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India's Hormuz Confrontation: Rethinking the Alternatives and Devising a Strategy to Ensure Energy Security

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Abstract

As the security architecture of west Asia topples once again, with the U.S. and Israel launching a major targeted offensive operation on Tehran and the latter retaliating by blocking the strait of Hormuz, Geography of the region has assumed renewed prominence. Nations that rely on West Asia for energy today face an acute crisis including India. While diversification of the sources is the most practical solution, it is not without conditions or limitations. Although turning to Russian oil could offer a temporary answer to sudden supply disruption, such an alternative amount merely to crisis management. Exploring pipelines laid by some Arabian countries also requires careful analysis. Beyond these measures, comprehensive strategies must be devised to overcome not just the sudden impact of the blockade but also for future vulnerabilities, as the geography of the region would essentially remain constant even though the geopolitics associated with it may evolve. However, securing energy sources is not without competition as other affected players are equally keen to overcome the crisis.

The study examines the conflict in west Asia and the blockade of the strait. An overview of the Strait of Hormuz and the challenges arising from its closure are examined. The importance of the strait for India's energy security is subsequently brought out. Existing alternatives to overcome India's upstream energy crisis caused due to the blockade are carefully analysed. The double burden of securing energy sources while competing with regional players is also studied. Finally, the paper tries to propose a phased strategy framework to India's evolving energy needs.

Keywords: Strait of Hormuz, Energy security, Energy diversification, Energy competition, crude oil, LNG, LPG, Supply disruption

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Introduction - Escalating conflict theatre of West Asia

The 1979 Iranian Revolution replaced a pro-Western monarchy with an anti-Western regime, triggering friction with the United States and Israel. Following events including proxy conflicts facilitated by Iran backed terrorist groups, led to decades of mutual suspicion, sanctions, and rivalry. Tensions further escalated over Iran's nuclear programme culminating in U.S. withdrawal from the JCPOA. In 2025, Iran enriched uranium to 60% and restricted inspections by the IAEA (IAEA, 2025), while Supreme Leader Ali Khamenei rejected any further nuclear talks (Khamenei, 2025). Washington and Jerusalem came to the conclusion that a nuclear-armed Iran posed an imminent security threat to America, Israel and America's Arab allies. Following the collapse of diplomatic negotiations and after months of military mobilization, Washington launched Operation Epic Fury against Tehran (U.S. Central Command, 2026). A series of coordinated United States–Israel aerial strikes targeting critical Iranian military infrastructure and leadership led to the elimination of Supreme Leader Ayatollah Ali Khamenei and several senior officials. Tehran's nuclear sites were targeted, along with Kharg Island which holds a major oil export terminal. Israel also struck the South Pars field, part of the world's largest natural gas reserve (Ramsay & Said-Moorhouse, 2026). Iran retaliated by carrying out widespread counterattacks and showering US bases with missiles and drones. The immediate result of the confrontation was the Islamic Revolutionary Guard Corps (IRGC) firing missiles and drones against vessels passing through the Strait of Hormuz, prompting high risk designation effectively imposing a de facto blockade of the strait.

For India, whose energy supply remains heavily dependent on imports transiting through the Strait of Hormuz, such disruption poses a significant challenge. This paper argues that while short-term measures such as supply diversification, spot trading, alternative pipeline infrastructure, and increased domestic production may mitigate the immediate effects of a Hormuz disruption, these alternatives alone cannot resolve India's long-term energy vulnerability. Ensuring sustained energy resilience requires a multi-layered strategy. Without structural reforms, India will remain vulnerable to recurrent geopolitical shock induced energy disruption.

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Research Question

1. What are the limitations of existing alternatives that are available to India's energy supply in the event of a disruption in the Strait of Hormuz?
2. How can India maintain continuous energy supply during a prolonged disruption of the Strait of Hormuz while dealing with regional competition?

Research Objective

The objective of this study is to evaluate the feasibility and limitations of alternative energy supply mechanisms available to India during the prolonged blockade of Strait of Hormuz and to propose a phased strategy framework for strengthening long-term energy resilience.

Research Methodology

This study mainly employs a qualitative research approach to arrive at a long-term feasible solution to India's energy demands. The study employs a comparative analysis framework to evaluate the feasibility of various alternatives available to India in times of Hormuz disruption. For the purpose of the study comprehensive review of secondary sources such as academic journals, government reports, statistical datasets, and newspaper articles are studied. Important details from the official websites of EU, UN and various governments' records are utilized. Tables consisting of quantitative data, such as trade volumes, shipping durations and relevant figures are incorporated where appropriate to support the argument and findings.

Literature Review

Several existing literatures such as discussed below have analyzed the risk factors associated with the Strait of Hormuz which could trigger India's energy sector vulnerability. However, existing literature does not analyse the drawbacks of the alternatives and provide a long-term strategy.

