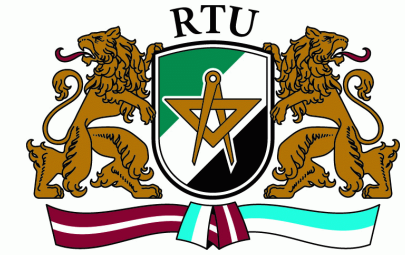




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# **Dzīves cikla novērtējuma metodika: SIMAPRO datorprogrammas izmantošana**

Francesco Romagnoli, M.Sc., pētnieks, doktorants

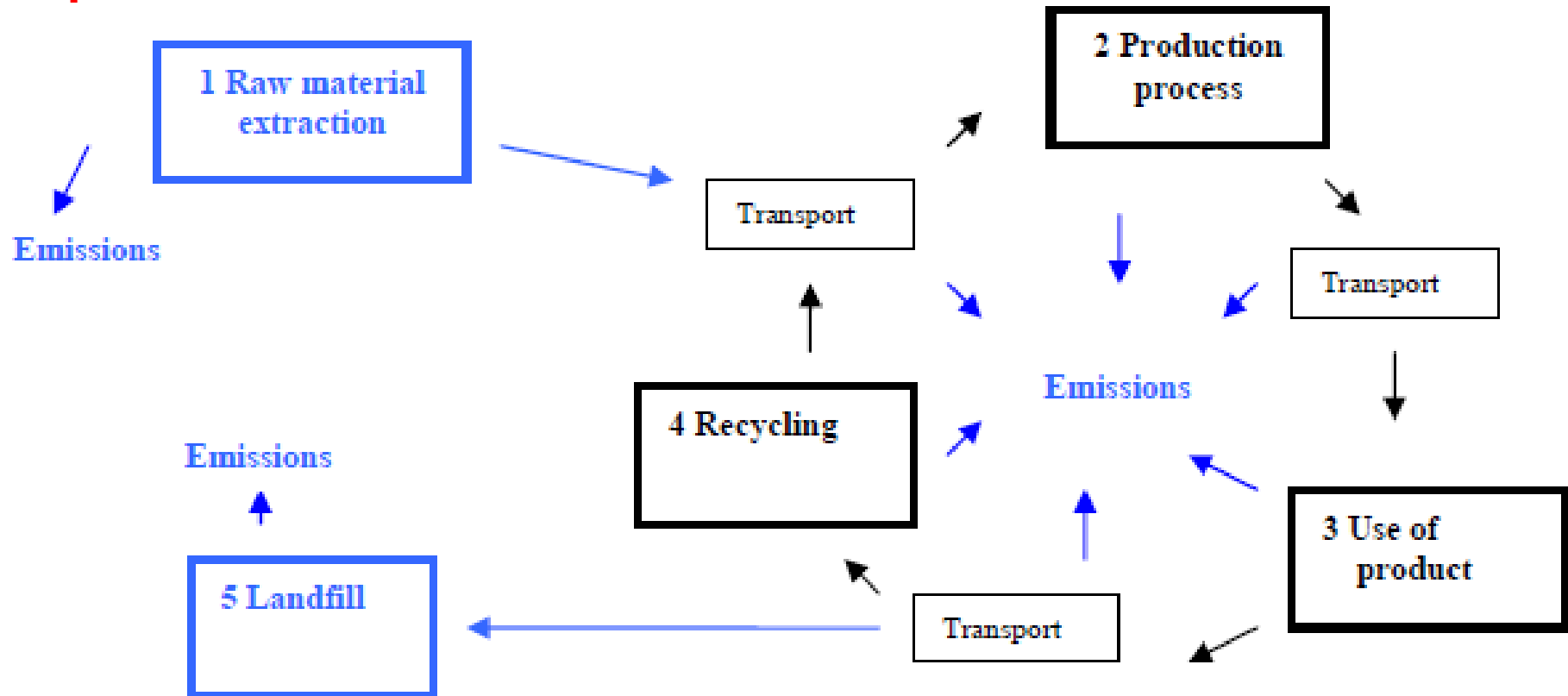
Konference “Dzīves cikla novērtējums biodīzeļdegvielas ražošanai Latvijā”  
24.11.2010.

