

PlasticLoop

Closing the loop for mixed automotive plastic waste

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Our Future Focused Sustainability Goals

ENDING PLASTIC WASTE

2MMT¹

of recycled and renewable-based polymers will be produced and marketed annually by 2030

FOR EVERY \$

we invest in venture funds that address the plastic waste challenge, we help catalyze another 5 dollars from co-investors

ZERO

plastic pellet loss to the environment from our facilities

ADDRESSING CLIMATE CHANGE

NET ZERO

greenhouse gas emissions from operations by 2050²

42%

absolute scope 1 and 2 greenhouse gas emissions reduction from operations by 2030³

30%

absolute scope 3 greenhouse gas emissions reduction by 2030³

50%

minimum of electricity procured from renewable sources by 2030⁴

SUPPORTING A THRIVING SOCIETY

ZERO

incidents, injuries and accidents

ACHIEVE

gender parity in senior leadership globally by 2032

INCREASE

the number of people from underrepresented groups in U.S. senior leadership roles to reflect the general population ratio by 2032

ASSESS

a minimum of 70% of our key suppliers globally using sustainability criteria by 2025

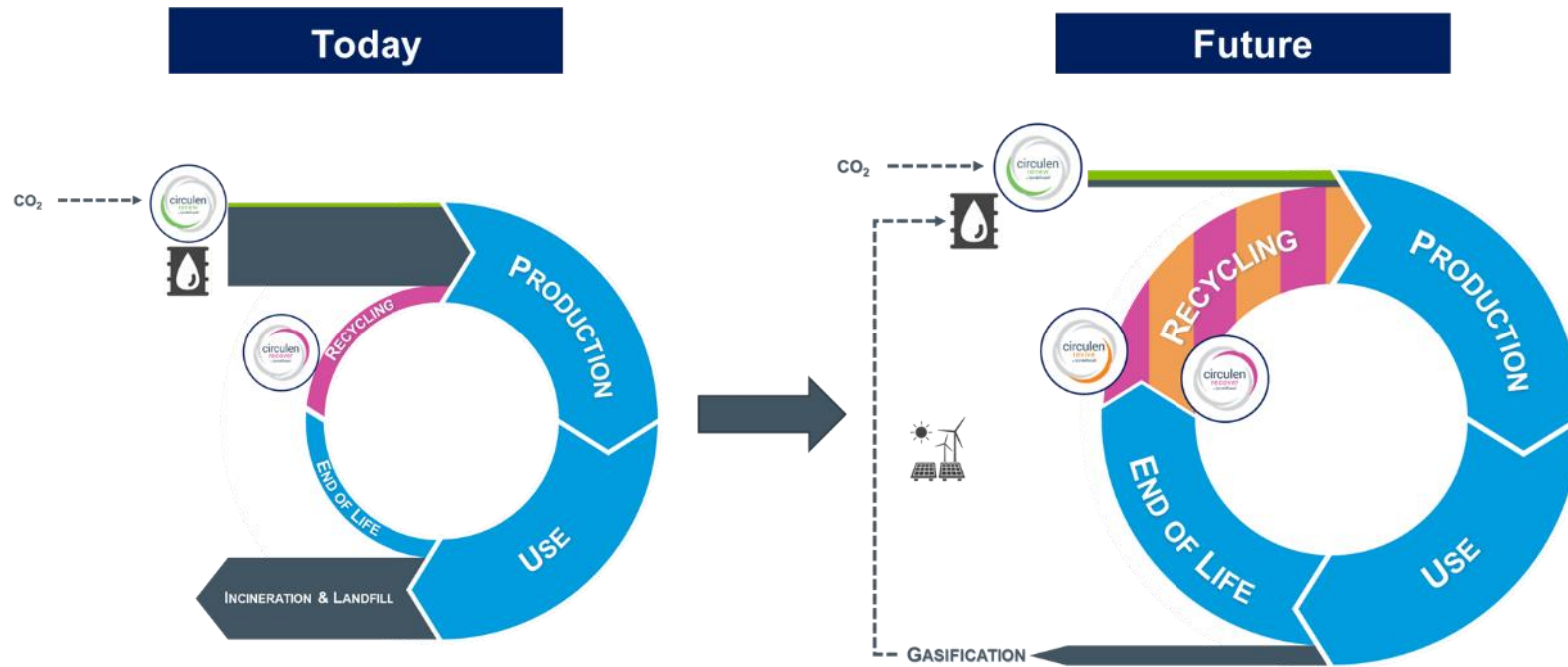
¹ 2 millions metric tons

² Our 2050 net zero greenhouse gas emissions goal includes scope 1 and 2 emissions

