



Public Service Commission

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DATE: JULY 15, 1999

TO: DIRECTOR, DIVISION OF RECORDS AND REPORTING (BAYO)

FROM: DIVISION OF ELECTRIC AND GAS (COLSON, DEAN)
DIVISION OF LEGAL SERVICES (JAYE)

RE: DOCKET NO.990538-EI - ESTABLISHMENT OF ELECTRIC REQUIREMENTS FOR SMALL PHOTOVOLTAIC SYSTEMS (10 KW OR LESS) REQUESTING INTERCONNECTION AND PARALLEL OPERATION WITH AN INVESTOR-OWNED UTILITY.

AGENDA: 07/27/1999 - REGULAR AGENDA - PROPOSED AGENCY ACTION - INTERESTED PERSONS MAY PARTICIPATE

CRITICAL DATES: NONE

SPECIAL INSTRUCTIONS: NONE

FILE NAME AND LOCATION: S:\PSC\EAG\WP\990538.RCM

CASE BACKGROUND

On May 13, 1999, Florida Power Corporation (FPC) filed a letter asking that we approve a proposed agreement to interconnect (to its utility system) an array of solar photovoltaic (PV) panels. This array of panels is owned by the Disney Wilderness Preserve (Preserve). The panels will produce some of the energy for the Preserve that is now provided by FPC. These panels will provide a peak output of approximately 10 KW. The output of these panels is not expected to ever exceed the load of the Preserve.

The Preserve is not seeking "qualifying facility" (QF) status as defined under the 1978 Public Utilities Regulatory Policy Act (PURPA) and Rule 25-17.080, Florida Administrative Code. Therefore, the interconnection requirements contained in those rules for QFs are not applicable in this case. The

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interconnection agreement that FPC submitted differs from the current QF rules on two main points. First, the liability insurance that must be maintained pursuant to the interconnection agreement will be \$100,000 instead of \$1,000,000 that is called for in the QF rules. Secondly, this agreement provides that no payment will be made by FPC to the Preserve in the event that energy produced by the panels is delivered to FPC.

In the interconnection agreement FPC has developed the necessary safety and electrical requirements that are needed for interconnecting this specific small photovoltaic system to its system.

DISCUSSION OF ISSUES

ISSUE 1: Should the Commission approve the proposed Interconnection Agreement between Florida Power Corporation (FPC) and Disney Wilderness Preserve?

RECOMMENDATION: Yes. The Commission should grant the Request for Approval of an Interconnection Agreement Between Florida Power Corporation and Disney Wilderness Preserve.

STAFF ANALYSIS: This docket was opened to establish appropriate operating, safety, and insurance requirements for small photovoltaic systems (SPS) requesting interconnection and parallel operation with an investor-owned utility. These small usually rooftop mounted solar panels take sunlight and directly convert it to direct current (DC) electricity. Inverters change the DC current to normal household 60 cycle AC current which is then used to power the customers household load. While there are very few such systems operating in Florida, some Western states have seen an increasing number of these distributed systems appear in their service area. The reason an interconnection agreement is required is because there is the potential for electricity from the SPS to back-feed into the utility's distribution system.

This proposed agreement has been filed as an electric service standard. Therefore, staff believes that Sections 366.05(1) and 366.051, Florida Statutes, are applicable. Section 366.05(1), Florida Statutes, grants the Commission authority to prescribe the "service rules and regulations to be observed by each public utility." Section 366.051, Florida Statutes, grants the Commission authority to regulate the relationship between cogenerators, small

DATE: JUNE 24, 1999

power producers and investor-owned utilities. Staff believes that these statutory provisions grant the Commission the authority to approve and monitor the proposed agreement between FPC and Disney Wilderness Preserve.

Staff believes FPC's SPS interconnection request has addressed the key issues associated with interconnecting with the utility's system. First, FPC will require the facility to comply with soon to be adopted national safety codes specifically designed for this kind of equipment. Second, FPC has retained the right to inspect the facility and specify additional safety features such as an external disconnect switch be accessible to FPC's personnel. Third, FPC is not contracting to purchase power from this facility. In the unlikely event that the energy output from the solar panels exceeds the load of the Preserve, the customer's billing meter will literally spin backwards which creates a defacto credit to the customer. Future energy consumption will then spin the meter forward which offsets the credit. No payment will ever be made to the customer for any excess production and no billing or metering costs are being imposed on other ratepayers. This arrangement is referred to as net metering. Last, the appropriate assignment of responsibility and indemnification has been included in the agreement. With respect to the \$100,000 insurance agreement, this coverage level is acceptable to both parties and staff recommends it be viewed as a reasonable level.

It should be noted that under existing rules FPC is not required to interconnect with a SPS unless the SPS were to become certified as a QF facility. Therefore, FPC should be commended for voluntarily negotiating a more appropriate interconnection standard for this solar photovoltaic system. Given the Commission's continuing efforts to encourage the use of renewable energy resources, specifically solar, this action on the part of FPC will make it easier to utilize this emerging technology.

