



Ultraform[®] Sustainable Solutions for Better Future:

Reducing CO₂ Emission by LowPCF & BMB Portfolio

BASF
We create chemistry



WE TURN CHALLENGES INTO OPPORTUNITIES

As the demand for energy increases globally, so does the need for alternative solutions that foster sustainability without compromising on efficiency, cost-effectiveness and economic development. While sustainable alternatives offer a promising future for societies in general, they also require expert knowledge for their optimal development and implementation. BASF has worked with our product development team to innovate sustainable materials that support our clients in their innovations.

As a global leading material provider, we understand that the development of sustainable materials can be challenging, as it involves important considerations in terms of strategy and product innovation. But with the right knowledge and approach, challenges can be turned into growth opportunities.

ULTRAFORM

SUSTAINABLE SOLUTIONS

TO REDUCE CO₂ EMISSION

Our Ultraform® LowPCF and BioMB solutions have focus on Low Product Carbon Footprint (PCF) solutions: BMB Certification by ISCC+ and Green electricity with 0 CO₂ emission. These solutions support help provide common ground for our customers diverse businesses through a more eco-beneficial Ultraform solution, and help them address the most critical sustainability areas.



**BMB Certification
by ISCC+**



**Apply Green
electricity with 0 CO₂
Emission**



WHAT IS BIOMASS BALANCE?

As climate change and other environmental issues take center stage and impact all areas of our lives, responsible companies are taking initiative to reduce their carbon footprints. That's why Ultraform supports customers with a growing specialty portfolio of engineering polymers and functionalized grades that help achieve both the sustainability goals of our customers, as well as help to meet their technical specifications as global manufacturers.

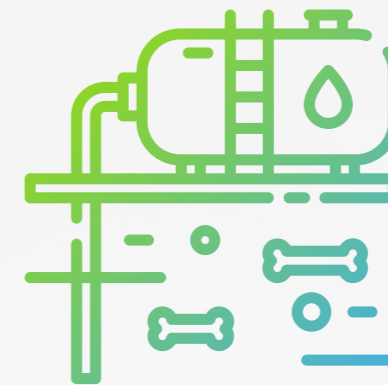
OUR APPROACHES

Our Biomass Balance Approach contributes to the use of renewable raw materials in its integrated production system and can be applied to the majority of the products in its portfolio. This allows customers to realize reduction in carbon dioxide emission in their end-use products and advance towards their renewable content goals.

In this process, renewable raw materials are used as feedstock at the very beginning of the Production Verbund, and allocated to the respective sales products using a third party verified certification method. The certified products thus contribute to sustainable development by reducing greenhouse gas emissions and saving fossil resources.

We believe that through this offering we can enable our customers in the automotive, consumer products and medical device industries with the means to achieve a reduction in carbon footprint and where renewable content is important.

1



FEEDSTOCK

FOSSIL

Renewable

Use of renewable feed-stock in very first steps of chemical production (e.g steam cracker)

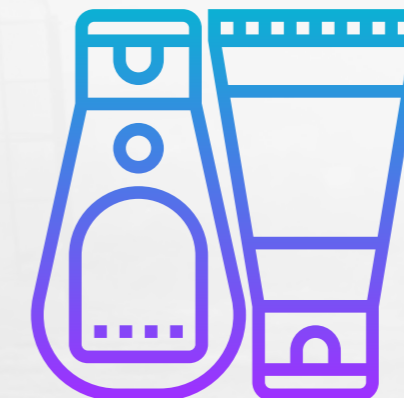
2



BASF PRODUCTION VERBUND

Utilization of existing Production Verbund for all production steps

3



PRODUCTS

CONVENTIONAL PRODUCT

Biomass Balance product

Allocation of renewable feedstock to selected products

BENEFITS OF BASF'S BIOMASS BALANCE APPROACH

DRIVES THE USE OF RENEWABLE RESOURCES

In the Biomass Balance Approach, renewable resources such as bio-naphtha or biomethane derived from by-products of agricultural production, crop or food processing, or residues are used together with fossil resources already in the very first steps of chemical production. The bio-based amount is then allocated to specific products sold by means of the certified method.



ISCC is globally the largest of the studied certification scheme, in terms of number of certified companies and products.

The organization of ISCC is based on a multi-stakeholder approach, with approx 130 different member from industry, NGOs and scientific organization.

