

Towards Circular Plastics

An Integrated Sustainability Assessment Approach

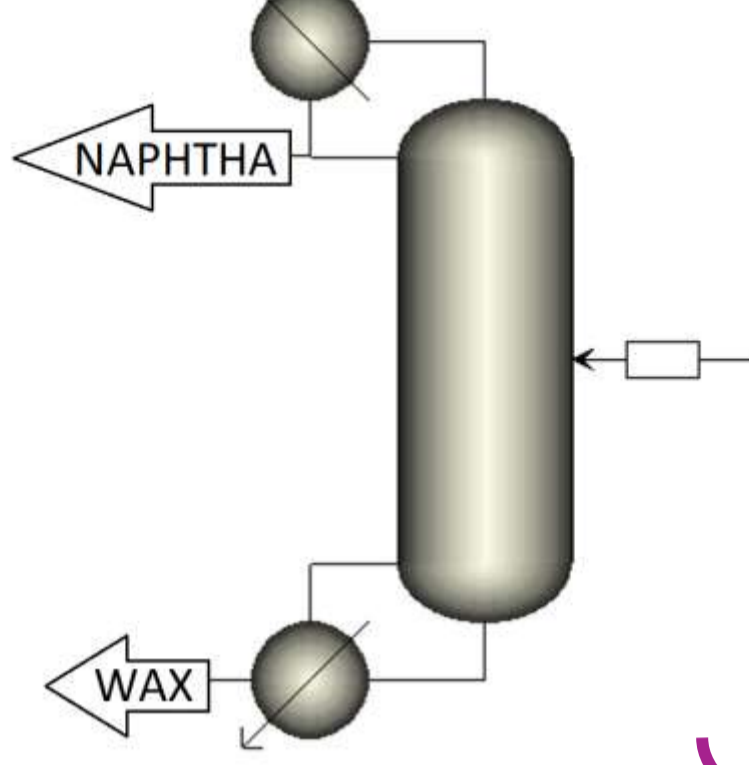
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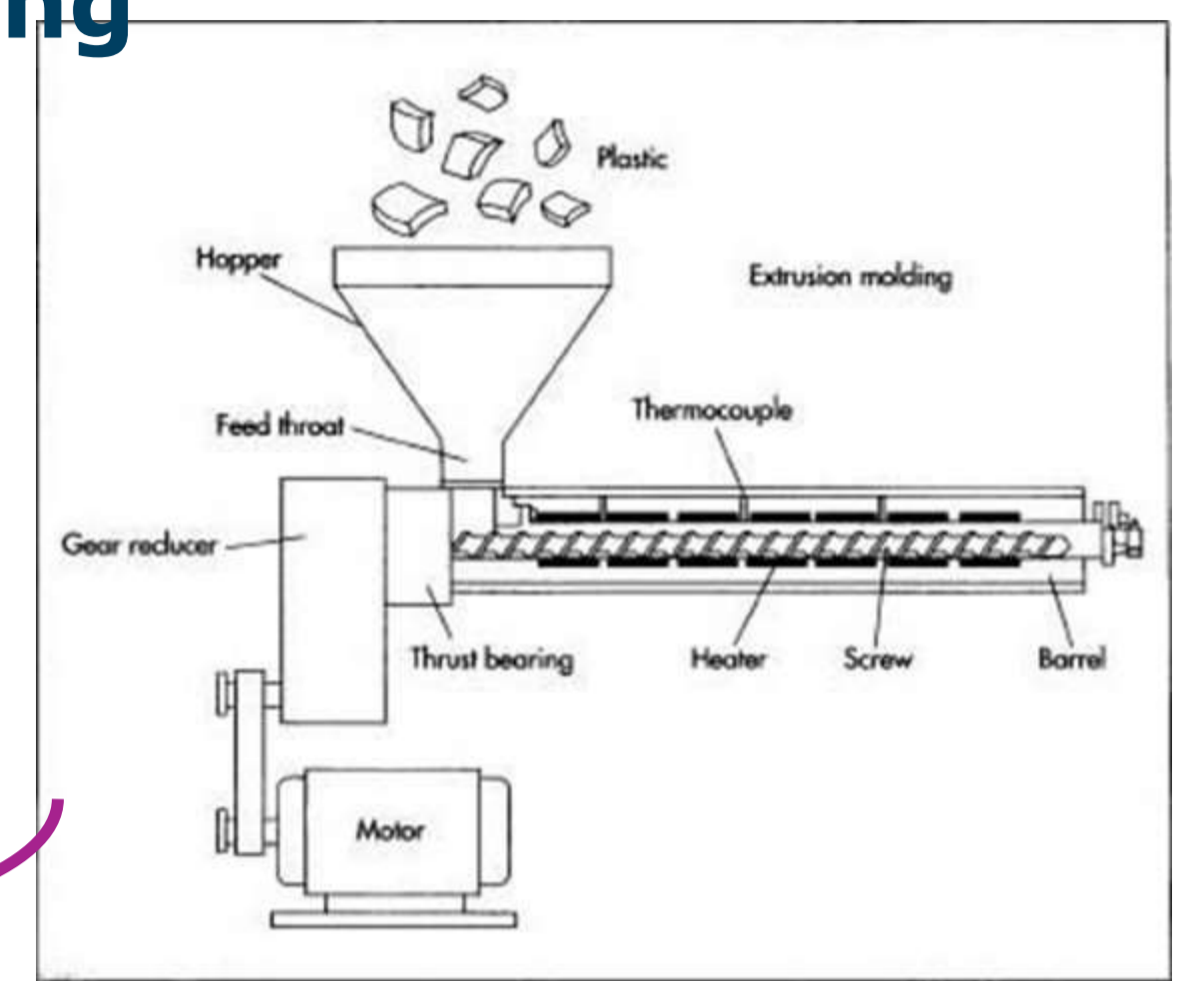
² Environmental Economics, Faculty of Business and Economics, Antwerp University

