

जन जागरूकता ई-संवाद पत्र

कुडनकुलम न्यूक्लियर पॉवर प्रोजेक्ट



अंक - 169

जुलाई 2026

इस अंक में:

- नाभिकीय नारे
- तकनीकी सत्र
- नाभिकीय आंकड़ा
- नाभिकीय समाचार
- शब्द कोश
- आपको मालूम है?
- विशेष आलेख
- नाभिकीय सामान्य ज्ञान

तैयारकर्ता एवं संपादक:

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टीएलडी प्रयोगशाला
kbjashi@npcil.co.in

पुनरीक्षणकर्ता :

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संजीव भारद्वाज ,
प्रशिक्षण अधीक्षक एवं
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जारीकर्ता:

अशोक भाटिया,
स्थल निदेशक,
कुडनकुलम न्यूक्लियर
पॉवर प्रोजेक्ट

प्रिय पाठकगण ,

जुलाई 2026, रणनीतिक भागीदारी और महत्वाकांक्षी घरेलू विकास के माध्यम से भारत की स्वच्छ ऊर्जा सुरक्षा के विस्तार की दिशा में महत्वपूर्ण प्रगति लाता है। माननीय प्रधानमंत्री नरेंद्र मोदी की यात्रा के दौरान एक ऐतिहासिक 2015 समझौते को पूरा करते हुए, भारत और ऑस्ट्रेलिया ने आईईए सुरक्षा उपायों के तहत ऑस्ट्रेलियाई यूरेनियम निर्यात को सक्षम करने, हमारे परमाणु बेड़े के लिए दीर्घकालिक ईंधन पाइपलाइन हासिल करने के लिए प्रशासनिक व्यवस्था को अंतिम रूप दिया।

समवर्ती रूप से, अश्विनी-एनपीसीआईएल और एनटीपीसी का संयुक्त उद्यम-जल्द ही हमारे स्वदेशी पीएचडब्ल्यूआर इतिहास में सबसे बड़े नाभिकीय द्वीप पैकेज को चिह्नित करते हुए माही बांसवाड़ा परियोजना की इकाइयों 1-4 के लिए ईपीसी निविदा जारी करेगा। सूचित रहें, जागरूक रहें। पढ़कर आनंदित हों...

अध्यक्ष, जन जागरूकता समिति



जुलाई 2026 के विशिष्ट बिंदु

1

केकेएनपीपी स्थल पर 44 और स्थल के बाहर 04 जन संपर्क कार्यक्रम आयोजित किए गए

2

1,940 घंटों का जन संपर्क, 6,193 लोगों से संपर्क

3

21,588 जन जागरूकता प्रकाशन वितरित किए गए



केकेएनपीपी का जलवायु परिवर्तन के न्यूनकरण में योगदान

जलवायु परिवर्तन आज वैश्विक पर्यावरण मुद्दों में सर्वाधिक महत्वपूर्ण है। नाभिकीय विद्युत न्यूनतम कार्बन प्रौद्योगिकियों में से एक है जो बढ़ती हुई आबादी एवं सामाजिक-आर्थिक विकास के लिए विद्युत उत्पादन करते हुए ग्रीन हाउस गैसों (जीएचजी) के उत्सर्जन (अधिकतर CO₂) में कमी लाती है। CO₂ के उत्सर्जन में कमी लाने में केकेएनपीपी का योगदान (दिनांक 31 जुलाई 2026 को) अब तक इस प्रकार है।



कुल उत्पादित विद्युत इकाई

131,916
मिलियन यूनिट



केकेएनपीपी द्वारा कुल CO₂ उत्सर्जन में कमी

113,315,763
टन

नोट: कोयले एवं नाभिकीय ऊर्जा के औसत जीवन चक्र ग्रीन हाउस गैस उत्सर्जन क्रमशः 888 एवं 29 (टन/गीगावाट घंटा) है।

Public Awareness e-Newsletter

Kudankulam Nuclear Power Project

July 2026

Issue –169

In this issue:

- Nuclear Slogan
- Technical session
- Nuclear Database
- Nuclear News
- Lexicon
- Did you know?
- Feature article
- Nuclear Trivia

Snap shot



A glimpse of a **juvenile Greater Coucal** spotted on the KKNPP plant premises

Photo Credit: **Sh Reji Joyson**, Scientific Assistant-G, HPU, KKNPP 1&2

Scientific classification

Kingdom:	Animalia
Phylum:	Chordata
Class:	Aves
Order:	Cuculiformes
Family:	Cuculidae
Genus:	Centropus
Species:	C. sinensis

Binomial name:
Centropus sinensis

Source: en.wikipedia.org

Dear Readers,

July 2026 brings pivotal strides toward expanding India's clean energy security through strategic partnerships and ambitious domestic growth. Fulfilling a landmark 2015 agreement during hon'ble PM Narendra Modi's visit, India and Australia finalized administrative arrangements to enable Australian uranium exports under IAEA safeguards, securing a long-term fuel pipeline for our nuclear fleet.

