Duurzaam Materialenbeheer

Het pad naar Urban Mining in Vlaanderen

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UNIVERSITEIT GENT

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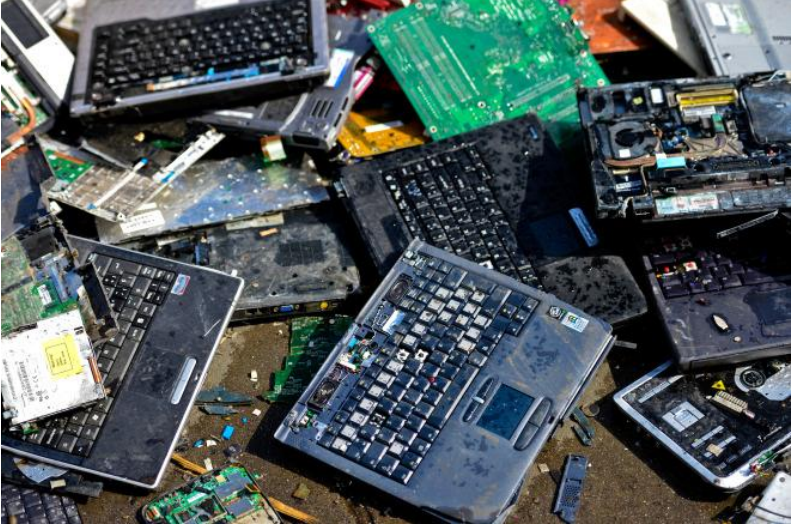
KNOWLEDGE IN ACTION

