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The commitment stated by both sides to "fully realise" the US-India 123 Civil Nuclear Agreement is a realistic admission of the lack of progress so far, and of the need to leverage the gains of the Indo-US nuclear deal, 2 decades after it was signed.



Prime Minister Narendra Modi and US President Donald Trump. (Photo: Narendra Modi/ X)

The announcement on renewed <u>nuclear cooperation</u> with the US marks a significant diplomatic upside for India, in what was otherwise a rather

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There are perhaps three clear gains from New Delhi's perspective.

The commitment stated by both sides to "fully realise" the <u>US-India 123 Civil</u> <u>Nuclear Agreement</u> is a realistic admission of the lack of progress so far, and of the need to leverage the gains of the Indo-US nuclear deal, two decades after it was signed.

Large scale localisation & possible tech transfer

At a time when the US has been extremely transactional on the issue of balancing trade balances and supporting American manufacturing, the commitment to jointly build American-designed nuclear reactors in India through large scale localisation and possible technology transfer, is being seen as a gain for India.

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The focus of this new pact specifically indicates the intent to transfer technology from the US and manufacture equipment locally in India for projects being set up here, which is against the grain of what Washington has generally been pushing for — bringing manufacturing back to the US.

Chance to upgrade reactor specialisation

The other upside is from the fact that this new deal offers a chance for India's nuclear sector to upgrade its reactor specialisation to those in use across most parts of the world, and an ability to scale up capacity addition against the current glacial pace of project development.

The plan to leverage private sector capabilities to get into the niche, but growing, small modular reactor (SMR) space is also significant.

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Though India's civil nuclear programme has expertise in manufacturing smaller reactor types – 220MWe PHWRs (pressurised heavy water reactors) and above – the problem for India is its reactor technology. Based on heavy water and natural Uranium, the PHWRs are increasingly out of sync with the pressurised water reactors or PWRs (a light-water nuclear reactor type that constitute the large majority of the world's nuclear power plants) are now the most dominant reactor type globally.

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On the SMR side, India' Department of Atomic Energy is already learnt to be in exploratory talks for collaborations with Camden, New Jersey-based Holtec International — a privately-held company that is now billed as one of the world's largest exporters of capital nuclear components.

The joint SMR push

Then there is also the strategic incentive for India and the US to join forces to compete with China at a time when Beijing is working on an ambitious plan to seize the opportunity of global leadership in the SMR space, unlike large reactors where China has been a latecomer.

Like India, Beijing is seeing SMRs as a tool of its diplomatic outreach in the Global South and that the country could shake up the SMR industry, just as it has done in the electric vehicle sector. Both India and the US are ill placed to compete with China on their own, given India's technological constraints and the US being seen as being impeded by a relatively high cost of labour and the growing protectionist mood in that country.

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"In reality, by opening up the nuclear generation to US technology, India will finally emerge from the technology isolation that has lingered nearly two decades after the country came out of "nuclear penalty box"... Without acquiring the PWR knowhow, India cannot join the mainstream of the commercial nuclear world that Korea and China joined three decades ago and are now nuclear plant exporters.

Opening of the nuclear sector will in fact create a deluge of work for the Indian companies," Kris P Singh, the Indian-American promoter of Holtec International, told *The Indian Express*.

Holtec has a non-nuclear manufacturing facility in Dahej, Gujarat, and has conveyed that it can double the workforce at that plant in less than a year if the proposed manufacturing plans are cleared. "As for us, Holtec is planning to build a large nuclear technology campus in <u>Pune</u> where we currently have a modest business presence. We will also build a specialty manufacturing plant at a suitable place in India. We believe the proposed change in the law will spur investments to pour into India's nuclear sector from the Middle East and Western capital markets.

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Nuclear will rise and nuclear's rise will have a knock-on effect on the whole (Indian) economy," Singh said.

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The 123 agreement signed by India and the US way back in July 2007 did, in fact, explicitly aim to enable full civil nuclear energy cooperation between the two sides by providing for "full civil nuclear energy cooperation covering nuclear reactors and aspects of the associated nuclear fuel cycle including enrichment and reprocessing" Since then, though, there has been no progress on the ground and a single investment is yet to come through, primarily due to legislative impediments in India. The Indian government has signalled its intent to amend two key domestic legislations to address these concerns.

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Holtec's pitch is for fostering a public-private initiative centred on the American company's flagship small modular reactor, the SMR-300, to potentially help break this stasis in the nuclear engagement between the two countries, with the possibility of using existing coal plant sites in India to deploy its proposed SMRbased projects and joint manufacturing at some point in the future. These developments come at a time when India is working to get into the manufacturing value chain of small reactors, both as a way of fulfilling its commitment to clean energy transition, and bundling SMRs as a technology-led foreign policy pitch.

SMRs — small reactors with a capacity of 30MWe to 300 MWe per unit — are increasingly seen as important for nuclear energy to remain a commercially competitive option in the future, especially in the wake of surging power demand from technology companies, given the massive incremental electricity requirement coming in from AI machine learning applications and data centres.

Holtec's SMR-300 is one of seven advanced reactor designs supported by the US Department of Energy's Advanced Reactor Demonstration Programme. In 2020, the company's SMR project received a \$116 million award to help accelerate design, engineering, and licensing activities and is currently in the early design review stages in the United Kingdom and Canada to deploy its small reactor.



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Apart from Holtec's SMR-300, other emerging western contenders in the SMR segment include the Rolls-Royce SMR, NuScale's VOYGR SMR, Westinghouse Electric's AP300 SMR and GE-<u>Hitachi</u>'s BWRX-300.





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