³ Relative to a 2020 baseline

⁴ And a minimum of 75% from low-carbon power by 2030

LyondellBasell – Helping to Close the Plastic Loop Based on our Comprehensive Approach



* Typical plastic loop referencing today's plastic economy. The sizes of the graphic are not scaled and therefore indicative.

** Aspirational future plastic loop. The sizes of the graphic are not scaled and therefore indicative.



Polymers made from plastic waste through a **mechanical recycling process**



Polymers made by converting plastic waste into feedstock to produce new polymers using an **advanced (molecular) recycling process***



Polymers made from **renewable feedstocks** such as used cooking oil*

*based on a mass balance approach

Pathways to Circularity of Plastics in Automotive Applications



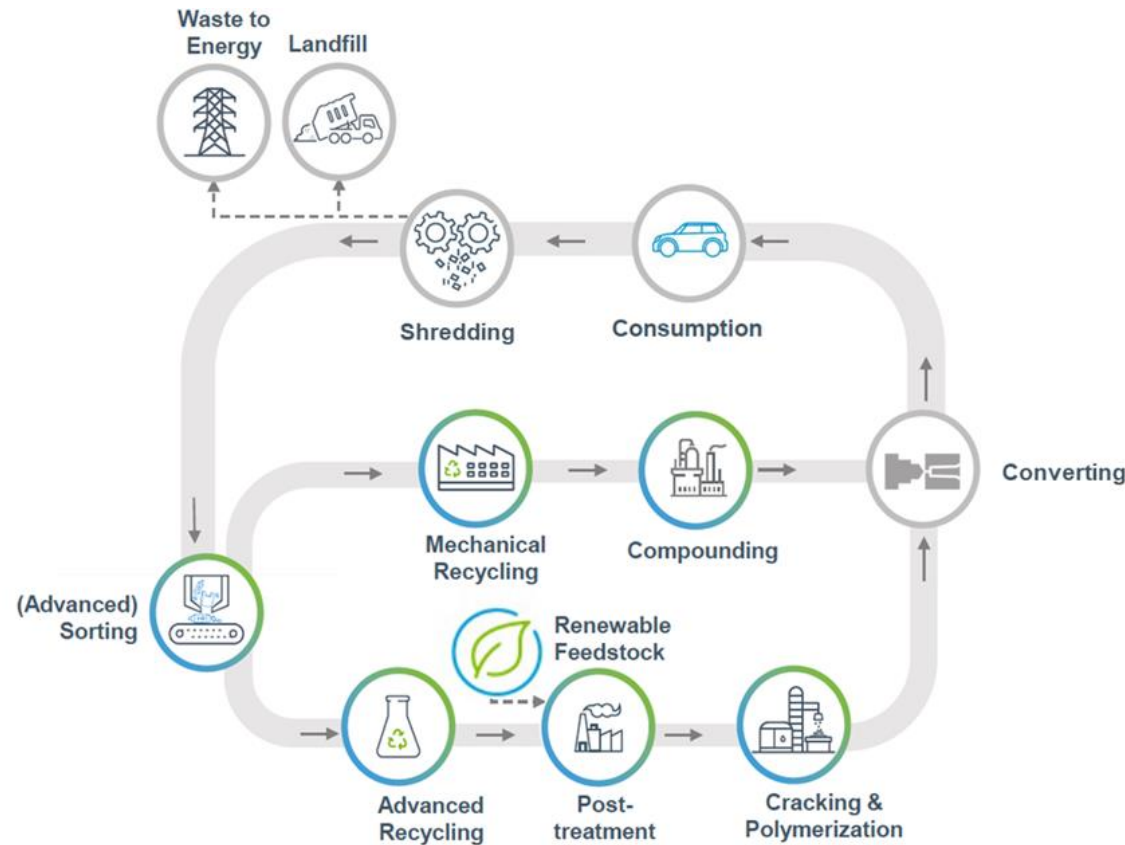
Mixed automotive plastic waste

Pathways to Circularity of Plastics in Automotive Applications

Recycling Feedstock



- >6 Mio ELV p.a. treated (EU)
- >1 Mio T p.a. circular plastics source
- Large variety of materials
- Partially high material aging