Universiteit Antwerpen

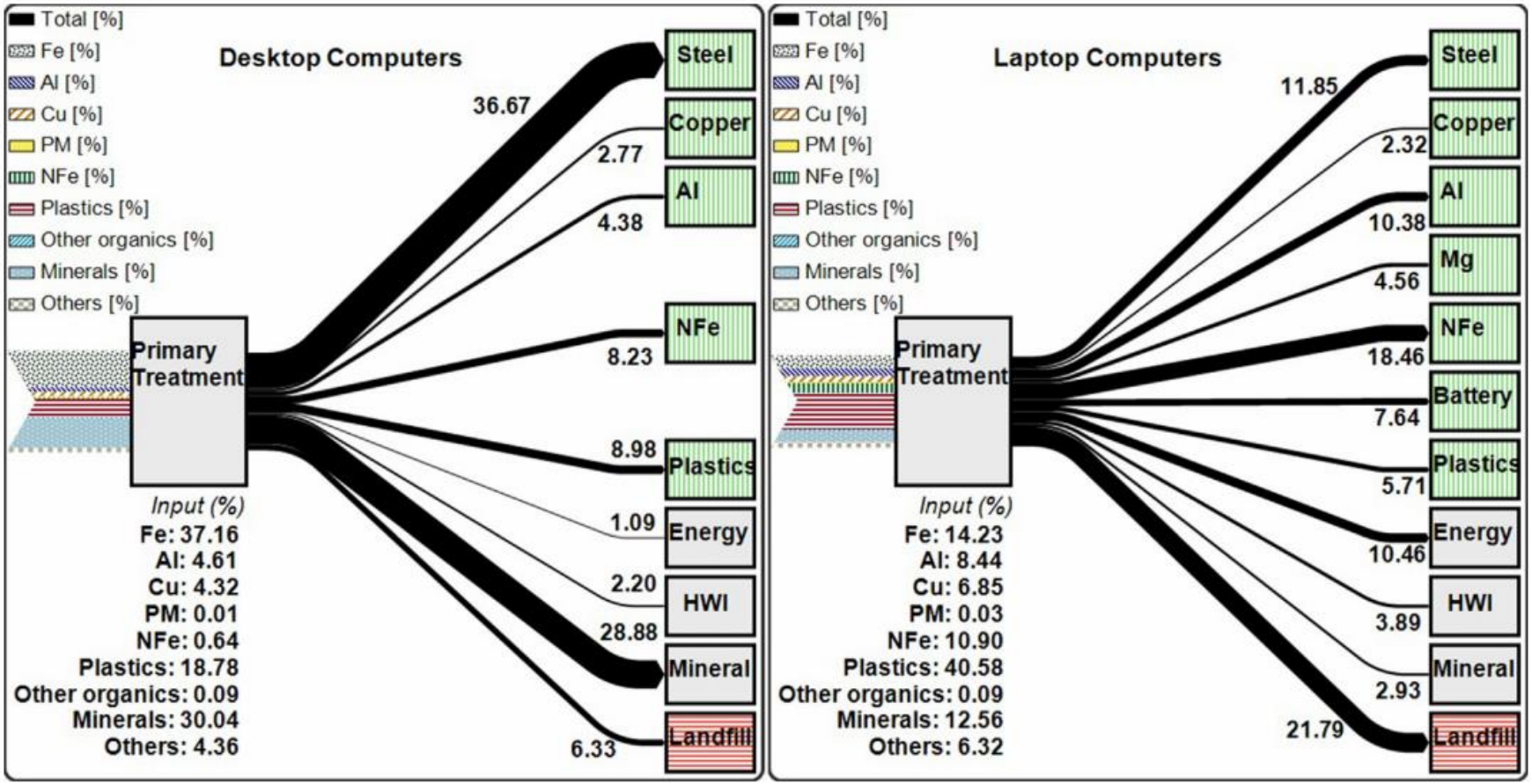
Doel van deze sessie

Op basis van enkele cases huidige status bespreken met opportuniteiten/bottlenecks bij urban mining in Vlaanderen

- Case 1: E-Waste: Computers & Batterijen
- Case 2: Material recycling
- Case 3: Ecodesign



Case 1: E-WASTE & batterijen



	Desktops				Laptop		
	Input	Recycled	MWR		Input	Recycled	MWR
	kg	kg	%		kg	kg	%
Ferrous	3.72×10^{2}	3.32×10^{2}	89		1.42×10^{2}	1.22×10^{2}	86
Aluminium	4.61×10^{1}	3.80×10^{1}	83		8.44×10^{1}	6.37×10^{1}	75
Copper	4.32×10^{1}	3.37×10^{1}	78		6.85×10^{1}	5.84×10^{1}	85
Precious metals	1.13×10^{-1}	5.52×10^{-2}	49		2.90×10^{-1}	1.84×10^{-1}	63
Other non-ferrous metals	6.39×10^{0}	1.87×10^{0}	29		1.09×10^{2}	9.82×10^{1}	90
Plastics	1.88×10^{2}	8.09×10^{1}	43		4.06×10^{2}	5.14×10^{1}	13
Other organics	9.14×10^{-1}	0	0		8.74×10^{-1}	0	0
Minerals	3.00×10^{2}	0	0		1.26×10^{2}	0	0
Others	4.36×10^{1}	0	0		6.32×10^{1}	0	0
Total	1.00×10^{3}	4.86×10^{2}	49		1.00×10^{3}	3.94×10^{2}	39

- At Belgian level (2013) estimated: 32 tonnes of steel, 17 tonnes of aluminium, 15 tonnes of copper, 14 tonnes of plastics, and 48 kg of precious metals
- 19% (by mass) in Belgium, 57% in the rest of the EU, and the remaining 24% to the rest of the world
- According to the model of Wang et al. (2013 and 2014) only 11% of the waste laptops generated in 2013 were collected by Recupel

Duurzaam Materialenbeheer

The drivers and barriers to battery pack drop-off intention perceived by Belgian households

Outline

- Introduction
- Methodology
- (Data collection and sampling)
- (Model evaluation)
- Results
- Discussion and conclusions

