



INDIA ENERGY BASKETS

Recent gulf crisis has brought back attention to India Energy Basket. This Research Report discusses India's Energy Consumption, Transition & Outlook.



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1. Executive Summary

India is the world's third-largest energy consumer, with total primary energy consumption crossing 40,663 Petajoules (PJ) in FY2024-25 — a 43% increase over FY2014-15.

While coal continues to dominate the energy mix at over 60% of primary energy supply, it is important to note that crude oil's share fell from 35.2% in 2016-17 to 28.6% in 2024-25.

Also the crude-to-refined-product ratio improved from ~74% in FY2014-15 to ~86% in FY2024-25

Key developments in India's energy landscape:

- » Total primary energy consumption reached 40,663 PJ, up from 28,393 PJ in FY2014-15 — a CAGR of ~3.7%.
- » Coal's share in the primary energy mix rose by +5.0 percentage points (pp) to 60.7% over the decade.
- » While crude oil's share fell by -5.0 pp from 33.6% to 28.6% — despite absolute crude consumption rising 22% in volume terms.
- » India's refining efficiency has witnessed a remarkable and sustained improvement over the past decade, with the refined-to-crude ratio climbing steadily from 0.71 in FY2013-14 to 0.86 in FY2024-25
- » Renewable electricity generation reached 254.5 BU in FY2024-25, more than four times the 61.7 BU recorded in FY2014-15.

2. Source-wise Share in Primary Energy Mix (%) – Full Decade

The table below captures the year-by-year percentage contribution of each energy source to India's total primary energy consumption. This is the clearest lens through which structural shifts in the energy basket can be observed. **Important to note that crude oil's share fell from 35.2% in 2016-17 to 28.6% in 2024-25**

FY	Coal (%)	Lignite (%)	Crude Oil (%)	Nat. Gas (%)	Electricity (%)	Total
2014-15	55.7	1.6	33.6	7.0	2.1	100%
2015-16	55.0	1.5	34.3	7.0	2.3	100%
2016-17	53.7	1.5	35.2	7.2	2.4	100%
2017-18	54.6	1.5	34.2	7.2	2.5	100%
2018-19	55.9	1.4	33.1	7.1	2.5	100%
2019-20	55.5	1.3	32.9	7.5	2.8	100%
2020-21	56.9	1.3	31.0	7.7	3.1	100%
2021-22	56.4	1.5	30.7	7.4	4.0	100%
2022-23	58.0	1.0	31.0	7.0	3.0	100%
2023-24	59.6	1.0	29.5	7.0	3.0	100%
2024-25	60.7	0.9	28.6	6.7	3.0	100%

Source: Computed from MoSPI Energy Statistics India 2025 data; Narnolia analysis. Figures may not sum to exactly 100% due to rounding.

2.2 India's Primary Energy Consumption — Overall Mix

India's total primary energy consumption (in Petajoules) has grown steadily over the past decade, driven by economic expansion, urbanisation, and rising industrial activity. The table below presents the source-wise energy mix from FY2014-15 to FY2024-25.

FY	Coal	Lignite	Crude Oil	Nat. Gas	Electricity (RE/Hydel/Nuclear)	Total (PJ)
2014-15	15,812	448	9,552	1,976	605	28,393
2015-16	16,112	425	10,034	2,058	661	29,290
2016-17	16,113	437	10,544	2,168	722	29,984
2017-18	17,272	465	10,833	2,279	794	31,643
2018-19	18,630	466	11,041	2,367	848	33,352
2019-20	18,396	429	10,916	2,488	916	33,145
2020-21	17,440	390	9,514	2,359	954	30,657
2021-22	18,633	496	10,121	2,437	1,331	33,018
2022-23	20,392	352	10,900	2,461	1,055	35,160
2023-24	22,764	375	11,269	2,663	1,135	38,206
2024-25	24,697	359	11,638	2,744	1,225	40,663

Source: Ministry of Statistics & Programme Implementation (MoSPI), Energy Statistics India 2025

2.3 Energy Mix Composition (FY2024-25)

In FY2024-25, the primary energy mix composition was as follows:

- » Coal: 60.7% — dominant fuel, driven by power generation, steel, and cement sectors.
- » Crude Oil: 28.6% — heavily import-dependent; 89% of crude supply sourced from imports.
- » Natural Gas: 6.7% — growing in share; government targeting 15% by 2030.
- » Renewables, Hydel & Nuclear: 3.0% — fastest growing segment in electricity generation.
- » Lignite: 0.9% — marginal and gradually declining.

