

Foreign Trade in Energy Resources and India's Energy Security: A Comparative Analysis of Fossil Fuels and Electricity

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Abstract

India's energy-security problem is often described as a general dependence on imported energy. That description obscures an important distinction between imported fuels and cross-border electricity. This paper compares India's foreign trade in coal, crude oil, natural gas and electricity using official Government of India data, principally *Energy Statistics India 2025* (Ministry of Statistics and Programme Implementation, Government of India, 2025), which compiles data from the Ministry of Coal, Ministry of Petroleum and Natural Gas (MoPNG), the Central Electricity Authority (CEA), and related government bodies (Statistics et al., 2025a). The publication year is 2025; its reference period is FY 2014–15 to FY 2023–24, with FY 2023–24 figures marked provisional where applicable. The evidence shows that India's fossil-fuel exposure is structural: net coal imports reached 262.99 million tonnes (MT), crude-oil imports 234.26 MT, and natural-gas imports 31.80 billion cubic metres (BCM) in FY 2023–24 (Statistics et al., 2025c). Official net-import-dependency indicators were 88.86% for crude oil, 46.60% for natural gas and 25.86% for coal (Statistics et al., 2025f). Electricity presents a sharply different trade pattern. In FY 2023–24, India imported 6,648.69 GWh but exported 11,361.98 GWh, producing a net export position of 4,713.29 GWh (Statistics et al., 2025c). Electricity trade therefore functioned primarily as regional balancing and commercial exchange, not as a major source of national energy dependence. The comparison supports the core argument: India's external energy vulnerability arises mainly from imported fossil fuels, especially crude oil and natural gas, while electricity trade is small relative to domestic generation and consumption. However, electricity is not automatically secure because most generation remains linked to coal. India can reduce external vulnerability only when electricity-sector expansion is accompanied by diversification of the fuels used to generate electricity, efficiency improvements, and lower dependence on imported hydrocarbons.

Keywords: India; energy security; foreign trade; crude oil; natural gas; coal; electricity trade; import dependence; cross-border electricity

1. Introduction

Energy security concerns the continuous availability of energy in sufficient quantities and at affordable prices. The Ministry of Statistics and Programme Implementation's *Energy Statistics India 2025* (2025) identifies monitoring net energy imports and critical-fuel stocks as important for assessing energy security (Statistics et al., 2025f). Foreign trade is therefore not merely a balance-of-payments issue. It affects the reliability, affordability and strategic resilience of the energy system.

India's foreign-trade profile contains two contrasting patterns. The country imports large quantities of primary fossil fuels to meet domestic demand. In parallel, it trades electricity with neighbouring countries, importing power in some years while exporting more in others. These flows should not be treated as equivalent. Coal, crude oil and natural gas are primary or intermediate fuels that must be purchased continuously to sustain transport, industry, fertiliser production and power generation. Electricity trade, by contrast, is a flow of a secondary energy carrier through interconnected regional grids. Its security implications depend on domestic generation capacity, transmission infrastructure, market arrangements and the availability of neighbouring-country power.

The central research question is: **Does India's energy insecurity arise principally from foreign electricity trade, or from dependence on imported fossil fuels?** The paper argues that the dominant vulnerability lies in fossil fuels. This conclusion follows from three comparisons. First, fossil-fuel import dependence is high as a share of domestic requirements, particularly for crude oil. Second, fossil-fuel imports are large and persistent in physical terms, whereas electricity imports are small relative to India's electricity system. Third, India's electricity trade changed from net importing to net exporting during the period, while dependence on imported crude oil and natural gas remained positive throughout the official trade series.

The argument requires one qualification. India's electricity trade is not the same as electricity security. The country's power system remains heavily dependent on coal: MoSPI's *Energy Statistics India 2025* (2025) reports that coal contributed about 79% of primary-energy generation in FY 2023–24, while approximately 76% of electricity from utility and non-utility sources was generated from steam (Statistics et al., 2025b). Thus, electricity can be relatively independent in foreign-trade terms while remaining vulnerable to domestic coal availability, transport constraints, generation outages, transmission losses and the indirect effects of imported coal prices.

