Founder's Day

Thursday, October 30, 2025

Venue: Bhabha Atomic Research Centre

Address by

Dr. A. K. Mohanty

Secretary DAE & Chairman AEC

My Respected Seniors, Dear Colleagues, Ladies & Gentlemen,

I extend a warm welcome to you all on the occasion of 116th birth anniversary of Dr. Homi Jehangir Bhabha.

As we all know, Dr. Bhabha was the founding director of TIFR and the founding director of the Atomic Energy Establishment, Trombay (AEET) which is now named Bhabha Atomic Research Centre in his honour. He was a scientist, an engineer and an artist who was bestowed with a very deep understanding of science, art and culture. He was a polymath, a visionary, an implementer and an institution builder who chose to take up atomic energy as his calling and mission for life. He not only dared to dream but took steps to realise these dreams, much ahead of his time. The best example of this is the fact that today while the whole world is focusing on critical minerals and rare earths, he thought of it more than 75 years ago and laid emphasis on preserving our beach sand minerals. It is indeed worth mentioning that "Atma-Nirbhar-Bharat" and "Make in India" were integral to Dr Bhabha's actions and vision. The announcement of "Nuclear Energy Mission" in Union Budget 2025-26 is a befitting act-of-honour to this great son of soil. Our true homage to Dr. Bhabha will be a resolve to collectively rise to this occasion as a nation and achieve the targets set out in the Mission, over the next 2 decades.

Dear Colleagues,

With that hope and ambition, I will now go through the many achievements of DAE since the celebration of Founder's Day last year.

I will start by highlighting the achievements in our Nuclear Power Programme. The leading DAE institutes which contribute towards nuclear power production in our country are AMDER, UCIL, NFC, HWB, ECIL, NPCIL, BHAVINI, BARC & IGCAR.

1. NFC has successfully developed the technology for production of high Residual Resistivity Ratio Niobium ingots and sheets. This material is a critical material required for a range of advanced accelerator programs and is aimed at strengthening India's capabilities in nuclear energy, materials research and critical applications.
2. The loading of fuel through an alternate route into India's first Prototype Fast Breeder Reactor (PFBR), Bhavini, began on 18th October this year. On the same day, the Fast Breeder Test Reactor which is the flagship reactor for the 2nd stage of our Nuclear Power Program, completed 40 years of safe and successful operation.
3. Since last October, AMD's continued efforts have resulted in augmentation of 10,980 tonne in-situ Uranium Oxide (U3O8) resources in the states of Andhra Pradesh, Jharkhand and Rajasthan. The total Uranium Oxide resource of the country has been updated to 4,36,700 tonne in-situ U3O8.
4. Geological Reports pertaining to the Tummalapalle Block-I and Block-II & Rachakuntapalle Block Uranium deposits in Andhra Pradesh along with the Beach Sand Mineral deposit at Tamil Nadu have been submitted to respective State Governments to initiate the process of granting mining lease. The

geological Report for Bhatikhera REE-Nb-Zr deposit at Rajasthan has been submitted to the Ministry of Mines. The mining lease for the sixth tranche of the minerals at this site is currently under auction by the Ministry of Mines.

5. Hon'ble Prime Minister has laid the foundation stone for the 4-unit Mahi Banswara NPP in Rajasthan on 25th Sept, 2025. The project will have four units of PHWR - 700 MW and to be deployed by NPCIL-NTPC JV, named ASHVINI.
6. First two units of the indigenous 700 MWe PHWR at Kakrapar, Gujarat (KAPS – 3 & 4) have received AERB license for regular operation. Rawatbhata Atomic Power Project (RAPP) Unit 7 – the 3rd indigenous 700 MWe PHWR in a series of 16 sanctioned reactors, has started commercial operation on April 15, 2025.
7. NPCIL has achieved the highest generation in its entire operating history – 56,681 Million Units of electricity in FY 2024-25, avoiding about 49 million tons of CO2 emissions. Continuous Operation for more than a year has been recorded 53 times so far, with TAPS-3 exceeding its earlier record of 521 days and KKNPP-2 operating more than a year.
8. For fulfilment of the Nuclear Energy Mission of India, the design and development of different reactors systems such as BSMR-200, SMR-55 and HTGCR is being pursued vigorously. Along with these, project proposals of IPR and HFRR research reactors are in advanced stage.
9. In the area of high level radioactive waste management, a new vitrification unit, AVS-3, has been successfully completed and hot commissioned at Tarapur, which incorporates advanced off-gas treatment systems and implementation of roll-in-roll-out concept for Joule Melter. In a separate development, BARC has developed and demonstrated the operation of a 25 kW all copper, hollow cathode, reverse polarity thermal plasma torch, which could be useful in active waste incineration.

