

Pushing the Boundaries of Solar in the Northeast

Terrasmart delivers project success across tough northern sites

Working in tight collaboration with developers and EPCs, Terrasmart continues to push the boundaries of what's possible in renewable energy. Two recently completed projects in the region highlight our team's skillful approach in the rugged, hilly Northeast at Quinebaug and Sangerfield. Terrasmart helped the developer maximize returns and reduce risks on both projects, showcasing best practices and unique problem solving to deploying utility-solar plants in tough northern conditions.

Quinebaug Project:

Terrasmart earns first place in the schedule race

Named Connecticut's "Best Old Home Neighborhood," Canterbury offers picture-book historical architecture, maple sugaring, and idyllic fly fishing on the Quinebaug river. It's also home to the largest solar plant in New England. At 66.5 MWs, the ground-mount Quinebaug project puts nearly 150,000 modules to work atop Terrasmart's **ground screw foundation** and fixed-tilt GLIDE racks.

Situation

Financial obligations drive schedule

The project's partners all faced extremely tight schedules as they worked to convert 270 acres of forest, farmland, and reclaimed gravel mining to renewable energy production.



To meet its financial obligations, the asset owner had to go live before 2022. Because all of the testing procedures for the system's commissioning and interconnection had to occur before the end of the year, the mechanical installation required completion by Dec. 17.

Situation

With a project start date of May 7, 2021, this left only seven short months to deploy the project.

Designing for icy New England weather meant the system had to sustain winds up to 120 miles per hour and snow loads of up to 35 psf. The design had to meet a frost depth of 27 inches to safeguard foundation integrity and a front panel height of 24 inches to ensure snow accumulation could slide completely off the panels.

System design requires more than just adhering to local building codes. Building codes are formulated with residential or commercial construction in mind, but ground-mount PV requires an entirely different set of considerations.

The Quinebaug project required tight collaboration with the Connecticut Department of Energy and Environmental Protection (Connecticut DEEP), which requires that contractors be responsible for temporary **sedimentation and erosion control measures** on any project larger than six megawatts.

Solution

“Survey-to-glass” scope in record time

Known in the industry for its full-scope approach to PV execution, Terrasmart’s end-to-end solution is valuable to developers that are looking to streamline projects. Terrasmart led the charge with a complete scope approach, including site survey, system design, manufacturing of the foundation and racking systems, and mechanical installation of the project on a 15% north/south slope.

From the start, Terrasmart used its proprietary surveying system to accelerate installation and improve accuracy. The team put its geotechnical, structural, mechanical, electrical, and civil experts on the project to value-engineer a robust system in record time.



Using racking technology like the **GLIDE fixed system**, designed with reduced hardware and parts, helped to speed things up. Inherently adjustable with a wide range of front-edge heights, GLIDE installation is 33% more efficient than other fixed systems while allowing for more snow clearance and less drift.

Terrasmart has its own manufacturing facilities using U.S.-made steel and a **high-velocity process** that streamlines old-style methods conventionally applied to metal treatments, adding precision and increasing production speed. This means faster production and better cost control.

After all the components were on-site, Terrasmart’s highly trained, professional installation crews produced **fast results and high-quality work**. Tight project management ensured no time was lost; installation and testing — typically done sequentially — was staggered by rows and done concurrently.

To meet the numerous requirements set out by Connecticut DEEP, Terrasmart placed strategic temporary erosion control at low points and runoff locations throughout the site. The team installed temporary seeding, rocks, and drainage basins in phases, and rushed to complete 80% of the structures and module installation before any of the erosion controls could be removed.



Result

Delivering project speed to meet aggressive goals

Terrasmart self-performed 100% of the work, deploying 170 team members seven days per week and 10 hours per day to deliver the project on time. The team worked hand-in-hand with the developer and other project stakeholders to compress a 130-week project into less than 33 weeks — 75% faster than a typical project of this size.

