

POLICY APPLICATION: USE OF LIFE CYCLE ASSESSMENT IN THE PET PLASTIC MARKET TO DETERMINE OPTIMAL DEGREES OF SOLID WASTE RECYCLING.

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This paper presents a policy application in product and process analysis from a sustainability point of view. The work presented is part of a project sponsored by a consortium of industries who participate in the Polyethylene Terephthalate (PET) market as resin producers, bottle manufacturers, soft drinks producers, distributors and plastic recyclers in Mexico.

PET bottle's market has increased substantially in the previous years due to its high resistance, light weight and adaptability to many bottle designs which constantly improve. In contrast, there is some concern about the environmental implications of PET use and the lack of analytical tools to describe the market and environmental effects of PET as a material for new product designs.

As such, this paper provides a robust framework to analyse a raw material along the supply chain, considering the main production and operation steps that need to be managed. As part of this work, a robust Simulation Model and a Life Cycle Assessment (LCA) of PET were performed, including all stages from raw material extraction to recycling and landfill. Results show that PET will continue increase its market participation in the bottle sector. Furthermore, the main stage in the supply chain that affect environmental impact is the production process which is considerably higher than the transport and distribution steps.

One of the major insights in this work lies on the use of LCA tools to determine an optimal degree of solid waste recycling. This work demonstrates that higher degrees of bottle recycling does not necessarily imply lower environmental impact. In fact, in all cases studied in this work and under various sensitivity scenarios, it was possible to identify a point at which total environmental impact is minimized. As such, this framework and the results will be used by industry and legislators as a basis for decision making in environmental policy.

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