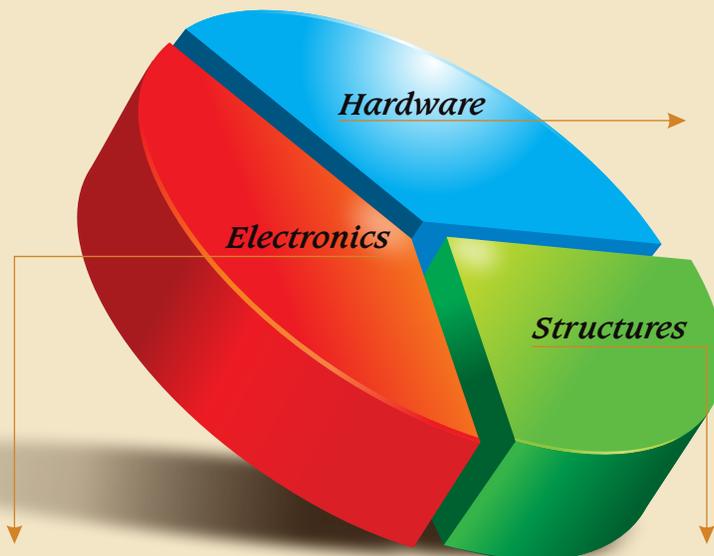


Scorpius Trackers

The Complete Tracking Solution



PIVOTING OPTIONS

- **Vader-FxP frictionless pivots**
100% frictionless movement
ZERO maintenance, NO lubrication
- **Composite material bearings**
ZERO maintenance, NO lubrication
NO replacement for > 30 years

TRACKER CONTROLLER

- Least power consumption (300 kWh / year)
- Backtracking with Azimuth Correction
- Standalone mode (no external power required)
- Single controller for up to 500 kW block
- Algorithms for E-W slopes, high wind speed stow

STRUCTURE DESIGNS

- Rotationally balanced structure
- Least tons / MW
- Easy installation - No welding
- Horizontal and tilted module tracking options

Solar PV technologies and prices have matured over the last decade and now seem to be stabilising.

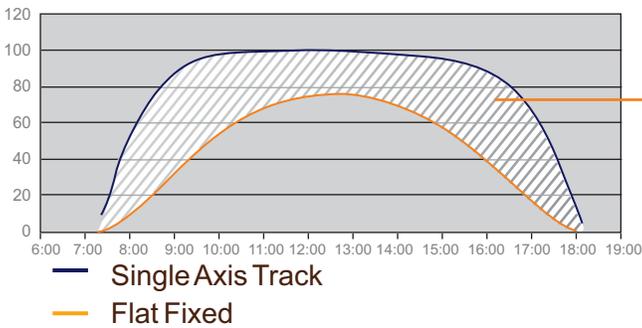
Competitive bidding in State and Central government programs creates need for developers to examine technology solutions for superior generation to boost returns, in comparison to other Solar developers. Globally, 85% of solar systems use trackers to enhance generation and project developers would substantially benefit through use of our solar tracker system.

Solar tracking is the only proven and bankable technology which increases the power generation of a plant by 18-25% (location and technology dependent), thereby lowering the cost of 'per unit' of power generation. This increase in delta translates to a direct profit in a fixed PPA regime.

Trackers allow Photovoltaic panels to track the sun from sunrise to sunset. Tracking increases power production from PV modules by 18-25%, depending on tracker configuration.

The position of the sun is calculated using a high precision astronomical algorithm. The Scorpius Tracker calculates the optimum rotation angle every minute. A wind stow algorithm keeps the PV modules safe during periods of high winds.

Energy Generation Comparison



Energy Output over fixed PV

18% - 25%

Increase in Capex per MW

9% - 12%

Economics

	Fixed PV	Tracked PV
1 MW Cost	~ 1.1 Mn\$	~ 1.21 Mn\$
Power Generation (kW/Hr)	~ 1.6 Mn	~ 1.92 Mn
Per Unit (kW/Hr) Income	0.1 \$	0.1 \$

On Additional investment of	~ 0.11 Mn\$ / MW
Additional income of : $19.2 - 16 = 3.2 * 0.1 =$	~ 0.32 Mn

Indicative figures. May vary as per site conditions, tracking technology selected. Above estimates and costs are for a typical project in INDIA.