10. Towards the 2nd stage of Nuclear Power Program, a large experimental sodium test facility has been commissioned at Sodium Technology Complex, IGCAR in June, 2025. This facility is to be used as test bed for improving and optimizing the design concepts and providing inputs for the design of future FBRs. ALSO, In-Principle approval for Fast Breeder Test Reactor – II (FBTR-II) has been obtained, whose major objective is to test metal fuels for next-gen FBRs.

In field of health care, DAE continues to contribute to the indigenous development, commercialization & supply of therapeutic/ diagnostic radiopharmaceuticals and Cancer Care. These activities are being pursued at BARC, BRIT, VECC, TMC and also HWB.

1. The 150-bed Homi Bhabha Cancer Hospital and Research Centre, Muzaffarpur, Bihar, was inaugurated by the Hon'ble Prime Minister of India on 22.08.2025.
2. TMC has seen a total of 1.3 Lakhs patient registration in FY 2024-25. Around 5 lakh women at Varanasi, Sangrur, Mullanpur and Guwahati have been screened for Oral, Breast and cervical cancer.
3. The 30 MeV Medical Cyclotron Facility, Kolkata, continues commercial production of FDG and other radiopharmaceuticals and delivered 371 Ci equivalent doses of radiopharmaceuticals were delivered to hospitals for cancer diagnostics.
4. HWB is regularly supplying Deuterium Depleted Water (DDW) of around 125 ppm deuterium in domestic market to healthcare industries. HWB has successfully produced, O-18 water, which has got clearance from the Radio Pharmaceutical Committee. This compound is being supplied to RMC, Mumbai and VECC, Kolkata through BRIT.

5. A novel therapeutic intervention, 177Lu-DOTA-FAPI-2286 Therapy, and five new diagnostic interventions with enhanced precision have been introduced, which are being offered in routine clinical practice, thereby enhancing the scope of patient care. The technology for isotopic separation and enrichment of 176Lu was successfully demonstrated in the indigenous Electromagnetic Isotope Separation Facility.
6. Electron beam based sterilization facility at Indore, Madhya Pradesh is continuously providing e-beam sterilization services to medical device manufacturers in compliance with ISO standards. In the month of Sept, 2025, the facility successfully completed cumulative sterilization of 1.53 Crore medical devices. The medical devices sterilized here are being exported to more than 35 countries including Germany, UK, Spain, France, Belgium, Italy, Netherlands, Switzerland, Austria, South Africa, Indonesia, Portugal, Czech, and Russian Federation.
7. A High-Intensity Gamma Irradiator with Category II type design, ISOMED 2 was completed in May 2025 to serve healthcare industry for terminal sterilisation of healthcare products. ISOMED 2.0 is the only High Intensity Land Based Stationary Gamma Irradiator in the world today.

Dear Colleagues,

We continue to prioritise our basic and directed research and our scientists are delivering on several front-end research areas. Few achievements are as follows.

1. At IGCAR, a new facility named 'In-situ ion irradiation and imaging with field emission scanning electron microscope (i4-FESEM)' coupled with the beam line of 1.7MV Tandetron accelerator has been established to study the evolution of

microstructure of samples under ion irradiation. This facility is the first of its kind in India.

