

**The Hindu Important News Articles For UPSC CSE**

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**Page 01 :GS II : International relations / Prelims Exam**

The visit is the first high-level diplomatic exchange from Washington since the outbreak of the U.S.-Israel war on Iran. It serves as a structural pivot to restore stability and predictability to India-U.S. ties, which have faced friction over the Trump administration's global tariff-heavy economic policies. It underscores a mutual acknowledgment that despite deep economic friction and differing regional priorities, the core components of the Comprehensive Global Strategic Partnership remain uncompromised.

**Core Pillars of Discussion & Geopolitical Alignment**

**A. Maritime Security and Global Commerce**

Both nations issued an explicit call for "unimpeded" maritime trade, focusing on the security of international waterways.

**U.S. and India call for 'unimpeded' sea trade**

‘Tactical’ ties with other countries not at India’s ‘expense’: U.S. Secretary of State Marco Rubio | Trump speaks over the telephone at an event, says India can 100% count on the U.S. President | In day-long meeting with Jaishankar, the top U.S. diplomat discusses energy, trade, and visa issues

**Kallol Bhattacharjee**  
 NEW DELHI

The United States works with many countries at a “tactical” level, but those relations will not disturb the strategic partnership with India, U.S. Secretary of State Marco Rubio said here on Sunday.

Addressing a joint press conference at the Hyderabad House lawns, Mr. Rubio said the idea of a “free and open Indo-Pacific” went beyond the Indo-Pacific to other “international waters” and accused Iran of blocking the Strait of Hormuz while sponsoring proxy terror groups.

Speaking on the occasion, External Affairs Minister S. Jaishankar acknowledged the disruption to supply chains because of the U.S.-Israel war on Iran, and said that both India and the U.S. had “very strong interest” to ensure “safe and unimpeded maritime commerce”.

“As far as our relations with other countries, yeah, we have relations and we work at the tactical level, for example, and in many other ways with countries



**Pivotal talks:** External Affairs Minister S. Jaishankar and U.S. Secretary of State Marco Rubio address the press at Hyderabad House in New Delhi after their meeting on Sunday. SHIV KUMAR PUSHPAKAR

all over the world. So does India. That’s what responsible nation states do but I don’t view our relation with any country in the world as coming at the expense of our strategic alliance with India...,” Mr. Rubio said.

He was responding to a question on the Pakistan-U.S. ties that are being discussed worldwide because of the prominent role that Pakistan has been playing in bringing the conflict in the Gulf to a pause.

Mr. Rubio, who arrived

in India for a four-day visit on Saturday, held a day-long meeting with Mr. Jaishankar and other officials of the Indian side including Foreign Secretary Vikram Misri, in which energy, bilateral trade, and visa issues for skilled Indian workers were among the items discussed.

**Trump speaks**

Later on Sunday night, U.S. President Donald Trump called Prime Minister Narendra Modi a “great friend” and said India can

“count on me 100%”. In a telephone call with U.S. Ambassador Sergio Gor, which was played out loud during an event at the Bharat Mandapam celebrating 250 years of U.S. independence, where both Mr. Jaishankar and Mr. Rubio were present, Mr. Trump said the U.S. was closer to India than ever. “I love the Prime Minister... I am a big fan [of Mr. Modi]... we have never been closer to India and India can count on me 100% and our country. If they [India] ever need

**Congress targets Modi over Rubio’s trade claim**

**The Hindu Bureau**  
 NEW DELHI

Targeting Prime Minister Narendra Modi over U.S. Secretary of State Marco Rubio’s statement that India has committed to purchasing \$500 billion worth of U.S. goods over five years, the Congress on Sunday alleged the “compromised PM” was going the extra mile to

appease his “good friend”. Congress leader Jairam Ramesh questioned why key announcements over India’s foreign policy were emanating from U.S. Noting imports from the U.S. stood at \$52.9 billion, he said this would have to be doubled to honour the commitment by Mr. Rubio.

**FULL REPORT ON**  
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help, they know where to call,” Mr. Trump said.

Mr. Rubio’s visit to India is the first by a senior official from Washington since the U.S. and Israel launched the war on Iran on February 28. He claimed that the war had “clear goals” and accordingly, the U.S. campaign had destroyed Iran’s Navy and “long-range” missile capability, saying “Iran can never possess a nuclear weapon”.

He focused on the chokehold that Iran has sus-

tained on the Strait of Hormuz. “And look what they’re doing now. They are holding hostage civilian vessels, including ships that have now been stuck in the Persian Gulf. They have laid mines in an international waterway. And yet, despite all of that, the United States remains committed to finding a peaceful, a diplomatic solution to this crisis,” said Mr. Rubio.

The visiting dignitary and Mr. Jaishankar both referred to the challenges

that have emerged before the energy market in recent months and sought an end to the stalemate. “We are working on having an open Strait of Hormuz without tolls,” Mr. Rubio said, contradicting Iranian officials who had claimed in Delhi that Iran would start charging money from the transiting ships for the services that it provides in the Strait.

India is among “very few countries” that have “very strong relations” with the U.S., Israel, Iran and the Gulf countries, Mr. Jaishankar said. However, he cited the “current situation in Hormuz and said that to deal with the prevailing risks, it is necessary to diversify India’s energy supplies.

Responding to a question on the Trump administration taking a tough line on trade relations with India, Mr. Rubio said it was not aimed at India alone and that it was a general trade policy that the Trump administration came up with to counter the “outsourcing-based” economy of previous U.S. administrations.

(With inputs from PTI)

- **The Strait of Hormuz Crisis:** The ongoing war has heavily disrupted critical supply chains due to Iran’s retaliatory choking of the Strait of Hormuz, including laying naval mines and seizing civilian vessels.
- **Contradicting Iranian Narrative:** Sec. Rubio stated that the U.S. is aiming for an "open Strait of Hormuz without tolls," directly pushing back against Iranian declarations of enforcing transit levies on vessels.

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**Con.- 09820971345, 9619071345, 9223209699**  
**G-mail-lakshyaacademymumbai@gmail.com**

- **Freedom of Navigation:** The U.S. expanded the scope of a "free and open Indo-Pacific" to include all vital international waters, seeking to align India with its broader freedom of navigation operations.

### B. Strategic Autonomy vs. Tactical Relations

A significant takeaway for Indian foreign policy is the explicit reassurance regarding third-country engagements.

- **The Pakistan Factor:** In light of Pakistan playing a visible diplomatic role in mediating pauses in the Gulf war, domestic and international questions arose about a potential shift in Washington's regional priorities.
- **The "Zero-Sum" Negation:** Sec. Rubio clarified that while the U.S. maintains "tactical" relations globally (including with Pakistan), these arrangements do not come at the expense of its core strategic alliance with India.

### C. Energy Security and Market Diversification

As one of the world's largest energy consumers, India is severely vulnerable to West Asian supply shocks.

- **India's Multi-Alignment Dilemma:** EAM Jaishankar noted that India belongs to an exclusive group of nations maintaining strong diplomatic channels with the U.S., Israel, Iran, and Arab Gulf states alike.
- **Supply Chain Resilience:** Due to the severe risks exposed by the blockage of the Hormuz choke point, India highlighted its strategic imperative to actively diversify its external energy sourcing to cushion its domestic economy from global crude volatility.

*Aim, Think & Achieve*

### D. Trade Recalibration and Functional Issues

The delegation actively sought to separate broader administrative trade policies from targeted bilateral friction.

