



Traffic Management
Products

NonCrete Bio-Polymer Bollard Life Cycle Assessment

October 2023

Objective

This study aims to calculate the Cradle to Gate carbon emissions of TMP's NonCrete Bollard from TMP's upstream operations and TMP's own operations before sale.

Assessment

Component list for the NonCrete bollard is listed below;

Components	Supplier	Product	Amount	Distance to Supplier
Powder	Matrix Braskem Liverpool	BIO Powder	2700 gr	145 km
Locking system	Goodturn Eng Central Laser Springmasters Redditch	Stainless Steel	80.5 gr	43 km

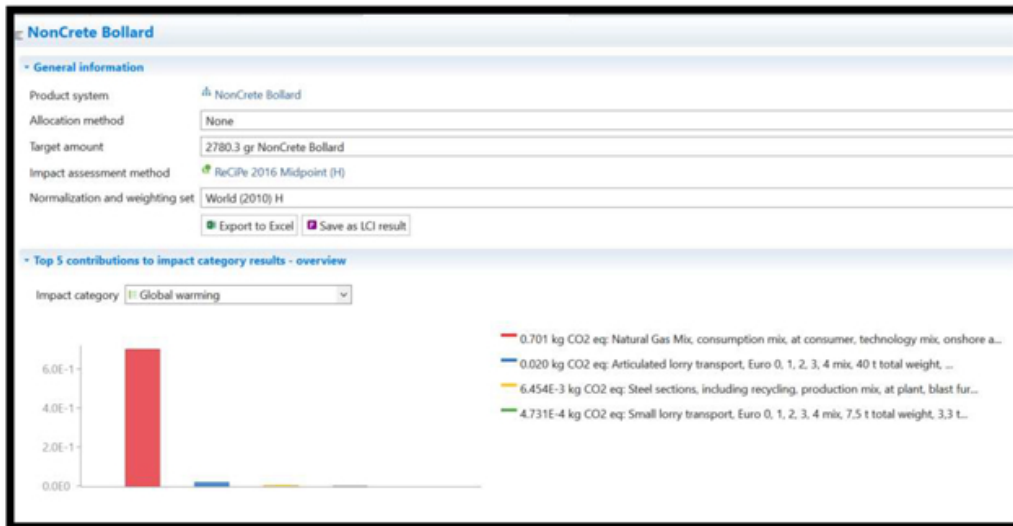
Selected providers are listed below:

Flow	Specification	Description
BIO Powder	Product	Excluding credits 2.32 kgCO ₂ e/kg is assumed according to Braskem's l'm green™ bio-based PE LCA
BIO Powder	Transportation	Articulated lorry transport, Euro 0, 1, 2, 3, 4 mix, 40 t total weight, 27 t max payload - RER
Stainless Steel	Product	Steel sections, including recycling, production mix, at plant, blast furnace route / electric arc furnace route, 1kg - GLO
Stainless Steel	Transportation	Small lorry transport, Euro 0, 1, 2, 3, 4 mix, 7,5 t total weight, 3,3 t max payload - RER
Energy Usage	Natural Gas Consumption	Natural Gas Mix, consumption mix, at consumer, technology mix, onshore and offshore production incl. pipeline and LNG transport - EU-27

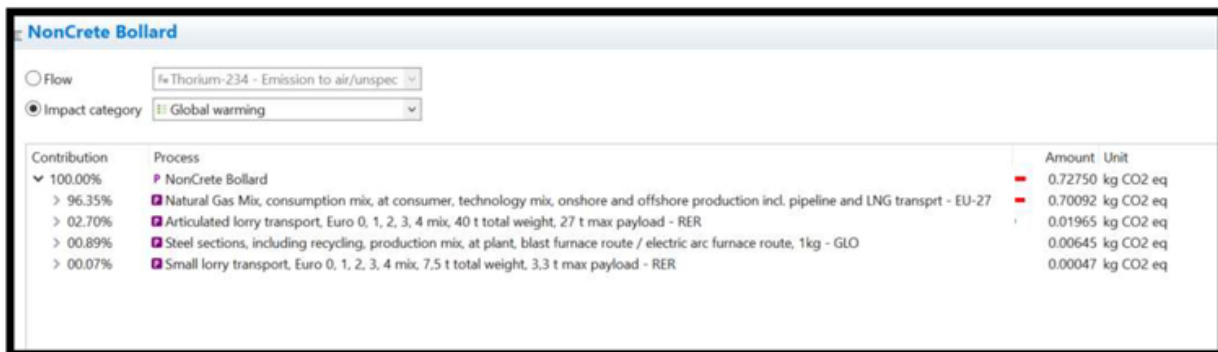
For the LCA (Life Cycle Assessment) of NonCrete Bollard input information is as follows:

- Software: openLCA
- Impact Method: ReCiPe 2016 Midpoint (H)

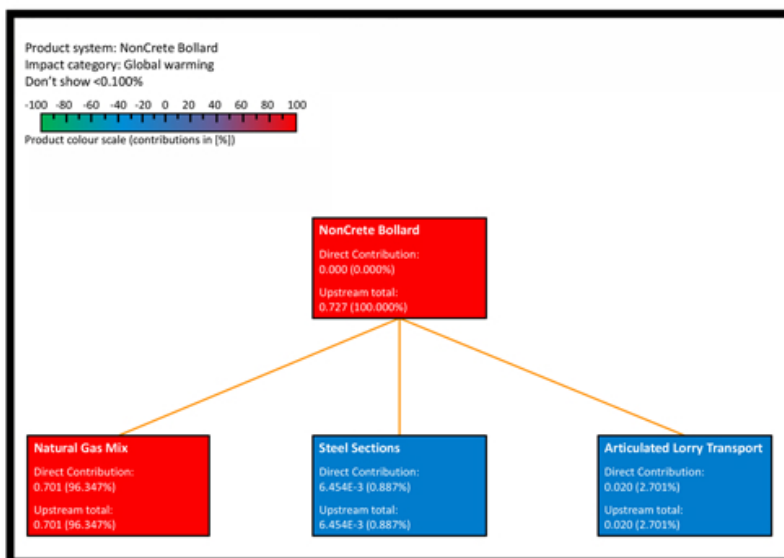
Contribution Category Results



Contribution Tree



Sankey Diagram



Assumptions

Excluded parameters in the Global Warming calculations are:

- Electricity usage is not included as TMP uses 100% renewable electricity
- No water is consumed
- No waste is generated

Summary

Total Global Warming impact results are as follows:

Flow	Specification	Impact Result (kgCO ₂ e/kg)
BIO Powder	Production ¹	2.32
BIO Powder	Transportation	0.01965
Energy Usage	Natural Gas Consumption	0.70
Stainless Steel	Production	0.00645
Stainless Steel	Transportation	0.00047
Total		3.04

¹Please see Appendix 1: Braskem Life Cycle Assessment summary table

Appendix 1

Braskem Life Cycle Assessment

Based on the summary table by Braskem "I'm green™ bio-based PE Life Cycle Assessment*," the carbon emission value for biobased polymer is 2.32 kgCO₂e/kg.

			kgCO ₂ e/kg
Sugarcane Growing	Agricultural Operations		0.91
		<i>Total</i>	<i>0.91</i>
Ethanol Production	Ethanol Production		0.03
	Bagasse Burning		0.16
		<i>Total</i>	<i>0.19</i>
I'm green™ bio-based PE	Ethanol Transport		0.46
	Industrial Operations (Ethylene and PE)		0.76
		<i>Total</i>	<i>1.22</i>
Total			2.32

**for more information please see Braskem's I'm green™ bio-based PE Life Cycle Assessment document*