2. High-performance reinforced green concrete with fly ash and nanoparticles of CaCO3 and TiO2 were developed at IGCAR for nuclear power plants in coastal environments, This concrete inhibits the ingress of aggressive chlorides and showed no significant corrosion degradation even after one year of exposure to seawater.
3. For the first time, NFC, in collaboration with BARC & ARCI, has developed a process for hot extrusion of a 12CrFeAl alloy rod of 18mm dia. using the powder metallurgy route for manufacture of Accident Tolerant Clads.
4. New zirconium-based advanced quaternary alloy (Zr-Nb-Sn-Fe) tubes with oxygen below 1000 ppm have been developed for high burn-up applications. These tubes are proposed as substitute for Zr1%Nb and have low irradiation growth, thereby enhancing fuel performance.
5. Zirconium Hydride filled Zircaloy moderator tubes have been produced with uniform density having high relative slowing down power (4.75 against 2.63 for H2O) and good neutron irradiation performance. This is a potential material for Advanced Modular reactors.
6. Capsules containing Yttria pins and Strontium pellets, irradiated at FBTR, were reprocessed for extraction of Strontium-89 (Sr-89) and Phosphorous-32 (P-32) radioisotopes. P-32 is being produced for the first time in FBTR. Also, recovery of Neptunium-237 from the PUREX process stream has been successfully demonstrated.
7. HWB has achieved a significant milestone in enrichment of Boron-11 of more than 99.8% purity (semiconductor grade) at the Boron Exchange Distillation Facility, HWBF-Talcher. The enriched product has been successfully converted

into purified enriched boric acid for subsequent transformation into enriched BF3 gas.

8. Researchers at TIFR Hyderabad have discovered that by reorganizing an internal cell structure called the endoplasmic reticulum, healing of a wound is governed by the shape of a wound. This endoplasmic reticulum acts like a sensor, helping cells choose the right strategy for wound repair based on curvature.
9. IMSc researchers have developed a simple, intuitive, and highly accurate growth model using the Gompertz formula to predict the weight of a newborn. The model requires only four standard foetal measurements from at least three routine ultrasound scans. This breakthrough allows for the early detection of foetal weight deviations linked to risks of neonatal complications and stillbirth, enabling timely clinical interventions.
10. The first run for the dark matter direct search experiment, Indian Dark matter search Experiment (InDEx) has been initiated by SINP at the Jaduguda Underground Science Laboratory to explore the low mass region of dark matter.
11. High Energy Physics group at HRI conducted comprehensive investigations into several Beyond Standard Model frameworks, focusing on neutrino properties, dark matter phenomenology, collider physics, and gravitational-wave signals under diverse cosmological scenarios and has recently became part of the cutting-edge international DUNE collaboration to advance neutrino physics.

Next sector where DAE institutes are making their presence felt is in high technology areas such as particle accelerators, laser, plasma, cryogenic, quantum, space applications, fusion, internal as well as cyber security etc. and are contributing in each and every aspect of it, starting from critical minerals and rare earths to

advanced materials , technologies & systems. DAE units belonging to Industry & Mineral Sectors (both PSUs and Industrial Organizations), supported by R&D centres have contributed significantly.

1. Towards Internal Security, ECIL has successfully developed, integrated and installed Chemical, Biological, Radiological and Nuclear (CBRN) System for protection from threats at vital installation. Also, first production module for Akash-Prime system, capable of 360º engagement of multi directional attacks from enemy aircrafts / drones, have been integrated.
2. Portable Radio-isotope Identifier Device (PRID), a field-deployable gamma spectrometry system designed for rapid detection, localization, quantification, and isotopic identification of radioactive materials, has been indigenously developed through ECIL-BARC joint efforts and finds application in Seaports and Airports security.
3. Towards National Security, ECIL has successfully developed and manufactured Integrated Power & Pyro Relay Units (IPPRU) and Launcher Interface Unit (LIU) for Agni missile Launcher System. Also, Weapon Control System (WCS) for Astra Missile (VL- SRSAM) was successfully tested and interfaced with other on-board systems on an Indian Naval Ship.
4. C4I (Command, Control, Communication, Computers and Intelligence) systems for Shore Based Anti-Ship Missile System (SBASMS) have been integrated and supplied to M/s BrahMos Aerospace Private Limited for export to friendly foreign country. Integration of Vehicle Mounted Radar was undertaken for the first time.
5. Niobium Thermit Production Facility (NTPF), a plant set up by NFC under MoU with Vikram Sarabhai Space Centre (VSSC), Department of Space (DoS) to meet the requirements of Niobium for space programmes has been commissioned.

First batch of Niobium oxide has been produced from the plant successfully and handed over to Secretary, Dept. of Space & Chairman, Space Commission.

