



# Speed. Accuracy.

Arguably the two most critical  
factors in solar farm construction.



# Thirty seconds...



It might not seem like much, but when multiplied by the number of posts driven during the course of a solar farm job, it's precious time saved by tapping into 3D machine control to augment pile driving machines. Seconds matter, and they add up. It didn't take long for IEA, an infrastructure construction company with specialized energy and

heavy civil expertise, to reap the rewards of GNSS when they invested in the industry-leading Vermeer PD10 pile driver (with the Trimble® Groundworks Machine Control System onboard) to pinpoint not only the exact location of where to drive each pile, but also deliver the accurate plumbness, alignment and planned depth.

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At the press of a button, [GNSS guided] pile drivers become smart machines that quickly maneuver from one coordinate to the next, minimizing the number of steps required from the operator.

*Solar Builder magazine*



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It took IEA roughly 1.5 to 2 minutes to drive the average pile using traditional methods, but they were able to shave off 30 seconds or more, reports their VP of operations, Chris Hanson.

That 30 seconds multiplied by 12,599 piles equaled substantial savings for both contractor and client—and that was just on one job. Hanson calls it a “game changer” that makes the whole process more streamlined and accurate. Listen to his experience [here](#).

# No strings attached.

It's not just what machine control offers in the way of speed and accuracy, it's also what it neutralizes that's making it a must-have on job sites across the globe. Like the added time of marking locations with stakes and string line, which creates a higher margin of error, not to mention trip hazards.

Stakes get bumped,  
String breaks,  
**Time is wasted**



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**Today's solar farm jobs call for a competitive edge to achieve the speed, productivity and accuracy necessary to compete and turn a profit. It pays to consider whether yesterday's methods are holding you back:**

- ? Are the "old-school" methods worth the costly rework that results from errors?
- ? Do they justify the excess time on setup and machine guidance?
  - Or the added inessential labor costs and downtime?
  - Or the safety risk to work crews?
- ? How much time do you spend physically checking progress or creating reports?



Labor savings  
compared to  
traditional  
methods:

**%**

Positioning accuracy down to

**2 cm**

using Trimble Groundworks  
System with RTK positioning

# Centimeters are **small,** but their ramifications are not



Relying on traditional methods to place machines at each pile location is arduous enough—but achieving the correct height, depth and orientation of hundreds of piles is grueling and subject to error.

Machine control with GNSS positioning allows more work to be done with less labor—not by replacing operators, but by increasing their productivity, speed and accuracy while taming the most grueling parts of the task. Reliable GNSS-aided machine control makes it all a reality—even in remote areas and on challenging terrain.

## Don't leave money on the table

It's no longer a question of whether it makes sense to leverage machine control, but rather how long you can afford to wait to start using it. Between declining costs of solar technology, favorable government policies and increasing demand for renewable energy sources, the benefits of leveraging the precision and savings are yours for the taking.

# Maximize your market share

with 3D machine control

Based on [McKinsey analysis](#), engineering, procurement and construction (EPC) capacity to serve utility-scale solar projects would have to almost triple to meet the projected demand of +/-50 GW installed in 2027. And the opportunity has never been bigger, as U.S. renewables could attract an estimated \$700 to \$800 billion in capital investments to build solar and wind projects through 2030.

With project pipelines growing quickly, the additional value at stake is pushing solar companies to look for innovations that increase overall solar construction capacity, McKinsey reports.

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U.S. renewables could attract an estimated \$700 to \$800 billion in capital investments to build onshore wind and solar projects through 2030.

*McKinsey & Co.*

# Real-world results tell it like it is...



Several years ago, utility-scale solar solution provider TerraSmart, now owned by Gibraltar, teamed with SITECH® Nevada to equip five drill rigs with the full 3D Trimble drilling system. In just four months, crews report that they were able to complete the rock drilling portion 50% faster than traditional methods.

Another 400-acre utility-scale solar field project entailed pile length, elevation, required embedment depth and alignments. Once exported, operators were able to access plans, and even view completion data in both 2D and 3D views. Using this [3D machine-guided approach](#), the labor required for prep and pile installation was reduced by more than 50%, taking a crew of 12 people down to three or four.

## Tech anyone can use

If your machine control system is built right, you don't need any special tech genius or GPS guru to use it, said NESCO Field Supervisor Vernon White.

