Draft SHANTI Rules, 2026 Seek to Strengthen Nuclear Liability, Financial Security and Private Participation in India’s Nuclear Expansion

Published On: 21-08-2026

Recent Developments:

- The **Department of Atomic Energy** released the **Draft SHANTI Rules, 2026** for public consultation in August 2026, seeking stakeholder feedback on the proposed nuclear regulatory framework. The consultation deadline is **4 September 2026**.
- The draft Rules seek to operationalise the **Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India Act, 2025**, commonly referred to as the **SHANTI Act, 2025**, and provide detailed provisions relating to nuclear liability, insurance and financial security.
- The framework is significant because India is seeking to expand nuclear capacity to **100 GW by 2047** while enabling greater participation of the private sector.
- India currently has **24 nuclear power reactors in commercial operation**, excluding RAPS-1, with an installed capacity of **8,780 MW**.
- The Government aims to increase nuclear capacity to about **22 GW by 2031–32** and subsequently expand it to **100 GW by 2047**.
- The Government has also announced development of at least **five indigenous Small Modular Reactors by 2033**, including the **220 MWe Bharat Small Modular Reactor, 55 MWe Small Modular Reactor and High Temperature Gas Cooled Reactor** for hydrogen production.

Draft SHANTI Rules, 2026:

Objective and Significance:

- The Draft Rules seek to provide a **predictable liability and financial-protection framework** for India's expanding nuclear sector.
- The Rules are intended to balance **private investment, operator accountability, victim compensation and nuclear safety**.
- The framework is particularly important because nuclear accidents involve potentially high-cost and long-duration liabilities that can affect investment decisions for decades.
- The proposed Rules therefore connect **operator liability with insurance, financial security, spent-fuel management and decommissioning obligations**.

Strict and No-Fault Liability:

- Nuclear installation operators would bear **strict liability** for nuclear damage, meaning liability can arise without requiring proof of negligence or fault.
- The framework also applies liability principles to nuclear damage arising during the **transportation of nuclear material**.

- The no-fault approach facilitates compensation by reducing the burden on victims to establish negligence after a nuclear incident.
- Where nuclear damage is attributable to multiple liable operators and cannot be separated, the SHANTI Act provides for **joint and several liability**, subject to the applicable statutory limits.

Mandatory Financial Protection:

- Operators would be required to maintain **insurance, financial security, or a combination of both** against nuclear damage.
- Financial security would have to remain **irrevocable** and continue until all spent fuel is removed from the spent-fuel storage pool after removal from the reactor.
- Where shares, bonds or other financial instruments are used as security, the proposed framework provides for a **1:1.33 security margin**.
- Any shortfall in the required financial protection would have to be covered through additional **insurance or financial security**.
- Such provisions seek to ensure that compensation obligations are backed by actual financial capacity rather than merely being legal liabilities.

Foreign Reactor Technology:

- The draft framework also seeks to establish additional regulatory certainty for the deployment of **foreign-designed reactors**.
- Foreign reactor technologies would be subject to appropriate certification or regulatory approval requirements linked to the regulatory framework of the country of origin.
- This approach seeks to reduce technological uncertainty while ensuring that imported reactor designs meet appropriate **safety and regulatory standards**.

Lifecycle Financial Responsibility:

Comprehensive Financial Planning:

- Licensed facilities would need financial arrangements covering **civil liability, operating expenditure, spent-fuel management, radioactive-waste management, decommissioning and site remediation**.
- This represents a **lifecycle approach** to nuclear regulation because financial responsibility would extend beyond the period of electricity generation.
- Such planning is important because nuclear facilities can generate financial obligations long after their operational life has ended.
- Dedicated financial provisions for decommissioning and waste management can prevent future liabilities from being transferred disproportionately to taxpayers.

Government-Owned Installations:

- Specified **Central Government-owned nuclear installations** may be exempted from obtaining insurance or other financial security under the proposed framework.
- In such cases, the **Central Government would assume liability** for attributable nuclear damage.
- This provision reflects the continuing strategic role of the State in India's nuclear programme even as private participation expands.

Periodic Review of Nuclear Liability:

Five-Year Review Mechanism:

- The proposed framework provides for periodic review of the **maximum civil-liability limits**.

