GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO – 4189
ANSWERED ON 26/03/2025

NUCLEAR MISSION

4189. SHRI DAMODAR AGRAWAL
SHRI ANURAG SHARMA
SHRI CHAVDA VINOD LAKHAMSHI
SHRI BHOJRAJ NAG
SMT. ROOPKUMARI CHOUDHARY
DR. K SUDHAKAR
DR. BHOLA SINGH
SHRI JANARDAN MISHRA
MS KANGNA RANAUT

Will the PRIME MINISTER be pleased to state:-

(a) the manner in which the "Nuclear Mission" announced in the Union Budget 2025-26 is likely to transform Country's energy scenario;
(b) the key objectives of Research and Development (R&D) in Small Modular Reactors (SMRs);
(c) whether the Government has any plans to establish Small Modular Reactors (SMRs) in the Country and if so, the details thereof including proposed locations and timelines;
(d) the manner in which the said reactors are likely to contribute to Country's energy security;
(e) the manner in which recently launched Nuclear Energy Mission is likely to strengthen Country's commitment to clean and sustainable energy solutions;
(f) the details of new nuclear power plants proposed by the Government; and
(g) the details of the status of the production of indigenously developed nuclear reactors?

ANSWER

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

(a) to (c) The nuclear energy mission announced in the budget-2025 envisages deployment of 100 GWe of nuclear energy by 2047, this initiative will increase the share of nuclear energy in India's energy mix for long term energy transition strategy for

Viksit Bharat. The mission aims to provide reliable energy alternative to fossil fuel energy sources. It will facilitate larger base load capacity from nuclear energy among all clean energy sources. The objective of R&D is development of nuclear technologies towards indigenous advanced reactors comprising safety features, associated fuel cycles for enhancing the share of nuclear energy & ensuring long term energy security and hydrogen production for decarburising transport sector & process industry.

Currently Department of Atomic Energy (DAE) is developing reactors & technologies for nuclear energy mission with objective described below:

1. Bharat Small Modular Reactors (BSMR-200) for repurposing of retiring thermal power plants & captive power plants for energy intensive industry such as aluminium, steel, metal.
2. Small Modular Reactors (SMR-55) for providing energy for remote as well as off-grid location with objective to decarbonise the energy sector.
3. High Temperature Gas Cooled Reactor of capacity 5 MWth for hydrogen generation for decarbonisation of transport sector & process industries.

Lead units of these reactors are planned to be set up at DAE sites. These demonstration reactors are likely to be constructed in 60 to 72 months after receipt of project sanctions.

Bharatiya Nabhikiya Vidyut Nigam Limited (BHAVINI) is currently commissioning the indigenously developed 500 MWe Prototype Fast Breeder Reactor (PFBR) project at Kalpakkam, Tamil Nadu. PFBR will establish the techno-commercial viability of the indigenously developed Fast Breeder Reactors. On successful commissioning of the same, Government will be approached for launching of 2x500 MWe twin unit of FBR 1&2 project at Kalpakkam, Tamil Nadu. FBR 1&2 will be of the same design as PFBR.

(d) Right from the inception, Department of Atomic Energy has chalked out three-stage nuclear power programme to optimally utilise its limited uranium resources and to exploit its large thorium reserves by adopting closed fuel cycle for India's energy security. The programme aims to use domestic uranium in the PHWRs

and use plutonium obtained from the reprocessing of spent fuel of Pressurised Heavy Water Reactors in Fast Breeder Reactors. Large scale use of thorium will subsequently follow making use of the Uranium-233 that will be bred in Fast Breeder Reactors, when adequate capacity will be built in the country. It will ensure the energy security.

(e) Nuclear Energy Mission strengthen India's commitment to clean & sustainable energy solutions through following:

1. Replacement of fossil fuel based base load thermal power plants & captive power plants with small nuclear power plants including SMRs.
2. Nuclear power at remote & off-grid locations in place of conventional fossil fuel plant.
3. Nuclear green hydrogen for transport sector & process industry for decarbonisation.
4. Development & demonstration of reactor technology of thorium utilisation.

Gradually replacement of fossil fuel-based energy sources with nuclear reactors can decarbonise the industrial, power & transport sector and development of reactors for thorium utilisation will be instrumental in strengthening India's commitment to clean and sustainable energy solutions.

Fast Breeder Reactor (FBR) is one of the low carbon energy resource that operates with a higher thermal efficiency which results in better utilization of resource and consequent reduction of radioactive waste and thermal pollution. FBR incinerates high level radioactive wastes arising from the reprocessing of spent fuel from thermal or fast reactors and thus reduces the long-term storage problems of radiological waste.

Nuclear power is a clean base load source of electricity available 24x7 with lifecycle Greenhouse gas emissions comparable to renewables like Hydro and wind. An installed nuclear power capacity of 100 GW envisaged in the Nuclear Energy Mission could potentially abate about 640 million tons of CO_2 equivalent emissions annually.

(f) Nil.

(g) Presently eighteen indigenous nuclear power reactors with a total capacity of 5560 MW are under commercial operation and one more indigenous reactor of 700 MW has been connected to the grid on March 17, 2025.

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