Introduction

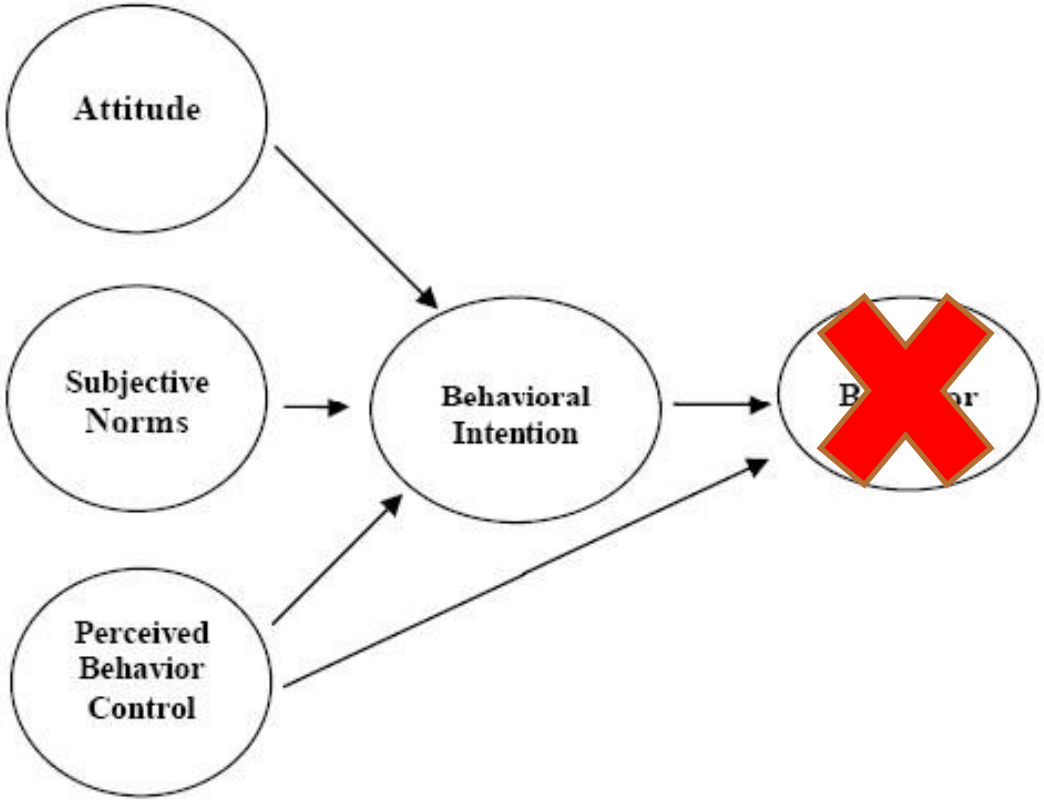
- Take-back scheme
- BEBAT: collecting & recycling
- Target ☺ <-> battery packs ☹
- Behavioral issue
- Pro-environmental behavior

Methodology

- The basic Theory of Planned Behavior states that:
  - attitude (+) towards the behavior,
  - subjective norms (+) towards the behavior and
  - perceived behavioral control (+) of the behavior
- shape an individual's behavioral intentions and behaviors
- Empirical findings show R^2 is low -> expanded models

