



May 9, 2021

Planning Board
Town of Phillipstown
Cold Spring, NY 10516

To the Planning Board Members,

Re: Our Solar Project

At our Board of Trustees meeting this Saturday, May 8, we heard from members of the public who attended our meeting (like you, we meet in public). They raised some additional questions about our proposed solar project. Those questions included:

1. Will we do a mockup of some of the actual panels on their posts so that everyone will be able to see what they will look like?
Yes, we have agreed to do this.
2. What exactly is a bifacial panel and how big are they? We are attaching a description and photos of these two-sided panels and will also post this on our Website. The panels are 7 feet tall and 3.4 feet wide; there are 104 of them at this point.
3. When we shared the plans for additional (native shrub) screening we plan to put in, one neighbor commented that it will not provide enough screening in the winter. We are willing to substitute some evergreens for some of the deciduous shrubs.
4. A question came in by letter about the strength of the helical ground screws that will anchor the array. Some information about these is also attached. Suncommon, our solar installer, has found these to be highly reliable for the thousands of ground array panels they have installed.

Thank you again,

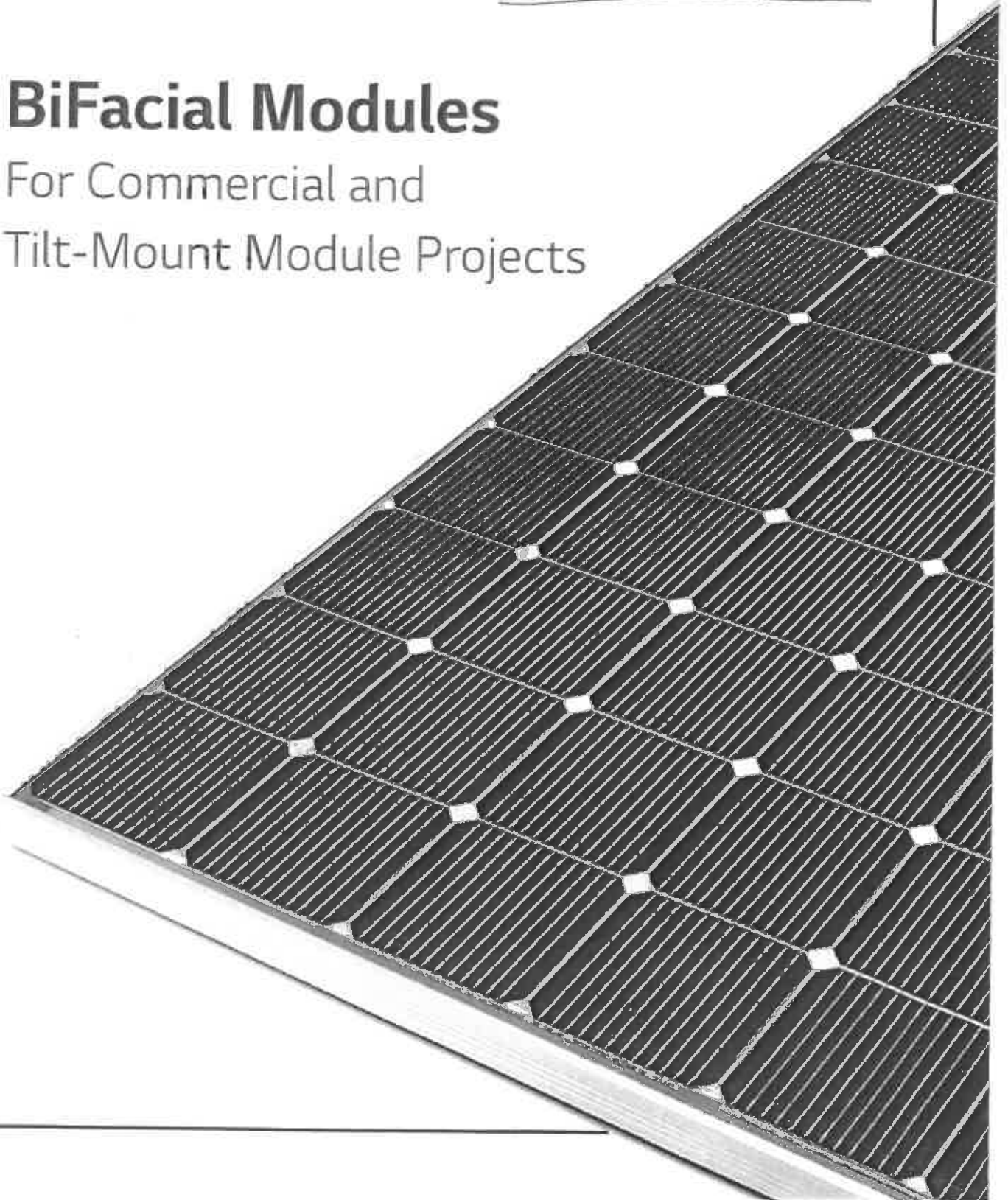

Anita Prentice
President, Board of Trustees
Desmond-Fish Public Library

LG Solar

*Elements for
Desmond-Fish
Solar Project*

BiFacial Modules

For Commercial and
Tilt-Mount Module Projects

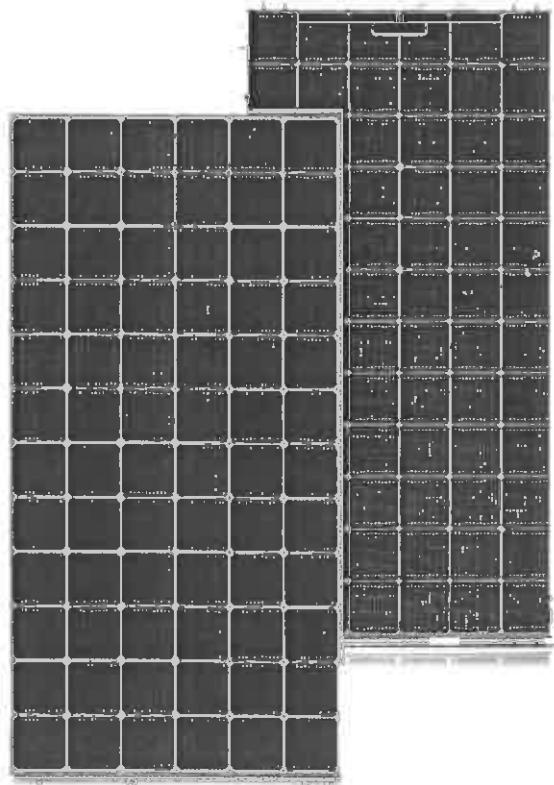


