



Invention harvests wasted process energy

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Photo by Johnny Quirin

Dean Rosendall's invention harvests energy from conveyor processes.

Dean Rosendall felt there was a need to reclaim wasted energy from certain processes, and no one seemed to be filling that need.

So he invented the Dean Energy Harvester — DEH for short — which utilizes wasted process energy in mining and similar industries.

“That’s the beauty of it,” said Rosendall, also a partner at Grand Rapids-based First Companies Inc. “It adds no drain on the existing systems.”

Industries such as aggregate, concrete, mining and forestry use conveyors to transport multiple tons of raw material. When that material reaches the end of a conveyor, it drops a short distance and lands on another conveyor or its final destination, Rosendall said.

“At those drop zones, you have falling material, and there’s an energy there,” he said.

The DEH’s reclaiming turbine attaches at the end of the conveyor and can operate with almost any size material. It resembles a wind turbine, but the weight of the falling material is what turns the paddles and powers a connected generator.

Rosendall, a Clint Eastwood fan, came up with the idea while watching a mining scene from the movie “Pale Rider.”

“I thought, ‘I wonder why no one’s ever captured the energy from a falling aggregate stream,’” Rosendall said. “I don’t know why I thought of it from that scene, but as a partner at First Companies, we’re in sustainable construction, so I’m always thinking along those lines.”

When working with those First Companies clients pursuing LEED certification, Rosendall recommends they focus on the LEED points that “really make business sense.”

“Often there’s points that make lifecycle cost improvements,” Rosendall said. “If you pick a better mechanical system, it will actually pay for itself over time.

“And this, to me, is the exact same concept. When you can purchase this machine and it will actually run cameras and light systems that help your productivity without having to power it through a power line, it makes business sense.”

The DEH connects to a power tower that can be customized for a variety of functions, Rosendall said. The tower collects energy from the turbines, which it redistributes to features such as safety and security cameras, lights, scales, recording equipment and charging stations, and it can power existing auxiliary equipment. One DEH turbine can stand alone, or multiple turbines can be linked.

Whatever power isn’t used during the day can be stored or could be used, for example, to run lights at night, Rosendall said.



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Courtesy Dean Rosendall

The Dean Energy Harvester attaches to the end of a conveyor and connects to a power tower.

“There’s certain applications where there’s not enough sun for solar, and there’s not enough sustainable wind force,” Rosendall said. “But this is a constant. Whenever you’re running your plant, you have power.”

Rosendall built a prototype with Grandville resident Doug Drost, who has 20 years of experience in the aggregate and concrete industries, and Chuck Ammond, an electrical engineer who also teaches at Kalamazoo Valley Community College and consults for Muskegon Community College.

He then tested the product at three different sites: a small recycling plant, a statewide aggregate producer and a national mining firm.

“I wanted to test it in three different sites with three different producers,” Rosendall said. “And all three liked the product, and more importantly, the product proved to work in different applications.”

Rosendall then went looking for a manufacturer that met specific criteria.

"I wanted to keep it in Michigan, yet wanted a company that had electrical and mechanical engineering — and was already in that industry and had global distribution," Rosendall said. "Those requirements led me to another state."

Last week, he signed a contract with Kentucky-based Arch Environmental Equipment Inc. Arch will manufacturer, market and distribute the product. The DEH likely will range from \$4,000 to \$8,000.

"However, I did negotiate that I will dictate the Michigan distribution chain, and my hope is to help a local West Michigan company in a distribution — and perhaps service provider — capacity, too," Rosendall said. "I want to help Michigan business."

In addition to being a good fit for manufacturing and distributing the product, Arch hopes to use the technology as a catalyst to enter the sustainability movement within the mining and aggregate industries, Rosendall said.

Mining and many related industries are starting to incorporate sustainability certifications, and early indicators show the DEH aligns well with certification requirements, Rosendall said. Along with producing energy without any byproducts, the DEH is made of mostly recycled steel, and the paddles can be replaced to extend the product's life.

One of the things that Rosendall is most excited about is that the DEH is a global product.

"All around the world, there's mining," Rosendall said. "And anywhere there's mining, there's drop zones.

"Estimates say there's over 8 million drop zones around the world. And there's no reason you couldn't put an energy harvester on every one of those drop zones and reclaim that power, that energy."

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