- **Global Tariffs Demystified:** Sec. Rubio defended the Trump administration's aggressive trade maneuvers, clarifying that they are part of a macro-economic shift away from previous "outsourcing-based" economic models rather than a policy designed to target India. Both sides signaled that they are on the verge of a long-term, sustainable trade agreement.
- **Bilateral Focus Areas:** Deliberations progressed on resolving visa challenges for skilled Indian professionals, critical energy imports, and ongoing technology and defense sharing.

### High-Level Leader-to-Leader Chemistry

A noteworthy diplomatic highlight occurred during the 250th anniversary celebration of U.S. independence at the Bharat Mandapam. U.S. President Donald Trump, via an amplified telephone call, directly reaffirmed his personal bonhomie with PM Narendra Modi, labeling him a "great friend" and stating that India could "count on the U.S. 100%." This top-level reassurance injects a high layer of political predictability into the partnership, acting as a buffer against institutional or trade-level frictions.

### Analytical Takeaways for UPSC

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**G-mail-lakshyaacademymumbai@gmail.com**

Dimension	Key Analysis / UPSC Application
<b>GS Paper II: International Relations</b>	<b>Strategic Autonomy:</b> India's calculated position on the U.S.-Iran war proves its adherence to independent foreign policy. It balances structural proximity to the U.S. with distinct energy dependencies on West Asia.
<b>De-hyphenation of Ties</b>	The U.S. validation of "tactical vs. strategic" ties ensures that India-U.S. relations are insulated from Washington's transactional maneuvers with Islamabad.
<b>Geo-Economics</b>	Emphasizes the vulnerability of India's energy corridors and highlights the structural necessity for alternative pathways like the <b>International North-South Transport Corridor (INSTC)</b> and direct supply diversification.

The Hyderabad House meeting indicates that India and the United States are successfully managing the classic balance between immediate transactional differences (trade tariffs, visa restrictions) and vital long-term convergence (maritime security, containing regional instability, Indo-Pacific stability). While economic vulnerabilities in the energy sector will push New Delhi to accelerate its sourcing diversification, the absolute geopolitical backing from the highest levels of the U.S. administration ensures that the strategic momentum of this bilateral partnership remains firmly intact amid a highly volatile global order.

### UPSC Prelims Exam Practice Question

**Ques: Q1. Consider the following statements regarding the Strait of Hormuz:**

1. It is a critical maritime chokepoint for global crude oil trade.
2. Any disruption in the Strait directly affects India's energy security.
3. It connects the Red Sea with the Mediterranean Sea.

**Which of the statements given above is/are correct?**

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

**Ans: a)**

### UPSC Mains Exam Practice Question

**Ques:** Discuss the significance of strategic autonomy in India's foreign policy in the context of the ongoing U.S.-Iran tensions and India-U.S. relations. **(150 Words)**

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**Con.- 09820971345, 9619071345, 9223209699**  
**G-mail-lakshyaacademymumbai@gmail.com**

**Page 07:GS II : Social Justice / Prelims Exam**

The publication of the SCORPIO-PEP trial marks a watershed moment in the global fight against COVID-19 and prepares humanity for future pandemics. While vaccines have been our primary defense, a critical gap remained in Post-Exposure Prophylaxis (PEP)—preventing someone from getting sick after they have been exposed to an infected individual. Ensitrelvir bridges this gap by targeting the virus's replication machinery during the crucial incubation window, reducing symptomatic infections within households by 67%.

**Core Pillars of Analysis & Scientific Breakdown**

**A. The Mechanism: Targeting the Viral "Scissors"**

Unlike bacteria, which are independent living cells with structures like cell walls that antibiotics can easily target, viruses are simple genetic packages that hijack human cell machinery to replicate. This makes designing antiviral drugs difficult without harming the human host cell.

- **The Protease Dependency:** When SARS-CoV-2 infects a cell, it produces its proteins in one continuous, non-functional chain. To become active, this chain must be precisely cut into individual proteins by two viral enzymes: the Main Protease (M<sup>Pro</sup>) and the Papain-like Protease (PL<sup>Pro</sup>).
- **The Target Advantage:** Human cells do not possess enzymes identical to M<sup>Pro</sup>. Therefore, a drug that deactivates M<sup>Pro</sup> safely stops viral replication without interfering with human cellular functions.

**Long-awaited anti-COVID drug is also a milestone against future viruses**

Betacoronaviruses have now caused three major outbreaks in recent memory; drugs like Ensitrelvir provide scientists with a valuable starting point against this entire sub-family of viruses, possibly allowing humankind to respond more quickly when the next virus will inevitably emerge

Arun Panchapakesan

The recent success of Ensitrelvir at preventing COVID-19 is a milestone in a drug quest that began with a singular development at the start of the pandemic. In January 2020, the full-length genome sequence of a strain of the SARS-CoV-2 virus was posted on an online discussion forum for virologists. The sequence revealed that SARS-CoV-2, like its relative SARS-CoV-1, keeps most of its proteins as one long chain. The individual proteins are then cut from this chain and released by enzymes called proteases.

Inconvenient guests SARS-CoV-2 has two proteases called the main protease (M<sup>Pro</sup>), which does most of the cutting, and the Papain-like protease (PL<sup>Pro</sup>) which cuts the three sites at one end of the chain that the M<sup>Pro</sup> does not process. Almost immediately after the genome sequence was published, scientists knew that both these proteases were attractive drug targets.

Viruses are made of the same material as their host cells. The viral membrane is derived from the host's cell membranes, and the viral proteins are made by the host cell itself. This makes antiviral drug development more challenging than developing drugs against, say, bacteria.

Most other pathogens are living cells with several features that humans do not have. For instance, bacteria have a rigid cell wall. Antibiotics can be made that block the synthesis of this cell wall, and those antibiotics will affect only the bacteria without affecting humans much. Also, that antibiotic will work against most classes of bacteria because most of them have a cell wall. Viruses, however, do not offer such conveniences. Since they rely heavily on the host cell's machinery, drugs that attack the virus can also risk damaging healthy cells. As a result, there is no broad-spectrum antiviral drug. Instead, scientists usually need to design drugs specifically for a particular virus, or if they are lucky, for a group of closely related viruses that share similar proteins.

A drug shelved This is why viral proteins that are essential for the virus while being significantly different from human proteins are extremely valuable drug targets. Both SARS-CoV-2 proteases fit this description perfectly. The virus cannot replicate without them and human cells do not have identical versions of these enzymes. Among them, M<sup>Pro</sup> was the first choice for most researchers.



A person diagnosed with COVID-19 being shifted to a ward at King George Hospital, Visakhapatnam on January 22, 2022. K. A. DEEPAK

When scientists sequenced the SARS-CoV-2 genome, those at Pfizer realised its M<sup>Pro</sup> protease was very similar to that of SARS-CoV-1. It so happened that a few years ago, they had developed an intravenous drug called PF-00835231 targeting the M<sup>Pro</sup> of SARS-CoV-1. However, when the virus vanished in early 2004, they shelved the compound thinking they would not need it again. In 2020, knowing that the two M<sup>Pro</sup> proteins are similar, they set out to re-engineer PF-00835231 because an intravenous drug would be useless at controlling a pandemic. The size of COVID-19, where most people would not get admitted to a hospital. After a few months, they developed Nirmatrelvir. By the time they finished clinical trials, it was already late 2021.

