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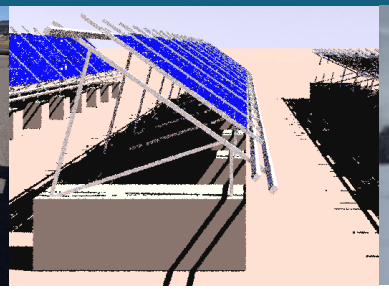
PVPerformance MODELING COLLABORATIVE

Sandia National Laboratories

The 2023 Blind Photovoltaic Modeling Intercomparison



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SAND2023-

Many thanks to the 2021 participants

32 participants from 12 countries and 26 organizations with 29 submissions

PROGRESS IN PHOTOVOLTAICS

Blind photovoltaic modeling intercomparison: a multidimensional data analysis and lessons learned

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K2

Objectives of the blind modeling comparisons

1. Quantify differences among modelers
2. Investigate whether some models are more accurate than others
3. See if performance modeling can be improved
4. Quantify validity of PV performance models
5. Find sources of uncertainty
6. Develop best practices to improve functionality and reproducibility

Approach

- What is different in this comparison: Two scenarios from a larger size plant and an iterative process for easier error propagation
- Two groups: 1) open invitation for anyone to participate, 2) software companies by invitation only
- Call for participants will be announced through the PVPMC emailing list in May; invitations will be sent to software companies separately
- FAQ section will be updated on the PVPMC website as questions arise
- Results will be collected and handled by Sandia ensuring **anonymity** and an **unbiased** analysis
- Participants will have knowledge of their "participation number"; software names will be published

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https://pvpmc.sandia.gov/

Scenarios

Generously shared by: Gantner instruments

S1: 72.36 kW_{dc} (1.2 DC/AC) **(or 14 MW)** of monofacial, fixed-tilt, half-cut monocrystalline Trina Solar in Germany over 1-year at **5-min** avg resolution

Generously shared by: Gantner instruments

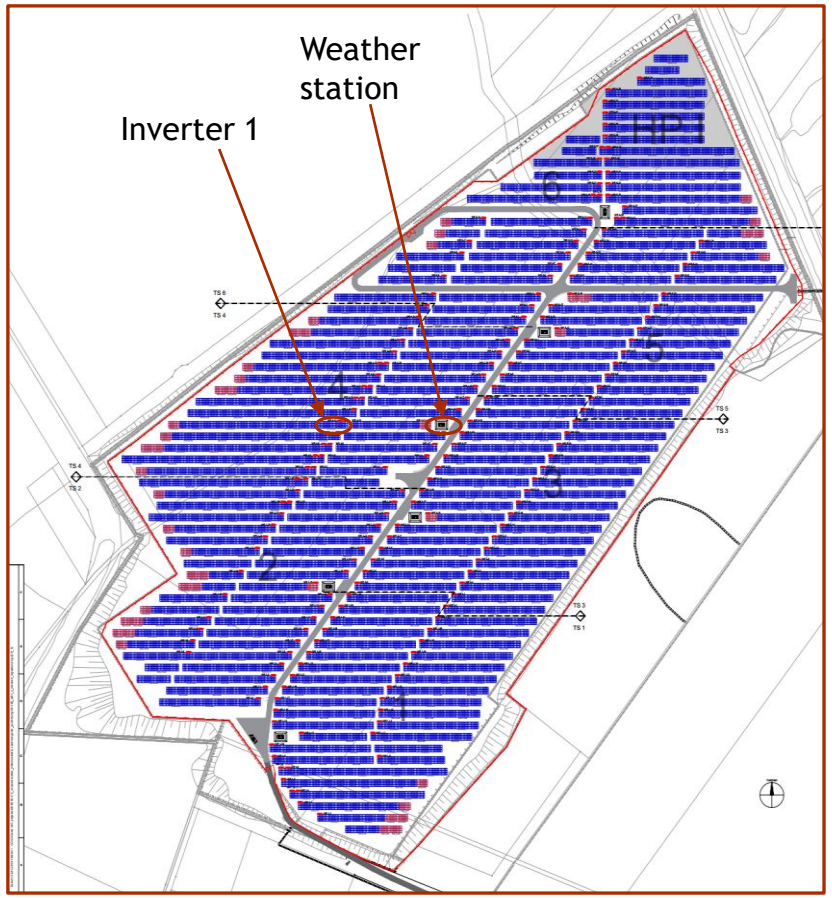
S2: 72.36 kW_{dc} (1.2 DC/AC) **(or 14 MW)** of monofacial, fixed-tilt, half-cut monocrystalline Trina Solar in Germany over 1-year at **hourly** avg resolution

PHASE 1

S3: 3.9 kW_{dc} of monofacial, fixed-tilt, LG n-PERT in Albuquerque, NM over 1-year at **1-min** resolution

