

FROM 123 TO EXECUTION: A ROADMAP FOR US-INDIA CIVIL NUCLEAR TRADE

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When the Indian leadership declared in 1998 that India and the United States were "natural allies," that statement signaled a shift away from Cold War mistrust to convergence. A decade later, the 2008 US-India Civil Nuclear (123) Agreement set out to operationalize that vision, establishing the baseline trust for bilateral ties. Since then, defense co-production and critical technologies—via the Major Defense Partner designation and more recently the TRUST initiative (short for "Transforming the Relationship Utilizing Strategic Technology")—have served as the engines driving Washington and New Delhi together.

Today, however, the relationship faces renewed headwinds. Friction over trade protectionism, tariff disputes, and divergent energy procurement choices has injected volatility into ties. In this context, civil nuclear energy should be reclaimed as the partnership's anchor. While defense and tech foster alignment, nuclear projects build industry partnerships that enable multi-billion-dollar, 60-to-80-year physical infrastructure that binds national power grids, supply chains, and regulatory bodies for the long-haul.

Furthermore, civil nuclear power is the foundation for advanced technological collaboration. Powering the super intelligence (SI) infrastructure, semiconductor foundries, and industrial clean-tech facilities envisioned under TRUST requires dense, zero-emission baseload power that intermittency-constrained renewables cannot deliver.

The timing to realize this vision has arrived. With the passage of India's SHANTI Act (short for "Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India Act") in December 2025, New Delhi has delivered the statutory framework foreign vendors long demanded, capping operator liability, establishing, for the first time, legal pathways for private joint ventures up to 49% foreign direct investment, and setting frameworks for streamlining regulatory channels.

To convert this legislative readiness into connected megawatts, Washington and New Delhi should pursue a dual-track strategy: executing large-scale reactors for grid baseload while deploying small modular reactors (SMRs) for industrial use and advanced technology hubs.

Strategic autonomy and geopolitical imperatives

Pursuing US-India civil nuclear trade responds to three interconnected drivers: reinforcing India's strategic autonomy, reducing New Delhi's legacy dependence on Russia, and offering an alternative to Chinese dominance in the developing world.

First, civil nuclear cooperation serves India's commitment to strategic autonomy. For New Delhi, independence is impossible without long-term energy security. As India advances toward its target of 100 gigawatts of nuclear capacity by 2047, nuclear energy provides the dense, zero-emission baseload power required to drive industrial expansion, high-performance computing centers, and domestic defense production without compromising net-zero commitments. From Washington's perspective, supporting India's autonomy reinforces a core US objective: fostering a more capable partner that can act as a security provider and economic anchor in the region. Expanding nuclear trade, plainly, allows India to diversify its high-technology energy ecosystem, strengthening its resilience and fulfilling the US vision of an order upheld by capable partners.

Second, expanding US-India energy trade helps reduce Indian dependence on Russia. For decades, Russia's state nuclear corporation, Rosatom, has operated as the sole foreign vendor constructing light-water reactors on Indian soil. The Kudankulam complex stands as a monument to this reliance, rooted in Moscow's willingness to absorb operational and financial risks, enabled by grandfathered bilateral liability protections and state backing that private Western vendors lacked. Over-reliance on Russian technology and fuel assemblies, however, leaves India's expanding power grid vulnerable to geopolitical friction and international sanctions. Facilitating bankable, Western-designed reactor builds helps India diversify its civilian energy sector.

Third, a functioning US-India nuclear partnership counters Chinese tech dominance in the Global South. Beijing is leveraging state-backed nuclear financing and technology exports (such as its Hualong One design) alongside its near-monopoly over critical mineral supply chains to dictate global clean-energy standards. Expanding US-India nuclear cooperation provides a transparent

alternative, ensuring that emerging economies can access clean technology without accumulating opaque debt or sacrificing energy sovereignty.

Unlocking large-scale nuclear power plant megaprojects

Meeting India's 100-gigawatt target by 2047 is impossible without multi-gigawatt, utility-scale light-water reactors. Large plants—such as the six Westinghouse AP1000 reactors planned for Kovvada, Andhra Pradesh—are India's grid-level baseload strategy. Unlocking these megaprojects requires converting statutory progress into bankable projects. Furthermore, overcoming historic pre-construction delays requires operationalizing the SHANTI Act's streamlined land allocation mechanisms through state-level joint coordination committees to fast-track land bank clearance and local community siting approvals.

Until recently, the primary bottleneck was Section 17(b) of India's Civil Liability for Nuclear Damage Act (2010), which exposed suppliers to open-ended liability. The SHANTI Act has resolved this impasse by aligning India's liability regime with the Annex to the Convention on Supplementary Compensation for Nuclear Damage. Liability is now strictly channeled to the operator and subject to tiered financial caps—scaled up to ₹3,000 crore ($360 million) for megaprojects exceeding 3,600 MWth—backed by mandatory insurance. To operationalize this shift, Washington and New Delhi should now establish a bilateral risk mitigation protocol that integrates the India Nuclear Insurance Pool with international reinsurance markets and sovereign backstops, providing commercial certainty to tier-one and sub-tier suppliers.