Different approach However, while Nirmatrelvir was very effective as an oral drug, it had major problems. First, it was metabolised very quickly by the liver. To keep it in the bloodstream for longer, scientists had to add a second drug, Ritonavir, to the regimen to slow down the liver's ability to metabolise Nirmatrelvir. The problem? Ritonavir had dangerous interactions with common heart and blood pressure medications. And then there was the added side effect of a bitter aftertaste. Around the same time that Pfizer was engineering Nirmatrelvir, a Japanese

pharmaceutical company named Shionogi took a different approach to targeting M<sup>Pro</sup>. Instead of making and testing millions of potential drug candidates, they decided in the interest of time that they would use computational chemistry to 'virtually' screen compounds.

Using the structure of the M<sup>Pro</sup> protease, they simulated thousands of molecules that would bind the protease and inactivate it. This approach quickly identified a promising molecule that they could then test further. Then they partnered with the International Institute for Zoonosis Control at Hokkaido University for testing. With a few tweaks, they came up with a molecule that stayed in the blood for a long time without the need for additional drugs and did not have the bitter aftertaste. They called this molecule Ensitrelvir.

SCORPIO-PEP trial Ensitrelvir was granted emergency approval in Japan for use in November 2022 to treat mild-to-moderate COVID-19. In early 2024, it was granted full authorisation for regular use. Now, a new paper in the *New England Journal of Medicine* has reported that it can also be used for post-exposure prophylaxis — to prevent infection after exposure to the virus.

The international study, called the SCORPIO-PEP trial, involved 2,387

participants, all of whom were exposed to an infected household member. They were assigned to a test or a placebo group at random. Participants in the test group received Ensitrelvir and the control group received the placebo.

The results revealed that Ensitrelvir lowered the incidence of symptomatic COVID-19 from 9% in the control group to 2.9% in the group that took the drug — a drop of 67%. The trial scientists showed that irrespective of whether symptoms developed, the presence of SARS-CoV-2 in the contacts was reduced from 21.5% to 14%. Importantly, the drug maintained a good safety profile in the study. The authors concluded that giving Ensitrelvir to contacts within 72 hours of a primary patient showing symptoms could effectively prevent COVID-19.

SARS-CoV-2 today does not pose the threat it once did but the importance of Ensitrelvir extends well beyond COVID-19. Betacoronaviruses have now caused three major outbreaks in just over two decades: SARS-CoV-1, MERS-CoV, and SARS-CoV-2. Drugs like Ensitrelvir provide scientists with a valuable starting point against this entire sub-family of viruses, possibly allowing humankind to respond more quickly when the next virus will inevitably emerge.

(Arun Panchapakesan is an assistant professor at the Y.R. Gaitonde Centre for AIDS Research and Education, Chennai. arun.panchapakesan@gmail.com)

THE GIST

Ensitrelvir was granted emergency approval in Japan for use in November 2022 to treat mild-to-moderate COVID-19. In early 2024, it was granted full authorisation for regular use.

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**B. Evolution of Oral Antivirals: Shionogi vs. Pfizer**

The journey to Ensitrelvir highlights a significant evolution in pharmaceutical design, overcoming the limitations of earlier first-generation oral antivirals like Pfizer's Nirmatrelvir (Paxlovid).

Feature	Nirmatrelvir (Paxlovid)	Ensitrelvir (Xocova)
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G-mail-lakshyaacademymumbai@gmail.com

Feature	Nirmatrelvir (Paxlovid)	Ensitrelvir (Xocova)
<b>Development Strategy</b>	Re-engineered from an older intravenous SARS-CoV-1 drug.	Designed from scratch using computational chemistry and virtual molecular screening.
<b>Metabolic Synergy</b>	Cleared rapidly by the liver; requires Ritonavir as a booster to block liver enzymes.	Possesses high metabolic stability; remains active in the bloodstream for long periods as a monotherapy.
<b>Drug Interactions</b>	Ritonavir causes severe, dangerous interactions with common heart and blood pressure medications.	Fewer drug interactions, making it safer for vulnerable, multi-medicated patients.
<b>Patient Compliance</b>	Leaves a distinct, bitter metallic aftertaste (dysgeusia).	No altered taste profile, leading to much higher patient compliance.

### C. The SCORPIO-PEP Trial Evidence

The Phase 3 global trial evaluated 2,387 asymptomatic, uninfected participants who lived with an active COVID-19 patient.

- **Efficacy:** Administering Ensitrelvir within 72 hours of the index patient's symptom onset slashed the incidence of symptomatic COVID-19 from 9% (placebo) to 2.9% (drug group).
- **High-Risk Protection:** For individuals with underlying risk factors (e.g., obesity, advanced age), the relative risk reduction was even higher, reaching 76%.
- **Viral Load Containment:** Even if a patient tested positive, Ensitrelvir significantly decreased the total viral load and reduced overall viral transmission rates within the household from 21.5% to 14%.

### Analytical Takeaways for UPSC

#### GS Paper III: Science & Technology

- **Computational Chemistry in Drug Discovery:** Traditional drug discovery requires physically mixing and testing millions of chemical compounds, taking years. Ensitrelvir proves that in-silico (virtual) screening simulations can isolate viable therapeutic molecules in a fraction of the time during health emergencies.
- **Broad-Spectrum Readiness Against Betacoronaviruses:** The true strategic value of Ensitrelvir extends beyond the current pandemic. The sub-family Betacoronavirus has caused three major lethal outbreaks in modern history: SARS-CoV-1 (2003), MERS-CoV (2012), and SARS-CoV-2 (2019). Because the M<sup>PTO</sup> structure is highly conserved (similar) across this entire sub-family, Ensitrelvir provides a ready-made molecular blueprint. If a new Betacoronavirus jumps to humans, scientists will not start from scratch; they have a validated chemical baseline to deploy immediately.

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**G-mail-lakshyaacademymumbai@gmail.com**

Ensitrelvir represents a shift from reactive medicine (treating an infection after symptoms present) to proactive intervention (blocking the virus post-exposure). By overcoming the metabolic and interaction barriers that limited earlier therapeutics, it establishes a safer, single-pill standard for high-risk populations. More importantly, it equips global public health infrastructure with a critical weapon to suppress future coronavirus outbreaks before they can scale into full-blown pandemics.

### UPSC Prelims Exam Practice Question

**Ques:** With reference to antiviral drugs, consider the following statements:

1. Viral proteases help in converting non-functional viral protein chains into active proteins.
2. Human cells possess enzymes identical to the SARS-CoV-2 Main Protease (Mpro).
3. Protease inhibitors can block viral replication inside host cells.

**Which of the statements given above is/are correct?**

- (a) 1 and 3 only
- (b) 2 and 3 only
- (c) 1 only
- (d) 1, 2 and 3

**Ans: a)**

### UPSC Mains Exam Practice Question

**Ques:** Explain the concept of Post-Exposure Prophylaxis (PEP). Evaluate its potential role in strengthening global public health systems during future pandemics. **(150 Words)**

**Page 07:GS I : Geography / Prelims Exam**

Our understanding of Earth's deep interior has traditionally relied on the assumption that the molten outer core moves in a comparatively stable, uniform manner. However, a study utilizing data from the European Space Agency's (ESA) Swarm and CryoSat missions, alongside legacy satellite data, has revealed that deep-earth liquids can change direction rapidly within a single decade. This discovery provides essential insights into the turbulent mechanics that generate Earth's magnetic field and highlights an unexpected physical link between the outer core and the solid inner core.

