India's Energy Security in Post June 2025: Structural Shifts, Geopolitical Risks, and Monsoon Impacts

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Abstract

The global energy landscape is undergoing a historic transformation, with a decisive shift toward renewable electricity. However, this long-term structural change is currently intersected by short-term disruptions, notably the geopolitical fallout from the Israel-Iran conflict and climate-driven variability associated with the Indian monsoon. Output from renewable solar and wind power are subjected to seasonal fluctuation during monsoon. These disruptions cast long shadow on Indian economy, which is otherwise poised to be on swift and steady growth trajectory. This policy paper examines the immediate implications of these disruptions on India's energy sector, quantifies their impacts, and proposes an integrated response framework that balances short-term resilience with long-term energy transition objectives. Specific focus has been made on actions planned by and proposed for the stakeholders in Indian energy landscape.

1. Introduction

India stands at a critical juncture in its energy journey. On one hand, it is aligning with global trends of decarbonization and electrification. On the other, it remains deeply vulnerable to disruptions in fossil fuel supply chains and climatic fluctuations. In June 2025, these tensions have become particularly acute due to three concurrent developments: the global structural pivot towards clean energy, the conflict between Israel and Iran, and a stronger-than-normal southwest monsoon. These developments carry potential to put the macroeconomic stability and ensuing growth momentum into jeopardy in the short term. This paper explores how India can navigate these interlinked challenges through a coherent policy strategy.

2. Structural Shift in Global Energy: Insights from IEA 2025

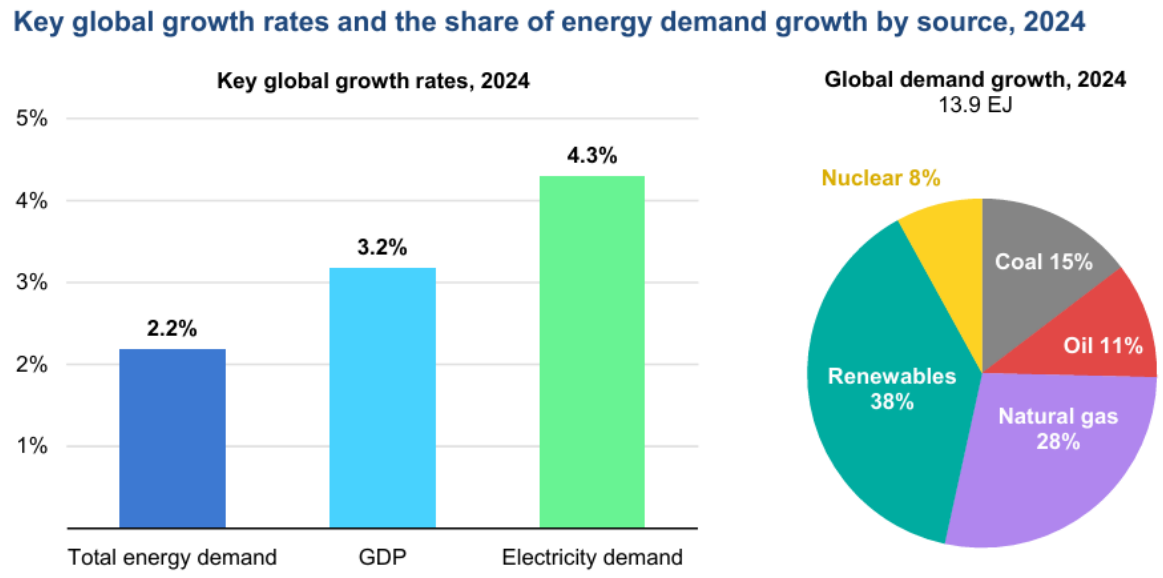
According to the IEA's Global Energy Review 2025, Global energy demand grew by 2.2% in 2024, a notably faster rate than the annual average of 1.3% witnessed between 2013 and 2023.

Despite this, energy demand grew more slowly than the global economy, which expanded by 3.2% in 2024, close to its long-term average.

The world is rapidly transitioning to a clean-energy future. Global electricity demand rose by 4.3% in 2024, led by sectors like cooling, digital infrastructure, and transport. Over 80% of new electricity generation came from renewables and nuclear energy. Clean electricity now constitutes 40% of global generation. Global clean-energy investments in 2025 are projected to reach USD 2.2 trillion, doubling fossil fuel financing.

