Touch base with novel R&I projects bioplastics

europeanbioplastics

First-hand insights into novel R&I approaches in the bioplastics sector

Explore opportunities for collaboration

Meet potential partners for your own R&I projects

Once a month, online, 45 minutes

Disclaimer

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Calendar

https://www.european-bioplastics.org/research-and-innovation-projects-events/touch-base-with-ri-projects/

29 September 2026

REPURPOSE

1 September 2026 Touch base with REPurpose: Recyclable Elastomeric Plastics safely and sUstainably designed and produced via enzymatic Recycling of Post-cOnsumer waSte strEams

Touchbase with R&I projects
Presented by europeanbioplastics

REPURPOSE

REPurpose project: Recyclable Elastomeric Plastics safely and sUstainably designed and produced via enzymatic Recycling of Post-cOnsumer waSte strEams

Speakers
Luciano Monsegue, Stefaan De Wildeman B4Plastics and Hanaa Dahy Frank Cheng-Huang Ling Aalborg University

This project has received funding from the European Union's Horizon Europe Programme under Grant Agreement number: 101057971.

Funded by the European Union

6 October 2026

LIVINGSOILL

6 October 2026 Touch base with LivingSoiLL: Healthy Soil to Permanent Crops Living Labs

Join us for a touch base with this project **from 12:00 to 12:45 pm CEST**.

LivingSoiLL project: Healthy Soil to Permanent Crops Living Labs

Eriselda Canaj
AREFLH - Assembly of European Horticultural Regions

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Some housekeeping for today

Recording will be made available

Presentation will be made available

Microphones are muted, camera if off per default

Q&A: Either use the chat or raise your hand

Follow up of the event on this page and with mails from Eventbrite:

https://www.european-bioplastics.org/research-and-innovation-projects-events/touch-base-with-ri-projects/

EBC26

European Bioplastics **Conference**

REGISTER NOW!

1 – 2 DEC 2026

Titanic Hotel Berlin and online:
www.ebc.european-bioplastics.org

Packaging experts wanted!

Online event

30 minutes

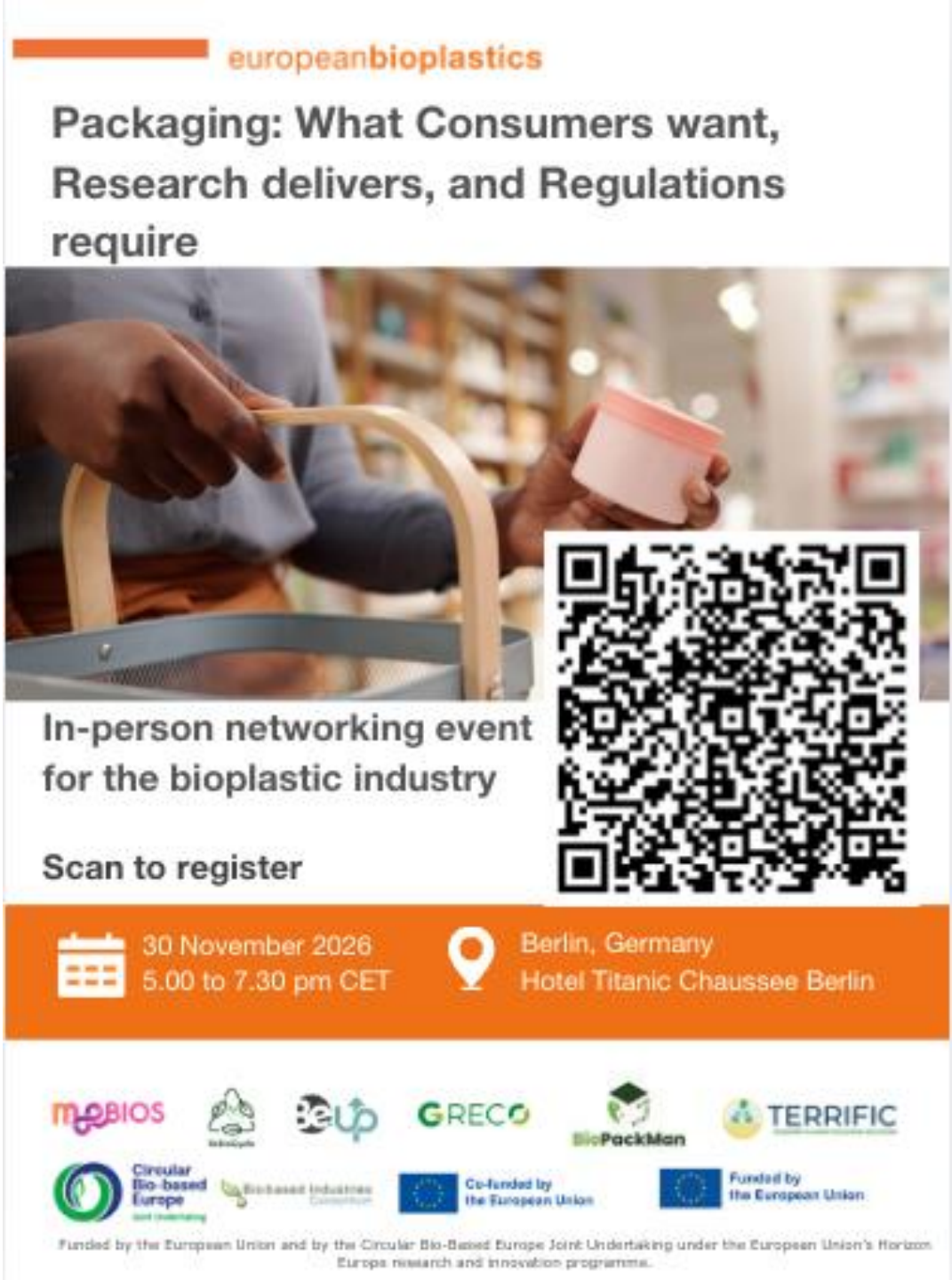
Have your say!