# Summary

- Life-Cycle Assessment and Prespective
- Stages of an Life Cycle Assessment
- Impact assessment
- Interpretation of results
- Reporting
- Overview of Simapro

# Life-Cycle Assessment and Perspective

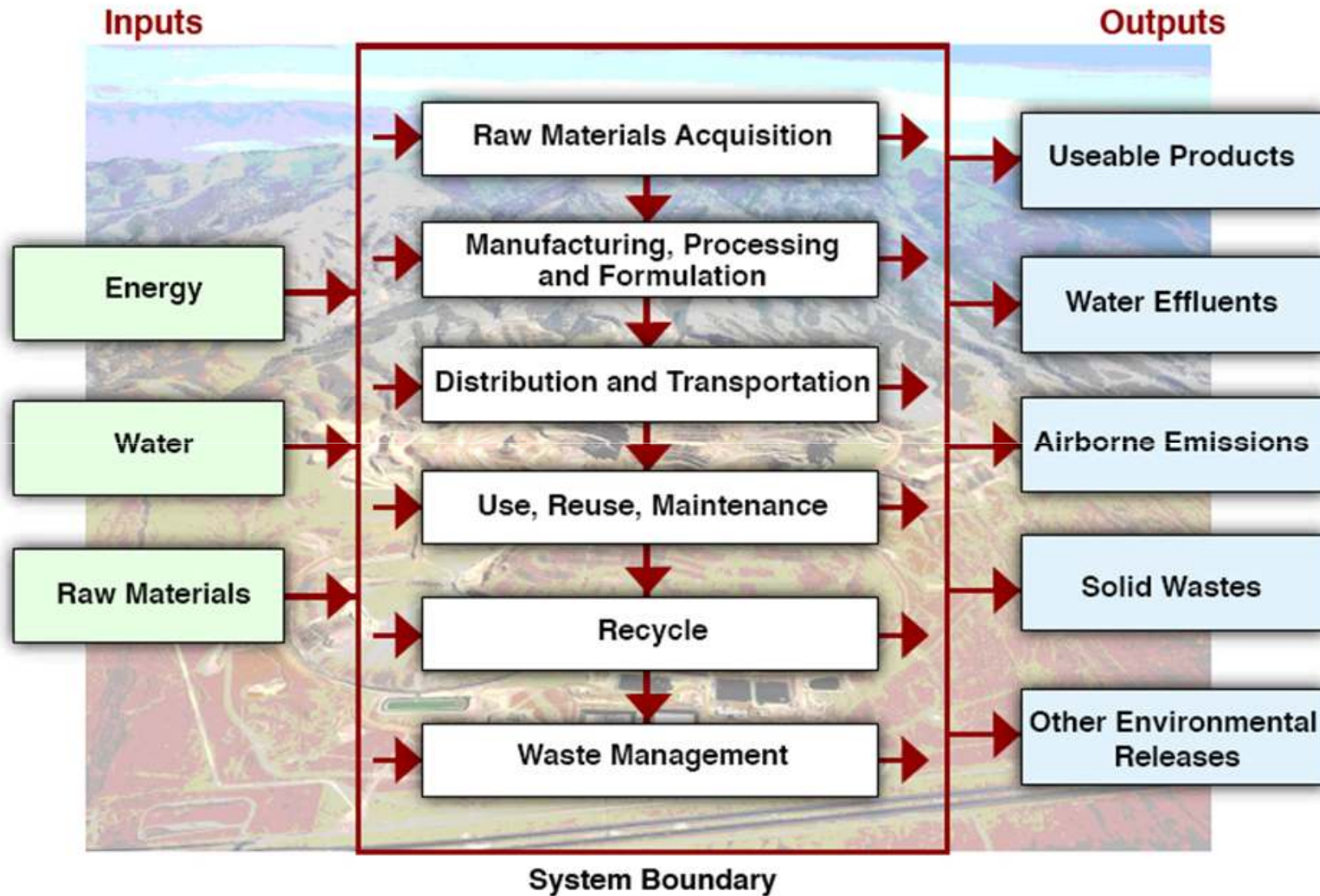
- Life cycle Assessment **considers the entire life cycle of a product**