What are BiFacial Solar Modules?

BiFacial solar modules are designed to capture light from both the front and back of the modules. BiFacials can capture direct sunlight as well as light reflected off of surfaces beneath or near the modules (including neighboring rows of solar modules).

If your solar project calls for tilted modules on the ground, a patio awning or roof, and if your installer plans to use pole mounts or ballasted systems, LG Solar's BiFacial modules are an excellent choice.

Introducing the NeON[®] 2 BiFacial Solar Module



LG NeON[®] 2 BiFacial

NeON[®] 2 Bifacial 72-cell modules are now available in the United States. Incorporating the same award-winning Cello Technology™ as our best-selling NeON[®] 2 monofacial modules, LG Solar BiFacials feature the following output and efficiency ratings:

LG 72-Cell NeON[®] 2 BiFacial

400W | 405W

19.3% | 19.5% Module Efficiency

LG Solar NeON® 2 BiFacial Modules:

- Provide improved performance on hot days due to a low temperature coefficient
- Offer BOS (Balance of System) savings – fewer high-efficiency modules and system components are required to achieve power goals
- Can generate power well even on cloudy days
- Experience near zero LID (Light Induced Degradation that occurs when modules are first exposed to sunlight)
- LG Solar offers a 25-year product, performance and labor* limited warranty

**Labor costs in the rare case of a needed module repair or replacement are covered up to \$450.*

Maximum Power without BiFacial Gain	Bifacial Gain**			
	5%	10%	20%	27%
400W	410	425	450	470
405W	415	430	455	475
410W	420	435	460	480

