EASTMAN

Scaling up Alternative Materials in the Chemical Industry

Dayton P. Street

ISCC Regional Meeting

November 14th 2023

A materials innovation company

- Celebrating more than **100 years of vital innovations that enhance people's lives every day.**
- A Fortune 500 company with approximately **14,500 employees and approximately 8.5 billion USD** in revenue
- Dedicated to **enhancing the quality of life in a material way**
- Sustainability strategy commitment to **mitigating climate change, mainstreaming circularity** and **caring for people and society**

US PLASTICS PACT

ENERGY STAR AWARD 2019 PARTNER OF THE YEAR Sustained Excellence

AMERICA'S MOST JUST COMPANIES

Responsible Care® OUR COMMITMENT TO SUSTAINABILITY

WSJ 100 MOST SUSTAINABLY MANAGED COMPANIES 2020

TOP 100 BARRON'S Most Sustainable Companies 2021

Global Commitment

Dayton P. Street

Eastman.com/circular

EASTMAN

Enhancing the quality of life in a material way

Plastics improve the quality of life . . .

HYDRATE

Plastics help to deliver hydration to those who need it

FEED

Advanced packaging technologies preserve fruits, vegetables, & meats

CARE

Plastics improve sterility, patient safety, and comfort in therapies

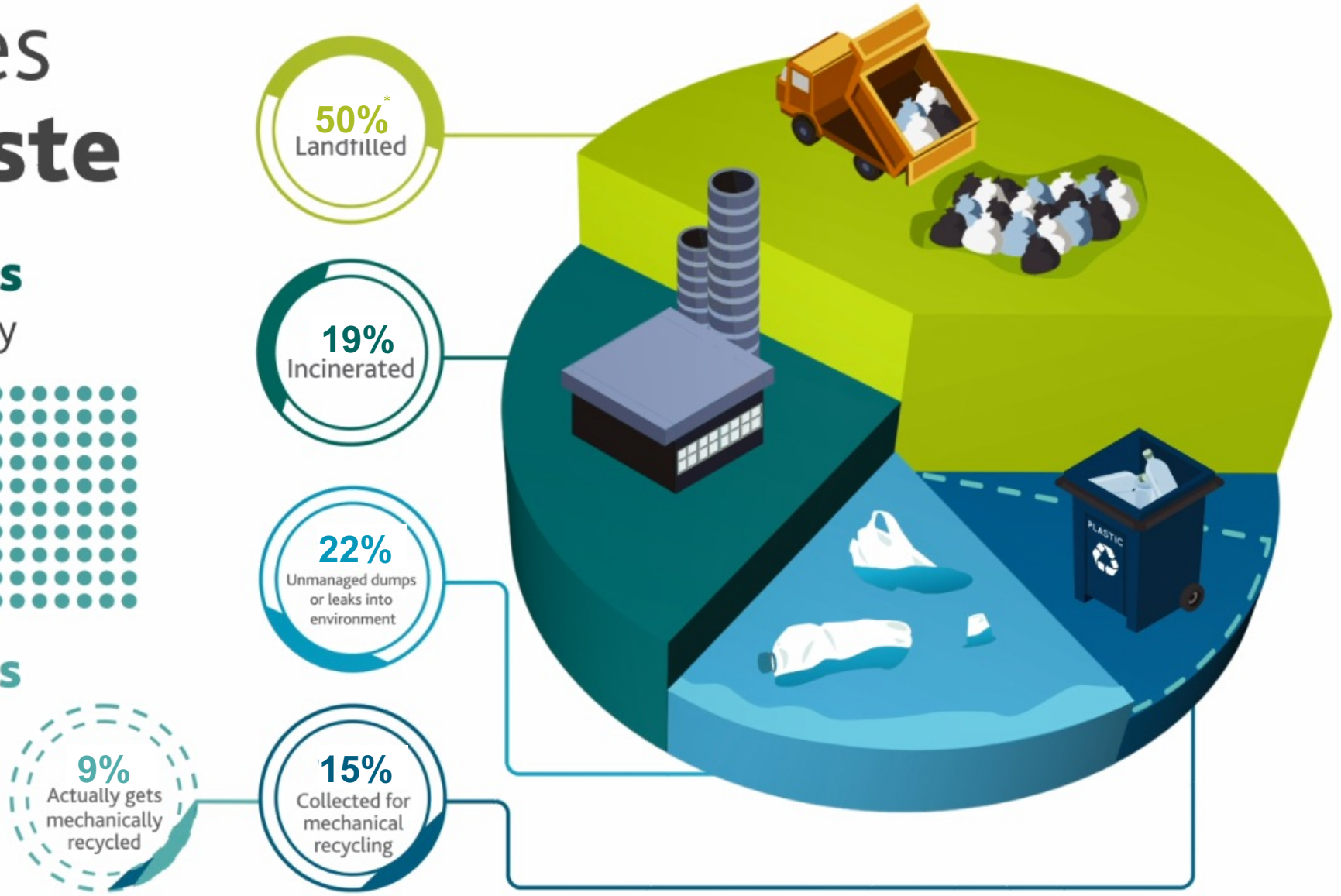
. . . BUT what about end of life?

