



Independent School District #146
Buildings and Grounds Committee Meeting
9:00 AM on July 10, 2023
Barnesville Elementary School
310 5th Street SE
Barnesville, MN 56514

1. Interview with Wolf River Electric

2

Barnesville Public School Solar RFP - Wolf River Electric

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Barnesville Public School Solar RFP - Wolf River Electric

Presented by:
Rob Dries
612-306-5749
rob@wolfriverelectric.com
Wolf River Electric
101 Isanti Parkway Northeast Suite G
Isanti, MN 55040

Overview and Principal Elements

Thank you for the opportunity to bid on the Barnesville Public Schools solar project. Myself and Wolf River Electric would be honored to partner on a project that can have a huge impact on the budget of the school as well as the environmental impact to our planet. We understand the importance of having a project that can meet the performance expectations at a competitive price. All while providing confidence that the product and installation companies will be around for years to come. I'm confident Wolf River Electric can exceed your expectations of a solar installation project within your district!

Provider Qualifications

Wolf River Electric

Since its founding in Isanti Minnesota in 2014. Wolf River has built a profitable and high growth solar business, achieving unprecedented growth year over year. Wolf River is home to 250 local employees and 20 local sales staff. With 5 Master Electricians and 40 journeymen on staff there is no need to hire sub contractors. This staff, with the yearly revenue and financial backing makes Wolf River one of the largest solar installers in the state of Minnesota. Wolf River is committed to providing quality solar power, on budget and on time. Allowing customers to take advantage of the substantial cost savings and the environmental impact associated with solar!

<https://wolfriverelectric.com/>

Wolf River recently received a minority ownership stake (16%) through SunPower. SunPower is a publicly traded company on the NASDAQ: SPWR. Sunpower is one of the oldest companies in the solar industry and is the most well known brand in the solar industry. They have raised over 634 Million in capital through three large investment groups. SunPower's investment in Wolf River Electric will secure tremendous growth and financial stability so that Wolf River will be able to service the state of Minnesota for decades to come.

History of SunPower: <https://us.sunpower.com/company/history>

Schematic Design Layout

The attached project scope, design and pricing is a turnkey proposal. Including all necessary inspections, interconnection agreements, product and labor. The system is designed to perform at 40kW AC. If the selection committee decided to add additional panels to the project, it would be easy to make adjustments and increase solar production to benefit the school district.

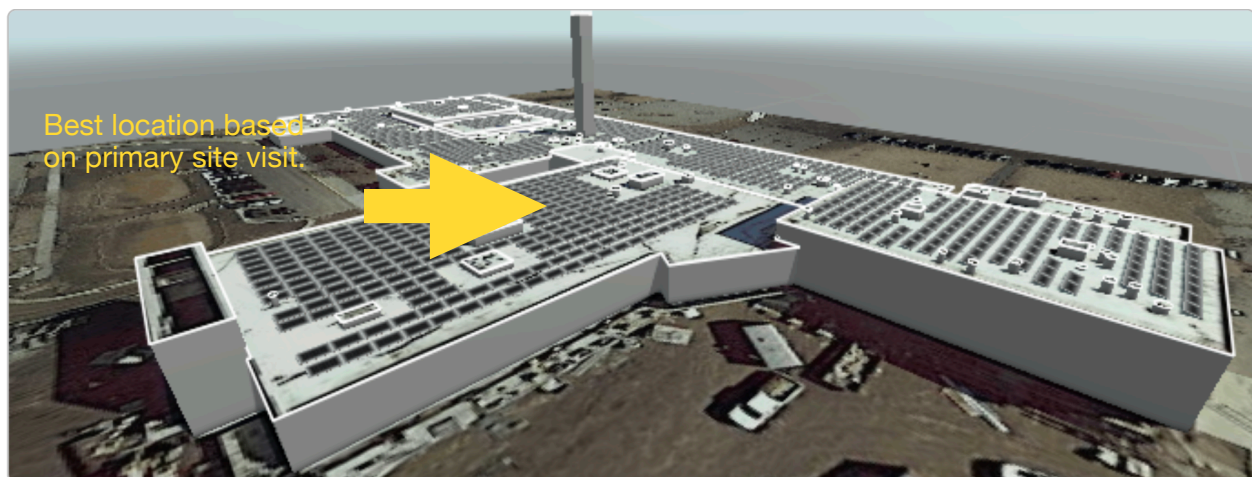
Products/Technical Specifications

Wolf River partners with well known brands that produce amazing products that are reliable and provide outstanding performance. Below are a list of the key products used on the project:

- Jinko 400 watt Eagle 72HM G2 are the panels used at the school. Jinko is one of the largest and most innovative solar companies in the world. In the first quarter of 2023, Jinko reported revenue of \$3.4 Billion Dollars. Jinko has a large US presence with a facility in Jacksonville, Florida.
 - 115 panels will meet the requirements of a 40kW AC system (with the opportunity to expand).
 - DC system is 46kW
 - The Jinko 400 panel is 19.88% efficient and has a 25 year performance guarantee of 83.1%.
 - Jinko has developed a process where 92% of the panels can be recycled.
 - <https://jinkosolar.us/press/jinkosolar-helps-create-nations-first-pv-recycling-network/>
 - Product spec sheets are located at the end of the proposal.
 - <https://jinkosolar.us/product/eagle-72hm-g2/>
- SolarEdge Three Phase Inverter SE10KUS (4 of these would be needed). SolarEdge has over 5,000 employees, is a publicly traded and on the S&P 500. Showing great stability and resources to provide some of the best products in the solar industry.
 - There is a monitoring system that will allow designated staff to see live and historical production. Wolf River Electric will also have access to this monitoring system. Therefore staff could partner with Wolf River Electric if any of the system wasn't performing as expected.
 - Product spec sheets are located at the end of the proposal.
- 59,163 kWh is the estimated 1st year production of the system. This system will provide approximately \$568/month of energy saving to the district.
- Over 30 years, assuming a 3.5% inflation cost of energy. The district will save approximately \$247,000 with a solar system in place.
- <https://www.solaredge.com/us/>
- Unirac RM10 is the racking system the panels would sit on. This system does not require any roof penetrations helping avoid additional holes in the roof that could eventually cause water damage.
 - <https://unirac.com/product/rm10/>



Based on the initial site visit, the panels would be best suited on one of two buildings. The first being on the roof of the Elementary School, the second being on roof of the Performing Arts Center. Both of these location would provide easy access to the transformers and the electrical room. Although I believe the Elementary School would be the most ideal location, after a contract is in place, Wolf River Electric would complete a site survey to design the optimal location. There is a detailed shade report of the two buildings attached at the end of the proposal.



180 - Azimuth (deg.) 15 - pitch (deg.)

Minimum Qualifications

Wolf River Electric is one of the largest solar installers in the state of Minnesota. We have all necessary approvals from the state to install solar systems on commercial and residential properties.

The following documents requested of Wolf River Electric are included in the RFP response. Being a private company these documents have been sent in a separate communication, and we request they not be shared as part of the public review process.

- Wolf River Financials; Profit and Loss, Balance Sheet
- Wolf River Minority Statement
- Master Electrician, Dan Halvorsen State of Minnesota License
- Certificate of Liability Insurance
- Minnesota Department of Labor Construction Coeds license

The project team will consist of oversight from one of the two owners of the company; Justin Neilson and Vlad Marchenko. A Project Manager will be assigned based on the timeframe of the project being approved. Dan Halvorsen will be the Master Electrician working with the Journeyman Electricians, as well as an installation team. There are two resources located in Fergus Falls and Park Rapids that would most likely participate in this project.