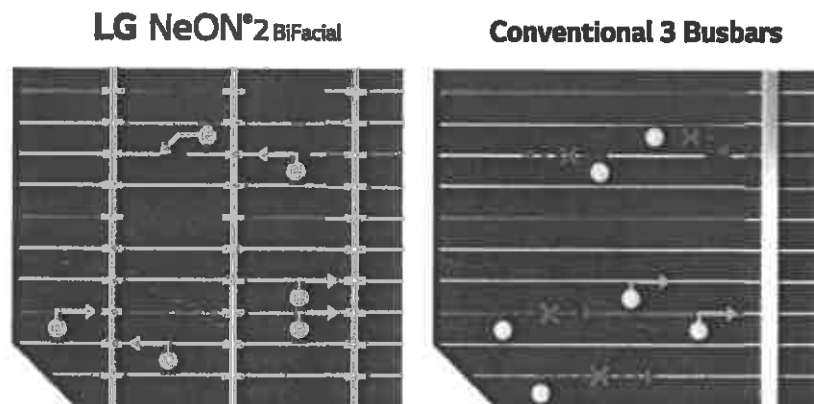
***Bifacial gain depends on a variety of factors: albedo, height, elevation, shading, etc.*

***Based on STC (Standard Test Conditions).*

Cello Technology™

All LG Solar NeON® 2 modules, including BiFacial modules, feature Cello (Cell Connection with Electrically Low loss, Low stress, and Optical absorption enhancement) Technology™.

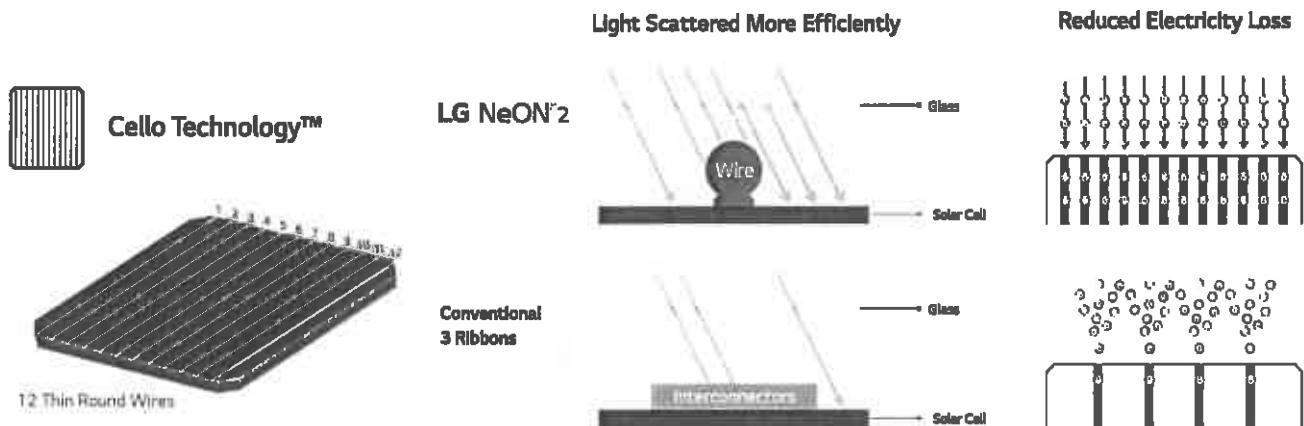
Cello Technology™ features 12 thin, circular-shaped wires instead of the usual 3-5 busbars. Photons absorbed from sunlight have more pathways to enter to produce electrical current in NeON® 2 cells. This also reduces vulnerability to power generation loss due to micro-cracks.



Multiple electrical pathways ensure that fewer electrons are lost in the absorption process.

Cello Technology™ Advantages:

- Traditional flat wires reflect out irradiance, while our round wires improve light absorption
- Light is scattered more effectively within the cells
- Resistance to performance loss due to environmental factors such as micro-cracks
- Improved module appearance