**Core Pillars of the Discovery**

**A. The Baseline: The Steady Westward Drift**

For centuries, scientists observed that Earth's geomagnetic field slowly drifts westwards. This study confirms that **95% of the outer core's movement** follows a steady, predictable westward crawl. The churning of this molten iron and nickel layer generates an electric current—acting as a massive internal dynamo—which creates the magnetosphere protecting Earth from harmful solar radiation.

**B. The 2010 Pacific Reversal**

The major anomaly discovered by the team occurred deep beneath the equatorial Pacific Ocean around the year 2010.

- **The Eastward Surge:** In 2010, a broad region of iron-rich fluid unexpectedly halted its westward crawl and shifted into a rapid **eastward surge**.
- **The Decadal Decay:** Satellite monitoring tracked this intense eastward movement for a decade, revealing that the anomaly peaked and began to systematically **weaken around 2020**.

**C. Mechanical Feedback and Hemispheric Lopsidedness**

The study provides deep-earth mapping that links this fluid disruption to structural changes in neighboring layers:

- **Inner Core Connection:** Using geodesy (measuring Earth's geometric shape and gravity) and seismology, researchers matched the 2010 fluid reversal with a documented slowdown and "backtracking" of Earth's solid inner core.
- **Asymmetrical Flow:** The model shows that the flow within the outer core is roughly **10% lopsided** between the Northern and Southern hemispheres, highlighting the complex, non-uniform nature of the geodynamo.

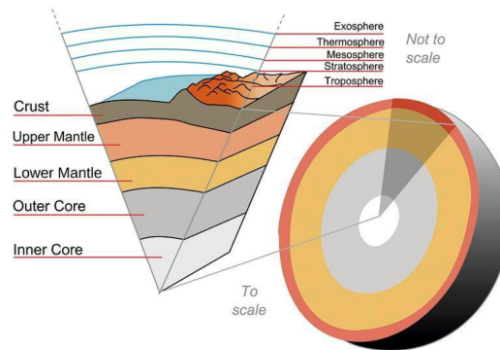
**Analytical Takeaways**

**Physical Geography**

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**Con.- 09820971345, 9619071345, 9223209699**  
**G-mail-lakshyaacademymumbai@gmail.com**

**WHAT IS IT?**

**Outer core: unafraid of drama**



An infographic depicting the earth's geophysical layers. SURACHIT (CC BY-SA)

**Vasudevan Mukunth**

**T**he earth's outer core is a voluminous liquid layer that lies around 2,800 km beneath the surface. This hot, churning sea is filled with molten iron and nickel.

As the outer core moves constantly, it acts like a large generator, creating the planet's magnetic field, which shields the earth from harmful solar radiation.

Researchers from the University of Edinburgh and the British Geological Survey have reported that around 2010, the liquid iron in the outer core below the equatorial Pacific Ocean changed direction from a slow westward crawl to a more rapid eastward surge.

They found this after mapping 27 years of iron movement in the outer core using data from ground stations and four European satellites. They identified two important patterns in the flow.

The main pattern accounted for 95% of the movement: it consisted of a

steady flow westwards — which also explains why the earth's magnetic field has historically drifted west. The second pattern revealed the dramatic shift in 2010. The researchers also found that this shift began to weaken around 2020.

The researchers were able to link the 2010 reversal to seismic and geodetic shifts in the earth's solid inner core. According to their model, the flow is also roughly 10% lopsided between the northern and the southern hemispheres.

These details could explain sudden 'jerks' in magnetic field readings and suggest that deep-earth liquids can change direction much faster than the traditional theory predicts.

**For feedback and suggestions** for 'Science', please write to [science@thehindu.co.in](mailto:science@thehindu.co.in) with the subject 'Daily page'

- **Interior Structure of the Earth:** Traditional curriculum treats the liquid outer core as a homogenous, steadily churning layer. This study introduces **fluid dynamics variability**, showing that regional fluid cells can alter their behavior independently of the global core rotation.
- **Origin of Geomagnetic Jerks:** Sudden, unpredictable shifts in magnetic field readings—known as "geomagnetic jerks"—have puzzled geophysicists. Rapid regional flow reversals, like the one beneath the Pacific, offer a concrete physical mechanism explaining these magnetic fluctuations.

### Space & Advanced Research

- **Role of Satellite Constellations:** The research demonstrates how space infrastructure is critical for mapping the deep earth. Magnetometers aboard the ESA Swarm satellites successfully isolated core signals from overlying crustal and atmospheric interference, turning space-based data into an X-ray for the planet's deep interior.

This geophysical breakthrough fundamentally reframes our understanding of Earth's internal dynamo. By proving that a massive mass of molten iron can alter its trajectory from a westward crawl to an eastward surge within a mere decade, the study shatters old models of slow, millenia-long core changes. While these profound shifts happen 2,800 km below the surface and pose no immediate threat to life or climate, they demonstrate that the core-mantle-boundary is a highly reactive, integrated network where changes in the solid inner core can rapidly trigger dramatic fluid dynamics in the outer core. ®

### UPSC Prelims Exam Practice Question

**Ques:** The term "geodynamo", often seen in geophysics, refers to:

- (a) Heat transfer from mantle to crust
- (b) Generation of Earth's magnetic field through motion in the liquid outer core
- (c) Rotation of tectonic plates around Earth's axis
- (d) Seismic wave propagation inside Earth

**Ans:** b)

### UPSC Mains Exam Practice Question

**Ques :**Discuss the structure and composition of Earth's interior. How do recent discoveries regarding the outer core challenge traditional understanding of Earth's geodynamics?(150 Words)

The article highlights a critical vulnerability in India's geopolitical and economic landscape. Despite heavy domestic investments in green alternatives, global shocks—specifically the ongoing military conflict in West Asia—instantly disrupt India's economic fabric. Because nearly half of India's fossil fuel imports pass through the unstable Strait of Hormuz, global spikes in crude oil and Liquefied Natural Gas (LNG) trigger a domino effect across the Indian economy, driving up domestic power costs, industrial inputs, and fiscal deficits.

## India's green transition still runs on coal

**T**he recent rise in global energy prices following the escalation of the conflict in West Asia has once again exposed India's continuing vulnerability to external energy shocks. Despite years of policy emphasis on renewable energy, nearly half of India's fossil fuel imports still transit through the Strait of Hormuz, including crude shipments from Saudi Arabia and Liquefied Natural Gas (LNG) imports from Qatar.

This vulnerability sits uneasily alongside the dominant narrative around India's clean energy transition. Over the past decade, India has emerged as one of the world's fastest-growing renewable energy markets. Since 2017, renewables have consistently accounted for the largest share of new power capacity additions in the country. In numbers, renewable energy sources accounted for 42.4% of India's installed power capacity by March 2026, up dramatically from just 0.72% in March 2005. Over the same period, coal's share in installed capacity fell from 58.7% to 42.2%.

By conventional metrics, India appears well into an energy transition. Yet, the persistence of energy price shocks reveals a more complicated reality. Installed capacity is not the same as actual electricity generation. While renewables now account for over two-fifths of installed capacity, they generated only 15.8% of electricity in April 2026. Coal, by contrast, still accounted for 71.8% of electricity generation, only marginally lower than its 76.2% share in March 2019.