Concurrently, ASHVINI—the joint venture between NPCIL and NTPC—will soon float EPC tender for Units 1–4 of the Mahi Banswara project, marking the largest Nuclear Island package in our indigenous PHWR history. Stay Informed, Stay Aware.

—Chairman, PA Committee



Spotlight of July 2026

1

44 on-site & 04 Off-site outreach programme organised

2

1,940 hours of Public Outreach, reached 6,193 people

3

21,588 PA Publications distributed



KKNPP's contribution to climate change mitigation

Climate change is the foremost global environmental issue today. Nuclear power is one of the low carbon technologies that can contribute to reducing greenhouse gas (GHG) emissions (mostly CO₂) while generating electricity for growing populations and socioeconomic development. KKNPP's contribution in preventing the CO₂ emissions till now (As on July 31, 2026) is given below.



No. of units of electricity generated 131,916 Million Units



Total CO₂ emissions avoided by KKNPP 113,315,763 Tonnes

Note: Average lifecycle GHG emissions for Coal & Nuclear is 888 & 29 (tonnes/GWh) respectively.

Australia agrees to export uranium to India

Australia's natural resources are vital for other countries' energy security and stability, and we look forward to becoming a reliable, trusted supplier of uranium to India.



Anthony Albanese
Hon'ble Prime Minister of Australia

Source: world-nuclear-news.org dated 09 July 2026 & Wikipedia



Public awareness Site visits:

Site visit commences with a visit to Nuclear Information Centre(NIC) and a structured lecture programme is conducted for about one hour on nuclear energy & safety features of KKNPP with relevance to the events at Fukushima and also addresses the queries mainly related to protection of marine organism and handling of waste. They are then taken to Model room for familiarization of site layout, simulator facility to visualize the functioning of safety systems and health physics training facility to understand the concept of radiation safety during normal operation & abnormal situation. Subsequently they are taken to the Intake structure and Desalination plant. This programme concludes with a feedback session. Two of the feedback received from the visitors are given in this section.



Public Voice



NUCLEAR POWER CORPORATION OF INDIA LTD
 திருச்சியில் புனர் கட்டுப்பாடுகள் ஆப இத்தியா லிமிடெட்
 (A GOVT OF INDIA ENTERPRISE)
 (ஒரு இந்திய அரசு நிறுவனம்)
 KUDANKULAM NUCLEAR POWER PROJECT
 கடங்குலம் அணுவின் திட்டம்

PUBLIC AWARENESS PROGRAM - FEED BACK FORM
 விழிப்புணர்வு நிகழ்ச்சி - கருத்து பதிவுத் தாள்

Date / தேதி: 18/7/26

Name of the Educational Institution / Village / Organization
 கல்வி நிறுவனம் / கிராமம் / நிறுவனத்தின் பெயர்
 Trainees from NPCIL - KKNPP & CUPET Skill Centre CSE Benchoorais, Radhapuram, Tirunelveli

Name of KKNPP officials conducted the PA program
 விழிப்புணர்வு நிகழ்ச்சியை நடத்திய கடங்குலம் அணுவின் தலைமை அதிகாரிகளின் பெயர்
 A.V. Kathish R. Velmail Murugan

No. of participants பங்கேற்றவர்களின் எண்ணிக்கை 49

Date and duration தேதி மற்றும் நேரம் 18/7/26 9:30 - 4:00

Visitors Feedback / பார்வையாளர்களின் கருத்துக்கள்
 உடனடியாகவே இங்குள்ள அமைச்சுக்கள் மிகவும் பயனுள்ளதாக இருக்கின்றன. இங்கு வந்த பார்வையாளர்கள் தான் நன்றாக தெரிந்துகொள்ள முடியும். இங்கு வந்த பார்வையாளர்கள் இங்குள்ள அமைச்சுக்கள் மிகவும் பயனுள்ளதாக இருக்கின்றன. இங்கு வந்த பார்வையாளர்கள் இங்குள்ள அமைச்சுக்கள் மிகவும் பயனுள்ளதாக இருக்கின்றன.

Signature / கையொப்பம் S. MEHALA 18/7/26

Name / பெயர் S. MEHALA Designation / பதவி Trainee

PUBLIC AWARENESS PROGRAM - FEED BACK FORM
 விழிப்புணர்வு நிகழ்ச்சி - கருத்து பதிவுத் தாள்

Date / தேதி: 28.7.2026

Name of the Educational Institution / Village / Organization
 கல்வி நிறுவனம் / கிராமம் / நிறுவனத்தின் பெயர்
 GREEN AGRI CLUB OF INDIA MARTANDOM.