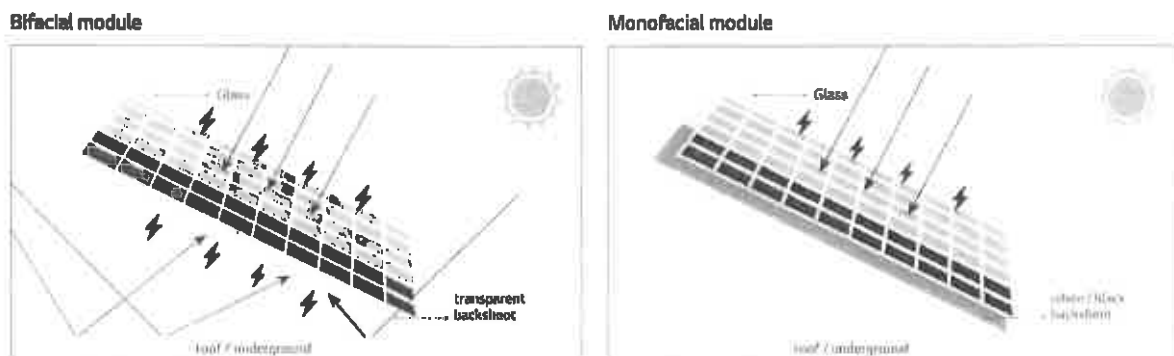


Transparent Backsheet

LG Solar's BiFacial modules have a transparent backsheet that enables reflected light to be absorbed by the cells. In addition, the cells in each module have a symmetrical structure designed to capture both front and rear irradiance.

BiFacial Gain

The additional power gained from the back of the double-sided cells in our BiFacial modules changes the electrical values of the module. Voltage stays constant while current increases proportionally with the power boost.



Extremely Low Light Induced Degradation (LID)

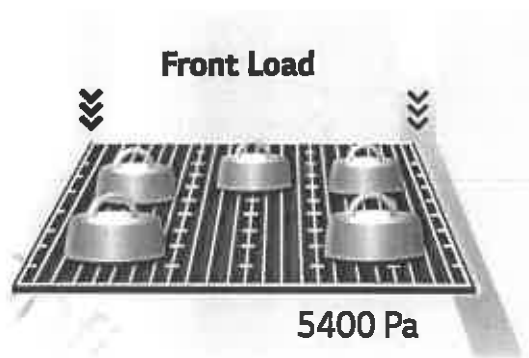
Many solar modules are built with P-type wafers that include boron, which interacts with oxygen to cause Light Induced Degradation (LID). Because our NeON[®] 2 modules are manufactured with N-type wafers that are based on phosphorous, they experience very low LID rates.



LG NeON[®]2 BiFacial / Phosphorus in N-Type wafers improves LID rates

Outstanding Durability

All LG Solar modules feature a reinforced frame design that allows for a strong load. Our 72-cell NeON[®] 2 BiFacial modules can handle a 5400 Pa (Pascal) front load and a 3000 Pa rear load.



Are NeON[®] 2 BiFacial Modules Right for Your Project?

BiFacial solar modules are designed for solar systems that expose the front and back of the modules to direct and reflected light. If this applies to your project, ask your installer about LG Solar's NeON[®] 2 BiFacial modules.



When you go solar,
ask for the brand you can trust: LG Solar

LG NeON[®] 2 BiFacial

LG435N2T-E6 Preliminary



144

435W

The LG NeON[®] 2 BiFacial is designed to absorb sunlight both from the front and the rear sides of its NeON[®] cell by using a transparent backsheet. The dual faces of the cell result in higher energy generation.



Features



25-Year Limited Product Warranty

The NeON[®] 2 BiFacial is covered by a 25-year limited product warranty.



Bifacial Energy Yield

LG NeON[®] 2 BiFacial modules use highly efficient bifacial solar cell, "NeON" applied Cello technology. Through the Cello technology, LG NeON[®] 2 BiFacial can achieve up to 30% more energy than standard PV modules.



Better Performance on a Sunny Day

LG NeON[®] 2 BiFacial now performs better on sunny days, thanks to its improved temperature coefficient.



More Generation on a Cloudy Day

The LG NeON[®] 2 BiFacial performs well on cloudy days; weak sunlight conditions cause a low energy reduction.

When you go solar, ask for the brand you can trust: LG Solar

About LG Electronics USA, Inc.

LG Electronics is a global leader in electronic products in the clean energy markets by offering solar PV panels and energy storage systems. The company first embarked on a solar energy source research program in 1985, supported by LG Group's vast experience in the semi-conductor, LCD, chemistry and materials industries. In 2010, LG Solar successfully released its first MonoX[®] series to the market, which is now available in 32 countries. The NeON[®] (previous MonoX[®] NeON), NeON[®]2, NeON[®]2 BiFacial won the "Intersolar AWARD" in 2013, 2015 and 2016, which demonstrates LG's leadership and innovation in the solar industry.



