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PLUSS®
TECHNOLOGY FOR
A BETTER WORLD

WATT MATTERS 2025

WEEKLY MEMBER SPOTLIGHTS

PLUSS

HARYANA | EST. 1994 | PHASE CHANGE MATERIAL TECH

ABOUT

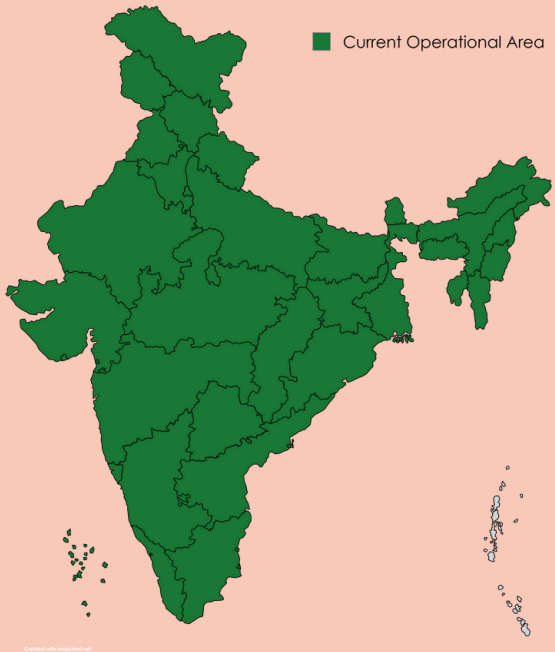
Founded in 1994 as a polymer company, PLUSS entered Phase Change Material (PCM) technology a decade later during India's telecom boom. In 2004, the team identified a critical challenge in the fast-growing telecom sector: sensitive tower electronics needed precise temperature control, but frequent power cuts and the 15–20-minute delay before diesel generators started posed serious risks.

PLUSS responded with HS29, India's first indigenously developed PCM, capable of maintaining a steady 29°C and "recharging" whenever the air conditioner was running. Until then, PCMs were largely imported—this innovation not only solved a pressing industry need but also positioned PLUSS as a homegrown PCM pioneer.

By 2013, backed by Tata Capital, PLUSS expanded its PCM portfolio, scaled up R&D, and diversified into new sectors. In 2014, it became the first Indian member of the RAL Quality Association PCM—the sole global standards body for phase-change materials—contributing to quality and testing guidelines (RAL-GZ 896) from the outset.

In 2016, PLUSS launched dedicated verticals for Agri Cold Chain and Healthcare, delivering advanced thermal solutions for farmers and medical services. Today, as a subsidiary of Carborundum Universal Limited (CUMI), part of the Murugappa Group, PLUSS has grown from ₹4 crores in 2013 to over ₹85 crores in revenue, cementing its status as a leader in PCM innovation.

Current Markets	Potential Markets
Pan India, Europe	United States, Southeast Asia



Map. Current and Potential Markets

TECHNOLOGY & SOLUTION

Phase Change Materials (PCMs)

PLUSS's core innovation lies in its proprietary range of Phase Change Materials. PCMs are substances capable of storing and releasing large amounts of thermal energy by undergoing a change in physical state, typically from solid to liquid and vice versa. This latent heat exchange allows them to maintain stable temperatures for extended periods, without requiring continuous external power sources.

Key attributes of PLUSS's PCM technology include:

- A wide operational temperature range (from -65°C to +150°C)
- Availability in organic, inorganic, form-stable, and macro-encapsulated compositions
- Long life spans with over 3,000 thermal cycles
- Customizable packaging for diverse applications
- Validation through rigorous testing protocols such as T-history, thermal stability, and aging assessments

These materials are integrated across sectors such as HVAC, pharmaceuticals, medical devices, solar energy, automotive components, building materials, and cold-chain logistics. PLUSS's technologies have contributed to measurable benefits across multiple industries:

1. Agri & Food Supply Chain Solutions

Reduced food loss and improved logistics efficiency for perishables, particularly in rural and semi-urban markets.

- **HimaCool:** Solar Cold Storage: A compact, 5MT off-grid cold room using solar power and PCM-based thermal batteries to maintain chilled or frozen temperatures 24/7—no grid or electrical batteries required.
- **Aagun:** The 24x7 Solar Dryer: A portable, battery-free solar dryer using PCM technology for uninterrupted, hygienic drying—day and night—boosting produce quality and farmer income at near-zero operational cost.
- **Last Mile Delivery:** PronGO®: An eco-friendly alternative to dry ice, PronGO® offers multi-temperature PCM-based shippers with varying capacities, supported by a recharge station network for safe, efficient deliveries.
- **Semi-Electric Reefer Trucks:** Thermal battery-powered refrigeration enables hybrid reefer trucks, reducing diesel use by 50%. PCM units charge while docked and maintain cooling on the move—efficient, clean, and scalable.

Milestone Timeline

2013
- Won Manufacturing Technology Award for innovation.

