



# Solar tracker supplier adds value with engineering services, software and construction leadership

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The year 2019 saw rapid growth in the solar PV tracker market, with most vendors doubling or at least significantly expanding their shipments from the previous year. Much of that activity was in the US, which represented 50% of global tracker sales and expanded its production by over 200%.



estimated 5,400 MW deployed worldwide. According to Wood Mackenzie, the market is on a trajectory to increase tenfold by 2024, when global bifacial capacity could exceed 21 GW.

The FTC Solar Voyager tracker systems are particularly well-adapted to bifacial panels, with their 'double portrait' or 2P configuration, and the company has benefitted from that trend, seeing a steady increase in customers electing bifacial options. Bifacial panels can increase solar production efficiency by as much as 8-12%, and when they are combined with trackers, result in a smoother production curve and better land use.

**Close customer collaboration, engineering services and software differentiate FTC from its competitors**

The technical and financial advantages that single axis tracking systems bring to solar project developers are undoubtedly driving strong market expansion. But, at FTC Solar we believe the company's rapid growth is also due, in no small part, to the additional value we bring to our customers through a comprehensive package of services that speeds solar construction, lowers financial risk, and reduces the soft costs associated with large, utility-scale solar developments.

We have established supply chains and manufacturing facilities around the world that support our customers' access to materials. Experienced solar engineering teams are ready to respond rapidly to customer needs. But although each project is highly customized to meet client needs, we go much further than that, striving to produce value that will exceed customer expectations. We act as a partner to our customers throughout the entire development process, and work to contribute expertise in the following areas:

Part of the reason for that growth was the US policy environment. In a process called 'safe harbor,' solar developers were scrambling to ensure that they could either purchase components or start their projects before the end of the year in order to be eligible for the 30% Investment Tax Credit, which is now gradually declining each year. However, safe harbor was only responsible for 30-40% of the market expansion, according to Renewable Energy World.

The rest is due to recognition of the superior efficiency of tracking systems, which can increase solar production by 15-25% under the right conditions. As the utility-scale solar sector continues to lead the renewable energy industry in growth worldwide, investors are looking for every opportunity to maximize energy production and return on investment.

FTC Solar is no exception to booming growth rates for tracker sales in 2019. After launching our business in 2017, we contracted over 500MW in 2019, the first full year of deployment for the company's new Voyager tracker, and have over 1.5 GW contracted for 2020. Most of those systems were installed in the US, and we are now on track to expand internationally.

Looking ahead to 2020 results, utility-scale solar is expected to maintain its rapid growth, possibly even reaching record installations, despite the coronavirus

pandemic. While distributed generation markets could lose close to 30% of their expected growth in 2020, according to the Solar Energy Industries Association, the utility-scale sector has 51 GW of contracted solar still in the pipeline, and that should help it maintain momentum.

**One factor driving rapid adoption of single axis trackers is bifacial panels**

2019 was also a great year for bifacial technology, doubling 2018 sales with an





## Value-added engineering services

### Design and software

FTC Solar strives for operational excellence, and engineering is a core competence. We offer a full complement of pre and post engineering services to support projects from concept through commissioning.

Developing a site plan or layout for the array is the first phase of value engineering. Using the SunDAT software originally designed by Sun Edison and refined for over 10 years, our engineering team analyzes proposed sites to develop optimal layouts, system sizes and configurations.

SunDAT is used for designing a broad range of solar project types including utility-scale PV, C&I ground mount, rooftop and canopy systems. It has an extensive component library that helps users compare trackers, modules, and inverters. SunDAT is available for licensing.

The SunDAT software is particularly adept at automating dozens of important solar design work processes. It produces layouts that can accommodate complex topography,

minimize shading, and obtain maximum solar production where land is limited. It has easy and intuitive methods for handling obstructions and boundaries and importing files from other geospatial applications. Ultimately our engineers and our software help optimize land use by configuring systems that will fit on irregular sites and accommodate obstructions gracefully. Finally, SunDAT allows comparisons of energy production from different layouts produced in the software.

While SunDAT can generate simple layouts in less than 20 minutes to do preliminary site surveys, it can also develop more complex electrical designs and single line diagrams and perform detailed topography analysis. According to our Director of Software Andrew Morse, 'The advantage of SunDAT is that, within minutes, the user can develop multiple layout options for their system. Using several metrics like system size, cost and LCOE, SunDAT then enables the user to choose the optimal design configuration that meets the needs of that specific system.'

### Terrain study and top of pile analysis for steep or rugged topography

One important competitive advantage that FTC Solar brings to the marketplace is

adaptation to rough topography and challenging soil environments. The Voyager tracker is self-powered and is uniquely suited to traverse steep terrain (up to 10° or 17.5%), which reduces the need for expensive earthwork. Secondly, our SunDAT software can rapidly analyze elevations for the piles that make up the foundation of the tracker system and propose optimal solutions. If there is rolling terrain beneath the trackers (in a North-South orientation), project designers must increase the undulation tolerance of the tracker with longer piles, or by 'smoothing' the terrain with earthwork.

Using the SunDAT software, our engineering team can run a top of pile analysis (TOPL) to determine what the undulation tolerance should be and include that in the foundation (structural) design. We have often found that the TOPL has found longer (taller) piles are the most economic option, but sometimes a challenging site requires a mix of increased undulation tolerance and grading.

### Detailed structural analysis

Foundation design is one of the most critical steps in a utility-scale solar project. It is critical to understand soil characteristics to identify the safest and most cost-effective





foundation designs. We work with client geotech reports to understand soil characteristics and recommend customized foundation designs.

The final step in value-added engineering is the preparation of detailed, stamped engineering plans that are construction ready. We collaborate with our customers in this process and can either provide in-house services or advise on important engineering issues that will support a smooth and successful project development process.

Ultimately, we customize our engineering packages to fit the unique needs of every project.

#### Lean construction

##### **We teach our customers how to work more effectively on the job site**

For FTC Solar, providing installation training and on-the-ground support for every installation phase is standard operating procedure.

The first step is a two-day training at our research and development facility for members of the customer's installation team,

including site superintendents, foremen, logistics managers, program managers, safety managers, field engineers and the quality control (QC) team. The purpose is to get the full installation team aligned with hands-on instruction on assembly techniques, methods, optimal crew sizes and workflow procedures. This process empowers our partners for optimal on-site execution.

The second step called the Golden Row training, is training at the customer's project site. After materials are delivered, we work side by side with installation crews on the first row of the array. Our staff walks through every aspect of the installation, marks all critical dimensions, and works with site managers to help develop a work process that can be applied to the rest of the project site.

Depending on the project requirements, FTC Solar can get involved with helping customers resolve supply chain issues, lay-down yards, and set up pre-assembly tables. Additionally, we teach customers all cold and hot commissioning phases to ensure optimal start-up and performance.

Our close collaboration with construction

crews during the earlier phases of the project allows sharing of best practices and open communication about any issues that arise, opening doors for stronger relationships with our customers.

#### Redefining the solar tracker experience

As FTC Solar CEO Tony Etnyre has said many times, 'We don't 'just' provide a customized solution to fit your project. We redefine that experience by coming alongside you as a partner and including you in our process.'

Throughout many years of solar industry experience, Etnyre, and most of our staff have learned that proactive collaboration with customers is the best way to build lasting partnerships and work creatively through any issues that come up.

'We don't claim to know it all,' adds Etnyre. 'No one does. But we are committed to changing the way trackers are done, one project at a time. As we adapt to market challenges, the most important thing is that we listen to our customers, put their feedback into practice, and deliver optimized solutions that exceed their expectations.'

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