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A large circular image in the background shows several colorful interlocking blocks in shades of blue, yellow, orange, pink, and purple, arranged on a wooden surface. A green horizontal bar is overlaid across the middle of the image, containing the main title.

The Sustainable Packaging Solution that fits

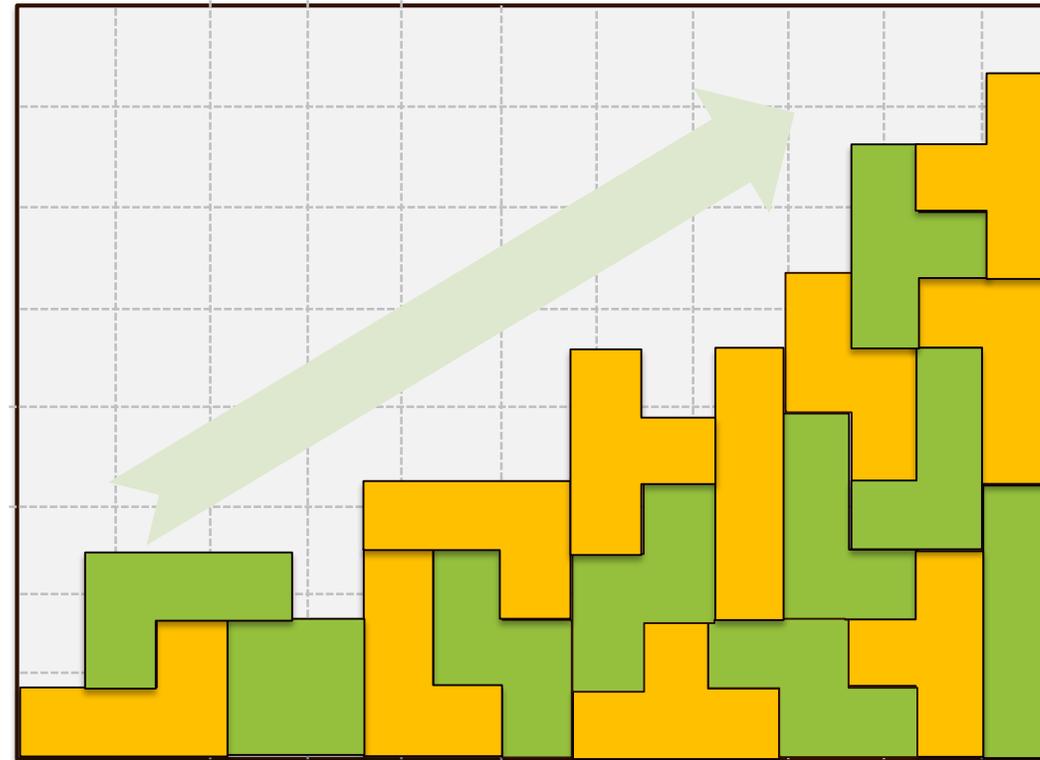
Sophie Kieselbach
Senior Consultant

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Senior Consultant

The changing status of packaging



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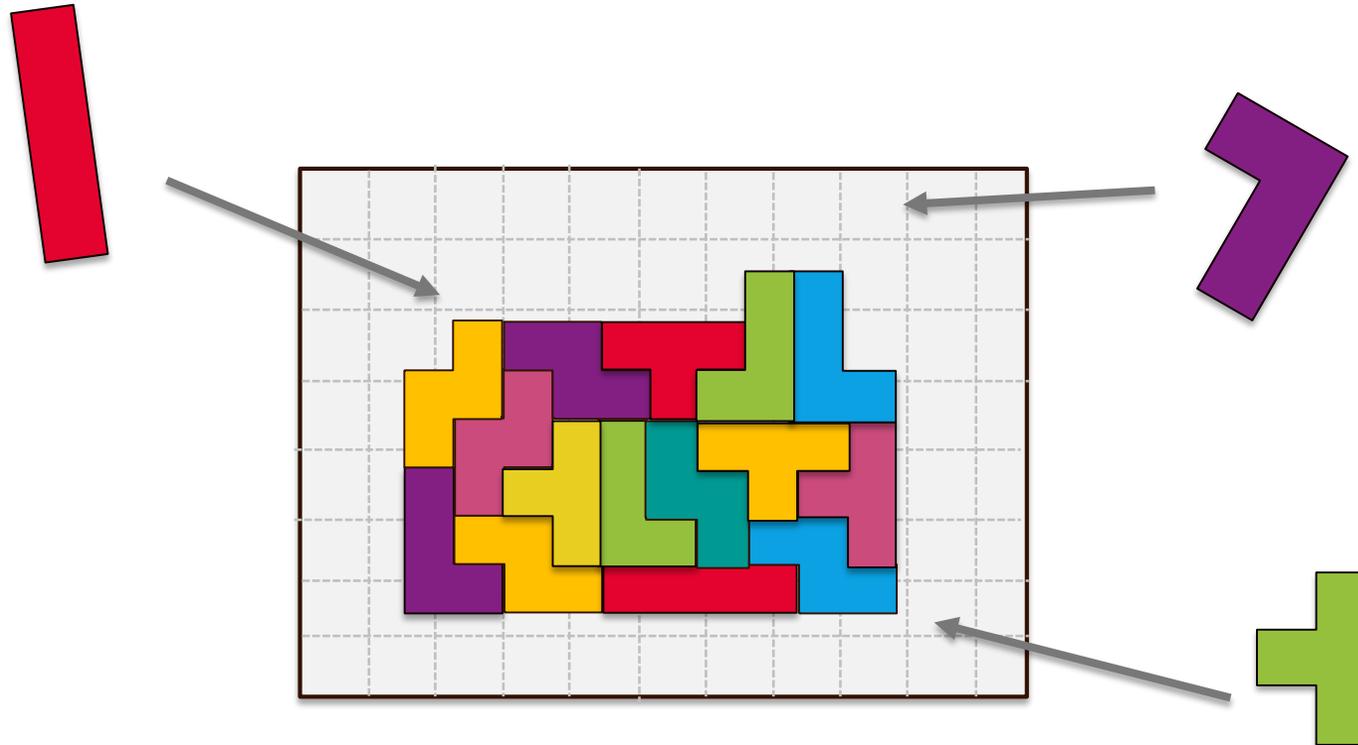
- GDP growth and rising consumer disposable income
- Growth in global trade

The changing status of packaging

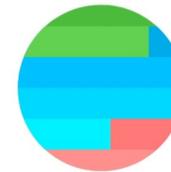


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- Convenience and on-the-go
- E-commerce
- hygienic prerequisites (food, medicine,...)



Take



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Make



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Waste



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Packaging under pressure



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Compliance



Industry Standards



Government Regulations



Business Drivers



Market access



Scarce resources & rising cost



Risk



Competition

Stakeholder Pressure



Customers



NGOs & Public



Employees



Investors & Analysts



Common EU target for recycling (by 2030):

- 65% of municipal
- 75% of packaging waste
- Simplified definitions & harmonized calculation methods for EU recycling rates



Binding landfill target (by 2030): to reduce landfill to max. of 10% of municipal waste



Ban on landfilling of separately collected waste

Source:





2025

50% of plastic

25% of wood

70% of ferrous metals

50% of aluminium

70% of glass

75% of paper and cardboard

Source: Directive 94/62/EC of the European Parliament

2030

55% of plastic

30% of wood

80% of ferrous metals

60% of aluminium

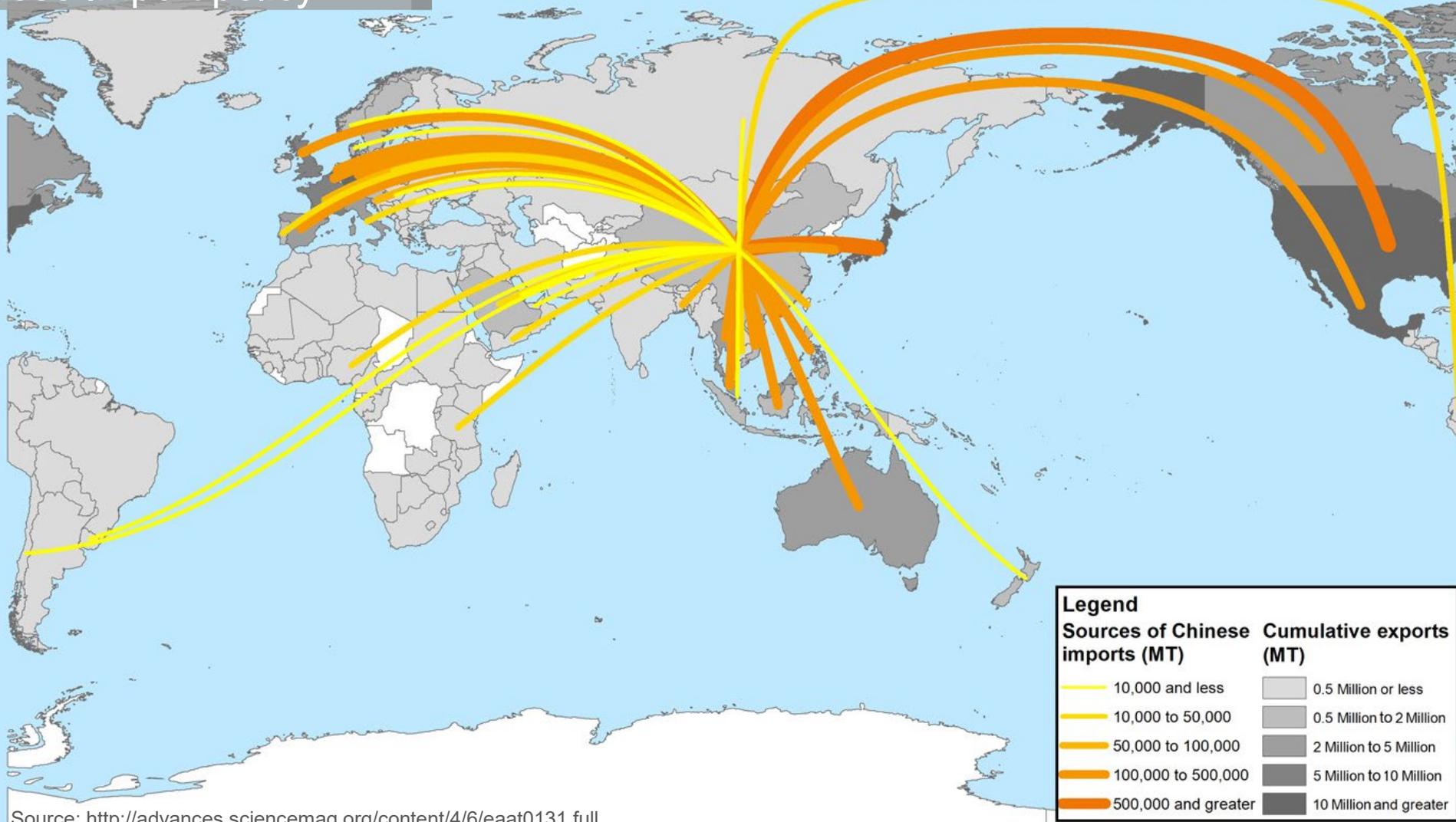
75% of glass

85% of paper and cardboard

Source: Directive 94/62/EC of the European Parliament

Compliance

Chinese Import policy



Source: <http://advances.sciencemag.org/content/4/6/eaat0131.full>

Packaging under pressure



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Compliance



Industry Standards



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Business Drivers



Market access



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Competition

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Customers



NGOs & Public



Employees



Investors & Analysts

Rising public demand for sustainable packaging





