



Smart. Sustainable. Solutions.

Portfolio
and Handbook

Introduction

In an era of growing environmental awareness and an urgent need for sustainable practices, the polymer industry is at a critical turning point. Polymers that are everywhere in modern life were traditionally associated with significant environmental problems, from the accumulation of plastic waste to dependence on fossil fuels and feedstocks. Yet this industry also has the unique potential to point the way to a more sustainable future through innovation, research and a commitment to eco-friendly practices.

This handbook on sustainability in the polymer industry provides a comprehensive guide for experts in the industry, researchers, policymakers and students. It is designed to inform readers in depth about the challenges and opportunities in this sector and offer practical solutions and strategies to promote sustainability.

The handbook is divided into sections, each of which covers an essential aspect of sustainability in the polymer industry.

Our aim with this guide is to equip you with the knowledge and tools you need to drive sustainable change in your organisation and beyond. By implementing more sustainable practices, the polymer industry can not only reduce its environmental impact but also open up new opportunities for growth and innovation.

Together we can build a more sustainable future in which we reap the benefits of polymer materials without jeopardising the health of our planet.

Welcome to the journey towards sustainability in the polymer industry.

The Biesterfeld Sustainability Team

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Your experts in sustainability



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Our sustainability vision



Our endeavour to make every application more sustainable.

WHY

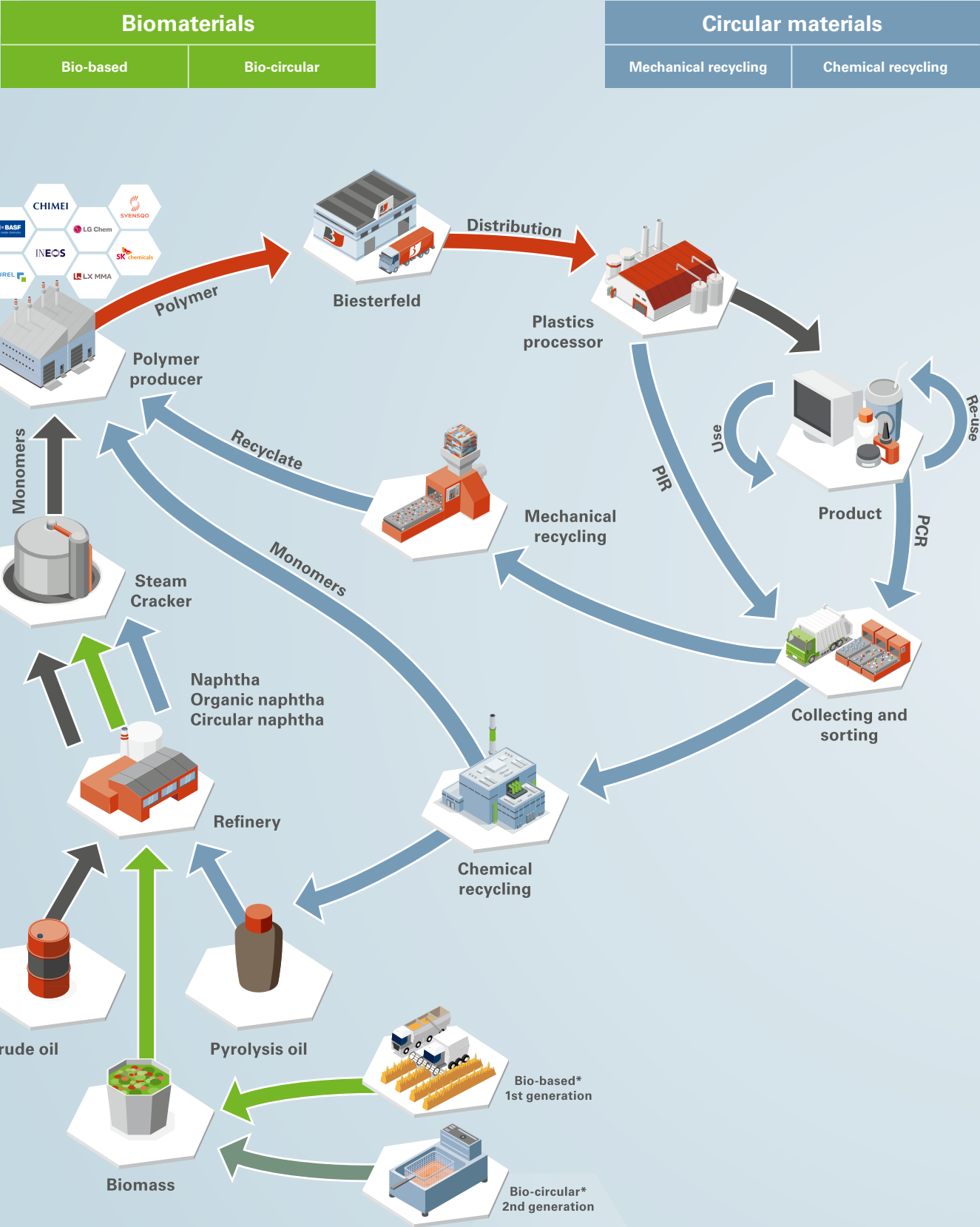
Proactively leading and inspiring our partners in relation to sustainability.