PLASTIC RECYCLING TECHNOLOGIES

Chemical Recycling



Mechanical Recycling

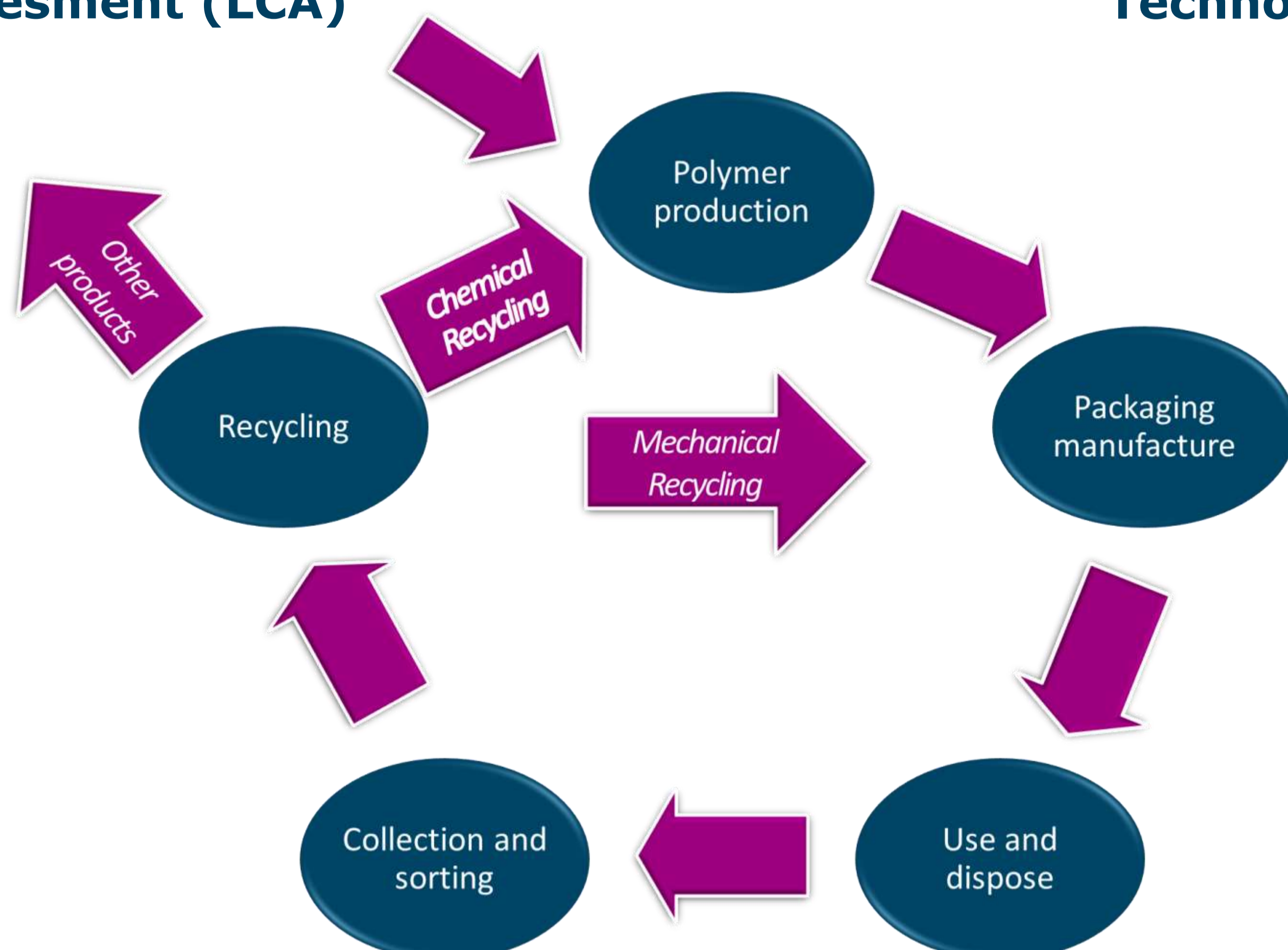


FROM INTEGRATED SUSTAINABILITY ASSESMENT...

