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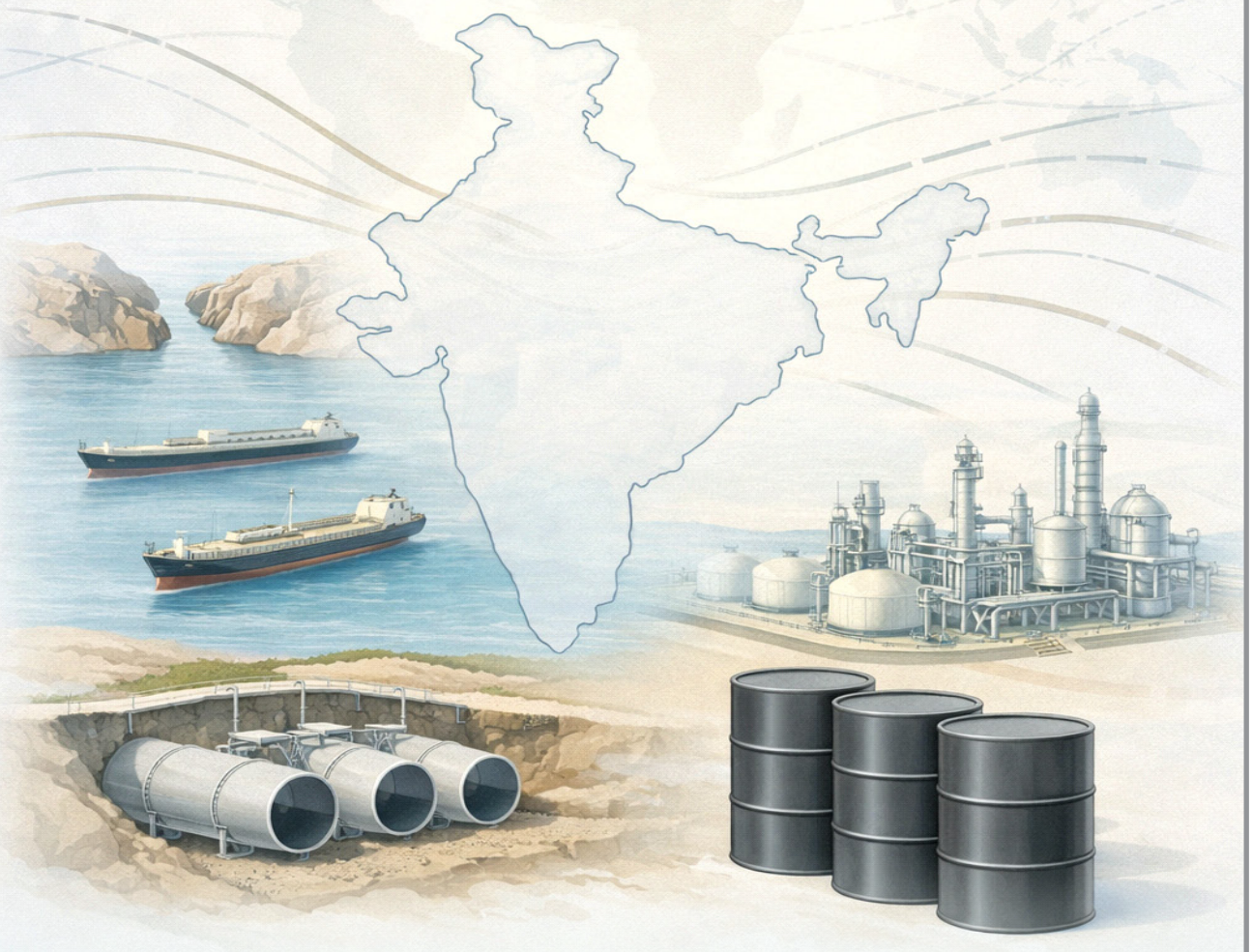
# The Fragile Backbone: India's OilDependenceand the Anatomy of Energy Vulnerability



A deep-data analysis of India's oil import structure, strategic reserve inadequacy, chokepoint exposure, and projected vulnerability across escalating conflict scenarios in West Asia and beyond.

Data Period 2021–2026 | Coverage Imports, Routes, Reserves, Scenarios

***Divyanka Tandon***

# Executive Summary

## The Anatomy of a Structural Vulnerability

India, the world's third-largest oil consumer and second-largest importer, faces a compounding energy security crisis in 2026. The country imports 88% of its crude oil, consumes 5.5 million barrels per day, and holds strategic petroleum reserves that — even at full capacity — cover only 9.5 days of demand. Its strategic buffer, combined with commercial stocks, totals approximately 74 days — well below the IEA benchmark of 90 days.

Three structural fault lines define India's vulnerability: geopolitical dependence on West Asia (which still supplies ~46% of imports), over-reliance on Russian discounted crude (~35% of imports) now being disrupted by US and EU sanctions, and critical chokepoint exposure at the Strait of Hormuz through which an estimated 50% of crude imports transited in early 2026.

- India's crude import dependency rose from 85% (2021) to 88.6% (2025), while domestic production stagnated near 0.65 mb/d
- Russia's share surged from 2% (pre-2022) to 37% (2024), creating a new dependency now under sanction pressure.
- The Strait of Hormuz handles ~50% of India's crude imports and 90% of its LPG — the latter fuels 300+ million households.
- A full Hormuz closure would drain India's SPR buffer in under 10 days; combined commercial stocks provide ~74 days of total cushion.
- Three conflict scenarios — Hormuz blockade, Russia supply disruption, and combined shock — generate GDP impacts ranging from 1.2% to 3.8%

CRUDE IMPORT DEPENDENCY

**88%**

Share of crude oil met by imports, FY 2024–25

RUSSIA'S IMPORT SHARE

**37%**

Up from <2% pre-2022; now largest single supplier

HORMUZ EXPOSURE

**50%**

Share of crude transiting Strait of Hormuz (early 2026)

STRATEGIC RESERVE DAYS

**9.5**

Days of coverage at full SPR capacity (currently ~64% full)