Workshop and match making event

In-person, Berlin

30 November 2026

Before the EBC 26



REPURPOSE

Rubbery plastics designed for recycling

Novel R&D in Bioplastics: Prototype Results & Scale-Up Pathways

September 29th 2026

Funded by the European Union

Funded by the European Union. Grant Agreement No 101057971

About the Speaker

Luciano Monsegue

R&D Scientist | B4Plastics

B4PLASTICS

Background

- Over 7 years of R&D experience in sustainable polymers and green chemistry
- Technical Project Lead in multi-stakeholder R&D initiatives
- Executes upscaling of bio-based formulations toward industrial pilot scale

Education

- M.Sc. Biobased Materials, Maastricht University
- B.Sc. Maastricht Science Programme, Maastricht University

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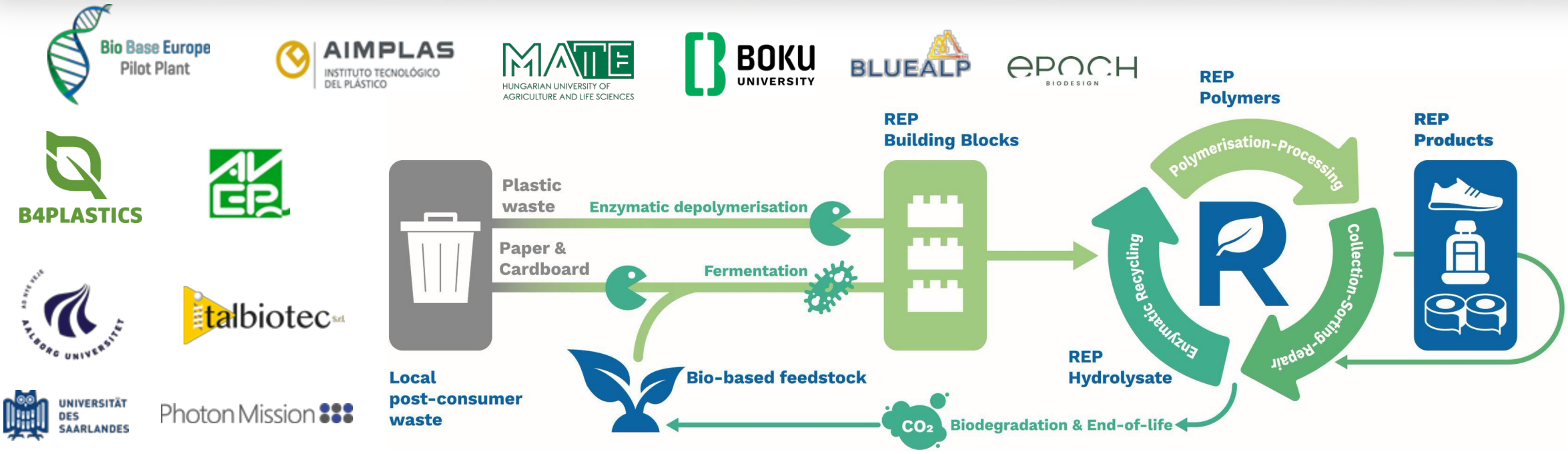
REPurpose: Scaling Circular Biopolymers from R&D to Industrial Reality

