EASTMAN ADVANCED CIRCULAR RECYCLING TECHNOLOGIES

Solving the global waste plastic problem

EASTMAN

300 MILLION TONS of plastic is produced globally each year.

16% of plastic is collected for recycling, but due to losses, **only 12%** actually gets recycled.

25% is incinerated.

40% goes to the landfill.

19% ends up in unmanaged dumps or leaks into the environment.

Source: Hundertmark, Mayer, McNally, Simons, and Witte. How plastic waste recycling could transform the chemical industry. Dec. 2019

Eastman is a materials innovation company made up of problem solvers, committed to immediate, substantive action to support a circular economy. Right now, our people are tackling some of the biggest problems we've ever faced—problems that face us all, like waste plastic in our environment.

Sustainability goes beyond simply increasing energy efficiency and limiting environmental impact **in our business**. Creating a more sustainable world **is our business**. We believe in using our skills to give new life to the most complex waste plastic. As demand grows for products that have a sustainable life cycle, Eastman continues to build on its heritage of world-class technology platforms and product innovations to deliver solutions. Through our products and technologies, we're determined to **transform tomorrow by revolutionizing the materials that shape it today**.

EASTMAN ADVANCED CIRCULAR RECYCLING TECHNOLOGIES

Three hundred million tons of plastics are produced globally. Only 16% of that plastic produced is collected for mechanical recycling. Of the remaining plastics produced, 25% gets incinerated, 40% goes to landfills, and 19% goes to unmanaged dumps or leaks into the environment. Our goal is to target these non-recycled materials and leverage advanced recycling technologies to keep these materials in play by recycling them into new materials.

As a result, our scientific and technical experts have developed two proven technologies that will expand the world's capabilities for recycling: carbon renewal technology and polyester renewal technology.

Together, these innovative recycling technologies will be able to process waste plastics that traditional mechanical recycling methods cannot process from a variety of sources, including single-use plastics, textiles, and carpet.

Eastman Advanced Circular Recycling technologies are **driving a revolution in materials**—from a linear life cycle that results in waste to a circular life cycle that keeps materials in use, creates sustainable value, and **enhances quality of life**.

CARBON RENEWAL TECHNOLOGY

With typical, mechanical recycling, products can only be recycled so many times before their properties and qualities are affected.

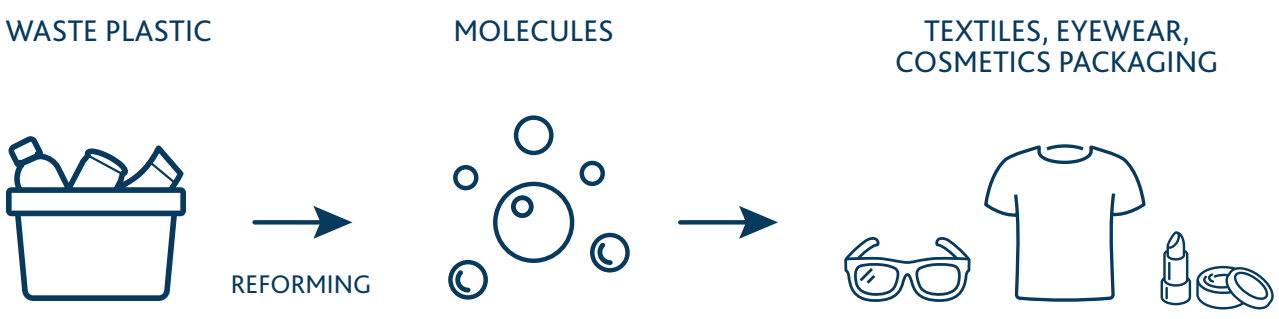
Eastman has developed an innovative way to modify the front end of our acetyls and cellulosic manufacturing processes to accept waste plastic feedstocks such as carpet. Through carbon renewal technology, waste plastics are broken down to their building blocks, allowing them to be recycled an infinite number of times without degradation in properties or quality.

This technology gives new life to waste plastic—such as single-use plastic, textiles, carpet, and other mixed plastics. Industrial and pre-consumer scrap feeds into the process, closing the loop on the mixed plastic life cycle.

