TrueCapture™

Unleash your potential

TrueCapture™ is an intelligent yield optimization and control software that leverages Nextracker's unique independent-row tracker architecture, advanced sensors, and site-specific 'digital twin' modeling to increase solar PV plant output by up to **4%** annually. Integrated with our solar tracker hardware systems, TrueCapture is fully validated by independent engineering firms, boosting project performance and financial returns on over 280 projects and 40 GW, across five continents.

The need for row-level tracker control

Row to row shading, also known as "terrain loss", is a common source of lost generation in solar plants. Standard backtracking algorithms attempt to mitigate this issue by uniformly rotating modules away from the sun at low elevation angles. This solution has limited effectiveness, particularly for sites with sloping or variable terrain and pile height variance – an increasingly common scenario as solar expands to geographies with hilly topography and challenging soil conditions. Independent engineer (IE) and technical advisory firms like DNV, Black & Veatch, Liedos, and Enertis have modeled annual losses of 2-4% for standard tracking in these cases.

TrueCapture provides a superior solution, leveraging NX Horizon's independent-row architecture and balanced design to mitigate shading on a row-by-row basis, optimize angle of incidence for half-cell modules, and respond to diffuse light conditions. TrueCapture utilizes sensor arrays, onsite data processing, and advanced algorithms to optimize the angle of every row. By contrast, tracking optimization on linked-row systems is constrained to block-level tracking adjustments and limited by slower repositioning time, especially detrimental on sites with undulating terrain.

TrueCapture and Nextracker's Horizon-XTR™ terrain-following trackers may be paired as a comprehensive solution for challenging terrain, delivering bankable energy gains perfectly tuned to site topography while dramatically reducing or eliminating the cost, risk, and environmental impact of grading.

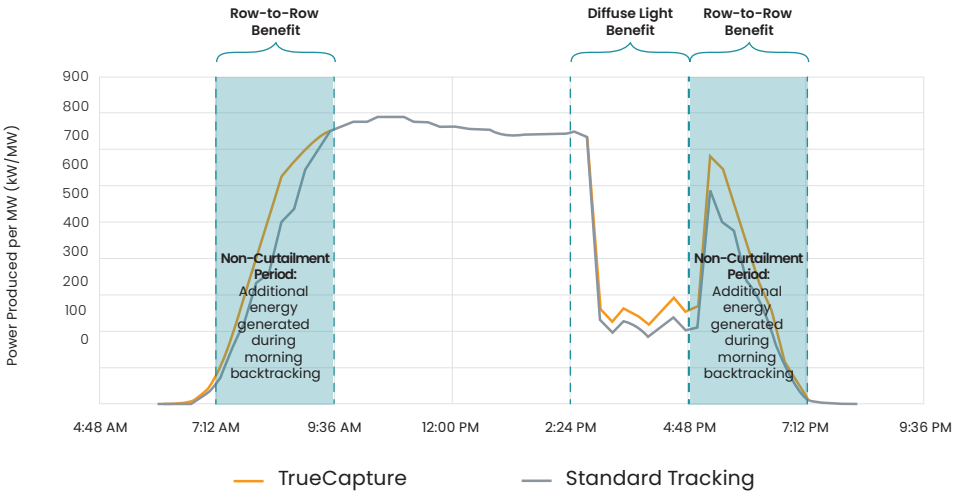
When the engineering report came back, the IE calculated a terrain loss of 2% but gave us a boost of 1.8% becausewe were using TrueCapture.

– Nick de Vries
Senior Vice President,
Silicon Ranch

SILICON RANCH®

TrueCapture vs. Standard Backtracking

1 MW Energy Production Standard Tracking vs TrueCapture



As shown in the chart, TrueCapture gains widen the "shoulders" of a solar plant's power production curve compared to standard tracking.]

Highlights

Up to 4% more energy annually

Bankable improvement to project economics

40 GW

Operating or contracted across five continents and over 280 projects

Advanced algorithms

Optimizing for terrain, module technology and weather

Proven

Independently validated annual field gains

The only tracking optimization solution with IE-validated annual gains

One reason Nextracker is the world's most widely deployed and trusted solar tracking provider is our commitment to validating TrueCapture's annual gains through a comprehensive measurement and verification (M&V) program. This testing is unique among the industry, considers site specific weather and terrain, and has been verified by independent engineer (IE) and technical advisory firms, including **Leidos**, **DNV**, **Black & Veatch**, **Enertis**, **ICF**, and **Luminate**.

In addition, these IEs have found high accuracy in pre-construction TrueCapture gain modeling with PVsyst, the most widely used energy prediction tool for developers, investors and lenders. Measured field gains from our M&V program have been shown to match or exceed Nextracker's pre-construction estimates and IE PVsyst estimates.

This combination of validated field gains with modeling capability and IE verification earns customer trust and creates bankability, unlocking enhanced project returns and access to more capital on more attractive terms.

