



Partners for
Innovation

TOOL FOR CO₂ AND FINANCIAL IMPACT CALCULATION

Community of Practice Reusable Packaging

31 March 2020



Kennisinstituut
Duurzaam Verpakken



Universiteit Utrecht

REKENTOOL: CO₂ en kostenindicator voor herbruikbare verpakkingen

Specifieke eisen en wensen voor de rekentool zijn:

1. **Overzicht van alle ketenstappen van een herbruikbare verpakking:** materialen en productieprocessen, opslag en distributie, gebruik, inzameling, wassen en controleren, heruitgifte (meerdere malen) en uiteindelijke recycling en afvalverwerking.
2. **Indicatie van de CO₂-impact en de integrale kosten** van alle fasen van de keten van een herbruikbare verpakking in vergelijking met een eenmalige verpakking.
3. De rekentool maakt het mogelijk om de CO₂-impact en integrale kosten te **optimaliseren**, zoals het aantal roulaties, de transportafstand en het soort transportmiddelen.

Reusable packaging

name: Reusable E-commerce Packaging

Technical lifespan (number of use cycles)
text input

50 cycles

Return rate (%)
text input

90%

Volume of packaging (L)
text input

20

Packaging production

Tip: this can include secondary and tertiary packaging.

Part name	material	mass (g)	process step	single use?
Optional text input	dropdown	text input	dropdown	checkbox

Envelope	pp	150	film extrusion	<input type="checkbox"/>
Label	LDPE	10		<input checked="" type="checkbox"/>
	LLDPE			<input type="checkbox"/>
	HDPE			<input type="checkbox"/>
	PS			<input type="checkbox"/>
	Corrugated board			<input type="checkbox"/>
	Paper			<input type="checkbox"/>
	Paperboard			<input type="checkbox"/>

Packaging costs

Production costs per packaging item in €

text input

Envelope	€	5,00	<input type="checkbox"/>
Label	€	0,05	<input checked="" type="checkbox"/>
	€		<input type="checkbox"/>

Transport to product producer / filler

Transportation mode	Distance (km)	Mass of packaging (g)	Cost of distribution (€)
dropdown	text input	optional text input	optional text input

Van (<3,5 ton)	150	150	€ 0,10
			€
			€

Filling of packaging

No significant CO2 impact is expected, compared to single use

Transport to DC

Transportation mode	Distance (km)	Mass of packaging (g)	Cost of distribution (€)
dropdown	text input	optional text input	optional text input

Lorry 7,5-16 ton	100	150	€
			€

Storage

No significant CO2 impact is expected, compared to single use packaging

Optional input for significant extra costs.

€

Single use packaging #1

name: Carton Box

Volume of packaging (L)
text input

20

Packaging production

Part name	material	mass (g)	process step
Optional text input	dropdown	text input	dropdown

Corrugated Box	Corrugated board	200	Board folding
Tape	PP	2	film extrusion

Costs

Production costs per packaging item in €

text input

€	1,20
€	0,01
€	

Transport to product producer / filler

Transportation mode	Distance (km)	Mass of packaging (g)	Cost of distribution (€)
dropdown	text input	optional text input	optional text input

Lorry 7,5-16 ton	100	200	€ 0,05
			€
			€

Filling of packaging

No significant CO2 impact is expected, compared to reusable packaging

Transport to DC

Transportation mode	Distance (km)	Mass of packaging (g)	Cost of distribution (€)
dropdown	text input	optional text input	optional text input

Lorry 7,5-16 ton	100	200	€
			€

Storage

No significant CO2 impact is expected, compared to reusable packaging

Distribution to customer

Transportation mode <i>dropdown</i>	Distance (km) <i>text input</i>	Mass of packaging (g) <i>optional text input</i>
Van (<3,5 ton)	50	150

Cost of distribution (€) <i>optional text input</i>
€
€

Consumption of product

Return transport

Transportation mode <i>dropdown</i>	Distance (km) <i>text input</i>	Mass of packaging (g) <i>optional text input</i>
Van (<3,5 ton)	50	150
Lorry 7,5-16 ton	150	150

Cost of distribution (€) <i>optional text input</i>
€
€
€
€

Cleaning

Cleaning method <i>dropdown list</i>	Surface area <i>text input</i>	Percentage cleaned <i>optional text input</i>
Inspection		

Cost of cleaning (€) <i>optional text input</i>
€
€
€

Transport to End of Life

Additional transportation at end of life

Transportation mode <i>dropdown</i>	Distance (km) <i>text input</i>	Mass of waste (g) <i>text input</i>
Lorry 7,5-16 ton	100	150

Cost of transportation (€) <i>optional text input</i>
€
€

End-of-life processes

Materials <i>automatically filled</i>	End of life scenario <i>dropdown list</i>	Mass (g) <i>optional text input</i>
PP	Recycling	
Paper	Recycling	
0		
0		
0		

Disposal costs (€ per ton) <i>optional text input</i>
€

Distribution to customer

Transportation mode <i>dropdown</i>	Distance (km) <i>text input</i>	Mass of packaging (g) <i>optional text input</i>
Van (<3,5 ton)	50	200