HOW

WHAT

A unique opportunity to play an active role in sustainable transformation.


On track towards a circular economy and defossilization




Our sustainable product solutions



- | | |
|--|---|
|   ABS ECOLOGUE™ |  PET SKYPET® |
|  ABS, ASA high heat LG ABS, LG ASA |  PET RYNITE® |
|  Bio-Copolyester ECOZEN® |  PLA Biopolymer Compound INZEA® |
|  Copolyester ECOTRIA® |  PMMA CRYSTALUX® |
|  PA 6 RECOMYDE® |  POM DELRIN® |
|  PA 6, PA 6.6 FRIANYL® |  PP Compounds OMIKRON |
|  PA 6.6, PA 6.10, PA 10.10 ZYTEL® |  PPA ZYTEL® HTN |
|  PA filaments TYNEX® |   PPS RYTON® |
|  PBT CELANEX® / CRASTIN® |  PPSU RADEL® |
|  PC ECOLOGUE™ |  PPSU DURADEX™ |
|  PC/ABS ECOLOGUE™ |  PSU UDEL® |
|  PC Blends & PC Compounds LUPOY® |  TPC HYTREL® |
|  PE & PP RECYCL-IN |  TPU ELASTOLLAN® |
|  PE & PP INEOS bio-attributed |  TPV SANTOPRENE® |

 Biomaterials

 Circular materials
(mechanical and chemical recycling)

