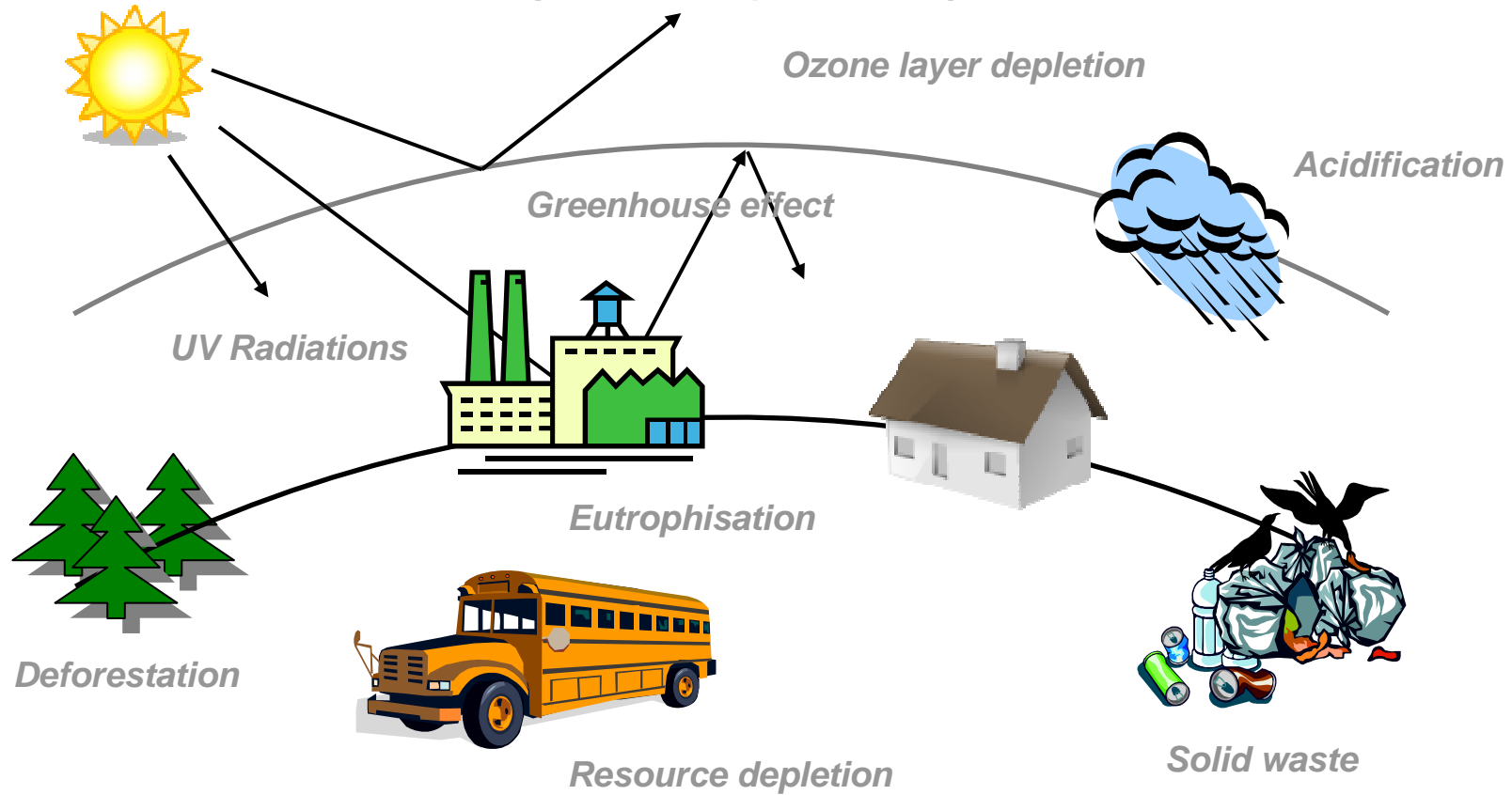


# Life Cycle Assessment of recycled concrete – A state-of- the-art

Adélaïde Féraïlle, Raphael Brière  
Laboratoire Navier

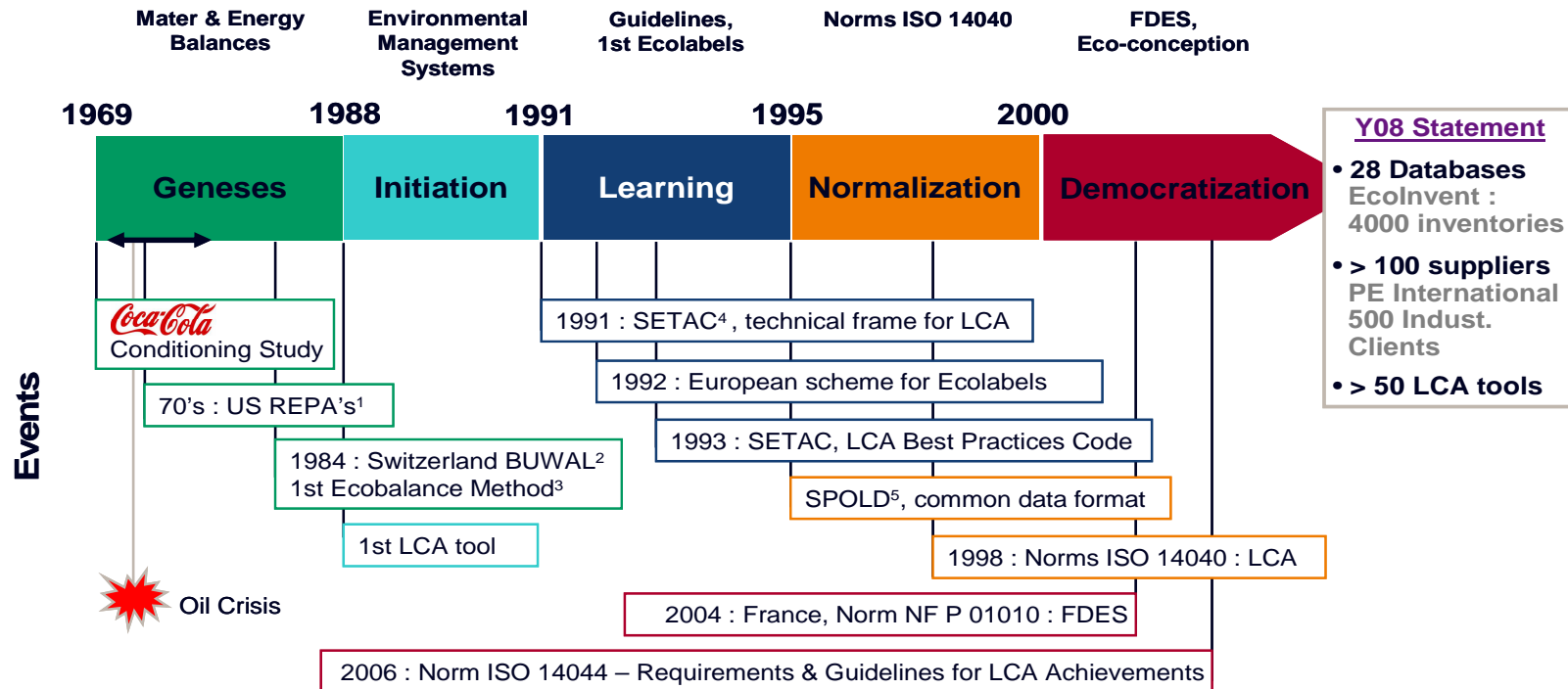


# Strong interaction with the environment



**Much more than one problem to consider !**

# Born 35 years ago, mature today



<sup>1</sup> REPA = Resources & Environmental Profiles Analysis

<sup>2</sup> BUWAL = Swiss Department for Environment