Less than
3.5 years payback
on tracker investment

More than
3% IRR increase
of the overall project

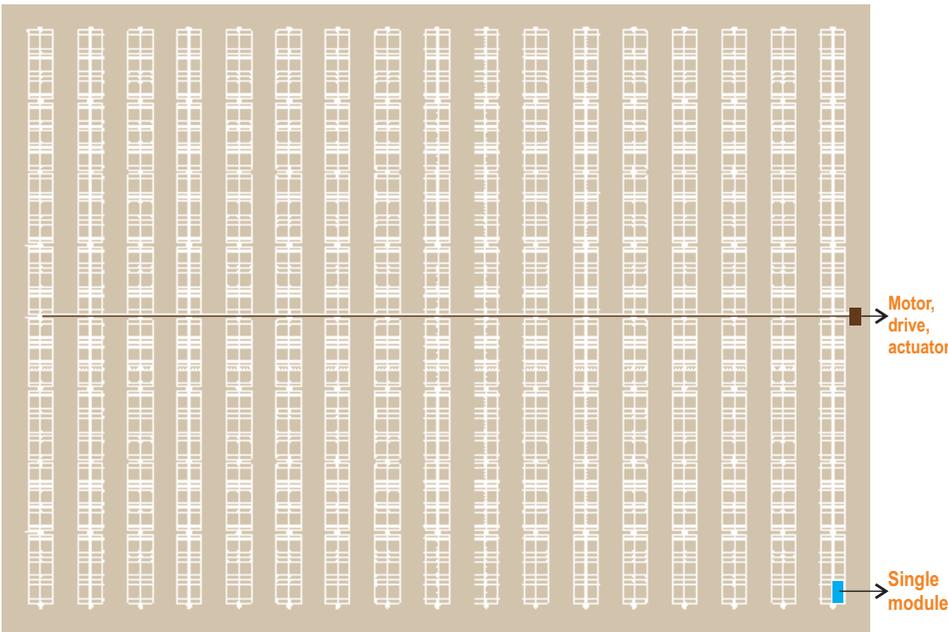
More than
10% reduction of LCoE,
power generation cost

Installation Photos



Note: The modules in this installation are oriented in portrait mode with only 4 per torque tube. This is as per design and stringing requirement of the customer.

Schematic of a single tracking block



6 nos. 250W modules on each torque tube. Modules are oriented in landscape mode in the 3x2 configuration.
8 nos. torque tubes in one row. Total rating = $6 \times 8 \times 250W = 12kW$
17 parallel rows, total rating = 204kW

- One 200 kW tracker block requires one tracker controller and one unit of drive/ motor / actuator.
- Five such blocks make 1MW
- BOM is all the required electronics, drives, motors, actuators and 170 number of frictionless pivots, bearings and related assemblies.
- Approximate weight of tracker hardware and electronics is 10 tons per MW.
- Structure weight is expected to be around 12-15 tons per block.
- **Maximum block size of 600 kW**

Turn On and Start mode. NO user configuration necessary

NO
mechanical maintenance /
lubrication required for LIFE

ONE 250 W module
is sufficient to power up
a 250 kW tracker block

Integrated battery
in controller is sufficient for
tracker movement for 5 days

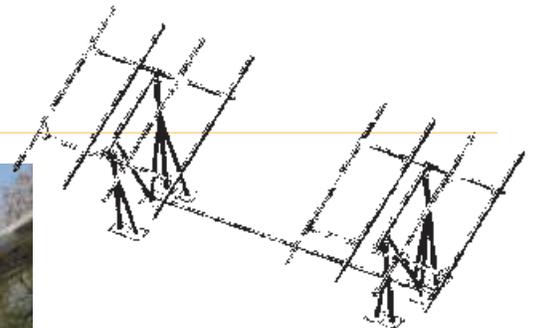
Some technology differentiators...

- 1 Back tracking with AZIMUTH correction:** Avoids the shading of the rows of PV modules on the shaded side, depending on time of day. This is a very advanced and proprietary algorithm and take into account the spacing and module size. This also takes into account the AZIMUTH of the sun and adjusts the tracker tilt based on the solar AZIMUTH.
- 2 Field slope:** Trackers are sometimes installed on land that is sloped in the E-W direction. The Scorpius Tracker is able to take this slope as a parameter and performs flawless backtracking in this condition.
- 3 Tracker stowing at wind speeds:** the tracker reduces its presented cross section to the wind in case of increase in the wind speed beyond a preset limit, thereby reducing the force on the tracker mechanical structure. The anemometer continuously sends the wind speed/direction to the tracker where an algorithm calculates when the stowing is required.
- 4 Electronics:** Has been tested at -20°C to $+85^{\circ}\text{C}$ temperature range. The electronics has an operating range of -10°C to $+60^{\circ}\text{C}$. All the boards have a conformal coating on it and are designed to resist damage due to condensation.
- 5 Lowest power consumption:** The tracker is designed to move rotationally well balanced system and because of frictionless movement, the power consumption of the entire system is very low - typically less than 0.02% of the energy generated by the power plant.
- 6 Multiple power source options:** The power supply unit is capable of using multiple power sources. Either a 415/230 VAC source or a battery charged by a PV Module can be used to run the tracking system.
- 7 Control algorithms:** The tracker functions on well tuned PID algorithms. This makes the system smoothly position itself between two positions without excessively stressing the mechanical structure or causing any over shoot. This also reduces the overall power consumption of the tracker plant.

Structures and moving mechanisms

- Frictionless pivots/composite material bearings
- Proprietary surface treatment for the mechanical parts, for long life
- Customized structure designs provided as per requirements

Off grid Solar Tracking Applications



Tracking options now available
for auto single axis, manual
seasonal tilt, dual manual tilt -
For 8/12/14/16/18 etc. modules

More than 300 trackers and structure designs supplied for Solar Pumping, Roof Top and other distributed system applications.

ScorpiusTrackers 

www.scorpiustrackers.com

397/6-7, Senapati Bapat Road, Gokhale Nagar, Pune 411016, Maharashtra, India.
Tel: 91-20-25659413 | Fax: 91-20-5650564 | Email: info@scorpiustrackers.com