Going beyond stuck trackers: how well do your trackers work?

PREPRINT

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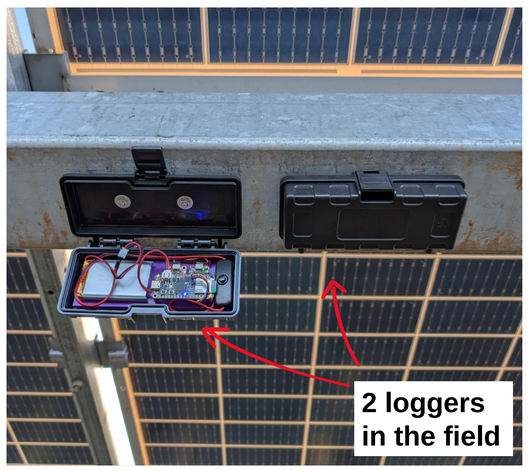
Stuck & broken trackers get attention in the industry, but there are additional **issues beyond binary "working/not working"** that can **impact performance**.

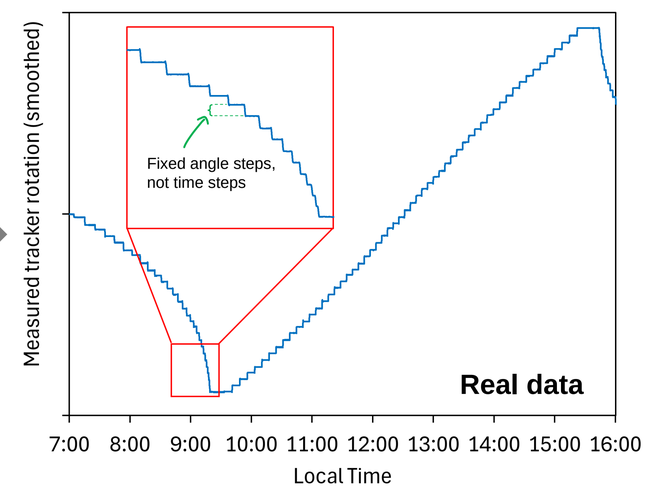
We are working on a cheap temporary datalogger to **measure actual position**, and models to **estimate impacts of "non-idealities."**

"Where are my trackers actually pointed?"

Non-idealities that **can't be measured with existing plant data**: torque-tube twist, torque-tube sag, actuator position calibration error.

Solution: cheap, mailable, magnet-mount 3-axis tilt data loggers. Measurements every 1-sec, compare to expected/modeled/ideal positions. Eventually open-source.





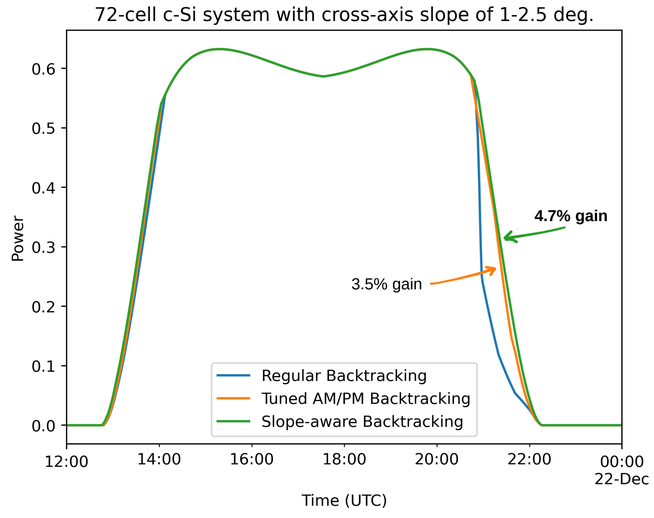
Mail to plant → stick on trackers for a few days → mail back.

Goal: assess plant-specific and industry-wide non-idealities. ***Contact us if you might want to participate!***

"How much am I losing?"

Modeling non-idealities isn't always easy, so how much are you losing?

- We presented some self-shade and tracker fault examples/methods in [2].
- Functions in [2] have been **expanded**: now allow cross-axis slope, independent AM/PM backtracking, clock-drift, fixed-tilt shade, others. https://github.com/williamhobbs/pv-system-model, with examples in https://github.com/williamhobbs/2025-pvrw-trackers.



References:

[1] Anderson, Kevin S., and Clifford W. Hansen. "Simulated Performance Effect of Torque Tube Twisting in Single-Axis Tracking PV Arrays." 2024 IEEE 52nd Photovoltaic Specialist Conference (PVSC). http://dx.doi.org/10.1109/PVSC57443.2024.10749340

[2] Hobbs, W., Anderson, K., Mikofski, M., and Ghiz, M. "An approach to modeling linear and non-linear self-shading losses with pvlib." 2024 PV Performance Modeling Collaborative (PVPMC). https://github.com/williamhobbs/2024_pvpmc_self_shade

POWERED BY pvlib

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