This shift underscores a structural decoupling from fossil fuels, with oil demand projected to plateau by 2030 and coal flattening in the late 2020s. India, as one of the world's fastest-growing energy consumers, is both a participant and a beneficiary of this transformation. Yet, its energy portfolio remains reliant on imported hydrocarbons, creating exposure to external shocks.

Figure: Share of Global Electricity Capacity Additions (2024)



Source: IEA Global Energy Review 2025

3. Geopolitical Shock: Impact of Israel-Iran Conflict on India's Energy Security

The 90 nautical miles (167 km) long Strait of Hormuz, spotted on the map above, which is located between Oman and Iran, connects the Persian Gulf with the Gulf of Oman and the Arabian Sea. The strait is one of the world's most important oil chokepoints. Large volumes of oil flow through the strait, and very few alternative options exist to move oil out of Persian Gulf if it is closed. More than 85 per cent of crude oil flowing out of the Persian Gulf travels through the strait. Flows through the Strait of Hormuz in 2024 and the first quarter of 2025 made up more than one-quarter of total global seaborne oil trade and about one-fifth of global oil and petroleum product consumption. In addition, around one-fifth of global LNG trade also transited the Strait of Hormuz in 2024, primarily from Qatar. Around 3,000 vessels cross the strait every month. Saudi Arabia moves more crude oil and condensate through the Strait of Hormuz than any other country. In 2024, exports of crude and condensate from Saudi Arabia accounted for 38 per cent of total Hormuz crude flows (5.5 mbd). It is estimated that 84 per cent of the crude oil and condensate and 83 per cent of the LNG that moved through the Strait of Hormuz went to Asian markets in 2024. China, India, Japan, and South Korea were the top destinations for crude oil moving through the Strait of Hormuz to Asia, accounting for a

combined 69 per cent of all Hormuz crude oil and condensate flows in 2024. These markets would likely be most affected by supply disruptions at Hormuz.

Most volumes that transit the strait have no alternative means of exiting the region, although there are some pipeline alternatives that can avoid the Strait of Hormuz. Saudi Arabia and the UAE have some infrastructure in place that can bypass the Strait of Hormuz, which may somewhat mitigate any transit disruptions through the strait. The pipelines do not typically operate at full capacity. It is estimated that about 2.6 mbd of capacity from the Saudi and UAE pipelines could be available to bypass the Strait of Hormuz in the event of a supply disruption. Saudi Aramco operates the 5 mbd East-West crude oil pipeline, which runs from the Abqaiq oil processing center near the Persian Gulf to the Yanbu port on the Red Sea. The UAE also operates a pipeline that bypasses the Strait of Hormuz. This 1.8 mbd pipeline links onshore oil fields to the Fujairah export terminal in the Gulf of Oman. Iran inaugurated the Goreh-Jask pipeline and the Jask export terminal on the Gulf of Oman (avoiding the Strait of Hormuz) with a single export cargo in July 2021.

Blocking the strait will impact the movement of oil and gas to Indian ports and would consequently lead to higher prices, which will, in turn, swell up India's import bill. The world's third largest crude oil importer and fourth largest LNG buyer purchases around 40 per cent of its crude and almost half of its imported LNG from the Middle East.

The outbreak of military action between Israel and Iran on 13th June 2025 has had immediate and severe ramifications for global oil and gas markets with direct consequences for India. Iran holds the world's eighth-largest oil reserves and fourth-largest gas reserves, and is surrounded by other significant energy producers. About 20% of world LNG exports and almost 20% of world oil production pass through the Strait of Hormuz. Some of the imminent fallout of the war are listed below:

- Crude oil prices may surge beyond USD 100/barrel amid fears of supply disruption through the Strait of Hormuz.
- India, importing over 85% of its crude oil and significant LNG and LPG volumes from the Gulf, faces increased energy import costs that would strain its current account and fiscal balances.

- War-risk premiums on shipping and insurance have risen sharply, inflating freight costs for Indian refiners and increasing the landed cost of energy imports.
- Spot LNG prices have also spiked due to heightened geopolitical risk, threatening gas-based power plants, city gas networks, and fertilizer production.
- Following the likely hike in the retail prices of energy products, inflationary pressures will be mounted, affecting household consumption. This may force RBI to reconsider its monetary easing cycle.

This conflict not only exposes India's vulnerability to geopolitical disruptions but also underscores the fragility of fossil-fuel-dependent systems during times of crisis. The strategic response must be immediate and multi-faceted, including both emergency measures and structural adjustments.