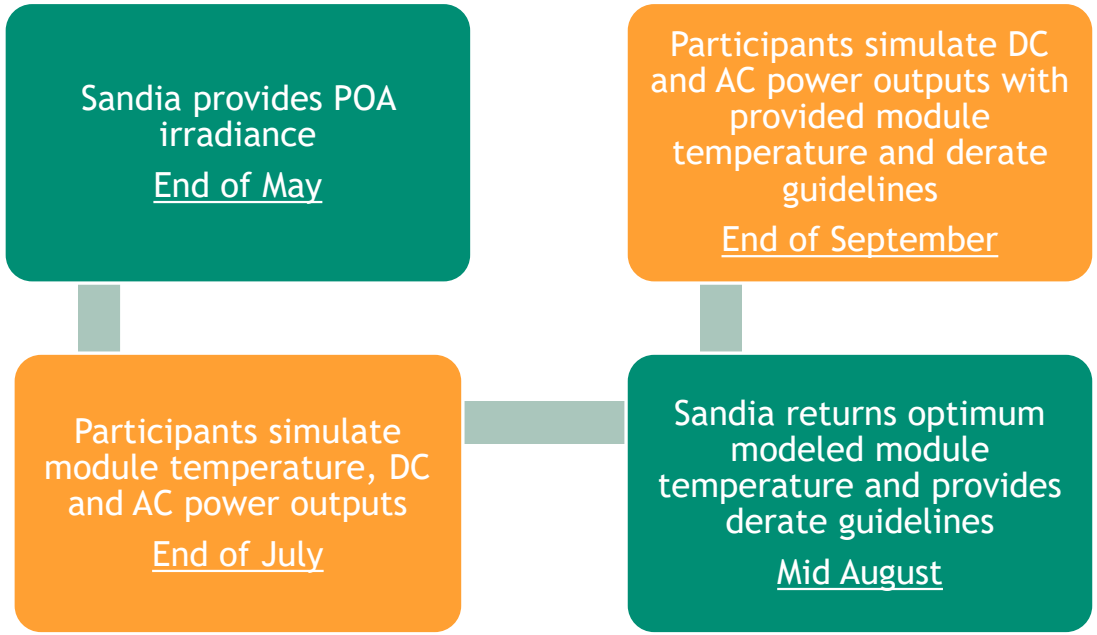
S4: 3.9 kW_{dc} of monofacial, fixed-tilt, LG n-PERT in Albuquerque, NM over 1-year at **hourly** avg resolution

PHASE 2

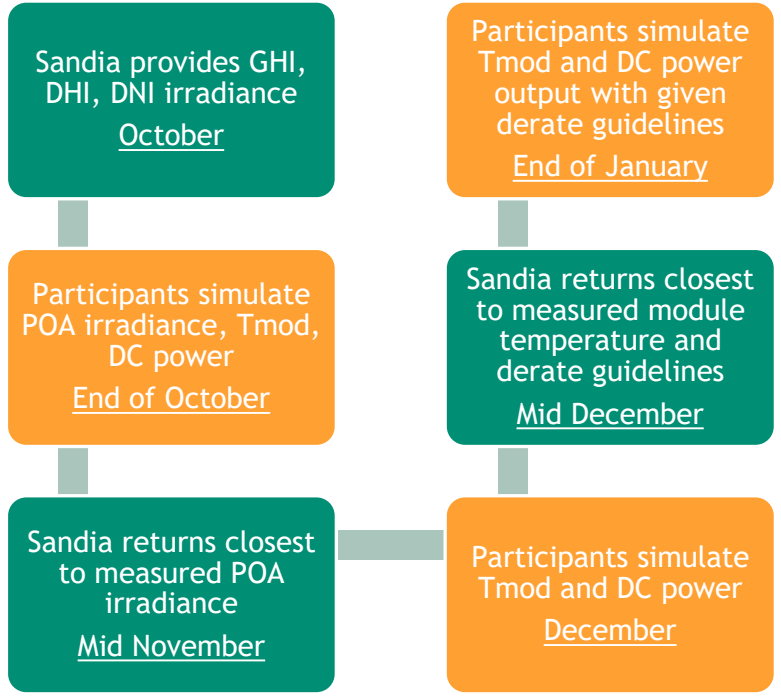


Iterative process

PHASE 1 (S1, S2): May – September 2023



PHASE 2 (S3, S4): October – January 2024



Iterative process enables error propagation and a self-learning experience
Analysis of Phase 1 and 2 will be published in a manuscript with best practices

Why participate?

- When an approach is tested against known datasets → bias
- This blind intercomparison provides an opportunity for PV modelers to test their models and ability
- This is an opportunity to participate in an international collaborative and see how your modeling skills or models compare to others
- Results are shared with the participants much earlier than any other dissemination efforts
- Participation in a large collaborative journal article
- Self-learning exercise; iterative process will allow modelers to understand at which step(s) the error/uncertainty is being introduced
- Get your company logo and name advertised for free!

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Well-documented PVPMC validation datasets can be downloaded at: https://datahub.duramat.org/project/about/pvpmc

Any feedback is welcomed!

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