



2026 PV Performance Modeling Collaborative Workshop (V4)

Mon, May 11 5:00-6:30 PM Happy Hour			
Site:	Hotel Albuquerque, 800 Rio Grande Blvd NW, Albuquerque, New Mexico USA		
Day 1	Tuesday, May 12, 2026		
8:00	1:00	Breakfast and Registration	
9:00	0:10	Welcome from Sandia National Laboratories	Erik Webb Sandia National Laboratories
9:10	0:10	Welcome from Groundwork Renewables	Ann Will GroundWork Renewables
9:20	0:10	PVPMC Updates	Joshua Stein Sandia National Laboratories
Session 1	Irradiance Modeling		Chair: Joshua Stein Sandia National Laboratories
9:30	0:15	Comprehensive review of satellite data site-adaptation to ground-measured Global Horizontal Irradiance across the US	Nate Croft GroundWork Renewables
9:45	0:15	Evaluation of Decomposition-Transposition Methods for POA Irradiance Estimation in Tropical High-Cloudiness Conditions Using High-Resolution Field Measurements	Erick Cepeda (Student) Ingeniería Creativa - ICREA and Universidad Nacional de Colombia
10:00	0:15	Uncertainty evaluation of PR measurement with focus of meteorological parameters	Kees van den Bos Hukx
10:15	0:15	Q&A	
10:30	0:45 Networking Break		
Session 2	Modeling Single Axis Trackers		Chair: Kevin Anderson Sandia National Laboratories
11:15	0:15	Thermal-Aware Single-Axis Tracking: Reducing PV Module Temperature and UV Exposure Without Sacrificing Yield	Robinson Cavieres The University of New South Wales
11:30	0:15	A Workflow to Analyze the Impact of Terrain Undulations on Energy Yield for Different Motor Block Sizes	Umay Akkoseoglu DNV
11:45	0:15	Probabilistic reconstruction of unknown tracker angles for sub-hourly loss quantification	Thore Müller PVRADAR Labs GmbH
12:00	0:15	A framework for improving wind stow models with field validation	Justin Roelant Array Technologies Inc.
12:15	0:20	Q&A	
12:35	1:00 Lunch		
Session 3	Posters		
13:35	1:00 Poster Session 1 - PV Performance Posters		
Session 4	PV Performance Model Development		Chair: Janine Keith National Laboratory of the Rockies (NLR)
14:35	0:15	Low Breakdown Voltage Cell in Pvsyst	Bruno Wittmer Pvsyst SA
14:50	0:15	Impact of Spectrum, Luminescent Coupling, and Temperature Coefficient on Tandem Device Performance	Zihui Zhang (Student) The University of New South Wales
15:05	0:15	Application of the Intrinsic-Adjusted Single Diode Model to Production Data	Phillip Hamer The University of New South Wales
15:20	0:15	Q&A	
15:35	0:45 Networking Break		
Session 5	Modeling PV + Battery Systems		Chair: Balamurali Rammohan Arevon Energy
16:20	0:15	Sizing DC-Coupled Utility-Scale BESS Using a Charging Reliability Metric Under High Curtailment Conditions	Andres Fernandez Ingeniería Creativa - ICREA
16:35	0:15	Gaps in PV-Coupled Battery Modeling	Janine Keith National Laboratory of the Rockies (NLR)
16:50	0:15	Combined Lost Energy and Fault Analysis for DC-Coupled PV+BESS	Nicholas Ward AES Clean Energy
17:05	0:15	PV + Li-Ion BESS: Modeling and Evaluation of Energy Arbitrage and Ancillary Service Use Cases	Richard Holz Bechtel Corporation
17:20	0:20	Q&A	
17:40	1:30 Happy Hour		
19:10	End of Day 1		