<sup>3</sup> Ecobalance = Comprehensive inventory of mater fluxes coming in & going out

<sup>4</sup> SETAC = Society of Environmental Toxicology & Chemistry

<sup>5</sup> SPOLD = Society for the Promotion of LCA Development

Sources : L'Analyse de Cycle de Vie d'un produit ou d'un service  
Académie des Technologies -ACV

# Two basic principles

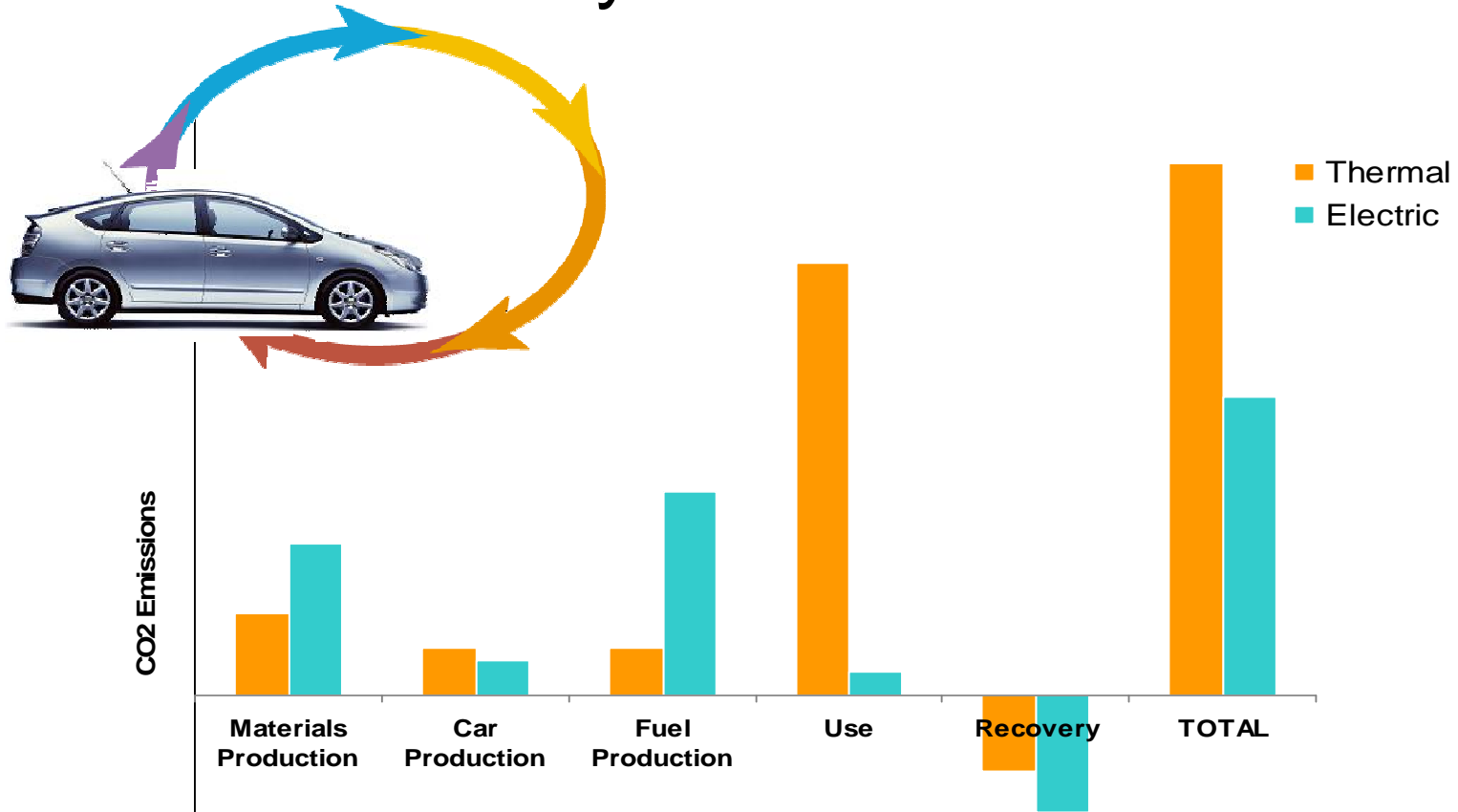
- Consider all life cycle !



