DENTONS LINK LEGAL

Nuclear Law:
Powering Change – India

May 2025

Preface

The pursuit of sustainable and reliable energy sources stands at the forefront of global economic and environmental priorities. Nuclear energy, with its capacity to deliver large-scale, low-carbon power, is poised to play a defining role in meeting these challenges. This sector booklet provides a comprehensive overview of the nuclear power landscape, capturing critical legal, regulatory, and commercial considerations relevant to stakeholders navigating this dynamic sector in the Indian market.

India's ambitions for energy security, net-zero emissions, and industrial growth create a timely backdrop for renewed focus on nuclear power. With the ongoing advancements in reactor technologies, progressive regulatory developments and rising investor interest, the sector presents both exciting and complex challenges that demand informed and strategic engagement.

Through this publication, we aim to equip our clients, collaborators, and industry partners with clear insights into the regulatory ecosystem, project structuring trends, financing models, and risk mitigation strategies pertinent to nuclear power projects. Our multidisciplinary team draws upon deep expertise across energy, infrastructure, regulatory, and dispute resolution practices to support stakeholders at every stage of the lifecycle of nuclear initiatives.

The growing global focus on Small Modular Reactors (SMRs) reflect their potential to provide clean, reliable and cost-effective alternative sources to conventional power sources. In alignment of these global trends, the recent budget presentation by the Indian Finance Minister to the Parliament proposed amendments to the Atomic Energy, 1962 and the Civil Liability for Nuclear Damage Act, 2010 with the aim of attracting private sector participation and foreign investments into the nuclear energy sector.

We trust that this booklet will serve as a useful resource for understanding both the promise and practicalities of nuclear power in India and beyond.

Atul Sharma
Executive Chairman
Dentons Link Legal

Contents

About the Contributors 4

I. Overview of Indian Power Sector 6

II. Legal Framework & Regulatory Bodies for Nuclear Energy in India 8

III. Private Participation in Nuclear Power Sector 10

IV. Efforts and Recent Developments in Nuclear Power Sector 12

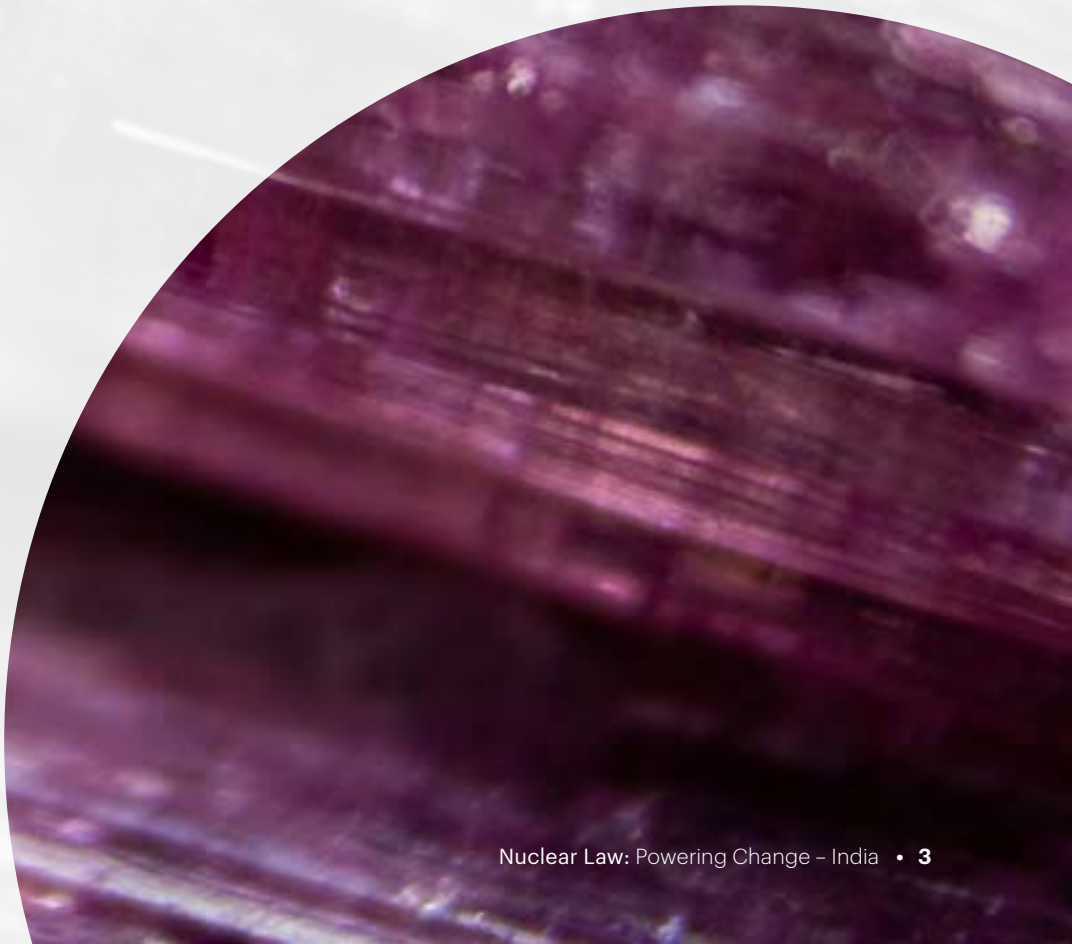
V. India's Evolving Nuclear Journey with Small Modular Reactors (Smrs): A New Paradigm for Nuclear Energy 14

VI. Thorium – A Developing Story 18

Annexure I: List of Abbreviations 21

Annexure II: Recent Industry Developments 23

Key Contacts 24



About the Contributors

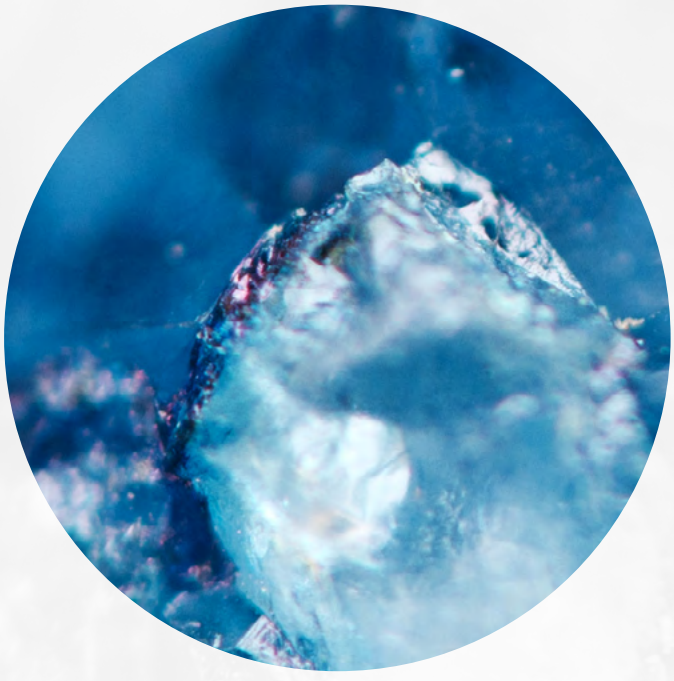
Samantha Fernandes
Partner
samantha.fernandes@dentonslinklegal.com

Samantha specializes in the Banking & Finance and Restructuring space, and has 15 years of experience in extensively advising domestic and international banks and financial institutions and leading corporate houses on the full spectrum of banking and finance transactions including project finance, syndicated finance, structured finance, debt restructuring, factoring, bond issuances, cross-border financing including external commercial borrowings, working capital, corporate loans and balance sheet funding across all sectors including infrastructure, energy, logistics, hotels & hospitality and manufacturing.

Samantha is recognized and respected for her holistic, pragmatic and innovative approach and for her expertise in her domain. Her advice is sought for legal and commercial issues pertaining to banking, finance and restructuring. Her vast experience in the infrastructure and energy space adds greater depth to the capabilities of the team in financing transactions including in relation to the project due diligence aspect.

She also has international experience, having worked with the Banking & Finance team at Pinsent Masons LLP, Dubai by virtue of her secondment in 2014, during which she had advised major Dubai banks on a number of finance transactions.

She has also graduated from the Globalaw Leadership Program – 2017; and is regularly recommended by global and domestic prestigious directories such as – The Legal500, IFLR1000, BW Legal World.



Nakul Vohra
Associate Partner
nakul.vohra@dentonslinklegal.com

Nakul Vohra is an Associate Partner at Dentons Link Legal with over 10 years of experience specializing in Mergers & Acquisitions, Projects, and Infrastructure. His practice spans a wide array of sectors including renewable energy, oil & gas, airports, railways, and manufacturing.

He has advised clients on complex cross-border investments, joint ventures, acquisitions and strategic structuring. Notably, Nakul played a key role in policy drafting for the Government of India under the Hydrocarbon Exploration & Licensing Policy (HELP), 2016. His transactional expertise includes advising major clients such as Ayana Renewable Power, Hinduja Group, Total Group, Reliance Group, Adani Group, ONGC, ExxonMobil, and international pension funds on acquisitions, regulatory compliance, and implementation of large-scale infrastructure projects.

