Operating nuclear plants is ‘lifetime commitment’: Experts

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Updated - April 19, 2026 06:27 pm IST - New Delhi

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Representative image. | Photo Credit: Getty Images

As India opens its nuclear power sector to private participation under the newly enacted SHANTI Act, former regulators of the nuclear energy establishment and policy veterans said that nuclear power required “lifetime commitment,” and maintaining “financial security” to account for “waste management, settlement of claims (caused by radiation), decommissioning (nuclear power plants).

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The Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Act, 2025, as the government has articulated repeatedly, is to help India raise its installed nuclear power capacity from the existing 8.7 gigawatt (GW) to 100 GW by 2047. Unlike the previous half-century, it hopes to achieve this by allowing, in theory, private companies to run nuclear power plants and harness foreign funds for the purpose.

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Ravi Grover, Member, Atomic Energy Commission and veteran nuclear engineer, at a talk in New Delhi on Saturday (April 18, 2026), said that the SHANTI Act clearly prescribed duties and liabilities that power plant operators must adhere to, whether in the private or public sector. “The prime responsibility for safety, security and safeguards lies with the licensee… section 10 of the Act clearly and transparently spells out what a newcomer to the sector should know…there is no place for indulging in regulatory tricks. No one can fudge the halflife of a radioisotope. If it is 30 years it remains 30 years,” he said.

Rajan Raghavan, Vice President, Tata Consulting Engineers Ltd and who represented Indian private sector companies interested in expanding their presence in India's nuclear power sector, said four priorities shaping investment decisions: site selection, affordable technology, government hand-holding, and tariff viability. Unlike conventional thermal plants, he noted, nuclear siting demands a specific set of criteria beyond land and water availability. Several private players have already identified sites across multiple States and are in the process of seeking approvals.

A case against the SHANTI Act | Explained

The 700 MW indigenous pressurised heavy-water reactor, Mr. Raghavan said, which the Nuclear Power Corporation of India Limited (NPCIL) – the public sector and sole operator of nuclear plants— plans to deploy in fleet mode over the next 10–12 years, was the "natural choice," The 220 MW design, though indigenous, was finalised fifteen years ago and would need substantial rework to meet current regulatory and safety benchmarks. Foreign reactors, he cautioned, came with prohibitive costs and lengthy design-validation timelines for Indian conditions — "two to three years" before construction could even begin. With electricity being a key input cost for process and metal industries, he stressed that the levelised cost of tariff (tariff that accounted for costs of land and factors that made power generation possible) is decisive. NPCIL's current tariffs, he pointed out, are comparable to — and in some cases lower than — coal, making nuclear commercially viable if the right technology is chosen.

Former Atomic Energy Regulatory Board Chairman. D.K. Shukla offered the regulator's view, arguing that the SHANTI Act finally provides a "unified legal framework" that separates control regulation from safety regulation — a clarity that was implicit earlier only

because every player sat within the Department of Atomic Energy. With private entities entering, he warned that issues previously considered minor would now become major.

When Shanti means nuclear energy

A central concern Mr. Shukla flagged was the lifetime commitment of nuclear operation demands. The Act, he noted, now requires licensees to “maintain design support throughout the lifetime of the facility” — a requirement far weightier for nuclear than for other power plants, given the longer operating life. Every ten years, operators must undertake a periodic safety review to demonstrate compliance with current safety standards.

“How do you modify or incorporate the new safety upgrade if you do not have the full-fledged design information and capability?” he queried, pointing out that changes to one system can cascade adversely through others. Design integrity must be preserved throughout the plant’s life, he stressed, “whether technology is developed within the country or it is imported” — a pointed caution for private players contemplating foreign reactor imports without securing long-term design support arrangements.

“For the expansion of nuclear energy, public confidence is the most important and production and safety performance are the key for this,” said Mr Shukla, emphasising that that primary responsibility for safety now rests with the licensee under the Act itself, and that honest reporting — not “fudging or concealment” — is what prevents latent failures from compounding into Fukushima-scale events.

SHANTI Act: What is still under centre’s control in India’s ‘open’ nuclear sector?

Former Secretary, Department for Promotion of Industry and Internal Trade (DIPP) Ajay Shankar said that India is already at the global frontier in nuclear engineering — a fact the country “refuses to acknowledge.” Recalling a 2002 conversation with a US Embassy official, he noted that India builds the cheapest nuclear power plants in the world, at roughly $1,000–1,200 per kW, against $1,800 for France and higher still for the United States, which “haven’t built a nuclear power plant in 30–40 years.”

Nr. Shankar was particularly blunt on small modular reactors: “the Small Modular Reactors (SMR) I see as a mirage.” Fifty-eight designs exist, he said, but not one has been built, and costs remain unknown. He cautioned against India becoming the testing ground for an untested Western SMR. He advised that India scale up the indigenous 700 MW programme the way France did in the 1970s, secure long-term government-backed debt at fixed rates for 25–30 years, and use public money to pre-identify optimal sites for the 100 GW target.

Published - April 19, 2026 03:29 pm IST