[www.capconseil.be](http://www.capconseil.be)

# Two basic principles

- Consider all life cycle !

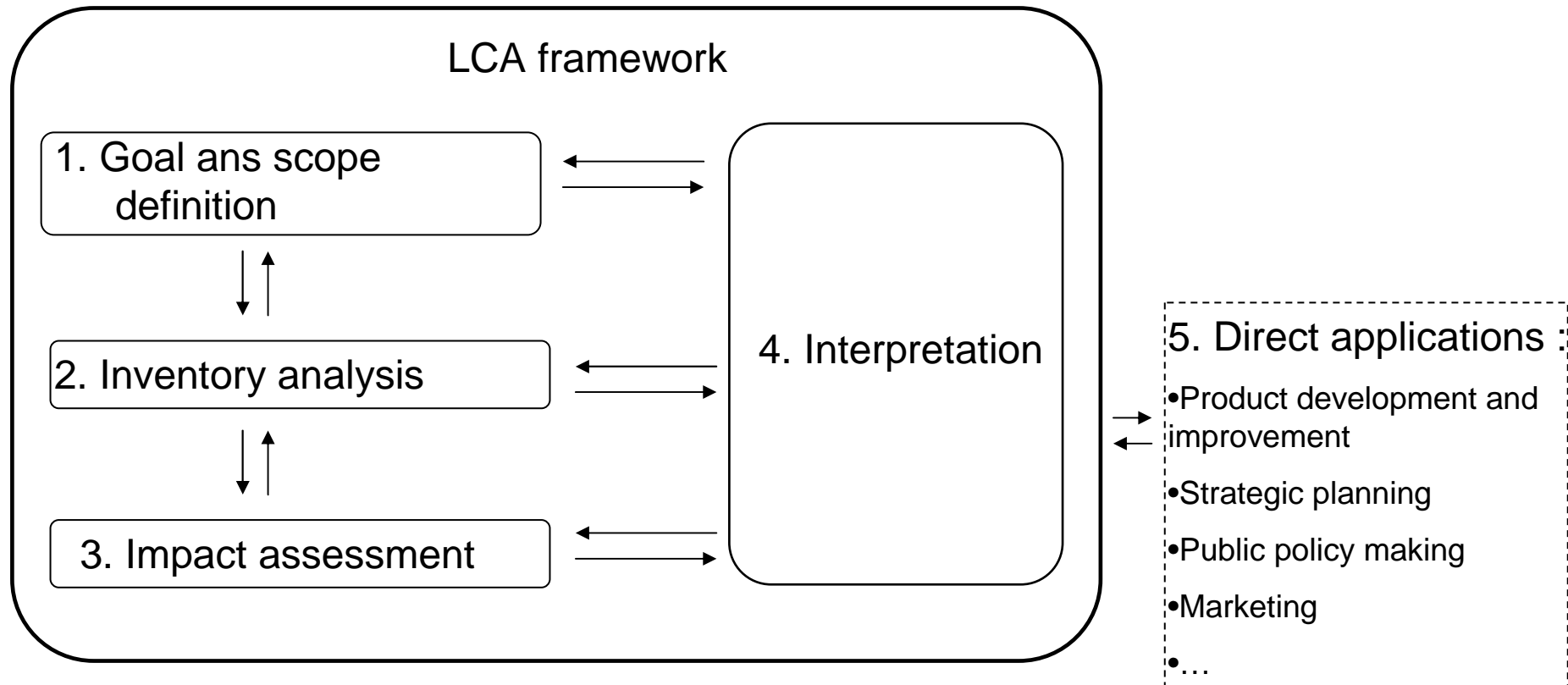


*From Toyota data*

# Two basic principles

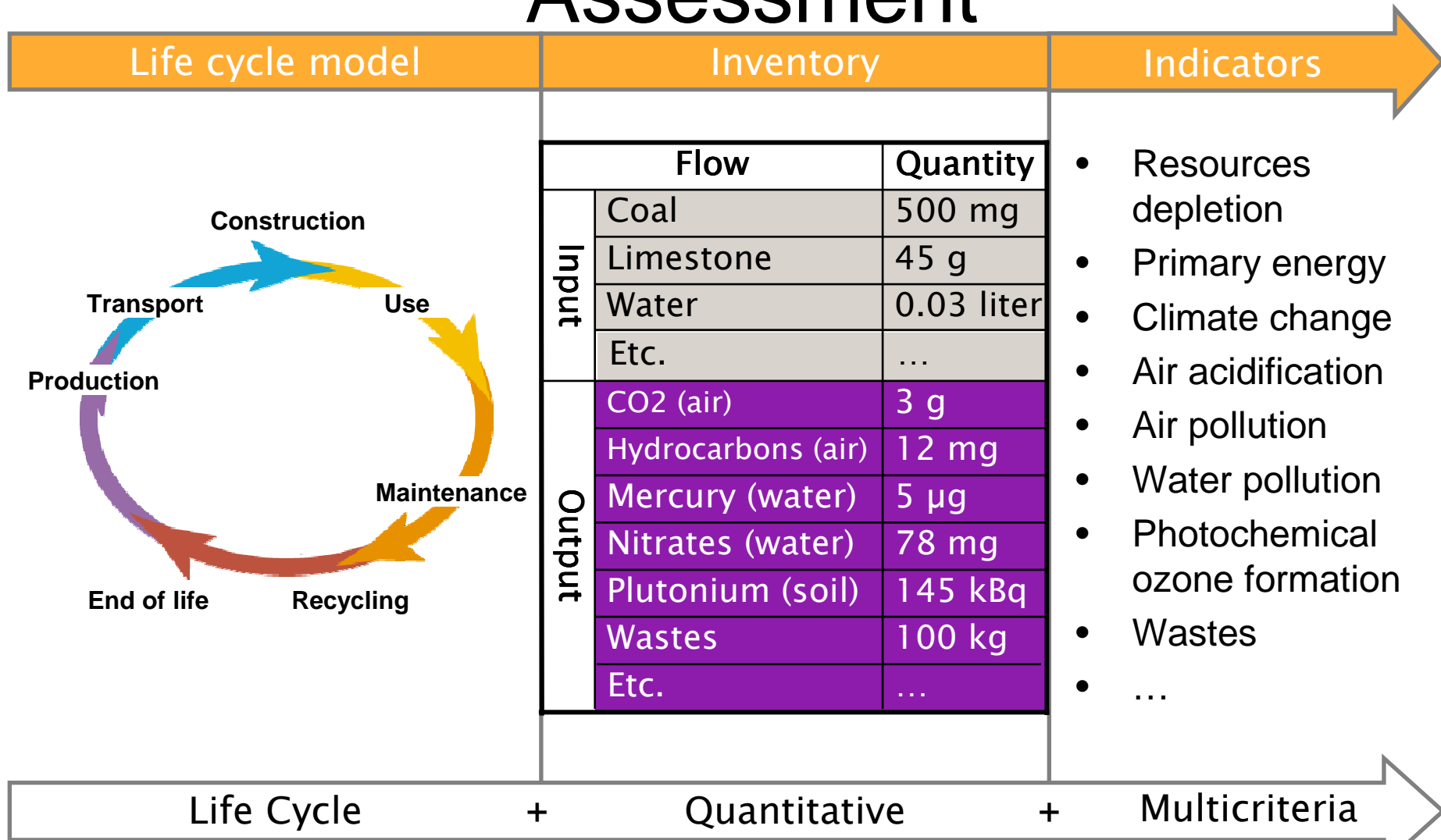
- Consider all life cycle !
- Consider various impact indicators !
  - Climate change (kg eq CO<sub>2</sub>)
  - Resource depletion (kg eq antimony)
  - Acidification (kg eq SO<sub>2</sub>)
  - ...

# Life Cycle Assessment method : 4 stages



Standard ISO 14040

