

300 North St.
Endicott NY 13760
www.etmsolar.com



Phone: 607-785-6499
FAX: 607-786-3388
email: info@etmsolar.com

Tuesday, March 22, 2016

Carolyn Price
Town of Windsor

Dear Carolyn,

I have explored what we can do to get solar power for the Town. Here's what I have found out:

We can fit a 178.56 kW solar electric system on the land around the Water Treatment plant. This is large enough to serve the needs of the water treatment, pump stations and some other Town loads (perhaps the garage or Town hall).

Your utility rates vary from 6.5 to 11 cents. The average is 8.5 cents. The cost and smallish size of the system is such that our finance people cannot offer a PPA. They can do that for larger systems (generally over 1000 kW in size).

So how can a Town go solar without a PPA? It is always difficult for Towns to get any kind of up-front money for projects. And no one wants to raise taxes. There are 2 main mechanisms Towns can use.

First, get all the grant money you can. There is an "automatic" grant from NYSERDA (as shown on the attached proposal). Then there are other funds via the NYS economic development grants and community grants.

Second, consider doing a municipal bond to pay for the system. Municipal bonds have really low interest rates.

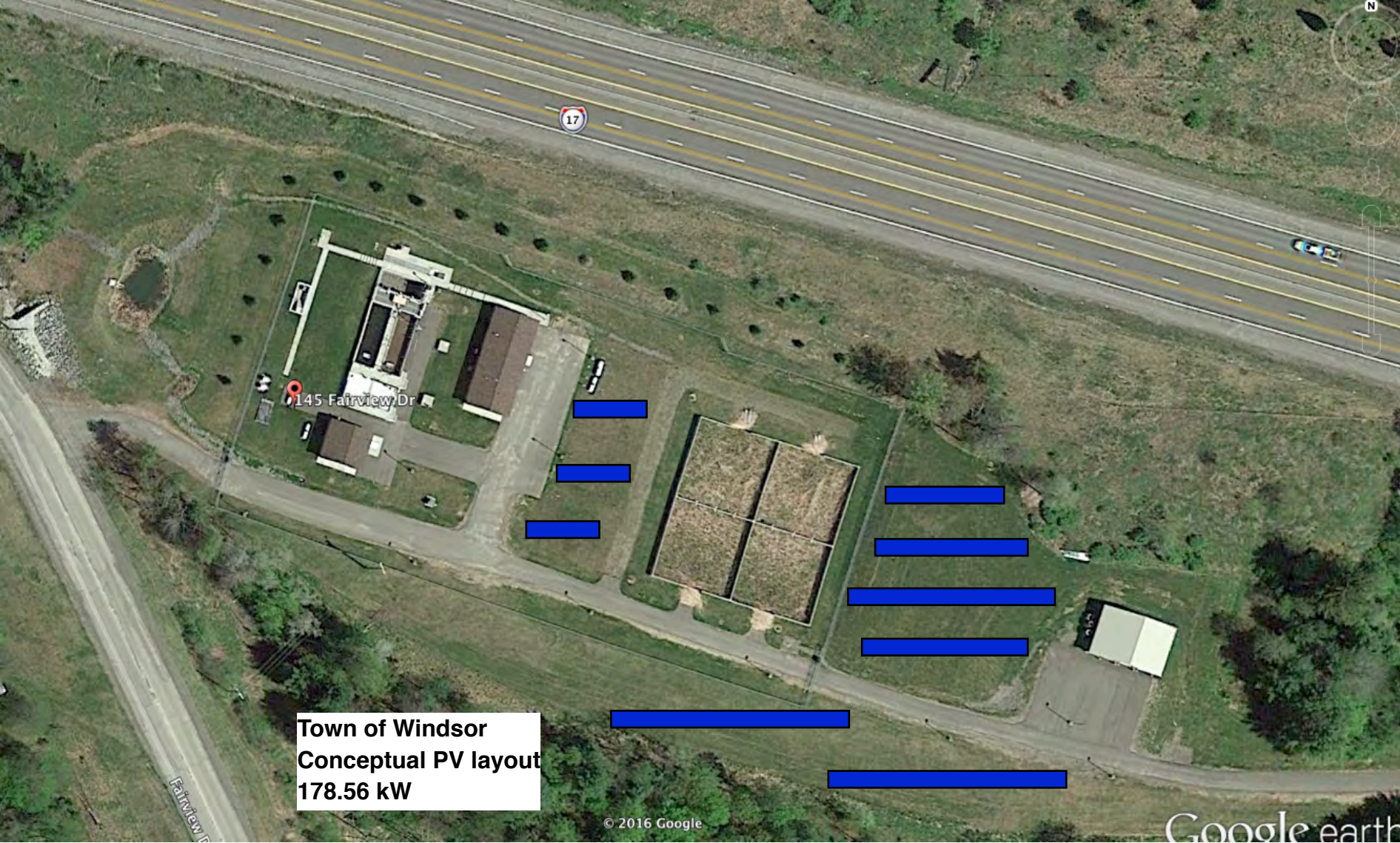
Something to consider is that utility rates are rising. The kWh rate of this system is the same as the average rate you have now, but it is a fixed rate for the next 35 years. Meanwhile, I just saw in the newspaper yesterday that NYSEG is asking for another rate increase.

