

India's Nuclear Energy Sector

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India's Nuclear Energy Sector: A Strategic Shift Toward Reform and Global Integration

The Government of India is poised to introduce significant legislative reforms in the nuclear energy sector during the upcoming Monsoon Session of Parliament. These proposed changes aim to liberalize the sector by allowing participation from private Indian enterprises and foreign collaborators—a substantial policy shift from the existing state-controlled framework. The reforms are timed with a landmark regulatory clearance from the United States, which further enhances the prospects for technological cooperation and investment inflows.

Introduction

India stands at the threshold of a transformative era in its nuclear energy program. The government is preparing to table two pivotal amendments to the legal framework governing atomic energy. These amendments aim to enable the participation of private companies, both domestic and international, in nuclear power generation. The strategic intent behind these reforms is to unlock the commercial and technological potential of the Indo-US civil nuclear agreement, signed nearly two decades ago but largely underutilized until now.

Key Legislative Reforms in the Nuclear Sector

1. Amendment to the Civil Liability for Nuclear Damage Act, 2010

The first proposed reform addresses the issue of liability in the event of a nuclear accident. Under the existing law, equipment suppliers and vendors bear a substantial share of the liability, which has deterred leading global firms—such as GE-Hitachi, Westinghouse, and Framatome—from participating in India's nuclear projects.

The proposed amendment aims to:

- Limit the liability of equipment vendors to the original contract value.

- Establish a defined, time-bound window during which liability claims can be made.

These measures are intended to reduce legal uncertainty and financial risk for foreign and private investors, thereby making India a more attractive destination for nuclear technology partnerships.

2. Amendment to the Atomic Energy Act, 1962

Currently, the operation of nuclear power plants is exclusively reserved for state-owned entities like the Nuclear Power Corporation of India Ltd (NPCIL) and NTPC. The second amendment proposes to liberalize this framework by allowing:

- **Private Indian companies** to become nuclear power generators.
- **Foreign entities** to participate in projects through minority equity stakes or joint ventures.

Expected outcomes include:

- Expansion of public-private partnerships in nuclear energy.
- Influx of advanced technology and investment from global stakeholders.
- Enhanced competition and innovation in the sector.

US Regulatory Clearance: A Game-Changing Development

In March 2025, the U.S. Department of Energy granted approval to **Holtec International** under **Part 810 of the U.S. Atomic Energy Act**, permitting the transfer of **Small Modular Reactor (SMR)** technology to Indian partners, including Tata Consulting Engineers and Larsen & Toubro.

Significance of the clearance:

- Prior restrictions had prevented U.S. companies from engaging in nuclear design or co-manufacturing in India.
- The new approval facilitates co-production, technology transfer, and local manufacturing of SMRs in India.
- This aligns with India's strategic objectives of energy self-reliance and reduced dependence on energy imports.

Strategic and Geopolitical Context

These nuclear sector reforms are part of a broader initiative to strengthen trade and strategic ties between India and the United States. The Indo-US nuclear partnership is now being seen as a cornerstone of clean energy collaboration.

Broader implications include:

- Advancement of bilateral trade negotiations, including potential progress toward a comprehensive Indo-US trade agreement.
- Deepening of strategic trust and alignment between the two nations.
- Development of India as a global hub for exporting next-generation nuclear technologies such as SMRs.

Implications for Energy Security and Climate Commitments

India has set ambitious climate targets, including achieving **net-zero emissions by 2070**. Expanding the role of nuclear energy is essential to meeting these goals.

Benefits of the proposed reforms:

- **Acceleration of nuclear capacity expansion**, which currently trails behind solar and wind energy.
- **Diversification of India's clean energy portfolio**, reducing dependence on coal and imported oil.
- **Promotion of innovation and manufacturing**, especially through global partnerships and technology transfers.

With electricity demand expected to **double by 2040**, nuclear power can provide stable baseload energy with a low carbon footprint, making it a critical component of India's long-term energy strategy.

Challenges and the Path Forward

Despite the optimistic outlook, several challenges could impede the reform process:

- **Political and public resistance** rooted in safety concerns about nuclear energy.
- **Complex legislative procedures**, especially for amending the liability law, which has remained contentious for years.
- **Regulatory preparedness**, including the need for robust oversight mechanisms to manage private sector participation safely and transparently.

Nevertheless, if the proposed amendments are passed, India could emerge as a leader in next-generation nuclear technologies, strengthening its **energy independence, technological capabilities**, and **global competitiveness**.

Conclusion

The Indian government's initiative to amend key nuclear laws represents a historic policy shift aimed at revitalizing the sector through private and international collaboration. Backed by recent regulatory support from the United States, these reforms have the potential to:

- Catalyze investment in clean nuclear energy.
- Facilitate the transfer and development of cutting-edge technologies like SMRs.
- Position India as a central player in the global nuclear energy landscape.

The realization of these objectives will depend on the swift passage of legislation, the establishment of robust regulatory frameworks, and consensus-building among stakeholders. If executed successfully, this reform could redefine India's energy future and reinforce its role in the global transition toward sustainable energy.

