



Making Solar Energy Easy!

Net Metering & Interconnection Standards

Best Practices

September 2012





Table of Contents

Introduction 5

State of Florida Renewable Energy Regulations 7

Broward County Public Utilities – Florida Power & Light 8

Broward County Net Metering & Interconnection Standards – Best Practices 10

Definitions.....10

Interconnection Standards & Best Practices.....12

Net Metering Standards & Best Practices.....20

Case Study: Practices from Other States.....24

Massachusetts.....24

Sacramento, CA.....24

Philadelphia, PA.....25

Conclusion.....26

References.....27

Acknowledgements

This report was prepared by a team of staff from the Broward County - Pollution Prevention, Remediation and Air Quality Division.

Jeffery Halsey, Director - Pollution Prevention, Remediation and Air Quality Division

Maribel Feliciano, Section Supervisor - Pollution Prevention, Remediation and Air Quality Division

Josefina Cisneros, Natural Resource Specialist II - Pollution Prevention, Remediation and Air Quality Division

Sean Sammon, Air Quality Program Intern - Pollution Prevention, Remediation and Air Quality Division

Tamara Pino, Air Quality Program Intern – Pollution Prevention, Remediation and Air Quality Division

Disclaimer

“This report was prepared as an account of work sponsored by the United States Department of Energy. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.”

Go SOLAR Grant Requirements

The Go SOLAR Broward Rooftop Solar Challenge Statement of Project Objectives (SOPO) included the following objective:

Objective 1: Develop and make available best practices for streamlining and standardizing permitting and interconnection processes.

This document is presented in fulfillment of **Sub-Task 3.1: Net Metering and Interconnection Standards** Develop and make available best practices regarding net metering and interconnection standards.

Introduction

On April 10, 2012 Broward County launched the Go SOLAR Broward Rooftop Solar Challenge. This program makes Broward County one of the top leaders nationwide in the implementation of permitting improvements for solar rooftop projects and solar energy promotion. The Go SOLAR Broward Rooftop Solar Challenge is a grant-funded program received from the U.S. Department of Energy. This grant was established to expand and promote solar energy use by focusing on four key areas related to solar photovoltaic (PV) system installation. The four key areas of the grant are: streamlining the permitting and interconnection process; PV system financing options; solar rights and zoning; and education and outreach. Broward County was the only agency in the Southeastern United States to be awarded this solar grant. Since program inception, 14 Broward County cities and/or municipalities have partnered with Broward County in the implementation aspects of the four key focus areas of the grant. To be more specific, Broward County has taken-on the tasks of: developing a streamlined on-line permitting process for PV system installation applications that is available 24-7, identifying and eliminating city and/or municipal restrictive zoning barriers hindering PV system installation; exploring ways to improve financing options for customers wishing to install PV systems; and educating the community about the economic and environmental benefits of using solar power.

One other specific grant objective is to research, develop, and make available best practices regarding net metering and interconnection standards for renewable energy generation systems. Net Metering and Interconnection are programs governed by Florida Statutes and Florida Administrative Code which require electric utility companies to allow customers to interconnect approved renewable generation systems (such as solar PV systems) to an electric grid, in order to power homes and businesses. Approved and installed solar PV systems promote the use of solar energy, provide electricity to residences and/or businesses while minimizing the amount of energy that would otherwise be purchased from an electric utility. In order to utilize and take advantage of electricity generated from PV systems, home and business owners (customers) are required to enter into an agreement for interconnection with their local utility company. It is the requirement of an interconnection agreement (between customers and an electric utility), and the process of setting up a special renewable generation system metering service, that establishes the basis and need for developing “best practices” regarding the net metering and interconnection process.

This report complies with establishing Broward County’s Best Practices for Net Metering and Interconnection based on standards promulgated by Florida Statutes and Florida Administrative Code. In order to establish these best practices, Broward County relied heavily on guidance documents created by the Interstate Renewable Energy Council (IREC) on Net Metering and Interconnection Procedures. IREC is

the leading agency that provides services and resources to many governing bodies, facilitating the development of interconnection procedures and net metering rules for renewable energy systems, and other forms of distributed energy generation throughout the U.S. To date, IREC is the model agency by which many states obtain assistance in establishing programs and policies that lead to easier, more affordable connection to utility grids.

This report will first explain State of Florida regulations related to renewable energy systems; followed by net metering and interconnection-specific regulations; followed by Broward County net metering and interconnection public utility programs; and finally, propose Broward County's best practices for net metering and interconnection standards. It is Broward County's intent that this report be used by Florida government agencies and their staff, Florida electric utility companies, homeowners, small business, the general public, and any other governing body in the state of Florida, as a resource from which to obtain guidance, information, and procedures on how to best comply with Net Metering and Interconnection processes of solar energy generation and utilization, specifically solar rooftop PV installations.

State of Florida Renewable Energy Regulations

Net Metering and Interconnection are programs governed by Florida Statutes and Florida Administrative Code. Section 366.91, of the Florida Statutes (F.S.), states that it is in the public interest to promote the development of renewable energy sources in the state of Florida.^[1] Section 366.91, F.S. also states that it is the responsibility of each public utility to develop a standardized interconnection agreement and net metering program for customer-owned renewable energy generation. To this end, the Florida Public Service Commission adopted Rule 25-6.065 of the Florida Administrative Code (F.A.C.), termed “Interconnection and Net Metering of Customer-Owned Renewable Generation,” and made the rule effective April 7, 2008. The purpose of Rule 25-6.065, F.A.C., is to promote the development of small, customer-owned, renewable energy generation systems, (particularly solar and wind energy systems); diversify the types of fuels used to generate electricity in Florida; lessen Florida’s dependence on fossil fuels for the production of electricity; minimize the volatility of fuel costs; encourage investment in the state; improve environmental conditions; and minimize costs of power supply to investor-owned utilities and their customers.^[2] The rule not only defines net metering, but also sets forth rules regarding the type and content of standard interconnection agreements, customer qualifications, fees, administrative and reporting requirements, requirements for disconnection-switch components, overall net metering policies, and renewable energy certificates. For purposes of this report it is important to note the definition of Net Metering as per Rule 25-6.065, F.A.C.:

(c) “Net metering” means a metering and billing methodology whereby customer-owned renewable generation is allowed to offset the customer's electricity consumption on-site.