Give a call if you want to discuss further.

Sincerely,

A handwritten signature in black ink that reads "Gay E. Canough". The signature is written in a cursive style with a small flourish at the end.

Gay E. Canough
President, ETM Solar Works



145 Fairview Dr

Town of Windsor
Conceptual PV layout
178.56 kW

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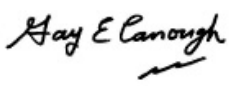
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Customer Purchase Agreement

3/22/16

<p>Customer Town of Windsor 124 Main St. Windsor NY 13865</p>	<p>Installation Address: 145 Fairview Windsor NY 13865</p>
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Days Valid: 15

Description	Price
<p>For Solar Electric System with: (576) BenQ 310 W PV modules 178560 Watts (6) SMA TL 30 kW Inverters Balance of System: Conduit and wire, disconnects, junction boxes, connectors, ground-mount Labor and Overhead: Design, travel, installation, paperwork, insurance All manufacturer's warranties honored.</p>	\$469,565
This System will generate about 203567 kWh per year	
NYSERDA incentive: <i>See page 2 for details</i>	-\$58,568
Labor warranty is 5 years. All manufacturers warranties honored. Lead time to install: 24 weeks, weather permitting. It takes 1 week to install it.	
SCHEDULE OF PAYMENTS	
Upon acceptance of proposal: \$ 20550 Upon start of installation: \$ 369898 Upon completion: \$ 20549	
All material is guaranteed to be as specified. Inverters and modules are certified by Underwriters' Laboratories or CSA International. All work to be completed in a workmanlike manner according to standard practices. Any alteration or deviation from the specifications will be executed only upon written orders signed by the customer and installer, and may involve additional costs and charges to be borne by the customer. All arrangements contingent upon strikes, accidents or delays beyond our control. Owner/customer to carry fire, tornado and other necessary insurance.	
The owner/contractor/client has an unconditional right to cancel the contract without penalty or obligation until midnight of the third business day after he or she signs the contract. Cancellation must be done in writing.	
ETM carries commercial liability insurance, worker's comp, unemployment and disability insurance. Certificate of insurance available upon request.	
We propose hereby to furnish material and labor, complete and in accordance with the above specifications.	
Total	\$410,997
<p>Customer: Name _____ Signature _____ Date _____</p> <p>Installer Representative:  Gay Canough, NABCEP-Certified Installer, NYSERDA installer # 4006</p>	