2. Data and Methodology

2.1 Official data sources

The main dataset is MoSPI's *Energy Statistics India 2025* (Ministry of Statistics and Programme Implementation, Government of India, 2025). Its data description states that the publication covers reserves, installed capacity, production, consumption, imports, exports, prices and energy indicators, and that the 2014–15 to 2023–24 series is compiled from the Ministry of Coal, MoPNG, CEA, the Ministry of New and Renewable Energy and other government institutions (Statistics et al., 2025a). The publication reports physical quantities in product-specific units, including GWh for electricity, while energy balances use kilo-tonnes of oil equivalent and some consumption and production series use petajoules.

The paper uses four official evidence groups, all drawn from named institutional publications or

webpages with identifiable publication or update years. The principal dataset is *Energy Statistics India 2025* (Ministry of Statistics and Programme Implementation, Government of India, 2025) (Statistics et al., 2025a):

1. **Foreign trade:** gross imports, exports and net imports for coal, crude oil, natural gas and electricity from MoSPI's *Energy Statistics India 2025* (2025), Chapter 4 (Statistics et al., 2025c).
2. **Import dependence:** MoSPI's *Energy Statistics India 2025* (2025) net-energy-import-dependency indicator for crude oil, coal and natural gas (Statistics et al., 2025f).
3. **Domestic production and consumption:** MoSPI's *Energy Statistics India 2025* (2025), Chapters 3 and 6, provides official series on coal production, crude-oil production, natural-gas production, electricity generation and energy consumption (Statistics et al., 2025b, 2025e).
4. **Power-sector context:** Central Electricity Authority and Ministry of Power material on generation, supply and cross-border interconnections, including the Ministry's *Power Sector at a Glance — All India* (Ministry of Power, Government of India, 2025; data as of 31 July 2025) and *Interconnection with neighbouring countries* webpage (Ministry of Power, Government of India, updated 13 March 2023) (Power & India, 2023, 2025).

FY 2023–24 values in *Energy Statistics India 2025* are marked provisional. The paper preserves that qualification rather than treating provisional values as final. The electricity series is reported in GWh; fossil fuels are reported in MT or BCM. These physical units are not added together because they measure different commodities and cannot be meaningfully pooled without an energy-conversion basis.

2.2 Definitions and comparison rules

For coal, crude oil and natural gas, net imports are calculated in the official table as gross imports less exports. For electricity, the same convention is used: imports less exports. A negative electricity net-import value therefore indicates that exports exceeded imports. The official table reports electricity net imports of –4,713.29 GWh in FY 2023–24 (Statistics et al., 2025c).

The paper distinguishes three measures:

- **Import volume:** the physical quantity entering India from abroad.
- **Net import:** gross imports minus exports; for electricity, a negative value means net exports.
- **Import dependency:** MoSPI's indicator of the share of domestic requirements met through net imports for the relevant fossil-fuel commodity. The Ministry of Statistics and Programme Implementation's *Energy Statistics India 2025* (2025) explicitly presents this indicator as a measure of fuel-specific dependence and includes it under the security theme (Statistics et al., 2025f).

No official electricity-import-dependency percentage is reported in the cited MoSPI indicator table. To make the comparison transparent, this paper calculates two supplementary ratios for FY 2023–24: gross electricity imports divided by electricity consumption, and net electricity imports divided by electricity consumption. These are **derived ratios**, not official MoSPI dependency indicators. The denominator is the reported electricity consumption of 1,543,000 GWh (Statistics et al., 2025e).

