



India's Energy Diplomacy: The Role of Foreign Policy in Securing Energy Security and Promoting Sustainable Development

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Abstract

With growing economic and geopolitical weight, energy security is becoming increasingly important for the Indian foreign policy and international relations. The paper focuses on energy diplomacy of India as one of the strategies for obtaining reliable sources of energy supplies and promotion of sustainable development. With high dependency on imports of hydrocarbons, especially of crude oil, reaching 90%, the Indian energy security is exposed to risks caused by price fluctuations, geopolitical factors, business risks, and maritime constraints. Against this backdrop, we discuss the role of the Indian diplomatic efforts via bilateral energy deals with energy exporting countries, multilateral and Mini lateral frameworks, energy investments abroad, strategic petroleum reserves and energy connectivity projects for securing energy security of India. The paper draws attention to the Indian energy ties with the Middle East, Russia, Central Asia, and South Asia. Also, we highlight the transition from traditional energy diplomacy to renewables-based initiatives like International Solar Alliance, Global Biofuels Alliance, and green-hydrogen partnerships. India's energy strategic autonomy is defined as the country's attempt to maintain a balance between its efforts at managing international interdependencies and developing strategic reserves of suppliers, technologies, markets, and critical minerals while avoiding dependence on a particular supplier. It is possible to note that there is a dilemma in the country's energy security and climate policies in terms of using carbon energy to achieve economic development goals while following the international decarbonization agenda of a climate leader. The conclusion drawn from the paper is that the Indian foreign policy should be more comprehensive by addressing energy security, geopolitics, technology, connectivity, climate, and sustainable development aspects to strengthen India's role as an energy consumer in the global community.

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1. INTRODUCTION

Indeed, energy diplomacy has become an integral aspect of India's foreign policy in the light of the relationship between energy and economic security, strategic autonomy, national development, and international power (International Energy Agency [IEA], 2021). The increase in energy consumption of India by more than twice as much since 2000 and the level of its per capita energy consumption that is still lower than half of the global average reveals the need for addressing the issues of access to energy sources as well as demands related to rapid industrialization (IEA, 2021). According to the estimates of the IEA, India may contribute close to a quarter of the world energy demand growth from 2019 to 2040, which implies the significance of India's energy-related decisions for its development, international energy markets, and global climate governance (IEA, 2021). The importance of the issue explains why energy diplomacy of India has shifted from being a purely economic problem to a significant tool for foreign policy (IEA, 2021).

The main problem faced by India is that it depends greatly on foreign hydrocarbon energy supplies especially crude oil which subjects the country to international politics, price fluctuations, maritime risks and uncertainties of transport logistics (IEA, 2024). In 2023 India is the second largest net importer of crude oil with approximately 4.6 million barrels per day being imported while the IEA predicts that in 2030 5.8 million barrels will be imported due to increased refinery requirements (IEA, 2024). This implies that areas where the energy is produced, routes where it is transported and crises that emerge in the process directly influence the economic security of India and, therefore, energy diplomacy becomes an important element of the energy security policy (IEA, 2024). At the same time that India's net dependence on oil imports could reach 90% by 2040 according to IEA's Stated-Policies Scenario (IEA, 2021).

From a foreign policy perspective, India's approach to energy has moved away from the traditional supplier-centric diplomacy to a multi-alignment and diversification of its energy portfolio, spanning the Gulf states, Russia, the United States, Central Asia, and other new partners (IEA, 2024; Saryal, 2026). With the emergence of renewable energy technologies, its energy diplomacy became even more diverse, and the country pursued its energy security through cooperation in climate finance, critical minerals, green hydrogen, biofuels, and resilient clean-energy supply chains (Aamodt et al., 2026). It is estimated that in 2024, about 83% of India's power sector investments were allocated to clean energy projects, implying that its strategy for energy security has become a combination of fuel and renewable generation and low-carbon infrastructure (IEA, 2025). India's participation in the International Solar Alliance shows how it moves from the diplomacy of energy imports to the norm- and institution-building in the sphere of global energy governance and an important characteristic of India's emerging energy and climate leadership (Jha, 2021). Jha notes that the ISA proves India's increasing ability to influence the international rulemaking and mobilize developing countries behind their shared energy and climate interest (Jha, 2021, pp. 517–541).

The sustainable-development aspect of India's energy diplomacy has been increasingly prominent as it seeks to balance between developing needs and international commitments, energy access and a transition towards a lower-carbon economy (Saryal, 2026). Initiatives such as the International Solar Alliance and the Global Biofuels Alliance demonstrate India's efforts to integrate its domestic energy needs with its leadership aspirations in the Global South and broader climate governance (Saryal, 2026). Recent scholarship has argued that India's energy diplomacy serves not only as a mechanism for securing its oil and gas, but also as an integrated foreign-policy instrument that links together strategic autonomy, economic resilience, international bargaining power and sustainable development (Aamodt et al., 2026). This review thus explores how foreign policy contributes to India's energy security, how its partnerships and multilateral initiatives reshape its energy strategy, and how its energy diplomacy can support a transition to a secure, economically viable, environmentally sustainable and internationally influential position at once (IEA, 2025; Saryal, 2026).

1.1. OBJECTIVES OF THE STUDY

1. To investigate the changing dimensions of energy security issues in India and its implications for foreign policy
2. To analyse important mechanisms of India's energy diplomacy
3. To appraise India's energy diplomacy on the bilateral and multilateral levels
4. To understand the link between energy diplomacy, renewable transition, and sustainable development
5. To find out new geopolitical threats to India's energy security policy.

