# *Local Codes Study*
## *Experience from Florida*

Gobind H. Atmaram, Ph. D
Stephen Barkaszi
Florida Solar Energy Center

Solar ABCs Project
Stakeholders First Meeting
September 27, 2007, Long Beach, CA

# *Local Codes Study Panel*
## *Lead: FSEC and IREC*
## *One Year Study*

Objectives:

To investigate critical issues related to permitting, fees, local codes and ordinances, solar access, contractor licensing, and others.

To develop model building code (for high wind locations) and model ordinance (with solar access rights) as references

# Issues

- Codes for high wind (hurricane level) load environments - - structural compliance
- Flexible codes to accommodate different jurisdictions
- Fast track permitting with PV system design approval
- Assistance on electrical codes (code compliance summaries for plan reviewers and inspectors)
- Building integration
- *Promote local net metering and interconnections reg.*
- *Local regulations, legislations and ordinances*

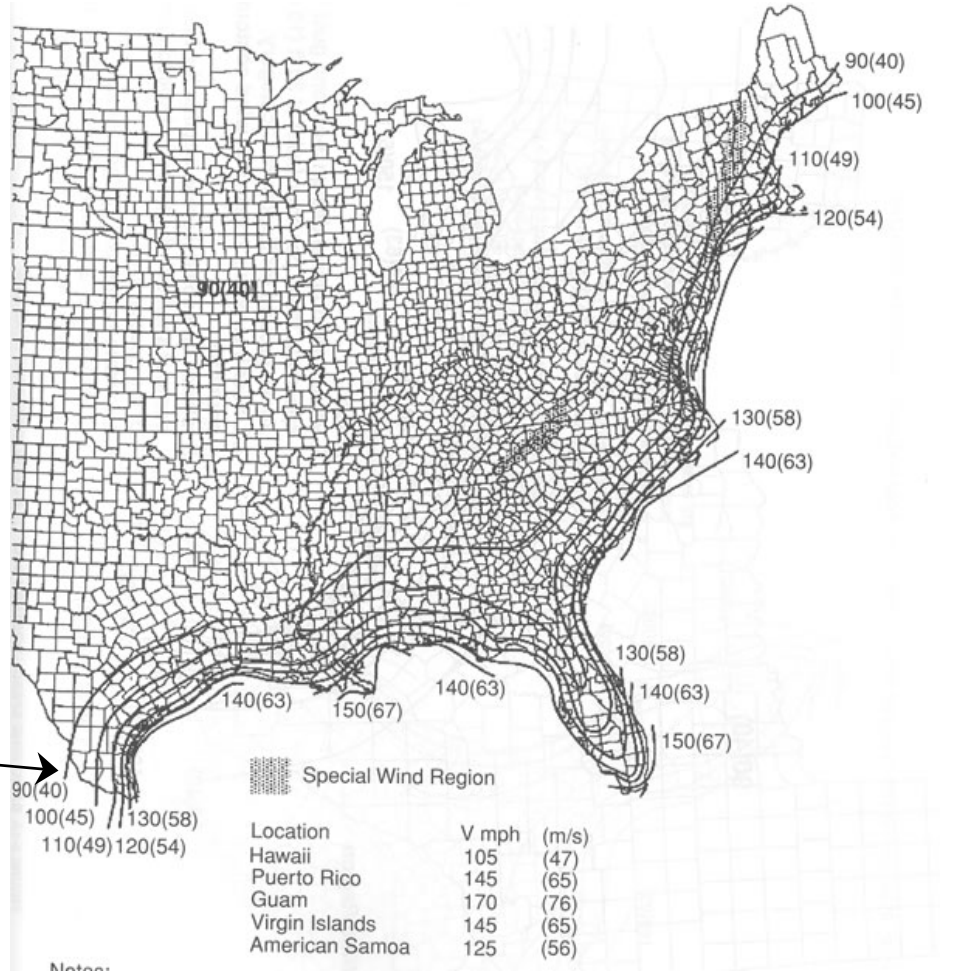
# Roof Mounted PV Arrays

- Roof Mounted PV Arrays are designed as building Components and Cladding per building codes and standards
- Components and Cladding are elements of the building envelope that are not part of the Main Wind Force Resisting System (MWFRS)