The first strand of literature focuses on the strategic and geopolitical importance of the Strait of Hormuz as a maritime choke point**.** Closure of the Strait of Hormuz: possibilities and challenges for India by Rhea Abraham (Abraham, 2013) discusses the importance of the Strait of Hormuz, the risks associated with its possible closure. The paper identifies US–Iran Rivalry, Territorial

Disputes between Iran and the United Arab Emirates over islands near the Strait and non- state threats as the challenges of the region. Dagobert Brito and Amy Myers Jaffe in 'Reducing Vulnerability of the Strait of Hormuz' (Brito & Jaffe, 2010) analyzes how nuclear capable Iran would hold a strategic leverage of threatening to close the Strait. Even though nuclear weapons are unlikely to be used, Iran holding them increases bargaining power and deterrence enabling them to influence political negotiations. Closing Time: Assessing the Iranian Threat to the Strait of Hormuz by Caitlin Talmadge (Talmadge, 2008) argues that Iran would use Naval mines, anti-ship missiles and surprise attacks by naval forces to block shipping passing through the strait.

A second strand examines the implications of such disruptions for major energy-importing economies, including India. Blocking the Hormuz Strait – China's Energy Dilemma" by Shen Dingli (Dingli, 2012) examines how Chinese weapons supplied to Iran may be used to attack ships passing through the Strait of Hormuz even though China being heavily dependent on the Strait for energy imports will be affected. Abrahm (2013) also talks about the implications of the closure of Hormuz on India's energy security, economy, and foreign policy. Talmadge (2008) concludes that Iran cannot permanently close the Strait of Hormuz, but it can disrupt shipping long enough to trigger international military intervention and economic instability. However, the blockade won't be feasible as Iran itself depends on the Strait for its own oil exports. Similarly, Maritime stability in the Strait of Hormuz: challenges, global impacts, and multilateral diplomacy (Ramadhani, R., & Marzaman, A., 2024) contributes to a broader understanding of the relationship between geopolitical conflict and global energy security.

A third body of literature evaluates alternative energy pathways and mitigation strategies. Talmadge (2008) warns that energy-importing countries have to plan early for supply disruptions. Changing Geo-politics of Oil and the Impact on India by Charu Rastogi (Rastogi, 2016) gives a three-step solution to India's energy vulnerability - structural adjustments in the energy sector by increasing renewable energy; improving energy efficiency by reducing losses and promoting research and development; Energy Assurance by diversification and domestic production. The Strait of Hormuz: Assessing and Neutralizing the Threat by Amos Yadlin and Yoel Guzanksy (Yadlin & Guzansky, 2014) analyzes how swing capacity of Saudi Arabia can be utilized in reducing the damage caused to the global energy market if Iran decides to block the strait. Abraham (2013) analyzes alternatives such as pipelines, especially mentioning about the Iran-Pakistan-India

pipeline that is stalled due to economic and political reasons. Brito & Jaffe - The paper also points to strategic petroleum reserves and pipelines, preparedness and diversification as long – term strategies. Ramadhani, R., & Marzaman, A. (2024) advises that major oil-importing countries should start switching to renewable energy to reduce dependence on traditional energy routes, such as the Strait of Hormuz.

Three major gaps remain in the existing literature. First, most studies assess alternatives without conducting a systematic comparative evaluation of their feasibility, cost, and geopolitical implications. Second, there is limited attention to the competitive dynamics among Asian energy importers, particularly in crisis scenarios where multiple countries simultaneously seek alternative supplies, thereby intensifying market pressures. Third, existing research does not adequately develop a phased policy framework that distinguishes between short-term crisis management and long-term structural transformation of energy systems. This study therefore, tries to addresses these gaps and proposes a multi-layered, phased strategy to enhance India's energy resilience.

Strait of Hormuz and the challenges associated with its blockade

The etymology of the word "Hormuz" is believed to be derived from the Greek word 'hormos' meaning 'cove' or 'anchorage', possibly indicating the presence of a sheltered harbor in the region. In contemporary usage, 'Hormuz' refers to a channel, approximately 104 miles long and 30 miles wide at the narrowest point, between Oman and Iran that connects the Persian Gulf to the Gulf of Oman (IEA, 2026). The Strait of Hormuz, a significant waterway in modern global trade, is, in essence, a maritime choke point, with roughly 25% of the global oil supply, 20% of global LNG and 29% of LPG passing through it. (International Energy Agency, 2026). Any disruption to traffic passing through the strait will have a ripple effect on economies across the Globe. In addition, visibility in some areas of the strait could fall below 12 miles due to dust and Haze, thereby limiting safe navigation as per Rule 22(c) of International Regulations for Preventing Collisions at Sea (COLREGs) (IMO, n.d). Low visibility and inadequate depth force maritime traffic to flow

through a confined channel within the strait, following the designated Traffic Separation Scheme[2], making them easy targets.

