline in domestic production. The net **imports** of crude oil have been rising, reaching **234.26 MT** in FY 2023-24 (P), a **0.67**% increase from the previous year, with a **CAGR of 2.39**% over the past decade, indicating India's continued reliance on foreign sources to meet domestic demand. As a result, the **total availability** of crude oil has slightly increased by **0.66**% in FY 2023-24 (P) to **263.62 MT**, driven by higher imports despite the decline in domestic production.

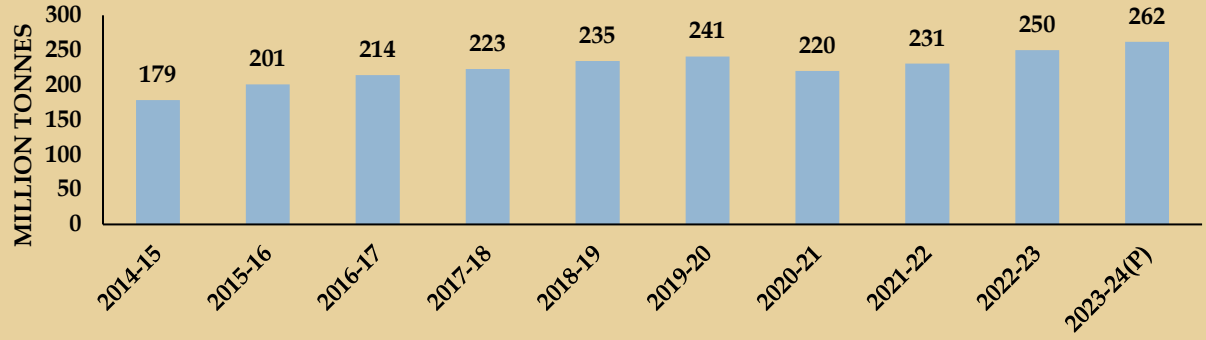
Fig 5.3: Yearwise Total Availability of Crude Oil in India during FY : 2014-15 to FY : 2023-24(P)



5.4 Petroleum Products Availability

Table 5.3 indicates that, In FY 2023-24 (P), the production of petroleum products increased by **3.58%**, reaching **276.09 MT** compared to **266.54 MT** in FY 2022-23, with a **CAGR of 2.50%** over the long term (2014-15 to 2023-24). Meanwhile, **net imports** of petroleum products decreased significantly by **15.33%**, dropping to **-13.90 MT** in 2023-24(P) to **-16.42 MT** in FY 2022-23, reflecting a reduced reliance on imports likely due to enhanced domestic refining capacity. As a result, the **availability** of petroleum products increased by **4.82%** to **262.19 MT** in FY 2023-24(P). The year wise availability of petroleum products during last 10 years is shown below:

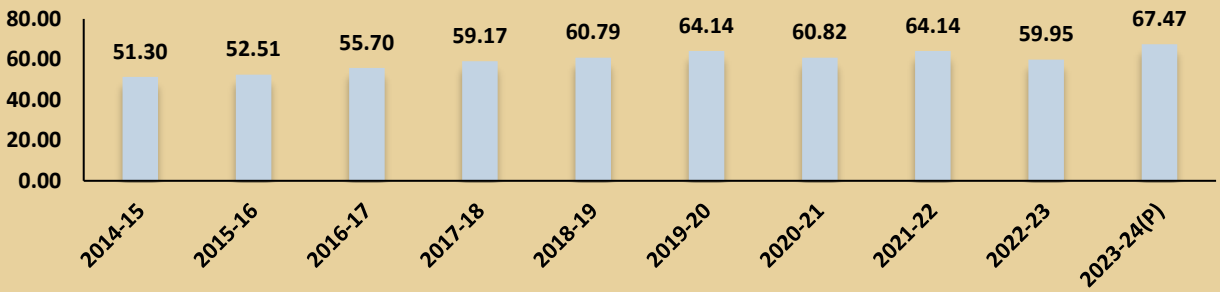
Fig 5.4: Yearwise Total Availability of petroleum products in India during FY : 2014-15 to FY: 2023-24(P)



5.5 Natural Gas Availability

Table 5.3 indicates that In FY 2023-24 (P), **natural gas production** grew by **6.03%**, reaching **35.68 BCM**, reflecting a positive trend in domestic production with a **CAGR of 0.98%** over the past decade. At the same time, **net imports** of natural gas increased by **20.87%**, reaching **31.80 BCM** compared to **26.30 BCM** in FY 2022-23, which grew at a **CAGR of 6.13%**. As a result, the **total availability** of natural gas increased by **12.54%** to **67.47 BCM** in FY 2023-24 (P). The year wise availability of natural gas during last 10 years is shown below:

Fig 5.5: Yearwise Total Availability of Natural Gas in India during FY : 2014-15 to FY : 2023-24(P)



5.6 Electricity Availability

Table 5.4 indicates that from 2014-15 to 2023-24 (P), India's electricity generation and supply have shown consistent growth. Gross electricity generation (utility) increased by **7.20%** in FY 2023-24 (P), reaching **1,734,375 GWh**, with a **CAGR** of **5.01%** over the decade. Similarly, net electricity generated (utility) grew by **7.20%**, reaching **1,634,302 GWh**, driven by both improved generation and efficiency.

