

PCF Simulator

Year

2024

Site Name

MODERDUK

Raw Material

(All)

Material Name

SOPROPHOR 796/P BULK

Reset all filters

Select 1 Alt. RM for each Raw Material

☐ (All)

☒ ETHYLENE OXIDE (PIPELINE) KG >> MB ETHYLENE OX...

☐ ETHYLENE OXIDE (PIPELINE) KG >> MB ETHYLENE OX...

☒ No alternative - Fossil

☒ PROPYLENE OXIDE BU >> MB PROPYLENE OXIDE (Use...

☒ STYRENE MONOMER BU >> MB STYRENE (ISCC+) - LY...

CancelApply

Critical Warning:

Never deselect "No alternative - biogenic." Doing so will result in incorrect PCF calculations.

Validated Material Name PCF

Raw Material	Contributor Code	Alt. Rm Name - Alternative Vendor Group	RCI	Usage Factor	Alt. Ratio	pcf without change excl biog. content	pcf without change incl biog. content	pcf with altern. excl biog. content	pcf with altern. incl biog content
ETHYLENE OXIDE (PIPE...	WP2_400/152762	MB ETHYLENE OXIDE (CCU) - ROYAL DUTCH SHELL PLC	0.00	0.59	100.00%	2.23	2.23	1.63	1.29
PROPYLENE OXIDE BU	WP2_400/61084	MB PROPYLENE OXIDE (Used Cooking Oil/ Palm Fatty Acid DL...	0.00	0.15	100.00%	2.23	2.23	1.63	1.29
STYRENE MONOMER ...	WP2_400/61088	MB STYRENE (ISCC+) - LYONDELLBASELL INDUSTRIES...	0.00	0.21	100.00%	2.23	2.23	1.63	1.29
CAUSTIC SODA PEARL...	WP2_400/138018	No alternative - Fossil		0.00	0.00%	2.23	2.23	1.63	1.29
ISONONANOI C ACID 900K...	WP2_400/145872	No alternative - Fossil	0.00	0.01	0.00%	2.23	2.23	1.63	1.29
PHENOL BU	WP2_400/61097	No alternative - Fossil	0.00	0.07	0.00%	2.23	2.23	1.63	1.29

MB ETHYLENE OXIDE (CCU) - ROYAL DUTCH SHELL PLC

MB PROPYLENE OXIDE (Used Cooking Oil/ Palm Fatty Acid Distill...

MB STYRENE (ISCC+) - LYONDELLBASELL INDUSTRIES NV

1

1

1

1

1

Alternative Raw Material

Raw Material	Emission factor	Usage factor	Current Contribution	Alt. Rm Name - Alternative Vendor Group	Alternative Rm Status	Fiscal Year Period	Alt. Ratio	Alt. Rm EF	Premium EUR/kg	Alt. Prem. EUR/kg	Alt. New Contribution	RM quantity (kg)
ETHYLENE OXIDE (PIPELINE) KG	1.50	0.59	0.89	MB ETHYLENE OXIDE (CCU) - ROYAL DUTCH SHELL PLC	PROSPECTIVE	November 2025	100%	0.83	0.15	0.09	0.49	
PROPYLENE OXIDE BU	1.78	0.15	0.26	MB PROPYLENE OXIDE (Used Cooking Oil/ Palm Fatty Acid...	PROSPECTIVE	August 2025	100%	1.24	1.087	0.16	0.18	
STYRENE MONOMER BU	2.94	0.21	0.62	MB STYRENE (ISCC+) - LYONDELLBASELL INDUSTRI...	PROSPECTIVE	January 2025	100%	2.32	2.64	0.55	0.49	

General description:

The **PCF Simulator Dashboard** enables users to model the impact of raw material substitutions on a product's Product Carbon Footprint (PCF). By selecting sustainable alternatives to current raw materials and adjusting substitution ratios, users can simulate and compare projected PCF values — both with and without biogenic carbon content — to support data-driven sustainability decisions and business case development.

Filters :

At the top of the dashboard, users can refine their analysis using the following filters:

- **Year:** Select the fiscal or calendar year for which you wish to analyse the product carbon footprint data.
- **Site Name:** Choose the production site or plant location. The data displayed will reflect only the materials used at that site.
- **Raw Material:** Filter to a specific raw material ingredient, or leave as (All) to view all raw materials associated with the selected product.
- **Material Name:** Select the finished product whose PCF you wish to evaluate and optimise.

