

enzycle

New recycling approaches for non-recycled plastic fractions PET, PE, PP

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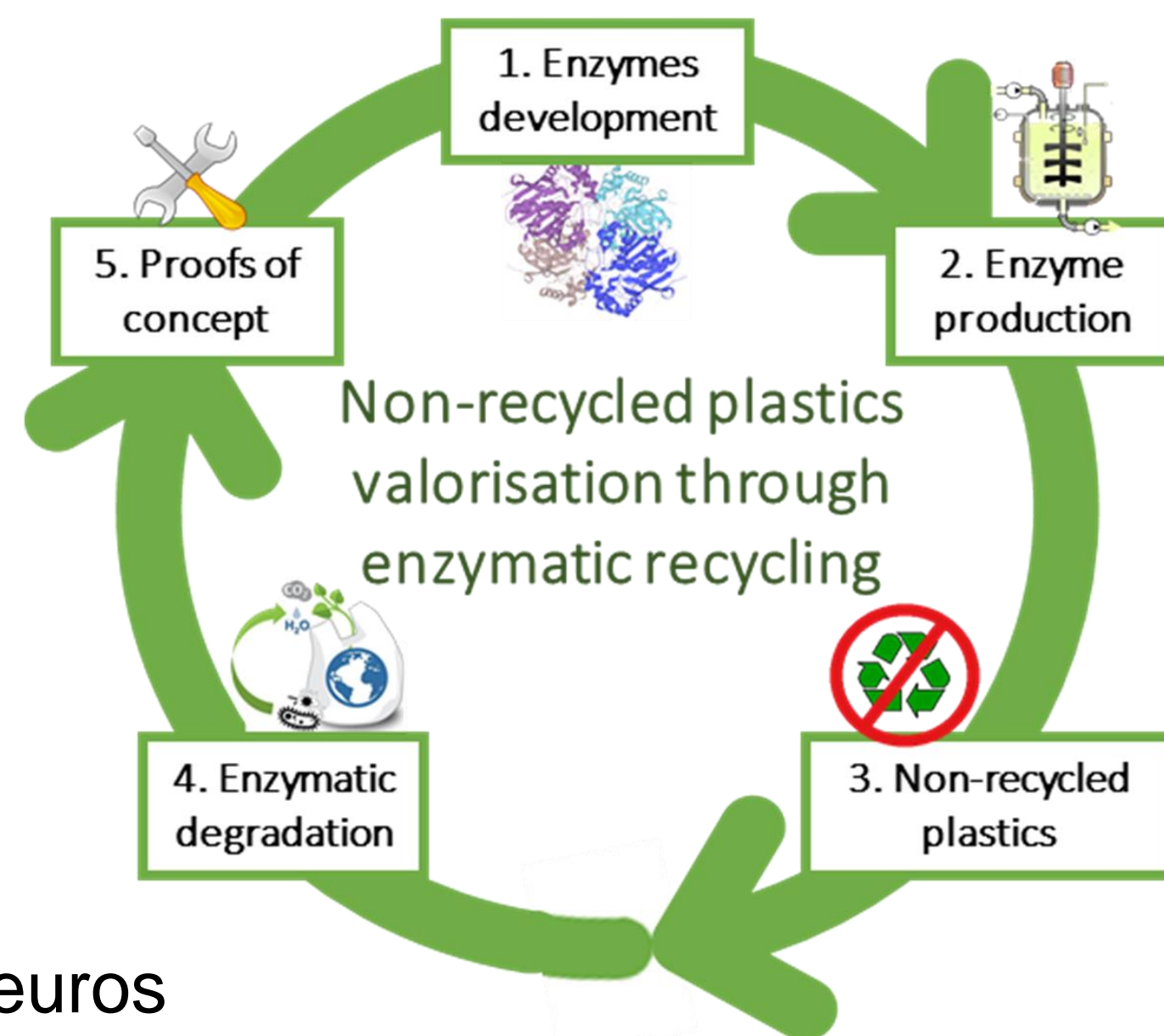
Introduction

Problem

- Plastic waste causes a massive burden for our planet.
- 27.1 M tonnes/year of plastic waste (only 31,1 % can be recycled, > 65 % is landfilled or incinerated).
- Packaging is the main plastic waste fraction (represents 63 % of total plastic waste generated in Europe).

ECONOMIC IMPACT: cost management > 19.3 billion euros

ENVIRONMENTAL IMPACT: 6.7 M tonnes/ year of CO₂ emissions



ENZYCLE Solution

Developing new enzymes and advanced processes for the enzymatic treatment of non-recycled plastic fractions in order to produce upgraded new materials, such as virgin PET, polyurethane foam and polyols and reduce the environmental impact generated by microplastics.

