FLORIDA SOLAR ENERGY CENTER®

The Difference is in What's on Top

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Last of the panels of photovoltaic cells is put into place on FSEC's experimental research facility.

The three-bedroom, two-bath house on the Florida Solar Energy Center grounds in Cape Canaveral is very much like millions of other homes in the nation with one exception--photovoltaic cells (solar cells) mounted on its south roof convert sunlight to electricity to meet much of the house's power needs.

Photovoltaic cells are truly "magical" devices, a direct product of the modern day, space age technology. Each of this facility's 168 photovoltaic modules contains 35 four-inch-diameter solar cells. In bright sunlight, the entire roof can generate more than 5,000 watts of electricity at a level of about 200 volts.

The sun-born electricity is, however, in the form of direct current (DC), similar to that obtained from an ordinary automobile battery. Since most homes and appliances operate on utility-supplied alternating current (AC), the cell-generated power must be converted to AC. This is done with an inverter, which also allows the normal utility power to "mix" with the solar-generated electricity so that the two complement each other. When the sunlight level is low, as on a cloudy day, the solar system provides what it can to power the house and then allows the utility company to do the rest of the job.

A most interesting and challenging situation occurs when the solar cell system provides more electricity than the house needs. This poses two possibilities: (1) Store the excess energy in batteries or flywheels for later use, or (2) sell the excess energy to the utility company for use elsewhere. This facility uses the latter approach through what might be called a trade--the excess electricity makes the house power meter run backward, thereby offsetting energy that had to be purchased from the utility. Two inverters and the associated monitoring and control equipment necessary to carry out such a process are mounted on the wall of the house's garage.

FSEC will use this facility to investigate the many technical, economic and legal issues which must be resolved before photovoltaic-powered houses could become a commercial reality. Florida Power & Light Company is actively involved in this project, supplying manpower and equipment. The facility also has received valuable support from the MIT Lincoln Laboratories, the agency primarily responsible for implementing residential photovoltaic research in the country.

Present costs for a photovoltaic system such as the one on this house are still far beyond the reach of most homeowners. However, it is projected that within 10 years such a utility-interactive system will cost about $10,000 to $12,000 installed and would, over a 20-year period, be economically competitive with utility-supplied electricity.