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## POWER HOUSE

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Mike Strizki's two-story Colonial home in the Sourland Mountains is equipped with a hot tub, big-screen television and power plant that turns a mix of renewable materials—mostly sunlight and hydrogen—into all the energy he and his family need.

Strizki, a 50-year-old inventor who works as a director at Advanced Solar Products, a solar installation company, has been "off the grid" since October, living a life free of the utility bills that he says once averaged \$400 a month. He is now working to bring the solar-hydrogen system that cleanly fuels his East Amwell home to other homeowners. His system was the prototype; Strizki is planning to install a second in the Cayman Islands, where he traveled this week to lay the groundwork for a system at the new home of a bank executive.

The home-powering plant Strizki built in East Amwell is not ready for mass-production—it cost more than half a million dollars to build, and nearly didn't pass local building code—but it has generated a force field of buzz.

Strizki said he has received thousands of e-mails and calls from people from around the world who want to know how they can fuel their homes, schools and businesses the way he powers his house.

"He's managed to prove a concept and to show that it is technically feasible to create a hydrogen-based solar home and transportation system and some of those components may actually enter our lives in a widespread way in the future," said Clinton Andrews, director of the Urban Planning Program at the Bloustein School of Planning and Public Policy at Rutgers.

Strizki has gotten to a place many homeowners only dream about: He is powering his own home, one of only a small fraction of New Jerseyans who no longer pay monthly bills to utility companies. (Doyal Siddell, a spokesman for the New Jersey Board of Public Utilities, said that less than one percent of residents who once paid for utilities now don't.) To top it off, he is doing it without polluting the environment.

"I'm basically doing what everyone has always wanted to do—store up heat from the summertime and use it to heat your house in the winter," Strizki said.

The land around Strizki's house is both lush (dotted with tall maple, oak, chestnut and hazelnut trees) and messy (a half-dozen cars and trucks, a boat and various pieces of farm equipment are parked in various places.) A sign at the start of the winding stone-and-gravel driveway that leads to it welcomes visitors to the "1st solar-hydrogen residence in North America." While others have staked a claim to that title, Strizki says his home was the first of its size in which an entire family—Strizki, his wife, Ann, their 23-year-old son, two Bichon Frises and a cat—is living.

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A white shed-like building that Strizki has used as a workshop now serves as the place where the magic begins. Its south-facing roof is covered with solar panels, and more panels are nearby, on a freestanding unit just outside of the building. The panels are the first step in the process that powers Strizki's home, absorbing sunlight and converting some of it into energy, which flows through inverters inside the building that supply power to the house, charges five banks of batteries and powers an electrolyzer.

The batteries provide short-term power and act as a backup. The electrolyzer converts tap water into hydrogen, which is stored in 10 large propane tanks outside, and oxygen, which is released into the atmosphere.

Strizki's solar installation was designed to make more energy than his house needs—up to 60 percent more in the summer—and for that reason, he is able to make and store enough hydrogen to get him through the sunless days of a New Jersey winter (via a hydrogen fuel cell, which converts it into energy) and power the New Jersey Genesis, the hydrogen car in his garage that he developed in collaboration with Rutgers.

Gregory Sachs, the lead designer on a house that has also laid claim to the title of first solar-hydrogen home, the United States Merchant Marine Academy/New York Institute of Technology solar-hydrogen home, said the endgame is to create a system where a person can come home at night and fuel his fuel-cell-powered car from the hydrogen he made in his garage. Sachs now lives in the energy-efficient 800-square-foot home, which was transported to Washington, D.C. for the U.S. Department of Energy's 2005 Solar Decathlon competition and has since been rebuilt in Kings Point, N.Y.

While his home was expensive to produce, Sachs is confident the cost of solar-hydrogen systems will drop as more people invest in the technology. He said the systems generate a substantial cost-savings, not just on utility bills but on harder-to-measure costs such as the political, environmental and health costs associated with continuing to rely heavily on fossil fuels.

"Without a doubt, these are the systems of the future," Sachs said.

Strizki's system nearly didn't come to fruition. The tanks he stores the hydrogen in made some local residents nervous and drew rejections from the man who was then East Amwell's zoning official. Strizki said that they hold the energy equivalent of a large sport utility vehicle's tank of gas when full.

People shouldn't worry about stored hydrogen any more than they worry about the propane they keep around their homes, said Ben Kroposki, a senior engineer at the National Renewable Energy Laboratory who is researching the production of hydrogen through wind power. "Using today's modern storage technology, hydrogen generation and compression is not any more unsafe than a gasoline engine, really," Kroposki said.

The 1,000-gallon tanks Strizki uses are cumbersome, but Strizki said the technology exists to store the hydrogen in smaller tanks at higher pressure and bury them underground.

Standing by the tanks on a recent hot afternoon, Strizki squinted in the sunlight. "What you're looking at is the ability to store renewable energy for an unlimited amount of time," he said.

The final component of the system that powers Strizki's home is a geothermal unit he installed 15 years ago when he built the house. It works like this: Copper coils buried in the ground circulate freon, collecting the coolness or the heat of the earth depending on the season. In the summer, Strizki's central air system extracts the 56 degree ground temperature and transfers it to the home for cooling; waste heat collected in the home is transferred to a hot water tank that provides hot water to the house and hot tub. In the winter, heat is extracted from the earth to help heat his home.

The switch Strizki can flip if he wants to reconnect to the grid is located in his basement. Back on grid, he can either buy power or sell it back to the power company. "Right now, the grid is my backup," Strizki said.

Patrick Serfass, the director of technology and program development for the National Hydrogen Association, said that the size and price of Strizki's system would need to decrease before even a small number of Americans would be interested in buying something like it.

"It's a great project and he's really done some fantastic things to show that renewables and hydrogen make a smart system," said Serfass. "But there's a little more work that needs to be done before this can be market-ready for residential customers."

Not counting the geothermal component, Strizki's home powering plant cost about \$500,000. Much of that was paid for through a \$225,000 grant from the state Board of Public Utilities and private and corporate donations of money and equipment; Strizki said he paid about \$100,000 out of pocket.

While some may balk at such a high cost, Strizki compares it to the high price people paid for the first computers. He maintains that prices will drop as soon as the "early adopters," people who like to be the first to own new products, install their own systems; he hopes to sell future systems through a company he started, Renewable Energy International, and raise money through a nonprofit called the Hopewell Project. He sees the technology being available to the average consumer in less than 10 years.

"My game is to lead by example, to think globally and act locally," Strizki said. "Others will follow."