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Plastic lumber, with UV-resistance to keep color from fading, makes excellent decking, fencing and outdoor furniture.
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Feeding good habits

Meet some companies with new ideas and new approaches to building businesses from recycling.

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A decade ago recycling became the law of the land in Wisconsin and now it's second nature for homeowners and renters to separate usable materials from the "trash" each week on Garbage Eve.

While changing people's wasteful habits remains a challenge, the businesses that process and return recyclables to the marketplace face a whole different set of issues: Can they collect, separate and sell materials economically? Can they make recycling pay or is it just the right thing to do?

On this tenth anniversary of our recycling law, we visited a mix of firms around Wisconsin that recycle paper, metal, glass, electronics, plastics and construction materials. These bright people showed us where the recycling business is moving and what we can do to bolster it. Here's what we heard.

Go deeper into the trash can

Headquartered in Atlanta, GA, Georgia-Pacific Corporation is the world's largest producer of tissue products (bath tissues, paper towels and napkins) including such popular brands as Brawny paper towels and Northern bath tissue products.

Georgia-Pacific's two Wisconsin mills in the Green Bay area use recycled paper to make most of their products. The company purchases waste paper through a subsidiary supplier based in New York that buys office paper and magazine waste across the United States. Georgia-Pacific used 665,000 tons of recycled material last

year, including fiber from the City of Green Bay's curbside pick-up program.

Recycled paper is de-inked, mechanically and/or chemically broken down, cleaned and screened to recover usable fiber. The finished pulp is used to produce brown and white paper towels, napkins and tissue grades.

Georgia-Pacific purchased Fort James Corporation in 2000 which included a James River plant (now called the Day Street mill) and the Fort Howard Corporation plant (now called the Broadway mill). Its Broadway mill started recycling in the 1930s; the Day Street mill, in the early 1990s.

Research at the company's Neenah Technical Center focuses on ways to make high quality tissue, towels and napkins from the lowest cost waste products. One complication has been finding ways to remove sticky material found on envelopes and items like papers where credit cards were attached for mailing.

"We are researching ways to get the glue out by screening it and cleaning the paper," says Eric Woolums, technical operations manager for Georgia-Pacific Corporation in Green Bay.

The company works with printers and buys some high-grade papers seasonally, like outdated copies and overruns of annual reports that peak from January to March. "We purchase ahead of time when supplies are plentiful," Woolums says.

International competition for waste paper is a challenge. "A lot of materials are being exported to China because they will pay a premium price," Woolums says. "As people use computers more and work toward paperless office environments, the U.S. doesn't print as much as we used to."

The company also runs a waste paper handling center, Ecosource. Once a year on Earth Day, Ecosource hosts an open house and invites the public to bring in their waste paper, tour the facility, and learn about the importance of correctly sorting waste.

Georgia-Pacific employs about 3,500 people in Green Bay and collects bottles cans, paper and polywrap for recycling. Since 1989, the mills have donated $110,000 to local charities from aluminum cans collected at its Green Bay plants.

"To remain competitive," Woolums says, "we are going deeper into the trash can to get as much quality fiber out of it as we can."

Watch close overseas, keep it stable at home

Samuels Recycling, a family-owned Wisconsin business since 1896, recovers scrap metals – iron, steel and nonferrous metals like aluminum, brass and zinc – at seven Wisconsin locations in Madison, Green Bay, Janesville, Waupaca and smaller processing yards in Beaver Dam,Waupun and Portage. The scrap metal business is a vital partner in recovering metals from old automobiles, foundries, industrial scrap and from private customers

who haul in old pipes, scrap and farming equipment.

“We are metal recyclers. We function in the recycling ‘food chain’ to break down products into forms of metal that can be melted by somebody else,” explains company President Mike Spear.

“Our customers are widespread. Most of the foundries are in Wisconsin; steel mills are out-of-state in Indiana, farther east and in Canada. Overseas markets in China, India, Korea and Japan are primarily buying our copper, brass and aluminum that can be shipped in containers,” Spear said. “These customers would likely take our steel too, if we could get it there economically. Now they buy from scrap dealers on the coasts, but we’re building markets. Some steel from Chicago travels by barge downriver to New Orleans and then overseas to Turkey and China.

