



# PANIMALAR ENGINEERING COLLEGE

An Autonomous Institution

## [JAISAKTHI EDUCATIONAL TRUST]

Approved by AICTE | Affiliated to Anna University | Recognized by UGC

All Eligible UG Programs are Accredited by NBA

Bangalore Trunk Road, Varadharajapuram, Poonamallee, Chennai- 600 123

### INDIA'S WOMEN CENTRIC NATIONAL LEVEL 24 – HOUR HACKATHON **TECHDIVATHON – 2.0**

**She blooms. She leads. She conquers**



**Domain: SOLAR ENERGY**

**Problem Statements:**

S.No	Title	Problem Statement	Description
1	Solar Panel End-of-Life Upcycling	Efficient disposal of aging solar panels remains unsolved.	Develop systems to upcycle or recover rare earth materials from decommissioned solar panels to minimize landfill waste.
2	Deployable Relief Solar Streetlights	Disaster-affected communities lack emergency lighting.	Design modular, rapid-deploy solar streetlights with mesh networking for remote activation during emergencies.
3	Induction Charging for E-Two-Wheelers	Urban e-mobility struggles due to difficult charging access.	Propose solar-powered induction paths in public parking to wirelessly charge electric two-wheelers without new infrastructure.
4	Peer-to-Peer Solar Blockchain Trading	Small-scale users can't easily monetize excess solar power.	Build a blockchain-enabled microgrid platform for communities to trade surplus energy in real time.
5	3D-Printed Solar Concentrators	Legacy solar panel efficiency drops in shaded zones.	Develop affordable, 3D-printed concentrators for retrofitting onto existing panels to boost output.
6	Nanocoating for Solar in Dust Zones	Frequent manual cleaning lowers solar panel ROI.	Create waterless, self-cleaning nanocoatings that repel dust for improved performance in polluted/desert areas.
7	Predictive Maintenance for Off-Grid Microgrids	Off-grid solar systems fail from unscheduled downtime.	Use AI models to predict and schedule preventative maintenance for off-grid microgrid installations.
8	Solar-Powered Climate-Resilient Food Dryers	Rural and remote farmers lose produce due to lack of affordable drying technology.	Develop solar-powered drying units that use precise climate control and low energy consumption to preserve crops and enhance shelf life, especially in humid or erratic weather zones.

9	Solar-Enabled Autonomous Wildlife Protection System	Solar parks pose risks of habitat disruption and poaching in surrounding wildlife zones.	Create a solar-powered, sensor-integrated autonomous system that monitors wildlife movements and alerts guards on potential threats, balancing conservation and energy production.
10	Plug-and-Play Business Solar Grid Module	SMEs find grid integration and storage complex.	Propose interoperable grid modules allowing small businesses to add rooftop solar and community battery storage seamlessly.
11	Solar-Powered Rural Cold Storage	Farmers lack off-grid cold storage, leading to spoilage.	Create standalone solar-powered cold chains for rural farming communities to reduce post-harvest losses
12	E-Ink Solar Road Signage	Live alerts on highways consume excessive grid power.	Design solar-powered, IoT-enabled e-ink road signs capable of showing live traffic and safety information.
13	Lunar-Regolith Integrated Solar Farm Concept	Conventional solar farms rely on heavy, earth-based materials and cannot be directly adapted for future off-world colonies.	Conceptualize a solar energy system that uses locally available lunar regolith (or analogous Earth materials) as structural and reflective elements, integrating in-situ resource utilization, dust-resilient panel design, and modular deployment strategies to enable scalable, low-mass solar farms for future Moon or extreme-terrestrial habitats.
14	IoT Biodiversity Sensors in Solar Parks	Solar parks impact local ecosystems in unknown ways.	Use solar-powered IoT sensors to monitor biodiversity, providing live data on ecosystem health near installations.
15	Solar Noise-Barrier Glass for Highways	Modern noise barriers waste potential energy.	Invent transparent, solar-integrated sound barriers for highways that attenuate noise and simultaneously produce power.
16	Vertical Farm Solar Irrigation Optimizer	Rooftop/vertical farms lack efficient water solutions.	Design an AI-driven, solar-powered irrigation management system for urban vertical farms and rooftop gardens.
17	Gamified Urban Solar Mapping	City solar potential data is outdated and incomplete.	Develop a gamified crowdsourcing app encouraging users to map rooftop solar potential for regional planning.
18	Solar-Powered Vaccine Refrigerator	Last-mile vaccination suffers from poor refrigeration.	Engineer a portable, solar-powered fridge with temperature and GPS tracking for remote vaccine delivery.
19	Solar Micro-Weather Mesh Network	Grid inefficiency results from poor local weather data.	Build a distributed, solar-powered sensor mesh for community-based hyper-local weather forecasting.
20	Smart Solar-Integrated Thermal Energy Storage	Solar intermittency limits continuous heat supply in industrial processes.	Innovate a solar-powered thermal energy storage solution that intelligently manages heat retention and release for industrial or residential heating needs, improving round-the-clock solar utility.
21	Floating Solar Fish-Farm Coexistence	Solar installations on water disrupt aquatic ecosystems.	Propose floating solar solutions for fish farms that both generate energy and maintain the health of the aquatic system.

22	IoT Solar Backpack for Logistics Workers	Field workers lack safe charging and safety tracking.	Invent an ultra-light, flexible solar backpack integrating device charging, GPS, and emergency communications.
23	Predictive Solar Asset Insurance	Insuring distributed solar is difficult due to unpredictable risks.	Apply predictive analytics for risk assessment in solar asset insurance using installation, usage, and climate data.
24	GIS for Marginal Land Solar Siting	Contaminated lands remain underutilized for renewables.	Create GIS-based tools for identifying and reclaiming marginal/constrained lands for community-owned solar projects.
25	Mobile Solar Waste Sorting Station	Urban slums struggle to process waste sustainably.	Design a mobile solar-powered station for waste sorting and recycling in dense urban

### **Reviewer's Digital Signature**

**Reviewer's Name:**

**Position:**

**Organization:**

**Date:**

**Digital Signature:**