Life Cycle Assessment (LCA)

Quantify

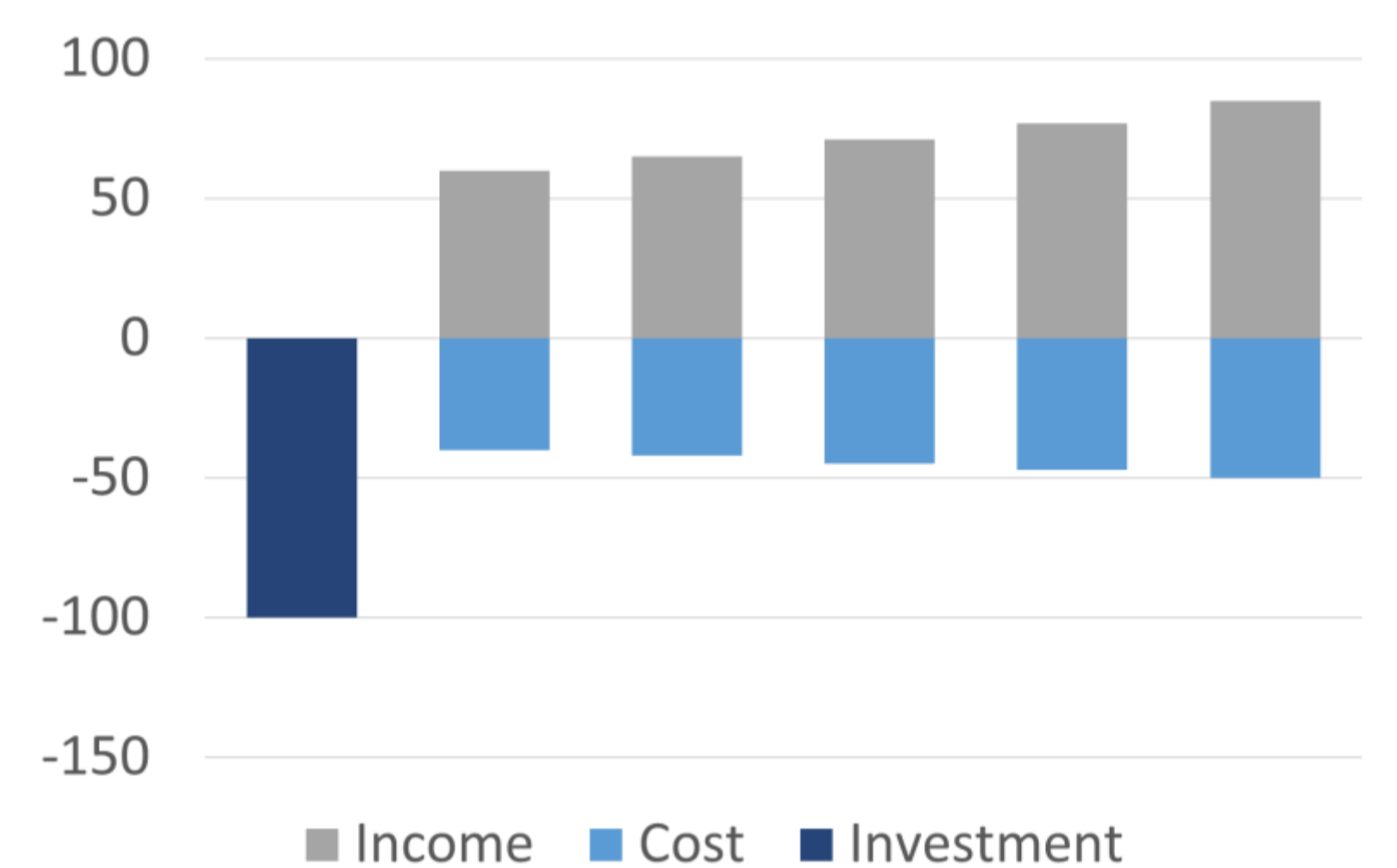
- GHG emissions
- Water Use
- Energy Use
- Fossil depletion