- An expert group would review these limits every **five years**, drawing expertise from nuclear science, engineering, actuarial science, insurance, law and public interest.
- Periodic review is important because inflation, reactor capacity, population density, technological change and evolving risk assessments can alter the adequacy of existing liability limits.
- Parliamentary committee discussions have similarly highlighted the need for a structured review mechanism so that statutory liability limits do not become outdated over time.

India's Nuclear Energy Landscape:

Nuclear Energy and Energy Transition:

- Nuclear energy provides **reliable, low-carbon baseload electricity** and can complement variable renewable sources such as solar and wind.
- Nuclear power can therefore contribute to India's objectives of **energy security, decarbonisation and economic growth**.
- India has committed to achieving **net-zero carbon emissions by 2070**, making the expansion of low-carbon electricity generation strategically important.
- The Government's Nuclear Energy Mission seeks to increase nuclear capacity to **100 GW by 2047** as part of the broader vision of Viksit Bharat.

Current Expansion Strategy:

- India is following a **two-pronged nuclear expansion strategy**.
- The first component involves deployment of large reactors, including indigenous **700 MWe Pressurised Heavy Water Reactors**, along with advanced imported reactor technologies at greenfield sites.
- The second component involves **Small Modular Reactors** for brownfield applications, captive power, energy-intensive industries and remote or off-grid locations.
- The roadmap envisages around **54 GW** of capacity from projects involving the Nuclear Power Corporation of India Limited by 2047, while the remaining capacity is expected to involve public-sector enterprises, State Governments, private companies and joint ventures.

Wider Applications of Nuclear Technology:

Beyond Electricity Generation:

- The SHANTI framework supports the wider use of nuclear technology beyond conventional electricity generation.
- Potential applications include **captive power, industrial process heat, hydrogen production, medical isotopes, research, education and training**.
- Nuclear captive power can be particularly relevant for **hard-to-abate industries** such as steel and other energy-intensive sectors.
- Emerging applications may include reliable electricity and process heat for **data centres, semiconductor manufacturing, quantum technologies and high-performance computing**.
- Such diversification can increase the economic value of India's nuclear technology ecosystem beyond conventional power generation.

SHANTI Act, 2025:

Statutory Framework:

- The **SHANTI Act, 2025** provides the statutory foundation for the next phase of India's nuclear-energy programme.

- The Act seeks to enable **wider public and private participation** while retaining strong government oversight over nuclear safety and security.
- It provides a framework for **licensing nuclear installations and activities** and establishes responsibilities for nuclear operators.
- The Act seeks to create greater **legal and regulatory certainty** for investment in the nuclear sector.
- It incorporates provisions concerning **civil nuclear liability and compensation for nuclear damage**.
- The legislation also provides for mechanisms relating to **insurance and financial security** for nuclear-liability obligations.
- The Act strengthens the institutional framework for nuclear regulation, including statutory recognition of the **Atomic Energy Regulatory Board**.
- The framework seeks to balance **energy security, climate objectives, public safety, environmental protection and strategic considerations**.

Why Private Participation Matters:

Capital and Technology:

- Achieving **100 GW by 2047** requires substantial capital investment and rapid expansion of manufacturing and technological capabilities.
- Greater private participation can supplement public-sector investment and bring additional **capital, technology, project-management expertise and supply-chain capacity**.
- Private participation can also support the development of domestic nuclear manufacturing and ancillary industries.

Regulatory Challenge:

- Nuclear energy differs from conventional infrastructure because commercial incentives must remain subordinate to **nuclear safety and security**.
- Private participation therefore requires strong regulation that prevents cost reduction from compromising safety standards.
- The regulatory framework must ensure that operators remain accountable throughout the **construction, operation, spent-fuel management and decommissioning lifecycle**.

Key Concerns and Issues:

Adequacy of Compensation:

- Liability limits must provide **meaningful compensation to victims** while remaining financially manageable for operators and insurers.
- If liability limits are too low, victims may remain inadequately compensated after a major accident.
- If liability obligations become excessively high or unpredictable, private investment and insurance availability may be adversely affected.

Private-Sector Risk:

- Nuclear accidents involve potentially **low-probability but high-consequence and long-tail risks**.
- High insurance premiums and uncertainty regarding future liabilities could discourage private investment.
- A predictable liability regime is therefore essential for creating investment certainty without weakening victim protection.

