

A new legal architecture for nuclear power sector

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Prime Minister (PM) Narendra Modi's new emphasis on nuclear power is in line with renewed global interest in this clean and stable source of electricity, which also supports India's quest for energy sovereignty, independence and security. According to the International Energy Agency (IEA), demand for electricity is growing at twice the rate of other forms of energy — and six times faster in the developing world — due to urbanisation, prosperity, transportation, air conditioning and the exponential growth in demand from data centres. Globally, nuclear power contributes to 9% of power generated, second behind hydropower as a source of non-fossil fuel. According to IEA, 63 reactors with a capacity of 70 GW are under construction — 25 are of Chinese design and 23 of Russian design. After decades of standstill, countries like France and the US are resuming capacity addition.



At the initial stages at least, the government will have to retain full control of the complete nuclear fuel cycle. (Shutterstock)

There is new excitement on the prospects of Small Modular Reactors (SMRs). SMRs have many advantages — shorter construction time, lower risk of cost and time overruns, better grid stability, manageable project costs, a payback period of 10-15 years, which is half that of large nuclear reactors, and amenability to project financing and refinancing. The US and China lead SMR development, with technology expected to mature by early 2030s.

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India is an early starter with high competence in all aspects of nuclear energy. However, growth, driven by indigenised technology and public monopoly, is sluggish. Nuclear power accounts for only 3% of electricity generated in India. The target set in 2007 for 63,000

MWe by 2032 has been replaced by the target of 100,000 MWe by 2047. That goal is unattainable in the current institutional and regulatory environment. The NSG exemption in 2008 and bilateral agreements opened access to international uranium sources, but progress on international nuclear technology and reactors to supplement domestic ones have been hampered by regulatory issues, especially the Civil Liability for Nuclear Damage Act (CLNDA) 2010, which has also led domestic suppliers to seek indemnities from the operator, NPCIL.

The government's intention to amend the Atomic Energy Act 1962 (AEA) and the CLNDA are timely and welcome. Comprehensive and unambiguous legislative changes can open up additional sources of investment in a highly capital-intensive sector, create a broader pool of developers and operators and accelerate industrialisation. Foreign participation can go beyond equipment supplies. The distributed market structure and wider industrial base associated with SMRs, in particular, require legal and regulatory changes.

India's nuclear liability regime diverges significantly from international norms, particularly the Convention on Supplementary Compensation for Nuclear Damage (CSC). The CLNDA, a well-meaning law intended to protect victims, has ended up discouraging supplier engagement. Neither the CLNDA rules, whose provisions on capping liability could be struck down as excessive delegation, nor the clarifications and assurances offered by the government through FAQs, which are not legally binding, have assured foreign or domestic suppliers. A comprehensive amendment, rather than piecemeal fixes, is required.

The amendment could either delete Section 17(b) to remove fault-based supplier liability, in line with CSC, or incorporate the relevant provisions of the CLND rules and FAQs to provide statutory caps on liability and claims periods. In addition, Section 46 would have to be amended to clearly bar all civil liability claims outside the CLNDA framework, while preserving the application of criminal liability. Amendments to Sections 5 and 9 would clarify that claims may only be made in accordance with CLNDA. The clarification in FAQ that the primary reactor vendor or technology provider would be deemed to be the supplier needs to be incorporated.

Complex decisions will be required to determine activities to be opened to the private sector in nuclear power as well as the level of private ownership and foreign shareholding, if any. The simplest proposition is for NPCIL or a government company to build, operate and control plants funded by the private sector; or, outsource the construction of reactors and power plants to the private sector, with status quo in every other aspect. However, the latter should be permitted to invest in, own and operate nuclear power plants, including reactors and power plants, under a strict licensing regime that addresses national security, proliferation and safety concerns, oversight needs and international obligations. Indian companies could be allowed full ownership and foreign ones up to 49%. For both large and SMR reactors, we would need standardisation, industrialisation and economies of scale.

At the initial stages at least, the government will have to retain full control of the complete nuclear fuel cycle. Globally, too, there are few actors involved in this process. There would, thus, be a separation between ownership and management of nuclear power plants, on the one hand, and of the fuel cycle on the other. Nuclear power generators would be treated on par with other power companies with administrative supervision by the ministry of power, while control of the nuclear fuel cycle would rest with the department of atomic energy.

This framework would entail amending Section 3 of the AEA to redefine atomic energy activities as universally licensable, allowing private companies to participate under central government oversight; amending Section 14 to allow up to 100% private ownership, including by companies with foreign investment, subject to security clearance; reforming Section 20 to permit intellectual property ownership for civilian nuclear research and development. Indian and other startups developing SMRs, for instance, should be allowed to retain and commercialise their technology; and, reforming Section 22 to place the regulation of electricity tariffs and trading under the Electricity Regulatory Commissions governed by the Electricity Act, 2003. Further, permitting foreign investment would require amendments to FEMA and FDI policy and rules. Private sector entry and large-scale deployment of SMRs would need a more independent and empowered AERB. Assured availability of human resources, finance, and fuel will be essential for growth.

India's private sector and startup community can meet the stringent requirements of the nuclear power sector through research, innovation, advanced engineering, investments and responsible and safe project management. Comprehensive and clear reforms will unlock foreign capital and participation. Nuclear power will have to be an integral component of an energy strategy needed to achieve the goal of Viksit Bharat while ensuring clean energy transition and energy access and equity for all.

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