

GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO.1707
TO BE ANSWERED ON 26.07.2017

FAST BREEDER REACTORS

1707. SHRI B. SENGUTTUVAN:

Will the PRIME MINISTER be pleased to state:

- (a) whether the country has mastered the technology involved in research, design and manufacturing of Fast Breeder Reactors (FBR) and if so, the details thereof and if not, the reasons therefor ;
- (b) whether the said reactors are more safe, efficient and economically viable than the currently operational conventional reactors and if so, the details thereof including the benefits associated with FBR along with the types of fuels employed in such reactors along with the sources thereof;
- (c) whether the Government is in process of commissioning a commercially viable indigenously designed prototype of a FBR at Kalpakkam and if so, the details thereof and the time by which the said prototype is likely to be commissioned; and
- (d) the other countries where the FBR is under operation or under construction?

ANSWER

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

- (a) Indira Gandhi Centre for Atomic Research (IGCAR) has been carrying out a comprehensive R&D on sodium cooled fast breeder reactor technology for the past 30 years. A test reactor, called Fast Breeder Test Reactors (FBTR), is in operation from 1985 onwards which has provided valuable feedback. Based on this experience and also taking into account the international experience, design of a 500MWe Prototype Fast Breeder Reactor (PFBR) has been done. The design has been peer reviewed by international design agencies. With respect to manufacturing, an elaborate manufacturing technology development program was undertaken which helped in identifying the major industries towards demonstration of indigenous capability. Currently, all the components and equipments, especially the oversized heavy components have been successfully manufactured by Indian industries and

erected in PFBR project. By following the above approach, India has mastered the design and manufacturing of sodium cooled Fast Breeder Reactors (FBR).

- (b) FBRs are designed with several safety measures and features which follow redundancy and diversity principles. Fast Breeder Reactors are safe and efficient apart from the benefits from environmental considerations. Economic viability of FBRs depends on successful operation of PFBR and subsequently successful commissioning and operation of FBRs in the country.

Electricity generated by FBR would be a source of green energy as the waste from the first stage nuclear programme is reprocessed and used as fuel in FBR. The spent fuel from this reactor can be fed back into the reactor core several times, till the spent fuel contains only short lived fission products. This is the concept of FBR with closed fuel cycle. Hence, there is no need of large quantity of fuel materials for the annual external feed and thus eliminates the need for large capacity waste storage spaces with complex construction features.

Indigenously produced Mixed Uranium & Plutonium Oxide will be used as the fuel in the Prototype Fast Breeder Reactor at Kalpakkam.

- (c) Yes, Sir. The indigenously designed industrial scale prototype FBR of 500 MWe capacity is in an advanced stage of commissioning at Kalpakkam. Consenting process by Atomic Energy Regulatory Board (AERB) for the commissioning of PFBR is begun concurrently with the ongoing commissioning activities. It is scheduled to go critical in 2017.
- (d) FBRs are currently in operation in Russia. One FBR of 600 MWe capacity called BN-600 has been in operation since 1980. Recently, Russia has commenced operation of BN-800 (800 MWe capacity). China has started a test reactor of 65 MWt capacity in 2010. Other two reactors JOYO, MONJU in Japan are under shutdown currently. New power reactor of 1200 MWe capacity is planned to be constructed in Russia for which design is in progress. Further, one test reactor is under construction (MBIR) in Russia.
