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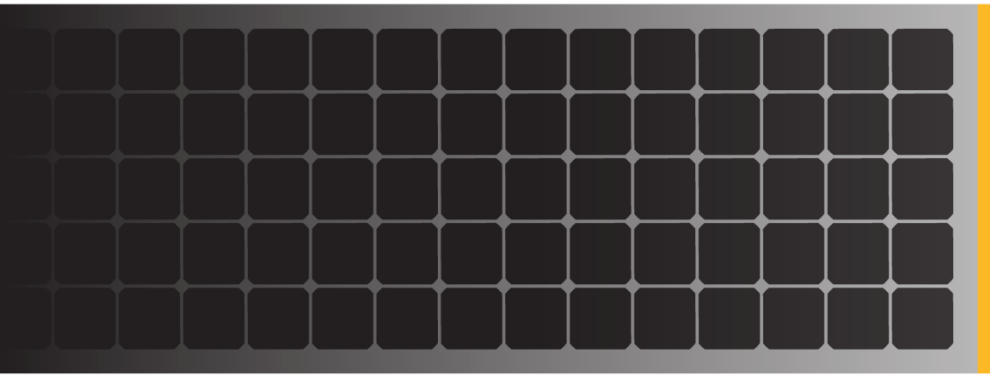

Model Validation Methodology and Results

Jeff Roche

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Why Validation is Important

- To prove that you can accurately model across a wide range of products and geographical locations
- Performance prediction key input in project finance models
  - Proven accuracy builds internal and investor confidence in performance predictions
- Important feedback mechanism for testing model changes

SunPower's Model Validation Program

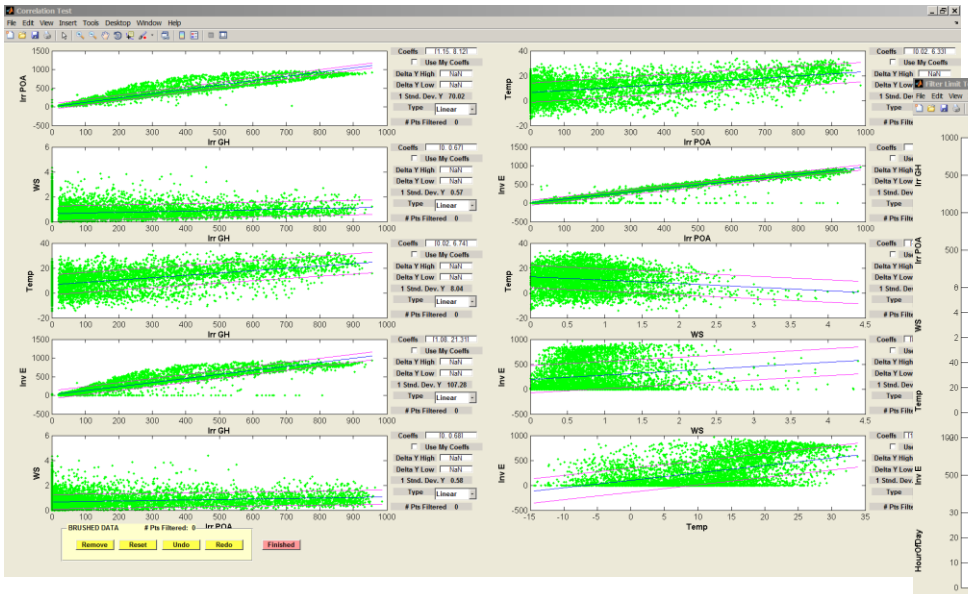
- As a project developer, SunPower has access to a significant amount of production data:
  - Hundreds of operating projects around the world generating production data and collecting meteorological data
  - A central server collecting data at high frequency
- Model validation efforts over past 5 years focused on comparing modeled production to real-world production:
  1. Simulate (using PVSim) first year production using measured meteorological data
  2. Compare simulated production to measured production at the given site
- Recently developed a suite of tools to significantly streamline and improve this process
- This suite of tools has enabled us to grow the number of sites that we are using in our program from about 30 to 100 over the past 2 years