Two Side Panels:

Upper Panel (PCF Recalculation View)

Year

2024

Site Name

MODERDUK

Raw Material

(All)

Material Name

SOPROPHOR 796/P BULK

Reset all filters

Select 1 Alt. RM for each Raw Material

☐ (All)

☒ ETHYLENE OXIDE (PIPELINE) KG >> MB ETHYLENE OX...

☐ ETHYLENE OXIDE (PIPELINE) KG >> MB ETHYLENE OX...

☒ No alternative - Fossil

☒ PROPYLENE OXIDE BU >> MB PROPYLENE OXIDE (Use...

☒ STYRENE MONOMER BU >> MB STYRENE (ISCC+) - LY...

CancelApply

Critical Warning:

Never deselect "No alternative - biogenic." Doing so will result in incorrect PCF calculations.

Validated Material Name PCF

Raw Material	Contributor Code	Alt. Rm Name - Alternative Vendor Group	RCI	Usage Factor	Alt. Ratio	pcf without change excl biog. content	pcf without change incl biog. content	pcf with altern. excl biog. content	pcf with altern. incl biog content
ETHYLENE OXIDE (PIPE...	WP2_400/152762	MB ETHYLENE OXIDE (CCU) - ROYAL DUTCH SHELL PLC	0.00	0.59	100.00%	2.23	2.23	1.63	1.29
PROPYLENE OXIDE BU	WP2_400/61084	MB PROPYLENE OXIDE (Used Cooking Oil/ Palm Fatty Acid DL...	0.00	0.15	100.00%	2.23	2.23	1.63	1.29
STYRENE MONOMER ...	WP2_400/61088	MB STYRENE (ISCC+) - LYONDELLBASELL INDUSTRIES...	0.00	0.21	100.00%	2.23	2.23	1.63	1.29
CAUSTIC SODA PEARL...	WP2_400/138018	No alternative - Fossil		0.00	0.00%	2.23	2.23	1.63	1.29
ISONONANOI C ACID 900K...	WP2_400/145872	No alternative - Fossil	0.00	0.01	0.00%	2.23	2.23	1.63	1.29
PHENOL BU	WP2_400/61097	No alternative - Fossil	0.00	0.07	0.00%	2.23	2.23	1.63	1.29

MB ETHYLENE OXIDE (CCU) - ROYAL DUTCH SH...

MB PROPYLENE OXIDE (Used Cooking Oil/ Pal...

MB STYRENE (ISCC+) - LYONDELLBASELL IND...

1

1

1

1

1

- Display filters at the top (Year, Site Name, Raw Material, Material Name) to focus the analysis on the relevant product and site.
- Include

s
a
c
h
e
c
k
b
o
x
p
a
n
e
l
o
n
t
h
e
l
e
f
t
w
h
e
r
e
u
s
e
r
s
c
a
n
s
e
l
e
c
t
o
n
e
a
l
t
e
r
n
a
t
i
v
e
r
a
w
m
a
t
e
r
i
a
l
p
e
r
i
n
g
r
e
d
i
e
n
t
. T
i
c
k
i
n
g
a
c
h
e
c
k
b
o
x
a
n
d
c
l
i
c
k
i
n
g
A

ply triggering a automatic PICC Freccialculation.

•

The Alternative Ratified in the Upper Panel defines the substitution rate percentage — the

share of the current raw material to be replaced by the selected alternative in the PCC calculation. This can be adjusted using the ratio

slide.
• Display the Validated Material Name PCFF table showing current and projected PCFF values, both excluding and including biog

carbon content.

Lower Panel (Alternative Material Details)

Provides a granular breakdown of each alternative raw material, including:

- Emission Factor (EF): kg CO₂e emitted per kg of raw material.

Alternative Raw Material													
Raw Material	Emission factor	Usage factor	Current Contribution	Alt. Rm Name - Alternative Vendor Group	Alternative Rm Status	Fiscal Year Period	Alt. Ratio	Alt. Rm EF	Premium EUR/Kg	Alt. Prem. EUR/Kg	Alt. New Contribution	OK	RM quantity (kg) 500K 100K 1500K
ETHYLENE OXIDE (PIPELINE) KG	1.50	0.59	0.89	MB ETHYLENE OXIDE (CCU) - ROYAL DUTCH SHELL PLC	PROSPECTIVE	November 2025	100%	0.83	0.15	0.09	0.49		
PROPYLENE OXIDE BU	1.78	0.15	0.26	MB PROPYLENE OXIDE (Used Cooking Oil/ Palm Fatty Acid..)	PROSPECTIVE	August 2025	100%	1.24	1.087	0.16	0.18		
STYRENE MONOMER BU	2.94	0.21	0.62	MB STYRENE (ISCC*) - LYONDELBASELL INDUSTRI..	PROSPECTIVE	January 2025	100%	2.32	2.64	0.55	0.49		

- Usage Factor (UF): quantity of the material used per kg of finished product.