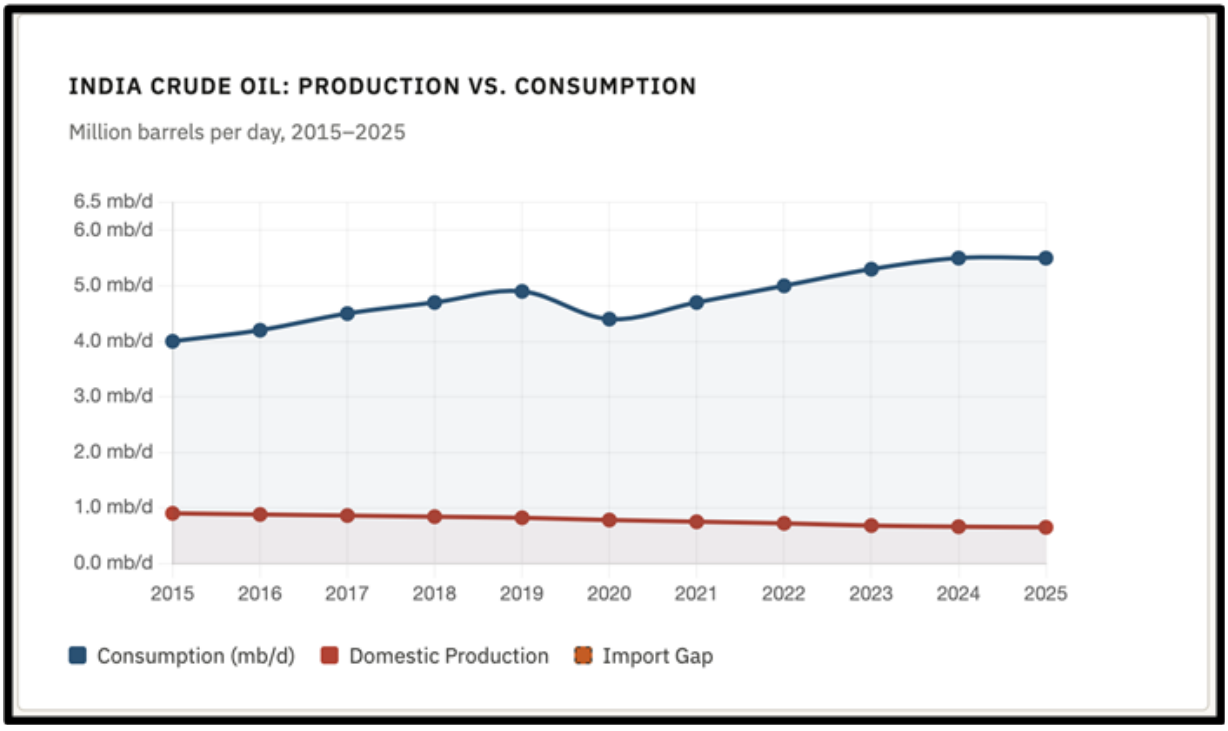
DAILY CONSUMPTION

**5.5mb/d**

World's 3rd largest consumer (2025 data)

## India's Oil Consumption & Import Architecture

India's thirst for petroleum is structural and growing. As the world's fifth-largest economy by nominal GDP and its most populous nation since 2023, India's energy demand trajectory is among the steepest globally. The country consumed an estimated 5.5 million barrels per day (mb/d) in 2025 — a figure the International Energy Agency projects will rise to 7 mb/d by 2030. Yet domestic oil production has barely moved, hovering near 650,000 barrels per day for the past decade. The arithmetic is stark: India must import to survive.

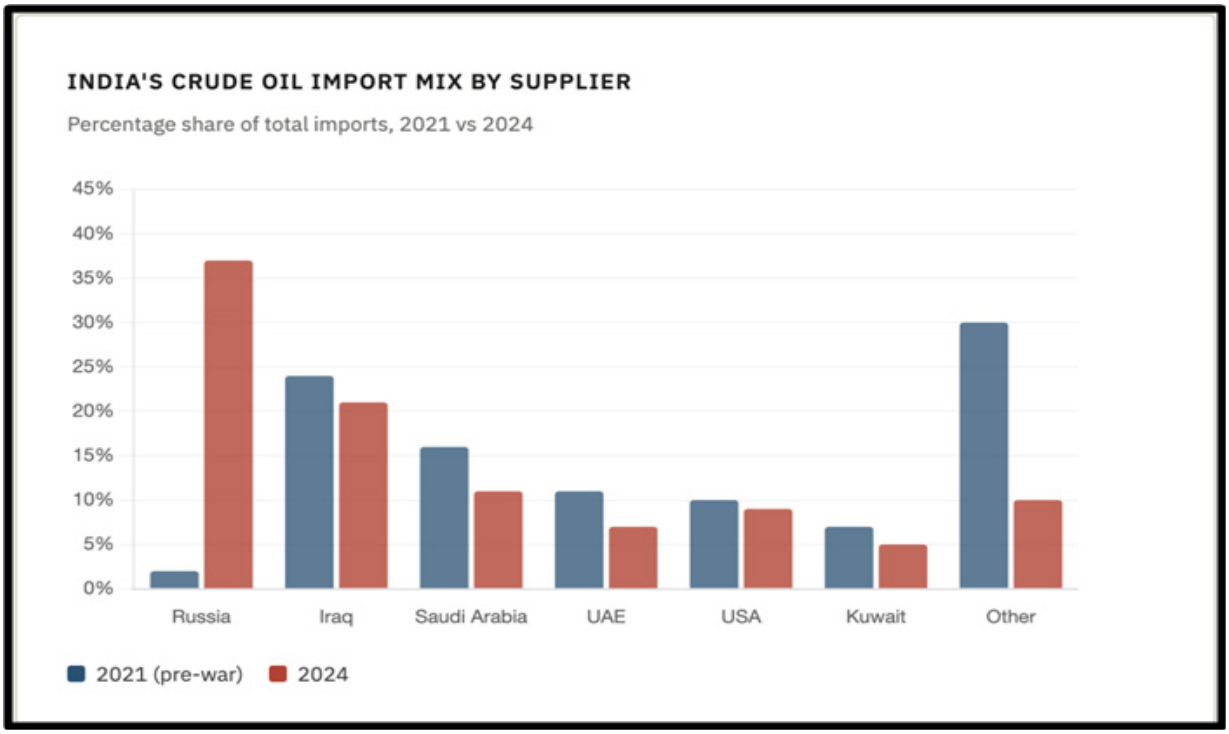



The divergence between consumption and production defines India's energy predicament. In 2015, India produced roughly 0.9 mb/d,while consumption was 4.0 mb/d — a gap of approximately 3.1 mb/d. By 2025, domestic production had actually declined to ~0.65 mb/d while consumption surged to 5.5 mb/d, widening the import gap to nearly 4.85 mb/d. This gap has been growing at roughly 4% annually.

India's import dependency ratio — imports as a share of total consumption — climbed from 75% in 2015 to 88.6% in FY 2024–25. There are no material discoveries or production ramp-ups on the horizon to reverse this trend. ONGC and Oil India Limited, the state-owned upstream operators, have seen flat-to-declining output from ageing fields in Gujarat, Rajasthan, and offshore Mumbai High.