Table: Estimated Impact of Geopolitical and Climatic Factors on India's Energy Sector (2025)

Parameter	Estimated Impact	Primary Cause
Crude Oil Import Cost Increase	USD +25–30 billion annually	Israel-Iran Conflict
Spot LNG Price Rise	+35% (Q2–Q3 2025)	Israel-Iran Conflict
Solar Output Reduction	-30% to -40%	Monsoon 2025 (Cloud Cover)
Wind Output Reduction	-10% to -15%	Monsoon 2025 (Curtailment)
Hydropower Generation Increase	+15%	Monsoon 2025 (Reservoir Refill)
Cooling Demand Reduction	-5% to -7%	Monsoon 2025 (Temperature Drop)

Source: IEA 2025, IMD 2025, MoPNG, Analytical Estimates (provided by ChatGPT, validated by the author)

Iran’s crude exports rebounded strongly since the Trump first presidency (2017-2021), reaching about 1.5 million barrels per day (mbd), all of which moves through the Strait of

Hormuz. Those exports are highly dependent on the Kharg Island terminal. Any disruption to this facility would severely hamper the country's ability to move crude out to market.

Before the conflict flared up, the global oil market was on course to be oversupplied by the fourth quarter of 2025, as OPEC+ producers unwind their 2.2 mbp voluntary production cut. Assuming the attacks continue to avoid oil production and export infrastructure, there would be risk premium in oil prices.

For gas, the global impact of any disruption is likely to be smaller. Despite its huge reserves, Iran is only a minor gas exporter. Most of its 29 billion cubic feet per day (bcfd) production is consumed locally. But disruption to its 1 bcfd of gas exports to Iraq, Turkey and Armenia could increase regional volatility

Another impact on gas markets comes from Israel, which has suspended operations at its Leviathan and Karish fields and stopped its exports to Egypt and Jordan. Egypt relies on imports from Israel for about a sixth of its total gas supply. It has started restricting gas consumption in an attempt to prevent shortages for power generation causing blackouts. Egypt has chartered two more floating storage and regasification units (FSRUs) and signed agreements to import more LNG. But supplies will be tight until those vessels are in operation, which is expected to be in the next few weeks.

The key risk of greater impacts, for both oil and gas, would emerge if Iran would decide to attack shipping in the Gulf or the Strait of Hormuz. The impact of that on oil prices would be significant. Brent crude could move towards US$90 to US$100/bbl. But that would be a sharp escalation that would further isolate Iran and hurt its improved relations with Saudi Arabia. The US has indicated that attacks on shipping in the Gulf would trigger a military response, exacerbating the consequences for Iran. That makes such a step unlikely as of now (19th July 2025).

The situation remains volatile, however, and markets are likely to stay on the alert for further shocks. No one can be sure as to the depth and duration of the conflict that is currently conflagrating. US has been a beneficiary of stable oil exports from the Middle East. As a net oil exporter, the US can weather surge in crude prices better than many other economies. But rise in the price of fuel still has consequences for American consumers, sapping their spending

power and potentially stoking inflation. Those economic effects are a reason why the US will remain closely interested in how the conflict progresses.

4. Climatic Volatility: Indian Monsoon 2025 and Its Energy Implications

The Israel Iran war came when India was passing through monsoon. India's renewable energy output exhibits marked seasonal variability, especially during the southwest monsoon season (June to September). The monsoon exerts opposing effects on solar and wind power generation due to changes in atmospheric and weather conditions.

