

SUSTAINABLE INNOVATION of PRODUCTS and SERVICES

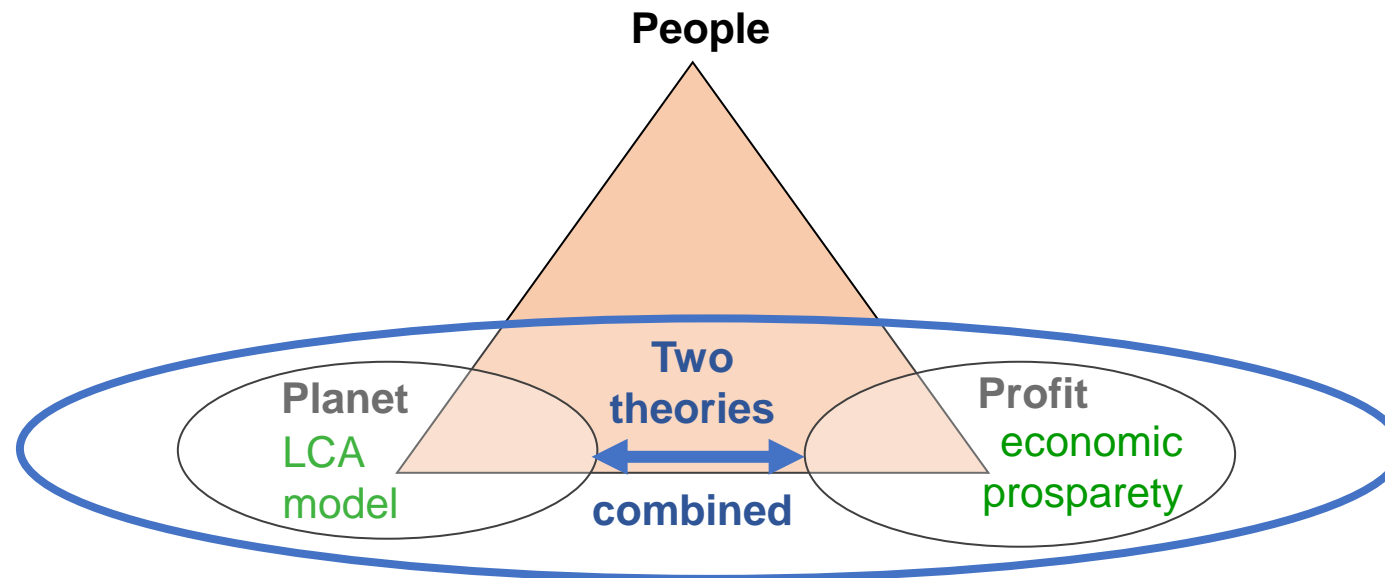
Eco-efficient Value Creation, EcoDesign, and Marketing of Green Products

- Introduction to EVC
- EVR examples
- Green Product Marketing
- Exercise and Discussion

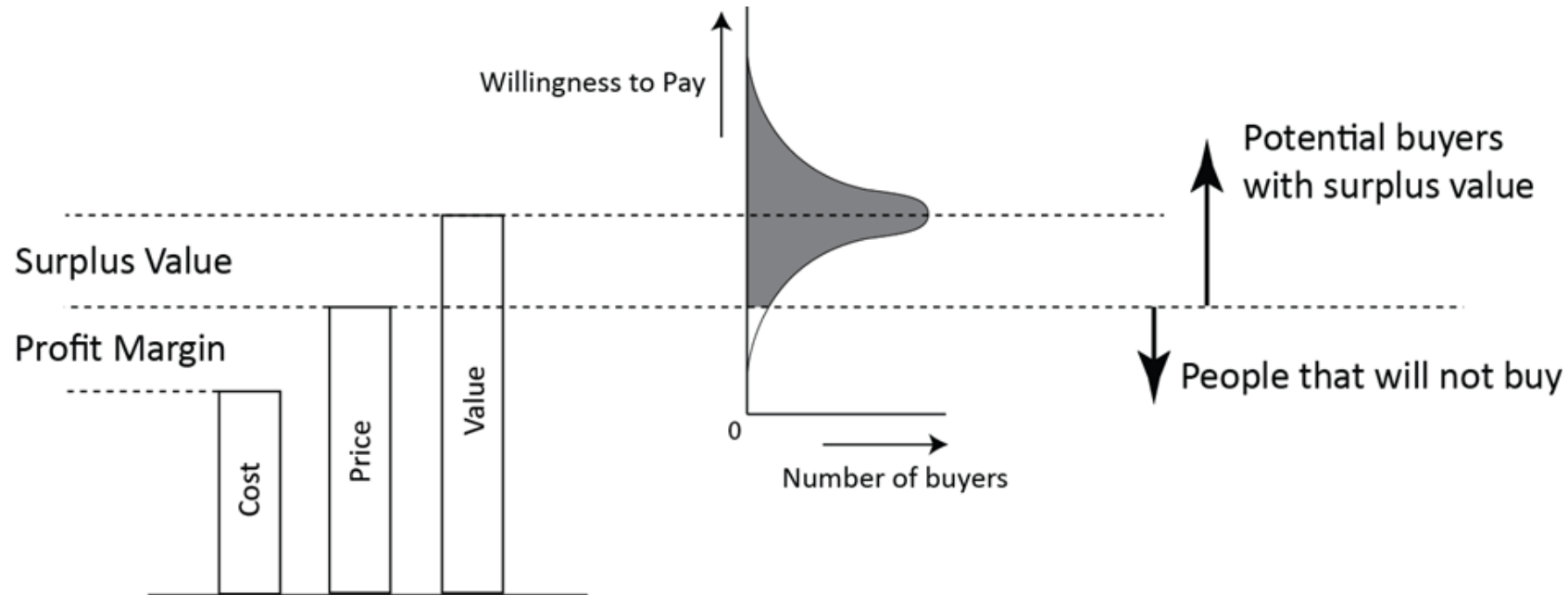
Eco- Efficient Value Creation (EVC) is related to the mission statement of the WBCSD (1995):

“The delivery of competitively priced goods and services that satisfy human needs and bring ‘quality of life’,
while progressively reducing ecological impacts and resource intensity, throughout the lifecycle, to a level at least in line with the earth’s estimated carrying capacity”

value
‘profit’
eco-costs
‘planet’

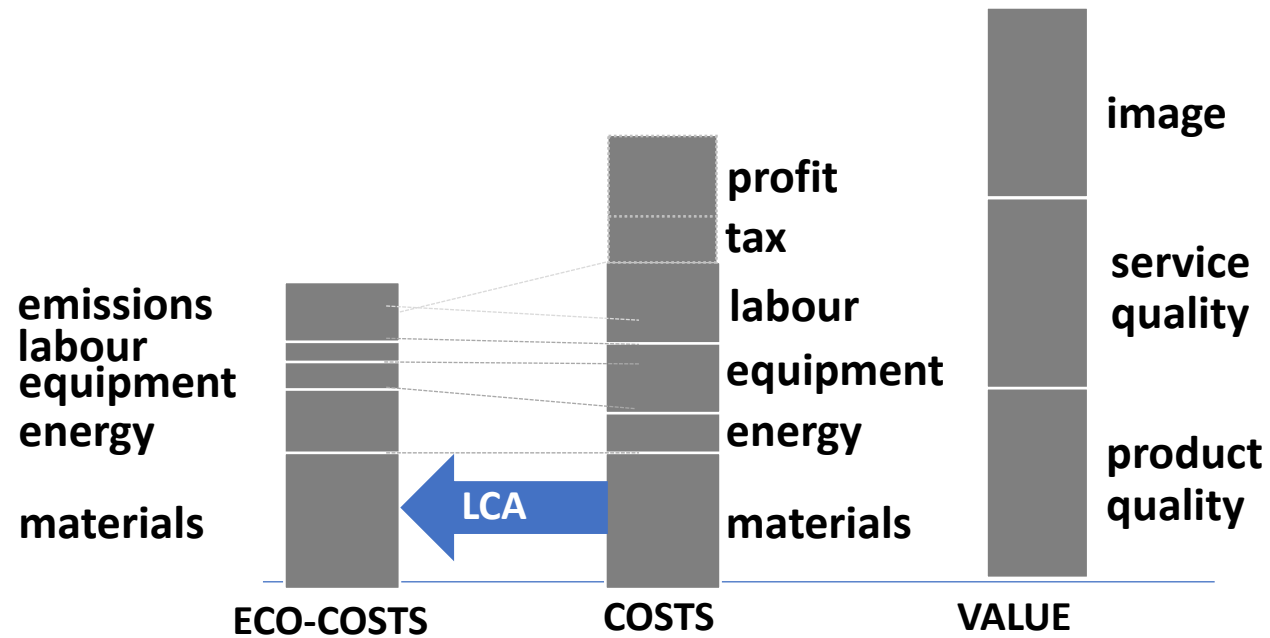


The value of a product: a complex, and sometimes confusing, issue in management science

