

Request for Silver Frame Panels at Cobblestone Barn

The Office of Sustainability and Innovation has instructed Homeland Solar to maximize solar output on Park's facilities. DTE has approved up to 47 kW DC for the Cobblestone Barn. The request for silver frame panels is to allow Homeland to meet the City objectives.

Silver frame panels at 460W each will allow this maximum wattage to be realized. Black framed at 410W each will result in 12% less power on the roof:

- The 460W silver frame panels allow 47.36 kW DC on the roof with three rows of panels (see layout 1).
- The 410W black frame panels are a different size, and a three-row layout gives less wattage at 41.82 kW DC (see layout 2).

Homeland Solar would like to note:

- 1) The historic character of the property will be retained and preserved because of several factors
 - a. The barn the panels will be mounted on is not an historic barn, nor a recreation of an historic barn
 - b. The barn is located over 275 feet from the Packard Road right-of-way and over 100 feet away from the historic Cobblestone Farmhouse.
 - c. The height of the roof is over 30 feet above ground level and the slope and alignment of the roof, in relation to the farmhouse, make the panels inconspicuous from the ground at the southern end of the property. Trees mask the panels from the west, north and east.
 - d. The roofing material is a grey shingle, making the silver frame panels more closely match the existing roof.
 - e. The solar panels will be mounted perpendicular to the existing roof line and will be approximately 8 inches from the roof surface.
- 2) The solar installation will not destroy any historic materials, features or spatial relationships that characterize the Cobblestone Farm and associated property.

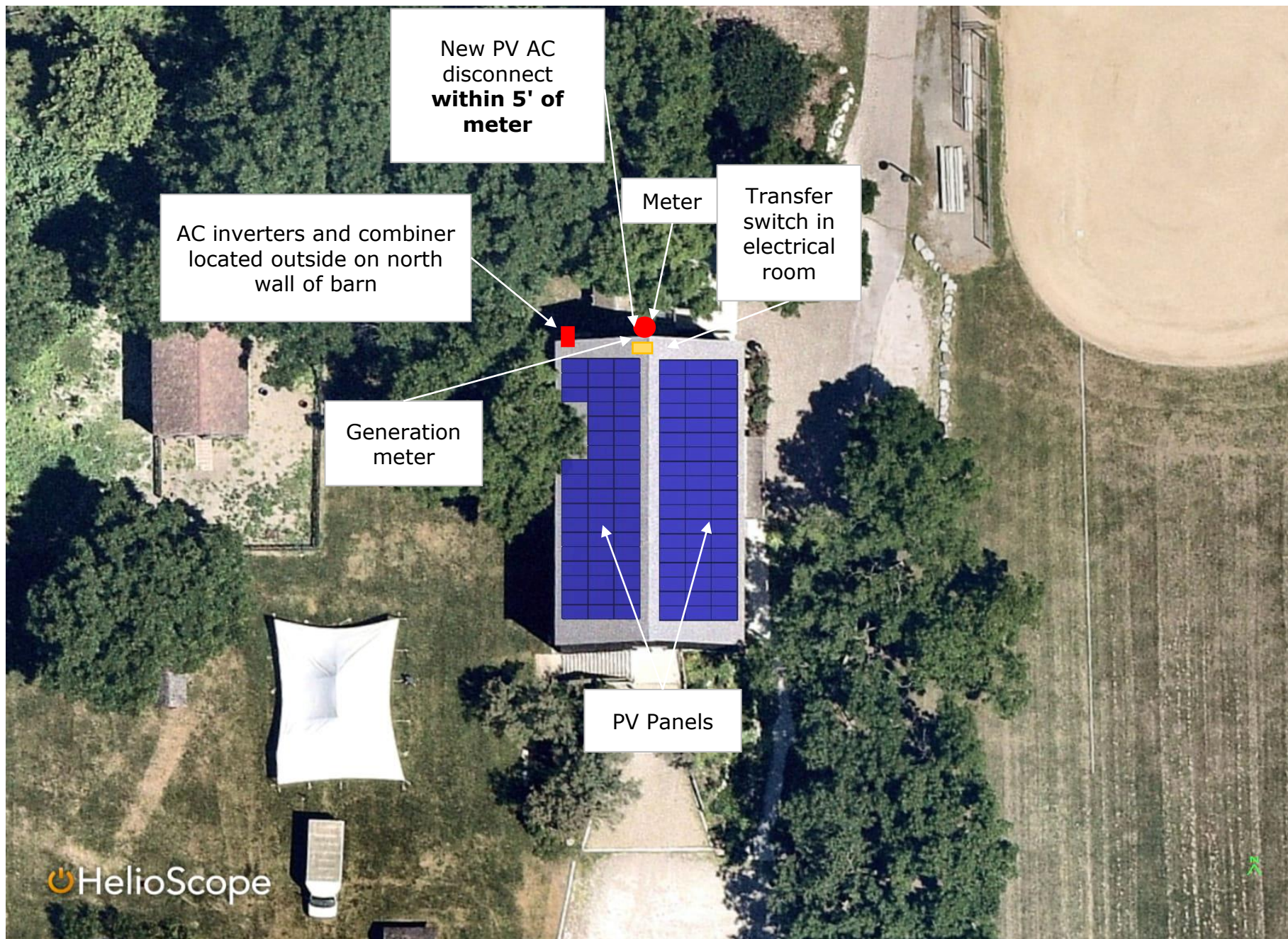
Layout 1 – 104 460W Silver Frame panels, 47.84 kW DC, three rows



