

India–South Korea Partnership on SMRs: Tapping into Strategic Potential for Clean Energy

August 1, 2025



As climate pressures intensify and states pivot toward developing advanced nuclear technologies, nuclear energy is re-emerging as a strategic solution to meet growing energy demands while accelerating decarbonization. The global push to reduce emissions, alongside the need for dependable and scalable power, is driving this renewed interest and investment in the nuclear sector.

India is no exception. With its ambitious goal of [achieving net-zero emissions by 2070](#), the country faces the pressing challenge of expanding clean energy access without compromising reliability. In this context, nuclear power is being deemed to offer a compelling pathway, providing steady, low-carbon electricity that can support the nation's transition to a more resilient and sustainable energy future.

However, the traditional model of large-scale reactors, while effective, is often constrained by cost, construction timelines, and siting challenges. As energy demands evolve—driven by rapid industrialization in developing countries and the increasing energy needs of sectors like artificial intelligence and data centers in developed economies—smaller, more flexible plants are expected to have great potential to serve energy-intensive industries, urban centers, and remote regions. It is here that Small Modular Reactors (SMRs) offer a transformative opportunity. While SMRs may not single-handedly resolve the challenge of rapid electricity generation, they are estimated to play a key role in easing the transition to large-scale nuclear investments and building trust in the future of nuclear energy.

India's energy roadmap, shaped by the country's commitments under the Paris Agreement and its own Nationally Determined Contributions and its domestic goals of reaching [Viksit Bharat@2047](#) (developed India), requires nuclear power to grow from approximately [8 GW at present](#), and with an [additional 7 GW under construction](#), to over [100 GW by 2047](#). This ambition has been acknowledged by the government as both necessary and achievable.

However, such an expansion cannot be achieved through state-owned enterprises alone. Although the establishment of joint ventures, such as NPCIL's [collaboration](#) with NTPC for four 700 MW PHWRs at Mahi Banswara in Rajasthan, mark important progress, they remain within the confines of wholly state-owned structures. The government has emphasized that achieving India's long-term nuclear capacity goals will require the participation of private capital and foreign technology providers.

India is already considering creating space for foreign collaboration. To operationalize this intent in a phased and controlled manner, the government is considering opening up

foreign direct investment (FDI) within the nuclear sector to 26%, with the option to increase it in tranches—potentially up to 49%—while ensuring that majority ownership remains with an Indian partner in the venture.

Building on this momentum of inviting private participation, a National Nuclear Energy Mission has been launched to drive reforms in India's nuclear sector. The initiative includes an INR 20,000 crore allocation for the research and development of indigenous SMRs, with an ambitious target of producing at least five domestically designed and operational reactors by 2033, potentially for captive utilization. The program focuses on three types of SMRs: the 200 MWe Bharat Small Modular Reactor, a 55 MWe SMR, and a 5 MWth High Temperature Gas Cooled Reactor, in addition to pressurized heavy water reactors (PHWRs).

Against this backdrop, India makes for an attractive long-term market for SMRs, driven by rising power demand, a strong policy mandate, a capable industrial base, and a government committed to reform. Major Indian conglomerates—including Tatas, Adani, Reliance, Vedanta, and L&T—have shown active interest across the nuclear value chain, both as EPC contractors and equity partners. Notably, foreign investors and technology providers, namely Westinghouse, Holtec Int., EDF, Rosatom have also signalled intent, despite the persistence of institutional and legal constraints—underscoring the strategic appeal and long-term promise of the Indian nuclear market.

Partnership Rationale and Pathways for Nuclear Cooperation

As political momentum for nuclear collaboration builds and these regulatory reforms edge closer to realization, critical gaps in India's civil nuclear ecosystem are ripe for strategic partnerships. In this context, South Korea offers a credible partnership for India's civil nuclear

ambitions—technologically, geopolitically, and industrially. Its nuclear ecosystem—[anchored](#) by KHNP, KEPCO, Doosan Enerbility, and KAERI—has demonstrated the capacity to deliver complex international projects, most notably the [Barakah plant in the UAE](#), on time and under stringent regulatory oversight. Korea's [advanced SMR designs](#) too (e.g., SMART, i-SMR) are nearing different stages of design and commercial readiness, and may potentially align well with India's grid structure, manufacturing base, and climate policy.