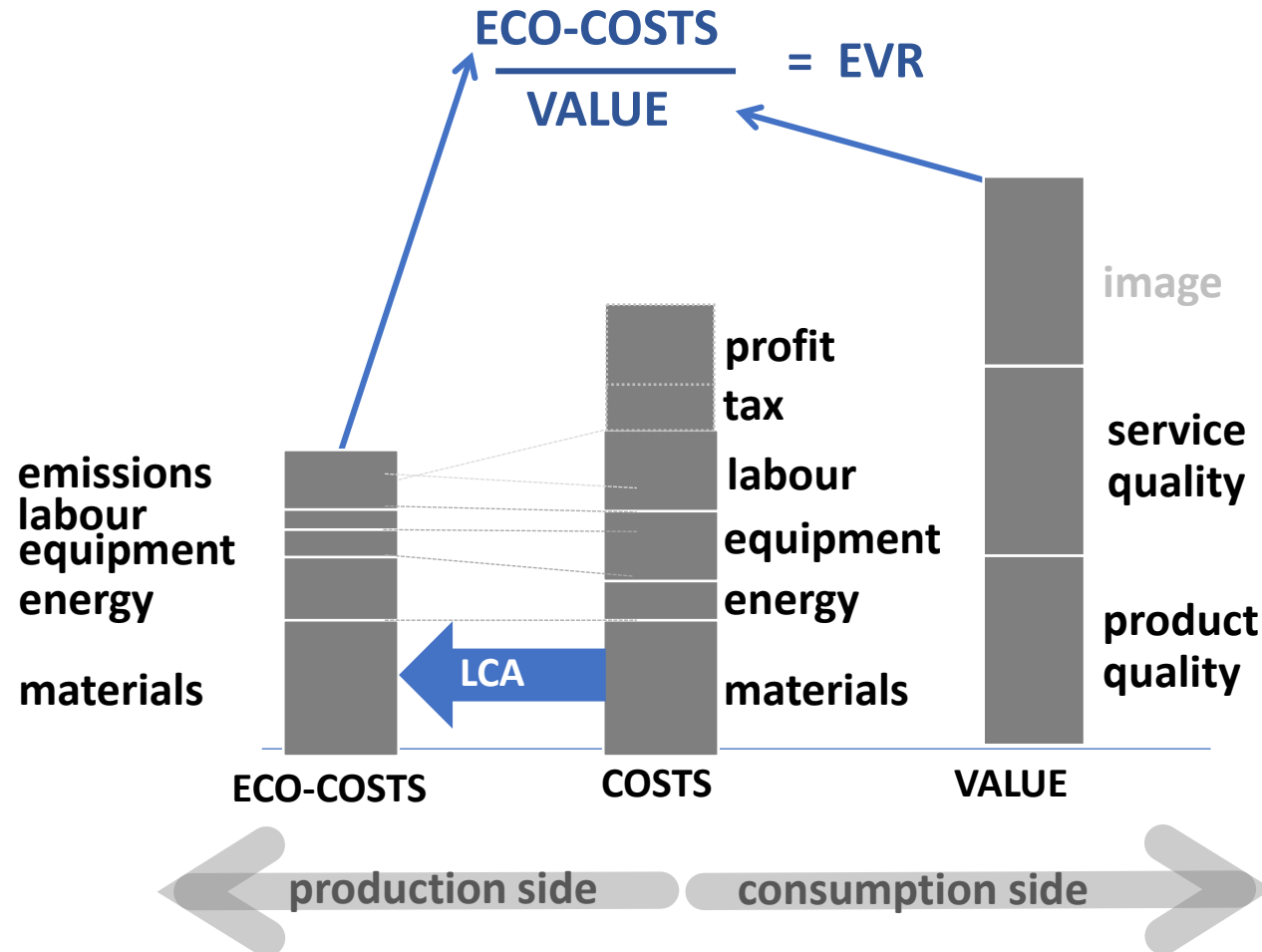


Note that the number of buyers will be lower when the profit margin is higher

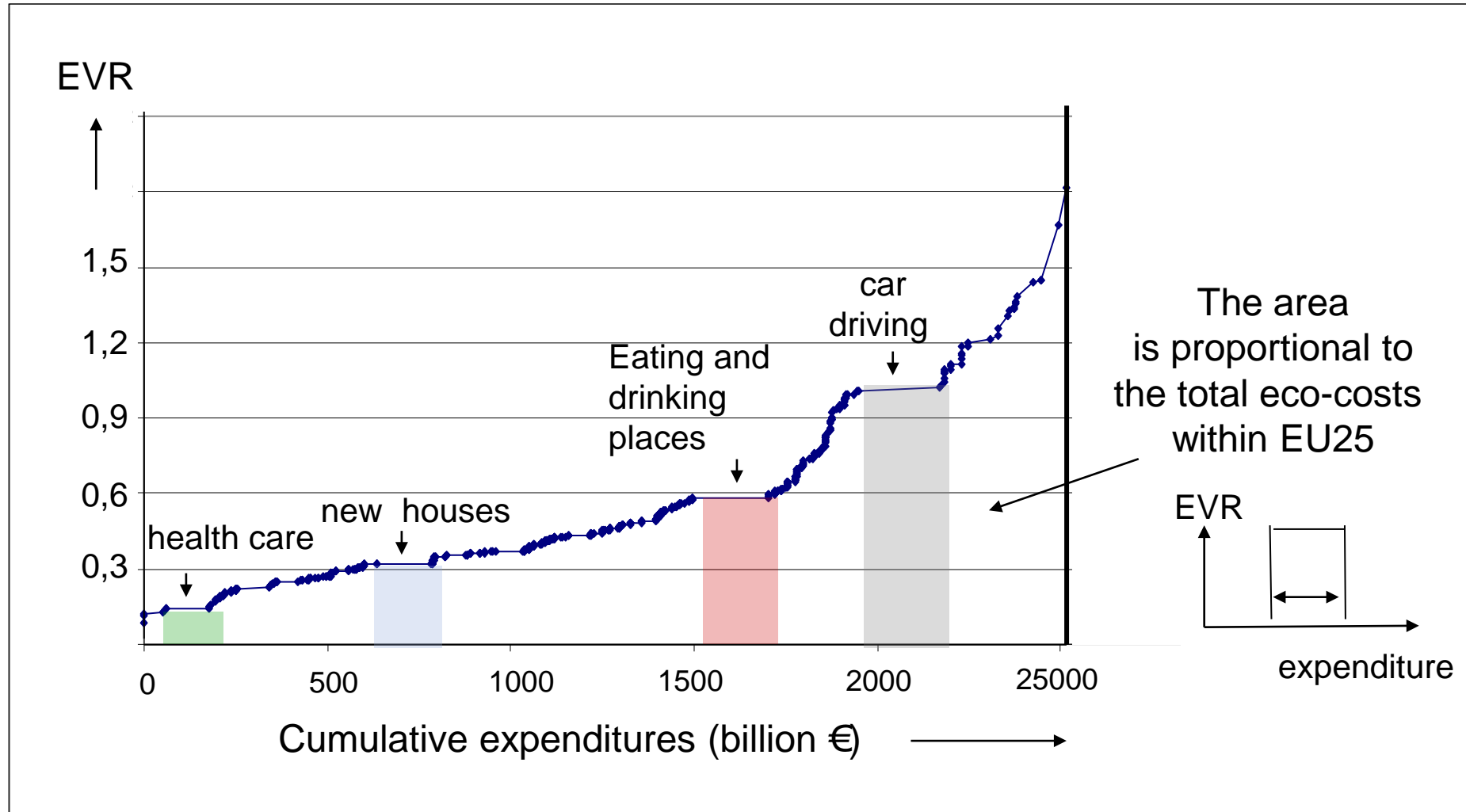
Products and services have 3 main dimensions in Eco- Efficient Value Creation (EVC):



Sustainable buying behaviour is buying products with a low Eco-costs / Value ratio (EVR).



Macro-economic consequences of expenditures of all consumers in the EU25: how to reduce eco-costs?

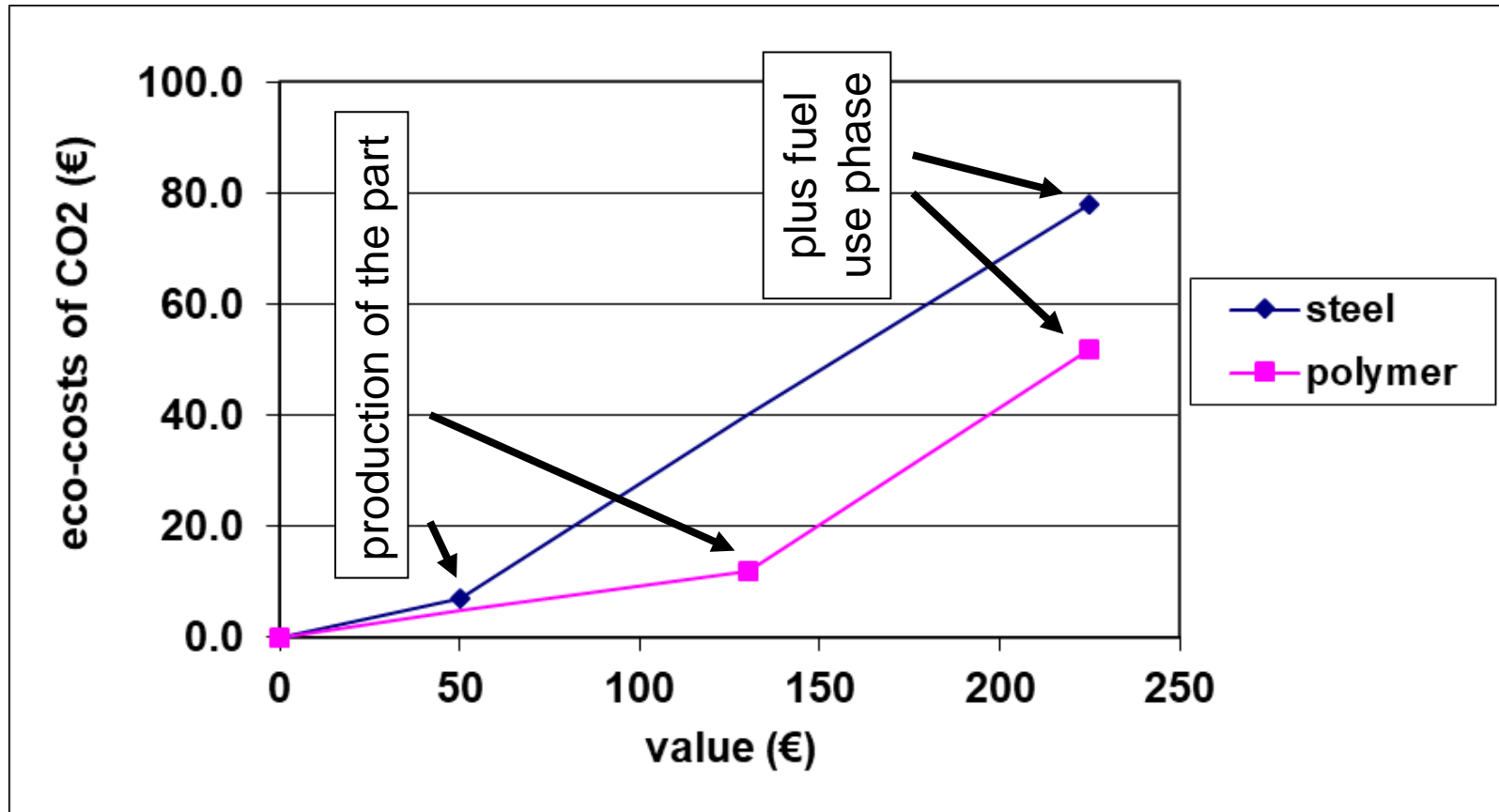


Two strategies to lower eco-burden within the EU:

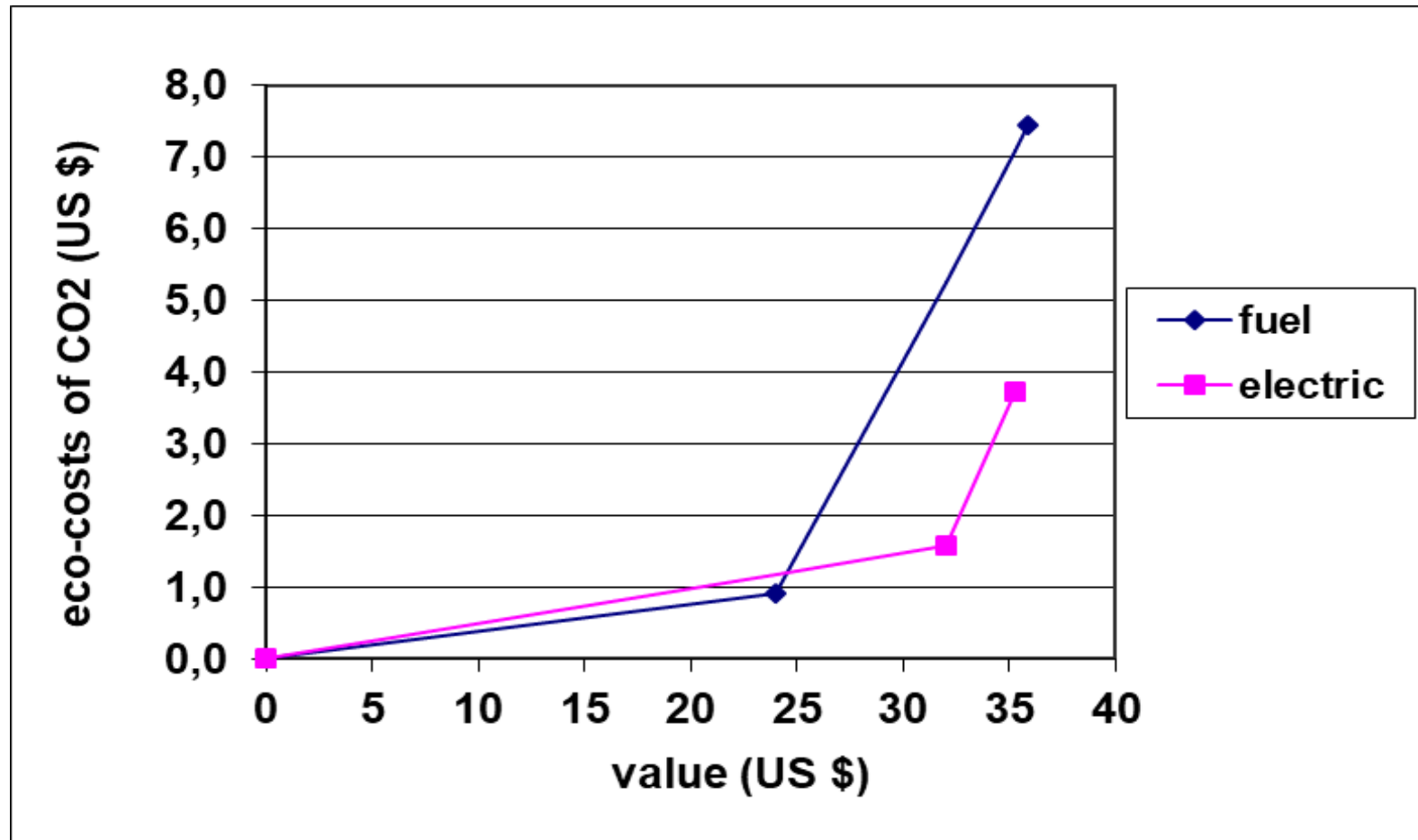
(1) by less eco-costs per product

(2) by shifting expenditures to products with co-costs per product

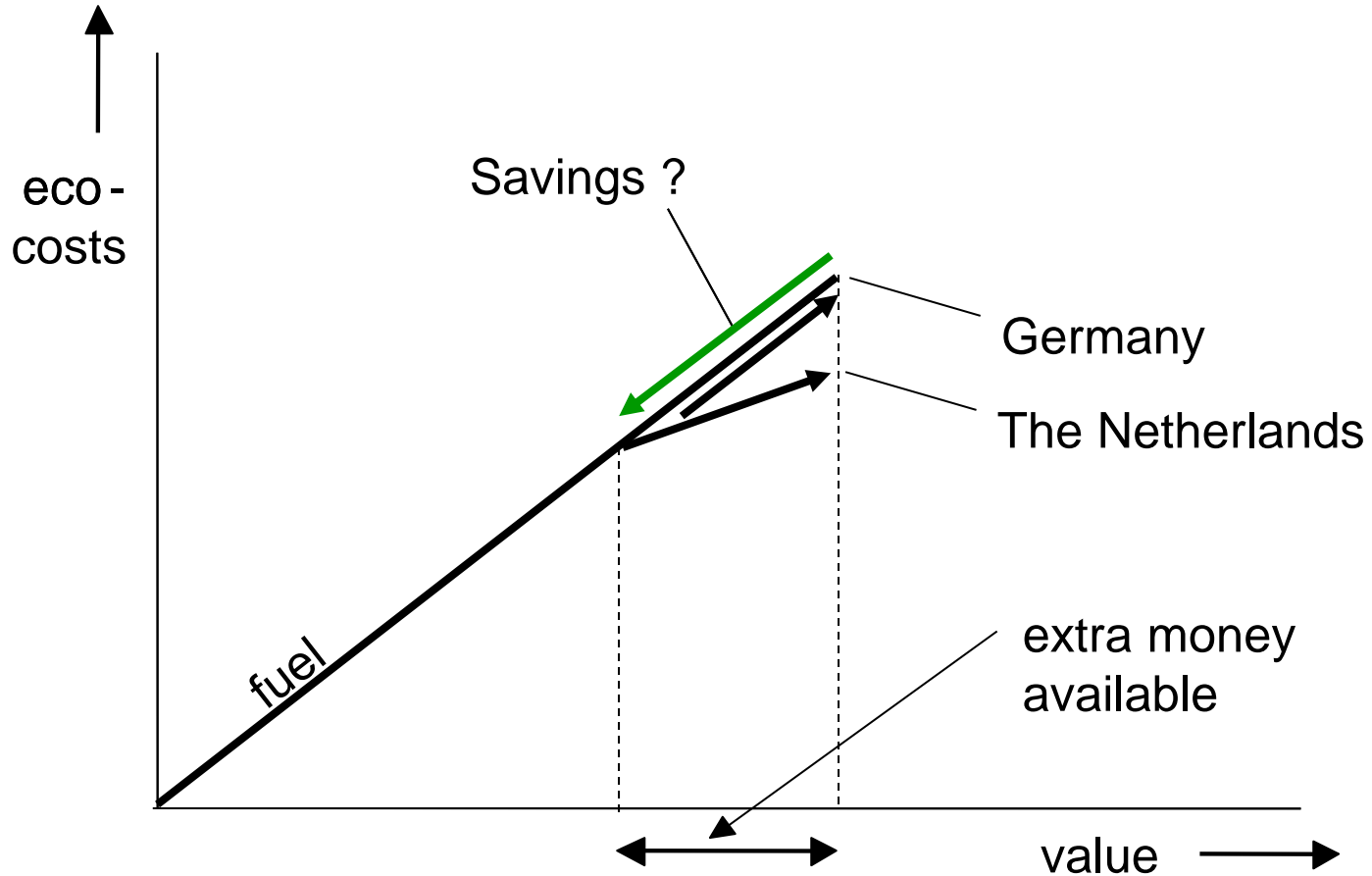
The EVR on product level: example of a more sustainable car by making a part of the body lighter



