

Partnership Helps Energy Community Shift to Solar

Project team overcomes tough terrain and difficult weather

Background



Energy transition is an increasingly important trend within the energy sector. As communities that are dependent on hydrocarbons begin to shift production to renewable sources, they not only lower global emissions, but also reap new economic opportunities from income-producing renewable sources.

A prime example: The BE Pines project in eastern Pennsylvania. At 48.6 MW, BE Pines brought jobs and a big economic boost to Greene Township, a small community nestled in the mountainous Great Appalachian Valley northwest of Pittsburgh. Natural gas, nuclear, and coal-fired generation facilities can also be found nearby, along the Ohio River.

One of many solar plants across America's energy-converging landscape, BE Pines is in an energy community that's eligible for a 10% Adder Tax Credit under the Inflation Reduction Act. To qualify as an energy community, projects must meet one of the following three criteria:

- | | |
|---|--|
| 1 | Located atop a brownfield site |
| 2 | In a region with 0.17% or greater employment in the fossil fuels sector or more than 25% tax revenues related to fossil fuel extraction, processing, transport, or storage and an unemployment rate at or above the national average |
| 3 | On a former coal mine, retired coal-fired power plant, or mine-scarred land |

Situation

Partners join forces to tackle complex project

When the owner of the BE Pines project, Four Twelve Renewables, chose its developer GPPT, LLC (a partnership between Propsect14 and Pro-Tech Renewables), it focused on collaborators with deep solar experience and a reputation for solving problems.

Four Twelve Renewables, Inc. was formed with the purpose of developing utility-scale renewable energy projects to provide funding for charitable causes in states of which it operates. For the BE Pines project, Dollar Energy Fund, a local non-profit organization that provides utility assistance to households experiencing financial difficulty, will receive funding from the revenue generated from the project. Since 1983, Dollar Energy Fund has assisted more than 800,000 families by providing one-time grants for basic utility services, totaling nearly \$250 million dollars. The grants are directed to electric, natural gas, water, and wastewater utilities.

Pro-Tech Energy Solutions was selected as the EPC for its responsible sustainability, integrity, and commitment to collaboration. Pro-Tech turned to Terrasmart for its legacy of leadership, integrated PV portfolio, expertise in tough terrains, and decade-long track record of successful partnerships.

Terrasmart designed and manufactured the site’s fixed-tilt system using its ground-screw solution and GLIDE racks. Drawing on its integrated experiences across the PV life cycle, the racking partner installed the foundation and secured the legs to contend with the site’s rugged topography and sub-surface risks.

Project Highlights:	
Size	48.6 MWac
Modules	89,648 panels by SEG Solar: 540/545W
Screws	16,300 ground screws plus 450 combiner screws (size - 2100mm)
Racking Tables	4,075 tables, GLIDE Portrait orientation
Slope	South 30 degree, North, East/West 30 degree
Operational date	Estimated as September 1, 2023

Challenges

Hilly, rocky site and drenching winter conditions



The partnership contended with a number of operational challenges as it worked toward completion, including:



Arduous site preparation:

BE Pines was not an easy site on which to build. Substantial civil work began in December 2020 to address its challenging terrain. Besides having to work around both hills and rocks, the 28-person civil team needed to clear large swaths of vegetation from the site and design a stormwater mitigation plan.



Winter construction:

The survey, foundation, and rack installation were all done during challenging fall and winter weather. Heavy rain and mud throughout construction bogged down the movement of equipment, materials, and personnel.

Terrasmart's skilled operators used exacting software and equipment to drill the ground screws and set the racking system's legs. Given the topography, Pro-Tech was glad to leverage Terrasmart's expertise on tough sites.

Other contractors may charge us a little bit less, but sometimes they struggle with the overall picture of where the racks and tables have to be, slowing things down," said Jeff Hill, Vice President of Operations for Pro-Tech. "So utilizing that kind of scope work from Terrasmart actually is worth the investment."



Refusal risks:

The biggest factor for projects of this size is schedule risk. Contracts for unionized electrical labor, for example, are scheduled a full year in advance. If the project slips even a single month, the EPC risks losing the entire contract. That's why unforeseen below-ground issues pose a critical hazard.



“If we are delayed with our racking install, it’s a disaster for the project. It doesn’t matter how many test pits you do, there’s always the unknown,” Hill explains. “We’ve done countless geotechnical tests on a job when—all of a sudden—we hit a ledge and now we’re stopping. Using ground screws wipes out refusals and locks in our schedule.”



