Fast Permitting for PV Systems

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Solar ABCs Project
Stakeholders Second Quarterly Meeting
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Objectives

- Develop procedures and recommendations for timely and efficient permitting of PV systems by building inspectors and other jurisdiction officials.
- Minimize costs of permitting for PV systems.

Approach

Based on:

- FSEC's *PV System Design Review and Approval* process.

- Brooks Engineering's *Inspector Guidelines for PV Systems*.

FSEC PV System Design Review and Approval

Objectives

- Provide consumers and agencies with the expected power output of certified systems
- Provide PV system design approval certificate that can be used by local building inspectors and officials for issuing the permits and inspection of installed systems
- Improve the quality, safety and reliability of PV systems

Steps

- Submittal of application
- Review of PV system design
- Issuing PV system design approval certificate

FSEC PV System Design Review Application

May be downloaded from www.fsec.ucf.edu under Testing & Certification Program at http://www.fsec.ucf.edu/en/industry/testing/PVsystems/pdf/PV_Sys_Cert_App_Form_09-19-06.pdf

Information required:

- Applicant: *Name, address, phone number and e-mail*
- PV Modules: *Manufacturer, model, UL listing, IEC qualification testing and power rating*
- PV Array: *Series-parallel configuration, power rating*
- Inverter: *Manufacturer, model, UL listing, maximum allowed DC power input, DC voltage widow, nominal AC voltage and AC power rating*
- Batteries and Charge Controllers (if used): *Manufacturer, model, UL listing, battery type and capacity, charge controller LVD, VR and EQ*
- Three-line Electrical Schematic: *All major components plus all DC and AC conductor types, sizes and lengths, BOS (fuses, circuit breakers, disconnects) ratings and locations, equipment and system grounding, point of connection to the utility grid*

FSEC PV System Design Review Process

Reviews three-line electrical schematics and checks for:

- Compliance with the latest version of the National Electrical Code.
- UL listing of modules (UL1703/IEC 61730).
- Qualification requirements per IEC 61215 for c-Si modules and IEC 61646 for thin-film modules.
- Compliance with IEEE 1547 and UL 1741 for grid-connected systems.
- Type, size and lengths of DC and AC conductors.
- Ratings and locations of BOS, including fuses, circuit breakers and disconnects.
- PV module, equipment and system grounding.
- Charge controller and battery, if applicable.
- Good, accepted design practices.

FSEC PV System Approval Certificate

FLORIDA SOLAR ENERGY CENTER

PV System Approval Certificate

07 - AB - 1234 Z

Awarded to:

Solar Company
123 Main Street
Suite A
Orlando, Florida

Important: All items should be checked by the building code official

PV Modules and Array:		System Certified for:
PV Module Manufacturer		Solar System Co.
PV Module Model Number		SSM-100B
FSEC Module Certification Number		07-FSEC-9999
Listing to UL1703 Verified	YES	
Array Configuration		
Total Number of PV Modules		32
Number In Each Series String		16
Number of Series Strings		2

Power Conditioning Equipment (Inverter):				
Inverter Manufacturer:		Inverter Co.		
Inverter Model Number		SI-3000		
Listing to UL1741 Verified:	YES			
Max. Allowable PV Array Power to Inverter:				
Inverter DC Voltage Window		Min: 200	Max:	450
AC Power Rating		3.0 kW		
AC Nominal Voltage Output	240 V			

FSEC PV System Approval Certificate (Contd)

Electrical Design

(Verify the following items for agreement between the installed components and the supplied electrical schematic)

Size, type, and location of all conductors in the PV system
Conduit, raceways, junction boxes, and combiner boxes
Size, current rating, voltage rating, and location of all overcurrent protection devices
Rating and location of all disconnects
Point of connection to the utility
PV module and equipment grounding system (including conductor size)
PV DC circuit and system grounding (including grounding electrode conductor size)
Ground Fault Detection & Interrupter (GFDI) rating and location
Battery wiring and cable sizes (if applicable)

An electrical schematic of the complete PV system consisting of a three-line diagram must be attached to this form.

Inspection

_____ Inspector Name (printed)

_____ Inspector Signature

_____ Date

Installer Information and Certification

Company Name _____

Address _____

Address _____

City _____ State _____ Zip Code _____

Phone Number _____ Fax Number _____

Web Site

Florida Contractor License Number _____

Florida Contractor License Type ___ Solar ___ Electrical ___ Other (specify) _____

I hereby certify that this PV system has been installed in full accordance with the National Electrical Code.

_____ Installer Name (printed)

_____ Installer Signature

_____ Date

Inspector Guidelines

Bill Brooks, PE
Brooks Engineering

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Introduction/Rational

- provide a framework for the permitting and inspection of PV systems
- two separate guidelines since jurisdictions normally treat the process in two steps.
  - First is the plan check stage where the information is reviewed for accuracy and completeness
  - Second is the field inspection stage where the installation is reviewed for compliance with the approved plans

Why do we need Inspector Guidelines?

- Variations in compliance requirements—some are insufficient to protect the public, others may not be consistent with established standards.
- Need a predictable process with uniform enforcement of code requirements for jurisdictional authorities and installing contractors.
- The way to speed permitting without sacrificing safety is to have well-defined process for submitting plans so that contractors know what to provide and jurisdictions know what to expect.

What are the objectives of the guidelines?

- Facilitate the installation of safe systems at a minimum of cost.
- Provide guidance on what information should be provided for permitting.
- Discourage “fly-by-nights” from the industry by making them do all the steps that a good installer does.
- Raise the professionalism of installing contractors.

What is the basic approach used to develop the guidelines?

- Developed by reviewing 2005 National Electrical Code, Article 690 and various guidelines from a few jurisdictions and using input from several experienced professionals including installers and inspectors throughout the U.S.
- In addition to national experts, California has over 15,000 systems that have been inspected by the local jurisdiction. This is an experience base not previously available.
- Approach is to establish a set of best practices that will ensure that the public safety is preserved when an installation meets these guidelines

Who will benefit from these guidelines?

- Jurisdictions in charge of public safety in the built environment (authority having jurisdiction or AHJ).
- Plan checkers and field inspectors tasked with reviewing PV systems.
- Installers who need consistent criteria in which to have their systems reviewed.
- Download the Inspector Guideline at www.irecusa.org and look under “Resources”

http://irecusa.org/fileadmin/user_upload/NationalOutreachPubs/InspectorGuidelines-Version2.1.pdf

Study Schedule

- Seek stakeholders input by January 15, 2008.
- Table of Contents by January 31, 2008
- Draft procedures and recommendations for fast permitting by March 31, 2008.
- Finalize procedures and recommendations for fast permitting by May 31, 2008.

Stakeholders Involvement

We need your input:

- At quarterly study panel meetings and via the website forum.
- By providing relevant information and assistance.
- To develop procedures and recommendations for fast permitting.
- In reviewing draft procedures and recommendations.