A second challenge was financial viability. The high upfront capital expenditure of imported Western reactors yielded levelized-cost-of-electricity projections that state-level distribution companies rejected as uncompetitive against solar, wind, and coal. Here, the path to tariff parity lies in hyper-localization. US providers should pivot to a co-production model, partnering with Indian engineering giants like Larsen & Toubro, Godrej & Boyce, and Walchandnagar Industries to fabricate heavy pressure vessels, steam generators, and balance-of-plant systems domestically at a fraction of Western costs. To secure component delivery schedules for ultra-heavy forgings, this hyper-localization strategy should be integrated with trusted allied supply chains, including Japanese and South Korean heavy forging partners. Paired with blended finance, sovereign credit guarantees, and export-import bank financing, this strategy will lower overnight capital costs per kilowatt to produce competitive off-take tariffs.

Finally, lead-time reduction is essential. Under the statutory authority granted to India's Atomic Energy Regulatory Board (AERB) by the SHANTI Act, New Delhi and Washington should establish a joint fast-track licensing channel with the US Nuclear Regulatory Commission (NRC). Reciprocal acceptance of safety evaluation reports for standardized designs like the AP1000 will shorten pre-construction licensing cycles.

Small modular reactors, private integration, and dual-track policy

Generating under 300 MWe per module, SMRs offer fast construction timelines, modular scalability, and reduced exclusion zones, making them ideal for heavy industry, green hydrogen production, and energy-intensive SI compute clusters.

The SHANTI Act creates a legal mechanism for private-sector entry into India's civil nuclear landscape by authorizing composite licenses for non-state entities, allowing industrial conglomerates like Tata Power, Adani Energy, and Reliance Industries to build, own, and operate commercial and industrial nuclear installations. Because accompanying foreign investment rules permit phased joint ventures with up to 49 percent foreign direct investment, US SMR vendors (e.g., Holtec, NuScale, Westinghouse AP300) can partner with Indian private conglomerates as equity-sharing co-developers while safeguarding proprietary technology through direct licensing agreements. Indian partners thus handle site acquisition, permitting, and grid integration, while US vendors supply pre-licensed reactor modules and digital control architectures.

To match the speed of private enterprise, Washington should modernize its regulatory mechanisms. Bureaucratic delays in Department of Energy Part 810 authorizations and Bureau of Industry and Security export licenses have impeded momentum. To resolve this issue, Washington and Delhi should consider working within existing US statutory and regulatory frameworks—including those administered by the Department of Energy, NRC, and Department of Commerce under the Atomic Energy of 1954—to streamline interagency review timelines. Additionally, both capitals should consider updating the arrangements under the 2008 123 Agreement to grant pre-approved vendor partnerships through multi-year technology transfer authorizations. This channel should prioritize nonproliferation-compliant co-production of high-assay low-enriched uranium to resolve the global fuel supply bottleneck constraining advanced SMR deployment.

Additionally, under the US-India Energy Security Partnership, both countries should establish joint research and development protocols focused on nuclear cybersecurity, digital twin modeling, and smart-grid synchronization to protect advanced reactor networks.

Front-end fuel security, joint licensing, and global leadership

A resilient partnership requires securing the entire nuclear ecosystem, from fuel fabrication to regulatory harmonization and joint global deployment.

Displacing Russia's monopoly over enriched nuclear fuel requires a reliable, Western-aligned front-end architecture. The SHANTI Act provides a legal breakthrough by opening front-end fuel cycle activities—including low-threshold uranium enrichment and fuel assembly fabrication—to private-sector participation and joint ventures, while keeping back-end spent-fuel reprocessing and waste management under government control. This division allows US fuel suppliers (e.g., Westinghouse, Clean Core Thorium Energy) to establish domestic joint ventures in India to fabricate enriched fuel assemblies and high-assay low-enriched uranium for domestic reactors and export.

To prevent regulatory friction, the NRC and AERB should create a joint technical licensing secretariat. Pre-licensing standardized reactor modules and advanced fuel types will convert multi-year design reviews into reciprocal safety audits, lowering capital risk.

Finally, the US-India civil nuclear energy partnership should serve as an export engine for the Global South. To make this pipeline bankable for developing economies, Washington and New Delhi should establish a joint export-financing window—co-anchored by the US International Development Finance Corporation and India's Export Import Bank—to underwrite project risks in third-country markets. By combining cutting-edge US reactor designs with India's lower-cost manufacturing base, adherence to the safeguards of the International Atomic Energy Agency, and operating experience, the two capitals can offer the Global South a safe, transparent, and affordable alternative to Chinese state-backed financing and Russian energy statecraft.

Conclusion: Translating statutory readiness into connected megawatts

Nearly three decades after India called the United States a natural ally, bilateral convergence remains imperative. As friction tests

alignment, civil nuclear cooperation is the long-term anchor, binding power grids, supply chains, and regulatory bodies for nearly a century.

By executing the strategy developed above, the United States and India can convert the momentum created by the SHANTI Act into connected megawatts, proving that nearly 20 years after the 123 Agreement, they truly are natural allies.

The Pilot *commentaries and responses represent the views of the respective authors. Alternative viewpoints are always welcomed and encouraged. Please write to rob@pacforum.org for more information on how to contribute.*