### Structural Context

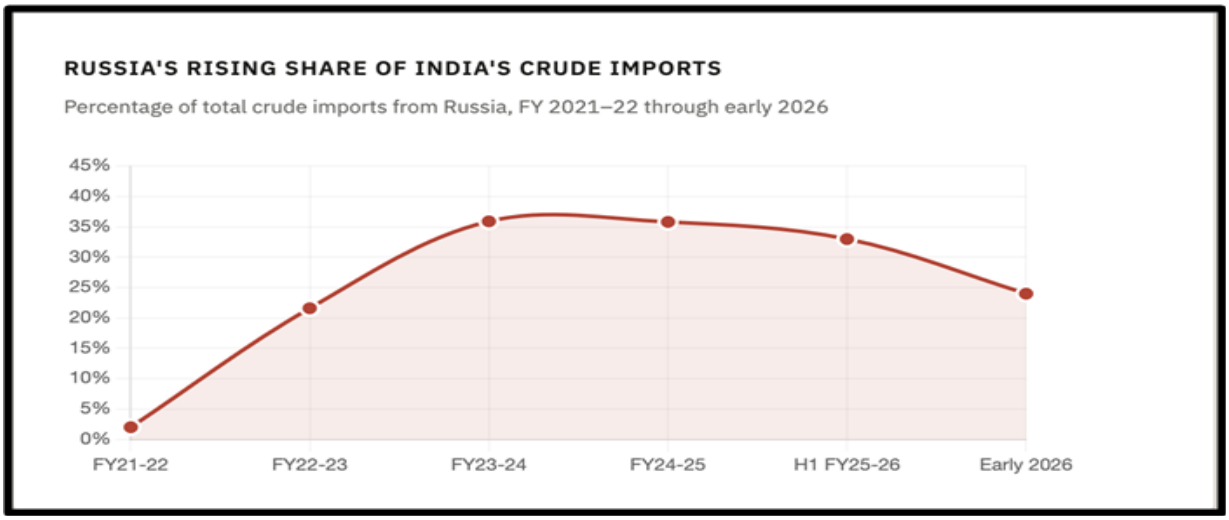
India's oil consumption grew at an average of 4% per year between 2014 and 2024. If this pace continues through 2030, India will need to import approximately 6.2–6.5 mb/d — a near-doubling of current imports relative to the post-2015 baseline.




## The Supplier Transformation: From Gulf Dependence to Russia Dependence

The most consequential structural shift in India's import architecture has occurred since February 2022, when Russia invaded Ukraine. In FY 2021–22, Russian crude accounted for barely 2% of India's total imports. By 2024, that share had exploded to 37%, making Russia India's single-largest supplier — a transformation without precedent in the history of Indian energy procurement.

This transformation was driven entirely by economics. European sanctions on Russian oil, beginning in December 2022, created a structural discount in Russian Urals crude relative to Brent. At peak discount in 2022–23, Indian refiners were purchasing Russian barrels at 15–20% below international benchmarks. ICRA Limited estimates India saved approximately $5.1 billion in FY2023 and $7.9 billion in the first 11 months of FY2024 — a combined $13 billion in import bill relief over two fiscal years.



## The West Asia Legacy

Even as Russia dominated headlines, West Asia retained significant structural weight. Iraq remained India's second-largest supplier at 21% (2024), Saudi Arabia at 11%, and the UAE at approximately 7%. Combined, Gulf producers still account for roughly 46% of India's crude imports — down from 63% in 2021, but still substantial. The proximity advantage of Gulf crude — shorter shipping distances, lower freight costs, familiar crude grades — means West Asia will remain structurally important regardless of geopolitical dynamics.

The sanction squeeze beginning in late November 2025 — when the US sanctioned Russian oil majors Rosneft and Lukoil — began reversing the Russia trend. By early 2026, Russia's share had fallen below 25% for the first time in two years, creating a supplier vacuum that pushed India back toward Gulf producers and raised its Hormuz exposure precisely when tensions in the region were escalating most dangerously.

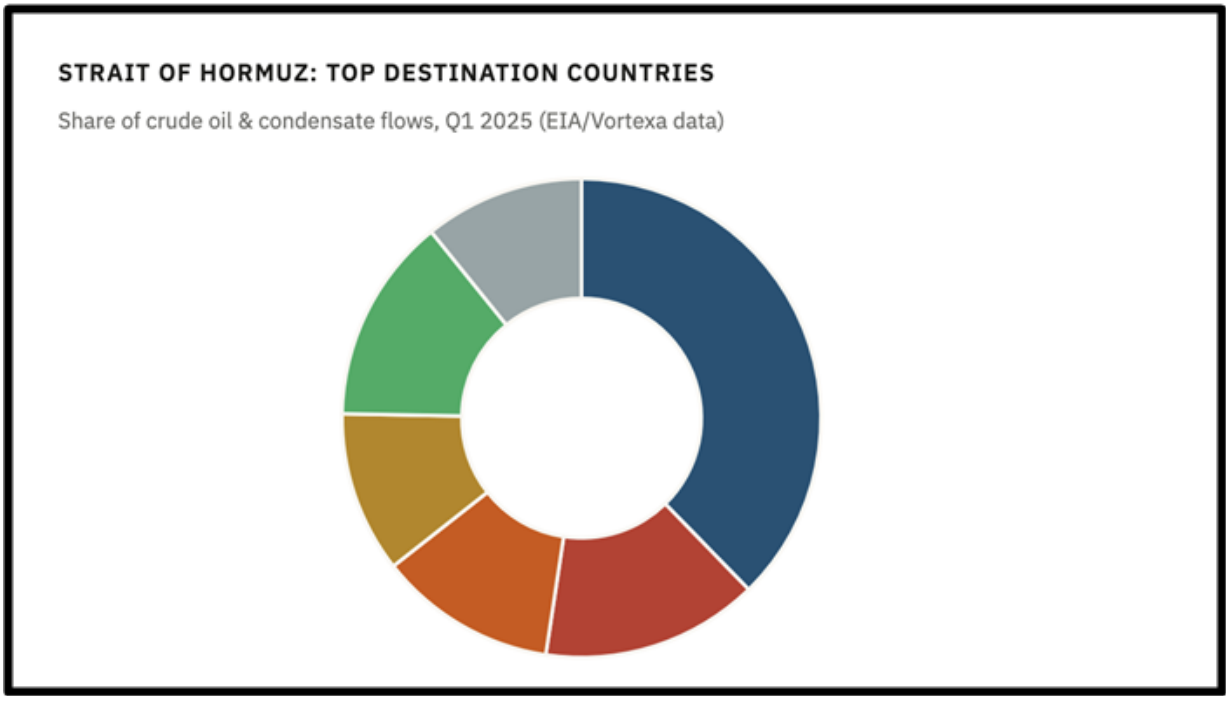
> "Without Russian crude, Indian refiners would likely rely more heavily on Middle Eastern grades, increasing dependence on a single region for supply. Given the uncertainties around Strait of Hormuz flows, maintaining diversified sourcing remains strategically important."
>
> — Sumit Ritolia, Lead Research Analyst, Kpler

| SUPPLIER COUNTRY | 2021 SHARE | 2024 SHARE | VOLUME (MB/D, 2024) | CHANGE |
|---|---|---|---|---|
| Russia | 2% | 37% | ~1.78 | ▲ +35pp |
| Iraq | 24% | 21% | ~1.01 | ▼ -3pp |
| Saudi Arabia | 16% | 11% | ~0.53 | ▼ -5pp |
| United Arab Emirates | 11% | 7% | ~0.34 | ▼ -4pp |
| United States | 10% | 9% | ~0.43 | ≈ flat |
| Kuwait | 7% | 5% | ~0.24 | ▼ -2pp |
| Other | 30% | 10% | ~0.48 | ▼ -20pp |