Nakul is a member of the Bar Council of Delhi and holds a law degree from Amity Law School, Delhi (GGSIPU).

Antra Shourya
Associate
antra.shourya@dentonslinklegal.com

Shruti Poddar
Associate
shruti.poddar@dentonslinklegal.com

I. Overview of Indian Power Sector

India is amongst the largest electricity producer in the world. The country's power generation relies on a combination of traditional and renewable sources including coal, natural gas, renewable sources (wind, solar, hydroelectric) and nuclear energy. With a population exceeding 1.3 billion and a rapidly growing economy, India is expected to experience the highest energy demand growth globally over the next decade, while currently relying on coal as its dominant energy source. At COP26, India committed to achieving net-zero emissions by 2070, with nuclear energy as the potential key component of its long-term energy strategy.

Renewable Energy

In 2021, India announced its aim to achieve net-zero carbon emissions by 2070 and to source 50% of its electricity from renewable sources by 2030, marking a pivotal step in global climate change mitigation efforts[1].

India's current total installed power generation capacity is approximately 466.25 gigawatts (GW)[2], with renewable energy sources contributing about 35.43% (165.20 GW), comprising of 100.33 GW from solar power[3], 48.37 GW from wind power, 10.74 GW from biomass/cogeneration, 5.10 GW from small hydro projects (≤25 MW), and 0.66 GW from waste-to-energy[4].

India's renewable energy sector has experienced rapid growth in recent years, with a compounded annual growth rate (CAGR) of 15.4% between fiscal years 2016 and 2023[5]. The nation has emerged as the fastest-growing market for renewable electricity, with projections indicating that new capacity additions could double by 2026. The government's supportive policies and improved economic viability have made the renewable energy sector increasingly attractive to investors[6].

Nuclear Power

India's nuclear journey commenced in 1945 with the establishment of Tata Institute of Fundamental Research (**TIFR**) by Dr. Homi J. Bhabha, remembered as the architect of India's nuclear program. Thereafter, Atomic Energy Commission (**AEC**) was formulated in 1948 by the Government of India for leveraging atomic energy for peaceful purposes. The Atomic Energy Act further reinforced this dedication, providing a legislative framework for nuclear activities.

India aims to nearly triple its nuclear power capacity to 22,480 megawatts (MW) by 2031-32[7], underscoring the government's commitment to scaling up nuclear infrastructure. The focus will be on developing indigenous technologies, enhancing safety protocols, and fostering international collaborations to meet energy demands sustainably. India's nuclear energy sector is poised for significant growth, driven by strategic policy initiatives, technological advancements, and global partnerships.

The US-India Civil Nuclear Agreement in 2008

A landmark in India's nuclear history, the 'US-India 123 Agreement', officially known as the India–United States Civil Nuclear Agreement, was signed in 2008. This agreement marked a significant shift in international nuclear policy, as it allowed India to engage in civilian nuclear trade despite not being a signatory to the Nuclear Non-Proliferation Treaty (NPT). The key provisions of the US-India 123 Agreement are as follows:

1. Ministry of Environment, Forst and Climate Change, August 3, 2023 : https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1945472
2. Power Sector in India, February 2025: https://www.ibef.org/industry/power-sector-india
3. Ministry of New and Renewable Energy, February 7, 2025: https://pib.gov.in/PressReleasePage.aspx?PRID=2100603
4. Power Sector in India, India Brand Equity Foundation, February 2025: https://www.ibef.org/industry/power-sector-india
5. Power Sector in India, India Brand Equity Foundation, February 2025: https://www.ibef.org/industry/renewable-energy
6. Power Sector in India, India Brand Equity Foundation, February 2025: https://www.ibef.org/industry/renewable-energy
7. India to triple atomic power capacity by 2031, December 11, 2024: https://economictimes.indiatimes.com/industry/energy/power/india-to-triple-atomic-power-capacity-by-2031/articleshow/116207405.cms?from=mdr

- **Civilian and Military Separation:** India agreed to separate its civilian and military nuclear facilities and place the civilian facilities under International Atomic Energy Agency (IAEA) safeguards.
- **Nuclear Trade:** The agreement permitted India to engage in nuclear trade with the U.S. and other countries, facilitating access to nuclear fuel and technology for civilian purposes.
- **Non-Proliferation Commitment:** India committed to maintaining its moratorium on nuclear testing and to strengthening measures to prevent the spread of nuclear technologies.

The agreement not only facilitated nuclear trade but also paved the way for India to sign agreements for uranium imports from countries like Australia, Canada, Kazakhstan, France, and Russia. Between 2008-09 and 2017-18, India imported over 7,800 metric tons of nuclear fuel. Furthermore, it opened avenues for India to access critical technologies in strategic areas and bolstered its case for membership in export control regimes such as the Australia Group, Wassenaar Arrangement, and the Missile Technology Control Regime (MTCR). The agreement was instrumental in ending India's nuclear isolation, opening avenues for international collaboration and technological advancement in the nuclear sector. It also underscored the strategic partnership between India and the USA, reflecting mutual trust and shared objectives in nuclear non-proliferation and energy security.

In February 2025, India and the United States agreed to fully implement the US-India 123 Agreement, advancing plans to construct US-designed reactors in India.

As of early 2025, India's installed nuclear energy capacity stands at approximately 8,180 MW spread across 24 nuclear power reactors. The government has set ambitious targets to expand this capacity to 22.48 GW by 2031-32 and further to 100 GW by 2047[8].

India's Current Nuclear Energy Capacity and growth targets

Capacity	Value
Installed Capacity (Dec 2024)	8,180 MW
Targeted Capacity by 2032	22.48 GW
Targeted Capacity for 2047	100 GW

Budget & Reforms in FY 2025-2026[9]

Policy Initiative	Details
Legislative Reforms	Amendments to Atomic Energy Act & Civil Liability Act to attract investment
Budget for SMRs	INR20,000 crore for R&D of Small Modular Reactors
SMR Deployment Target	5 reactors to be operational by 2033

To attract private investments in implementation of future nuclear projects (particularly SMRs) across India, the latest budget proposes to amend the Atomic Energy Act and the Civil Liability Act (amendments bill under consideration). Additionally, the Union Budget 2025-26 has introduced a dedicated Nuclear Energy Mission, with INR20,000 crore allocation for the research and development of SMRs. The government plans to operationalize at least five SMRs by 2033, marking a significant step toward modernizing India's nuclear infrastructure and achieving long-term energy security.

8. Department of Atomic Energy, February 3, 2025: https://pib.gov.in/PressReleaseIframePage.aspx?PRID=2099244
9. Department of Energy, February 5, 2025: https://pib.gov.in/PressReleasePage.aspx?PRID=2100108#:~:text=The%20Union%20Budget%202025%2D26%20has%20allocated%20%E2%82%B920%2C000%20crore,emissions%20and%20ensuring%20energy%20sustainability.

II. Legal Framework & Regulatory Bodies for Nuclear Energy in India

Constitution of India

Under Schedule VII of the Constitution of India, the power relating to making of laws in respect of *'atomic energy and mineral resource necessary for its production'* is with the central legislature i.e., Indian Parliament.

Atomic Energy Act, 1948

The Atomic Energy Act, 1948, was passed in parliament soon after the country gained independence in 1948 and set forth India's objective for the development and utilization of atomic energy solely for peaceful purposes. This enactment was later replaced by the Atomic Energy Act, 1962 (discussed below). Since enactment of the erstwhile legislation, India embarked on a wide variety of technological activities such a uranium extraction and purification, fuel fabrication, reactor control and instrumentation, research reactor construction and operations.

Department of Atomic Energy

The Department of Atomic Energy (**DAE**) was set up under the direct charge of the Prime Minister of India through a Presidential Order on August 3, 1954, and the Atomic Energy Commission is responsible for formulating the policies of DAE.

Since its establishment, DAE has been responsible for the entire spectrum of activities related to nuclear science and technology encompassing power generation, research, development, safety, security, safeguards, environmental protection, international collaborations and societal applications[10].

DAE along with its constituent establishments play a pivotal role in advancing nuclear science, technology and innovation. DAE comprises various research centres, industrial organizations, public sector undertakings and service organizations. DAE also has several grant-in-aid institutes of international repute engaged in research in basic and applied sciences, cancer care & research.

Atomic Energy Commission

The Atomic Energy Commission (AEC) was setup in August 1948, with function of formulating the policy for DAE, preparing budget of DAE for each financial year and implementing other government policies in all related matters.

Atomic Energy Act, 1962

The Atomic Energy Act, 1962 (**Atomic Energy Act**), notified with the objective to promote development of nuclear energy in India, has paved the way forward for setting standards for use of radioactive substances for power production. Under the Atomic Energy Act, the Central Government is conferred with the power to, either directly or through its nominee, produce, develop, use and dispose of atomic energy and to manufacture radioactive substances required for such energy production.