HelioScope

Layout 2 – 102 410W black panels, 41.82 kW DC, three rows in portrait





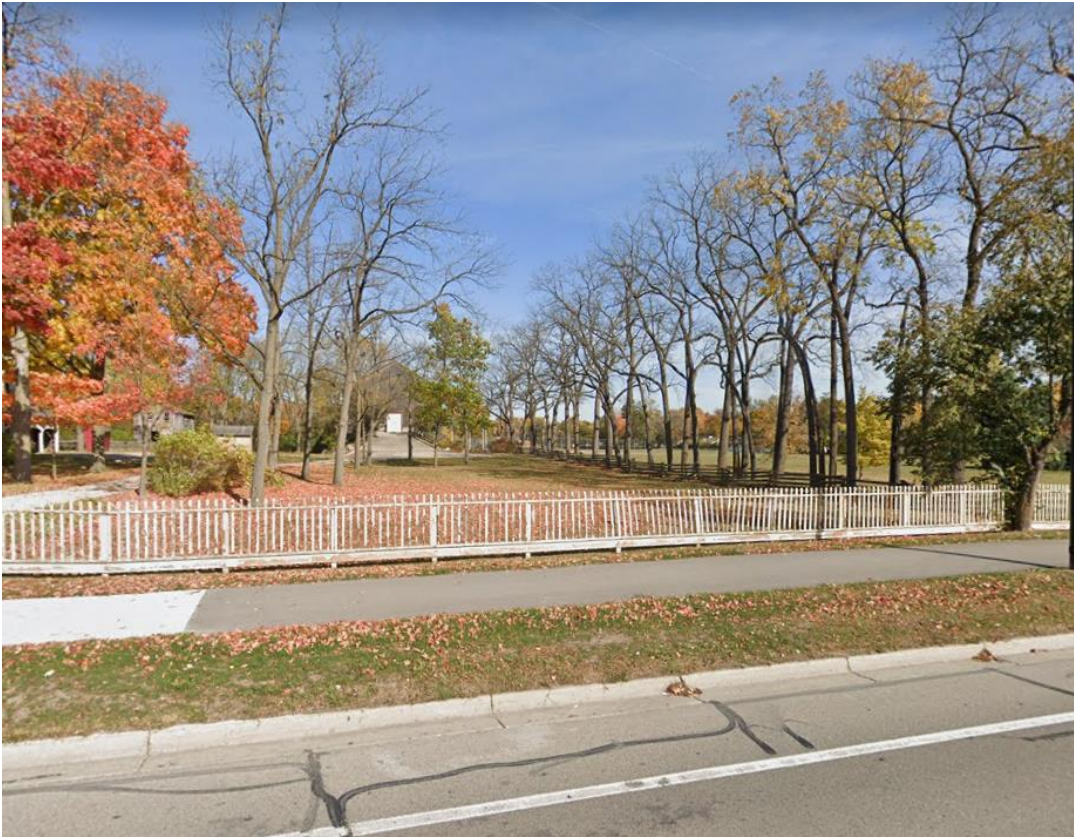
Mark Dorogi
(734)846-8911



4/19/2023











144HC M6 Monofacial Module

144 Half-Cut Monocrystalline 450W – 470W

21.3%

Utilizes the latest M6 size super high efficiency Monocrystalline PERC cells. Half cut design further reduces cell to module (CTM) losses.

Stability & Looks

Rugged, double webbed frame design withstands wind, snow, and other mechanical stresses. Framed Glass-Backsheet aesthetic is ideal for high visibility installation.

