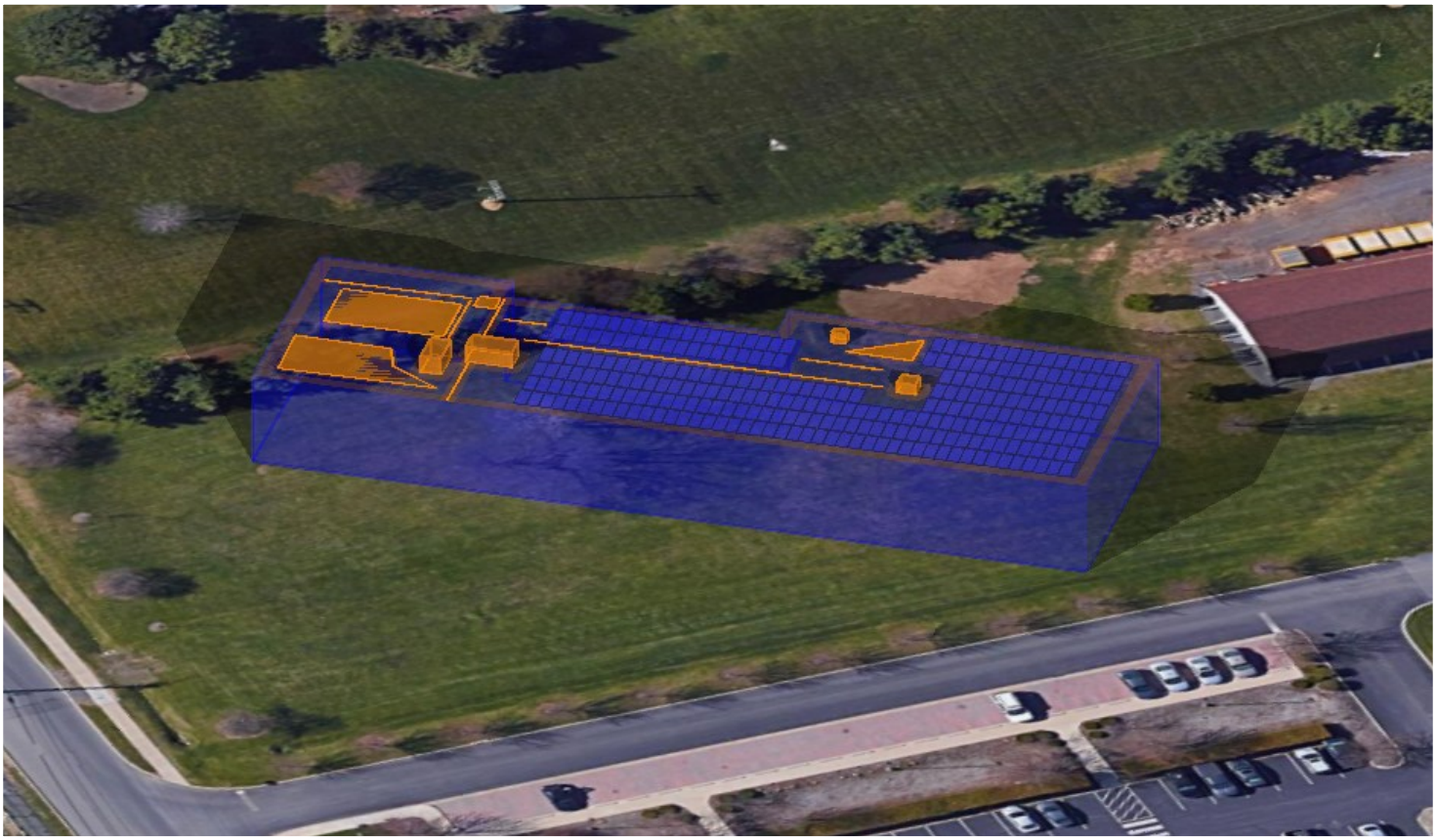
Solar Proposal by Energy Independent Solutions LLC

For Ferguson Twp. Public Works Building

January 15, 2021



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Solar Power System Proposal

Ferguson Township Public Works Garage

3147 Research Drive State College, PA

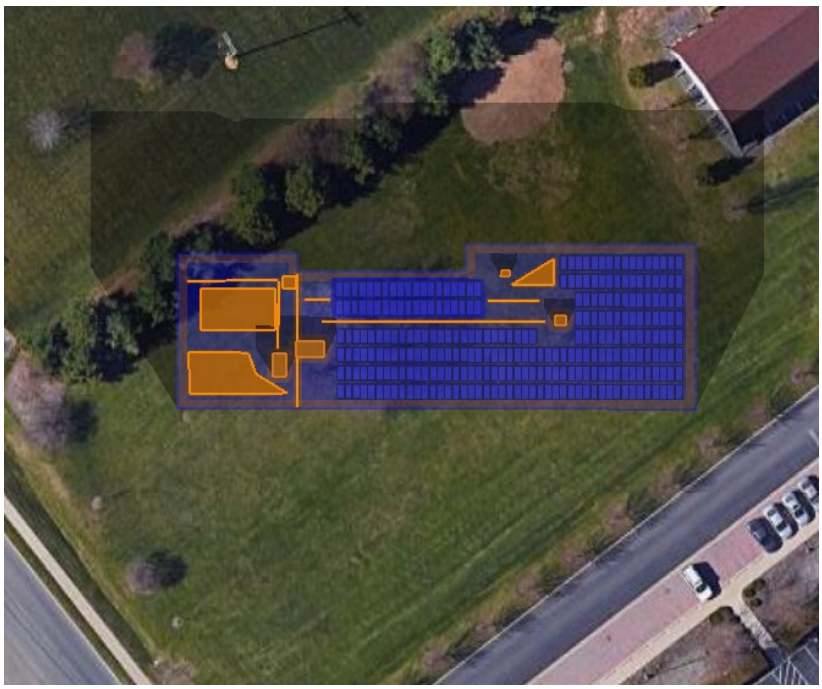
Design Summary:

273 Each 390 Watt PV Panels

DC Capacity: 106.5 kW

Specific Yield (kWh/kWp) 1.181
Power Output: 125,700 kWh/ Yr. 1

PV System Cost: $200,000



EIS Solar System Features

- Full 25-Year Warranty with Tier 1 PV Panels
- 10-year Inverter Warranty extendable to 20 yrs. Extension cost - $1,000-2,000 per inverter, Inverter replacement estimated at $5-7,000 per inverter.
- O&M Service beyond PPA available under separate contract if desired - Contract cost
- Standard On-line Monitoring Included, Kiosk display also available.

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EIS Solar Project Cover Letter for Ferguson Township

Greetings Ferguson Township,

Please accept this as our cover letter for the pending Solar RFP for the New Public Works Building located at Research Drive, State College, PA

Here are our responses to the RFP:

Energy Independent Solutions, LLC (EIS Solar) is a Pennsylvania company located outside of Pittsburgh, PA at 51 Arch St. Extension, Carnegie, PA 15106. Our contact for this RFP is Hal Saville, Commercial Energy Projects Consultant, hal@eissolar.com, 724-766-1962.