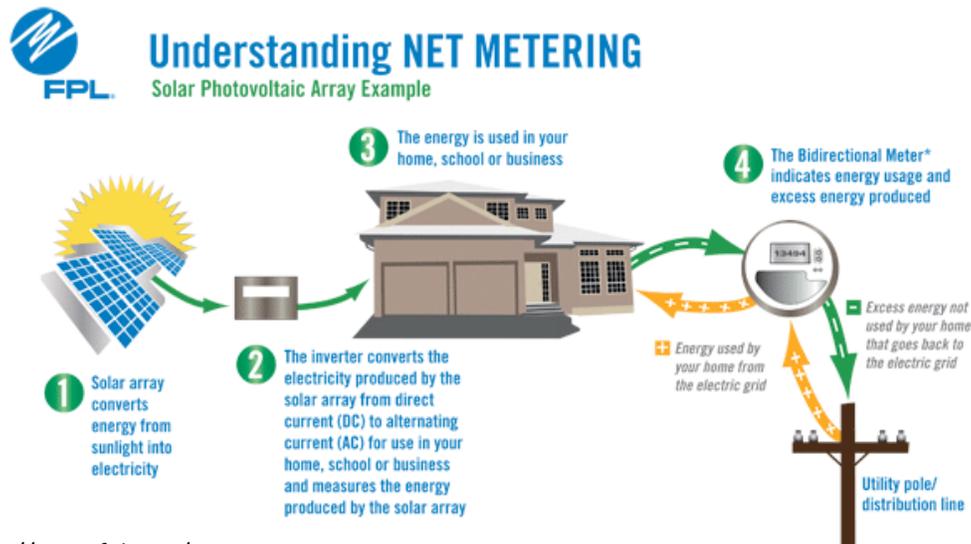
Net Metering and Interconnection allow customers to avoid purchasing energy from an electric utility company by offsetting all or part of a customer's energy use at the customer’s metered service. In order to be able to take advantage of utilizing any renewable energy to power homes and small business, Broward County customers must first establish what is called an Interconnection Agreement. An interconnection agreement is an agreement between the customer and a public utility company which allows the customer to interconnect a renewable energy source to an electrical grid, via internal wiring. An interconnection agreement is the first step of the Net Metering and Interconnection Program. Both Net Metering and Interconnection are programs handled by public utilities, but governed by Florida Statutes and State of Florida renewable energy regulations.

Broward County Public Utilities – Florida Power & Light

In Broward County, the public utility that provides power to Broward County residents and businesses is Florida Power & Light (FPL). As a result of Rule 366.91, F.S. and Rule 25-6.065, F.A.C, FPL has established an Interconnection Agreement and Net Metering Program for customers who are interested in utilizing alternative renewable energy to power their homes and business. The goal of FPL's Net Metering and Interconnection Program is to offset all or part of a customer's energy use at the customer's metered service account. Before FPL can install a net metering system at a customer's home or business, a customer must submit an Application for Interconnection, and a signed Interconnection Agreement (both provided by FPL). Once construction is completed, FPL requires that the system be inspected by the customers' local building authority and a permit be issued. After submission of copies of the inspection and permit, FPL installs a specific meter called a bidirectional meter. This process entails "Net Metering and Interconnection" of a renewable energy generation system.

FPL's bidirectional meter measures both the quantity and direction of electricity flow to and from a customer's renewable energy generation system. When the renewable energy generation system is making more electricity than what is being used at the customer's home or business, the excess electricity is recorded by the meter as it flows back into the FPL grid. The kilowatt-hour (kWh) remaining (for future use), is the amount of electricity the renewable energy generation system has made to-date in that current year, in excess of the amount of electricity received from FPL. If electricity is used in excess of what the renewable energy generation system is making, the supplemental energy received from FPL is recorded as it flows into the home or business. Refer to Figure 1 for an FPL example illustration of Net Metering for a solar PV system.^[3]

Figure 1. Florida Power & Light – How Net Metering Works*



*<http://www.fpl.com/netmetering>

With FPL's Net Metering Program, when a customer's renewable energy system produces excess energy (less than that supplied by FPL), that amount of energy is subtracted from the customer's monthly electricity use before billing. If a customer produces more electricity than they receive, the excess amount is applied to the customer's next month's electric bill. At the end of each calendar year, any kWh of energy remaining in the customer's "bank" is credited to the customer's account at the annual average cost of generation. For more information on FPL's Net Metering Program, please visit:

<http://www.fpl.com/netmetering>.

Broward County Net Metering & Interconnection Standards – Best Practices

The section establishes Broward County’s Best Practices for Net Metering and Interconnection. These best practices are modeled after IREC’s, Interconnection Procedures and Net Metering Model Rules. ^{[4],[5]} It is important to state that although the best practice standards presented here are modeled after IREC’s guidance documents, within Florida, precedence is given to the State of Florida Net Metering and Interconnection Standards in Section 366.91, F.S. and Rule 25-6.065, F.A.C.