TrueCapture production estimates are currently offered by the following independent engineers:

Leidos

ICF

Black & Veatch

DNV·GL

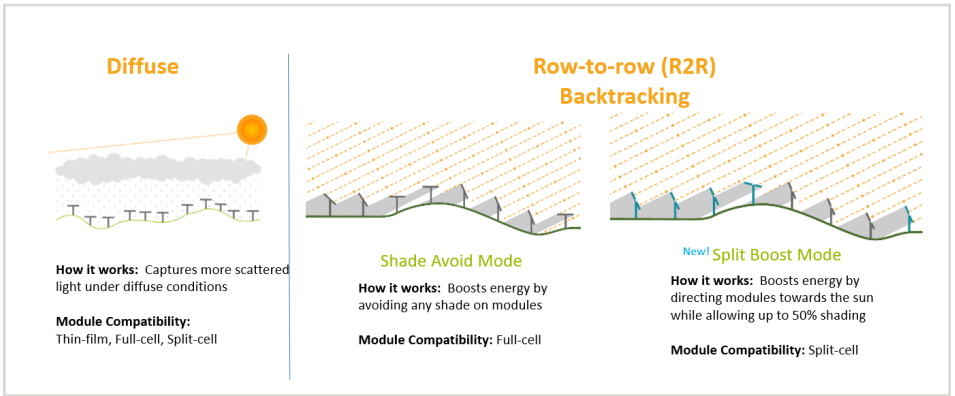
Luminate

RINA

Underwriters Laboratories

ENERTIS

Sargent & Lundy



A suite of advanced algorithms

TrueCapture includes multiple algorithms designed to maximize solar plant output across different weather conditions, site topography and PV module technology. Built by our software team using digital twin modeling techniques and Nextracker's unsurpassed dataset of historical tracker performance, these algorithms drive maximum performance for every project throughout the day, whether it's sunny or cloudy, and whether a project uses full-cell, half-cell, or thin-film solar module technology.

Row-to-Row Tracking: Under clear-sky conditions, TrueCapture tracks the sun and adjusts the tracker angle for each row based on site topography, the type of module technology used, and their responses to inter-row shading.

- **Half-Cell:** Introduced in 2021, the **Split Boost** algorithm takes advantage of the greater shade tolerance of half-cell modules and determines when production can be increased by maximizing irradiance on the top half while allowing shading on the bottom half. Balancing these effects boosts output in the early morning and late afternoon, further broadening the production curve's shoulders.
- **Full-Cell:** Nextracker's original **Shade Avoid** algorithm works with traditional full-cell modules to maximize production by calculating angles for each row, which minimizes row-to-row shading as much as possible.
- **Thin-Film:** Thin-film solar modules use true tracking of the sun's position during periods of clear weather, optimizing for their highly linear response to shading.

Diffuse Tracking: During cloudy, hazy, foggy, and other diffuse-sky conditions, sunlight is scattered across the sky dome, allowing for additional energy to be harvested by adjusting tracker angles to a more horizontal position. By opening the solar module's aperture area to capture more diffuse irradiance, this algorithm can boost production during these periods by 20 to30%, translating to annualized gains of 0.5% to 2% depending on the degree of sky cloudiness or haziness at the site.

- **Zonal Diffuse™:** Our latest edition of TrueCapture includes expanded sensing capabilities and applies different algorithms across the solar plant based on real-time light conditions, increasing the optimization granularity on large projects. Zonal Diffuse can adjust trackers to variations in cloud cover across the entire power plant. For example, if the eastern portion of a solar plant is sunny while the western portion is cloudy, TrueCapture will automatically zone the site and employ diffuse algorithms where optimal. Plants equipped with Zonal Diffuse can "chase clouds" for additional gains, without compromising tracking performance during clear skys.

Key TrueCapture components

TrueCapture delivers industry-leading energy optimization through a combination of hardware, communications, and software. Nextracker trackers feature independent rows powered by their own solar modules and include a communications and control system that aggregates to the onsite NX Data Hub. This industrial computer provides advanced plant-level control functions on top of the standard sun position tracking algorithm onboard each tracker row and meets NERC's CIP-007 cybersecurity standards.

TrueCapture sites add proprietary smart panel sensors and pyranometers across the project site, providing additional real-time data for the site and every tracker row. TrueCapture software uses a project-specific, 3D digital twin assimilation model that accounts for as-built plant geometry, terrain, weather conditions, and module technology.

Better software for complex systems

For maximum returns, each solar power project must optimize for its unique and complex combination of PV technology, site terrain, and variable weather conditions. TrueCapture software makes this possible in combination with Nextracker's unique independent row hardware, communications, and controls. By implementing IE-validated TrueCapture, project owners enjoy bankable production gains and maximized project financing.

This combination of technologies results in a decentralized command-and-control system that continually calculates and adjusts optimal tracker angles on a row-by-row basis, optimizing overall plant performance and ensuring that real-world production matches or exceeds pre-construction estimates.