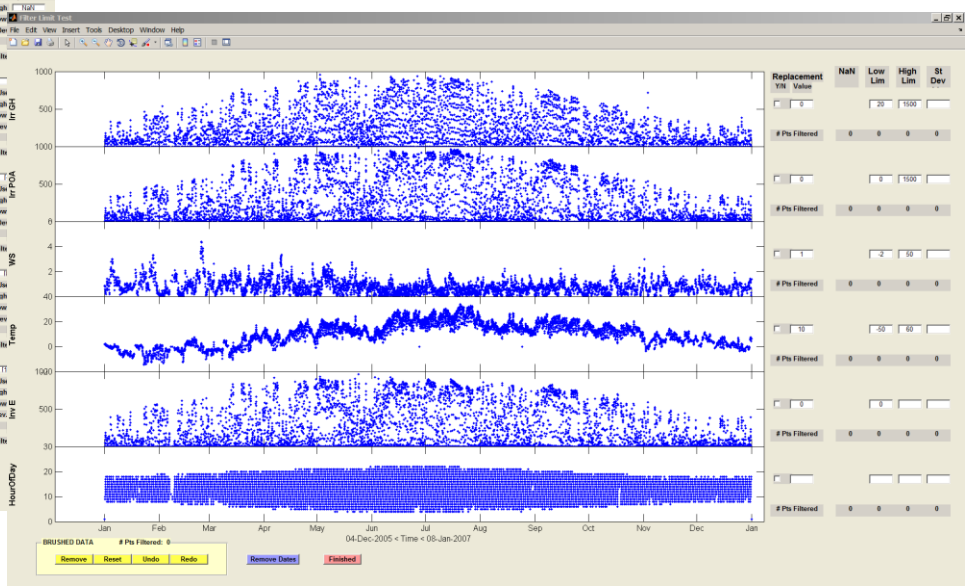
Model Validation Process

1. Choosing sites:
   - Ensure that the study includes the suite of SunPower module and mounting products
   - Select diverse geographic locations
   - Rule out sites with major issues in first year of operation (data outages, technical issues that can't be modeled, etc.)
2. Gathering simulation inputs:
   - Use as-built drawings to generate simulation inputs
3. Retrieving meteorological and production data

Model Validation Process

4. Data quality checking:
   - Only compare to measured conditions we'd expect the tool to simulate
   - Use an internally-developed tool to remove or fix anomalies in the data:
     - Inverter outages
     - Data acquisition outages
     - Fix time shifts