Iran has employed targeted offensive strategy by laying naval mines, using drones, deploying missiles and small attack boats which has caused tanker traffic through the narrow passage to slow down sharply resulting energy prices to spike. On the day that Iran started attacking its neighbors' facilities, oil prices jumped by 10% and gas by 50% (Global Witness, 2026). Such actions have triggered war-risk underwriters to cancel coverage for vessels and increase premium for ships navigating the strait which is now a high-conflict maritime zone. Insurance rates have surged leading to the "actuarial blockade" of the strait (Khan, 2026). Though supply shortfalls driven by geopolitical tensions have occurred in the past, a disruption of such a magnitude is new. For example, during the Yom Kippur War in 1973 and in the Persian Gulf War in 1990 only a little more than 6% of oil supply was pulled out of the market and in the Iranian Revolution in 1979 and Iraq–Iran War in 1980 only about 4 percent. Today, the shortfall is close to 20 percent, making this crisis three to five times larger. (Federal Reserve Bank of Dallas, 2026)

Moreover, the macroeconomic consequences of the energy crisis of such a magnitude have led to a spillover effect on the broader global economy. The removal of approximately 20 percent of global oil supply pushed the West Texas Intermediate (WTI) price of oil to rise approximately $98 per barrel (Meredith, Shan, & Kimball, 2026). With every $10 rise in oil prices US inflation rises by ~0.20%. Asian importers including China, India, and Japan are affected by high inflationary pressure and trade imbalances. An immediate impact of the surge is the bullwhip effect, a phenomenon where small, minor fluctuations in consumer demand at the retail level become amplified, causing massive, distorted disruptions in production, inventory levels, and logistics further up the supply chain. When supply chains face such unexpected shocks, consumers panic-order, exacerbating the ripple effect down the chain. Such cascading effects ultimately reduce global real GDP growth annually.

[2] A Traffic Separation Scheme (TSS) is maritime traffic routing system designed by IMO to avoid collision and enhance safety

Impact on India

Due to India's heavy reliance on the Strait of Hormuz for energy imports - crude oil, LNG and LPG - the repercussions following its closure are particularly severe for the country. With nearly 50% of its crude oil imports, 90% of its LPG and 60% of its LNG imports (PIB, 2026) transiting through the Strait, India's energy sector has taken a heavy toll exposing structural vulnerabilities in the import dependent model.

As per the definition of International Energy agency, “Energy security is the uninterrupted, affordable, and sustainable availability of energy sources to meet a nation’s needs”. (IEA, n.d) Three determinants of energy security are: availability, accessibility and affordability. Availability ensures a consistent physical supply of energy resources; Accessibility guarantees the secure movement of energy through stable transport routes; and Affordability ensures that energy remains economically viable for the citizens without excessive price volatility. The absence of any one of these factors results in energy insecurity. The blockade of the Strait has disrupted all three determinants, thereby posing a significant challenge to India's energy security.

However, the disruption is not confined to the energy sector alone and has produced a spillover effect across multiple industries. The financial implications have disturbed the very core of household budgets, due to inflationary pressures. The Reserve Bank of India estimates that a 10% increase in LPG prices increases India's retail inflation by approximately 0.2 percentage points (RBI, 2018). The rise in LPG prices directly affects households, hospitality, and small-scale industries by raising operating costs. Unaffordability of LPG may force low-income households to revert to traditional biomass fuels such as firewood. The rise in crude oil prices on the other hand has increased transportation, manufacturing, and petrochemical costs. Fall in natural gas supply which is cleaner fuel for power production may increase coal imports and thereby carbon footprint. Thus, disruption in the energy sector causes cascading effects across ancillary sectors. As petroleum products serve as feedstock for the fertilizers industry, rising energy prices lead to higher production costs, reduced output, which in the long run affect food security and farming productivity. Dependent industries such as chemicals, steel, ceramics, tiles, paints, and textiles are also significantly affected. Meanwhile, rising energy prices increase operating costs for businesses,

reduce profit margins and drive down stock market indices. Overall, the disruptions in energy supply have slowed down India's economic growth and will continue until the crisis persists.

Analyzing alternative options

Existing reserves

India’s existing petroleum buffer stored in underground caverns at Visakhapatnam, Mangaluru, and Padur account for 5.33 million metric tonnes which would last only 9.5 days. In addition, when commercial refinery stocks maintained by oil public sector undertakings and floating inventories at ports are added the reserve improves to approximately 74 days of buffer. (Press Information Bureau, 2021)

Russia as an attractive source

In order to avoid dependence on a geopolitically volatile region, India started diversifying its energy sources around 2018–19. While the United States emerged among top ten suppliers, Russia remained a negligible contributor until 2022. However, the outbreak of the Russia-Ukraine war in 2022, attracted the US sanctions and price cap on Russia’s seaborne crude oil exports. Russia soon offered substantial discounts on crude, attracting India’s attention. Besides alternative routes, insurance coverage from Russian providers and payment mechanisms in Rupees made the offer favorable to India. Consequently, Russia’s share of India’s crude oil imports surged reaching 35.8 percent in 2024–25 (Ministry of Petroleum and Natural Gas, 2025). Following Russia's emergence as India's largest oil supplier, the U.S. imposed a “targeted penalty” on India charging an additional 25% *ad valorem* duty specifically meant as a punitive measure against India for importing Russian oil (United States Government, 2025). India significantly reduced its oil purchases from Russia in view of its national interest. By December 2025, India’s oil imports from Russia dropped by 20% (Centre for Research on Energy and Clean Air, 2026). However, the blockade of Strait of Hormuz has made India turn towards Russia again. As of March 2026, Indian refiners booked 60 million barrels of Russian crude oil cargoes currently in the Indian Ocean. Both countries also agreed verbally to trade LNG (Sharma, 2026; Reuters, 2026).

