

Thrust Area 4: Solar (Testing Facility)

Solar Systems Testing Facility

PIs: James Roland, David Block

Description: Over the past five years, the Florida Solar Energy Center (FSEC) has received a significant increase in demand for solar thermal and PV testing and certification. This occurrence has resulted in requiring the Center to correspondingly amplify its capabilities to respond to the increased demand. Thus, the objective of this task was to construct a solar thermal and PV systems testing facility. This facility was built by adding walls, windows, doors and air conditioning to an existing roof only facility at the FSEC site. This new facility provides laboratory space for testing of solar water heating components and systems and PV modules and inverters. At this time, the facility is completed and this is the final report for the project.

Budget: \$600,609

Universities: UCF/FSEC

Executive Summary

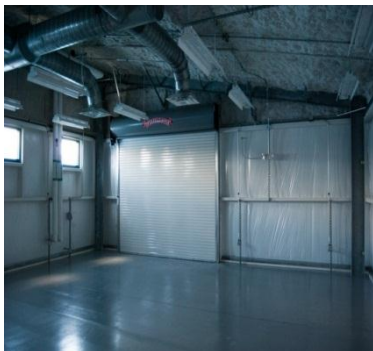
The building renovation has been completed and the new facility is now called the Solar Systems Testing Facility (Bldg. #1940). The following photographs show the facility before any renovations were begun (Figure 1) and the exterior and interior views after renovation (Figures 2 to 4). The action to enclose the existing roof facility was taken following a study which determined this action was the most cost effective means of adding valuable indoor laboratory space.



Figure 1: Ground Level Front View Completion



Figure 2: Exterior View After



Figures 3 and 4: Interior Views – Ready for Laboratory Installation

Within the new facility, two laboratories plus technician offices have been developed and construction is complete. Both of the laboratory development projects are part of the FESC program and are reported in greater detail under the following two projects:

1. Enhanced and Expanded Solar Thermal Testing Capabilities, PI: John DelMar, Joe Walters
2. Enhanced and Expanded PV Systems Testing Capabilities at FSEC, PI: Stephen Barkaszi

2011 Annual Report

Results

At this time, the facility is completed and this is the final report for the project. For information purposes, in 2005, the cost of the original 4,500 ft² roof only facility was \$165,947 or \$36.88 per sq. ft. FESC funds were used in 2009 to enclose and air condition giving a building cost of \$437,316 or \$116.62 per sq. ft. The entire roof structure building was not enclosed, only 3,750 ft². These values give a total building cost of \$603,263 or \$153.50 per sq. ft.

Background

The Florida Solar Energy Center (FSEC) is one of the nation's leading testing and certification organizations for solar products and equipment. The center's expertise is based on over 40 years' experience conducting accredited solar energy testing and certification programs. FSEC believes that independent, third-party testing and certification has extensive value in the marketplace, especially for products that are not widely "proven" with consumers such as solar water heating systems and solar electrical (photovoltaic) systems. Independent, third-party certification provides not only protection for consumers, but also much needed consumer confidence. Even more important, third-party certification provides protection to reputable manufacturers, ensuring that lower quality products, often from foreign markets, do not compete head-to-head with Florida and U.S. products unless they meet the same standards.

Due to the resurgence of the solar industry, FSEC has received a significant increase in demand for solar collector and solar system testing and certification. This occurrence has resulted in requiring the Center to correspondingly amplify its capabilities to respond to the increased demand.

Thus, the objective of this project was to add walls, windows, doors and air conditioning to an existing FSEC roof only facility for the purpose of increasing indoor and air-conditioned laboratory space and to allow for conducting tests on solar water heating systems and PV modules and inverters.

Existing Facility

In 2005, FSEC constructed a slab and roof only facility. The purpose of this facility was to allow for PV module and inverter testing and for hydrogen research. Due to the increase in testing and certification requirements, the need for conditioned laboratory space became a critical requirement. Thus, the most cost-effective program that could be done to add laboratory space was to design and construct an enclosure for the existing roof facility.

I. Solar Thermal Testing

FSEC's solar thermal systems laboratory has been moved from its previous location to the new lab and the required system mounting racks and storage tanks have been redesigned and are now in place for testing. The new system lab now operates more efficiently with regard to testing time and reporting of test results. The photo in Figure 5 shows the tank setup and storage tanks.



Figure 5: Solar Thermal Testing Lab

II. PV Systems Testing

The PV Systems Testing part of the facility conducts testing on PV inverters and has a new long pulse simulator manufactured by Spire Corporation. The photo in Figure 6 shows the Spire pulse simulator and Figure 7 shows the inverters testing.



Figure 6: PV Simulator



Figure 7: PV Inverter Testing

Industry Support:

This task is supported by testing fees received from the solar thermal and PV manufacturers who must have certification to sell their products in Florida and to qualify those products for various other state and federal incentives and rebates.

This project has been completed.