Impact on Solar Power Output

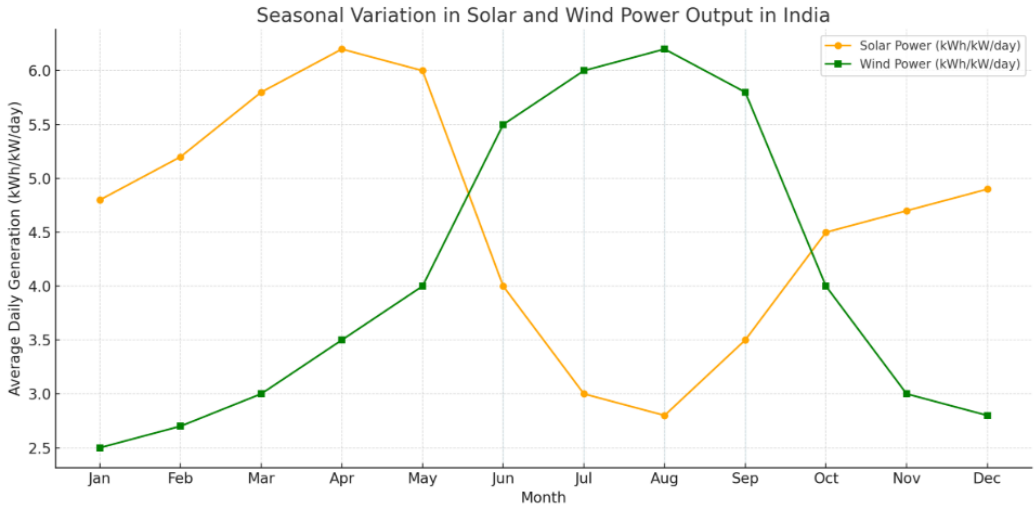
Solar power generation experiences a significant decline of 30% to 50% during the monsoon months. This drop is primarily caused by dense cloud cover, reduced solar irradiance, and frequent rainfall, which limit the amount of sunlight reaching photovoltaic panels. For instance, in Maharashtra, average solar output can fall from about 5.5 kWh/kW/day in peak summer to nearly 2.8–3.0 kWh/kW/day during July and August. Such reductions can constrain supply from utility-scale solar farms and rooftop installations alike, necessitating backup capacity or energy storage interventions.

Impact on Wind Power Output

In contrast, wind power generation peaks during the monsoon, with output rising by 30% to 50%, depending on the region. The strong south-westerly monsoon winds lead to a surge in capacity utilization in wind-rich states like Tamil Nadu, Gujarat, Maharashtra, and Karnataka. Capacity factors in these regions increase from ~25% in the dry months to as high as 45–50% during July and August, aligning well with seasonal electricity demand from agriculture and cooling.

The following chart illustrates the typical monthly variation in average daily generation from solar and wind sources, normalized per kW of installed capacity:

Figure: Seasonal Variation in Solar and Wind Power Output in India



(Source – ChatGPT)

This seasonal complementarity between solar and wind resources is a strategic asset for India's grid planners. It allows for partial compensation of reduced solar availability with increased wind generation, supporting efforts to balance renewable supply and demand.

The monsoon brings about 70% of the annual rains in nearly $4-trillion Indian economy, to which agriculture, employing more than half of a population of 1.4 billion, contributes about 16%. IMD has forecast a strong southwest monsoon for 2025. Rainfall is projected at 105–106% of the Long Period Average (LPA), with June rainfall already at 108%. Monsoon-induced cloud cover and rainfall reduce solar photovoltaic output by 30–40%. Wind generation, while seasonally strong, may face 10–15% reductions due to grid curtailment and storm-related disruptions.

At the same time, a robust monsoon provides benefits such as, hydropower generation capacity increases due to fuller reservoirs. Cooling demand in urban areas may decline by 5–7%, easing peak load pressure. Agricultural output and rural incomes may improve, enhancing economic resilience.

Thus, the monsoon exerts a dual influence, depressing solar output while enhancing hydropower and demand-side relief. This however does not follow a predictable pattern.

5. India is Already Action Ready

India's energy companies, particularly those operating in oil and gas marketing space, have faced similar crises situations earlier and have their playbook ready for the probable contingency measures required for the emergencies such as the one emerging now as fall out of Israel's attack on Iran since 13th June 2025.

It has been the experience that India usually does not resort to blanket demand management measures. Managing supply side security, accessibility and affordability are considered to be important, in view of the critical roles played by energy products in achieving country's priorities and above all for improving quality of life of people. India's crude oil demand is projected at 5.7 mbd in 2025 as per OPEC's latest monthly update. The demand is likely to grow at 2.8 percent per annum annual average from 5.64 mbd in 2024 to 6.66 mbd in 2030. India will continue to be the third largest oil consumer and importer globally.

