



BAD REPUTATION

ARE BLACK PLASTICS AN UNRECYCLABLE NUISANCE OR A VALUABLE FEEDSTOCK FOR NEW PRODUCTS? IT DEPENDS ON WHOM YOU ASK.

BY MEGAN QUINN

The city of Toronto generates lots of recycled material each day. One item has been haunting its collection efforts: black plastics.

Residents are putting black trays from microwave meals and Chinese food takeout containers into their blue bins because they believe the city is able to recycle them. But Toronto officials say these black plastics, regardless of quality, belong in the trash because they contribute to skyrocketing contamination rates.

Toronto isn't the only city to blacklist black plastics. The material is unpopular with many MRFs. These facilities say their optical sorting machines can't "see" the material due to its dark color, so it typically ends up in the landfill. Even if the facilities are able to recover the plastic, they have trouble collecting enough volume and quality to sell it. And if they could produce sufficient volume and quality, it still can be tough to find markets because the feedstock is too dark to be

made into clear, white, or colored plastic.

Others argue that black plastics' bad reputation is undeserved. Plastics manufacturers that buy black postconsumer plastic say the material is great for uses where color is not specified, such as car parts and shelving, and packaging companies that embrace black-colored packaging help keep good quality black plastics out of the landfill. MRFs that have good relationships with their buyers say many don't mind the plastic's color as long as it's a good-quality material. "The only difference between black plastics and other plastics is simple: It's black," says Keith Bechard, CEO of ReVital Polymers (Sarnia, Ontario), a plastics recovery facility that buys black plastic to produce recycled black plastic resin.

SORTING OUT SORTING ISSUES

Optical sorters are a modern marvel for MRFs, but the same technology that can easily identify and sort other types of plastics just doesn't work on black plastics. That's because most optical sorters work by beaming a near-infrared light signal onto the plastic, then studying the wavelengths the polymers reflect back. "The system works very well for clear or natural polymers," says

Dave Cornell, technical consultant for the Association of Plastics Recyclers (Washington, D.C.). "Black color, unfortunately, absorbs light and reflects none or very little. So black plastic registers as a blank space. That means we do not know what the polymer is." A high-quality black plastic shampoo bottle is just as invisible as a low-quality black polystyrene coffee cup lid.

Jim McKay, general manager of solid waste management services for Toronto, says this "blank space" phenomenon is one of the main reasons the city asks residents to throw away the plastic instead of putting it in the blue bin. The recycling facility's sorters "cannot distinguish black plastic from the black conveyor belt, and as a result can't sort it," he said in a March interview with the Canadian Broadcasting Corp.

It's more than just a nuisance: For this facility, black plastic is a contaminant, and contamination costs time and money, he says. Toronto's contamination rates have increased 25 percent in the last few years, and each time contamination goes up a percentage point, it can cost between \$600,000 and \$1 million a year in processing fees.


One solution is to replace or upgrade the sorters with new technology that can better identify black plastics by using other parts of the light spectrum. Several manufacturers have recently unveiled new optical sorters that they say can detect and sort

black plastics. The UniSort BlackEye sorter from Steinert (Walton, Ky.), for example, uses "extended infra-red technology" and a hyperspectral imaging camera to detect black PE, PP, PS, and PVC and separate them from each other. TOMRA (Asker, Norway) recently introduced the Autosort, which uses a combination of NIR and laser technology to identify the plastics, while the ColorPlus from NRT (Nashville, Tenn.) and the PlasticMax from MSS (Nashville, Tenn.) both use "in-flight" technology that helps lift the materials off the belt so the sensors can better distinguish black items from the black belt underneath.

A report from Scout Environmental Services (Encinitas, Calif.), which assessed the current models of black plastic sorters, including the ones above, concluded that the machines are costly but are an effective way to sort the plastics. "With economies of scale and with the introduction to more MRFs around the world, the cost will decline over time," it says. Cornell of APR says the machines, which were introduced between 2012 and 2018, have not yet proved themselves on the market, and only time will tell if they can play a role in keeping black plastics out of landfills. As with any piece of sorting equipment, "the questions are cost, effectiveness, and reliability," he says.

New sorting equipment isn't the only solution to accurately recovering black plastics from the stream, says Scott Saunders, general manager of KW Plastics (Troy, Ala.). His company buys black plastics from across North America, and some of his best sources are in places in Mexico and the Caribbean, where hand sorting is more common. "Before optical sorting, black containers weren't a problem because humans were picking the plastic," he says. "As an industry, we are all trying to run our businesses more efficiently, so it's understandable that we invest in equipment. But black plastics are part of the stream, and you can't blame the stream if the new equipment can't identify it."

In fact, some higher-tech MRFs still use hand sorters to collect black plastics, even as they upgrade their other equipment. Eco-Cycle (Boulder, Colo.) completed major upgrades to its MRF in 2017 that included installing two new optical sorters, which replace the labor of eight hand sorters. The MRF accepts black plastic, which it still picks off the line by hand, says Suzanne Jones, Eco-Cycle's CEO, in an announcement about the company's upgrades.



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SEARCHING FOR END MARKETS

Even if MRFs are ready to invest in high-tech or human solutions to recover black plastic, they still have questions about whether the volume and quality of material they capture will find a buyer. Brent Bell, president of Waste Management Recycle America (Houston), says its 45 MRFs that accept plastic only see an average of 2 percent black in the plastic stream. "We don't get a lot," he says—not enough to justify the cost to collect it.