LG435N2T-E6

General Data

Cell Properties (Material/Type)	Monocrystalline/N-type
Cell Maker	LG
Cell Configuration	144 Cells (6 x 24)
Number of Buses	9EA
Module Dimensions (L x W x H)	2,130mm x 1,042mm x 40 mm
Weight	23 kg
Glass (Thickness/Material)	2.8mm/Tempered Glass with AR Coating
Backsheet (Color)	Transparent
Frame (Material)	Anodized Aluminium
Junction Box (Protection Degree)	IP 68 with 3 Bypass Diodes
Cables (Length)	1,400mm x 2EA
Connector (Type/Maker)	MC 4/MC

Certifications and Warranty

Certifications*	IEC 61215-1/-1-1/2:2016, IEC 61730-1/2:2016, UL 61730
	ISO 9001, ISO 14001, ISO 50001
	OHSAS 18001
Salt Mist Corrosion Test	IEC 61701:2012 Severity 6
Ammonia Corrosion Test	IEC 62716:2013
Module Fire Performance	Type 1 (UL 1703)
Fire Rating	Class C (UL 790)
Solar Module Product Warranty	25 Years
Solar Module Output Warranty	Linear Warranty*

*Initial 107%, 1st year 103.4%, After 1st year: -0.35%/year; 96.9% at year 25 (Based on BIF100)
 **In Progress

Temperature Characteristics

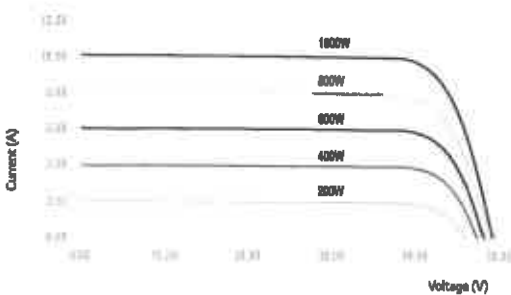
Parameter	Unit	Value
NMOT*	[°C]	42 ± 3
Pmax	[%/°C]	-0.34
Voc	[%/°C]	-0.27
Isc	[%/°C]	0.04

*NMOT (Nominal Module Operating Temperature): Irradiance 800 W/m², Ambient temperature 20°C, Wind speed 1 m/s, Spectrum AM 1.5

Electrical Properties (NMOT)

Model	LG435N2T-E6			
	STC*	BIF100**	BIF200**	
Maximum Power (Pmax)	[W]	327	349	372
MPP Voltage (Vmpp)	[V]	38.2	38.2	38.2
MPP Current (Impp)	[A]	8.55	9.14	9.73
Open Circuit Voltage (Voc)	[V]	45.9	45.9	45.9
Short Circuit Current (Isc)	[A]	8.98	9.60	10.22

I-V Curves



Electrical Properties

Model	LG435N2T-E6			
	STC*	BIF100**	BIF200**	
Maximum Power (Pmax)	[W]	435	465	495
MPP Voltage (Vmpp)	[V]	40.7	40.7	40.7
MPP Current (Impp)	[A]	10.70	11.44	12.17
Open Circuit Voltage (Voc)	[V]	48.7	48.7	48.7
Short Circuit Current (Isc)	[A]	11.15	11.92	12.68
Module Efficiency	[%]	19.6	21.0	22.3
Pmax Reliability Coefficient	[%]	75 ± 5		
Power Tolerance	[%]	0 ~ +3		

*STC (Standard Test Condition): Irradiance 1000W/m², Cell temperature 25°C, AM 1.5, Measure Tolerance: ± 3%

**The electrical properties of BIF100 and BIF200 measure under the front side irradiance 1000W/m² * (100W/m² or 200W/m²)¹ BIFL Usa 100W/m² for BIF100 and 200W/m² for BIF200.
 2) IEC/UL Certifications is scheduled to proceed.