***Sources: Energy Institute Statistical Review 2025; ICRA India; Ministry of Commerce & Industry; Kpler tanker tracking; DGCI&S***

## Maritime Chokepoints: The Hormuz Exposure Trap

The Strait of Hormuz — the narrow 33-kilometre passage between Iran and Oman — is the single most consequential chokepoint in India's energy supply chain. In 2024, approximately 20 million barrels of oil and petroleum products flowed through the strait every day, representing roughly 20% of global petroleum liquids consumption and over 25% of global seaborne oil trade. India sits at 14.7% of all Hormuz crude oil flows — the second-largest destination after China's 37.7%.

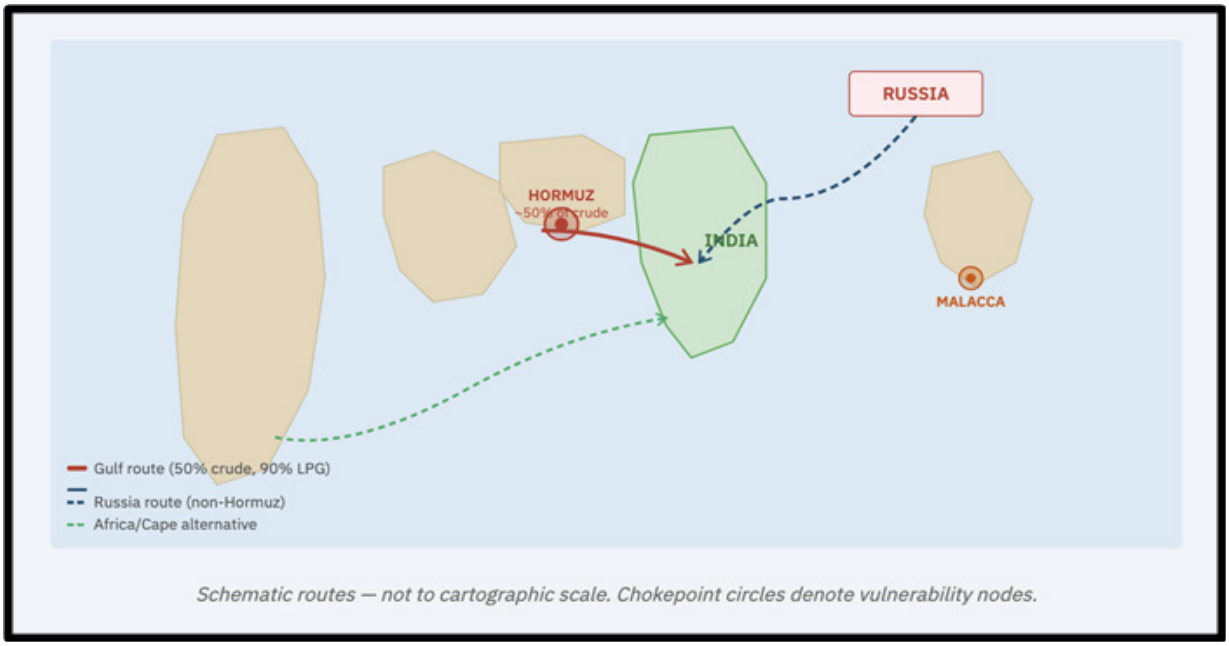



India's exposure to Hormuz has been dynamic. Before the post-2022 Russian pivot, approximately 55% of India's crude imports transited the strait. As Russia-routed volumes grew, Hormuz's share fell to an estimated 45%. However, as Russian sanctions squeezed volumes in late 2025 and early 2026, India's Gulf procurement surged — Kpler data show India's Hormuz dependence had climbed back to approximately 50% by February 2026, with Gulf country imports reaching 2.6 mb/d that month.

## The LPG Dimension: The Hidden Vulnerability

Crude oil is not India's only Hormuz-linked energy exposure. India imports approximately 60% of its liquefied petroleum gas (LPG) consumption, and roughly 90% of those LPG imports transit the Strait of Hormuz. LPG — cooking fuel for over 300 million Indian households — is socially and politically the most sensitive energy commodity. A Hormuz disruption hitting LPG supply would create immediate hardship for the poorest segments of Indian society, triggering inflationary shocks that no petroleum reserve mechanism can readily offset.

Similarly, India's LNG dependence on Gulf sources is rising. Qatar and the UAE together supply approximately 53% of India's LNG imports, according to Kpler data. Nearly all of these transits Hormuz.




*Schematic routes — not to cartographic scale. Chokepoint circles denote vulnerability nodes.*

In 2025, the strait carried approximately 27% of Asia's total LNG imports — and a closure would strand those volumes with no practical alternative routing.

### Crude Oil Exposure

~50% of India's crude imports transit the Strait of Hormuz as of early 2026. This represents approximately 2.75 mb/d at current import levels — enough to cripple refinery throughput within 2–3 weeks if supply ceased entirely.