Source: R. Carlson et al., LCA training package for users of LCA data and results, 2003

- Identification of the shifting of a potential environmental burden**

# Life-Cycle Assessment and Prespective



Source: RTU summer school 2010, LCA, Dainius Martuzevicius

Environmental mechanism

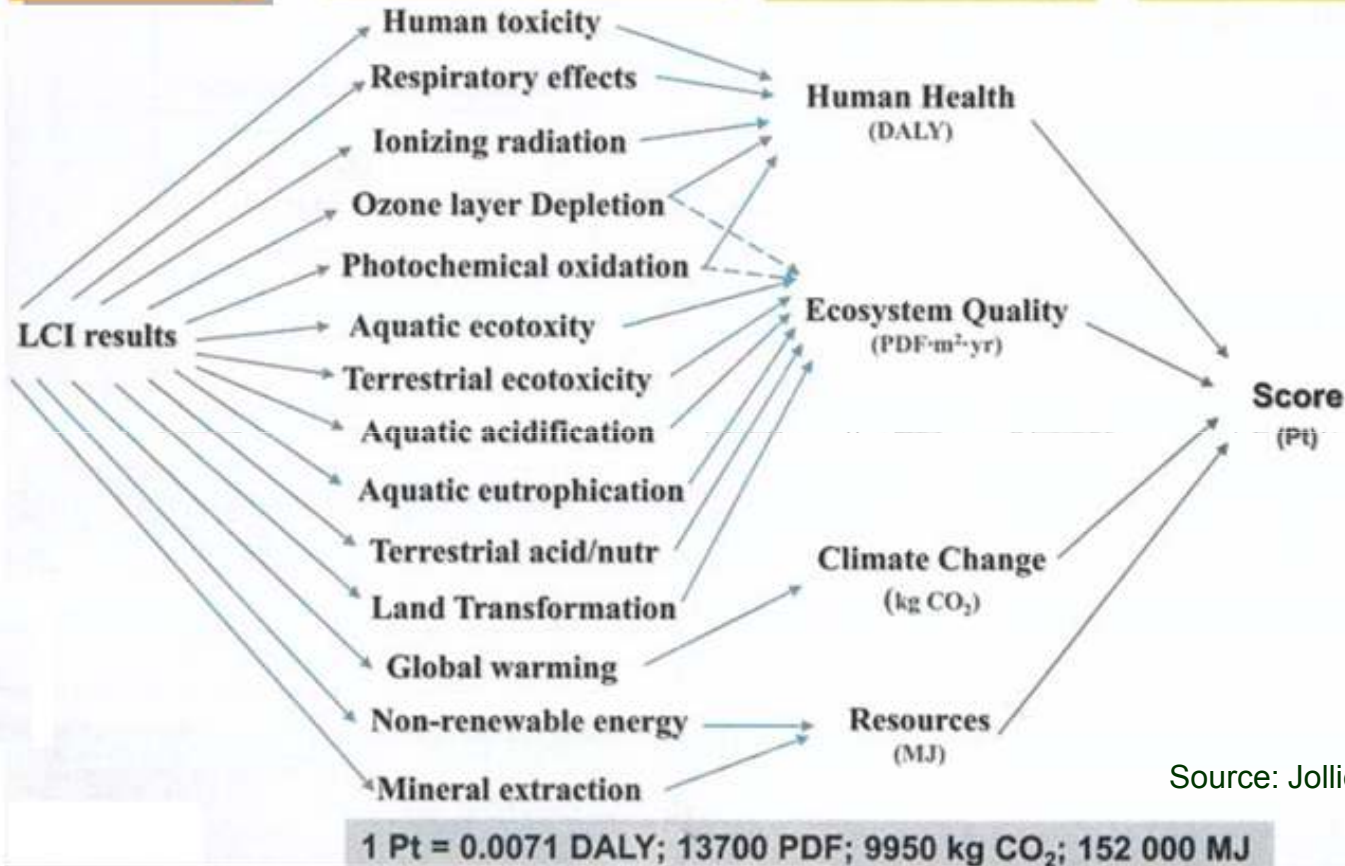
Inventory

Midpoint categories

Damage categories

Weighting

category is



Source: Jolliet et al., IMPACT 2002+, 2003

- The environmental impact is expressed by impact categories: mid-point effects, end-point effects.