Atomic Energy Regulatory Board

The Atomic Energy Act also established the Atomic Energy Regulatory Board (**AERB**) as the governing body responsible for setting safety standards for preventing radiation accidents, retaining public safety, cautious disposal of radioactive wastes and other related rules and regulations.

The key functions of AERB include:

a. regulation and safety oversight;

b. grant of licenses for the establishment, operation, and decommissioning of nuclear reactors;

c. inspect nuclear establishments and ensure compliance with safety and operational regulations;

d. set radiation protection standards and oversee compliance to protect workers, the public, and the environment from harmful radiation exposure;

e. develop and enforce safety protocols for nuclear accidents, ensuring that operators have necessary measures in place to handle emergencies effectively; and

10. Department of Atomic Energy Website: https://dae.gov.in/activities/

f. work in coordination with other governmental bodies, such as the DAE and other ministries of the Central Government (like power ministry), on matters related to atomic energy safety.

Nuclear Power Corporation of India Ltd.

Nuclear Power Corporation of India Ltd. (**NPCIL**) was established in 1987 as a public sector undertaking (**PSU**) under the DAE. Its primary role is to implement, operate and manage nuclear projects for generation of power for India's energy requirements. NPCIL took over the operations of India's nuclear power plants, a responsibility initially managed by the DAE.

The Civil Liability Nuclear Damage Act, 2010

The Civil Liability for Nuclear Damage Act, 2010 (**Civil Liability Act**) seeks to create a mechanism for compensating victims of nuclear incidents and lays emphasis on the necessity of joining international liability regime. India is a signatory to the Convention on Supplementary Compensation for Nuclear Damage of 1997, along with a few bilateral agreements with countries like USA, UK, Russia, France and Canada, for co-operation in using nuclear energy for civilian purposes.

The Civil Liability Act defines the allocation of responsibility for nuclear incidents, and as per this enactment, the operator has strict liability based on the principals of *'no-fault liability'* regime. The definition of 'nuclear damage' under the Civil Liability Act includes environmental harm and economic losses resulting from environmental degradation.

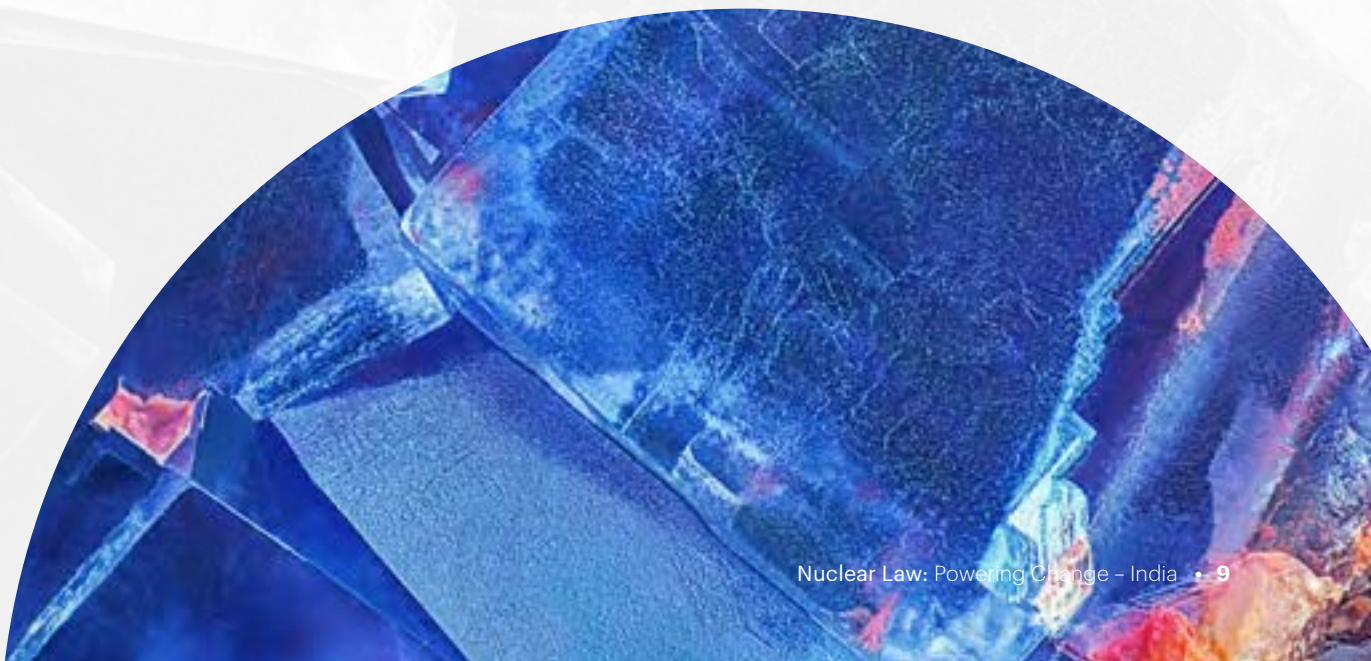
Liability of Equipment Suppliers

India's nuclear liability framework has posed a significant challenge for potential suppliers of material. In most countries, nuclear plant operators are solely responsible for any damage resulting from an accident, for which they obtain liability insurance, however in India, as per the current law, the supplier of equipment (or its employee) is also liable if the nuclear incident has resulted as a consequence of an act of supplier (or its employee), which includes supply of equipment or material with patent or latent defects or sub-standard services.

Suppliers have attempted to negotiate with operators to limit or exclude their liability under supply or construction contracts. However, the Indian government deemed such practices unfair and beyond the scope of the Civil Liability Act, leading to the enactment of the Civil Liability for Nuclear Damage Rules, 2011. These Rules mandates that any contract between an operator and a supplier must include a right of recourse against the suppliers. This right must be for an amount not less than the operator's liability under the Civil Liability Act or the total contract value, whichever is lower.

Liability under Tort Law

Section 46 of the Civil Liability Act states that its provisions are in addition to and not in derogation of any other law in force. It further clarifies that nothing in the Civil Liability Act exempts the operator from legal proceedings that could otherwise be instituted under any other law. At first glance, this provision appears to allow victims to pursue claims under tort law, even though the Civil Liability Act's primary objective is to centralize liability on the operator.



III. Private Participation in Nuclear Power Sector

Private entities have historically been barred from participating in India's nuclear sector. The Atomic Energy Act grants exclusive authority over nuclear energy to the central government, with operations managed through federal bodies like the DAE and public sector undertakings including the NPCIL. As a result, private companies have been prohibited from engaging in nuclear power generation or the production and use of atomic energy (as per Section 22 of the Atomic Energy Act).

In February 2016, the Indian government amended the Atomic Energy Act, allowing NPCIL to establish joint venture companies with other public sector undertakings (PSUs) to participate in nuclear power generation and potentially other areas of the fuel cycle[11]. As a result, three joint ventures with major energy-sector PSUs have been formed under the revised law[12]:

a. Anushakti Vidhyut Nigam Ltd (a collaboration between NPCIL and NTPC),

b. NPCIL-Indian Oil Nuclear Energy Corporation Ltd, and

c. NPCIL-Nalco Power Company Ltd.

NPCIL reportedly has an investible surplus of approximately INR12,000 crore ($1.8 billion), while NTPC, IOC, and Nalco can each contribute around INR10,000 crore ($1.5 billion) to new nuclear initiatives, holding a 49% equity stake[13].

The proposed privatization of India's nuclear energy sector, including amendments to the Civil Liability Act could significantly reshape the country's nuclear energy landscape. When implemented, the reforms would bring private players into the sector, alter liability structures, and align India's nuclear liability framework with international standards.

Foreign direct Investment (FDI)

India's foreign investment policies are governed by the Consolidated FDI Policy, which is periodically issued and updated by the Department for Promotion of Industry and Internal Trade (**DPIIT**) under the Ministry of Commerce and Industry. However, the responsibility for enforcing FDI regulations lies with the Reserve Bank of India (**RBI**), as per the provisions of the Foreign Exchange Management Act,1999 (**FEMA**).

India's nuclear sector has historically been under stringent government control, primarily due to national security and strategic considerations. Here's an overview, Foreign Direct Investment (**FDI**) restrictions in the nuclear power sector:

Manufacturing and Technology[14]: As of now, 100% **FDI** is permitted under the automatic route for manufacturing nuclear reactors, their components, and related technologies. This includes areas like:

» Manufacturing of nuclear reactors and components.

» Research and development in nuclear technologies.

» Supply of specialized materials and equipment.

Power Generation: FDI in nuclear power generation remains prohibited. The Atomic Energy Act reserves nuclear energy production exclusively for government entities, preventing private sector involvement in power generation.

