

# La valorisation des déchets plastiques par pyrolyse catalytique

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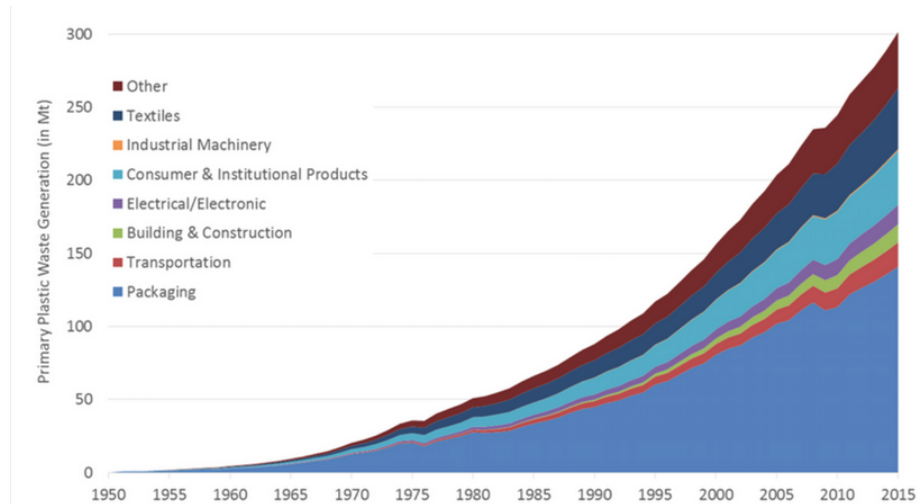
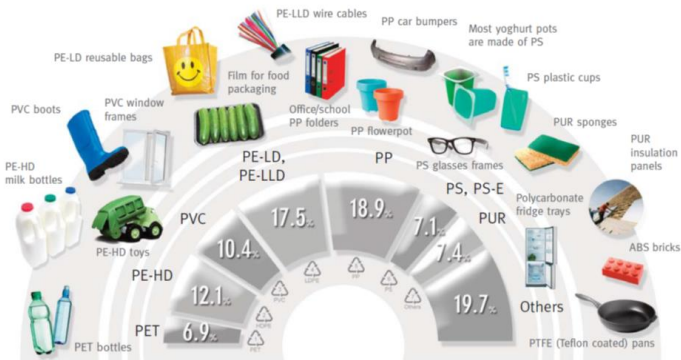
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# Context