Impact categories/category

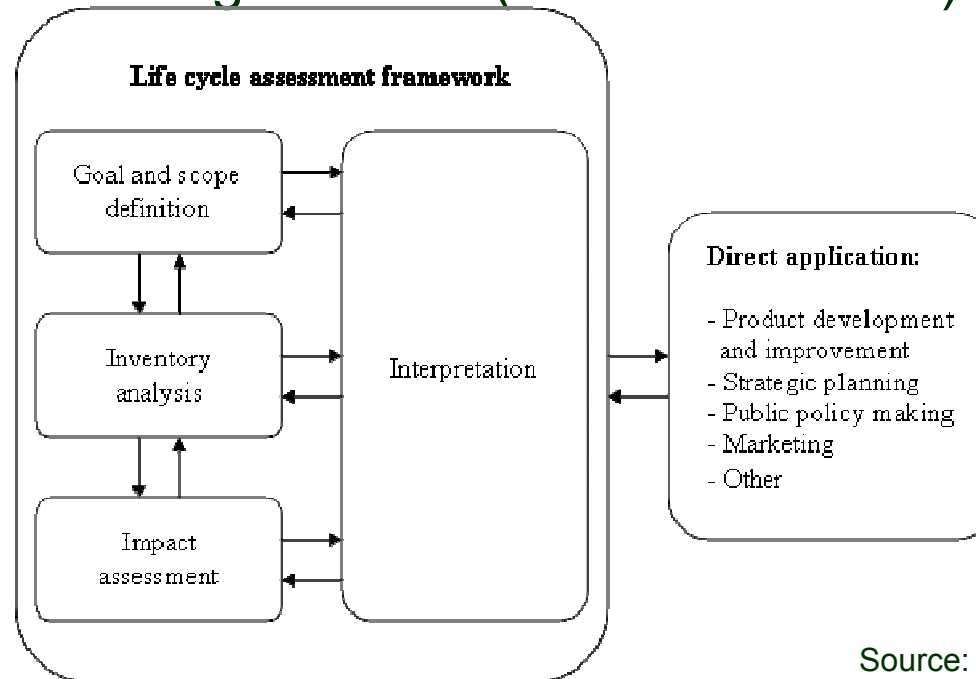
Source: R. Carlson et al., LCA training package for users of LCA data and results, 2003



# Stages of Life Cycle Assessment (1)

## ISO 14040

- Goal and scope definition (ISO 14041:1998)
- Inventory analysis (ISO 14041:1998)
- Life cycle impact assessment (ISO 14042:2000)
- Life cycle interpretation (ISO 14043:2000)
- Requirements and guidelines (ISO 14044:2006)



Source: ISO Standards 14044

# Stages of Life Cycle Assessment (2)

## Goal and scope

- What is the purpose of the LCA?
- Who is the intended audience?
- What are the systems under study and what are their functions?
- What are the underlying assumptions / limitation?
- What are the data quality requirements?

# Stages of Life Cycle Assessment (3)

## Goal and scope - Items

- the product or process system to be studied;

