The George Washington University, Mississippi State University Develop Solar Kilns To Reduce Lumber's Carbon Footprint

George Washington University
Mississippi State University

After lumber is sawn from the log it must be dried to improve durability and strength, and every year, lumber producers spend millions of dollars to heat wood-drying kilns. The time and energy costs associated with drying lumber create financial and environmental challenges for lumber producers around the world.

Richard C. Millar and Thomas Mazzuchi from the George Washington (GW) School of Engineering and Applied Science (SEAS), in partnership with Mississippi State University (MSU) professors Todd Mlsna and Rubin Shmulsky have developed new technology to not only increase lumber productivity by speeding up drying time, but also recapture energy typically lost as heat, thus reducing lumber's carbon footprint.

This hybrid, solar-power technology was developed to efficiently dry agricultural products like lumber and biochar – a carbon-rich residue used in diverse sectors from agriculture to construction materials. The kiln uses a novel solar energy collector that has previously been used to preheat air for ventilation and crop drying. It redistributes and recirculates thermal energy in the air, spreading heat throughout the kiln and reducing the need for natural gas or other energy sources.

"The solar hybrid dryer is a good example of promoting collaboration across disciplines," Millar said. "When this project started, no one expected that this technology would reduce energy and greenhouse gases, thereby preventing climate change and promoting a better world."

The technology has been licensed for exclusive commercial use by Englo, Inc., a West Virginia-based air handling business. Tim Warden, president of Englo, said he became connected with Millar and his research through the company's work in the forest products industry.

"This technology capitalized on Dr. Millar's experience in private industry and his knowledge of engineering to put together a product that is commercially viable," Warden said. "If we can increase productivity through their kilns using this technology, then it's going to have a huge impact on the industry."

Englo has designed and installed its first rooftop solar hybrid kiln for InterFor, a large commercial company. The project was the first application of hybrid solar technology on wood-drying kilns. Each design and installation is custom, based on the roof area size and shape and needs of the company. Englo is now working with several additional users to design custom roof kilns.

The licensing agreement was facilitated by the GW Technology Commercialization Office (TCO).

"The university does really top-quality research here, not just in terms of fundamental research, but also taking it from the lab bench and applying it to the real world for things that need solutions right now," said Michael Harpen, TCO licensing manager. "We're taking technologies developed here, and we're finding people who can take them and turn them into products that impact the lives of people around the world."

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