# Design Wind Speed

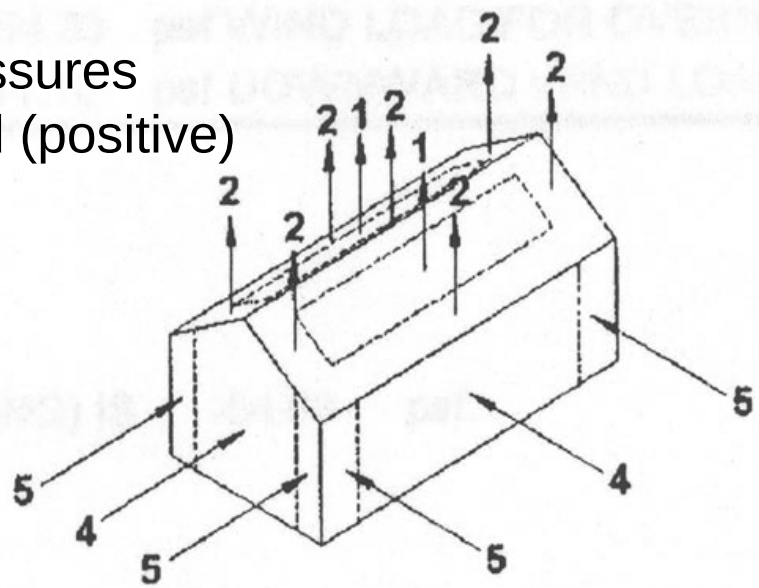
- Design Wind Speed
  - 90 mph for most of the US
  - Up to 150 mph for Gulf Coast and Eastern Seaboard regions
  - Minimum 100 mph in Florida (small relatively unpopulated area)

90 mph contour



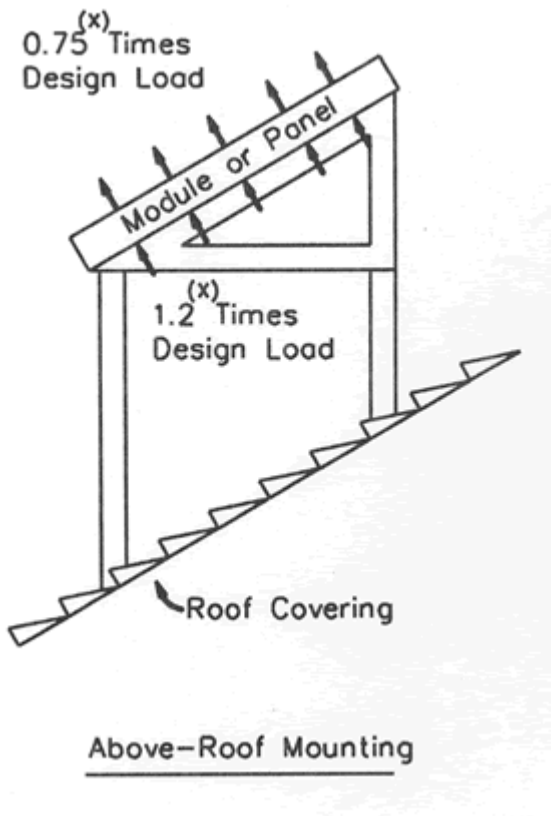
# Design Pressures

- Roof Component and Cladding design pressures can exceed 100 psf
- Upward (negative) design pressures typically exceed the downward (positive) for components and cladding.
- 50 psf meets requirements for 100 mph wind zones
- May be exceeded in 100+ mph wind zones



