

# Northern Solar Thrives Despite Harsh Conditions

Ground-screw adapted SAT makes PV possible in Rumford, Maine

## Background

The historic town of Rumford in Maine has become the business center of the state's charming River Valley, where the Androscoggin River flows into the highest waterfall east of Niagara Falls. Surrounded by forested mountains and situated atop a bedrock of granite, Rumford features a historic paper mill and a world-class ski station. With annual snowpacks frequently exceeding 25 inches and an average of 59 days per year covered in snow, local winters routinely hit freezing temperatures.



Image provided by Nexamp

Located on the southeast edge of town, Rumford Solar is a new 6.5 MW solar farm that takes advantage of Maine's Net Energy Billing Tariff Rate program, delivering savings to non-residential customers. The Town of Rumford, along with other businesses and municipal organizations, will realize significant annual savings on their electric costs thanks to this project in the Central Maine Power service area.

Developed and built by Nexamp with its partner Terrasmart, the single-axis tracker project features more than 16,000 bi-facial modules. The project — which is expected to offset more than 12 million pounds of CO<sub>2</sub> annually — has proven to be a valuable economic investment, generating jobs, energy savings, and emission reductions. The land where the project is located provides long-term lease income for the private owner.

But there were quite a few challenges along the way.

## Challenge

### Rocky soils, undulating slopes, deep snow, and frozen ground

The region's tough soil, steep hills, and powerful frost heave potential all pointed to ground screws as the only viable foundation option for the site. Only ground screws could prevent the heaved piles that can result from Maine's freeze/thaw cycles.

Given these grueling parameters, the Rumford team agreed that pile foundations would not be suitable. Ground screws, on the other hand, would eliminate 100% of the refusal risks while protecting foundation integrity against frost heave, minimizing land grading, and slashing other civil expenses. Paired with adaptable racking designed for flexible land use, ground screws deliver reliable returns from unreliable sites.



Image provided by Nexamp

The site's significant slopes — up to a 20% grade — plus potential 105 mph winds and 100 psf of snow pressure required adaptable racking with built-in flexibility. In addition, frost depths up to 50 inches required a high front panel clearance of 45 inches. While the front edge height requirement is not unusual in Maine, few single-axis trackers have the structural integrity and flexibility to utilize ground screw foundations while clearing this front edge height.

## Solution

### Racks designed for optimum production and yield

Terrasmart engineers designed the project to maximize energy production and revenue. More than 5,000 ground screws and 215 TerraTrak single-axis rows were used to support the project's 16,068 bi-facial modules.

Unique in the industry, TerraTrak is paired with an adaptable A-frame structure designed to support ground screw foundations. The A-frame redirects loads to favorable forces onto the ground screws. TerraTrak also uses screw extensions to bring more versatility to the project. In this case, the SAT was designed to allow for 11% E/W and 20% N/S slope adjustments while providing a +/- 60-degree range of motion.

Terrasmart designers worked hand-in-hand with Nexamp to draft the ultimate site layout. Designing around the bifacial layout meant incorporating multiple configurations of tracker rows to fit within the site's boundary and maximize yield.




Designing the 2P tracker system to optimize bifacial technology entailed increasing E/W spacing between panels. While TerraTrak typically has 0.5 inches between modules for monofacial panels, the team increased this spacing to 4.5 inches to ensure the tracker structure did not block reflected sunlight on the backside of the panel. Because TerraTrak's design allows for custom purlins, the Rumford team was able to increase the project's power output.

## Result

### Early snow meant harsh winter conditions for installation

Terrasmart was charged with installing the ground screws and racking systems during the fall and winter. Because snow comes early in Maine — usually in November — most of the work took place in frigid temperatures after the ground was frozen.

**Snowfall throughout the project meant the team had to take extra measures to keep everyone safe:**

	Ground thawing and freezing required ice cleats and other OSHA safety PPE
	Torque tubes and purlins were 25" higher than usual; slippery, icy conditions required extra manpower to secure installers on ladders
	Brutally cold temperatures required frequent work stoppages

Nonetheless, strategic measures made a difference in the schedule. Terrasmart used its proprietary ground screw machine to install the screws quickly and efficiently. TerraTrak's telescoping screw extensions offered best-in-class field adjustability to help streamline the build on variable slopes.

## Partnership brings environmental and economic value to Rumford community

Terrasmart is proud to have partnered with Nexamp to build this milestone solar project in the Town of Rumford. The collaboration between the teams at Nexamp and Terrasmart thrived through the tough wintery conditions to deliver a more sustainable future for the community and support Maine's renewable energy goals.



Image provided by Nexamp

Strong partnerships like this one are a core part of Terrasmart's mission. Our end-to-end project experience and best-in-class C&I, utility, and community solar solutions make us a dedicated partner across the project lifecycle. When facing difficult project conditions like those encountered in Rumford, Nexamp and other leading partners can depend on Terrasmart's 19 GWs of solar experience to amplify returns for projects of any size, type, and location.