EIS Solar is a solar EPC/ Development Company whose primary mission is providing high quality renewable energy solutions for residential, commercial, agricultural and institutional customers. Founded in 2008, we are privately owned by Joseph Morinville - Managing Member/President.

This proposal covers EPC services for the Township solar project including design and engineering, pre-construction municipal permitting and utility interconnection interfaces as well as procurement of all equipment and materials, turnkey project construction and management, and closeout commissioning and system start-up. Ongoing Operation and Maintenance services are offered under a separate contract. The extent of construction services offered are detailed in the scope of work listed below.

With regard to project management experience, we produce results:

- Over 700 satisfied customers in the Western PA region and beyond in Ohio, West Virginia, New Jersey, Indiana and Washington, DC. **Completed installations on three schools in the State College Area School District. (**See our similar projects section below for additional project references.)
- Over 7 Megawatts of Solar installed with another 8MW + under contract.
- Green Building Certification Documentation experience with LEED, and many other energy efficiency standards. Successful documentation of two of the first Living Building Challenge (LBC) buildings certified nationally, both at Pittsburgh's Phipps Conservatory and Frick Environmental Education Center.
- Past Power Purchase Agreement (PPA) funding secured for multiple non-profit organizations with a pool of investors available to fund future projects. Lower interest solar commercial loans also available. Currently building the largest PPA project in Western PA at PIT International Airport including the nation's first micro-grid powered major airport. While we have not provided specific PPA terms in this proposal, we are open to exploring the Township's options including a prepaid PPA or working together with a financial partner looking for an EPC provided like EIS.
- NABCEP Certified Professionals throughout our project management team. Several years participation in the Pennsylvania Sunshine Program, Contributor to the Federal Sunshot Initiative in Western PA, Involvement in Green Jobs and Community Solar initiatives locally in Western PA.

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Ferguson Township Solar RFP Response

Project Team

Joe Morinville – Owner/Developer

- Founder/President Energy Independent Solutions: Western PA's leading alternative energy developer with over 700 successful projects totaling over 7MW of energy generation capacity, EIS is the largest Solar Developer in Western PA.
- Founder/Director Oil Free Farms: Nonprofit dedicated to assisting small and medium agricultural facilities in becoming energy independent through conservation and alternative energy generation
- Founder/President EIS Finance: A wholly owned subsidiary of EIS. EIS Finance facilitates, owns and/or manages PPA projects and enables the utilization of ITC for the benefit of nonprofits.
- Designed and built solar and wind energy generation for Pittsburgh's only Living Building Challenge project, Phipps Conservatory Center for Sustainable Landscapes
- Designed and built passive and active solar 'Net-Zero' home.
- President of financial services company for 11 years specializing in project finance
- Co-Founder Diagnostic Energy Auditors of Western PA (DEAWP)
- NABCEP Certified Professional: Solar Electric Design, Solar Thermal Design, Solar Electric Battery Based Design
- NABCEP Training: Solar Electric Design, Solar Thermal Design, Solar Electric Battery Based Design
- RESNET Certified, BPI Certified Building Analyst, Certified Energy Auditor

Hal Saville – Commercial Energy Project Designer/Consultant

- Administrative project management, energy design, project financial modeling and design execution for EIS Solar on commercial and institutional solar projects.
- Ten years prior experience in the new construction and energy conservation manufacturing industries overall, involving oversight of sales activity equaling over $20 million annually, architectural design work, specification writing and technical contact for architects and electrical engineers.
- Documentation of Living Building Challenge (LBC) compliance for Phipps Conservatory Center for Sustainable Landscapes including involvement of underserved labor participants through Pittsburgh Job Corps.
- Participation on Green Jobs Advisory Board and CCAC Solar Program Advisory Board promoting green

job growth by networking with educational and workforce development professionals, attending job fair and other promotional activities, designing and building organization website.

- Successful grant proposal written for CCI with Community Foundation of the Alleghenies to fund solar installer classes leading to NABCEP Certification.
- Founding Member of Solar Unified Network of Western PA (SUNWPA), currently involved with Community Shared Solar Taskforce formation.
- Associate of Science in Architectural Engineering Technology with Emphasis on Solar and Energy Conservation from Penn State University
- NABCEP Training: Solar Electric Design. Entry-Level Certificate.

Martin Bovee – Production Superintendent, Project Manager

- Manages production for all EIS installations of solar and wind power including , already totaling over 7MW of installed power in over 700 individual installations.
- BPI Certified for Building Analysis and Envelope Professional.
- Bachelors of Science in Technology from California University of PA
- Participated in national Solar Decathlon Competition with team from Carnegie Mellon University
- Participation in TEAC and ITEA, leading multiple award winning teams in competitions involving manufacturing and production.
- 16 year active member of Munhall Volunteer Fire Department, holding positions including Chief, Assistant Chief, and Engineer.

Ben Howar - Photovoltaic Technician

- NABCEP PV Associate responsible for power system quality assurance
- Oversight of O&M contracts
- Field technician in charge of customer project service administration

EIS Solar System Scope of Work

Project Scope:

- Design and Build a complete solar photovoltaic power system:
- Project Solution: Ballasted Flat Roof Mount PV Array consisting of 106.5 kW of Solar Electric/PV modules estimated to produce a total of 125,700 kWh/year.
- Solar arrays containing 273 each VSun 390 Watt Panels totaling 106500 Watts (or equivalent +/- 300W) and 2 SMA Core1 50 kW inverters *(or equivalent).*
- Orientation: Azimuth within 10 degrees of 180 degrees due South, array pitch of 5 degrees.
- Proposal subject to review of building electrical system. Minimum of three phase 208 volt electrical service assumed. EIS to approve site electrical riser, switchgear and interconnection plan prior to commencement of work to ensure NEC compliance.
- EIS will design systems in compliance with all manufacturer recommendations, grant requirements and zoning and permitting requirements
- EIS will provide and install all PV modules, inverters, racking equipment, conduit, wire, and all associated materials through the point of AC interconnection. Any required modification of main service relative to main transformer, generator or switchgear to be provided by others. EIS can provide under separate contract if necessary.
- Utility accessible and lockable solar disconnect to be provided by others and must be located within 10 ft and visual sight of building meter. Final location of utility disconnect is subject to approval by utility company. EIS will coordinate location of disconnect with utility company.
- System interconnection will require either breakers in MDP rated for solar and sized per NEC or Supply Side Connection. MDP must also be adequately sized to accept solar in compliance with NEC.
- Inverter-based on-line monitoring included. Internet connection and duplex outlet required at inverter location and to be provided by others. Client must disclose any firewalls used: EIS shall provide firewall protocols to client; Client to add protocols to

allow inverter communication to outside server. This shall be done prior to commissioning.