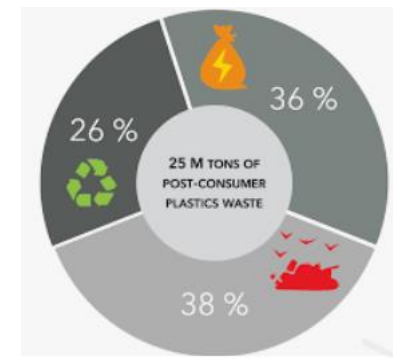


**Plastics production, plastic waste generation by industry and plastic waste treatment**

# Recycling methods

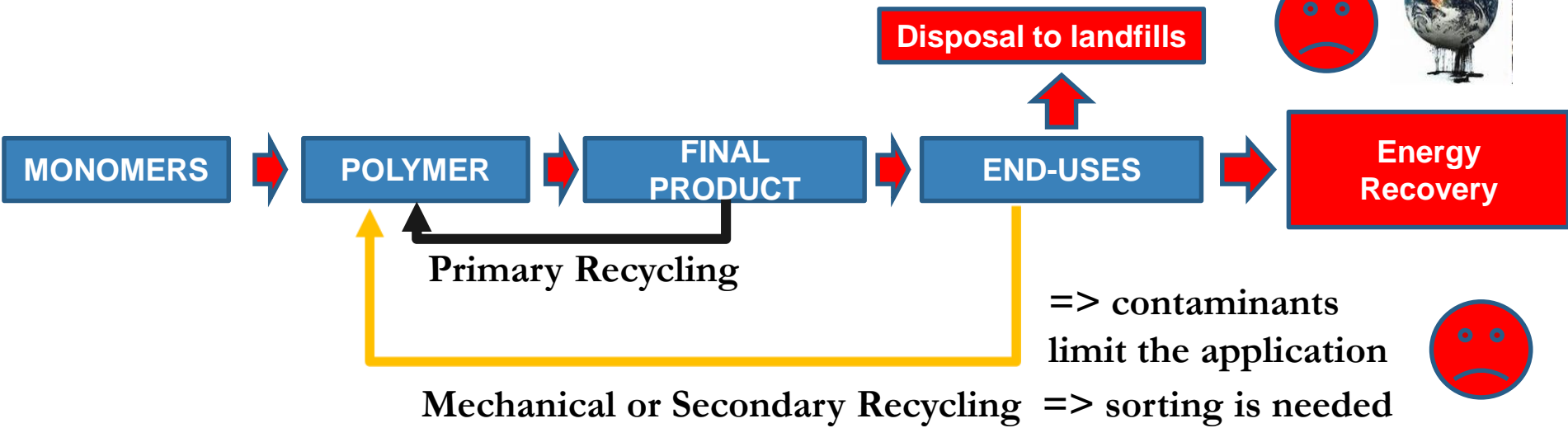


Environnemental issues

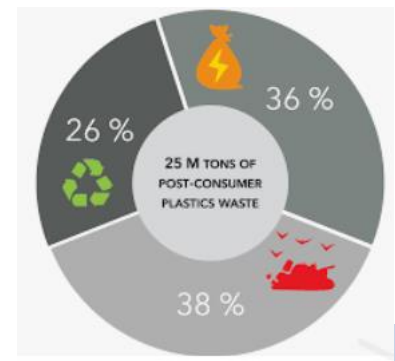


# Recycling methods

Environnemental issues

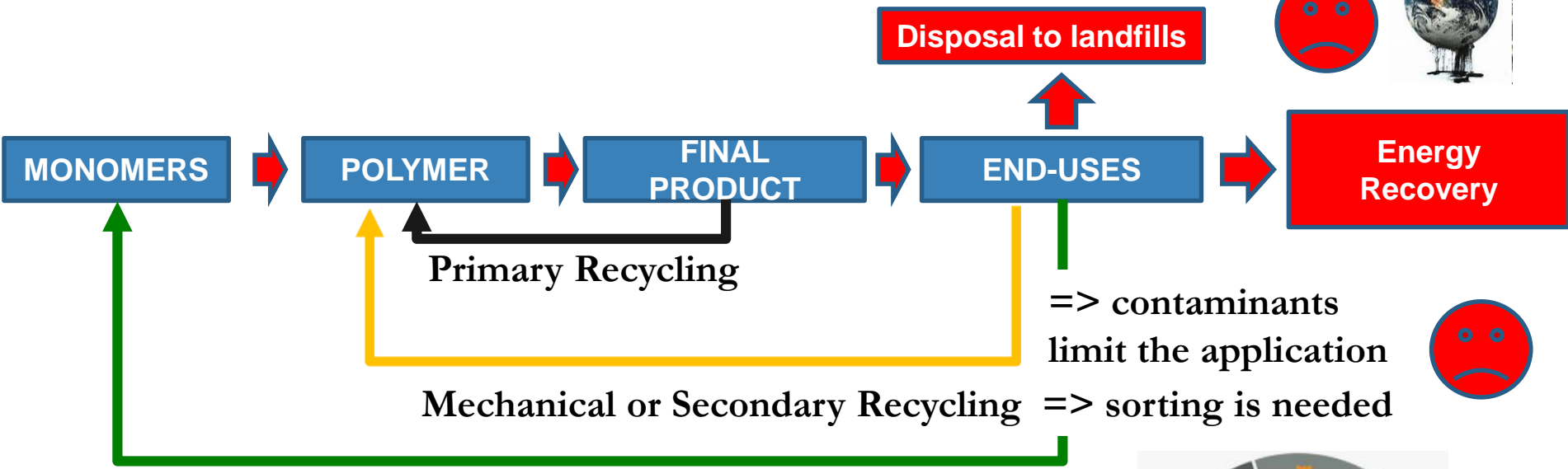


## Waste hierarchy

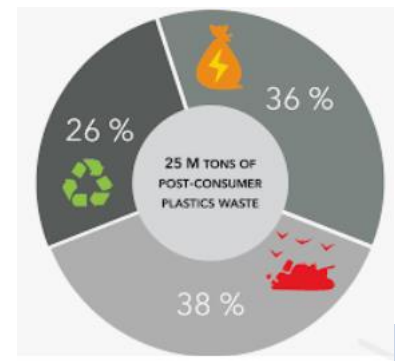
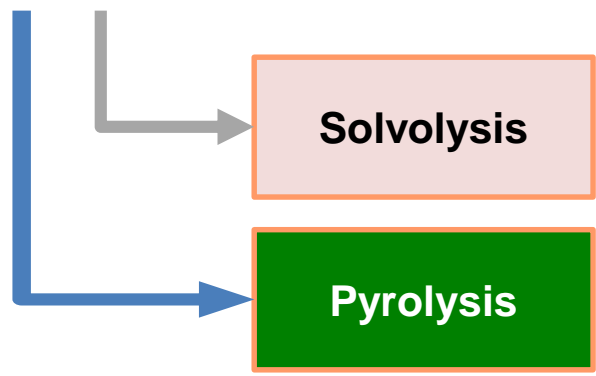


# Recycling methods

Environnemental issues

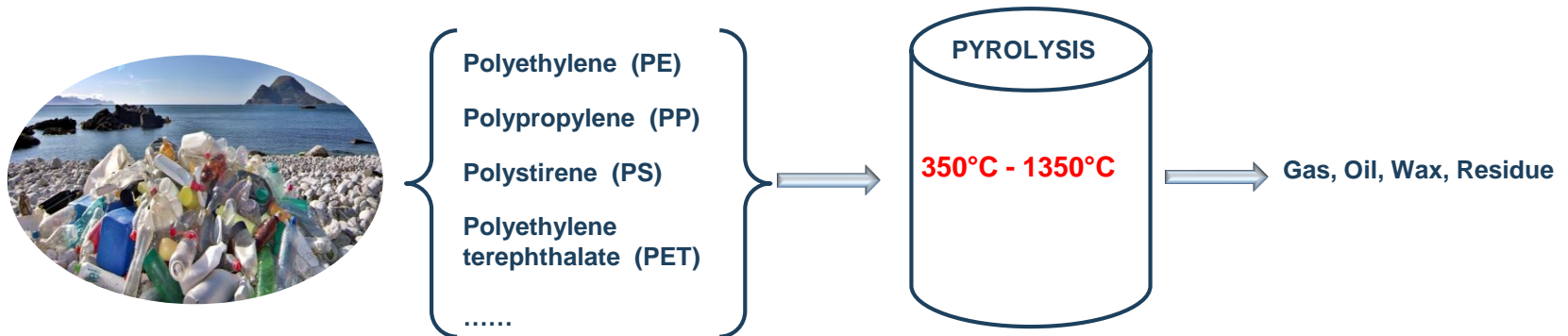


## Chemical or Tertiary Recycling




# What is pyrolysis?

**Environment-friendly process** allowing the valorization of plastic waste by thermal degradation of polymers into smaller valuable molecules

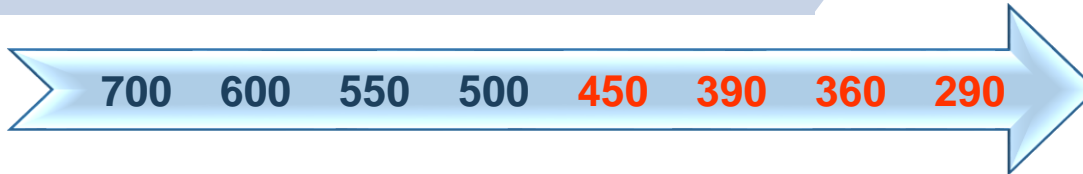


## Drawbacks:

- 
- Thermal degradation mechanism: very complex (reaction of  $\beta$ -scissions, isomerization, hydrogen transfer, oligomerization, Diels-Alder addition...)
  - Very wide range of products  $\rightarrow$  complicated processes for separation
  - Low quality of products  $\rightarrow$  making this process unfeasible
  - High temperature of process  $\rightarrow$  high energetically cost

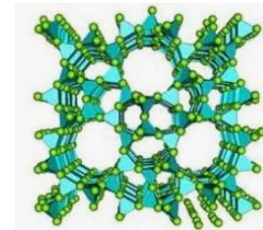
# Why catalytic pyrolysis?

Pyrolysis



Catalytic Pyrolysis

Acid Catalyst offer the possibility to orientate the degradation process !



