

PARLIAMENT QUESTION: DEPLOYMENT OF SMALL MODULAR REACTORS

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The Nuclear Energy Mission (NEM), announced in the Union Budget 2025–26 is aimed to design, develop and operationalise at least five indigenous SMRs besides with an objective of achieving 100 GWe nuclear power generation capacity by 2047. In this regard, Bhabha Atomic Research Centre (BARC) has undertaken design, development and deployment of 220 MWe Bharat Small Modular Reactor (BSMR-200), 55 MWe Small Modular Reactor (SMR-55), and High Temperature Gas Cooled Reactor (HTGCR) having capacity up to 5 MWth for hydrogen production. These SMRs will be demonstration reactors. Capacity augmentation of BSMR-200 to 300 MWe is envisaged based on experience of BSMR-200.

BARC has undertaken indigenous development of SMRs with domestic industries leveraging their capability and expertise acquired from development, manufacturing and construction of indigenously developed Pressurised Heavy Water Reactors (PHWRs). The necessary technology for development and deployment of SMRs is available in the country and the majority of equipment are within the manufacturing capability of Indian industries with technological handholding by BARC.

The special material Advanced Purified Reactor Vessel Alloy (ApuRVA) and technology for forgings for reactor pressure vessels of BSMR-200 and SMR-55 have been developed indigenously in collaboration with Indian industries. The control rod drive mechanism has also been developed in-house.

The Sustainable Harnessing and Advancement of Nuclear Energy for Transforming India (SHANTI) Act, 2025, has been enacted by The Ministry of Law and Justice and notified on the 21st of December 2025 as a single, coherent legislation, with enabling provisions for private sector participation to carry out research and innovations for peaceful application of nuclear energy under license and safety authorization. The act opens the nuclear sector for wider participation including public and private sectors while retaining sovereign control. Further, towards strengthening of the regulatory framework, the act accords statutory status to AERB for ensuring stringent regulatory oversight. The liability regime is also reformed to attain alignment with international convention and practices besides fixing a graded liability based on the nature of facilities and the power of a reactor which opens the door for a wider spectrum of participation.

With respect to strengthening of the regulatory framework, Atomic Energy Regulatory Board (AERB) has specified safety requirements for nuclear power plants based on light water reactors, pressurised heavy water reactor and sodium cooled fast reactors. These requirements take account of the current international benchmarks including the safety standards of International Atomic Energy Agency (IAEA). AERB has established regulatory processes for licensing and safety oversight of nuclear power

plants. These processes are generally technology neutral. The same regulatory framework can be utilised for licensing and safety assessment of any proposed advanced reactors including SMRs, except a few technology specific aspects for which review may be required.

Under NEM, a total budgetary provision of Rs. 20,000 crore has been allocated for research, development and deployment of Small Modular Reactors (SMRs). The major progress made for these SMRs are mentioned below:

BSMR-200: In-principle approval for engineering and construction has been received. The proposal for Administrative & Financial sanction has been cleared by the Atomic Energy Commission (AEC) and approval of the Empowered Technology Group (ETG) has been obtained. Tarapur, Maharashtra has been approved as the site by the AEC.

SMR-55: In-principle approval for engineering and construction has been received. Tarapur, Maharashtra has been approved as the site by the AEC.

HTGCR: In-principle approval for engineering and construction has been received. The proposed site is BARC, Vizag, and siting consent has been received. Terms of Reference (ToR) for obtaining environmental clearances has been received from the Ministry of Environment, Forest and Climate Change (MoEF&CC).

The estimated time for construction of these demonstration SMRs is 60 to 72 months from receipt of financial approval.

This information was given by Union Minister of State for Prime Minister's office and Personnel, Public Grievances and Pensions, Atomic Energy and Space, Dr. Jitendra Singh, in a written reply in the Lok Sabha today.

NKR/AK/NM

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