Local Economic Development

As mentioned previously Wolf River has their headquarters and warehouse facility in Isanti, MN. There is also a downtown Minneapolis office with support and sales staff. Wolf River is supporting our community by paying local taxes and creating jobs for 270 employees throughout the state of Minnesota. There are also various local vendors Wolf River works with to source products and materials.

References

While we are happy to provide contact details of our referrals, we try to respect their time and coordinate as a last step in the selection process. With roots in the commercial electric business we have worked on many commercial electric projects:

- Minnesota History Center
- Cedar Creek Middle School
- Osseo High School

Currently we are installing solar projects at the Edina City Hall and a manufacturing facility in St. Paul called Navy Island.

In the RFP Request, you are looking for at least five systems installed of at least 40kW. We have installed greater than five systems of similar size in small business farms throughout the state. Mike Bishman in Princeton MN would be happy to talk about his experience with Wolf River Electric as well as the production of his panels.

Pricing and Warranties

Pricing Overview

- \$128,800 Gross Cash Price
- (\$38,640) 30% Federal Tax Credit
- \$90,160 Net System Cost to District

Warranty Overview

- Jinko Panels have a 25 year product and power warranty.
 - 25 year performance guarantee is 83.1% or greater.
- Unirac RM10 racking system has a 25 year warranty.
- Wolf River provides a 10 year workmanship warranty.
- Solar Edge Inverters have a 12 year warranty. Solar Edge does provide an option to purchase an extended warranty for 20 or 25 year. This can be done within 24 months of the inverter shipment.

Operations and Maintenance

Installing a solar system on the roof of a building does not require maintenance or a scheduled service plan. Helping minimize the long term costs to the district. There is a monitoring system built into the SolarEdge inverter that will allow designated staff to see the regular production of the panels. Wolf River Electric will also have access to the monitoring of the panels. Therefore if the Burnsville staff is seeing anything irregular, they can call Wolf River for service and assistance. Wolf River Electric is quick to respond via the phone as well as onsite if required.

Project Schedule

Once Wolf River is selected as the contractor for the Burnsville Public schools. A small celebration would happen in the office where we would congratulate each other and get very excited to work with you! After that, a Project Manager would take over the project and communicate with the Burnsville Schools point of contact.

- Site Survey scheduled - Where the specifics are configured and an official project plan is put together.
- Permitting - The plans are submitted to your city's building department. The plans will undergo review to ensure the system is up to date with local building codes. Any corrections that need to be made will be resubmitted. The permitting process can take up to 1 to 3 weeks depending on jurisdiction.
- Utility Interconnections - All documents are submitted to the Utility company seeking approval. This process can take some time and usually is completed within 30-60 days.
- Purchase Order - After everything is approved with the utility company the product is ordered and sent to the installation site. Usually this is a week or two depending on supply chain.
- Installation - A project of this size could take up to a week to complete.
- Permission to Operate - Once installed, a submission is completed and sent to your utility company. This process could take up to 2 weeks where the utility company will test your system to validate the system is installed properly.
- Power Up - Your system is ready to go! A Wolf River Electrician will walk through any details with your project team.

Currently the entire process has been taking between 3-5 months, although much of this depends on how quick the utility company can move behind the scenes to get your system ready for solar.

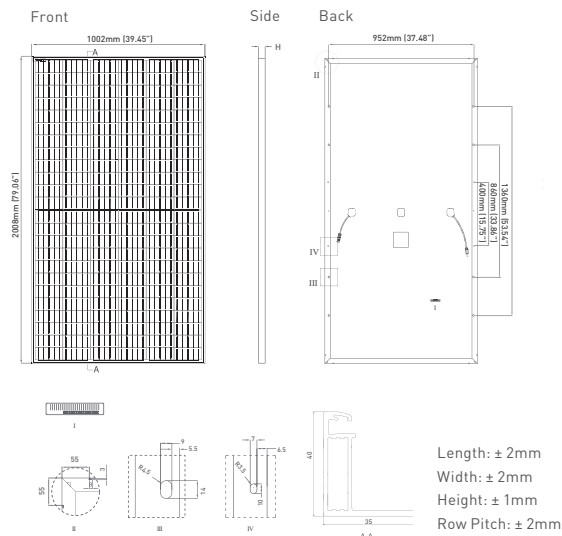
Proposal Submittal and Signature

Wolf River verifies the Request for Proposal for the Burnsville Public School District. This proposal shall remain valid for 60 days after submission date of June 16, 2023

Rob Dries
Solar Consultant Representing Wolf River

Brandon Lotsberg
General Manager Representing Wolf River

ENGINEERING DRAWINGS



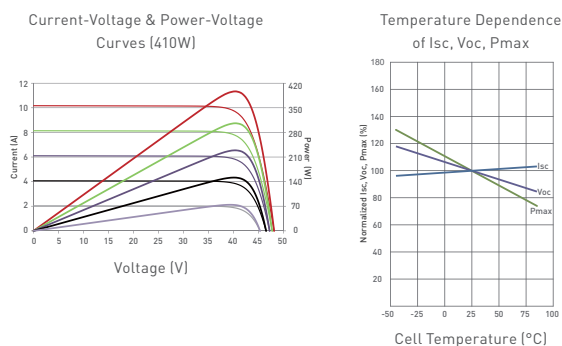
MECHANICAL CHARACTERISTICS

Cells	Mono PERC Diamond Cell (158.75x158.75mm)
No. of Half Cells	144 (6x24)
Dimensions	2008x1002x40mm (79.06x39.45x1.57in)
Weight	22.5kg (49.6lbs)
Front Glass	3.2mm, Anti-Reflection Coating High Transmission, Low Iron, Tempered Glass
Frame	Anodized Aluminum Alloy
Junction Box	IP67 Rated
Output Cables	12 AWG, 1400mm (55.12in) or Customized Length
Fire Type	Type 1
Pressure Rating	5400Pa (Snow) & 2400Pa (Wind)

TEMPERATURE CHARACTERISTICS

Temperature Coefficients of Pmax	-0.35%/°C
Temperature Coefficients of Voc	-0.29%/°C
Temperature Coefficients of Isc	0.048%/°C
Nominal Operating Cell Temperature (NOCT)	45±2°C

ELECTRICAL PERFORMANCE & TEMPERATURE DEPENDENCE



MAXIMUM RATINGS

Operating Temperature (°C)	-40°C~+85°C
Maximum System Voltage	1500VDC (UL and IEC)
Maximum Series Fuse Rating	20A

PACKAGING CONFIGURATION

(Two pallets = One stack)
27pcs/pallet, 54pcs/stack, 594pcs/40' HQ Container

ELECTRICAL CHARACTERISTICS

Module Type	JKM390M-72HL-V		JKM395M-72HL-V		JKM400M-72HL-V		JKM405M-72HL-V		JKM410M-72HL-V	
	STC	NOCT	STC	NOCT	STC	NOCT	SCT	NOCT	SCT	NOCT
Maximum Power (Pmax)	390Wp	287Wp	395Wp	291Wp	400Wp	294Wp	405Wp	298Wp	410Wp	302Wp
Maximum Power Voltage (Vmp)	39.64V	37.0V	39.90V	37.4V	40.16V	37.6V	40.42V	37.8V	40.68V	38.0V
Maximum Power Current (Imp)	9.84A	7.75A	9.90A	7.77A	9.96A	7.82A	10.02A	7.88A	10.08A	7.94A
Open-circuit Voltage (Voc)	48.6V	45.8V	48.8V	46.0V	49.1V	46.2V	49.4V	46.5V	49.6V	46.7V
Short-circuit Current (Isc)	10.46A	8.45A	10.54A	8.51A	10.61A	8.57A	10.69A	8.63A	10.76A	8.69A
Module Efficiency STC (%)	19.38%		19.63%		19.88%		20.13%		20.38%	

