BY REED McMANUS

Mike Biddle turns the shredded castoffs of 21st-century life into good-as-new plastic.

So long, landfill: Recycling goes high tech and big time

Master of Plastic

"YOU HAVE A CHANCE TO BE A HERO OR A DOG." With that blunt go-ahead from his managers at Dow Chemical in 1988, engineer Mike Biddle started the corporation's first-ever plastics-recycling research efforts. Back then, the powers that be at one of the nation's largest manufacturers of polystyrene believed that discarded plastic products belonged in a landfill. Biddle was determined to prove them wrong.

Dow's support only lasted a few years, but Biddle went on to become a hero—and a big dog. His company, MBA Polymers, is the world's largest recycler of mixed, discarded plastic from durable goods. The Richmond, California, operation turns shredded plastic that was once in computers, televisions, refrigerators, and other products into pellets that are as useful as virtually any plastic made fresh from fossil fuel.

That's no simple task. There are upwards of 40 types of plastics on the market, each with different properties. To create a recycled product that matches the quality of plastic made from Alaska or Saudi crude, Biddle's company cobbled together techniques from a variety of industries into a 20-step, automated process that separates plastics from nonplastics, then plastics from each other by type and grade.

Biddle's pellets are cheaper than virgin plastic because their manufacture requires less than 10 percent of the energy needed to make new plastic, and because the raw material is junk rather than costly oil. The environment wins along with the industry: Every pound of virgin plastic replaced keeps two to three pounds of greenhouse-gas emissions out of the atmosphere and lessens demand for landfills.

Recycled plastic accounts for less than 5 percent of North America's 100 billion-pound-per-year plastics market, so Biddle's a long way from greening the entire industry. But he's making a bold start: MBA Polymers recently opened the two most advanced plastics-recycling plants in the world, in China and Austria. Each facility can process about 40,000 tons of shredded plastic annually.

The task is a perfect match for Biddle, 50, a Sierra Club member and bicycle commuter who hated waste so much as a kid growing up in Kentucky that he followed his parents around turning off unnecessary lights. ("I drove them crazy," he says.) When Suffolk County, New York, passed a law banning polystyrene foam containers in 1988, the news turned on the proverbial lightbulb. The freshly minted PhD had been working on aerospace plastics for Dow at its Walnut Creek, California, research facility. "I think this is the beginning," efficiency-minded Biddle told his manager. "The company's future depends on doing something about this." The manager's initial reply: "We didn't hire a PhD in polymers to work on garbage."

But one city after another legislated against plastic packaging, and Biddle was allowed to dive into recycling until Dow closed its California research facility as part of a consolidation in 1992. He and his colleague Trip Allen moved on, in 1994 founding MBA Polymers, which tinkered with the plastics-separation

process until the company was ready for commercial operation in 2000. "Now Dow and other manufacturers are coming to me," Biddle says proudly.

The firm's high-tech remanufacturing process is only half the solution to the problem. Ironically, the remaining hurdle is finding enough discarded material. While many cast-off durable goods are picked over for their valuable components and metals, there has never been much of an economic incentive to aggregate the massive volume of cheap plastic that remains. (Some plastics recycling has been around for years, but it mostly involves much simpler streams of raw materials such as soda bottles or industrial scraps that have never been made into products.)

A breakthrough came from Europe and Japan, where nationwide "take back" laws require electronics and appliance manufacturers to pay for their products' recycling and disposal. That has created a reliable supply of raw material, enough to fuel Biddle's two overseas factories. In effect, the manufacturers do Biddle's front-end work, producing the shredded plastic that is manna to MBA Polymers.

Biddle's biggest successes have occurred abroad (his California operation remains a pilot plant) because the United States lags in comprehensive recycling efforts. While some states have enacted plastics-recycling legislation, federal efforts languish, and an attempt to create a voluntary nationwide take-back program floundered in 2004.

A free marketeer, Biddle reluctantly acknowledges that local regulations got him into the field and that international laws are making his operation viable. "Legislation is a facilitator," he says. "But when people ask me, 'Why did this technology come out of the U.S. when there's nothing driving it?' I say, 'Because we had to make it work from an economic standpoint.'"

As much as he cares for the planet, Biddle minds the bottom line. "My environmental side says, 'This *should* be done.' My business side sees an opportunity: 'This *isn't* being done.'" ■