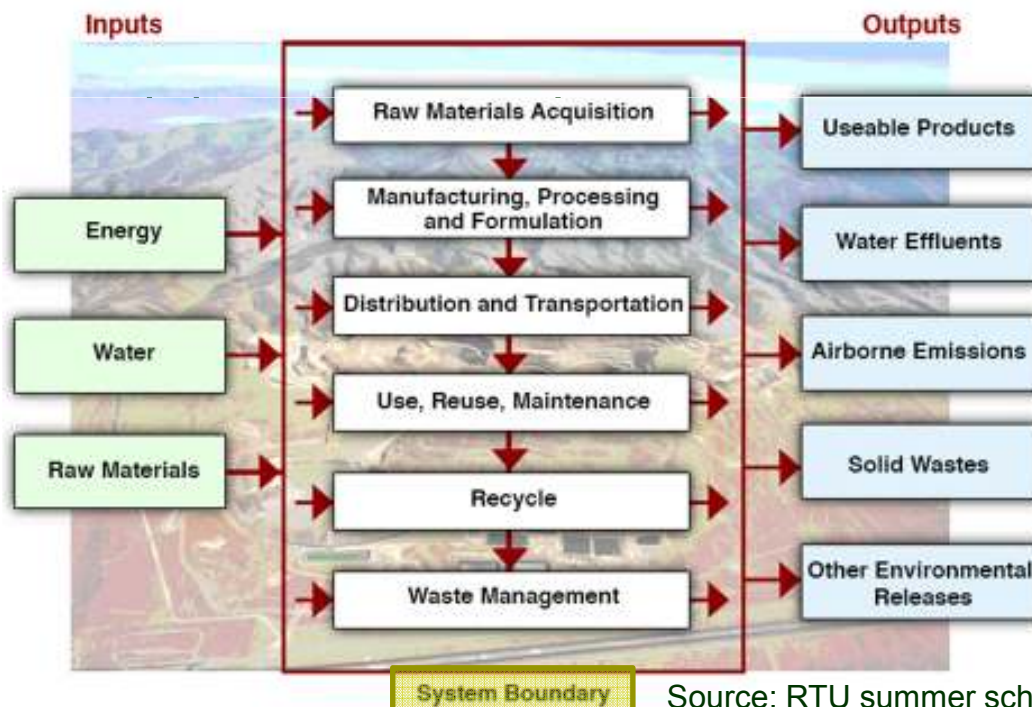
the functional unit;

the system boundary;

- **Measure of the functional performance** of the outputs of the product system,

- **Reference unit** for inputs and **Limits** of the subsequent processes

**Comparability** of results.



Source: RTU summer school 2010, LCA, Dainius Martuzevicius

## Stages of Life Cycle Assessment (4)

### Inventory

- What are the relevant emissions and resources the system produce or consume?
- How are these inputs and outputs allocated to the functions of the systems?
- What is the quality of data (uncertainties)?