Broward County Net Metering & Interconnection Standards – Best Practices

(A) Definitions:

1. Applicant - means a person or entity that has filed an application to interconnect a Renewable Energy Generating Facility to an Electric Delivery System. For a Renewable Energy Generating Facility that will offset part or the entire load of a Utility customer, the Applicant is that customer, regardless of whether the customer owns the Renewable Energy Generating Facility or a third party owns the Renewable Energy Generating Facility. For a Renewable Energy Generating Facility selling electric power to a Utility, the owner of the Renewable Energy Generating Facility is the Applicant.
2. Area Network - means a section of an Electric Delivery System served by multiple transformers interconnected in an electrical network circuit generally used in large, densely populated metropolitan areas in order to provide high reliability of service, and having the same definition as the term “secondary grid network” as defined in IEEE Standard 1547.
3. Biomass - means a power source that is comprised of, but not limited to, combustible residues or gases from forest products manufacturing, waste, byproducts, or products from agricultural and orchard crops, waste or co-products from livestock and poultry operations, waste or byproducts from food processing, urban wood waste, municipal liquid waste treatment operations, and landfill gas.
4. Certified - has the meaning provided in Section C of these procedures, regarding IEEE and UL standards applicable to Renewable Energy Generating Facility components.
5. Commission - means the Florida Public Service Commission.
6. Customer-generator - means any customer of an Electricity Provider that generates Electricity on the customer’s side of the billing meter with Renewable Energy Generation that is primarily intended to offset part or all of the customer’s electricity requirements. A Customer-generator does not need to be the owner of the Renewable Energy Generation system.
7. Electric Delivery System - means the equipment operated and maintained by a Utility to deliver electric service to end-users, including without limitation transmission and distribution lines, substations, transformers, Spot Networks and Area Networks.
8. Electricity Provider - means the jurisdictional entity that is required to offer Net Metering service to eligible Customer-generators.

9. Fault Current - means electrical current that flows through a circuit and is produced by an electrical fault, such as to ground, double-phase to ground, three-phase to ground, phase-to-phase, and three-phase. A Fault Current is several times larger in magnitude than the current that normally flows through a circuit.
10. Force Majeure Event - means any event: (a) that is beyond the reasonable control of the affected party; and (b) that the affected party is unable to prevent or provide against by exercising reasonable diligence, including: acts of war, public disorder, insurrection, or rebellion; floods, hurricanes, earthquakes, lightning, storms, and other natural calamities; explosions or fires; strikes, work stoppages, or labor disputes; embargoes; and sabotage.
11. Generating Capacity - means the rated capacity of a Renewable Energy Generating Facility in alternating current. For an inverter-based Renewable Energy Generating Facility, the Generating Capacity is the rated capacity of the inverter.
12. IEEE - means the Institute of Electrical and Electronic Engineers.
14. IEEE Standards - means the standards published by the Institute of Electrical and Electronic Engineers, available at www.ieee.org.
15. Interconnection Agreement - means a standard form agreement between an Interconnection Customer and a Utility governing the interconnection of a Renewable Energy Generating Facility to a Utility's Electric Delivery System, as well as the ongoing operation of the Renewable Energy Generating Facility after it is interconnected.
16. Interconnection Customer - means an Applicant that has entered into an Interconnection Agreement with a Utility to interconnect a Renewable Energy Generating Facility and has interconnected that Renewable Energy Generating Facility.
17. Interconnection Equipment Package - means a group of components connecting an electric generator with an Electric Delivery System, and includes all interface equipment including switchgear, inverters or other interface devices. An Interconnection Equipment Package may include an integrated generator or electric source.¹
18. Interconnection Procedures - means these procedures including attachments.
19. Minor System Modifications - means modifications to a Utility's Electric Delivery System, including activities such as changing the fuse in a fuse holder cut-out, changing the settings on a circuit recloser, and other activities that usually entail less than four hours of work and \$1000 in materials.
20. Net Metering - means a methodology under which electric energy generated by or on behalf of a Customer-generator and delivered to the Electricity Provider's local distribution facilities may

¹ The most common Interconnection Equipment Package is an inverter. However, a solar array and an inverter can be bundled as a complete Interconnection Equipment Package. In that case, the Renewable Energy Generating Facility would simply be the Interconnection Equipment Package.

be used to offset electric energy provided by the Electricity Provider to the Customer-generator during the applicable billing period.

21. Parties - means the Applicant and the Utility in a particular Interconnection Agreement. “Either Party” refers to either the Applicant or the Utility.
22. Point of Common Coupling - means the point in the interconnection of a Renewable Energy Generating Facility with an Electric Delivery System at which the harmonic limits are applied and shall have the same meaning as in IEEE Standard 1547.
23. Renewable Energy Credit - means a tradable instrument that includes all renewable and environmental attributes associated with the production of electricity from a Renewable Energy Generation system.
24. Renewable Energy - means biomass, solar energy, geothermal energy, wind energy, ocean energy, hydroelectric power, or hydrogen produced from any of these resources.
24. Renewable Energy Generating Facility - means the equipment used by an Interconnection Customer to generate, store, manage, interconnect and monitor electricity generated from a renewable energy source. A Renewable Energy Generating Facility includes the Interconnection Equipment Package.
24. Renewable Energy Generation - means an electrical energy generation system that uses one or more of the following Renewable Energies: biomass, solar energy, geothermal energy, wind energy, ocean energy, hydroelectric power, or hydrogen produced from any of these resources.
25. Spot Network - means a section of an Electric Delivery System that uses two or more inter-tied transformers to supply an electrical network circuit. A Spot Network is generally used to supply power to a single Utility customer or to a small group of Utility customers, and has the same meaning as the term is used in IEEE Standard 1547.
26. UL - means Underwriters Laboratories, which has established standards available at <http://ulstandardsinonet.ul.com/> that relate to components of Renewable Energy Generating Facilities.
27. Utility - means an operator of an Electric Delivery System.²

(B) Interconnection Standards & Best Practices:

1.0 General Provisions

- 1.1 The Applicant of an interconnection agreement is responsible for construction of the Renewable Energy Generating Facility and obtaining any necessary local code official approval (building, electrical, zoning, etc.).
- 1.2 The Applicant shall conduct a commissioning test pursuant to IEEE Standard 1547, IEEE 1547.1, and UL 1741, and comply with all manufacturer requirements.

² “Utility” is meant to include all investor-owned and public utilities, including cooperatives, municipal utilities and public utility districts.