BASF has established a closed chain of custody from the renewable feedstock it uses through to the final product. An independent certification confirms that BASF has replaced the required quantities of fossil feedstock for the biomass balanced product you purchase with renewable feedstock according to the ISCC+ requirements.



SEAMLESS AND TRANSPARENT CREDIT TRANSFER UNDER BASF

With applying our In-house MeOH also certified by ISCC+, entire value chain is transparent and under BASF control - From bio-content into our BASF cracker to BMB MeOH and all the end to Ultraform production.



ENSURES IDENTICAL PRODUCT QUALITY AND PROPERTIES

The method is applied for many BASF products, e.g. superabsorbents, dispersions, plastics and intermediates that are accordingly independently certified. The resulting biomass balanced products are identical in terms of formulation and quality but save fossil resources and are associated with quantifiably lower greenhouse gas emissions. Our customers can rely on the same performance to which they are accustomed and benefit from a drop-in solution.



SAVE CO₂ EMISSIONS

With the Biomass Balance Approach we offer our customers the opportunity to stand out from the competition and directly influence the way they save CO₂ and thereby make a conscious contribution to environmental protection. By having a closed chain of custody the CO₂ equivalent savings for each specific product can be quantified.

ADDITIONAL SOLUTION FOR LOWER CO₂ EMISSION

ULTRAFORM[®] STAYING AHEAD OF CHANGE WITH GREEN ELECTRICITY ACHIEVING LOWER CO₂ EMISSION

Green electricity is the least expensive options in boosting electricity access, reducing air pollution and cutting carbon dioxide emissions worldwide. The BASF Ultraform team is forging pathways to scale promising technologies into tomorrow's reliable, low-emission energy solutions