Seeing is believing



Seeing is believing

Plastics



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Technical properties



Plastics



Microplastic



Seeing is believing

Paper



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Renewable material



Paper



Deforestation



Emotional arguments



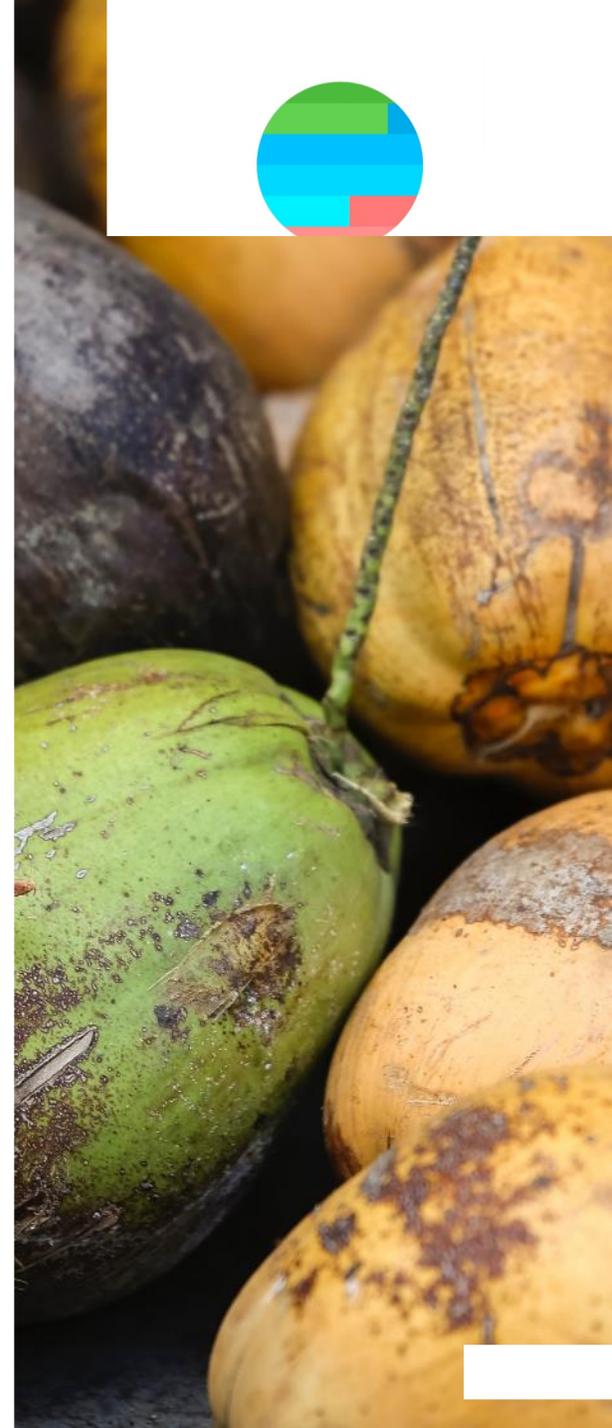
Rational arguments



Packaging under pressure

Summary

- Function is priority
- There is no 'one-fits-all' solution regarding sustainability
- New designs and new ideas are needed
- How can you tell what is more sustainable?





Simply calculate your
packaging's sustainability!

Life Cycle Assessment (LCA)



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- Considers raw materials, production, distribution, use, and end of life
- Based on internationally established, scientific approach



Life Cycle Assessment (LCA)

Environmental impacts such as:

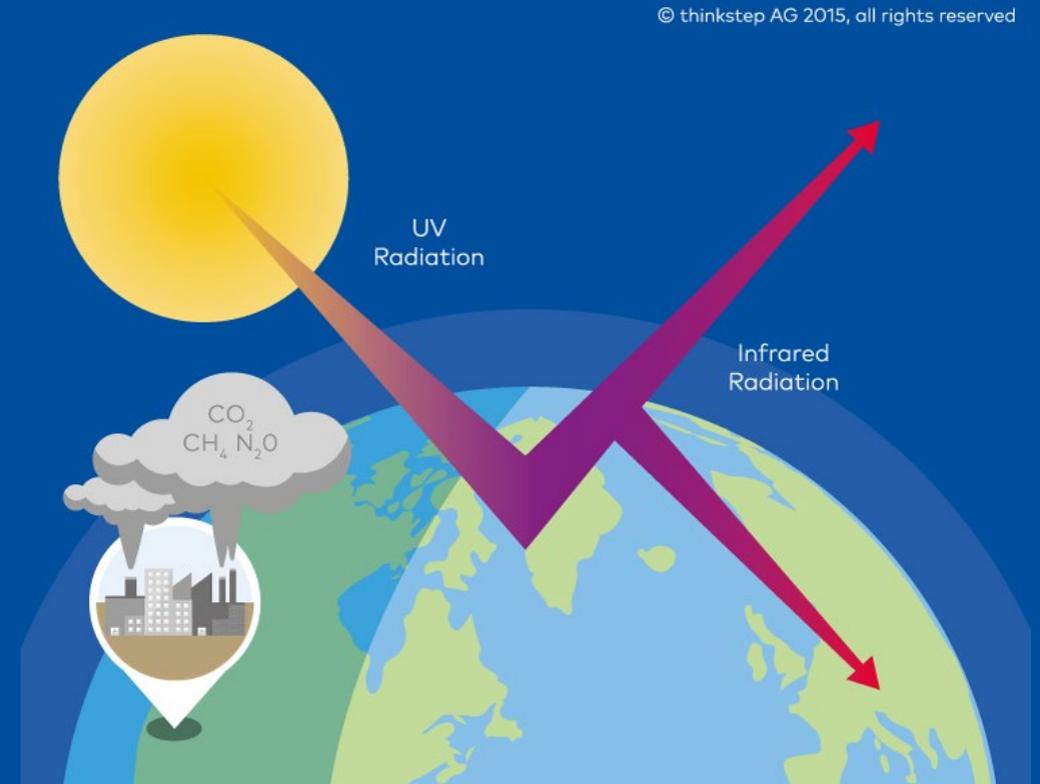
Carbon footprint

Photochemical Ozone depletion potential

Primary energy demand from fossil fuels

Water consumption

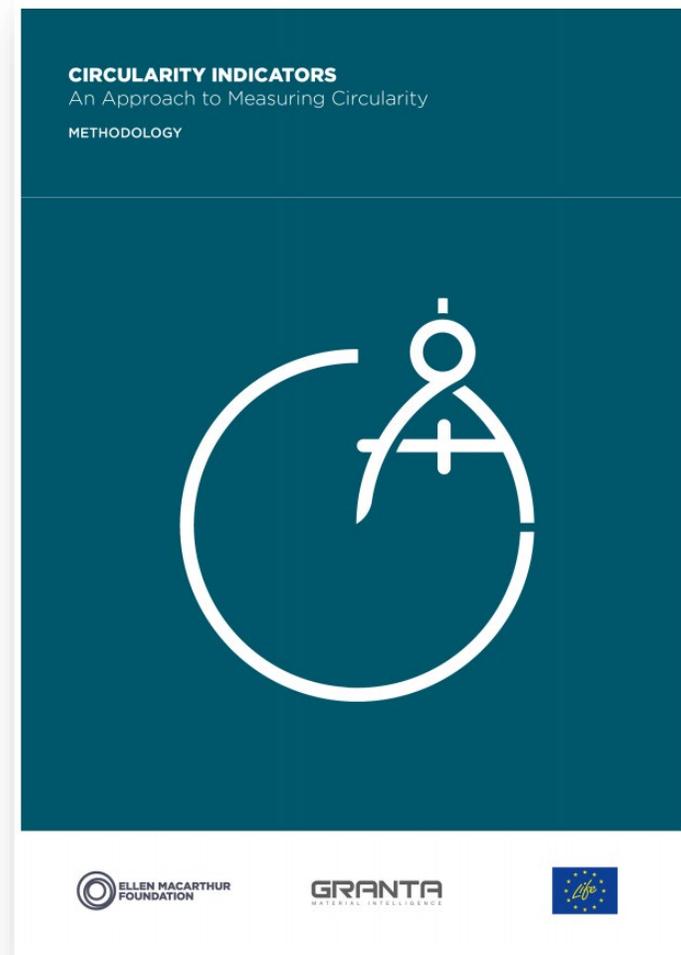
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Material Circularity Indicator (MCI)