Product



- Durable performance materials
- Design and functionality
- Emission and odor relevance (interior)

**Advancing circularity plastics through mechanical and advanced recycling.
Managing waste complexity – Enhancing recycling quota – Accelerate decarbonization**



lyondellbasell
Advancing Possible



PlasticLoop
Closed loop for automotive
mixed plastic waste



**We're
Finalists**



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SynCycle / Collaboration along the value chain...



Advanced Plastic Recycling – Technological Diversity

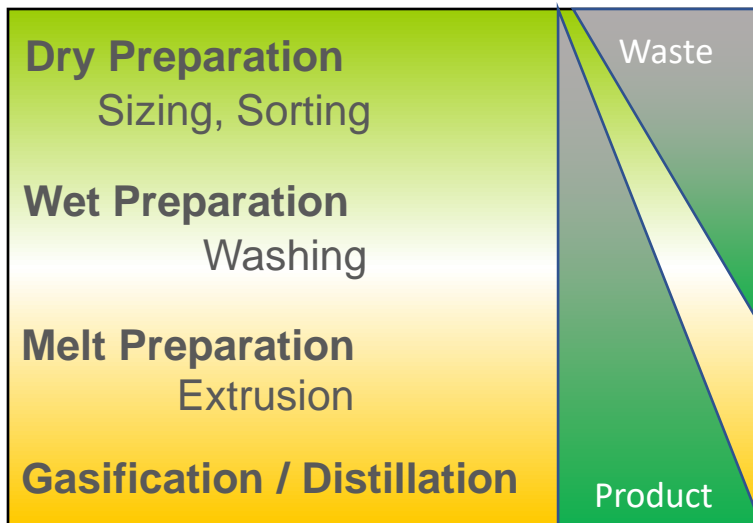
Target @ 2030
30% r-Plastic



Post industrial | pre-treated
post consumer material

Upgrading of recycled material –
not changing the “origin”

Transformation into
monomers or feedstock
equivalents



Process Design for Recycling
Holistic approach

**Preparation of plastics waste
as a (re)new feedstock
for a sustainable plastics product**

**To achieve
quality & quantity**

Melt Blending
@ mas balance

Use of Up-grading
process technologies

Oil blending
@ mas balance

“Language” – The Challenge of “Contamination”

	Waste Collection	Recycling	Product
%	5 - 20%	0,2 – 5%	0,001 – 0,1%
ppm	50.000 – 200.000	200 – 50.000	10 - 1000