- 1.3 To assist Applicants in the interconnection process, a Utility shall designate an employee or office from which basic information on interconnections can be obtained. Upon request, a Utility shall provide interested Applicants with all relevant forms, documents and technical requirements for filing a complete application. Upon an Applicant's request, a Utility shall meet with an Applicant at the Utility's offices or by telephone prior to submission for up to at least two hours.
- 1.4 A Utility shall not require an Applicant to install additional controls (other than a utility accessible disconnect switch for non-inverter-based Renewable Energy Generating Facilities), or to perform or pay for additional tests to obtain approval to interconnect.
- 1.5 A Utility may only require an Applicant to purchase insurance covering Utility damages, and then only in the following amounts:
- 1.5.1 For non-inverter-based Renewable Energy Generating Facilities:
- | | |
|--------------------------------------|--------------|
| Generating Capacity > 5 MW | \$3,000,000 |
| 2 MW < Generating Capacity ≤ 5 MW | \$2,000,000 |
| 500 kW < Generating Capacity ≤ 2 MW | \$1,000,000 |
| 50 kW < Generating Capacity ≤ 500 kW | \$500,000 |
| Generating Capacity ≤ 50 kW | No Insurance |
- 1.5.2 For inverter-based Renewable Energy Generating Facilities:
- | | |
|-----------------------------------|--------------|
| Generating Capacity > 5 MW | \$2,000,000 |
| 1 MW < Generating Capacity ≤ 5 MW | \$1,000,000 |
| Generating Capacity ≤ 1 MW | No Insurance |
- 1.6 Additional protection equipment not included with the Interconnection Equipment Package may be required at a Utility's discretion as long as the performance of an Applicant's Renewable Energy Generating Facility is not negatively impacted and the Applicant is not charged for any equipment that provides protection that is already provided by interconnection equipment Certified in accordance with IEEE and UL standards.
- 1.7 Metering and monitoring shall be as set forth in the Utility's tariff for sale or exchange of energy, capacity, or other ancillary services.
- 1.8 Once an interconnection has been approved, a Utility shall not require an Interconnection Customer to test its Renewable Energy Generating Facility except that the Utility may require any manufacturer-recommended testing.
- 1.9 A Utility shall have the right to inspect an Interconnection Customer's Renewable Energy Generating Facility before and after interconnection approval is granted, at reasonable hours and with reasonable prior notice provided to the Interconnection Customer. If the Utility discovers an Interconnection Customer's Renewable Energy Generating Facility is not in compliance with the requirements of IEEE Standard 1547, 1547.1, and UL 1741, and the non-compliance adversely affects the safety or reliability of the electric system, the Utility may require disconnection of the Interconnection Customer's Renewable Energy Generating

Facility until the Renewable Energy Generating Facility complies with IEEE Standard 1547, 1547.1, and UL 1741.

- 1.10 The Interconnection Customer may disconnect the Renewable Energy Generating Facility at any time without notice to the Utility and may terminate the Interconnection Agreement at any time with one day's notice to the Utility.
- 1.11 An Applicant may designate a representative to process an application on the Applicant's behalf, and an Interconnection Customer may designate a representative to meet some or all of the Interconnection Customer's responsibilities under the Interconnection Agreement.³

2.0 Scope and Responsibility

Responsible parties shall perform all obligations of an Interconnection Agreement in accordance with all applicable laws and regulations, and operating requirements.

- 2.1 The Interconnection Customer shall arrange for the construction, interconnection, operation, and maintenance of the Renewable Energy Generating Facility in accordance with the applicable manufacturer's recommended operation and maintenance schedule.
- 2.2 The Interconnection Customer shall be responsible for its share of all reasonable expenses, including overheads, associated with (1) owning, operating, maintaining, repairing, and replacing its Interconnection Equipment Package, and (2) operating, maintaining, repairing, and replacing the Utility's Interconnection Facilities as set forth in any exhibits to this Agreement.
- 2.3 The Utility shall construct, own, operate, and maintain its Electric Delivery System and its facilities for interconnection ("Interconnection Facilities") in accordance with all applicable laws and regulations, and operating requirements.
- 2.4 The Interconnection Customer agrees to arrange for the construction of the Renewable Energy Generating Facility or systems in accordance with applicable specifications that meet or exceed the National Electrical Code, the American National Standards Institute, IEEE, Underwriters Laboratories, and any operating requirements.
- 2.5 Each Party shall operate, maintain, repair, and inspect, and shall be fully responsible for the facilities that it now or subsequently may own and shall do so in a manner so as to reasonably minimize the likelihood of a disturbance adversely affecting or impairing the other Party.
- 2.6 Each Party shall be responsible for the safe installation, maintenance, repair, and condition of their respective lines and appurtenances on their respective sides of the Point of Common Coupling.

³ In the most common case, a residential customer may designate an installer as the representative.

3.0 Applicable Electrical Standards

Unless waived by the Utility, a Renewable Energy Generating Facility must comply with the following standards, as applicable:

- 3.1 IEEE Standard 1547 for Interconnecting Distributed Resources with Electric Power Systems for Renewable Energy Generating Facilities up to 10 MW in size;
- 3.2 IEEE Standard 1547.1 for Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems; and
- 3.3 UL 1741 Standard for Inverters, Converters and Controllers for Use in Independent Power Systems. UL 1741 compliance must be recognized or Certified by a Nationally Recognized Testing Laboratory as designated by the U.S. Occupational Safety and Health Administration. Certification of a particular model or a specific piece of equipment is sufficient. It is also sufficient for an inverter built into a Renewable Energy Generating Facility to be recognized as being UL 1741 compliant by a Nationally Recognized Testing Laboratory.

4.0 Construction of the Renewable Energy Generating Facility

After the Utility executes an Interconnection Agreement with an Applicant, the applicant may construct the Renewable Energy Generating Facility, including interconnected operational testing, not to exceed two hours.