Methodology

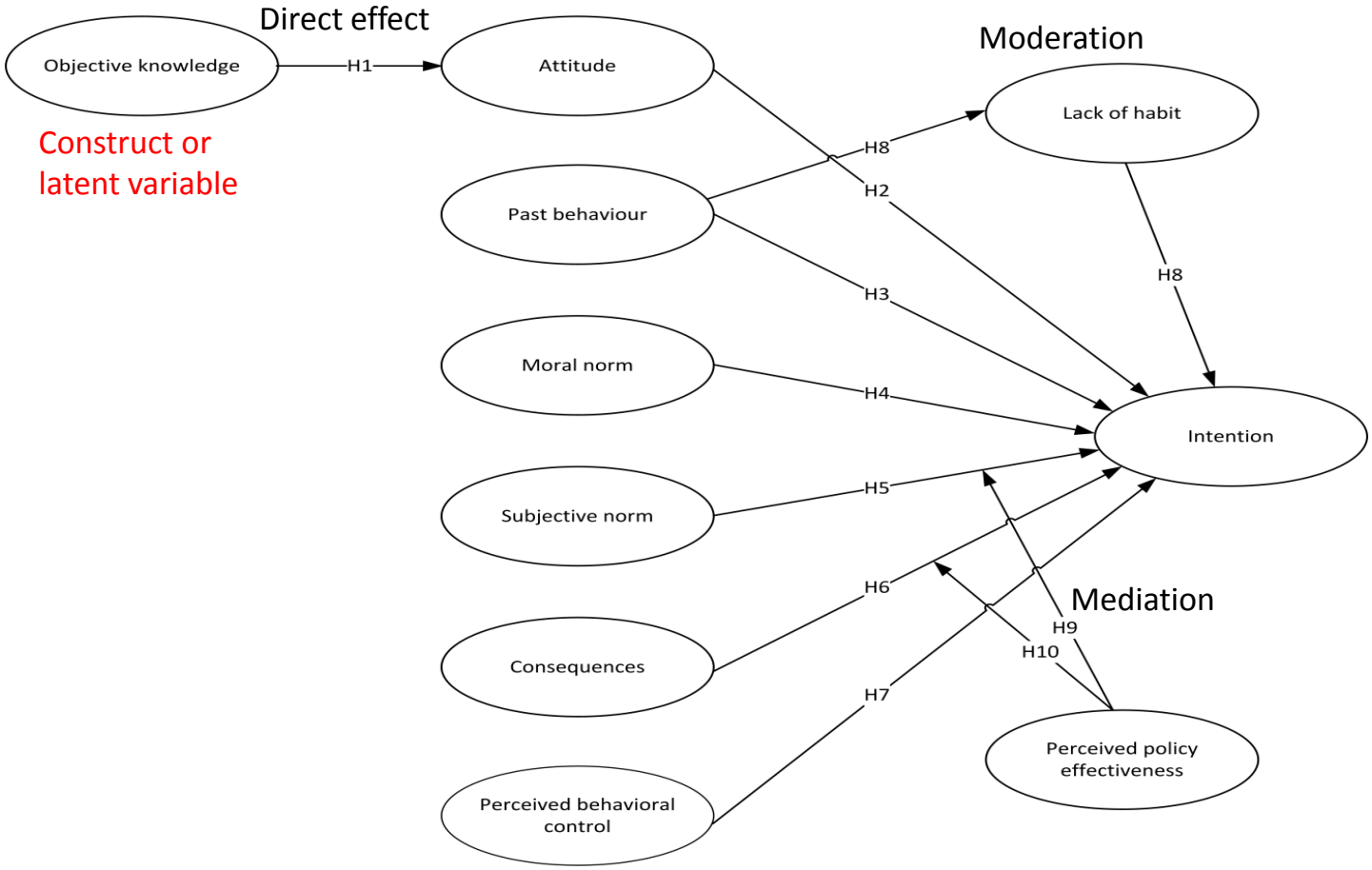
BASIC



Methodology

- Theory of Planned Behavior: expanded structural model:
  - Past behavior (+)
  - Objective knowledge (+)
  - Perception of consequences (+)
  - Moral norms (+)
  - Lack of habits (-)
  - Perceived policy effectiveness (+)

Methodology



Intention towards dropping off unnecessary and removable battery packs as soon as possible to a BEBAT collection point

Results

- Attitude: generally positive
- Consequences: environment, example, future generation, waste
- Moral norms: generally highly activated
- Subjective norms: approve vs desirable
- Perceived behavioral control: **think** they can do it
- Lack of habit: other collection points

Results

- PPE: BEBAT is effective: **most** ☺ guidelines - **least** ☺ about facilities

- Knowledge:

  - Not obliged to sort batteries: 63% <-> crowding out

  - BEBAT collects battery packs: 56%

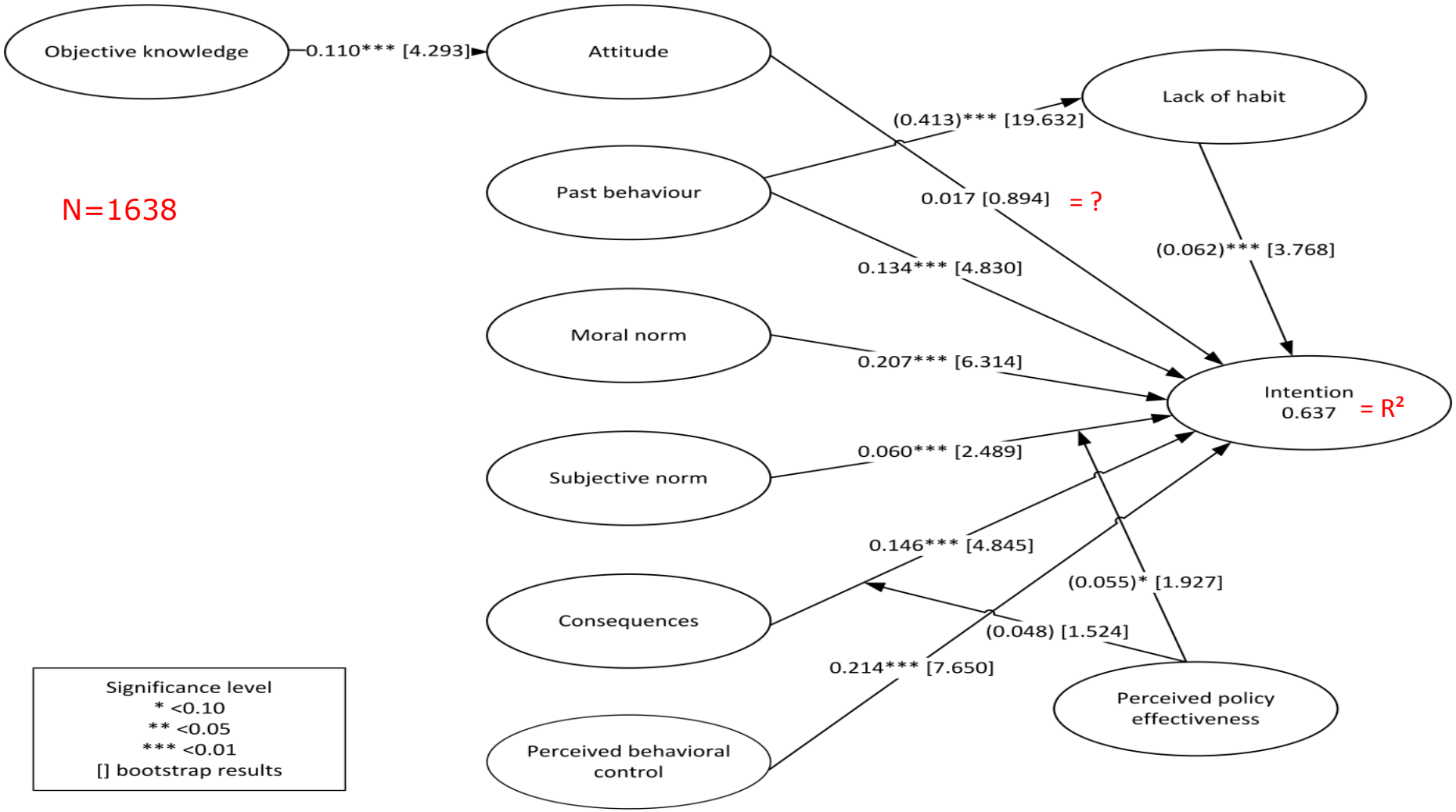
  - Facilities: Schools and toy stores least known

  - Removable battery packs: in everything

Results

- Past behavior:
  - Brought back majority of battery packs to BEBAT: 78%
  - Why not: other selling point or pass it on, don’t know where to drop it of, don’t know I could
  - Mitigate: label, shared collection point WEEE/batteries

Result



N=1638

Significance level
* <0.10
** <0.05
*** <0.01
[] bootstrap results

Results: MGA

- **Moral norms** have a *stronger + im*pact on intention for people having a *high pro-ecological* worldview, but a *lower + impact* for *families -12* compared to families +12

- **Consequences** have a *stronger + impact* on intention for *families -12* compared to all other life stage categories.

- The features causing **most observed heterogeneity** are: pro-ecological worldview and the life stage: family -12

N≠1638

Discussion and conclusions

- Model predicts the intention well
- No one size fits all:
  - *Subjective norms & moral norms* have less of an influence on families with kids -12, but *consequences* have an above average influence
  - Lack of habit is related to lower ecological worldview
- Intention is not the same as behavior:
  - Label
  - Shared facility

Future work

- Qualitative interviews -> insight in why/how
  - Master thesis student

- Effectiveness of BEBAT campaign for raising awareness of battery packs
  - Bachelor thesis students

Think about it…

- Do you sort your batteries?
- Who brings back the batteries?
- How often do you do that? How often do you forget?
- (How) Is the process organized?
- Do you feel guilty if you don’t do it? Do you feel proud when you do?
- Is it fun to you?
- What would motivate you to do it more (often)?
- What types of batteries do you know of?
- Do you bring back battery packs?
- Did you see/hear the latest BEBAT campaign on tv/radio?
- Did you hear the part about battery packs?
- Can you tell me a couple devices in which you can find battery packs?
- Do you have kids? If so, have you collected enough batteries yet?
- Is it fun?
- Why do you think you sort your batteries?
- Do you sort other types of waste?
- Do you consider yourself to be environmentally aware?