From Safe-and-Sustainable-by-Design Synthesis to Pilot Line Validation and Cross-Sector Prototypes (TRL 3 → 5)

Market Gap: Fossil-based polymers face increasing regulatory scrutiny and lack viable circular end-of-life pathways

REPurpose Mission: A Horizon Europe project established to upcycle post-consumer plastic waste and bridge the critical gap between laboratory-scale biobased chemistry and industrial application

Today's Scope: Presenting empirical pilot line conversion data, functional prototypes, and our industrial commercialization pipeline



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Value Chain and Scale-Up Focus

REP Polymers

- ✓ Upcycled waste streams

Synthesizing functional building blocks from post-consumer waste streams.

- ✓ SSbD polymers

Safe-and-Sustainable-by-Design materials formulated without hazardous additives.

- ✓ Configurable properties

Tunable formulations spanning flexible to rigid structural matrices.

- ✓ Bio-reinforcement

Enhanced with natural fibers and consolidated via Tailored Fiber Placement (TFP).

- ✓ Drop-in processing compatibility

Compatible with standard industrial equipment.

- ✓ Closed-loop circularity

Engineered for disassembly, recycling, and direct reuse.

Semi-Finished Products

Sectors

TRL 3-4 → **TRL 4** → **TRL 4-5**

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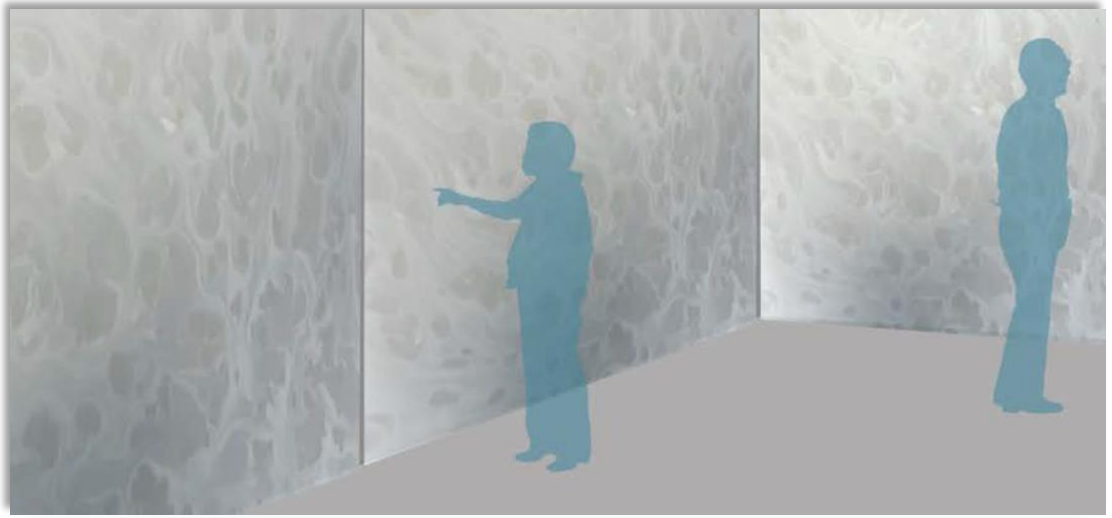
Building & Construction



Flat interior-wall panels with different surface appearances

- Thermo-consolidated polymer sheets
- Decorative interior cladding demonstrators

HEAT-PRESSED INTERIOR WALL PANELS

1. Material & Surface Performance

- **Aesthetic Versatility:** Compounded with natural fillers and pigments to achieve diverse marble, terrazzo, and mineral surface appearances without secondary coating
- **High Flexural Rigidity:** Flat heat-pressed sheet consolidation targeting stiffness and surface impact resistance needed for interior wall applications.

2. Manufacturing & Installation Advantages

- **Scalable Processing Route:** Thermal consolidation demonstrates a viable pathway to convert extruded polymer sheets into large-format interior panels.
- **Circular Cladding Alternative:** Evaluates thin, composite sheet formats as sustainable, non-structural alternatives to conventional interior wall finishes.