11. Department of Atomic Energy, February 24, 2016: https://pib.gov.in/newsite/PrintRelease.aspx?relid=136697
12. Joint Ventures, NPCIL Website: https://www.npcil.nic.in/content/307_1_JointVentures.aspx
13. Nuclear Power in India, World Nuclear Association, March 2025: https://world-nuclear.org/information-library/country-profiles/countries-g-n/india
14. DAE, September 16, 2020, https://www.pib.gov.in/PressReleasePage.aspx?PRID=1655136

Case Study – First Public Private Partnership in Nuclear Power Generation

India's nuclear power sector is on the brink of a major transformation as the NPCIL takes a groundbreaking step by issuing a Request for Proposal (RFP) to involve private players in the development of small reactors and participation in upcoming nuclear projects. This marks a significant shift in India's nuclear policy.

NPCIL on December 31, 2024, has invited requests for proposal (RFP) from private players to set up Bharat Small Reactors (BSRs), making it the first formal move by the Union government to decentralise the country's nuclear power sector. The NPCIL stated that in line with the announcement in the 2024-25 Union budget, BSRs are planned to be set up with private capital within the existing legal framework and approved business models.

As per the tender document, the private participant will have the right to offtake the entire electricity output generated (net of auxiliary consumption) by the Nuclear Power Plant (NPP). Post construction, the assets of NPP, for purpose of operation, will get transferred to NPCIL.

Key features of the RFP are as follows:

i. ***Eligibility Criteria:*** The bidder must have (a) an industrial/commercial unit needing about 2500 MUs of electricity per year; (b) a minimum net worth of INR3000 Crores (as of the financial year 2023-24); and (c) a high credit rating with very low credit risk.

ii. ***Funding Responsibility:*** The private participant shall bear the entire funding required for both Capital Expenditure (CAPEX) and Operating Expenditure (OPEX), covering the entire project life cycle, including pre-project costs, asset reinstatement in case of damage, and decommissioning. The private participant shall arrange finances against the intangible asset, i.e., the right to beneficial ownership of the electricity produced by the Nuclear Power Plant (NPP).

iii. ***Site Evaluation:*** The private participant and NPCIL shall carry out detailed site evaluation studies, thereafter, NPCIL will approach the DAE site selection committee for approval.

iv. ***EPC:*** The private participant will select and identify agencies for NPP construction under the supervision and control of NPCIL (excluding financial supervision), choosing from the approved list of vendors provided by NPCIL.

v. ***Spent Fuel Management Costs:*** The private participant shall bear all costs related to the construction, operation, and maintenance of spent fuel management facilities within the plant, including Away-from-Reactor (AFR) facilities.

vi. ***Waste Management and D2O Upgradation Costs:*** The private participant shall bear all costs related to the construction and operation of waste management facilities and D2O upgradation facilities.

vii. ***Township and Allied Facilities:*** The private participant shall provide appropriate township accommodation with suitable amenities such as transportation, medical facilities, schooling, training facilities, security, and neighborhood development as agreed with NPCIL.

viii. ***Force Majeure Event Costs:*** In the event of a force majeure event, NPCIL shall not be liable for any costs, and the private participant will continue to pay for the resources deployed by NPCIL for project construction, operation, and facility safety and security.

IV. Efforts and Recent Developments in Nuclear Power Sector

India is actively seeking collaborations to bolster its nuclear capabilities:

Jaitapur Nuclear Power Project with France: In partnership with France's Électricité de France (EDF), India plans to construct six European Pressurized Reactors, each with a capacity of 1,730 MW, totalling 10,380 MW[15]. This project exemplifies India's commitment to expanding its nuclear infrastructure through international cooperation. In February 2025, India and France have signed memorandum of understanding to collaborate on advanced modular and SMRs. India and France have signed three key Memorandums of Understanding (MoUs) to advance civil nuclear cooperation: (i) declaration of intent to jointly develop AMR and SMRs for peaceful civilian use; (ii) renewal of MoU between India's DAE and France's Commissariat à l'énergie atomique et aux énergies alternatives (CEA) for collaboration with the Global Centre for Nuclear Energy Partnership (GCNEP). Cooperation Agreement between DAE and CEA to facilitate technical cooperation between GCNEP (India) and the French Institute for Nuclear Science and Technology[16].

Engagement with Russia: India and Russia have a longstanding partnership in nuclear energy, exemplified by the Kudankulam Nuclear Power Plant (KKNPP) in Tamil Nadu. Despite challenges such as cost overruns and construction delays, both nations are committed to expanding their civilian nuclear cooperation. The first two units of KKNPP, each with a capacity of 1000 MW, became operational in 2013 and 2016, respectively, and currently contribute significantly to India's nuclear power generation. Construction of Units 3 and 4 began in 2017, with Units 5 and 6 following in 2021[17]. In December 2023, India and Russia signed agreements to further advance these projects, underscoring their mutual commitment to deepening nuclear collaboration[18]. This enduring partnership highlights Russia's pivotal role as India's primary collaborator in the nuclear sector, a relationship that has remained resilient despite global geopolitical shifts.

Engagement with Canada: A bilateral safeguards agreement was signed between the DAE and the Canadian Nuclear Safety Commission (CNSC), allowing trade in nuclear materials and technology for facilities which are under IAEA safeguards. A similar bilateral safeguards agreement with Australia was signed in 2014 and finalized in November 2015. Both apply essentially to uranium supply[19].

Nuclear Suppliers Group: The Nuclear Suppliers Group (NSG) agreement, finalized in September 2008, expanded India's ability to procure reactors and nuclear fuel from international suppliers. Since then, India has signed civil nuclear cooperation agreements with multiple countries, including the USA, Russia, France, the UK, South Korea, the Czech Republic, Canada, Australia, Argentina, Kazakhstan, Mongolia, and Namibia[20].

In November 2015, India and the UK signed an additional nuclear cooperation agreement, forming part of a £3.2 billion ($4.9 billion) collaboration package focused on energy security and climate change initiatives. However, the absence of an agreement with Japan initially posed a challenge for technology transfers involving GE Hitachi and Westinghouse[21].

15. Department if Atomic Energy, March 19, 2025: https://www.pib.gov.in/PressReleasePage.aspx?PRID=2112842#:~:text=With%20technical%20agreements%20now%20finalized,nuclear%20energy%20target%20by%202047.
16. France and India decide to jointly develop advanced nuclear reactors, Times of India, February 13, 2025: https://timesofindia.indiatimes.com/india/france-and-india-decide-to-jointly-develop-advanced-nuclear-reactors/articleshow/118191250.cms
17. Despite challenges at Kudankulam project, India and Russia likely to deepen civilian nuclear cooperation, By Dmitry Gorchakov, Aditya Pareek, September 30, 2024, The Bellona Environmental Foundation, https://bellona.org/news/nuclear-issues/2024-09-despite-challenges-at-kudankulam-project-india-and-russia-likely-to-deepen-civilian-nuclear-cooperation
18. India, Russia ink pacts on construction of future power units of Kudankulam nuclear plant, December 27, 2023, The Hindu, https://www.thehindu.com/news/national/india-russia-ink-pacts-on-construction-of-future-power-units-of-kudankulam-nuclear-plant/article67677964.ece
19. Nuclear Power in India, World Nuclear Association, March 2025, https://world-nuclear.org/information-library/country-profiles/countries-g-n/india
20. Nuclear Power in India, World Nuclear Association, March 2025 https://world-nuclear.org/information-library/country-profiles/countries-g-n/india
21. Nuclear Power in India, World Nuclear Association, March 2025, https://world-nuclear.org/information-library/country-profiles/countries-g-n/india

After prolonged discussions, India and Japan reached a preliminary agreement in December 2015. Following six years of negotiations, a comprehensive nuclear cooperation agreement was finalized in November 2016. This agreement allows India to import Japanese nuclear technology and secures Japan's support for India's NSG membership bid. The agreement was formally ratified by Japan's parliament in June 2017[22].

Some of recent developments in Indian nuclear energy industry have been summarised in Annexure II of this brochure.

22. Nuclear Power in India, World Nuclear Association, March 2025, https://world-nuclear.org/information-library/country-profiles/countries-g-n/india

V. India's Evolving Nuclear Journey with Small Modular Reactors (SMRS): A New Paradigm for Nuclear Energy

The advent of SMRs has gained significant attention globally, with several countries exploring their potential to provide clean, reliable, and cost-effective energy. Globally, there are 90 or so SMR technological designs[23] at different stages of development across 18 countries, with only 2 operational SMRs – Russia's Akademik Lomonosov (35 MWe x 2) floating SMR (operational since May 2020) and China's HTR-PM (operational since 2023).[24] These compact, scalable, and cost-effective reactors offer a promising solution for meeting the world's growing energy demands while reducing greenhouse gas emissions.

Aligning with the global outlook, India's nuclear energy sector, while still evolving, is poised for significant growth with ground-breaking amendments to the nuclear laws on the anvil, opening up new avenues for private sector participation.