- Current Contribution (CC): the material's share of the total PFC before substitution.

- New Contribution (NC): the project decided share after switching to the alternative.

- Premium EUR/kg (P/R/AP): the additional cost associated with adopting these sustainable alternatives.

- Authorized personnel only. This document contains confidential information and is intended for use by authorized personnel only. It is not to be distributed outside the organization without the express written permission of the authorized personnel.

Key Features:

Comprehensive Filtering Options

- Refine your analysis using four filters: Year, Site Name, Raw Material, and Material Name to focus on the most relevant product and site data.
- All filtered results are reflected immediately across both panels upon selection.

Alternative Material Selection

- The checkbox panel in the Upper Panel lists all available sustainable alternatives for each raw material ingredient in the product formula.
- Only one alternative per raw material may be selected at a time. If no sustainable substitute is available, the entry will display "No alternative".
- Once selections are made, click Apply to trigger the PCF recalculation. Click Cancel to restore the previous selection without applying changes.

Alternative Ratio Configuration

- The Alt. Ratio field defines the proportion of the current raw material to be replaced by the selected alternative, from a partial replacement up to a full 100% substitution.
- The ratio can be adjusted using the slider in the Upper Panel. A value of 1 (100%) indicates that the alternative fully replaces the current raw material in the PCF calculation.

PCF Recalculation and Comparison

- The Validated Material Name PCF table displays four key metrics for each material: PCF without change (excl. biogenic), PCF without change (incl. biogenic), PCF with alternative (excl. biogenic), and PCF with alternative (incl. biogenic).
- A negative PCF value including biogenic content indicates that the product sequesters more CO than it emits — a highly favourable result for bio-based materials.
- Compare the current and projected PCF figures side by side to quantify the environmental benefit of each substitution scenario.

Cost Premium Analysis

- The Lower Panel displays the Premium EUR/kg for each alternative, representing the additional sourcing cost of the sustainable substitute.
- Use this information alongside the PCF improvement figures to build a complete environmental and financial business case for raw material substitution.

Important Notes and Best Practices

- Data displayed in this dashboard is intended for internal analysis only. PCF figures must not be used for external reporting without formal validation.
- Always ensure the "No alternative – Bio-based" option in the Upper Panel remains selected at all times. Deselecting it will exclude bio-based carbon contributions from the PCF calculation, resulting in inaccurate figures.
- Only modify checkboxes for raw materials where a genuine sustainable alternative is being evaluated. Leave all other options unchanged.
- Any sourcing change arising from this analysis must follow the organisation's standard procurement, quality assurance, and sustainability approval processes before implementation.

KPIs

Name	Definition
Alt. Ratio	The proportion of the current raw material to be replaced by the selected sustainable alternative. A value of 1 (100%) indicates full substitution.
PCF without change (excl. biog.)	The current PCF of the product calculated without applying any substitution and excluding biogenic CO content. Unit: kg COe / kg of finished product.
PCF without change (incl. biog.)	The current PCF including biogenic CO — relevant for materials of biological origin where CO absorbed during plant growth is taken into account.
PCF with alternative (excl. biog.)	The projected PCF if the selected alternative is used, excluding biogenic content. Compare to PCF without change (excl. biog.) to assess improvement.
PCF with alternative (incl. biog.)	The projected PCF including biogenic content when using the alternative. A negative value means the product sequesters more CO than it emits.
Emission Factor (EF)	The carbon intensity of a raw material: kg COe emitted per kg of material produced. A lower emission factor indicates a more sustainable material.
Usage Factor (UF)	The quantity (in kg) of a raw material used per kg of finished product. A higher usage factor amplifies the material's impact on the overall PCF.
Current Contribution (CC)	The contribution of this raw material to the overall product PCF before any substitution is applied. Unit: kg COe / kg of finished product.
New Contribution (NC)	The projected contribution of this raw material to the overall PCF after switching to the selected alternative. Compare to Current Contribution to quantify the improvement.
Premium EUR/kg (PR / AP)	Additional cost per kilogram for switching to the sustainable alternative. Weigh against the PCF improvement to build the sourcing business case.
Renewable Carbon Index (RCI)	A measure of the renewable carbon content of a raw material, on a scale from 0 to 1. A value of 1.00 indicates a fully renewable material; 0.00 indicates fossil-based.

Guided Tour: Using This Section