### LPG Exposure

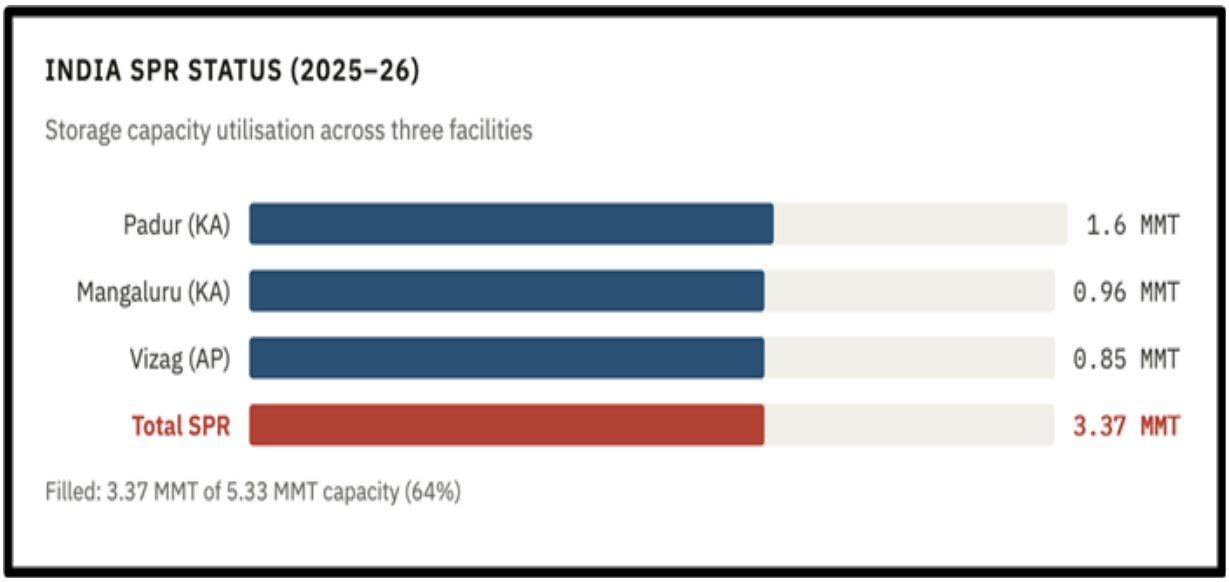
~90% of India's LPG imports transit Hormuz. India imports ~60% of its LPG. A Hormuz closure would eliminate approximately 54% of LPG availability to 300+ million households within weeks.

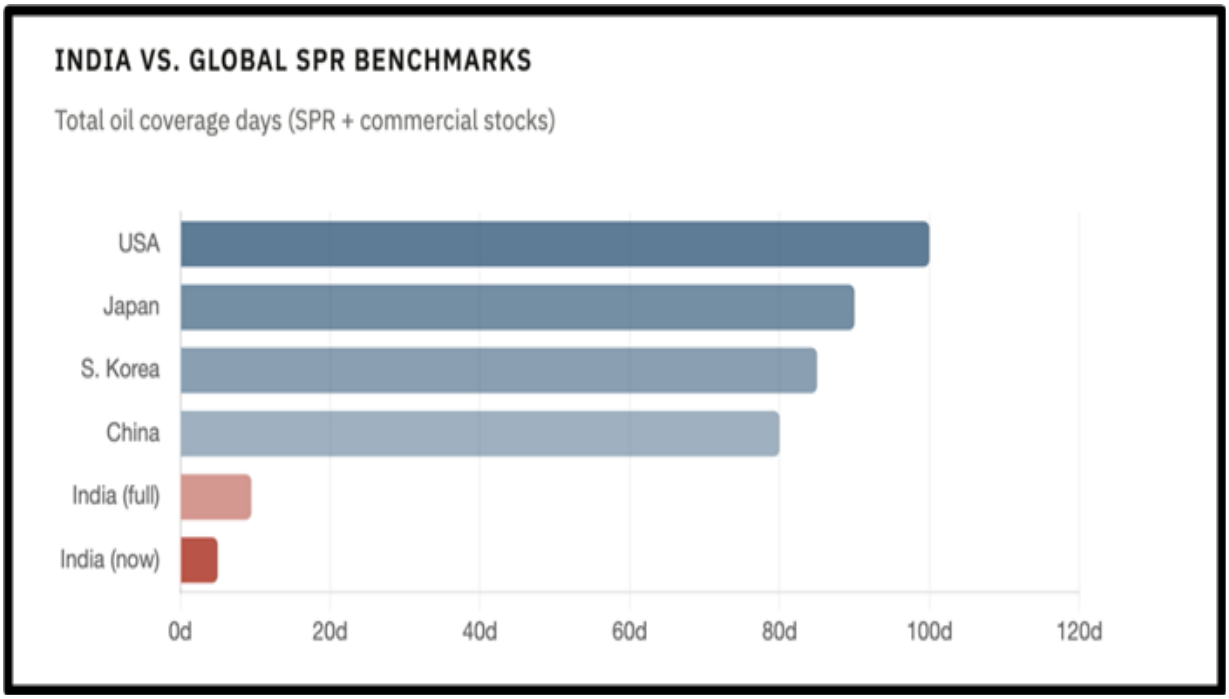
## The Malacca Strait & Secondary Routes

Russia-sourced crude travels via the Cape of Good Hope route or through trans-shipment at Fujairah, UAE, and does not rely on Hormuz. However, once transiting the Indian Ocean, most cargoes pass through the Malacca Strait en route to Indian east coast ports — another chokepoint, albeit one India is less exposed to than Hormuz. The Malacca Strait carries approximately 90,000 vessel transits annually and has no viable bypass for loaded VLCC tankers heading to Indian east coast ports like Paradip and Vizag.

## Strategic Petroleum Reserves: The 9.5-Day Illusion

India's Strategic Petroleum Reserve (SPR) system, managed by Indian Strategic Petroleum Reserves Limited (ISPRL) under the Ministry of Petroleum and Natural Gas, represents the country's primary formal buffer against




supply shocks. The system consists of three underground rock cavern facilities in southern India — Visakhapatnam (Andhra Pradesh, 1.33 MMT), Mangaluru (Karnataka, 1.50 MMT), and Padur (Karnataka, 2.50 MMT) — with a combined storage capacity of 5.33 million metric tonnes, equivalent to approximately 39 million barrels.