Anti-Reflective

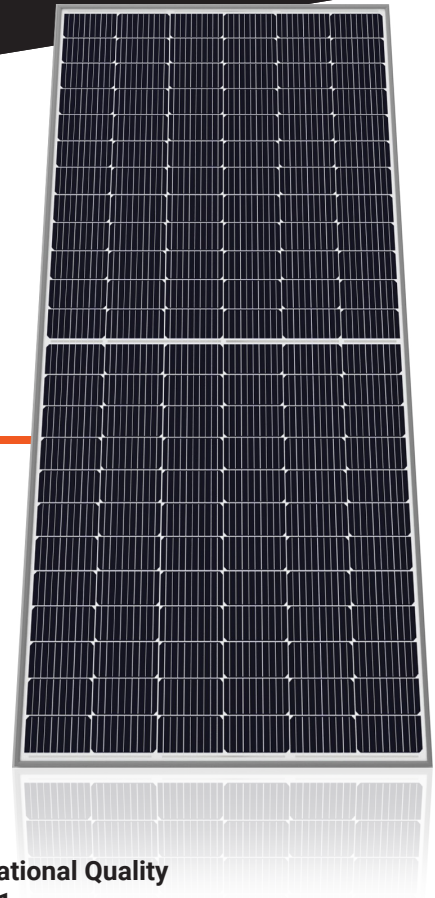
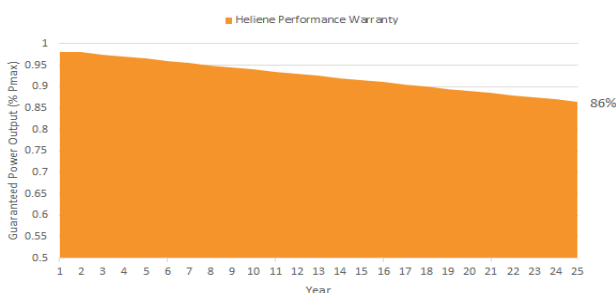
Premium solar glass with anti reflective coating delivers more energy throughout the day

High Reliability

Proven resistance to PID and reliable in high temperature and humidity environments.

No Compromise Guarantee

15 Year Workmanship Warranty
25 Year Linear Performance Guarantee



Manufactured Using International Quality System Standards: ISO9001

Half-Cut Design with Split Junction Box Technology

1500V System Voltage Rating

World-class Quality

- Heliene's fully automated manufacturing facilities with state-of-the-art robotics and computer aided inspection systems ensure the highest level of product quality and consistency
- All manufacturing locations are compliant with international quality standards and are ISO 9001 certified
- Heliene modules have received Top Performer rankings in several categories from PV Evolution Labs (PV EL) independent quality evaluations

Bankable Reputation

- Established in 2010, Heliene is recognized as highly bankable Tier 1 manufacturer of solar modules and has been approved for use by the U.S. Department of Defense, U.S. Army Corps of Engineers and from numerous top tier utility scale project debt providers
- By investing heavily in research and development, Heliene has been able to stay on the cutting edge of advances in module technology and manufacturing efficiency

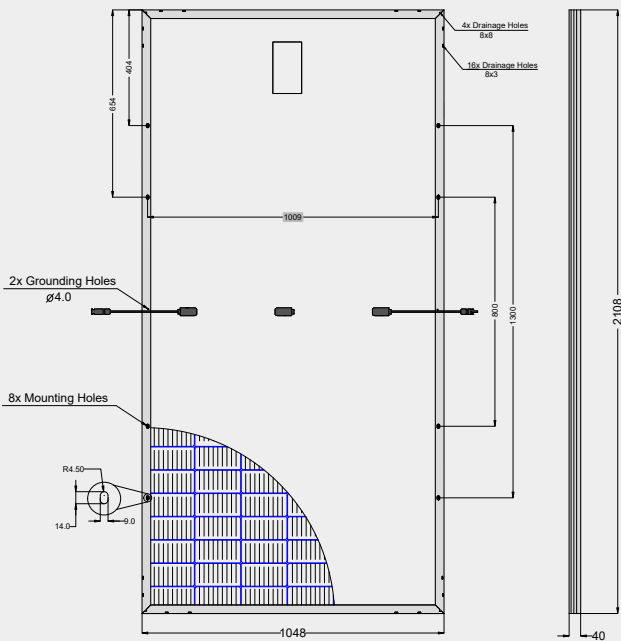
Local Sales, Service, and Support

- With sales offices across the U.S. and Canada, Heliene prides itself on unsurpassed customer support for our clients. Heliene has become the brand of choice for many of the leading residential installers, developers and Independent Power Producers due to our innovative technology, product customization capability and just in time last-mile logistics support
- Local sales and customer support means answered phone calls and immediate answers to your technical and logistics questions. We understand your project schedules often change with little warning and endeavor to work with you to solve your project management challenges