Name of KKNPP officials conducted the PA program
 விழிப்புணர்வு நிகழ்ச்சியை நடத்திய கடங்குலம் அணுவின் தலைமை அதிகாரிகளின் பெயர்
 R. Thanapaul
 S. Prabhakara Kannan

No. of participants பங்கேற்றவர்களின் எண்ணிக்கை 59

Date and duration தேதி மற்றும் நேரம் 28.7.2026

Visitors Feedback / பார்வையாளர்களின் கருத்துக்கள்
 This program is very informative. We thought some radiation are here. After visiting we fully satisfied. No radiation. Fishes are alive in the sea. It function smoothly then will be no power cut in our country. We wish all the six Reactors should function on a short time.

Signature / கையொப்பம் S. Prabhakara Kannan

Name / பெயர் Y. SUNDAR RAJ. Designation / பதவி Administrator

**NPCIL Mission:**

To develop nuclear power technology and to produce Nuclear Power as a safe, environmentally benign and economically viable source of electrical energy to meet the increasing needs of country.

Criticality for third US reactor ahead of 4 July deadline

“Achieving criticality in roughly 150 days is a remarkable accomplishment, and Idaho National Laboratory is proud to have provided the facilities and expertise that helped make this milestone possible.”


John Wagner

Director, INL Laboratory

Source: world-nuclear-news.org,
www.idahostatejournal.com


Technical session
Electricity and Energy Storage

(Source: World Nuclear Association)

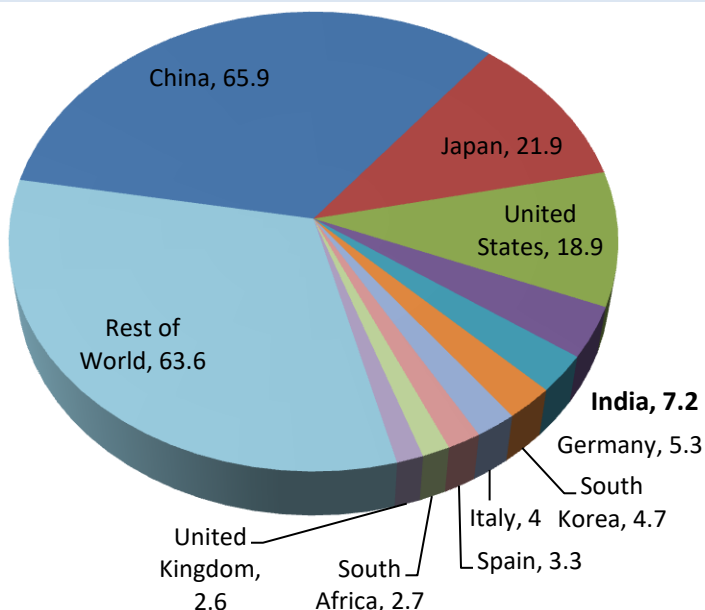
Pumped hydroelectric storage:

The International Hydropower Association has a tracking tool, which maps the locations and power capacity for existing and planned pumped storage projects.

Pumped storage has been used since the 1920s and today about 160 GW pumped storage is installed worldwide, including 31 GW in the USA, 53 GW in Europe and Scandinavia, 27 GW in Japan and 23 GW in China. This amounts to some 500 GWh able to be stored – about 95% of the world's large-scale electricity storage in mid-2016, and 72% of that capacity which was added in 2014. IRENA reports that 96 TWh was used from pumped storage in 2015. The International Energy Agency's World Energy Outlook 2016 projects 27 GW of pumped storage capacity being added by 2040, mainly in China, the USA and Europe. However, as outlined in World Energy Outlook 2020, the geographical limitations of suitable pumped storage sites mean that other options, such as battery storage and thermal storage, are being explored.

Countrywise Pumped Storage Hydropower Capacity (GW)