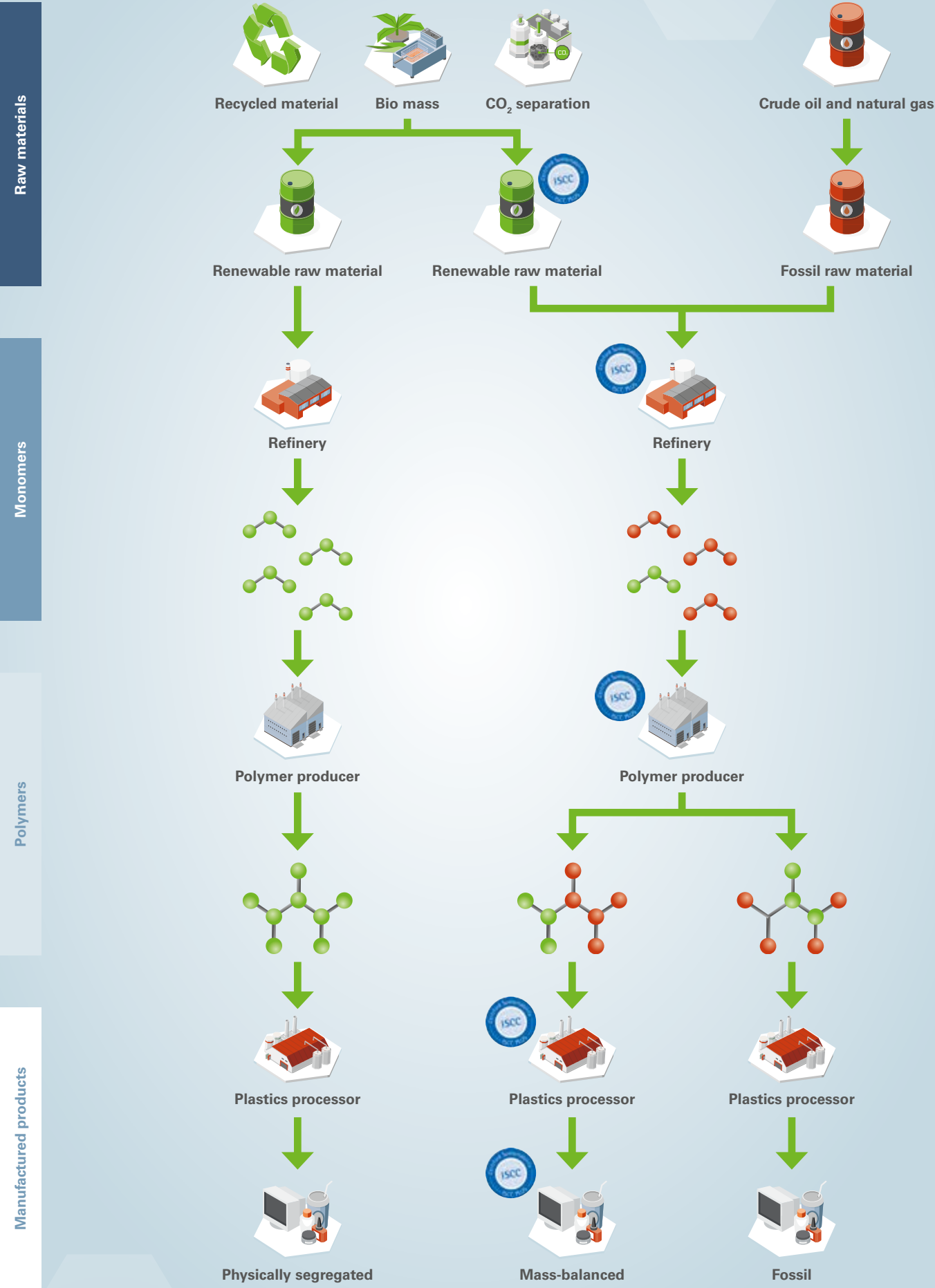
ISCC PLUS mass balancing

- Accelerates the transition from fossil raw materials to (sustainable) renewable materials
- Supply and value creation chain subject to full external inspection and certification
- Chemically identical material composition
- Fossil-based version can be replaced immediately without requalification
- Declaration of sustainable mass proportion on each material delivery






Raw materials in the ISCC PLUS system:



Physically segregated vs. mass-balanced



Resource-efficient plastics















	Product	Polymer	Circular materials				Biomaterials	
			Mechanical recycling		Chemical recycling		Bio-based (1 st generation)	Bio-circular (2 nd generation)
			PCR	PIR	PCR	PIR		
	Elastollan® N	TPU					47-57%	
	Elastollan® BMB	TPU						≤ 100%
	Santoprene® ECO-R	TPV	15-25%					
	Zytel® RS	PA 6.10					≤ 60%	
	Zytel® RS	PA 10.10					≤ 90%	
	Zytel® HTN	PPA					20%	
	Zytel® ECO-R	PA 6.6		30%				
	Hytrel® ECO-B	TPC						≤ 73%
	Rynite® ECO-R	PET	20-70%					
	Celanex® ECO-R	PBT/PET	25%					
	Celanex®, Crastin® ECO-B	PBT						≤ 40%
	Tynex® RS	PA 10.10					100%	
	Frianyl® ECO-R	PA 6; PA 6.6		30%				
	Delrin® Renewable Attributed	POM						100%
	Recycl-IN	PP	50-70%					
	Recycl-IN	LDPE	60%					
	Recycl-IN	LLDPE	32-70%					
	Recycl-IN	HDPE	50%					
	INEOS bio-attributed	PP						100%
	INEOS bio-attributed	PE						100%
	RYTON®	PPS				41%; GF only*		≤ 43%
	UDEL®	PSU				≤ 34%		
	RADEL®	PPSU				≤ 38%		
	DURADEX™	PPSU				≤ 38%		