**List of all the materials in the inputs and outputs.**

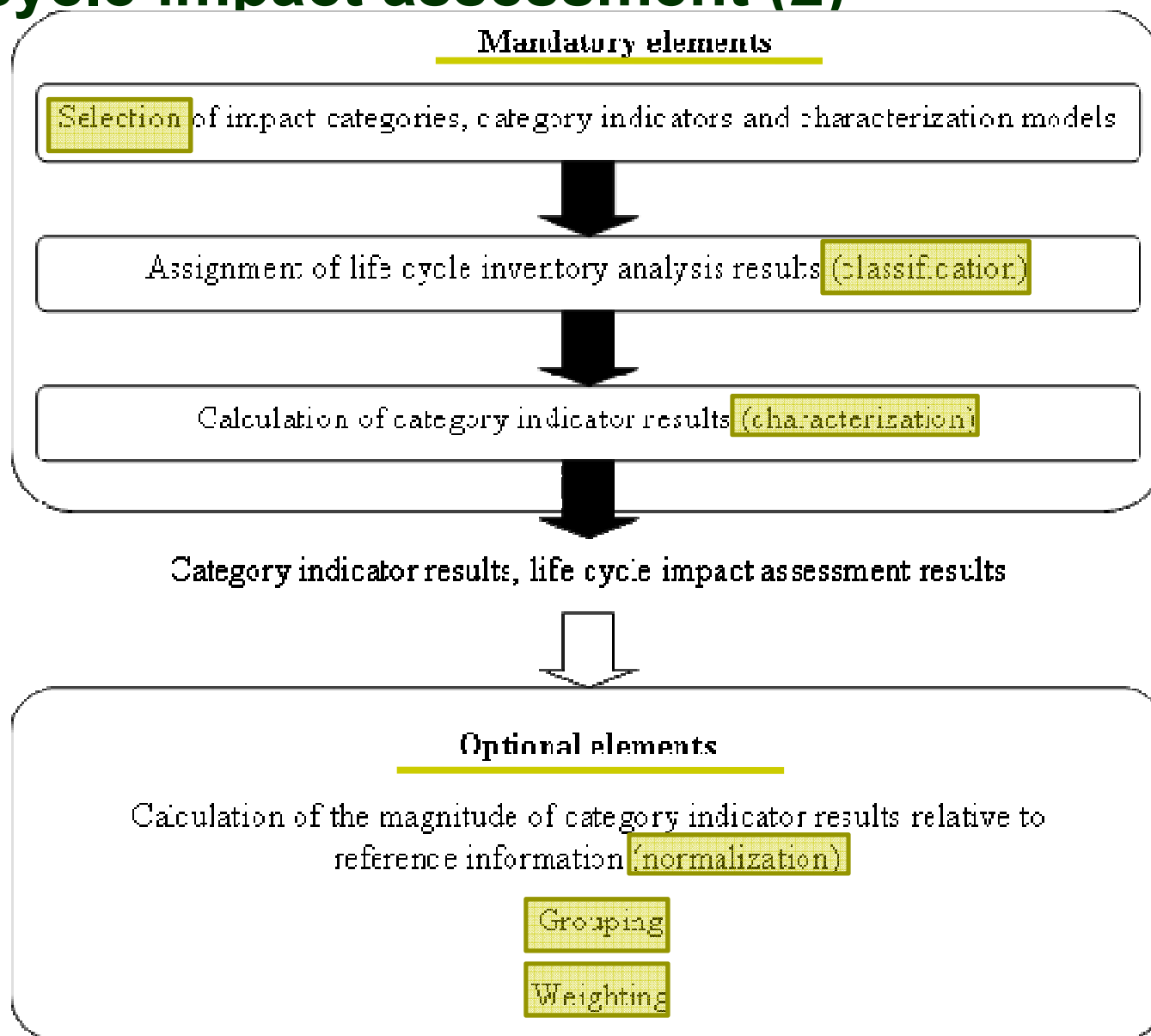
- 1) Preparing for data collection
- 2) Data collection
- 3) Calculation and allocation

**THE MOST TIME SPENDING !**

# Life cycle impact assessment (1)

- Which impact categories are considered and which models are used?
- What environmental impacts are caused by the emissions and the use of resources from the system?
- How is the aggregation within the impact categories performed?
- Are impact categories weighted and, if so, how?

## Life cycle impact assessment (2)



Source: ISO  
Standards  
14044

# Interpretation

- What are the conclusions?
- What are the limitations?
- How reliable and sensitive are the results?
- What are the recommendation?



**Summary and discussion** as a basis for **conclusions**, **recommendations** and decision-making in accordance with the goal and scope definition

# Reporting

- An effective report should address **the different phases of the study** under consideration.
- **Report the results and conclusions of the LCA** in an adequate form to the intended audience, addressing the data, **methods and assumptions applied in the study, and the limitation** thereof.

## Overview of Simapro: Database structure

The SimaPro database main parts:

- 1. Project data:** data for the project currently performed.
- 2. Library data:** contains data to serve as a resource for your projects.
- 3. General data:** storage data for all libraries and projects (e.g. unit conversion factors and the central list of substance names).

# Overview of Simapro: the LCA explorer

S:\Documents and Settings\All Users\Documents\Simapro\Database\Professional; Biodiesel\_2

File Edit Calculate Tools Window Help

**LCA Explorer**

Wizards  
Wizards  
Goal and scope  
Description  
Libraries  
DQI Requirements  
Inventory  
Processes  
Product stages  
System descriptions  
Waste types  
Parameters  
Impact assessment  
Methods  
Calculation setups  
Interpretation  
Interpretation  
Document Links  
General data  
Literature references  
DQI Weighting  
Substances  
Units  
Quantities  
Images

Processes

- Material
  - Agricultural
    - Animal production
      - Animal foods
    - Food
      - Others
      - Plant oils
        - Byproducts
        - Infrastructure
      - Plant production
  - Ceramics
  - Chemicals
  - Construction
  - Electronics
  - Fibers
  - Fishery
  - Food
  - Fuels
  - Glass
  - Input Output
  - Laminates
  - Metals
  - Minerals
  - Others
  - Paper+ Board
  - Plastics
  - Textiles
  - Water
  - Wood
- Energy
- Transport
- Processing
- Use
- Waste scenario
- Waste treatment

