

# Science Diplomacy Alert

*A fortnightly newsletter on S&T, Science Policy and Diplomacy*

## A New Era Begins for India-US Civil Nuclear Cooperation

Focus



The symbolic significance that the materialisation of India-US Civil Nuclear Deal holds for ushering in a new phase in the bilateral relationship cannot be understated. Even as the cooperation under iCET is picking up, nuclear energy is set to re-emerge as a central pillar of cooperation. Anupama Vijayakumar writes.

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## SCIENCE POLICY & DIPLOMACY

### International S&T Cooperation



### European Space Agency Finalises Budget Package

The ESA's budget for 2025 will be 7.68 billion euros (\$7.91 billion). With big contributors including Germany, Italy and the UK cutting down contributions, the figure "is down by about 1.4 per cent from the 7.79 billion euros the agency had for 2024".

### Multinational Research Study Recommends UN Goal on Space Debris Management

The idea has been proposed in a paper published in the One Earth Journal, authored by researchers from space agencies including NASA and industries. They recommend for space sustainability to be included as a sustainable development goal.

### USA and South Korea Ink MoU on Nuclear Export

South Korea has so far had to go through US export consent or notification procedures for exporting their nuclear reactors. The new MoU could pave the way for US governmental consent for South Korea to sell its AP-1000 reactors to the Czech Republic.

### Emerging Tech & Governance



### Morocco's Legislature Evaluating Draft AI Law

The draft law spans 17 articles and includes definitions for key concepts such as "personal data" and "automated systems". It also covers aspects related to cybersecurity and intellectual property rights.

### South Korea Looks to Boost Ties With Japan and Israel on Semiconductors

With Israel it is looking to cooperate on cybersecurity, while with Japan it is looking to enhance collaboration to stay ahead in the rapidly changing tech landscape.

### AI Innovation and Skilling: Microsoft Announces 3 Billion Dollars Investment in India

The company "plans to invest US \$3 billion in India in cloud and AI infrastructure and skilling over the next two years, including the establishment of new data centers".

## MeiTY Releases Draft DPDP Rules

The Ministry has sought public comments on the draft executive rules under the Digital Personal Data Protection Act. The rules require data fiduciaries to obtain verifiable parental consent before processing children's personal data and conduct annual Data Protection Impact Assessments.

### Events & Meetings



### Workshop Organised Under Australia-India Critical Minerals Research Hub

The event held at IIT-Hyderabad during 3-4 January, 2025 focused “on advancing research and innovation in critical minerals, emphasising sustainable methodologies for exploration, extraction, and recycling”.

### Consultation held on ‘Diversity, Equity, Inclusion and Accessibility’ on STEMM

Chaired by Dr. Parvinder Maini, Principal Scientific Advisor (PSA) to GoI, the consultation sought to conceptualise and discuss a draft Self-Assessment and Reporting Framework (SARF) developed by the Office of the PSA on ‘Diversity, Equity, Inclusion and Accessibility’.

### Panel on Diaspora Contributions to Sustainable Development during Pravasi Bharatiya Divas Celebrations

The plenary session called the “Green Connections: Diaspora’s Contribution to Sustainable Development” was organised on the second day of the celebrations in Odisha.

### Bharat Climate Forum Organised in New Delhi

Held on 10 January 2025, the forum discussed six themes including clean mobility, energy storage and industrial decarbonisation. During the forum, India also launched a forum to focus on clean tech manufacturing.

## INDIAN SCIENCE NEWS

### IMD Marks 150th Anniversary

The Indian Meteorological Department was founded on 15 January 1875 by the provisional British government. In addition to the IMD Vision-2047 document, PM Modi also announced the launch of Mission Mausam, “an initiative aimed at transforming India into a ‘Weather-ready and Climate-smart’ nation” during the occasion.

### IIT Bombay Researchers Develop New Toxin-eating Bacteria

The researchers observed species belonging to genera Pseudomonas and Acetobacter to be particularly capable of breaking down certain toxic compounds found in the soil. The bacteria can also enrich the soil with nutrients.

### Startup Incubated at IISc Develops Ecofriendly Cement

The startup, Novacret utilised geopolymer-based materials which would “cut carbon emissions compared to traditional Ordinary Portland Cement (OPC), but also promises zero use of water. The new tech, IISc team claims, would offer 15-20% cost advantage”.

### India to Launch New Health Policy

Union Health Minister J P Nadda noted that the new health policy would integrate yoga, ayurveda and naturopathy with modern medicine for combining traditional wisdom with contemporary practices.

