GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY

RAJYASABHA
UNSTARRED QUESTION NO – 329
ANSWERED ON 06/02/2025

NEW TECHNOLOGIES FOR CLEAN ENERGY

329. SHRI G.C. CHANDRASHEKHAR

Will the PRIME MINISTER be pleased to state :-

(a) whether Government is working on new technologies such as Small Nuclear Reactors to make clean energy transition;
(b) if so, the details of the technologies along with the progress that has been made so far in this regard; and
(c) if not, the reasons for delay and by when it is expected to commence?

ANSWER

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

(a) & (b) Nuclear power is considered as one of the most promising clean energy options for power generation. There is a thrust world over for a strategy to use nuclear power that could reduce reliance on fossil fuels over the coming years. Small Nuclear Reactors, popularly called Small Modular Reactors (SMRs), with their unique features of modularity, scalability, small footprint and improved safety present themselves as an attractive option for repurposing of retiring coal-based thermal power station sites, cater to electricity requirement for off-grid locations and use as captive power plants for energy intensive industries. Deploying Small Modular Reactors (SMRs) across the country especially in locations not suitable for large nuclear plants, can produce large amount of low-carbon electricity. However, SMRs are not expected to serve as replacement to conventional large-sized nuclear power plants, which serve as base load plants.

The Government has accorded approval for setting up Bharat Small Reactors (BSR), an upgraded version of the proven 220 MW Pressurized Heavy Water Reactor (PHWR), with private capital investment in an approved business model to address the large decarbonization requirement of hard to abate industries.

In this regard, two designs are being considered by BARC for aforesaid purposes. Both designs of SMRs are based on Pressurised Water Reactor (PWR) technology.

i. Design and development towards 200 MWe Bharat Small Modular Reactor (BSMR) is being carried out for repurposing of retiring coal based power plants. It is planned to set a reactor in-house for technology demonstration.

ii. The design options for small capacity SMR for remote locations are also being evaluated for intended purpose considering aspects like capital cost, commercial viability, refuelling requirements, safety requirements, sustainable and scalable fuel supply chain, and safe processing or disposal of spent fuel.

The Request for Proposals (RFP) inviting proposals from industries in line with the approved business model has been published in December, 2024.

(c) Nuclear power plants are to be installed and operated in line with stringent regulatory requirements to contain radiation and to avoid exposure to public in all circumstances. The techno-commercial aspects of SMRs are still in initial stages even globally and its large scale deployment depends on various factors including regulatory harmonization globally by Internal Atomic Energy Agency (IAEA), especially considering emergency planning zone and public acceptance. However, the R&D towards SMRs has already been initiated.

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