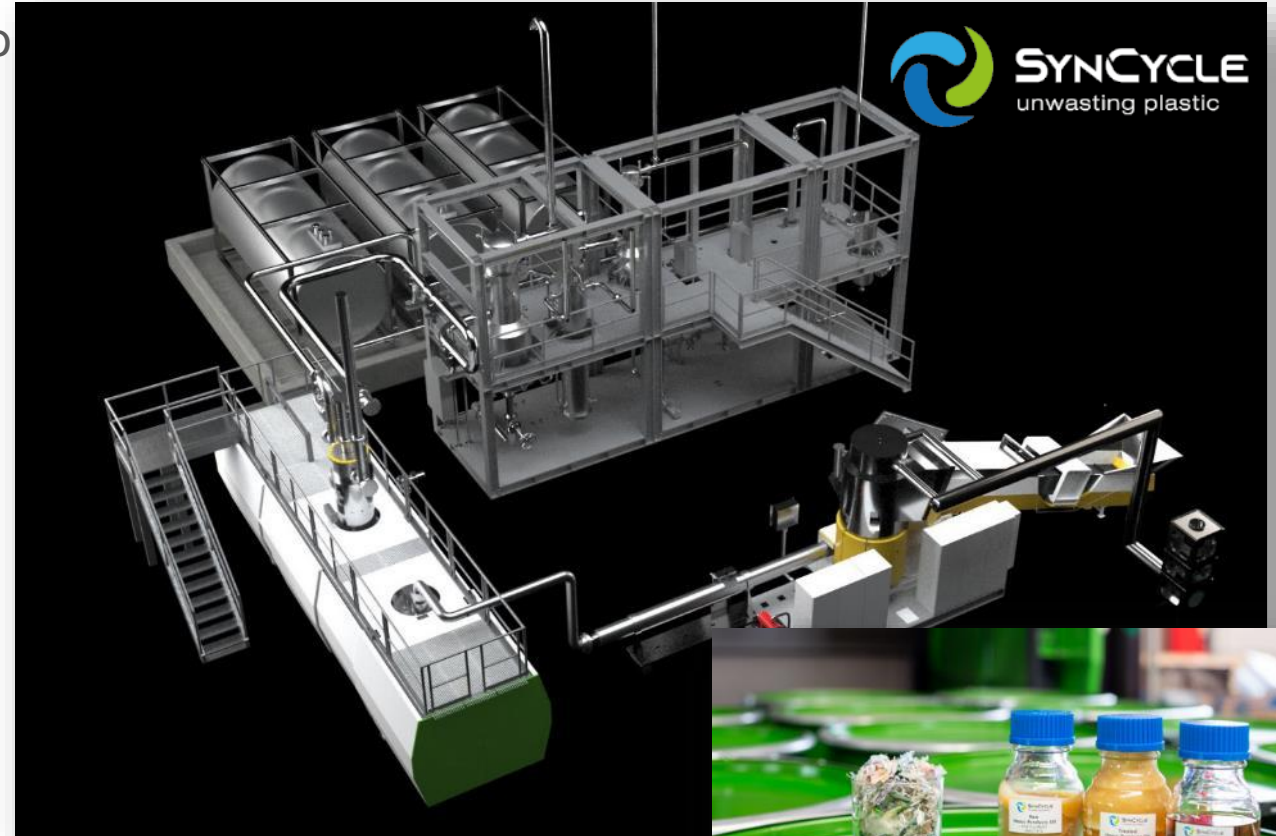
Chemical Recycling – SynCycle Technology

PO plastic waste can be thermo-chemically treated to **Pyrolysis Oil** as recycling feedstock for the petrochemical industry

SYN-CYCLE® - Partnership between **upstream** recycling expert *Next Generation Group* and **downstream** recycling expert *BioDiesel International Group*

aspects being addressed:

- Bringing back **non-recyclable PO** waste into a feedstock for **virgin polymer** production
- Building up a **modular concept** to produce an intermediate on a **decentralized basis**
- Challenging aspects: youngest recycling approach, raw material availability, by-products, permission...
- **DEMO Plant** available to test and demonstrate **feasibility and competence**



PlasticLoop

Leveraging Circular Feedstocks by Cross-Sector Recycling Process



- **Feedstock challenges - material diversity / Multi-material components / inorganic fillers >10%**

SYNCYCLE → *System robustness, easy maintenance and cleaning opportunities, modularity...*

- **High PyOil yield**

SYNCYCLE → *System control by accurate feedstock injection, temperature profile, sophisticated condensation approach...*

- **Ensuring PyOil quality by overarching combination of recycling processes and material know-how**

SYNCYCLE → *NG group's plastic recycling expertise + BDI downstream/chemical expertise (biodiesel etc); availability of lab scale unit for pre-testings etc.*



Thank you !



Together we close the loop for automotive plastic.



In the PlasticLoop project, PRSE Award 2023 finalists LyondellBasell, Audi and SynCycle Operations recycled automotive plastic waste and transformed it into new safety-related seatbelt buckles for the Audi Q8 e-tron.



For more information about the project, scan the QR code.

LyondellBasell's polymer product (including fillers and additives) is manufactured from chemical recycling using 70% recycled content by weight. The recycled content is allocated by a mass balance method, and validated by an independent certification body, ecoLoop. This means that recycled and non-recycled feedstocks are mixed in the production process, and an amount of recycled feedstock equivalent to 70% of the Audi product was attributed using a certified mass balance accounting methodology.

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— ADVANCING CIRCULARITY

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