1.2. RESEARCH METHODOLOGY

This study employs a qualitative methodology involving the analysis of secondary data to evaluate India's energy diplomacy, energy-security strategy, and sustainable-development goals. The research uses secondary sources of information, including scholarly articles, review papers, books and chapters, edited volumes, reports by international organizations, policy briefs, and energy-related documents required to perform statistical analyses. The sources used for this study were published between 2021 and 2026 to ensure the relevance of secondary data on global energy politics, India's foreign policy, hydrocarbon dependence, renewable energy, mineral security, and climate diplomacy. The current study implements a descriptive, analytical, and interpretative nature of research to gather and assess evidence on energy imports, consumption, renewable resources, international relations, and geopolitical changes. Comparative analysis is used to review India's relationships with energy-producing countries and international energy organizations. This study combines various methods of research to review the existing literature, highlight the most prominent trends, contradictions, and opportunities, and make recommendations on how to leverage India's foreign policy to achieve energy security, sovereignty, economic stability, and sustainable development.

2. RESULT AND DISCUSSION

INDIA'S ENERGY SECURITY PROBLEMS IN THE ERA OF GEO-POLITICAL ORDER CHANGE

2.1 Dependence on Imports, Risks and Vulnerability Associated with Oil and Gas and Price Volatility

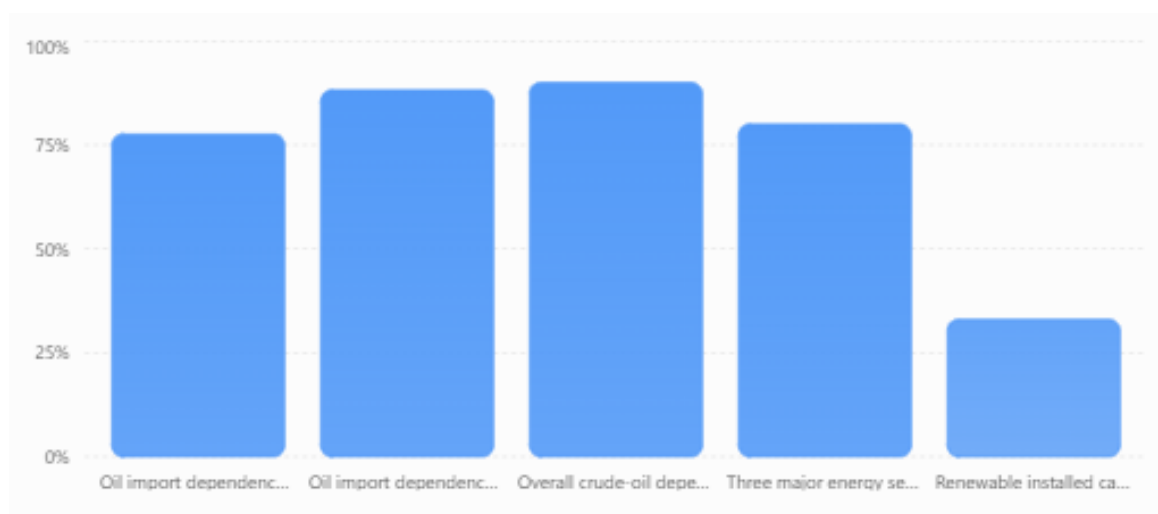
India's problem with energy security depends on the scale of the country because India's economic growth requires energy sources beyond what can be produced domestically (Abhyankar et al., 2023, pp. 1-12). India's dependence on imports of oil was at 88.2% in 2024–25, which was up from 77.6% in 2013–14 and means that the growth in economy did not reduce the risk of being exposed to the petroleum imports (Basu & Ghosh, 2025, pp. 4-9). The volatility in the prices of oil India is facing is even higher since 90% of crude oil is imported by the country while demand for oil in the country is expected to grow by 1.2 million barrels per day between 2023 and 2030 and account for a third of the worldwide growth in consumption (Abhyankar et al., 2023, pp. 1-8). Another point

of vulnerability in energy sources for India is natural gas since LNG imports will cover all of India's demand (Pradhan, 2022, pp. 61-86).

India's vulnerability to oil price shocks has ramifications for inflation, the current account deficit, fiscal policy, and the rupee, because crude oil import expenditures are a significant economic determinant that translates geopolitical tensions into domestic policy changes (Mishra & Kanjilal, 2023, pp. 113804-1–113804-17). Evidence suggests that India's demand for oil is less sensitive to price changes, meaning that economic growth tends to drive consumption regardless of price changes (Mishra et al., 2023, pp. 113804-1–113804-17). Electricity is presented as a potential substitute for crude oil, which would reduce India's exposure to geopolitical risks and facilitate the transition to a low-carbon economy (Mishra et al., 2023, pp. 113804-1–113804-17). This finding highlights the importance of diversifying energy sources to reduce the risks associated with oil and gas import dependence (Dey et al., 2022, pp. 1–13).

Table 1. Selected Indicators of India's External Energy Vulnerability

Indicator	Statistical value	Strategic implication	Academic source and URL
Crude-oil import dependence	77.6% in 2013–14 → 88.2% in 2024–25	Rising import dependence increases exposure to external price and supply shocks.	Basu & Ghosh (2025); RBI evidence. https://www.rbi.org.in/Scripts/BS_ViewBulletin.aspx?Id=23516
Crude-oil dependence	≈90%	Makes oil diplomacy central to macroeconomic and strategic security.	Abhyankar et al. (2023). https://doi.org/10.1016/j.tej.2023.107273
Projected oil-demand increase, 2023–2030	≈1.2 million barrels/day	India will remain a major additional source of global oil demand.	Abhyankar et al. (2023). https://doi.org/10.1016/j.tej.2023.107273
Share of India's three major energy-consuming sectors	>80%	Power, transport and industry provide major opportunities for electrification and import reduction.	Abhyankar et al. (2023). https://doi.org/10.1016/j.tej.2023.107273
Renewable share of installed capacity in recent assessments	>33%	Diversification is progressing, but fossil fuels remain structurally important.	Dubey et al. (2023, pp. 5491-1–5491-16). https://doi.org/10.3390/en16145491