The availability of Russian crude at substantial discount rates often priced below global benchmarks such as Brent, save billions of dollars for India making it an attractive source. In

addition, the chemical characteristics of Russian Urals crude—being relatively heavy and high in sulfur—makes it ideal for India's refineries, which are specifically designed to process such heavier grades efficiently. Russia also provides an alternative shipping route, bypassing the Hormuz choke point allowing constructive utilisation of the Vladivostok–Chennai maritime corridor.

Diversifying the sources

India currently has a supplier base of forty countries for crude oil, which can serve as alternative sources in times of geopolitical tensions. Today, crude oil is sourced from Africa, Latin America, Australia, the United States and other countries unlike the past when West Asia was the major provider. However, they have several significant logistical and economic challenges associated with it.

Table 1: India's top 10 crude oil suppliers

Country	Supply (Barrels/Day)	Shipping Days	Major Crude Grade	Category	Currency
Russia	1.1–1.6 million	25–35 days	Urals,	Sour	Rubles/ Yuan / Dirham / USD
Iraq	850k–900k	5–7 days	Basrah Medium, Basrah Heavy	Sour	USD
Saudi Arabia	600k–700k	6–8 days	Arab Light, Arab Medium	Sour	USD
UAE	400k–450k	3–5 days	Murban, Upper Zakum	Sweet, Sour	USD / Dirham
United States	450k–550k	35–45 days	WTI, Eagle Ford	Sweet	USD

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Kuwait	300k–350k	5–7 days	Kuwait Export Crude	Sour	USD
Nigeria	120k–180k	20–24 days	Bonny Light, Qua Iboe	Sweet	USD
Angola	100k–120k	18–22 days	Girassol, Dalia	Sweet, Sour	USD
Brazil	80k–100k	30–35 days	Lula, Tupi	Sweet	USD
Mexico	70k–90k	35–40 days	Maya	Sour	USD

Source: Author's compilation based on IEA, PIB, and media reports

Due to its geographical location far from the disruption, the US has emerged as an alternative supply source. However, long shipping distance increases freight charges, transit time and insurance premiums. US crude is also more expensive making it an unattractive choice as costly energy alternatives would widen India's current account deficit, weaken the rupee, raise inflation, affect monetary policy as well as fiscal management. Similar bottlenecks evolve when crude oil is brought from Latin American countries like Brazil, Guyana, or West African producers such as Nigeria and Angola. Although these routes bypass the strait of Hormuz, hold low geopolitical risk and strengthen supply resilience, and serve as alternatives to traditional West Asian energy dependence during periods of instability, longer transportation distances reduce their overall competitiveness. In addition, as visible from Table 1, at present, the combined import from these suppliers does not equal to the crude imports from Russia and West Asian countries.

An additional structural limitation arises from refinery compatibility. Indian refineries are optimized to process medium-to-heavy sour crude oil, capable of processing heavier and more sulfur-rich crude efficiently and convert lower-cost crude into high-value fuels. Such a limitation poses an obstacle in replacing the Arab countries or Russia with the US that produce light sweet crude oil namely Brent Crude Oil and West Texas Intermediate which are less compatible with India's existing refining configuration. Processing such crude requires blending with heavier grades, reducing operational efficiency and increasing refining costs.

Furthermore, dependence on the petrodollar system for crude oil trade continues to further constrains energy security. Since crude oil trade is predominantly conducted in U.S. dollars, fluctuations in the rupee-dollar exchange rate directly influence import costs and domestic fuel prices leading to inflationary pressures. Dollar-denominated trade also exposes India to secondary sanctions and financial pressure linked to geopolitical alignments, particularly when importing crude from countries viewed unfavorably by Washington. As a result, despite diversification efforts, India's energy sector remains vulnerable to external financial and geopolitical disruptions.

Spot trading as an option

Spot trading of crude oil is a mechanism rather than an alternative to mitigate the market volatility that occurred due to geopolitical events, shipping disruptions, natural disasters, OPEC+ decision or economic trends. Traders and governments use spot trading to hedge risk, diversify supply portfolios, and secure short-term procurement opportunities during periods of uncertainty. Crude oil is brought or sold for immediate delivery reflecting prevailing market demand and supply conditions. Commonly described as trading "on the spot", it represents the current market value of oil and is heavily influenced by short-term fluctuations in supply and demand.