## In a First, ISRO Grows Crops in Space

“The CROPS (Compact Research Module for Orbital Plant Studies) experiment was successfully conducted on PSLV-C60 POEM-4, and germination occurred in just four days. We expect leaves to emerge soon.” The agency tweeted on 4 January 2025.

## PM Narendra Modi Releases Data from India’s Largest Genome Sequencing Project

The data was compiled as part of the Genome India Project launched in 2020 under which genome sequencing of 10,000 samples collected from diverse sections of the India’s population.

## India Joins UN Committee on Big Data and SDG

The expert committee on big data and data science for official statistics was “created to further investigate benefits and challenges of big data, including potential for monitoring and reporting on sustainable development goals.

# ADVANCES IN S&T

## New Process to Curb Hazardous Waste from Aluminium Production

**The problem:** After steel, aluminum is the second-most-produced metal in the world. Its demand is projected to drive aluminum production by 40 percent worldwide. This steep rise will magnify aluminum’s environmental impacts, including pollutants that are released with its manufacturing waste.

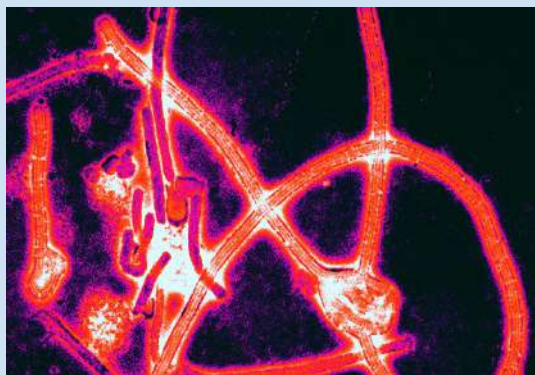
**Nanofiltration Process:** The novel membrane filters solutions that were similar in content to the waste streams produced by aluminum plants. The membrane captured more than 99 percent of aluminum ions in these solutions.

**Future Prospects:** The membrane technology could reduce the amount of wasted aluminum and improve the environmental quality of the waste. “This membrane technology cuts down on hazardous waste and enables a circular economy for aluminum.”



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## Nanobody Inhibitors to Target Ebola Virus



**The problem:** Ebola virus is one of the deadliest pathogens. It has a fatality rate of about 50 per cent, and poses a serious threat to global health and safety.

**Nanobody Inhibitors:** Researchers developed two new nanobody inhibitors for Ebola: Nanosota-EB1 and Nanosota-EB2. These nanobodies work in different ways to stop Ebola. The virus hides the part it uses to attach to human cells under a protective layer. Nanosota-EB1 prevents this layer from opening, blocking the virus from attaching to cells. Nanosota-EB2 targets a part of the virus essential for breaking into cells,

stopping its spread. In lab tests, Nanosota-EB2 was especially effective, greatly improving survival rates in Ebola-infected mice.

**Future Prospects:** These nanobodies represent a major step toward treatments for other viruses in the same family, like Sudan and Marburg viruses.



## A New Era Begins for India-US Civil Nuclear Cooperation

Anupama Vijayakumar  
Consultant, RIS

The Year 2025 has started on a bright and positive note for India-US cooperation in civilian nuclear energy. Visiting India for the last time as US Secretary of State on 6 January 2025, Jake Sullivan noted that the US is finalising steps to remove “long-standing regulations that have prevented civil nuclear cooperation between India’s leading nuclear entities and US companies”. Consequently, the US Bureau of Security has removed the names of three Indian institutions, the Bhabha Atomic Research Centre (BARC), Indira Gandhi Centre for Atomic Research (IGCAR) and Indian Rare Earths Limited (IREL) from the entity list. Representing a core component of the US’s export control policy intended to prevent proliferation of Weapons of Mass Destruction, the entity list basically consists of names of individuals, businesses or organisations to whom exports of certain technologies and goods are restricted. This development came after U.S. Assistant Secretary of State for Energy Resources Geoffrey R. Pyatt in February 2024 termed the nuclear deal an “important piece of unfinished business” which both countries had a “shared interest” in moving forward with.