The geopolitics of dependence is inextricably linked with the geography of supply. Indian refiners have gradually diversified their sources in the Gulf, Russia, Africa, and other regions, but this does not eliminate the vulnerability of the country's energy security, given the common delivery routes and price benchmarking (Pradhan, 2020/2021, pp. 129-148; Khan et al., 2023, pp. 57-109). The Russia-Ukraine war has significantly impacted India's foreign policy and access to energy markets through financial, economic, and transportation linkages, which has affected India's trade with Russia in particular (Warren & Ganguly, 2022, pp. 811-837). The geopolitical risk of energy security in India is related to the tendency of the country to balance its trade and diplomatic priorities with Russia, western countries, and the Arab Gulf states due to the need for diversified imports and the desire to avoid associated risks (Quamar, 2023, pp. 274-294).

2.2 Geopolitical Conflicts, Maritime Chokepoints and the Resilience of India's Energy Supply Chains

India's heavy reliance on maritime transportation makes energy security inseparable from questions of ocean security (Kaplan, 2021, pp. 103-126; Pradhan, 2022, pp. 1-32). Given the predominance of imports in India's energy mix, the security of supply depends to a considerable extent on the state of West Asian energy infrastructure and the stability of sea routes through the Strait of Hormuz, the Bab el-Mandeb strait, the Arabian Sea, and other strategic points (Pradhan, 2022, pp. 61-86). Maritime transportation of hydrocarbons is a critical

disruptions in the transportation corridors lead to increases in prices, freight rates, and insurance costs, which indirectly affect the national economy, even with an alternative supply of oil (Bridge et al., 2021, pp. 1-17). Consequently, energy diplomacy acquires a new meaning, exploring opportunities to strengthen security through naval power, overseas infrastructure, and geopolitical partnerships, in addition to traditional commercial mechanisms (Khan et al., 2023, pp. 141-177).

Ukraine war and the Red Sea crisis are indirect factors influencing India's energy security, highlighting the importance of protecting supply chains from geopolitical risks (Prys-Hansen & Kaack, 2023, pp. 121-132). Diversion of shipping routes around the Cape of Good Hope increases the

distance travelled and the costs for Indian buyers of energy from Africa and the Middle East, illustrating the vulnerability of energy security to disruptions in maritime transportation (Lambert et al., 2022, pp. 1-16). This is especially true for India, which is gradually transforming from an importer of hydrocarbons into a refining and manufacturing powerhouse, with significant domestic demand for petroleum products and a growing export potential (Pradhan, 2021, pp. 129-148). India's energy diplomacy should explore new opportunities for ensuring security through maritime partnerships, emphasizing the need for attention to oceanic infrastructure, insurance, and trade, rather than only focusing on landlocked resources and bilateral trade agreements (Aswani & Sajith, 2024, pp. 1-20).

vulnerability in India's energy security policy as any

Table 2. Energy-Supply-Chain Risk Dimensions Relevant to India

Risk dimension	Quantitative/structural evidence	Implication for India
Oil-import exposure	≈88.2% crude import dependence in FY2024–25	Maritime disruption can rapidly affect domestic prices and inflation.
Energy-sector geopolitical exposure	India simultaneously engages with Gulf states, Russia, Iran, Europe and the United States	Diversification reduces dependence on any single political bloc but increases diplomatic balancing requirements.
South Asian electricity potential	Enhanced cross-border trade modelling can reduce 100-year GWP by >30% relative to a baseline scenario	Regional electricity networks can complement maritime hydrocarbon diversification.
Clean-energy supply-chain concentration	China manufactures around 80% of major solar-PV upstream and manufacturing segments	Energy transition transfers part of India's vulnerability from oil suppliers to technology and material supply chains.

Maritime considerations also help explain India's interest in connectivity projects like the India-Middle East-Europe Economic Corridor, the International North-South Transport Corridor, Indian Ocean port development, and enhanced relations with Oman, UAE, Saudi Arabia, and other GCC states (Quamar, 2023, pp. 274-294; Gurjar, 2023, pp. 1-15). Connectivity is not just an economic consideration since corridors of any type offer alternative logistical channels that diminish strategic reliance on specific chokepoints (Khan et al., 2023, pp. 141-177). The same can be said about India's policy towards Iran which is the result of the intersection of energy security, access to Central Asia, Persian Gulf stability, and connectivity (Gurjar, 2023, pp. 1-15). Resilience depends on redundancy: having several suppliers, several shipping routes, several ports, and several ways to generate energy (Huda, 2024, pp. 100815-1-100815-16).

2.3 Energy Diversification, Strategic Petroleum Reserves and Strategic Autonomy Pursuit

India has diversified its sources of suppliers, domestic production, strategic reserves and accelerated renewable energy production to tackle external vulnerability of its energy resources (Sinha et al., 2022, article 112815). Strategic petroleum reserves act as a buffer to cope with the temporary nature of an external shock; while releasing crude oil under extreme disruption scenarios, the measure cannot offset India's structural reliance on imports (Pradhan, 2022, pp. 257-312). The logic parallels financial risk management, wherein the reserves provide insurance against external disruptions, while diversification reduces long-term vulnerability (Khan et al., 2023, pp. 57-109).

India's policy includes diversification via renewable electricity generation, thereby shifting some of the energy security burden

from internationally traded hydrocarbons (Dubey et al., 2023, pp. 5491-1 -5491-16). The capacity for renewable energy in India rose to 220.10 GW by March 2025, out of which the installed capacity for photovoltaics is 105.65 GW, which indicates a marked structural change in the Indian energy matrix (Dey et al., 2022, pp. 1-13; Abhyankar et al., 2023, pp. 1-12). However, there comes a new strategic dependence due to the changeover to renewable energy as the country's energy security now depends on solar panels, polysilicon, wafer, battery, and other critical minerals (Srivastava & Kumar, 2024, article 101536). What needs to be done is not the end of the strategic dependence, but its transformation from dependency into interdependence through domestic production, strategic stockpile, partnerships abroad and technology (Yaseen et al., 2025, article 105542).

