GreenBiz

Gifts from Grandma and the mass balance approach

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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; Source: iStock.

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This is a story about using innovation to do what's right for the environment, about next-generation recycling that can help tackle the plastic waste crisis, about a delicious meal at your favorite restaurant, about great birthday gifts from Grandma and about a concept called mass balance that is critical to achieving circularity.

If that reads like a complex menu, bear with us — the payoff is worth it. Who doesn't want to see less plastic waste in the world? Who doesn't want material circularity? Who doesn't want to eat at their favorite restaurant these days?

First, the obvious. The global waste crisis is one of the great problems of our times. It's one we must solve because there are so many everyday uses for plastic materials that we simply cannot stop using plastic. But we can't keep throwing most of it away, either.

Unfortunately, the world disposes of most used-up plastic products as garbage. We recycle a small amount (12 percent) globally because the recycling method we all know, mechanical recycling, processes some plastics efficiently but is limited in the types of materials it can handle. We must do more. At Eastman, we are.

Giving materials infinite life

If you could recycle materials over and over again, common sense suggests there would be little to no waste. After all, if you can reuse the same materials instead of making new ones from scratch, that's a win/win. At Eastman, we are giving plastic infinite life through a new innovation we call molecular recycling.

You may have heard of molecular recycling before — in the industry, it can be commonly referred to as "advanced recycling" or "chemical recycling." At Eastman, we refer to our technologies as molecular recycling because we break down waste to the molecular level and turn those molecules into new materials.

Molecular recycling at Eastman is focused only on material-to-material recycling solutions. We do not practice waste-to-energy or waste-to-fuel technologies. Our portfolio of technology solutions enables Eastman to recycle almost any kind of plastic waste.

This is recycling reimagined. Mechanical recycling is still a critical part of a circular economy — but we need more. Molecular recycling creates infinite life for plastics. Molecular recycling is necessary for the circular economy to work. And mass balance is necessary for molecular recycling to work right now.

Mass balance in simple terms

Don't worry! We're getting to the dinner and the gift from Grandma.

So, what is mass balance and why is it critical to achieving circularity?

Simply put, mass balance is a certified method to document and track recycled content through complex manufacturing systems. Mass balance is used when an input such as plastic waste is mixed with a traditional input such as fossil-based feedstocks. Because these inputs are blended together in molecular recycling and because the outputs are absolutely indistinguishable, it's impossible to trace the exact molecules to the end products that are produced from them.

By using mass balance, we can record how much recycled plastic has been used in our manufacturing systems and balance it out exactly with the certified recycled content in end products. All systems and processes are audited and certified by International Sustainability & Carbon Certification (ISCC), an independent organization that specializes in sustainable, traceable supply chains. The result is that brands can report, with certainty, the amount of certified recycled content created by the products they sell to consumers.

Eastman was able to launch needed recycling solutions at commercial scale in less than a year — making the right choice available now. We did this so quickly by innovating existing manufacturing assets to feed plastic waste to replace as much fossil feedstock as possible. That's why the molecules are blended and why we use mass balance to reimagine recycling today — right now — instead of years from now.

You may ask: What's the alternative to this approach?

The alternative to mass balance is to completely segregate the inputs, which would require building new facilities that only process waste. So instead of one plant, we would need to build and operate two. It would require separate reactors, purification columns, storage tanks, polymerization lines — the list goes on. The alternative approach would result in tremendous environmental impact and added costs and would take decades.

With the waste crisis we are facing, we can't afford to wait decades.

Leading voices for circularity, including the Ellen MacArthur Foundation, recognize that mass balance enables the circular economy today because mass balance allows for recycled plastics and conventional fossil fuel-based raw materials to be used together in existing manufacturing systems. We collaborated with the foundation on a white paper on this topic, which you can read here.

How does mass balance work? (And, yes, dinner is served!)

We're doing great things — but you don't have to take our word for it. Our processes and systems are certified by ISCC, which, for nearly a decade, has certified other industries that use mass balance to track sustainable content. At the risk of enjoying dessert before dinner, Ben & Jerry's uses mass balance for its Caring Dairy program, and the cocoa and sugar industries are other examples where mass balance is essential for the production of sustainable products.

Right now, Eastman materials are available with certified recycled content. We recently launched Eastman Tritan Renew copolyester with up to 50 percent certified recycled content based on the mass balance concept. Two esteemed brands with well-defined visions for a sustainable future, CamelBak and Nalgene, already produce reusable water bottles made with Tritan Renew.

Eastman Renew materials carry the ISCC PLUS certification to ensure brands that partner with us can make verifiable claims about the recycled content in their products using mass balance.

If mass balance still isn't making complete sense, let's think about it a different way. It's time to thank Grandma. Why? Because she gave you a great birthday gift: money.

It's your birthday. Grandma gives you $100 and says, "Dinner's on me!" You deposit the money into your checking account. Weeks later, you and your partner go out to dinner and spend $100 on the meal because Grandma earmarked the gift for just that. You pay the bill with Grandma's gift.

But was the $100 you spent the actual money Grandma gave you? Almost certainly not. Those Grandma dollars were co-mingled with the other money in your account, but you spent $100 on dinner as if it were the actual $100 gift. The alternative would be carrying around the cash from Grandma and paying for it with the exact bill she gave you. Most of the time, that's just not the way things work.

With mass balance in mind, how can we work together for circularity?

We need to make the right choices now, but there are challenges to overcome — Eastman knows this. Molecular recycling is new. Mass balance isn't new, but it may be unfamiliar or not well understood when it comes to recycling.

Tangible hurdles exist, too. For example, generally accepted definitions of "recycled content" in ISO 14021 and the FTC Green Guides are premised on mechanical recycling and do not adequately address mass balance. Emerging regulations for advanced recycling are considering how to include mass balance to help measure and achieve recycling targets.

We may be two people on the Eastman team, but we can speak for the 14,500 of us around the globe in saying we want to help solve the global waste issue. We believe on the very deepest level that Eastman, through molecular recycling and mass balance, can contribute to a society where we reduce our use of natural resources and reuse plastic infinitely by recycling almost all plastic we use.

By understanding mass balance, it becomes easier to explain to anyone — a consumer, an elected official or your grandma — that this concept can enable us all to make better choices for the planet, right now. In the spirit of collaborating, please share our story. Visit Eastman.eco to learn more, or get in touch with us — Holli and Jason — if we can answer your questions.