Currently India imports around 40 percent of crude oil from Russia, 40 percent from Middle East countries including Saudi Arabia, Iraq, the UAE, Kuwait, among others. Remaining oil supply comes from the US, West African nations and some other suppliers. India's oil refiners are sourcing more oil from Russia and the US in June 2025 to mitigate supply related risks in the Middle East, with imports from Saudi Arabia and Iraq having fallen. Total supply from Iraq in June is expected at around 0.86 mbd, down from 1.07 mbd in the previous month, while Saudi oil imports are down to 0.52 mbd from 0.58 mbd in May 2025. India is set to import 2.16 mbd of Russian oil in June 2025, which is the highest in last two years, sharply higher than at 1.85 mbd purchase in May 2025. India's crude oil imports from the US stands at 0.44 mbd in June 2025, a big jump of almost 66 percent from a month ago, when it supplied 0.26 mbd. Russian crude is acting as a critical buffer for India amid the escalating Middle East crisis. Over the past 30 months, Russian oil has steadily supplied over 35% of India's total crude imports, a structural shift that has proven strategically valuable. Unlike oil from the Gulf, Russian crude reaches India without passing through the Strait of Hormuz, a chokepoint now under serious threat due to Israeli-Iranian tensions.

While India boosted oil supply from Russia, imports also increased from countries such as the US, Colombia and Argentina in June 2025. However, oil imports have so far (till 19th June 2025) stayed normal from the UAE, Qatar, Oman and Kuwait, which ship to India via the Strait of Hormuz route, unlike Saudi Arabia and Iraq. India is expected to rapidly diversify its intake

toward the United States, West Africa (e.g., Nigeria, Angola), and Latin America (e.g., Brazil, Guyana) should the Strait of Hormuz be disrupted. These flows are already tested and viable for Indian refiners, though they come with a significant freight premium.

Despite no disruption to oil supplies from the Middle East, shipping and insurance costs have risen for oil refiners by 8 to 9 percent. Freight rates in the Middle East Gulf have spiked, particularly for VLCCs (Very Large Crude Carriers). The cost of shipping crude from Middle East Gulf to India since June 12, 2025 is up by almost 47 percent, Ship owners, being worried about safety and unclear shipping conditions, are choosing to pause and wait, rather than send their vessels through the region. This 'wait-and-see' behaviour has led to fewer ships being available, which means oil companies looking to move crude out of the Middle East Gulf must offer higher rates to attract ships willing to take the risk.

India most likely cannot not escape the impact of unusual spike of crude oil price in global market, if that were to happen as outcome of the war. Higher shipping and insurance cost also cannot be escaped from. Keeping in view the mandate of feeding the market as per demand, Indian oil and gas companies will incur unrecovered cost while maintaining the supply line uninterrupted.

The policy managers, namely Ministry of Petroleum and Natural Gas and Ministry of Finance, conventionally have three routes to handle the higher than usual landed cost. The unrecovered cost arises when crude oil purchase price (landed cost) does not get fully paid for by the retail selling price of petroleum products, which were fixed by the import parity pricing basis of lower landed cost prevailing earlier. Route number one is to pass on the higher cost to the consumer, by increasing the retail selling price of petroleum products including gas and LPG. Second route would make oil and gas marketing companies incumbent to absorb the higher costs. Third route is for the Government of India to absorb the higher costs from the federal budget. Any combination and permutation of these routes is possible with their attendant consequences.

A normative principle of energy economics suggests the first route to be the last option. The first route, which is passing on the high global crude oil price to the consumers, would build inflationary pressure that will likely to create destabilizing macro-economic impact. This will also create pressure on household budget. It will thus dent the saving - investment – income –

consumption circle in the economy, which affects both capital market and the real economy. It is generally known that when prices of retail fuels rise, these tend to rise like rocket. And when conditions are set for the retail prices to fall by softening of global crude oil prices, the retail selling price falls like feather. This route of passing on the global crude oil hike to consumer is therefore not advisable.

The second route of absorption of unrecovered procurement cost by PSU oil and gas marketing companies and the third route of financing by the Government are something like zero sum game. Public sector oil and gas marketing can absorb some burden to the extent and till such time as their balance sheet permits. Thereafter Government of India has to finance the unrecovered costs of PSU oil and gas marketing companies. Government of India has to devise innovative financing mechanisms to shoulder this kind of burden. Instruments like bankable petro bond and subsidy particularly for products of mass consumption having inflationary tendency like petrol, diesel and LPG, are good measures. However active management with clear objective are required for administering these tools.

India cannot escape a worsening Current Account Deficit (CAD), if there is a surge in crude oil price in global oil market. One estimate says that every $10 per barrel increase in oil prices can worsen the annual CAD by nearly $15 billion. The estimate has put CAD at 0.9 percent of GDP for FY 25 and 1.2 percent of GDP for FY 26.

