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Mass balance and the circular economy

The global waste crisis and climate change are two of the greatest challenges of our time, and the world desperately needs a materials revolution that will help address both. This site uses cookies to store information on your computer. Some are essential to make our site work, others help us improve the user experience.

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Brands are facing growing climate and environmental scrutiny from consumers, end users, nongovernmental organizations (NGOs), investors, and other stakeholders, resulting in companies setting aggressive goals to include recycled content in products.

Setting aggressive goals

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Traditional recycling, commonly known as mechanical recycling, is a good start but doesn't solve the issue. But what if materials could be broken down to basic building blocks and then used to create new materials?

They can. And our Advanced Circular Recycling technologies are making it possible right now.

At Eastman, we're revolutionizing recycling on the molecular level—repurposing waste that could otherwise end up in landfills, incinerators, or oceans. In fact, our Advanced Circular Recycling technologies, also known as molecular or advanced recycling, enable waste plastic to be recycled an infinite number of times.

But unlike mechanical recycling, which essentially cleans, chops, and melts plastic into reused plastic, molecular recycling breaks down waste to the molecular level to create renewed resources.

So how are those recycled materials accounted for? After all, businesses, brands, consumers, and communities want to know how the decisions they make regarding recycled materials truly benefit the environment.

Enter an approach called "mass balance."



Defining mass balance

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Mass balance is an accepted and certified protocol that documents and tracks recycled content through complex manufacturing systems. It's used when sustainable inputs like recycled plastic are mixed with traditional inputs like fossil-fuel-based feedstock.

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For example, at Eastman, we use both sources to make identical building blocks for materials. Because they are identical, it is impossible to trace exact molecules to end products. However, we can record how much recycled plastic has been used in manufacturing and balance it with the certified recycled content in end products.

It works like this:

1. Waste plastic is fed into Eastman's Advanced Circular Recycling technologies in place of fossil-fuel feedstock.
2. That plastic is broken down into building-block molecules that are fed into production systems, resulting in fewer molecules being purchased or produced from fossil fuels.
3. The quantity and identity of the recycled molecules are placed into an inventory that keeps a precise tally of how many of each molecule were recycled. (Remember, these molecules are indistinguishable from the building blocks produced with fossil feedstock.)
4. Because Eastman tracks the exact number of molecules required to produce each Eastman Renew product, the appropriate number of molecules is deducted from the inventory when it is produced.
5. Based on mass balance standards, Eastman is not allowed to sell more Renew products than they have created from recycling waste plastic.
6. More waste plastic is then fed into the system to replenish the inventory.

The alternative to mass balance is building a separate and redundant infrastructure. To duplicate the many reactors, purification columns, storage tanks, polymerization lines, and packaging and distribution systems would result in tremendous environmental impact and take decades.

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Mass balance is an accepted and certified method to measure and track recycled inputs and outputs. In fact, its principles are used in a number of industries like renewable energy and the cocoa industry.

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In advanced recycling, mass balance traces, measures, and reports the amount of recycled materials used to create a product. This method, certified by the by International Sustainability and Carbon Certification (ISCC), measures recycled inputs and outputs and allows brands to report the percentage of recycled content allocated to manufactured products.

Mass balance is third-party certified to the ISCC PLUS standard, an international certification system for sustainable, traceable supply chains. Our partners use ISCC standards on an ongoing basis to ensure accuracy in the materials we use to make our products. This third-party certification provides transparency to track certified recycled content through critical points in the value chain, allowing brands to make claims with meaning.

Leading voices, like the [Ellen MacArthur Foundation \(https://www.ellenmacarthurfoundation.org/\)](https://www.ellenmacarthurfoundation.org/), recognize that mass balance enables the circular economy today. It allows recycled plastics and conventional fossil raw materials to be processed together in existing, world-scale manufacturing systems.

Thanks to mass balance and a transparent third-party auditing process, brands can report, with certainty, the amount of recycled content allocated in products, and consumers can feel good purchasing products that keep material out of landfills, leave fossil fuel in the ground, and lower carbon emissions.



Want to learn more?

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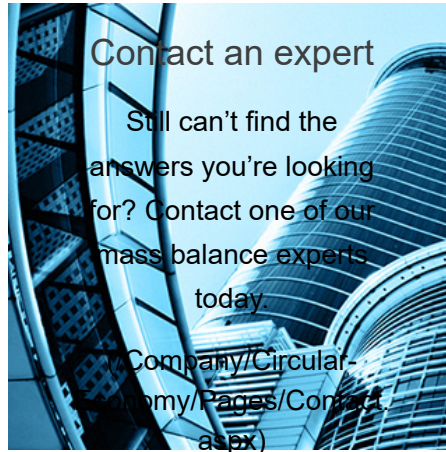
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Do you still have questions about mass balance? Learn more by reading through our frequently asked questions about the process.

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Contact an expert

Still can't find the answers you're looking for? Contact one of our mass balance experts today.

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Circular solutions

Learn more about our two Advanced Circular Recycling technologies and how they're helping to create a more circular economy today.

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