6. Samarium-Cobalt magnets produced at Rare Earth Permanent Magnet facility in BARC Campus, Vizag have been supplied to end user for acceptance test & performance level trials on end use component.
7. Towards development of clean hydrogen generation technologies, a prototype of 1 MW alkaline water electrolysis stack has been tested. BPCL has fabricated complete stack of 0.5 MW AWE (100 Nm3/h) based on BARC design, which will shortly be commissioned at Cochin International Airport Limited (CIAL) for transport application.
8. BRIT has launched ROTEX-I, India's first tungsten-shielded, Iridium-192-based industrial radiography device, and COCAM-A – a Cobalt-60 based Radiation Exposure Device, approved as Type-A radioactive material transportation package. Both the devices find wide ranging applications across chemical industry, energy sector, aerospace sector, nuclear industry, and defence sector.

In application of radiation-based technologies for Agriculture & Food Preservation, work is being done at BARC and the positive impact that it is now being recognised by various stakeholders in the country. I will also touch upon on the progress made as spin-offs and technology transfer from non-power applications of nuclear energy for societal benefits like water treatment, waste management, post-harvest cold chain, etc. BARC, IPR, IGCAR, RRCAT and UCIL are making steady progress in this area.

1. An early maturing mutant banana variety – TBM-9 has been developed and notified in collaboration with National Research Centre for Banana (NRCB), Trichy. An early-maturing Sorghum mutant-variety, with 15-20% higher grain

yield, RTS-43, was gazette notified. These has taken the number of varieties released by BARC to 72. Apart from this, 6 previously released BARC oilseed varieties have been now extended for cultivation to additional states.

2. BRIT has initiated Radio Analytical Service through its NABL-accredited Radio Analytical Laboratory for the customers in and around Telangana and Andhra Pradesh, to test Cs -137 content in Food & Agricultural Products.
3. 17 MoUs were signed for setting up gamma radiation processing facilities in private and state government sectors and 6 such facilities were commissioned during this period, taking the total number of such facilities operating in the country to 40. BRIT is supporting these facilities by supplying Co-60 sources and establishing the plant operational parameters.
4. UCIL has successfully developed an in-house chemical treatment method to address the challenge of decontamination of mine water at the Tummalapalle underground mine. In this process sulphuric acid, barium chloride, lime and phosphoric acid are used to remove uranium and radium effectively from mine water, ensuring environmental safety and sustainable operations.
5. At the Atal Incubation Centre of IPR, AIC-Plasmatech, 9 incubation agreements have been signed with Indian start-ups and 6 technology transfer agreements have been executed. As a first time initiative, HBNI student led startup 'Redero Trionics' has also been incubated at AIC-Plasmatech. This startup addresses specialized engineering and prototype demands for specific development of plasma and allied systems

Considering all these achievements, it is not surprising that quite a few National & International accolades have been bestowed upon the DAE fraternity – both in organizational and individual category. I would like to share some of these recognitions with you.

1. Dr. S. M. Yusuf, Director DAE-CEBS has been awarded the prestigious Vigyan Shree award this year.
2. Dr. S. M. Yusuf, DAE-CEBS and Dr. D. K. Tyagi , HBNI have been awarded the UNESCO fellowship of The World Academy of Sciences (FTWAS) 2025, Dr. Yusuf has also been elected as a fellow of the Indian National Academy of Engineering (INAE) 2025.
3. Dr. Aradhana Srivastava from BARC and Dr. Mythili Ramasamy from ICTS, TIFR Hyderabad have been awarded the INSA fellowship while Prof. Sanjib Kumar Agarwalla from IoP has been elected as the Fellow of National Academy of Sciences, India (NASI), Prayagraj
4. Smt. Sonia Kapoor, Headmistress, AECS-2 Mumbai has been conferred the National Award for Teachers 2025 by the Honourable President of India, a recognition that shines as a testament to the excellence of our faculty.
5. On the occasion of Hindi Diwas on September 14, DAE has been awarded the Rajbhasha Kirti Puraskar for the second consecutive year.
6. IREL and ECIL have received the prestigious 'SCOPE Eminence Award 2022-23 under the category of "Institutional Excellence" and "Other Profit Making / Surplus generating PSU", respectively. The award was presented by Hon'ble President of India, Smt. Droupadi Murmu, on 29th August 2025 at Vigyan Bhawan, New Delhi.
7. Team AMD has won the First Prize in the 'Mineral Exploration Hackathon' organised by Geological Survey of India (GSI), Ministry of Mines (MoM) on 'Innovative Mineral Hunt Techniques'.
8. Indian students, mentored by TIFR, have registered stellar performances at the 5 International Olympiads in Biology, Mathematics, Physics, Chemistry and Astronomy & Astrophysics.