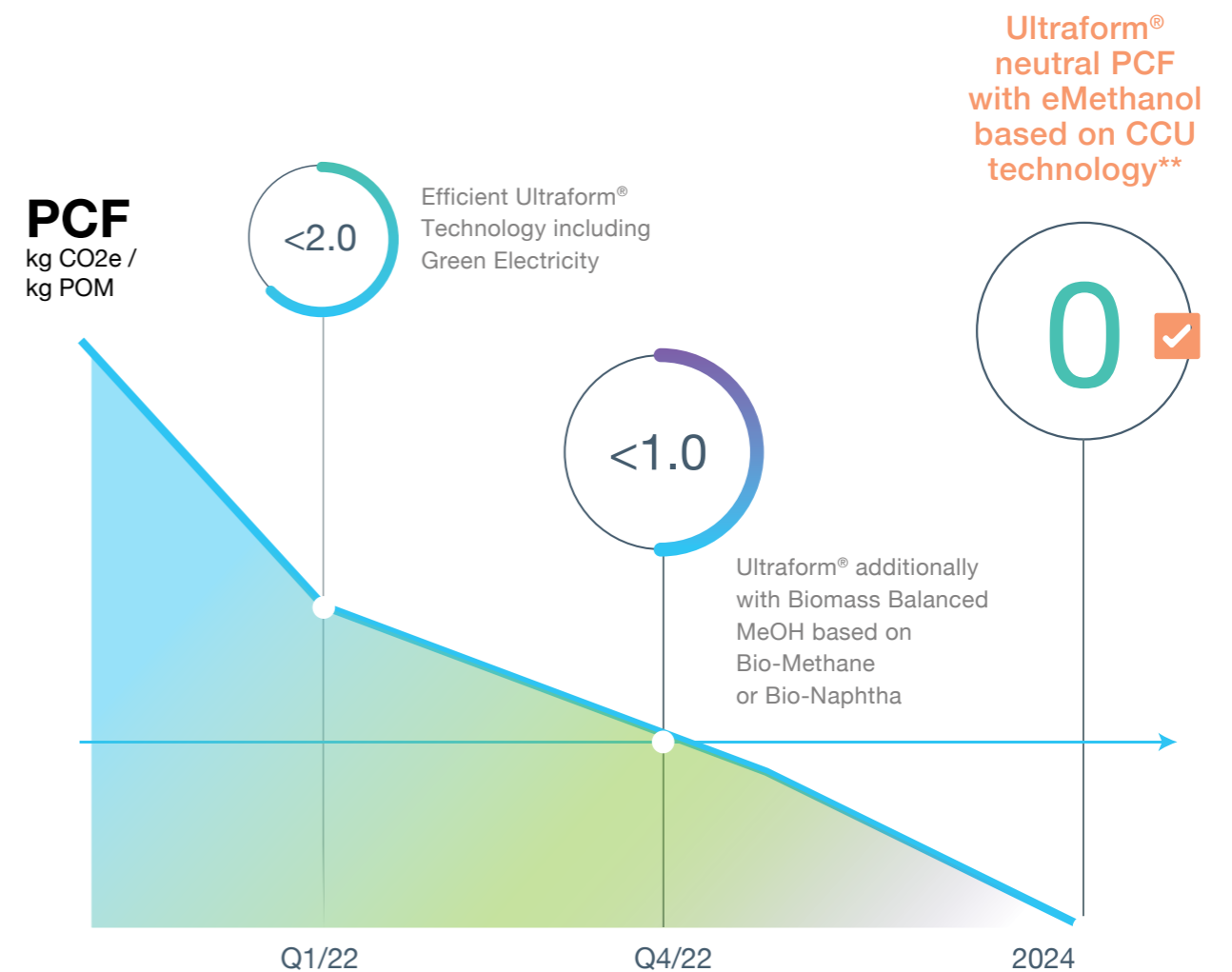


WHAT ARE RENEWABLE ENERGY CERTIFICATES?

Renewable Energy Certificates (RECs) are a market-based instrument that certifies the bearer owns one megawatt-hour (MWh) of electricity generated from a renewable energy resource.

