
Wind Loads on PV Arrays

Solar ABC's Project

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*Colleen O'Brien, PE
BEW Engineering*

*Stephen Barkaszi, PE
Florida Solar Energy Center*



Problems:

- Existing codes lack guidelines for PV systems
- Existing codes are intended for design of buildings
- Many interpretations are possible for same design
- Many PV systems are significantly over-designed or under-designed to withstand expected wind speeds.



Status

1. Guideline published - application of existing code to roof-mounted systems (PV parallel to roof)

2. Future work
 - A. Guideline pending – application of existing code to ground-mounted systems

 - B. Wind tunnel testing on roof-mounted PV



Solar ABCs Report Published

Wind Load Calculations for PV Arrays

- Report available online: www.solarabcs.org/wind
- Applicable to roof-mounted PV systems where PV is parallel to the roof and supported on racks up to 6" above the roof
- Based on the American Society of Civil Engineers Minimum Design Loads for Building and Other Structures (ASCE 7-05)
- Next step = peer review; need feedback from structural engineers and aerodynamics experts



Future Work

Guideline for Ground-Mounted Systems

- ASCE standard is more readily applied to ground-mounted PV than roof-mounted PV: geometry is more like a building/carport (“unenclosed building”)
- Will recommend which ASCE tables to use to estimate wind pressure



Future Work

Wind Tunnel Testing in 2011-2012

- First priority = roof-mount, PV sloped
- Second priority = roof-mount, PV parallel (if \$\$)
- Will select wind tunnel based on competitive bid



Future Work

Wind Tunnel Testing - Approach

- Tests must be applicable to as many common rooftop PV geometries as possible
- Must address sensitivity to many variations in PV geometry
 - PV height above roof
 - PV tilt angle
 - Horizontal spacing between rows of PV
 - Obstructions below PV
 - Roof slope
 - PV location on roof
 - Presence of rooftop objects
 - Building size and shape
 - ...and more



Future Work – 2011-2012

Publish Recommendations

- Guideline to estimate wind loads for roof-mounted sloped PV and ground-mounted PV
- Updates existing report on roof-mounted parallel PV
- Recommend changes to ASCE-7 if applicable
- Peer reviews



Contact Information

Colleen O'Brien, P.E.

BEW Engineering

colleen.obrien@bewengineering.com

925-867-3330 extension 120

Stephen Barkaszi, P.E.

Florida Solar Energy Center

barkaszi@fsec.ucf.edu

321-638-1473

