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# Going 3-D: Manufacturers say tech drives sustainability, revenue

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Michigan Technological University used a mixture of finely ground wood powder and plastic resin to 3-D print a door pull and handle, shown above. Researchers at the university hope to launch a \$25,000 research program with the West Michigan Zero Waste to Landfill user group to develop the technology to be able to use wood waste from the region's office furniture manufacturers.

*Courtesy Photo*

West Michigan office furniture manufacturers could soon be incorporating scrap wood into the production of their products through a new partnership with **Michigan Technological University**.

The West Michigan Zero Waste to Landfill user group and other local manufacturers have partnered with Michigan Tech to develop a process that would use a mixture of finely ground wood scrap and plastic resin to produce components using additive manufacturing, a process commonly referred to as 3-D printing.

"I'm really geeked on it," said Bill Gurn, manager of facilities and operational maintenance at **Haworth Inc.**, one of the members of the user group. "I think it might be one of the most feasible things I've seen in our path over the last four years of working in this group. We've looked at gasification of wood and other opportunities to do it, but this may be the most feasible because (3-D printing) is actually being done today."

Although the project is still in its early stages, Michigan Tech has successfully printed a handful of door knobs and pulls from a mixture of commercially available wood powder and plastic resin, Gurn said. But the process needs to be refined since the wood scrap that office furniture manufacturers produce is typically already full of resins and plastics that could impact the final filament, he added.

To further the project, Michigan Tech has proposed a \$25,000 research program over the summer of 2016 with members of the user group, a loose consortium of West Michigan manufacturers facilitated by the **Michigan Manufacturing Technology Center-West at The Right Place Inc.**

If successful, the project could open a market for entrepreneurs to take wood waste produced by members of the user group, set up processing operations and sell 3-D printed components back to manufacturers, according to Gurn.

"The great story for this is it's a full-circle scenario," he said. "We produce the scrap, and we can grind it up and

produce parts that go on our own product. If you look further down the pipe than that, we could use that technology for when furniture wears out and someone has table tops they want to get rid of. It gives us as manufacturers the ability to take that product back, grind it up and make a new product out of it.”

While the current technology would blend wood powder with resin to make the 3-D printing filament, researchers at Michigan Tech’s forestry program think they’ll eventually be able to directly convert the wood waste into printable material, said Mark Rudnicki, a professor in the school of forest resources and environmental science.

“The particle board has added resins and laminates itself,” Rudnicki said. “Our material science and engineering group and our wood chemists here in the School of Forestry, they think it’s also possible to liquefy the waste particleboard, resin and all (the materials) and turn that into a printable media directly. That means it would be almost 100 percent recycled and not added polymers.”

## OFFERING BENEFITS

The commitment on the part of the Zero Waste to Landfill user group and Michigan Tech to develop recycled materials for 3-D printing underscores a larger move by West Michigan manufacturers to integrate the technology into their operations in new ways.

While product development firms have long embraced 3-D printing, manufacturers are now increasingly investing in the technology in-house to help drive revenue in their operations.

For example, Grand Rapids-based **Cascade Engineering Inc.** recently upgraded its 3-D printer to a larger model that allows the company to use a wider variety of plastics for filament materials.

Incorporating 3-D printing allows the manufacturer of plastic injection-molded components for an array of industries to increase its speed to market by weeks and avoid costly delays to its customers from prototyping, said Scott Zylstra, general manager of Cascade’s automotive and commercial product lines.

“Speed to market matters,” Zylstra said. “The customer doesn’t want to be late because of delays in prototyping. 3-D printing can shorten up that process.”

Cascade Engineering uses its 3-D printer to test jigs and fixtures and inserts used in plastic injection molding machines prior to machining those components from metal.




Manufacturing executives and industry watchers remain bullish on the global 3-D printing or additive manufacturing industry, which is expected to skyrocket to \$26.7 billion in 2021, up from \$5.1 billion last year, said Terry Wohlers, principal and president of **Wohlers Associates**, a Fort Collins, Colo.-based consulting firm that tracks the industry.

Elsewhere in West Michigan, Kalamazoo-based **Stryker Corp.** announced plans to build a new 3-D printing facility this year to grow its portfolio of printed titanium implant products, according to a quarterly conference call with analysts in January. The company expects annual capital expenditures to spike to between \$400 million and \$450 million in 2016, up from \$270 million in 2015, partially as a result of the project, Stryker President and CEO Kevin Lobo said in the call.

Outside of West Michigan, industrial giant **General Electric** also opened the doors in April to a \$39 million additive manufacturing facility in Pittsburgh, according to reports.

For its part, Cascade Engineering plans to continue developing its 3-D printing technology to eventually create tooling for low-volume production runs.

“For us, it’s understanding and being able to play with the technology and understanding what else it can do for us,” Zylstra said. “The industry is strong and it’s growing extremely fast.”

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