

SYSCHEMIQ PROJECT DISCUSSION

Circular Transition of the Plastics System

The Regional Policy Perspective

Intervention on behalf of the Regione Emilia-Romagna

Agenda

Navigating the circular plastics transition

01

Why Plastics Matter

Emilia-Romagna's strategic manufacturing ecosystem

02

Circular Economy Calls

2024-2025 funding initiatives and flagship projects

03

STEP Call

Strategic Technologies for Europe

04

Policy Architecture

Multi-level strategic framework

05

Lessons & Challenges

European context and policy insights

06

Concluding Message

The path forward for regional leadership

01

Why Plastics Matter in Emilia-Romagna

One of Europe's most advanced manufacturing ecosystems



Strategically Central Sector

Plastics are deeply embedded across multiple sectors in Emilia-Romagna, making it **not just a minor industrial segment** but a **core component** of the regional economy.



Food packaging



Automotive



Biomedical



Construction



Mechanical



Consumer goods



The Systemic Challenge



Reduce fossil dependency



Prevent waste



Increase circularity



Maintain competitiveness



Policy Response Framework

1

Immediate Industrial Circularity

Process and product level interventions

2

Value Chain Integration

Collaborative innovation ecosystems

3

Strategic Transformation

Advanced technologies and scale-up

02 The 2024-2025 Circular Economy Calls

Supporting industrial prevention under Regional ERDF Programme 2021-2027

€ Programme Framework
Regional ERDF 2021-2027 Focus
Circular Economy

Major Funding Calls

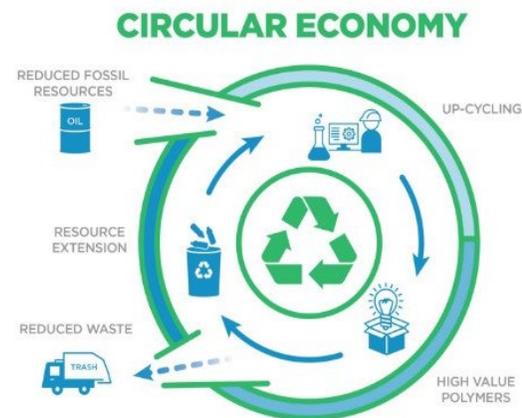
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Launched in 2024 & 2025

Plastics-Related Projects

~33%

Of funded initiatives



🎯 Objectives



Promote Circular Economy

Transform linear production models



Waste Reduction

Minimize waste in productive systems



Industrial Competitiveness

Maintain regional manufacturing leadership

Three Flagship Projects

1

**Closed-Loop Process
Optimisation**

2

**Eco-Design of Durable
Components**

3

**Circular Packaging
Systems**

02-A Flagship Project 1: Closed-Loop Process Optimisation

Reducing scrap in extrusion and injection moulding

Key Technologies Implemented

 **Real-Time Digital Monitoring**
Process parameter tracking

 **Temperature & Pressure**
Optimization during moulding

 **Advanced Tooling**
Precision calibration systems

 **Internal Regranulation**
Grinding & reprocessing

Impact & Results

In-House Reprocessing

Plastic scraps reprocessed internally without quality loss, re-entering production seamlessly

Reduced Virgin Polymer

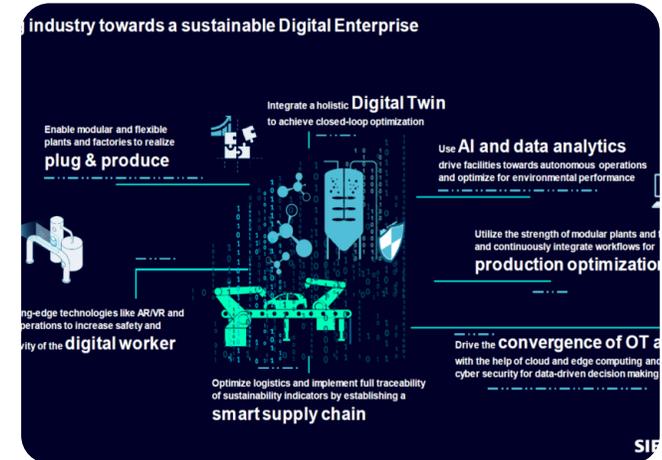
Significant reduction in virgin polymer consumption through closed-loop material flow