“We employ about 250 people at our seven facilities. Our volume is 50-100 percent higher today than 10 years ago, yet we can operate with slightly fewer employees thanks to their efficiency and technology. That’s important as we consider that our competitors in China have labor costs as low as a dollar a day. Our machines are sophisticated; they use electromagnetics and detect differences in metal conductivity (eddy currents) to separate the components.

“For instance, the lightweight cars we shred today weigh about a ton. Electromagnets will pull out about 1,500 pounds of iron and steel. Other technology separates about 50 pounds of nonferrous metals like copper, brass and aluminum. The remaining 20-25 percent of that weight is ‘fluff’ -- cushions, glass, vinyl and plastics that are currently landfilled, but someday may be usable. To give you an idea of scrap volume, our company ships several thousand tons of iron and steel monthly, and the nonferrous metals are shipped in 40,000-pound containers. We export at least a million pounds a month to China alone.

“We’re watching the China market evolve,” Spear says. “They’re building infrastructure, power plants and manufacturing, and they’re getting smarter all the time. In the next 15-20 years, I believe China will continue to grow and many jobs will be created. As they make more things and make enough money, the Chinese will be buying more of the Fords, Buicks and Chevys. They will be the ones building houses, and after that, they will be the ones discarding the metal. They will be the world’s biggest generator of scrap metal. Right now it’s still the U.S.. We’re still the ones with all the cars and the toys, and we’re still the people throwing it all away. We’ve got a few hundred million people. They’ve got 1.6 billion people, and once they all have houses, cars, motorcycles, shopping carts, cans and whatever, they’ll be generating a lot more scrap than we ever did. And somebody’s going to have to be there to process all that scrap, like we do.

“Most people say we are entering the Chinese Century. We still have the technology here in the U.S. to recycle these materials. Firms that figure out how to take that know-how and apply it to the rest of the world will be viable businesses in the future. Those that just sit here and do it the same way, over and over will die.

“What incentive do we need? From an environmental standpoint, in the 70s and 80s we cracked down in the U.S. on manufacturing and anybody who was making smoke, dust, or dirty water while the rest of the world was polluting the heck out of the environment. That process made the ‘good guys’ clean their act up and do things right. Those that chose not to go along with it are gone now. We spent millions pouring concrete, pouring asphalt, and contouring land to contain stormwater runoff. We looked at every bit of land at our facilities. We tested and removed ‘bad dirt’ that may have been there since 1910. We worked with the DNR, and it cost us a lot of money to clean up what our predecessors were unaware of.

“Going forward, to compete, we need continued cooperation with regulatory agencies. We need people who understand our business, who can continue the relationships it has taken us 20 years to build. The way state government has continued to cut funding and staff, we’re dealing with new people every few years, and that hurts. Government needs long-term people who know the game.”

Innovate with new product ideas

When Edward Creske founded Wausau Tile in 1953, he valued innovation. Today, the company still operates with that same value under his son, Bill.

“We began working with an engineering professor at Columbia University about six years ago to develop glass-concrete technology,” Bill Creske says. “As a result of that collaboration, today we manufacture products with recycled glass in aggregates that create textured materials and appearance.”

Wausau Tile’s products are manufactured in a 400,000-square-foot, state-of-the-art facility in Wausau. The company employs about 330 people producing concrete furnishings including waste containers, tables, benches, planters, bollards (heavy posts), signs, playground amenities and terrazzo tile. The company’s pavers and terrazzo tiles use recycled glass. Production of big bollards and planters using recycled glass ramped up post-9/11 to enhance security at stadiums, public and private buildings.

Wausau Tile purchases about 200 tons of glass annually from suppliers in Indiana, Arizona and Tomahawk, Wisconsin. The Tomahawk facility buys much of its glass from the Langlade County landfill and curbside pickup. Wausau Tile works closely with its suppliers to establish price guarantees and a uniform product flow, says Commercial Division Manager Rodney Dombrowski.