Leveraging Terrasmart’s unique end-to-end capabilities allowed the asset owner to complete all electrical testing prior to commissioning so that it could obtain permission-to-operate status by 2022.

Sangerfield Project:

Overcoming hills, rocks, wind, and frost

When settlers first came to this region of upstate New York, they were attracted by the freshwater supply and rich soil, which provided the basis for Sangerfield’s main economic growth engine through the years — farming. Located in an area once known as “the hops capital of the world,” the 6.5-MW Sangerfield project converted a former undulating hayfield into a solar farm.

Situation

Weathering seasonal conditions, uncertain soils, and steep slopes

The Sangerfield project presented unique challenges. At the start of the five-month installation, Terrasmart's team had to contend with frozen ground and snow; Sangerfield sees nearly triple the average U.S. snowfall. By the time the last of the site's 17,038 modules went up, the team was often mowing fast-growing grass. In between those two extremes, Terrasmart's installation crew contended with thick mud that threatened to mire its heavy equipment and machinery.

As a former farming site, the Sangerfield property also presented the challenge of working around clay drainage tiles and flood zones at the bottom of steep slopes.

Solution

Balancing the extremes

This complex site required a tracking solution ready to handle the extremes: flexible, durable mechanics, and intelligent controls. Terrasmart's single-axis tracker (SAT) technology, TerraTrak, is known for its performance on steep slopes, environmentally sensitive land, and frost-susceptible soils. It is also the only SAT with an A-frame design capable of using either ground screws or driven-pile foundations.

In this case, underground drainage tiles required ground screws to **eliminate 100% of the site's refusal risk**. Terrasmart engineers also proposed a creative solution to contend with 20% north/south slopes: Dividing the project into two sub-sites of 113 rows and designing for a 60-degree tilt angle.



Built tough for reliable performance, Terratrak has undergone advanced wind tunnel testing. Our engineers used sophisticated software to simulate the most cost-effective design for Sangerfield's challenging upstate New York 105-mph wind profile and test for varying angles of wind force. Robust snow-load tests ensure TerraTrak's ability to maximize energy output and returns within 52 psf snow conditions.

Terrasmart engineers tailored the system to meet Sangerfield's unique site conditions by optimizing steel usage to keep material cost down.

TerraTrak works in tandem with an intelligent control system to **maximize energy yield** through efficient land utilization. The PeakYield™ system is designed to optimize the

Solution

tracker's performance and lower operating costs with live data output and smart-tech controls. It maneuvers each tracker row to limit shading, maintaining optimum exposure and production.



Terrasmart's system connects two weather stations per network station to allow for maximum communication and capture more data for wind speed and ground snow. Because of the steep and irregular terrain at Sangerfield, the team had to install a repeater to data flowing even where line-of-sight is interrupted by the undulating hills.

Ultimately, Sangerfield offered so many unusual challenges that Terrasmart used it during installation as an opportunity to train personnel on how to contend with the unexpected.

Result

From winter through to summer, getting the job done right

Terrasmart was able to stagger the work through varying seasonal conditions to keep the project on schedule. Ingenious system design and adaptable SAT technology turned the hilly site into a productive solar farm, using proprietary ground screw drilling machinery to secure foundations despite the ongoing refusal risk of underground irrigation tiles. And a bespoke communications solution ensures that the asset operator will know exactly what's going on no matter which side of the site's steep hills they're reviewing.

Tough sites are where we thrive

Large and small, developers and EPCs can leverage our team's unique competencies to overcome rugged Northeast conditions. With 65% of our builds in the region, our comprehensive portfolio addresses the area's unique demands: solid foundations, durable racking, and smart technology put in place by experienced installation teams who know how to boost energy output and ensure reliable performance.

Whether you are facing the Northeast's tough terrain, high snow, or punishing winds, you can rely on our deep experience over a decade of project success in the region. Trust us as your partners in the Northeast to reduce risk, maximize returns, and convert challenging land into valuable assets.