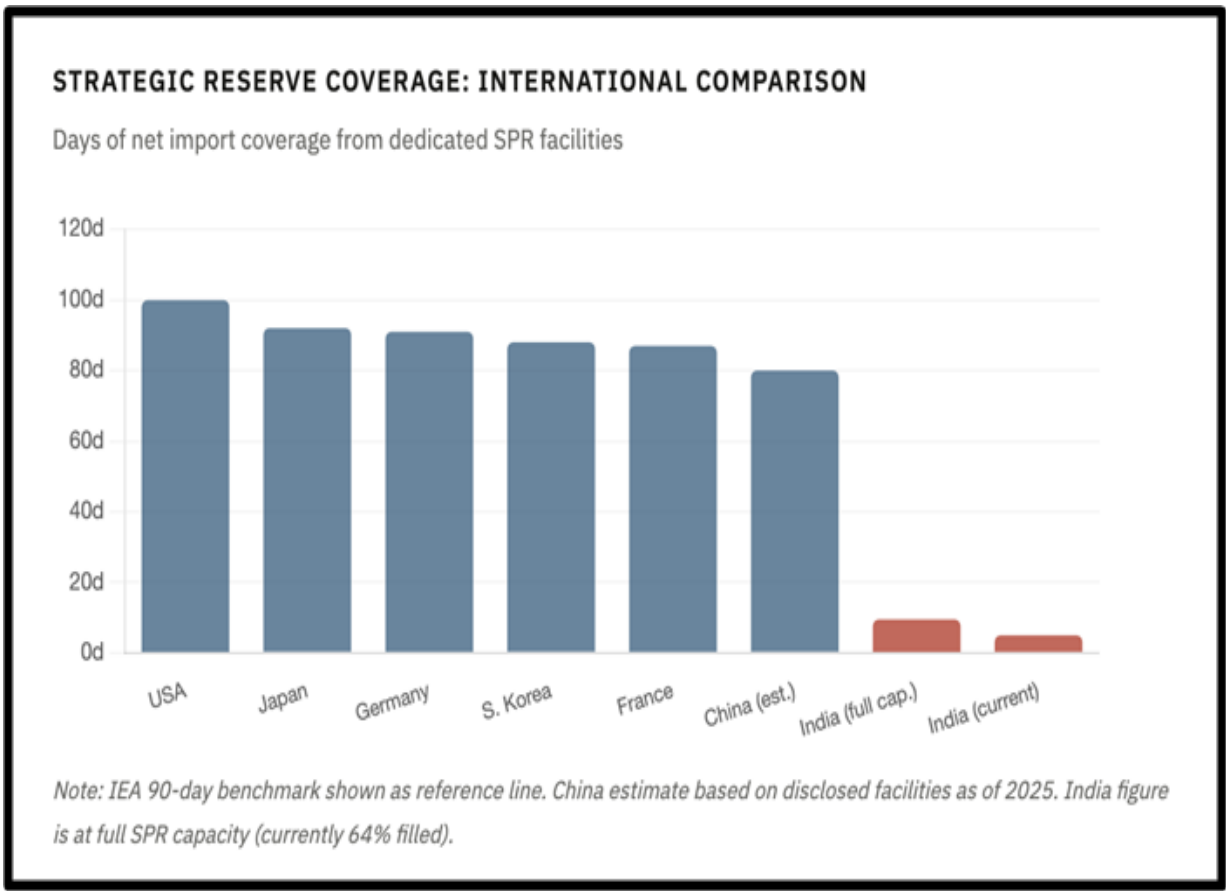
The critical data point: at the current 64% fill rate, the SPR covers approximately 5 days of India's crude requirements. At full capacity, it covers 9.5 days. Even the IEA-recommended 90 days of coverage remains a distant aspiration. India's total energy buffer — combining SPR with commercial stocks held by oil marketing companies at refineries, ports, and floating storage — stands at approximately 74 days. This falls below the IEA benchmark of 90 days and reveals the gap between India's official reserve structure and genuine resilience.

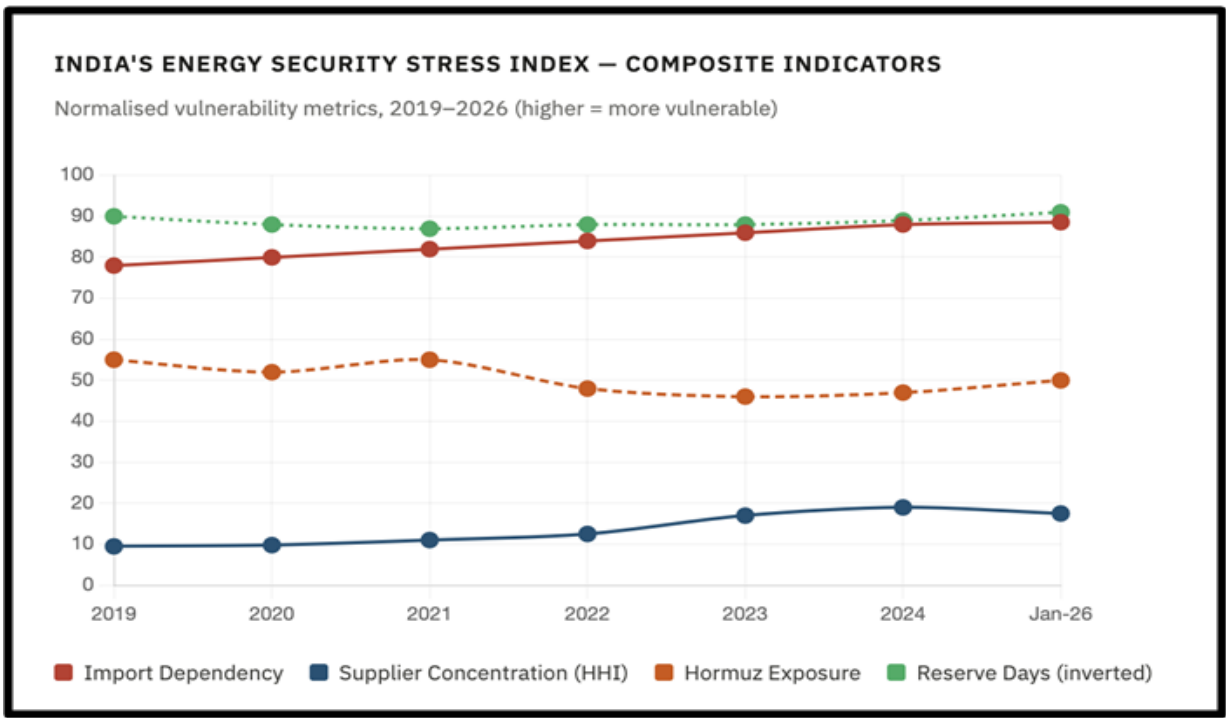
### The Reserve Gap vs. IEA Standard

The IEA requires member nations to hold oil stocks equivalent to at least 90 days of net imports. India's total buffer of 74 days (including all commercial stocks) is 16 days below this standard. India's goal of 90 days of SPR-only coverage remains unachieved, with only 9.5 days of dedicated strategic reserve available at full capacity. The approved Phase II expansion — 6.5 MMT additional capacity at Chandikhol (Odisha) and expanded Padur — would bring SPR-only coverage to approximately 22 days when complete.

## The Comparative Deficit

India's SPR inadequacy is starkest in international comparison. The United States maintains 411 million barrels in four Gulf Coast salt cavern facilities — approximately 100 days of import cover. China, with comparable import volumes to India, has been aggressively expanding its SPR, with 11 new sites planned between 2025 and 2026, adding ~169 million barrels. Japan maintains reserves sufficient for over 90 days. India's 39 million barrel SPR against an import rate of 5+ mb/d is structurally insufficient for a crisis of any duration beyond two weeks.






## Data Trend Analysis: The Converging Stress Lines

Understanding India's energy security posture requires analysing four converging data trends simultaneously: rising import dependency, shifting supplier concentration, growing chokepoint exposure, and stagnant reserve building. These trends do not operate independently — they interact and amplify each other in ways that compound vulnerability rather than average it out.