Name /	Unit	Waste type	Project	DQI
Crude cc	kg	not defined	Ecoinvent system processes	
Crude cc	kg	not defined	Ecoinvent unit processes	
Palm kerri	kg	not defined	Ecoinvent system processes	
Palm kerri	kg	not defined	Ecoinvent unit processes	
Palm oil,	kg	not defined	Ecoinvent system processes	
Palm oil,	kg	not defined	Ecoinvent unit processes	
Rape oil,	kg	not defined	Ecoinvent system processes	
Rape oil,	kg	not defined	Ecoinvent unit processes	
Rape oil,	kg	not defined	Ecoinvent system processes	
Rape oil,	kg	not defined	Ecoinvent unit processes	
Rape oil,	kg	not defined	Ecoinvent system processes	
Rape oil,	kg	not defined	Ecoinvent unit processes	
Rape oil,	kg	not defined	Ecoinvent system processes	
Rape oil,	kg	not defined	Ecoinvent unit processes	
Rapeseed	ton	not defined	Biodiesel_2	
Rapeseed	ton	not defined	Biodiesel_2	
Rapeseed	ton	not defined	Biodiesel_2	
Rapeseed	ton	not defined	Biodiesel_2	
Soya oil,	kg	not defined	Ecoinvent system processes	
Soya oil,	kg	not defined	Ecoinvent unit processes	
Soybean	kg	not defined	Ecoinvent system processes	
Soybean	kg	not defined	Ecoinvent unit processes	
Soybean	kg	not defined	Ecoinvent system processes	
Soybean	kg	not defined	Ecoinvent unit processes	

New  
Edit  
View  
Copy  
Delete  
Used by  
 Show DQI specifications  
 Show as list

13229 items  
1 item selected

# Overview of Simapro: entering data

## PROCESSES

**New material process**

Documentation | Input/output | Parameters | System description

Products

Known outputs to technosphere. Products and co-products

Name	Amount	Unit	Quantity	Allocation %	Waste type	Category	Comment
(Insert line here)	0	kg	Mass	100 %	not defined	Agricultural/Plant oils	

Known outputs to technosphere. Avoided products

Name	Amount	Unit	Distribution	SD <sup>2</sup> or 2*SDMin	Max	Comment
(Insert line here)						

Inputs

Known inputs from nature (resources)

Name	Sub-compartment	Amount	Unit	Distribution	SD <sup>2</sup> or 2*SDMin	Max	Comment
(Insert line here)							

Known inputs from technosphere (materials/fuels)

Name	Amount	Unit	Distribution	SD <sup>2</sup> or 2*SDMin	Max	Comment
(Insert line here)						

Known inputs from technosphere (electricity/heat)

Name	Amount	Unit	Distribution	SD <sup>2</sup> or 2*SDMin	Max	Comment
(Insert line here)						

Outputs

Emissions to air

Name	Sub-compartment	Amount	Unit	Distribution	SD <sup>2</sup> or 2*SDMin	Max	Comment
(Insert line here)							

Emissions to water

Name	Sub-compartment	Amount	Unit	Distribution	SD <sup>2</sup> or 2*SDMin	Max	Comment
(Insert line here)							

Emissions to soil

Name	Sub-compartment	Amount	Unit	Distribution	SD <sup>2</sup> or 2*SDMin	Max	Comment
(Insert line here)							

Final waste flows

Name	Sub-compartment	Amount	Unit	Distribution	SD <sup>2</sup> or 2*SDMin	Max	Comment
(Insert line here)							

Non material emissions

Name	Sub-compartment	Amount	Unit	Distribution	SD <sup>2</sup> or 2*SDMin	Max	Comment
(Insert line here)							