6. Integrated Policy Strategy for Energy and Economic Stability Amid Geopolitical and Climate Risks

Amid intensifying geopolitical uncertainties, climate variability, and a structural transition toward a low-carbon economy, India is required to adopt an integrated energy strategy. This strategy should rest on five interlinked pillars that balance resilience, adaptability, and long-term sustainability.

6.1 Resilience in Fossil Fuel Supply

India must expand its strategic petroleum and gas reserves while ensuring these are regionally distributed to protect against localized disruptions. Import diversification is also critical; sourcing energy beyond traditional Gulf suppliers—by engaging more actively with Africa,

Russia, and the United States—can reduce supply vulnerability. In addition, India should negotiate short- to medium-term LNG and crude oil contracts with flexible pricing and volume terms to respond to market fluctuations. Strategic cooperation with global partners is necessary to develop emergency supply corridors and establish frameworks for shared energy reserves, enhancing collective resilience in times of crisis.

As energy management system prevails now, many of these measures are already being followed, with appropriate diplomatic back up.

6.2 Renewable Energy Smoothing and Grid Flexibility

To manage the seasonal volatility of renewable energy, particularly during the monsoon season, India should invest in large-scale grid-connected battery storage and pumped hydro systems. These technologies can help mitigate the estimated 35% decline in solar output during monsoon months. Strengthening forecasting capabilities by use of AI and transmission infrastructure for wind energy are vital to handle the roughly 12% seasonal variability in wind generation. Furthermore, dynamic load balancing and demand-response mechanisms should be deployed, especially across industrial and urban zones, to improve grid stability and responsiveness during peak variability periods.

Some of these measures are already in the agenda of energy managers and Governments. These call for revamping large track of transmission network with appropriate technology and investment.

6.3 Climate-Adaptive Energy Planning

Integrating climate intelligence into energy operations is increasingly important. India's energy dispatch algorithms should incorporate probabilistic monsoon forecasts provided by IMD to anticipate and manage supply-demand imbalances. Planning should include contingency strategies for rainfall deviations of ±5% from the Long Period Average (LPA), particularly to manage hydropower output and agricultural load. Additionally, during monsoon months, the country should scale up distributed renewable energy deployment in drier western states, thereby leveraging regional advantages to offset deficits in other parts of the grid.

6.4 Inflation Management and Fiscal Cushioning

In order to maintain economic stability in the face of energy price volatility and monsoon-related demand shocks, India should institute a targeted fuel subsidy mechanism that activates automatically when global fuel prices breach pre-defined thresholds. Temporarily adjusting fuel excise duties can also serve as a counter-inflationary measure during global price surges. On the fiscal side, employment guarantee schemes such as MGNREGA should be strategically expanded during poor monsoon seasons to provide income security and support aggregate rural demand.

Some of these fiscal and administrative measures have been tried in India with varying degree of success. RBI keeps a close tab on these issues as a matter of their regular monitoring exercise and adjusts the monetary instruments to maintain macroeconomic stability, both internal and external and to keep inflation within their flexible target.

6.5 Accelerating Long-Term Transition with Resilience Lens

India's long-term transition to a low-carbon economy should be front-loaded by accelerating the deployment of renewable energy capacity during non-monsoon quarters when installation and output are more reliable. Public policy should incentivize research and development in clean energy technologies while promoting the localization of critical components such as solar modules, electrolyzers, and storage systems to reduce supply chain dependencies. Finally, state-level energy transition plans should be developed and implemented with resilience criteria at their core, ensuring alignment with both national climate goals and local vulnerability profiles.

Summarily, this five-pillar framework offers an integrated pathway for India to strengthen its energy security, contain inflationary risks, and drive structural transformation. By bridging short-term safeguards with long-term transition objectives, the strategy enables India to navigate a complex and rapidly changing global energy landscape with stability and purpose.

7. Conclusion

India's energy policy in post June 2025 must simultaneously address long-term transformation and short-term instability. The structural shift toward clean electricity is irreversible and

beneficial, but the Israel-Iran conflict and monsoon variability highlight the fragility of transitional energy systems. A multi-pronged policy that enhances resilience, smoothens variability, and deepens the clean energy transition is essential to safeguard India's energy security and economic stability in the face of compounding risks. Immediate actions to mitigate the fallout of the Israel-Iran conflict must go hand-in-hand with strategic planning for climate variability and future supply security.

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