### Capacity and generation gap

This gap between capacity and generation is central to understanding India's energy system. The country has succeeded in building renewable infrastructure, but not yet in replacing coal in the actual electricity mix. In effect, renewable energy is being added on top of coal rather than



**Aashi Gupta**

Associate Fellow at the Centre for Social and Economic Progress, New Delhi



**Naveen Kumar**

Associate Fellow at the Centre for Social and Economic Progress, New Delhi

Rising renewable capacity has yet to substantially displace coal generation

displacing it. The data clearly show India's continued dependence on coal. Despite strong renewable growth since 2017, India has added almost no new fossil fuel capacity since 2018, retired very few old coal plants, and seen gas-based capacity decline. As a result, coal remains the main backup and balancing source in the power system.

The reasons are structural. Solar and wind power remain intermittent sources of electricity. Their output fluctuates with weather conditions and the time of day, while electricity demand remains continuous. In the absence of large-scale battery storage, flexible grids and adequate balancing capacity, coal continues to provide the baseload reliability required to keep the system functioning.

This also explains why domestic electricity prices remain closely tied to global fossil fuel markets. Historical trends show Indian electricity prices moving alongside Brent crude in the last few years. Even sectors that appear domestically anchored remain indirectly exposed to external commodity cycles because fossil fuels continue to determine marginal cost of power.

### Ground reality

As a result, current geopolitical tensions in West Asia affect India more severely. A spike in crude prices not only raises transportation and industrial costs directly, but also pushes up coal prices, electricity tariffs, inflation, and fiscal pressures.

India's energy transition discourse is increasingly centred around the wrong benchmark. The focus remains on installed renewable capacity because it offers an attractive measure of progress. Yet, power systems are not sustained by headline capacity additions. They depend on actual electricity generation and the

ability to supply power consistently when it is needed most.

The distinction matters because it shapes perceptions of vulnerability. China remains less exposed, with oil and gas accounting for only 4% of its power mix and electric vehicles and hybrids, now over half of new car sales, reducing oil demand by over a million barrels a day. Spain shows the alternative, having broken the gas-electricity link through renewables. India's transition is real, but incomplete.

### Work towards system transformation

This does not diminish the importance of the renewable push. On the contrary, India's decision to aggressively scale solar and wind capacity since the late 2010s now appears prescient given growing geopolitical instability and fossil fuel volatility. But the next phase of transition will require moving beyond capacity creation towards system transformation itself.

That means investing in storage infrastructure, grid modernisation, transmission connectivity and market mechanisms capable of integrating intermittent renewables at scale. It also requires recognising that coal's persistence is not simply a policy failure or institutional inertia. Coal currently performs a stabilising function within the grid that renewable energy, in its present form, cannot yet fully replicate.

India's energy challenge today is therefore not merely about producing more green power. It is about building an electricity system in which renewables can reliably substitute for fossil fuels in actual generation. Until that happens, every geopolitical crisis and every spike in global energy prices will continue to remind India that its green transition still runs on coal.

*The views expressed are personal*



## Core Pillars of the Structural Paradox

### A. The Capacity vs. Generation Dichotomy

The core of India's energy dilemma lies in the vast difference between **installed capacity** (the theoretical maximum output of infrastructure) and **actual generation** (the real electricity delivered to the grid).

- **The Progress Illusion:** By conventional metrics, India appears to be transitioning rapidly. Clean energy accounting for 42.4% of total installed capacity by March 2026 presents an impressive policy victory, especially alongside the decline of coal's capacity share to 42.2%.

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**Con.- 09820971345, 9619071345, 9223209699**  
**G-mail-lakshyaacademymumbai@gmail.com**

- **The Hard Reality:** In terms of real-world generation, renewables contributed a mere 15.8% to the power pool in April 2026. Conversely, coal continues to carry the load, supplying **71.8% of actual electricity**, proving that green capacity additions are merely stacking on top of coal rather than replacing it.

### B. The Intermittency and Baseload Challenge

The persistent reliance on coal is not a failure of policy intent, but an unavoidable outcome of grid physics and structural limitations:

- **The Intermittency Bottleneck:** Solar and wind power are variable, dependent on weather conditions and sunlight hours. Conversely, the power grid demands a continuous, predictable base load to prevent blackouts.
- **Absence of Storage Ecosystems:** Renewable energy cannot provide continuous power without utility-scale battery storage systems (BESS) or pumped hydro storage. Consequently, legacy coal plants remain active as the only viable mechanism to balance the grid when green output drops.
- **The Price Linkage:** Because coal and gas are utilized to meet the marginal, peak-hour demand, domestic electricity prices remain tied to global Brent crude and commodity cycles, exposing even clean-energy users to external economic shocks.

### C. Global Comparisons: System Integration vs. Capacity Creation

The analysis benchmarks India against international strategies to outline what a complete energy transformation requires:

- **China's Sectoral De-linking:** China has reduced its power grid's exposure to oil and gas to just 4%. Simultaneously, electric and hybrid vehicles make up over half of its new car sales, cutting oil demand by over a million barrels per day.
- **Spain's Market Decoupling:** Spain has successfully broken the structural link between natural gas prices and electricity pricing through comprehensive renewable integration and grid-scale storage.

### Analytical Takeaways for UPSC

#### Infrastructure (Energy Sector) & Economic Development

- **Decoupling Economic Metrics:** Candidates must distinguish between Green Capacity Additions and Green Base Load Integration. True energy security is measured by a clean energy source's ability to operate around the clock, not just its total peak capacity during midday hours.
- **The Path Forward—System Transformation:** To successfully move past the "coal-trap," India's policy focus must shift from simply installing solar panels to executing deep grid modernization. This involves heavy capital investment in storage infrastructure, interstate transmission connectivity, smart grids, and Time-of-Day (ToD) tariff mechanisms to smooth out intermittent power supply.

India's clean energy transition is undoubtedly real, but it remains structurally incomplete. The country has successfully mastered green capacity creation but is still grappling with the complex challenge of comprehensive system integration. Until grid-scale storage, advanced transmission corridors, and smart distribution systems are deployed to handle the natural fluctuations of solar and wind power, coal will remain the indispensable anchor of the national grid. Consequently, India's short-term economic stability and energy security will remain tied to the volatile geopolitical landscape of West Asia.

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**UPSC Prelims Exam Practice Question**

**Ques:** The term “baseload power” refers to:

- (a) Electricity supplied only during peak demand hours
- (b) The minimum continuous level of electricity demand required by the grid
- (c) Backup power generated during emergencies only
- (d) Power generated exclusively from renewable sources

**Ans:** b)

**UPSC Mains Exam Practice Question**

**Ques:** How do geopolitical tensions in West Asia affect India’s energy security and macroeconomic stability?(150 Words)



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**Page 10:GS II :International Relations / Prelims Exam**

The Hainan FTP represents Beijing's most ambitious, modern-era institutional opening-up strategy. Located as a tropical island province at the northern edge of the heavily contested South China Sea, Hainan has transitioned into a unique, island-wide special customs supervision zone. The initiative seeks to build an economic powerhouse focused on liberalization, high-tech manufacturing, modern services, and global consumption, directly driving China's vision of "socialist modernization."

**Core Pillars of the Hainan FTP Model**

**A. The Structural Shift: Radical Changes in Tariffs and Trade**

The central mechanism of the FTP is a dual-boundary regulatory framework summarized by the policy: **"Freer access at the first line, regulated access at the second line, and free flow within the island."**

- **The First Line (Global to Hainan):** Ordinary customs operations have been dissolved. Tariff barriers are removed for international imports entering the island. Since its full launch, the number of zero-tariff product categories expanded aggressively from 1,900 to **6,600**, raising the total share of zero-tariff eligible goods on the island to **74%**.
- **The Second Line (Hainan to Mainland China):** Hainan functions as an offshore neutral trade zone. Standard Chinese tariffs and import procedures apply only when goods move from Hainan into the Chinese mainland.

