National Institute of Technology,
Tiruchirappalli - 620015.
Department of Energy and Environment

ENIR11 – PROJECT EXPO

Title of the Event: ENIR 11 - PROJECT EXPO

Date and Duration of the Event: 18-12-2025 and 2 PM to 5 PM

Overall Faculty Coordinator: Dr. M. Premalatha, Professor, DEE, NIT Tiruchirappalli.

Background

Project-based learning is an essential pedagogical approach in engineering education, enabling students to bridge the gap between theoretical knowledge and practical application. In the domains of **Energy and Environmental Engineering**, experiential learning becomes particularly important, as students must understand real-world constraints, sustainability challenges, and the development of innovative solutions.

The **ENIR11 Project Expo is a bi-annual academic initiative facilitated by the Department of Energy and Environment at the National Institute of Technology, Tiruchirappalli, as part of the first year GIR course named ENIR11 – Energy and Environment Engineering offered for all branches of B.Tech of NITT**. The expo provides a structured platform for first-year undergraduate students to conceptualize, design, and demonstrate working models and project prototypes related to energy, environment, and sustainability.

The ENIR11 Project Expo is facilitated every year by the Department of Energy and Environment as part of the course *ENIR11 – Energy and Environment Engineering*. This initiative is founded on the principle that effective teaching and learning extend beyond classroom instruction. While theoretical understanding remains essential, the real-time development and execution of projects enable students to gain deeper insights, practical exposure, and enhanced learning outcomes in the fields of energy and environmental engineering.

Objectives

The primary objectives of conducting the ENIR11 Project Expo are as follows:

1. To promote **experiential and project-based learning** among first-year engineering students.
2. To encourage **innovation, creativity, and interdisciplinary thinking** at an early stage of engineering education.
3. To enable students to apply theoretical concepts of **energy and environmental engineering** to real-world problems.
4. To expose students to **sustainable technologies and emerging trends** in energy and environment.
5. To cultivate an **entrepreneurial mindset and a startup orientation** among students.
6. To provide **industry-oriented evaluation and mentoring** – For instance, involvement of SCIEnT this semester.

Event Details and Organization

CHIEF GUEST
Dr. G. Aghila,
Director

Dr. V. Sankaranarayanan,
Dean (R&C)

Dr. A. K. Bakthavatsalam,
Placement and SCIEnT Head

Prof. R. Gururaj,
Placement Officer

Dr. K. Muthukumar,
HOD (i/c) -DEE

Overall Faculty coordinator
Dr. M. Premalatha, DEE NITT

Faculty Mentors
Dr. Jaganathan VM, DEE NITT
Dr. D V Siva Krishna Rao K, DEE NITT
Dr. Aditya Kumar, DEE NITT

Evaluation and Mentoring Partner
DEE and SCIEnT Team, NITT

The event was systematically planned and executed by the faculty members of the Department of Energy and Environment, with coordination support from SCIEnT. The ORION Building provided an ideal venue with multiple halls to accommodate parallel project displays and evaluation.

Participation and Project Details

Student Participation

The expo witnessed enthusiastic participation from **first-year undergraduate students**, involving: **Total number of projects**: 54

- **Total number of students involved**: 345

Participating branches (Odd Semester):

- Computer Science and Engineering – CSE (A & B)
- Electronics and Communication Engineering – ECE (A)
- Instrumentation and Control Engineering – ICE (A & B)

Project Titles – Circuit Branches (July 2025 Session)

CSE A	
Project Batch	**Project Title**
1.	Kinetic Energy Harvesting and Storage Systems
2.	Solar Power Streetlights with Motion Sensor
3.	Watt a Ride!
4.	CYCLOWATT: The Pedal-Powered Energy Initiative
5.	Greywater Recycling
6.	NITT Campus Buggy Tracker
7.	Gym Power Generator
8.	Real-Time Fault Locator Network
9.	Hostel Energy Saver

CSE B	
Project Batch	**Project Title**
1.	Noise Harvest
2.	Hybrid Systems of Solar and Wind Energy
3.	Smart Power Automation System
4.	Soil Moisture Indicator and Irrigation Management
5.	Smart Solar Tracker
6.	Power Generation by Speed Breaker
7.	Smart Waste Segregation System
8.	Data driven carbon dioxide estimation and Remedial action framework.
9.	IoT based water leakage detection system
10.	Piezoelectric tile