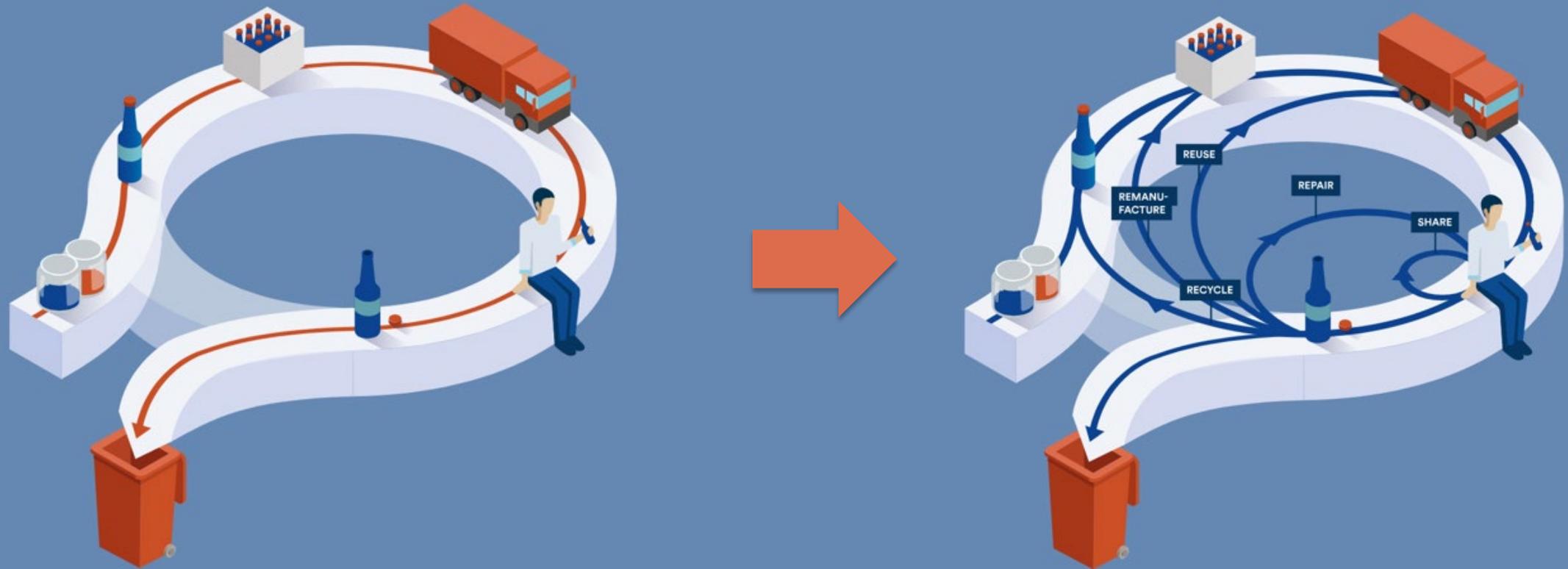


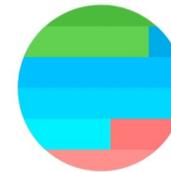
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https://www.ellenmacarthurfoundation.org/assets/downloads/insight/Circularity-Indicators_Methodology_May2015.pdf

Material Circularity Indicator (MCI)





Solution



Our answer

GaBi Packaging Calculator



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GaBi Envision REPORTS ADMINISTRATION HELP ▾ Flora D'Souza ▾

GLO_ Life Cycle of Packa...

Calculation status: **finished**

Text Variables

Scenarios

Parameter ▾	Baseline	Alternative
General overview		
Consumer packaging		
Display packaging		
Shipment packaging		
Packaging & filling		
Product distribution		

Tables and Charts

Resize / Close

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GaBi Packaging Calculator
- a thinkstep solution
thinkstep Packaging Calculator

thinkstep



Demo



Characteristics

Full LCA Model built using the latest GaBi Databases

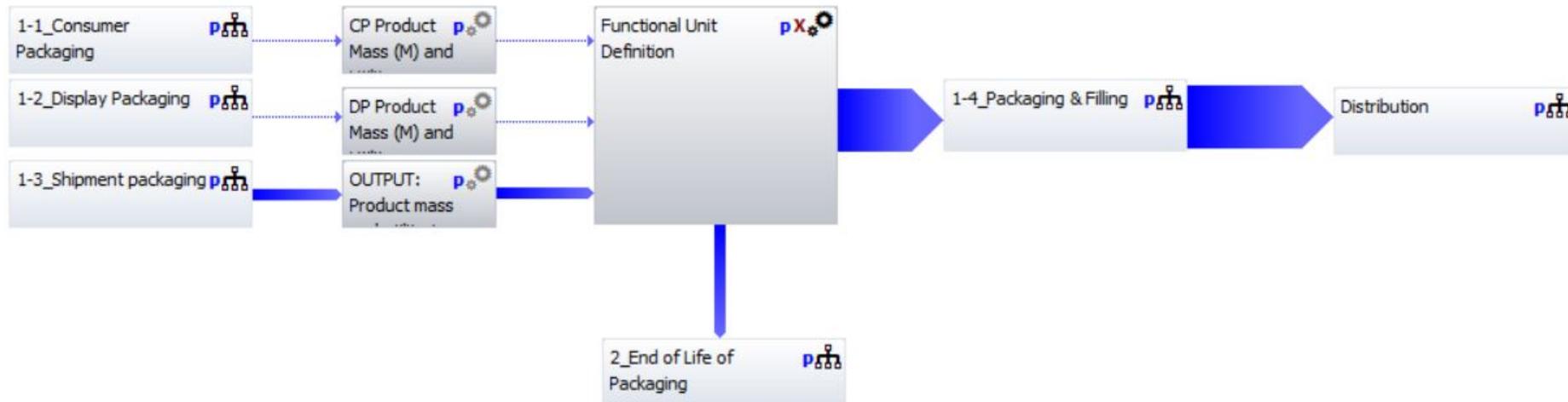


Life Cycle of Packaging 2018

GaBi Prozess-Plan: Mass [kg]

p

Selection: Life C



Online packaging calculator



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Packaging Sustainability Calculator

A thinkstep Solution