3. India's Fossil-Fuel Trade Dependence

3.1 Comparative trade data

Energy resource	FY 2014–15 net imports	FY 2022–23 net imports	FY 2023–24 net imports	Change, 2014–15 to 2023–24	FY 2023–24 official import dependency
Coal	216.54 MT (Statistics et al., 2025c)	236.50 MT (Statistics et al., 2025c)	262.99 MT (Statistics et al., 2025c)	+21.45% (derived)	25.86% (Statistics et al., 2025f)
Crude oil	189.43 MT (Statistics et al., 2025c)	232.70 MT (Statistics et al., 2025c)	234.26 MT (Statistics et al., 2025c)	+23.67% (derived)	88.86% (Statistics et al., 2025f)
Natural gas	18.61 BCM (Statistics et al., 2025c)	26.30 BCM (Statistics et al., 2025c)	31.80 BCM (Statistics et al., 2025c)	+70.88% (derived)	46.60% (Statistics et al., 2025f)

The table shows three different forms of vulnerability. Crude oil has the highest dependence ratio: 88.86% of domestic crude-oil requirements were met through net imports in FY 2023–24 (Statistics et al., 2025f). Coal has a lower dependence ratio because India has a large domestic production base, but its absolute net imports were the largest of the three fossil fuels at 262.99 MT (Statistics et al., 2025c). Natural gas has the fastest growth in net-import volume across the comparison period, increasing from 18.61 BCM to 31.80 BCM, a derived rise of approximately 70.88%.

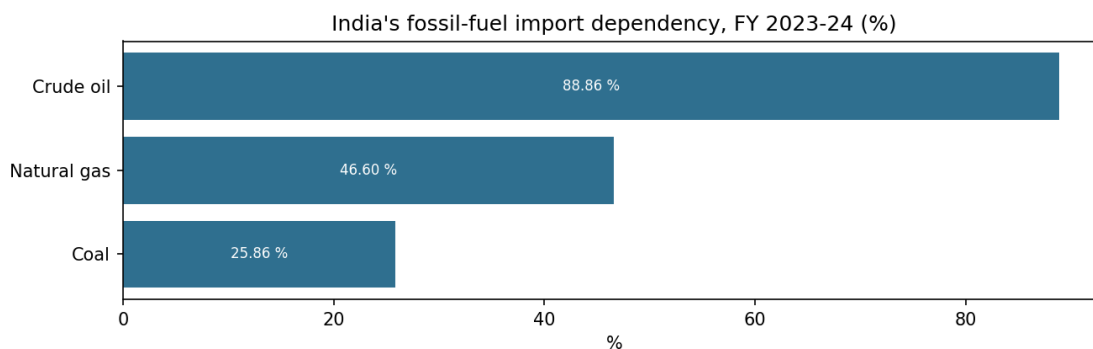


Figure 1. Official net energy import dependency for India's major fossil fuels in FY 2023–24. Source: Ministry of Statistics and Programme Implementation, *Energy Statistics India 2025* (2025); values are reported directly in the cited source (Statistics et al., 2025f).

3.2 Coal: large imports alongside strong domestic production

Coal illustrates why absolute import volume and import dependence must be interpreted together. India's net coal imports increased from 216.54 MT in FY 2014–15 to 262.99 MT in FY 2023–24, an 11.20% increase in the last year of the series (Statistics et al., 2025c). Yet MoSPI's indicator shows coal import dependency at 25.86% in FY 2023–24, down from 28.71% in FY 2014–15 (Statistics et al., 2025f). The country is therefore a major coal importer in volume terms but less import-dependent than it is for crude oil or natural gas.

The explanation is domestic production. MoSPI reports coal production of 997.83 MT in FY 2023–24, up 11.71% from 893.19 MT in FY 2022–23, with production growing at a 5.64% CAGR between FY 2014–15 and FY 2023–24 (Statistics et al., 2025b). Coal remains central to electricity generation: the electricity sector consumed 69% of total coal consumption in FY 2023–24 (Statistics

et al., 2025e). Coal-import exposure therefore affects both the electricity system and industrial users, even though India's overall coal dependence is moderated by domestic output.

Coal security is consequently a question of quality, location, logistics and demand as well as geological availability. A lower import-dependency ratio does not mean that coal imports are strategically unimportant. The scale of imports and the power sector's dependence on coal mean that disruptions in domestic production, rail movement, port handling or imported-coal supply can still affect electricity reliability and industrial costs. The official statistics support a narrower conclusion: coal is India's largest-volume imported fossil fuel in FY 2023–24, but not its most import-dependent fuel.