# A scientific tool for Environmental Assessment





# End of life of buildings

- Traditional buildings
- Low consumption buildings

**CONSTRUCTION**

**USE ~ 90 %**

**~ 50 %**

**DECONSTRUCTION**

## Importance of the deconstruction phase

# Deconstruction or demolition ?

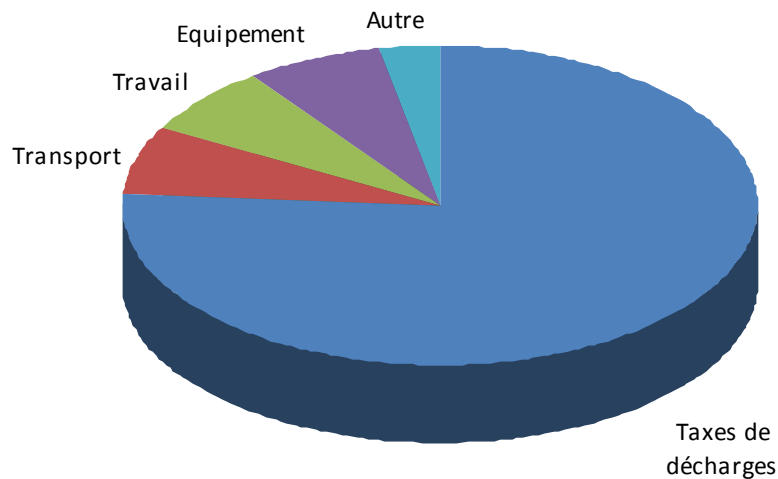
- Traditional demolition is not always less expensive
- It depends on :
  - Landfill tax
  - Transport
  - Equipment
  - Work