Current development in west Asia and the de facto blockade of Strait of Hormuz leading to restriction of shipping has activated spot markets as a mechanism for immediate and flexible procurement of crude oil from non-Arab sources. Spot procurement enables India to maintain supply continuity despite disruptions in traditional shipping routes.

Despite its operational advantages, India cannot heavily rely on spot trading as it carries inherent economic and strategic risks. Spot markets are more volatile because prices fluctuate in response to immediate supply and demand dynamics, shipping availability, and benchmark price movements. Frequent dependence on spot purchases can therefore increase India's import costs and fiscal stability. Thus, spot trading must primarily be utilised as a short-term supply management tool rather than a long-term solution to such geopolitical events. While spot markets provide flexibility during emergencies, they do not eliminate India's exposure to maritime chokepoints and regional instability.

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Pipelines to bypass the Strait

Another available infrastructural option that can support recourse from the Strait of Hormuz is the utilization of pipelines in West Asia. Saudi Arabia operates the East–West Pipeline (Petroline), connecting the oil - rich Abqaiq field in the Eastern Province to the port of Yanbu overseeing the Red Sea (Arab News, 2026). The UAE has constructed Abu Dhabi Crude Oil Pipeline (ADCOP), linking inland oil fields at Habshan to the port of Fujairah on the Gulf of Oman (Abu Dhabi National Oil Company, 2021). Oman has a main oil pipeline in Oman that runs approximately 250 kilometers from the Fahud oilfield to the Mina al Fahal coastal terminal in Muscat. The pipeline will be connected to the proposed 440 Km Ras Markaz pipeline extending till the Ras Markaz Oil Storage Terminal in Duqm (Oman Ministry of Energy and Minerals, 2020).

However, the capacity at which these pipelines operate are limited. For example, Saudi Arabia's East-West Pipeline can transport only 7 million barrels a day which only partially offsets the loss of the 15 million barrels that normally pass through the Strait of Hormuz (EIA, 2023). Similarly, The UAE ADCOP only operates 1.8 million barrels per day (Abu Dhabi National Oil Company, 2021). While these pipelines can absorb a portion of the shipment that usually go through the strait, their combined capacity is only about 9 million bpd, compared to 20 million bpd that flow through the strait. Dingli (2012) also supports this argument in his work where he states that pipelines that would carry only a drop of China's oil demand. Thus, the pipelines would support the crude oil prices from skyrocketing in times of geopolitical crisis. However, due to their structural limitations, pipelines cannot be termed as an alternative.

Pipelines are also vulnerable to attacks during periods of conflict. In May 2019, the Saudi energy ministry reported that the East–West pipeline had been struck by drones launched by Yemen's Houthi militia (Gornall, 2024). More recently, in March 2026, a fuel storage tank at the port of Duqm in Oman was reportedly targeted by Iranian drones for hosting a U.S. military vessel (Varghese, 2026), underscoring the exposure of pipelines associated with ports in conflict zones. The incident highlights the facts that pipelines constitute critical infrastructure and are easily targeted in times of a conflict. Being within the range of Iranian missiles and drones, makes them just as vulnerable to attacks and damage as ships travelling through the strait.

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Reliance on Domestic Gas production

To diversify reliance on imported LNG, the Government of India is encouraging domestic gas production, promoting Compressed Bio-Gas (CBG) and increasing output from the KG-D6 basin. In addition, substitute energy sources such as fuel pellets, coal, kerosene, and biomass are also promoted. However, projections indicate that LNG and LPG demand will rise sharply in the near future, while domestic production is expected to grow only marginally (IEA, 2025). The alternatives promoted also pose public health risks due to higher emissions and indoor air pollution.

This study evaluates India's alternative energy options through a comparative analysis framework based on four criteria: supply reliability, economic viability, geopolitical risk, and long-term sustainability. Each alternative is assessed according to its ability to maintain uninterrupted energy flow during a prolonged Hormuz disruption while minimizing any vulnerability.

Table 2: Comparative evaluation of available alternatives

Option	Reliability	Cost	Risk	Sustainability	Overall Assessment
Existing reserves	Exhaustive and dependable for only immediate crisis management	Low transportation and distribution cost compared to imports	No associated risk	Very Low	Current reserves are low to sustain India's energy demands
Russian crude	Highly reliable. Russia is second highest supplier	Cheaper than other sources	Sanctions from US	Depends on Geopolitical events.	Viable for short period

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Diversified supply	Reliable as supply continuity is ensured	High due to costlier insurance premiums	Low	Not sustainable as Current Account Deficit rises for the long run	Emergency option
Spot trading	Lowest reliability	Very high and unstable	Market volatility	Low	For Crisis management only
Pipelines bypassing Hormuz	Short time reliability	Changes as per location	Prone to attack	Sustainability depends on Infrastructural exposure	Supportive measure and not an alternative
Domestic production	Reliable for short period till the demand exceeds production	Comparatively cheaper to imports	Environmental effects and public health risk	Sustainable only when produced with low carbon footprints	The best alternative to reduce energy import dependence if the risks associated with it is negated.