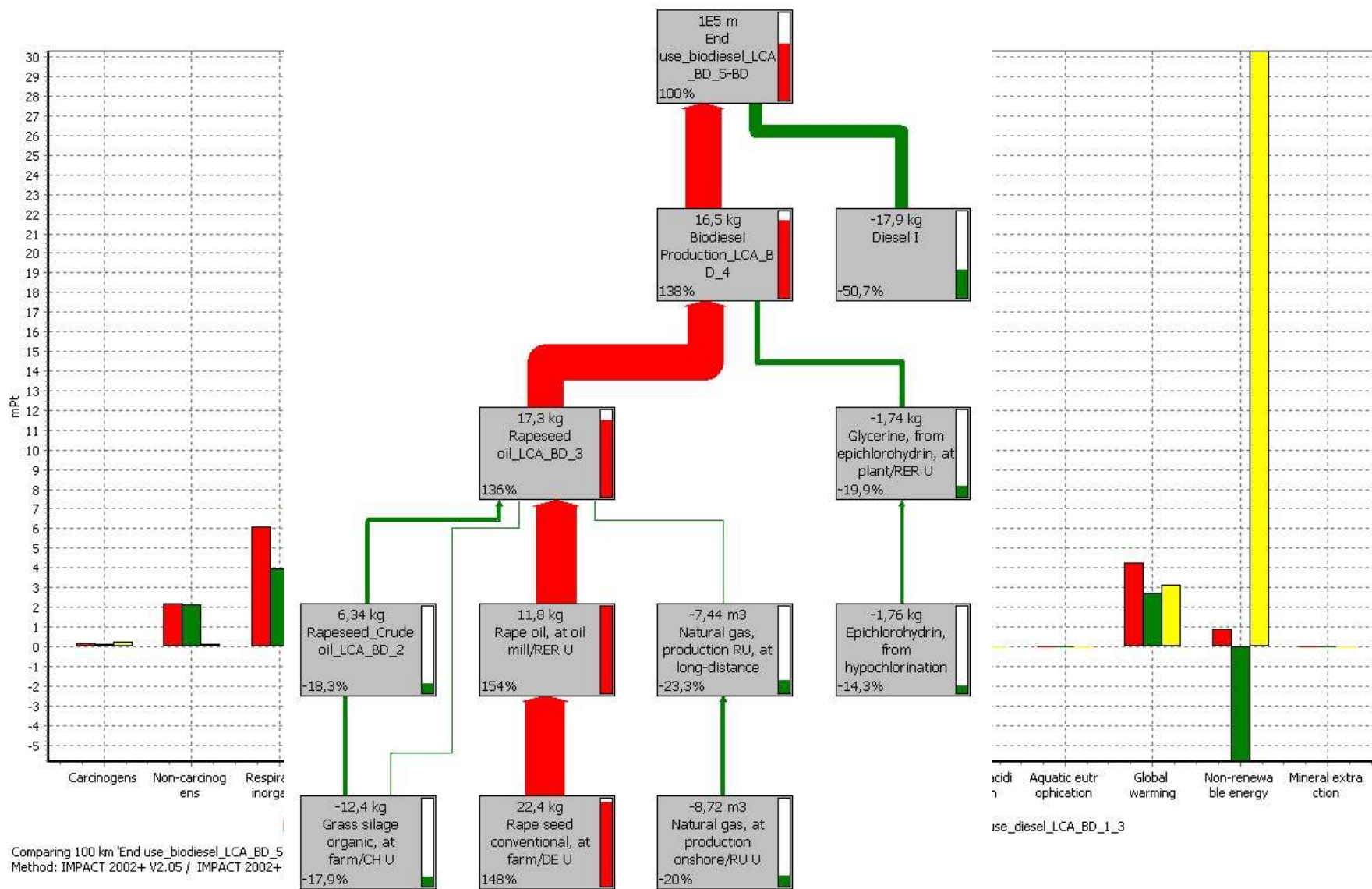
Social issues

Name	Sub-compartment	Amount	Unit	Distribution	SD <sup>2</sup> or 2*SDMin	Max	Comment
(Insert line here)							

Economic issues

Name	Sub-compartment	Amount	Unit	Distribution	SD <sup>2</sup> or 2*SDMin	Max	Comment
(Insert line here)							

# Overview of Simapro: showing results



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