3. FOREIGN POLICY INSTRUMENTS OF ENERGY DIPLOMACY OF INDIA

3.1 Bilateral Energy Partnerships, Long-Term Supply Agreements and Foreign Energy Investments

Bilateral diplomacy provides the most direct means for India to pursue foreign-policy outcomes relevant to energy security (Kissane, 2022, pp. 337-354). Energy partnerships with Gulf producers secure crude oil, LNG, refinery collaboration and investment; while India's partnership with Russia facilitates discounted crude purchases, and Indian ownership interests in upstream overseas hydrocarbons (Warren & Ganguly, 2022, pp. 811-837). In the case of long-term LNG supply agreements, India's contracts with suppliers like Qatar signify that contractual diplomacy is a source of stability compared to volatile energy markets, linking foreign policy to domestic planning (Pant & Quamar, 2023, pp. 83-102).

A second measure is overseas investment in upstream energy production by firms like ONGC Videsh, since such ownership interests provide strategic access to energy resources, while promoting political relationships with producer states (Pradhan, 2020/2021, pp. 33-59). However, such political risks as geopolitical instability, sanctions, renegotiation of contracts, civil unrest and infrastructure constraints, may diminish the commercial value of overseas energy assets (Pradhan, 2022, pp. 61-86). India's diplomatic experience in Russia shows the limitations of commercial diplomacy when the strategic risk profile rises sharply, as in the case of sanctions and trade and transport constraints (Warren & Ganguly, 2022, pp. 811-837). Flexibility in foreign policy provides economic insurance to the extent that India can both secure its energy interests, and avoid reliance on any single strategic partner (Destradi, 2024, pp. 58-94).

3.2 Multilateral and Minilateral Engagement through the G20, BRICS, SCO and Other Energy Platforms

In terms of energy diplomacy, India uses multilateral and Minilateral institutions since the issue of global energy insecurity cannot be dealt with bilaterally (Mishra & Manhas, 2023, pp. 552-563). In its capacity as G20 President, India tied energy transition issues with development, financing, access to

technology and the Global South's worries. This shows its willingness to use a consensus-based approach to climate action rather than coercion (Mishra & Manhas, 2023, pp. 552-563). The importance of G20 lies in the fact that its members are responsible for emitting more than three-quarters of global greenhouse gases (Mishra & Manhas, 2023, pp. 552-563). BRICS and Shanghai Cooperation Organisation constitute complementary forums for dealing with major hydrocarbon producers (Khan et al., 2023, pp. 179-218). They allow India to engage Russia, Central Asian states, China and other major producers without turning economic cooperation into political alignment (Rana, 2024, pp. 1-18). In general, such engagement reflects what new research refers to as multi-alignment: engaging multiple power centres simultaneously in order to further national interests (Quamar, 2023, pp. 274-294). Energy diplomacy thus reflects India's general foreign policy posture as a state pursuing strategic autonomy, while simultaneously promoting a more plural international order (Ganguly, 2024, pp. 527-544).

3.3 Economic Diplomacy, Technology Partnerships, Investment Flows and Energy Infrastructure Connectivity

Contemporary energy diplomacy has increasingly adopted instruments other than those in the domain of fuel purchases and sales (Griffiths, 2019/2021, pp. 1-13). Whether states are able to exploit their gains from new energy systems increasingly hinges on the transfer of technologies, finance for projects, investments in infrastructure, research collaborations, and industry partnerships (Huda, 2024, article 100815). India, therefore, not only engages in partnerships in the domain of oil and gas, but also in the production of solar power, batteries, electric vehicles, green hydrogen, and biofuels (Choudhary & Kumar, 2024, pp. 22-4).

India's pursuit of domestic clean-technology production capability while relying on external investment to catalyse its rise is an economic-diplomatic duality (Rana & Jindal, 2025, article 100034). India's solar industry is a telling example: while its production is becoming increasingly domestic, its supplier chains are still largely dependent on China, with recent studies suggesting that over 85% of some solar components are sourced from China (Patil et al., 2026, pp. 1-18). Thus, technology diplomacy will complement India's traditional resource diplomacy, with a growing emphasis on production control and innovation as a substitute for fuel access (Srivastava & Kumar, 2024, article 101536).

4. REGIONAL AND GLOBAL DIMENSIONS OF INDIA'S ENERGY DIPLOMACY

4.1 India-Middle East Energy Ties & the Gulf's Strategic Importance for India

With its oil and gas reserves, proximity to Indian markets, and the location of critical transit routes linking the Persian Gulf with the Indian Ocean, the Middle East is India's priority region in terms of energy diplomacy (Quamar, 2023, pp. 274-294). India's Gulf policy cuts across energy, economic, and strategic spheres of partnership (Quamar, 2023, pp. 274-294). India has deepened its strategic ties with Saudi Arabia, the

UAE, Qatar, and Oman, and has sustained its engagement with Iran, as it seeks to balance its options rather than follow an either-or approach with these countries (Alam, 2022, pp. 81-99).

The investment dimension is taking precedence in India's Gulf policy as both sides seek to exploit sovereign wealth to satisfy India's demand for hydrocarbons while generating revenues for Gulf states in the process (Kumaraswamy et al., 2026, pp. 1-25). India's large diaspora and trade contacts serve as a catalyst for India's engagement with the Middle East, adding to its strategic value, and acting as a lever for stability in the Gulf region (Pant & Quamar, 2023, pp. 1-25). Thus, India's energy diplomacy cuts across purchasing oil from the Gulf countries and includes investment in downstream refining and petrochemicals, food security, port development, maritime security, as well as renewable energy cooperation (Quamar, 2023, pp. 274-294).