2.4 10-Year Change Summary — Who Gained and Who Lost Share

The table below distils the net shift in each source's share of India's primary energy mix over the decade FY2014-15 to FY2024-25. Percentage point (pp) changes highlight structural winners and losers in the energy mix.

Energy Source	FY2014-15 Share	FY2024-25 Share	Change (pp)	Direction
Coal	55.7%	60.7%	+5.0 pp	↑ Increased
Lignite	1.6%	0.9%	-0.7 pp	↓ Declined
Crude Oil	33.6%	28.6%	-5.0 pp	↓ Declined
Natural Gas	7.0%	6.7%	-0.3 pp	↓ Marginal decline
Electricity (RE/Hydel/Nuclear)	2.1%	3.0%	+0.9 pp	↑ Increased

Source: Narnolia analysis based on MoSPI Energy Statistics India 2025.

2.5 The Crude Oil Story – A Structural Decline in Share

The single most notable structural shift in India's primary energy mix over the past decade is the sustained decline in crude oil's percentage share — from 33.6% in FY2014-15 to 28.6% in FY2024-25, a reduction of 5.0 percentage points. This is the largest absolute share decline of any energy source in the basket and is a counterintuitive finding given that crude oil consumption in absolute terms actually rose by ~22% (from 9,552 PJ to 11,638 PJ) over the same period.

The decline in crude oil's share is driven by three concurrent forces:

- » Coal crowding out: India's coal consumption grew far faster (+56% in PJ terms) than crude oil (+22%), increasing coal's share by +5.0 pp and mechanically diluting crude oil's weight in the total mix.
- » Efficiency gains in refining: **The crude-to-refined-product ratio improved from ~74% in FY2014-15 to ~86% in FY2024-25**, meaning refineries are extracting more usable product from each barrel — effectively reducing crude consumption per unit of petroleum product delivered.
- » Renewable displacement: While crude oil's role in electricity generation is negligible, the overall energy pie growing faster due to coal and renewable additions has mathematically reduced crude oil's proportionate weight

Importantly, this does not mean India's oil import bill has fallen — quite the opposite. India's crude oil import volume rose from ~223 MT in FY2014-15 to ~242 MT in FY2024-25, and import dependence in volume terms stands at ~89% of total supply. The declining share in PJ terms is a mix-composition story, not an energy security improvement. India remains structurally vulnerable to global oil price shocks, particularly given that ~89% of its crude supply is imported and the Middle East accounts for a significant share of those imports.

2.6 Clean Electricity – Small but Accelerating

The share of electricity from hydel, nuclear, and renewables in the primary energy mix grew from just 2.1% in FY2014-15 to 4.0% in FY2021-22 – a high watermark – before settling at 3.0% in FY2024-25. The dip post-FY2021-22 reflects a moderation in hydro generation in certain years and the still-modest absolute scale of renewables in the primary energy pie (as opposed to the installed capacity picture, where renewables have grown dramatically). With solar PV generation expected to grow at 24% annually through 2030, this share is set to accelerate materially in the second half of the decade.

3. Coal – India’s Dominant Energy Source

Coal has been and remains the cornerstone of India’s energy economy. In FY2024-25, total coal consumption stood at approximately 1,495 MT, of which domestic production contributed ~84.9% and the balance was met through imports.

FY	Total Coal (MT)	Coal Imports (MT)	Import %
2014-15	822	218.7	26.6%
2016-17	837	187.8	22.4%
2018-19	968	234.6	24.2%
2020-21	906	215.2	23.8%
2022-23	1,234	96.9	7.9%
2024-25	1,495	225.7	15.1%

Source: Ministry of Coal, Government of India; MoSPI Energy Statistics India 2025.

3.1 Sector-wise Coal Consumption

Power generation (utility + captive) accounts for approximately 60–64% of India's total coal consumption. Other significant consumers include:

- » Steel & Washeries: ~5–6% of total coal use (coking coal for blast furnaces).
- » Cement: ~0.7–1% — relatively stable with modest growth.
- » Sponge Iron: ~0.9% — steady demand from the long-products steel value chain.
- » Others (paper, textiles, SMEs): ~17–21% of coal use, catching up post-COVID.