# How make deconstruction ?

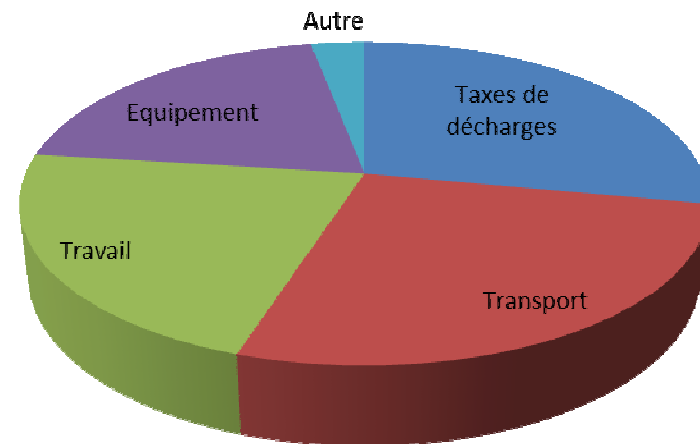
## Deconstruction or demolition ?

- Traditional demolition is not always less expensive

**Démolition traditionnelle**



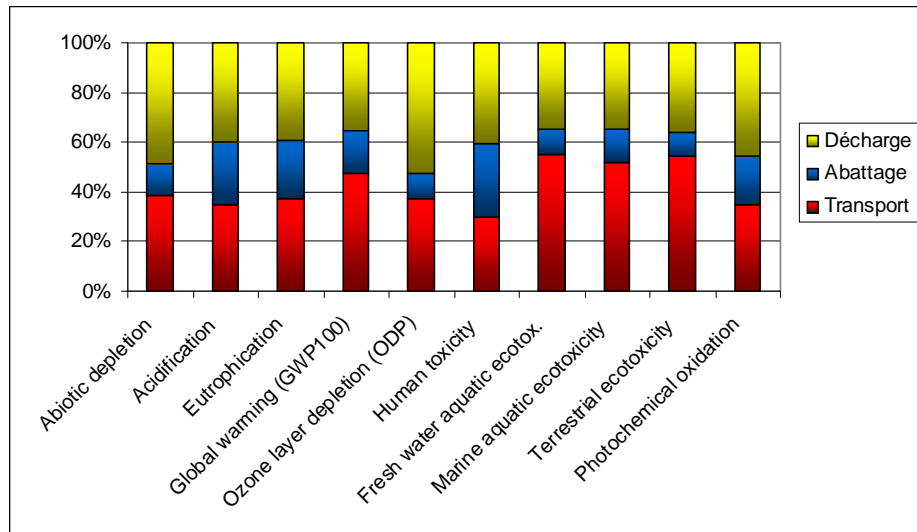
**Démolition sélective/déconstruction**



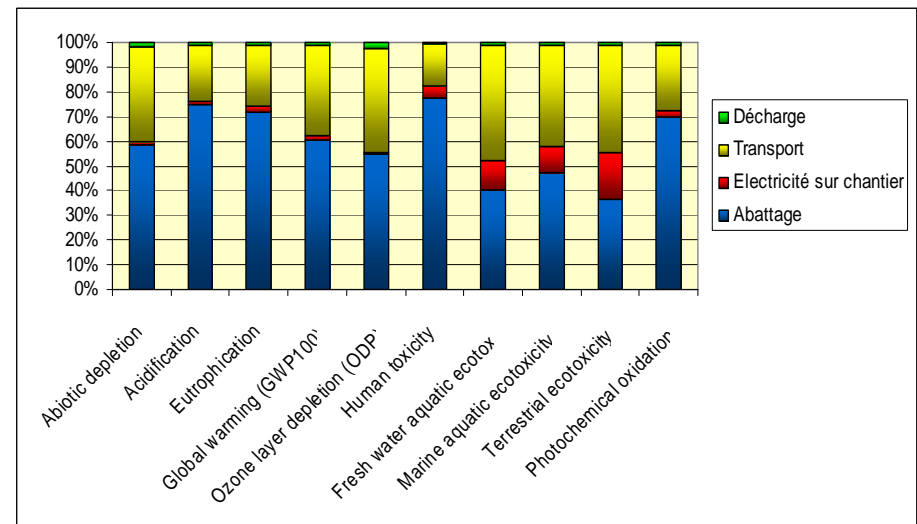
# Comparison between demolition and deconstruction in Toulouse

- Process to be taken into account :
  - Slaughter of the structure
  - Transportation of waste
  - Lanfill

