

# Bhabha Atomic Research Centre (BARC)

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**In news :** Recently, BARC has designed first research reactor through PPP model

## Key updates

BARC has designed a research reactor that can make radioisotopes available at low costs to medical and other industries.

For the first first time, the premiere nuclear research organisation of the department of atomic energy (DAE) will share the technology with industries through a public-private partnership. This is expected to bring down costs of cancer treatment in India.

The proposed research reactor is expected to bring down the cost of nuclear medicine, which are extensively used for cancer treatment.

## What are Radioisotopes?

- Radioisotopes are radioactive isotopes that have an unstable atomic nucleus. They emit energy and particles when they change to a more stable form.
- Radioisotopes are widely used in nuclear medicine for diagnostics as well as to treat diseases such as cancer.
- The industrial uses of radioisotopes include identifications of flow malfunctions, measurement of flow parameters, evaluation of design of chemical reactors, monitoring of product quality and process efficacy.

In India, all major radioisotopes are produced by the BARC,

which houses research reactors in its Trombay campus and an accelerator in Kolkata. Some radioisotopes are imported from Europe, Australia and other Asian countries

It is to be noted that Radioisotopes in India can be procured and handled only by the users duly authorised by the radiological safety division (RSD), atomic energy regulatory board (AERB). Private entities that are willing to invest in the construction of the research reactor and its processing units will get exclusive rights to process and market the radioisotopes produced in the reactor.

### **Evolution of BARC**

- The Government of India created the Atomic Energy Establishment, Trombay (AEET) with Homi J. Bhabha as the founding director on 3 January 1954.
- It was established to consolidate all the research and development activities for nuclear reactors and technology under the Atomic Energy Commission.
- All scientists and engineers engaged in the fields of reactor designing and development, instrumentation, metallurgy, and material science, etc., were transferred with their respective programs from the Tata Institute of Fundamental Research (TIFR) to AEET, with TIFR retaining its original focus for fundamental research in the sciences.
- After Homi Jehangir Bhabha's death in 1966, who is also known as the "Father of Indian Nuclear Programme", the centre was renamed as the Bhabha Atomic Research Centre on 22 January 1967

### **About Bhabha Atomic Research Centre (BARC)**

- It is India's premier nuclear research facility
- Location: It is headquartered in Trombay, Mumbai
- It is a multi-disciplinary research centre with extensive infrastructure for advanced research and

development covering the entire spectrum of nuclear science, engineering and related areas.

- **Mandate:** Its core mandate is to sustain peaceful applications of **nuclear energy**, primarily for power generation
- In addition to its nuclear research mandate also conducts research in other high technology areas like accelerators, micro electron beams, materials design, supercomputers, and computer vision among the few
- It manages all facets of nuclear power generation, from the theoretical design of reactors to, computerized modeling and simulation, risk analysis, development and testing of new reactor fuel materials, etc.
- It also researches spent fuel processing and safe disposal of nuclear waste. Its other research focus areas are applications for isotopes in industries, medicine, agriculture, etc. BARC operates a number of research reactors across the country
- Work on Biotechnology: The BARC also researches biotechnology at the Gamma Gardens and has developed numerous disease-resistant and high-yielding crop varieties, particularly groundnuts.
- It also conducts research in Liquid Metal Magnetohydrodynamics for power generation.
- To encourage research in basic sciences, BARC started the Homi Bhabha National Institute.

### **Important reactors of BARC**

- Apsara (1956; named by the then Prime Minister of India, Jawaharlal Nehru)
- CIRUS (1960; the “Canada-India Reactor” with assistance from the US)
- the now-defunct ZERLINA (1961; Zero Energy Reactor for Lattice Investigations and Neutron Assay), Purnima I (1972)
- Purnima II (1984)

- Dhruva (1985)
- Purnima III (1990), and
- KAMINI.

### **Institutes affiliated to BARC**

Research institutions affiliated to BARC include

- Indira Gandhi Centre for Atomic Research(IGCAR),
- Raja Ramanna Centre for Advanced Technology(RRCAT), and
- Variable Energy Cyclotron Centre(VECC )