The world has a plastic waste problem.

Opportunities **going to waste**

460 million metric tons
of plastics are produced globally

353 million metric tons
of plastics are disposed



2019 figures
Source: OECD.*org Global Plastics Outlook*

*After collected residues from recycling collection

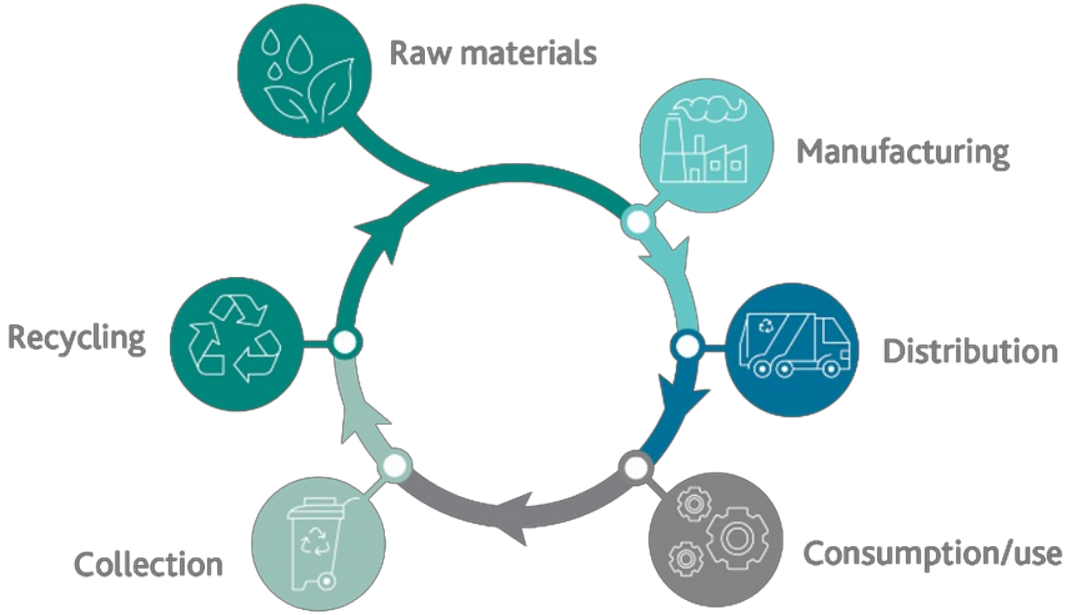
EASTMAN

Circular economy

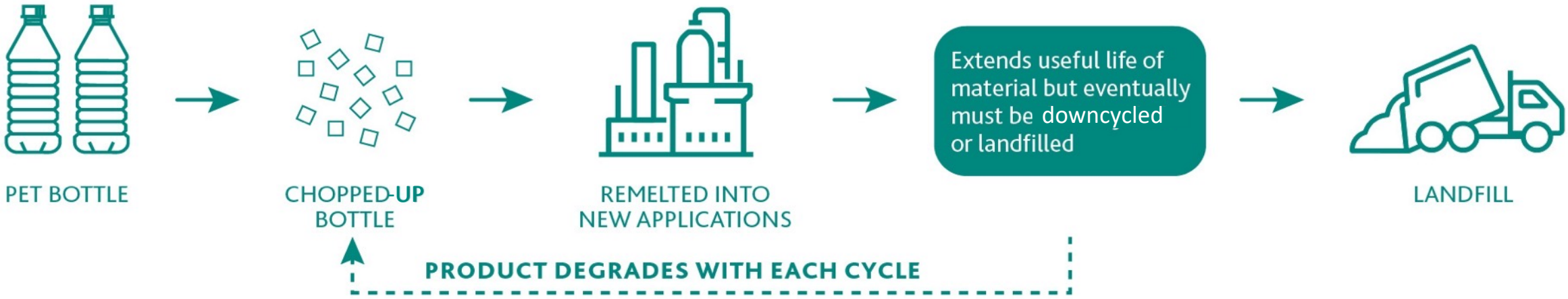
Moving towards a sustainable future

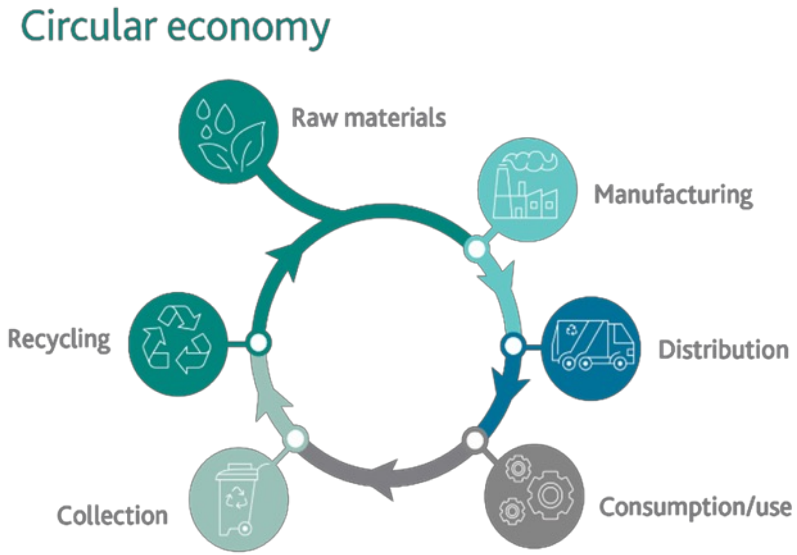
Linear economy

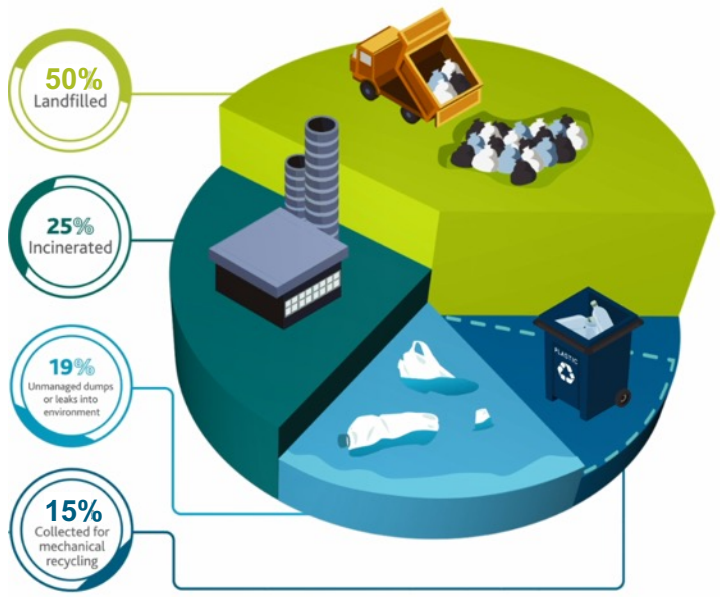
Circular economy



Mechanical Recycling is a Start Towards a Circular Economy…







