CSI RD&D Program
Coordination and IOU Outreach - Solicitation #1 Grants
Advanced Modeling and Verification

July 22nd, 2010

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Project summary

Project participants including…	…will complete four deliverables

• Companies/Agencies/Organizations
  • CPR
  • SUNY
  • NREL
  • NYSERDA
  • SEPA
 	
• Utilities
  • SMUD
  • LIPA
  • SRP
  • NYPA
	• Enhance spatial and temporal resolution of SolarAnywhere®
	
	• Enhance PVSimulator to include output variability and validate
	
	• Integrate PV modeling capabilities into a distribution system engineering and analysis tool
	
	• Create tool to calculate economic value of a specific PV fleet configuration, whether it be distributed or central station

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Participant roles

- CPR
  - Manage project
  - Deliver high resolution SolarAnywhere data
  - Extend short-term output variability algorithms
  - Modify PVSimulator for distribution planning tool integration
  - Develop economic valuation tool
  - Work with utilities to design and test new tools
- SUNY
  - Create high resolution SolarAnywhere data
- NREL
  - Modify distribution planning tool

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Participant roles (cont.)

- NYSERDA
  - Provide funding and oversight
- SEPA
  - Facilitate information transfer
- Utilities
  - Provide data
  - Interact with CPR to test four new products
    - High resolution solar data
    - Output variability algorithms
    - Distribution planning tool
    - Economic valuation tool

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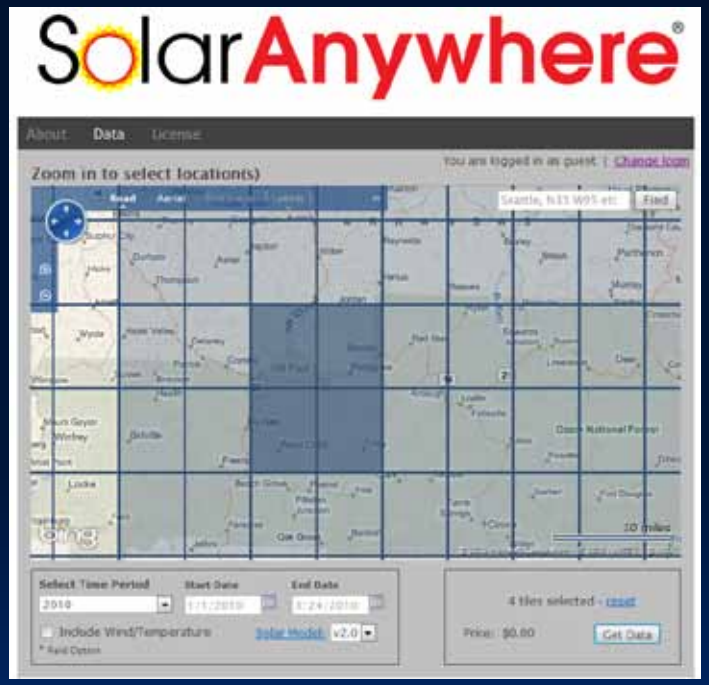
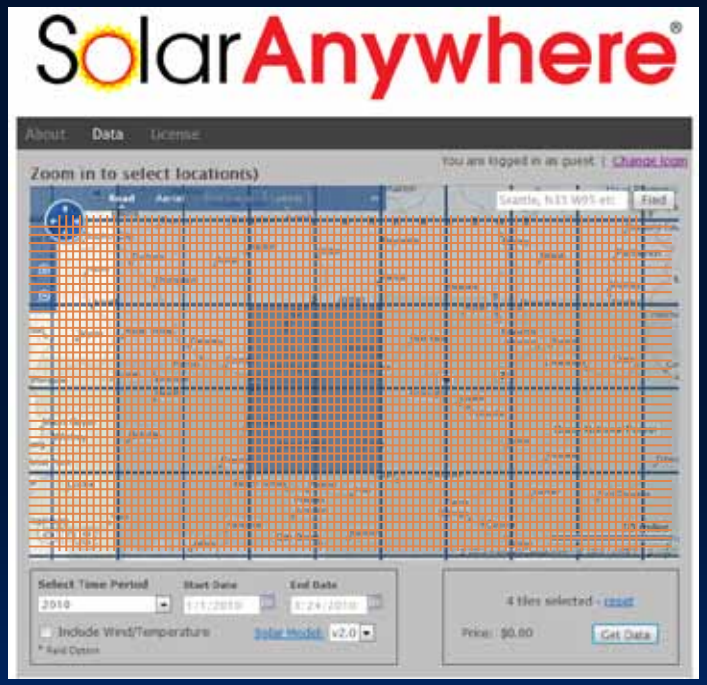
Deliverable 1: Enhance SolarAnywhere

- The first deliverable is to extend spatial and temporal resolution of SolarAnywhere at selected locations in CA

Move from 10 km grid …



… to 1 km grid



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Deliverable 1: Progress

- Launched extensively revised SolarAnywhere website (www.SolarAnywhere.com) that provides free, low resolution data through 2007 anywhere in the U.S. – this will be the basis for 1 year old high resolution data for CA
- Completed implementation of providing high resolution imagery to SUNY
- **Made decision to cover 100% of CA with high resolution data**
- CPR is considering how to leverage this work for CA by integrating into its real-time and forecasting PV output (PVCheck for SMUD and CEC? ISO forecasts?)