Make checks payable to *ETM Solar Works*

NYSERDA Incentive Details

1. 100% of the incentive goes to customer. Visit www.PowerNaturally.org for program details.
2. NYSERDA reserves the right to inspect the system.
3. Customer must collaborate with NYSERDA's Director of Communications if preparing any press release or when planning any news conference related to the PV system.
4. Neither NYSERDA nor the State of New York: (1) endorse any Eligible Installer; or (2) guaranty, warranty, or in any way represent or assume liability for any work proposed or carried out by an Eligible Installer. Additionally, NYSERDA is not responsible for assuring that the design, engineering and construction of the project or installation of any PV system is proper or complies with any particular laws, regulations, codes, licensing, certification and permit requirements, or industry standards. NYSERDA does not make any representations of any kind regarding the results to be achieved by the PV system or the adequacy or safety of such measures.
5. NYSERDA will not make any payments without proof that all required permits and approvals have been obtained.
6. PV System Warranty. There is a full warranty to the purchaser of the PV generation system installed under this Agreement for a period of five years after installation. The warranty covers all components of the PV System against breakdown or degradation in electrical output of more than ten percent from the original rated electrical output. The warranty covers the full costs, including labor and repair or replacement of defective components or systems. If the PV System includes a battery pack, the battery system is covered by a full warranty including labor and repair or replacement of the battery to the purchaser for two years after installation.

ETM Advisements

1. Apply for NY Solar Electric Generating Equipment Credit and Federal tax credits at tax time.
2. Shade Note: Keep trees trimmed to avoid shade on PV. Shade greatly reduces the performance of PV systems.
3. Customer will report kWh production to ETM **once every six months** for the 3-year monitoring period.
4. Definition of Completion for this project: When system installation is finished, system is commissioned and electrical inspection is done.
5. Be advised that it can take as long as 60 days for the local utility to finalize interconnection.
6. kWh production varies about 10% from year to year, because the amount of sun varies.
7. PV mounting systems CANNOT withstand hurricanes, tornadoes and other extreme weather events. Advise your insurance agent of the system value.
8. **The NYSERDA incentive amount is subject to change. We have no control over this and so be advised that changes in the incentive amount made by NYSERDA will change the bottom-line cost to you. However, once they approve the application for an incentive, the amount will be locked in at that point.**

Scope of Work

What is included:

1. Electrical and mechanical design of PV system
2. Completion of paperwork for state incentives and utility interconnection
3. Drawings: PV Layout, wiring diagram
4. Installation of racks and PV as per layout
5. Installation of all conduit, junction boxes and wire associated with PV system
6. Installation of inverters.
7. Installation of all disconnects associated with the PV system.
8. Installation of a new breaker in the existing main panel or tap to existing electrical service
9. System commissioning
10. Operations Manual for the PV system
11. Grading and seeding for ground mounts
12. Building Permit

What's not included, but may be added for additional cost

1. Electrical service upgrades

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About ETM Solar Works

Our prime directive is to bring environmentally friendly solar power to as many people on planet Earth as possible. *This is our 28th year in business!*

ETM specializes in solar energy systems. We install solar electric systems and solar hot water heaters on residences and commercial buildings and repair existing solar energy systems. **ETM is a woman-owned business.** ETM's website is on a solar powered server and we have a solar electric system on our building.

ETM President, Dr. Gay E. Canough, is a founding member of the New York Solar Energy Industries Association (NYSEIA: www.nyseia.org) and instructor for over 200 Solar Installer courses.

We have been in business since 1988. We started out doing aerospace consulting work (ETM is short for Extraterrestrial Materials). We led the design work for the Lunar Prospector, a small robotic spacecraft that orbited the Moon in 98-99 looking for water at the lunar poles. We also did work on space solar power for the Space Studies Institute in Princeton and NASA.

In 1993 we decided to bring the resources of space to Earth more directly and go into the "terrestrial" solar energy business (solar energy being a valuable and easily accessible resource). Since then we have installed over 2 megawatts of photovoltaics in New York, New Jersey and Pennsylvania.