Purchases from non-utilities and net imports also increased by **13.45%** to **12,696 GWh**, though their long-term growth has been more modest, with a **CAGR** of **-0.90%**.

Overall, the **net electricity available for supply** rose by **7.25%** to **1,646,998 GWh**, showing a steady rise, with a **CAGR** of **5.08%** from 2014-15 to 2023-24(P). The year wise availability of electricity during last 10 years is shown below:

Fig 5.6: Trends of Net availability of Electricity in India

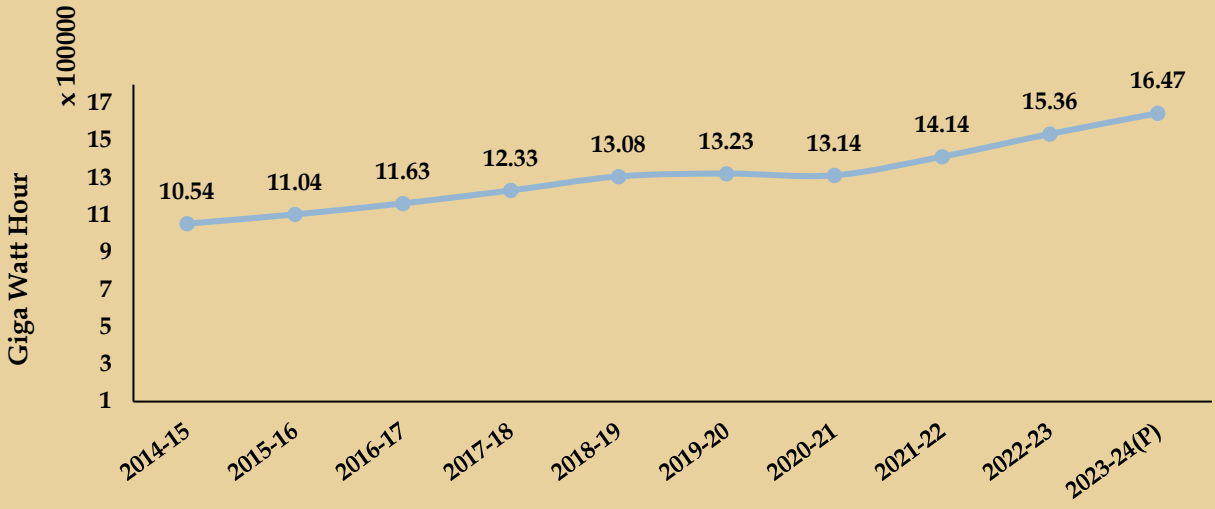


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Table 5.1 : Yearwise Availability of Energy Resources

Year	Coal (Million Tonnes)	Lignite (Million Tonnes)	Crude Oil (Million Tonnes)	Natural Gas (Billion Cubic Metres)
2014-15	821.85	46.95	226.90	51.30
2015-16	835.63	42.21	239.79	52.51
2016-17	836.46	43.17	249.94	55.70
2017-18	896.06	46.32	256.12	59.17
2018-19	967.16	45.76	260.70	60.79
2019-20	954.59	42.23	259.12	64.14
2020-21	900.76	38.24	226.95	60.82
2021-22	1025.68	49.08	242.07	64.14
2022-23	1114.18	45.55	261.88	59.95
2023-24(P)	1236.48	42.64	263.62	67.47
Growth rate of 2023-24 over 2022-23(%)	**10.98**	**-6.38**	**0.66**	**12.54**
CAGR 2014-15 to 2023-24 (%)	**4.64**	**-1.06**	**1.68**	**3.09**

(P): Provisional

Note: Availability is defined as below:
Coal/lignite: Production+Import -Export- change in stocks (Figure for 2014-15 to 2022-23 stand modified due to correction in formula)
Natural gas:Net Production i.e. (Gross production -Flared - Losses) + Net imports

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

Table 5.2 : Yearwise Availability of Coal and Lignite

(Million Tonnes)