Recycled glass gives terrazzo tiles an iridescent and refractive look.

While it has taken some time to convince people that the highly polished flooring they are walking on is glass, and it isn't sharp, Consumer Division Manager Rob Geurink says customers are coming to appreciate the color options – blue, green, clear, brown and red – that glass adds to the traditional terrazzo flooring. "These tiles have an iridescent and refractive look," Geurink says.

"We've put recycled glass on the forefront by putting it out there in terrazzo floors and in planters," Dombrowski says. "Using these products makes an architectural and environmental statement."

Expand consumers' horizons about what is recyclable

5R Processors, Ltd. recovers components from consumer electronics like computers, peripherals, office equipment and cell phones as well as utility equipment and machinery (like grinders, lathes and pumps). The firm operates three receiving centers in northern Wisconsin at Glen Flora, Catawba and Ladysmith as well as in Syracuse, NY; sorting "triage" centers in Atlanta, GA, and Memphis, and a processing facility in Clinton, TN.

The business started in the late 1980s in Wisconsin recovering metals, alloys and mainframe computers. As the use of home computers and other equipment increased, the company developed expertise in dismantling home, business and industrial electronics. We can take apart almost anything with a plug (other than fridges, stoves and big home appliances), says Executive Vice President Karen Birkenstock.

"If the client allows it, we reuse equipment for its intended purpose first. If not, or if equipment is proprietary, we will disassemble it," she says. "We view ourselves as 'end of life' processors for electronics. We don't smash and grind products to form a co-mingled mix of plastics, wires, glass, resins and metals like lead, mercury and cadmium. In taking apart devices like computers, we don't generate any wastes because we demanufacture and separate components by hand," Birkenstock adds.

Once hard drives are wiped clean, some computers can be refurbished for reuse for schools or other resale. Otherwise, 5R carefully disassembles electronic devices so components like hard drives, circuit boards, fans and motors can be reused or recycled. These pieces are all bar-coded and tracked before they are marketed to businesses in the Midwest and eastern U.S. Nearly 10 million pounds a year of electronic components are reclaimed by 38 employees in the Wisconsin facilities alone, says Birkenstock.

"For our future, it would help to have support and funds for research and development to try new processes and products," Birkenstock said. "We're always looking for financial assistance to continue that R&D work." For example, research funds from state recycling grants a few years ago allowed the firm to experiment in developing a brick

product from the glass in old CRT monitors.

Nationwide, we face a challenge educating people about these kinds of used electronics, Birkenstock says.

“Consumers want to know what they can do to recycle e-wastes. We encourage those running recycling programs to publish lists of locations where people can bring used electronics instead of discarding them. For instance in Tennessee, our firm runs the collection program for household electronics. We accept computers, printers, monitors, fax machines, microwaves, AV equipment and TV sets as well as cell phones (once the batteries are separated). We protect your privacy and wipe all hard drives and memory equipment clean. We can be reached at 1-877-NO E-WAST to learn about nearest drop-off locations and any fees.”

Find new uses for recycled materials near home

At its largest plant and corporate headquarters in Kohler, Wisconsin, Kohler Company manufactures cast iron, brass and vitreous plumbing products as well as small gasoline engines. The firm employs about 8,000 in Kohler and 28,000 worldwide.

“We recycle manufacturing by-products such as ferrous foundry sand, foundry slag, vitreous plumbing scrap (pottery cull), ferrous and nonferrous metals,” explains Nathan Nissen, waste management supervisor for Kohler Company. “We also have extensive recycling programs for paper, cardboard and other materials. We continue to look for ways to expand our recycling programs and to reduce our environmental footprint.”

In business since 1873, Kohler Company has been making products from recycled materials since its inception.

“One of our first products was a cauldron made from recycled iron that was first used as a pig scalder,” Nissen says. “We added an enamel coating and made the world’s first enameled cast iron bathtub, a product we still manufacture today. Styles have changed over the years, but its core ingredients have not.”