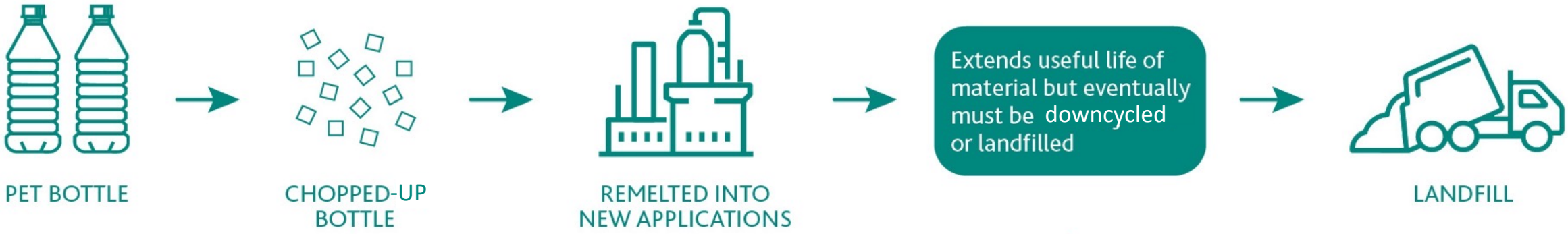
… but Mechanical Recycling is Not Enough to Solve the Plastic Waste Problem

	Common Uses	Share of Plastic Waste Generated	Mechanically Recycled?
1 PETE Polyethylene Terephthalate	Bottles	14%	Yes (clear) ~ 30% recycle rate
	Films, Forms, Other		✗
	Textiles	N/A	Very Little
	Carpet	N/A	Very Little
2 HDPE High Density Polyethylene		17%	Yes ~31 recycle rate for Natural HDPE
3 PVC Polyvinyl Chloride		3%	✗
4 LDPE Low Density Polyethylene		23%	Very Little
5 PP Polypropylene		23%	Very Little
6 PS Polystyrene		7%	✗
7 OTHER Other (acrylic, polycarbonate, PETG, mixed plastics)		13%	Very Little *Diversity of materials risks contamination*