Cost of distribution (€) <i>optional text input</i>
€
€

Consumption of product

Skip to end of Life

Skip to end of Life

Transport to End of Life

Additional transportation at end of life

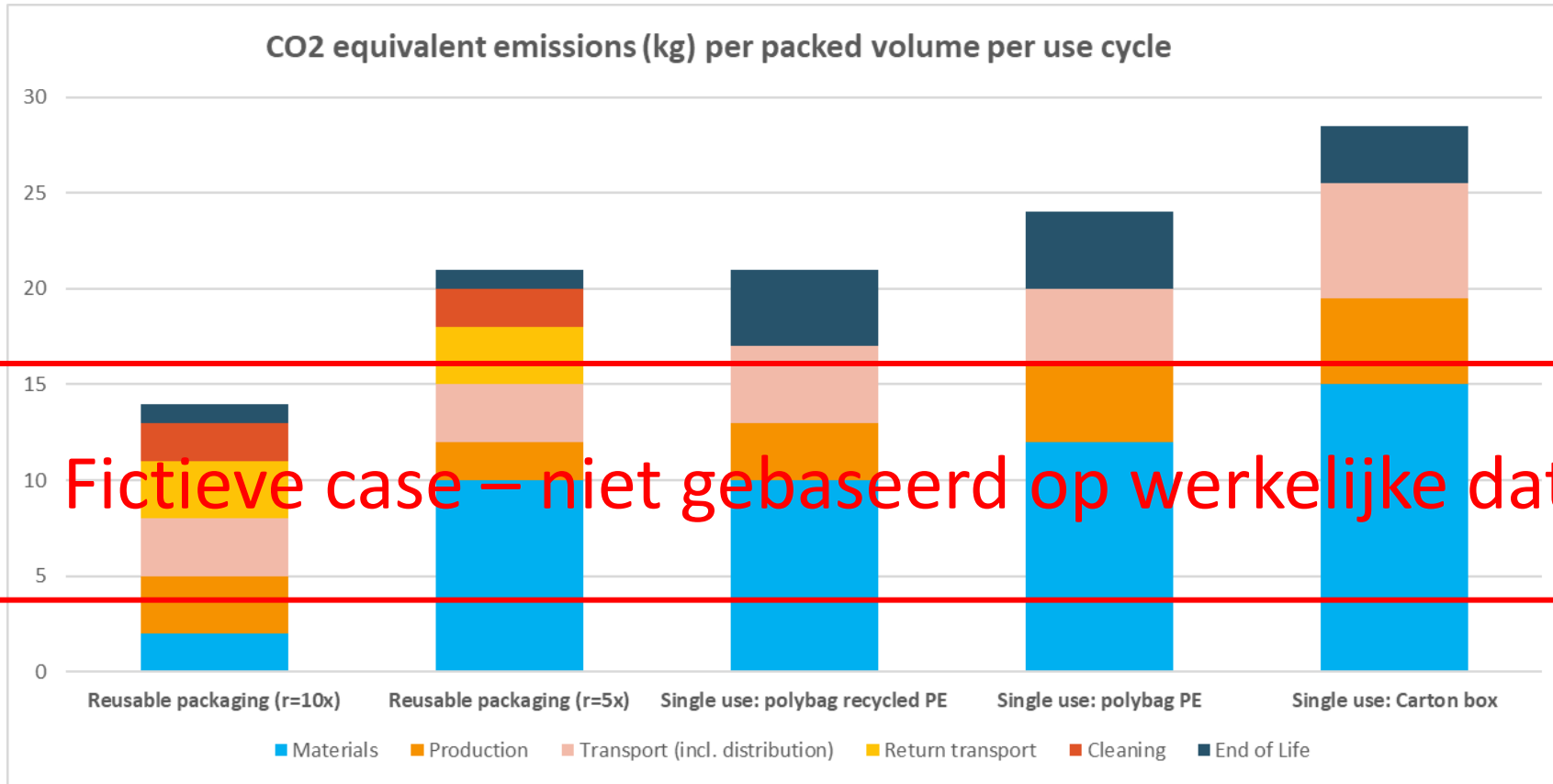
Transportation mode <i>dropdown</i>	Distance (km) <i>text input</i>	Mass of waste (g) <i>text input</i>
Lorry 7,5-16 ton	100	200

Cost of transportation (€) <i>optional text input</i>
€
€

End-of-life processes

Materials <i>automatically filled</i>	End of life scenario <i>dropdown list</i>	Mass (g) <i>optional text input</i>
Corrugated board	Recycling	
PP		
0		
0		
0		

Disposal costs (€ per ton) <i>optional text input</i>
€



Break-even point

The reusable packaging contributes to less CO₂ equivalent greenhouse gas emissions when the packaging is used at least:

- 5,1** times, when compared with the single use packaging Polybag recycled PE.
- 4,3** times, when compared with the single use packaging Single use packaging Polybag PE.
- 2,1** times, when compared with the single use packaging Single use packaging Carton Box.

NEXT STEPS

Activiteiten

- *Programma van Eisen*
 - Concept versie bouwen (lopend)
 - Data invoeren
 - Testen met leden CoP > **wie doet er mee?**
 - Definitieve versie
-
- Feedback is welkom (tot 7/4)
 - Testen met 5 verschillende cases (vanaf 15/4)

Planning

Maart

Maart – 15 April

1-30 April

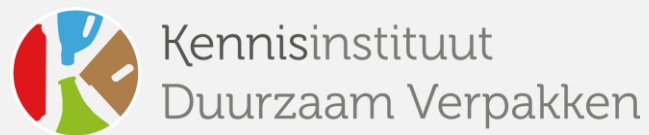
15 April – 15 Mei

Eind Mei

Mail naar: Marcel Keuenhof (KIDV)

DANK VOOR JULLIE AANDACHT

Marcel Keuenhof



Siem Haffmans
Jannes Nelissen



Ernst Worrell
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