Gold Level
Sponsors





Day 2			
Wednesday May 13, 2026			
	6:30 AM	Fun Run - Meet at Entrance to Hotel	
8:00	1:00	Breakfast	
9:00	0:10	PVMAC Updates	Marios Therists, Sandia National Laboratories
Session 6		Key Performance Indicators	Chair: Marios Therists, Sandia National Laboratories
9:10	0:15	Reliable and Actionable Performance Metrics for Heavily Curtailed Plants	Gofran Chowdhury, 3E
9:25	0:15	O&M KPIs: You get what you pay for	Kevin Anderson, Sandia National Laboratories
9:40	0:15	Energy accounting harmonization	Dan Leary, Denowatts
9:55	0:15	How spectral effects impact capacity testing — a case study	Keith McIntosh, PV Lighthouse and Kiewit Engineering
10:10	0:20	Q&A	
10:30	0:45	Networking Break	
Session 7		Closing the loop from operations to design	Chair: Rhonda Baily, RB RE Consulting LLC
11:15	0:15	Interpreting Field Data from Five Utility-Scale PV Projects	Graham Gallop, Mortenson
11:30	0:15	Measurement of Single-Axis Solar Tracker Availability for a >100 GW Operating Fleet Across 6 Continents	Aron Dobos, Nextpower
11:45	0:15	Understanding discrepancies in module degradation and performance loss rate	Norman Jost, Sandia National Laboratories
12:00	0:15	Quantifying Losses and Failure Rates in Large-Scale PV Fleets with the SUPER Benchmarking Tool	Daniel Fregosi, EPRI (Electric Power Research Institute)
12:15	0:20	Q&A	
12:35	1:00	Lunch Break	
Session 8			
Posters			
13:35	1:00	Poster Session 2 - PV Operations Posters	
Session 9		Model Validation	Chair: TBD
14:35	0:15	Comparative analysis: Validating PV simulation uncertainty against field measurements	Tomas Cebecauer, Solargis
14:50	0:15	Evaluating Error Propagation Across the Photovoltaic Modeling Pipeline Through Blind Modeling	Lelia Deville, University of Louisiana at Lafayette
15:05	0:15	Validation with PV plant data and updates of the 3D energy yield calculation model for the RatedPower software	Félix Ignacio Pérez Cicala, Rated Power
15:20	0:15	Q&A	
15:35	0:45	Networking Break	
Session 10		Uncertainty	Chair: Clifford Hansen, Sandia National Laboratories
16:20	0:15	Climate-Dependent Differences in Energy-Yield Exceedance Levels: Parametric (PVsyst) vs Monte Carlo Uncertainty for Four U.S. PV Sites	Rounak Kharait, E3 Consulting Services, LLC
16:35	0:15	An Operational Evaluation of Modeled Uncertainties to Measured Solar Irradiance and Grid Energy	Halley Darling, Natural Power
16:50	0:15	Why Nominal Generation Is Not P50: Quantifying Systematic Bias In Solar Performance Modeling	Chetan Chaudhari, PowerUQ
17:05	0:15	Adding Context to P50: A Practical Approach for Pre-Construction Energy Assessments	Jon Kalantar, DNV
17:20	0:20	Q&A	
17:40	0:05	Poster Award Ceremony	
17:45	1:30	Happy Hour	
19:15		End of Day 2	

Gold Level Sponsors



Day 3 Thursday May 14, 2026			
8:00	1:00	Breakfast	
Session 11 Forecasting			
Chair: Andres Calcabrini		PVcase	
9:00	0:15	How Hybrid Forecasting Improves Earnings of Utility-Scale Energy Assets	Juergen Sutterlueti Gantner Instruments
9:15	0:15	Reducing Month-Ahead PV Yield Uncertainty with ENSO-Informed Machine Learning	Marc Perez Clean Power Research
9:30	0:10	Q&A	
Session 12 Modeling Tool Updates 1			
Chair: Amir Asgharzadeh Shishavan		Nextpower	
9:40	0:10	pvcaptest Evolves: Streamlined Bifacial Testing	Ben Taylor Tailored Data Consulting
9:50	0:10	Updates on the National Solar Radiation Data Base	Yu Xie National Laboratory of the Rockies (NLR)
10:00	0:10	PVCollada: A Schema for Exchange of Digital PV System Design Data	Clifford Hansen Sandia National Laboratories
10:10	0:10	What's New in System Advisor Model	Janine Keith National Laboratory of the Rockies (NLR)
10:20	0:20	Q&A	
10:40 0:45 Networking Break			
Session 13 Modeling Tool Updates 2			
Chair: Kendra Conrad		Array Technologies	
11:25	0:10	SolarGIS Evaluate: Browser-based high-fidelity PV plant modelling using high-resolution terrain	Tomas Sasko SolarGIS
11:35	0:10	Updates and future developments in PVsyst	Robin Vincent PVsyst SA
11:45	0:10	DNV SolarFarmer: latest developments and insights	Javier Lopez-Lorente DNV
11:55	0:10	PlantPredict: Software Updates and Roadmap	Jason Spokes Terabase
12:05	0:20	Q&A	
12:25	0:10	Closing Remarks	Joshua Stein Sandia National Laboratories

12:35 1:00 Lunch

Afternoon parallel sessions continue on next page

Gold Level
Sponsors



Poster Session 1 - 13:35 -14:35 on Day 1 (May 12)

