

The Energy Laboratory of Dr. Jessica Tew

Sun Powers This Home in Murrells Inlet

by Keith Waller

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~Jessica Tew



Although Drs. Joshua and Jessica Tew bought the solar energy system for their home together, it is really a pet project for Jessica. "I have thought about solar energy since I was a kid, and I always wanted to do this," she explains. "As a child in the 1970s, I read about solar energy, and it made so much sense to me. It was free power, and it produced clean energy. It made so much sense for the world, but back then they told us that it was expensive and that it didn't make economic sense, so we forgot about it."

"We Do Solar"

The Tews had lived in their Murrells Inlet home in the Mt. Gilead development for nine years when their Florida-style air conditioning system, which used ground water for cooling support, failed. A completely new system would be needed, and as luck would have it, Jessica noticed one of the Carolina Cool trucks on the road with a sign on the back that said "We Do Solar." "I had this big roof with no shade. I thought since it was sunny enough on the south side that plants burned, it must be great for solar energy, right?"

Eco-Cooling and Endless Hot Water

"As big as this house was, the electric bills seemed relatively low. It's only 11 years old and was built pretty tight and energy efficient. It had a three-zone system, and the kids' rooms were always too hot or too cold." Verlon Wulf, owner of Carolina Cool, describes the idea behind the solar powered cooling system. "This house would take about 9 tons of cooling power, but with this Sanyo ECO-i system, we can do

it with only 6 tons using five different cooling heads to focus cooling only where it's needed as weather and requirements change, solving comfort problems with less energy. Most importantly, this system can run completely off of solar and batteries," Verlon explains. The Tews' new solar-powered air conditioning system used the existing ductwork and involved few visible changes inside, with the exception of two wall-mounted units in the kids' rooms. Now, the kids have remote controls to cool their rooms as they like, ending years of family disputes over air conditioning.

It took about six weeks to install the new system. The roof on the back of the Tew house is covered with 50 solar electric panels across two surfaces of the roof, and a large evacuated tube solar hot water system. The hot water system circulates an antifreeze glycol fluid into a 100 gallon tank in the attic, which in turn heats the existing home electric water heaters to 160 degrees through a heat exchanger system. There's nothing to freeze, and water isn't piped all over the attic and roof to be heated.

Steve Brakefield of Carolina Cool demonstrates the hot water solar system with some of the components, holding a glass tube and one of the copper inserts in the sun. The copper insert, a completely closed piece of pipe with a copper bulb at one end, was cool to the touch, but when inserted into the glass tube and held in the sun for only a few seconds, it became too hot to touch. "The tube is filled with saline, and through conduction, it heats the glycol tank," Steve explains. "The system is super efficient, and if it is damaged can be easily repaired without affecting the house's water plumbing system."

Smart Electric Systems

Always checking the system's performance, Jessica Tew chimes in; "There's a control unit connected to the tank. I can see the temperature of the water in the system and in the tanks and how well it's working. If I could do one thing, I'd convince everyone with a roof that got any sun at all to get solar hot water. If we had everyone on solar hot water, think how much we could reduce the need for coal-burning electricity in this community alone!"

Kurt Gainforth, representative for Sanyo, explained that the ECO-i is a smart system with sensors throughout the Tew house that can manage humidity at 50 percent through circulation and targeted cooling where and when needed, a very different way of thinking than most common air conditioning systems. "The system also has an Earth-friendly refrigerant that contains no chlorine, the chemical that is responsible for damaging the ozone layer."

Come Down to the Lab

Jessica has her own "command center" in her home office, where she can collect data from her "energy laboratory." "She's very in tune with all this solar stuff," says Verlon. "She's been monitoring it and knows more about it now than we do, and she did a lot of her own investigation." Sitting in front of her computer in her home office, Jessica explains how she planned her energy system. "I'm still connected to Santee Cooper for electricity, and while I have 18 batteries and can store solar power to use at night, if I need more, I can still get it from Santee Cooper. My excess clean green energy goes back into grid.

"I have this information system," she adds, "a Sunny Web Box that I can access from the Internet to see how I've done. On a bright sunny day like today, I produced this nice bell curve graph of energy," she points out on her computer screen. "Even on a rainy day, I'll produce 16 kilowatts of energy, and a sunny day will make 50. The hot water system works well on any day." With sensors, data and computers, this is a "smart" system that improves and learns as it functions. Jessica continues: "There's some adjustments I can make to maximize the energy benefit from my system, and

I'm still in the information gathering stage. I want to make better use of my batteries, to use more power at the right times and set up the charge controller to manage better use of my electricity.

"If Santee Cooper power goes down in a storm, there is an automatic shut off that keeps my system from sending power back into the damaged grid. My air conditioning system and refrigerator, and soon my office, will always stay on, should that happen, and I can also manually disconnect and allow only the sun to run my house on solar energy."

This laboratory of residential systems and data should be very valuable for those studying residential power systems and the best way to get "off the grid" with clean energy. "There's always a lot of new stuff to learn," says Jessica. "Battery technology is always improving, and by the time mine need to be replaced, there'll be a whole new technology and plan."



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Asking Questions about Energy

"We felt that this system would pay for itself eventually, given the rising cost of energy," says Jessica. "But even if it doesn't, we wanted to do it for the environment. It makes me more conscious about power; for example, my washer takes a lot less energy than the dryer, and when others see my system, it gets people talking.

"I was really guided by Carolina Cool as to what would be least expensive, what would fit, and what would provide the most power for the money," adds Jessica. "Verlon Wulf and Dan Evans, who has since

moved on to form his own solar planning company, were great resources, and they have a unique way of looking at things. But there's room for a lot of people to get credit for this great project, even the workmen who were scrambling all over the roof to install equipment. I had so many people up on that roof!"

For more info, call Verlon Wulf or Steve Brakefield at Carolina Cool in Surfside Beach at (843) 238-5805, or visit Carolina-Cool.com. See ad page 22.