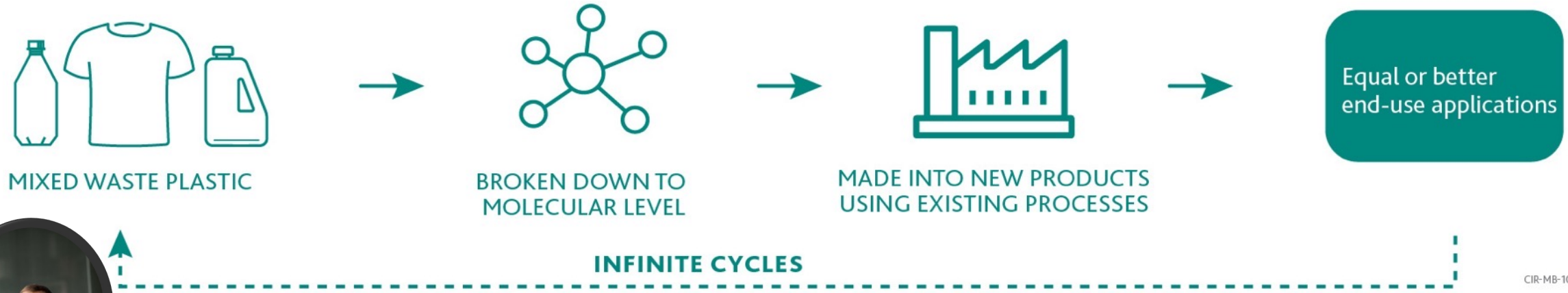
Generated share & recycled share of material sent to US Municipal Solid Waste in 2017 reported as recycled by US EPA. "Combusted" materials not considered recycled. Total of 32,120,000 MT discarded. Recyclability from OurWorldinData.org

Mechanical and molecular recycling:

MECHANICAL RECYCLING



MOLECULAR RECYCLING



CIR-MB-10689-5A 3/20

Dayton P. Street

Eastman.com/circular

EASTMAN

Vision for a sustainable future…

Transforming our product portfolio to participate in the circular economy via **two loops**