Member: Better Business Bureau, New York Solar Energy Industries Association, Southern Tier Homebuilders and Remodelers Association, and the Greater Binghamton Chamber of Commerce.

G. Canough is now master trainer emeritus, but still adjunct at SUNY ESF teaching PV installing class. G. Canough is a certified PV installer (North American Board of Certified Energy Practitioners, www.nabcep.org). **ETM has 2 NABCEP-certified PV Installers.**

Projects include:

- 1) 2014-2015: Participated in 3 Solarize campaigns, which racked up more residential jobs than ever before!
- 2) 2013: Offered a variety of financing and leasing for solar energy systems. Solar power heading toward: the mainstream.
- 3) 2012: Installed over 40 residential PV systems. Began offering residential leasing with SunPower.
- 4) 2011: Installed 50 kW PV systems on Chatham and Guilderland Schools, 80 kW at SUNY Brockport
- 5) 2010: Installed 50 kW PV at Marcy Correctional, 20 kW PV at Westport Water Treatment Plant, many residential systems.
- 6) 2010: Installed 10 kW Bergey wind turbine for Monticello School.
- 7) 2009: Lime Hollow Nature Center, 20 kW, Cortland NY, Designed three projects over 1 MW in size.
- 8) 2007-2008: Brooklyn Children's Museum 26 kW PV system
- 9) 2007: Design and construction management for 100 kW PV system in Orange, NJ
- 10) 2006-2007: We installed over 200 kW of residential PV this year along with more PV systems for schools.
- 11) 2005: Solar electric systems installed on municipal and county buildings such as 40 kW at the Albany County Hockey Facility.
- 12) 2005: Installed 7 kW PV systems for the New York Power Authority solar schools project.
- 13) 2004: Installed PV systems on schools for the School Power Naturally Program (NYSERDA)
- 14) 2003: Installed 40 kW PV system at NY Dept. of Transportation (Kirkwood) plus various residential, small commercial systems.
- 15) 2001-present: LIPA Solar Pioneer contractor; installed net metering photovoltaic (PV) systems on homes in Long Island.
- 16) 2001-present: Installed net metering photovoltaic (PV) systems on homes in upstate NY,
- 17) 2001 to 2008: Maintenance contract for New York Power Authority's large PV systems.
- 18) 2000: Installed 186 kW PV system on the Tompkins Co Library in Ithaca NY
- 19) 1999: People with utility power started to switch to solar power. We installed 7 PV systems on suburban homes.
- 20) 1996-98: Installed 4 grid-interactive PV systems for NYSEG demos on residences.
- 21) 1997, 1998: Installed 2 kW PV systems for NYS Police on Cathead and Black Mountains in Adirondacks.
- 22) 1993 to present. We have installed numerous off-grid systems for people with remote homes and cabins. All of these are still operational.

Plus we have installed hundreds of residential solar energy systems over the years, starting with Gay's house. We installed the first pure grid-tied system in upstate NY!

Green Triplex PM072P00

Multi-Crystalline
Photovoltaic Module



Power Range
300 ~ 310Wp



Highly Strengthened Design
Module complies with advanced loading tests to meet 5400 Pa loading requirements



Flammability Test
Low ignitability ensuring fire safety



Anti-Reflection Coated Glass
Anti-reflective surface enhances the power performance



Resistance to Salt Corrosion and Humidity
Module complies with IEC 61701: Salt Mist Corrosion Testing



Ammonia Test
Reliable in ammonia rich environment



BenQ
Solar

Green Triplex PM072P00 (300 ~ 310 Wp)

Electrical Data

Typ. Nominal Power P_N	300 W	305 W	310 W
Typ. Module Efficiency	15.46%	15.72%	15.98%
Typ. Nominal Voltage V_{mp} (V)	36.70	36.91	37.12
Typ. Nominal Current I_{mp} (A)	8.17	8.25	8.33
Typ. Open Circuit Voltage V_{oc} (V)	45.55	45.65	45.75
Typ. Short Circuit Current I_{sc} (A)	8.62	8.68	8.77
Maximum Tolerance of P_N	0 / +3%		