ECE A	
Project Batch	**Project Title**
1.	Automation of Biomass power plants
2.	Low-temperature Catalytic Conversion of Biomass to Jet Fuel
3.	Smart irrigation system
4.	Inkfinity -Infinite use of carbon
5.	B.I.N.A.U.R.A.L - Bio-Inspired Neural Architecture for Real-time Auditory Localisation
6.	The green building
7.	Energy Efficient Smart Home
8.	Micro Scale Hydroelectric Power Plant in Agriculture
9.	Transparent Solar panel.
10.	Purification of air
11.	Smart street light system
12.	Greywater Reuse System for Sustainable Water Management
13.	High voltage dew/fog condenser
14.	Motion that Sparks Efficiency
15.	Foot power generation
16.	Solar Tracking System

ICE A	
Project Batch	**Project Title**
1.	Use of Piezoelectricity in Speed Breakers
2.	Air Quality Monitoring System
3.	Smart Irrigation and Soil Health Monitoring System
4.	An IVR-Based Smart Agricultural Assistance and Information System for Farmers
5.	Automatic plant watering system
6.	Solar PV lamb
7.	Aqua Watchdog
8.	Syngas production from biomass
9.	Power generation using speed breakers
10.	Smart bin

ICE B	
Project Batch	**Project Title**
1.	Wildfire detection
2.	Air purifying using photocatalytic concrete
3.	Smart transformer monitoring system
4.	Solar hydro hybrid water purifier
5.	Smart, Sustainable and Adaptive Street Lighting
6.	Electrostatic, Fog to Water Harvesting System
7.	Multilayered pollution eradication strategy
8.	Biofilm inhibition system
9.	Dual-axis solar tracker using LDR

The Department of Energy and Environment follows a structured academic practice wherein:

Odd Semester: Circuit branches participate (For instance, this **July 2025** Session)

Even Semester: Non-circuit/core branches (Civil, EEE, Mechanical, Production, Metallurgy) participate (upcoming **Jan 2026 session**)

This ensures equitable exposure to project-based learning across all disciplines.

Project Domains

The student projects addressed diverse and contemporary themes, including:

- ☐ Solar and renewable energy systems
- ☐ Biomass and waste-to-energy technologies
- ☐ Electric vehicles and smart mobility
- ☐ Water management and purification systems
- ☐ Environmental monitoring and automation
- ☐ Sustainable engineering solutions

SCIEnT Team Involvement and Evaluation

The participation of **SCIEnT Student Centre** for Innovation in Engineering and Technology, National Institute of Technology Tiruchirappalli, was a noteworthy addition to this year's ENIR11 Project Expo.

About SCIEnT

SCIEnT is a multidisciplinary innovation centre that provides students with access to advanced tools, machines, consumables, and mentoring. It enables students to explore, experiment, and innovate in a supportive environment without the fear or cost of failure.

Evaluation Process

- Each SCIEnT team member **individually evaluated student projects**
- Evaluation was based on: Innovation, Creativity, Relevance to current and emerging technological trends
- Projects were also monitored for: Technical execution, Feasibility, Practical applicability

Mentoring and Feedback

SCIEnT mentors actively interacted with student teams, reviewed their project execution, and provided constructive feedback. The evaluators appreciated the **high level of student involvement**, originality of ideas, and enthusiasm shown by first-year students. Students were motivated to consider **entrepreneurship and startup pathways** based on their project concepts.

External Visitors

Approximately **100 students and faculty members** from the nearby **Government Polytechnic College, Tiruchirappalli,** attended the Expo, reflecting NITT's social responsibility in educating and disseminating knowledge to institutions in the immediate vicinity.

Prize Distribution and Outcomes

Prize Categories

Prizes were awarded under the following categories:

✓ Best Project ✓ Innovation ✓ Sustainability ✓ Creativity

Awards and Recognition

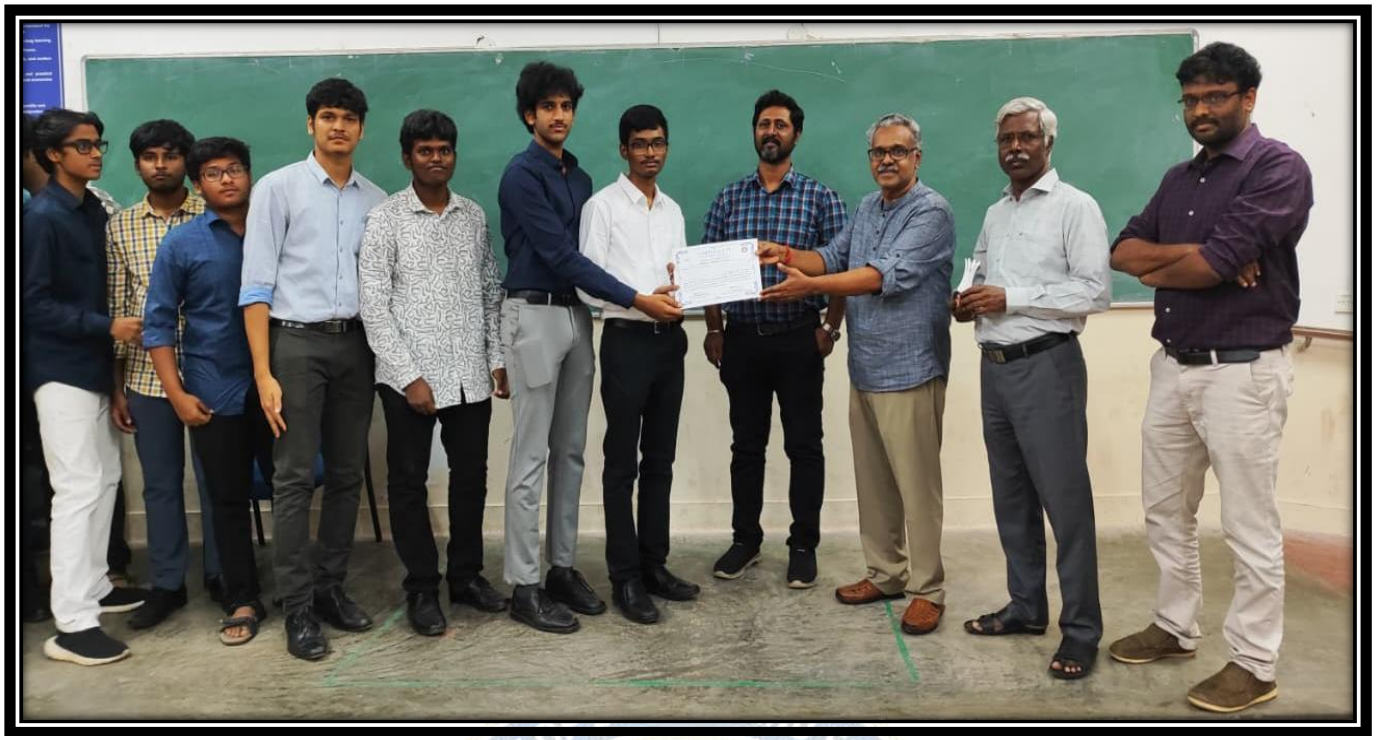
- **Each class**: One Winner and One Runner-up
- **Certificates** were issued to all participating students
- **Funding and incubation support** announced by SCIEnT
- Selected projects will be supported to progress to the **next level of development**, including **the fabrication of 3D-printed prototypes** at SCIEnT.

Winners

- CSE A - **Greywater Recycling** – Faculty Mentor Dr. Jaganathan VM
- CSE B - **Smart Power Automation System** – Faculty Mentor Dr. Aditya Kumar
- ECE A – **B.I.N.A.U.R.A.L - Bio-Inspired Neural Architecture for Real-time Auditory Localisation** – Faculty Mentor Dr. D V Siva Krishna Rao K
- ICE A - **An IVR-Based Smart Agricultural Assistance and Information System for Farmers** – Faculty Mentor Dr. Aditya Kumar
- ICE B – **Wildfire Detection** - Faculty Mentor Dr. Aditya Kumar.

Runners

- CSE A - **Hostel Energy Saver** – Faculty Mentor Dr. Jaganathan VM
- CSE B - **IoT-based water leakage detection system** – Faculty Mentor Dr. Aditya Kumar
- ECE A – **Transparent Solar panel** – Faculty Mentor Dr. D V Siva Krishna Rao K
- ICE A - **Smart Irrigation and Soil Health Monitoring System** – Faculty Mentor Dr. Aditya Kumar
- ICE B – **Smart transformer monitoring system** - Faculty Mentor Dr. Aditya Kumar.



The **ENIR11 Project Expo** strongly aligns with the **National Education Policy (NEP) 2020**, which emphasizes experiential learning, multidisciplinary education, innovation, and the development of problem-solving skills. Through hands-on project development, first-year students translated NEP principles into practical academic learning.

The projects also aligned with several **United Nations Sustainable Development Goals (SDGs)**, reflecting national and global priorities in energy and environmental sustainability. The expo effectively demonstrated the value of **project-based learning** by providing early exposure to innovation, teamwork, sustainability challenges, and real-world problem-solving.

The active involvement of **SCIEnT** enhanced evaluation quality, mentoring, and post-expo support, encouraging an **entrepreneurial mindset** among students. Overall, the ENIR11 Project Expo serves as a model of academic practice, aligning with outcome-based education, sustainability goals, and institutional excellence.

Team

Overall Faculty Coordinator: **Dr. M. Premalatha**

Faculty Mentors:
Dr. Jaganathan VM - CSE A
Dr. D V Siva Krishna Rao K - ECE A
Dr. Aditya Kumar - CSE B, ICE A&B

Climbs