PCR: post-consumer recycling

PIR: post-industrial recycling

*GF: glass fibre

Resource-efficient plastics

	Product	Polymer	 Circular materials				 Biomaterials		
			Mechanical recycling		Chemical recycling		Bio-based (1 st generation)	Bio-circular (2 nd generation)	
			PCR	PIR	PCR	PIR			
 CHIMEI a step up	Ecologue™	ABS	70%				50% / 70% / 100%		
	Ecologue™	PC	70-90%						
	Ecologue™	PC/ABS (FR)	60%						
	Ecologue™	M-ABS					50%		
 SK chemicals	Ecotria® CR	Copolyester + chemically recycled PET				≤ 70%			
	Ecotria® R	Copolyester + PCR-PET	30-70%						
	Ecozen® CR	Copolyester				50%			
	Ecozen®	Copolyester					≤ 22%		
	Skypet® CR	PET				≤ 100%			
 LG Chem	Lupoy® ER	PC/ABS	30-60%						
	Lupoy® ER	PC	30-90%						
	Lupoy® ER	PC/ASA	50%						
	LG ABS high heat	ABS	30%					≤ 100%	
	LG ASA high heat	ASA						≤ 100%	
	LG TR-ABS	M-ABS				30%			
 LX MMA	Crystalux®	PMMA				≤ 50%			
 NUREL	INZEA®	PLA Biopolymer Compound					≤ 95%		
	Recomyde®	PA 6		30-100%					
 OMIKRON	OMIKRON	PP Compounds		30-100%					
	OMIKRON ECO	PP Compounds		30-100%					
	OMIKRON ECO	PP		100%					

Post-consumer recycling (PCR)
Post-industrial recycling (PIR)

Examples of plastics applications



Product	Polymer	Applications
Elastollan® N	TPU	Cables, hoses, profiles, seals, plugs, blowers, dampers; CVJ bellows
Elastollan® BMB	TPU	



Santoprene® ECO-R	TPV	Cables, hoses, profiles, seals, plugs, blowers, dampers; CVJ bellows
Zytel® RS	PA 6.10	Fuel lines, fuel vapour lines, PCV and pneumatic brake lines, pipes, brake line coatings, fuel line connectors
Zytel® RS	PA 10.10	
Zytel® ECO-R	PA 6.6	
Zytel® HTN	TPC	Plugs and plug connectors, charge air dampers, thermostat housings, switches and relays, gearbox housings
Hytrell® ECO-B	TPC-ET	Cables and lines, gears, sports items, airbag systems, bellows
Rynite® ECO-R	PET	Brake systems, windscreen wiper arms, microswitches, oven handles, photovoltaic modules, bulb holders
Celanex®, ECO-R	PBT/PET	Windscreen wiper arms, ventilation grilles, oven handles, microswitches, switching systems, roof racks, headlight systems
Celanex®, Crastin® ECO-B	PBT	
Tynex®	PA 10.10	Toothbrush applications, baby brushes, sensitive brushes
Frianyl® ECO-R	PA 6; PA 6.6	Plug connectors, terminal strips, circuit breakers, charging plugs (appliances), high-voltage connectors, PCBs, charging plugs (automotive)



Delrin® Renewable Attributed	POM	Automotive applications, gearboxes for e-bikes, conveyor belts to medical applications
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Recycl-IN	PP	Injection moulding of technical parts, caps (without food approval), trays
Recycl-IN	LDPE, LLDPE	Laminating films, heavy-duty sacks, industrial films, blown films, cast stretch films, masterbatches
Recycl-IN	HDPE	Blow-moulded bottles (including cosmetics) up to 10 litres, improved rigidity for co-extruded films
INEOS bio-attributed	PP	Injection moulding applications, e.g. technical components or sealing caps, extrusion applications such as films and packaging for industrial, food and medical applications
INEOS bio-attributed	PE	