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# What is China's Hainan FTP initiative?

How has Hainan's free trade port changed tariffs and trade rules? Why is the FTP attracting new enterprises? What benefits are businesses gaining? How are the duty-free system and visa-free policy boosting tourism and consumption? What strategic role does FTP play in China's comparison with Hong Kong?

**EXPLAINER**  
Vighnesh P. Venkitesh

**The story so far:**  
Hainan, China's southernmost province and a tropical island in the South China Sea, has come to the forefront of the country's modern-era opening-up efforts with the beginning of its free trade port (FTP) and customs closure in December. Envisioned as a 'landmark leap' into economic ease, China is trying to set up a business hub in the island province aimed at attracting global and local customers with the appeal of zero tariffs, low personal taxes, and simplified flow of commuters and data.

**What is the free trade port initiative?**  
The plan for the FTP in Hainan was first unveiled on June 1, 2020. The FTP was officially launched on December 18, 2025, with island-wide special customs operations implementing the policy of "freer access at the first line, regulated access at the second line, and free flow within the island". Under the initiative, tariff barriers on trade were removed from the island with the closure of ordinary customs operations, enabling easier imports. While the island remains an integral part of China, it has now become a neutral zone for international trade, with regular customs procedures and tariffs applying only to goods entering the Chinese mainland from the island. Visa-free entry for people from 86 countries is also expected to boost tourism.  
Hainan will be a "new frontier of opening up, hub for regional cooperation and engine for economic globalisation," said Wang Bin, spokesperson for the Chinese Communist Party's Hainan Committee, ahead of the official opening of the FTP. He added that the FTP would help save 860 million RMB in tariffs annually while creating investment opportunities for Chinese enterprises in the Global South.



The International Yacht Centre at Sanya Central Business District, a key tourist and industrial hub in Hainan. VIGHNESH P. VENKITESH

**How will the initiative help China's trade?**  
The island-wide special customs operation is seen as an opportunity to "deepen reforms in key sectors, steadily advance high-quality development, improve risk prevention, and build the FTP into a leading gateway for China's opening-up in the new era," He Lifeng, Chinese Vice-Premier, said at the launch of the FTP on December 18.  
Since the launch, the number of tariff-free product categories has expanded from around 1,900 to 6,600, while the share of goods eligible for zero tariffs has risen from 21% to 74%. *Global Times* reported that 3,265 foreign-invested enterprises registered in the FTP between December 18 and December 31, while over 30,000 foreign trade registration enterprises were added in 2025.  
According to Haikou Customs, goods worth around 753 million yuan (about \$107 million) were imported into Hainan in the first few months after the FTP's opening. The value of processed and value-added goods brought into the mainland during the same period stood at around 85.9 million yuan.  
**How are businesses benefiting?**  
The establishment of the FTP has drawn numerous industries to the island. The MI

Coffee Dream Factory in Wanning is one such enterprise benefiting from the initiative. "We import coffee beans for RMB 1,100 per kilo from Panama, which cost RMB 1,700 per kilo on the mainland," said Tong Shuo, director of MI.  
Hainan Ausca International Oils and Grains Co., Ltd., established with a total investment of 3.5 billion RMB, is among the first enterprises operating within the FTP. It piloted the import tariff exemption policy to produce goods with at least 30% added value after processing. The group started construction in September 2020, soon after its first production line in April 2021. It now has a production line of 2 million tonnes per year.  
**How does the initiative encourage consumers?**  
The FTP has also opened Hainan to individual consumers.  
Sanya, the province's main tourist hub, houses the China Duty Free centre, with a collection of global and local brands competing for customers. The CDF offers a shopping experience for both international tourists and mainland residents, provided they present a return ticket at entry. Local residents, however, face a shopping cap of 1,00,000 RMB per person per year and must travel out of the

province once a year.  
"The FTP is expected to bring benefits with an increase in overseas visitors, which will boost spending and help the local economy," said Bai Xue, deputy general manager at Sanya CDF. "The visa-free policy will help us provide a window to showcase Chinese culture to the world, while introducing local brands and shifting focus from the world to China," she added.  
The *Global Times* reported that offshore duty-free shopping in Hainan exceeded 2 billion RMB since the FTP's opening, with more than 3,00,000 shoppers. Haikou and Sanya, the two major cities of the province, have seen the fastest growth in inbound flight ticket bookings.

**THE GIST**  
Hainan has launched its free trade port (FTP) with island-wide "customs closure," enabling "freer access at the first line, regulated access at the second line, and free flow within the island," along with zero tariffs, lower taxes and simplified movement of trade, people and data.  
The FTP is attracting foreign-invested enterprises and boosting trade, tourism and consumption through expanded tariff-free products, duty-free shopping, visa-free entry for 86 countries, and growing investment and trade volumes since its launch.

**What does China seek to gain with Hainan?**  
While Hainan is on its way to further China's strategy of economic opening up, there are multiple factors affecting its success. Unlike Hong Kong – one of the world's leading financial hubs, being a special administrative region under the Chinese government, with its own legal system, currency, and independent membership in international trade organisations – Hainan is China in all perspectives and domain.  
With a customs-free, tariff-free, region outside the mainland that follows all other legal and constitutional provisions, China has made both a partner and competitor to Hong Kong in Hainan. China now has an open economic and tourist zone at the northern end of the much-contested South China Sea, with fresh and vast economic opportunities compared to congested Hong Kong.  
The geopolitical and economic implications of Hainan, and its output to China, which seeks to attain "socialist modernisation" in the coming decade, will be unveiled in time.  
For now, the Hainan experiment is attracting eyes and its baby strides are firm.  
(The writer was in China at the invitation of the China Public Diplomacy association)



## B. Business Incentives: Why Enterprises are Converging

The FTP has triggered a massive influx of corporate entities, recording over 30,000 foreign trade registrations in 2025 alone. Businesses are drawn by two powerful competitive advantages:

- The 30% Value-Added Rule:** Under the "second-line" regulation, if an enterprise imports raw materials zero-tariff into Hainan and processes them into products that add **at least 30% value**, the final goods can be shipped into mainland China completely **exempt from import duties**. Companies like *Ausca International Oils and Grains* and *Siemens Energy* have established massive manufacturing hubs to leverage this rule.
- Drastic Cost Reductions:** Businesses achieve huge supply chain savings. For example, raw materials like high-end coffee beans can be imported into Hainan at nearly 35% less cost than on the mainland.

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**Daily News Analysis**

- **Tax Parity Incentives:** Corporate Income Tax (CIT) for encouraged industries is capped at a highly competitive **15%** (compared to the mainland's 25%). Furthermore, high-end talents enjoy an Individual Income Tax (IIT) cap of 15%.