Operating Conditions

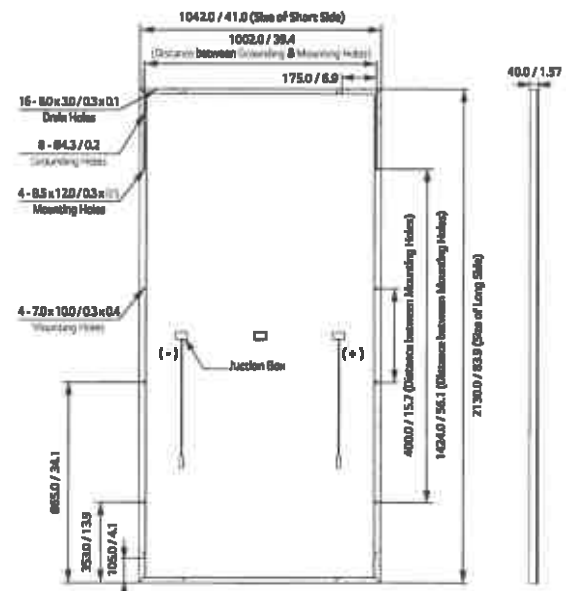
Operating Temperature	[°C]	-40 ~ +80
Maximum System Voltage	[V]	1,000(IEC)/1,500(UL)
Maximum Series Fuse Rating	[A]	20
Mechanical Test Load (Front)	[Pa/m ²]	5,400/113
Mechanical Test Load (Rear)	[Pa/m ²]	3,000/63

*Test Load = Design Load x Safety Factor (1.5)

Packaging Configuration

Number of Modules per Pallet	[EA]	25
Number of Modules per 40' Container	[EA]	550
Number of Modules per 53' Container	[EA]	750
Packaging Box Dimensions (L x W x H)	[mm]	2,172 x 1,120 x 1,213
Packaging Box Dimensions (L x W x H)	[in]	85.5 x 44.1 x 47.8
Packaging Box Gross Weight	[kg]	593
Packaging Box Gross Weight	[lb]	1,307

Dimensions (mm/inch)



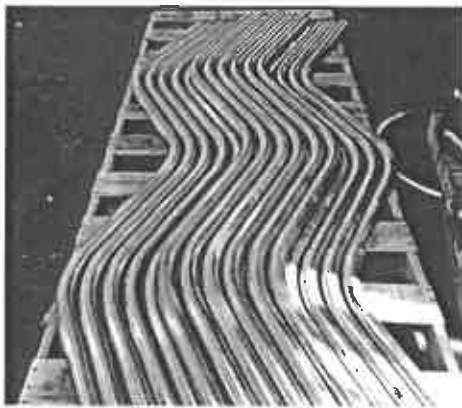
LG Electronics USA, Inc.
 Solar Business Division
 2000 Millbrook Drive
 Lincolnshire, IL 60069
 www.lg-solacem

Product specifications are subject to change without notice.
 LG435N2T-E6.pdf
 122820

© 2020 LG Electronics USA, Inc. All rights reserved.