- Above data are the effective measurement at Standard Test Conditions (STC)
- STC: irradiance 1000 W/m², spectral distribution AM 1.5, temperature 25 ± 2 °C, in accordance with EN 60904-3
- The given electrical data are nominal values which account for basic measurements and manufacturing tolerances of ±10%, with the exception of P_N . The classifications is performed according to P_N

Temperature Coefficient

NOCT	45 ± 2 °C
Typ. Temperature Coefficient of P_N	-0.42 % / K
Typ. Temperature Coefficient of V_{oc}	-0.30 % / K
Temperature Coefficient of I_{sc}	0.06 % / K

- NOCT: Normal Operation Cell Temperature, measuring conditions: irradiance 800 W/m², AM 1.5, air temperature 20 °C, wind speed 1 m/s

Mechanical Characteristics

Dimensions (L x W x H)	1956 x 992 x 40 mm (77.00 x 39.05 x 1.57 in)
Weight	26 kg (57.33lbs)
Front Glass	High transparent solar glass (tempered), 4.0 mm (0.16 in)
Cell	72 multicrystalline solar cells, 156 x 156 mm (6 x 6 in)
Back Sheet	Composite film
Frame	Anodized aluminum frame
Junction Box	IP-67 rated with 3 bypass diodes
Connector Type & Cables	MC4 / MC4 Compatible: 1 x 4 mm, Length: 1.1 m (43.3 in)

Operating Conditions

Operating Temperature	-40 ~ +85 °C
Ambient Temperature Range	-40 ~ +45 °C
Max. System Voltage IEC	1000 V
Serial Fuse Rating	15 A
Maximum Surface Load Capacity	Tested up to 5400 Pa according to IEC 61215 (advanced test)

Warranties and Certifications

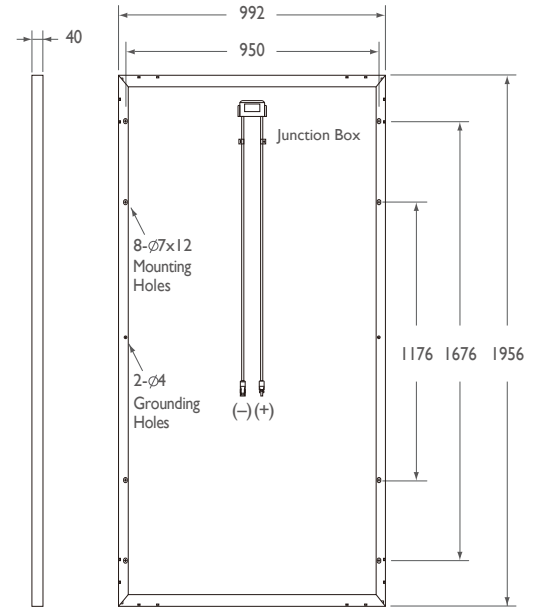
Product Warranty	Maximum 10 years for material and workmanship
Performance Guarantee	Guaranteed output of 90% for 10 years and 80% for 25 years
Certifications	According to IEC/EN 61215, IEC/EN 61730 *

- * Please confirm other certifications with official dealers

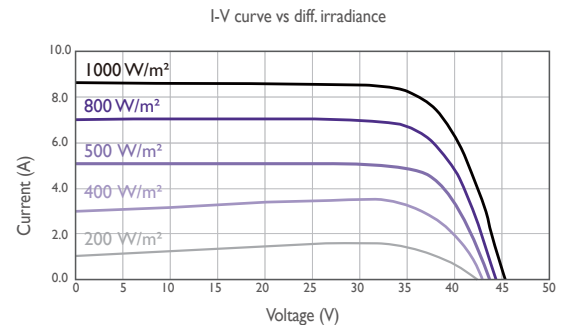
Packing Configuration

Container	20' GP	40' GP	40' HQ
Pieces per Pallet	26	26	26
Pallets per Container	5	11	22
Pieces per Container	130	286	572