In the early 1990s the company assigned a business start-up expert to develop ways to recycle factory by-products. Research is threefold – environmental, technical and financial. The goals for new materials developed from research are they cannot harm the environment, they must perform as well or better than alternative product, and there must be a market for the materials.

In 1995, the company was awarded a state grant to research the use of foundry sand to make controlled low-strength material known as flowable fill. In partnership with the University of Wisconsin-Milwaukee, flowable fill made with foundry sand was used in two overpasses for bridge abutments and performed well.

Nissen says that in finding beneficial reuses for materials, “We have found we need to have a large stockpile of materials. We are marketing to large construction projects such as highways and commercial developments. These customers need large volumes in

a very short time. In our most recent project we delivered eight months of stockpiled material in only four days.

“The Wisconsin Department of Natural Resources has complimented us on our storage pad because it is suitable for use in all weather conditions, handles rainwater runoff, and is very well organized,” Nissen says. “We segregate five materials in the storage pad, four of which require crushing before they can be used.” About every six weeks a bulldozer crushes these piles and pushes them into separate stockpiles that are held until a suitable project is identified. Then we can quickly deliver to the customer.”

To expand Kohler Co.’s recycling efforts, Nissen would like to see improvement in Wisconsin’s regulatory framework. He notes that some industrial by-products can be used for many construction projects instead of sand and gravel.

“From an environmental perspective, our materials are comparable to virgin materials and in many cases, are cleaner than dirt,” Nissen says. “Right now it’s only economical to consider projects within 30 miles of our stockpile. We continue to research how we can best use recycled materials as raw materials.”

Take a long-term view about recyclables

“My folks, Irvin and Nancy Vincent, founded N.E.W. Plastics Corp. back in 1968 to blow mold milk jugs and other HDPE (high density polyethylene) plastic containers for the food and chemical business,” said Lynie Vincent, company vice president. “Now, that part of our business also makes containers for nutritional supplements and medical supplies.

“By 1973, Minnesota was already considering banning plastics from landfills, and my father had a vision that old containers could be ground up and reused for something else; his idea was making plastic lumber for pallets and skids. Back then, others in the plastics industry thought that was crazy. The conventional wisdom was that plastics could not be recycled. But by August 1973 when I was six, I remember our family trip driving down from our plant in Luxemburg, Wis. to Houston, Tex. where my dad dropped off the first plastic 2 x 4 to one of the executives of the Gulf Oil Company (now Chevron). The rest is history.

“Our recycled plastic division, called RENEW, produces plastic lumber under the name Evolve that is up to 96 percent recycled HDPE. We offer this product in a wide range of colors, dimensions, shapes and textures for customers in marine, agricultural, industrial and residential markets.”

Plastic lumber makes excellent decking, fencing, railings and outdoor furniture. The product is colored throughout and it is UV-resistant so the colors won’t fade. Since it is only made from pure recycled HDPE (gallon milk jugs and water bottles), it can be recycled over and over again and made into something else.

“I think that composites and solid plastic lumber can be a viable

alternative in products and locations where wood might rot," Vincent said.

"Raw materials for our recycled plastics come from companies that specialize in recovering used plastics. The material has already been granulated, flaked, washed and dried for our use. Washing is important to make sure that dried residues are removed so we don't have to worry about contaminants coming off when the plastics are heated to more than 390° and extruded.

"Many people know it is wise to recycle, but they don't often see that their soda bottles are spun into insulation or carpeting. They haven't seen for themselves how we can remake milk jugs into lumber. People would benefit from better training in preparing materials for recycling too. For instance some don't realize that the caps should be removed from milk jugs, that containers ought to be rinsed to remove residues, and containers used to collect used motor oil should not be placed in the recycling bag because the oil contaminates other plastics.

"Second, we have to get past the mindset that products made from recycled materials are cheaply made and ought to be less expensive. Some are, but others, like our plastic lumber is made to be extremely durable and UV-stabilized so it won't fade. There are costs in doing business," Vincent explained. "We have costs to collect milk jugs, get them to a recycling facility, grind them, wash them, form pellets and then get them to us for processing. Then we take plastics from different sources and make them into a product with excellent bonding and strength properties. We add colorants that are UV-stable so they won't weather and change. We also can emboss the product so it can have a nice-looking wood grain texture.