*STC: ☀ Irradiance 1000W/m² ☁ Cell Temperature 25°C AM = 1.5
 NOCT: ☀ Irradiance 800W/m² ☁ Ambient Temperature 20°C AM = 1.5 🌬 Wind Speed 1m/s

*Power measurement tolerance: ±3%

The company reserves the final right for explanation on any of the information presented hereby. JKM390-410M-72HL-V-A4-US

BUILDING YOUR TRUST IN SOLAR. JINKOSOLAR.US



Three Phase Inverters for the 120/208V Grid For North America

SE10KUS / SE17.3KUS



The best choice for SolarEdge enabled systems

- Specifically designed to work with power optimizers
- Quick and easy inverter commissioning directly from a smartphone using SolarEdge SetApp
- Fixed voltage inverter for superior efficiency and longer strings
- Built-in type 2 DC and AC Surge Protection, to better withstand lightning events
- Small, lightest in its class, and easy to install outdoors or indoors on provided bracket
- Integrated arc fault protection and rapid shutdown for NEC 2014, 2017, and 2020, per article 690.11 and 690.12
- Built-in module-level monitoring with Ethernet, wireless or cellular communication for full system visibility
- Integrated Safety Switch
- UL1741 SA and SB certified, for CPUC Rule 21 grid compliance

/ Three Phase Inverters for the 120/208V Grid⁽¹⁾

For North America

SE10KUS / SE17.3KUS

Model Number	SE10KUS	SE17.3KUS	
Applicable to inverters with part number	SEXK-USX2IXXX		
OUTPUT			
Rated AC Power Output	10000	17300	W
Maximum Apparent AC Output Power	10000	17300	VA
AC Output Line Connections	3W + PE, 4W + PE		
AC Output Voltage Minimum-Nominal-Maximum ⁽²⁾ (L-N)	105 – 120 – 132.5		Vac
AC Output Voltage Minimum-Nominal-Maximum ⁽²⁾ (L-L)	183 – 208 – 229		Vac
AC Frequency Minimum-Nominal-Maximum ⁽²⁾	59.3 – 60 – 60.5		Hz
Continuous Output Current (per Phase)	27.8	48.25	Aac
GFDI Threshold	1		A
Utility Monitoring, Islanding Protection, Country Configurable Set Points	Yes		
THD	≤ 3		%
Power Factor Range	+/- 0.85 to 1		
INPUT			
Maximum DC Power (Module STC)	17500	30275	W
Transformer-less, Ungrounded	Yes		
Maximum Input Voltage DC+ to DC-	600		Vdc
Operating Voltage Range	370 – 600		Vdc
Maximum Input Current	27.8	48.25	Adc
Maximum Input Short Circuit Current	55		Adc
Reverse-Polarity Protection	Yes		
Ground-Fault Isolation Detection	167kΩ Sensitivity ⁽³⁾		
CEC Weighted Efficiency	97	97.5	%
Night-time Power Consumption	< 4		W
ADDITIONAL FEATURES			
Supported Communication Interfaces	2 x RS485, Ethernet, Cellular (optional)		
Inverter Commissioning	With the SetApp mobile application using built-in Wi-Fi access point for local connection		
Rapid Shutdown	NEC2014, NEC2017 and NEC2020 compliant/certified		
RS485 Surge Protection Plug-in	Supplied with the inverter, Built-in		
AC, DC Surge Protection	Type II, field replaceable, Built-in		
DC Fuses (Single Pole)	25A, Built-in		
Smart Energy Management	Export Limitation		
DC SAFETY SWITCH			
DC Disconnect	Integrated		
STANDARD COMPLIANCE			
Safety	UL1741, UL1741 SA, UL1741 SB, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07		
Grid Connection Standards	IEEE1547-2018, Rule 21, Rule 14 (HI)		
Emissions	FCC part15 class A		
INSTALLATION SPECIFICATIONS			
AC Output Conduit size /AWG range	¾" or 1" / 6 - 10 AWG		
DC Input Conduit size / AWG range	¾" or 1" / 6 - 12 AWG		
Number of DC inputs pairs	4		
Dimensions with Safety Switch (H x W x D)	31.8 x 12.5 x 11.8 / 808 x 317 x 300		in / mm
Weight with Safety Switch	78.2 / 35.5		lb / kg
Cooling	Fans (user replaceable)		
Noise	< 62		dBA
Operating Temperature Range	-40 to +140 / -40 to +60(4)		°F / °C
Protection Rating	NEMA 3R		
Mounting	Bracket provided		

(1) For 277/480V inverters refer to the [Three Phase Inverters for the 277/480V Grid for North America datasheet](#).

(2) For other regional settings please contact SolarEdge support.

(3) Where permitted by local regulations.

(4) For power de-rating information refer to the [Temperature De-rating – Technical Note \(North America\)](#).

Jinko 400 Product Detail:



EAGLE
MODULES

**THE MOST
DEPENDABLE
SOLAR BRAND**

EAGLE 72HM G2

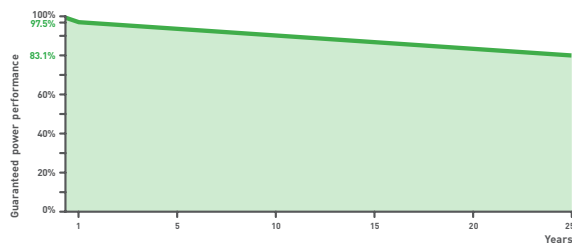
390-410 WATT • HALF CELL MONO PERC MODULE

Positive power tolerance of 0~+3%

- NYSE-listed since 2010, Bloomberg Tier 1 manufacturer
- Best-selling module globally for last 4 years
- Top performance in the strictest 3rd party labs
- 99.9% on-time delivery to the installer
- Automated manufacturing utilizing artificial intelligence
- Vertically integrated, tight controls on quality
- Premium solar panel factories in USA and Malaysia