a) At the 57th International Chemistry Olympiad (IChO) held in Dubai, UAE, from July 5 to 14, the team secured 2 Gold and 2 Silver medals.
b) At the 55th International Physics Olympiad (IPhO) held in Paris, France, from July 18 to 24, the Indian team secured 3 Gold and 2 Silver medals.
c) The 36th International Biology Olympiad (IBO), held in Quezon, Philippines, from July 20 to 27, saw India win 2 Gold and 2 Silver medals, further demonstrating their scientific excellence.
d) In the 66th International Mathematical Olympiad (IMO), hosted at Sunshine Coast, Australia, from July 10 to 20, the Indian team secured 3 Gold, 2 Silver, and 1 Bronze medal.
e) Finally, at the 18th International Olympiad on Astronomy and Astrophysics (IOAA), held in India this year and hosted by TIFR, the team achieved an exceptional performance, winning 4 Gold and 1 Silver medal.

9. NIRF ranking 2025 has placed HBNI at 7th position in the Research Institution category, 12th position in the University category, and 20th position in Overall category in India. The Nature Index 2024-25 has placed HBNI in the first position regarding publications in Physical Sciences and in the third position for overall publications among all institutions in India.
10. One of the recent publication from the group of Prof. Satyaprakash Sahoo, IoP Bhubaneswar, on 2D quantum material based transistor for neuromorphic computing applications has been selected for Nature's cross-journal retrospective collections for 2024 Nobel Prize. This is the only research article from India to be included in such prestigious collection.

While our scientists, technologists, engineers and teachers continue their efforts to deliver their best, the families of our colleagues have also been making us proud. It is always a feeling of immense joy to share some of those achievements.

1. In the Sarabhai Program on Technology (SPOT) Exam 2024–25 conducted by Vikram Sarabhai Science Foundation, Three students from AECS-1, Tarapur were ranked in the top 100 and earned internships. One student from AECS-1, Tarapur qualified for the national finals.
2. Five students of Std IX & X from AECS Mysuru, OSCOM & Rawatbhata have presented their projects and got selected for INSPIRE-MANAK Awards 2024–25, constituted by Department of Science & Technology.
3. As a testament of all-round development environment at our AECS schools, at CBSE Cluster III Volleyball Tournament in Sept 2024, Under-14 girls team took the 1st place and got qualified for CBSE Nationals. In Under-19 category, the girls' team bagged 2nd position.
4. In the true spirit of Sab-ka-Vikas, AEES takes pride in its Societal Enrichment & Education Programme (SEEP), by extending quality education to economically disadvantaged children from rural and tribal areas surrounding project sites. Currently operational at nine centres, the program supports 958 students, offering them free education and additional facilities to empower their academic journey.

To create an enabling environment towards effective functioning of all our units, DCSEM, DPS and GSO have not only continued to support, facilitate and augment the department's infrastructure but have also efficiently managed real estate and maintained the landscape and biodiversity in all the DAE campuses. Community infrastructure like New CRECHE and Extension to Indradhanush cultural centre has been augmented, besides several official & residential buildings. Steps have also been taken to enhance patient care for our employees. In BARC hospital, a modern operation theatre complex, equipped with advanced surgical facilities, including the ability to perform complex cardiac procedures, has been commissioned.

At the end, I would like to thank all the members of our Scientific & Technical; Administration & Security and last but not the least, health care professionals, who are working hand-in-hand round the clock and bringing in all possible efforts, in making the program of the Department a success.

Dear Colleagues,

Before concluding, I would like to reiterate that the nation has awaken to the potential of atomic energy and it's far reaching positive impact on the society. This puts the program of the Department on an accelerated track. I would like to urge all the members of DAE family to stand up to the occasion in all possible ways and work with dedication to make country's Nuclear Power Program a resounding success. There can be no better day than today's occasion to renew our oath and rededicate ourselves to the high values and standards, which Dr Bhabha had practised throughout his life.

At the end, I once again extend my good wishes to all members of DAE and their families on this august occasion.

Jai Hind.