- EIS will complete all required net metering paperwork.
- System maintenance to be provided upon request under separate contract.
- Based on the 106+ kW system capacity, an evaluation of interconnection will need to be performed by the utility to determine if any transformer upgrades will be needed. Those utility charges, if any, cannot be known prior to interconnection application and thus are not part of this offering.
- Note that the project pricing above is contingent on all work done in single staging. Multiple phasing of the work could require additional staging costs. Pricing of any subset of the whole is available upon request.
- Likely location of inverters is attached to ground mount racking, however, actual inverter location is flexible. This proposal assumes each inverter can be located within 50 feet of the PV Modules.

Project Timing:

Project engineering will begin within 7 days of engagement. Typical completion date based upon 180 days beyond notice to proceed.

Construction Schedule:

Work to be done is based on a single mobilization for installation. EIS will coordinate with facility staff on scheduling all work. All work is weather permitting. Below are approximate task durations

Lead time on racking and inverters is 6-8 weeks.

Install racking: 3-5 days

Install conduit system: 3-5 days

Install panels: 7-10 days

Install inverters: 2-3 days

Commission system: 1-2 days (subject to inspector and utility delays.)

Project Documentation:

EIS Solar to provide solar power system as-built drawings as part of final completion manual. 1 Day of On-Site training for FedEx Operations Staff included.

SREC's (Solar Renewable Energy Credits):

EIS will assist in the registration of the PV System on PJM GATS exchange and the monetization of the SREC revenue.

Equipment and workmanship warranties:

EIS Solar provides 5-year workmanship free of defects warranty in addition to equipment warranties detailed in specification exhibits provided.

Safety Plan and Management:

EIS will implement complete on-site safety management plan including fall protection management, COVID-19 mitigation plan and other required safety precautions. Video

surveillance services optionally available upon request.

Operations & Maintenance Plan:

Beyond O&M provided under a PPA, EIS offers full maintenance and cleaning service contracts. Visual & mechanical inspection of general site conditions, PV arrays, electrical equipment, mounting structure, data acquisition system, & balance of system. (repairs of minor issues included).

Contracts include:

- Switches and disconnects test
- Checking torque marks and re-tightening appropriate wiring connections to design specification torque force (per manufactures guidelines)
- String testing, including string level open circuit voltage & DC operating current tests on all strings
- Monitor Alarms pro-actively
- Inverter preventive maintenance (per manufacture's operating guidelines)
- Cleaning of inverter cabinet air vents
- Cleaning and changing inverter air filters (per manufacturer warranty requirements)
- Cleaning and removing dust from inverter heat sinks (per manufacturer warranty requirements)
- Provide written maintenance report (Panel cleaning and snow removal is also available under a separate agreement.)

Design 2 - 4 ft setback RFP requirement Ferguson Twp, 3147 research drive

Report

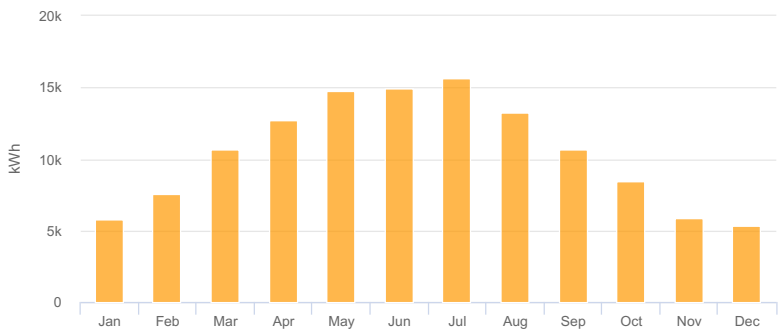
Project Name	Ferguson Twp
Project Address	3147 research drive
Prepared By	Joe Morinville joe@eissolar.com

System Metrics

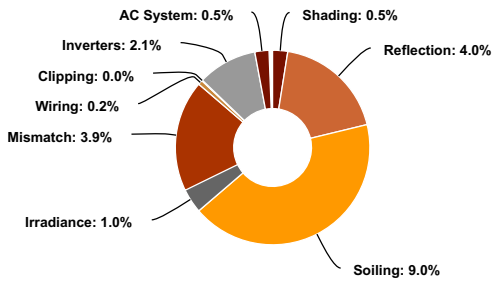
Design	Design 2 - 4 ft setback RFP requirement
Module DC Nameplate	106.5 kW
Inverter AC Nameplate	100.0 kW Load Ratio: 1.06
Annual Production	125.7 MWh
Performance Ratio	80.6%
kWh/kWp	1,180.9
Weather Dataset	TMY, 10km grid (40.75,-77.85), NREL (prospector)
Simulator Version	8a7215b171-d9c7bb36e2-077dbb99ac-acffd7d0a7

Project Location

Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,405.3	
	POA Irradiance	1,465.6	4.3%
	Shaded Irradiance	1,457.8	-0.5%
	Irradiance after Reflection	1,400.1	-4.0%
	Irradiance after Soiling	1,274.1	-9.0%
	Total Collector Irradiance	**1,274.0**	**0.0%**
Energy (kWh)	Nameplate	135,744.0	
	Output at Irradiance Levels	134,417.7	-1.0%
	Output at Cell Temperature Derate	134,580.9	0.1%
	Output After Mismatch	129,303.1	-3.9%
	Optimal DC Output	129,096.8	-0.2%
	Constrained DC Output	129,064.1	0.0%
	Inverter Output	126,359.7	-2.1%
	Energy to Grid	**125,727.9**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		11.0 °C
	Avg. Operating Cell Temp		17.3 °C
Simulation Metrics			
	Operating Hours		4671
	Solved Hours		4671

Condition Set

Description	Condition Set 1
Weather Dataset	TMY, 10km grid (40.75,-77.85), NREL (prospector)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Sandia Model

Temperature Model Parameters	Rack Type	a	b	Temperature Delta
	Fixed Tilt	-3.56	-0.075	3°C
	Flush Mount	-2.81	-0.0455	0°C

Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	9	9	9	9	9	9	9	9	9	9	9	9

Irradiation Variance	5%
Cell Temperature Spread	4° C
Module Binning Range	-2.5% to 2.5%
AC System Derate	0.50%

Module Characterizations	Module	Uploaded By	Characterization
	VSUN390-72MH (VSUN)	Folsom Labs	Spec Sheet Characterization, PAN

Component Characterizations	Device	Uploaded By	Characterization
	Sunny Tripower_Core1 50-US-41 (SMA)	Folsom Labs	Default Characterization

Components

Component	Name	Count
Inverters	Sunny Tripower_Core1 50-US-41 (SMA)	2 (100.0 kW)
Strings	10 AWG (Copper)	17 (1,944.5 ft)
Module	VSUN, VSUN390-72MH (390W)	273 (106.5 kW)