Comparison of two packaging alternatives

= Report =

< Inputs and results > side by side

Out-of-the-box tool today

OR

*Customized tool tomorrow**

**Delivery timing a function of project scope :-)*

Comprehensive parameter choices

42 raw materials, 16 manufacturing processes, 7 geographic regions, EoL



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Plastic: EVOH

Manufacturing: EVOH, HDPE, LDPE, PA (nylon), PET, PP, PP oriented, PS, PU, PVC

Recycled content: 50

Plastic: PET

Manufacturing: Injection moulding

Recycled content: Blow moulding, Extrusion, Film uncoated, Film thermoformed, Film metalised, Injection moulding

Transport to pack site: Air, Rail

Shipment packaging: Region of manufacturing: EU28

Plastics, Bioplastics, Foams, Natural materials, Metals

EU28, United States, China, Japan, South America, Australia, India

End-of-life of packaging: Region of EoL treatment: EU28, EU28. Select location for end-of-life treatment

End-of-life plastics: EoL EVOH

Landfill	0	0	[0-100%] Plastics to landfill
Recovery	50	50	[0-100%] Plastics to incineration with energy recovery
Recycling	50	50	[0-100%] Plastics to recycling

Dynamic results analysis



GaBi Envision REPORTS ADMINISTRATION HELP

Packaging Calculator_ts_Version 1...