5.0 Interconnection and Operation

The Applicant may operate the Renewable Energy Generating Facility and interconnect with the Utility's Electric Delivery System once all of the following have occurred:

- 5.1 The Renewable Energy Generating Facility has been inspected and approved by the appropriate local electrical wiring inspector with jurisdiction, and the Applicant has sent documentation of the approval to the Utility; and
- 5.2 The Utility has either: Inspected the Renewable Energy Generating Facility and has not found that the Renewable Energy Generating Facility fails to comply with IEEE 1547, IEEE 1547.1, and UL 1741 standard; or waived its right to inspect the Renewable Energy Generating Facility by not scheduling an inspection in the allotted time; or explicitly waived the right to inspect the Renewable Energy Generating Facility.

6.0 Safe Operation and Maintenance

The Interconnection Customer shall be fully responsible to operate, maintain, and repair the Renewable Energy Generating Facility as required to ensure that it complies at all times with IEEE Standard 1547, 1547.1 and UL 1741.

7.0 Access

The Utility shall have access to the metering equipment of the Renewable Energy Generating Facility at all times. The Utility shall provide reasonable notice to the Interconnection Customer when possible, prior to using its right of access.

8.0 Disconnection

The Utility may temporarily disconnect the Renewable Energy Generating Facility upon the following conditions:

- 8.1 For scheduled outages upon reasonable notice.
- 8.2 For unscheduled outages or emergency conditions.
- 8.3 Routine maintenance, construction and repair.
- 8.4 Adverse operating effects.
- 8.5 If the Renewable Energy Generating Facility does not operate in the manner consistent with the terms and conditions of the Interconnection Agreement.
- 8.6 The Utility shall inform the Interconnection Customer in advance of any scheduled disconnection, or as is reasonable after an unscheduled disconnection.
- 8.7 The Parties shall cooperate with each other to restore the Renewable Energy Generating Facility, Interconnection Facilities, and the Electric Delivery System to their normal operating state as soon as reasonably practicable following a temporary disconnection.

9.0 Modification of the Renewable Energy Generating Facility

The Interconnection Customer must receive written authorization from Utility before making any change to the Renewable Energy Generating Facility that may have a material impact on the safety or reliability of the Electric Delivery System. Such authorization shall not be unreasonably withheld. Modifications shall be completed in accordance with good utility practice. If the Interconnection Customer makes such modification without the Utility's prior written authorization, the latter shall have the right to temporarily disconnect the Renewable Energy Generating Facility.

10.0 Indemnification

Each Party shall at all times indemnify, defend, and save the other Party harmless from, any and all damages, losses, claims, including claims and actions relating to injury to or death of any person or damage to property, demand, suits, recoveries, costs and expenses, court costs, attorney fees, and all other obligations by or to third parties, arising out of or resulting from the indemnified Party's action or inactions of its obligations under the Interconnection Agreement on behalf of the indemnifying Party, except in cases of gross negligence or intentional wrongdoing by the indemnified Party.

11.0 Insurance

The Interconnection Customer is not required to provide general liability insurance coverage as part of the Interconnection Agreement, or through any other Utility requirement unless stipulated in the Agreement and agreed upon by both Parties.

12.0 Limitation of Liability

Each Party's liability to the other Party for any loss, cost, claim, injury, liability, or expense, including reasonable attorney's fees, relating to or arising from any act or omission in its performance of the Interconnection Agreement, shall be limited to the amount of direct damage actually incurred. In no event shall either Party be liable to the other Party for any indirect, incidental, special, consequential, or punitive damages of any kind whatsoever, except as allowed under paragraph 10.0 – Indemnification.

13.0 Termination

The Interconnection Agreement may be terminated under the following conditions:

- 13.1 By the Interconnection Customer: By providing written notice to the Utility of termination within 2 business days of termination.
- 13.2 By the Utility: If the Renewable Energy Generating Facility fails to operate for any consecutive 12-month period or the Interconnection Customer fails to remedy a violation of the terms and conditions of the Interconnection Agreement.
- 13.3 Permanent Disconnection: In the event the Interconnection Agreement is terminated, the Utility shall have the right to disconnect its facilities or direct the Interconnection Customer to disconnect its Renewable Energy Generating Facility.
- 13.4 Liabilities and obligations: The termination of the Interconnection agreement shall not relieve either party of its liabilities and obligations owed, or continuing at the time of the termination.
- 13.5 Survival Rights: The Interconnection Agreement shall continue in effect after termination to the extent necessary to allow or require either Party to fulfill rights or obligations that arose under the Agreement.

14.0 Assignment

For a Renewable Energy Generating Facility offsetting part or the entire load of a utility customer at a given site, that customer is the Interconnection Customer and that customer may assign its Interconnection Agreement to a subsequent occupant of the site.⁴ For a Renewable Energy

⁴ In the most common case, an Interconnection customer is a homeowner. This clause allows the homeowner to sell the home and assign the Agreement to the new owner. In commercial situations, the Interconnection Customer is a lessee and this clause allows the lessee to move out at the end of a lease and assign the Agreement to a new lessee.

Generating Facility providing energy directly to a Utility, the Interconnection Customer is the owner of the Renewable Energy Generating Facility and may assign its Interconnection Agreement to a subsequent owner of the Renewable Energy Generating Facility. Assignment is only effective after the assignee provides written notice of the assignment to the Utility and agrees to accept the Interconnection Customer's responsibilities under the Interconnection Agreement. The Interconnection Customer shall have the right to assign this Agreement, without the consent of the Utility, for collateral security purposes to aid in providing financing for the Renewable Energy Generating Facility

15.0 Force Majeure

If a Force Majeure Event prevents a Party from fulfilling any obligations under the Interconnection Agreement, the Party affected by the Force Majeure Event ("Affected Party") shall promptly notify the other Party of the existence of the Force Majeure Event. The notification must specify in reasonable detail the circumstances of the Force Majeure Event, its expected duration, and the steps that the Affected Party is taking to mitigate the effects of the event on its performance. If the initial notification was verbal, it should be promptly followed up with a written notification. The Affected Party shall keep the other Party informed on a continuing basis of developments relating to the Force Majeure Event until the event ends. The Affected Party will be entitled to suspend or modify its performance of obligations under the Interconnection Agreement (other than the obligation to make payments) only to the extent that the effect of the Force Majeure Event cannot be reasonably mitigated by the Affected Party. The Affected Party shall use reasonable efforts to resume its performance as soon as possible.