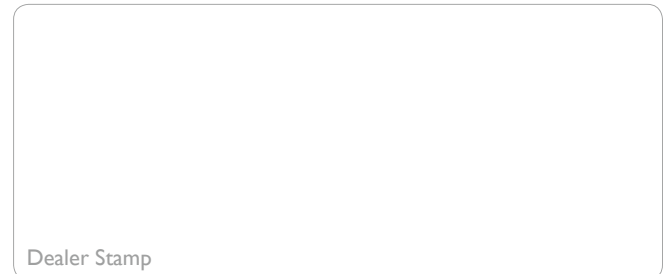
Dimensions mm (inch)



I-V Curve



Current/voltage characteristics with dependence on irradiance and module temperature.



AU Optronics Corporation

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BenQ
Solar

SUNNY TRIPOWER 12000TL-US / 15000TL-US / 20000TL-US / 24000TL-US / 30000TL-US



STP 12000TL-US-10 / STP 15000TL-US-10 / STP 20000TL-US-10 / STP 24000TL-US-10 / STP 30000TL-US-10



RATED FOR
1000 V DC & 600 V DC
SYSTEMS



Design flexibility

- 1000 V DC or 600 V DC
- Two independent DC inputs
- 15° to 90° mounting angle range
- Detachable DC Connection Unit

System efficiency

- 98.0% CEC, 98.6% Peak
- 1000 V DC increases system efficiency
- OptiTrac Global Peak MPPT

Enhanced safety

- Integrated DC AFCI
- Floating system with all-pole sensitive ground fault protection
- Reverse polarity indicator in combination with Connection Unit

Future-proof

- Complete grid management feature set
- Integrated Speedwire, WebConnect, ModBus interface
- Bi-directional Ethernet communications
- Utility-interactive controls for active and reactive power

SUNNY TRIPOWER 12000TL-US / 15000TL-US / 20000TL-US / 24000TL-US / 30000TL-US

The ultimate solution for decentralized PV plants, now up to 30 kilowatts

The world's best-selling three-phase PV inverter, the SMA Sunny Tripower TL-US, is raising the bar for decentralized commercial PV systems. This three-phase, transformerless inverter is UL listed for up to 1000 V DC maximum system voltage and has a peak efficiency above 98 percent, while OptiTrac Global Peak minimizes the effects of shade for maximum energy production. The Sunny Tripower delivers a future-proof solution with full grid management functionality, cutting edge communications and advanced monitoring. The Sunny Tripower is also equipped with all-pole ground fault protection and integrated AFCI for a safe, reliable solution. It offers unmatched flexibility with a wide input voltage range and two independent MPP trackers. Suitable for both 600 V DC and 1,000 V DC applications, the Sunny Tripower allows for flexible design and a lower levelized cost of energy.