*Data from ADEME*



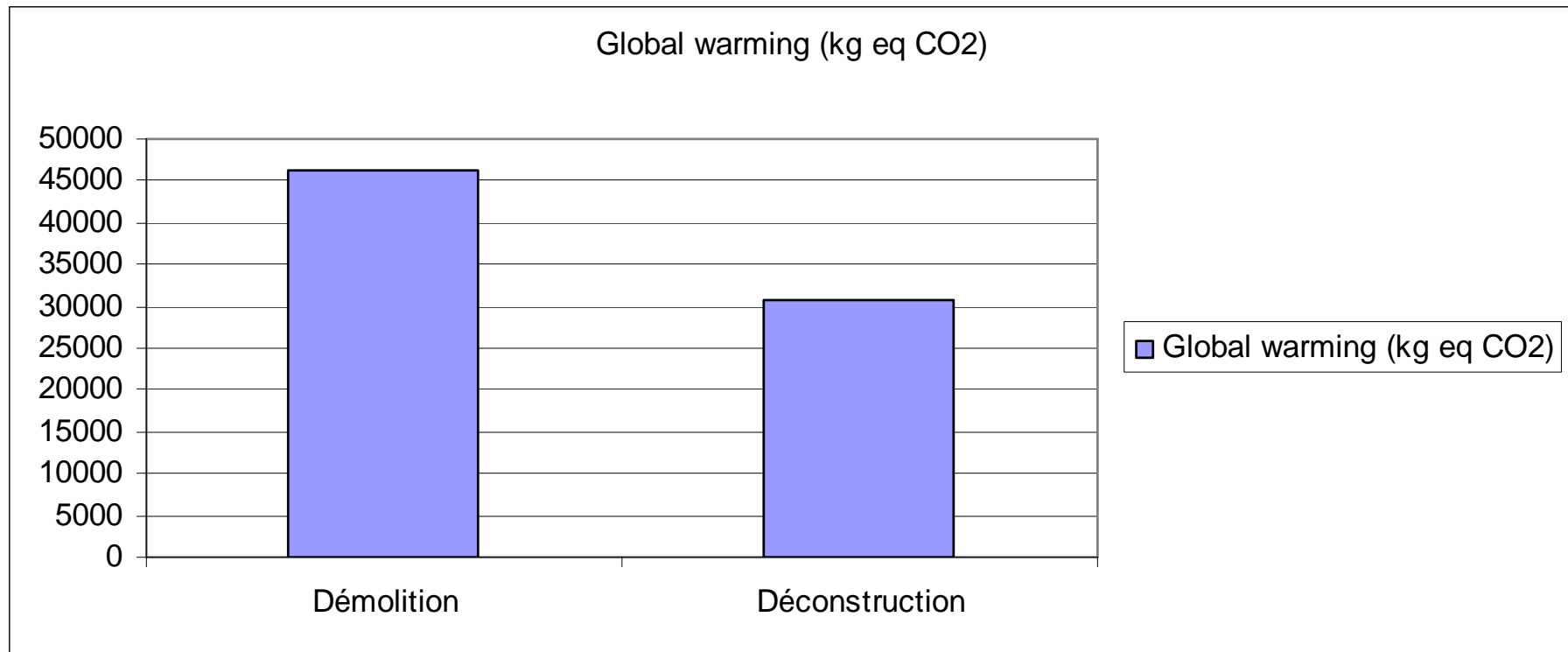
Traditional demolition



Selective demolition

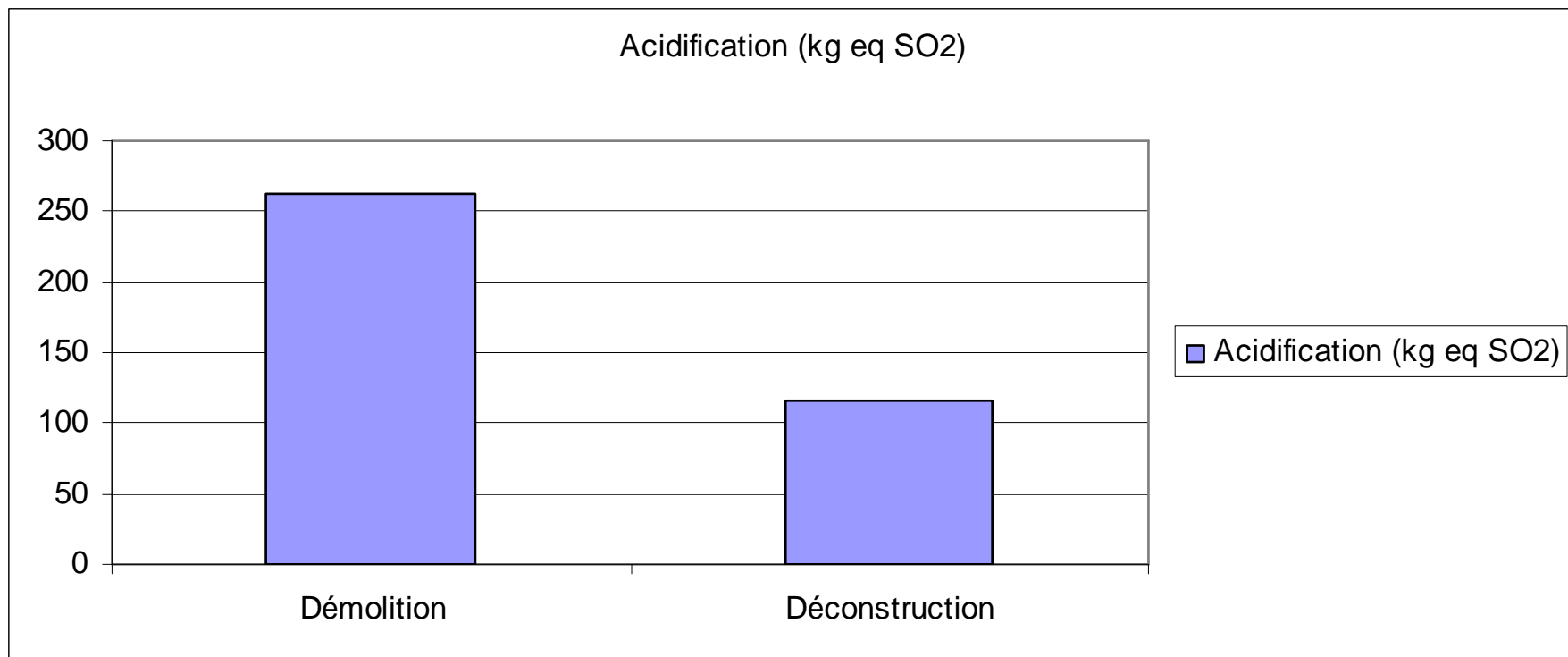
- Results are dependant on the quality of 3 datas :
  - The amount of energy involved in the slaughter
  - The distance transport of waste from site to its outlet or to its place of treatment
  - The management of end-of-waste.

