

YEAR END REVIEW: DEPARTMENT OF ATOMIC ENERGY

Relevant for: Developmental Issues | Topic: Government policies & interventions for development in various Sectors and issues arising out of their design & implementation incl. Housing

Department of Atomic Energy

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The major policies and programmes by the Department of Atomic Energy (DAE) during the year 2019 are given below:

i. Nuclear Power Programme:

- Kaiga Atomic Power Station (KGS-1) has set the world record of 962 days of continuous operation.
- Tarapur Atomic Power Station Units (TAPS 1 &2), connected to the grid in April and May 1969, have completed 50 years of safe operation. TAPS- 1&2 are currently the oldest operating power reactors in the world, producing reliable power at about two rupees per unit.
- At present there are 22 reactors with installed capacity of 6780 MWe operating above 80% plant load factor in the country.
- Six Pressurised Heavy Water Reactors (PHWRs) of 700 MWe capacity each are at different stages of construction which would add 4200 MWe.
- Four VVER reactors (KKNPP-3 to 6), each with 1000 MWe capacity are under construction.
- Nuclear Fuel Complex (NFC), has completed supply of 37 element fuel bundles to Kakrapar Atomic Power Plant (KAPP3), first 700MWe PHWR, towards initial core requirement by establishing fabrication facility for 37 element fuel bundle manufacture.

ii. Medicine and Health Care:

- Tata Memorial Centre (TMC), has commissioned new hospitals and has catered to the needs of more than half a million patients in 2019, among which, ~1,25,000 are new patients.

- DAE has launched a global cancer care network, “NCG-Vishwam Cancer Care Connect” (NCG-Vishwam 3C) on 17th September 2019. NCG-Vishwam envisages integration of the hospitals and relevant cancer care institutes in partner countries with the National Cancer Grid (NCG) of India.
- About 120 nuclear medicine centers and more than 400 radioimmunoassay (RIA) laboratories are deriving the benefit from the indigenous radioisotope products. This has benefited more than 10 lakh patients.
- World’s first of its kind Glass vitrified Cesium pencil, extracted from high level radioactive waste for blood irradiation application has been developed and 7 such blood irradiators have been supplied to hospitals.
- Ready to use 4 new Radiopharmaceuticals viz. 99mTc- HYNIC TATE injection for imaging of Neuro-endocrinetumours, 188Re-HEDP Cold Kit for bone pain palliation, 177Lu-EDTMP injection for bone pain palliation and 131 Iodine-Lipiodol injection for treatment of liver. These are in addition to 14 varieties of medicinal radioisotopes/radiopharmaceutical products developed and supplied for diagnostics, therapeutics and palliative use.
- Clinical grade Yttrium-90 in 90Y-Acetate form has been extracted from high level waste trials for Patient trials have been started, subsequent to regulatory clearances.

iii. **Research & Development**

- ECIL has successfully delivered latest model M3 EVMs – 3.3 lakh units & VVPATs – 5.8 lakh units for General Elections 2019.
- Apsara-U, an upgraded swimming pool type reactor, has demonstrated that, it can produce carrier free Cu-64 radioisotope, which has potential for usage in PET scans.
- A Compact facility for Reprocessing of Advanced fuels (CORAL) has been relicensed by the regulatory authority up to 2023, and the 50th reprocessing

campaign of FBTR spent fuel is in progress.

- Developed kit for detection of Chromium contamination of water -Developed a simple, user friendly, quick and cost effective kit for onsite determination of Cr (VI), a carcinogenic compound in water. This kit meets IS10500 as well as EPA criterion.
- Many of our research facilities, including Synchrotron, Cyclotron, Dhruva, Fast Breeder Test Reactor (FBTR) etc. continued to achieve the highest ever performance. FBTR was operated at 30 MWt, a major milestone in its history, and its turbo generator was synchronized to the grid, delivering an electrical output of 6.1 MWe.
- Indus synchrotrons (Indus-I and II) a national facility at RRCAT continued its operation in the three shifts, round the clock mode and 20 beamlines have been made available to users from all over the country. Nearly 1,000 user experiments have been carried out till November 2019.
- RRCAT has developed two medical devices viz.
 - i. 'TuBerculoScope', a low cost, compact and portable optical device for rapid detection of TB, and
 - ii) An 'OncoDiagnoscope', which is a low cost Raman probe, for in situ spectroscopic measurements of biological tissues. This is a compact and portable system for the non-invasive detection of (pre)cancerous lesions in oral cavities. This device was successfully deployed at six cancer screening camps by doctors of AIIMS, Jodhpur.
- IREL has also successfully developed a flow sheet and produced 99% pure hafnium oxide from NFC raffinate. These are value added products.

iv. **Mega Science Projects**

- Vigyan Samagam, the travelling exhibition a first-of-its-kind in the world showcasing all the Mega Science projects on a single platform. This is jointly organised by Department of Atomic Energy (DAE), Department of Science and

Technology (DST) and National Council of Science Museum, Ministry of Culture are jointly organising a multi-venue mega-science exhibition, Vigyan Samagam at Mumbai, Bengaluru, Kolkata, and New Delhi. The footfalls, both at Mumbai and Bengaluru, have been very impressive with more than 2.7 lakh visitors at both the cities.

- 67 ultra-stable power converters built at ECIL, Hyderabad for FAIR accelerator in Germany have been shipped to Germany after Factory acceptance clearance from FAIR, Germany.

v. **Civil Nuclear Cooperation:**

Progress has been made in India's bilateral international engagement in civil nuclear cooperation with major partners.

Russia:

- Discussions are underway with **ROSATOM** for building **6x1200 MWe** nuclear power plant at a new site.

France:

- Negotiations are in advanced stage for implementation of the Jaitapur project (6x1650 MWe).

U.S.A:

- Discussions are underway with **Westinghouse** for building **6x1100 MWe** nuclear power plant in **Kovvada (A.P.)**

(vi). Progress in procurement of uranium from major global suppliers:

As part of Government's efforts towards operationalisation of India's international civil nuclear cooperation, significant outcomes have been achieved in fuel supply arrangements with major global suppliers viz, Canada, Kazakhstan and Australia.

vi. **Human Resource Development**

- Since its inception in 2008, last year, Homi Bhabha National Institute (HBNI), a

deemed to be University of the Department, crossed the prestigious milestone of awarding 1000 Ph.D degrees and 1000 M.Tech degrees. Till March 31, 2018,

- HBNI awarded 1132 Ph.D degrees and 1060 M.Tech degrees. Today, a large number of the practicing oncologists in the country have been associated with HBNI academic programs. Based on its NAAC accreditation, HBNI was chosen by UGC as one of the Deemed-to-be Universities to be given enhanced autonomy.
- Global Centre for Nuclear Energy Partnership (GCNEP) has started operating in its newly developed campus near Bahadurgarh from April 2017. The centre has conducted more than 18 International training programs, technical meetings, workshops, etc., on topical areas. Since signing of MoU between GCNEP and Bangladesh Atomic Energy Commission, 10 experts from DAE have been deputed for consultancy work for Rooppur Nuclear Power Plant, Bangladesh varying from a few weeks to less than 3 months.

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