The machine knows right where it needs to be, and practically drives itself—**no strings, no stakes.**



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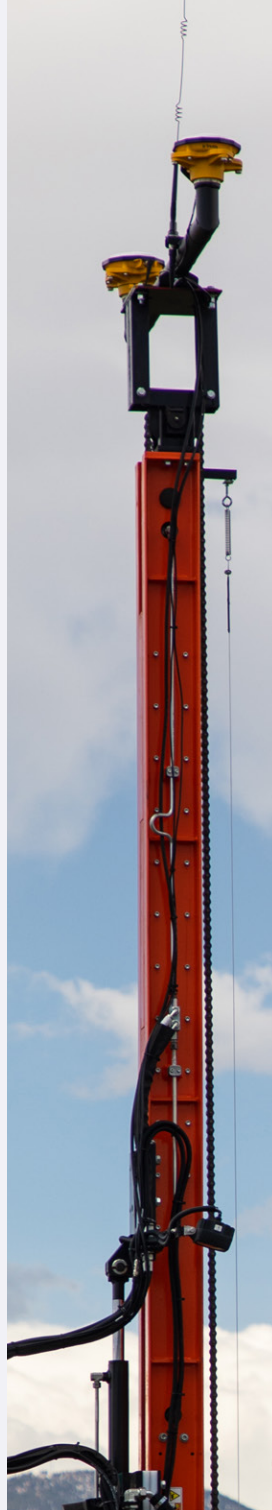
## Faster, more accurate piles

“We hit a 95% post accuracy rating out here. Imagine how much time that would save on a 50 MW site,” NESCO Field Supervisor Vernon White said.

On top of that, he was able to get the job done with half the crew it would have taken him otherwise—saving 80+ hours on labor on just that one job—with virtually no learning curve required.

Pile driving is the foundation of your entire solar farm project, said White. “Nobody likes rework. When your posts are primo, that’s time and money saved.” He also found a measurable benefit in the time he didn’t have to spend trudging through the field logging quality control. Being able to pull that information from each machine at the end of the day, plug it into the computer and look through those maps changed all that.

The ability of the machines to upload data also enabled him to track job progress, quality and productivity a lot easier and faster, streamlining his supervising duties. Learn more about White’s experience and observations [here](#).



# 95%

Post  
accuracy

%

# 50%

Labor  
efficiency

# 2%

Less  
misalignment



# Get the most

for your machine  
control investment

Machine control systems for piling machines are not all created equal. When it comes to your solution, make sure yours checks all the right boxes:

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Does it send design plans from the office to machines in the field?

?

Does it enable safe, accurate workflows that are user friendly?

?

Does it digitally log as-built data during operation for better, easier project tracking and client reporting?

?

Can it drill to a specified depth, at up to a 50 degree angle, with accuracy down to 2 cm?

?

Are auto-stop drills built in, reducing machine wear and tear?

?

Are avoidance zone alerts built in for worker safety?

?

Is the machine control hardware certified to withstand the shock and vibration of drilling machines?



# Market facts

speaking loud and clear

Solar photovoltaic installation in the U.S. has increased by an average of

**48%**

per year over the past decade, and current capacity is expected to double again over the next few years.



Solar farm market size was valued at

**\$143.11B**  
USD

in 2023 and is projected to reach \$309.30 billion by 2030

48%

Overall, photovoltaic solar accounted for **48%** of all new electricity-generating capacity additions in the first three quarters of 2023.

The Inflation Reduction Act signed into law in 2022 will lead to over

**\$565B** in new investment over the next decade, \$144 billion more than under a no-IRA scenario.

Wood Mackenzie forecasts that solar has reached a new evolutionary stage in 2024. With about 1.5 TWdc installed globally through 2023, and another 3 TWdc of capacity expected in the next decade, it's no longer a burgeoning renewable energy technology—it's a **cornerstone of the global energy transition**.

## Choose an eco-conscious partner

that is earnestly invested in the planet's well-being to achieve your goals. A company committed to sustainable practices will not only help you meet your sustainability targets but also produce products built to last.

Trimble Groundworks is your integrated system to bring office and field together for less rework, more productivity and efficiencies that benefit the planet and your bottom line.



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Find out more about the versatile  
**3D machine control guided solution**  
that makes it all happen [here](#).

