

GOVERNMENT OF INDIA
DEPARTMENT OF ATOMIC ENERGY
LOK SABHA
UNSTARRED QUESTION NO. 680
TO BE ANSWERED ON 05.02.2020

THORIUM BASED NUCLEAR POWER PROJECTS

680. Dr. Sanjay Jaiswal:

Will the PRIME MINISTER be pleased to state:

- (a) the timeline of the three stage nuclear power projects;
- (b) whether there is a deadline to achieve self-sufficiency by developing a closed Thorium based Nuclear power cycle; and
- (c) if so, the details thereof and if not, the time by when the three stage is likely to be fully realised ?

ANSWER

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

(a)to(c)With a view to optimally utilise limited Uranium reserves and large Thorium reserves in the country, the Department of Atomic Energy has adopted a three stage nuclear power programme, based on a closed nuclear fuel cycle, for generation of nuclear power and for achieving long term energy security. The three stage nuclear power programme, which is to be implemented sequentially, aims to multiply the domestically available fissile resources through the use of natural Uranium in Pressurised Heavy Water Reactors (first stage), followed by use of Plutonium obtained from the spent fuel of Pressurised Heavy Water Reactors in Fast Breeder Reactors, in the second stage. Large scale use of Thorium, in third stage, will subsequently follow making use of Uranium-233 that will be bred in Fast Breeder Reactors, when adequate nuclear installed capacity in the country has been achieved.

The first stage comprising of Uranium fuelled Pressurised Heavy Water Reactors (PHWR) has reached commercial maturity and presently there are eighteen (18) PHWRs in operation and six (6) under construction. Another ten (10) PHWRs have been sanctioned to be implemented in fleet mode.

After development of FBR technologies, using Plutonium as fuel, a Fast Breeder Test Reactor (FBTR) is in operation since 1985 and has helped studying all the technologies including fuel and materials for large power FBRs. As a result, a 500 MWe Prototype Fast Breeder Reactor is under initial stage of commissioning. Indigenous technology development is continuing for larger power - FBRs with high breeding ratio.

With these reactors, it would be possible to produce more fissile material than consumed, leading to large scale deployment, to supply energy to the country for long time. On account of non-existence of any fissile isotope in naturally occurring Thorium (unlike that existing in Uranium), commercial utilisation of Thorium, on a significant scale, can begin only when abundant supply of either Uranium-233 or Plutonium resources are available. Accordingly, the utilisation of Thorium as a practically inexhaustible energy source has been contemplated during the third stage of the Indian nuclear programme. Upon the launch, followed by a significant growth of a Thorium based nuclear programme in this manner, it could be possible to maintain the achieved level of nuclear power programme with Thorium alone, without additional demands on Uranium or Plutonium resources. The timeline for second and third stage depends on breeding ratio achieved during second stage and reactors designed for the third stage and their subsequent deployment scenario.