Scenarios

Parameter	Baseline	Alternative	Comment
Region of manufacturing	EU28	EU28	Select manu
Plastics			
HDPE part (crate, tray etc.)			
Mass of part	0	0	[g] Mass of
Recycled content	0	0	[%] Recycle
Use cycles	1	1	Number of u
Transport to pack site			
Air	0	0	[km] Transp
Rail	0	0	[km] Transp
Road	0	0	[km] Transp
Sea	0	0	[km] Transp
LDPE film			
PET film			

Sophie Kieselbach

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2.2.1 Equivalency Calculator

Impact Category	Equivalency in each Impact Category	Baseline	Alternative
Climate change [kg CO2 eq.]	driving a passenger car for [km] ^{a)}	0.298	0.412
Acidification [moles H+ eq.]	quantity of emissions is sufficient to damage [kg] of calcium carbonate-based minerals (used for construction of historical monuments or present in coral reefs)	0.000219	0.000551
Eutrophication freshwater [kg P eq.]	emissions could make [L] of natural spring drinking water unhealthy to drink ^{b)}	0.00243	0.00447
Photochemical ozone formation [kg NMVOC eq.]	emissions value reported could bring this amount of [m3] of air from the safe level to dangerous level of air quality for outdoor sports ^{c)}	0.188	0.224
Primary energy demand, total [MJ]	amount of energy with which you could power a laptop for this many hours [h] ^{d)}	0.27	0.572

a) Assuming that car complies with EURO6 emission standard and has engine size between 1.4 and 2 liters. Gasoline use for one km is 0.0505 kg gasoline.
 b) Maximum value for phosphate in drinking-water in order to be still considered healthy is 5 mg/liter, according to German Water Regulation act (2001).
 c) Ozone concentration limit is 100 µg/m3 for 8-hour mean, according to the WHO (2011).
 d) The model in consideration is Dell XPS 14 Laptop with 69 Watt of active mode power, reported by the producer.

The equivalency calculator represents the values that are converted from the environmental impact categories into relative situations known to a user. In each category, it is seen how the amount of environmental impact is translated into different units.

2.2.2 Material Circularity Indicator

A circular economy aims to maintain the value of products, materials and resources for as long as possible by returning them into the product cycle at the end of their use, while minimizing the generation of waste. The fewer products we discard, the less materials we extract, the better for our environment. This process starts at the very beginning of a product's lifecycle: smart product design and production processes can help save resources, avoid inefficient waste management and create new business opportunities.

The Circularity Indicator shows how circular your product is, where 0,1 means that your product is completely linear and a number close to 1 means that you have a circular product. The methodology used in this report is based on the Ellen MacArthur Foundation's methodology published in "Circularity Indicators: An Approach to Measuring Circularity, Ellen MacArthur Foundation and Granta Design, 2015."

	Baseline	Alternative
Material Circularity Indicator	0.595	0.499

Put things in perspective with **equivalencies** („same as driving X miles“)

Track how **circular** your solutions are

Characteristics

Description and
Documentation included



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GaBi Packaging Calculator

User's Manual

A product by
thinkstep



Offerings & Pricing



Solutions

GaBi Packaging Calculator: Costs for Software

Tool sold as

- SaaS offering based on GaBi Envision, hosted by thinkstep, annual subscriptions
- Includes annual maintenance

€2,900 per year per named seat



Solutions

thinkstep's Packaging Consulting Offerings

Workshops

Workshop based on customer requirements and specifications: e.g. including general information about sustainability, LCA, Circularity and as well the GaBi packaging calculator

Training and support

Hands on training for the use of the GaBi Packaging Calculator and/or frame contract for further support