Global total installed capacity as of 2025: **201 GW**



Source: Statista – Global pumped storage capacity 2025 & www.hydropower.org

To be continued in Aug 2026

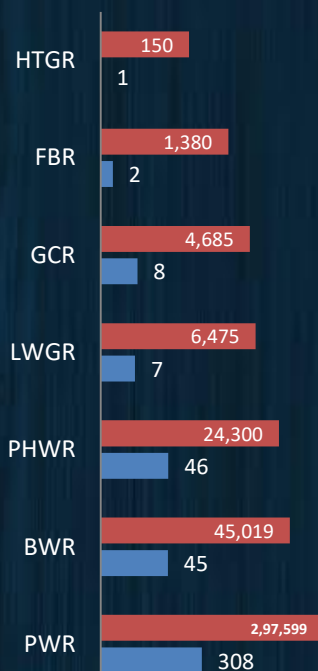


Updated as on Aug 11, 2026

Source: <https://pris.iaea.org/PRIS>

OPERATIONAL REACTORS

- Net electrical capacity MW(e)
- Number of reactors

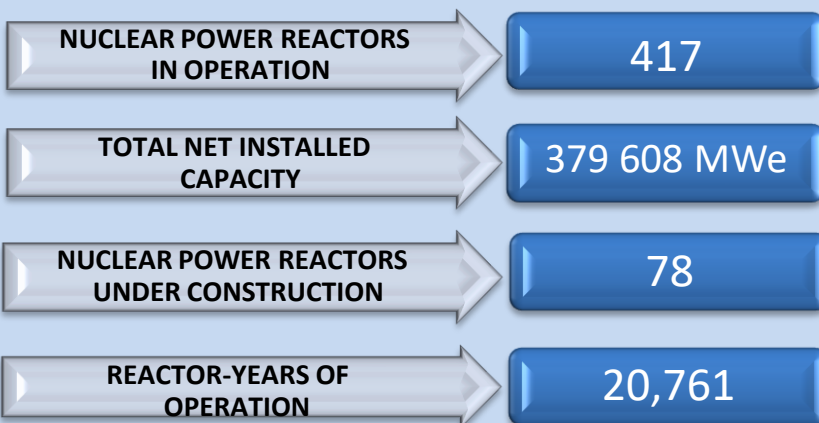


Type	Number of reactors	Net electrical capacity MW(e)
PWR	308	297 599
BWR	45	45 019
PHWR	46	24 300
LWGR	7	6 475
GCR	8	4 685
FBR	2	1 380
HTGR	1	150
Total	417	379 608

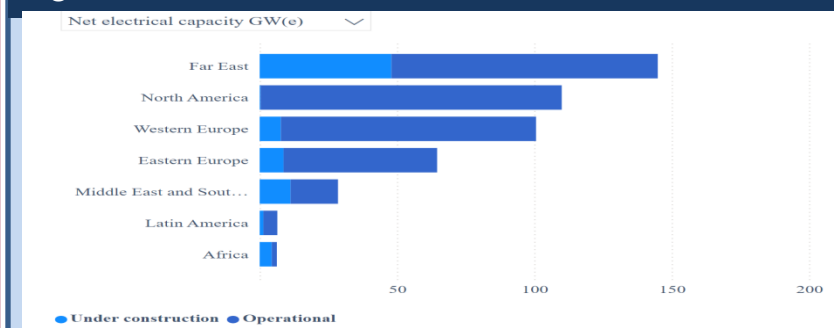
Source:

<https://pris.iaea.org/PRIS>

Current Status:



Regional Distribution of Nuclear Power Plants:



New connections to the grid: (Year 2026)

Source: www.nucnet.org & www.neimagazine.com



Tender set to be launched for Mahi Banswara plant 15 Jul



Anushakti Vidhyut Nigam Limited - the joint venture between Nuclear Power Corporation of India Ltd and National Thermal Power Corporation - will soon launch a tender for the nuclear island EPC package for units 1 to 4 of the Mahi Banswara Rajasthan Atomic Nuclear Power Project. "Estimated at over INR28,000 crore (USD2.9 billion), this is the largest Nuclear Island EPC packages ever floated for India's indigenous Pressurised Heavy Water Reactor (PHWR) programme," NPCIL said in a post on X.

Source: www.world-nuclear-news.org

Approval for VVER fuel production in Germany 24 Jul



The Lower Saxony Ministry for the Environment, Energy and Climate Protection, acting on behalf of the federal government, has approved an application from Framatome subsidiary Advanced Nuclear Fuels to expand its facility in Lingen for the production of fuel for VVER-1000 reactors. The fuel elements are to be manufactured using Russian licences and Russian technology in a joint venture with TVEL for the Eastern European market.

Source:

<https://world-nuclear-news.org/>



Criticality for third US reactor ahead of 4 July deadline

02 Jul



Deployable Energy's Unity reactor has successfully achieved initial criticality at the National Reactor Innovation Center located at Idaho National Laboratory - which means the US has achieved the presidential goal set last year of three microreactors under Department of Energy authorisation to achieve initial criticalities by 4 July 2026. Antares Nuclear's Mark-0 reactor became the first to do this, reaching initial criticality in early June, closely followed by Valar Atomics' Ward 250 reactor. The Unity microreactor is envisaged by Deployable Energy as a compact, 1 MWe water-moderated, gas-cooled "nuclear battery" designed to provide reliable, carbon-free power where conventional energy infrastructure is unavailable, impractical, or vulnerable.