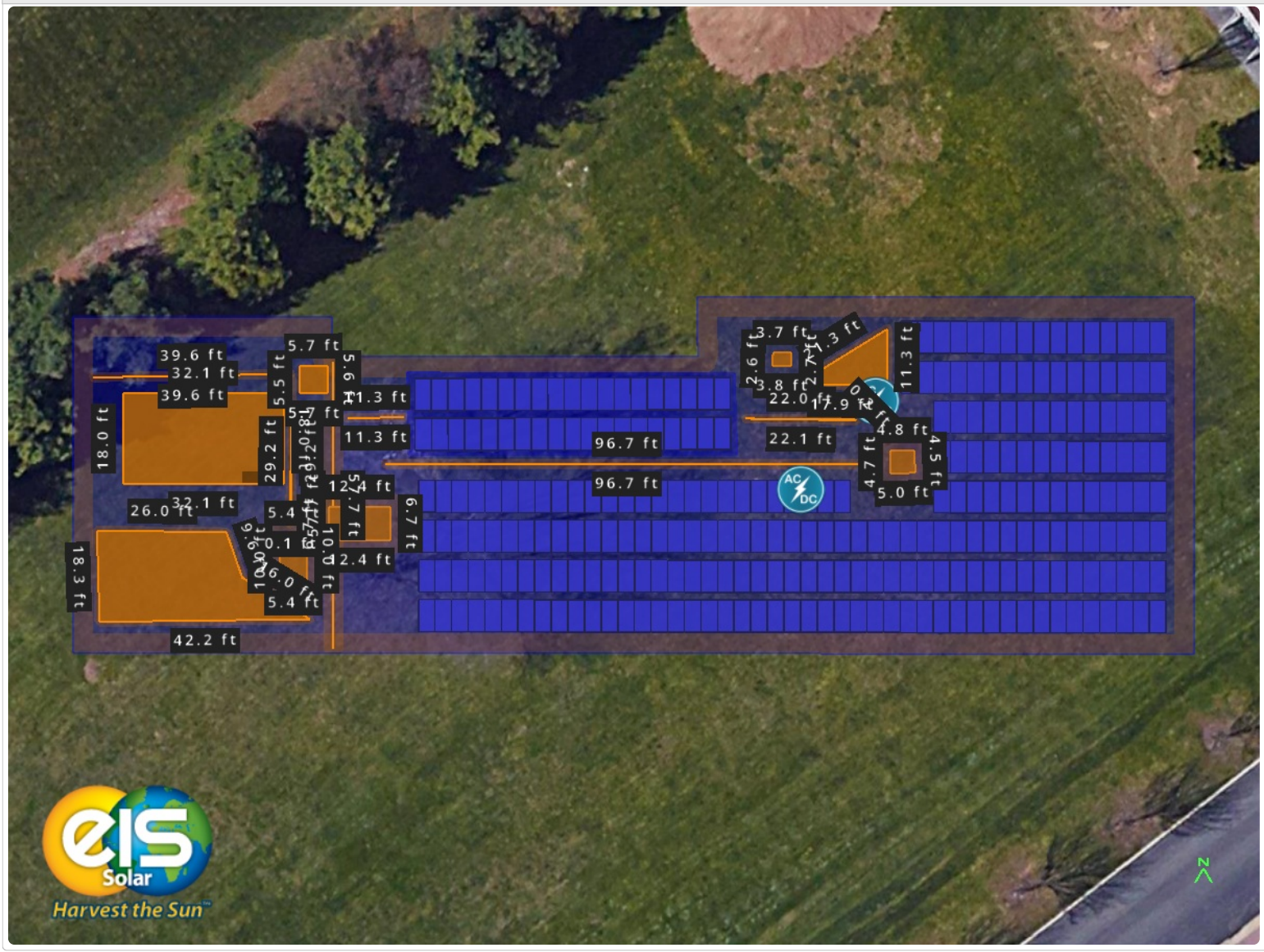
Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	4-18	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Fixed Tilt	Portrait (Vertical)	5°	180.06952°	1.5 ft	1x1	235	235	91.7 kW
Field Segment 2	Fixed Tilt	Portrait (Vertical)	5°	179.8031°	1.5 ft	1x1	38	38	14.8 kW