3.3 Crude oil: the clearest external vulnerability

Crude oil is the strongest evidence for the paper's core argument. Imports rose from 189.43 MT in FY 2014–15 to 234.26 MT in FY 2023–24, while the official import-dependency indicator reached 88.86% (Statistics et al., 2025c, 2025f). Domestic production was only 29.36 MT in FY 2023–24, compared with 29.18 MT in the previous year (Statistics et al., 2025b). The combination of high consumption, limited domestic production and a very high import share creates a structural exposure that cannot be removed by short-term adjustments in electricity trade.

Crude oil also matters beyond the physical import quantity. MoSPI's *Energy Statistics India 2025* (2025) states that energy prices influence transport, manufacturing and agriculture, and that rising energy prices raise India's import bill and can widen the trade deficit (Statistics et al., 2025d). The economic effect of oil dependence is therefore transmitted through fuel prices, transport costs, production costs, inflationary pressure and the external account. Even if electricity imports were zero, India would still face substantial energy-security exposure because transport and other oil-consuming activities require imported crude or petroleum products.

India's refining capacity creates a further analytical distinction. The Ministry of Statistics and Programme Implementation's *Energy Statistics India 2025* (2025) reports that India exports petroleum products, with exports of 62.59 MT in FY 2023–24, even though it imports 234.26 MT of crude oil (Statistics et al., 2025c). Product-export capacity can improve foreign-exchange earnings and supply flexibility, but it does not eliminate upstream crude-oil dependence. A country can be a net exporter of refined products while remaining a highly import-dependent crude-oil consumer.

3.4 Natural gas: rising dependence in a smaller but strategic fuel

Natural-gas imports increased from 18.61 BCM in FY 2014–15 to 31.80 BCM in FY 2023–24, with a 20.87% increase over FY 2022–23 (Statistics et al., 2025c). MoSPI's import-dependency indicator rose from 35.60% in FY 2014–15 to 46.60% in FY 2023–24 (Statistics et al., 2025f). Domestic net production for consumption reached 35.68 BCM in FY 2023–24, up 6.03% from 33.65 BCM in FY 2022–23 (Statistics et al., 2025b). Domestic production growth therefore did not prevent a substantial rise in imported gas.

Natural gas is smaller than coal and crude oil in India's total energy consumption, but its import dependence is strategically important because imported gas is exposed to international prices, shipping and liquefied-natural-gas supply conditions. The official data show a fuel whose import burden is materially lower than crude oil's but whose dependence has grown faster over the decade.

This makes gas a secondary, not negligible, source of India's external energy vulnerability.

4. Electricity Trade: A Different External-Energy Relationship

4.1 From net imports to net exports

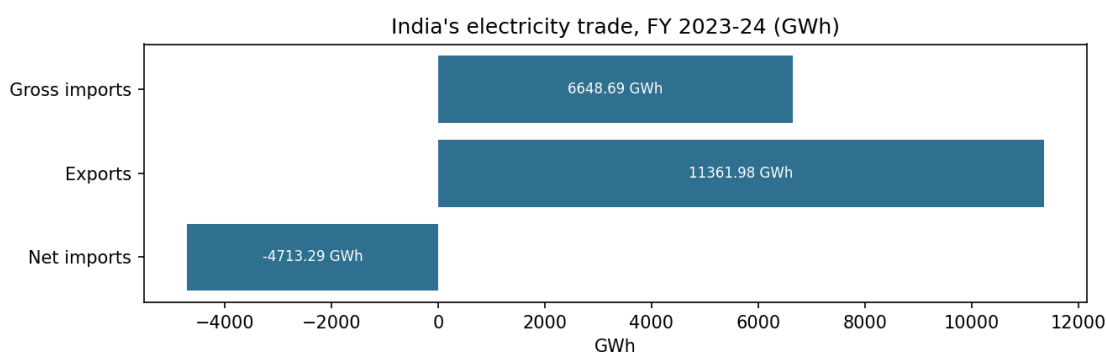
India's electricity trade has a markedly different trajectory from fossil-fuel trade. In FY 2014–15, India imported 5,007.74 GWh and exported 4,432.76 GWh, producing net imports of 574.98 GWh (Statistics et al., 2025c). By FY 2016–17, exports had risen to 6,710.19 GWh against imports of 5,617.30 GWh, producing net exports of 1,092.89 GWh. The net-export position expanded to 4,713.29 GWh in FY 2023–24, when exports were 11,361.98 GWh and imports were 6,648.69 GWh.