This Section provides a comprehensive analysis of the financing challenges and opportunities associated with SMRs that are redefining the nuclear energy paradigm.

Understanding SMRs

SMRs are nuclear reactors that are small in size with comparatively lower power output when compared to conventional large-scale nuclear reactors. Typically, SMRs are a fraction of the size of a conventional nuclear power plant and produce less than 300 MW of electricity, which is about one-third of the generating capacity of traditional reactors.[25]

A few key considerations, which make SMRs an attractive investment opportunity include:

- **Design:** As the name implies, SMRs are designed to be small and modular, allowing for factory-based construction and quicker installation. Unlike lengthy on-site construction, these reactors can be built in a factory, shipped to the site and assembled as a single or multi-module plant. Given the inherent nature of its design, SMRs can be deployed across a variety of settings, from remote regions to industrial facilities, offering a tailored solution for diverse energy needs.
- **Scalability:** The standardized design of SMRs enable manufactures to benefit from easier scalability and economies of scale. Using standardized components like solar panels and battery modules for repeated builds can reduce costs, making SMRs an even more affordable solution.
- **Reduced Capital Costs & Faster Construction:** SMRs are less expensive to build due to their design and shorter construction period (with less likely overruns expected). They can be constructed in 3 –5 years (or less)[26], significantly quicker than the average 7 or more years required for traditional reactors.[27]
- **Flexibility:** SMRs can be integrated with other renewable energy sources (such as solar photovoltaic and wind) to develop hybrid energy systems, which can help address intermittency issues associated with renewables, resulting in a more reliable and sustainable source of power.
- **Smaller Environmental Impact:** SMRs have a reduced construction footprint and produce low-carbon energy, offering a cleaner alternative to fossil fuels.

23. Int'l Atomic Energy Agency [IAEA], *Climate Change and Nuclear Power*, financing nuclear energy in low carbon transitions (2024), https://www-pub.iaea.org/MTCD/Publications/PDF/PUB9048_web.pdf
24. Int'l Atomic Energy Agency [IAEA], *small modular reactors-Advances in SMR Developments*, International Conference on small modular reactors and their applications 21–25 October 2024 (2024), https://www-pub.iaea.org/MTCD/Publications/PDF/p15790-PUB9062_web.pdf
25. Joanne Liou, *What are Small Modular Reactors (SMRs)*?, IAEA Office of Public Information and Communication, (Sept 13, 2023), https://www.iaea.org/newscenter/news/what-are-small-modular-reactors-smrs
26. B. Mignacca & G. Locatelli, *Economics and finance of Small Modular Reactors: A systematic review and research agenda*, Vol 118-109519, Renewable and Sustainable Energy Reviews, 7 (2020), https://doi.org/10.1016/j.rser.2019.109519
27. Bart Linssen, *Small Modular Reactors: Pros and cons*, Euroview (November 07, 2024), https://euroview.ecct.com.tw/category-inside.php?id=2160

- **Leveraging Existing Infrastructure:** SMRs can be utilized to repurpose aging thermal power plants, dispensing with land acquisition constraints.
- **Safety System:** Traditional nuclear reactors use physical barriers like concrete shielding and multiple safety systems for protection against radiation and to mitigate human or computer errors. In contrast, the inherent safety characteristics of SMRs include low power and operating pressure, and they are designed with passive cooling systems, which do not require human intervention reducing accidental radioactive exposure.

SMRs, driven by their technological, economic and environmental advantages, offer a compelling investment proposition for countries and industries seeking to diversify their energy portfolios while reducing carbon emissions.

The Financing Conundrum

The bankability of SMRs is a critical factor in determining their viability for financing, and is influenced by a range of factors, including technology risk, regulatory framework and economic viability. While SMRs offer several potential advantages, they also face challenges, which negatively impact their bankability:

- **Technology Uncertainty:** SMRs remain a new and emerging technology. With more than 90 SMR designs and concepts globally, at various levels of maturity, and only 2 operational SMRs, there is need for extensive testing and demonstration of SMRs to prove commercial viability for a select design, as well as addressing issues relating to decontamination and waste disposal.
- **Regulatory Framework:** India's nuclear regulatory framework is still evolving, leaving room for uncertainty for investors and lenders. A clear and supportive regulatory framework is paramount for SMR bankability.
- **High Intital Costs:** SMRs require substantial upfront investment in R&D, licensing and regulatory approvals.
- **Domestic Funding:** India's domestic funding options for nuclear energy are limited, making it essential to attract foreign investment.
- **Public Perception:** Nuclear energy is often associated with safety concerns, which affects public perception and investor confidence.

Creating a viable financing ecosystem for SMRs requires a multifaceted approach, necessitating concerted efforts on the part of all stakeholders and a synergistic collaboration among governments, private sector entities and financial institutions.

India's nuclear power sector has historically been driven by public investment, with NPCIL at the helm. However, to meet the country's growing energy demands and achieve net zero by 2070, the Government is actively seeking private sector participation in the nuclear energy industry to bridge the funding gap and accelerate development and deployment of SMRs.

Financing Mechanism

With the proposed decentralization of the country's nuclear power sector, mobilizing financing for investment in SMRs will play a crucial role. Overtime, as SMRs continue to evolve, potential financing solutions for SMR projects could include:

a. Green Bonds

Globally, Green Bonds are increasingly being used to support investment in nuclear projects. Initially, proceeds from green bonds were primarily deployed to fund life extension and refurbishment projects for existing nuclear reactors. However, in recent years, green bonds are being used to finance new nuclear builds.

Several countries, including Canada, France, Finland and the United States, have issued green bonds to finance nuclear energy projects. Some notable issuances include:

- **Canada's Bruce Power's Green Bond:** In 2021, Bruce Power issued a CAD 500 million green bond to upgrade its existing reactor fleet, becoming the first nuclear operator globally to successfully issue green bonds. Today, Bruce Power has cumulatively issued $1.7 billion in green bonds.[28]

28. Bruce Power, *Bruce Power Sustainability Report 2024 (2024)*, https://www.brucepower.com/wp-content/uploads/2024/06/240136A_SustainabilityReport_R000-AX.pdf

- **Canada's OPG's Green Bond:** In 2022, Ontario Power Generation issued a first of its kind CAD 300 million nuclear green bond to fund the Darlington refurbishment project.[29]
- **Finland's TVO's Green Bond:** In 2023, Teollisuuden Voima Oyj issued a EUR 600 million green bond to finance investments in its existing 3 Olkiluoto units or to refinance investments already made.[30]
- **France's EDF's Green Bond:** In 2023, Électricité de France launched a EUR 1 billion senior green bond issue for its existing nuclear fleet.[31]
- **USA's Constellation's Green Bond:** In 2024, Constellation Energy issued the first corporate green bond in the USA equivalent to USD 900 million to finance *inter alia* maintenance, uprates and life extensions of its nuclear power plants.[32]
- **Asia's first Green Nuclear Bond – South Korea's KHNP's Green Bond:** Recently this year, Korea Hydro and Nuclear Power raised HKD 1.2 billion from a green bond issuance for nuclear power plant safety upgrades and R&D for next-generation reactors.[33]

The growing number of nuclear energy friendly green bond issuances worldwide reflects a shift in the global energy landscape, where nuclear energy is increasingly being acknowledged as an indispensable component of a diversified low-carbon energy mix.

India has also recognized green bonds as a viable financing avenue for nuclear energy initiatives, with a particular focus on SMRs. NITI Aayog's May 2023 report titled – "*The Role of Small Modular Reactors in Energy Transition*" advocates for innovative financing approaches, combining blended finance and green bonds to stimulate private investment in SMRs. The report emphasizes that the inclusion of nuclear energy in sustainable investment taxonomy could strengthen the economic feasibility of SMR projects.

b. Blended Finance, Project Finance & Asset Finance

- **Project Finance & Asset Finance:** As SMRs evolve, a traditional project finance route may be considered for funding SMRs in some cases (with government backing for nuclear specific risks), in view of their bankability advantage over conventional nuclear plants. Based on cash flows generated by the SMR, asset based financing may also be considered as an alternate financing option.
- **Blended Finance:** SMR projects are likely to use a blended financing approach, combining budgetary allocation, sponsor equity or commercial loans. Blended finance will help de-risk private sector investments (from risk challenges associated with new technologies or less mature markets) by leveraging instruments such as subordinated debt, sovereign guarantees, concessional finance etc.

c. Financial Institutions

Multilateral development banks have the potential to play an important role in deployment of different blended finance solutions. With sentiments towards nuclear energy undergoing a tectonic shift globally, accelerated deployment of SMRs would require substantial support of financial institutions. Historically, the World Bank, Asian Development Bank and other multilateral development banks have been reluctant to invest in nuclear energy. In fact, the World Bank has not financed a nuclear power plant since its USD 40 million loan to Italy's first atomic plant in 1959.[34] While nuclear industry associations are urging multilateral development banks to include nuclear energy in their investment portfolios, 14 leading global banks and financial institutions have collectively pledged their support for nuclear energy projects, marking a notable milestone in the financing landscape. Some of the institutions include Barclays, BNP Paribas, Goldman Sachs, Societe Generale and Morgan Stanley.

