Monetization of social impacts as part of sustainability assessment: methodology and case study

4th international seminar on Social LCA

B. Liégey, E. van Overbeke,
S. Standaert, M. Coppens, B. De Caevel

RDC Environment

Our mission:

RDC Environment supports decision making towards a sustainable world

Our 4 activities:

Waste management

- **Economic and technical expertise** on waste management projects
- **All types of household & industrial** waste streams

LCA tools

- **Environmental labelling and eco-design tools**
- **User-friendly** and accessible by non-experts
- **Database** development

Sustainable evaluation

- **Innovative method based on several R&D projects**
- **Integration of environment, social and economic aspect through the whole life cycle**

Life Cycle Assessment

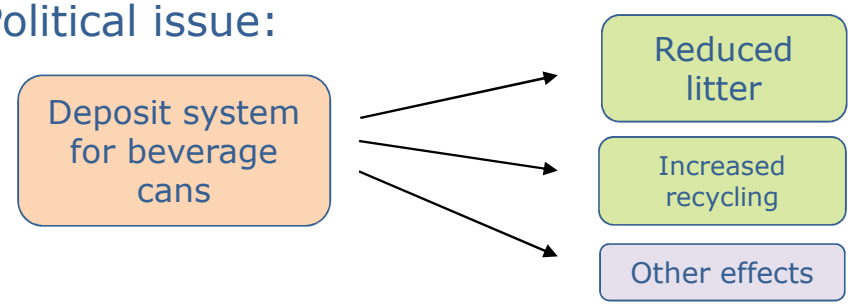
- **200 LCA studies** in various sectors
- **An expertise of standards** and **R&D projects** (PEF, Water Footprint, BPX30-323…)
- **Innovative LCA software "RangeLCA"**

Outline

- Presentation of a real case study :
  - Political decision about a waste management issue
  - Cost-benefit analysis (environmental, social, economic aspects)
- Presentation of our monetization methodology for 2 social aspects
  - Visual disamenities
  - Net job creation
- Results of the case study
- Conclusions related to monetization of social aspects
  - for sustainability assessment
  - for political decision

Case study: can deposit system

- Study for the Walloon Region (Belgium)
- Political issue:



Globally beneficial
or not for Belgium ?

- Assessing the balance between impacts

Environmental
Social
Economic

→ Cost-benefit analysis

- Functional unit

"Collection and treatment of the cans consumed in Belgium in 2010"

Scope of the case study

	Current situation	Prospective scenario with deposit	Main differences
Production		Specific production of cans for Belgium	Increased production costs
End-of-life	Collection Selective collection Non-selective collection	Collection Deposit-refund Selective collection Non-selective collection	Refund: Costs (machinery and wages) Employment Consumer time Elimination of can litter
End-of-life	Treatment Including sorting and recycling	Treatment Including sorting and recycling	Global increase in recycled material

Globally beneficial ? **→ single score through monetization (CBA)**

Monetization principles

- How are human beings affected by a decision ?

1 € of well-being =
welfare brought by 1 additional € of wealth to a citizen with mean revenue

Environmental
Social
Economic

Chain of effects

Length of life
YOLL

Quality of life
Health
(Dis)amenities
Leisure time
Utility of consumption

Monetary valuation

Through economic valuation methods

Monetization principles

Example : air emission of PM2.5

Environmental

e.g. emission of
1 kg of particles
PM2.5 into the air

Impact pathway approach

Full modelling of the effect chain:

→ Fate modeling

→ Dose response curves

→ **Health effects (suffered)**

Length of life
YOLL

Quality of life
Health
(Dis)amenities
Leisure time
Utility of consumption

Monetary valuation

Through economic valuation methods

→ Willingness to pay for avoiding
- YOLL
- Morbidity cases

Monetization of visual disamenities

Litter

Environmental / Social:
can litter

Visual impacts

Length of life
YOLL

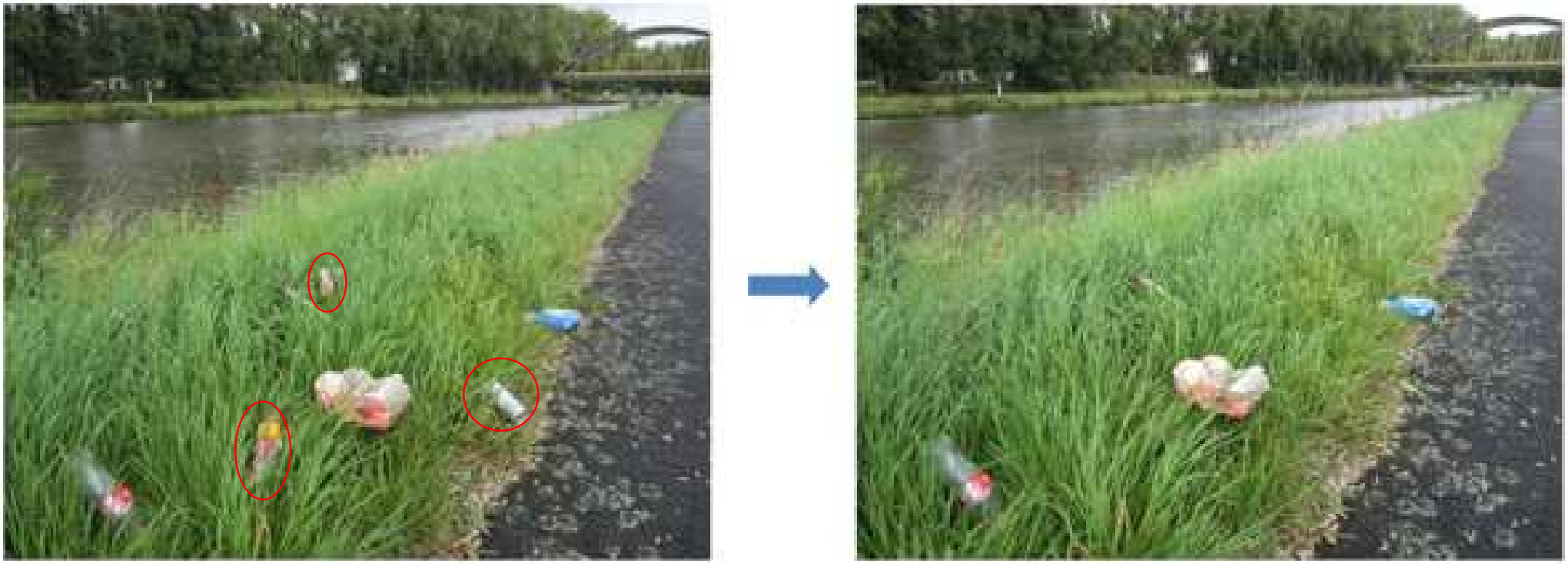
Quality of life
Health
(Dis)amenities
Leisure time
Utility of consumption

Monetary valuation

Through economic valuation methods

→ **Local contingent valuation**: willingness to pay of the population to reduce visual impacts

Local contingent valuation



Local contingent valuation

Methodology

Internet survey

Sample of 1000 persons

Collaboration with Ipsos

Elimination of biased answers

→ **willingness to pay of the population to eliminate can litter = 9 to 22 € / year / household** :

Monetization of job creation

Social:
1 additional person working instead of unemployed

= net job creation

List of effects

→ Individual impacts on worker: well-being and employability

→ Societal development

- Reduction of inequalities
- Increase of social capital (cohesion and social norms)
- Improvement of collective living conditions → e.g. potential impacts on delinquency, addiction, hygiene conditions, etc.

→ Direct effects: Decrease of unemployment expenses + increase of income tax

→ Induced effects of wage on the economy

Monetization of job creation

List of effects

→ Individual impacts on worker

→ Societal development

Social:
1 additional person working instead of unemployed

→ Direct effects on public budget

→ Induced effects

Length of life
YOLL

Quality of life
Health
(Dis)amenities
Leisure time
Utility of consumption

Monetization of job creation

List of effects

→ Individual impacts on worker

→ Societal development

Worker
Society

Social:
1 additional person working instead of unemployed

= "Externalities"

Length of life
YOLL

Quality of life
Health
(Dis)amenities
Leisure time
Utility of consumption

Monetary Valuation

Through observed political valuation

→ Direct effects on public budget

→ Induced effects

Monetization of job creation

- Observed political valuation

→ **subsidies** delivered by public authorities to support net job creation

When one job is created: Increase in society's well-being >= amount of the subsidy

Value of one job-year (net creation)= $\frac{Subsidy\ for\ job\ insertion\ program}{Number\ of\ subsequent\ years\ worked}$