The contrast is visible in the direction of the balance. Fossil-fuel net imports remained positive throughout the reported series. Electricity shifted from a small net-import position to a net-export position and remained net-exporting in each year from FY 2016–17 through FY 2023–24 in the MoSPI table (Statistics et al., 2025c). Electricity exports also grew faster than imports over the decade: the reported CAGR was 11.02% for exports and 3.20% for imports.

4.2 Electricity trade is small relative to the domestic power system

India's electricity trade is not only directionally different; it is small relative to domestic electricity use. The Ministry of Statistics and Programme Implementation's *Energy Statistics India 2025* (2025) reports electricity consumption of 1,543,000 GWh in FY 2023–24 (Statistics et al., 2025e). Relative to that denominator, the reported gross electricity imports of 6,648.69 GWh equal approximately 0.43% (derived), while exports of 11,361.98 GWh equal approximately 0.74% (derived). Net imports of –4,713.29 GWh equal approximately –0.31% (derived), meaning that net exports were equivalent to about 0.31% of domestic consumption (Statistics et al., 2025c).

These ratios should not be confused with the official fossil-fuel import-dependency measure. They are simple trade-to-consumption ratios calculated to show scale. The comparison nevertheless is informative: crude-oil import dependence was 88.86%, natural-gas dependence 46.60% and coal dependence 25.86% (Statistics et al., 2025f), whereas net electricity trade was a small net-export position relative to consumption (Statistics et al., 2025c, 2025e). On the specific question of foreign-trade exposure, electricity is therefore far less important as a source of national dependence than fossil fuels.



Figure

2. India's electricity imports, exports and net imports in FY 2023–24; negative net imports indicate net exports. Source: MoSPI's *Energy Statistics India 2025* (2025) (Statistics et al., 2025c).

4.3 Regional integration rather than national dependence

Electricity trade is geographically concentrated in South Asia. The Ministry of Power's *Interconnection with neighbouring countries* webpage (updated 13 March 2023) identifies interconnections with Nepal, Bhutan, Bangladesh and Myanmar and describes cross-border electricity trade as a mechanism for using regional resources more effectively (Power & India, 2023). The same government page records power transfers to Nepal, imports from Bhutan and electricity transfers to Bangladesh and Myanmar, while also explaining that India and neighbouring countries are connected through high-voltage lines.

This pattern makes electricity trade a form of regional integration and system balancing. India can import hydropower from Bhutan while exporting power to Nepal or Bangladesh; the direction of flow can vary by season, demand and generation conditions. The arrangement creates interdependence, but interdependence is not equivalent to the one-sided dependence represented by an 88.86% crude-oil import-dependency ratio. Electricity trade can improve regional resource use and provide commercial flexibility, while fossil-fuel imports are required continuously to supply a large part of India's primary-energy system (Power & India, 2023; Statistics et al., 2025c).

5. Comparative Energy-Security Assessment

5.1 Exposure, scale and substitutability

The fossil-fuel and electricity cases differ along four dimensions.

First, exposure is asymmetric. Crude oil and natural gas show positive and substantial net-import dependence, while electricity was a net export in FY 2023–24 (Statistics et al., 2025c, 2025f). Coal's dependence is lower than oil's but remains significant because net imports exceeded 262 MT (Statistics et al., 2025c).

Second, the commodities occupy different positions in the energy system. Coal, crude oil and natural gas are fuels that enter multiple sectors. The Ministry of Statistics and Programme Implementation's *Energy Statistics India 2025* (2025) reports that coal accounted for 60% of primary-energy consumption in FY 2023–24 (Statistics et al., 2025e). Electricity is an energy carrier produced domestically from several sources, not a primary fuel imported in the same manner as crude oil or LNG.