Source: <https://dae.gov.in> & www.world-nuclear-news.org

Australia agrees to export uranium to India

09 Jul

India and Australia have signed the administrative arrangement to enable uranium exports to India for peaceful purposes under the nuclear cooperation agreement signed between the two countries more than a decade ago. The announcement came during an official visit by India's Prime Minister Narendra Modi to Australia.

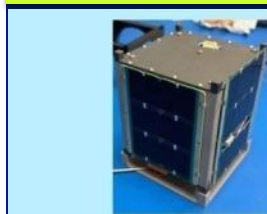


"The arrangement facilitates Australian uranium exports to India to help increase the share of non-fossil fuel power capacity, providing an additional market for the Australian resources sector," the Australian government said in a statement. Australia and India have now finalised the administrative arrangements necessary to enable the export of Australian uranium to India for exclusively peaceful purposes and under IAEA safeguards, as provided for under the 2015 cooperation agreement.

Source: www.world-nuclear-news.org

First commercial nuclear-powered satellite launched

10 Jul



Miami-based City Labs Inc announced that its Betavoltaic Orbital High-Reliability (BOHR) satellite - the world's first commercial nuclear-powered satellite and first nuclear CubeSat - was on board SpaceX Transporter-17, a rideshare mission launched on Tuesday.

City Labs specialises in designing, developing, and manufacturing advanced nuclear micropower technology based on tritium, enabling long-life, maintenance-free power for medical, industrial, and space applications. Its NanoTritium platform delivers reliable micropower where conventional energy sources are impractical. City Labs said the BOHR mission demonstrates its proprietary NanoTritium betavoltaic technology in orbit as a dedicated payload power source, providing continuous, long-duration electrical power independent of solar energy. "This milestone establishes a new class of spacecraft capabilities, enabling persistent operation of critical subsystems where traditional power systems fall short," it said.

Source: www.world-nuclear-news.org



QUICK FACTS

Tritium betavoltaic Vs RTGs

Neither tritium nor Sr-90 can compete with **Pu-238 radioisotope thermoelectric generators (RTGs)** for high-power space missions.

■ **Pu-238 RTGs** produce **tens to hundreds of watts** by converting decay heat into electricity and are used on missions like Voyager, Curiosity, and Perseverance.



■ **Tritium betavoltaics** produce only **microwatts to milliwatts**, but they are tiny, don't run hot, and can power electronics continuously for many years.

Source: citylabs.net,
www.space.com



Nuclear Slogan

Powering a Cleaner, Brighter, Stronger Tomorrow

Nuclear Energy:

Zero Emissions, Zero Interruption,
Total Solutions.

Zero Emissions
Clean energy for a healthier planet

Zero Interruption
24/7
Reliable power, day and night

Total Solutions
Energy, climate and economic security

The Power the Future Needs

Deep Decarbonization

Stable & Resilient Grid

Clean Energy for Industries

Energy for Every Community

Sustainable Growth

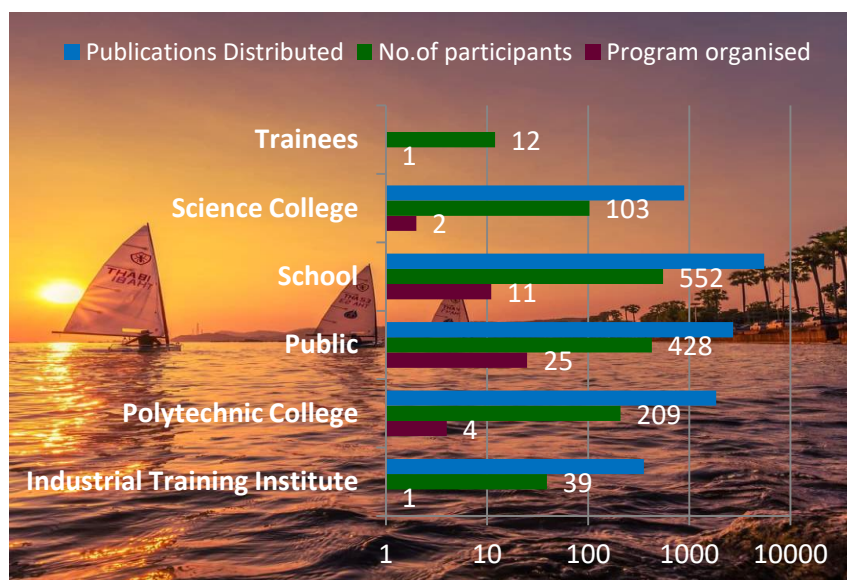
Clean. Reliable. Powerful.
A Smarter Energy Choice for a Greener Tomorrow.



