



THE RIGHT ANSWER FOR COST AND ENERGY-EFFICIENT PLASTIC RECYCLING

Valencia, 18th February 2019 – A consortium of European industrial and scientific partners will collaborate to convert waste plastics into valuable chemicals in cost and energy efficient way, by integration of advanced catalytic processes, artificial intelligence, Life Cycle Analysis and economic analysis.

Approximately 70% of European plastic waste (18.5 Mt/year) is not being recycled due to technical or economic reasons and is thus sent to landfill (27%) or incinerated (42%). This situation affects negatively the environment in terms of pollution and greenhouse gases emissions, as well as social perception regarding waste management, consumer's products industry and policy makers.

Integrated catalytic recycling of plastic residues into added-value chemicals (iCAREPLAST) project is set to address the cost and energy-efficient recycling of a large fraction of today's non-recyclable plastics and composites from urban waste. iCAREPLAST project has been funded by the European Union's Horizon 2020 Research and Innovation programme within the SPIRE (Sustainable Process Industry through Resource and Energy Efficiency) initiative. The project coordinator is Mr. José M. Serra, Research Professor at the Institute of Chemical Technology (ITQ) at UPV-CSIC (*Universidad Politécnica de Valencia - Consejo Superior de Investigaciones Científicas*), leading the Energy Conversion and Storage research group.

In this research project, heterogeneous plastic mixtures will be converted into valuable chemicals (alkylaromatic) via chemical routes comprising sequential catalytic and separation steps. This multistage process will also yield carbon char and a pure captured CO₂ stream as products, whilst it will present improved economic sustainability, operational flexibility and lower CO₂ footprint thanks to:

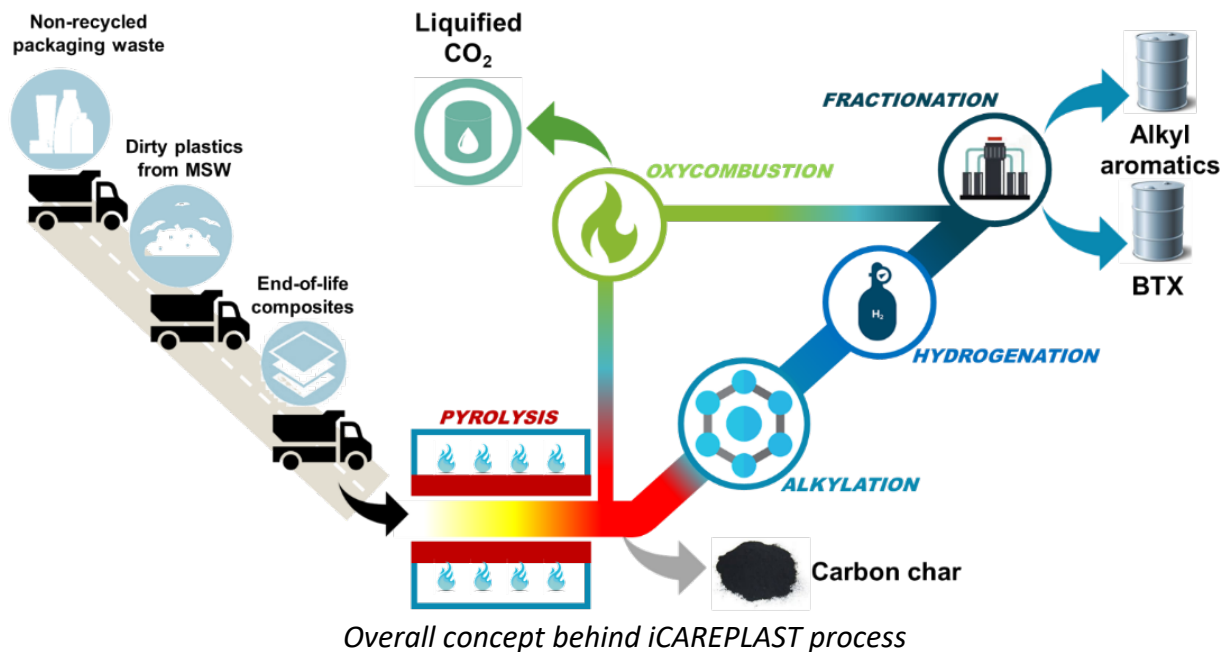
- (i) iCAREPLAST aims to demonstrate the whole technology for plastic waste valorisation in a pilot plant able to process >100 kg/h of plastic.
- (ii) the energetic valorisation of gas by-products through innovative oxycombustion units integrated with efficient heat recovery,
- (iii) the use of AI predictive control and real time optimisation.

iCAREPLAST solution will enforce circular economy by substantially increasing the amount of recycled plastics to produce commodity products that can be used for virgin-quality polymers production or as raw materials for other processes in petrochemicals, fine chemicals, automotive and detergent/surfactants industries. As a result of its initial exploitation we will treat 250,000 t of plastic waste which otherwise would have become landfill, converting it into 1,500 t of alkylaromatics and 1,000 t of aromatics. Additionally, liquid and gaseous streams of rich-hydrocarbons (including CO₂), and solid sub-products (char) will be also recovered and valorised to maximise material and energy balance of the overall process, thus minimising environmental footprint and ensuring economic sustainability.

iCAREPLAST: The key to close the plastic recycling loop

iCAREPLAST combines pyrolysis, catalytic upgrading and conversions, membrane separation technologies and oxy-fuel combustion systems to obtain high added-value chemical in an energy efficient and environmentally friendly context. To ensure sustainability of the process, AI-based advanced control of the pilot plant will be applied that aim at harmonising economic and environmental targets, making use of meaningful indicators defined taking into account LCA (life cycle assessment) and LCC (life cycle cost) analyses.

The nature of the project required the involvement of industrial and scientific stakeholders, the participation of citizens and policy makers that should be aware of project potential environmental advantages, so a special communication effort will be directed to raise social acceptance.



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(**) Project Partners: AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS, UNIVERSITAT POLITÈCNICA DE VALÈNCIA, TECHNISCHE UNIVERSITÄT BRAUNSCHWEIG, IPOINT-SYSTEMS GMBH, LABORATORIO NACIONAL DE ENERGIA E GEOLOGIA I.P., BioBTX BV, IMPERIAL COLLEGE OF SCIENCE TECHNOLOGY AND MEDICINE, UNIVERSITEIT TWENTE, KERIONICS S.L., URBASER S.A.

(***) Contact: icareplast@itq.upv.es, Coordinator team: laullia@itq.upv.es, Project coordinator: jmserra@itq.upv.es



www.icareplast.eu