Constrained site logistics:

Greene Township, like other municipalities new to solar, was wary about the development plans, including stormwater management, setbacks, site safety and security, and decommissioning. Nonetheless, the town’s leaders ultimately welcomed the project and the economic benefits that BE Pines brought to the community.

Because the Greene Township is rural, traffic from deliveries to the project needed to be properly managed. Terrasmart worked with Pro-Tech Energy Solutions to establish a delivery schedule that kept trucks off the rural roads when school buses were operating, which minimized local concerns about construction-related traffic. Four Twelve Renewables and Pro-Tech also stayed active in the community, attending local functions and township meetings while engaging the abutting property owners.

Solution

Collaboration and adapted systems eliminate risks and rescue schedules

1 Risk-free racks:

Using ground-screw foundations to eliminate pile refusals allowed Terrasmart to stay on schedule despite the site's rough terrain. Because Terrasmart has a wide portfolio of foundation options ranging from driven piles and screws to ballasted structures, it can recommend the best solution for a site's profile. Subterranean risks like boulders or ledge are common throughout the Northeast. For such sites, ground screws mitigate 100% of refusal risks. Because they can be driven into the ground using advanced machinery no matter what lies underground, ground screws keep costs and schedules on track.



It's all about schedule and timing. We know that when we get a date from Terrasmart it doesn't move," said Matthew Braccio, Senior Project Manager with Pro-Tech. "If we're driving piles and we hit refusals, we have to deal with mitigation, which becomes a nightmare that can totally derail a project. The ground screw foundation is a little more costly up front, which typically saves us money in the end."

After Terrasmart conducted the site survey, it used proprietary rock drilling machines and seasoned operators to secure nearly 17,000 ground screws. It also installed the legs for the racks before passing the baton back to Pro-Tech for the table installation.

"When we have some civil conditions, like heavy undulating topography or ledge or any kind of rock, we lean heavily towards utilizing Terrasmart's screw system foundation," says David Moulton, Director of Construction with Pro-Tech. "It allows us to shore up cost and schedule without the uncertainties and risks of piles."

2

Integrated racking and installation:

Working with manufacturers that also install their own products makes for a seamless project experience. Over time, this experience helps troubleshoot difficult construction conditions. Unaffectionately coined the “Seattle of the Midwest,” the BE Pines region is known for its heavy rain. This year’s weather was particularly bad. But driving screws in frozen ground is easy compared to installing them in thick mud. Terrasmart’s on-site crew had to use all of their hard-won tricks to keep each phase of the project on schedule.

We had times where everybody else had demobilized due to weather, but the Terrasmart team just kind of kept rocking right along to keep everything on schedule,” says Braccio. “You guys were rock stars—really the best I’ve worked with.”

3

Top-notch logistics:

Keeping roads clear for materials and the local community required extensive coordination. Because the project site didn’t have a laydown area for 50 MW of racking and modules, the work was split into three blocks to allow for material transport. One of the phases for 15 MW of capacity required using an entirely different access road.

Close communication and logistics amongst all partners made the tight delivery schedule possible.

“Terrasmart’s coordinated deliveries were critical for us to not have to double- or triple-handle material,” says Hill.

In the end, the community has been excited to have a project of this size in their township. With more than 150 people working in a town that only has a population of 300, the local economy got a significant boost.

“The duration of the build, the magnitude of the build, the amount of people that we employed—it was a win for the community out there for sure,” Moulton says.





Results

Partnering to expand the ‘coal to clean’ transition

Four Twelve Renewables is developing additional utility-scale solar projects throughout Pennsylvania and other states within the PJM interconnection territory. The organization will use 100% of the free cash flow from its solar portfolio to fund basic needs initiatives through partnerships with social service organizations.

To benefit the local community, the BE Pines solar farm will produce 62,000 MWh annually, offsetting 43,000 tons of carbon dioxide each year. Such benefits are the equivalent of 49,217,653 pounds of avoided coal emissions or supplying electricity to 9,000 homes.

It's this kind of substantial success that has kept Terrasmart and Pro-Tech partnering through more than 50 projects totaling 250 MW of PV capacity. The partnership results in efficient projects like BE Pines that support communities once dependent on coal transition to a renewable energy economy.