PA activity conducted at KKNPP Site

At
site

As a part of public awareness programme, visits of Public from districts such as Tirunelveli, Kanyakumari and Tuticorin and also from Kerala to KKNPP were organised. The visitors of KKNPP were provided with a detailed information on nuclear power generation and its safety principles.





Few glimpses from Site Visit

At
site

**MGM Polytechnic College,
Kerala
(01 Jul)**



**Merit Polytechnic College,
Ambasamudram
(02 Jul)**



**Government ITI,
Virudhunagar
(03 Jul)**



**Members from Tamilnadu
Science Forum, Tenkasi
(04 Jul)**





Few glimpses from Site Visit

At
site

**Members from
Sasthravedhi District
Committee, Kollam
(06 Jul)**



**Mount Litera Zee School,
Neyyoor
(07 Jul)**



**Visit of Deputy Collectors for
Various District, Chennai
(07 Jul)**



**Visit of BARC Trainees,
Mumbai
(08 Jul)**





Few glimpses from Site Visit

At
site

**Tirunelveli Dakshina Mara
Nadar Sangam College,
T. Kallikulam
(08 Jul)**



**Merit Polytechnic College,
Ambasamudram
(09 Jul)**



**St.Xavier's Polytechnic
College, Seydunganallur
(10 Jul)**



**Inplant Trainees,
Kudankulam
(14 Jul)**





Few glimpses from Site Visit

At
site

**Best School (CBSE),
Karungal
(14 Jul)**



**Arasu College of Arts and
Science for Women,
Karur
(15 Jul)**



**Members from CSI
Kulavanigarpuram
Pastorate, Tirunelveli
(16 Jul)**



**Vishwa Vidyapeeth Group of
Schools, Karnataka
(17 Jul)**





Few glimpses from Site Visit

At
site

**Staffs from Kerala State
Electricity Board Limited
Kunnathukal, Kerala
(18 Jul)**



**Trainees from NPCIL-
KKNPP & CIPET Skill Centre
CSR Beneficiaries,
Radhapuram
(18 Jul)**



**Sri Ambal Vidhyalaya CBSE,
Tuticorin
(20 Jul)**



**Govt. Vocational Higher
Secondary School Parassala,
Kerala
(21 Jul)**





Few glimpses from Site Visit

At
site

**Amrita Vidyalayam Senior
Secondary School (I Batch),
Tirunelveli
(22 Jul)**



**Nirmala Bhavan Higher
Secondary School,
Kerala
(23 Jul)**



**Lakshmi School,
Madurai
(24 Jul)**



**The Vikasa Sainik School,
Tuticorin
(25 Jul)**





Few glimpses from Site Visit

At
site

**Government VHSS Vithura,
Kerala
(27 Jul)**



**Members from Green Agri
Club of India, Kanyakumari
(28 Jul)**



**Trainees of Indian Revenue
Service (IRS) from Madurai
Income Tax office, Madurai
(29 Jul)**



**Lakshmi School,
Madurai
(30 Jul)**



More on NanoTritium batteries

Applications:

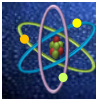
❖ NanoTritium batteries have limited applications where there is no accessibility and long-term but very minimal power is beneficial. This includes powering components on COMSEC devices, satellites, unattended sensors, and implantable medical devices.

❖ Despite containing radioactive materials, the batteries are considered safe for implants due to their engineering and inherently low radiation levels.

❖ A significant drawback is their price (US\$5200 as of 2023).

❖ City Labs is also designing tritium-powered devices for NASA applications, including autonomous sensors for the Moon.

Source: <https://citylabs.net/WNA>, Wikipedia



NanoTritium batteries

NanoTritium™ batteries harness the power of tritium beta decay to generate a consistent flow of low-level electrical energy. This betavoltaic technology provides ultra-long-life power to devices where traditional batteries fall short—in remote, high-risk, or maintenance-prohibitive environments.

Key Features:

20+ year lifespan

Nanowatt to microwatt range

Performs in high-vibration, extreme temperatures, and vacuum conditions

No maintenance, charging, or replacement cycles

Technology

NanoTritium batteries employ principles of betavoltaic conversion and radioactive beta decay rather than conventional electrochemical cells to generate power, harnessing electrons released as the contained tritium naturally decays into helium-3, a non-radioactive isotope. Current models are capable of producing an output voltage of 0.8 to 1.1 V with a current density of 150 nA/cm². Tritium's 12.32-year half-life and the relatively low amount of radiation emitted allow these batteries to safely output electrical power for decades. Testing performed by Lockheed Martin found NanoTritium batteries to be resistant to vibration, altitude, and temperatures ranging from -55°C to +150°C. Repeated temperature cycling had no effect on the performance of the batteries.

