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Recycling-technology startups find fertile ground in city's garbage

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Sajoux of Arqlite plans to expand his Buenos Aires-based recycling business to New York, where the company will recycle 1,500 tons of flexible and laminated plastics into gravel for construction. Now these plastics end up in a landfill.

HIGHLIGHTS

\$500K AWARDED to two winners of the NYC Curb-to-Market Challenge

\$500M INVESTED in recyclable technology from firms such as Citi, Goldman Sachs and Google

Chris Graff, an Indiana native and manufacturing entrepreneur, was on his first visit to [Governors Island](#) when he spotted a set of Polywood-brand Adirondack chairs. Polywood is based in Syracuse, Ind., near Graff's former companies.

He knew the chairs had been made from recycled milk jugs that were processed into pellets, then planks. Having recently moved to [New York](#), Graff also knew the city had plenty of its own [plastic waste](#).

"I thought, There's got to be opportunities to take all this raw material in New York City and use it to manufacture products and then market them here," he said. "But I couldn't find anything that would accomplish that."

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Graff's solution was to enlist a panel of experts and fund a contest for turning recyclables into locally made goods. The two winners of the NYC Curb-to-Market Challenge, Anthropocene.Design and Arqlite, are splitting a \$500,000 investment and will receive mentoring from Graff and access to advisers and investors.

The firms are arriving at a fertile time for recycling-technology startups. They also might mesh with the city's goals for creating jobs.

Arqlite, based in Buenos Aires, turns flexible and laminated plastics, including grocery bags and the clear wrap known as film, into gravel for construction. Flexible plastics are not collected as part of New York City's residential recycling program, and once they become contaminated with food, they are considered too expensive to clean and overwhelmingly wind up in a landfill.

Spurred by the contest award, announced last month, Arqlite Chief Executive Sebastian Sajoux says his company is planning a New York facility that can process 1,500 tons of recyclables per month.

The other winning idea involves Bushwick-based Anthropocene. The firm would use solar-powered rotational molds to turn milk jugs and detergent containers into traffic bollards, street furniture and other products. The molds could be placed in vacant lots or brownfields and would not need to be connected to conventional power sources. The plan is still in the conceptual stage.

A smaller carbon footprint

Recognizing New York's high costs and red tape—and seeing local manufacturing jobs as a potential ladder to the middle class—city officials have been looking at what kind of operations might work. Making products out of what is now considered garbage could be an answer.

"One of the things New York City has is a lot of waste—and a lot of recycling," said Bridget Anderson, deputy commissioner for recycling and sustainability at the Department of Sanitation and a contest judge. "The closer you can source your manufacturing to your feedstock, the better. This might be where localized manufacturing makes sense."

The startups will enter a market with more opportunity than there has been in the past.

Interest and investment in the sector have been growing since China—once the world's biggest processor of recyclables—announced two years ago that it was shutting its doors on the materials—which were often sullied by food and other contaminants—globally. Municipalities that relied on China to handle their plastic and paper waste have had to find new markets or pay to dump their material in a landfill.

In one sign of increased interest in new solutions, Closed Loop Partners, a Manhattan-based investor in what's called the circular economy, has enlisted a range of limited partners in its fund, including Amazon, Procter & Gamble, Unilever and Walmart. The consumer-goods giants consider the partnership important to their business—because shoppers are increasingly concerned about products' environmental impact—as well as part of being good corporate citizens.

In addition, the recycling-tech startups in which Closed Loop Partners has invested in the past four years have received subsequent investments totaling \$500 million from firms such as Citi, Goldman Sachs and Google.

"We're in this time where there's more investment coming in, and people are being pretty innovative about new materials and new markets because of China," said Maite Quinn, a managing director at Closed Loop, which was not involved in the Curb-to-Market contest. "We're seeing a lot of businesses pop up to take on that opportunity. Whoever's going to win will be the one that figures out the highest economics on [recyclables]."

The city's Department of Sanitation already has a market for the rigid plastics and metal that residents separate, and it has been able to cope with China's action. Sims Municipal Recycling, its vendor for discarded milk jugs, water bottles, Tide containers and the like, sells them to domestic processing companies, mostly in Alabama, North Carolina, Ohio and Pennsylvania.

Some of the material is turned back into bottles. Some is used to produce textiles, auto parts and plastic lumber.

Tom Outerbridge, manager of Sims, sees advantages to having New York companies process and reuse New York's material.

But the customers he already has, which are paying market rates for his clean and bundled plastics, are in states where labor, energy and real estate costs are far lower than they are here.

A New York-based startup would save on transportation costs and have a smaller carbon footprint. But it still would need to be able to pay market rates for the commodities without losing money.

"I love the idea of producing something locally using renewable energy, but in the end these are critical revenue streams for us," Outerbridge said.

At the same time, he added, "assuming the business model supports that, it becomes an alternative home for the material, and the more customers for these products, the better."

Right now Anthropocene would be paying about 20 cents a pound for its material, which is high-density polyethylene. The startup has talked to Sims about purchasing small amounts for its proof-of-concept stage.



Buck Ennis

Creating a cyclical flow

Anthropocene's founder, Barent Roth, an industrial designer, said the cost has been priced into its model.

He added that it is too early to say which products the startup will make. He has considered traffic bollards because they are in high demand as part of the city's Vision Zero program—designed to eliminate traffic deaths—and often get run over by cars. Anthropocene potentially could use damaged bollards to produce new ones.

Roth founded Anthropocene to use solar power in turning milk jugs and detergent containers into new products.

"Once we demonstrate the ability to create a truly cyclical flow of post-consumer materials back into valuable products with minimal transportation costs, then we can begin to expand the product offerings," Roth wrote in an email.

Arqlite, founded four years ago, already has proved its model in Argentina, Sajoux said, by making gravel out of discarded plastics that had been useless.

Though flexible plastics are not routinely collected in recycling programs, they wind up at materials-recovery facilities, or MRFs—pronounced "murfs"—because people use plastic bags to discard their recyclables. By that point they're too dirty for MRF operators such as Sims to do anything but pay landfills to take them.

Sajoux estimates that thousands of tons of these plastics are sent to landfills every month. He is in talks with city officials and waste-management companies in New York about gaining a steady supply of the material.

"The city is very interested in diverting these plastics from landfill," Sajoux said. Consumer-goods companies are as well. "They do not want to see their brands in landfill."

Sajoux said Arqlite competes with landfills by charging MRFs the same price or a little more to take the plastics while offering environmental benefits and recycling certificates for companies seeking to improve their sustainability metrics.

The cost per ton to dispose of waste in a landfill ranges from \$80 for commercial haulers to \$130 for the city, which has higher operating and capital costs, said Kendall Christiansen, a principal of Gaia Strategies, a waste industry consulting firm.

Arqlite gravel is three times lighter and provides 10 times better insulation than traditional gravel, according to the company's website. The company is planning an expansion to Southern California. A New York City plant would follow.

Experts say there is a market among commercial users for clean plastic film and for the plastic bags collected in drop-off programs, which are mandated in New York state for large retailers and some chains.

Arqlite, however, will have no competitors for laminated plastics—which can contain aluminum and are hard to process—or for contaminated film.

"That's the holy grail," Christiansen said. "If you can do something with dirty film without adding a lot of cost to clean it up, that can be a difference-maker."

Inline Play

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