



THE FIELD PERFORMANCE OF PV ROOFS:

A CRITICAL RESEARCH OPPORTUNITY

PHASE ONE FUNDING PROPOSAL

Background:

A recent white paper on rooftop solar energy systems released by the Center for Environmental Innovation in Roofing (“Successful Rooftop Photo-Voltaic: How to Achieve a High-Quality, Well-Maintained, Compatible Rooftop PV System”) identifies the key challenges of integrating photo-voltaic (PV) energy into roofing. These challenges include:

- Maintaining roof watertightness, both at initial installation and throughout the 20+ year service life of the PV system.
- Maintaining the roof system warranty and establishing a long-term positive relationship with the roof system manufacturer and installer.
- Maintaining continuous energy-production operations, even during extreme weather events.
- Meeting building codes, including important fire and storm-related code requirements.
- Matching the investment horizons of the PV system (20+ years) with the new or existing roof system.

In addition, the white paper identifies the guiding principles necessary to achieve successful rooftop PV installations. These key principles include:

- Starting with a high quality, well-maintained roofing system designed for compatibility with the intended PV system (or upgrading an existing high quality roofing system for compatibility with the PV system).
- Making sure the roofing warranty is not compromised by the PV system installation.
- Making sure the PV roofing will do more than just “make it through the storm” to help insure continuous operations.
- Anticipating and planning for the high levels of service traffic and other impacts associated with PV.
- Anticipating and planning for the eventual replacement of both the PV system and the roofing system.
- Engaging qualified professionals to insure all building codes and safety regulations are met.

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Although this white paper will serve an important purpose by defining the critical issues and guiding principles for successful rooftop PV, the paper lacks definitive field data regarding the frequency and magnitude of the challenges involved. And without demonstrated field data, the document may lack the authority and credibility to become fully recognized in the marketplace.

Comprehensive field research can be very expensive, especially if time and effort must be invested in identifying a large list of potential roofs to evaluate. Fortunately, the state of Florida currently maintains a database of all solar installations in that have received state subsidies. This database currently contains over 6000 solar roofing installations, including both PV and solar thermal systems installed in the last few years. Although the database includes few technical specifics about the assemblies, the name and address of the building owner is available for each installation.

Research Proposal:

Using the Florida solar database as the basis for a field performance study to monitor roof system performance over the next few years, the objective of the proposed research would be to develop reliable data to support the recommendations of the Center's white paper. In order to accomplish this objective, the research project would include the following elements:

Phase One:

- Develop a survey instrument for the owners of the 6000+ solar installations in Florida. In particular, the survey instrument would address:
 - The amount of consideration given to the suitability of the roof during the design process.
 - The role (if any) roofing professionals played in the design and installation, especially whether the roof was formally evaluated for suitability prior to installation.
 - The extent that the owners have experienced any roof-related problems with their solar systems, including leaks, excessive down-time, building code issues, etc.
 - The magnitude of service-related loads on the roof from maintenance traffic, heat build-up, drainage blockages, etc.
 - The interest of each owner to allow a roofing professional to evaluate the roof / solar system and possibly keep track of its performance over the next few years.
- Conduct a survey of the 6000+ Florida building owners, using a combination of telephone interviews and mailed survey forms.



- Conduct field evaluations of selected rooftop PV installations.
- Evaluate the survey data and use the results to generate an improved white paper as well as research and magazine articles about the findings.

Phase Two:

- Establish an ongoing review of the data, including additional owner surveys and field inspections.
- Continue to update the public on the findings of the ongoing study

Discussion:

Although it is possible that similar data bases may exist to some extent for other states and localities, Florida may provide the best situation to perform a realistic and timely field evaluation. Because of high levels of wind and rain occurring annually in Florida, weather-related problems may be magnified and accelerated. As a result, 2 or 3 years of data in Florida may be as valuable as 6 or 7 years of data from dryer locations, such as California or Arizona. In addition, the existence of over 6000 solar installations in a relatively compact state may also make an ongoing field survey process more efficient.

Phase One Project Deliverables:

- Rooftop solar survey forms for use in Florida as well as other states in the future.
- Comprehensive database of Florida rooftop solar installations that can be updated chronologically and expanded to other states.
- Correlated rooftop photos of critical solar installation and maintenance issues to support Center white paper recommendations
- Comprehensive research report to support the Center white paper and stimulate ongoing research and discussion
- Magazine articles and media placements to promote the report and highlight the importance of effective rooftop solar guidelines

Phase One Project Costs:

In order to minimize costs, the staff of the Center would conduct all professional research and marketing services at current base hourly costs. Telephone and mail surveys would be conducted by an independent consumer survey firm operating under the oversight of the Center research staff. The majority of field surveys would be conducted by local field representatives of Center members with the assistance and coordination of Center staff.



Professional Services and Project Management: \$12,000.00

- Develop customer survey instrument and field survey forms
- Oversee customer survey process
- Oversee and coordinate field survey process
- Analyze customer and field survey data
- Prepare research report with conclusions / recommendations
- Prepare magazine articles and obtain media placements

Telephone & Mail Survey: \$12,000.00

- Prepare and mail survey form
- Conduct approximately 100 telephone interviews
- Assemble and tabulate survey data in a retrievable database

Field Survey: \$6000.00

- Visit and survey selected roofs
- Complete and return field survey forms

Office and Publishing Expenses: \$4000.00

- Prepare survey photos and graphics
- Publish 4-color survey report (200 copies for Alliance)

TOTAL ESTIMATED PHASE ONE PROJECT COST: \$34,000.00

Project Timeline: Phase One

Finalize survey forms	June 1, 2009
Complete mail survey	August 1, 2009
Complete survey data analysis	September 1, 2009
Publish interim report (mail survey data)	October 1, 2009
Complete field surveys	January 1, 2010
Publish final report (mail & field survey data)	February 1, 2010
Obtain selected media placements	March 1, 2010