Number	Position	Title	Name	Institution
1	1-1	How Complex Are Satellite-Based Irradiance Data? From Global to Location-Specific Accuracy for PV Performance Modeling	Gofran Chowdhury	3E
2	1-2	Quantifying Performance Differences Between Manufacturer-produced and Third Party-produced PAN Files	Scott Meredith	Anza Renewables
3	2-1	Impacts on backtracking energy generation from underlying terrain undulations and varying motor block size	Billy Hayes	Array Technologies, Inc
4	2-2	Comparative Analysis of Third-Party Measured Incidence Angle Modifier Profile with Manufacture-based Profile for PV Modules	Stephen John	Black & Veatch
5	3-1	A Designer's Perspective on Complex 3D Shading Scenes in Solar PV Performance	Stephen Sherwood	Black and Veatch
6	4-1	Integrated day-to-hour downscaling of irradiance and temperature for climate projection	Marc Perez	Clean Power Research
7	4-2	When Resolution Reveals Geometry: Correcting Parallax Bias in Satellite-Derived GHI	Marc Perez	Clean Power Research
8	5-1	Impact of Long-Term Average Soiling and Temporal Resolution on Energy Yield Analysis	Umay Akkoseoglu	DNV
9	5-2	From GHI-MLE to POA-MLE: Configuration-Relevant Solar Resource Selection for PV Performance Modeling	Rounak Kharait	E3 Consulting Services LLC
10	6-1	Validation of PVsyst and Pvlb Transposition Models Implementations Using Long-Term Operational Data	Vivek B. Mahtani	Enerjis Solar Inc.
11	6-2	Validation of Diffuse Irradiance Estimation Models for Use with the Pérez Transposition Model in PVSyst	Javier W. Delgado Hernandez	Enerjis Solar Inc.
12	7-1	Laboratory and Outdoor Measurement Insights for CdTe Module Performance Evaluation	Daniel Zirzow	GroundWork Renewables
13	7-2	Backyard PV Module Partial Shade Characterization	Will Hobbs	Hobbs Family
14	8-1	Comparison of Horizon Shading Models	Sydney Eiss	Invernergy LLC
15	8-2	From GHI to POA: Validation of Decomposition and Transposition Models Using Field Measurements	Bahram Emami	McCarthy Building Companies, Inc.
16	9-1	Exploring terrain modeling through PVfarm-PVsyst integration	Levi Brown	McCarthy Building Companies, Inc.
17	9-2	Hybrid Physics-Informed Digital Twin for PV Performance Modeling with Field Validation	Daniel Okon (Student)	Morgan State University
18	10-1	Enhancements in voltage degradation modeling for multi-year analyses	Matt Prilliman	National Laboratory of the Rockies (NLR)
19	10-2	A Systematic Review and Integrated Approach to Modeling of Aging Utility Scale PV Systems	Matt Prilliman	National Laboratory of the Rockies (NLR)
20	11-1	The Integration of GOES Data for Solar Resource Assessment of the Contiguous U. S.	Yu Xie	National Laboratory of the Rockies (NLR)
21	11-2	Improving the National Solar Radiation Data Base using PSM V4	Yu Xie	National Laboratory of the Rockies (NLR)
22	12-1	High-resolution WRF-based Downscaling of Earth System Model Projections for Energy Applications across CONUS	Jaemo Yang	National Laboratory of the Rockies (NLR)
23	12-2	Modeling wind in agrivoltaics and its impact on eddy covariance flux measurements	Nick de Vries	Silicon Ranch
24	13-1	Assessing Uncertainty in Solar Measurements: Key Findings from NLR's SUNI Application across 89 Stations	Aron Habte	National Laboratory of the Rockies (NLR)
25	13-2	Skewed results: Can diagonal arrays maintain/improve performance?	Laura Hinkelman	Origen Energy, Inc.
26	14-1	Impact of Time-Series Weather Dataset Selection on NEC-Compliant PV String Sizing and Balance-of-System Economics	Vatan Kumar	Sun2O
27	14-2	Using electrical circuit tool pvspsc for potential induced degradation simulations on a string level	Norman Jost	Sandia National Laboratories
28	15-1	Evaluating the Variability of Photovoltaic Capacity Factor Utilizing Long-Term Satellite-Derived Solar Resource Data in the Brazilian Climate	Joao Frederico (Student)	Universidade Estadual de Campinas and NLR
29	16-1	Thermal & Electrical Model coupling – Modelling Recombination effects for high efficiency modules at module scale	Robinson Cavieres Abarca (Student)	University of New South Wales
30	16-2	Towards an Improved Thermal Model with Physically Consistent Heat Loss Coefficients	Phillip Hamer	University of New South Wales
31	17-1	Evaluating Photovoltaic Inverter Clipping Using Minute-Resolution Irradiance Data	Albert Chang	VDE Americas
32	18-1	Leveraging ArcGIS Pro for 10%–30% Civil Grading Estimation	Matthew Gagne	Wood PLC
33	18-2	Designing for Terrain: A Case Study for PV Yield Optimization	Matthew Gagne	Wood PLC