29. *OPG expands green financing to include new nuclear*, World Nuclear News, June 26 2024, https://www.world-nuclear-news.org/articles/opg-expands-green-financing-to-include-new-nuclear
30. Staff Writer, *TVO issues €600M green bond to finance nuclear power and waste management*, Nuclear Engineering International, May 16 2024, https://www.neimagazine.com/news/tvo-issues-e600m-green-bond-to-finance-nuclear-power-and-waste-management/
31. Igor Todorović, *France's EDF sells Europe's first green bonds for nuclear energy*, Balkan Green Energy News, Dec 01, 2023, https://balkangreenenergynews.com/frances-edf-sells-europes-first-green-bonds-for-nuclear-energy/
32. *Constellation issues first US nuclear green bond*, World Nuclear News, March 19 2024, https://www.world-nuclear-news.org/articles/constellation-issues-first-us-nuclear-green-bond#:~:text=In%20November%202023%2C%20France%27s%20EDF,1%20billion
33. *Asia's first nuclear green bond*, Enteprise, March 07 2025, https://enterprise.news/climate/en/news/story/872c429c-ef98-4978-ad69-4d19b037d8b6/asia%25e2%2580%2599s-first-nuclear-green-bond
34. *Loan for Nuclear Power (English)*, World Bank Group Archives exhibit series|no. 034 Washington, D.C.: World Bank Group. http://documents.worldbank.org/curated/en/700621467993172257

Nuclear Infrastructure Bank: Drawing a parallel with the existing institutional structure for infrastructure and energy financing in India, India may consider exploring the concept of a dedicated national Nuclear Infrastructure Bank to support its growing nuclear energy program. A Nuclear Infrastructure Bank for India could provide financing for various aspects of the nuclear project cycle, including:

- **Nuclear Power Generation:** Financing for new nuclear reactors, including Small Modular Reactors (SMRs) and Pressurized Heavy Water Reactors (PHWRs).
- **Fuel Cycle Facilities:** Support for uranium mining, fuel fabrication, and reprocessing facilities.
- **Nuclear Waste Management:** Financing for nuclear waste storage and disposal facilities.
- **Research and Development:** Funding for R&D initiatives focused on advancing nuclear energy technologies.

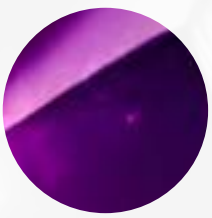
Indian EXIM Bank:

The Export-Import Bank of India is a specialized agency established for financing imports and exports. It may, under its existing frame-work, consider extending facilities for importing technical know-how and components for SMRs.

By leveraging innovative financing models, mobilizing domestic and international capital, and cultivating strategic partnerships, India can harness the vast potential of SMRs to drive energy security, economic growth, and environmental sustainability.

As India continues to navigate its energy landscape, SMRs hold the potential to unlock a trifecta of benefits: enhanced energy security, reduced greenhouse gas emissions, and increased access to reliable and affordable electricity.

However, the successful development and deployment of SMRs and its seamless integration into India's energy mix, necessitates a harmonious interplay of a robust policy framework, technological innovation, stakeholder engagement and collaborative financial ecosystem. While SMRs have garnered much interest, there is still a long way to go before they can realize their full potential in promoting sustainable economic development.



VI. Thorium – A Developing Story

It is believed that India has amongst the largest thorium reserves in the world. DAE has integrated thorium as a long-term sustainable energy resource within India's three-stage nuclear power programme. This strategy begins with using natural uranium in Pressurised Heavy Water Reactors (PHWRs) to generate plutonium, followed by Fast Breeder Reactors (FBRs) that produce more fissile material. Thorium's large-scale deployment is planned for the third stage, where Uranium-233 bred from Thorium-232 will be used as fuel. Since thorium cannot directly fuel a reactor, it must first be converted into Uranium-233, and in this regard, India has made significant R&D progress in the thorium fuel cycle, with a key focus towards its safe deployment[35].

India's Three-Stage Nuclear Power Programme[36]

The use of thorium is a long-term strategic vision first proposed at the University of Chicago in 1944 to harness the country's limited uranium reserves and vast thorium resources for sustained nuclear energy generation through the following three sequential phases:

Stage 1: *Pressurised Heavy Water Reactors (PHWRs) using Natural Uranium*

In this initial stage, India will use Pressurised Heavy Water Reactors that run on natural uranium. Natural uranium consists mainly of the isotope U-238, with a small fraction of fissile U-235. PHWRs are efficient in using natural uranium and also produce plutonium-239 as a by-product. India has already operationalized multiple PHWRs across the country, forming the foundation of its nuclear infrastructure.

Stage 2: *Fast Breeder Reactors (FBRs) using Plutonium*

The second phase focuses on using the plutonium obtained from Stage 1 in Fast Breeder Reactors. These FBRs use a mixed oxide (MOX) fuel of plutonium and uranium. They are designed to "breed" more fissile material (plutonium or uranium-233) than they consume by converting U-238 or thorium-232 into usable nuclear fuel. India's Prototype Fast Breeder Reactor (PFBR), developed by BHAVINI, is a critical component of this stage and is intended to lay the groundwork for large-scale deployment of breeder technology.

Stage 3: *Thorium-Based Reactors*

This final and long-term stage aims to exploit India's abundant thorium reserves. Thorium-232 is not fissile on its own but can be converted into fissile Uranium-233 in breeder reactors. Stage 3 envisions Advanced Heavy Water Reactors (AHWRs) and other thorium-based technologies using U-233. This stage promises energy security and sustainability, reducing dependence on imported uranium and minimizing nuclear waste.

Significance of the Programme: It ensures maximum resource utilization, particularly of Thorium, which India possesses in large quantities. The closed fuel cycle reduces radioactive waste and supports energy self-sufficiency. The phased approach allows technological maturity and regulatory safety at each step.

This programme underscores India's commitment to indigenous nuclear development and clean energy transition, with recent developments—such as Maharashtra's MoU with ROSATOM for thorium-based SMRs—potentially accelerating the realization of the third stage.

35. Department of Atomic Energy: https://pib.gov.in/Pressreleaseshare.aspx?PRID=1575801#:~:text=Thorium%2DBased%20Nuclear%20Reactors,due%20to%20its%20physics%20characteristics.
36. Thorium, World Nuclear Association, May 2024 https://world-nuclear.org/information-library/current-and-future-generation/thorium#:~:text=India's%20plans%20for%20thorium%20cycle&text=Fast%20breeder%20reactors%20(FBRs)%20will,as%20well%20as%20U%2D233.

Recent Developments[37]

In April 2025, the Government of Maharashtra has entered into a MoU with Russia's state-owned nuclear corporation ROSATOM to jointly develop a thorium based SMR.

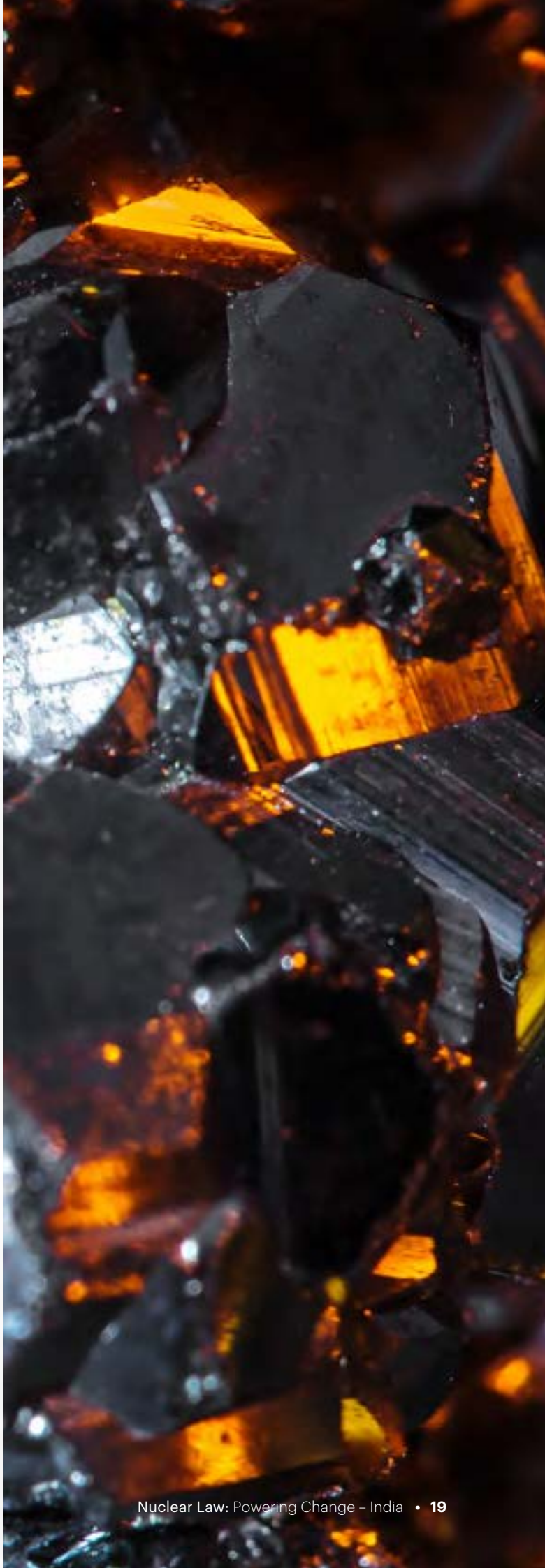
This marks a notable departure from conventional practice, as nuclear energy in India has traditionally remained under the exclusive domain of the Central Government of India, specifically the DAE.