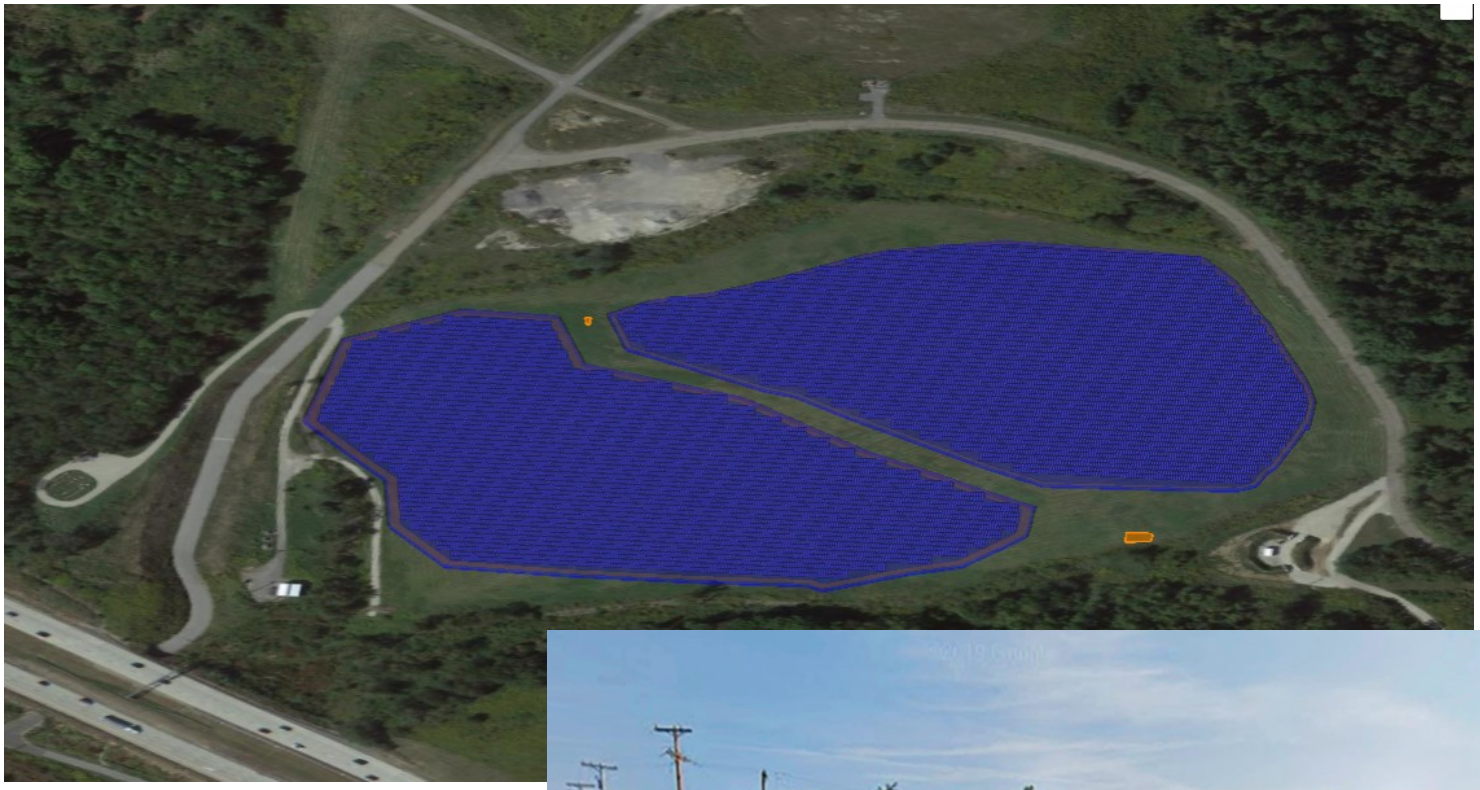
Detailed Layout

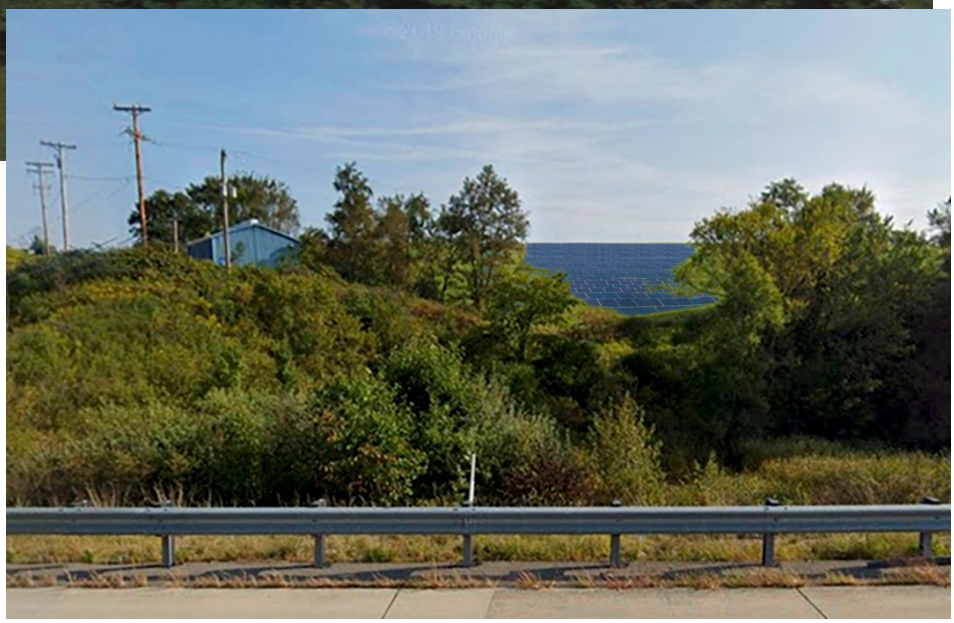


Similar Projects Completed (or under Construction)

Pittsburgh International Airport—3.75 MW in Phase 1

Description: Currently building the largest PPA project in Western PA at PIT International Airport including the nation's first micro-grid powered major airport. This project is a collaboration of EIS Solar, Peoples Gas, and a national co-generation power plant provider. Artist renderings of Array field depicted below.





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Ballasted Roof Mounted Solar Array –
State College Area Schools
State College, PA Total 200 + kW

Project Contact: - Timothy J. Kilburn—Contract Manager
THE FARFIELD COMPANY
517 Airport Road P. O. Box 0387
Lititz, PA. 17543-0387
Phone: 717-560-7930 , tim.kilburn@Farfield.net

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Metal Roof Solar Array: Forest Hills Municipal Center - 175 kW
4400 Greensburg Pike, Pittsburgh, PA 15221

Description: Forest Hills Borough took an innovative approach not only in the design/build side of the passive solar building (utilizing SIPS structural panels fabricated off-site) but also with the financing, utilizing a long term solar Power Purchase Agreement (PPA) with an option to buy out in year 7. This minimized upfront cash layout while still capturing the benefit of the Federal Investment Tax Credit (ITC) and depreciation through investor involvement, even as a governmental entity.

Project Contact: Steve Morus - Borough Manager 412-351-7330 manager@foresthillspa.com

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Ground Mounted Solar Array –
City of Corry Redevelopment Authority,
83.2 kW Corry, PA

Description: The City of Corry sought out multiple state grants to fund this publicly bid project in Northwestern PA. To achive the grant requirements, EIS expedited the procurement of materials, obtained required permitting and battled the elements, working in the snow belt in winter to bring the project in on time and under budget.

Inverters were integrated into the array structure and essential components were enclosed in a security fence to isolate it from the public.

Project Contact: Rick Novotony - Director—Redevelopment authority of Corry, PA
814-664-3884 rnovo@corryidc.org

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Rooftop Architectural Canopy – The Brew House, 47.5 kW Southside Pittsburgh, PA

Description: The Brew House demonstrates the pinnacle of affordable housing development design and execution. This beautiful canopy covering a rooftop patio provides its mixed income tenants with stylish comfort in a relaxed yet secure setting. At the same time the power generated from the architectural canopy and additional conventional ballasted flat roof array significantly reduces operating costs for the project with highly desirable ROI.

Project Contact: John Ginocchi - Vice President of Trek Development 412-688-7200
jginocci@trekdevelopment.com

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Parking Garage Cover: Marquis Plaza - 305 kW - 11 Parkway Center Suite 300 Pittsburgh, PA 15220

Description: Marquis Center is the first parking garage canopy array located in the Pittsburgh Area. The Arrays consist of 270 kW of parking garage cover and 35 kW of integrated solar window awnings. It was built and designed locally by EIS, using locally sourced steel and totally erected with local labor. It also features virtual net metering and PPA and as such, is very close to the specifications we recommend for this RFP including clear back sheet modules that allow for natural light transmittance.

Project Contact: Bryan Martucci – Dir. of Construction 412-921-6100 bmartucci@kossman.com

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Commercial Rooftop, Ground Mount and Parking Canopies - Phipps Conservatory – 198 kW of PV 10 kW of Wind Power - Pittsburgh, PA

Description: This Pittsburgh landmark is not only a pioneer in achieving LBC certification but is also a repeat customer, contracting EIS Solar to implement four separate solar installations including standard flat roof commercial arrays, ground mounted pods overlooking historic Panther Hollow, freestanding parking canopies and a solar tracker array. We also installer a vertical wind turbine including compliance with Historical Landmark requirements.