HOW MUCH ULTRAFORM[®] CAN REDUCE CO₂ EMISSION IN 2022 AND BEYOND

Targeting carbon neutral Ultraform[®] products in the future

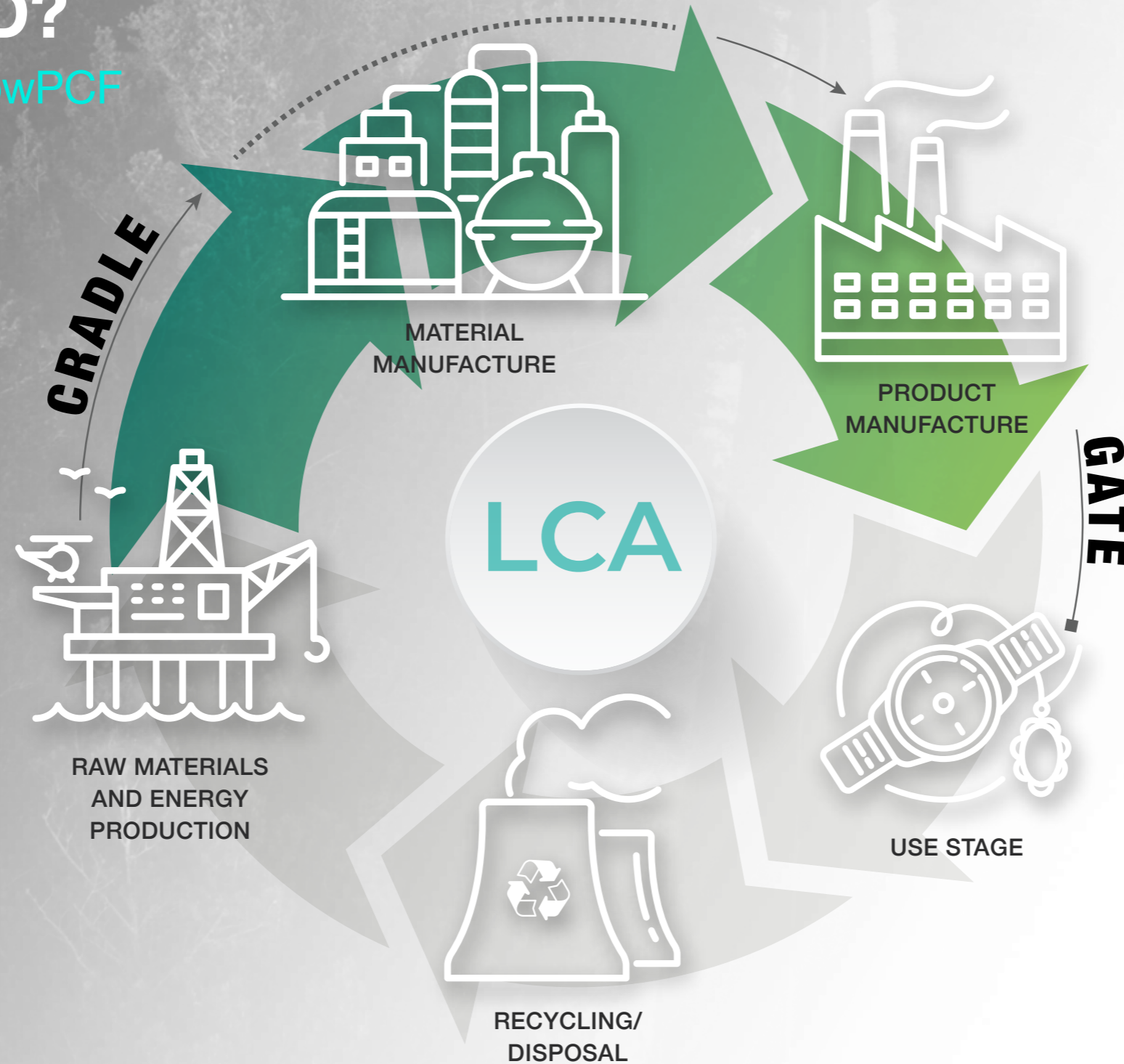


HOW IS THE PRODUCT CARBON FOOTPRINT IS CALCULATED?

FOR ULTRAFORM LowPCF AND BMB

LCA Calculation on a cradle-to-gate basis for both fossil based alternatives as well as for a set of more sustainable alternatives that include the usage of biomass and renewable energy.

Conducted quantitative analysis of environmental impacts of product and processes over the entire life cycle for our customers. Assessment includes analysing environmental footprints such as carbon emissions and water footprints. The LCA considers the entire life cycle of a product from



To improve the quality of our interactions, and enhance our credibility with our customers, Ultraform also Finalized external 3rd party review with NSF, which is internationally known for environmental claims

- BASF calculates the Product Carbon Footprint based on the ISO standards 14040:2006 and 14044:2006 for life cycle assessment.
- Additionally, our calculation is aligned with the ISO/ TS 14067:2018 for carbon footprint of products and with the GHG Protocol Product Standard (WRI & WBCSD, 2011)
- BASF supports establishing global standards
- An independent, 3rd party critical review of the Ultraform LCA was conducted by NSF international.
- The review confirmed that the Ultraform LCA has met the requirements for methodology, data, interpretation, and reporting and is consistent with the principles and requirements of ISO 14040 & 14044 and with ISO 14067.
- The reported values have been updated to reflect the most recent operational and supply data (2019-2021).

WHAT WILL YOU GET BY ULTRAFORM LowPCF AND BMB GRADES?

BASE RESIN

PORTFOLIO FOR ULTRAFORM® LowPCF GRADES

Product	ULTRAFORM® N2320 003 LCO2 AT UN	ULTRAFORM® S2320 003 LCO2 AT UN	ULTRAFORM® S1320 003 LCO2 AT UN	ULTRAFORM® W2320 003 LCO2 AT UN	ULTRAFORM® H2320 006 LCO2 AT UN
Features	Green Electricity	Green Electricity	Green Electricity	Green Electricity	Green Electricity
Customer claims	<ul style="list-style-type: none"> Focus on efficient CO₂ footprint reduction Identical material performance Only with Green Electricity used for Production (Zero CO₂ emission) ~40% lower Product carbon footprint compared to Fossil conventional Ultraform 				

PORTFOLIO FOR ULTRAFORM® BMB GRADES

Product	ULTRAFORM® N2320 003 BMB AT UN	ULTRAFORM® S2320 003 BMB AT UN	ULTRAFORM® S1320 003 BMB AT UN	ULTRAFORM® W2320 003 BMB AT UN	ULTRAFORM® H2320 006 BMB AT UN
Features	Biomass Balance + Green Electricity	Biomass Balance + Green Electricity	Biomass Balance + Green Electricity	Biomass Balance + Green Electricity	Biomass Balance + Green Electricity
Customer claims	<ul style="list-style-type: none"> 100% of the fossil-based organic materials required for the manufacturing of this product are replaced by sustainably certified renewable organic feedstock Identical material performance 40-60% lower PCF with only Biomass Balance Up to ~70% lower product carbon footprint (LCA Cradle-to-gate) in the case both biomass balance and Green Electricity compared to Fossil conventional Ultraform No product requalification required 				

