

Multisector Analysis: Advanced Wind Engineering for Solar Trackers

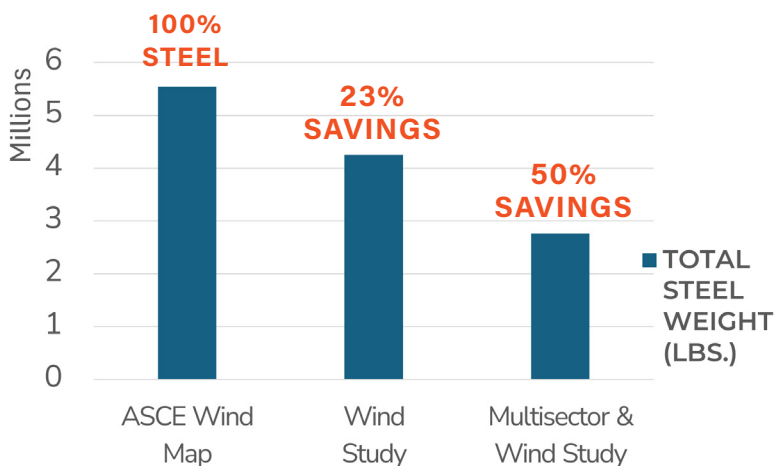
Wind loading governs structural design of solar trackers. Conventional building design practice combines wind speeds prescribed in building Codes with loads from worst-case wind directions. This approach is inherently conservative. For example, because trackers are oriented along the north-south axis, they are not sensitive to north-south winds. This conservatism can result in oversized structures with increased steel tonnage and higher project costs.

MULTISECTOR METHODOLOGY

Multisector analysis addresses these limitations by applying a site-specific wind study in accordance with ASCE 7, Section 26.5.3. Instead of all-direction Code-based wind speeds, the analysis incorporates decades of wind records from nearby meteorological stations to establish more precise site-specific design wind speeds. The wind patterns from the weather data are then resolved into directional sectors. Advanced computer simulations (Monte Carlo) are then used to model thousands of potential storm events across all sectors. These simulations are integrated with tracker specific wind tunnel response data for each wind direction to produce the controlling structural loads for various tracker zones under consideration.

RESULTS & BENEFITS

The outcome is a statistically rigorous, site-specific prediction of tracker loads under extreme wind conditions that reflect the project's unique tracker configuration, such as pier height and ground coverage ratio (GCR). This approach can significantly lower panel pressure demands, tracker pier sizes and embedment depths resulting in significant reduction in project costs.



SAVE UP TO 50% ON STEEL PILES*

Findings based on a case study by CPP Wind in partnership with Kimley Horn.

**Savings are site, racking, and stow policy specific*

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