Current P100 series NanoTritium batteries are limited to powering low-power microelectronic devices.

History: The NanoTritium battery was developed by City Labs, a company specializing in long-life tritium-based power solutions. The company was co-founded in 2005 by Peter Cabauy, a physicist with expertise in quantum information physics, and Denset Serralta. City Labs originated as part of the Office of Entrepreneurial Science at Florida International University, where Cabauy led efforts in technology commercialization and startup incubation.

See left

As a part of PA outreach activity, Seminars, Workshop, Lectures and exhibitions were conducted at Educational Institutions and Organizations.

PA lecture at Muslim Arts College, Thiruvithancode KK District

A District-Level Quiz Competition was organized by the Tamil Nadu Arival Sangam in association with Muslim Arts College, Thiruvithancode,

Date: Jul 14, 2026

to commemorate the birth anniversary of Hon. K. Kamaraj, Former Chief Minister of Tamil Nadu celebrated as Educational Development Day.

Shri A.V. Sathish, OIC, Nuclear Information Centre, KKNPP, participated as the Resource Person and delivered an informative and motivational lecture to the participating school students. He encouraged the students to develop scientific curiosity, broaden their knowledge, and pursue excellence in education. The programme provided an enriching and inspiring learning experience for the participants.



PA outreach programme conducted outside KKNPP:

Outside KKNPP

Date	Name of the Institution	No. of participants	Publications distributed
Jul 14	Muslim Arts College, KK district	400	200
Jul 24-25	Marian Engineering College, Kerala	4000	10108
Jul 27	Noorul Islam Centre for Higher Education, , KK district	200	0
Jul 30	Science Festival at Kerala Science Center, Kerala	250	0
Grand Total		4850	10308

Few glimpses

PA lecture at Muslim Arts College, Thiruvithancode KK District on Jul 14, 2026



No. of participants 400

No. of awareness publications distributed 200

**PA
Exhibition at
Marian Engineering
College
Trivandrum**

As part of the 25th Silver Jubilee Celebrations of Marian Engineering College, KKNPP participated in the Mega Expo **INNOVISTA 2026** held at the college campus in Thiruvananthapuram.

Date: July 24–25, 2026

KKNPP established a dedicated Public Awareness Pavilion and the initiative aimed to enhance public awareness regarding nuclear energy, demonstrate zero-carbon power generation capabilities, interact with budding engineers, and address common queries and misconceptions surrounding nuclear safety.

**PA lecture
at NCC Camp at
Noorul Islam Centre
for Higher
Education, KK
District**

Shri Prabhakara Kannan S, Scientific Assistant-G, NTC, KKNPP delivered an inspiring and motivational address to the cadets during the NCC camp at Noorul Islam Centre for Higher Education, Kanyakumari district on the "Peaceful Uses of Nuclear Energy".

Date: Jul 27, 2026

He highlighted the role of nuclear energy in national development, clean energy generation, healthcare, agriculture, and scientific advancement.



Few glimpses

Outside
KKNPP

**PA exhibition at Marian Engineering College
Trivandrum during 24-25 Jul 2026**



No. of participants	4000
Publications distributed	10108

PA lecture at Noorul Islam Centre for Higher Education, Kanyakumari district on 27 Jul 2026



No. of participants	200
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Vilavur, Tamil Nadu, India

Illathar Street, Kalkulam, Vilavur, Tamil Nadu 629180, India
Lat 8.251775, Long 77.350358

Monday, 27/07/2026 03:03 PM GMT+05:30
Note - Captured by GPS Map Camera

PA lecture at Kerala Science Centre, Trivandrum

As part of ongoing public outreach and STEM engagement, the Nuclear Technology Information Centre (Russia), in collaboration with KKNPP, hosted an engaging Science Festival at the Kerala Science Centre in Trivandrum on **July 30, 2026**. Attended by over 200 students and families, the event featured a key career interaction session titled "Why Do We Need Science?" Key speakers from Kudankulam Nuclear Power Plant, including Shri A. V. Sathish, OIC, Nuclear Information Centre, KKNPP and Ms. Priya, Scientific Officer-D, Operation, KKNPP 1&2 delivered an insightful presentation on "How Science Powers Kudankulam Nuclear Power Plant." They explained in accessible, everyday language how foundational principles of physics, chemistry, and engineering come together to safely and efficiently generate clean electricity. By sharing real-world plant insights, safety practices, and personal career pathways, the speakers demystified nuclear technology and inspired the next generation of students to explore rewarding STEM careers dedicated to sustainable development.

