

FLORIDA SOLAR



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# Hurricane Andrew Photovoltaic Traffic Control Relief Preliminary Report

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**Hurricane Andrew Photovoltaic Traffic Control Relief  
Preliminary Report**

**FSEC-CR-550-92**

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### Abstract:

On August 24, 1992 hurricane Andrew damaged and destroyed much of south Florida. The use of solar powered traffic devices in the aftermath was research and evaluated.

### Key Words:

Photovoltaic, solar power, traffic devices, transportation

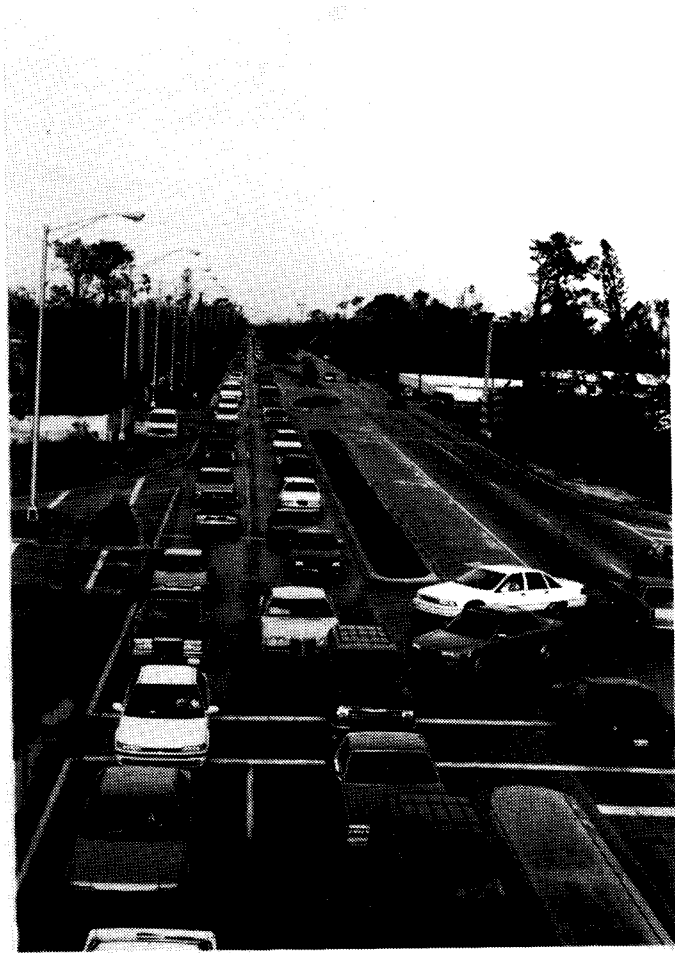
## 1.0 INTRODUCTION

The Florida Solar Energy Center (FSEC) in cooperation with the Florida Department of Transportation (FDOT) and funded by the Florida Energy Office (FEO) is implementing solar electric powered traffic devices in Florida. Many traffic devices presently found on our highways such as flashing lights, arrow boards, and guide signs can be solar electric (photovoltaic) powered.

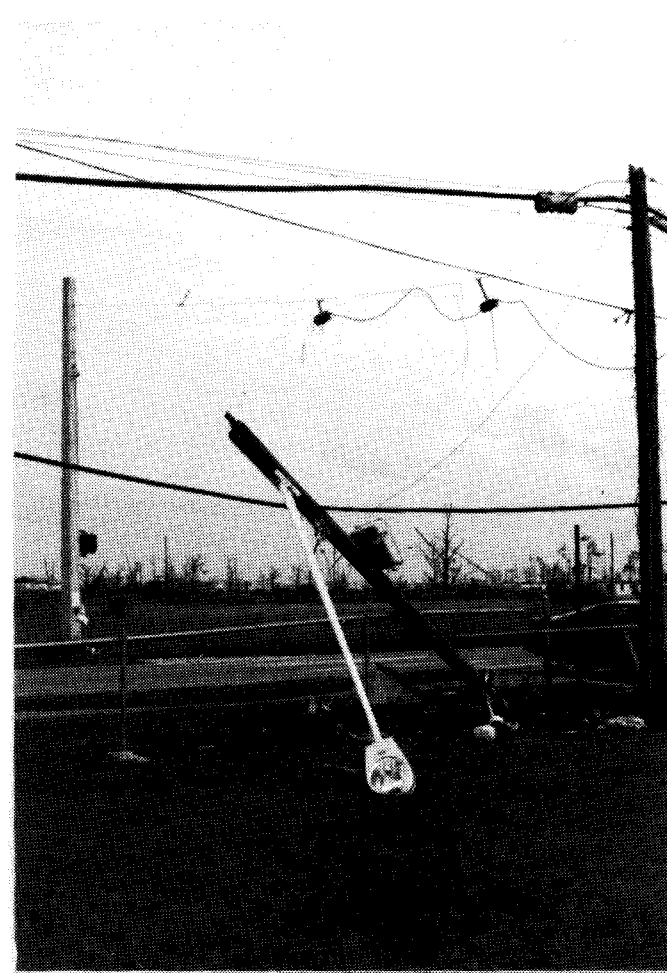
Hurricane Andrew destroyed much of the south Dade County area as shown in Figure 1. The storm destroyed buildings, structures, and vegetation, including traffic devices along the highway. Traveling was hazardous with debris in the roadway, traffic signals damaged or not working, and signs missing. Some of the devices were intact, but without power. This disaster offers a unique opportunity to research and evaluate the potential for using photovoltaic (PV) powered systems in emergency traffic control situations. An understanding of the hurricane damage to transportation devices provides information that can aid in future disaster relief efforts. An on-site survey was preformed and recommendations presented.