- Application:
  - Subsidy of the Walloon Region for reintegration through training by work in a company
  - Number of years worked: based on literature (surveys and modeling)
- Justification: the selected subsidy avoids
  - Deadweight (*effet d'aubaine*): to avoid measure supporting a job that would have been created anyway → net job creation value
  - Feedback effect: not to take into account the avoided expenses (unemployment benefits) and increase in income tax → valuation of the social externalities

Monetization of job creation

- Value used in the study = 11 k € per job year (full-time-equivalent, FTE)
- Comments:
  - Order of magnitude
  - Robustness of the value: similar values observed in a large panel of countries (OECD-type)

- In each study: need to model the link between working hours and net job creation
  - Our assumption in this study: 1 hour of work = 1 hour of net job creation

Monetization principles: summary

Environmental
Social
Economic

Chain of effects

Length of life
YOLL

Quality of life
Health
(Dis)amenities
Leisure time
Utility of consumption

Monetary valuation

Illustration of 3 possible approaches:

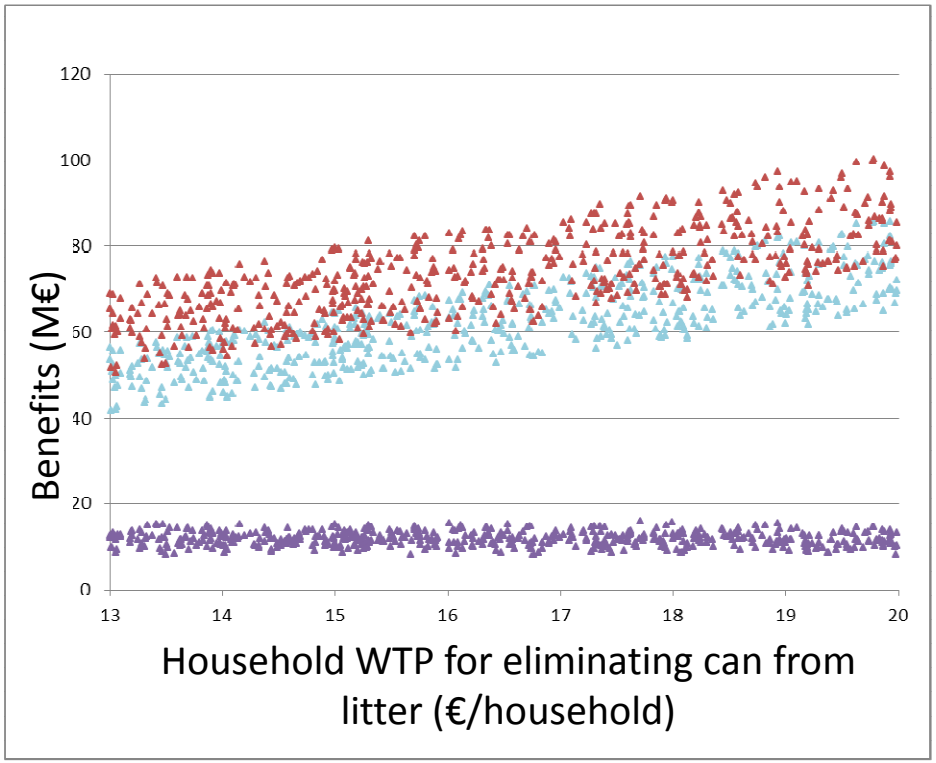
1. Full modeling of the effect chain + monetization of final effects
2. Straight effect chain → WTP through declared preferences
3. Revealed preferences already integrate comprehensively the effect chain

Results: social aspects

Social balance of the deposit system versus current situation

Our *RangeLCA* software

→ **Range graph**:
Representing results for all combinations of variable or uncertain parameters