Duurzaam Materialenbeheer

Hoe moet het verder?

- Consumentengedrag
- Zeldzame metalen
- Plastic
- Trend van toenemende complexiteit en afnemende massa’s van producten
- …

Duurzaam Materialenbeheer

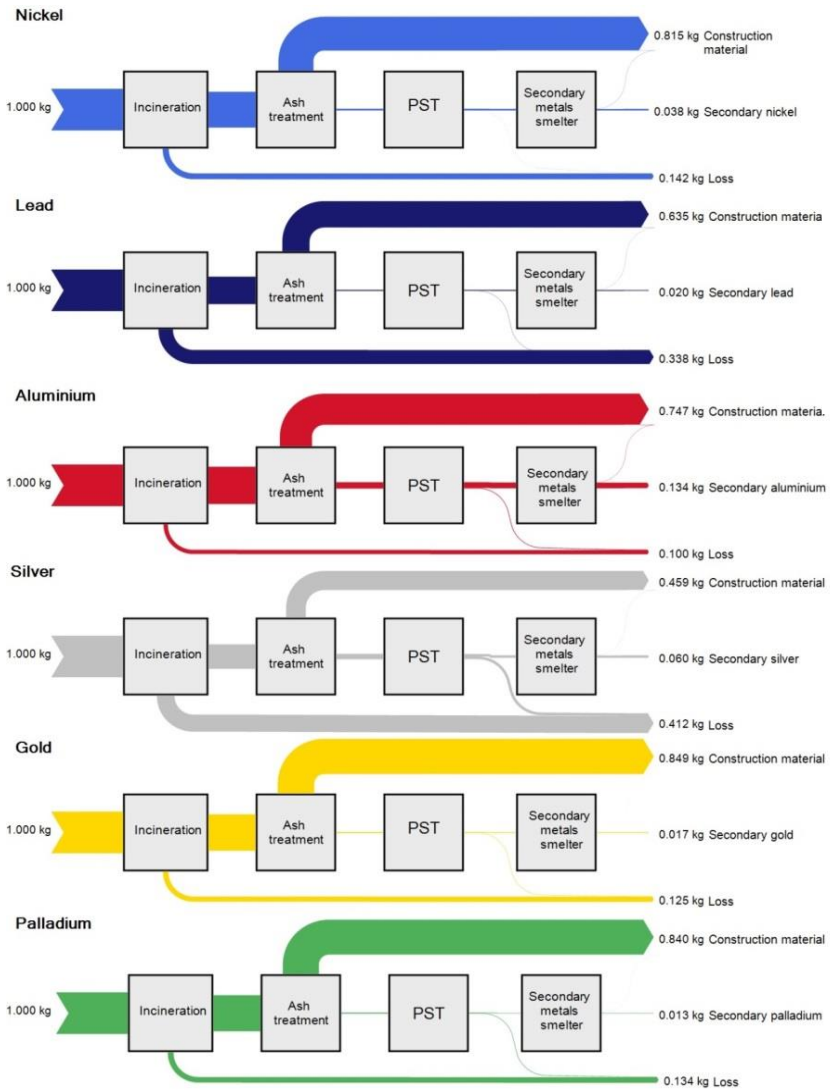
Case 2: Material recycling

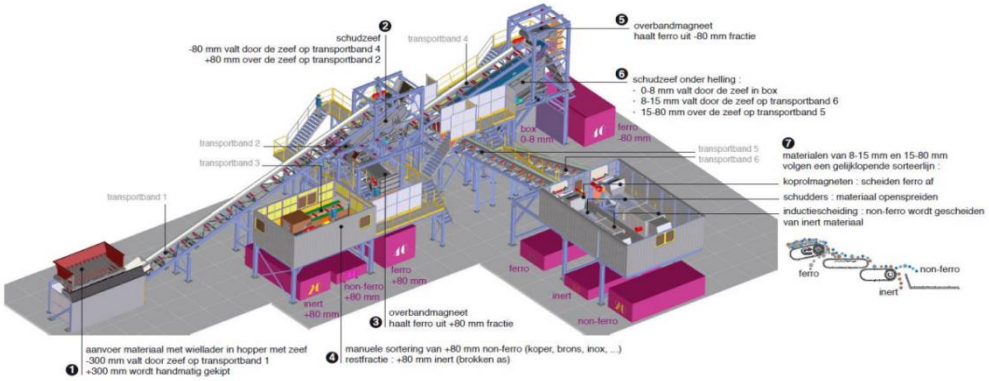
?