### The Herfindahl-Hirschman Index of Supplier Concentration

A key metric for evaluating import vulnerability is the Herfindahl-Hirschman Index (HHI) of supplier concentration — the sum of squared market shares. A higher HHI signals greater dependence on a single supplier. In 2021, India's HHI for crude suppliers was approximately 1,100, moderately diversified across Iraq, Saudi Arabia, the UAE, and the USA. By 2024, with Russia at 37%, the HHI had spiked to approximately 1,900 — approaching "highly concentrated" territory. This is a paradox: India diversified away from Gulf suppliers into Russia, but in doing so, created a different, equally dangerous concentration risk.

### HHI Analysis Note

Markets with an HHI below 1,500 are considered competitive; 1,500–2,500 moderately concentrated; above 2,500 highly concentrated. India's crude HHI rose from ~1,100 (2021) to ~1,900 (2024), peaking during the period of maximum Russian dependence. As Russian volumes decline under sanctions pressure in 2025–26, the HHI will shift rather than fall — potentially back toward Gulf concentration.

## The Refinery Lock-In Problem

India's 23 major refineries, with a combined capacity exceeding 250 MMT per annum, have been progressively configured to process heavy-sour grades typical of Russian Urals. This creates a technical lock-in: refineries optimised for Urals cannot easily switch to lighter Arabian grades without reducing throughput efficiency and margins. The sudden decline in Russian supplies in early 2026 — caused by US sanctions and logistical disruptions — forced Indian refiners to scramble for alternative Middle Eastern grades, with some operating at sub-optimal configurations. This refinery inflexibility is an underappreciated dimension of India's energy security vulnerability.

## Conflict Scenario Forecasting: Vulnerability Under Stress

The true measure of energy security is not the baseline state, but resilience under disruption. The following three scenarios model India's supply and economic vulnerabilities across plausible conflict-escalation pathways, based on the current import architecture, reserve levels, and routing patterns as of April 2026.

### SCENARIO A - HORMUZ BLOCKADE

- Iran closes Hormuz following US/ Israeli strikes on nuclear facilities
- ~50% of crude supply (2.75 mb/d) is immediately at risk
- ~90% of the LPG import route is blocked within days
- SPR provides ~5-9.5 days coverage (at current fill rate)
- Commercial stocks add ~65 days of buffer
- Brent price shock to $120-140/ barrel estimated
- India's import bill increases by ~$35-45bn annually at elevated prices
- GDP impact: -1.8% to -2.5% over 12 months
- INR depreciates 12-18% against USD
- Inflation (CPI) could rise 3-4 percentage points

### SCENARIO B - RUSSIA SUPPLY DISRUPTION

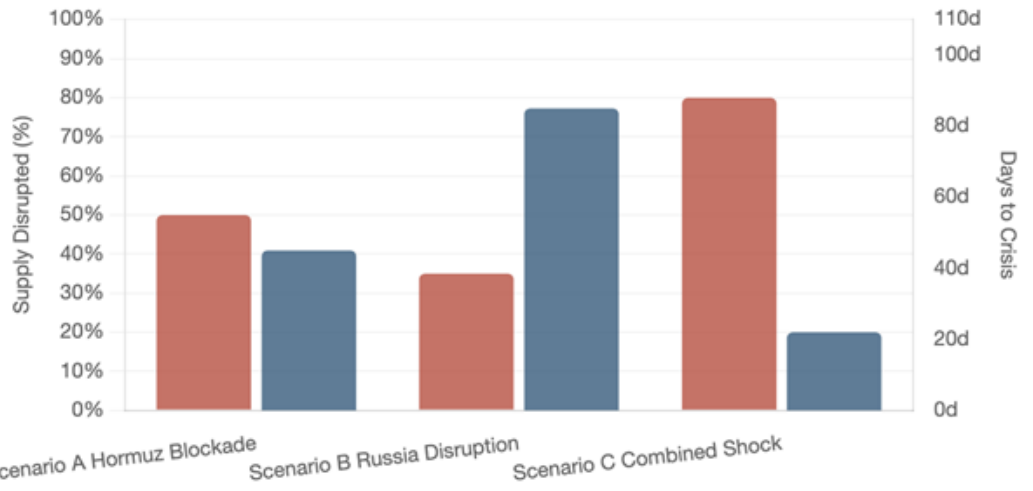
- Full US secondary sanctions eliminate Russian crude flows to India
- ~35% of supply (~1.7 mb/d) must be replaced at market rates
- Discount advantage eliminated; premium costs incurred
- Indian refiners lose ~7-10bn annual savings on import bill
- Refinery throughput efficiency drops 15-20% during transition
- Gulf alternative procurement drives Hormuz exposure to 75%+
- GDP impact: -1.2% to -1.8% over 12-18 months
- Inflation rises 1.5-2.5 percentage points
- Current account deficit widens by -0.8% of GDP

## SCENARIO C — COMBINED SHOCK

- Simultaneous Hormuz disruption AND Russia sanction enforcement
- Combined supply at risk: 70-80% of total crude imports
- Total buffer exhausted within 74 days from commercial stocks alone
- Emergency procurement requires Africa/US Atlantic Basin sources
- Freight premiums and insurance surge 300-500%
- Fuel rationing required beyond Day 45
- GDP contraction: ~3.2% to ~3.8% over 12 months
- INR collapse scenario: 25-35% depreciation
- Inflation: 6-8 pp above baseline
- Potential current account crisis; IMF support scenario activates

**SUPPLY AT RISK & TIME-TO-CRISIS: SCENARIO MODELLING**

Days of supply coverage vs. percentage of supply disrupted under each scenario




*Modelled from ISPRL capacity data, commercial stock estimates, and EIA tanker flow data. Assumes IEA emergency coordination and some alternative sourcing with extended lead times.*

## The Cascade Effects: Beyond Oil Prices

Oil supply shocks do not operate in isolation. An extended Hormuz disruption would trigger a sequence of second-order effects, particularly damaging for India. First, fertiliser supply disruption: up to 30% of global fertiliser trade moves through Hormuz, threatening India's kharif and rabi crop cycles. Second, LPG scarcity would

disproportionately hit rural households that depend on Pradhan Mantri Ujjwala Yojana (PMUY) connections for cooking fuel. Third, currency pressure: India's trade balance, already a source of CAD vulnerability, would widen dramatically as the import bill surges. A sustained $30/barrel oil price spike has historically widened India's CAD by approximately 0.6% of GDP.