Examples of plastics applications



Product	Polymer	Applications
RYTON®	PPS	Various automotive applications, plug connectors, switches, housings, coil formers, pumps
UDEL®	PSU	Sanitary applications, medical applications, diaphragms
RADEL®	PPSU	Medical applications, pipe connectors, sanitary applications, food applications
DURADEX™	PPSU	



Ecologue™	ABS	Electrical appliances, household items, toys
Ecologue™	PC	Housings for electrical appliances and adapters, electronic components
Ecologue™	PC/ABS (FR)	Electrical and electronic appliances
Ecologue™	M-ABS	Toys, sealing caps, household products, boxes, housings, stationery and bathroom accessories



Ecotria® CR	Copolyester + chemically recycled PET	Cosmetic packaging, bottles, cream pots, closures, lipstick/lip gloss packaging, powder compacts, etc.
Ecotria® R	Copolyester + PCR-PET	
Ecozen®	Copolyester	Containers for food, beverages and household goods
Skypet® CR	PET	High-gloss fibres, BOPET films, EP Compounds, hot fill bottles, thin sheets



Lupoy® ER	PC/ABS	Automotive interior parts & office equipment
Lupoy® ER	PC	Electrical housings & appliances
Lupoy® ER	PC/ASA	Automotive interior parts & office equipment
LG ASA high heat	ABS	Toys, sealing caps, household products, boxes, housings, stationery and bathroom accessories
LG ABS high heat	ASA	Automotive interior & exterior parts
LG TR-ABS	M-ABS	Toys, sealing caps, household products, boxes and housings



LX MMA	PMMA	Household products, electronic equipment, furniture decoration, automotive tail lamps
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OMIKRON	PP Compounds	Automotive parts, furniture parts, domestic, electric and garden appliances, household goods, industrial parts, structural parts, boxes and housings, extruded parts
OMIKRON ECO	PP Compounds	
OMIKRON ECO	PP	



INZEA®	PLA Biopolymer Compound	Packaging, films, bags, cutlery, coffee capsules, outdoor and agricultural applications, construction and non-durable goods
Recomyde®	PA 6	Technical parts in all industry segments

Supplier activities to promote sustainability



- By 2030: -25% for scope 1 & 2 emissions (compared with 2018)
- By 2030: -15% for scope 3 emissions (compared with 2022)
- By 2050 net zero
- Approx. €29 billion in fixed investments between 2022 and 2027
- Construction of large wind energy plants in the North Sea
- Founding member of the Together for Sustainability initiative



- By 2030: -30% for scope 1 & 2 emissions (compared with 2021)
- By 2030: -10% energy consumption
- By 2030: -10% water consumption
- By 2030: -15% waste from production
- EcoVadis Platinum



- 100% wind energy for Delrin® Renewable Attributed, in addition to the use of water vapour during production.



- By 2030: -33% for scope 1 & 2 emissions (compared with 2019)
- By 2030 20% renewable energy
- By 2030 850 kt sustainable products
- By 2050 net zero emissions in Europe
- Construction of environmentally-friendly steam cracker
- EcoVadis Gold rating



- By 2040 net zero for scope 1 & 2 emissions
- By 2030: -40% for scope 1 & 2 emissions (compared with 2021)
- By 2030: -23% for scope 3 emissions (compared with 2021)
- Compounding uses 100% renewable energy in 2024
- By 2030 18% of turnover from ECHO portfolio



- EcoVadis Platinum
- By 2030 42% for scope 1 & 2 emissions
- By 2035 40% renewable energy for production
- By 2050 net zero for scope 1 & 2 emissions
- 22 MW of solar energy installed, equivalent to electricity consumption of 8100 households



- By 2040 net zero for scope 1 & 2 emissions
- By 2030 80% of turnover from sustainable products
- By 2030 100% of copolyester from recycled materials
- CDP rating: A-



- By 2030 net zero emissions
- By 2050 net zero for scope 1 & 2 emissions
- By 2030 100% renewable energy outside Korea
- By 2050 100% renewable energy globally
- 2023: CDP Climate change A-, Water security A-



- 100% renewable energy for compounding
- ISO 14001 certified



- By 2025 net zero for scope 1 & 2 emissions
 - 16% of product portfolio contains recycled material
 - CSI certified
-

Sustainability at Biesterfeld

As a family business, we think in terms of generations. Sustainability is a vital consideration and motivating factor in all our activities. We care about people, the environment and our business. We will advise our partners on all aspects of sustainability and regulatory compliance, and actively contribute to building a more sustainable future.