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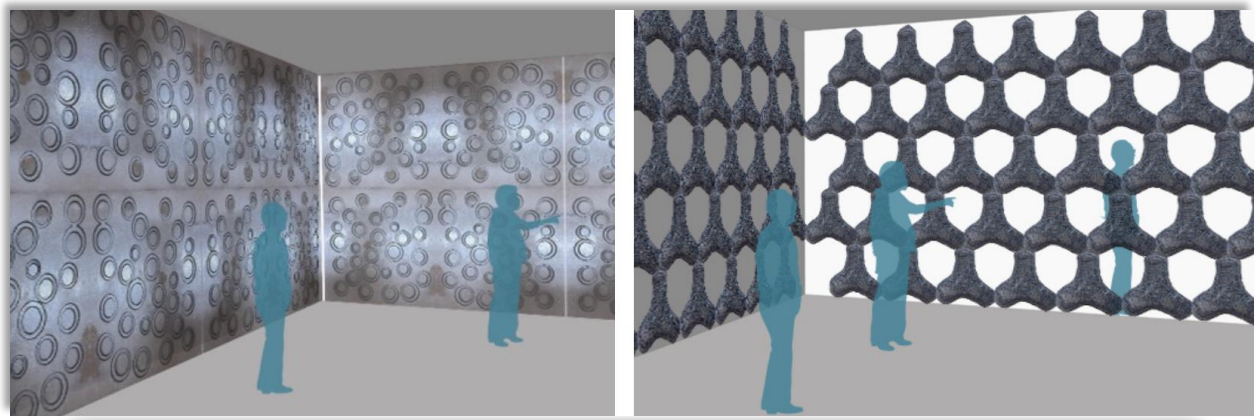
Building & Construction



Interior wall panel with repeated circular pattern

TFP interior partition with a geometric lattice structure

- Tailored Fiber Placement (TFP) preforms with biobased matrix
- Modular open-cell & relief partition demonstrators

TFP-REINFORCED COMPOSITE & DECORATIVE PARTITION SYSTEMS

1. **Structural Optimization & Surface Design**

- **Targeted Fiber Placement:** Continuous reinforcement fibers are along primary stress trajectories to enhance component rigidity while minimizing material consumption.
- **Acoustic Exploration:** The geometric lattice voids and surface reliefs are shaped to explore sound diffusion concepts and visual depths in open interiors.

2. **Circular Design & Spatial Zoning**

- **Mass-Efficient Demarcation:** Open-lattice nodes create lightweight, non-load-bearing room dividers that delineate spatial zones with minimal polymer volume.
- **Manufacturing Offcut Upcycling:** Preform fabrication directly integrates sheet offcuts and production cut-offs back into the composite matrix, minimizing processing waste.

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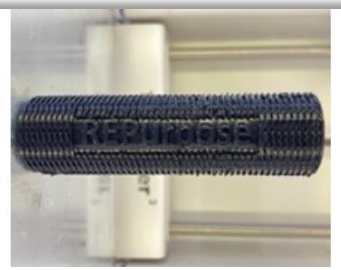
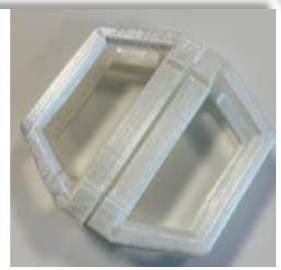
Consumer Goods

End cap



Handlebar grip

Wheel stands



Pedal

- High-durability elastomeric grips & frame accents
- Prototyped via 3DP; scalable via injection moulding

OUTDOOR RECREATION: CYCLING COMPONENTS

1. Environmental & Contact Durability

- **UV & Weathering Targets:** Formulations target outdoor solar stability, minimal moisture uptake, and resistance to surface embrittlement under environmental exposure.
- **Skin Contact Resistance:** Targets surface friction and elasticity against sweat and skin oils to prevent tackiness during extended contact.

2. Tactile Ergonomics & Modularity

- **Ergonomic Flexibility:** Prototyping flexible REP formulations evaluates compliance, tactile feel and rider comfort at key contact points.
- **Tactile Surface Detailing:** Integrated ribbed surface textures explore non-slip mechanical grip and wear aesthetics without secondary coating steps.