The MoU, between Maharashtra State Power Generation Company Limited (**MAHAGENCO**) and ROSATOM's Thorium SMR initiative, was signed in the presence of Chief Minister Devendra Fadnavis and aims to jointly develop, commercialize, and eventually manufacture thorium-fueled SMRs in the state, in accordance with the safety standards prescribed by AERB.

The Maharashtra Institution for Transformation (**MITRA**) will provide strategic oversight, while a joint working group comprising representatives from MAHAGENCO, ROSATOM, MITRA, and the Global Technology Alliance will coordinate research and implementation. Notably, all activities under the MoU will be contingent upon necessary approvals from the Indian Government.

India currently has no operational Thorium reactor, having said that, Thorium can play a critical role in India's long-term three-stage nuclear energy program. Experts such as former Atomic Energy Commission Chairman Dr. Anil Kakodkar have welcomed such initiatives for study and exploration, underscoring the potential of thorium in securing India's energy future. The collaboration also reinforces the state of Maharashtra's aspiration to position itself at the forefront of advanced nuclear technologies under the 'Make in Maharashtra' initiative, while aligning with India's broader policy of leveraging its abundant thorium reserves for sustainable, low-waste energy generation.

37. Maharashtra signs MoU with Russia's ROSATOM to develop thorium-based small modular reactor, The Hindu Business Line, April 12, 2025: https://www.thehindubusinessline.com/news/national/maharashtra-signs-mou-with-russias-rosatom-to-develop-thorium-based-small-modular-reactor/article69442281.ece



Annexure I: List of Abbreviations

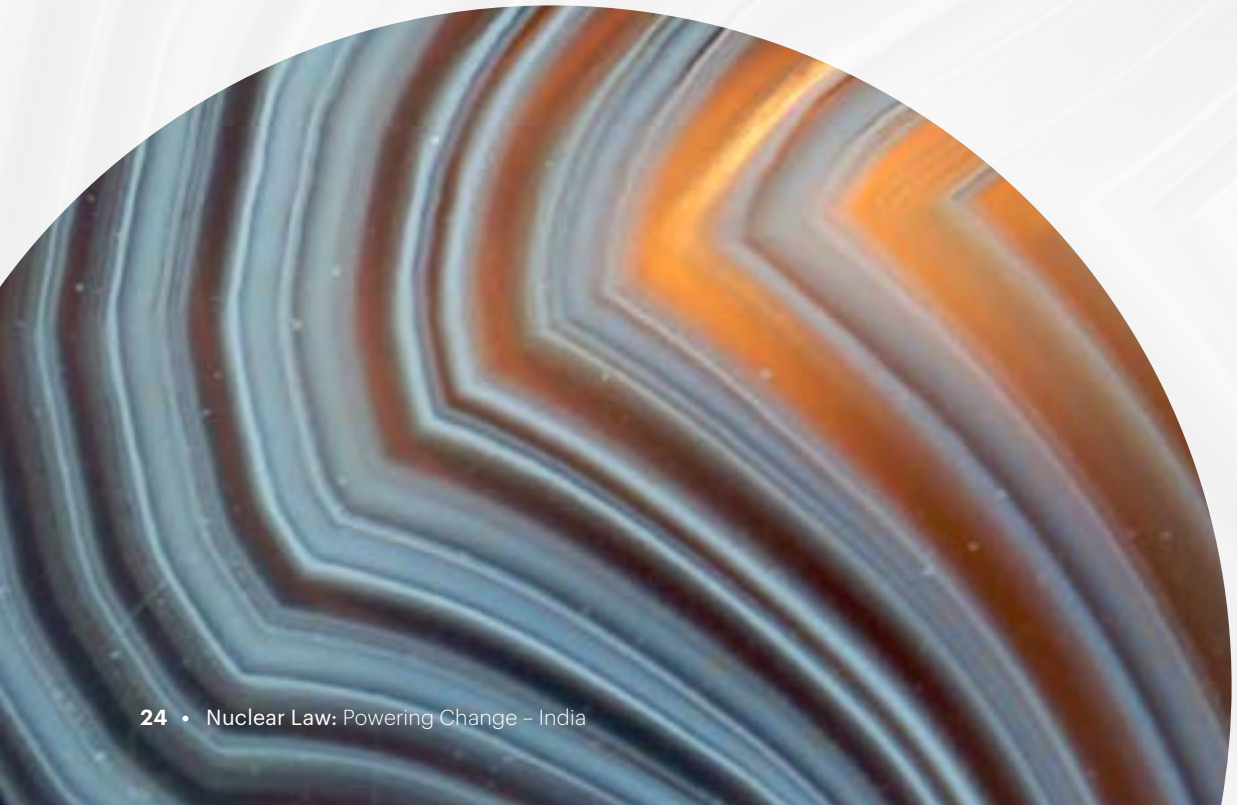
Sr.No	Abbreviations	Particulars
1.	AEC	Atomic Energy Commission
2.	AERB	Atomic Energy Regulatory Board
3.	AMR	Advanced modular reactors
4.	Atomic Energy Act	Atomic Energy Act, 1962
5.	BO	Branch Office
6.	BSR	Bharat Small Reactors
7.	BWR	Boiling Water reactor
8.	CAD	Canadian Dollar
9.	CAGR	compound annual growth rate
10.	CAPEX	Capital Expenditure
11.	CGP	Captive Generation Plant
12.	Civil Liability Act	Civil Liability for Nuclear Damage Act, 2010
13.	COP26	UN Climate Change Conference
14.	DAE	Department of Atomic Energy
15.	DPIIT	Department for Promotion of Industry and Internal Trade
16.	FBR	Advanced Fast Breeder Reactors
17.	FDI	Foreign Direct Investment
18.	FEMA	Foreign Exchange Management Act
19.	GW	Gigawatts
20.	HKD	Hong Kond Dollar
21.	IAEA	International Atomic Energy Agency
22.	ICRA	Investment Information and Credit Rating Agency

Sr.No	Abbreviations	Particulars
23.	IEA	International Energy Agency
24.	LO	Liaison Office
25.	MTCR	Missile Technology Control Regime
26.	MW	Megawatts
27.	MU	Million Units
28.	MoU	Memorandum of Understanding
29.	MAHAGENCO	Maharashtra State Power Generation Company Limited
30.	MITRA	Maharashtra Institution for Transformation
31.	NPCIL	Nuclear Power Corporation of India
32.	NPP	Nuclear Power Plant
33.	NPT	Nuclear Non-Proliferation Treaty
34.	NSG	Nuclear Supplier Group
35.	OPEX	Operating Expenditure
36.	PHWR	Pressurized Heavy Water Reactors
37.	PO	Project Office
38.	R&D	Research and Development
39.	ROSTAOM	Russian state-owned nuclear energy corporation
40.	RBI	Reserve Bank of India
41.	RFP	Request for Proposal
42.	SMR	Small modular reactors
43.	UK	United Kingdom
44.	USD	United States Dollar