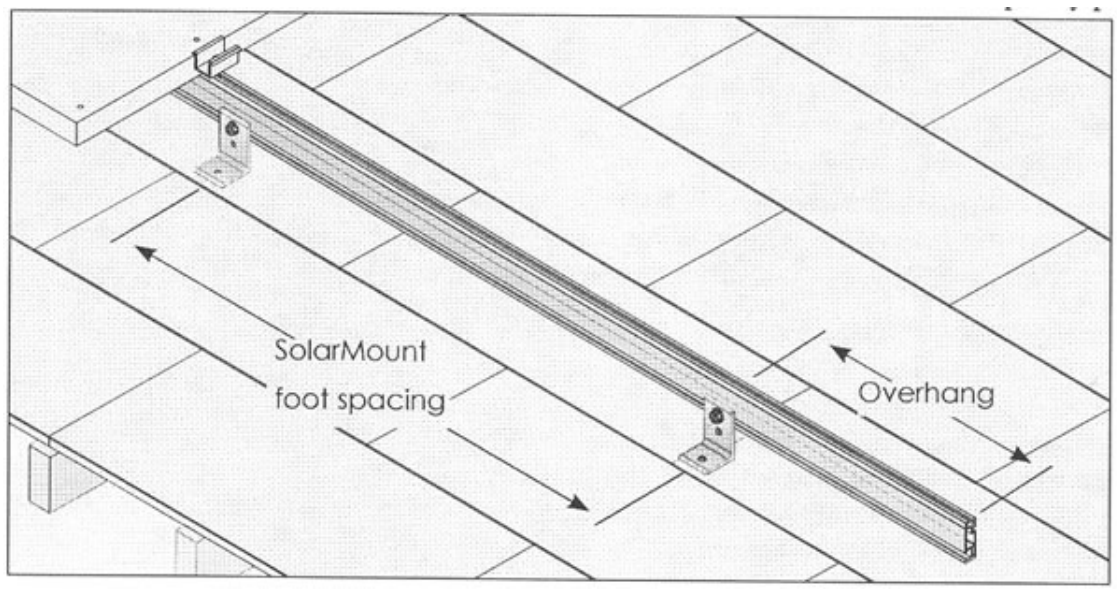
# Design Loads

- UL 1703 describes the mechanical loading tests for PV modules
- Minimum design load 30 psf* 1.5 = 45 psf



# Mounting Hardware

- Array mounting rails and attachments transfer loads from the modules to the structure
- Loads can be concentrated and may exceed the design strength of structural members if installed incorrectly
- Mounting foot spacing affects the loading requirements



# Air Permeable Cladding

ASCE 7 6.4.3 Air Permeable Cladding

Design wind loads shall be used unless approved test data or recognized literature demonstrate lower loads

- Wind loads on air-permeable components are recognized to be less than non-air-impermeable components
- Guidance is lacking in ASCE 7 to determine the wind loading adjustment factors
- Basic research is needed to develop test methodology for air-permeable component loads

# Model Ordinance

- 35 states currently have Solar Access and/or Solar Easement Laws
- Deed restrictions, covenants shall not prohibit solar collectors

- Easements for maintaining exposure of a solar energy device shall be created in the same manner as other easement
- Florida statutes 163.04 and 704.07

# Electrical Code

- General lack of familiarity with NEC Article 690 by local code officials, installers and design professional
- Specific areas with frequent questions
  - DC rated equipment and components versus AC ratings
  - Temperature requirements (above 30°C)
  - Grounding, bonding, lighting protection confusion
  - Conduit types and applications
  - Labeling
  - Disconnect requirements
  - Adequate schematic drawings for permitting and installation

# Stakeholders Involvement

- Help to identify and prioritize issues and needs
- Participate in quarterly panel meetings, website forum/discussion group, and other related activities
- Provide input  and assistance in panel study, and review study drafts

# Stakeholders Role

- Make recommendations to panel how to deal with the issues
- Provide technical assistance and resources to panel, as required

# Interconnections and Net Metering
## Draft FL Statute 25-6.065 (FL PSC)
## Customer-Owned Renewable Generation

- Scope (primarily PV and Wind up to 1.0 MW)
- Standard Interconnection Agreement (IEEE 1547 and UL 1741)
- Customer Qualification and Fees (up to 25 kW, 25-100 kW, 100-1000 kW –no fee for tier 1 and 2, utility may propose fee for tier 3))
- Content of Std. IA (approval by code official, compliance inspection by utility, $100K liability insurance, may require manual visible disconnect)
- Administrative Requirements (Std. IA to be executed within 30 days of application for tier 1 and 2, inform in 60 day if study is needed for tier 3)
- Conditions for Disconnect (maintenance, emergency, hazard, adverse)
- Net Metering (utility equipment, monthly credit, annual payments)
- Reporting (by April 1, total number, capacity, energy delivered by and supplied to, payments, technology and location for each)
- Dispute Resolution (customer may petition, PSC to resolve all disputes)

# Local Regulations
## FL Governor's Executive Orders (Draft)

- EO 07-126
  - Greenhouse gases reduction of 10% by 2012, 25% by 2017 and 40% by 2025 for state agencies and depts.
  - Report financial savings and carbon scorecard
  - Assess current levels by October 1, 2007
  - DMS to adopt GBC LEED-NC and EB standards
- EO 07-127
  - Greenhouse gases reduction to 2000 level by 2017, to 1990 level by 2025 and to 80% of 1990 level by 2050
- EO 07-128
  - Governor's Action Team on Energy and Climate change