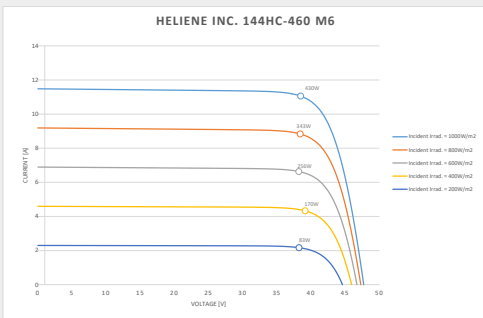
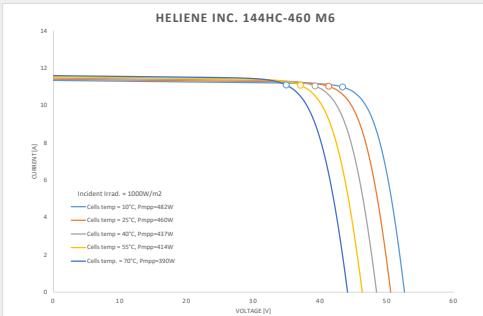




Dimensions for 144HC M6 Monofacial Series Modules



I-V Curves for 144HC M6 Monofacial Series Modules



Certifications



Electrical Data (STC)

Peak Rated Power	P_{mpp} (W)	470	465	460	455	450
Maximum Power Voltage	V_{mpp} (V)	42.45	42.39	42.31	42.24	42.17
Maximum Power Current	I_{mpp} (A)	11.07	10.97	10.88	10.78	10.69
Open Circuit Voltage	V_{oc} (V)	51.54	51.40	51.26	51.00	50.74
Short Circuit Current	I_{sc} (A)	12.27	12.10	11.93	11.72	11.51
Module Efficiency	Eff (%)	21.3	21.0	20.8	20.6	20.4
Maximum Series Fuse Rating	MF (A)	20	20	20	20	20
Power Output Tolerance		[- 3/+3%]				

STC - Standard Test Conditions: Irradiation 1000 W/m² - Air mass AM 1.5 - Cell temperature 25 °C

Electrical Data (NMOT)

Maximum Power	P_{mpp} (W)	350	348	343	340	336
Maximum Power Voltage	V_{mpp} (V)	39.65	39.37	39.17	39.18	38.68
Maximum Power Current	I_{mpp} (A)	8.86	8.84	8.76	8.68	8.69
Open Circuit Voltage	V_{oc} (V)	47.64	48.46	47.17	48.08	46.71
Short Circuit Current	I_{sc} (A)	9.24	9.75	9.15	9.44	9.06

NMOT - Nominal Module Operating Temperature:
Irradiance at 800W/m², Ambient Temperature 20°C, Wind speed 1m/s

Mechanical Data

Solar Cells	144 Half-Cut, M6, 166mm, PERC Cells
Module Construction	Framed Glass-Backsheet
Dimensions (L x W x D)	2108 x 1048 x 40 mm (82.99 x 41.25 x 1.6 inch)
Weight	25 kg (55.12 lbs)
Frame	Double Webbed 15-Micron Anodized Aluminum Alloy
Glass	3.2mm Low-Iron Content, High-Transmission, PV Solar Glass with Anti Reflective Coating
Junction Box	IP-68 rated with 3 bypass diodes
Output Cables	0.3-meter Symmetrical Cables
Connectors	Multi-Contact/ Stäubli MC4

Certifications

UL Certification UL61215, UL61730

Temperature Ratings

Nominal Operating Cell Temperature (NOCT)	+45°C (±2°C)
Temperature Coefficient of P_{max}	-0.33%/°C
Temperature Coefficient of V_{oc}	-0.26%/°C
Temperature Coefficient of I_{sc}	0.037%/°C

Maximum Ratings

Operational Temperature	-40°C to +85°C
Max System Voltage	1500V
Mech. Load Test (Front)	113 psf / 5400Pa
Mech. Load Test (Back)	50 psf / 2400 Pa
Fire Rating	Type 1

Warranty

15Year Manufacturer's Workmanship Warranty
25 Year Linear Power Guarantee

Packaging Configuration

Modules per box: 27 pieces
Modules per 53' trailer: 702 pieces

