GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
RAJYA SABHA
UNSTARRED QUESTION NO - 482
ANSWERED ON 24/07/2025

NUCLEAR ENERGY MISSION FOR VIKSIT BHARAT

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Will the PRIME MINISTER be pleased to state:-

(a) the key features of the Nuclear Energy Mission for Viksit Bharat and how it aims to achieve 100 GW capacity by 2047 through indigenous technologies and advanced reactor designs;

(b) the details of current status of Small Modular Reactor (SMR) development projects in country by 2033 and their expected role in industrial decarbonization and clean energy generation;

(c) the current status of nuclear power capacity installed at Kakrapar units 3 & 4 and Rajasthan unit-7, and their future capacity expansion plans; and

(d) the updates on uranium exploration and domestic fuel supply, including discoveries in Jaduguda, and the safety measures adopted to meet international standards?

ANSWER

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

(a) Nuclear energy mission for Viksit Bharat is aiming to achieve nuclear power generation capacity of 100 GWe by 2047 to contribute significantly in achieving the target of Net Zero by 2070. Its main features are to augment power production from nuclear energy with least carbon emission and to cater the base load requirement which is currently supported by fossil fuel base power plants. Nuclear energy mission envisages deployment of nuclear power plants not only in green fields but also in brown fields. These nuclear power plants for brown fields will be of smaller capacity up to 300 MWe small nuclear reactor.

Two-pronged strategy is envisaged for rapid capacity addition of nuclear energy in line with Nuclear Energy Mission.

a) Deployment of large reactors such as 700 MWe indigenous Pressurised Heavy Water Reactors (PHWRs) and large capacity imported advanced reactor designs at green field sites for rapid expansion.

b) Small reactors such as Bharat Small Reactor (220 MWe PHWR), Bharat Small Modular Reactor (BSMR-200 MWe PWR) and Small Modular Reactor (SMR-55 MWe PWR) are being indigenously designed & developed with objective of,

1. Repurposing of retiring fossil fuel-based power plants,

2. Captive plants for energy intensive industries and

3. Off-grid applications for remote locations.

(b) Three types of SMR are being designed and developed indigenously for demonstration. These reactors are

(i) 200 MWe Bharat Small Modular Reactor.

(ii) 55 MWe Small Modular Reactor

(iii) 5 MWth High Temperature Gas Cooled Reactor for hydrogen production.

In-principle approval has been obtained for construction of these demonstration reactors. These demonstration reactors are likely to be constructed in 60 to 72 months after receipt of administrative sanction of projects. Lead units of Bharat Small Modular Reactor (BSMR) & SMR are planned to be installed at DAE sites in collaboration with Nuclear Power Corporation of India Limited (NPCIL).

A 5 MWth high temperature Gas Cooled Reactor (GCR) is also planned to be used dedicatedly for hydrogen production by coupling with suitable thermochemical hydrogen production process. The potential thermo-chemical technologies for hydrogen production such as Copper-Chloride (Cu-Cl) & Iodine-Sulphur (I-S) cycles have already been developed and demonstrated by Bhabha Atomic Research Centre (BARC). Necessary technology for deployment of these reactors is available in the country and majority of equipment are within manufacturing capability of Indian Industries with technological handholding by Department of Atomic Energy (DAE). These plants are designed & developed considering deployment as captive power plant, repurposing of retiring fossil fuel-based plants and hydrogen production to support transport sector with prime objective of decarbonization.

(c) Presently, the installed nuclear power capacity in the country comprises of 25 reactors with a total capacity of 8880 MW, including RAPS-1 (100 MW), which is under long term shut down. KAPS-3&4 (2x700 MW) and RAPP-7 (700 MW) have already commenced commercial operation. Presently, 18 reactors with a total capacity of 13600 MW (including 500 MW PFBR, being implemented by BHAVINI) are at various stages of implementation. On their progressive completion, the installed nuclear power capacity will reach 22480 MW.

(d) As on June, 2025, Atomic Minerals Directorate for Exploration and Research (AMD), a constituent unit under DAE has established 4,33,800t *in-situ* U_3O_8 resource in 47 uranium deposits located in Andhra Pradesh, Telangana, Jharkhand, Meghalaya, Rajasthan, Karnataka, Chhattisgarh, Uttar Pradesh, Uttarakhand, Himachal Pradesh and Maharashtra.

In recent years, AMD has established 26,437t *in-situ* U-oxide resource at Jaduguda North - Baglasai - Mechua deposit, East Singhbhum district, Jharkhand; which is the north-western continuity of Jaduguda uranium deposit.

Atomic Energy Regulatory Board (AERB) monitors the radiological safety aspects in uranium mining and milling activities, including waste management. Any new project starting from mine development, siting of ore processing plant, etc. are subject to multi-stage safety review by AERB in accordance with its regulatory requirements. Also, AERB carries out regulatory inspections of these facilities to verify compliance with the regulatory requirements. The regulatory requirements of AERB take into account the safety standards of International Atomic Energy Agency (IAEA).

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