

## **Why Mechanical Versus Chemical Recycling? Alternatives and Innovations are Needed! Can't the Processes Complement Each Other?**

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### **Abstract**

Mechanical plastics recycling is increasingly facing discussions by physical and chemical processes more as complementation as of competition. Nevertheless many NGOs argue against chemical recycling, citing its environmental impact and questioning its economic viability.

Nonetheless, alternatives must be developed in order to meet the ambitious recycling targets of agreements such as the EU's Green Deal.

Based on a review of recent studies and interviews with industry participants, the paper provides an overview of the current situation of the plastics material flow, production figures and disposal routes. Additionally, different processes of plastics recycling are discussed with a focus on the processes of chemical recycling. For this purpose, existing studies and life cycle assessments based on scientific and industrial sources are evaluated. The mass balance approach is also considered.

It is important to further consider the carbon footprint of chemical recycling. On this point, global collaboration within would be desirable. Research into chemical recycling should be pursued to further evaluate it and encourage innovation.

However, we also maintain that the economics of plastics recycling are not the only way forward. Fluctuation in oil prices has a major impact on the economics of recycling. The economic viability of plastics recycling should be promoted by building markets, through measures such as substitution quotas or design for recycling, provided that manufacturers understand the importance of sustainability and carbon footprint.

### **Key Words**

Mechanical recycling, feedstock recycling, legal situation, Life Cycle Assessment, pilot plants, technical maturity level, mass balance