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Spl. Coverage IBET Expo 2026

India Expo Centre & Mart, Greater Noida, Uttar Pradesh
11–13 August 2026

INDIA BIOENERGY & TECH EXPO

Spl. Issue on GOBARdhan Scheme



Shri Narendra Modi
Hon'ble Prime Minister of India



Shri Hardeep Singh Puri
Hon'ble Union Minister of Petroleum & Natural Gas, Government of India

- ₹23,731 crore national outlay
- Assured CBG Offtake
- Stable Administered Pricing Framework
- Capital Assistance of up to ₹2 crore per TPD
- Pipeline Infrastructure Development
- Credit Guarantee Mechanism
- CBG Ecosystem Fund









Scaling LA-PLA Successfully: Integrating Market, Technology and Economics

Why application-led market development, end-to-end technology, and differentiated economics must advance together



Sunil Rohom
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The world produces about 431 million tonnes of plastics each year. Global biobased-plastics capacity stood at 2.31 million tonnes in 2025, with PLA representing roughly one quarter, about 0.6 million tones.[1] If PLA were to address only 2% of today's plastics market, the implied opportunity would be approximately 8.6 million tonnes annually, more than fourteen times current PLA capacity. This is not an argument for replacing every polymer. It shows the headroom available when PLA is directed to applications where renewable carbon, performance, safety and an appropriate end-of-life pathway create value. The commercialization question is not whether the opportunity is large, but where to enter first.

Market first: choose where PLA can win

Market analysis should begin at sector level. Food and food service, clothing and textiles, personal care, healthcare, agriculture, consumer goods, mobility and electronics have different performance expectations, qualification cycles, price benchmarks and sustainability drivers. The opportunity lies at the intersection of addressable volume, PLA's functionality, customer readiness and a credible end-of-life system.

Within this landscape, selected single-use plastic products offer a logical near-term focus. They combine high volumes and short life spans with regulatory and brand pressure for renewable alternatives. PLA can be particularly relevant where products are food-contaminated or difficult to recycle mechanically, and a defined recovery route exists. The target should be selective substitution: material, collection system, and local infrastructure must be designed together.

Build the market before the plant is ready

Market development cannot wait for commissioning. Before plant capacity is finalized, resin manufacturers should validate sector demand, functionalities, converter capability, certification, willingness to pay, end-of-life expectations, and anchor offtake. Customer trials should define qualification milestones, ramp-up volumes, and pricing logic. This turns market intelligence into an engineering input and reduces demand risk.

Once the priority applications and value pools are clear, the project can move backwards from market need to technology design.

Start with the application, then design the molecule

An application-led approach begins with the performance that the market will buy and works backwards through formulation and compounding, PLA resin, polymerization, lactide, lactic acid (LA), fermentation and feedstock. Technology translates market requirements into a repeatable material solution.

Key specifications should remain visible without allowing chemistry to overwhelm the business case. LA purity and optical composition influence lactide; lactide quality and yield affect polymerization; and PLA molecular weight, crystallinity and rheology shape processing.[2]

Strengthening the PLA Ecosystem to Accelerate Market Adoption

PLA ecosystem shapes globally in several layers: LA production, polymerization for PLA production, development of formulations, compounding, and form product manufacturing. Production ecosystems have developed across North America, Europe, and East and Southeast Asia through technology licensers, resin producers, and compounders.

India, however, does not need to begin from zero. It already has a well-developed plastics ecosystem comprising compounders, con-

1 European Bioplastics, "Bioplastics Market Development Update 2025," December 2025.

2 S. Inkinen et al., "From Lactic Acid to Poly (lactic acid) : Characterization and Analysis of PLA and Its Precursors," Biomacromolecules 12 (2011): 523-532.

verters, processors, machinery suppliers, and application manufacturers across food and food service, clothing and textiles, consumer goods, agriculture, healthcare, mobility and other sectors. Several Indian companies also compound and formulate bioplastics for different performance requirements. The missing link is upstream: commercial-scale domestic manufacturing of resin remains limited, leaving the market largely dependent on imports. This restricts supply-chain responsiveness, exposes users to logistics and currency risks, and makes it harder to develop application-specific grades collaboratively.

This gap creates a significant strategic opportunity. With India's growing plastics demand and the considerable headroom for selective PLA substitution, an Indian technology player capable of connecting domestic feedstocks with lactic acid, lactide and PLA production could materially strengthen the ecosystem. The objective should extend beyond establishing resin capacity. By working closely with compounders, converters and end users, such a player can accelerate grade development, customer trials, certification and application qualification. This would create a continuous feedback loop between market requirements and technology development, helping India meet emerging demand while building a more resilient and competitive domestic PLA value chain.

Technology Integration: From Demonstration to Commercial Scale

Praj is addressing this missing link through an indigenously developed, molecule-to-market PLA ecosystem spanning lactic acid production using various feedstocks, lactide production, an integrated demonstration facility, partnership-enabled PLA polymerization, and application development with ICT Mumbai and various other partners. Together, these capabilities connect Indian biotechnology with commercial polymer engineering and market validation.

Praj: One stop solution for LA-PLA

Praj also offers a single-window solution for LA-PLA projects, bringing technology licensing, engineering services, and plant construction under one roof. This integrated delivery model provides single-point accountability, reduces customers' interface and execution risks, and improves cost, schedule and performance certainty from concept to commercial operation.

Competing on Full-Cycle Economics

Bioplastics will inevitably compete with fossil-based plastics. Fossil-based plastics are often cheaper at the factory gate because they benefit from mature, large-scale, and highly optimized supply chains. However, their apparent price advantage rarely reflects the full cost of careless disposal-including pollution management, ecosystem damage, potential health impacts, and the long-term burden placed on communities. Viewed across the complete lifecycle, bioplastics can therefore be considerably less costly to society and the environment. Where these benefits are measurable and credible, the market may also accept a reasonable green premium.

Technology will be critical to narrowing the initial resin-price gap. Higher feedstock conversion, High process efficiencies, optimised chemical and utility consumption, and integrated plant design can lower production costs across the value chain. Application-led compounding- including blending PLA with compatible, cost-effective bioplastics or fillers where performance permits, can further improve affordability without compromising functionality or end-of-life objectives.

Even then, there is no single economic model for every PLA application. Food-related applications may derive value from food-contact assurance, hygiene, product protection, and responsible management of contaminated waste, making a modest premium more acceptable. Clothing and textiles are more likely to be driven by renewable carbon, traceability, brand commitments, and fibre performance and sustainability targets. The relevant benchmark is, therefore, not simply the cost of neat PLA resin, but the cost of a qualified application solution, covering feedstock, production, compounding, conversion, certification, logistics, and end-of-life. Commercial success will come from optimizing this entire cost curve for each priority market.

The leadership takeaway is positive and practical. The 1-2% substitution scenario shows that PLA does not need to replace the entire plastics market to become a significantly larger industrial platform. The winners will be those who identify the right markets, assemble the complete technology chain, and align economics to each application. When these decisions advance together, PLA scale-up becomes not only technically possible, but commercially lucrative. ■