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High-fidelity modeling of single-axis tracker PV systems

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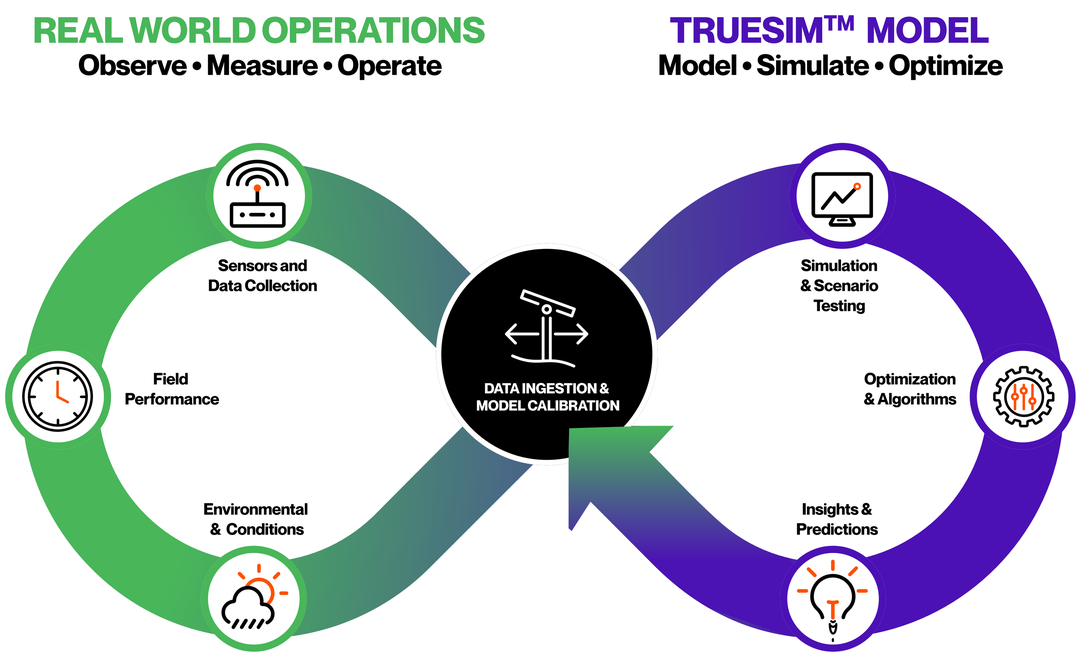
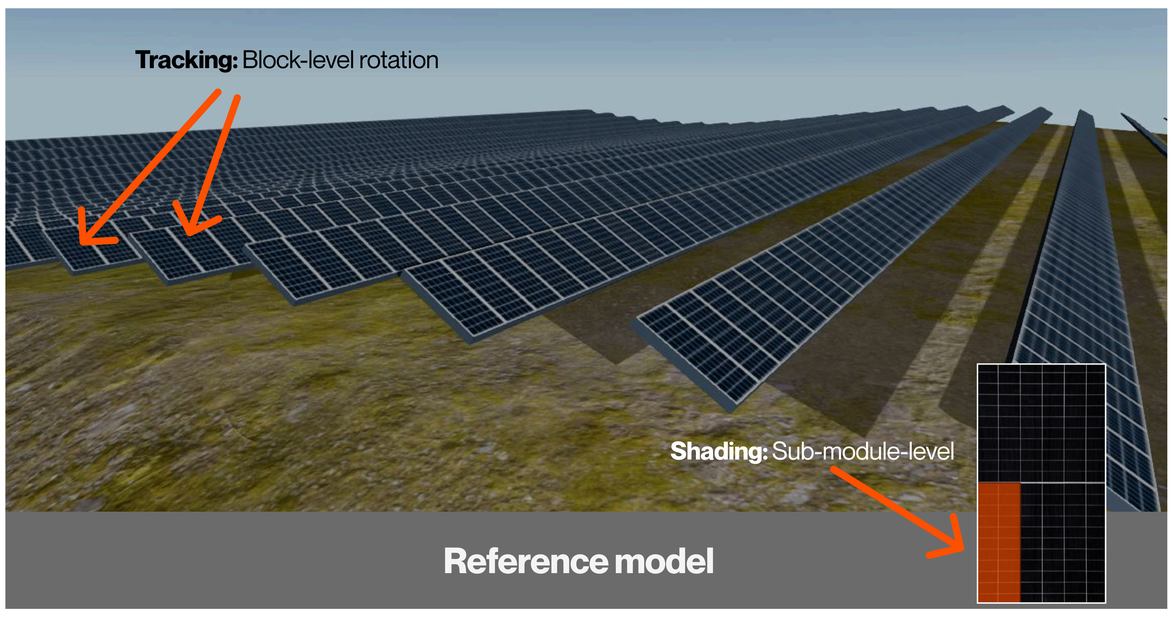
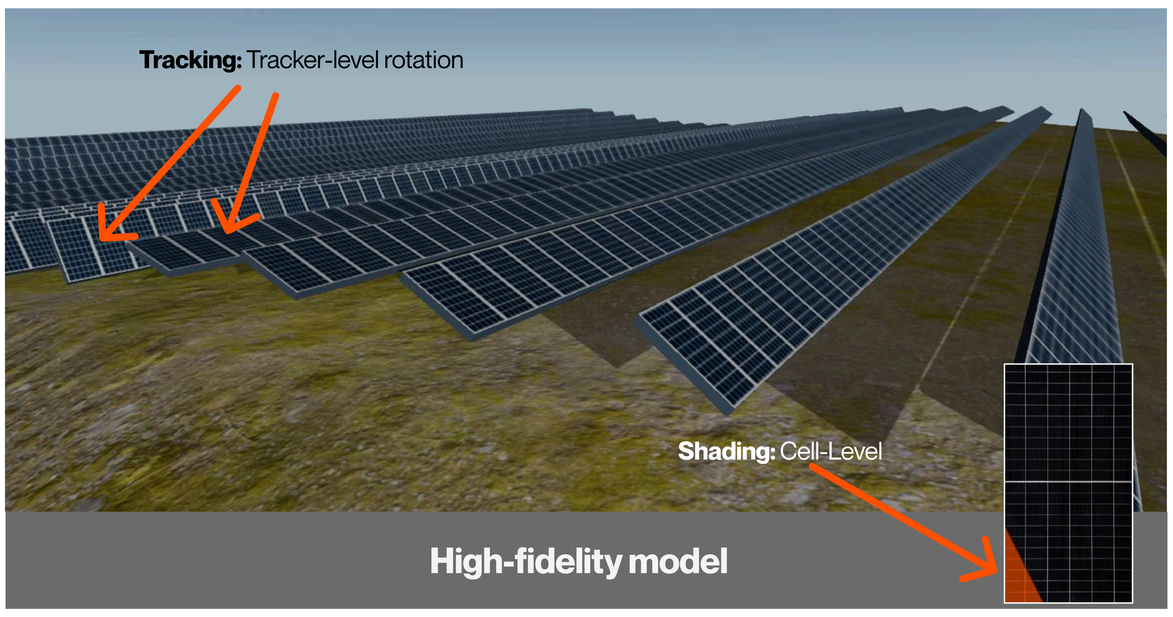
- TrueSim™ is a high-fidelity, web-based modeling tool built on open-source and internally-developed libraries. It is used to make site-specific commitments for energy gains from various products including advanced tracking → **Accuracy is critical.**
- A modeling-operations feedback loop built on 64.5 site-years of data taken from a total **9.5 GW** of sites enables continuous improvement of products in the field as well as modeling capabilities.
- Our objective in this work is to quantify the importance of two high fidelity model features: cell-level shading and tracker-level rotation.