2014
- Won CII Innovation Award (SME category)
- Won Indo Global Healthcare Award for MiraCradle™ – Neonate Cooler.
- Developed MiraCradle™ with CMC Vellore.
- Inaugurated manufacturing unit at Bawal, Haryana.
- Joined the RAL Quality Association PCM

2015
- Won Kirloskar Technology Award
- Won Plasticon-2015 Award for MiraCradle™

2016
- Launched Celsure™ for temperature-controlled pharma/vaccine transport.
- MiraCradle™ received CE certification.

2017–18
- Received Technology Day Award from President Pranab Mukherjee for MiraCradle™
- Formed partnerships with Draegerwerk AG & Co.(Germany) and FIC S.P.A. (Italy).

2019
- Incorporated PLUSS BV for the European market.

2021
- Won MSME Award for Celsure™.
- Acquired by CUMI; opened new PCM factory in Bawal.
- Granted patent for space heating.

2022
- Granted patent for solar dryer (Aagun).

2023
- Launched CREST R&D facility.
- Began PCM manufacturing in Europe.

2024
- Granted patents for ultra-low temp PCM and therapeutic heating pad with PCM.

TECHNOLOGY & SOLUTION

2. Life Sciences & Healthcare Solutions

Enabled secure cold-chain transport for vaccines, insulin, and other temperature-sensitive products, reducing spoilage and improving access to essential medicines.

- **MiraCradle®:** Neonatal Cooling: PCM-based device for therapeutic hypothermia in newborns with birth asphyxia—safe, CE-certified, reusable, and 10x more affordable than conventional systems.
- **Celsure:** Vaccine & Pharma Packaging: Pre-validated PCM packaging ensures precise temperature control for over 120 hours, safeguarding vaccines, biologics, and critical pharmaceuticals—protecting more than 60 million doses from spoilage.

3. Climate Technology

Launched in 2022, Climate Technologies develops scalable solutions to decarbonize heating/cooling and enhance thermal management in batteries and electronics..

- **Built Environment:** Pluss's PCMs improve building energy efficiency by enabling passive and "free" cooling, reducing HVAC loads, managing peak demand, and maintaining indoor temperature during power outages—cutting energy use and infrastructure costs.
- **Thermal Management:** Pluss's liquid-form PCM technology regulates EV battery temperatures, extending battery life by 75%, increasing usable capacity, enabling faster charging, and reducing risks of thermal runaway and fire.

The 1,20,000 sq. ft. PLUSS facility includes a state-of-the-art production unit, advanced testing labs, and a dedicated R&D center.

MARKETS

Market Segments

- Business-to-Business (B2B): Supplies PCM solutions to pharmaceutical companies, cold-chain logistics providers and food supply chains.

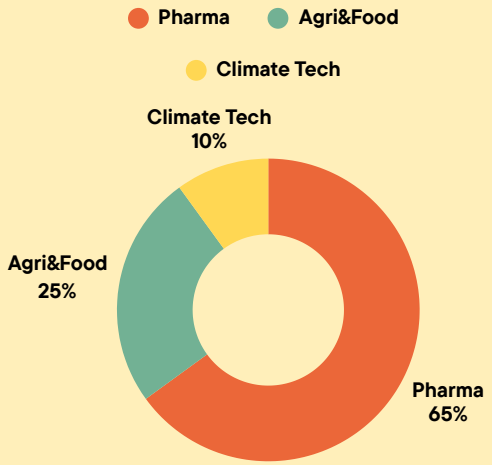


Chart. Sectoral share for PCM application

Business and Payment Models

PLUSS operates on a product- and innovation-centric business model with the following components:

- Customized Solutions: Works closely with clients to co-develop tailored PCM systems that enhance thermal management performance.
- Research and Development: Maintains a strong R&D focus to continually expand applications for PCMs and refine existing technologies.
- Strategic Partnerships: Collaborates with global and domestic partners for distribution and joint innovation.

IMPACT

- **Reduced food loss & boosted farmer incomes**
  - Solar-powered cold storage and dryers enhance produce quality and shelf life.
- **Protected 60+ million vaccines from spoilage**
  - Advanced PCM cold-chain packaging ensures reliable vaccine delivery.
- **Improved neonatal health**
  - Affordable, non-electric cooling devices support better care for newborns.
- **Cut diesel use by 50% in refrigerated transport**
  - Energy-efficient solutions lower fuel dependency and operating costs.
- **Reduced greenhouse gas emissions**
  - Thermal storage technologies minimize environmental impact.
- **Empowered rural communities**
  - Sustainable, low-cost temperature management tools improve livelihoods.

50%
diesel use cut in refrigerated transport

78,156 tonnes
Total Estimated CO_2 Reduction in 2025

60+ million
vaccines protected from spoilage

Way Forward

PLUSS Advanced Technologies has an established presence across India, Europe, the United States, UAE, Mexico, Australia, South Africa, Kenya, Netherlands, Thailand, Turkey, and Italy. Building on its expertise in thermal innovation, the company is actively pursuing opportunities to expand its reach in the U.S. market, focusing on healthcare, agriculture, and sustainable cold-chain solutions.

In terms of technology and R&D, PLUSS is advancing climate tech innovations in the built environment and thermal management, developing scalable solutions for a low-carbon future.

Allignment with SDG Goals

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