16.0 Default

Default exists where a Party has materially breached any provision of the Interconnection Agreement, except that no default shall exist where a failure to discharge an obligation (other than the payment of money) is the result of a Force Majeure Event as defined in this Section, or the result of an act or omission of the other Party.

16.1 Upon a default, the non-defaulting Party shall give written notice of such default to the defaulting Party. Except as provided in Section 16.2, the defaulting Party shall have 60 calendar days from receipt of the default notice within which to cure such default; provided however, if such default is not capable of cure within 60 calendar days, the defaulting Party shall commence efforts to cure within 20 calendar days after notice and continuously and diligently pursue such cure within six months from receipt of the default notice; and, if cured within such time, the default specified in such notice shall cease to exist.

16.2 If a default is not cured as provided in this Section, or if a default is not capable of being cured within the period provided for herein, the non-defaulting Party shall have the right to terminate the Interconnection Agreement by written notice at any time until cure occurs,

and be relieved of any further obligation hereunder and, whether or not that Party terminates the Interconnection Agreement, to recover from the defaulting Party all amounts due hereunder, plus all other damages and remedies to which it is entitled at law or in equity. The provisions of this Section will survive termination of the Interconnection Agreement.

17.0 Subcontractors

Nothing in the Interconnection Agreement shall prevent a Party from utilizing the services of any subcontractor as it deems appropriate to perform its obligations under the Interconnection Agreement; provided, however, that each Party shall require its subcontractors to comply with all applicable terms and conditions of the Interconnection Agreement in providing such services and each Party shall remain liable for the performance of such subcontractor.

17.1 The creation of any subcontract relationship shall not relieve the hiring Party of any of its obligations under the Interconnection Agreement. The hiring Party shall be fully responsible to the other Party for the acts or omissions of any subcontractor the hiring Party hires as if no subcontract had been made; provided, however, that in no event shall the Utility be liable for the actions or inactions of the Interconnection Customer or its subcontractors with respect to obligations of the Interconnection Customer under the Interconnection Agreement. Any applicable obligation imposed by the Interconnection Agreement upon the hiring Party shall be equally binding upon, and shall be construed as having application to, any subcontractor of such Party.

17.2 The obligations under this Section will not be limited in any way by any limitation of subcontractor's insurance.

18.0 Dispute Resolution

For disputes related to the Interconnection Agreement, either Party may submit a written request to the other Party for an informal meeting by phone, electronic media, or in person to attempt to resolve the dispute. Following such a request, each Party shall make available a person with authority to resolve the dispute. A meeting shall be scheduled for at least one hour, but may be shorter at the option of the Party requesting the meeting. The meeting shall take place at a time and in a manner agreeable to the Party receiving the request within three business days of the Party's receipt of the request for a meeting. If a dispute involves technical issues, persons with sufficient technical expertise and familiarity with the issue in dispute from each Party shall also attend the informal meeting.

18.1 If an informal meeting of the Parties does not resolve a dispute, the Parties may mutually agree to further discussions or either Party may seek resolution of the dispute through the complaint or mediation procedures available at the Commission. Dispute resolution at the Commission will be initially conducted in an informal, expeditious manner to reach

resolution with minimal costs and delay. If no resolution is reached after informal discussions, either Party may file a formal complaint with the Commission.

19.0 Utility Reporting Requirement

Each electric utility, as defined in Section 366.02(2), F.S., shall file with the Commission as part of its tariff a copy of its Standard Interconnection Agreement form for customer-owned renewable generation. In addition, each electric utility shall report the following, by April 1 of each year.

- (a) Total number of customer-owned renewable generation interconnections as of the end of the previous calendar year;
- (b) Total kW capacity of customer-owned renewable generation interconnected as of the end of the previous calendar year;
- (c) Total kWh received by interconnected customers from the electric utility, by month and by year for the previous calendar year;
- (d) Total kWh of customer-owned renewable generation delivered to the electric utility, by month and by year for the previous calendar year; and
- (e) Total energy payments made to interconnected customers for customer-owned renewable generation delivered to the electric utility for the previous calendar year, along with the total payments made since the implementation of this rule.
- (f) For each individual customer-owned renewable generation interconnection:
 1. Renewable technology utilized;
 2. Gross power rating;
 3. Geographic location by county; and
 4. Date interconnected.

(C) Net Metering Standards and Best Practices:

1.0 General Provisions

- 1.1 All Electricity Providers shall offer Net Metering to Customer-generators with Renewable Energy Generation that is interconnected and operated in parallel pursuant to the interconnection rules in Rule 25-6.065, F.A.C.; provided, however, that the rated capacity of the Renewable Energy Generation does not exceed the Customer Generator's service entrance capacity.
- 1.2 All Electricity Providers shall make Net Metering available to Customer-generators in a timely manner and on a first-come, first-served basis. An Electricity Provider shall not limit the cumulative, aggregate generating capacity of net-metered systems in any manner.
- 1.3 Each Electricity Provider shall develop a net metering tariff that provides for Customer-generators to be credited in kilowatt-hours (kWh) at a ratio of 1:1 for any excess production of their Renewable Energy Generating Facility that exceeds the Customer-generator's on-site consumption of kWh in the billing period.