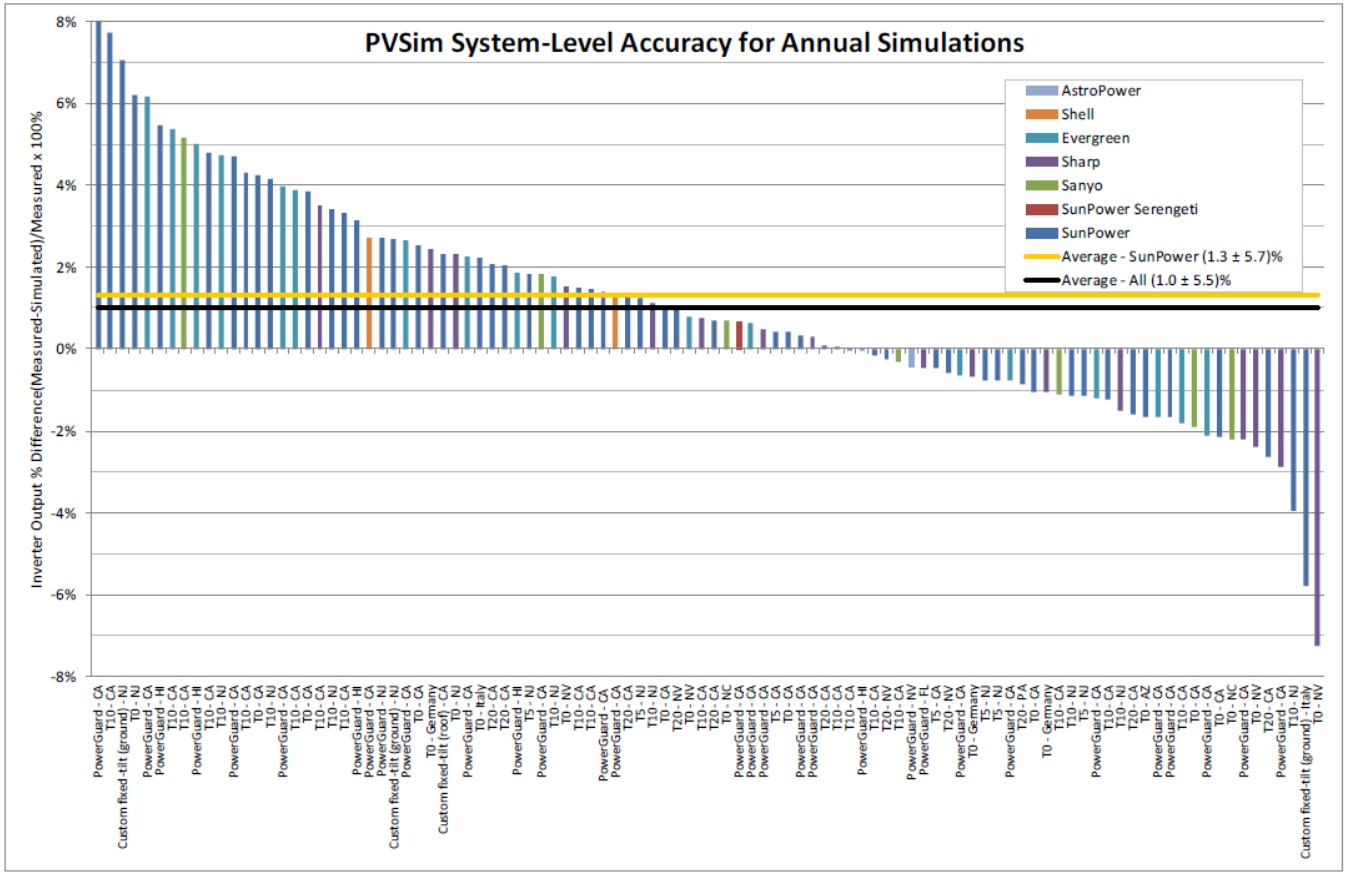


Model Validation Process

5. Process results
   - Key metric: % difference in annual yield between measured and modeled
   - Roll-up results in many other ways to investigate, for example:
     - Seasonal differences
     - Regional results
     - Time series results

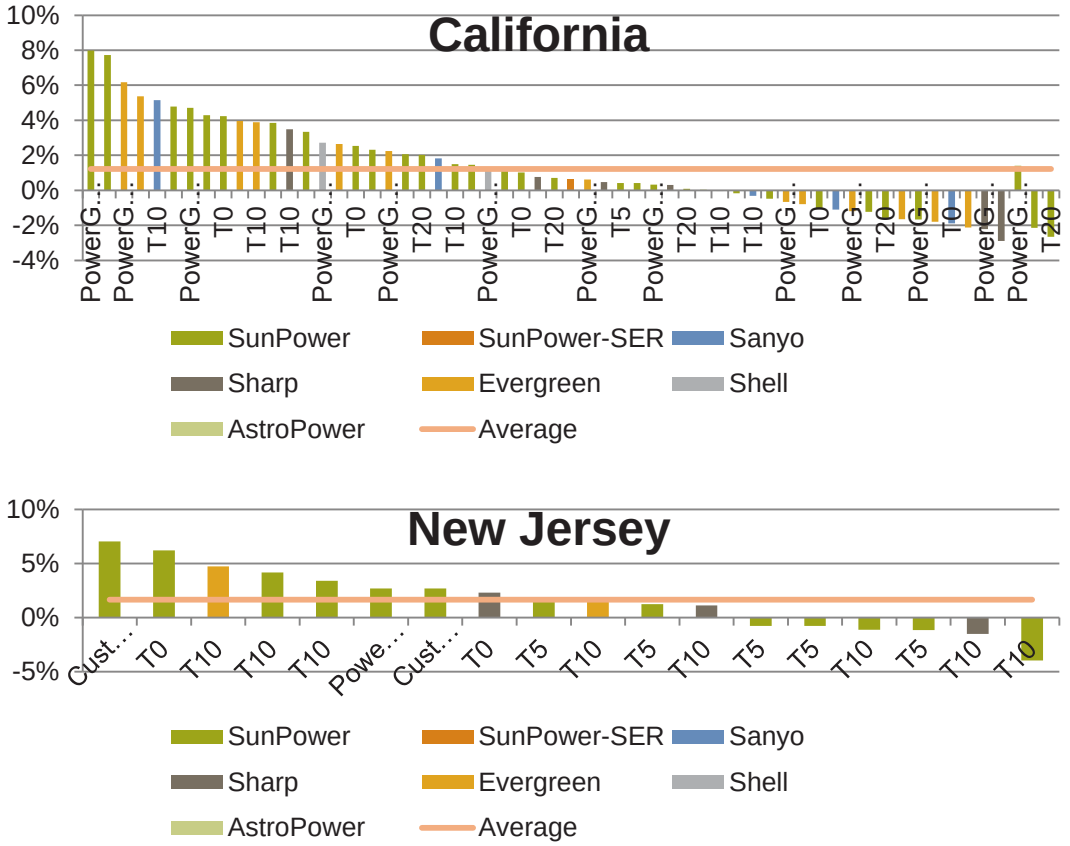
Results

- On average, annual energy production is 1.3% greater than predicted for SunPower modules and 1.0% greater than predicted across all module manufacturers compared



Lessons Learned & Next Steps

- Soiling & snow cover a significant source of uncertainty
  - Effort underway to improve and expand soiling & snow cover model
- Further expansion of compared sites:
  - More utility-scale projects to validate dynamic AC loss model
  - Residential projects



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