The history of the India-US Agreement on Civilian Nuclear cooperation, which was ratified in 2008 marks an important milestone in the history of India-US relations. It was in 2004 that the Prime Minister Atal Bihari Vajpayee and President George W. Bush announced the [Next Steps in Strategic Partnership \(NSSP\)](#) which laid the groundwork for the elevation of bilateral ties to that of a strategic partnership in 2005. The NSSP essentially outlined three specific areas for cooperation: civilian nuclear technologies, civilian space technologies as well as trade in high technologies. Given a history of bilateral relations marred by distrust in the post-1971 era, cooperation over these areas symbolised a dramatic turnaround from estrangement to engagement. The subsequent era witnessed both parties take several steps to overcome hurdles that kept the agreement from materialising. India on one hand brought its civilian nuclear facilities under the International Atomic Energy Agency’s safeguards. The USA on the other hand took note of India’s impeccable non-proliferation record while acknowledging India as a [“responsible state with advanced nuclear capabilities”](#). Both sides demonstrated a tremendous amount of political will to appease their domestic constituencies to finally ratify the

agreement in 2008. Later, India would also gain a waiver from the Nuclear Suppliers’ Group allowing it to engage in nuclear trade and commerce.

The coming into being of the Agreement marked a fundamental shift in the bilateral relationship which went through several ebbs and flows amid Cold War geopolitics. However, a combination of [“insurance, technological and regulatory barriers”](#) have prevented the agreement from materialising over two decades. American nuclear energy companies including GE-Hitachi and Westinghouse were reluctant to oblige, partly due to the Civil Nuclear Liability Act, 2010, which imposes a strict liability on nuclear plant operators. The 10 CFR 810 regulation of the US Atomic Energy Act which bars US nuclear companies from manufacturing or designing equipment in foreign countries also served to halt the materialisation of the agreement. Meanwhile, the differences in design, fuel and operational protocols between India’s indigenous Pressurised Heavy Water Reactors (PHWR) and the globally popular Light Water Reactors has also prevented technology transfer and collaboration between Indian and American entities.

The symbolic significance that the materialisation of India-US Civil Nuclear Deal holds for ushering in a new phase in the bilateral relationship cannot be understated. Even as the cooperation envisaged under iCET (US-India Initiative on Critical & Emerging Technologies) is picking up, nuclear energy is set to re-emerge as a central pillar of cooperation. This is particularly so as India is seeking to deploy its [Bharat Small Reactors \(BSR\)](#) to enhance its energy security and achieve net zero goals, with the USA trying to manage China’s efforts to capitalise on a growing global interest in Small Modular Reactors. The dynamic is expected to yield a win-win situation for both parties, with US companies entering into the Indian nuclear energy market to enter into joint ventures with Indian entities and further the spirit of self-reliance as envisaged under Make in India to achieve energy security.

## Fallouts From Technology Discussed in WEF Global Risks Report 2025

The report elaborates on global risks while classifying them as short-term, medium-term and long-term concerns. It classifies technology and polarisation as a long-term concern while noting “biotech and super ageing as areas where serious risks could unfold over a longer-term time horizon”. Key snippets from the report as it pertains to risks from technology are presented below:

- Adverse outcomes of AI technologies is one of the risks that climbs the most in the 10-year risk ranking compared to the two-year risk ranking which classifies the same as low risk.
- **Technology and Polarisation:** The report identifies polarisation brought about by proliferation of digital platforms, misinformation and disinformation as a major risk. It also notes that this scenario could lead to growing algorithmic bias and misuse of surveillance capabilities to aggravate polarisation in societies.
- **Losing Control of Biotech?** : The diffusion of biotech offers opportunities for threat actors to create novel biological agents which can be employed as bioweapons and potentially lead to pandemics. Moreover, biotech-based health solutions can create new risks and lead to unknown impacts. Disregarding ethical concerns would aggravate such risks and lead to new sources of division and conflict.

## GoI Expert Subcommittee Publishes Report on AI Governance Guidelines

The report has been published by the Subcommittee on AI Governance and Guidelines Development formed under an advisory group chaired by the Principal Scientific Advisor, Government of India. The advisory group has been constituted to undertake the development of an ‘AI for India-Specific Regulatory Framework’. The draft is open for public consultation until 27 January 2025.

- Based on its examination of key AI governance issues and a gap analysis of existing frameworks, has proposed a comprehensive approach to ensure the trustworthiness and accountability of AI systems.
- It highlights the importance of a coordinated, whole-of-government approach to enforce compliance and ensure effective governance as India's AI ecosystem evolves.
- It identifies three concepts for operationalising principles which should guide AI regulation: **lifecycle approach** ( across development, deployment and diffusion of AI), **ecosystem approach** ( to involve multiple stakeholders) and **techno-legal approach** for AI governance.
- It also recommends means to strengthen AI governance such as, the creation of a technical secretariat for AI governance, instituting an AI incident database, the integration of AI specific measures in the Digital India Act and voluntary regulation for industry.

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