- 1.4 The Electricity Provider shall carry over any excess kWh credits earned by a Customer-generator and apply those credits to subsequent billing periods to offset the Customer-generator's consumption in those billing periods until all credits are used. Any excess kWh credits shall not reduce any fixed monthly customer charges imposed by the Electricity Provider.
- 1.5 An Electricity Provider shall offer a Customer-generator the choice of a time differentiated energy tariff rate or a non-time-differentiated energy tariff rate, if the Electricity Provider offers the choice to customers in the same rate class as the Customer-generator. If a Customer-generator uses a meter and retail billing arrangement that has time differentiated rates, the Electricity Provider shall net any excess production against on-site consumption within the same time-of-use period in the billing period. Excess monthly kWh credits shall be based on the ratio representing the difference in retail rates for each time of use period.
- 1.6 If a Customer-generator terminates service with the Electricity Provider or switches Electricity Providers, the Electricity Provider is not required to provide compensation to the Customer-generator for any outstanding excess kWh credits.
- 1.7 A Customer-generator facility used for Net Metering shall be equipped with metering equipment that can measure the flow of electricity in both directions. For Customer-generator facilities less than 25 kilowatts (kW) in rated capacity, this shall be accomplished through the use of a single, bi-directional electric revenue meter that has only a single register for billing purposes.
- 1.8 A Customer-generator may choose to use an existing electric revenue meter if the following criteria are met:
 - 1.8.1 The meter is capable of measuring the flow of electricity both into and out of the Customer-generator's facility; and
 - 1.8.2 The meter is accurate with a degree of accuracy that the Electricity Provider requires when measuring electricity flowing from the Customer-generator facility to the electric distribution system.
- 1.9 If a Customer-generator's existing electric revenue meter does not meet the requirements of subsection (C)1.8, the Electricity Provider shall install and maintain a new revenue meter for the Customer-generator at the Electricity Provider's expense. Any subsequent revenue meter change necessitated by the Customer-generator, whether because of a decision to stop Net Metering or for any other reason, shall be paid for by the Customer-generator.
- 1.10 The Electricity Provider shall not require more than one meter per Customer-generator. However, an additional meter may be installed under either of the following circumstances:
 - 1.10.1 The Electricity Provider may install an additional meter at its own expense if the Customer-generator provides written consent; or
 - 1.10.2 The Customer-generator may request that the Electricity Provider install a meter, in addition to the revenue meter addressed in Subsection (C)1.8, at the Customer-

generator's expense. In such case, the Electricity Provider shall charge the Customer-generator no more than the actual cost of the meter and its installation.

- 1.11 A Customer-generator owns the Renewable Energy Credits (RECs) associated with the electricity it generates, unless such RECs were explicitly contracted through a separate transaction independent of any Net Metering or interconnection tariff or contract.
- 1.12 An Electricity Provider shall provide to Customer-generators electric service at nondiscriminatory rates that are identical to the rates that a Customer-generator would be charged if not a Customer-generator, including choice of retail tariff schedules. This requirement pertains to rate structures, retail rate components and any monthly charges.
- 1.13 An Electricity Provider shall not charge a Customer-generator any fee or charge; or require additional equipment, insurance or any other requirement not specifically authorized under an Interconnection Agreement, or the interconnection rules, unless the fee, charge or other requirement would apply to other similarly situated customers who are not Customer-generators.
- 1.14 Each Electricity Provider shall submit an annual Net Metering report to the Commission. The report shall be submitted each year by the date indicated by the Commission, and shall include the following information for the previous year:
 - 1.14.1 The total number of Net Metered Customer-generator facilities, by resource type;
 - 1.14.2 The total rated generating capacity of Net Metered Customer-generator facilities, by resource type;
 - 1.14.3 The total number of kWh received from Net Metered Customer-generators; and
 - 1.14.4 The total estimated amount of kWh produced by Net Metered Customer-generators, provided that this estimate does not require additional metering equipment.
- 1.15 If a Customer-generator's Renewable Energy Generation system has been approved for interconnection under the interconnection rules in Rule 25-6.065, F.A.C., the Electricity Provider shall not require a Customer-generator to test or perform maintenance on the Customer-generator's system except in the case of any testing or maintenance recommended by the system manufacturer.
- 1.16 An Electricity Provider shall have the right to inspect a Customer-generator's system during reasonable hours and with reasonable prior notice to the Customer-generator. If an Electricity Provider finds that the Customer-generator's system is not in compliance with the requirements of the interconnection rules in Rule 25-6.065, F.A.C., and the requirements of IEEE Standard 1547, 1547.1, and UL 1741, the Interconnection Agreement, and the non-compliance adversely affects the safety or reliability of the Electricity Provider's facilities or of other customer's facilities, the Electricity Provider may require the Customer-generator to disconnect the facility until compliance is achieved.
- 1.17 Each Electricity Provider shall make Net Metering applications available through the Electricity Provider's website.

- 1.18 For Customer-generators participating in meter aggregation, the following provisions shall apply:
- 1.18.1 For the purpose of measuring electricity usage under Net Metering rules, an Electricity Provider must, upon request from a Customer-generator, aggregate (for billing purposes), a meter to which the Net Metering facility is physically attached (“designated meter”) with one or more meters (“additional meter”) in a manner set out in this subsection. This rule is mandatory upon the Electricity Provider only when:
 - 1.18.1.1 The primary “designated meter” is physically attached to the Net Metering facility;
 - 1.18.1.2 The additional meter(s) is located on the Customer-generator’s contiguous property;
 - 1.18.1.3 The additional meter(s) is used to measure only electricity used for the Customer-generator’s requirements.
 - 1.18.2 A Customer-generator must give at least 30 days’ notice to the Electricity Provider to request that additional meters be included in meter aggregation. The specific meters must be identified at the time of such request. In the event that more than one additional meter is identified, the Customer-generator must designate the rank order for the additional meters to which Net Metering credits are to be applied.
 - 1.18.3 The Net Metering credits will apply only to charges that use kWh as the billing determinant. All other charges applicable to each meter account will be billed to the Customer-generator.
 - 1.18.4 If in a monthly billing period, the Net Metering facility supplies more electricity to the Electricity Provider than the energy usage recorded by the Customer-generator’s designated meter, the Electricity Provider will apply credits to additional meters in the rank order provided by the Customer-generator, and any remaining credits after doing so will be rolled over to the designated meter for use during the subsequent billing period.
 - 1.18.5 Customer-generators participating in meter aggregation do not have to have all meters on the same rate schedule.