Third, import substitution differs. Lower oil dependence requires changes in transport fuels, vehicle technologies, industrial processes and demand patterns. Electricity can support that transition through electrification, but the electricity itself must be generated reliably and affordably. Lower electricity imports alone do not reduce oil dependence unless transport and industrial demand actually shift from petroleum products to electricity or other domestic alternatives.

Fourth, the risk transmission mechanism differs. Fossil-fuel imports transmit international price and supply shocks directly into India's energy system. The Ministry of Statistics and Programme Implementation's *Energy Statistics India 2025* (2025) links imported-energy dependence and price volatility to the import bill and trade balance (Statistics et al., 2025d). Electricity trade is more exposed to regional transmission availability, contractual arrangements, grid operation and seasonal hydropower conditions. Its trade volume is much smaller, but its reliability depends on the physical grid and the generation mix.

5.2 Electricity independence does not mean fossil-free electricity

The strongest counterpoint to a simple fossil-fuel-versus-electricity comparison is that India's electricity system remains coal-intensive. The Ministry of Statistics and Programme Implementation's *Energy Statistics India 2025* (2025) reports that coal contributed about 79% of primary-energy generation in FY 2023–24 and that close to 76% of electricity from utility and non-utility sources was generated from steam (Statistics et al., 2025b). The Ministry of Power's July 2025 power-sector profile shows that fossil-fuel sources represented 49.7% of installed generation capacity as of 31 July 2025, while non-fossil sources represented 50.3% (Power & India, 2025). Installed capacity, however, is not the same as actual generation; capacity shares do not by themselves demonstrate that generation is equally divided between fossil and non-fossil sources. This distinction produces two different meanings of security. **External electricity security** is relatively strong because India generates almost all of the electricity it consumes and was a net exporter in FY 2023–24. **Domestic generation security** remains tied to fuel supply, especially coal, because coal remains central to actual generation. India can therefore be secure against dependence on imported electricity while still being vulnerable to disruptions in the coal supply chain or to the economic costs of fossil-fuel generation.

5.3 Demand growth increases the importance of domestic resilience

India's energy demand is rising. Electricity consumption rose from 948,522 GWh in FY 2014–15 to 1,543,000 GWh in FY 2023–24, with a reported CAGR of 5.56% (Statistics et al., 2025e). Rising demand means that stable domestic generation and transmission will remain important even if electricity imports stay small.

The policy implication is not to treat electricity trade as irrelevant. Rather, electricity trade should be evaluated as a supporting instrument within a larger security strategy. Cross-border power can improve flexibility, provide access to complementary hydropower resources and strengthen regional connectivity. But it cannot substitute for measures that address crude oil and gas dependence, nor can it by itself remove the coal dependence of domestic generation.

6. Discussion: Implications for India's Energy Policy

The comparative evidence points to a hierarchy of priorities.

6.1 Oil should be the first external-dependence priority

Crude oil has the highest official import-dependency ratio and a large import volume, while domestic crude production remains low relative to imports (Statistics et al., 2025f, 2025c, 2025b). Reducing this vulnerability requires demand-side and technology measures in transport, industry and households, together with supplier diversification, strategic stocks and greater efficiency. The official data do not permit this paper to quantify the effect of any one policy measure, but they clearly identify crude oil as the most exposed major fuel.

6.2 Gas requires attention before dependence becomes more entrenched

Natural-gas import dependence rose from 35.60% to 46.60% over the official indicator period, while import volume rose from 18.61 BCM to 31.80 BCM (Statistics et al., 2025f, 2025c). Gas policy must therefore balance its role in industry, fertiliser and power with the price and supply risks of imported LNG. Domestic production growth alone has not prevented rising net imports (Statistics et al., 2025b).

6.3 Coal policy must distinguish volume security from dependence security

Coal import dependency declined slightly over the decade, but net imports reached 262.99 MT in FY 2023–24 and the electricity sector consumed 69% of coal (Statistics et al., 2025f, 2025c, 2025e). Policy should therefore track both the import-dependency ratio and the absolute quantity of imports. A lower percentage can coexist with rising import tonnage when demand grows quickly. Coal security also requires attention to transport and plant-level coal quality, not only national production totals.

