Relations between environmental, economical and social aspects in LCM of technical objects

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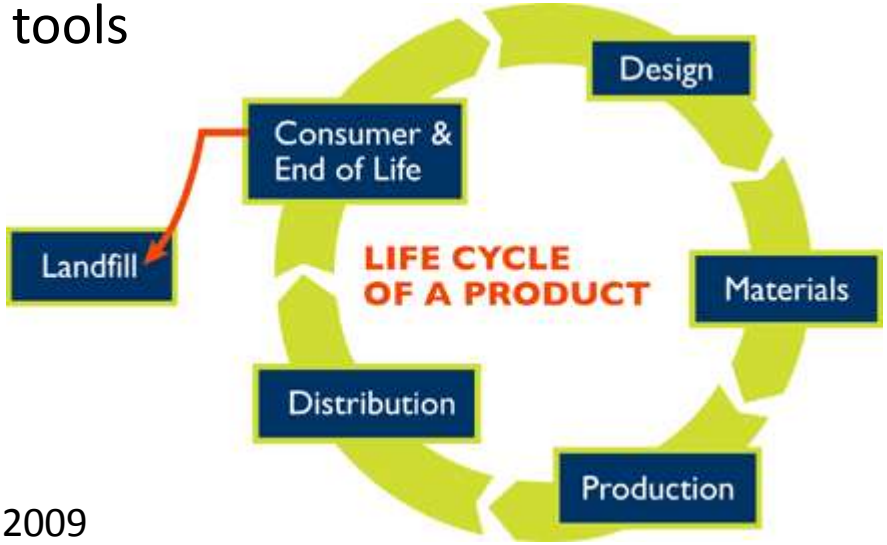
Presentation plan

- The idea of Life Cycle Management (LCM)
- Partial life cycle evaluation vs Modelling complex life cycle evaluation
- Interdependence of impact categories – examples of positive and negative correlations
- Introducing complex LCM into business practice
- Conclusions

Life Cycle Management (1)

- Framework to analyze and manage the sustainability performance of goods and services*
- Proposed integration of environmental, economical and social impacts in the LCM of an object
- Use of specialized tools

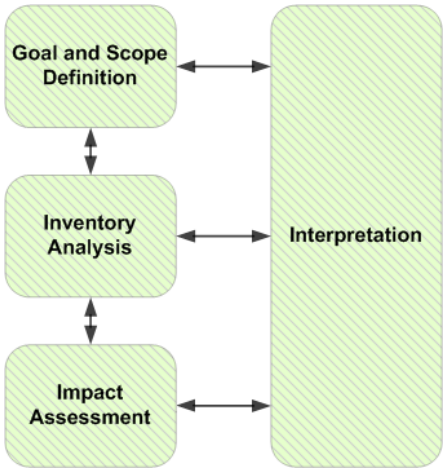
  (LCA, LLC, S-LCA)



*UNEP-SETAC guidelines 2009

Life Cycle Management (2)

- LCM concentrates mainly on environmental issues, using highly developed methodology
- Two dimensions of analysis:
  - Life cycle phases (project, produce, use, dispose)
  - Phases of analysis (goal & scope, LCI, LCIA, interpretation)



Life Cycle Evaluation Model (1)

Life cycle analysis methods (LCA, LCC, SLCA) →

← Quality level description or measurement		Development	Manufacturing	Utilization	Disposal	Result
	Environmental	ENV/DEV	ENV/MAN	ENV/USE	ENV/DIS	Env. Points
	Economical	ECON/DEV	ECON/MAN	ECON/USE	ECON/DIS	Money units
	Social	SOC/DEV	SOC/MAN	SOC/USE	SOC/DIS	Social Points
	Result	Quality Level	Quality Level	Quality Level	Quality Level	

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INDECO 2011

Life Cycle Evaluation Model (2)

PROS	CONS
Horizontal analysis can be conducted using existing life cycle assessment tools	
	Impossible to present a total result, due to the incompatibility of units
Vertical analysis reveals quality levels in each life cycle phase, but with no quantification	
Intuitive tool for comparison, e.g. existing and „zero” version of an object	

Interdependence of impact categories (positive)

Proposed change: **Redesigning the product, so that it contains more organic (plant-based) materials instead of petroleum-based resources**		
Environmental impact	Economical impact	Social impact
Lowered: organic materials are renewable and can be disposed easily without harm to the natural environment, no pollution from petrol industry	**Lowered**: the cost of obtaining and modifying organic materials to the needs of manufacturing is low, easy disposal means cheap disposal	**Lowered**: more people find employment in agriculture (especially in developing countries), people are not subject to the drawbacks of petrol industry

Interdependence of impact categories (negative)

Proposed change: **outsourcing the obligatory disposal of electronic equipment to a contractor operating in a country with very liberal environmental regulations**

Environmental impact	Economical impact	Social impact
Increased: landfilling or incinerating instead of recycling – means pollution and increased demand for natural resources in the future	**Lowered**: outsourcing the disposal lowers the total life cycle cost of a product from manufacturer's point of view	**Increased:** people employed as dismantlers lose their jobs, negative environmental impacts create a global problem, accusations of unethical conduct

LCM IN BUSINESS PRACTICE (1)

- Proinnovative B2B services focused on environmental, economical and qualitative development of products and services
- Cooperation between expert scientific knowledge and commercial approach to gain clients
- EU funding – the Innovative Economy Operational Programme (sub: Infrastructure & Environment)
- Project due to mid-2014 – about 320 services to be performed

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LCM in business practice (2)

- Three-step service procedure
  - **1** – validate the client's needs
  - **2** – choose the mode of development (qualitative, economical, environmental)
  - **3** – perform basic or detailed service
- Possibility for a two-directional development
- Inclusion of social aspects – compatible in qualitative development

Conclusions

- Increased consumer awareness creates a „fertile ground” for the development of LCM
- Reducing negative impacts in one category can have negative consequences for the overall impact of object’s life cycle
- Object can be developed „step by step”, but the innovation process is the key to substantially increase object’s sustainability performance


Thank You for the attention!