You can read about our sustainability strategy and activities in our sustainability report, which is available on our website.



Commitment and certifications

To put our principles into practice, we have been supporting internationally recognised standards and initiatives since 2019. We also undergo regular external certification of our efforts and activities.

- Signatory to Operation Clean Sweep (OCS) (since 2014)
- Participant in the UN Global Compact (since 2008)
- EcoVadis Bronze Medal (since 2018)
- Responsible Care certified
- IntegrityNext profile
- Member of the Roundtable (since 2014) on Sustainable Palm Oil (RSPO)
- ISCC PLUS-certified*
- ISO 9001-certified (since 1998)
- Biesterfeld Group Sustainability Report (since 2015)



* Covers part of the company; further expansion planned

Supply chain management at Biesterfeld

In logistics and supply chain management, Biesterfeld acts as a full-service provider to its customers:

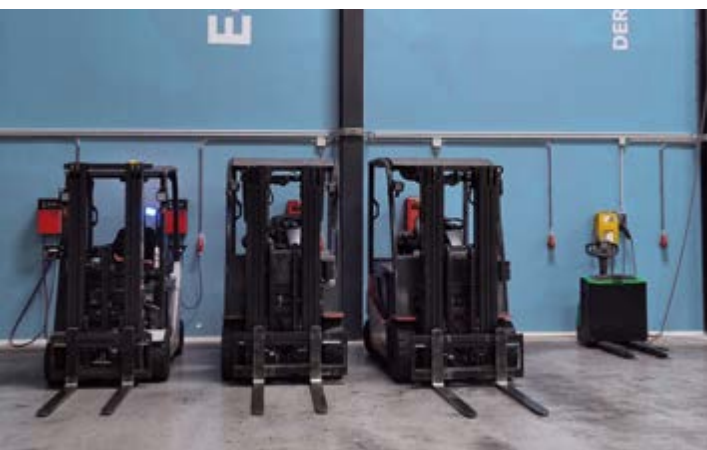
- Sales and product development
- Planning and forecasting
- Procurement and purchasing
- Warehousing, transport and distribution

Biesterfeld maintains strong, long-term relationships with local and global logistics partners to provide an optimum service.

We believe it's important to respect our employees and partners.

We stay in regular contact with our partners on economic, environmental, legal and social issues and actively support the individual sustainability approaches of our partners, for example:

- Use of lorries with low-noise and low-pollutant technologies
- Lorry driver training to ensure safe procedures and reduce diesel consumption and CO₂ emissions
- Modern digital technologies to optimise charging processes and avoid empty trips
- Implementation of and transition to paperless processes in storage and during transport
- Use of solar energy on warehouse roofs and use of sustainable energy for internal logistics
- Innovative technologies such as hydrogen energy and drones



☐

I have read the **data privacy statement**.

Head office: Hamburg, court of registration: Hamburg District Court, Commercial Register HRB 41045, VAT ID no. DE811 186 394

Information, data and graphics relating to raw materials have been sourced from the documentation provided by our suppliers.
Product availability may vary from country to country.

Disclaimer:

We shall not be held liable for the goods being suitable for the purpose intended by the purchaser, unless the contract expressly states that a particular use will achieve a successful outcome. Our technology-based consulting services, information and recommendations are all given to the best of our knowledge. Since how the product is actually used is beyond our control and not all potential situations can be foreseen, any information, advice and so on, whether given verbally or in writing, shall always be non-binding. In particular, such information or advice does not release the purchaser from their duty to check that our products and goods are suitable for the intended purpose and procedure.



We would be delighted to give you in-depth advice on our sustainable solutions.

Product availability may vary from country to country.

All portfolios



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