Year	Coal					Lignite				
	Production (Coking + Non-coking)	Imports	Exports	Change of Vendible Stock (closing stock-Opening stock)	Availability for Consumption	Production	Imports	Exports	Change of Vendible Stock (closing stock-Opening stock)	Availability for Consumption
1	2	3	4	5	6=2+3-4-5	7	8	9	10	11=7+8-9-10
2014-15	609.18	217.78	1.24	3.88	821.85	48.27	0.00	0.00	1.32	46.95
2015-16	639.23	203.95	1.58	5.97	835.63	43.84	0.00	0.00	1.63	42.21
2016-17	657.87	190.95	1.77	10.59	836.46	45.23	0.02	0.01	2.07	43.17
2017-18	675.40	208.25	1.50	-13.92	896.06	46.64	0.01	0.00	0.33	46.32
2018-19	728.72	235.35	1.31	-4.40	967.16	44.28	0.02	0.08	-1.54	45.76
2019-20	730.87	248.54	1.03	23.79	954.59	42.10	0.05	0.09	-0.18	42.23
2020-21	716.08	215.25	2.95	27.63	900.76	37.90	0.02	0.19	-0.51	38.24
2021-22	778.21	208.63	1.32	-40.16	1025.68	47.49	0.01	0.02	-1.59	49.08
2022-23	893.19	237.67	1.17	15.52	1114.18	44.03	0.02	0.33	-1.83	45.55
2023-24(P)	997.83	264.53	1.55	24.33	1236.48	42.92	0.05	0.00	0.33	42.64
Growth rate of 2023-24 over 2022-23(%)	**11.71**	**11.30**	**32.53**	**-**	**10.98**	**-2.52**	**-**	**-**	**-**	**-6.38**

(P): Provisional

Total may not tally due to rounding off

Source : Ministry of Coal

Table 5.3 : Yearwise Availability of Crude Oil, Petroleum Products and Natural Gas.

Year	Crude Oil (Million Tonne)			Petroleum Products (Million Tonne)			Natural Gas (Billion Cubic Meter)*		
	Production	Net Imports	Availability	Production	Net Imports	Availability	Production	Net Imports	Availability
1	2	3	4=2+3	5	6	7=5+6	8	9	10 = 8+9
2014-15	37.46	189.43	226.90	221.14	-42.63	178.50	32.69	18.61	51.30
2015-16	36.94	202.85	239.79	231.92	-31.08	200.84	31.12	21.39	52.51
2016-17	36.01	213.93	249.94	243.55	-29.23	214.32	30.85	24.85	55.70
2017-18	35.68	220.43	256.12	254.40	-31.37	223.03	31.73	27.44	59.17
2018-19	34.20	226.50	260.70	262.36	-27.75	234.61	32.05	28.74	60.79
2019-20	32.17	226.95	259.12	262.94	-21.90	241.04	30.26	33.89	64.14
2020-21	30.49	196.46	226.95	233.51	-13.52	219.99	27.78	33.03	60.82
2021-22	29.69	212.38	242.07	254.31	-23.74	230.57	33.12	31.03	64.14
2022-23	29.18	232.70	261.88	266.54	-16.42	250.12	33.65	26.30	59.95
2023-24(P)	29.36	234.26	263.62	276.09	-13.90	262.19	35.68	31.80	67.47
Growth rate of 2023-24 over 2022-23(%)	**0.61**	**0.67**	**0.66**	**3.58**	**-15.33**	**4.82**	**6.03**	**20.87**	**12.54**
CAGR 2014-15 to 2023-24 (%)	**-2.67**	**2.39**	**1.68**	**2.50**	**-11.71**	**4.36**	**0.98**	**6.13**	**3.09**

* : Availability of natural gas is equal to indigenous net production (Gross production-Flared/Losses) + net imports

(P): Provisional; Total may not tally due to rounding off.

Source : Ministry of Petroleum & Natural Gas.

Table 5.4 : Yearwise Availability of Electricity

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

Year	Gross Electricity Generated from Utilities	Consumption in Power Station Auxiliaries	Net Electricity Generated from Utilities	Purchases from Non-Utilities + Net Import from Other Countries	Net Electricity Available for Supply
1	2	3	4=2-3	5	6=4+5
2014-15	1,116,850	76,268	1,040,582	13,773	1,054,355
2015-16	1,167,584	79,302	1,088,282	15,947	1,104,228
2016-17	1,235,358	81,044	1,154,314	8,977	1,163,290
2017-18	1,303,455	82,148	1,221,307	11,198	1,232,505
2018-19	1,371,779	83,386	1,288,393	19,291	1,307,685
2019-20	1,383,417	83,301	1,300,116	22,932	1,323,048
2020-21	1,373,187	80,472	1,292,715	21,310	1,314,025
2021-22	1,484,463	86,756	1,397,707	16,197	1,413,903
2022-23	1,617,904	93,429	1,524,475	11,191	1,535,665
2023-24(P)	1,734,375	100,073	1,634,302	12,696	1,646,998
Growth rate of 2023-24 over 2022-23(%)	**7.20**	**7.11**	**7.20**	**13.45**	**7.25**
CAGR 2014-15 to 2023-24 (%)	**5.01**	**3.06**	**5.14**	**-0.90**	**5.08**

(P): Provisional

Source:Central Electricity Authority.