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Consumer Goods

Footwear (flat)

Footwear (flexed)

- 3D-printed flexible shoe upper demonstrators
- Modular ergonomic tool handles with detachable grips

Screwdriver with detachable flexible handgrip

ERGONOMIC FOOTWEAR & TOOL SYSTEMS

1. Flexibility & Deformation Prototyping (Footwear)

- **Manual Flexion & Geometry:** 3D-printed shoe upper prototypes evaluate flexible REP formulations under repeated manual bending and deformation without material cracking.
- **Differentiated Flexibility:** Additive manufacturing enables localized variations in pattern geometry and wall thickness from a single material formulation.

2. Modular Ergonomics & Circularity (Screwdriver)

- **Detachable Grip Shell:** Combines a rigid core with a mechanically detachable flexible shell, eliminating permanent overmoulding to enable independent recycling.
- **Modular Repairability:** Allows worn or damaged ergonomic contact surfaces to be swapped out without discarding the structural tool core.

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Automotive

Airbag cover

Interior door handles

Driver footrest

- Multi-process validation: thermoforming, injection moulding and 3DP
- Targeting cabin touchpoints across aesthetic, ergonomic and trim roles

AUTOMOTIVE INTERIOR & SAFETY DEMONSTRATORS

1. Process Feasibility & Geometry (Airbag & Handle)

- **Thermoforming Feasibility:** Sheet thermoforming evaluates deep-draw material flow, thickness uniformity, and geometric replication of complex interior cabin trim.
- **Moulding Optimization:** Validated injection parameters on vehicle door handles. Lower mould temperatures successfully prevented sink marks and part distortion.

2. Prototyping & Surface Integration (Footrest)

- **Tool-Free Additive Detailing:** Direct 3D printing of footrest validates integrated anti-slip surface treads and ribbing without requiring dedicated tooling.
- **Interior Material Targets:** Aligns biobased polymer development with automotive trim expectations, targeting dimensional stability and cabin aesthetic fit.

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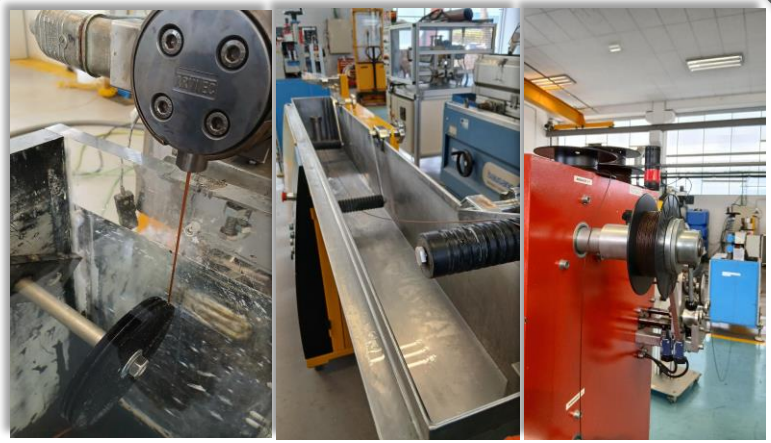
Pilot Line Integration

Twin-screw compounding & pelletizing



Single-screw filament extrusion (1.75 mm feed for 3DP)

ARBURG 420C cell & automotive door handle tooling

INDUSTRIAL CONVERSION FEASIBILITY

1. Drop-In Industrial Compatibility (TRL 4 → 5)

- **Standard Asset Validation (TRL 5):** Proved direct compatibility with legacy commercial hardware, including industrial ARBURG injection molders, twin-screw compounding lines, and sheet presses, eliminating the need for custom equipment retrofits.
- **Bio-Composite Compounding (TRL 4):** Successfully compounded matrices with natural fiber loadings on continuous twin-screw lines, stabilizing semicrystalline morphology via controlled post-crystallization thermal conditioning (130°C).

2. Process Parameters & Operational Learnings

- **Mandatory Moisture Management:** Established strict pre-drying protocols (12h at 50-70°C) as an essential quality control gate to prevent melt degradation and stabilize viscosity across filament extrusion and moulding lines.
- **Narrow Melt Window Control:** Managed narrow thermal boundaries through mould temperature optimization, preventing sink marks and demoulding distortion on complex automotive door handles.

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Industrial Outreach and End-User Pipeline

8 Executed NDAs

Active bilateral engagement across Automotive, Consumer Goods, and Building & Construction.

Construction
Architectural panel integration

Consumer Goods
Brand owner sampling & haptic validation

Automotive
OEM specification alignment

1 Bilateral Value-Chain Engagement

Strategic Non-Disclosure Agreements
Advanced from exploratory networking to 8 fully executed NDAs with major Tier-1 suppliers and brand owners across target sectors.