Techno-economic Assessment (TEA)

Quantify

- Net Present Value (NPV)
- Return on Investment (ROI)



Plastic Fraction 1
e.g LDPE



Plastic Fraction 2
e.g PP

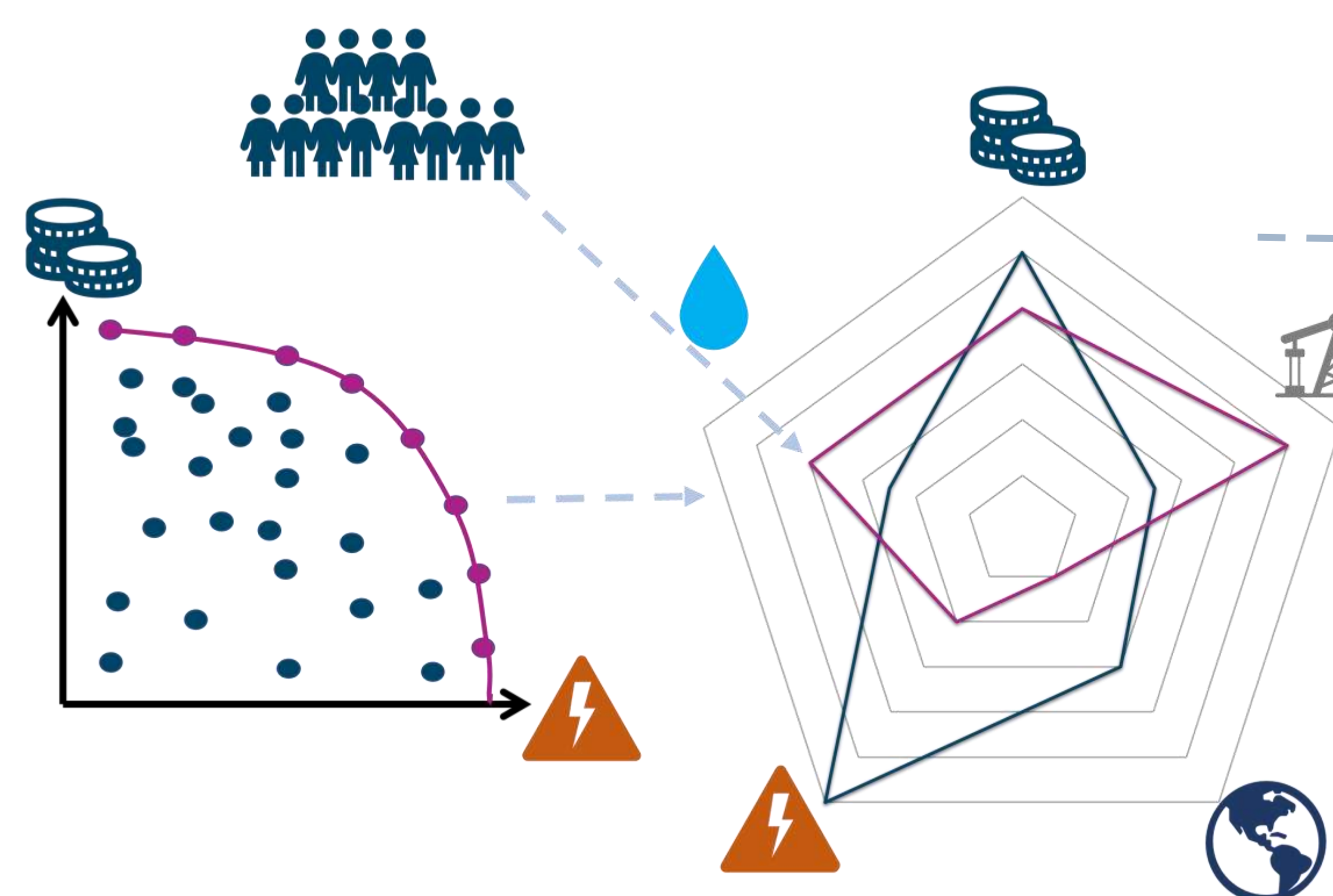


Plastic Fraction n



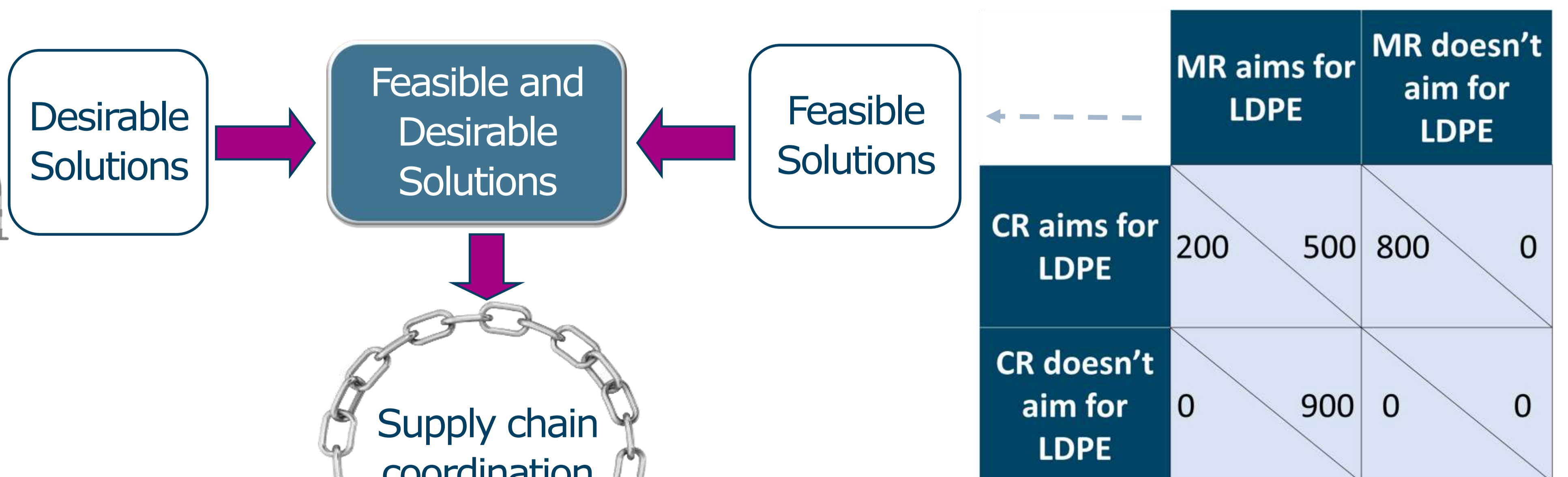
...TO ACTIVE DECISION MAKING

Multi-criteria decision analysis



With Multi-objective optimization (MOO) determine the Pareto frontier: curve in which we cannot improve one indicator without harming the other ones. Further with econometric tools determine the weights that the society assign to each criteria.

Game Theory



Study the strategic interactions between the different stakeholders to determine which ones would have incentives to treat the different waste streams