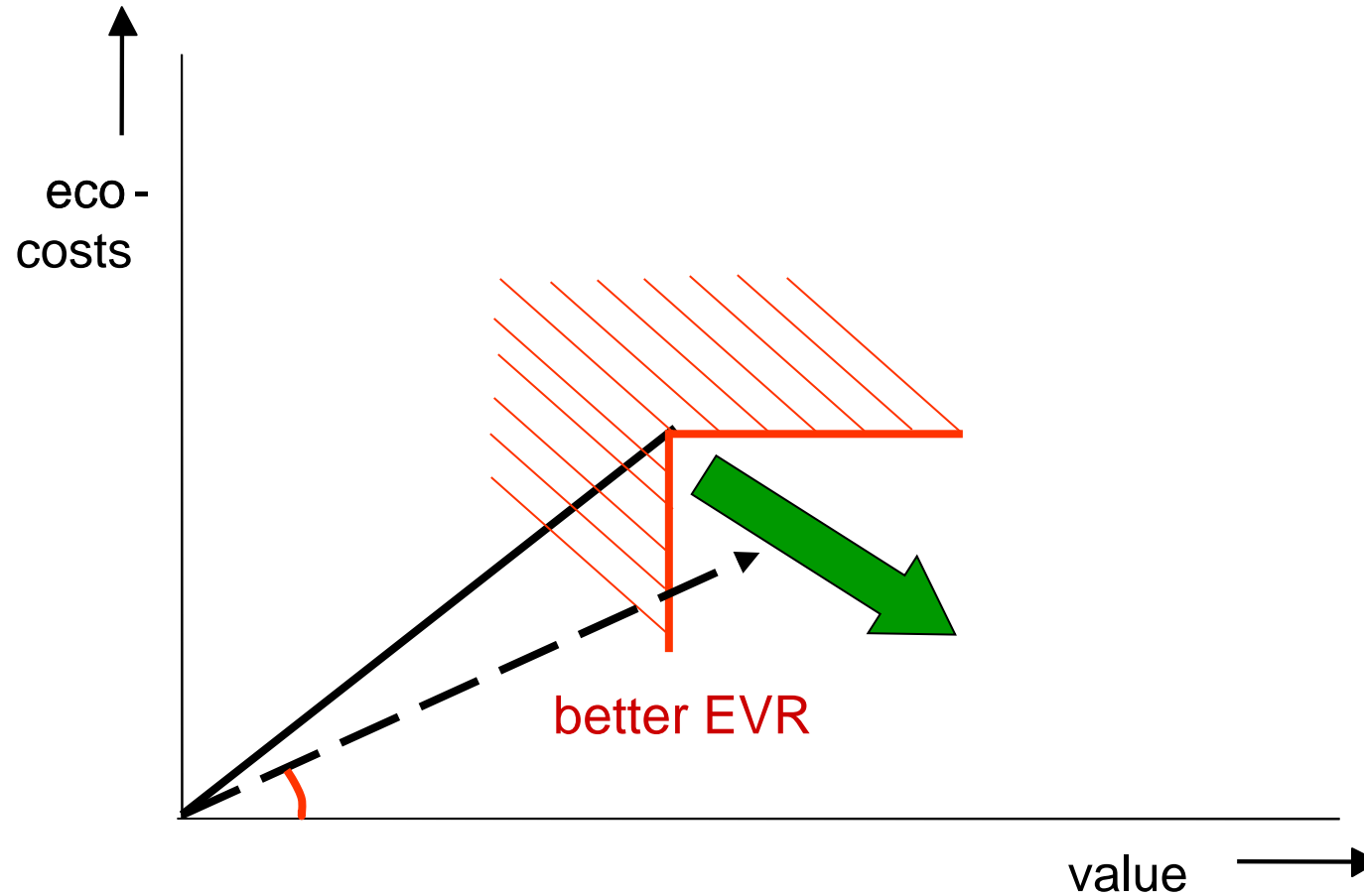
The EVR on product level: example of an Electric Car



Savings generate the 'rebound effect': example of an aerodynamic car



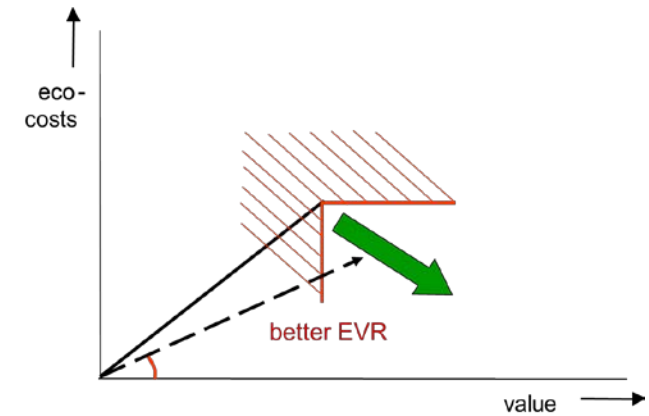
The road towards sustainability: the 'double objective' for innovation and design



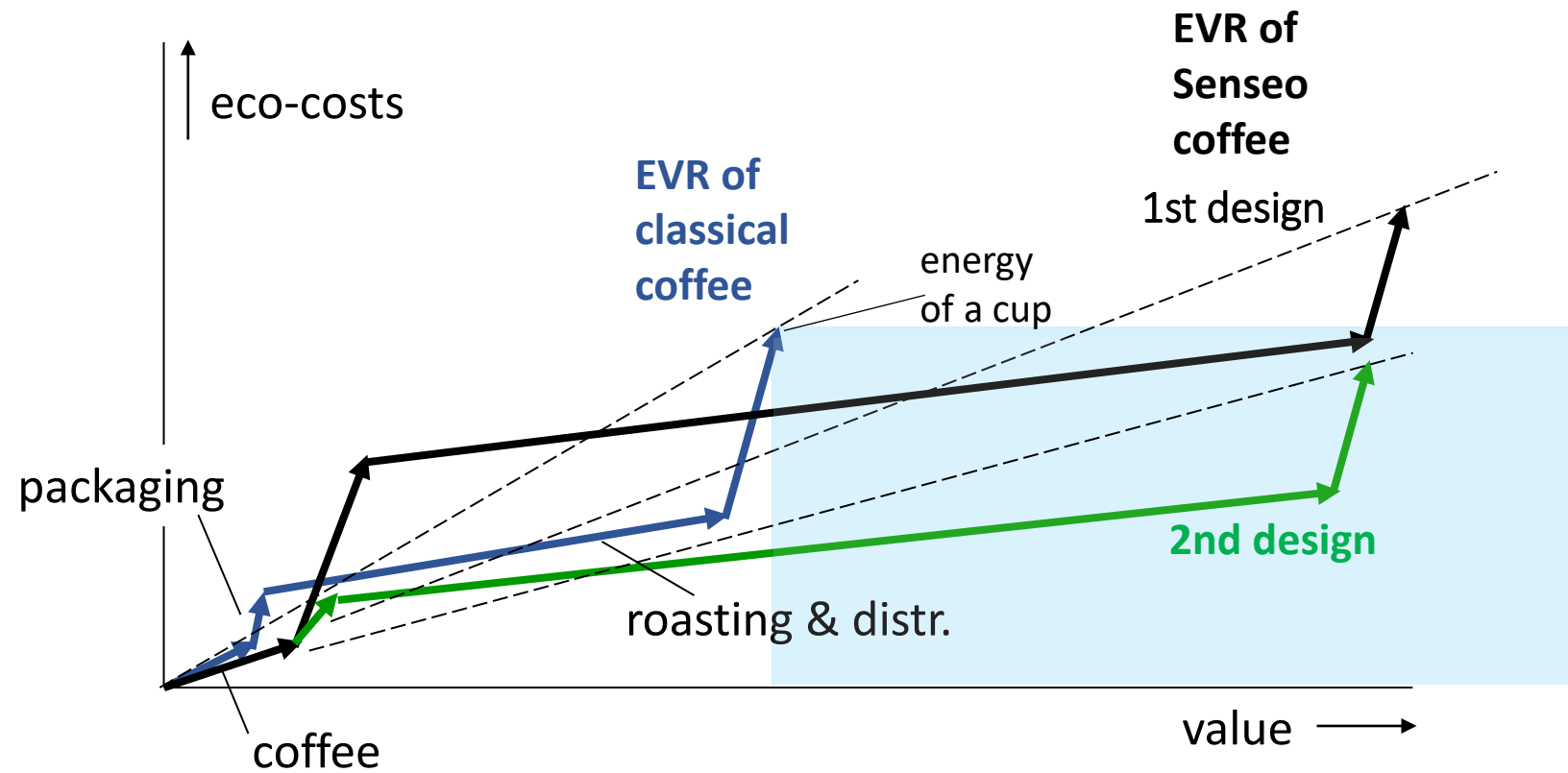
Example of the 'double objective' for innovation and design

The design of a leisure boat by a team of students who apply the double objective of eco-efficient value creation