LINEAR PERFORMANCE WARRANTY

25-Year Performance Warranty

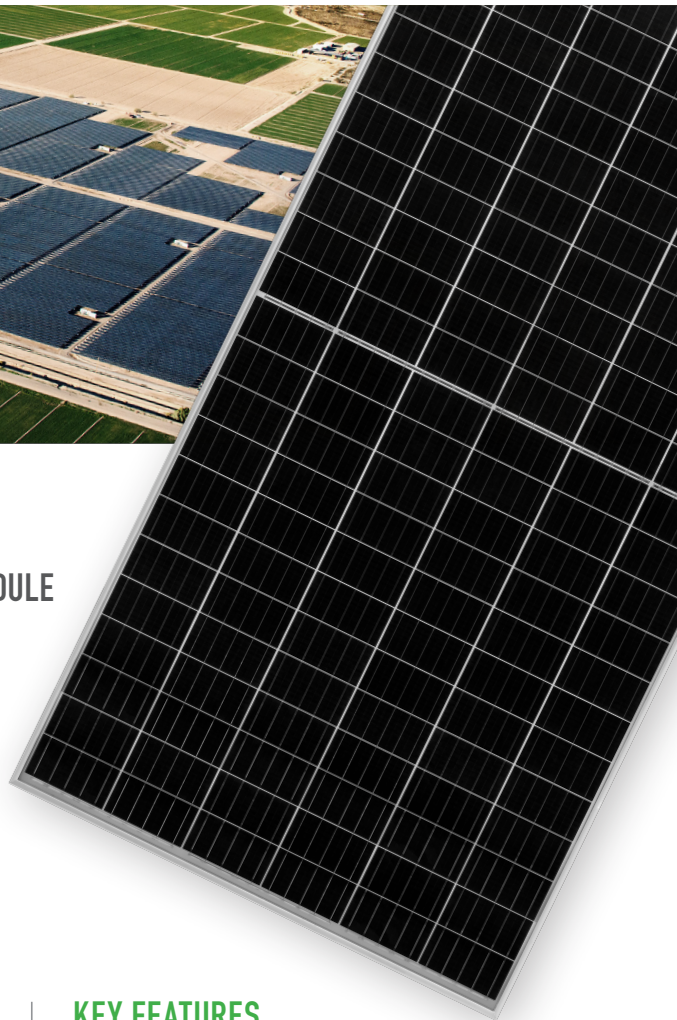


Nomenclature: JKM410M - 72HL-V

Code	Cell	Code	Cell	Code	Certification
null	Full	null	Normal	null	1000V
H	Half	L	Diamond	V	1500V



- ISO9001:2008 Quality Standards
- ISO14001:2004 Environmental Standards
- IEC61215, IEC61730 certified products
- OHSAS18001 Occupational Health & Safety Standards
- UL1703 certified products



KEY FEATURES



Diamond Half Cell Technology

World-record breaking efficient mono PERC half cut solar cells deliver high power in a small footprint.



Designed for Long Life

Uses the same DuPont protective film as the Space Station, Mars Lander, and jetliners. 25-year warranty.



Shade Tolerant

Twin array design allows continued performance even with shading by trees or debris.



Power Boost in Cloudy Conditions

A special film diffuses light, boosting performance even with shading by trees or debris.



Protected Against All Environments

Certified to withstand humidity, heat, rain, marine environments, wind, hailstorms, and packed snow.

Customer

Barnesville Elementary
School, Barnesville, MN
Address
Barnesville
MN 56514, USA

Designer

Sergii Petrenko

Coordinates

(46.650636, -96.413370)

Organization

Wolf River Electric

Date

6 June 2023

Zoomed out satellite view



3D model



3D model with LIDAR overlay 125 ft

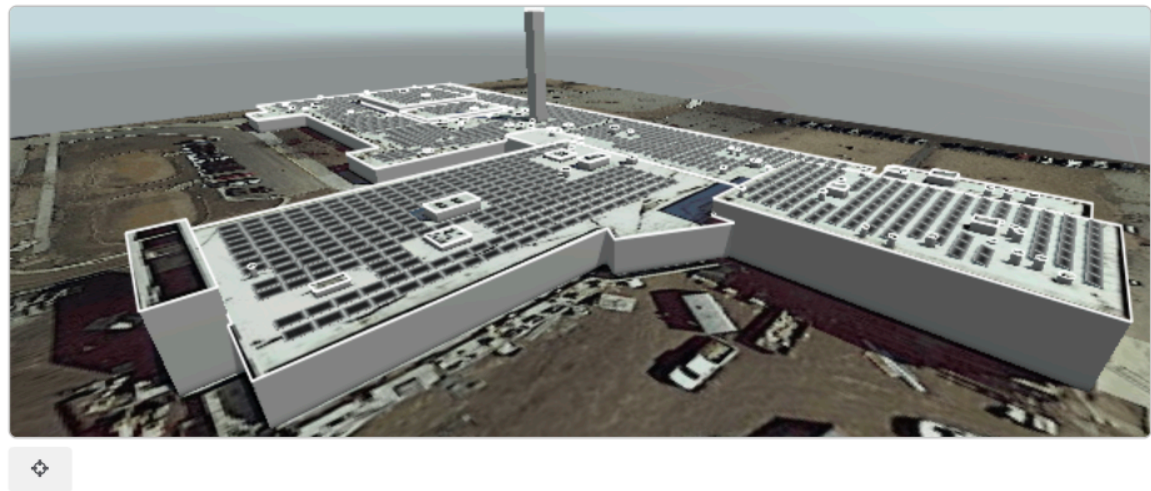


Customer
Barnesville Elementary
School, Barnesville, MN
Address
Barnesville
MN 56514, USA

Designer
Sergii Petrenko
Coordinates
(46.650636, -96.413370)

Organization
Wolf River Electric
Date
6 June 2023

Street view and corresponding 3D model



I, **Sergii Petrenko**, certify that I have generated this shading report to the best of my abilities, and I believe its contents to be accurate.

Aurora Shade Report

Customer
Barnsville High School

Address
302 3rd St SE
Barnesville, MN 56514,
USA

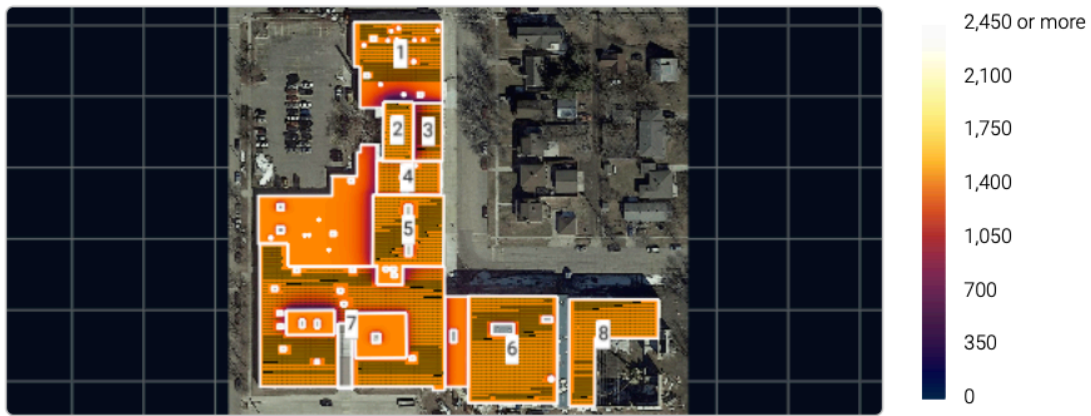
Designer
Sergii Petrenko

Coordinates
(46.650959, -96.416822)

Organization
Wolf River Electric

Date
16 May 2023

Annual irradiance



Summary

Array	Panel Count	Azimuth (deg.)	Pitch (deg.)	Annual TOF (%)	Annual Solar Access (%)	Annual TSRF (%)
1	232	180	15	93	96	89
2	80	181	15	93	98	91
3	80	180	15	93	86	80
4	92	180	15	93	96	90
5	219	181	15	93	98	91
6	460	180	15	93	97	90
7	840	180	15	93	95	88
8	250	180	15	93	98	91
Weighted average by panel count	-	-	-	-	95.8	89.1

Customer
Barnesville High School

Address
302 3rd St SE
Barnesville, MN 56514,
USA

Designer
Sergii Petrenko

Coordinates
(46.650959, -96.416822)