Project Contact: Marcus Diniaco
Owners Rep 412 559 0696

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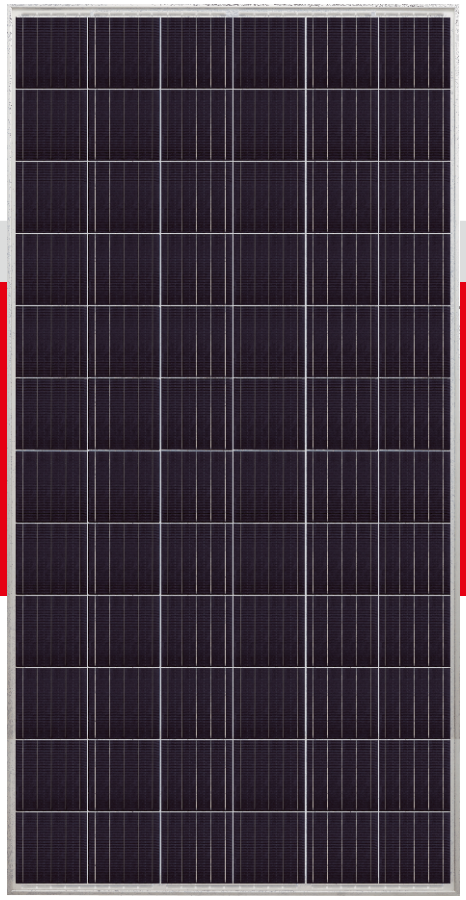
VSUN

Innovative & Smart



VSUN395-72MH

VSUN395-72MH VSUN390-72MH
VSUN385-72MH VSUN380-72MH
VSUN375-72MH

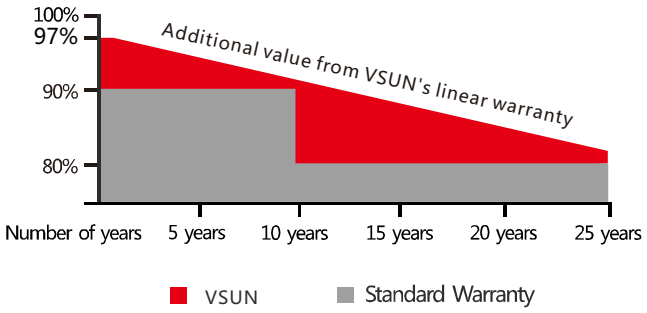
19.89%
Module efficiency

12years
Material & Workmanship warranty

395W
Highest power output

25years
Linear power output warranty

- PID-free
- World class mono efficiency
- Tighter product performance distribution and current sorting reduces the mismatch power loss in system operation
- Positive tolerance offer
- Good temperature coefficient enables higher output in high temperature regions
- Excellent performance under low light conditions
- Certified for salt/ammonia corrosion resistance
- Load certificates: wind to 2400Pa and snow to 5400Pa



Munich RE

- 12-year product warranty
- 25-year linear power output warranty

Invested by Fuji Solar, VSUN is a Japanese solar module solutions provider located in Tokyo that offers Japanese quality solar technologies globally. The group's business started in Japan in 2006, later spreading to North America, Southeast Asia, and EMEA.

Innovative & Smart – VSUN has been committed to providing greener, cleaner, and more intelligent renewable energy solutions. It is focusing on the new energy market and the development of customized and high-efficiency products.

Note:

All information and data are subject to change without notice.

A Sub-company of FUJI SOLAR

Engineered in Japan
vsun@vietnamsunergy.com
www.vsun-solar.com

Electrical Characteristics at Standard Test Conditions(STC)

Module Type	VSUN395-72MH	VSUN390-72MH	VSUN385-72MH	VSUN380-72MH	VSUN375-72MH
Maximum Power - Pmax (W)	395	390	385	380	375
Open Circuit Voltage - Voc (V)	48.3	48.1	47.9	47.8	47.6
Short Circuit Current - Isc (A)	10.36	10.27	10.18	10.07	9.98
Maximum Power Voltage - Vmpp (V)	39.9	39.7	39.5	39.3	39.1
Maximum Power Current - Impp (A)	9.91	9.83	9.75	9.67	9.59
Module Efficiency	19.89%	19.64%	19.39%	19.13%	18.88%

Standard Test Conditions (STC): irradiance 1,000 W/m²; AM 1,5; module temperature 25°C. Tolerance of Pmpp: 0~+3%.

Measuring uncertainty of power: ±3%.

Electrical Characteristics at Normal Operating Cell Temperature(NOCT)

Module Type	VSUN395-72MH	VSUN390-72MH	VSUN385-72MH	VSUN380-72MH	VSUN375-72MH
Maximum Power - Pmax (W)	292.2	288.3	284.6	281	277.4
Open Circuit Voltage - Voc (V)	44.6	44.4	44.3	44.2	44
Short Circuit Current - Isc (A)	8.31	8.3	8.19	8.14	8.06
Maximum Power Voltage - Vmpp (V)	37.2	36.8	36.8	36.6	36.5
Maximum Power Current - Impp (A)	7.85	7.82	7.73	7.68	7.61

Normal Operating Cell Temperature((NOCT) : irradiance 800W/m^2; wind speed 1 m/s ; cell temperature 45℃; ambient temperature 20℃.

Measuring uncertainty of power: ±3%.

Temperature Characteristics

NOCT	45℃ (±2℃)
Voltage Temperature Coefficient	-0.29%/℃
Current Temperature Coefficient	+0.05%/℃
Power Temperature Coefficient	-0.39%/℃

Maximum Ratings

Maximum System Voltage [V]	1500
Series Fuse Rating [A]	20

Material Characteristics

Dimensions	1982×1002×40mm (L×W×H)
Weight	22.4kg
Frame	Anodized aluminum profile
Front Glass	White toughened safety glass, 3.2 mm
Cell Encapsulation	EVA (Ethylene-Vinyl-Acetate)
Back Glass	Composite film
Cells	6×12 pieces monocrystalline solar cells series strings
Junction Box	Rated current≧13A, IP≧67, TUV&UL
Cable&Connector	Length 1200 mm, 1×4 mm^2, compatible with MC4

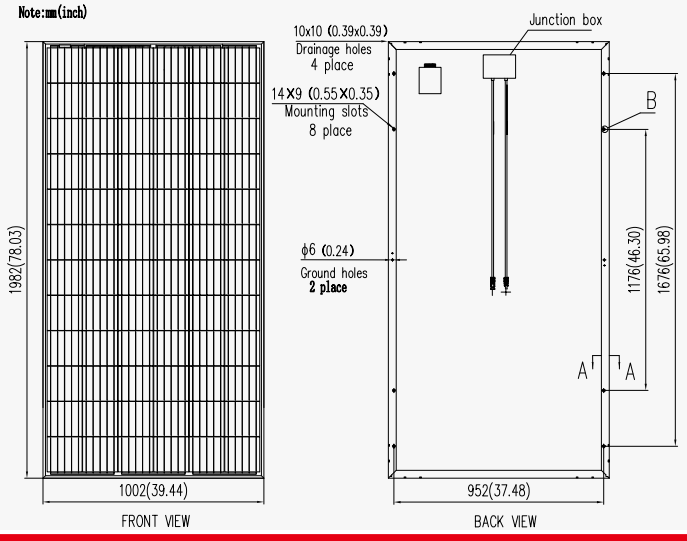
Packaging

Dimensions(L×W×H)	2010×1130×1132mm
Container 20'	270
Container 40'	594
Container 40'HC	649