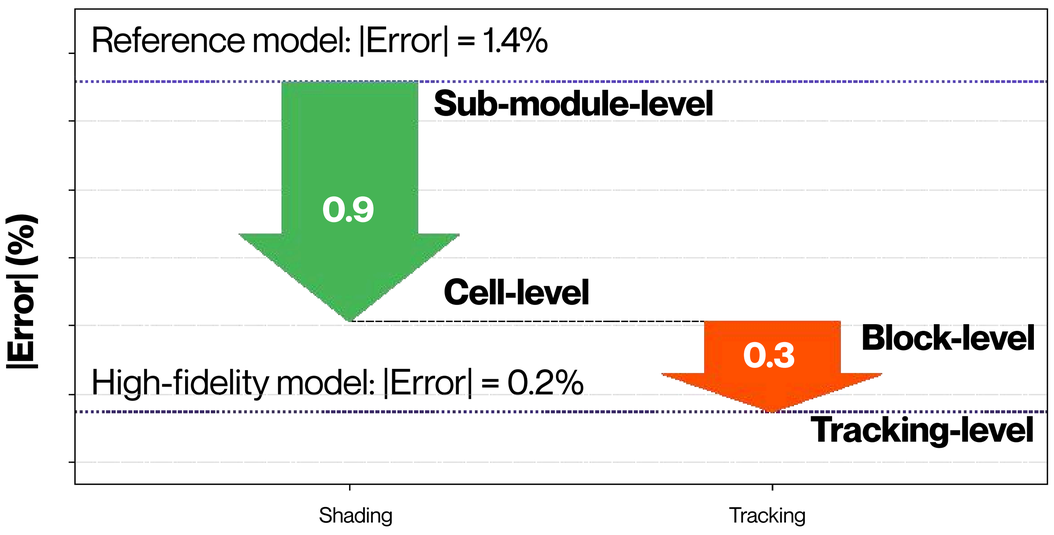


Method: Mimic the low-fidelity features used in conventional models and evaluate accuracy impact



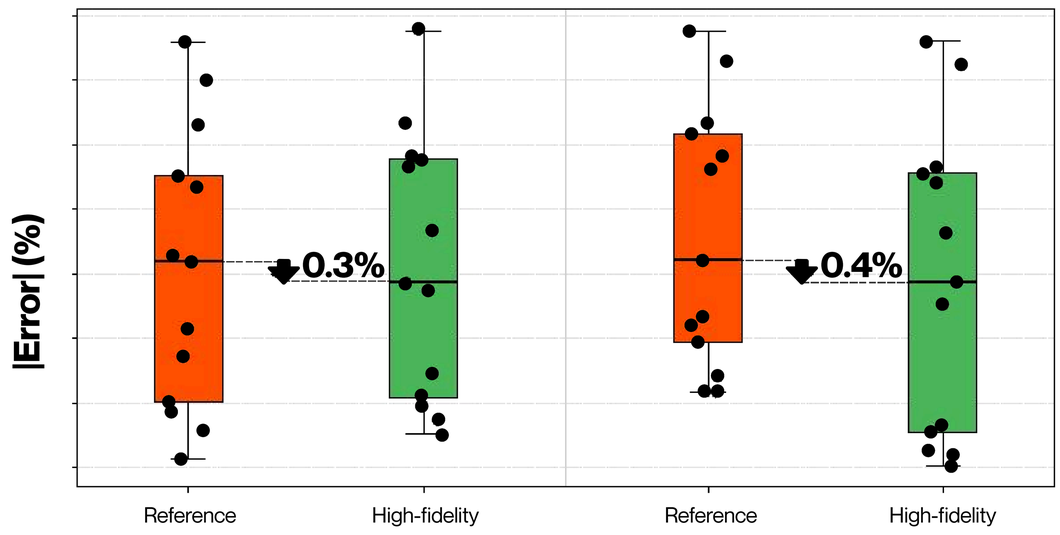


Results: Modeled error, relative to measured site data. Each site has ~1 year of data



Error for a single site in the USA using Advanced Tracking.

High-fidelity model features reduce the error by 1.2% for this site



Standard Backtracking **Advanced Tracking**

Error for 13 blocks (at 7 sites) in the USA, Europe, and Australia. Each marker represents the error for 1 block.

The high-fidelity model reduces the median error, most significantly for advanced tracking.

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