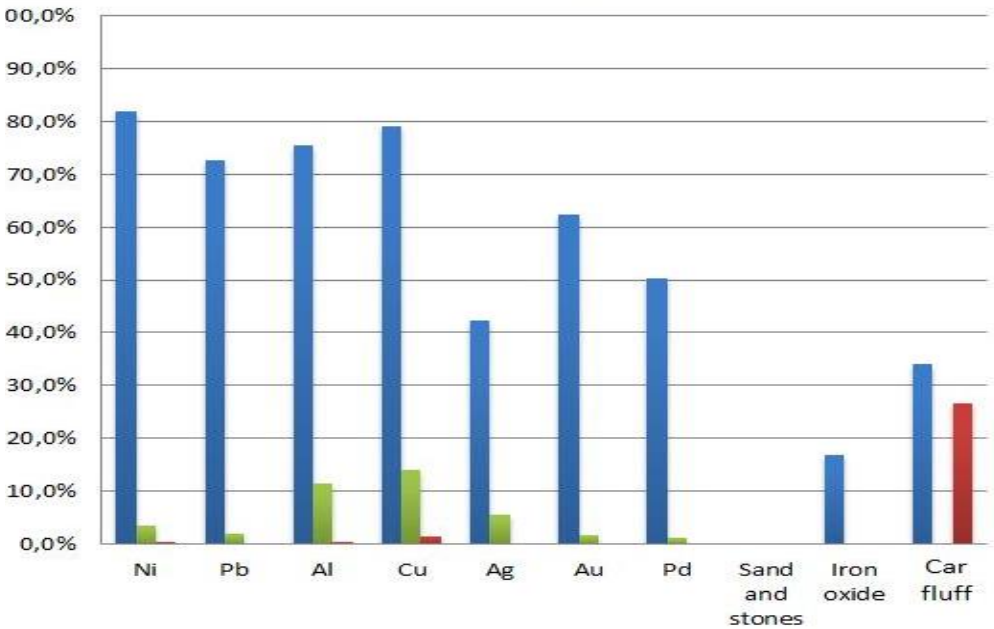
	Recycling	Recovery
Benefit rate	78,2%	39,6%

?

Milieuwinst recyclage







Milieuwinst recyclage

Hoe de criticality bepalen?

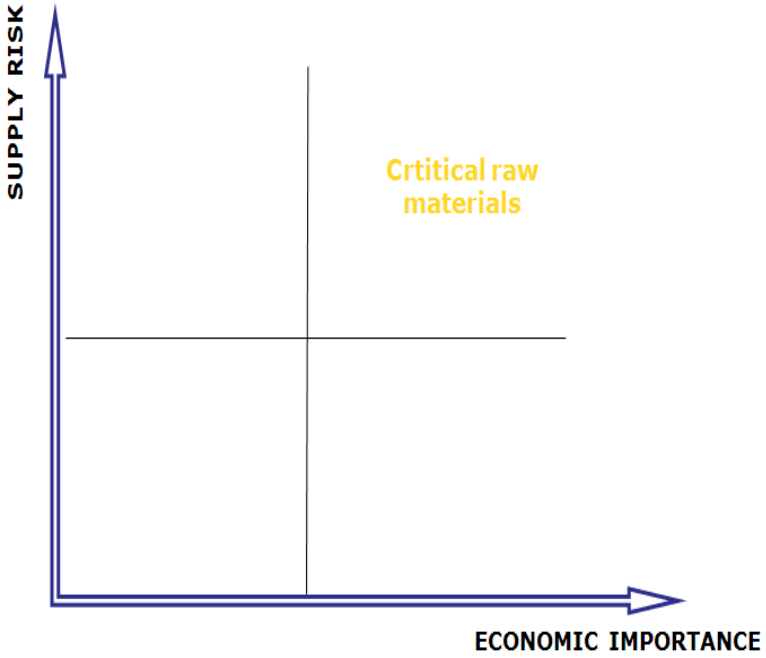
Economic importance

- Importance of a raw material per economic sector & importance of the sector in the EU economy