No. of
participants

250



Few glimpses

PA lecture at Kerala Science Centre, Trivandrum
On 30 July 2026

Outside
KKNPP





*Did
you know?*

Tritium

- ▶ Tritium (^3H) is a radioactive isotope of hydrogen that emits very low-energy beta particles.
- ▶ These particles cannot penetrate human skin and can even be stopped by a sheet of paper or a few millimetres of plastic.
- ▶ Tritium is about **three times heavier** than ordinary hydrogen because its nucleus contains **one proton and two neutrons**.
- ▶ A tritium atom eventually decays into **helium-3**, releasing a beta particle and an antineutrino.
- ▶ One gram of tritium contains about **9,600 curies ($\approx 355 \text{ TBq}$)** of radioactivity, yet its beta radiation does not pose an external exposure hazard
- ▶ In heavy-water reactors such as **CANDU** and **PHWRs**, tritium is produced by neutron capture in deuterium
- ▶ Besides its use in betavoltaic batteries, tritium is widely used in self-luminous exit signs, watch dials, scientific research, and as a fuel component in future fusion reactors such as ITER.

Source: IAEA, WNA



Feature article

Nuclear Energy and Sustainable Development

Source: World Nuclear Association

The social pillar

Human health – radiation

Radiation is a well-understood process, with natural sources accounting for most of the radiation people receive each year. Doses received average 2.4 mSv/yr, but vary widely by location, driven by factors such as underlying geology and altitude. The highest known level of background radiation affecting a substantial population is in the state of Kerala in India where some 140,000 people receive doses which average over 15 mSv/yr from gamma radiation, in addition to a similar dose from radon. Comparable levels occur in Brazil and Sudan, with average exposures up to about 40 mSv/yr to many people. Lifetime doses from natural radiation range up to several thousand millisieverts. However, there is no evidence of increased cancers or other health problems arising from these high natural levels.

20 mSv/yr is the current average allowed limit for nuclear industry employees and uranium miners during normal operation. The millions of nuclear workers that have been monitored closely for 50 years have no higher cancer mortality than the general population but have had up to ten times the average dose.

Nuclear power is the only technology that systematically measures and accounts for radioactive emissions. However, exposure to above-background radiation is not exclusive to nuclear power-related activities. UNSCEAR has estimated that both occupational and public exposures from electricity generation are higher for workers in the coal industry, for example.

To be continued in Aug 2026



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Which innovative hydrogen production technology is demonstrated at India's newly inaugurated nuclear-powered hydrogen facility?

4. Oxygen Production / Decomposition Phase (Highest Temperature)

This is the step that demands the maximum thermal energy, drawing directly from the FBTR's high-temperature nuclear heat. The Reaction:



Mechanism: Driven directly by high-temperature heat from the Fast Breeder Test Reactor (FBTR), copper oxychloride decomposes into molten cuprous chloride (CuCl) and releases oxygen gas (O_2). The molten CuCl is recycled back to Step 1 to close the loop.

Why is this a game-changer for India?

i) **Higher Efficiency:**

ii) **Continuous 24/7 Production:** Unlike solar or wind-powered green hydrogen, which is intermittent, a nuclear-coupled facility runs around the clock.

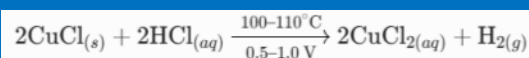
iii) **Industrial Scale Decarbonization:** Producing hydrogen via nuclear heat provides a truly zero-carbon fuel for heavy industries like steel, chemicals, and fertilizers, directly expanding the utility of India's fast breeder reactor program.

Copper–Chlorine (Cu–Cl) Thermochemical Cycle. Unlike electrolysis (which uses electricity) or direct thermolysis (which requires unachievable temperatures above 2000°C), a thermochemical cycle uses a series of closed-loop chemical reactions. The chemicals are continuously recycled, meaning the only inputs are water and heat, and the only outputs are hydrogen and oxygen.

The Cu-Cl cycle is highly favored because its maximum required temperature is around 530°C , which perfectly matches the high-temperature heat supplied by sodium-cooled Fast Breeder Reactors.

The process consists of Four main steps:

1. Hydrogen Production Phase (Low Temperature):



Mechanism: In the electrolyzer, cuprous chloride and hydrochloric acid are reacted at the anode to form cupric chloride while hydrogen gas is evolved at the cathode.

2. Drying and Crystallization

The aqueous copper(II) chloride solution generated from the first step is dried using low-grade waste heat to yield solid CuCl_2 crystals.

3. Hydrolysis Phase (Intermediate Temperature)



Mechanism: Solid copper(II) chloride reacts with superheated steam in a spray reactor to form copper oxychloride, also represented as $\text{CuO} \cdot \text{CuCl}_2$, and regenerates HCl gas, which is recycled back to Step 1.

Source: www.insightsonindia.com,
www.pib.gov.in

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