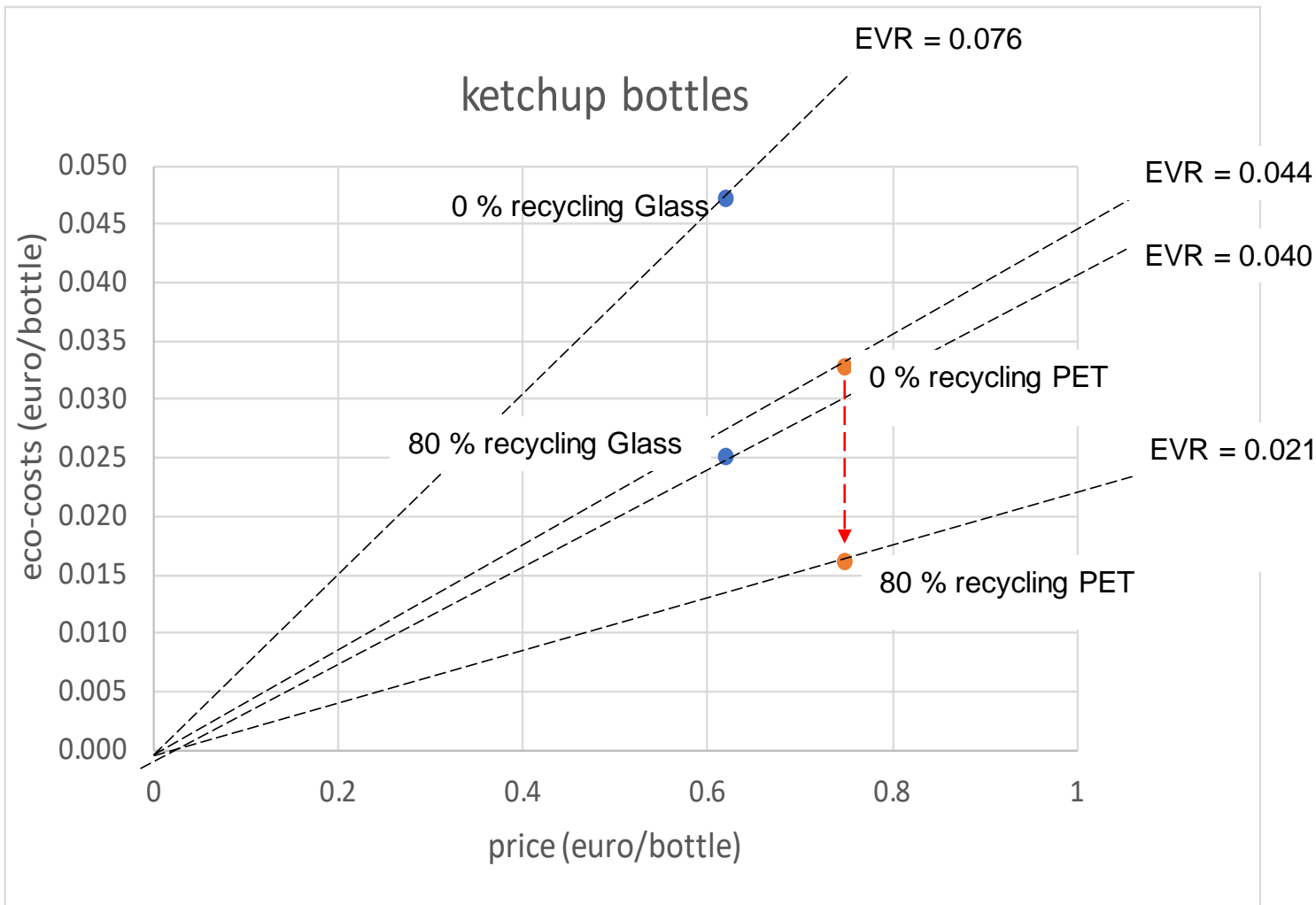
<https://youtu.be/bBJIMUHsWzs>



The 'double objective' in product innovation example: the Senseo coffee machine



The ketchup bottle, Glass or PET ? A product portfolio



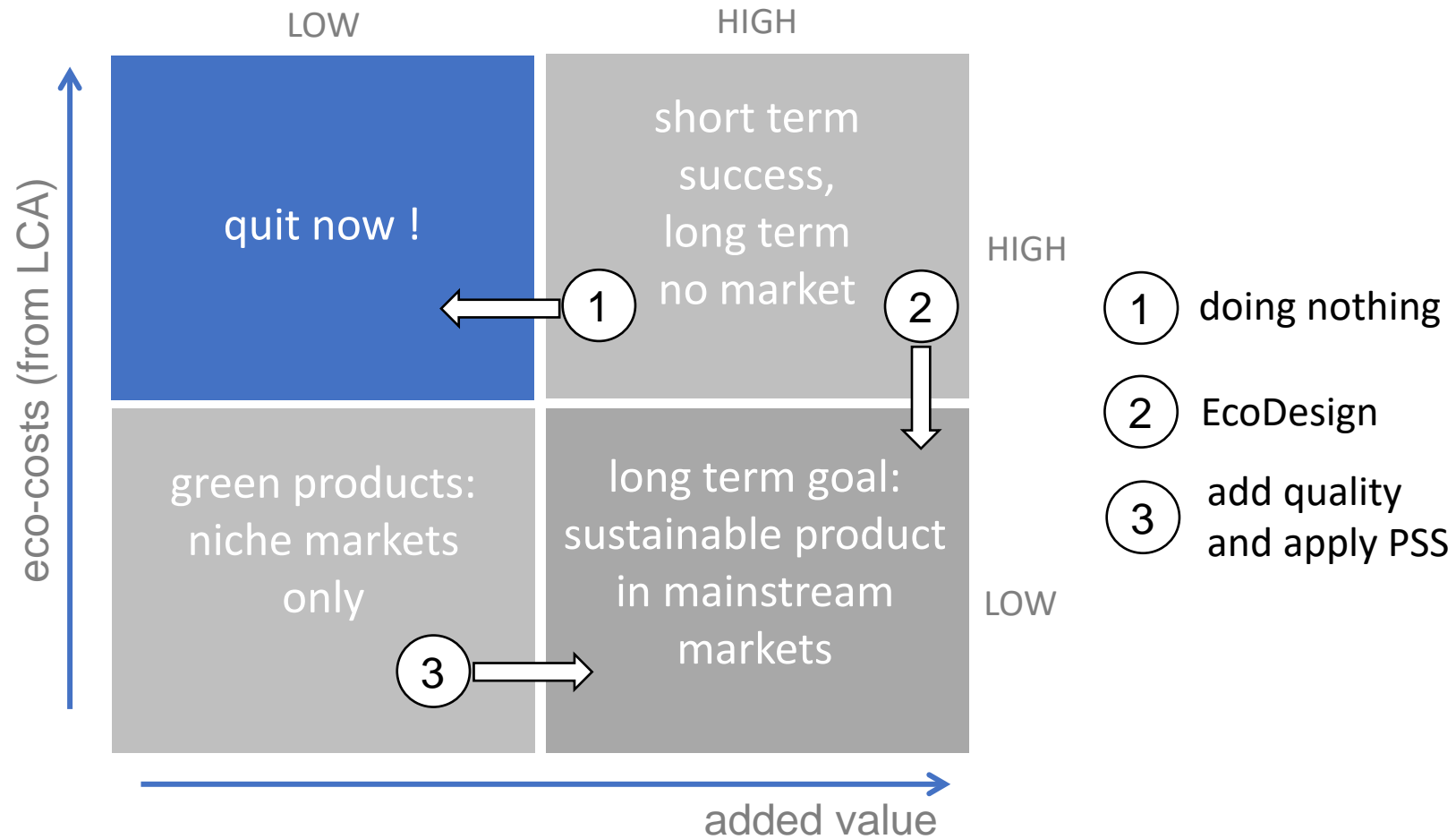
Classic glass bottle

Value ketchup: 0.60 euro
 Value bottle: 0.62 euro
 Glass weight: 197 gram
 Steel cap 3.2 gram

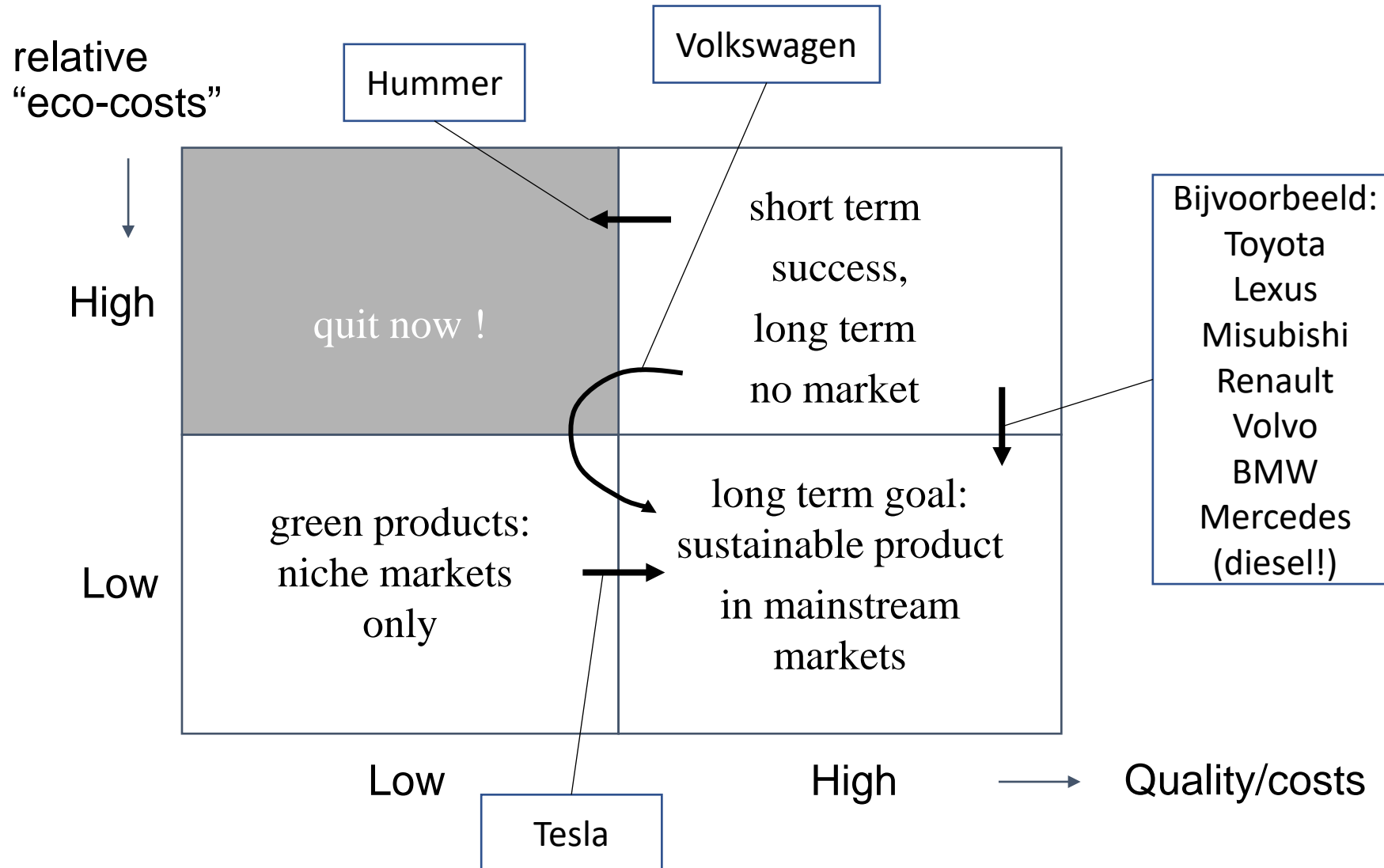


Plastic (PET)
 squeezable bottle

Value Ketchup: 0.60 euro
 Value bottle: 0.75 euro
 PET weight: 22.7 gram
 PP cap 3.9 gram