**C. Boosting Tourism and Consumption: Duty-Free and Visa-Free Ecosystems**

Beijing has integrated trade liberalization with a massive domestic and international tourism drive:

- **The 86-Nation Visa-Free Umbrella:** To catalyze inbound travel and position the island as a regional cooperation hub, Hainan allows visa-free entry to citizens from 86 nations, transforming it into an easily accessible global vacation and business destination.
- **The Luxury Consumption Vacuum:** Centered in hubs like Sanya, the offshore duty-free shopping policy has been upgraded to an annual cap of **100,000 RMB (~\$14,000) per person** across 47 product categories. Since full customs closure, offshore duty-free shopping quickly crossed the 2 billion RMB mark, capturing massive retail spending that Chinese consumers previously directed toward European or West Asian luxury markets.

**3. Strategic Geometry: Hainan vs. Hong Kong**

The creation of the Hainan FTP introduces a complex dynamic into China's internal economic geography, framing Hainan as both a complement and an alternative to Hong Kong.

Feature	Hong Kong SAR	Hainan FTP
<b>Political &amp; Legal System</b>	Special Administrative Region; distinct common law system, separate currency (HKD), independent seat in global trade bodies (WTO).	Integral part of sovereign China; operates completely under Chinese legal, constitutional, and political frameworks.
<b>Economic Position</b>	A highly congested, historically mature global financial hub facing geopolitical adjustments.	A vast, fresh geographical territory with massive spatial capacity for high-tech manufacturing, deep-sea research, and aerospace logistics.
<b>Tax Context (2026)</b>	Implemented the global minimum tax framework (raising multinational effective tax rates to 15%).	Offers a stable, localized 15% CIT with built-in zero-tariff raw material processing advantages.

**Beijing's Double-Port Strategy:** While the Chinese government emphasizes cooperation via the "connection of the two ports," Hainan provides a state-controlled insurance policy. It offers international investors a completely tariff-free, low-tax environment that sits securely within the mainland's political and legal domain, bypassing the unique geopolitical complexities associated with Hong Kong.

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**Con.- 09820971345, 9619071345, 9223209699**  
**G-mail-lakshyaacademymumbai@gmail.com**

## Analytical Takeaways for UPSC

### International Relations & Bilateral Trade

- **China's Economic Statecraft:** The Hainan FTP acts as an economic gateway to the Global South and ASEAN nations. By embedding a mega-free port at the tip of the South China Sea, Beijing strengthens its supply chain integration with Southeast Asia, turning a contested security zone into a highly lucrative trade corridor.
- **Implications for Regional Free Trade Agreements:** Hainan's zero-tariff manufacturing capabilities will create strong competition for existing manufacturing hubs in India and Southeast Asia, as multinational corporations can now utilize Hainan to manufacture goods inside China's economic orbit without paying traditional Chinese import duties.

The Hainan Free Trade Port is not merely a regional development project; it is a meticulously planned restructuring of global trade routing. By legalizing zero tariffs on three-quarters of its imports, utilizing computational speed to streamline market approvals, and eliminating visa barriers for 86 nations, Beijing has turned a remote island into a highly competitive global economic zone. While it lacks the independent judicial tradition of Hong Kong, its vast land area, lower operational costs, and direct integration with the mainland market make the Hainan experiment a powerful new engine for economic globalization.

### UPSC Prelims Exam Practice Question

**Ques:** The Hainan Free Trade Port (FTP), recently seen in news, is strategically significant because:

- (a) It is China's first offshore military colony in the Pacific Ocean
- (b) It is located near the South China Sea and acts as a major trade liberalization hub
- (c) It replaces Hong Kong as an independent financial territory
- (d) It functions outside China's constitutional framework

**Ans:** b)

### UPSC Mains Exam Practice Question

**Ques:** Discuss the strategic significance of the Hainan Free Trade Port in China's economic statecraft and regional influence in the Indo-Pacific. **(150 Words)**

Page :08 : Editorial Analysis

The U.S. ends Russia oil waiver, implications for India

The United States' decision to tighten restrictions again on Russian seaborne oil may seem like another chapter in the sanctions battle over the Ukraine war. But beneath the headlines lies a much larger story – one that directly affects India and much of the developing world.

The issue is no longer just Russia. It is whether the global energy system can withstand simultaneous geopolitical shocks without causing prolonged inflation, supply insecurity and economic instability across Asia. For over three years, the world has attempted an unprecedented balancing act: keeping one of the largest oil exporters under heavy sanctions while trying to maintain stable energy prices. That balancing act is becoming increasingly fragile. The latest restrictions come at a sensitive moment. Oil markets are already unsettled by conflict in West Asia, persistent disruptions in maritime trade routes and growing concerns over the Strait of Hormuz, the world's most critical oil transit chokepoint. In such conditions, even policy signals from Washington can alter freight rates, insurance premiums and crude price expectations almost overnight.

**Why India cannot ignore this development**  
India imports nearly 90% of its crude oil and is the world's third-largest importer as well as one of the fastest-growing energy consumers. Unlike many developed economies, where energy demand has plateaued, India's energy needs will keep rising with industrialisation, urbanisation and expanding mobility. It is this reality that shapes India's energy choices.

When Russian crude began flowing into India in large volumes after 2022, many in the West viewed it through a geopolitical lens. India saw it



**Shrikant Madhav Vaidya**

Former Chairman of IndianOil Corporation Ltd. and an energy strategist

The world's emerging economies are increasingly being caught between geopolitics and energy survival

as an economic stabiliser during a period of extreme volatility. Russian oil helped moderate inflationary pressures, improved refinery economics and reduced dependence on any single region. It provided supply flexibility at a time of great turbulence in global energy markets. Critics often frame the debate as morality versus commerce. But energy-importing countries rarely have that luxury.

For countries such as India, energy affordability directly affects transport costs, food inflation, fertilizer subsidies, manufacturing competitiveness and household spending. A sustained rise in crude prices quickly spreads through the wider economy.

**When sanctions meet market reality**

Global oil markets are operating with little room for psychological comfort. The world has already seen disruptions in the Red Sea, attacks on shipping infrastructure, growing military tensions involving Iran, tighter tanker availability and sharply higher war-risk insurance premiums. In such conditions, constraining one of the world's largest oil suppliers inevitably unsettles markets, even if physical supply losses remain limited at first.

Oil markets react not only to shortages but also to the fear of shortages. That fear alone can drive prices sharply higher. Ironically, this exposes a contradiction at the heart of the western sanctions policy.

The U.S. and Europe want to reduce Russia's oil revenues. But they also want lower inflation, stable fuel prices and uninterrupted global energy flows. Increasingly, these objectives are colliding with each other. The harder sanctions become, the greater the risk of tightening global supply balances. Once oil prices rise sufficiently, Russia can continue earning substantial revenues despite lower export volumes. In some cases, higher global prices can partially offset the impact of sanctions themselves. This explains why the sanctions policy has repeatedly oscillated between aggressive rhetoric and tactical flexibility. Markets eventually force pragmatism.

The temporary waivers and carve-outs of recent years were not merely signs of policy inconsistency; they reflected energy-market realities. The uncomfortable truth is that the modern global economy still runs overwhelmingly on hydrocarbons. Despite the rapid growth of renewables, oil remains central to transport, aviation, petrochemicals, agriculture and global trade logistics. The world may speak of transition, but it still functions on molecules.

For India, the challenge is even more complex. The Strait of Hormuz remains a major strategic vulnerability, carrying nearly one-fifth of global

oil trade. A large share of India's crude oil and LPG imports transit through these waters. Any escalation in the region could disrupt supplies, raise shipping costs and delay deliveries. This is why Russian crude evolved into something larger than a discounted barrel for Asia. It emerged as a diversification mechanism during a period of growing uncertainty in West Asia.