Source: Compiled by author

The comparative analysis demonstrates that no single known alternative can fully pose as a substitute and resolve India's long-term energy insecurity. Furthermore, growing competition among Asian economies for the same alternative supply sources reduces the reliability and attractiveness of these options during perods of crisis. This necessitates an approach combining multiple options and supply channels to ensure resilience during geopolitical disruptions. The alternatives discussed above can only serve as short – term solutions to energy disruptions.

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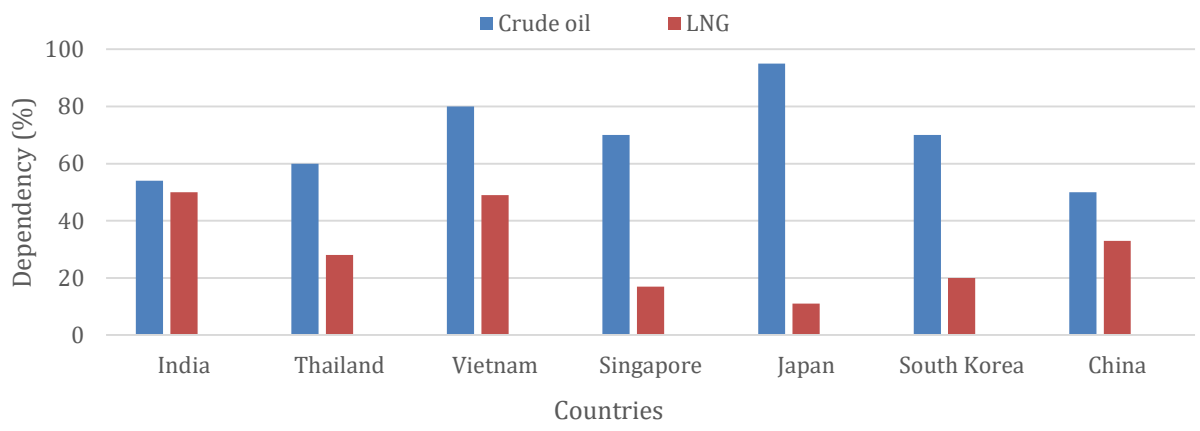
Regional competition for energy

Supply disruption due to the blockade of the strait of Hormuz has intensified competition between Asian economies for alternative energy supplies. More than half the amount of crude oil that moves through the Strait towards Asia are destined to China, India, Japan, and South Korea. Recent trends show that several south east Asian nations such as Philippines, Thailand and Vietnam are eyeing Russian crude. Such high demand for discounted Russian crude could affect Indian imports. The Philippines, for example, imported Russian crude for the first time in five years shortly after declaring an energy emergency. Japan, South Korea, and Southeast Asia have also begun sourcing crude from the United States, West Africa, and South America. However, due to freight cost and increasing crude oil prices poorer Asian nations are scrambling for nearby sources. The blockade has also caused intense competition among Asian countries for Natural Gas. Such demand has forced importers like China, Japan, and India to battle for spot LNG cargoes.

Figure 1: Asian Dependency on West Asian energy



Source: The author has collected data from various online reports

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Table 3: India's regional energy competition and implications

Energy	Nature of Competition	Implication for India
Russian crude	High demand for discounted crude	Reduced availability and higher prices for India
United States LNG and crude	Strong purchasing power of these countries and long-term LNG contracts	Transit time to India is more
African crude	Increased imports by other countries	Spot trading difficulty
Latin American crude	Growing demand from Asian economies	Supply competition and long distant freight challenges
Australian LNG	Long term contracts with East Asia countries	Limited spot cargo availability for India

Source: Compiled by the Author

Solutions to India's energy question

Since the alternatives such as existing reserves, Russian crude, supply diversification, spot trading and domestic production function as short-term solutions for immediate crisis management remain vulnerable to geopolitical competition, India requires a phased strategic framework to achieve energy resilience. The medium- and long-term solutions to address India's energy demands are discussed below.

Medium-Term Strategies

Increase strategic reserve

Among the possible solutions that can be adopted, one key component is the strategic petroleum reserve (SPR). While strong economies of the world hold reserve above 100 million barrels,

India’s existing SPR capacity is only about 39.36 million barrels (PIB, 2023). Enhancing strategic reserve capacities, irrespective of the current West Asia crisis and the blockade is important for buffer against supply shocks and India's energy security.

Similarly, India currently operates only underground LPG storage caverns in two states with a combined capacity of approximately 1.6 lakh tonnes, equivalent to roughly two days of national consumption (PIB, 2023). Conversely, Japan maintains an LPG stockpile of 90 days reflecting higher levels of preparedness against supply shocks. Japan holds the world’s largest liquefied natural gas (LNG) storage capacity. The infrastructure is supported by an extensive network of both underground and above-ground cryogenic storage facilities designed to be highly disaster-resilient, integrated with artificial intelligence (AI) and Internet of Things (IoT) technologies. India could benefit from adopting best practices from Japan.