Sustainable Product Portfolio management In the car industry



Be aware of negative and positive connotation in green product 'branding'



1. Be aware of the **negative** connotation of sustainability caused by awareness building
(you feel bad when you are confronted with the problems of pollution)



2. Build on the **positive** connotation of conservation of a beautiful nature
(you feel good when you think about nature)



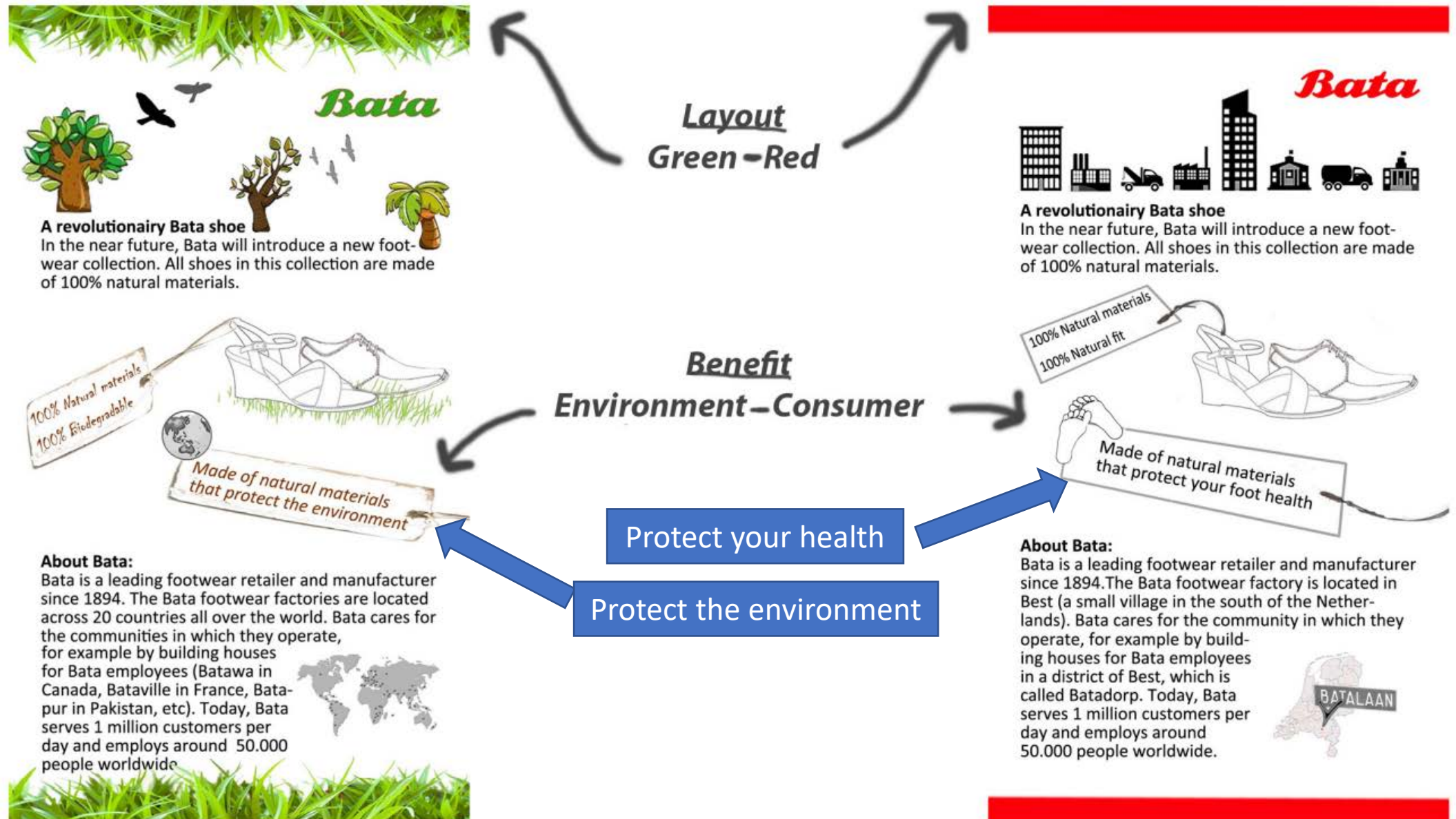
3. Be aware that your buyers have **negative doubts on the functional quality of a green product**

What to do about is?

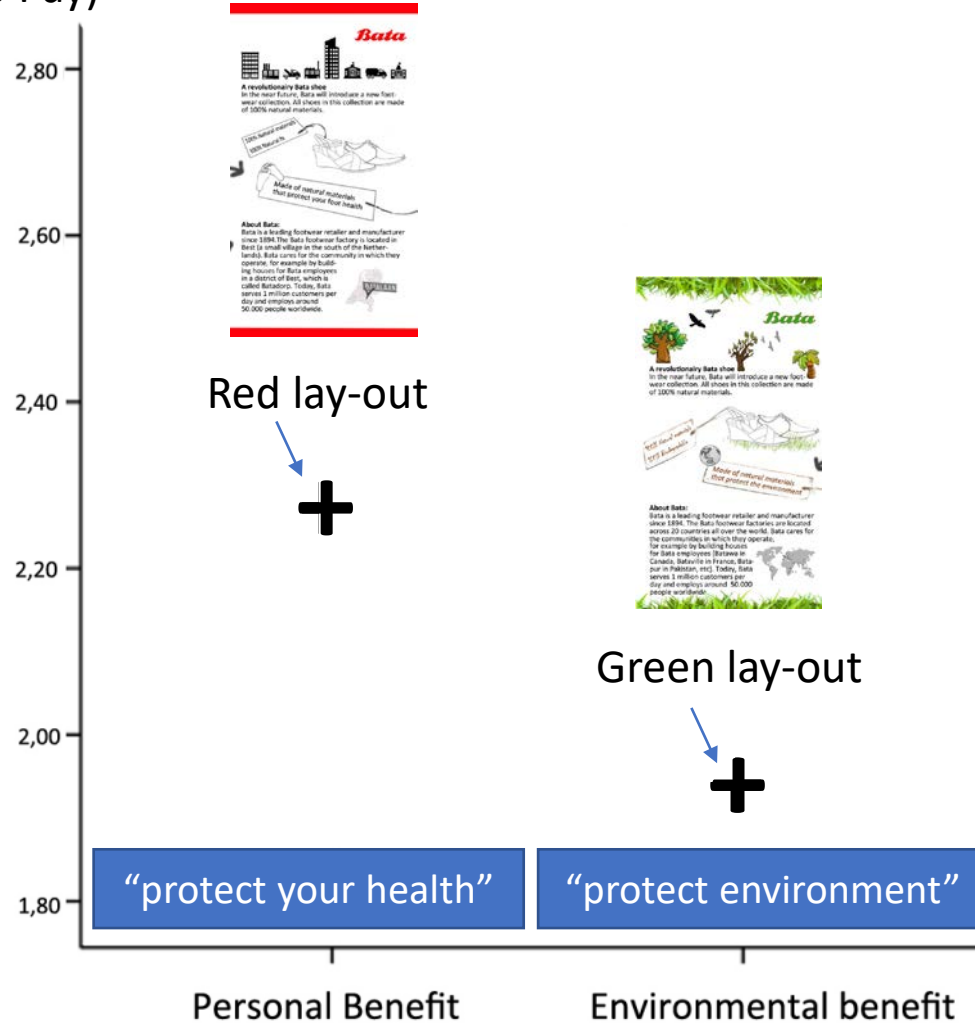
Awareness building is important, but leave that task to the NGOs

Make buyers happy with the idea that they do something positive with regard to the conservation of mother earth

Emphasise the quality of your product, also in branding
(as explained in next sheets)



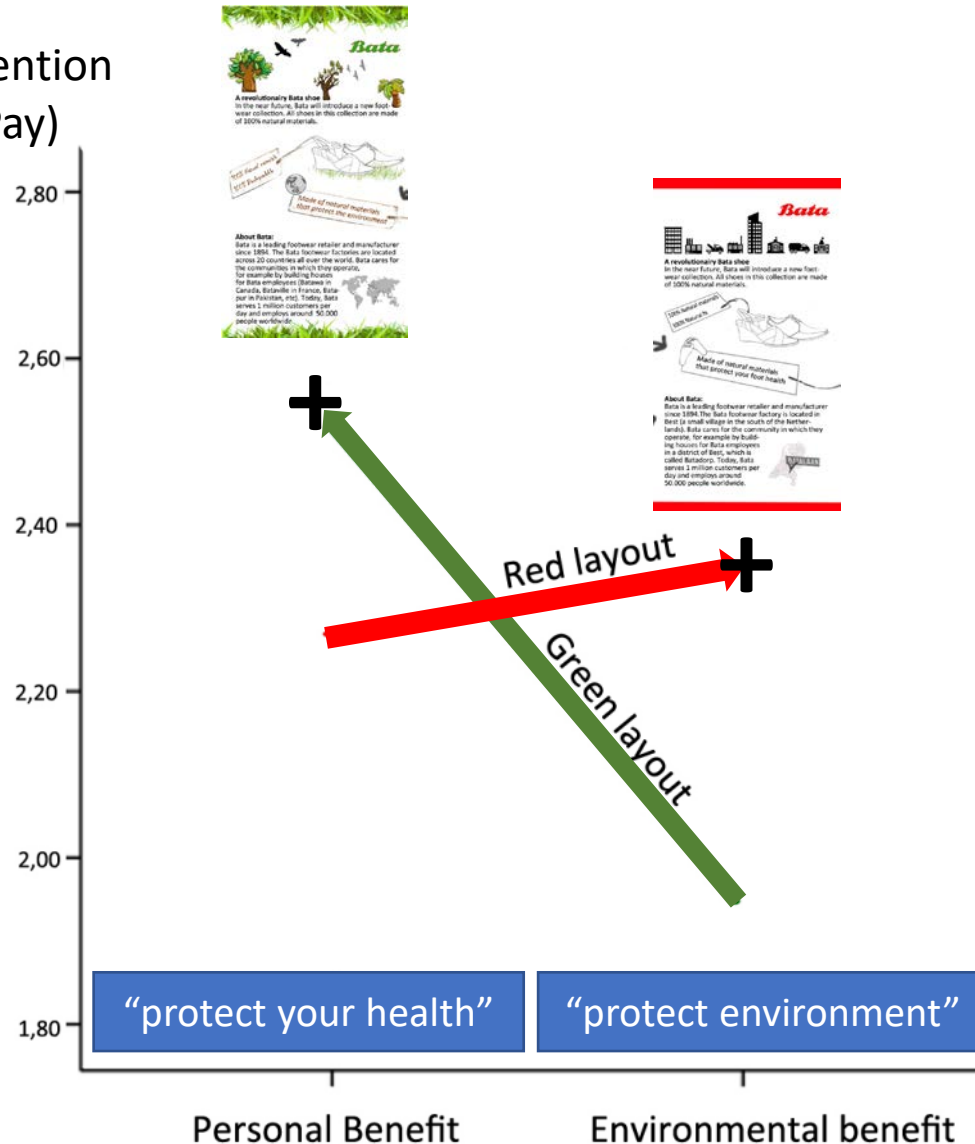
Relative Buying Intention (Willingness to Pay)



**The green advertisement
has less WtP !!!!!**

What can be done?

