

# Introduction to the NREL PV Module Field Failure Database



**PV Systems Integrator  
Workshop**

**Ryan Smith**

**March 31, 2010**

# Background

---

- The PV community is interested in knowing what module failures are seen in the field and at what rates
  - Not necessarily preceded by a loss in module performance
- Failure mechanisms and rates may depend on a variety of factors
  - Technology, vintage, climate, mounting scheme, etc.
- Understanding module failure types and rates may lead to improved financial and maintenance predictive models
- Contributions from the PV community are essential
  - Proper analysis requires substantial quantities of data

# Intent

---

Support the needs of the PV community by soliciting, analyzing and summarizing module failure data

- Web-based submission site is online  
[http://www.nrel.gov/pv/performance\\_reliability/failure\\_database.html](http://www.nrel.gov/pv/performance_reliability/failure_database.html)
- Requests information regarding the module, observed failure(s), images, installation location, and contact information
- **Confidentiality of data is respected**
  - No raw data is available on this site
  - No raw data will be distributed outside of NREL
- Non-identifiable summarized data will be published as **technical reports (publically available)** and through peer-reviewed journals
  - Only applicable after sufficient data is available for analysis
- Opportunity for failure analysis at NREL
  - Unseen or emerging failure modes

# Collaboration

---

- Review existing site
  - Site must support the PV community as well as NREL
  - Each of you have a voice in what information is requested as well as in how it is disseminated
- Provide feedback and critiques on website and methods
  - Seeking volunteers for occasional (2x / year) conference calls
- Assist in creating the “Atlas of Photovoltaic Module Field Failures”
  - Photographic and technical reference document
- Contribute!
  - Success of this project is closely tied to the quantity and the quality of failure submissions

# Questions

---

How many of you...

...find this information useful?

...feel that you have a good handle on module failure types and associated impact? Do you maintain your own failure databases?

...would contribute to this database in its present form?

...have suggestions?

# Questions

Ryan Smith  
[ryan.smith@nrel.gov](mailto:ryan.smith@nrel.gov)  
303-384-7907

The screenshot shows the NREL website interface. At the top left is the NREL logo with the text 'National Renewable Energy Laboratory' and the tagline 'Innovation for Our Energy Future'. To the right is a 'NREL HOME' link. Below the logo is a navigation bar with tabs for 'ABOUT NREL', 'ENERGY ANALYSIS', 'SCIENCE & TECHNOLOGY', 'TECHNOLOGY TRANSFER', and 'APPLYING TECHNOLOGIES'. The 'Photovoltaic Research' section is highlighted in orange, with a sub-section for 'Performance & Reliability R&D'. A search bar is visible on the right with a 'SEARCH' button and links for 'More Search Options' and 'Site Map'. A 'Printable Version' link is also present. The main content area features the title 'Photovoltaic Module Field Failure Database' and a paragraph explaining its purpose: 'The PV Module Field Failure Database will enable NREL to gauge existing reliability of PV modules and improve methods of testing reliability. Participation from the solar industry, specifically PV installers, is vital to the accuracy and success of our analysis.' Below this is a paragraph stating: 'You can use the database to provide information on modules, installation locations, and failures. You'll have the ability to upload photographs of the failure(s) or scans of documents when relevant.' The final paragraph reads: 'Your participation will help us better understand real-world PV module reliability and ensure that NREL's research activities encompass failures that are historically common as well as newly emerging.'