4.2 India-Russia, Central Asia & Eurasian Energy Engagement: Strategic Hedging?

With a significant share of discounted exports to India, Russia has become a preferred destination for India's oil imports since 2022, and its importance for India's energy security is set to grow (Warren & Ganguly, 2022, pp. 811-837). In its foreign policy, New Delhi continues to hedge its bets between natural partners, including Russia and the United Arab Emirates, as well as India's growing energy ties with the U.S. and Europe (Ganguly, 2024, pp. 527-544). At the same time, this relationship is complicated by numerous sanctions, bilateral payment issues, and transportation logistics, with Russia's

interests (Warren & Ganguly, 2022, pp. 811-837). Similarly, Central Asia is a region that possesses critical resources for India's energy security, such as Kazakhstan, Turkmenistan, and Uzbekistan's reserves of hydrocarbons and uranium, but its remoteness and the lack of infrastructure limit India's options (Pradhan, 2021, pp. 129-148). At the same time, India's Central Asia policy is shifting towards building transport and trade linkages, nuclear energy cooperation, and related infrastructure rather than hydrocarbon pipelines (Khan et al., 2023, pp. 111-177). Thus, India's energy policy towards Russia and Central Asia is an example of competition and cooperation between strategic partners, with energy interests being inseparable from transport and geopolitical issues (Gurjar, 2023, pp. 1-15).

4.3 South Asian Energy Cooperation, Electricity Trade, & Regional Integration

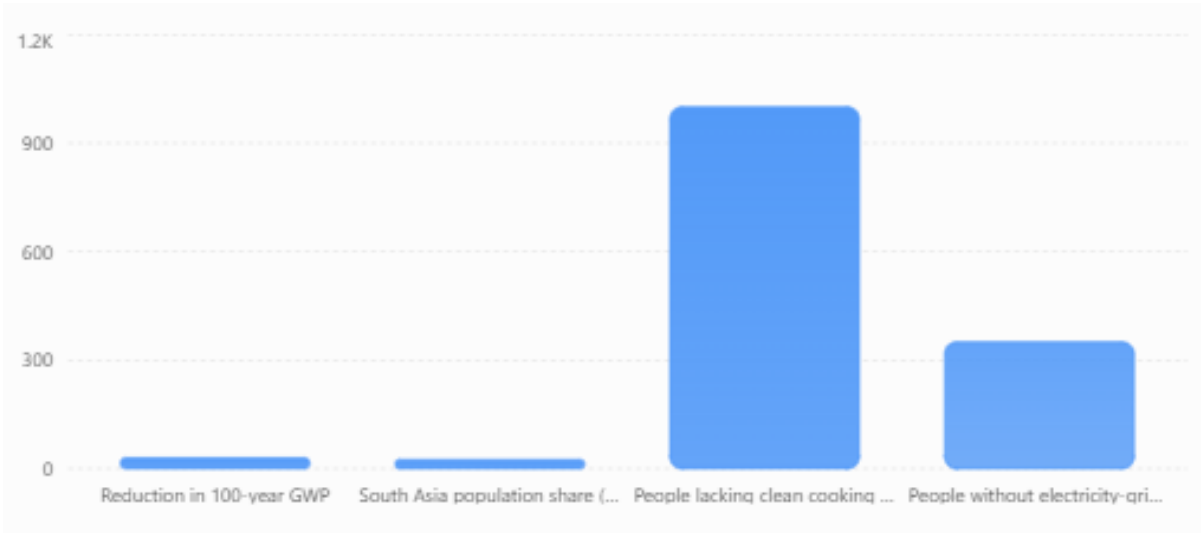
South Asia offers significant potential for India to turn its energy security into a regional public good (Mostaque, 2022, pp. 185-204). India's neighbors can provide India with electricity and energy through their natural resources and excess renewable energy production, and cooperation with them can contribute to regional energy security and sustainability. For example, Nepal, Bhutan, and Bangladesh have vast hydropower potential, and Bangladesh is now India's largest electricity trading partner, and both countries can benefit from greater regional power market integration (Jha et al., 2025, article 139239). Recent studies suggest that increased electricity trade between India, Bangladesh, Bhutan, Nepal, and Sri Lanka, can reduce the global-warming potential by over 30% in comparison to the business-as-usual scenario within a century (Jha et al., 2025, article 139239).

growing energy ties with China also damaging India's strategic

Table 3. Regional Energy Connectivity and Sustainability Indicators

Measure	Finding	Relevance to India
Countries examined in enhanced CBET modelling	India, Bangladesh, Bhutan, Nepal and Sri Lanka	Establishes India as a regional electricity hub.
Reduction in 100-year GWP under enhanced CBET	>30% versus baseline	Indicates that regional electricity integration can support both security and climate objectives.
South Asian population share of world population	≈25%	Regional energy-security cooperation has consequences for a major global population centre.
People lacking clean cooking access in South Asia	≈1 billion	Energy diplomacy must incorporate energy access, not only geopolitical supply security.
People not connected to electricity grids in South Asia	≈350 million	Regional energy trade can contribute to SDG 7 and inclusive development.

(Jha et al., 2025, article 139239; Rahman et al., 2022, article 112492). ([ScienceDirect](#))



Despite these developments, the key challenges still persist as political distrust, regulatory imbalance, transmission problems, issues related to pricing and dependence on India (Jha et al., 2025, article 139239). Nonetheless, a grid would enable India to have access to hydropower during intermittent periods of renewable energy generation and allow other countries to make profit from their excess energy (Mostaque, 2022, pp. 185-204). Thus, energy connectivity can become a tool of regional power capable of providing public goods rather than just dependence (Khan et al., 2023, pp. 179-218).

