The Atomic Energy Bill 2025 – Opening Up India's Nuclear Power Sector

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The Atomic Energy Amendment Bill 2025 Latest News

- Recently, the Indian government cleared the Atomic Energy Bill 2025 — rebadged as the Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (**SHANTI**) Bill.
- The proposed amendments aim to **overhaul** India's highly closed atomic energy framework by modifying the **Atomic Energy Act, 1962** and aligning it with global practices to enable private and foreign participation in civil nuclear power.
- This move is crucial for India's long-term **energy security**, climate commitments, and grid stability.

Reforming India's Nuclear Sector

- **Energy transition and baseload needs:**
  - Rapid renewable expansion without adequate energy storage has increased **grid instability**.
  - Thermal capacity expansion is slowing, and coal is environmentally and politically constrained.

    - Nuclear energy offers reliable baseload power and a low-carbon alternative.
- **Capital constraints, not technology deficit:**
    - India's push for global nuclear collaboration is driven more by capital requirements than technology.
    - Interest from foreign sovereign wealth funds, especially from West Asia, has been expressed.
- **Leveraging the Indo-US Civil Nuclear Deal:**
    - Nearly two decades after being signed, the deal's commercial potential remains underutilised.
    - The reforms are being packaged as part of India–US trade and investment negotiations.

Key Provisions of the Atomic Energy Bill 2025 (SHANTI Bill)

- **Opening up to private and foreign players:** Private companies allowed up to 49% minority equity in nuclear power projects. Potential entry of foreign companies in partnership with global sovereign funds.
- **Expanded scope of private participation:**
    - Exploration of atomic minerals
    - Fuel fabrication
    - Equipment manufacturing
    - Select aspects of plant operations
    - Research & Development (R&D) of civil nuclear technologies, especially Small Modular Reactors (**SMRs**) – **under 300 MW** nuclear fission reactors built in factories and shipped to sites.

Scaling Up Nuclear Capacity – India's Ambition

- **Target**: 100 GWe nuclear capacity by 2047, up from about 8 GWe currently.
- **Global comparison:** USA (approx. 100 GWe); France (~65 GWe); China (58 GWe).
- **Nuclear Energy Mission:**
    - **Outlay**: ₹20,000 crore for R&D in Small Modular Reactors (SMRs).
    - **Goal**: At least 5 indigenously developed SMRs operational by 2033.

SMRs – The New Pillar of India's Nuclear Strategy

- **Why SMRs:**
    - Smaller size, modular construction, quicker deployment.
    - Suitable for industrial decarbonisation and captive power (e.g., data centres, steel, cement).
    - Provide **carbon-neutral baseload power**, complementing renewables.
- **Indian SMR designs under development:**
    - Developed by Bhabha Atomic Research Centre (BARC) –
        - Bharat Small Reactor (BSR – 220 MWe) – Pressurised Heavy Water Reactor (PHWR)-based
        - Bharat Small Modular Reactor (BSMR – 200 MWe) – Light Water Reactor (LWR)
        - SMR-55 (55 MWe) – LWR-based
    - Designs are at an advanced stage; no foreign collaboration envisaged initially.

Private Sector Interest in SMRs

- **Companies expressing interest**: Reliance Industries, Tata Power, Adani Power, Hindalco, JSW Energy, Jindal Steel & Power.
- **16 potential sites**: Across Gujarat, Madhya Pradesh, Odisha, Andhra Pradesh, Jharkhand, Chhattisgarh.
- **Operational model:**
    - The state-owned Nuclear Power Corp of India Ltd (NPCIL) retains ownership and operational control.
    - Private players will fund the entire project lifecycle (including decommissioning), and get assured long-term captive power.
    - **Concerns** raised over ownership structure, charges and cost recovery, long-term project viability.

Nuclear Liability Law – The Key Bottleneck

- **Civil Liability for Nuclear Damage Act, 2010 (CLNDA):**
    - Includes “right of recourse”, allowing operators to seek compensation from suppliers.
    - Foreign vendors (Westinghouse, EDF/Areva) see this as a major investment deterrent.
- **Proposed workarounds:**
    - Capping supplier liability beyond a threshold.
    - Creation of a state-backed insurance or fund pool.
    - Aligning Indian law with global nuclear liability conventions.

Challenges and Way Forward

- **Political and public concerns over nuclear safety:** Strengthen independent nuclear safety oversight. Promote SMRs for industrial decarbonisation and grid stability.
- **Private sector worries:** Commercial viability and risk-sharing. Leverage reforms to deepen strategic partnerships (US, France, Russia).
- **Scalability issues:** India’s PHWR-dominated reactor fleet. Gradually move towards globally dominant LWR technologies while preserving indigenous capability.
- **Need to balance:** Sovereignty, safety, and openness. Integrate nuclear energy within India’s climate and energy transition strategy.
- **Managing liability reforms**: Without diluting victim compensation. Ensure clear regulatory frameworks and predictable liability regimes.

Conclusion

- The Atomic Energy Bill 2025 marks a **paradigm shift** in India’s nuclear energy policy, transitioning from a state-dominated, closed model to a strategic, investment-friendly and climate-aligned framework.
- If implemented carefully, the SHANTI Bill could become **a cornerstone of India’s energy security and net-zero pathway.**

Source: IE