Case Studies: Best Practices from Other States

In completing these Best Management Practices, the programs summarized below seemed particularly well developed, are specific case studies from other parts of the country, and are presented here for the readers' information. Massachusetts was reviewed to present a comparative case on how net metering facilities are best classified based on capacity. Sacramento, CA was studied due to the facts that it resides in a state that is a leader in solar energy production and that the city of Sacramento provides a residential program that promotes the installation of solar energy. Lastly, Philadelphia, PA was studied to review the process for interconnection and the utility requirement's for participating residents.

Massachusetts

Class I, Class II, Class III net metering facilities

In Massachusetts, there are several categories of net-metering facilities. "Class I" facilities are generally defined as systems up to 60 kW in capacity. "Class II" facilities are generally defined as systems greater than 60 kW and up to one megawatt (MW) in capacity that generate electricity from agricultural products, solar energy or wind energy. "Class III" facilities are generally defined as systems greater than 1 MW and up to 2 MW in capacity that generates electricity from agricultural products, solar energy or wind energy. Massachusetts also allows "neighborhood net metering" for neighborhood-based Class I, II or III facilities that are owned by (or serve the energy needs of) a group of 10 or more residential customers in a single neighborhood and served by a single utility. The neighborhood facility may also serve additional customers (including commercial) as long as the base requirements are met. All net-metered facilities must be behind a customer's meter, but only a minimal amount of load located on-site is required. In aggregate, these "non-governmental facilities" may not exceed 1% of the distribution company's peak load.*

Sacramento, California

The City of Sacramento encourages the installation of solar energy systems and has streamlined the review process for small-scale solar. All new installations require review for building permits and for interconnection with the Sacramento Municipal Utility District (SMUD). Depending on the size of your system, you may qualify for a flat permit rate of \$280. If you will be rewiring or replacing your electrical panel, please contact SMUD for possible additional requirements.

^[7] Residential Retrofit PV Program

Nearly a decade ago, SMUD initiated its PV Pioneer I program by designing and installing PV systems on residential structures in the Sacramento area. SMUD owned these systems, received the electrical output, and took full responsibility for operation and maintenance. This arrangement afforded great flexibility, promoted rapid technological advancement, and enabled SMUD to develop standardized, low-cost

installation methods. Since 2001, SMUD has introduced the PV Pioneer II program, through which the customers own the systems. As a result, homeowners are able to take advantage of “net metering,” where SMUD pays retail prices for energy produced by the PV system.

Philadelphia, Pennsylvania

^[1] PECO Interconnection

It is important that Solar Contractors understand PECO’s interconnection requirements BEFORE the design is finalized. This understanding is essential to ensure that the electric lines serving the home or building can accommodate a customer-sited generating unit. An application must be submitted to PECO before they can identify any potential site limitations for interconnection. Contractors are encouraged to review PECO’s Yellow Book for small generators rated at 50 kW or less [the Yellow Book is a condensed version of the requirements contained in the procedures for 2 million volt amps(MVA) or less]. Even if the system is never anticipated to export power to the grid, PECO must be aware of and understand potential faults in the system that may impact their lines and determine if their lines have enough capacity to accommodate the net flow of energy from a PV system.

Failing to coordinate with PECO before the design is finalized may result in additional work or additional costs (if equipment has already been purchased). There are scenarios seen in an interconnection review that, per *The Pennsylvania Code* may limit a lot’s ability to have a small generator facility (such as a solar PV system) or that may require upgrades to the electric lines serving the building **at the customer’s expense**.

Conclusion

In conclusion, Broward County's Best Practices for Net Metering and Interconnection Standards were established for the Go SOLAR Broward Rooftop Solar Challenge Team to make available, to interested stakeholders, a resource for promoting and implementing suitable Net Metering and Interconnection practices. Homeowners, small business owners, Florida public utilities, Florida government agencies, and the general public can benefit from following practices stated in this report not only to maximize the benefits of utilizing renewable energy generation systems, but also make the interconnection and net metering process simple and easy to implement. The practices outlined in this report serve as guidance for Florida public utilities and their renewable energy generation customers, on how to best act upon and perform State of Florida Net Metering and Interconnection regulations.

REFERENCES

1. "052 Pa. Code Review procedures..." *The Pennsylvania Code Online*. N.p., n.d. Web. 7 May 2012. <<http://www.pacode.com/secure/data/052/chapter75/s75.34.html>>.
2. "Florida Power & Light Company (FPL): Electric Power Utility." *Florida Power & Light Company (FPL): Electric Power Utility*. N.p., n.d. Web. 26 Apr. 2012. <<http://www.fpl.com/netmetering>>.
3. "Interconnection and Metering of Customer-Owned Renewable Generation." *Florida Administrative Weekly & Florida Administrative Code*. N.p., n.d. Web. 25 Apr. 2012. <<https://www.flrules.org/gateway/ruleNo.asp?id=25-6.065>>.
4. "Model Interconnection Procedures." *Interstate Renewable Energy Council 2* (2009): n. pag. <http://irecusa.org/irecprograms/>. Web. 30 Apr. 2012.
5. "Net Metering Model Rules." *Interstate Renewable Energy Council 6* (2009): n. pag. www.irecusa.org. Web. 3 May 2012.
6. "Statutes & Constitution : View Statutes : Online Sunshine." *Welcome : Online Sunshine*. N.p., n.d. Web. 23 Apr. 2012. <<http://www.leg.state.fl.us/Statutes>>.
7. Sacramento Municipal Utility District Upper American River Project (Ferc no. 2101) Application for New License Exhibit H General Information
Sacramento Municipal Utility District; Sacramento, California, June 2005