



DAILY EDITORIAL ANALYSIS

TOPIC

**BUILDING BLOCKS OF AN
INDIA-U.S. ENERGY FUTURE**

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BUILDING BLOCKS OF AN INDIA-U.S. ENERGY FUTURE

Context

- Recently, the **United States** Vice-President highlighted its willingness **to cooperate with India** more closely on energy and defence.
- India's foreign policy establishment outlined the need for cooperation on energy, defence, technology and the mobility of people.

India-U.S. Cooperation in Energy and Defence

- **Strengthening India's Energy Security:** India's energy security is anchored in three imperatives:
 - ♦ **Stable and Predictable Energy Resources:** Ensuring access to reliable energy supplies to support India's rapid economic growth.
 - ♦ **Minimizing Supply Chain Disruptions:** Strengthening supply chains for critical minerals and energy infrastructure to reduce dependency on geopolitical uncertainties.
 - ♦ **Advancing Sustainability:** Expanding the role of nuclear energy and clean technologies to achieve India's net-zero targets.
- **Nuclear energy and critical minerals** play a pivotal role in India's clean energy transition, positioning them as foundational pillars for a stronger India-U.S. energy and technology partnership.

Critical Minerals

- These are those minerals, *such as lithium, graphite, cobalt, titanium, and rare earth elements* that are essential for economic development and national security.
- These are essential for the advancement of many sectors, including hightech electronics, telecommunications, transport, and defence.
- **China** controls **nearly 90% of rare earth processing**, and its recent **restrictions on exports** highlight the fragility of global supply chains.
- In response, **India and the U.S. signed a MoU in 2024** to diversify these supply chains.
 - ♦ It can bolster economic security, technological innovation, and strategic autonomy.

Nuclear Energy Security

- India's nuclear energy capacity **currently stands at just over 8 GW**, contributing **only 2% of the country's installed power capacity**.
- To meet the **2047 target of 100 GW**, India must commission 5-6 GW annually starting in the early 2030s.
- Studies by CEEW suggest that achieving **net zero by 2070** could require **over 200 GW of nuclear capacity** under certain scenarios.

Strengthening Supply Chain Transparency For Critical Minerals

- **India-US Critical Minerals Consortium** could explore **joint extraction and processing projects** across **Africa, South America, and Southeast Asia**.
- Establishing an **India-U.S. Mineral Exchange**, a secure digital platform for real-time trade, investment tracking, and mineral traceability.
- **Co-developing a Blockchain-based Traceability Standard:** It is inspired by the **EU's Battery Passport** which would prevent supply chain disruptions and ensure ethical sourcing.
- **Joint Strategic Stockpiles of Key Minerals:** For leveraging existing storage infrastructure **such as India's Strategic Petroleum Reserves** and the **U.S. National Defense Stockpile** for cost-effective deployment.
- **Investment in Energy Infrastructure:** Platforms such as the **U.S.-India Initiative on Critical and Emerging Technology (iCET)** could advance data-sharing protocols, innovation corridors, and workforce development.

Key Reforms for Nuclear Expansion

- **Reducing Deployment Timelines:** Standardizing reactor designs, streamlining approval processes, and improving skilled project delivery are essential.
- **Strengthening Financial and International Cooperation:** India's power sector exposure stands at \$200 billion.
 - ♦ Collaboration with global firms for technology transfer, co-creation, and waste management solutions is crucial.
- **Enabling Private Sector Participation: Small Modular Reactors (SMRs),** with their lower capital expenditure, flexibility, and reduced land requirements, can become viable with private sector involvement.
 - ♦ **Amending the Civil Liability for Nuclear Damage Act, 2010** to encourage private investments in nuclear power plants, fostering technological innovation and financial backing.
 - ♦ **Prioritizing Nuclear Safety and Waste Management:** As India leads in SMR manufacturing, adopting centralized waste management and repurposing strategies is essential.
 - ♦ **Long-Term Energy Security Amid Global Uncertainty:** The **IMF's latest World Economic Outlook** highlights rising trade and tariff tensions, impacting global energy markets.

Challenges and Future Prospects

- **Geopolitical Risks:** China's restrictions on rare earth exports highlight the need for secure and diversified supply chains.
- **Policy Alignment:** Both nations must harmonize regulatory frameworks to facilitate cross-border investments in energy infrastructure.
- **Technology Transfer:** Strengthening collaborative R&D will accelerate the adoption of next-generation energy solutions.

Conclusion

- The India-U.S. energy partnership is poised to play a crucial role in global energy security and sustainability. By focusing on critical minerals, nuclear energy, and clean technology, both nations can drive economic growth and climate resilience.
- Strengthening bilateral agreements and strategic investments will ensure a stable and sustainable energy future.

Source: TH

Mains Practice Question

[Q] How can India-U.S. energy cooperation in critical minerals, nuclear energy, and clean technology shape global energy security and sustainability, and what challenges must be addressed to ensure a stable and equitable energy future?

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