As with any other plastic product, the quality has to be high enough for buyers to be interested, he adds. Many types of black plastics they find in the stream, like flower pots and coffee cup lids, are too low-quality to resell, he says. In other cases, the plastic is contaminated with another type of plastic, such as a black microwave dinner tray with pieces of thin, clear plastic still

glued to the top to protect the food during cooking.

Even where MRFs can collect enough high-quality material, they still face limited markets, Bell says. Black plastics can only be turned back into black plastics, which narrows the range of products manufacturers can produce from them. In the past, Waste Management has accepted black plastics and used hand sorters at its MRFs to recover them, but now the company has started asking residents to put the items in the trash. Waste Management's plastics buyers "do not want black. They need a clear, green, or a blue that they can turn into other products," he says.

BLACK IS THE NEW GREEN

Black plastic buyers like Saunders of KW Plastics disagree with that perspective. Many plastics buyers do

prefer clear or light-colored postconsumer plastics, such as milk bottles or yogurt cups. They prize those colors for their versatility because they can melt them down to become any color of the rainbow. Yet KW's big business is in black plastics, both on the buying and selling sides, he says.

KW processes about 500 million pounds of plastic a year, and it sells about 380 to 400 million pounds of that to go into black applications, Saunders says. One sector of the company focuses on buying black plastic battery casings, which it melts down into resins used for more car battery casings. Another sector buys postconsumer mixed-color plastics, such as detergent bottles and personal care products. The company melts these plastics together to create a greenish-grey color that it sells to black plastic markets.

Saunders says a "tremendous"

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amount of KW's black resin goes into black plastic uses, such as drain pipe or black flower pots. Another major market is car parts. "There is a lot of parts manufacturing in the Midwest, and we ship a good amount of black polypropylene and polyethylene there," he says.

Black plastic applications can easily consume other plastics that other plastics buyers might pass over because of its color, he says. "It's disingenuous to say black plastics are not recycling-friendly," he says, because any color of postconsumer plastic can be melted and mixed together to become a black resin. It's possible to sort recycled colored plastics into like-colored groups, but brands that create colored packaging from postconsumer plastics want specific pigments that can be difficult to recreate using mixed colors. "Downy wants Downy blue, not sort-of-Downy

blue," Saunders says. "So even if you have a lot of blue [plastic] material, if you can't get it to match, most of it still [is dyed black] for the black plastic market."

Bechard of ReVital Polymers agrees there is a healthy market for black plastics and feels it's inaccurate to say its black coloring limits its future uses. "We view [black plastics] as a valuable resource. We use it to run our business because there's no differentiation in quality between black plastics and others when it comes from postconsumer sources," he says. ReVital buys mixed plastics from throughout North America, but its chief supply source is the province of Ontario, which he estimates generates 1,405 mt of black plastics a year—about 7 percent of the local plastic stream. The plastics come from major cities such as Ottawa and from Toronto-area suburbs that collect

the material, he says. ReVital turns the plastic into pellets that eventually become car parts and shelving, he says.

Bechard takes issue with MRFs that say it takes hefty labor or equipment costs to sort the plastic because ReVital doesn't buy all-black bales. Instead, it buys the "orphan plastics" left over after MRFs pull out PET, HDPE, and other resins bound for other plastics buyers, then it sorts out the black plastic using its own proprietary system. His company's process works well for the MRFs he buys from because they don't need special sorting procedures before selling it to him, he says. "Whether or not they go about specifically collecting it, their material has black in it," he says.

A FUTURE OUTSIDE THE LANDFILL

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more black plastic, more MRFs are asking consumers to stop recycling the material. Nonprofits and brand owners have started influencing the market, too. WRAP, a UK-based organization that aims to reduce plastic waste, has asked brands to stop using black plastic packaging because of recycling difficulties in the UK. Quorn, a vegetarian meat company that once packaged its frozen food in black trays, started phasing out black plastic in April. The company estimates it will replace about 297 mt of black plastic with clear or opaque white plastic by the end of the year. British grocery chain Waitrose announced in January that it plans to eliminate the black plastic food trays it uses for vegetables and meats by 2019.

WRAP participants say it's their corporate responsibility to package their products in materials that can be most easily recycled, but others say an all-out ban on black plastics should be met with lots of thought. "Bans need to be supported by viable alternatives," says Janette Micelli, Waste Management's communications manager.

With such differing opinions on the value and recyclability of black plastic, recyclers say the future of the material is up in the air. Saunders believes the black plastics market will grow if MRFs and buyers can meet each other in the middle and talk through their concerns. MRFs "have a product that we want," he says. Bechard fights against the idea that black plastics are inherently less valuable, recyclable, or needed. "Black plastics are valuable," he says.

Micelli says recyclers like Waste Management are mostly concerned with making sure the right items are passing through their MRFs and that the items MRFs can't sell find the right home. There's no clear answer for how to do that in cities where there aren't good markets to support black plastics, she says. But if there's one thing all parties can agree on, it's that "we would be happy to recycle all plastics if we could," she says. ■

Megan Quinn is reporter/writer for Scrap.