Duration: 1 June 2020 → 31 May 2024

TRL evolution: TRL 3 → TRL 6

Methodology

Innovations:

- New enzymes identification and selection
- Continuous enzyme production process
- Post-consumer PET
- Multilayer recycling process
- Degradation of microplastics:

New materials developed:

- Polyols from PET depolymerization products PU & PU foam for thermal insulation formulations
- New repolymerized PET
- New polyols from PE and PP

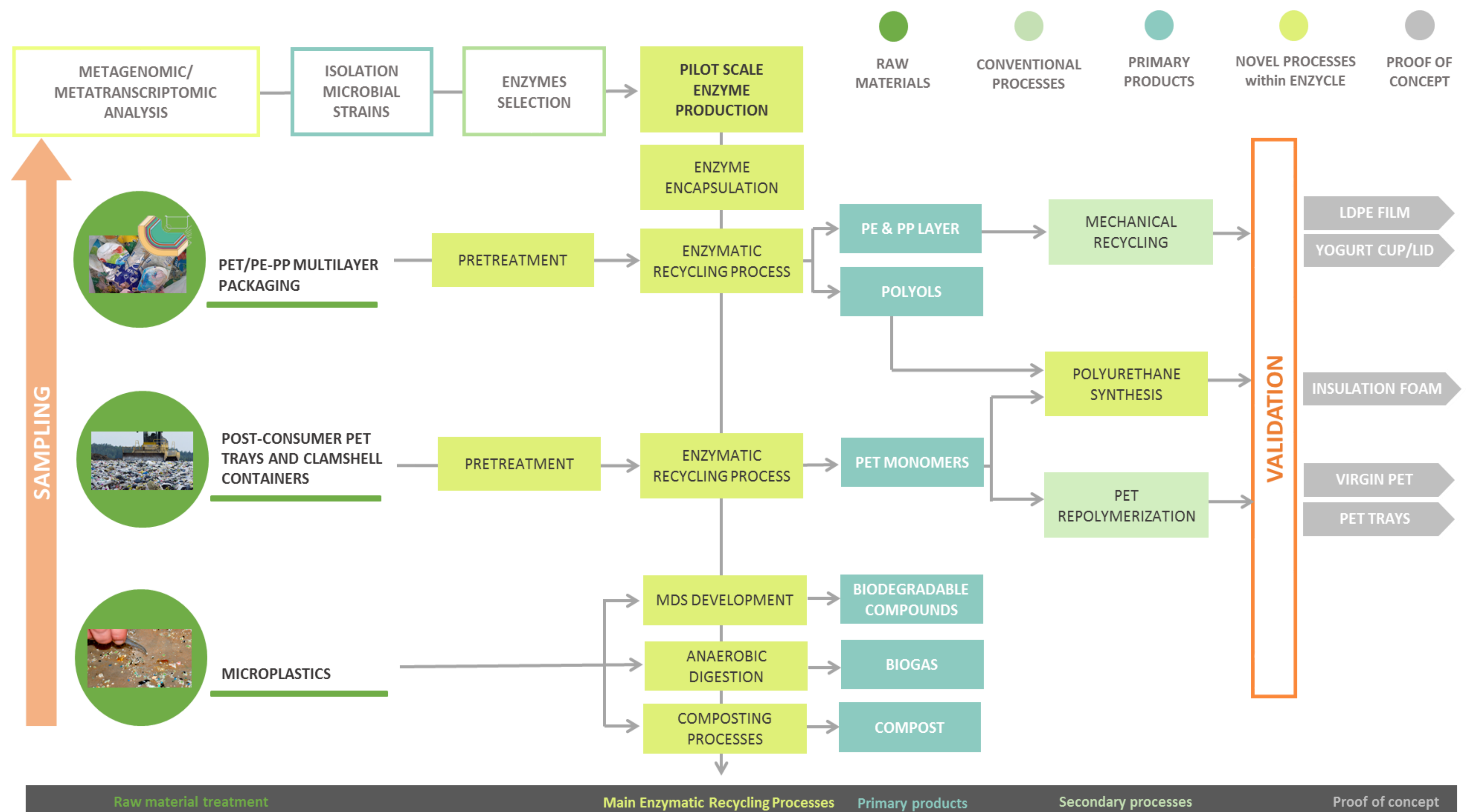


Figure 1. Overview of ENZYCLE in terms of processes and targeted markets.

Impacts & Results

- ✓ **Decrease the amount of non-biodegradable polymers** sent to disposal or even discharged to the environment. Reducing cost of recycling plastic fractions.
- ✓ Reduction of environmental impact in (i) Atmosphere & Global warming; (ii) Soil; (iii) Water and (iv) Flora, Fauna and Human Health.
- ✓ **Creation of new markets** from the new materials and processes developed within ENZYCLE.
- ✓ **Enlarge the range of feedstock** able to be **effectively and sustainably processed** through biocatalytic systems.
- ✓ Lay the basis to the **further exploitation at higher scales of microorganisms and/or enzymes** to convert currently challenging streams.
- ✓ **Increase income and business opportunities** for stakeholders and actors (including primary producers) in the biobased sectors, in particular in the waste management sector

Consortium

Coordinator



Financial conditions

Grant agreement ID: 887913