**Figure 1.** Illustration of Hurricane Damage.



**Figure 2.** Rush Hour Traffic.



**Figure 3.** School Crossing Signal and Street Light Damage Near Homestead.



**Figure 4.** The Poles are Standing, but the Signals are Missing at an Intersection in Miami.



**Figure 5.** An Intersection in Miami where Only One Signal Head Remains; a Soldier is Directing Traffic.



**Figure 6.** Traffic Buildup at an Intersection where Stop Signs are Installed.



**Figure 7.** Partially Repaired Traffic Lights that are Difficult to Understand.



**Figure 8.** A Volunteer Directing Traffic at an Intersection in Miami.

## **6.0 EQUIPMENT AVAILABILITY**

District 1 was approved by the Federal Emergency Management Agency (FEMA) for reimbursement of disaster relief efforts related to transportation. Therefore, Dade County made a formal request to FDOT for reimbursement of a PV powered portable traffic signal through FEMA. Ingrid Melody assisted in writing the request as shown in Appendix B.

An extensive search by Lisa Shepperd of FSEC was made of the manufacturers listed on the FSEC Photovoltaic Transportation Industry Directory. No PV powered portable traffic signals were available or manufactured at this time. Only two possible sources were found. Horizontal Signal of Pennsylvania and Electro Solar Products of Florida offered to design and construct the signals. All involved were expediting the process to obtain the systems as soon as possible.

Many discussions between FSEC, FDOT, DCTCC and FEMA were conducted to determine the design and purchase of the system. District 6 agreed to obtain a system through FEMA for their permanent use and FSEC agreed to obtain a system for this program. The two systems built by two different manufactures are to be evaluated together.



District 5 was selected to receive a PV powered portable traffic signal. District 5 traffic engineer, George Gilhooley, agreed to allow District 6 to use their system for six months in the Miami relief effort before they receive the system.

Specifications were determined and bids were obtained. The results of the bids are shown in Appendix C. Purchase orders are being processed and systems constructed for delivery as soon as possible. The systems are to be tested at sites in Miami before being issued temporary FDOT permits.

## **7.0 PV POWERED PORTABLE TRAFFIC SIGNAL**

The traffic signal is constructed as a stand-alone four-way portable emergency signal with 12 inch lens. The traffic signal and photovoltaic system are mounted on a trailer for portability. The trailer transports the system and is equipped with leveling jacks to steady the system and brackets to tilt the array. Signal and power controllers are mounted in waterproof containers. A battery system is provided for nighttime operation. The system is to operate 24 hours a day for 7 days a week. The system is to meet Manual on Uniform Traffic Control Devices (MUTCD), National Electrical Manufacturers Association (NEMA) and National Electrical Code (NEC) standards. A copy of the specification on the unit is found Appendix D.

## **8.0 EQUIPMENT SUPPLIED**

The systems are to be evaluated when received and permit process completed. They are to operate in the disaster area for six months, after which the Electro Solar Products system is to be sent to District 5.

## **9.0 CONCLUSION**

This disaster offered a unique opportunity to research and evaluate the potential for using photovoltaic (PV) powered systems in emergency traffic control situations. An understanding of the hurricane damage to transportation devices provided information that can aid in future disaster relief efforts. Conclusions will be determined after operation of the systems.