What differentiates South Korea as an attractive collaborator is not only its technical capabilities but also its consistent track record of structured, long-term cooperation with India across sectors such as defense, infrastructure, and industrial development. Korean firms bring institutional depth, demonstrated reliability in technology transfer, workforce development, and transparent project delivery—qualities that align with India's call for [“Atmanirbhar”](#) partnerships.

The strategic landscape is shifting. [U.S.](#), [French](#), and [Russian](#) players are actively seeking entry into India's SMR space, while domestic industrial groups too explore foreign partnerships and indigenous designs. The first-mover window, amid these developments is narrow—but open. This partnership is also geo-strategically aligned, as both nations remain committed to a rules-based Indo-Pacific, to technological self-reliance, and to balancing industrial growth with environmental stewardship. India–South Korea cooperation on nuclear energy has the potential to not only deliver on bilateral objectives but set a precedent for clean energy collaboration across Asia.

A Shift in Mood: Regulatory Complexity, Legal Bottlenecks

Despite the policy intent and commercial interest, the legislative and regulatory frameworks governing India's

nuclear sector remain outdated, complex, and restrictive. These are not marginal issues—they are central constraints that must be resolved for foreign partners to invest and operate with confidence.

The first and most fundamental challenge lies in the [Atomic Energy Act of 1962](#), which restricts the ownership and operation of nuclear facilities to government entities. While proposals to amend the law have circulated for some time, it continues to limit the scope of private and foreign participation. Joint ventures with public sector undertakings (PSUs) are legally permissible, but key issues—over majority ownership, responsibility for the nuclear island, fuel supply assurance, tariff regulations and operational control—remain undefined.

Secondly, the [Civil Liability for Nuclear Damage Act \(CLNDA\) of 2010](#), though designed to align with the [Convention on Supplementary Compensation \(CSC\)](#)—diverges in a key way. Enacted to ensure swift compensation in the event of a nuclear accident, the law assigns primary liability to the operator, [capped at ₹1,500 crore](#), with the government responsible for any excess. Operators must maintain an insurance pool to guarantee timely relief. While in certain circumstances, operators have the right to recover costs from other responsible parties through legal channels, they cannot delay compensation payments while pursuing such claims. Now in India, the right to sue the responsible party in a nuclear accident is limited, creating legal ambiguity. Since NPCIL, the sole nuclear operator, is entirely a government-owned body, the government effectively acts as its own insurer. This deters private players from participating, as a potential nuclear accident could entangle them in complex legal disputes with NPCIL—or, essentially, the government itself—seeking damages from private entities, whether domestic or foreign. Calls for amending the two, are deemed to be proposed in the Parliament soon.

Thirdly, despite its role in low-carbon energy, nuclear power is not currently classified as "renewable" in India's official green taxonomy—limiting access to green bonds, concessional finance, and climate-linked incentives. The government is now exploring a revised classification to enable SMR projects to access sustainable financing instruments, creating a powerful incentive for early investors.

Fourth, while partnerships with countries like France and the U.S. have been in the works for decades, execution and fruition have remained slow primarily due to India's complex legal framework and the need for different bilaterally tailored agreements—especially concerning liability and technology transfer. These negotiations, while essential, are often prolonged. India is now signalling a shift: it seeks partners who can move faster within the evolving regulatory envelope—technically, financially, and diplomatically.

These gaps are further complicated by the frequent absence of public acceptance, which continues to constrain political momentum for meaningful reform. SMRs, with their enhanced safety profile and smaller footprint, are expected to strengthen this positive public outlook.

India seems to have reached a moment of readiness, as the government proposes these legislative and regulatory amendments. The need for foreign capital, global technology, and private-sector risk-sharing is therefore well-recognized, and enabling mechanisms are beginning to take shape. What is required now is the timely implementation of these proposed changes to enable seamless strategic engagement from global players seeking long-term partnerships in a market defined by scale, industrial depth, and a clear policy commitment to nuclear expansion.