Projects

Your ideas, your specifications, our solution

→ Prices upon request



Summary

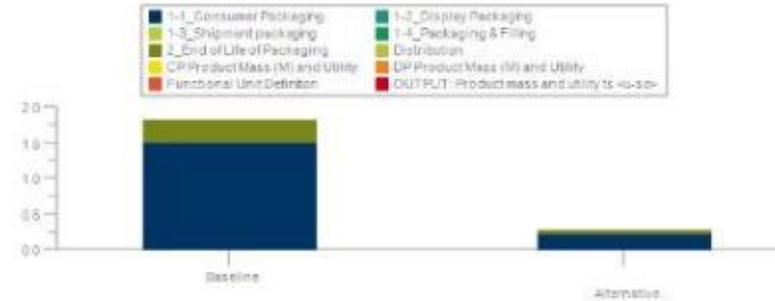
- Assess existing product portfolio
- Inform R&D, prototyping
- Respond to stakeholder inquiries
- Measure, manage, improve your product environmental impacts

Rapid sustainability assessment for everyone on your team!



2.2 Scenario Overview

Climate change midpoint excl. biogenic carbon (CO2 eq)



	Baseline	Alternative
Acidification midpoint (v1.09) [Mole of H+ eq.]	0.00205	0.000205
Climate change midpoint, excl. biogenic carbon (v1.09) [kg CO2 eq.]	1.87	0.278
Climate change midpoint, incl. biogenic carbon (v1.09) [kg CO2 eq.]	1.87	0.28
Eutrophication freshwater midpoint (v1.09) [kg P eq.]	1.81E-005	1.72E-006
Eutrophication marine midpoint (v1.09) [kg N eq.]	0.000678	0.000102
Eutrophication terrestrial midpoint (v1.09) [kg N eq.]	0.00648	0.000973
Ionising radiation [kg U235 eq.]	0.0917	0.0137
Particulate matter [kg PM2.5 eq.]	8.16E-005	1.22E-006
Photochemical ozone formation midpoint, human health (v1.09) [kg NRVOC eq.]	0.00262	0.000393
Resource depletion, mineral, fossil and renewables, midpoint (v1.09) [kg Sb eq.]	1.76E-006	1.84E-007
Primary Energy Demand, Non-Renewable [MJ]	34.2	5.13
Primary Energy Demand, Renewable [MJ]	2.13	0.319
Primary Energy Demand, Total [MJ]	36.3	5.44
AWARE, OECD-BRIC average for unspoiled water [m³ world equiv.]	0.558	0.0817
Blue water consumption [kg]	17.4	2.81

The fields in the above table are coloured in GREEN when an alternative has a value that is 20% lower than that of the product in the first column, and are coloured in RED when an alternative has a value that is 20% higher than that of the first product.

2.2.1 Equivalency Calculator

Impact Category	Equivalency in each Impact Category	Baseline	Alternative
GWP(100) [kg CO2 eq.]	driving a passenger car for [km] ^{a)}	9.63	1.44
Acidification Potential [kg SO2 eq.]	quantity of emissions is sufficient to damage [kg] of calcium carbonate-based minerals (used for construction of historical monuments or present in coral reefs)	0.00267	0.0004
Eutrophication Potential [kg Phosphate eq.]	emissions could make [l] of natural spring drinking water unhealthy to drink ^{b)}	66.7	10
POCP [kg Ethene eq.]	emissions value reported could bring this amount of [m³] of air from the safe level to dangerous level of air quality for outdoor sports ^{c)}	4.29E03	643
Primary Energy Demand, Total [MJ]	amount of energy with which you could power a laptop for this many hours [h] ^{d)}	14	2.59

a) Assuming that car complies with EURO6 emission standard and has engine size between 1.4 and 2 liters. Gasoline use for one km is 0.0525 kg gasoline.
 b) Maximum value for phosphate in drinking water in order to be still considered healthy is 5 mg/liter, according to German Water
 c) Maximum value for ozone in outdoor air in order to be still considered healthy is 100 µg/m³, according to German Air Quality Standard
 d) Assuming that laptop consumes 15W



Time for your questions

Upcoming webinars



GaBi Circularity Toolkit



Guest Speaker:
Sven Herrmann, Programme Lead
Circularity Indicators Project,
Ellen Mac Arthur Foundation

GTC tool covering both LCA and MCI
calculation → *unique on the market!*

October 23rd, 10am – 11am CEST

October 25th, 6pm – 7pm CEST

GaBi Carbon Composites Database



Guest Speaker:
Robert Ilg, Chief Engineer Department Life
Cycle Engineering,
Fraunhofer Institute

Database contains 137 LCI datasets related to
Carbon composites (CF) and carbon fiber-
reinforced plastics (CFRP)

October 17th, 4pm-5pm CEST



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