Eastman's molecular recycling technologies

Carbon renewal technology

REFORMING

Operational today

*20-50% less GHG emissions**

Polyester renewal technology

GLYCOLYSIS

Operational today

*20-30% less GHG emissions**

METHANOLYSIS

Coming soon

*20-30% less GHG emissions**

*Based on production of intermediates versus fossil feedstocks

EASTMAN

Utilizing various recycling techniques to solve the plastic waste problem

	Plastic type	Common uses	Share of plastic waste generated	Mechanical recycling?	Eastman Advanced Circular Recycling?	
					PRT	CRT
1 PETE	Polyethylene terephthalate	Bottles	14%	Yes (clear) ~ 30% recycle rate	✓	✓
		Films, forms, other		✗	✓	✓
		Textiles	N/A	Very little	✓	✓
		Carpet	N/A	Very little	✓	✓
2 HDPE	High-density polyethylene		17%	Yes ~ 31 recycle rate for natural HDPE	✗	✓
3 PVC	Polyvinyl chloride		3%	✗	✗	Not yet (2nd generation)
4 LDPE	Low density polyethylene		23%	Very little	✗	✓
5 PP	Polypropylene		23%	Very little	✗	✓
6 PS	Polystyrene		7%	✗	✗	✓
7 OTHER	Other (acrylic, nylon, polyurethane, polycarbonate, PETG)		13%	Very little *Diversity of materials risks contamination.*	✗	✓

Generated share and recycled share of material sent to U.S. Municipal Solid Waste in 2017 reported as recycled by U.S. EPA. “Combusted” materials not considered recycled. Total of 32,120,000 MT discarded. Recyclability from OurWorldinData.org.

MECHANICAL RECYCLING ~~VS.~~ AND Molecular RECYCLING

- Optimal GHG footprint
- Limited to clean sources
- Degradation in performance properties
- Finite processing

Best choice if applications allow

- Improved GHG footprint
- Enable use of broad range of waste
- Indistinguishable performance
- Infinite processing

Required where mechanical cannot work

Dayton P. Street

Eastman.com/circular

Vision for a sustainable future…

Transforming our product portfolio to participate in the circular economy via **two loops**

Eastman's molecular recycling technologies

Carbon renewal technology

REFORMING

Operational today

*20-50% less GHG emissions**

Polyester renewal technology

GLYCOLYSIS

Operational today

*20-30% less GHG emissions**

METHANOLYSIS

Coming soon

*20-30% less GHG emissions**

*Based on production of intermediates versus fossil feedstocks

EASTMAN

METHANOLYSIS

POLYESTER RENEWAL TECHNOLOGY (PRT)

20%–30% less GHG emissions than fossil based monomer

EASTMAN

Enables a diverse variety of polyesters, including many that are difficult to mechanically recycle, to be unzipped to their monomers and reassembled into new polyesters with prime performance.

RECOVERED POLYESTER

MECHANICAL PURIFICATION PROCESS

DEPOLYMERIZATION

rDMT

rMEG

EXISTING SPECIALTY PLASTICS PRODUCTION

DMT | MEG

rEmbrace
rEastar
rTritan

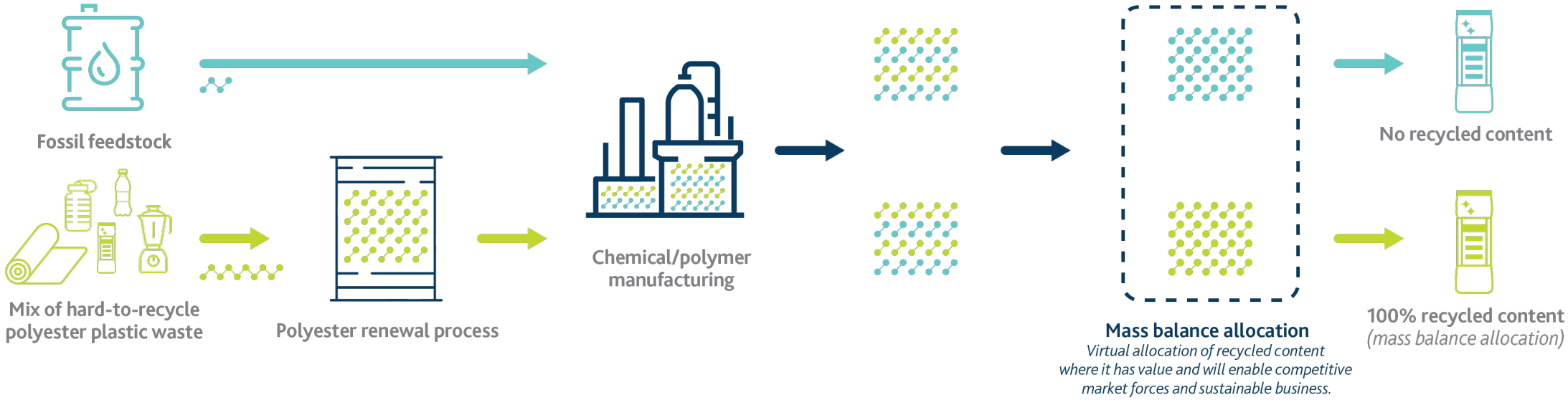
Can efficiently source feedstock that diverts waste from landfill
- or -
Create circularity via take back programs with strategic customers

