GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO – 2264
ANSWERED ON 12/03/2025

BHARAT SMALL MODULAR REACTORS

2264. SHRI MUKESHKUMAR CHANDRAKAANT DALAL
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Will the PRIME MINISTER be pleased to state:-

(a) the details of plans for the development and deployment of Bharat Small Modular Reactors and their role in India's energy strategy;
(b) whether the potential locations have been identified for setting up these reactors and if so, the details thereof;
(c) the current status of the Bharat Small Modular Reactors (SMR) research and development initiatives including progress made in partnerships with private sector entities and research institutions along with the major milestones achieved so far and the estimated timelines for its completion;
(d) the key technologies under development in Bharat SMRs to enhance safety and address nuclear waste management challenges;
(e) the funds allocated for SMR research since the initiative's announcement along with the details of their utilization;
(f) the expected role of SMRs in providing reliable power to remote areas by 2030 and plans for integrating them into the national energy grid; and
(g) the timelines for pilot projects and the criteria for selecting sites for SMR deployment?

ANSWER

THE MINISTER OF STATE FOR PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND PRIME MINISTER'S OFFICE (Dr. JITENDRA SINGH)

(a) BSMR-200 is of Pressurised Heavy Water Reactor (PWR) type design. It will utilise Slightly Enriched Uranium (SEU) as fuel. Department of Atomic Energy (DAE) has requisite scientific & technological know-how for its design and development. Majority of equipment are within capability of Indian industries. Bharat Small

Modular Reactors of capacity 200 MW (BSMR-200) are being designed and developed by Bhabha Atomic Research Centre (BARC) & Nuclear Power Corporation of India Limited (NPCIL) to cater to:

1. Captive power generation for the energy intensive industries such as steel, aluminium, cement etc.
2. Repurposing of the retiring thermal power plants.
3. Electricity requirement of remote locations not having the grid connectivity.

(b) The lead unit will be located at a DAE site. The subsequent units are to be located at the sites of the end-user industry in case of captive power plants and at brown fields sites of retiring thermal power plants.

(c) BSMR is being jointly designed and developed by BARC and NPCIL. Manufacturing and delivery of equipment and components will be carried out through various indigenous nuclear vendors developed by DAE. Development of critical items such as low alloy steel forgings required for manufacturing the reactor pressure vessel and reactivity control drive mechanisms have been realised by the domestic private vendors. Development works for other critical items such as reactor coolant pumps have been initiated with the private vendors. All major development works will be completed in the pre-project phase. The concept design of BSMR has been completed and is in approval stage. Estimated time for construction of BSMR is 60 to 72 months after receipt of project sanction.

(d) BSMR is based on the globally proven pressurised water reactor technology. It has been provided with passive safety features as well as several engineered safety systems to ensure nuclear safety during accidents.

Systems have been planned to handle spent fuel and its storage in-situ. In case of domestic fuel, the broad philosophy of nuclear waste management remains same to reduce the overall nuclear waste burden i.e. recovery of useful radioisotopes, if any, volume reduction followed by vitrification of waste in stable glass matrix and storage in engineered facilities kept under surveillance at par with internationally accepted practices.

However, in case of SMRs the reprocessing technology is to be re-engineered based on the fuel configuration.

(e) The Union budget 2025 has provisioned Rs. 20,000 Crore towards design and development of SMRs and their deployment.

(f) Design and development of SMRs (55 MWe) is being carried out targeting their deployment in remote locations. The lead twin units of such reactors will be first set-up in a DAE site by 2033. Depending on the projected demand, BSMR-200 also can be deployed for such purposes. Both these plants are designed to operate in isolated mode not connected to the grid.

(g) Estimated timelines for construction of BSMR-200 (lead unit) will be 60-72 months from the date of sanction of the project. Sites for SMR will be depending on their end-use viz., captive power generators will have sites provided by the user, brown field sites in the case of repurposing fossil fuelled power stations, green field sites for remote locations.

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