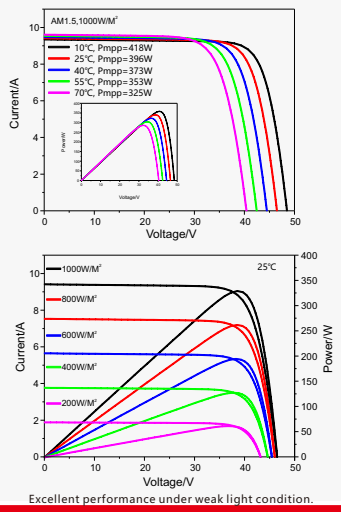
System Design

Temperature Range	-40 °C to + 85 °C
Withstanding Hail	Maximum diameter of 25 mm with impact speed of 23 m/s
Maximum Surface Load	5,400 Pa
Application class	class A

Dimensions



IV-Curves



Excellent performance under weak light condition.

Engineered in Japan
vsun@vietnamsunergy.com
www.vsun-solar.com

SUNNY TRIPOWER CORE1 33-US / 50-US / 62-US

Fully integrated

- Innovative design requires no additional racking for rooftop installation
- Integrated DC and AC disconnects and overvoltage protection
- 12 direct string inputs for reduced labor and material costs

Increased power, flexibility

- Multiple power ratings for small to large scale commercial PV installions
- Six MPP trackers for flexible stringing and maximum power production
- ShadeFix, SMA's proprietary shade management solution, optimizes at the string level

Enhanced safety, reliability

- Integrated SunSpec PLC signal for module-level rapid shutdown compliance to 2017 NEC
- Next-gen DC AFCI arc-fault protection certified to new Standard UL 1699B Ed. 1

Smart monitoring, control, service

- Advanced smart inverter grid support capabilities
- Increased ROI with SMA ennexOS cross sector energy management platform
- SMA Smart Connected proactive O&M solution reduces time spent diagnosing and servicing in the field

SUNNY TRIPOWER CORE1 33-US / 50-US / 62-US

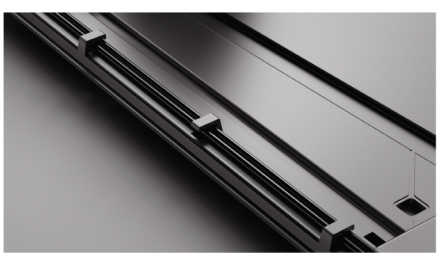
It stands on its own

The Sunny Tripower CORE1 is the world's first free-standing PV inverter for commercial rooftops, carports, ground mount and repowering legacy solar projects. From distribution to construction to operation, the Sunny Tripower CORE1 enables logistical, material, labor and service cost reductions, and is the most versatile, cost-effective commercial solution available. Integrated SunSpec PLC for rapid shutdown and enhanced DC AFCI arc-fault protection ensure compliance to the latest safety codes and standards. With Sunny Tripower CORE1 and SMA's ennexOS cross sector energy management platform, system integrators can deliver comprehensive commercial energy solutions for increased ROI.

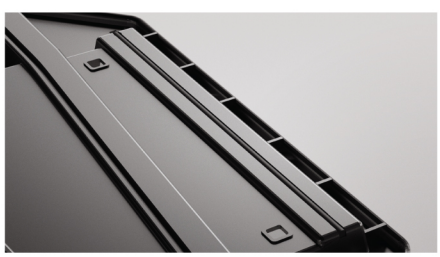
Ecofoot2®

The Next Step.

Ecofoot2® is the first modular system that combines the benefits of polymer with integrated grounding and wire management. This pioneering combination maximizes installation efficiency while providing the most roof friendly design on the market.



Wire Management
Design accelerates the install process and reduces additional accessories on the roof.



Roof Friendly
Base contours and built-in gaskets provide a membrane friendly material and design. The drainage channels and weep holes encourage water flow.

Integrated Grounding
Eco Mid Clamp's attachment provides integrated grounding with the turn of a bolt.

340 W State St, Unit 22, Athens, OH 45701 | 740-249-1877 | www.ecolibriumsolar.com

EcolibriumSolar®

Ecofoot2® delivers the simplicity installers love, durability and roof friendly features site owner's demand, and cost savings that make projects possible. By combining the key components' of the original Ecofoot®: speed, low part count, and cost effectiveness with the new features; integrated grounding, wire management, and increased weatherability, **Ecofoot2®** *is the next step in mounting systems.*

