

# GEORGIA TECH RESEARCH

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## News Release

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GEORGIA TECH EXPERIMENTS AIM TO SOLVE  
PROBLEMS OF SOLAR ELECTRIC HOUSES

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ATLANTA, GA -- The time when you can live in a house that draws its electrical energy directly from the sun may be nearer than you think. And Georgia Tech is collaborating with the Georgia Power Company on some tests to hasten the day.

The space age technology called photovoltaics uses rows of silicon solar cells, mounted on a house roof or another sunny location, to capture sunlight and convert it directly to electricity. Right now it's economically viable only in areas like California, which has generous tax credits and abundant sunshine. However, advances in solar cell manufacture and rising costs of conventional energy sources are narrowing the cost gap for the rest of the country. That's why Georgia Tech and Georgia Power are investigating the technical problems now.

Two of the problems involve power quality and utility lineman safety. "The average residence may never become totally solar electric," Research Engineer Larry Banta explained. "Its occupants probably will need power supplied by an electric utility at night, on rainy or cloudy days, and whenever power needs exceed the amount that can be generated by the solar cells. At other times, the cells may produce more electricity than the residents can use, and the excess power will feed back into the electric utility lines. Electric utilities are concerned about the impact of thousands of solar electric houses feeding back into their lines."

(more)

A potentially serious safety problem is "islanding". Theoretically, when a utility line goes down, all photovoltaic and other sources feeding into the line are supposed to go down, too. But it is sometimes possible for them to continue to operate, creating a shock hazard for line repairmen.

Another problem is the introduction of distortions that can cause difficulties along the utility lines and lower power quality. The distortions, called "harmonics," are created by DC to AC inverters, which are necessary to convert the direct current produced by solar cells to alternating current, the form which utilities supply to run our electrical appliances. These distortions can travel along the lines and join with others at places far from the input location. The aggregate effect may cause power losses and damage to utility equipment.

On Thursday through Sunday of this week, February 2-5, Georgia Tech engineers will be performing tests at three Georgia Power Company sites to gather hard data that will help them in their studies. They will set up equipment at Georgia Power's photovoltaic house in Roswell (the Future I House), at a substation, and at a campsite along power lines.

Tech's Engineering Experiment Station and the School of Electrical Engineering are collaborating on the research, with the major assistance of Georgia Power. The experiments are part of a large research program which is now in its second year of funding by the U.S. Department of Energy. Project participants in addition to Georgia Tech include the Florida Solar Energy Center, the Alabama Solar Energy Center, and seven utility companies in four southeastern states.

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