

FLORIDA SOLAR



ENERGY CENTER[®]

**SUNSENSE/SUNSMART PLUS UP
SCHOOLS PROGRAM**

**FINAL INSPECTION
REPORT**

FSEC-CR-2004-15

Submitted to:
Duke Energy

Submitted by:
Susan T. Schleith
University of Central Florida
Florida Solar Energy Center
1679 Clearlake Road
Cocoa, Florida 32922-5703

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1679 Clearlake Road, Cocoa, FL 32922-5703 • Phone: 321-638-1000 • Fax: 321-638-1010
www.fsec.ucf.edu



A Research Institute of the University of Central Florida

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1. Executive Summary

This report provides information regarding the photovoltaic systems that are associated with the 2014 SunSense/SunSmart School Plus-UP program. Dave Click led the project as Principal Investigator and technical expert. Susan Schleith, participated as Co-Principal Investigator and education/school liaison. Four schools participated in the program. Each of the photovoltaic systems installed at the schools was inspected by the University of Central Florida's Florida Solar Energy Center (FSEC), as well as the local authority having jurisdiction (AHJ). This report details the results of the final inspections associated with National Electric Code (NEC) and performance testing as required by the SunSense/SunSmart Schools Plus-UP program for each school. All schools satisfactorily passed final inspection. All deliverables associated with the program have been met. Documentation relating to permits, SunEye Report, Operation Manual and photos are provided on a separate CD as part of this report.

2. Introduction

FSEC visited ten schools as possible participants in the SunSense Schools program. These schools were selected for inclusion in the SunSense program through an application process conducted by Duke Energy. During the initial site visits, FSEC in coordination with the district and school facility managers identified the PV array location and key loads within the emergency shelter locations, as applicable to the program parameters. The ten schools visited were: Trenton Elementary in Gilchrist County, Forest High and Legacy Elementary in Marion County, Palm Harbor University High, Clearwater Fundamental Middle and Sawgrass Lake Elementary in Pinellas County, Hagerty High and Milwee Middle in Seminole County, and Timber Creek High and Castle Creek Elementary in Orange County.

Orange, Seminole and Marion County School districts did not provide signed school agreements for those schools within their districts that had applied. Therefore, those schools did not participate in the 2014 – 2015, program. Four schools participated in the 2014 SunSense Schools program. These included Clearwater Fundamental Middle, Palm Harbor University High, Sawgrass Lake Elementary within Pinellas County on the west central coast and Trenton Elementary in Gilchrist County in the north bend of Florida.

An Invitation to Bid (ITB) coordinated by the University of Central Florida (UCF) Purchasing office was used to select the companies subcontracted to complete the photovoltaic installations. The ITB was issued on September 5, 2014 with the bid opening on September 26, 2014. Constructive Resource Inc., dba AAA Solar Source was subcontracted to install the three photovoltaic systems in Pinellas County. Power Production Management (PPM) was subcontracted to install the PV system in Gilchrist County. As part of the PV installation, each school was also equipped with a data monitoring system.

In addition to the installation of the photovoltaic and data monitoring systems, each subcontractor was required to facilitate an instructive session on the operation and maintenance of the photovoltaic system for the facility manager in charge at each site. Each school was also given an operation and maintenance manual for the PV system. The information that follows includes photos, system description and inspection results for each school.

3. Clearwater Fundamental Middle School



Dave Click and/or Thomas Lancione of the Florida Solar Energy Center (FSEC) visited the Clearwater Fundamental Middle School installation a total of three times. The PV installation at Clearwater Fundamental Middle was inspected on April 20, 2015, when the acceptance test was performed. The 10 kW bi-modal PV system was installed by Constructive Resource Inc., dba AAA Solar Source, which is headquartered in Largo FL. This PV system with battery backup provides power to the Gymnasium and Locker Room area of the school during a grid power outage. A total of twelve fixtures and four outlets are on the new panel 'ES', with all devices identified with red labels.

System Description:

The site consists of two rows of 18 modules ground-mounted arrays with a total of 36 Solarworld 315 XL modules (11.34KW dc). The arrays are connected to three SMA Sunny Boy 3000 TL-US There are also 24 SunXtender PVX 6480T Deep Cycle Solar Batteries controlled by three SMA Sunny Island 6048 US inverters to provide backup power when the utility is lost.

Inspection:

No issues on this site.

4. Palm Harbor University High



Dave Click and/or Thomas Lancione of the Florida Solar Energy Center (FSEC) visited the Palm Harbor University High School installation a total of four times. The PV installation at Palm Harbor University High was inspected on April 16 2015, when the acceptance test was performed on their new 10 kW PV system, installed by Constructive Resource Inc., dba AAA Solar Source, headquartered in Largo FL. This is a bi-modal photovoltaic system which provides back-up power to Building 'E' Reading Room, and Restroom area of the school during a grid power outage. A total of eleven fixtures and four outlets are on the new panel 'ES', with all devices identified with red labels.

