Great Place To Work. Certified FEB 2025-FEB 2026 INDIA

FUTURE FOUNDERS CHALLENGE 2025

runway incubator START YOUR START-UP JOURNEY

UPES

UNIVERSITY OF TOMORROW

QS WORLD UNIVERSITY RANKINGS

801-850 BAND IN THE WORLD | *NO.1 IN ACADEMIC REPUTATION

*among pvt. universities in India - QS World Rankings 2025

THE World University Rankings 2025

501-600 BAND IN THE WORLD | 7TH RANK IN INDIA

Times Higher Education World University Rankings 2025

nirf RANKING 2024

Ranked 46 in India (University category)

ACCREDITED WITH GRADE A NAAC

Accredited Grade 'A' by NAAC

runway incubator
START YOUR START-UP JOURNEY

FUTURE FOUNDERS CHALLENGE 2025

UPES
UNIVERSITY OF TOMORROW

Team Name: The Energy Ethos

"Born of the Sun, Guided by our Ethos"

School: Maharana Mewar Public School

Problem Statement:

Across rural India, farmers, fishers, shop owners, medical staff, and relief workers struggle with unreliable electricity, making cold storage for essentials like food, dairy, fish, and medicines often inaccessible. Our product aims to develop an affordable, sustainable cold-storage solution powered by renewable energy and thermoelectric technology, providing reliable preservation for underserved communities.

Some of the Affected users can be: **Farmers, Fishermen, Hospital & Clinic Staff, Low-Income & Rural Households, Emergency & Relief Forces, etc**

Example Scenario:

Imagine During a flood relief mission, an emergency team struggles to keep insulin and blood samples viable long enough to reach the destination in the summer heat.
A lightweight thermoelectric device could be a lifesaver when every minute counts.
That’s where Our Product comes in.

The Idea:

Our Product which we call ‘ThermaVault’, is a portable, **solar-powered** thermoelectric device that can heat or cool an insulated chamber to preserve perishables and medicines, even in situations where electricity may not be always available

Key Features:

- **Dual-Mode Functionality:** Can both cool and heat using the **Peltier effect**, simply by reversing current flow.
- **Off-Grid Operation:** Runs on solar power + battery, requiring minimal main-grid connection.
- **Energy-Efficient Design:** Uses renewable energy and doesn’t use a compressor, making it lightweight and eco-friendly.
- **Smart Temperature Control:** Built-in sensors and a microcontroller maintain precise temperature.
- **Modular & Affordable:** Simple components make it easy to build, repair, and scale for rural use.

Why ThermaVault?:

ThermaVault solves the issue of unreliable cold storage by offering a solar-powered, thermoelectric system that works entirely off-grid.

It keeps food, medicine, and perishables safe during power outages, cuts carbon emissions, and ensures reliable cold storage for underserved communities.

ThermaVault: Market Opportunity Overview

Target Audience

- **Farmers & Agri Workers:** Approximately 40M individuals need cold storage for perishable produce.
- **Fisherfolk:** 28M People, require off-grid solutions for fish preservation.
- **Rural Households:** 890M people, 2/3 face daily power outages.
- **Rural Healthcare:** 188K facilities, need vaccine/medicines storage.
- **Emergency Relief:** Portable cooling capabilities for disaster response teams in off-grid areas.

Market Size & Growth

- **India Cold Chain:** USD 10.6B (2024) → USD 35B (2034), CAGR 12.7%; 90% unorganized, huge rural gap.
- **Solar Cold Storage:** Global USD 127B → USD 229B by 2030, CAGR 11%.
- **Thermoelectric Coolers:** USD 569M → USD 1.32B by 2030, CAGR 8.7%.
- **Portable Refrigerators:** USD 2.24B → USD 3.36B by 2030, CAGR 7%.

Why Now?:

- 74M tonnes food lost annually in India (~USD 18.5B)
- Rural grid unreliable; daily outages common
- Rising climate & health challenges
- Government subsidies & solar initiatives (like PMKSY, PMMSY, and DDUGJY, etc)
- Declining Costs of Thermoelectric & Solar Tech

Why ThermaVault Is Special

• **Solar + Thermoelectric Innovation:** Uses Peltier modules and sun-tracking solar panels — no compressors, no grid — creating a truly off-grid cold storage solution.

• **Affordable & Scalable:** Priced at ₹6,000–8,000, it's up to 70% cheaper than traditional refrigerators while cutting power use by 50%.

• **Climate-Resilient Engineering:** Operates in power-deficient, high-heat environments, ensuring uninterrupted cooling for food, vaccines, and medicines.