Organization
Wolf River Electric

Date
16 May 2023

Monthly solar access (%) across arrays

Array	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	78	93	98	99	99	98	99	99	99	97	83	72
2	88	97	99	99	99	99	99	99	99	99	91	84
3	75	85	85	87	89	88	88	87	86	85	79	71
4	85	95	98	98	98	98	98	98	98	97	89	80
5	87	97	99	99	99	99	99	99	99	98	91	83
6	86	96	99	99	99	99	99	99	99	98	90	82
7	80	91	96	97	98	97	98	97	96	94	84	76
8	88	97	99	99	99	99	99	99	99	99	91	83

Customer
Barnesville High School

Designer
Sergii Petrenko

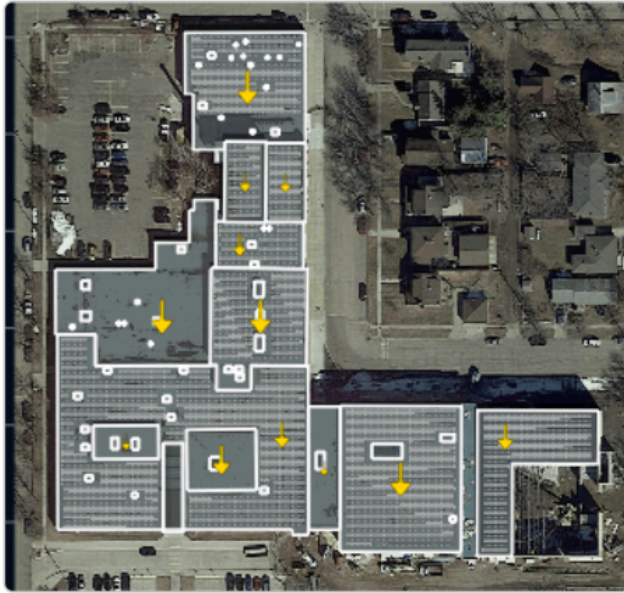
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Barnesville, MN 56514,
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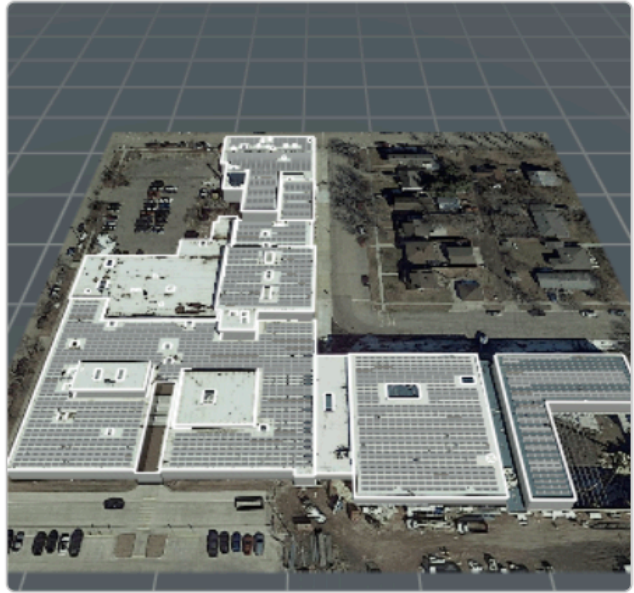
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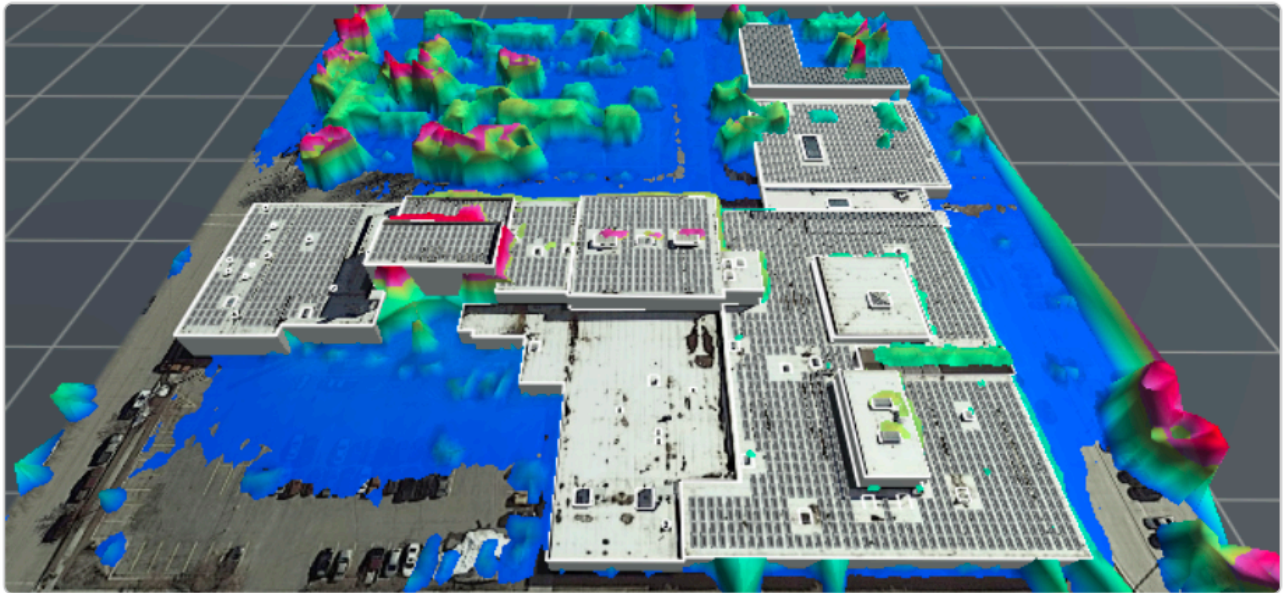
Zoomed out satellite view



3D model



3D model with LIDAR overlay  154 ft



3/4

powered by
 aurora

Customer
Barnsville High School

Designer
Sergii Petrenko

Organization
Wolf River Electric

Address
302 3rd St SE
Barnsville, MN 56514,
USA

Coordinates
(46.650959, -96.416822)

Date
16 May 2023

Street view and corresponding 3D model



I, **Sergii Petrenko**, certify that I have generated this shading report to the best of my abilities, and I believe its contents to be accurate.