By breaking waste plastic down to the molecular level, we accomplish two important goals:

1. **Reduce the amount of fossil feedstocks required**—By incorporating waste plastic into the production of these products, we are reducing the amount of fossil feedstocks required. Carbon renewal technology breaks waste plastic down to the molecular level in the same manner as fossil feedstocks. It also has a life cycle analysis that demonstrates up to a 40% reduction in carbon footprint, which reduces the total impact on our planet.

2. **Create recycled, high-grade materials**—These materials can be used in products in a wide spectrum of end markets, including textiles, cosmetics, personal care, and eyewear. This technology provides a solution of endless recycling for materials, allowing them to be reused repeatedly compared to mechanical recycling.



POLYESTER RENEWAL TECHNOLOGY

Polyester renewal technology allows us to divert a broad range of waste polyesters beyond water bottles, such as carpet and textiles, from the landfill. This technology converts materials back to their building blocks through the process of glycolysis or methanolysis, depending on the type of feedstock. This creates high-grade materials, ensuring that product performance and quality are not compromised. Capturing postindustrial waste as feedstock as part of the process delivers a truly circular solution.

Using polyester renewal technology, waste plastic from single-use applications can be used to produce high-grade, durable products suitable for use in a variety of end markets, including food contact applications.

Polyester renewal technology not only diverts waste plastic from landfills but also has a life cycle analysis showing up to a 33% reduction in carbon footprint.

With 100 years of technical expertise, Eastman is one of the pioneers in developing methanolysis technology and sustainable solutions at commercial scale.

TECHNOLOGY COMPARISON

RIGHT. NOW. → **FUTURE**

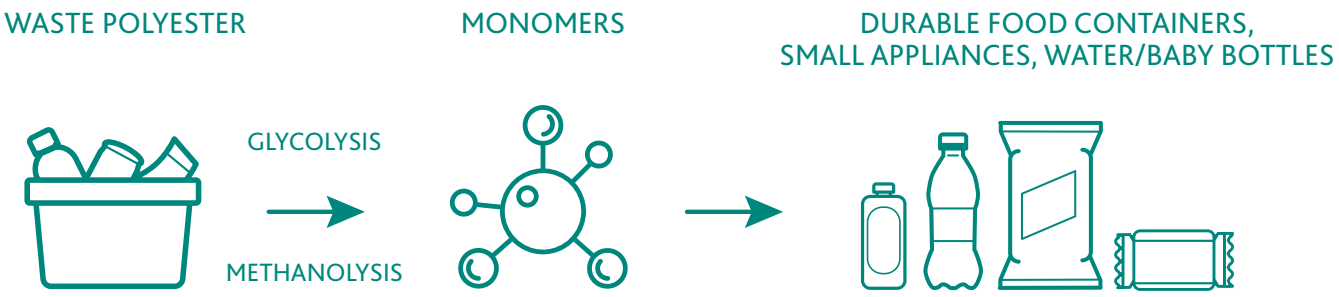
GLYCOLYSIS

- A solution right now to incorporate recycled content into our specialty copolyester portfolio by utilizing modified existing assets
- Enables commodity plastics to be upgraded into specialty materials by leveraging existing recycled PET streams

METHANOLYSIS

- Allows expansion of our feedstocks to include polyester materials destined for landfill
- Provides end-of-life options for specialty copolyesters to create infinitely circular materials
- Building an asset and expect full scale in 2022

Eastman's Advanced Circular Recycling technologies provide sustainable solutions to plastic production while addressing the global waste plastic problem.



PARTNERING FOR A MATERIALS REVOLUTION

Our technologies give new life to waste plastic, but the global waste plastic problem is too big and too important to solve alone.

