



EXPECTED IMPACT

The sheer and direct numbers of the preliminary **LCA study** do not convey fully the real opportunity posed by DEMETO.

In 2015 an estimated 32% of plastics escaped the collection system globally. This means that today, at least **8 million tonnes of plastics leak into the ocean every year**. While the total economic impact is still unclear, initial studies suggest that it is at least in the billions of euros. Just in Europe, where leakage is relatively limited, potential costs for coastal and beach cleaning alone could reach €630M per year.

In addition to them, there are potential adverse impacts on human livelihoods and health, food chains, with **more than 260 species already known to be affected by plastic debris** through entanglement or ingestion.

DEMETO's technology is the first one that would allow to finally close the recycling loop for PET, with a potential impact on environment and society at large that would be enormous, introducing the concept of full circular economy in the plastic domain.

| | DE-POLYMERIZATION | | |
|--|---|---|-------------|
| |  |  | |
| GWP [kg CO ₂ /kg PET] | 1.28 | 2.08 | -38% |
| Energy content [MJ/kg PET] | 21.6 | 66.3 | -67% |

CONSORTIUM



Modular, scalable and high-performance de-polymerization by Microwaves



Offering to plastic producers and to waste recyclers a profitable way to treat plastic waste, enabling its chemical recycling and closing its life cycle.

CONTACT US

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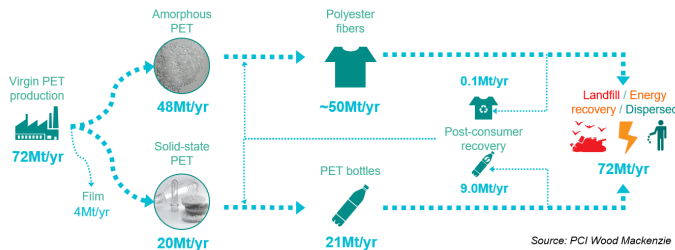
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 768573, DEMETO.



CONTEXT AND OBJECTIVES

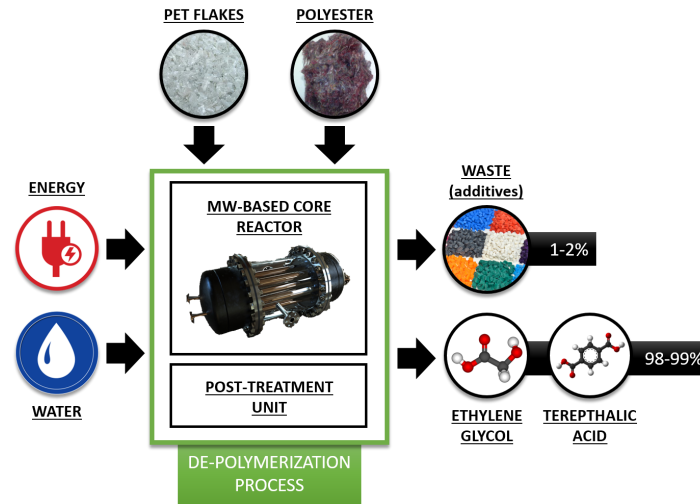
The last 40 years have seen a constant and apparently unstoppable growth of the polymers global production, due to the widespread adoption of plastic materials in fundamental applications of both the industrial and consumer goods domains, posting a sound 5% CAGR yearly and reaching about 381M tonnes in 2014. Indeed, **PET is replacing the conventional packaging materials**, such as glass, aluminium paper, and metal due to its light weight.

This context of increasing global importance of PET inevitably raises concerns about the future sustainability of its market. In fact, and this is the crucial point, today **PET is reused and not recycled**, despite the “abuse” of terminology by the plastics waste management sector: compared for instance to a really recycled material such as aluminium, each time PET is re-used the quality of its polymers degrades, inevitably leading to landfill or combustion for energy generation.



DEMETO proposes the industrialization and demonstration at full-scale of a new industrial process which allows for the first time **to recycle chemically PET bottles, food containers and even textiles in a highly profitable and environmentally sustainable way.**

INNOVATIVE TECHNOLOGY



Exploiting the scientific fact that microwaves excite the rotational degrees of freedom of certain molecular groups of PET, **the core technology of DEMETO’s has been invented by gr3n to enable an effective Process Intensification of the depolymerisation reaction (hydrolysis) of plastic**, from bottles as much as from any other source, leading it back to its building blocks (EG and PTA) and, consequently, allowing their full re-introduction directly at the virgin-grade production stage.

Already patented at international level and validated at different TRLs, the major strength of DEMETO’s core concept is the adoption of a full process approach that, embedding at its heart the process intensifying MW-based reaction, then proposes a **completely self-contained post-processing unit** whose outputs, apart from the virgin-grade EG and PTA raw materials, will generate directly feedstock for the overall de-polymerization process.

BUSINESS POTENTIAL

The business exploitation strategy of DEMETO is based on a **synergistic relationship between two industrial stakeholders**: gr3n, as the manufacturer of the Reactive Units, and Processi Innovativi, as EPC contractor to build the full-scale de-polymerization plants. The former will supply the latter with all the reactors needed to realize the plants required to cover progressively the total available market.

Starting from the European area and with a focus on coloured bottles waste, the envisioned exploitation already foresees extensions to other markets.