Supply risk

- Political and economic stability
- Level of production concentration
- Potential for substitution
- Recycling rate

EU 2014



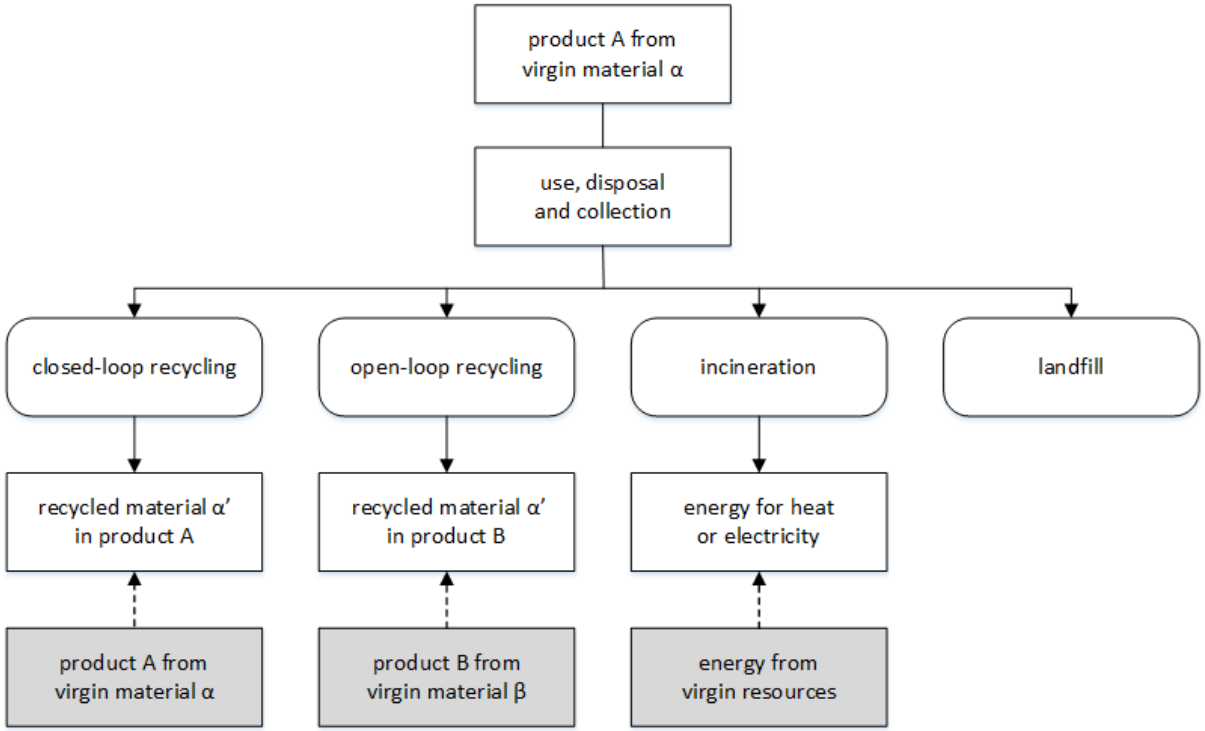
Duurzaam Materialenbeheer

Hoe de juiste route voor afval bepalen/sturen?

- Economisch
- Milieukundig
- Criticality
- Verbeterende technieken stimuleren
- …

Duurzaam Materialenbeheer

Case 3: Ecodesign



Fairheid tegenover lagere kwaliteit afval!

Maximum bereikbare kwaliteit met die stroom?

Probleem daarvan zit dus bij design, niet noodzakelijk bij afvalverwerking

Duurzaam Materialenbeheer

Hoe omgaan met verschillende kwaliteiten afval in beleid?

Hoe ecodesign stimuleren?

- Verder gaan dan assembly-ecodesign
- Verder gaan dan A, AA+, …
- Zorgen dat maximale recyclage effectief mogelijk is?

Discussie

Hoe moet het verder?

- Consumentengedrag
- Zeldzame metalen
- Plastic
- Trend van toenemende complexiteit en afnemende massa's van producten
- …

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Policy Research Centre

3rd generation

Sustainable Materials Management

Bedankt voor uw aandacht