5. ENERGY TRANSITION AND INDIA'S SUSTAINABLE DEVELOPMENT DIPLOMACY

5.1 International Solar Alliance and India's Leadership in Global Renewable Energy Cooperation

India's International Solar Alliance represents a new phase in which energy diplomacy transitions to institution-building (Jha, 2023, pp. 64–100). By linking domestic solar expansion to international development cooperation, capacity building, technology access, and finance, the ISA gives renewable energy a diplomatic function beyond powering the domestic economy (Jha, 2023, pp. 131–159). In effect, renewable energy diplomacy differs from traditional hydrocarbon diplomacy precisely and specifically because influence is derived not merely from having resources but also from establishing standards, knowledge, finance and institutional leadership (Huda, 2024, article 100815).

India's solar deployments furnish a domestic foundation for international leadership, although technological and supply chain limitations remain (Dubey et al., 2023, pp. 5491-1–5491-16). By March 2025, India's renewable capacity had reached 220.10 GW, with solar at 105.65 GW, suggesting an increasing shift towards non-fossil generation (MNRE-based figures reported in recent scholarship) (Dey et al., 2022, pp. 1–13; Abhyankar et al., 2023, pp. 1–12). Diplomatically this could translate into a leadership role as institutional solution provider for the Global South, rather than merely a major energy consumer (Jha, 2023, pp. 131–159).

5.2 Global Biofuels Alliance, Green Hydrogen and Emerging Clean-Energy Partnerships

The establishment in 2023 of the Global Biofuels Alliance marks India's widening of its diplomatic brief from solar to liquid and gaseous low carbon fuels (Treat, 2025, pp. 516–525). Its biofuel diplomacy allows India to tackle at the same time transport decarbonisation, agricultural value chains, technology cooperation, and reduced energy imports (Treat, 2025, pp. 516–525). For the Global South it holds particular significance since countries with substantial agricultural economies can utilise biofuels for both rural development and energy transition purposes (Vijayakumar, 2024, pp. 1–12). Green hydrogen represents a still more radical field of diplomacy since future competitiveness will hinge on renewable electricity, electrolyser technology, water availability, certification standards, shipping infrastructure and cross-border offtake agreements (Prys-Hansen & Kaack, 2023, pp. 121–132). In the case of India's engagement with Europe and other countries on hydrogen, there are the clean energy trade corridors which are likely to become more common to supplement or even replace oil and gas pipelines (Prys-Hansen & Kaack, 2023, pp. 121-132). International cooperation becomes critical: green hydrogen may contribute about 12% towards the abatement of global emissions and 14% to the final energy consumption by 2050 under an IRENA 1.5°C pathway (IRENA-linked academic assessments) (Agarwal et al., 2024, pp. 1-18).

5.3 Climate Diplomacy, Energy Access, Just Transition, and SDGs

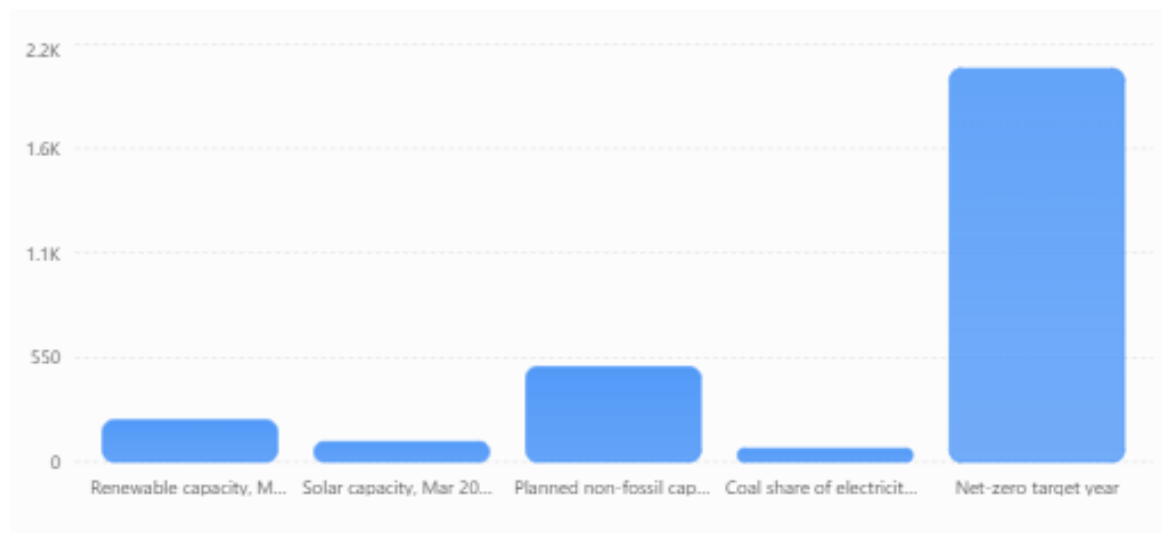
India's climate diplomacy involves a combination of developmental considerations and climate change concerns (Ratha & Barik, 2025, pp. 1-20). Its net zero emissions goal for 2070 is associated with energy access, need for industrialization, and reliance on coal, resulting in tensions among three principles of availability, affordability, and sustainability (Bhushan et al., 2025, article 062001). Thus, India refuses to view decarbonization as an emissions problem only, as far as equity, historical responsibility, financing, and

technology transfer are concerned (Mishra & Manhas, 2023, pp. 552-563).