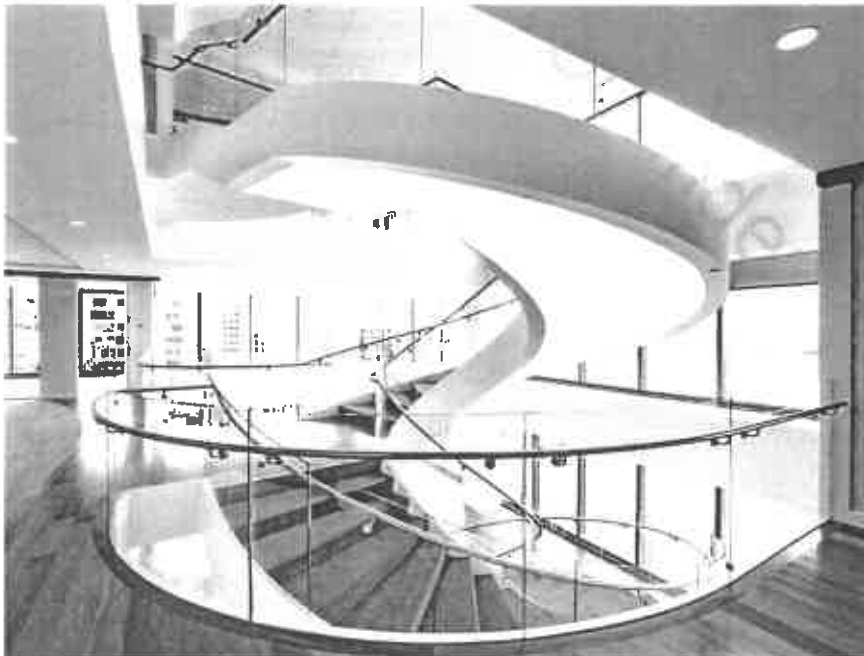


Custom Fabrication Vendors



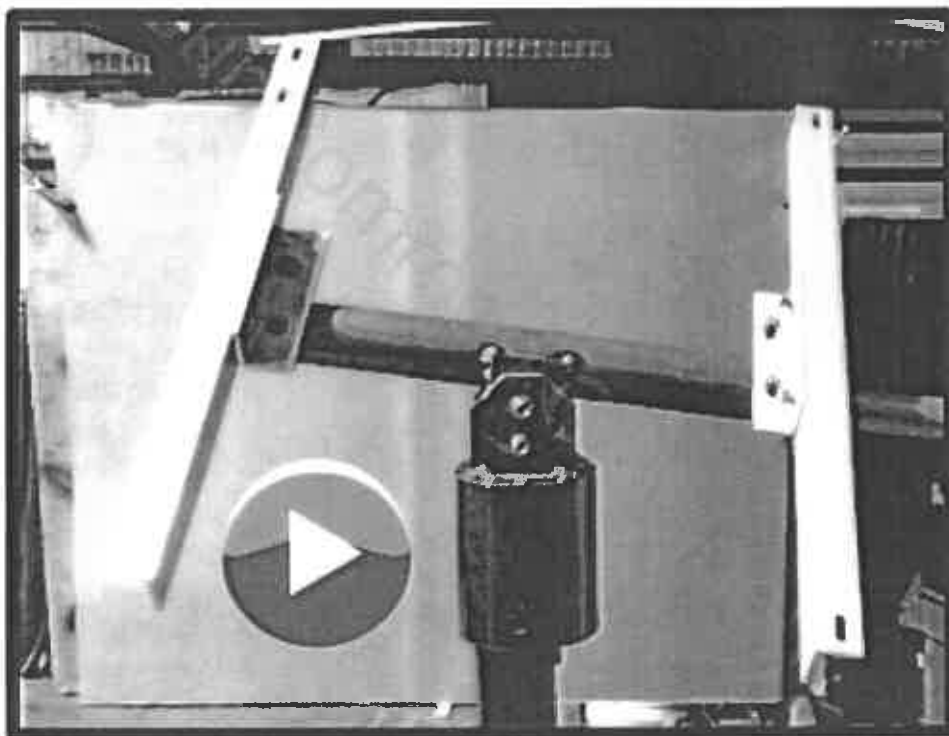
Chicago Metal Rolled Products is a contract manufacturer and job shop that specializes in tube bending, beam bending and the bending of pipes. They bend all types of structural steel members - angles, bars, channels, tees - as well as sheet and plate. These radiused sections are used as parts of equipment and structures, such as staircases and playground equipment. SunCommon's

collaboration features custom aluminum rails in our Alternate 1 submission.





Ameresco is a major solar distributor and specializes in ground mount top-of-pole hardware. SunCommon has worked closely with them to custom design and fabricate a simple prototype for a 3-axis top of pole mounts for 3" poles. Fabrications would be independently engineered and stamped for wind ratings. The mount is steel galvanized after fabrication with aluminum and stainless steel hardware.



Helical Ground Screws -American Ground Screws

Resembling a large screw, American Ground screw piles are installed deep into the ground, beneath the ground freezing level, to solidly support the structure of this project.

SunCommon owns our own equipment for installation.

- Minimal disturbance to landscape



- Perfectly levelled structure
- No delays between the end of the installation and the beginning of works
- Possible no matter the season



Designed to last. Please see attached ESR report.

- Fights frost and thawing soil movement.

- The steel piles are fully galvanized to protect the tubes as well as the heads and helixes against physical deterioration.



Specialized Equipment for Ground Screws





Monitoring / Data Communications / Kiosk

SunCommon would provide monitoring via a smart type wifi capable TV with system level monitoring via Enphase Enlighten.



SunCommon would anticipate the wifi Enphase Enlighten communication connection to be near the main service panel at the current wifi equipment location. An ideal location for the TV may be in the breezeway above the meter location near the exit door (patrons would see this going to and from the walking path). Credentials would allow ADMIN sign in for settings and alerts. A simple exterior weather monitoring station would be included.

Optional Timber Frame Solar Canopy

SunCommon would highly recommend that the array does not slope to the ground level. Especially at the walking path intersection the array would provide a hard to resist "ramp" for climbing, bikes or skateboarders which would be a safety, liability and potentially damaging to the solar sculpture. One possibility is raising the array to go above the path. SunCommon's true Timber Frame Solar Canopy would provide an additional 11,295 kWh's of production and provide a safer solution.