The larger lesson from these developments is that energy security itself is changing shape. In earlier decades, countries were concerned mainly with access to physical supply. Today, vulnerabilities are far more complex. Energy flows can now be disrupted by shipping restrictions, insurance controls, financial sanctions, tanker blacklisting, payment barriers and maritime security risks. In effect, global energy has become deeply entangled with financial and geopolitical architecture.

**India's long-term energy strategy**

This changing landscape has major implications for India's long-term strategy. India cannot rely indefinitely on opportunistic crude sourcing during crises. The country needs a broader and more resilient energy framework. That means expanding strategic petroleum reserves, diversifying crude sourcing regions, strengthening domestic exploration, improving refining flexibility, accelerating gas infrastructure, expanding alternative energy pathways and reducing dependence on vulnerable maritime chokepoints. At the same time, India will need to preserve strategic autonomy in energy decision-making.

The emerging global order is becoming increasingly fragmented. Energy trade is no longer governed purely by economics; it is increasingly shaped by sanctions regimes, strategic rivalries and competing geopolitical blocs. For major importing countries, excessive dependence on any single geopolitical camp carries long-term risks. India's approach therefore reflects not neutrality, but realism.

The years ahead are likely to witness repeated tensions between geopolitical objectives and energy-market stability. The world is entering an era in which sanctions, wars, maritime insecurity and supply-chain disruptions may become recurring features rather than temporary exceptions. That makes resilience more important than ideology. In the end, energy systems obey physical realities, not political slogans. Tankers must still move. Refineries must still operate. Economies must still function. Nations that fail to diversify and resilient energy systems may discover that, in the 21st century, economic sovereignty increasingly depends on the ability to navigate a fragmented and unstable energy world.

How energy shocks travel into India's economy

The implications for India extend far beyond crude prices alone. Modern energy disruptions now transmit through multiple interconnected channels

Energy shock	Immediate impact	Secondary impact on India
Higher crude oil prices	Costlier imports	Inflation and rupee pressure
Strait of Hormuz disruption	Supply uncertainty	LPG and fuel logistics stress
Shipping insurance surge	Higher landed crude cost	Refining margin pressure
Russian crude restrictions	Reduced supply flexibility	Higher sourcing costs
Freight disruptions	Delayed cargoes	Inventory and stock management strain

Sources: IEA, Energy Institute Statistical Review, industry and shipping estimates

**GS Paper II: International Relations**

**UPSC Mains Exam Practice Question:** Discuss the importance of diversification, Strategic Petroleum Reserves (SPRs), and refinery flexibility in ensuring India's energy security. (250 Words)

## Context:

The commentary arrives amid extreme fragility in the global energy map, exacerbated by the ongoing U.S.-Israel military campaign against Iran. The effective closure and blockading of the **Strait of Hormuz**—through which nearly 20% of global oil and a vast chunk of India's crude and LPG transit—has triggered severe West Asian supply disruptions. In this high-inflation environment, U.S. sanctions policy on Russian seaborne oil has faced an intense structural contradiction, constantly oscillating between aggressive enforcement and forced diplomatic pragmatism.

## Core Pillars of the Energy Dilemma

### A. The Impracticability of Pure Sanctions (The Regulatory Tangle)

The analysis beautifully captures the collision between Washington's geopolitical ambitions and economic realities.

- **The Colliding Objectives:** The U.S. wants to choke the Kremlin's revenues but simultaneously demands low domestic inflation, stable global oil prices, and uninterrupted energy flows.
- **The Sanctions Paradox:** If U.S. sanctions restrict Russian supply too severely, global crude prices spike (with Brent hovering above \$110-\$120 per barrel). This higher price baseline allows Russia to earn equal or greater revenues on lower export volumes, rendering the sanctions counterproductive while punishing developing economies.
- **The Policy Oscillation:** This reality explains why the U.S. Treasury (under Secretary Scott Bessent) has repeatedly executed policy U-turns—such as issuing rolling 30-day "wind-down" extensions (like General License 134C through June 17, 2026) to release stranded Russian seaborne oil back into the physical market to rescue "energy-vulnerable" countries.

### B. Why Russian Crude is an Economic Stabilizer for India

India imports roughly 85–90% of its crude requirements, consuming nearly 5 million barrels per day. The pivot to Russian crude after 2022 was an act of national interest, not political alignment.

- **Macroeconomic Buffer:** Affordable crude directly dampens domestic transport costs, contains food inflation, restrains fertilizer subsidy bills, and protects the purchasing power of citizens.
- **The Diversification Urgency:** With the Strait of Hormuz highly vulnerable to naval mining and shipping seizures, Russian seaborne crude has shifted from being just a "discounted luxury" to a vital geographical diversification tool to replace lost Middle Eastern barrels.
- **Refinery Economics:** Discounted Urals crude drastically improved the gross refining margins (GRMs) of Indian public and private refiners, stabilizing the country's trade deficit.

### C. The Evolution of Energy Vulnerabilities

Vaidya highlights a generational shift in how "energy security" is defined. It is no longer just about owning or having physical access to oil wells. In the modern financialized world, energy flows are routinely disrupted by invisible Western-controlled architectural levers:

- **Financial Sanctions & Payment Barriers:** Restriction of access to the SWIFT transaction network.

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**G-mail-lakshyaacademymumbai@gmail.com**

- **Maritime Restrictions:** Tanker blacklisting, strict insurance controls (P&I clubs), and war-risk insurance premiums that can double freight costs overnight.

### Analytical Takeaways for UPSC

#### International Relations & Strategic Autonomy

- **Realism over Ideology:** India's stance embodies pure strategic realism. New Delhi's recent declarations that it will buy Russian crude based on "commercial logic and energy security requirements—regardless of whether U.S. waivers are in place"—reaffirms its commitment to strategic autonomy. It rejects a zero-sum choice between the Western camp and its legacy partner, Moscow.

#### Economic Development & Security (Energy Infrastructure)

- **Building Structural Resilience:** The article serves as a policy blueprint for India's long-term energy strategy. To successfully transition away from opportunistic sourcing during global crises, India must aggressively scale up the following structural frameworks:

#### INDIA'S LONG-TERM ENERGY ROADMAP

##### 1. Strategic Pool

- Expand Strategic Petroleum Reserves (SPRs).
- Create longer emergency oil supply cushions.
- Strengthen energy security during global disruptions.

##### 2. Geographic Shift

- Diversify crude oil sourcing.
- Reduce dependence on vulnerable maritime choke points.
- Increase imports from multiple stable regions.

##### 3. Supply Reforms

- Boost domestic oil and gas exploration.
- Improve refinery flexibility and efficiency.
- Strengthen overall energy supply resilience.

The global energy ecosystem has firmly entered a fragmented era where trade is dictated by geopolitical blocs, sanctions architectures, and maritime conflict rather than pure market economics. For a massive importing nation like India, economic sovereignty is directly tied to its ability to navigate this volatile landscape. As Vaidya notes, energy systems ultimately answer to physical realities—tankers must sail, and economies must function. India's multi-alignment strategy and relentless focus on commercial pragmatism are essential protections for its domestic growth in a highly unstable world.



**Add- 21/B, Om Swati Manor Chs, J.K. Sawant Marg, Opp. Shivaji Natyamandir, Behind  
Cambridge Showroom, Dadar (West) Mumbai - 400028  
Con.- 09820971345, 9619071345, 9223209699  
G-mail-lakshyaacademymumbai@gmail.com**