4. Petroleum & Liquid Fuels

India is the world's third-largest crude oil importer and the fourth-largest refiner. Crude oil is entirely import-dependent for ~89% of supply, making petroleum a critical energy security concern. In FY2024-25, crude oil imports increased by 4.2% YoY to 242.4 MT, while domestic petroleum product consumption stood at 239.2 MMTPA.

4.1 Petroleum Product Consumption Breakup

FY	Diesel (HSD)	Petrol (MS)	LPG	Petcoke	Others	Total (MMT)
2014-15	69.4	19.1	18.0	14.6	44.4	165.5
2016-17	76.0	23.8	21.6	23.9	49.3	194.6
2018-19	83.5	28.3	24.9	21.3	55.2	213.2
2020-21	72.7	28.0	27.5	15.6	50.8	194.6
2022-23	85.9	35.0	28.5	18.3	55.3	223.0
2024-25	92.1	39.8	31.2	20.5	61.4	245.0

Source: Petroleum Planning & Analysis Cell (PPAC), Government of India; MoSPI Energy Statistics India 2025.

Key highlights from the petroleum product consumption data:

- » Diesel (HSD): Largest single fuel category at 92.1 MMT in FY2024-25 – driven by freight transport, agriculture, and industrial use. Grew from 69.4 MMT in FY2014-15.
- » Petrol (MS): Rose sharply from 19.1 MMT to 39.8 MMT – reflecting personal mobility growth, rising two-wheeler and passenger car penetration.
- » LPG: Grew from 18 MMT to 31.2 MMT, supported by the Pradhan Mantri Ujjwala Yojana (PMUY) scheme that connected rural households to clean cooking fuel.
- » Petcoke: Rose to 20.5 MMT, used as a fuel substitute in cement kilns and refineries.

4.2 Refining Capacity & Import Dependence

India's refining capacity reached 258.1 MMTPA in FY2024-25, up from 215.1 MMTPA in FY2019-20. Despite significant refining capacity, domestic crude oil production has fallen by 22.3% over the past decade to just 28.7 MT in FY2024-25, making import dependence structural rather than cyclical.

India's crude oil consumption is projected to grow at a CAGR of 4.59%, reaching 500 MT by FY2040 (from ~223 MT in FY2022-23), as per IBEF estimates. Oil demand is expected at 5.74 million barrels per day (bpd) in 2025 and 5.99 million bpd in 2026, according to OPEC.

4.3 Refining Efficiency Improvement

FY	Total Refined (MMT)	Raw Crude (MMT)	Refind/Crude
2013-14	158	222	0.71
2015-16	185	233	0.79
2017-18	206	252	0.82
2019-20	214	254	0.84
2021-22	202	242	0.83
2023-24	234	275	0.85
2024-25	245	284	0.86

India's refining efficiency has witnessed a remarkable and sustained improvement over the past decade, with the refined-to-crude ratio climbing steadily from 0.71 in FY2013-14 to 0.86 in FY2024-25 — a 21% improvement that reflects the sector's deepening technical maturity. This means Indian refineries today extract significantly more finished petroleum products from every tonn of crude oil processed.

5. Electricity Generation – The Transition in Action

India's electricity generation has expanded significantly, reaching 1,855 BU in FY2024-25 from 1,103.9 BU in FY2014-15 – a CAGR of ~5.3%. The composition of the generation mix is evolving, with renewables (solar, wind, and small hydro) growing at a rapid pace while coal continues to hold the largest share.

FY	Coal & Lignite (BU)	Nat. Gas (BU)	Nuclear (BU)	Large Hydro (BU)	Renewables (BU)	Total (BU)
2014-15	835.8	41.1	36.1	129.2	61.7	1,103.9
2016-17	944.9	49.1	37.9	122.3	81.5	1,235.7
2018-19	1,021.9	49.9	37.8	135.0	126.3	1,370.9
2020-21	981.2	51.0	43.0	150.3	147.3	1,372.8
2022-23	1,235.9	24.0	45.8	162.1	203.5	1,671.3
2024-25	1,363.2	32.0	56.7	148.6	254.5	1,855.0

Source: Central Electricity Authority (CEA), Government of India; MoSPI Energy Statistics India 2025.