Relative Buying Intention
(Willingness to Pay)



The basic idea behind it

The ‘double benefit’ model
(Jacquelyn Ottman, 1993)
distinguishes two types of benefit:

- The ‘personal benefit’ which is related to the customer perceived value, short term (what’s in it for me?)
- The ‘environmental benefit’ related to the issue of eco-burden, long term (what’s in it for my grandchildren)
- The ‘personal benefit’ plays a major role in the shop, the ‘environmental benefit’ is important at home

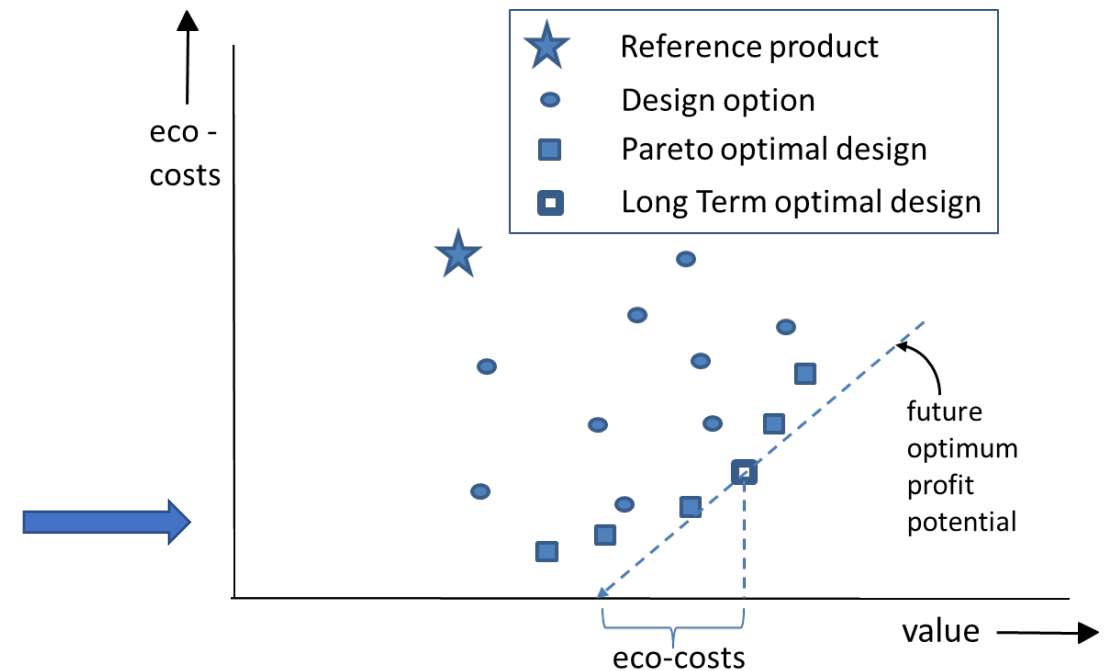
Successful Green Marketing requires a careful strategy, to avoid common failures

Do's and don'ts:

- do not label a product as 'green' in the shop, since it will attract less buyers
- do emphasise product quality in the shop, to counteract the negative green image on quality (which allows a higher price)
- enhance green aspects in product branding, since that supports the 'feel good' emotion after the purchase (generating 'repeat buyers')

Now you can apply the EVR Method to your own product, use a Pareto analysis to select alternatives

1. Calculate the eco-costs of your existing product (the reference)
2. Redesign your product with the EcoDesign method (LiDS wheel), and determine the eco-costs of it (iterative process)
3. Determine the value of that product (= product quality + service quality + image)
4. Optimise your value proposition and check your Business Model and your
5. Check whether there are other Product Service Systems and Business Models that can meet your clients needs as well
6. Repeat step 2 – 5 until you are satisfied
7. Select the best solution in the EVR matrix (applying a choice in the 'Pareto front' = Pareto optimal design)



You will need the IdematLightLCA (on IOS and Android) for the next two exercises

Sep 1. Install the app from the AppStore or the Google Play store

Step 2. Click “yes” on the question on installing the newest database

Step 3 Look at the fast instruction video (a combination of instruction video 1 and 2) of 8.45 minutes:

<http://www.ecocostsvalue.com/EVR/img/Innomat-teaching-materials/utra-short-instruction-IdematLightLCA.mp4>

Step 4. Perhaps at home; have a look at www.idematapp.com

Example of EVR benchmarking: different types of chairs (1)



Bamboo chair

€10.00

4.6 kg

electrical power 2.2 MJ

Sea container 0.05 m3

20.000 km

municipal waste
incineration



Oak chair

€18.00

4.3 kg

no paint

Truck&trailer 0.05 m3

500 km

Incineration in
small elect power plant



Steel chair

€23.00

4.98 kg

Powder coating 1.1 m2

Truck&trailer 0.05 m3

500 km

open loop recycling



Plastic chair

€11.00

PP - 2.92 kg

Injection moulding

Truck&trailer 0.05 m3

500 km

municipal waste
incineration

Example of EVR benchmarking: different types of chairs (2)

Instruction video app:

<http://www.ecocostsvalue.com/EVR/img/Innomat-teaching-materials/utra-short-instruction-IdematLightLCA.mp4>

bamboo

eco-costs (euro)	carbon footprint (kg CO2e)
landfill € 1,22	landfill 2,62
waste treatment € 0,76	waste treatment -0,67
circular economy € 0,64	circular economy -1,57
eco-costs for EoI scenarios (euro)	
landfill	waste treatment
	circular economy
Materials	
Bamboo in China	
0,13	-0,33
Processes	
electricity, general	
0,05	0,05
container ship	
1,04	1,04
Use-phase	
Total	
Total bamboo chair	
1,22	0,76

oak

eco-costs (euro)	carbon footprint (kg CO2e)
landfill € 0,31	landfill 0,34
waste treatment € -0,12	waste treatment -2,74
circular economy € -0,23	circular economy -3,58
eco-costs for EoI scenarios (euro)	
landfill	waste treatment
	circular economy
Materials	
Oak, European	
0,06	-0,37
Processes	
truck, trailer, 24 t	
0,25	0,25
Use-phase	
Total	
Total oak chair	
0,31	-0,12