Market Pull Across Key Verticals
Progressing pending agreements to benchmark REPurpose formulations directly against established fossil-based benchmarks.

2 De-Risking Commercial Market Adoption

Targeted Material Sampling
Delivering scaled pilot compounding batches to commercial partners for independent tool and line trials.

Technical Specification Benchmarking
Correlating real-world mechanical, thermal, and regulatory data directly with commercial end-user component requirements to accelerate market adoption.

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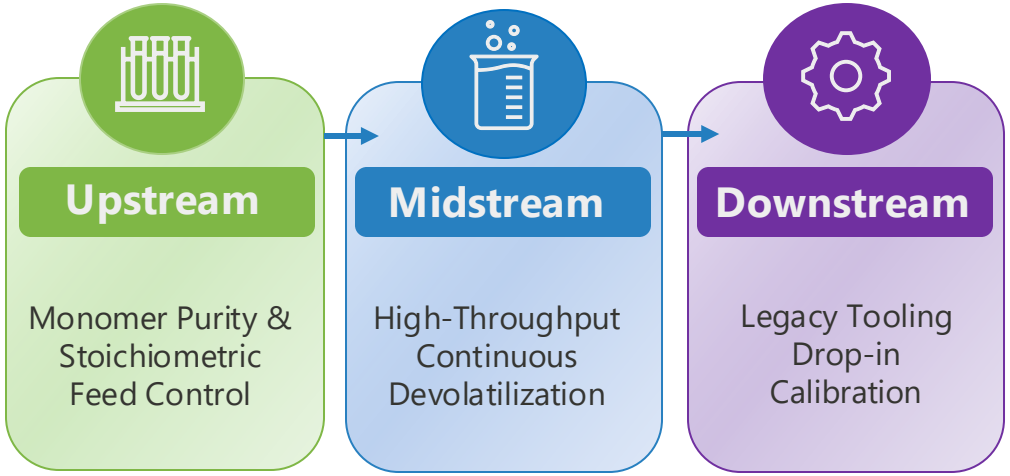
Industrial Scalability and Industry Needs

Toll Compounding Scaling
Metric-Ton

Contracting large-scale toll compounders and established feedstock partners to eliminate pilot-scale batch constraints.



1 Upstream Polymerization & Compounding Bottlenecks

Mitigating Batch-to-Batch Variability
Transitioning from batch synthesis to continuous reactor configurations with automated stoichiometric feeds to lock target Mw, PDI and Melt Flow Index (MFI).

Thermal Stability & Melt Integrity
Implementing optimized vacuum devolatilization, minimized reactor headspace, and tailored antioxidant packages to suppress oxidation, discoloration, and chain scission.

2 Downstream Qualification & Factory Drop-In Needs

Full Regulatory Certification
Navigating rigorous sector testing, including automotive VOC/fogging limits, fire/smoke ratings for construction, and extended UV weathering against fossil incumbents.

Tooling & Parameter Calibration
Fine-tuning standard injection moulding and extrusion windows (barrel temperatures, cooling cycles, packing pressures) to guarantee drop-in conversion or legacy tooling.

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Commercialization & Technology Transfer

Low-CapEx Model

Existing Asset Conversion

Capital-light commercialization utilizing proven operational production lines across B4P facilities and partner industrial plants with capacity reserve.

Internal Exploitation

Direct conversion on internal compounding & moulding lines

Third-Party Scale-Up

Upscaling and technology deployment for wider market variants

1 Internal Consortium Exploitation (B4P)

Direct Market Exploitation
Consortium partner B4P will drive the commercialization of selected REPurpose formulations on existing operational processing infrastructure.

High-Value Flexible Applications
Targeted deployment into market-ready flexible goods, particularly injection-moulded specialty products and heavy-duty industrial components.

2 Third-Party Industrial Scale-Up (Engineering Partners)

Strategic Scale-Up Alliance
Engaging established polymer engineering companies to upscale REPurpose variants beyond the consortium's immediate manufacturing lines.

Low-CapEx Metric-Ton Deployment
Utilizing and refurbishing existing production assets with idle capacity in Europe, to deliver industrial kilo-ton quantities without major new investments: "CapEx light".

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REPURPOSE

Rubbery plastics designed for recycling

Many thanks for your attention

B4Plastics

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