Annexure II: Recent Industry Developments

- India's leading power producer, National Thermal Power Corporation (NTPC), is in talks with foreign nuclear firms, including those from Russia and the U.S., to construct small modular reactors. The NTPC plans to invest $62 billion to build 30 GW of nuclear power capacity over the next two decades. This ambitious plan reflects the country's commitment to reducing reliance on fossil fuels and achieving its clean energy goals.
- Clean Core Thorium Energy (CCTE), a US-headquartered company with Indian roots, has announced a partnership with NTPC leveraging CCTE's innovative fuel technology to harness India's abundant thorium reserves. CCTE's nuclear fuel, named ANEEL (Advanced Nuclear Energy for Enriched Life), combines thorium with high-assay low-enriched uranium (HALEU). This fuel can be used directly in India's existing Pressurized Heavy Water Reactors, unlocking the potential of India's estimated one million tonnes of thorium reserves.
- Tata Power Ltd. plans to significantly increase its capital expenditure to INR1.25 lakh crore during the five-year period from FY26 to FY30, more than doubling its spending from the previous five years. The investment will focus on renewable energy projects, pumped hydro storage plants, and an exploration into nuclear energy through small modular reactors (SMRs).
- Nadi Airtechnics Pvt Ltd, a leading manufacturer and exporter of industrial fans, has announced a significant INR15 crore investment to enhance its production capabilities. The company also supplies high-quality fans for nuclear power plants, where reliability is crucial.
- Larsen & Toubro (L&T) has signed a Memorandum of Understanding (MoU) with Clean Core Thorium Energy (CCTE), a U.S.-based company to collaborate on nuclear energy solutions using CCTE's patented ANEEL fuel. The partnership signals L&T's intent to expand its role in the nuclear energy sector, particularly in small modular reactors (SMRs), which are gaining global interest.
- IBM has announced the acquisition of Bengaluru-based renewables company Prescinto, aiming to enhance the capabilities of its Maximo Application Suite (MAS) for asset lifecycle management. This move strengthens IBM's position in the energy and utility sectors, where its MAS solution is already widely used by companies in water, natural gas, oil, nuclear, and other energy sectors.
- Tata Steel is exploring the possibility of using nuclear energy to produce green steel. According to sources in the atomic energy sector, the company is assessing the feasibility of installing around 200 Bharat Small Reactors (BSRs), each with a capacity of 220 MW, totalling approximately 45 GW. However, for this to happen, the Atomic Energy Act would need to be amended to allow private sector ownership and operation of nuclear power plants in India.
- Megha Engineering & Infrastructures Ltd (MEIL) has secured a contract worth 128 billion rupees ($1.53 billion) from the Nuclear Power Corporation of India Ltd (NPCIL). The contract entails the construction of two 700 megawatts (MW) electrical reactors at Kaiga in Karnataka.

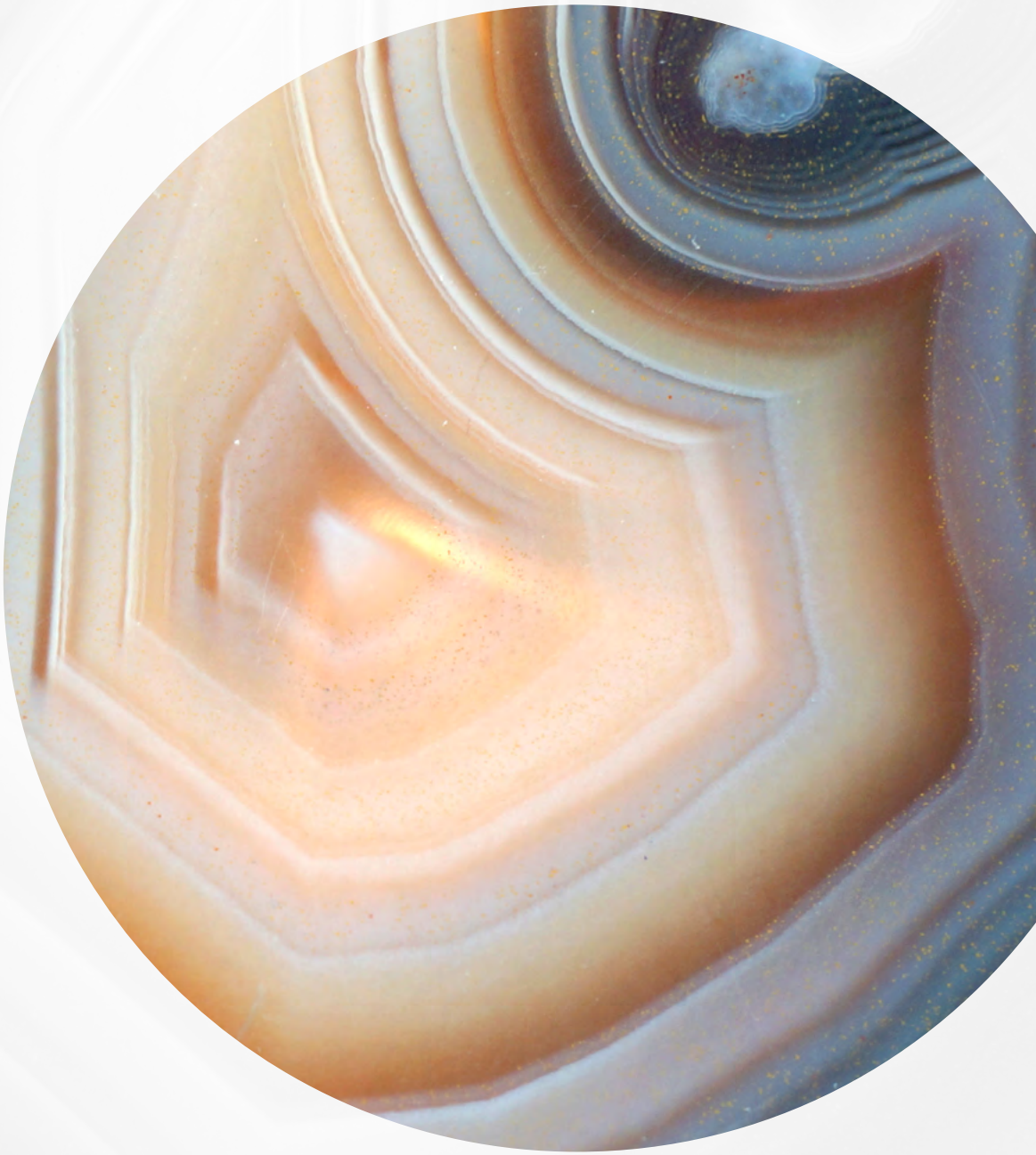
- Power Mech Projects (PMPL) has bagged an order worth Rs 563 crore to construct a nuclear power plant. PMPL has secured its first construction project in the critical nuclear power sector. This order represents the company's expansion of industrial civil works capabilities into the nuclear power projects sector. The award is from BHEL- Power Sector Southern Region for executing civil, structural, and architectural works of turbine island package of 2x700 MWe, pressurised heavy-water reactor (PHWR), Kaiga Atomic Power Project (Units- 5 & 6) in Uttar Kannada district, Karnataka.
- Tata Power and Jindal Nuclear have expressed interest in SMRs, aligning with India's legislative push (2025-2026) for private sector nuclear involvement. Tata Power, with 14,110 MW capacity across multiple energy sectors, plans to invest in SMRs as part of its clean energy expansion. Jindal Nuclear, a new subsidiary of Jindal Renewables, has outlined an $21 billion plan to develop 18 GWe of nuclear capacity over 20 years, incorporating SMRs and Gen IV reactors. The Indian Railways Ministry is also exploring nuclear power for its growing energy needs.
- Indian Railways is actively considering nuclear power to meet its growing traction energy needs, with NPCIL and the Ministry of Power being approached for energy allocation. Railways Minister Ashwini Vaishnaw emphasized that nuclear power, being a clean and reliable energy source, could help reduce Indian Railways' reliance on fossil fuels and lower carbon emissions. Consequently, NPCIL and the Ministry of Power have been approached to allocate nuclear energy for railway operations. Finance Minister Nirmala Sitharaman's 2025 budget speech reaffirmed India's target of 100 GW of nuclear capacity by 2047 and introduced plans to partner with the private sector in developing the Bharat Small Modular Reactor (220 MW PHWR). Amendments to nuclear laws are also in progress to enable private sector involvement in commercial nuclear projects.



Key Contacts

Atul Sharma
Executive Chairman
D: +91-98110-55984
atul.sharma@dentonslinklegal.com

Anand Srivastava
Managing Partner
D: +91-98110-43316
anand.srivastava@dentonslinklegal.com



Disclaimer

The contents of this document are for the purpose of information only; and not intended to address the circumstances of any particular individual or corporate body. These contents are not in the nature of legal opinion or advice, nor solicitation or advertisement, and should not be treated as such. Dentons Link Legal ("The Firm") does not warrant the accuracy and completeness of this content, and readers are encouraged to seek appropriate professional advice based on a thorough examination of the facts and circumstances of a particular situation before acting upon any of the information provided herein. The Firm gives no assurance that the judicial/ quasi-judicial authorities may not take a position contrary to the views mentioned in this document. In no event shall the Firm be liable for any loss whatsoever arising out of the use of or reliance upon the contents of this document. The Firm reserves the exclusive copyright of the contents and the same should not be circulated, reproduced or otherwise used by the intended recipient without the prior permission of its originator.

ABOUT DENTONS LINK LEGAL

Established in 1999, Dentons Link Legal is a full service corporate and commercial law firm with over 50 partners and 250 lawyers across multiple practice areas. With offices across all major Indian cities and access to more than 160 offices in more than 80 countries of Dentons' combination firms across the world, Dentons Link Legal is equipped to assist you in achieving your business objectives with the help of a team of experienced, well trained and qualified lawyers.

www.dentonslinklegal.com

CSBrand-169315-Nuclear Power - Sector Brochure-05 — 26/05/2025