System Description:

The array consists of two rows of 18 modules ground-mounted array with a total of 36 Solarworld 315 XL modules (11.34KW dc). The arrays are connected to three SMA Sunny Boy 3000 TL-US. There are also 24 SunXtender PVX 6480T Deep Cycle Solar Batteries controlled by three SMA Sunny Island 6048 US inverters to provide backup power when the utility is lost.

Inspections:

- N.E.C. article 690.54 label displaying rating
- N.E.C. article 705.10 Map at main disconnect
- N.E.C. article 690.55 label at battery disconnect
- N.E.C. article 690.74 Finely Stranded lugs or crimps on battery disconnect

5. Sawgrass Lake Elementary



Personnel from the Florida Solar Energy Center (FSEC) visited the Sawgrass Lakes Elementary School installation a total of five times including the Teachers Workshop. The PV installation at Sawgrass Lakes Elementary was inspected on April 16 2015, when the acceptance test was performed on their new 10 kW PV system, installed by Constructive Resource Inc., dba AAA Solar Source, headquartered in Largo FL.

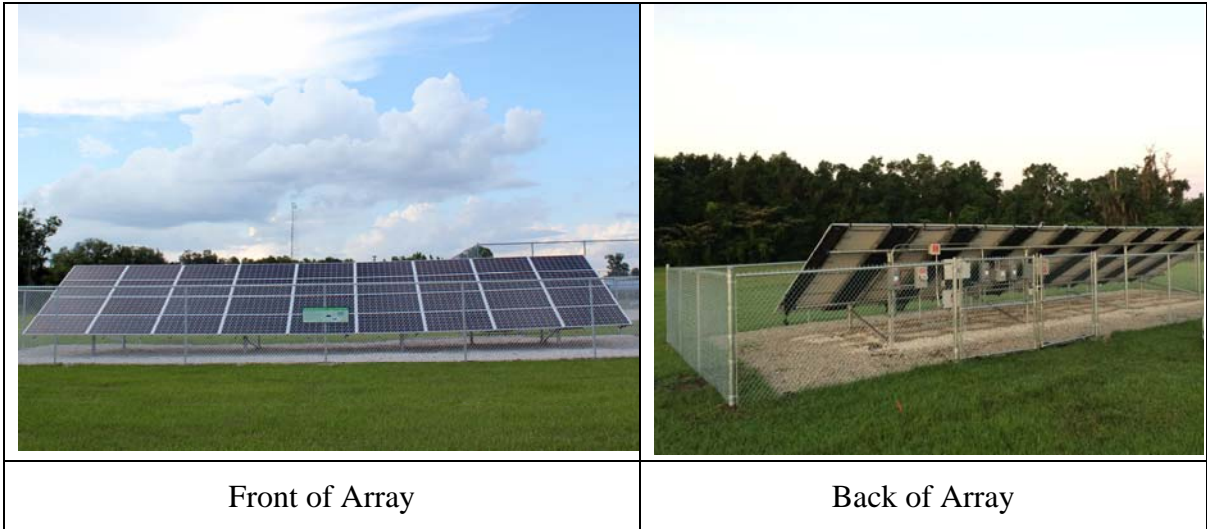
System Description:

The array consists of two rows of 18 modules ground-mounted split into two arrays with a total of 36 Solarworld 315 XL modules (11.34KW dc). The arrays are divided in to one array of 12 modules and the back array contains 24 modules. The arrays are connected to one SMA Sunny Boy 10000 TL-US via a Sunny Boy Combiner Box. This system is a grid tied system that provides power back into the school grid to reduce the schools utility power consumption.

Inspections:

- N.E.C. article 250 grounding terminations in pull boxes both the building outside of the electrical room and at the array.
- N.E.C. article 705.10 Map at main disconnect
- Install scrim to protect students from wires
- N.E.C. article 705.12 (D)(7) breaker labeling

6. Trenton Elementary



Dave Click and / or Thomas Lancione of the Florida Solar Energy Center (FSEC) visited the Trenton Elementary School installation a total of four times. The PV installation at Trenton Elementary was inspected on April 24 2015, when the acceptance test was performed on their new 10 kW PV system, installed by SENA TECH LLC., dba Power Production Management, Inc., headquartered in Gainesville, FL.

System Description:

The array consists of four rows of 9 modules ground-mounted array with a total of 36 Solarworld 285 modules (10.26KW dc). The arrays are connected to one SMA Sunny Tripower 12000 TL-US. This system is a grid tied system that provides power back into the school grid to reduce the schools utility power consumption.

Inspections:

Since F.S.E.C. assisted P.P.M. with this system's design and installation the issues that were identified during site visits, were resolved by the end of the project.

7. Conclusion

Due to a variety of factors the four photovoltaic systems and all associated deliverables were not completed until June 15, 2015. However the bulk of the hardware for the four PV systems was completed prior to the December 31, 2014 deadline.