ISSUE 2: Should this docket be closed?

RECOMMENDATION: No. This docket should remain open so that the staff can continue its investigation into developing appropriate interconnection standards for SPS systems for the investor owned utilities in Florida.

DOCKET NO. 9900538 M
DATE: JUNE 24, 1999

STAFF ANALYSIS: FPC has established electric requirements for this single SPS requesting interconnection with its electrical system. Staff believes that these requirements could be appropriate for use by all the utilities. Therefore, staff recommends that the Commission keep this docket open to investigate and, if appropriate, recommend mandatory interconnection standards for these kinds of small PV systems for all the investor owned utilities.



May 12, 1999

Mr. Joe Jenkins
Florida Public Service Commission
Capital Circle Office Center
2540 Shumard Oak Blvd.
Tallahassee, FL 32399-0850

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SERVICE COMMISSION
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Dear Mr. Jenkins,

Attached is an interconnection agreement that Florida Power Corporation is proposing to use with the Disney Wilderness Preserve. The Disney Wilderness Preserve is owned and managed by the Nature Conservancy and is located near Poinciana. The Nature Conservancy is building a Gateway Center that as a place to greet and educate visitors to the Disney Wilderness Preserve. The design of the Gateway Center emphasizes energy efficiency, reused and recycled materials and green technology. As a part of this green technology, the Gateway Center will utilize photovoltaic panels to provide part of their energy needs.

The attached interconnection agreement differs from the current QF rules on two main points. First, this agreement calls for \$100,000 in liability insurance to be maintained by the Nature Conservancy. As you may recall, the QF rules currently call for \$1,000,000 in liability insurance. Secondly, this agreement provides that no payments will be made to the Nature Conservancy in the event that energy is delivered to Florida Power Corporation. The Nature Conservancy agreed to this provision because they do not expect the generation from their photovoltaic cells to ever exceed their load.

Please review the attached interconnection agreement and let me know if you have any concerns with the terms and conditions of this agreement. Florida Power Corporation will assume that this agreement meets with your approval if we have not heard back from you before May 31, 1999.

Thank you for your assistance in this matter. If you have any questions, please call me at (727) 826-4397

Sincerely,

A handwritten signature in cursive script, appearing to read "David Gammon".

David Gammon
Manager, Purchased Power Resources

Cc: J. A. McGee

**AN AGREEMENT BETWEEN
FLORIDA POWER CORPORATION AND THE PHOTOVOLTAIC SYSTEM OWNER OR END USER
FOR
INTERCONNECTING SMALL PHOTOVOLTAIC SYSTEMS TO THE ELECTRIC UTILITY GRID**

A. Definitions

1. A small photovoltaic (PV) system is a solar electric generator with an array rating of 10 kWp or less under standard test conditions (STC) of 1000 watts/m² solar irradiance, 25°C cell temperature, air mass 1.5, and ASTM standard solar spectrum.
2. An inverter, also referred to as a power conditioner, is a dc to ac conversion device that converts PV energy to ac energy for utility interconnection. The inverter contains many control functions, such as voltage and frequency monitoring and protection against islanding.

B. Mandatory Requirements: Standards and Codes

1. Inverter(s). The inverter(s) must be listed and in compliance with *Underwriters Laboratories (UL) 1741, Standard for Static Inverters and Charge Controllers for Use in Photovoltaic Systems*.
2. Photovoltaic Modules and Panels
 - a. Photovoltaic modules and panels must be listed and be in compliance with *Underwriters Laboratories (UL) Standard 1703, Standard for Safety: Flat-Plate Photovoltaic Modules and Panels*.
 - b. Photovoltaic modules must be in compliance with *IEEE Standard 1262-1995, IEEE Recommended Practice for Qualification of Photovoltaic (PV) Modules*.
3. System Installation. The installed system must be in compliance with:
 - a. *IEEE 929, Recommended Practice for Utility Interface of Photovoltaic Systems*.
 - b. All relevant articles of the *1999 National Electrical Code®* (or subsequent revisions).

C. Alternatives and Exceptions

1. **Inspection and Approval.** Prior to operation, FPC may elect to inspect the photovoltaic system installation to ensure compliance with the standards and codes noted in the previous sections. FPC agrees to provide written approval of the interconnection if the system is in compliance (using the *Application and Compliance Form*) within ten working days following the request for inspection and approval. Parallel operation of the photovoltaic system with the grid shall not begin without the approval of the utility.