Pyrolysis processes

Key Aspects

Temperature

Residence time

Composition of the waste

Heating rate

Catalysts

Catalysis Pyrolysis

Less demand in energy

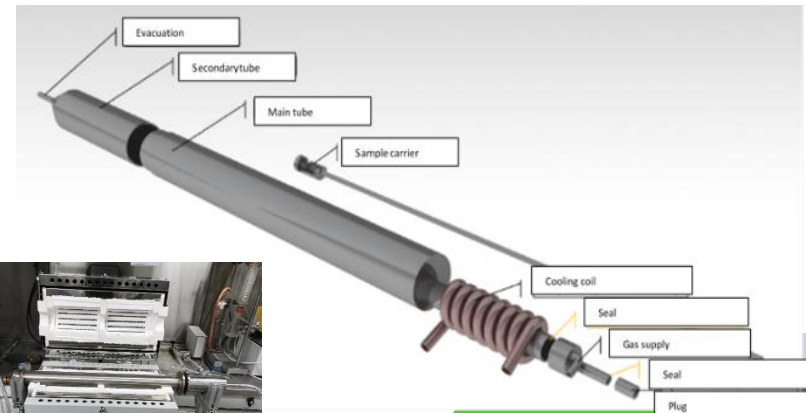
Less impurities / selectivity

Decreasing the char residue

Catalyst : cost and recycling?

Knowledge on the mechanism of action

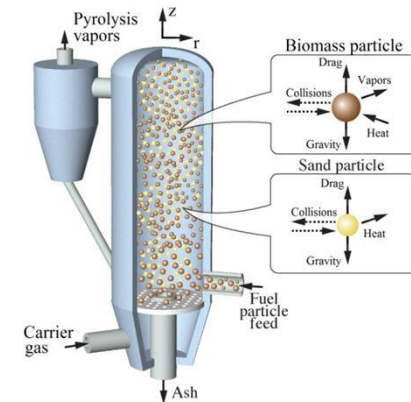
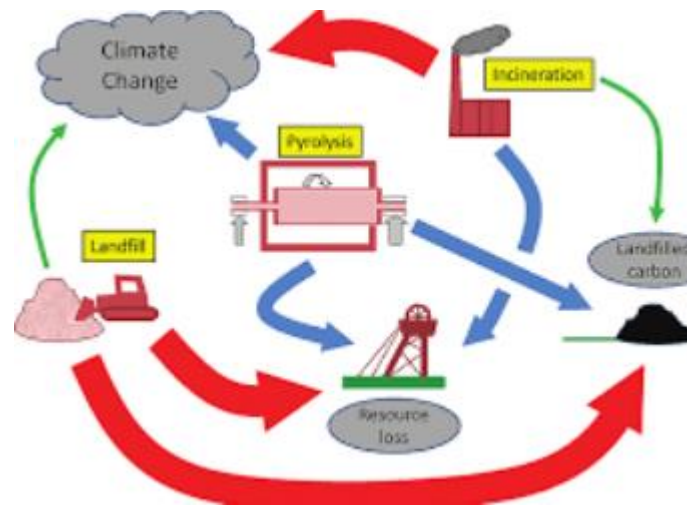
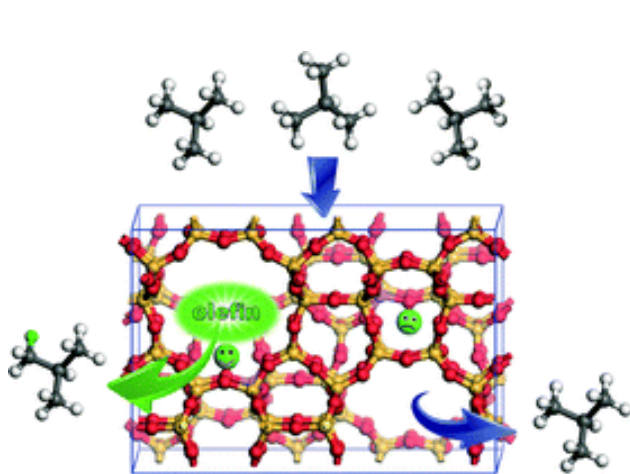
Economic / environmental impact of the processes





# Outlooks

- ❖ Development of low cost catalyst having low environmental impact
- ❖ Development of pilot scale pyrolysis unit
- ❖ Determination of the environmental impact of the process using LCA





# Thank you for your attention!

## Acknowledgment to the Région Hauts de France for its financial support



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