Total social benefits

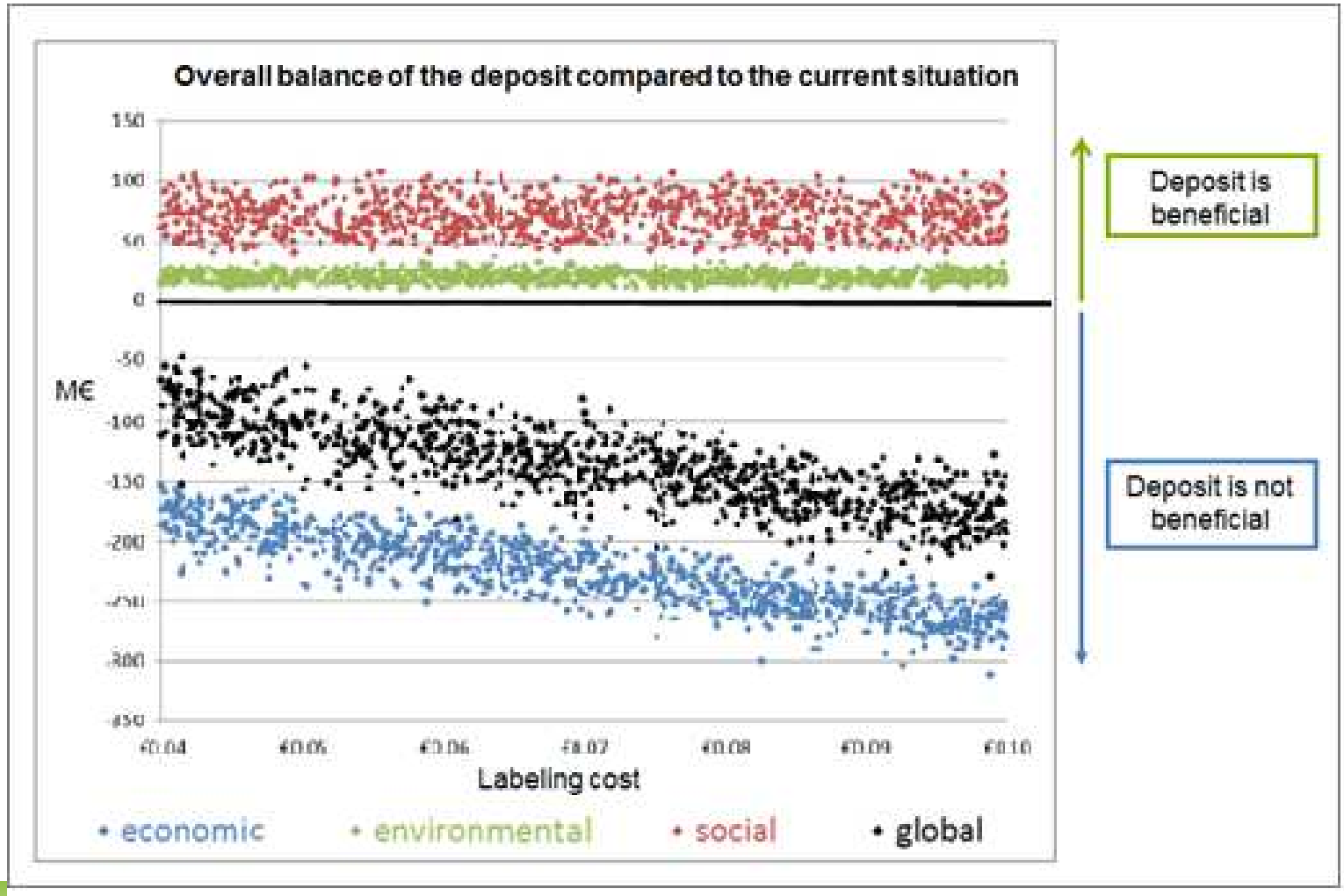
Benefits of elimination of can from litter

Assumed consequence of deposit

Benefits of job creation

(700 to 1450 FTE-jobs created, assimilated to net job creation)

Results: Environmental + social + economic



Remark: the current situation implies already a high rate of recycling due to a successful selective collection system and to partial recovery at incineration.

Total : for all studied cases

Globally not beneficial

Economic costs not compensated by social and environmental benefits

Conclusions

Monetization of social aspects

- Case study: main issues captured
- Local contingent valuation : effective added value
- Use of revealed preferences expressed by public authorities

Monetization

- Allows balancing impacts of different nature
- Avoids other forms of weighting (that can be arbitrary)
- Allows efforts to be concentrated on key points
- Helps political decision (but does not replace it)

Thank you for your attention.

RDC Environment SA

Av. Gustave Demey,57 (2nd Floor)
B-1160 Bruxelles (Belgique)

Tél. + 32 (0)2 420 28 23
Fax +32 (0)2 428 78 78

Web : www.rdcenvironment.be
E-Mail : rdc@rdcenvironment.be

Life Cycle Assessment,
Waste Management,
Impact Assessment