www.SMA-America.com



Technical data	Sunny Tripower 12000TL-US	Sunny Tripower 15000TL-US	Sunny Tripower 20000TL-US	Sunny Tripower 24000TL-US	Sunny Tripower 30000TL-US
Input (DC)					
Max. usable DC power (@ $\cos \varphi = 1$)	12250 W	15300 W	20400 W	24500 W	30800 W
Max. DC voltage	*1000 V	*1000 V	*1000 V	*1000 V	1000 V
Rated MPPT voltage range	300 V...800 V	300 V...800 V	380 V...800 V	450 V...800 V	500 V...800 V
MPPT operating voltage range	150 V...1000 V	150 V...1000 V	150 V...1000 V	150 V...1000 V	150 V...1000 V
Min. DC voltage / start voltage	150 V / 188 V	150 V / 188 V	150 V / 188 V	150 V / 188 V	150 V / 188 V
Number of MPP tracker inputs	2	2	2	2	2
Max. input current / per MPP tracker input	66 A / 33 A	66 A / 33 A	66 A / 33 A	66 A / 33 A	66 A / 33 A
Output (AC)					
AC nominal power	12000 W	15000 W	20000 W	24000 W	30000 W
Max. AC apparent power	12000 VA	15000 VA	20000 VA	24000 VA	30000 VA
Output phases / line connections	3 / 3-N-PE				3 / 3-N-PE, 3-PE
Nominal AC voltage	480 / 277 V WYE				480 / 277 V WYE, 480 V Delta
AC voltage range	244 V...305 V				
Rated AC grid frequency	60 Hz				
AC grid frequency / range	50 Hz, 60 Hz / -6 Hz...+5 Hz				
Max. output current	14.4 A	18 A	24 A	29 A	36.2 A
Power factor at rated power / adjustable displacement	1 / 0.0 leading...0.0 lagging				
Harmonics	< 3%				
Efficiency					
Max. efficiency / CEC efficiency	98.2% / 97.5%	98.2% / 97.5%	98.5% / 97.5%	98.5% / 98.0%	98.6% / 98.0%
Protection devices					
DC reverse polarity protection	●	●	●	●	●
Ground fault monitoring / grid monitoring	●	●	●	●	●
All-pole sensitive residual current monitoring unit	●	●	●	●	●
DC AFCI compliant to UL 1699B	●	●	●	●	●
AC short circuit protection	●	●	●	●	●
Protection class / overvoltage category	I / IV	I / IV	I / IV	I / IV	I / IV
General data					
Dimensions (W / H / D) in mm (in)	665 / 650 / 265 (26.2 / 25.6 / 10.4)				
Packing dimensions (W / H / D) in mm (in)	780 / 790 / 380 (30.7 / 31.1 / 15.0)				
Weight	55 kg (121 lbs)				
Packing weight	61 kg (134.5 lbs)				
Operating temperature range	-25 °C...+60 °C				
Noise emission (typical) / internal consumption at night	51 dB(A) / 1 W				
Topology	Transformerless				
Cooling concept / electronics protection rating	OptiCool / NEMA 3R				
Features					
Display / LED indicators (Status / Fault / Communication)	- / ●				
Interface: RS485 / Speedwire, WebConnect	○ / ●				
Data interface: SMA Modbus / SunSpec ModBus	● / ●				
Mounting angle range	15°...90°				
Warranty: 10 / 15 / 20 years	● / ○ / ○				
Certifications and approvals	UL 1741, UL 1998, UL 1699B, IEEE 1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1				

NOTE: US inverters ship with gray lids. Data at nominal conditions. *Suitable for 600 V DC max. systems

● Standard features ○ Optional features – Not available

Type designation STP 12000TL-US-10 STP 15000TL-US-10 STP 20000TL-US-10 STP 24000TL-US-10 STP 30000TL-US-10