Moral Hazard:

- Government assumption of liability for specified installations can create a potential **moral-hazard problem** if operators perceive that the State will ultimately bear the consequences of accidents.

- Strong safety standards, independent oversight and operator accountability are therefore essential.

Radioactive Waste and Decommissioning:

- **Spent fuel and radioactive waste management** require long-term technical, institutional and financial capacity.
- Decommissioning nuclear facilities can remain a financial obligation for decades after electricity generation ends.
- Lifecycle financial planning is therefore essential to prevent future environmental and fiscal liabilities.

Regulatory Independence:

- Greater private participation increases the importance of an **independent, technically capable and adequately resourced nuclear regulator**.
- Regulatory decisions should remain based on scientific evidence and safety considerations rather than commercial or political pressures.
- Transparent regulatory procedures can strengthen public confidence in nuclear expansion.

Public Trust and Emergency Preparedness:

- Nuclear expansion requires strong **emergency preparedness, environmental safeguards, public communication and disaster-response mechanisms**.
- Public trust is particularly important because nuclear accidents can have consequences extending beyond the immediate plant area.
- Parliamentary committee recommendations have emphasised the importance of **real-time public alert mechanisms and periodic emergency drills**.

Way Forward:

Balancing Investment with Public Protection:

- India should adopt a **risk-sensitive nuclear liability regime** that provides investor certainty without compromising public protection.
- Liability limits should be clear, predictable and periodically revised using **technological, actuarial, economic and safety evidence**.
- Insurance and financial-security requirements should remain sufficiently robust to ensure that operators can meet their obligations after an accident.

Strengthening Regulation:

- India should ensure an **independent, well-resourced and technically competent nuclear regulatory system**.
- Private operators should face transparent eligibility, financial-capacity and technical-competence requirements before receiving licences.
- Continuous regulatory monitoring should be strengthened during the initial years of private-sector participation.

Building a Domestic Nuclear Ecosystem:

- India should develop domestic capabilities in **reactor manufacturing, nuclear-grade components, insurance, safety technology, waste management and decommissioning**.

- Indigenous **Small Modular Reactor** development can support technology self-reliance while creating applications for captive power, industrial heat and remote energy supply.
- Research and development should continue across **advanced reactors, fuel cycles, nuclear hydrogen and non-power applications**.

Ensuring Lifecycle Accountability:

- Nuclear operators should maintain **ring-fenced financial arrangements** for waste management, spent fuel, decommissioning and site remediation.
- Emergency-response systems should include clear institutional responsibilities, rapid public communication and regular drills.
- Nuclear expansion should follow the principle that **commercial participation must not dilute safety accountability**.

Conclusion:

- The Draft SHANTI Rules, 2026 represent an important step in translating the **SHANTI Act, 2025** into a detailed operational framework for India's expanding nuclear sector.
- The proposed combination of **strict no-fault liability, mandatory financial protection, lifecycle financial planning and periodic review** seeks to balance investment certainty with public protection.
- The framework is particularly important because India is pursuing **100 GW of nuclear capacity by 2047** while opening greater space for private participation.
- The success of this transition will ultimately depend on whether India can combine **rapid capacity addition with uncompromising safety, independent regulation, responsible waste management and credible compensation mechanisms**.
- A successful nuclear expansion can strengthen **energy security, industrial competitiveness and low-carbon development**, but only a robust regulatory architecture can ensure that greater private participation does not weaken public accountability.

Value Addition for UPSC:

Key Concepts:

- **Strict Liability:** Liability can arise without establishing negligence or fault on the part of the operator.
- **No-Fault Liability:** Compensation can be claimed without requiring the victim to prove fault or negligence.
- **Long-Tail Risk:** A risk whose financial or environmental consequences can continue for a long period after the triggering event.
- **Moral Hazard:** A situation in which protection against losses may reduce incentives to take adequate precautions.
- **Lifecycle Liability:** The principle that financial and regulatory responsibility extends from construction through operation to waste management and decommissioning.
- **Spent Fuel:** Nuclear fuel that has been irradiated inside a reactor and subsequently removed from the reactor core.
- **Small Modular Reactor:** A relatively smaller nuclear reactor designed with modular construction and deployment characteristics, potentially enabling applications beyond conventional large nuclear power plants