



SBIR/STTR SUCCESS

Solar cells are constructed with silver, which is costly. By making improvements to the top layer of the solar panel, less silver can be used, increasing efficiency and lowering costs associated with manufacturing.

PICASOLAR, INC.

Within the walls of the University of Arkansas just several years ago, a few graduate students submitted a business plan that would change the face of solar energy, literally. The idea was a technology, known as the Hydrogen Selective Emitter (HSE) process, which would alter the top layer of a solar cell. By using hydrogen to fix the inherent defects in the solar cell, efficiency could be increased while reducing manufacturing costs. The grid lines on the face of a solar cell are traditionally constructed with silver, which accounts for the second most costly part of the cell. With improvements made to the top layer of the solar cells that allow electrons to move freely, manufacturers could use less silver, and in turn, create the panels for less. The HSE process can potentially save the average Gigawatt scale solar panel manufacturer up to \$120 million annually, exemplifying one of the largest leaps in solar power to this day.

PHASE III SUCCESS

Raised \$2.5 million in equity capital; additional \$500k in funding provided by the Arkansas Science and Technology Authority; awarded \$1.2 million through the DOE Sunshot Initiative.

AGENCIES

DOE, NSF

SNAPSHOT

Picasolar, which began at the University of Arkansas, has a clear mission to make solar energy the cheapest form of electricity on the planet.

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“Our technology is a process that preferentially alters the top layer conductivity of a silicon solar cell, reducing the total required amount of silver by up to 22 percent while making it 15% more efficient,” explains Picasolar CEO Douglas Hutchings. “The HSE is an easy to implement technology; a one-step process that can utilize water for hydrogen generation and offers an incredible cost-savings for solar manufacturers.”

Not wasting any time, Picasolar caught the attention of both government and industry with a slew of awards right around the same time they started with the Small Business Innovation Research (SBIR) program. The company was the recipient of the North East Region DOE EERE Clean Energy Prize and the Grand Prize Winner of the MIT Clean Energy Prize. Picasolar took home \$150,000 in award money for defeating 55 of the nation’s best sustainability startups, plus an additional \$100,000 from the U.S. Department of Energy (DOE).

The company’s first SBIR award came by way of the National Science Foundation (NSF), and the results allowed Picasolar to continue its work with DOE.

“Once we had the NSF Phase I underway, we were able to complete the proof of concept, and we showed efficiency improvements that were the largest since 1974,” said Hutchings. “So we applied for a Phase II award, and in tandem, we also submitted a proposal to the DOE for the Sunshot Initiative, and we got fantastic feedback from both programs.”

The DOE Sunshot Initiative drives research, manufacturing, and market solutions to make the abundant solar energy resources in the United States more affordable and accessible for Americans. Since the project was founded in 2011, the DOE has funded more than 350 small businesses. Picasolar decided to focus solely on its DOE solutions, since the objectives of the agency are right in line with the company's goals – and that is to make solar energy available to everybody, at a low cost. However, the experience with NSF was a major contributor to Picasolar's success by allowing it to assess the marketplace and get the critical early stage R&D completed.

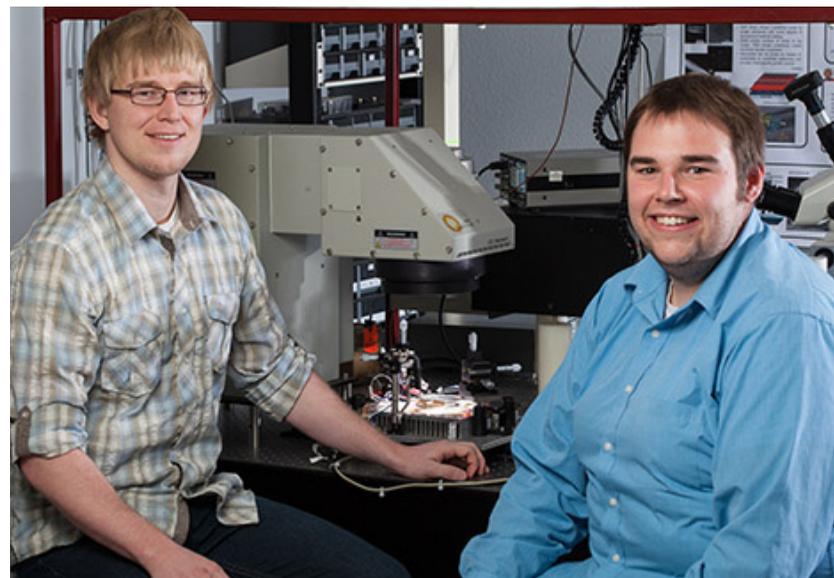
"One of the programs we were very fortunate to participate in was the NSF I-Corps™ Program because you engage in customer discovery," says Hutchings. "So along with the technical work within the SBIR, we had a very strong focus on regularly interacting with our customers to make sure that the R&D was focused on showing the results they needed to see in order to buy into the product. Our understanding of the market had changed by being able to get direct feedback from our customers, which was invaluable. NSF didn't tie us to what we thought we wanted – they let us evolve."

Now, Picasolar is taking pre-orders on the patented process, including a non-exclusive right to the technology, which is providing them the capital to build. Sales will start in 2016. Target customers are the silicon-based solar manufacturers of the world, like Green Energy, JA Solar, and Canadian Solar.

Hutchings admits the company's fast track to success was partly paved by the fact it is located in Arkansas. Setting up shop in the research and technology park within the University allowed Picasolar to leverage the resources and labs at an hourly rate, as opposed to spending hundreds of thousands of dollars on space and equipment. State funding has also been a pivotal advantage to getting off the ground.

"We are going to be shipping equipment around the globe, and Arkansas has a world-class logistics infrastructure," adds Hutchings, who is proud to continue to call Arkansas his company's headquarters.

Since the company's founding in 2012, it has experienced growth along with a surge in demand, and recently moved into its brand new, 2,300 square foot space in the Enterprise Center within the research and technology park at the University of Arkansas.



TOP Picasolar's patented technology, the Hydrogen Selective Emitter (HSE), allows manufacturers to construct solar panels with improved efficiency and at a lower cost by using less silver.

LEFT Picasolar won the MIT Clean Energy Prize in 2013 for its HSE technology, along with a supplemental \$100,000 from the U.S. Department of Energy.

RIGHT Douglas Hutchings (left), CEO of Picasolar, and Matthew Young, an employee, pose in a GREEN Center Laboratory at the University of Arkansas Research and Technology Park.