Waste Per Unit ↓

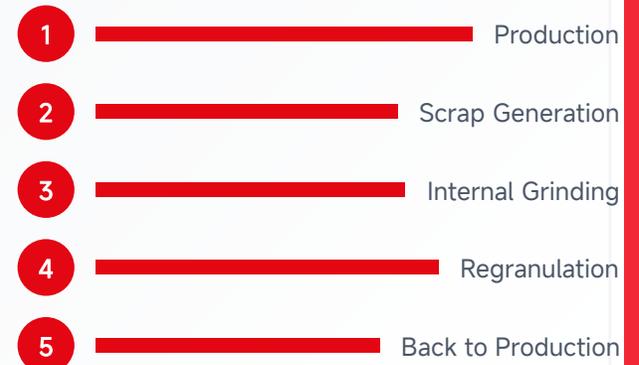
Dramatic decrease in waste generation per unit produced

Dual Benefits

Improved competitiveness AND enhanced sustainability simultaneously



Process Flow



∞ True Circular Loop

Flagship Project 2: Eco-Design of Durable Components

Upstream interventions for systemic impact

Eco-Design Strategies

-  **Multi- to Mono-Material**
Transition from complex multi-material to simpler mono-material components for easier recycling
-  **Material Weight Reduction**
Optimize designs to use less material without compromising functionality
-  **Additive Elimination**
Remove recycling-hindering additives and problematic substances
-  **Recycled Polymer Integration**
Incorporate recycled content into new product designs
-  **Improved Disassembly**
Design for easy disassembly and reparability at end-of-life



Strategic Insight

70–80%

of a product's future environmental impact is determined at the design stage

This demonstrates that **eco-design is not just a technical exercise**—it is a **strategic industrial tool** with profound long-term implications for sustainability and competitiveness.

02-C Flagship Project 3: Circular Packaging Systems

Anticipating European packaging regulations while creating competitive advantage

📦 Packaging Redesign Elements

✂️ **Reduced Thickness**
Material optimization

📦 **Mono-Material**
Enhanced recyclability

♻️ **Recycled Content ↑**
Circular material use

🚚 **Transport Formats**
Logistics optimization

🔄 **Refillable/Reusable Models**
Exploration of innovative business models beyond single-use



🏆 Dual Advantage Strategy

🔨 Regulatory Anticipation

Proactively addresses upcoming European packaging regulations before they become mandatory, ensuring compliance readiness

🏆 Competitive Edge

Creates market differentiation through sustainable packaging solutions that meet evolving consumer and business expectations

European Context

🚩 PPWR Directive

Packaging and Packaging Waste Regulation driving transformation

🌿 Sustainability Targets

Mandatory recycled content requirements approaching

→ **Early movers gain advantage**

03 The STEP Call: Strategic Technologies for Europe

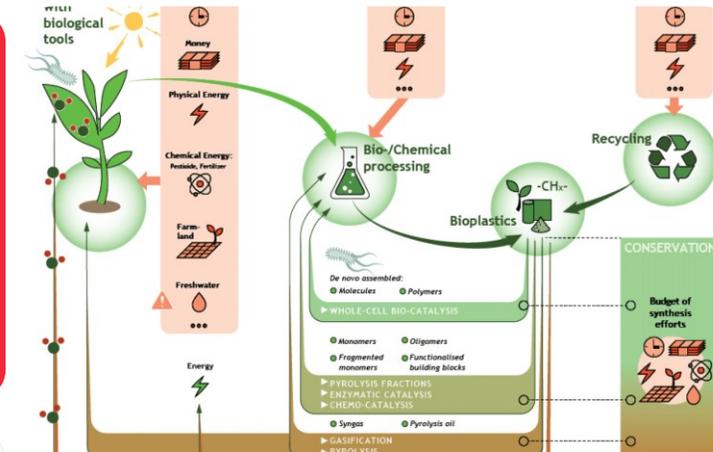
From incremental efficiency to systemic innovation

Launch Year
2025

Number of Calls
2

Total Budget
~45M €

Target
SMEs & Large Companies



🎯 Technology Focus Areas

🔧 **Advanced Digital & Clean Technologies**
Industry 4.0 solutions and green tech