Multilateral mechanism for diplomatic negotiation

Importing countries not participating in the conflict should negotiate arrangements with Iran to ensure the safe passage of tankers carrying oil and gas through the Strait. A coordinated regional diplomatic response could provide an additional layer of risk mitigation. Countries that are non-aligned or not directly involved in the conflict could form a coalition or regional grouping/ multilateral mechanism to engage in dialogue with both Iran, Israel and the United States to ensure the continued flow of energy through the maritime chokepoints. Further, the multilateral institution could engage in any such future conflict where energy flow is disrupted and ensure smooth supply.

Utilising state - of - the art refineries for South American crude

Indian refiners have recently resumed importing Venezuelan crude oil after a period of suspension which were influenced by U.S. sanctions. Venezuelan crude oil such as *Maya* and *Merey* are heavy sour crude oil, which has both high density and high sulfur content. Due to its thickness and viscosity, it requires more advanced and energy-intensive refineries to convert it into usable fuels that are also more difficult and expensive to refine. Brazil, Canada, and Mexico also produce similar heavy crudes. While most of the crude oil importing countries lack sophisticated refineries in place, Indian refineries are configured to refine such heavy crude. For example, Reliance’s Jamnagar refinery has a Nelson Complexity Index (NCI) of 21.1, which is the highest in the world

reflecting advanced capability to process heavy crudes to high end valuable products. [3] However, being located 9800 nautical miles across the world, crude shipments from Venezuela and other South American producers typically require voyages of around 40 days to reach Indian ports. Consequently, high freight charges increase crude price rises to $4 per barrel. Nevertheless, when offered at a sufficient discount, importing Venezuelan crude can remain economically viable for Indian refiners. Securing access to discounted crude for long term ensures a more stable and continuous flow of crude oil that provides India with greater leverage in global energy markets while reducing vulnerability to supply competition from other major importing nations.

Currency swap agreement

Currency swaps agreements refer to exchange of one currency for another at a preset rate over a given period involving two parties/countries. India currently holds such mechanism based crude trade agreements with Russia and the United Arab Emirates. These arrangements are intended to reduce exposure to exchange-rate volatility, mitigate the risks associated with overdependence on the U.S. dollar, and enhance financial resilience in energy transactions during periods of geopolitical uncertainty. Going forward, India should encourage energy trade with its diverse supplier base through a flexible payment framework that combines local currencies with the U.S. dollar. Such a hybrid settlement mechanism would preserve the stability and global acceptance of the dollar, reducing vulnerability to sanctions and currency fluctuations.

Turning to the swing producers

A swing producer is one that “has a large market share, spare capacity, very low production costs, and is capable of raising and lowering production to affect the price” (Coy, 2015). Historically, Saudi Arabia fell in this definition and had spare capacity of more than 1.5 - 2 million barrels per day. Today, outside of West Asia, the United States, Canada, Guyana and Brazil have significant crude oil production capacity capable of acting as a swing producer by increasing output quickly to offset supply disruptions within 30 to 90 days. (EIA, 2025) Russia also has a limited, yet

[3] The Nelson Complexity Index (NCI) is a metric that measures an oil refinery's secondary conversion capacity compared to its primary distillation capacity, developed by W.L. Nelson. It ranks refinery sophistication and value-addition potential, with higher values (e.g., >10) indicating advanced abilities to process heavy/sour crude into valuable products.

emerging, potential to act as a swing producer. A long - term pre-arrangement with such a “crisis ready” or swing supplier can avoid the disruptions caused by geopolitical tension. Such agreements can serve as a cushion against forcing India into spot trading. A preplanned agreement should allow the swing producer to allocate spare production capacity to India during emergencies mitigating the competitive pressures India faces from other major Asian crude oil importers.

Long- term strategy

Looking East

The proven oil reserves of Southeast Asia are around 16 billion barrels, approximately 1% of the world reserves and 39% of the Asia-Pacific reserves (Cu, Phung, & Le, 2018). Due to lack of refining capacity, these countries are forced to import refined petroleum. Indonesia produces approximately 608,100 barrels of crude oil per day. However, domestic consumption is estimated at around 1.6 million barrels per day (Hanan,2025), highlighting a substantial gap between production and demand. Despite being the third-largest oil producer in the Asia–Pacific region, Indonesia remains heavily dependent on imported refined petroleum products. This is due to the country's aging refineries. Consequently, a substantial portion of its refined fuel supply is sourced from Singapore, the largest refining hub in Southeast Asia but for high cost. Similarly, Malaysia with the highest capacity of proven reserves in Southeast Asia, is a significant exporter of crude and importer of petroleum products.