# Comparison on a demolition site in Toulouse



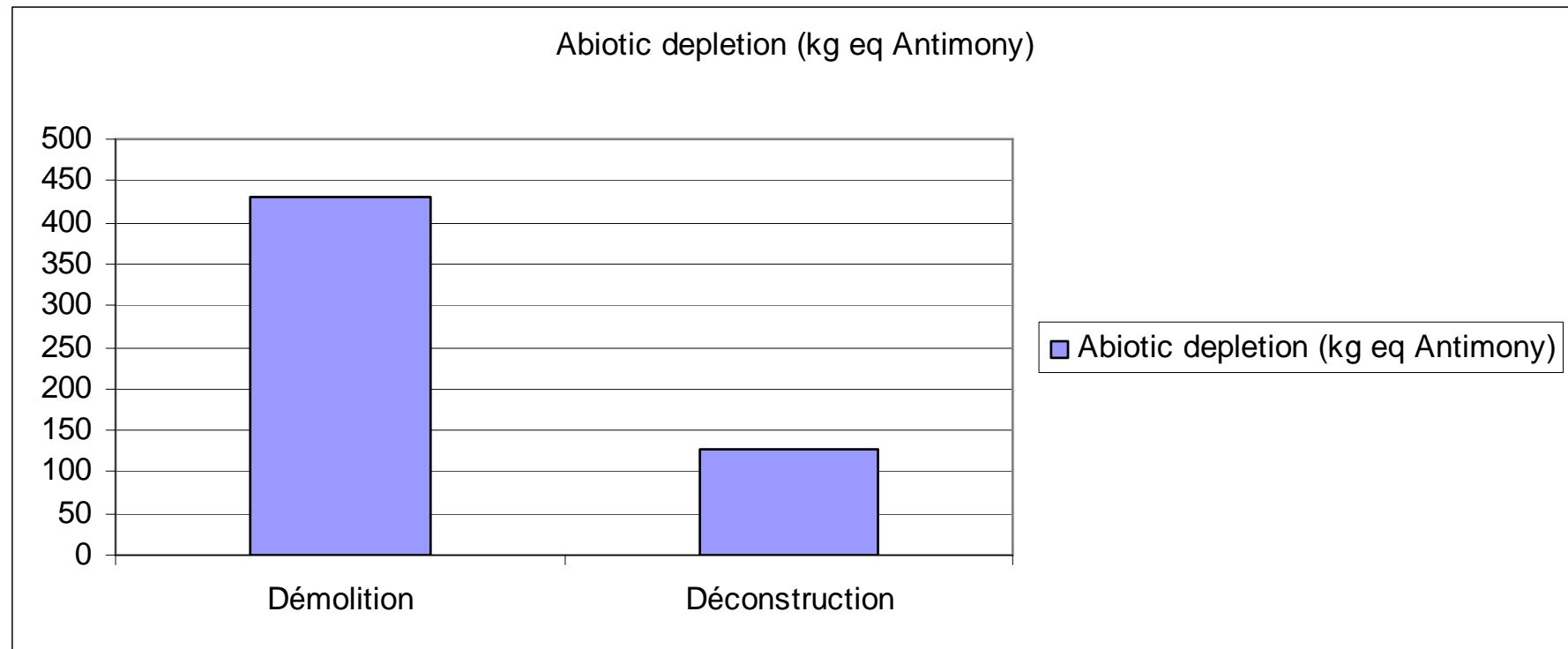
*Data from ADEME*

# Comparison on a demolition site in Toulouse



*Data from ADEME*

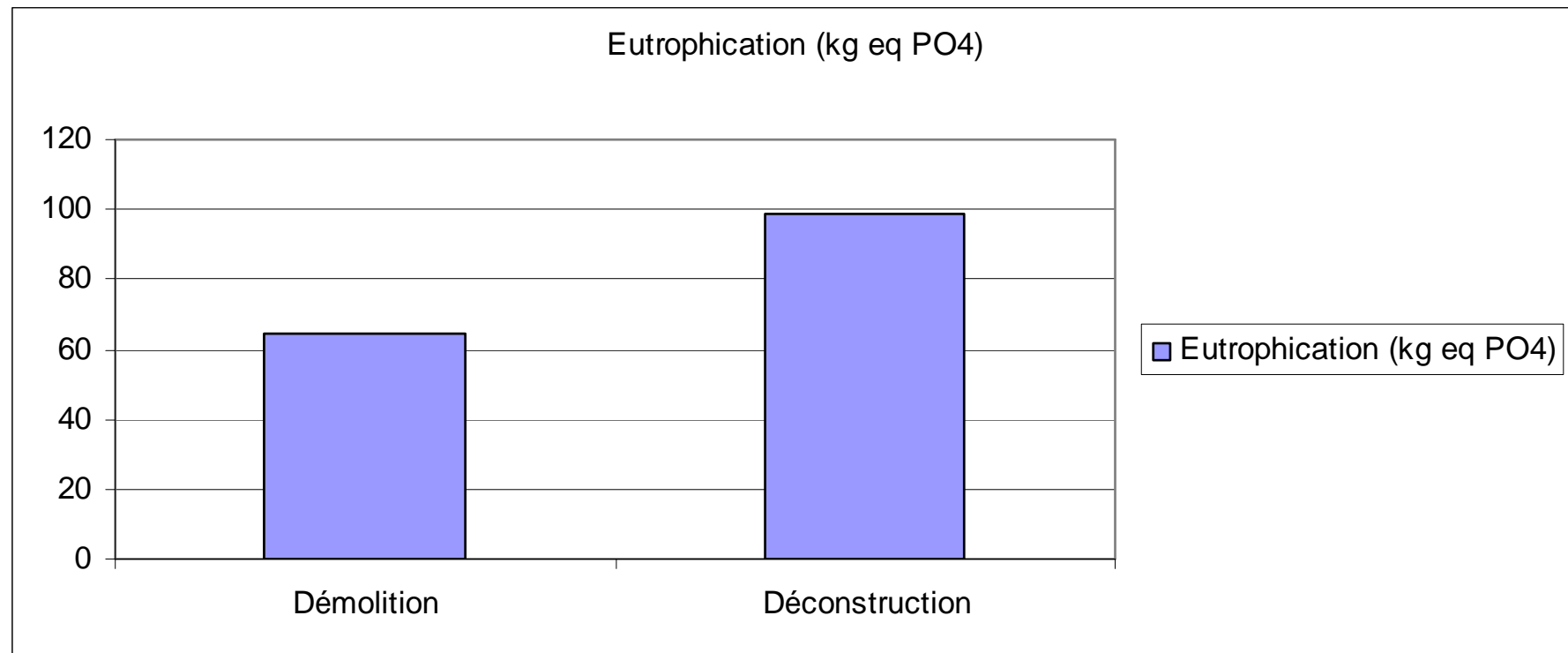
# Comparison on a demolition site in Toulouse



*Data from ADEME*



# Comparison on a demolition site in Toulouse

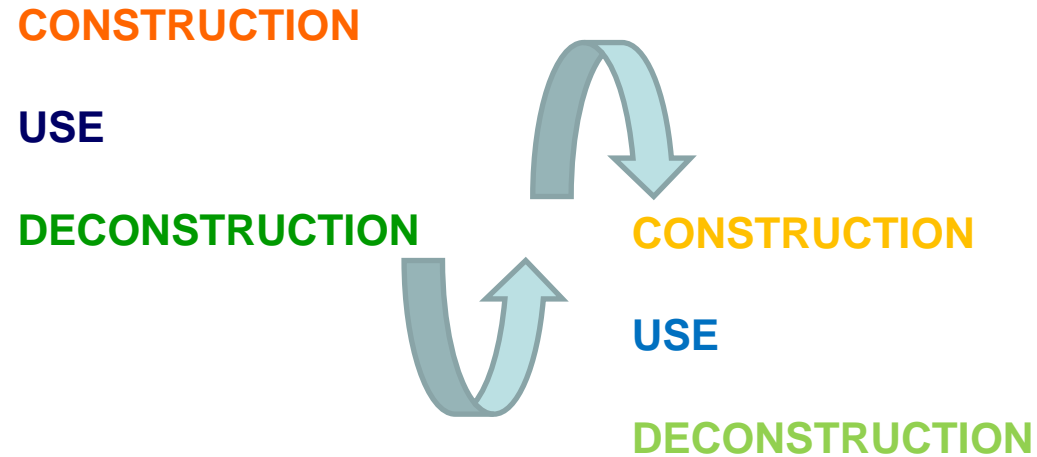


*Data from ADEME*

# Conclusion and perspectives

- *Design for Deconstruction*
  - **DECONSTRUCTION** – **MODIFICATION** –  
**REUSE** – **RECYCLING**
    - *Reuse of the building*
    - *Reuse of the elements*
    - *Reuse of materials*
    - *Recycling of materials*

- *Supply Driven Architecture*



- *Reuse of "waste"*
- *Limitation of Transports*
- *New architectural forms*