"Also, you need to look at long-term costs for materials. Quality plastic lumber may cost as much or a little more than wood lumber, but the wood will need more maintenance. For instance if you buy cedar for a deck project, three years from now it may have weathered to a different color. Now you have to go buy a few gallons of deck wash, a few gallons of stain and, perhaps, a few gallons of sealant. You've just added several gallons of chemicals to the environment, waste containers and your labor is worth something too. And using the plastic lumber reuses resources. A 20 x 20-foot deck would use the equivalent of 8,400 one-gallon plastic milk jugs that won't end up in a landfill. Choosing quality goods made from recycled products can end up costing a lot less over time.

"Education about conserving resources remains a key. I still think that people today have a lot to learn from people in their 80s who learned to conserve resources during World War II when so many materials were collected and rationed. Those people kept lifelong habits about not being wasteful that served them well for decades after the war effort ended," Vincent said. "That's a mindset that would serve us well today and tomorrow."

Recycle onsite where wastes are made

“We started business as PTS Landscaping and operate as Prairie Tree Landscape Center in Elkhorn,” said Jamie Stilling, company president. “We are a family-owned landscaping business completing everything from small residential landscape projects to large commercial landscape projects.” Prairie Tree started with Bielinski Homes a developer here in southeastern Wisconsin, installing street tree plantings, berm plantings and temporary seeding throughout their subdivisions. Within two years Bielinski and Prairie Tree developed a working partnership.

Bielinski knew that many of its customers wanted to preserve the way the land looked before it was developed. As an outgrowth, customers wanted to make the best use of construction materials. A team including Bielinski Homes, WasteCap Wisconsin, and Prairie Tree researched ways to recycle throughout Bielinski subdivisions.

“WasteCap Wisconsin recommended contacting a Georgia company, Packer Industries, which had machinery that ground recyclable materials,” Stilling said. “Packer Industries was well known for its programs in the south to help cut waste and recycle those materials onsite throughout subdivision development. PTS purchased similar grinding equipment and developed our own approach for construction site recycling. Now we have a system for each phase of the development.

“We are helping develop Best Management Practices for recycling wood and drywall. First, we set up collection areas within the subdivisions where scrap concrete, drywall, lumber, steel, cardboard and other materials can be stockpiled. Two of our crews travel throughout the different subdivisions collecting, grinding and moving usable materials.

“Lumber and drywall are ground and stockpiled for use in the landscape package for each house. Wood grindings can be used in mulch beds and for erosion control instead of silt fence or added throughout the yard to enhance soil conditions. Drywall is ground to gypsum and mixed in with the compost then placed on yards after rough grading is complete. Cardboard is taken to a specific container, picked up and recycled. Concrete is ground and used under driveways. Steel is taken back to Prairie Tree and taken to a recycling company. We are also working with the Department of Natural Resources to determine if vinyl siding can be ground and recycled.

“Currently, Prairie Tree provides recycling for 7-15 subdivisions. Next year the firm hopes to build new partnerships and pursue business from other homebuilders with similar interests. We also hope to expand to commercial site recycling. The aim is to educate people to start this collection process as the initial project specifications are drawn up. This will force all contractors to follow specific guidelines when bidding, recycling and using recycling materials through the landscaping on projects.

“I think in 10-15 years, construction businesses nationwide will see they can make these recycling systems work. Partnerships among

developers, landscapers and waste management companies will show they can all benefit from this as well as the homeowners. We also need to see the same standards adopted in neighboring communities. The sooner Best Management Practices for construction sites are in place, the sooner we will have assurances that the guidelines we develop in one community will be acceptable elsewhere. It would save effort if we didn't have to negotiate with each municipality and development to meet the same statewide goals everywhere. I'm hoping we get to the point where this kind of construction site recycling has to be done and becomes routine," Stilling said.

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