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Deliverable 2: Enhance output variability algorithms

- Develop output variability algorithms and test and validate implementation in PVSimulator to perform PV simulations on a sub-hourly time scale
  - Current approach models **relative** output variability for a **simplistic** PV fleet configuration over any time interval
  - Enhanced approach will model **absolute** output variability for **any** PV fleet configuration over any time interval

	Output Variability	PV Fleet Configuration
Current Model	**Relative**	**Simplistic**
Enhanced Model	**Absolute**	**Any**

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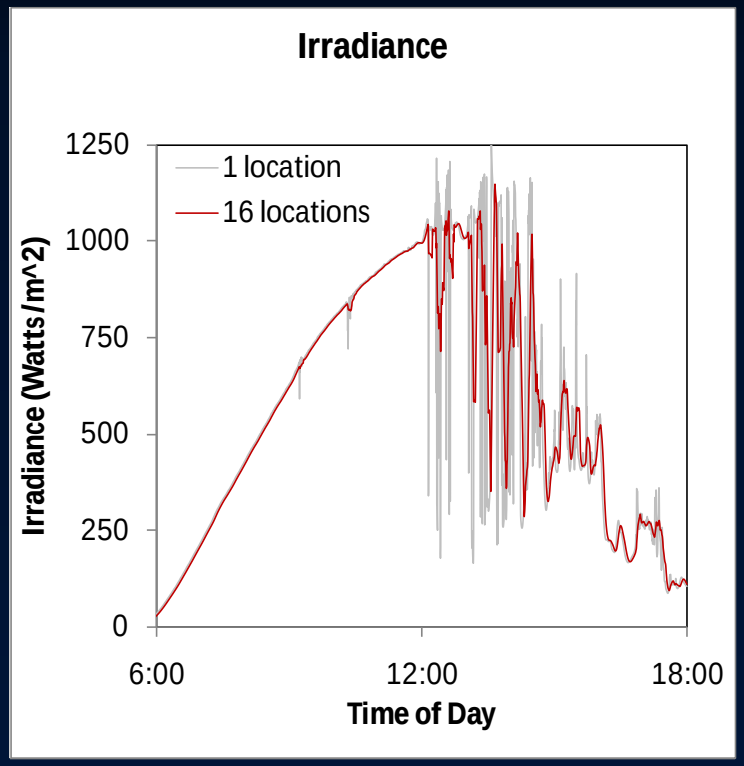
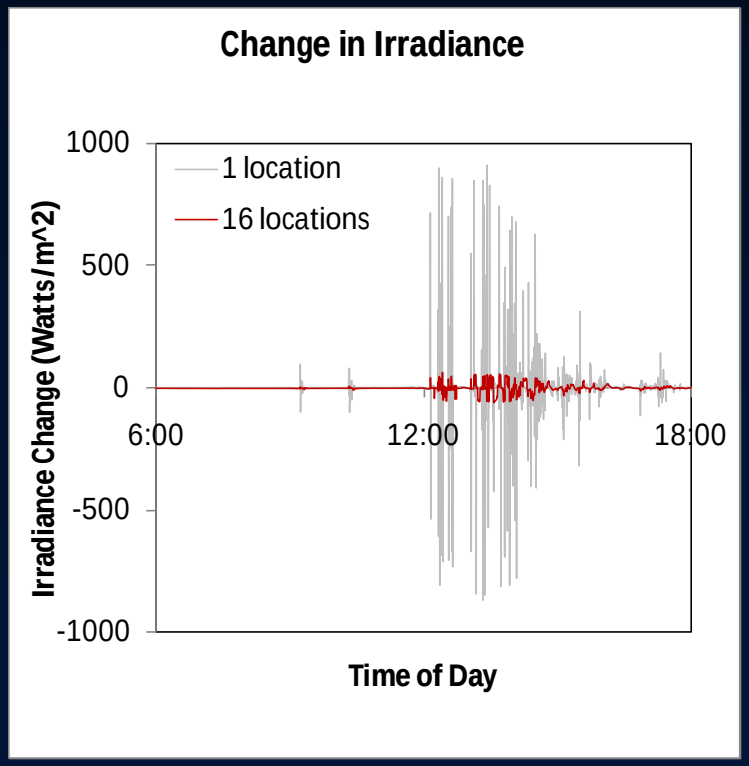
Solar irradiance variability





- **Variability (change in irradiance) decreases as number of locations increase**
- **More distributed systems reduce variability**

* Relative Output Variability = Output variability for fleet / Output variability at single location

Source: CPR analysis

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Deliverable 2: Progress

- Initiated research to quantify short-term (< 1 hour), absolute output variability using hourly SolarAnywhere data correlated with high speed data from 24 locations
- Began to evaluate low-cost data collection devices that could be deployed in a large number in a dense area for a short-term test because high speed PV performance data will be difficult to obtain from utility sources

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Deliverable 3: Distribution tool with PV capabilities

- Integrate PV modeling capabilities with distribution engineering and analysis tool

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Deliverable 3: Progress

- CPR has given detailed projet presentations to 7 utilities (ConEd, LIPA, NYPA, PG&E, SCE, SMUD, and SRP), none of whom use the software for distribution planning that CPR originally planned to modify
- One widely used tool is SynerGEE (SMUD uses SynerGEE). SMUD and has another CSI grant to do development work with SynerGEE and CPR is coordinating its efforts with this project

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Deliverable 4: Economic valuation tool

- Create a PV value assessment tool that takes technical inputs from the distribution planning process and calculates the economic value of a specific PV fleet configuration

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Deliverable 4: Progress

- Initiated tool design
  - Progress was made on how to combine hourly PV output data with hourly load data as a first step to calculate capacity value on the generation, transmission, and distribution systems
  - Developed and implemented loss savings calculations
  - Implemented the Effective Load Carrying calculations
  - Draws from work performed for Austin Energy and other utiltiies
- Extended scope of project to use tool in support of NYSERDA's geographic balancing program

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