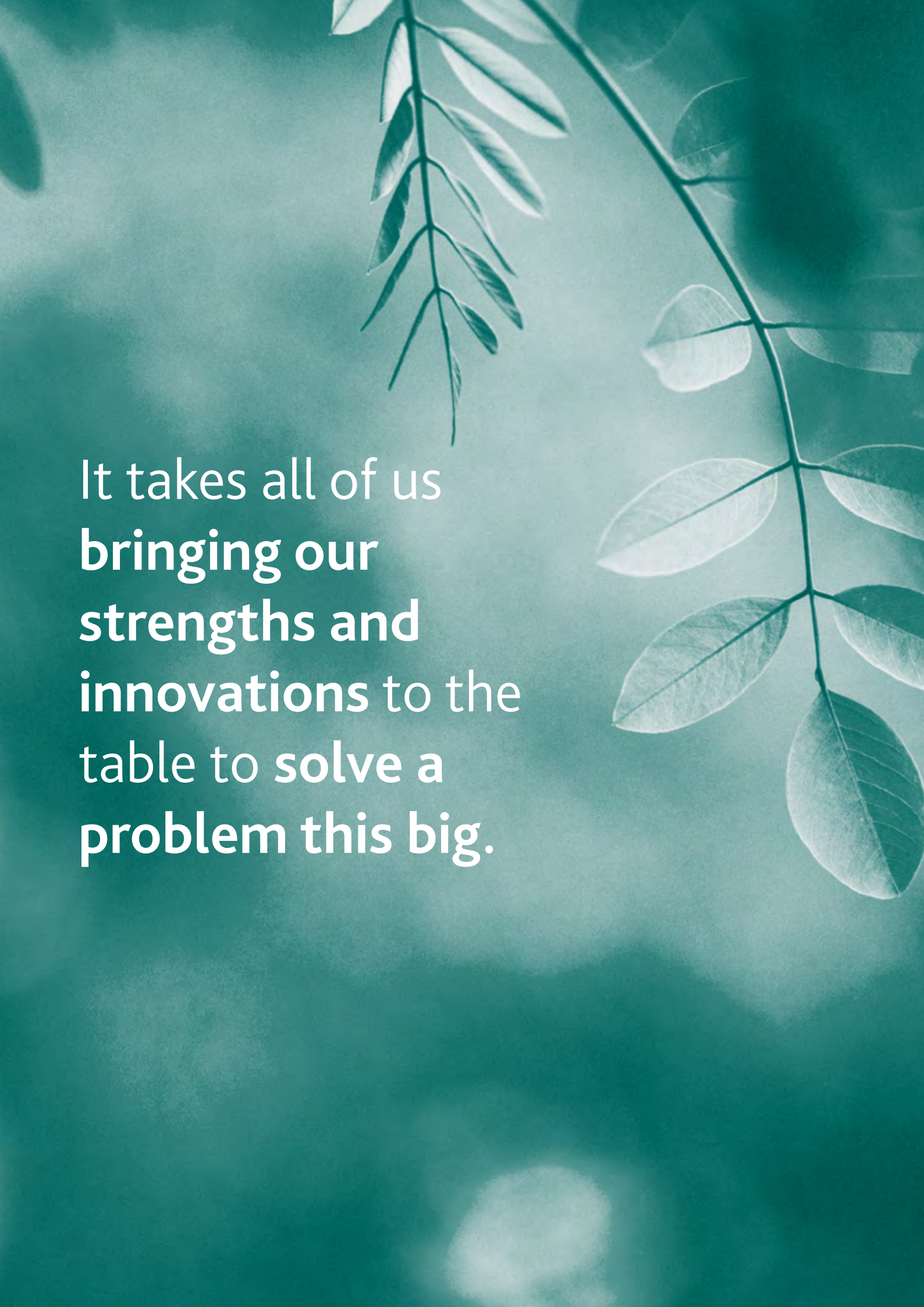
- We need to bring the 65% of waste plastic going to landfills or the incinerator and bring it back into the production cycle.
- We need to create a truly circular economy where our resources retain their value infinitely.
- And to do all that, we need partners.

It takes all of us bringing our strengths and innovations to the table to solve a problem this big.

Partnerships are a big requirement for building new recycling infrastructures, which is why we are partnering with various organizations throughout the value chain, such as Ellen MacArthur Foundation and the Plastics Industry Association. Together, we can envision and drive a truly circular economy—an economy that includes a future for plastics with no environmental impact.

We can't revolutionize materials alone. Our technologies make revolution possible, and our partnership commitments help make it a reality.

For more information on how Eastman is working to greatly reduce the amount of plastic in today's economy, go to **eastman.eco** or contact your Eastman representative today.


It takes all of us
bringing our strengths and innovations to the table to **solve a problem this big**.

EASTMAN

The results of **insight**™

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CIR-10275 2/20