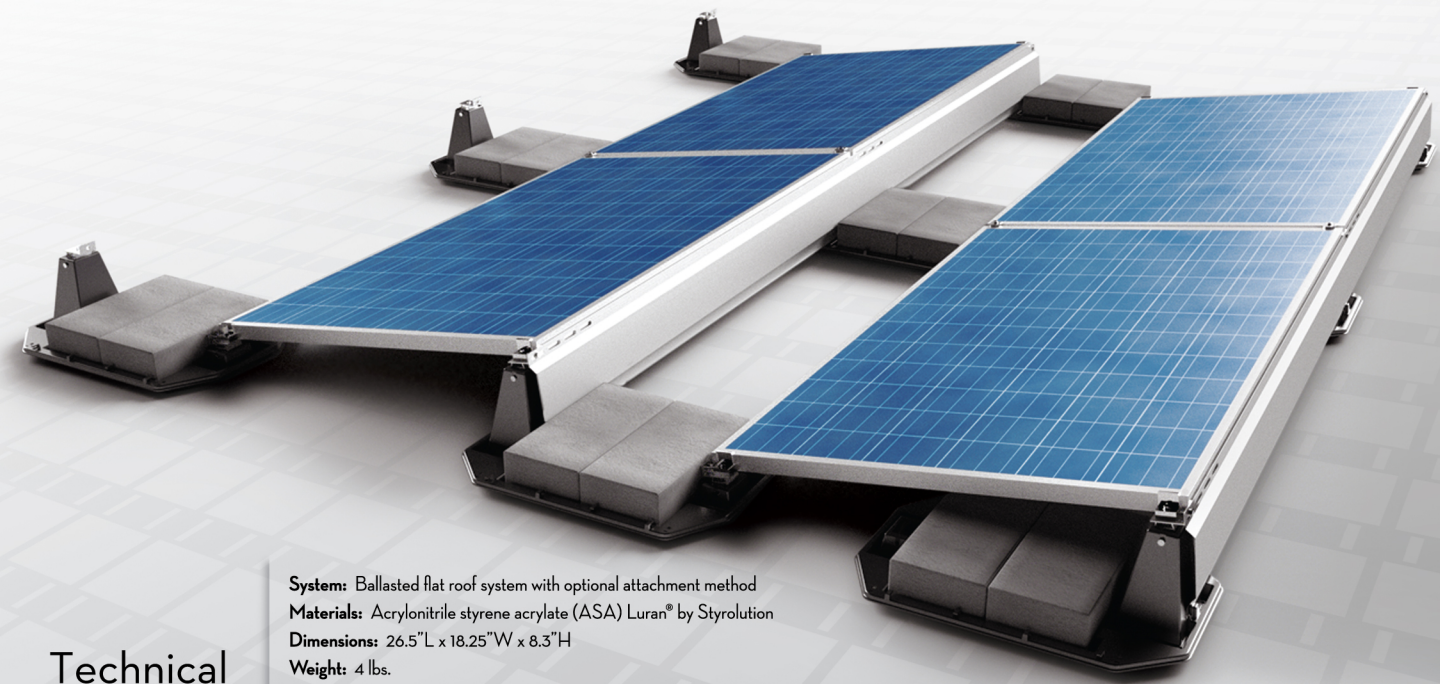
Additional Features

Advanced Material
Luran® ASA by Styrolution, a BASF company. The engineered resin has proven durability, ensuring Ecofoot2® will withstand the toughest rooftop exposure for over 25 years.

Aerodynamic
Interior deflectors reduce the weight load placed on the roof structure while enhancing the wind load performance, permitting system installations on challenging roofs.

Adaptable
Modular system design promotes easy layout and accommodates uneven roof surfaces and drainage systems.

Flexible
Modules may be mounted in portrait or landscape.



Technical Specifications

System: Ballasted flat roof system with optional attachment method
Materials: Acrylonitrile styrene acrylate (ASA) Luran® by Styrolution
Dimensions: 26.5"L x 18.25"W x 8.3"H
Weight: 4 lbs.
Module type: Framed PV module
Compatible modules: List of approved manufacturers: ecolibriumsolar.com
Module orientation: Landscape and portrait
Module tilt angle: 4°-12°
Module inter-row spacing: 18"
Roof pitch: 0°-5°
Ballast requirements: 4"x8"x16" roof paver
Installed weight: 3-5 psf
Building height: Meets ASCE 7-05 up to 60 feet, higher upon request
Exposure: Meets ASCE 7-05 category B, C, D
Wind load: Meets ASCE 7-05 up to 120 mph
Snow load: Meets ASCE 7-05 up to 70 psf
Seismic load: Meets ASCE 7-05 in all seismic zones
Warranty: 25 years

MADE IN U. S. A.

EcolibriumSolar®

Technical data	Sunny Tripower CORE1 33-US	Sunny Tripower CORE1 50-US	Sunny Tripower CORE1 62-US
Input (DC)			
Maximum array power	50000 Wp STC	75000 Wp STC	93750 Wp STC
Maximum system voltage		1000 V	
Rated MPP voltage range	330 V … 800 V	500 V … 800 V	550 V … 800 V
MPPT operating voltage range		150 V … 1000 V	
Minimum DC voltage / start voltage		150 V / 188 V	
MPP trackers / strings per MPP input		6 / 2	
Maximum operating input current / per MPP tracker		120 A / 20 A	
Maximum short circuit current per MPPT / per string input		30 A / 30 A	
Output (AC)			
AC nominal power	33300 W	50000 W	62500 W
Maximum apparent power	33300 VA	53000 VA	66000 VA
Output phases / line connections		3 / 3-(N)-PE	
Nominal AC voltage		480 V / 277 V WYE	
AC voltage range		244 V … 305 V	
Maximum output current	40 A	64 A	80 A
Rated grid frequency		60 Hz	
Grid frequency / range		50 Hz, 60 Hz / -6 Hz … +6Hz	
Power factor at rated power / adjustable displacement		1 / 0.0 leading … 0.0 lagging	
Harmonics THD		<3 %	
Efficiency			
CEC efficiency	97.5%	97.5%	97.5%
Protection and safety features			
Load rated DC disconnect		●	
Load rated AC disconnect		●	
Ground fault monitoring: Riso / Differential current		● / ●	
DC AFCI arc-fault protection		●	
SunSpec PLC signal for rapid shutdown		●	
DC reverse polarity protection		●	
AC short circuit protection		●	
DC surge protection: Type 2 / Type 1+2		O / O	
AC surge protection: Type 2 / Type 1+2		O / O	
Protection class / overvoltage category (as per UL 840)		I / IV	
General data			
Device dimensions (W / H / D)		621 mm / 733 mm / 569 mm (24.4 in x 28.8 in x 22.4 in)	
Device weight		84 kg (185 lbs)	
Operating temperature range		-25 °C … +60 °C (-13 °F … +140 °F)	
Storage temperature range		-40 °C … +70 °C (-40 °F … +158 °F)	
Audible noise emissions (full power @ 1m and 25 °C)		65 dB(A)	
Internal consumption at night		5 W	
Topology		Transformerless	
Cooling concept		OptiCool (forced convection, variable speed fans)	
Enclosure protection rating		Type 4X, 3SX (as per UL 50E)	
Maximum permissible relative humidity (non-condensing)		100 %	
Additional information			
Mounting		Free-standing with included mounting feet	
DC connection		Amphenol UTX PV connectors	
AC connection		Screw terminals - 4 AWG to 4/0 AWG CU/AL	
LED indicators (Status / Fault / Communication)		●	
Network interfaces: Ethernet / WLAN / RS485		● (2 ports) / ● / O	
Data protocols: SMA Modbus / SunSpec Modbus / Webconnect		● / ● / ●	
Multifunction relay		●	
ShadeFix technology for string level optimization		●	
Integrated Plant Control / Q on Demand 24/7		● / ●	
Off-Grid capable / SMA Fuel Save Controller compatible		● / ●	
SMA Smart Connected (proactive monitoring and service support)		●	
Certifications			
Certifications and approvals		UL 1741, UL 1699B Ed. 1, UL 1998, CSA 22.2 107-1, PV Rapid Shutdown System Equipment	
FCC compliance		FCC Part 15 Class A	
Grid interconnection standards		IEEE 1547, UL 1741 SA - CA Rule 21, HECO Rule 14H	
Advanced grid support capabilities		L/HFRT, L/HVRT, Volt-VAr, Volt-Watt, Frequency-Watt, Ramp Rate Control, Fixed Power Factor	
Warranty			
Standard		10 years	
Optional extensions		15 / 20 years	
O Optional features ● Standard features – Not available			
Type designation	STP 33-US-41	STP 50-US-41	STP 62-US-41

Accessories

SMA Data Manager M
EDMM-US-10

SMA Sensor Module
MD.SEN-US-40

Universal Mounting System
UMS_KIT-10

AC Surge Protection Module Kit
AC_SPD_KIT1-10, AC_SPD_KIT2_T1T2
DC Surge Protection Module Kit
DC_SPD_KIT4-10, DC_SPD_KIT5_T1T2

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