One potential strategy could involve trading refined petroleum products from India in exchange for crude oil from Indonesia. India has emerged as a major global hub for refined petroleum products, exporting approximately $65.4 billion worth of refined fuels in 2024, thereby becoming the world’s second-largest exporter of refined petroleum. This strong downstream capacity provides India with an advantage in regional energy markets. Building on this strength, India could establish a structured exchange of refined products for crude utilising India's diversified supply base who are net exporters of crude but importers of refined petroleum. India must tap this gap by increasing its refining capacity. The strategy could be slowly implemented across the ASEAN countries who depend on Singapore for refined products at higher cost.

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Furthermore, Indonesia is considered one of the most promising countries for petroleum investment due to its large number of sedimentary basins and established infrastructure. The country contains more than 60 sedimentary basins, many of which remain underexplored or undeveloped (Cu, Phung, & Le, 2018). The country's regulatory framework allows international companies to participate in investment and exploration of these sites. India could therefore participate in exploration of these basins and production of oil by facilitating upstream investment through ONGC Videsh Limited.

Another potential strategy is establishing a refining infrastructure in the Andaman and Nicobar Islands which could provide several advantages including proximity to Southeast Asia, reduced transportation time and shipping costs and capacity to export refined products to ASEAN markets.

New partners for LNG security

As India’s demand for natural gas continues to rise, India must strategically position itself in the global gas markets by establishing long-term energy linkages particularly looking at the future geopolitical dimensions.

Malaysia is among the top five global producers and exporters of liquefied natural gas (LNG), with annual production estimated at approximately 70–75 billion cubic meters (IEA, 2024). The country exports around 26–27 million tonnes of LNG annually, primarily under long-term, high-value contracts with major Asian consumers such as Japan and South Korea. India’s LNG imports from Malaysia remain minimal at present. Nevertheless, Malaysia could serve as a viable alternative supplier capable of providing reliable LNG volumes under flexible contractual arrangements. A key advantage is the relatively short shipping duration between Malaysia and India, typically 3-4 days, which enables rapid delivery. Malaysia’s location far away from the West Asian crisis also makes it a reliable source.

Another pillar of India’s LNG diversification source could be Australia which ranks among the top three global LNG exporters. LNG shipments from Australia to India generally take around 9 days and with large-scale LNG projects such as Gorgon, Wheatstone, and Prelude consistent production capacity can be assured.

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Alternative domestic production methods

Adopting unconventional sources of natural gas, particularly Coal Bed Methane (CBM), which is extracted from coal seams could serve as a supplementary source of domestic gas and contribute to reducing import dependence over the long term. The Ministry of Petroleum and Natural Gas has launched Mission Anveshan, a programme for conducting 2D seismic surveys across uncharted onshore sedimentary basins, targeting over 20,000-line kilometres of survey data in seven priority basins (AGGRP, 2025). As an extension of the National Seismic Programme (NSP), the initiative aims to identify untapped hydrocarbon reserves in underexplored basins that collectively hold a significant portion of India's estimated 42 billion tonnes of hydrocarbon resources (AGGRP, 2025). The program supports efforts to reduce the energy trade deficit and enhance long-term energy availability. At current consumption levels, these reserves are estimated to provide roughly 22 years of supply.

Blending programme

India's existing Ethanol Blending Programme (EBP) represents an ambitious strategy to enhance energy security by reducing dependence on crude oil imports. Under the programme, the Government has set a target of achieving 20 percent ethanol blending in petrol by 2030. The initiative has progressed rapidly, with ethanol blending in petrol increasing from 1.53 percent in 2014 to over 19 percent by August 2025 (Government of India, 2025), highlighting significant improvements in its implementation. A similar blending programme could be explored for liquefied petroleum gas (LPG) and other gaseous fuels. In addition to expanding supply sources and domestic production, the Government could consider promoting Dimethyl Ether (DME) as an alternative clean-burning fuel. DME is produced through the dehydration of methanol in the presence of a catalyst, with coal and biomass serving as key feedstocks for methanol synthesis (CSIR, n.d.). DME could then be blended with liquefied petroleum gas (LPG) at levels of up to 20 percent without requiring major modifications to existing infrastructure or distribution systems which could facilitate its gradual adoption in the household cooking fuel sector. This blending strategy could reduce import dependence, and promote the use of domestically sourced energy resources.

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Conclusion

The blockade of the Strait of Hormuz demonstrated that India's upstream energy supply remains highly vulnerable to geopolitical supply shocks, exposing structural weaknesses rooted in external dependence. Though switching towards renewable sources of energy is the best alternative, the transition cannot be rapid but a gradual process. To mitigate the risks associated with its heavy dependence on imports, India should maintain a multi-layered energy security strategy. India must take a flexible energy procurement stance that can adjust based on changing circumstances switching sources simultaneously delineating the cost and time. For this India must hold an energy buffer and several alternatives and wide supply sources that would act as a cushion in times of sudden supply shocks emerging due to geopolitical tensions.

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Declaration on the Use of AI Tools

I hereby declare that this work has utilized ChatGPT-5.0 for the purposes of summarizing content and refining language. The AI tool was not used for generating original research ideas, or content creation. All arguments and analysis presented in this manuscript are the author's own.