

# Evaluation of municipal waste management in Belgium (Liège) for the last thirty years

## CHEMICAL ENGINEERING

*Processes and Sustainable Development*

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1. **Context of research**
2. Definition of studied systems
3. Environmental evaluation of waste management
4. Perspectives in waste management



## Context

- Waste = important concern of our century
- Tool to help management
  - Life Cycle Assessment
- Improvement of waste management processes
  - Reduction of waste quantity
  - Increase of valorization
  - Decrease of the induced environmental impacts



## Waste management – Goals

- Goals of study
  - To evaluate the improvement of waste management through years
    - Belgian situation (Liège) from 1970 until now
  - To help making the best sustainable choice in the future
- Functional unit
  - Treatment and valorization of one ton of average municipal waste



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## 5 systems through years

- Before 1970
  - Wild landfilling
- From 1990 until 2009
  - Waste grinding and sorting



FLUFF



REMAINING WASTE



## 5 systems through years

- From 2009 until now
  - Incineration of the whole fraction of waste



- Short term project

- Sorting and collection of the biodegradable fraction

**BIODEGRADABLE FRACTION**



**REMAINING WASTE**



## 5 systems through years

- Mid-term project
  - Sorting and collection of the biodegradable fraction
  - Use of heat for district heating

**BIODEGRADABLE FRACTION**



**REMAINING WASTE**



**DISTRICT HEATING**



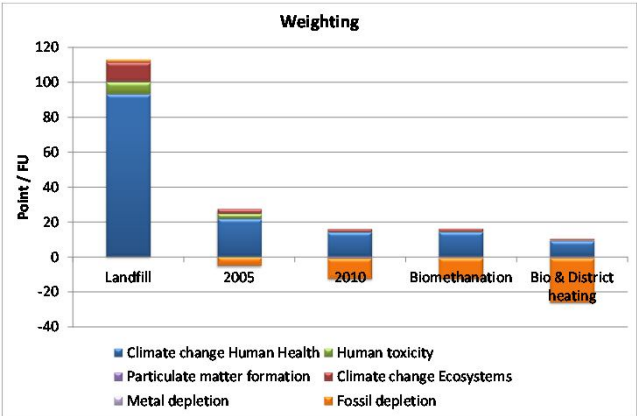
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## Waste management – LCI

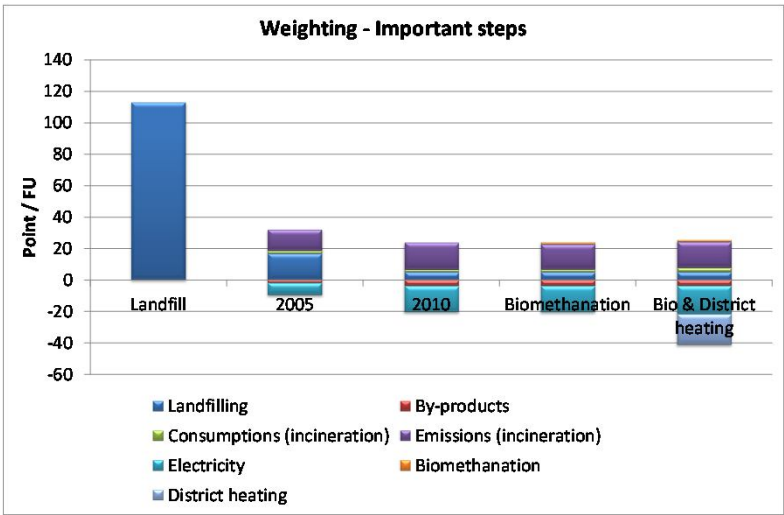
- Use of ReCiPe method
  - Endpoint
  - Hierarchist
- Use of databases
  - Ecoinvent
  - From producers
  - From scientific literature

# Waste management - Impact assessment



Scenario	Landfill	2005	2010	Biomethanation	Bio & District heating
Global impact	113	22	3,2	3,5	-15,8

# Waste management - Impact assessment



## Waste management – Interpretation

- Global warming and fossil fuel depletion are reduced
- Valorization of heat and electricity is helpful
- Importance of landfilling

## Waste management – Interpretation

- Limitations of the study
  - Assumptions about landfilling – uncertainties
  - Infrastructure to take into account
  - Possibility in the future ( economic situation and feasibility to evaluate)
  - Other techniques to consider?

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## Waste management – Perspectives

- Life Cycle Assessment = environmental management tool
  - Decision support tool
  - Need of others tools for economic and sociological aspects → **3 pillars** of sustainable development
- Waste
  - FIRST: reduce the quantity → to prevent
  - SECOND: valorize in the best sustainable way



## Waste management – Perspectives

**Thank you for your attention!**



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