Detailed Shade Report:

Aurora Shade Report

Customer

Barnesville Elementary School, Barnesville, MN
Address
 Barnesville
 MN 56514, USA

Designer

Sergii Petrenko

Organization

Wolf River Electric

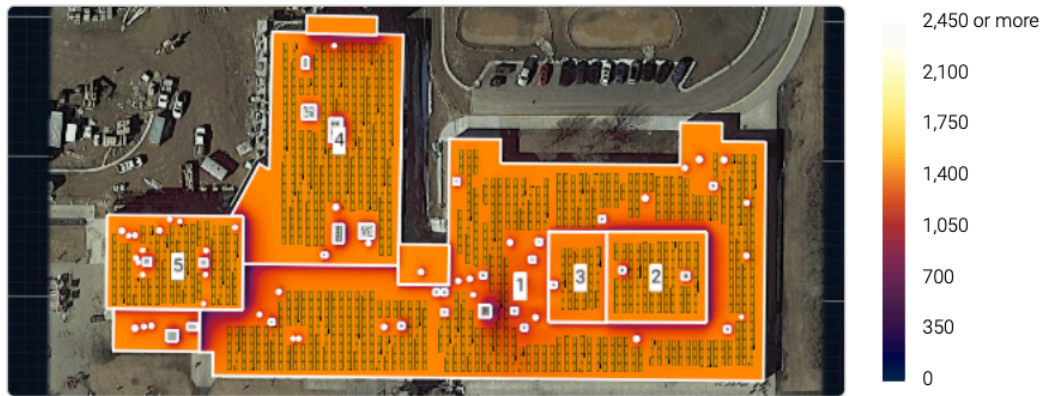
Coordinates

(46.650636, -96.413370)

Date

6 June 2023

Annual irradiance



Summary

Array	Panel Count	Azimuth (deg.)	Pitch (deg.)	Annual TOF (%)	Annual Solar Access (%)	Annual TSRF (%)
1	664	180	15	93	96	89
2	88	180	15	93	97	90
3	42	180	15	93	96	89
4	284	180	15	93	97	90
5	132	180	15	93	97	91
Weighted average by panel count	-	-	-	-	96.3	89.6

Monthly solar access (%) across arrays

Array	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	87	95	97	97	97	97	97	97	97	96	91	84
2	84	95	98	99	99	99	99	99	99	97	89	82
3	83	91	95	98	99	99	99	99	97	93	86	79
4	90	96	97	98	98	98	98	98	98	97	93	87
5	88	96	99	99	99	99	99	99	99	98	92	84

1/3





March 8, 2021

Sent via e-mail

Justin Neilsen
LTL LED, LLC
DBA Light the Lamp LED
DBA Wolf River Electric
101 Isanti Parkway NE #G,
Isanti, MN 55040

Dear Justin Neilsen,

The Minnesota Unified Certification Program (MnUCP), in compliance with 49 Code of Federal Regulations Part 26 (49 C.F.R. §§26 et seq.), is pleased to inform you that your firm has been certified as a Disadvantaged Business Enterprise (DBE) with the MnUCP, effective date February 24, 2021, in the following NAICS codes:

- 1) 238210 Electrical Contractors and Other Wiring Installation Contractors**
- 2) 423610 Electrical Apparatus and Equipment, Wiring Supplies, and Related Equipment Merchant Wholesalers**

The description of services performed by your firm will be:

Sales and commercial installation of LED lighting and solar. General electrical work.

In order to remain certified under 49 C.F.R. Part 26, you must contact our office if any significant changes occur in your firm. This includes changes in any of the following: address, work areas the firm performs, locations that the work is conducted, and ownership of the firm.

Federal regulations require that in order to remain qualified under the DBE Program, the DBE owners must continue to demonstrate majority ownership, control of the firm's day-to-day operations, and direct and ongoing involvement in the firm's management. You must also continue to demonstrate direct involvement in contracts or projects awarded by MnUCP members, which are subject to the MnUCP DBE Program.

Additionally, on an annual basis you will be required to file a No Change Affidavit, with supporting documentation. The No Change Affidavit indicates whether there are changes regarding the firm's size, gross receipts, ownership, work areas, and that your firm continues to meet the requirements of 49 C.F.R. Part 26 to participate as a member of the DBE Program. It is deemed a failure to cooperate pursuant to 49 C.F.R. Part 26.109(c) if this Affidavit is not submitted in a timely manner or inaccurate information is provided.

Your firm will be listed in the DBE Directory in the work area(s) in which you have been certified. <http://mnuccp.metc.state.mn.us>. The DBE Directory has a searchable engine to assist contractors looking for subcontractors to work on various projects. The MnUCP recommends that, as a regular business practice, you contact directly the organizations you are interested in working with. Detailed information concerning projects in the State of Minnesota can be obtained by contacting the specific participating MnUCP agency whose contracts you are interested in, or by visiting their website. To do business with the City of Minneapolis, you must first register as a supplier. Information about the supplier registration process is [linked here](#).¹ Attached is further information about doing business with the City of Minneapolis.

As a certified DBE, you have the following responsibilities:

- Comply with all aspects of 49 C.F.R. Part 26.
- Maintain an accurate mailing address with MnUCP.
- Maintain a working phone number.
- Promptly return all solicitation calls or inquiries.
- You may also be invited to attend construction-related or business-related workshops, conferences, and seminars that may be organized by MnUCP.

If you have any questions, concerns, or would like more information about the services provided by the City of Minneapolis, you may contact Aidan Dunne at (612) 673-2602 or at aidan.dunne@minneapolismn.gov.

Sincerely,



Brian Walsh, Assistant Director
Minneapolis Department of Civil Rights

ATTACHMENT: Doing Business with the City of Minneapolis

¹ <https://www.minneapolismn.gov/business-services/doing-business-with-the-city/>



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

2/25/2022

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER		CONTACT NAME: Justin Martin	
Martin Insurance Group, LLC		PHONE (A/C, No, Ext): 952-913-9264	FAX (A/C, No):
106 2nd Ave SW		E-MAIL ADDRESS: martininsurance@mnipn.com	
Hutchinson MN 55350		INSURER(S) AFFORDING COVERAGE	
		INSURER A: United Fire Group	NAIC # 13021
INSURED		INSURER B: Accident Fund Insurance Company of America 10166	
LTL LED, LLC dba Wolf River Electric		INSURER C:	
101 ISANTI PKWY NE, Unit #G		INSURER D:	
ISANTI MN 55040-7523		INSURER E:	
		INSURER F:	

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:	Y	Y	60533019	02/12/2022	02/12/2023	EACH OCCURRENCE \$ 2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 300,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 1,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000
A	AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY		Y	60533019	02/12/2022	02/12/2023	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
A	<input checked="" type="checkbox"/> UMBRELLA LIAB <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> OCCUR <input type="checkbox"/> CLAIMS-MADE DED RETENTION \$	Y	Y	60533019	02/12/2022	02/12/2023	EACH OCCURRENCE \$ 3,000,000 AGGREGATE \$ 3,000,000
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N/A	Y	WCV 622436500	10/12/2021	10/12/2022	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Owner Copy

CERTIFICATE HOLDER	CANCELLATION
Owner Copy	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
	AUTHORIZED REPRESENTATIVE Justin Martin

LTL LED LLC

Balance Sheet

As of December 31, 2022

	TOTAL
ASSETS	
Current Assets	
Bank Accounts	\$2,407,238.19
Accounts Receivable	
Accounts Receivable	12,935,320.56
Total Accounts Receivable	\$12,935,320.56
Other Current Assets	
Inventory Asset	1,050,877.60
Loan receivable - JN	152,793.42
Mosaic Claw Back Receivable	12,901.61
Solar Financing Fees	6,151,080.16
TD Ameritrade Investment Account	211,431.02
Undeposited Funds	52,153.45
WIP Construction	
WIP 305 Falcon Run (3589)	33,675.00
WIP 307 Falcon Run (3570)	180,358.99
WIP 324 Falcon Run (3600)	44,925.00
WIP Eagle Ridge Lot Pool	224,600.00
Total WIP Construction	483,558.99
WIP Solar Equipment	7,858,068.94
Total Other Current Assets	\$15,972,865.19
Total Current Assets	\$31,315,423.94
Fixed Assets	
Accumulated Depreciation	-163,787.25
Equipment	
2016 John Deere 317G	38,295.00
2021 Lowe XR21 Trencher	6,974.01
2021 Lowe XR21 Trencher 38x6	7,284.50
Bobcat with bucket and forks from CHR	38,566.80
Bobcat with 2 Augers, Trailer, 2 trenchers and Bucket from CHR	53,564.33
Bobcat with Trailer, Bucket. and Forks from CHR	24,978.99
Bulb Recycler	4,781.12
CHR Personal Scissor Lift	10,340.15
CHRental Scissor Lift & Trailer	14,223.57
Ground Thaw Blankets	3,875.35
McMillen AUGER Yr	2,779.90
Scissor Lift and Trailer from CHR	12,456.63
UnitedRental Scissor Lift	12,994.15
Vehicle Ladder Racks	18,921.03
Total Equipment	250,035.53