Quality	Identical with ULTRAFORM® N2320 003 AT UN	Identical with ULTRAFORM® S2320 003 AT UN	Identical with ULTRAFORM® S1320 003 AT UN	Identical with ULTRAFORM® W2320 003 AT UN	Identical with ULTRAFORM® H2320 006 AT UN
Mass Balancing	Yes	Yes	Yes	Yes	Yes
Certification by	ISCC+	ISCC+	ISCC+	ISCC+	ISCC+
Available	Q4/2022	Q4/2022	Q4/2022	Q4/2022	Q4/2022

COMPOUNDED RESIN

PORTFOLIO FOR ULTRAFORM® LowPCF GRADES

Product	ULTRAFORM® N2640 Z2 LCO2 AT UN	ULTRAFORM® N2640 Z6 LCO2 AT UN	ULTRAFORM® N2720 M210 LCO2 AT UN	ULTRAFORM® N2200 G23 LCO2 AT UN	ULTRAFORM® N2200 G43 003 LCO2 AT UN	ULTRAFORM® N2200 G53 R01 LCO2 AT UN
Features	Green Electricity	Green Electricity	Green Electricity	Green Electricity	Green Electricity	Green Electricity
Customer claims	<ul style="list-style-type: none"> Focus on efficient CO₂ footprint reduction Identical material performance Only with Green Electricity used for Production (Zero CO₂ emission) ~40% lower Product carbon footprint compared to Fossil conventional Ultraform 					

PORTFOLIO FOR ULTRAFORM® BMB GRADES

Product	ULTRAFORM® N2640 Z2 BMB AT UN	ULTRAFORM® N2640 Z6 BMB AT UN	ULTRAFORM® N2720 M210 BMB AT UN	ULTRAFORM® N2200 G23 BMB AT UN	ULTRAFORM® N2200 G43 003 BMB AT UN	ULTRAFORM® N2200 G53 R01 BMB AT UN
Features	Biomass Balance + Green Electricity	Biomass Balance + Green Electricity	Biomass Balance + Green Electricity	Biomass Balance + Green Electricity	Biomass Balance + Green Electricity	Biomass Balance + Green Electricity
Customer claims	<ul style="list-style-type: none"> 100% of the fossil-based organic materials required for the manufacturing of this product are replaced by sustainably certified renewable organic feedstock Identical material performance 40-60% lower PCF with only Biomass Balance Up to ~70% lower product carbon footprint (LCA Cradle-to-gate) in the case both biomass balance and Green Electricity compared to Fossil conventional Ultraform (*Reduction portion may vary by grades) No product requalification required 					

Quality	Identical with ULTRAFORM® N2640 Z2 AT UN	Identical with ULTRAFORM® N2640 Z6 AT UN	Identical with ULTRAFORM® N2720 M210 AT UN	Identical with ULTRAFORM® N2200 G23 AT UN	Identical with ULTRAFORM® N2200 G43 003 AT UN	Identical with ULTRAFORM® N2200 G53 R01 AT UN
Mass Balancing	Yes	Yes	Yes	Yes	Yes	Yes
Certification by	ISCC+	ISCC+	ISCC+	ISCC+	ISCC+	ISCC+
Available	Q4/2022	Q4/2022	Q4/2022	Q4/2022	Q4/2022	Q4/2022

WE HELP TO ACCELERATE THE WORLD TRANSITION TO SUSTAINABLE MATERIALS.

LET'S WORK HAND IN HAND FOR A BETTER ENVIRONMENT



ENDLESS POSSIBILITIES



ZERO EMISSION



COMPETENCIES BENEFITS

HOW OUR CUSTOMERS BENEFIT

- Accurately calculate carbon footprint and identify where improvements can be made
- Reduce emissions throughout products' life cycles
- Access to sustainable feestock without risking quality
- Materials selection that reduce waste and meet regulatory requirments
- Offer products and materials with extended lifespans
- Choice of high-quality, recucled materials to satisfy future compliance and delight customers
- Community that strives towards reducing plastic waste and creating a more reliable infrastrucutre

WHAT WE DO DELIVER

- Ever-evolving tools to quantify environmental footprint
- Various lightweight solutions that contribute to reducing CO₂ Emission
- Renewable and recycled materials expertise
- Broad and established biopolymers product portfolio
- Extend-the-loop solutions that enhance durability
- Technology and expertise for recycling process
- Strategic partnerships committed to ending plastic waste