Gold Level Sponsors



Poster Session 2 - 13:35-14:35 on Day 2 (May 13)

Number	Position	Title	Name	Institution
34	1-3	Universal Analytical Model for Inter-Row Shading Loss Estimation in PV Plants	Gofran Chowdhury	3E
35	1-4	Comparative Assessment of ASTM E2848 and Temperature-Normalized Solar PV Capacity Testing Protocols	Shail Bajpai	Black & Veatch
36	2-3	Diagnostic techniques for PV plant performance	Jay Miller	Black & Veatch
37	2-4	An Alternative Approach for Determining Reporting Conditions and Expected Capacity for PV Capacity Testing	Parag Pathak	Black & Veatch
38	3-3	ASTM E2848-13 Based Energy Forecasting Methodology for Underperforming Solar PV Plants	Saurav Kadel	Black & Veatch
39	4-4	A Data-Driven Method for Predicting PV Energy Losses from Shading	Radhika Lampuse and Andrea Quattrone	DNV
40	5-3	Evaluation of Dust Soiling Models Against Operational Data	Umay Akkoseoglu	DNV
41	5-4	Is IEC-61853 testing useful for predicting the energy yield of tandem solar cells?	Rajiv Daxini	National Laboratory of the Rockies (NLR)
42	6-3	First Solar True-Backtracking vs. Backtracking in Various Diffuse Conditions	Anna Raper	DNV Energy USA Inc
43	6-4	A review of the data landscape for solar & storage reliability analyses	Peter Burgess	EDF power solutions
44	7-3	Beyond Performance Ratio: Differentiating Model Bias from Field Underperformance using Physics-Based Modeling	Trevor Coathup	Enurgen
45	7-4	Improving PV Performance Modeling Through Data Quality Flagging and Classification	Devin Widrick	EPRI
46	8-4	Soiling losses: quantifying soiling using operational data	Malcolm Heath	GreenPowerMonitor, a DNV Company
47	9-3	Measurement-Supported Soiling Loss Modeling: Incorporating Site-Specific Preconstruction Measurements with Standard and Advanced Soiling Models	Julie Chard	GroundWork Renewables
48	9-4	Optimizing statistical sampling of in-situ PV module performance metrics for protection against plant total loss	Lawrence Pratt	GroundWork Renewables
49	10-3	Forecast-Driven BESS Scheduling in PV Plants: Intraday Updates to Maximize Arbitrage and Effective Utilization	Rafael Avila Naranjo	ICREA
50	10-4	Solar Capacity Test Case Study – Uncertainty Calculation	Kyle LaBrosse	Invenergy
51	11-3	Quantifying Power Losses from Inverter Voltage Floor Limitations	Sha Li	Leeward Renewable Energy
52	11-4	Combiner-Level Operational Performance Analysis Improvements	Tim Zimet	Longroad Energy
53	12-3	Short Form Energy Performance Index (EPI) Test vs Capacity Testing – A Legitimate Alternative to Industry Standard Milestone Testing	Lucas Smith	Moss
54	13-3	The importance of high-fidelity modeling of single-axis tracker PV systems	Ricky Dunbar	Nextpower
55	13-4	Distinguishing Soiling and Degradation Losses Using In-Situ I-V	Michael Gostein	OTT Hydromet
56	14-3	Use of a modeled-to-measured comparison approach to detect stalled tracker events in a monofacial photovoltaic power plant	Riccardo Adinolfi Borea	RSE - Ricerca sul Sistema Energetico
57	14-4	Impact of Quality Control on Uncertainty in Solar PV Performance Evaluation	Marketa Hulik Jansova	Solargis
58	15-3	Implementing pvlib-based modeling from a grid operator perspective	Matt Malles	Southern Company
59	15-4	Free near-real-time irradiance data from NOAA GOES satellite program	Will Hobbs	Southern Company
60	16-4	Applying Advanced Wind and Precipitation Sensing to Improve Solar Plant Weather Data Reliability and O&M Decisions	Mikko Krapu	Vaisala Oyj
61	17-3	RSS vs. Monte Carlo for Overbuilt Solar: Evaluating Accuracy Across the Distribution	Daniel Moghtader	VDE Americas
62	17-4	Operational Energy Yield Assessments: Comparing Approaches and Managing Uncertainty	David Smith	Wood PLC
63	18-3	Energy Losses due to Temporally or Spatially Significant Tracker Faults	Innes MacMillan	Wood PLC
64	18-4	Evaluating Cyber-Physical Cybersecurity in PV systems	Birk Jones	Sandia National Laboratories

Gold Level Sponsors

