



NATIONAL INSTITUTE OF TECHNOLOGY
TIRUCHIRAPPALLI, INDIA



CONFERENCE REPORT

OF

INTERNATIONAL CONFERENCE ON

ADVANCES IN Green, NET-ZERO INNOVATION - SUSTAINABILITY 2026

Organized by:

Department of Energy & Environment,
NIT Tiruchirappalli



April 15th – 17th, 2026



Golden Jubilee Convention Hall
NIT Tiruchirappalli, Tamil Nadu, India



*“Shaping a Greener, Net-Zero Future
Through Innovation and Collaboration”*

CORE ORGANIZING COMMITTEE



Chairperson:
Dr. Premalatha M



Co-Chairpersons:
Dr. Muthukumar K
Dr. R. Kalpana



Organizing Secretary:
Dr. Aditya Kumar

🌿 Executive Summary 🌿

AGNI-S 2026 served as a high-impact platform for knowledge exchange, innovation, and collaboration across energy, environment, and sustainability. The conference addressed critical challenges in climate change, resource efficiency, and the transition to a low-carbon future, bringing together researchers, academics, and industry professionals.

The conference received over **330 paper submissions**, reflecting strong engagement from the research community. A structured **single-blind review process**, supported by expert reviewers, ensured the quality of contributions. Following the evaluation, **162 papers were selected**, of which **152 high-quality papers were successfully presented**.

The technical program was organized into **four thematic tracks**, conducted through **two parallel sessions**, enabling focused discussions and effective knowledge dissemination. The conference featured **eight keynote speakers**, whose expert insights on emerging technologies and sustainability trends significantly enriched the academic discourse.

AGNI-S 2026 hosted **126 registered participants** from across the country, creating a vibrant platform for interaction and interdisciplinary collaboration. The event also witnessed strong **industry participation**, with organizations such as **BPCL, IOCL, High Energy Batteries, TryCAE, HIOKI, Ampeers, and Elmack Engineering, Precision Scientific & Co.** enhancing the practical relevance of the conference.

Overall, AGNI-S 2026 successfully fostered academic excellence, industry engagement, and innovative thinking, contributing meaningfully to advancements in sustainable energy and environmental solutions.

🌿 Paper Details 🌿

330+	162	152	126
Paper Submissions	Papers Selected	Papers Presented	Registered Participants

Organizing Institute

The National Institute of Technology Tiruchirappalli (NIT-T), formerly known as a Regional Engineering College (REC), was established in 1964 through a collaborative effort between the Indian and Tamil Nadu governments. Over the years, it has evolved into a Deemed University and eventually gained the status of an Institution of National Importance in 2007, showcasing its journey towards academic autonomy and excellence. The institute offers a wide array of courses, including undergraduate programs in ten branches, postgraduate courses across twenty-one disciplines in Science, Engineering, and Technology, as well as M.S. (by Research) and Ph.D. programs, NIT-T prides itself on a faculty recruitment process conducted on a national scale, ensuring a diverse and skilled teaching staff. The institute holds the 9th position in the current NIRF ranking and is the only NIT to get into the Top-10. The Institution stands as a testament to cultural diversity, with students hailing from various states contributing to its vibrant community. Sprawling across an extensive 800 acres campus, the institute is well-equipped with modern facilities housed in the Octagon, including a CAD/CAM Lab, a robust Local Area Network (LAN), high-speed internet, and seminar/conference amenities managed by the Computer Support Group (CSG). Beyond academics, NIT-T emphasizes extracurricular growth, offering opportunities for NCC, NSS, IEEE student chapters, social clubs, and sports activities, nurturing well-rounded student experiences. Its alumni network boasts individuals excelling across diverse fields in leading organisations globally.



About The Department

The Department of Energy and Environment (DEE) at the National Institute of Technology (NIT) Tiruchirappalli, originally established in 1995 as the Centre for Energy and Environmental Science and Technology (CEESAT), focuses on developing sustainable solutions for global energy and environmental challenges. Renamed in 2012, DEE offers an interdisciplinary M.Tech. program in Energy Engineering, which blends principles from energy systems, environmental technologies, and sustainability. The department actively engages in advanced research in areas such as carbon capture using microalgae, solar energy applications, wind energy, energy-efficient building design, and computational fluid dynamics (CFD). DEE's laboratories are ISO 9001:2008 certified and NABL-accredited, enabling both academic research and industrial testing in fields like photovoltaic systems, effluent treatment, and energy system modelling. In addition to research and education, the department also provides consultancy services including energy audits, photovoltaic system design, water and waste material testing, and environmental monitoring for industries and institutions. DEE has implemented several notable pilot projects such as the Energy Efficient Building, which utilizes passive architectural techniques for minimizing energy consumption, and the Algal Shed, a project demonstrating the use of algae for wastewater treatment and CO₂ sequestration. These projects showcase the department's commitment to innovation in sustainable infrastructure. Through its robust academic offerings, practical research, and real-world application, DEE continues to contribute significantly to energy conservation, environmental protection, and sustainable development. Its interdisciplinary approach positions it as a key player in addressing the pressing global need for clean and efficient energy technologies.





International Conference on Advances in Green Net-Zero Innovation – Sustainability

AGNI-S 2026

ABSTRACTS

15,16,17 April 2026

**National Institute of Technology
Tiruchirappalli, Tamil Nadu , India**



PAPER ID : 225

Smart Helmet for Real-Time Drowsiness and Alcohol Detection with IoT-Enabled Emergency Alerts

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Abstract: Road accidents because of drowsy or unconscious riders still pose a really big safety risk especially for two- wheelers as these have less physical shielding and the time to get emergency services is longer. This work proposes a smart helmet system that is a part of the Internet of Things paradigm which can quickly determine the drowsiness state of a rider in real time and implement corrective actions in time. A multi, core ESP32 microcontroller is used in this case to cope with the various jobs of sensing, communicating, and issuing the right control commands. The eyelids are detected by an eyeblink sensor based on infrared sensing to find if the eyelids are closed for too long and this prolonged eyelid closure is considered as an incident of drowsiness. When the eyeballs remain closed for more than a set limit of 1.75 seconds, the eyes are closed for too long with an alarming sound and the bike's motors are slowed down via the motor control unit besides sending a message through the GPS, GSM interface as a help=crime message along with the live location to the user with a specified contact.

Keywords: Internet of Things (IoT), ESP32 Microcontroller, Eye-Blink Detection, IR Sensor, GPS Module, GSM Communication, Arduino IDE, Buzzer Alert System, L298N Motor Driver Module.