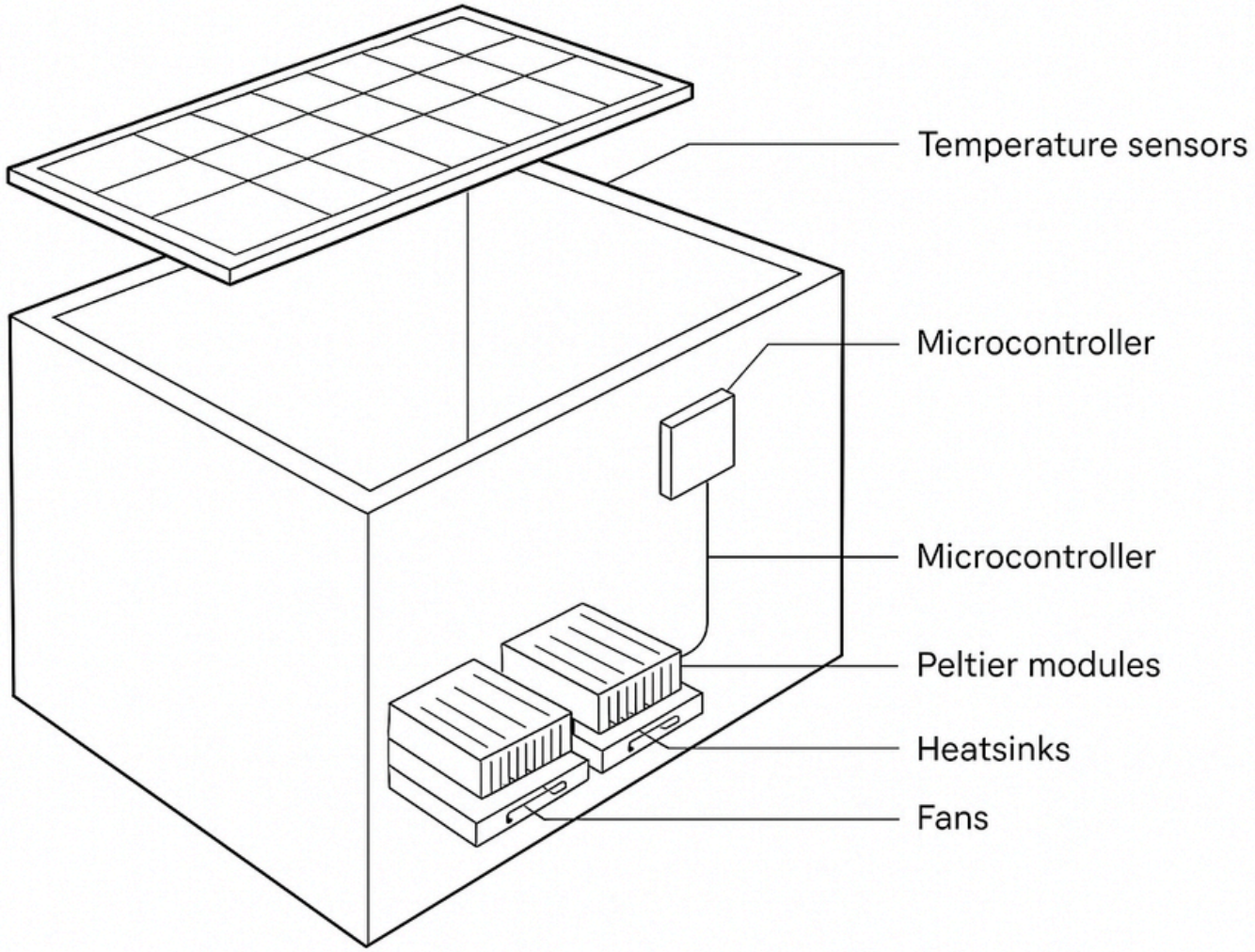
• **Socio-Environmental Impact:** Reduces post-harvest losses, empowers rural livelihoods, and supports India's shift toward clean, decentralized energy.

Our Competitors

Feature	Ecofrost (Existing Market Solution)	SureChill (Solar Fridge Model)	Our Prototype – ThermaVault
Power Source	Solar panels + battery backup	Solar + thermal water core	Solar + Peltier modules + insulated core
Portability	Fixed setup, not easy to move	Compact but heavy	Lightweight, portable, modular design
Cooling Method	Compressor-based	Passive water-thermal storage	Solid-state Peltier cooling + smart insulation
Primary Use	Farm produce preservation	Vaccine and medical storage	Multi-purpose: food, medical, field cooling
Maintenance Needs	Moderate (compressor upkeep)	Low	Very low — no refrigerants or compressors
Eco Impact	Uses refrigerants	Minimal refrigerants	Fully eco-friendly, zero refrigerants
Main Edge	Scalable cold room	Long duration cooling	Portable, adaptive, completely solar-

Prototype Blueprint

Our prototype is currently in its early development phase. While we have successfully acquired and begun making the core structure and the preliminary components, further funding is essential to incorporate higher-cost elements such as Sun-Tracking Solar panels, Battery Pack, Peltier modules, and Heatsinks. These enhancements will allow us to fully realize the prototype's functionality and bring it closer to a market-ready solution.



The Ask / Vision

Our Vision:

To make sustainable, portable cooling accessible anywhere — from remote villages to urban disaster zones — without relying on fuel, grid power, or complex maintenance.

Our Next Steps:

- Completely a fully functional prototype integrating the Peltier-based cooling system with solar tracking and temperature regulation.
- Conduct field testing for performance validation under varied climatic conditions.
- Optimize insulation materials for maximum efficiency and minimum cost.

Support Needed:

- Technical mentorship for thermal system optimization.
- Funding for hardware prototyping and solar integration.
- Collaboration opportunities with sustainability-focused institutions.

runway incubator
START YOUR START-UP JOURNEY

FUTURE FOUNDERS CHALLENGE 2025

UPES
UNIVERSITY OF TOMORROW

Thank you for your Time!