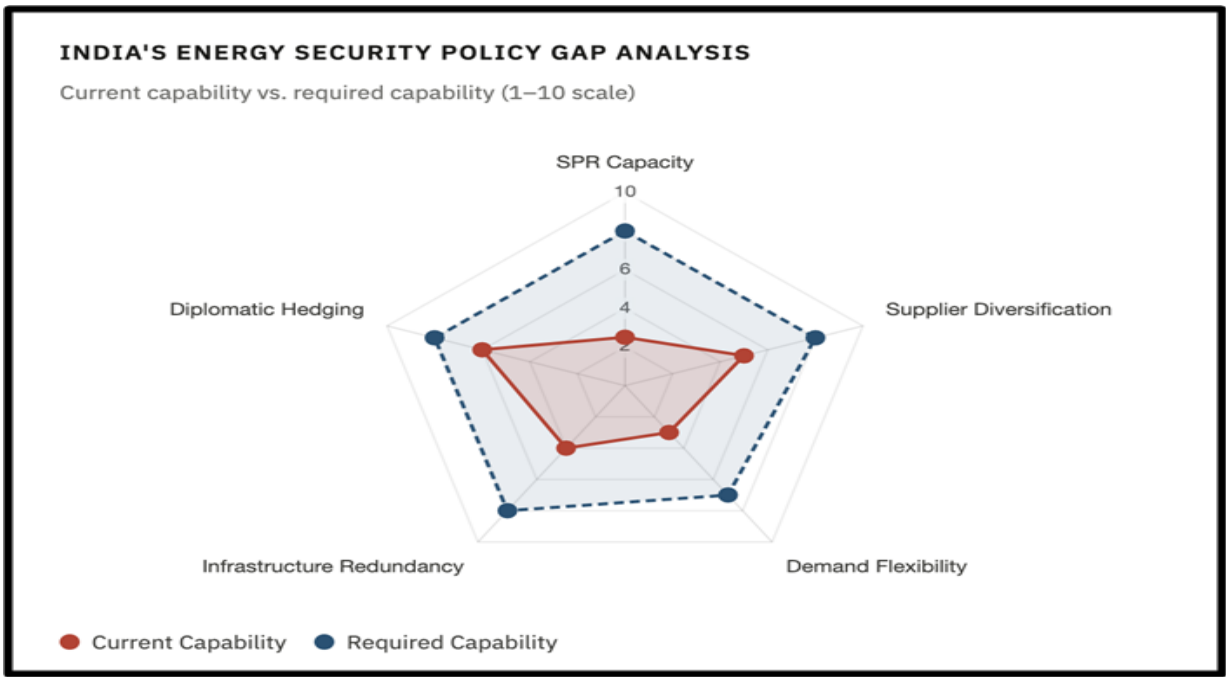
### Macro Transmission Channels

Oil price shock → import bill surge → current account deficit widening → INR depreciation → imported inflation → RBI rate dilemma (tighten to defend currency vs. ease to support growth). This sequence played out partially in 2022 and would be more severe in 2026, given higher import volumes and more complex geopolitical entanglements.

## Policy Gaps and the Path Toward Resilience

India's energy security architecture has evolved, but it remains structurally insufficient for the threat environment of 2026. The government has approved the SPR Phase II expansion, adding 6.5 MMT at Chandikhol and expanding Padur, to be developed through public-private partnerships. Megha Engineering & Infrastructures Limited (MEIL) secured the first private-sector SPR contract at Padur in September 2025 — a positive signal. Future sites at Bikaner (salt cavern), Rajkot, and Bina are under planning consideration, potentially adding another 6 MMT of capacity.

However, three structural gaps persist. First, the pace of SPR expansion is insufficient relative to consumption growth — by the time Phase II is complete, India's daily import requirement will have grown further, leaving coverage days approximately unchanged. Second, India has not



developed a comprehensive Emergency Demand Reduction Plan comparable to IEA protocols — there is no pre-defined rationing framework, sectoral priority matrix, or coordinated communication strategy for a supply crisis. Third, the government's energy diversification strategy — while rhetorically emphasising 40 source countries — has not translated into binding supply agreements with enough volume diversity to neutralise concentration risk.

## Strategic Recommendations from the Data

The data analysis points to six priority interventions. First, accelerate SPR expansion to 100 million barrels (approximately 20 days of import cover) on an expedited 5-year timeline, backed by emergency fiscal allocation. Second, mandate a minimum 30% utilisation of SPR at all times, removing the current ambiguity around fill-rate targets. Third, formalise a multi-year supply agreement with at least two non-Russian, non-Gulf producers (USA, Brazil, West Africa) capable of supplying 0.5+ mb/d to provide a genuine demand pull away from concentration. Fourth, develop dedicated LPG strategic reserves — currently absent from the official reserve framework — sufficient for at least 30 days of import replacement. Fifth, build refinery flexibility to process a wider range of crude grades, reducing the Urals lock-in that now constrains emergency sourcing. Sixth, consider formal IEA observer membership — which India currently holds — upgrade to full membership, enabling access to coordinated emergency oil release mechanisms.

## Key Takeaways

### Ten Data-Driven Conclusions

01

India's crude import dependency has risen to 88.6% in FY 2024-25, up from ~75% a decade ago, with no domestic production trajectory capable of reversing this trend.

02

Russia's share surged from 2% (2021) to 37% (2024), generating $13 billion in cumulative savings, but created a new, sanctions-vulnerable single-supplier concentration risk.

03

West Asia still supplies ~46% of India's crude imports. Russia's decline under sanctions pressure in 2026 is pushing India back toward Gulf sourcing, increasing Hormuz exposure.

04

The Strait of Hormuz now channels approximately 50% of India's crude imports, 90% of LPG imports, and is the critical route for LNG from Qatar and the UAE - a compounding chokepoint risk.

05

India's SPR at 64% utilisation covers only ~5 days of crude demand. Even at full capacity, it covers 9.5 days - far below the IEA benchmark of 90 days of net import cover.

06

Total national oil buffer (SPR + commercial) of ~74 days is below LEA norms. A combined Hormuz-Russia supply shock would exhaust this within 74 days, triggering fuel rationing.

07

A Hormuz-only blockade scenario projects a GDP impact of -1.8% to -2.5%, INR depreciation of 12-18%, and CPI increase of 3-4 percentage points within 12 months.

08

A combined conflict scenario (Hormuz + Russia) projects GDP contraction of -3.2% to -3.8%, potential current account crisis, and systemic fuel rationing beyond Day 45.

09

India's refinery infrastructure has developed a technical lock•in on Russian Urals crude grades, creating throughput inefficiency when emergency substitution to Middle Eastern grades is required.

10

The Phase II SPR expansion (6.5 MMT) is approved but insufficient at India's current consumption trajectory. A 100 million barrel target (=20 days import cover) is the minimum credible strategic buffer for a country of India's scale and vulnerability.

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