Table 4. India's Energy-Transition and Sustainable-Development Indicators

Indicator	Value	Significance
India's renewable-energy capacity, March 2025	220.10 GW	Indicates rapid structural diversification of electricity supply.
Solar capacity, March 2025	105.65 GW	Solar has become the principal driver of renewable expansion.
India's net-zero target year	2070	Establishes the long-term foreign-policy framework for climate and energy diplomacy.
Planned non-fossil capacity target	500 GW by 2030	Links domestic deployment with international technology and finance partnerships.
Coal's continuing role	>70% of electricity generation in recent assessments	Creates tension between energy availability and decarbonisation.

(Dubey et al., 2023, pp. 5491-1–5491-16; Bhushan et al., 2025, article 062001; Khan et al., 2024, pp. 1–30). ([Press Information Bureau](#))



Just transition is relevant for India's international energy policy since areas producing coal, poor customers and industries using large amounts of energy cannot undergo transformation at the same rate (Dutt, 2022, article 102876). Studies on energy justice point to the existence of an ongoing conflict of interests concerning energy affordability, availability and sustainability in India after Paris (Dubey et al., 2022, article 102687). Therefore, the diplomatic challenge includes not only increasing renewable energy capacity but also designing international rules in a way that the costs of transition will not impede the development of developing countries (Nakanwagi, 2023, pp. 1–15).

6. STRATEGIC DILEMMAS AND NEW CHALLENGES FOR INDIA'S ENERGY DIPLOMACY

6.1 Balancing the Security of Fossil Fuels against Decarbonisation and Net Zero Goals

In order to transition from fossil fuels to renewables, India would create threats for energy security, economic affordability, and industry growth (Sinha & Srikanth, 2022,

article 112815). Coal will remain a critical part of electric power security, and oil is needed for transport and petrochemicals, making it difficult to abandon fossil fuels (Sinha & Srikanth, 2022, article 112815). In the context of this, the energy diplomacy of India pursues two opposite goals – securing fossil fuel supplies and building international cooperation to enable long-term decarbonisation (Huda, 2024, article 100815).

This dichotomy does not mean merely policy inconsistency since energy transitions are path-dependent and technologically diverse (Dutt, 2022, article 102876). Instead, one can perceive the strategy pursued by India as a sequential approach whereby fossil fuels contribute to stability in the short term, while renewables, efficiency, electrification, hydrogen, and biofuels progressively protect against external supply disruptions (Abhyankar et al., 2023, pp. 1-12). Therefore, the diplomatic task is to avoid locking into fossil fuel dependencies through foreign relations which would contradict climate goals in the long run (Maltby & Mišík, 2024, pp. 65–102).

6.2 Critical Minerals, Clean-Energy Supply Chains, Technology Dependence and Energy Geopolitics

The energy transition is leading to new geopolitics of materials centered around lithium, cobalt, nickel, copper, graphite, rare earth elements and other key ingredients (Nakanwagi, 2023, pp. 1–15). It presents India with a crucial contradiction whereby renewable energy sources would help decrease dependency on imported hydrocarbons but at the same time increase dependency on geographic clusters of mineral and technology supply chains (Srivastava & Kumar, 2024, article 101536). In academic literature, critical mineral governance emerges as a complicated international regime with the

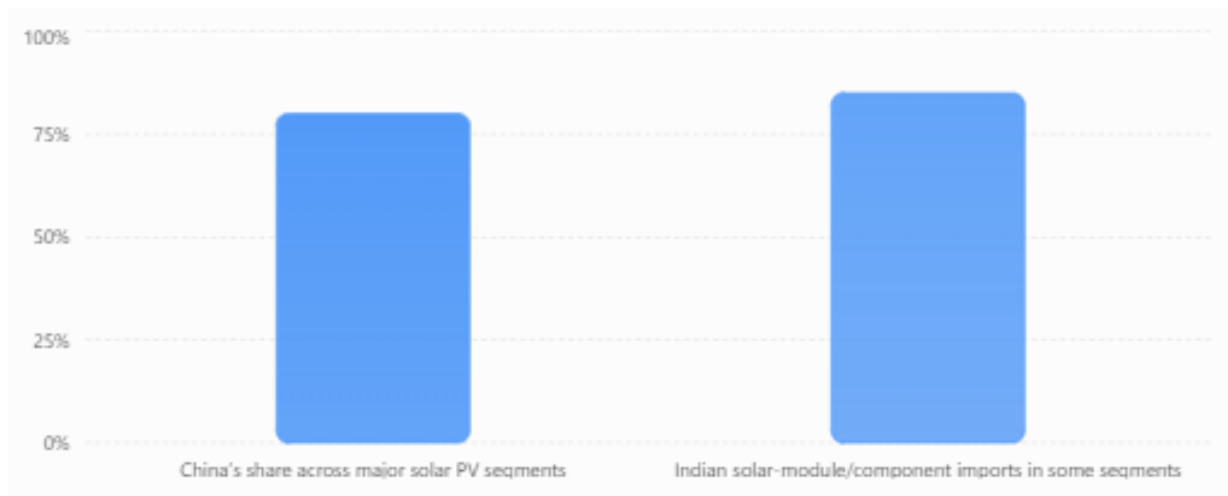
involvement of governments, multinational corporations, and international organizations rather than a simple commodity market (Srivastava & Kumar, 2024, article 101536).

The Indian solar industry demonstrates this dilemma since Chinese companies are the dominant actors in several crucial links of the global PV supply chain like polysilicon, wafers, cells and modules (Rana & Jindal, 2025, article 100034). As was noted recently, China dominates approximately 80% of production in major links of solar energy manufacturing, whereas India is still highly dependent on imports in some upstream parts (Patil et al., 2026, pp. 1–18).

