

# Introducing **+LC** (Low Carbon) Solutions



## What is **+LC**?

**+LC** solutions represent a sustainable offering from LyondellBasell, encompassing a range of Intermediates and Derivatives (I&D) chemicals produced under an International Sustainability and Carbon Certification (ISCC) PLUS certified mass balance methodology.

Sourced from renewable or recycled feedstocks, these **+LC** solutions are designed to support businesses in their efforts to meet greenhouse gas (GHG) emissions reduction goals, all while maintaining the high-quality applications essential for modern, sustainable living by offering a lower carbon footprint than fossil-based alternatives.

## Why Choose **+LC**?

- **Sustainable Certification:** Each **+LC** solution is backed by an ISCC+ mass balance certificate, ensuring sustainable sourcing and production practices.
- **Reduced Carbon Footprint:** **+LC** products are created from renewable or recycled feedstocks, offering a lower carbon footprint compared to conventional fossil-based alternatives.
- **Supports GHG Reduction Goals:** Tailored to assist businesses in achieving their greenhouse gas (GHG) emissions reduction targets, particularly Scope 3 emissions.
- **Wide Range of Applications:** From insulation materials to automotive and consumer goods, **+LC** offers versatile applications across various sectors.
- **Global Availability:** Available across Europe, the Americas, and Asia in 2024.

**Join us in leading the sustainability transformation with **+LC** – where our proven low carbon solutions can help meet your business's emissions reduction goals.**

For more information, please visit [www.lyondellbasell.com](http://www.lyondellbasell.com) or follow @LyondellBasell on LinkedIn.



**+LC Product Carbon Footprint Summary - PO&D\***

[kg CO<sub>2</sub>eq per kg of product]

I&D Products from LyondellBasell	Fossil-based	Bio-attributed (mass balancing)	
	Naphtha/NGL's	Bio-based feedstock	CO <sub>2</sub> emission reduction potential of bio-based feedstock compared to fossil-based feedstock
	ISO 14067 GWP100, Total (incl. carbon removals)	ISO 14067 GWP100, Total (incl. carbon removals)	
Propylene Oxide (PO)	1.91	-1.04	2.95
Styrene (SM)	2.92	-1.10	4.02
Monopropylene Glycol (MPG)	1.98	-0.40	2.37
Dipropylene Glycol (DPG)	2.12	-0.55	2.66
Tripropylene Glycol (DPG)	2.16	-0.64	2.80
Propylene Glycol Monomethyl Ether (PM1)	1.88	-0.12	2.00
Dipropylene Glycol Monomethyl Ether (DPM)	2.03	-0.40	2.44
+LC solutions			

- Global blend basis
- Cradle to Gate (LyondellBasell)
- Per kg of product basis
- All I&D LCAs follow Together for Sustainability (TfS) guidelines

(\*) PCFs numbers have been updated from 2025 figures

**+LC Product Carbon Footprint Summary - BDO&D\***

[kg CO<sub>2</sub>eq per kg of product]

I&D Products from LyondellBasell	Fossil-based	Bio-attributed (mass balancing)	
	Naphtha/NGL's	Bio-based feedstock	CO <sub>2</sub> emission reduction potential of bio-based feedstock compared to fossil-based feedstock
	ISO 14067 GWP100, Total (incl. carbon removals)	ISO 14067 GWP100, Total (incl. carbon removals)	
Allyl Alcohol (AA)	2.77	-0.57	3.34
1,4-Butanediol (BDO) (**)	3.47	1.41	2.06
2-Methyl-1,3-Propanediol (MPD) (**)	3.47	1.41	2.06
Tetrahydrofuran (THF)	5.20	2.51	2.68
N-Methyl-2-Pyrrolidone (NMP)	5.16	3.16	2.00
+LC solutions			

- Cradle to Gate (LyondellBasell)
- Per kg of product basis
- All I&D LCAs follow Together for Sustainability (TfS) guidelines

(\*) PCFs numbers have been updated from 2025 figures  
(\*\*) BDO & MPD have the same PCF because a mass allocation is applied to that sub-process

**+LC Product Carbon Footprint Summary - Acetyls**

[kg CO<sub>2</sub>eq per kg of product]

I&D Products from LyondellBasell	Fossil-based	Bio-attributed (mass balancing)	
	Naphtha/NGL's	Bio-based feedstock	CO <sub>2</sub> emission reduction potential of bio-based feedstock compared to fossil-based feedstock
	ISO 14067 GWP100, Total (incl. carbon removals)	ISO 14067 GWP100, Total (incl. carbon removals)	
Vinyl Acetate Monomer (VAM)	2.84	1.39	1.45
+LC solutions			

- Cradle to Gate (LyondellBasell)
- Per kg of product basis
- All I&D fossil-based and +LC LCAs follow Together for Sustainability (TfS) guidelines



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The Product Carbon Footprints (PCFs) displayed in this presentation are calculated in accordance with general standards for life cycle assessment (ISO 14040 and ISO 14044) and the carbon footprint of products (ISO 14067). The calculations for PCF are based on greenhouse gas (GHG) emissions from LyondellBasell plants and secondary datasets, and they may utilize high-quality average data for purchased feedstocks and energy. This cradle-to-gate methodology excludes emissions that occur after manufacturing. The PCFs provided are estimates and rely on current, relevant data and methodologies. These may be updated or refined as we continue to evolve our approach to identifying, measuring, and addressing emissions.

For further information regarding the life cycle assessment methodology, including underlying assumptions and results, please contact your LyondellBasell sales representative. While PCFs provide transparency about the greenhouse gas emissions associated with products, they should not be viewed as a comprehensive assessment of a product's sustainability.

ISCC+ certified bio-based raw materials, which include bio-based wastes and residues such as used cooking oil (UCO) and palm fatty acid distillates (PFAD), are allocated to **+LC** products using a mass balance approach. Use of a mass balance approach means that we mix fossil feedstocks with bio-based feedstocks in our traditional production processes and allocate bio-based feedstock to final product via mass balance certificates; individual products may or may not physically contain bio-based material. In the life cycle assessment, all bio-based raw materials in the feedstock, including PFAD, are treated using a waste-like approach. For more information on alternative feedstock scenarios, please consult your LyondellBasell sales representative.

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