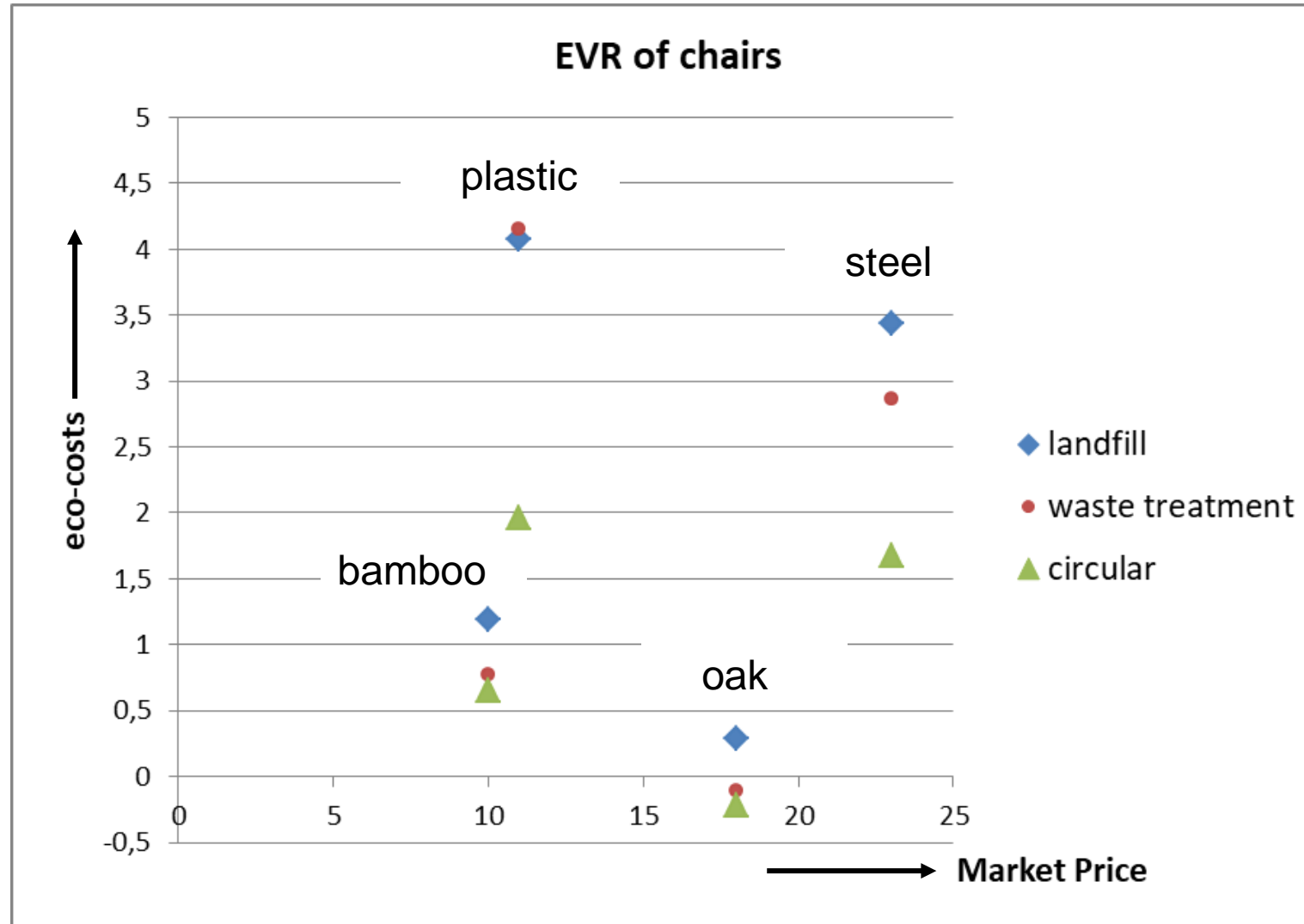
steel

eco-costs (euro)	carbon footprint (kg CO2e)
landfill € 3,54	landfill 14,42
waste treatment € 2,97	waste treatment 14,42
circular economy € 1,62	circular economy 6,81
eco-costs for EoI scenarios (euro)	
landfill	waste treatment
	circular economy
Materials	
carbon steel, market mix	
2,51	1,93
Processes	
powder coating steel	
0,79	0,79
truck, trailer, 24 t	
0,25	0,25
Use-phase	
Total	
Total steel chair	
3,54	2,97

plastic

eco-costs (euro)	carbon footprint (kg CO2e)
landfill € 4,15	landfill 7,73
waste treatment € 4,18	waste treatment 11,86
circular economy € 2,07	circular economy 12,77
eco-costs for EoI scenarios (euro)	
landfill	waste treatment
	circular economy
Materials	
PP	
3,67	3,69
Processes	
injection moulding, machine	
0,24	0,24
truck, trailer, 24 t	
0,25	0,25
Use-phase	
Total	
Total plastic chair	
4,15	4,18

Example of EVR benchmarking: different types of chairs (3)



Exercise of EVR benchmarking: 4 different types Nespresso coffee cups (1)

- Environmental pressure groups accuse Nestle of applying Aluminium coffee cups as being disastrous for the environment, e.g. Die Deutsche Umwelthilfe (DUH)
- The issue is that Nestle claims that AL is a good solution, when it is 100% recycled
- The pressure groups say that this is not a good solution, since even in Switzerland the recycling rate is not higher than 50%, already for many years (in the Netherlands approx. 23%, in Germany not know, but not higher than 50%)
- Nestle says that the consumer should change his or her behaviour, but the pressure groups say that Nestle should apply another material
- Nestle has announced that they will use virgin Al from Rio Tinto that uses electricity from hydro-electric power plants as of 2020 (which reduces the eco-costs of CO2 from 1.17 to 0.46 euro per kg)
- Nestle claims that Al is required to maintain the coffee quality standard, but is that true? EVOH blocks all gasses as well. Or take biodegradable plastic cups in a metal container (instead of cardboard)



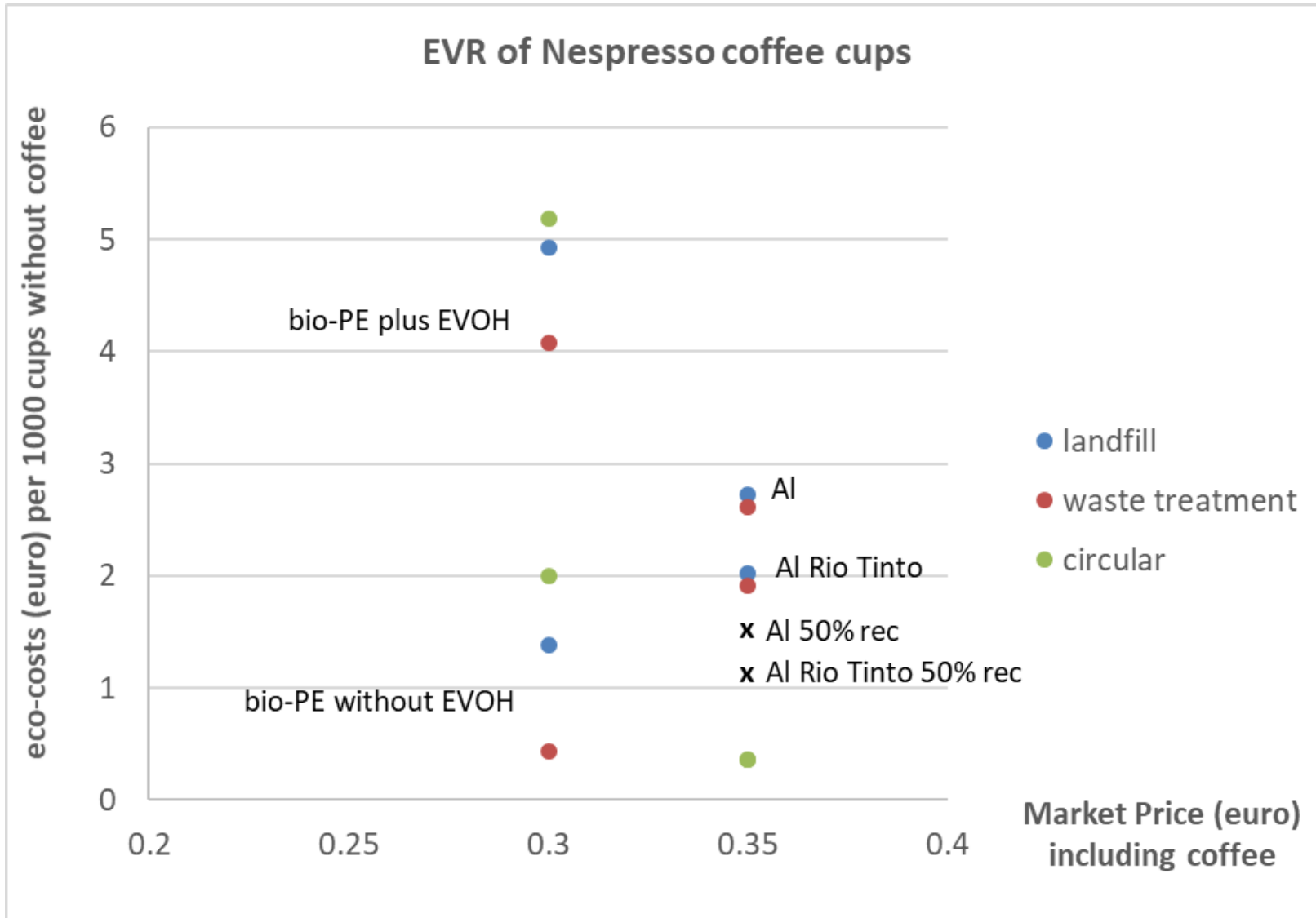
The advertisement of Nespresso
<https://www.youtube.com/watch?v=aM20MRUPSTk>

The response to it of an NGO
<https://player.vimeo.com/video/116606409>

Exercise of EVR benchmarking: 4 different types Nespresso coffee cups (2)

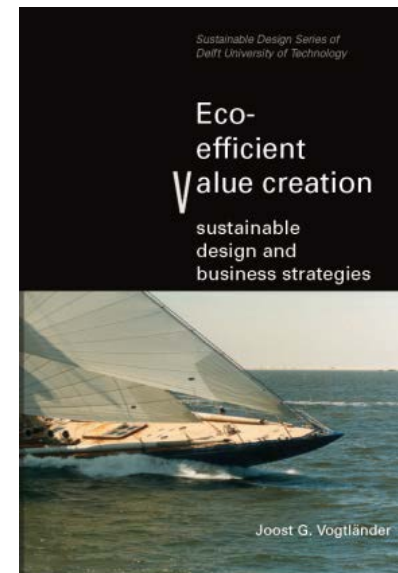
- Step 1. Make a group inventory on the Willingness to Pay for different kind of coffee cups: (1) Al, (2) PP with EVOH layer, (3) biodegradable plastics or fibres in steel container, or other ideas. Use post-its.
- Step 2. Create groups of 3 – 4 participants
- Step 3. estimate the eco-costs of the Al solutions (“virgin” and “RioTinto virgin” for 50% recycling. Benchmark materials only, including end-of-life, for 1 kg Al (= 1000 cups)
- Step 4. estimate the eco-costs of the EVOH on a bio-PE concept (10% EVOH, 90% bio-PE). Benchmark materials plus end-of-life only. Calculate also bio-PE without EVOH.
- Step 5. Plot each solution in the 2 dimensional EVR matrix, assume that the Al coffee cup price is 0.35 euro and the plastic cup price is 0.30 euro
- Step 6. Decide on your best options
- Step 7. Report your findings to the group
- Note: The fastest data source is the app, however, the app has no data for the virgin Rio Tinto Al (from hydropower). Make a correction by hand: - 0.7 euro per kg). Recycled Al would score better, but is not allowed for food
Note that the -0.7 correction must **not** be applied to the recycled Rio Tinto AL.



Exercise of EVR benchmarking: 4 different types Nespresso coffee cups (3)

Discussion

You may read for additional information:



copy right training course:
EIT/KAVA

project:
EU EIT Raw Materials
Lifelong Learning KAVA
Education project (project
number 17226)

contact:
J.H.Welink@TUdelft.nl

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