Table 5. New Dependencies Emerging from India's Energy Transition

Strategic input	Approximate concentration/dependency	Foreign-policy consequence
Global solar PV manufacturing	China ≈ 80% across major segments	India must diversify technology and manufacturing partnerships.
Indian solar-module/component imports	>85% for some segments in recent assessments	Domestic supply-chain localisation becomes an energy-security issue.
Chromium and gallium security	Different risk profiles for India, China and the United States	Critical-mineral diplomacy must be mineral-specific rather than one-size-fits-all.
Global South critical-mineral resources	Large concentrations of lithium, cobalt, graphite, nickel and copper	India can develop resource partnerships with developing economies while supporting sustainable extraction.

(Rana & Jindal, 2025; Zhang et al., 2023, article 107151; Nakanwagi, 2023, pp. 1–15). ([ScienceDirect](#))



6.3 Great Power Competition, Sanctions, Volatility in Energy Markets, and Strategic Autonomy of India

Most significant among the constraints affecting the foreign policy aspect of India's energy diplomacy is the increasing great power competition (Ganguly, 2024, pp. 527–544). The increasing intersections between India's energy policies and US-China rivalry, Russia-West confrontation, Iran-US conflict, and Gulf realignments make the treatment of energy transactions as merely commercial less likely (Warren & Ganguly, 2022, pp. 811–837; Gurjar, 2023, pp. 1–15). Sanctions become even more significant as sanctions may impact payments, insurance, shipping, technological transfers, and access to finance while physical supplies of the crude oil remain intact (Prys-Hansen & Kaack, 2023, pp. 121–132).

India's approach to such challenges includes the preservation of strategic flexibility rather than alignment into any bloc (Quamar, 2023, pp. 274–294). The examples of such flexibility include simultaneous engagement of Russia, the United States, Europe, Gulf countries, Iran and multilateral organizations (Ganguly, 2024, pp. 527–544). Nevertheless, strategic autonomy is sustainable only in case of adequate material strength of India capable to withstand such challenges; hence the significance of manufacturing, renewable energy, reserves, and diversification of trade relations (Khan et al., 2023, pp. 257–312).

7. CONCLUSION

Energy diplomacy for India has evolved into a more complex instrument of foreign policy involving economic security,

geopolitics, technological capability, maritime security, and sustainability (Khan et al., 2023, pp. 1-56). This is partly due to the fact that India is not only a significant consumer of energy but is an emerging power and plays a critical role in the move towards cleaner energy (Ganguly, 2024, pp. 527-544). As such, energy security is intertwined with foreign policy as it becomes evident that geopolitics, concentration of supply lines, climate changes, and technological rivalry determine energy access and costs (Dutt, 2022, article 102876).

India's overreliance on imports remains its Achilles' heel as the country's share of crude oil imports as a percentage of gross petroleum demand surged from 77.6% in 2013-14 to 88.2% in 2024-25 (Basu & Ghosh, 2025, pp. 4-9). Since oil prices directly impact inflation, the currency, the trade balance, freight rates, and industrial competitiveness, energy security is a matter of both economic and foreign policy (Mishra et al., 2023, article 113804; Quamar, 2023, pp. 274-294). India has consequently pursued a diversified import strategy, including oil and gas from Gulf states, Russia, Africa, Latin America, Central Asia, the US, and Europe (Ganguly, 2024, pp. 527-544). India's deepened energy ties with Russia, evidenced by soaring Russian crude purchases in 2022, demonstrate how India's foreign policy priorities are increasingly informed by its commercial and strategic interests (Warren & Ganguly, 2022, pp. 811-837).

The sea lanes of communication with respect to hydrocarbon imports are another vital foreign policy issue, given India's reliance on the Strait of Hormuz, Bab el-Mandeb, the Arabian Sea, and the Indian Ocean for its energy needs (Pradhan, 2022, pp. 61-86). Given the potential impact on India's trade and economy, navigational safety, and freight and insurance costs, India has had to adopt a more integrated foreign policy that harmonizes energy, maritime, and economic strategies (Aswani & Sajith, 2024, pp. 1-20; Lambert et al., 2022, article 100934). Meanwhile, while strategic petroleum reserves are an important foreign policy tool, they cannot offset India's reliance on imports (Sinha & Srikanth, 2022, article 112815). India has diversified its approach of energy security by not just focusing on alternate sources of energy but also technologies. The cumulative installed capacity of renewable energy reached 220.10 GW as of March 2025 with solar power contributing 105.65 GW, making up for a substantial proportion of renewable energy used in India's energy basket, thereby minimizing carbon emissions (Abhyankar et al., 2023, pp. 1-12). However, the transition from the traditional energy basket towards renewable sources of energy needs critical minerals such as lithium, cobalt, nickel, copper, graphite, gallium, and rare earth metals along with technologies such as battery and solar panels (Nakanwagi, 2023, pp. 1-15; Zhang et al., 2023, article 107151). India needs to pursue an all-encompassing foreign policy approach that focuses on exploration of minerals, recycling, downstream processing, and resource/technology collaboration. (Yaseen et al., 2025, article 105542).

India's emerging status as a clean energy leader also gives it greater geopolitical influence through enhanced participation in the G20, BRICS, SCO, International Solar Alliance, Global Biofuels Alliance, and other multilateral organizations (Mishra

& Manhas, 2023, pp. 552-563; Trebat, 2025, pp. 516-525). Electricity trade within regional neighbours such as Nepal, Bhutan, and Bangladesh, too, could contribute to energy security while promoting sustainability. For instance, a study found that the regional electricity trade could reduce the 100-year warming potential by more than 30% over the reference case by 2040 (Jha et al., 2025, article 139239). Overall, India's energy security strategy, which combines diversified hydrocarbon imports, enhanced strategic reserves, renewable energy development, critical minerals security, and institutional diplomacy, enables it to adopt a more balanced foreign policy that promotes its strategic autonomy while bolstering economic growth and sustainability (Ganguly, 2024, pp. 527-544; Khan et al., 2023, pp. 257-312).

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