



The path to sustainable and affordable plastics

Abstract:

The plastics industry faces significant challenges in achieving sustainable growth.

Using recycled materials can help reduce carbon footprints and greenhouse gas emissions but this is not always sufficient to minimize the environmental impact of a molecule. A good illustration of this is polyolefins, where recycling may be energy intensive with a lesser impact on the global carbon balance.

This example shows the importance of performing Life Cycle Assessments (LCA) when trying to find sustainable alternatives. Carbon emissions are not the only criteria of interest, and performances such as material yields, water usage and energy consumption can be just as important. And technology is not the only aspect that matters, since raw materials sourcing and plant location are of utmost importance.

Technip Energies and Processium have developed an in-house LCA methodology based on ISO standards and the use of expert tools and databases, applied at very early stages of a new technology development, to confirm and quantify the advantages of a solution. All the steps, from R&D through piloting to commercialization, integrate an eco-design ensuring a positive environmental impact. Having process engineers as LCA practitioners also enable a very efficient iterative process when missing data is identified in the LCIA databanks, and data reliability is challenged.

Specifically, we are exploring various routes for developments of bio-polyesters from bio-sourced materials through applied R&D in our labs and pilot plants. These bio-polyesters could not only reduce global carbon footprints, but also offer benefits of biodegradability for specific single-use applications, reducing the impact of micro plastic particle pollution.

The key battle to affordability remains a priority to ensure public acceptance and large industrial deployment. This is why we are convinced that with the right technology, methodology and skills it is possible to reduce overall costs, technology risks and time to market, and accelerate the de-fossilization of the plastic industry.