LTL LED LLC

Balance Sheet

As of December 31, 2022

	TOTAL
Fleet	1,494,526.70
Tools and Equipment	255,334.18
Total Fixed Assets	\$1,836,109.16
Other Assets	
Industrial Label & Placard Printer	8,749.68
Office and Equipment	160,696.86
Total Other Assets	\$169,446.54
TOTAL ASSETS	\$33,320,979.64
LIABILITIES AND EQUITY	
Liabilities	
Current Liabilities	
Accounts Payable	
Accounts Payable	2,134,840.75
Total Accounts Payable	\$2,134,840.75
Credit Cards	
Credit Card (1730)	10,692.02
Credit card (Personal 9350)	15,993.16
Total Credit Cards	\$26,685.18
Other Current Liabilities	
Accrued Interest	12,913.30
Accrued State Minimum Fee	2,090.00
Eagle Ridge Purchase Agreement	224,600.00
Unearned Revenue Solar Projects	
Unearned Revenue - Beam	14,165,746.78
Unearned Revenue - Dividend	3,861,081.91
Unearned Revenue - Mosaic	85,067.17
Total Unearned Revenue Solar Projects	18,111,895.86
Total Other Current Liabilities	\$18,351,499.16
Total Current Liabilities	\$20,513,025.09
Long-Term Liabilities	
2009 Chevrolet 3500 (FO 2916)	18,640.45
2011 Dodge Ram (FO 2917)	11,163.42
2012 Ford Econoline (Magnifi B13686)	6,000.38
2012 Ford Econoline (Magnifi B34688)	5,599.94
2013 Chevrolet Express Van Loan (FO 2905)	3,152.93
2014 Chevrolet Silverado Loan (FO 2906)	6,755.79
2015 Chevrolet Silverado Loan (FO 2903)	8,573.80
2015 Chevrolet Silverado Loan (FO 2908)	19,809.32
2015 Chevy Impala (FO 2925)	10,876.75

LTL LED LLC

Balance Sheet

As of December 31, 2022

	TOTAL
2015 Ford F450 & 2008 Ford E23 Loan (FO 2910)	16,636.53
2015 Ford Transit Loan (FO 2912)	18,979.72
2016 & 2017 Dodge Promaster Loan (FO 2938)	59,033.75
2016 Chevrolet Suburban Loan (FO 2902)	5,798.33
2016 Dodge Promaster (FO 2913)	19,021.19
2016 Dodge Promaster (FO 2921)	24,301.95
2016 Ford Transit (FO 2914)	22,604.11
2016 Ford Transit Loan (FO 2911)	14,635.69
2016 John Deere (FO 3105)	26,484.71
2016 Promaster Loan (FO 2935)	14,180.57
2016 Promaster Loan (FO 2936)	14,359.48
2017 Chevrolet Silverado (FO 2923)	24,758.76
2017 Dodge Promaster (FO 2915)	20,929.82
2017 Promaster (FO 2924)	24,247.06
2017 Promaster 1500 (FO 2920)	26,037.81
2017 Promaster Loan (FO 2933)	28,337.10
2018 Dodge Promaster (FO 2918)	26,016.26
2019 Dodge Promaster (FO 2929)	35,547.63
2019 Dodge Promaster 1500 (FO 2922)	28,227.67
2019 Dodge Promaster 1500 (FO 2928)	34,633.72
2019 Promaster (Magnifi 523394)	18,273.00
2019 Promaster Loan (FO 2932)	31,582.81
2019 Ram Promaster (Magnifi 531021)	33,429.10
2020 Chevy Impala (FO 2926)	20,776.94
2021 Chevrolet Silverado (FO 2927)	36,509.44
2021 Ford Econoline (Magnifi B29156)	6,000.38
2021 GMC Yukon (Magnifi 241805)	72,198.22
2023 GMC Yukon (Magnifi 104926)	68,720.38
2023 Ram Promaster (Magnifi Opened 12/27/22)	41,293.00
21st Century Bank Loan (0001)	244,589.07
Business Equipment (FO 3106)	12,560.67
First Bank & Trust (3570)	180,358.99
First Bank & Trust (3589)	33,675.00
First Bank & Trust (3600)	44,925.00
Ford F350 & GMC Van Loan (FO 2909)	18,296.60
Tranzporter Ladderhoist Loan (FO 3103)	11,428.78
Two 2013 Ford Transit Loan (FO 2937)	29,103.35
2018 Ram Promaster (Magnifi 138915)	31,668.75
Total Long-Term Liabilities	\$1,510,734.12
Total Liabilities	\$22,023,759.21

LTL LED LLC

Balance Sheet

As of December 31, 2022

	TOTAL
Equity	
Capital Stock	3,000.00
Members Draw	-973,033.28
Opening Balance Equity	37,435.62
Retained Earnings	3,779,929.60
Net Income	8,449,888.49
Total Equity	\$11,297,220.43
TOTAL LIABILITIES AND EQUITY	\$33,320,979.64

LTL LED LLC

Profit and Loss

January - December 2022

	TOTAL
Income	
Sales & Services	
Construction	3,172,936.70
Electrical	1,124,802.90
Installation	55,547.11
Other Sales	52,076.80
Solar Project Income	58,909,553.19
Total Sales & Services	63,314,916.70
Total Income	\$63,314,916.70
Cost of Goods Sold	
Cost of Goods - Construction	2,843,333.86
Cost of Goods - Electrical	4,226,732.94
Cost of Goods - Solar	38,686,868.74
Cost of Goods Sold	1,266,443.17
Merchant Account Fees	555.51
Total Cost of Goods Sold	\$47,023,934.22
GROSS PROFIT	\$16,290,982.48
Expenses	
Advertising and Promotion	3,627,724.04
Bank Service Charges	15,900.86
Charitable Contributions	1,870.00
Computer and Internet Expenses	7,184.37
Dues and Subscriptions	355,376.63
Forte Credit Card Processing	3,031.65
Garbage/ Recycle	10,130.60
Hiring Expense	108,013.38
Income Tax	46,104.04
Insurance Expense	222,517.75
Interest Expense	84,806.07
Meals and Entertainment	9,649.47
Office Supplies	60,888.59
Payroll Expenses	2,461,503.85
Postage and Delivery	13,774.90
Printing	11,366.04
Professional Fees	109,470.77
Rent Expense	33,528.62
Repairs and Maintenance	15,986.93
Telephone Expense	24,722.13
Tools & Equipment	19,969.52
Travel Expense	34,121.84
Uncategorized Expense	1,403.56