Accessories



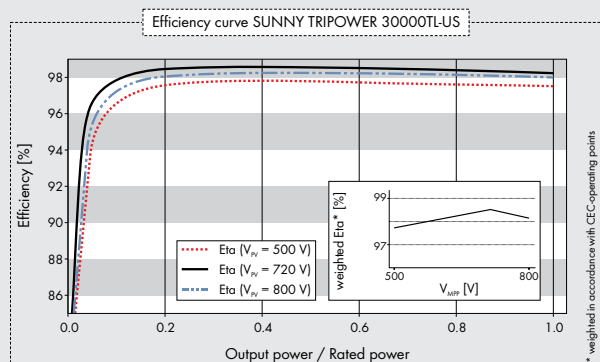
RS485 interface
DM-485CB-US-10



Connection Unit
CU 1000-US-10



SMA Cluster Controller
CLCON-10





Power Peak™ GS

Large Scale Ground Mount System



-  COMMUNICATIONS
-  ENERGY
-  SPECIAL INDUSTRIES
-  SOLAR


Quality Hardware for the PV Industry

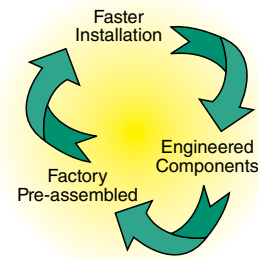
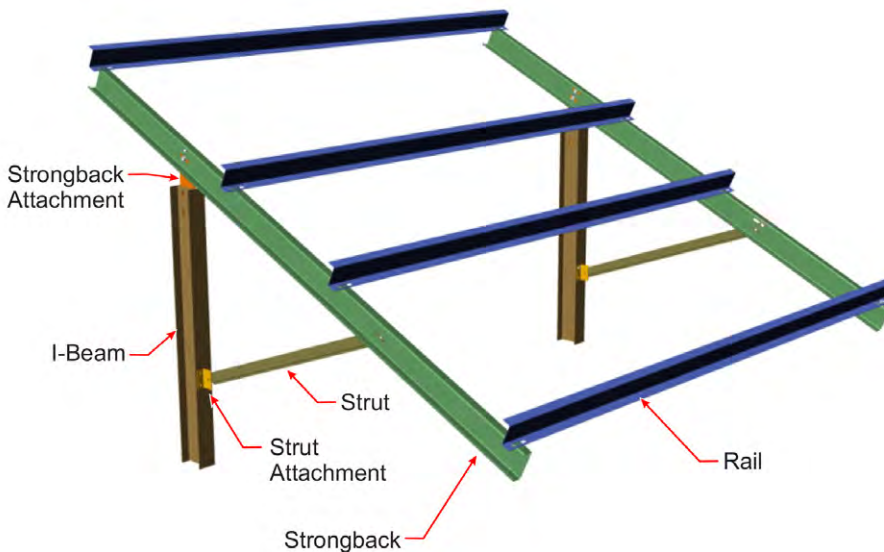
20th
ANNIVERSARY
1993 – 2013

The Power Peak™ GS – PV Solar Mounting System

The **Power Peak™ GS** PV mounting system is engineered for large scale ground mount installations that demand faster build rates. Combining high strength galvanized steel with up to 50% less hardware and components, the Power Peak GS provides a fast and secure mounting structure for most PV modules.

Power Peak mounting structures are optimized to site-specific conditions and designed to mount on standard pile driven I-Beams. Attachment points feature field adjustments for handling post misalignment and a quicker squaring of the table. The system layout allows for continuous rows or shorter tables to fit the land space available and match specified string size.

The Power Peak GS system assembles without any lifting equipment and along with fewer components significantly reduces installation time and labor costs. Wind tunnel tested, code compliant and supported by an experienced structural engineering staff, the Power Peak GS is designed to provide long term service and reliability.



Key Benefits

- **Site Optimized Designs**
Reduces overall material costs
- **String Size Matched Sub-arrays**
Faster repetitive layouts and easier wiring
- **Pre-drilled I-Beam Vertical Posts**
Eliminates on-site fabrication and potential corrosion
- **Racking Adjustment Slots**
Easier to square the structure when posts twist or misalign
- **Module Clamp Assemblies**
Faster installation and fewer parts
- **Lightweight Components**
Eliminates heavy-duty lifting equipment and promotes “assembly-line” installation
- **Integral Wire Management**
Reduces labor, and provides a clean and professional appearance

Technical Services Offered:

- PE Stamps
- Permit Ready Drawings
- Foundation Designs
- Pile Driving Proposals
- Rack Assembly Proposals



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Fax: 519-740-7917
Web site: www.preformed.on.ca
Email: sales@preformed.on.ca

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DPW Solar's engineering staff is available to assist with your next project.
Please visit www.DPWSolar.com and complete an RFQ Form or contact our product support team at (800) 260-3792.