🧬 **Biotechnology & Bio-Based Polymers**
Alternative feedstocks and bioplastics

🧪 **High-TRL Research & Scale-Up**
From lab to industrial deployment

⚙️ **Chemical Recycling & Regeneration**
Advanced material recovery

TRL Requirement

Technology Readiness Level

≥ 6

Close to industrial deployment

- ✓ Demonstrated in relevant environment
- ✓ Ready for pilot or demonstration
- ✓ De-risked for industrial adoption

04 Why STEP Is Crucial for the Plastics Transition

Addressing plastics streams that cannot be mechanically recycled efficiently

⚠ The Challenge: Non-Recyclable Streams



Contaminated
Plastics

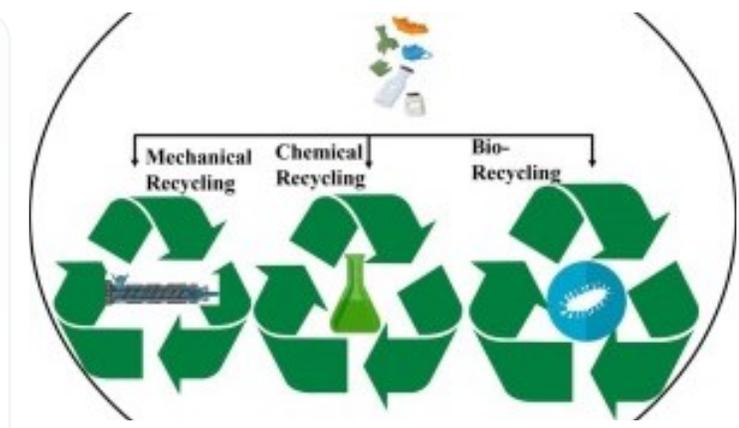


Multi-Layer
Materials



Technical
Polymers

These complex waste streams represent a **significant portion** of plastic waste that traditional mechanical recycling cannot process efficiently, creating a critical gap in the circular economy.



🧪 Chemical Recycling Technologies



Depolymerisation

Breaking polymers into monomers for repolymerization



Pyrolysis

Thermal decomposition to recover valuable feedstocks



Solvent Purification

Dissolving and purifying polymers for reuse



Monomer Recovery

Extracting pure monomers for new polymer production

Bio-Based Pathway



Biopolymers

Polymers derived from renewable biological sources



Alternative Feedstocks

Moving beyond fossil-based raw materials

↓ **Reduced Fossil Dependency**

05 A Multi-Level Policy Architecture

Ensuring coherence between short-term action and long-term structural transformation

1 Immediate Circularity

Process & Product Level

 Waste Prevention

 Eco-Design

 Process Optimisation

 Packaging Redesign

2 Value Chain Integration

Collaborative Ecosystems

 Industrial Symbiosis

 Collaborative R&D

 Digital Traceability

 Supply Chain Coordination

3 Strategic Technologies (STEP)

Long-Term Transformation

 **Chemical Recycling**
Advanced material recovery for complex streams

 **Biopolymers**
Bio-based alternatives to fossil-derived plastics

 **Advanced Materials**
Next-generation sustainable materials

 **High-TRL Scale-Up**
From research to industrial deployment

Coherence Strategy

STEP complements the 2024-2025 circular calls by **bridging immediate efficiency and long-term industrial transformation**, creating a seamless policy continuum.

06 Lessons Learned & European Challenges

Policy insights and the broader European context

Three Key Lessons

- 1 Policy Reduces Uncertainty**
Public funding accelerates industrial adoption by de-risking investments in circular technologies
- 2 Eco-Design Is Leverage**
Upstream interventions drive systemic impact—design decisions determine 70–80% of environmental outcomes
- 3 Technology Is Strategic**
Chemical recycling and biopolymers are essential for European industrial autonomy and competitiveness

European Challenges

-  **Circular Economy at Scale**
Many sectors still operate in linear models; systemic integration necessary
-  **Trade Policies**
Protecting European industry from unfair imports to safeguard circular investments
-  **Eco-Modulation**
PROs apply fee differentiation to incentivize recyclable/eco-designed plastics
-  **Country Differences**
Diverse approaches across EU—from ambitious North to fragmented South
-  **Market Impacts**
EU policies and global dynamics affect secondary plastics availability and prices
-  **Value Chain Innovation**
Success stories show industrial innovation is possible with coherent policy