6.4 Electricity trade should be developed as a flexibility and regional-integration mechanism

India's electricity exports exceeded imports by 4,713.29 GWh in FY 2023–24, and the country has cross-border links with Nepal, Bhutan, Bangladesh and Myanmar (Power & India, 2023; Statistics et al., 2025c). Regional trade can complement domestic generation by allowing seasonal and geographic balancing. The Ministry of Power's *Guidelines for Import/Export (Cross Border) of Electricity-2018* (issued 18 December 2018) explicitly seek to facilitate imports and exports, create predictable regulatory arrangements and support reliable grid operation (Power & India, 2018).

The limitation is scale. Electricity trade equivalent to approximately 0.31% of domestic consumption on a net basis cannot solve an 88.86% crude-oil import-dependency problem. Electricity trade should be treated as an enabler of system flexibility and clean-power integration, not as a substitute for fossil-fuel import reduction.

7. Limitations

The analysis has four limitations. First, FY 2023–24 values in *Energy Statistics India 2025* (2025) are provisional, so later revisions may alter individual totals (Statistics et al., 2025a). Second, physical units differ across fuels; the paper therefore does not aggregate MT, BCM and GWh into a single energy-import total. Third, the official net-energy-import-dependency indicator is available for crude oil, coal and natural gas in the cited material but not as an equivalent electricity indicator. The electricity ratios presented here are derived trade-to-consumption measures, not official dependency statistics. Fourth, trade volumes do not measure all energy-security dimensions. Supply concentration, contract structure, shipping routes, storage, price exposure, grid congestion and the ability to substitute one fuel for another are also relevant, but the cited government series does not provide a complete comparable measure for each of these dimensions.

These limitations do not undermine the central comparison. They caution against claiming that electricity is risk-free or that a single percentage captures total energy security. The evidence supports the narrower and more defensible conclusion that India's foreign-trade dependence is substantially more severe for fossil fuels than for electricity.

8. Conclusion

India's energy insecurity is driven mainly by fossil-fuel dependence, not by electricity trade. In FY 2023–24, the country's official net-energy-import-dependency indicators were 88.86% for crude oil, 46.60% for natural gas and 25.86% for coal (Statistics et al., 2025f). Net imports reached 234.26 MT of crude oil, 31.80 BCM of natural gas and 262.99 MT of coal (Statistics et al., 2025c). These figures show persistent exposure to foreign supply and international energy prices.

Electricity presents a different pattern. India imported 6,648.69 GWh and exported 11,361.98 GWh in FY 2023–24, yielding net exports of 4,713.29 GWh (Statistics et al., 2025c). Relative to

electricity consumption of 1,543,000 GWh, the net-export balance was approximately 0.31% of consumption in absolute terms, based on a derived calculation (Statistics et al., 2025e, 2025c). Electricity trade is therefore small and, in aggregate, does not represent a major foreign-supply dependence.

The conclusion must still be qualified by the structure of India's power system. Coal supplied about 79% of primary-energy generation in FY 2023–24, and close to 76% of electricity from utility and non-utility sources was generated from steam (Statistics et al., 2025b). India is relatively secure from imported electricity dependence while remaining exposed to fossil fuels used within domestic electricity generation. The appropriate policy objective is thus a two-part strategy: reduce crude-oil and natural-gas dependence, manage the scale and logistics of coal imports, and expand electricity trade as a regional flexibility mechanism while progressively diversifying the fuels and technologies that generate electricity.

The comparative lesson is clear. Electricity trade is a limited, reversible and often reciprocal component of India's external energy relations. Fossil-fuel trade is the structural foundation of the country's external energy vulnerability. Energy security policy should therefore place imported crude oil and natural gas at the centre of risk reduction, treat coal as a major domestic-and-import logistics challenge, and use cross-border electricity trade to support—not replace—the transition toward a more diversified energy system.

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