MASS BALANCE ENABLES CHEMICAL REYCLING AT WORLD-SCALE

MASS BALANCE—HOW IT WORKS

Process used to record how much recycled content has been used in manufacturing products with chemical recycling

Scan to download our *Mass Balance Fast Facts Guide*



Mass balance

- Enables chemical recycling to happen at massive *scale.*
  - Both virgin and recycled monomers are integrated into existing assets. This avoids building separate and redundant infrastructures that would tremendously impact the environment.
- Enables accurate and transparent tracking of recycle materials that are co-processed together with virgin materials.
- Enables linkage of recycled materials to market demand.

Recycled Content Traceability:
Making Claims with Meaning

The ISCC PLUS certification ensure that brands have the substantiation to make transparent, accurate claims for circular materials.

Certified Eastman RENEW products which are linked to recycled sources.

ISCC International Sustainability & Carbon Certification

Final products utilizing certified materials linked to recycled sources.

Eastman's first site was ISCC certified in 2019 and we now have 6 sites ISCC certified in the US, Europe, and China.

Valid Certificates – ISCC System (iscc-system.org)

EASTMAN

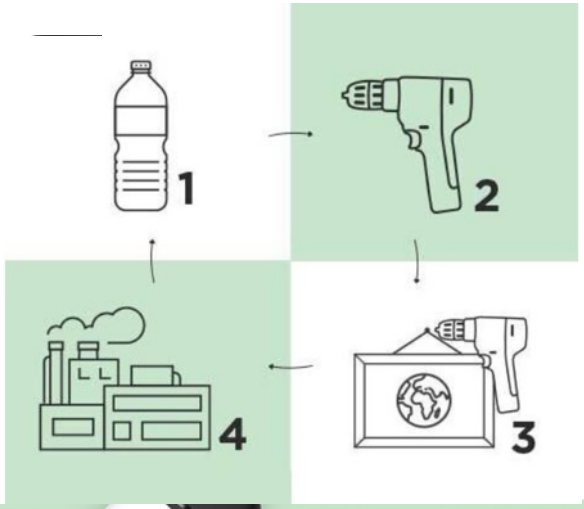
Brands adopting Eastman Renew materials

BLACK+DECKER

reviva™

reviva™ lifecycle

1. Single-use plastic bottles[2]
2. Molded into reviva™ tool housing
3. reviva™ products used for projects at the home
4. Recycled for another purpose



EASTMAN

Eastman's view on ISCC PLUS challenges for circular economy in 2020

Standardized claims for percent recycled content based on mass balance allocation.

-> ISCC now has standardized claims for Mass Balance.

Mass balance methodology to accommodate more complex products, operations, and ERP systems.

-> ISCC published details on Mass Balance methodology and formed a working group (mass balance) to work on Energy exclusion.

Licensing option needed for brand owners.

-> ISCC implemented licensing options (over 100 products now), launched Amazon climate pledge (NA/EU).

Eastman view on ISCC PLUS challenges for circular economy – 2023

Challenge: Favorable outcome for European Plastics Policy.

Single use plastics directive, packaging and plastic waste directives.

-> ISCC to continue to advise EU on Policy.

Challenge: Keeping up with rapid growth of ISCC PLUS.

Rapid adoption and growth of ISCC PLUS.

-> ISCC to continue to grow and contribute resources as ISCC PLUS grows.

Challenge: Alignment and Guidance for ISO TC308 Chain of Custody Standard Development.

ISO developing international Standards on Mass balance.

-> ISCC to continue to maintain awareness and participate with ISO (at an appropriate level) as they develop their standards.

Challenge: Lack of Standards for LCA in a Circular Economy

Need for guidance to generate LCA values when Mass Balance is utilized.

-> ISCC to form a working group on LCA.

Thank you!

EASTMAN