5.1 Key Trends in Electricity Generation

- » Coal & Lignite: Absolute generation rose from 835.8 BU to 1,363.2 BU (+63%), though its share in total generation has stayed around 73–75% for most of the decade.
- » Renewables (excl. large hydro): Grew from 61.7 BU in FY2014-15 to 254.5 BU in FY2024-25 – a CAGR of ~15.3%, now contributing ~13.7% of total generation.
- » Large Hydro: Broadly stable at 120–165 BU range, sensitive to annual monsoon variability.
- » Nuclear: Grew steadily from 36.1 BU to 56.7 BU (+57%), with further capacity planned.
- » Natural Gas: Declined sharply from 49–51 BU range (FY2016-21) to 24 BU in FY2022-23, recovering to 32 BU in FY2024-25 – reflecting gas price volatility and availability constraints.

5.2 Renewable Energy Surge

India added 41 GW of renewable energy in the first eleven months of CY2025 — a record — raising the share of renewables to 40% of the country's installed capacity. Renewable electricity generation grew by 20% in CY2025, posting its strongest-ever annual increase of +82 TWh. Solar PV led the growth at +24% YoY, followed by wind at +28%.

India's domestic solar PV module manufacturing capacity reached 100 GW under the Approved List of Models and Manufacturers (ALMM) in 2025, reflecting progress on energy supply chain self-reliance. Solar PV generation share is expected to reach ~10% of total generation in 2026 and approach ~18% by 2030, as per IEA forecasts.

6. Natural Gas — Underpenetrated, High-Growth Potential

Natural gas currently contributes ~6.7% of India's primary energy mix — well below the government's stated target of 15% by 2030. Total natural gas consumption stood at approximately 2,744 PJ (~68 BCM) in FY2024-25, with LNG imports rising 15.4% YoY to 36,699 MMSCM.

India's natural gas consumption is projected to grow by nearly 60% by 2030, reaching 297 MMSCMD (from 188 MMSCMD in FY2024). The IEA's India Gas Market Report projects LNG demand to reach 64 BCM/year by 2030 — an 11% CAGR — driven by expansion in city gas distribution (CGD), fertilisers, and industry.

Key constraints to gas adoption include:

- » Natural gas is not under the GST regime, creating a complex and high tax burden that makes it uncompetitive versus coal in several sectors.
- » Pipeline and LNG terminal infrastructure has not kept pace with potential demand, creating connectivity bottlenecks.
- » ~64% of domestic gas supply is still priced under the APM (Administered Pricing Mechanism), limiting price signals for efficiency.

Domestic gas production is expected to see only moderate growth through 2030. ONGC's deepwater KG-D5 project and coal bed methane (CBM) fields will add supply, but these will be partially offset by declining legacy assets, leaving domestic production at ~38 BCM by 2030.

7. Outlook & Key Themes for Investors

7.1 Energy Demand Will Continue Growing

India's economy is projected to grow at ~5% annually through 2050 – the fastest among major economies (BP Energy Outlook). Primary energy consumption is expected to grow strongly, with India's share of global demand rising from 7% in 2023 to ~12% by 2050. Electricity demand is forecast to grow at 6.4% CAGR through 2030, even after the slowdown in 2025 due to weather impacts.

7.2 Coal – Enduring Role, Evolving Constraints

Despite renewable growth, coal is projected to remain India's largest source of electricity through at least 2030 – with its share declining from ~70% today to ~60% by 2030. Coal-fired generation is expected to rise ~2.5% annually over the next five years. The Union Budget 2026-27 marked a ~640% increase in the Ministry of Coal's budgetary allocation over the revised estimate for 2025-26, reinforcing the government's commitment to coal security even as it pursues the clean energy transition.

7.3 Renewables – Fastest Growth, Structural Shift

~50% of India's incremental electricity demand growth through 2030 is forecast to be met by solar PV, with coal supplying ~25% and the rest from wind, nuclear, hydro, and gas. Wind generation is expected to grow at 8.2% annually. Total renewable share in electricity generation is projected to cross one-third by 2030. This creates a structural investment opportunity across solar manufacturing, storage, EPC, and transmission infrastructure.

7.4 Natural Gas — Policy-Driven Upside

The government's gas sector investment plan of US\$67 billion over 5–6 years (announced by PM Modi in February 2024) is a strong policy signal. Expansion of CGD networks, CNG infrastructure, and industrial gas pipelines will be key drivers. However, gas inclusion under GST remains a critical enabling reform that is still pending.

7.5 Petroleum — Refining Capacity & Demand Growth

India's refining capacity expansion — with investments of Rs. 30–35 lakh crore (US\$348–406 billion) planned by 2035 — will keep India among the world's top refiners. Crude oil consumption is projected to reach 500 MT by FY2040.



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