2. **Extreme Conditions.** FPC reserves the right to refuse to accept electric power from the photovoltaic system under extreme conditions as described below. If FPC chooses to exercise this right, which may involve physically disconnecting from the photovoltaic system, it agrees to notify the system owner or end user when such conditions exist or are anticipated if possible, and to reconnect when the adverse conditions no longer exist. Extreme conditions are conditions that impact FPC's ability to deliver electricity to its customers, and are not unique to the operation of photovoltaic systems. Examples of conditions that may lead to disconnection include:
 - a. utility system emergencies and/or maintenance requirements
 - b. hazardous conditions existing on the photovoltaic system premises that may adversely affect other FPC customers
 - c. failure of the photovoltaic system owner or end user to comply with regulations, rules, orders or decisions of any government or regulatory authority having jurisdiction over the generating equipment or operation.
3. **External Disconnect Switch.** FPC requires the installation of a manual, lockable, load break utility-interface disconnect switch that is both visible and accessible to FPC workers.
4. **Insurance.** FPC requires the photovoltaic system owner or end user to provide proof of and to maintain at all times a general liability insurance policy for personal and property damage in the amount of at least \$100,000. A standard homeowners policy meets this requirement.

D. Metering and Billing

It is expected that all of the electrical energy generated by this photovoltaic system will be used at the premises of this photovoltaic system. Therefore, it is not expected that any excess electrical energy will be generated. If, during any billing-period, the energy produced by the photovoltaic system exceeds the energy consumed on the premises of the photovoltaic system, FPC will not be liable to the photovoltaic system owner or end user, in any way, for this excess energy.

E. Responsibility and Indemnification

1. **Equipment and Facilities.** FPC and the photovoltaic system owner or end user shall each be responsible for its own equipment and facilities. Each shall be responsible for ensuring adequate safeguards for other FPC customers, FPC equipment and personnel, photovoltaic system equipment and personnel, and for the protection of its own generating capability.
2. **Indemnification.** FPC and the photovoltaic system owner or end user shall indemnify each other for any and all claims, demands, costs, or expense for loss, damage, or injury to persons or property of the other caused by, arising out of, or resulting from the following conditions:
 - a. any act or omission by FPC or the photovoltaic system owner/end user or their contractors, agents, servants or employees in connection with the installation or operation of either party's generation or distribution equipment.
 - b. any defect in, failure of, or fault related to FPC's or the photovoltaic generation or distribution equipment.

- c. negligence by FPC photovoltaic system owner/end user or either party's contractors, agents, servants or employees.
 - d. any other event or act that is the result of, or proximately caused by FPC or photovoltaic system owner/end user.
3. **Photovoltaic System Equipment Protection.** It is the responsibility of the photovoltaic system owner or end user to protect its generating equipment, inverters, protection devices, and other system components from damage by the normal conditions and operations that occur on the part of FPC in delivering and restoring system power.

Interconnection Agreement

We the undersigned, agree to abide by all requirements, terms and conditions as stated in this document.

Authorized Florida Power Corporation Representative

Name (Type or Print): _____

Signature: _____ Date: _____

Photovoltaic System Owner or End User

Name (Type or Print): _____

Signature: _____ Date: _____

Witness

Name (Type or Print): _____

Signature: _____ Date: _____

**INTERCONNECTING A SMALL PHOTOVOLTAIC SYSTEM TO FLORIDA POWER CORPORATION'S GRID
APPLICATION AND COMPLIANCE FORM**

Docket No. 990538-EI
7/15/99

A. Applicant Information

Name: _____
 Mailing Address: _____
 City: _____, FL Zip Code: _____
 Street Address (if different from above): _____
 Daytime Phone: _____ Fax: _____ Email: _____
 Electric Utility Name: _____ Account No.: _____

B. Photovoltaic System Information

System Name/Model: _____ Array DC Power at STC _____ watts
 List Manufacturer/Model for:
 Modules: _____ Inverter: _____ Batteries (if applicable): _____
 Array Location: _____ Inverter Location: _____
 AC Disconnect Location: _____ Permission to Monitor? Yes No

C. Installation Contractor Information

Installation Contractor: _____, FL License No.: _____
 Address: _____
 City: _____, FL Zip Code: _____
 Daytime Phone: _____ Fax: _____ Email: _____
 Proposed Installation Date: _____

D. Hardware and Installation Compliance

1. The system hardware is in compliance with *Underwriters Laboratories (UL) 1741, Standard for Static Inverters and Charge Controllers for Use in Photovoltaic Systems and UL 1703, Standard for Safety: Flat-Plate Photovoltaic Modules and Panels*, and *IEEE 1262-1995, IEEE Recommended Practice for Qualification of Photovoltaic (PV) Modules*.
2. The system has been installed in compliance with *IEEE Standard 929, Recommended Practice for Utility Interface of Photovoltaic Systems* and the *1999 National Electrical Code® (NEC)*.

Signed (Contractor): _____ Date: _____
 Name (Print): _____ Company: _____

E. Owner Acknowledgment

The system has been installed to my satisfaction and I have been given system warranty information, and an operation manual. Also, I have been instructed in the operation of the system.

Signed (Owner): _____ Date: _____

F. Electrical Code Inspection

Satisfies Code Requirements
 Inspector Name (Print): _____
 Inspector Signature: _____ Date: _____

G. Florida Power Corporation Approval

Satisfies Utility Interconnection Requirements
 Utility Representative Name (Print): _____
 Utility Representative Signature: _____ Date: _____