LTL LED LLC

Profit and Loss

January - December 2022

	TOTAL
Utilities	4,519.73
Vehicle Expense	368,779.76
Vehicle Lease	5,365.96
Total Expenses	\$7,657,711.06
NET OPERATING INCOME	\$8,633,271.42
Other Income	
Gain/Loss on Construction Projects	-87,507.61
Gain/Loss on Investments	974.21
Other Income	0.70
Total Other Income	\$ -86,532.70
Other Expenses	
Ask My Accountant	16,019.38
Investment Fees	1,682.03
Property Taxes	-131.19
Reconciliation Discrepancies	-714.42
State Tax	25,203.57
Uncollectible Accounts	54,791.36
Total Other Expenses	\$96,850.73
NET OTHER INCOME	\$ -183,383.43
NET INCOME	\$8,449,887.99

Minnesota Department of Labor and Industry
Construction Codes and Licensing Division
443 Lafayette Road N
Saint Paul, MN 55155

Licensing and Certification Services
Phone: 651.284.5034
Email: DLI.License@state.mn.us
Website: www.dli.mn.gov/ccld.asp

NOTICES

NOT TRANSFERABLE

CHANGE YOUR BUSINESS STRUCTURE
SUBMIT A NEW APPLICATION FOR NEW ENTITY

RENEW OR REPLACE INSURANCE POLICY
SUBMIT NEW CERTIFICATE OF INSURANCE

LTL LED LLC
DBA WOLF RIVER ELECTRIC
101 ISANTI PARKWAY NE
ISANTI, MN 55040

NOTIFY THE DEPARTMENT OF A CHANGE IN YOUR BUSINESS.

Failure to do so, subjects you to administrative penalties of up to \$10,000.

15-Day Notice Requirement – Forms available online at www.dli.mn.gov/CCLD/LicUpdate.asp

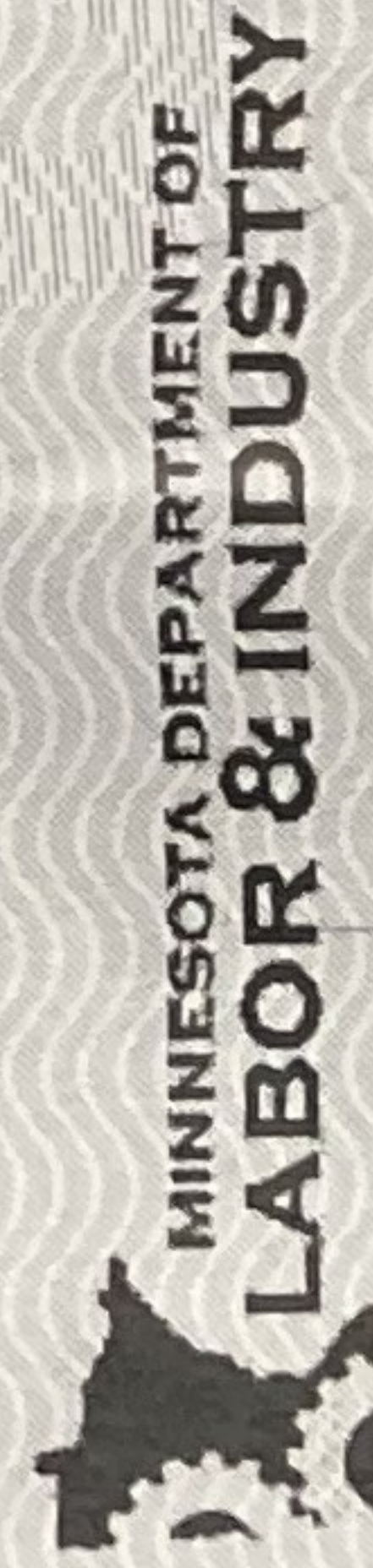
- Change in business' physical address, mailing address, phone number, or email address
- Change in control, owners, officers, directors, members, partners
- Change in business' legal name and/or assumed name
- Loss of or change in MASTER A ELECTRICIAN
- Change in general liability insurance or workers' compensation insurance coverage

Immediate Notice Requirement – Notification to DLI in writing

- Judgment Debtor. A licensed contractor has 15 days to provide written notice of the finding that it is found to be a judgment debtor based upon conduct requiring licensure.
- Bankruptcy Petition Filed. A licensed contractor has 15 days to provide written notice that it filed a petition for bankruptcy.
- Conviction Notice. A licensed contractor has 10 days to provide written notice that it has been found guilty of a felony, gross misdemeanor, misdemeanor or any comparable offense related to the license, including convictions of fraud, misrepresentation, misuse of funds, theft, criminal sexual conduct, assault, burglary, conversion of funds, or theft of proceeds in this or any other state or any other United States jurisdiction.

YOUR CERTIFICATE IS BELOW THE PERFORATION.

SHOW CERTIFICATE WHEN OBTAINING PERMITS.



CLASS A ELECTRICAL CONTRACTOR

Construction Codes and Licensing Division
Website: www.dli.mn.gov/ccld.asp

Licensing and Certification Services
Email: dli.license@state.mn.us

443 Lafayette Road N St. Paul, MN 55155
Phone: 651.284.5034

This is to certify that the certificate holder is licensed as a CLASS A ELECTRICAL CONTRACTOR in the state of Minnesota and is in compliance with Minnesota Statutes 326B.33, Subd. 14, and may perform or offer to perform any electrical work in all areas of the state during the license period; provided the responsible individual is at all times a MASTER A ELECTRICIAN and the certificate holder maintains compliance with the required bond, general liability insurance, and workers' compensation laws.

License : CLASS A ELECTRICAL CONTRACTOR

Lic Number : EA777669 LTL LED LLC

Effective Date : 03/01/2022

Expiration Date : 02/29/2024

DBA WOLF RIVER ELECTRIC
101 ISANTI PARKWAY NE
ISANTI, MN 55040

VERIFY UP-TO-DATE STATUS, BOND, AND INSURANCE INFO AT www.dli.mn.gov/ccld/LicVerify.asp (ENTER NUMBER).

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T

Iowa Electrical Examining Board

DANIEL HALVORSEN

Master Class A

EL2096661MA

Issued Year
2023

Expiration
12/31/2025



STATE OF MINNESOTA

MASTER A ELECTRICIAN

License # AM788982
Expiration Date 02/28/2025
Effective Date 03/01/2023
Original Issue Date 12/27/2021

DANIEL B HALVORSEN
5936 HIDDEN LN
SOUTH HAVEN, MN 55382

2. Specs for Storage Shed
3. Interview with iSolar



June 15, 2023

iSolar, LLC
455 Broadway Ave
St. Paul Park, MN 55071

Dr. Jon Ellerbusch, Superintendent
Barnesville Public Schools
302 3rd St. SE, Barnesville, MN 56514

Dear Dr. Ellerbusch,

Please accept the following scope of work estimate from iSolar in St. Paul Park, MN, in response to your Request for Proposal (RFP) with regards to a solar project to be built on-site at Barnesville Public Schools, 302 3rd St. SE, Barnesville, MN 56514. We believe our proposal goes above and beyond the scope of requirements and specifications requested by the school district and that our experience and expertise will make us a good partner in executing this project from planning to construction as well as operations and maintenance in the years to come.

iSolar is a Minnesota-based commercial and residential solar installation company. A family-owned company, iSolar was incorporated in 2019. Our leadership team has more than 75 years of combined experience in renewable energy projects. iSolar was founded on the principal that ALL Minnesotans deserve the opportunity to produce their own energy. Last year, iSolar installed more than 100 systems throughout the state.

There are several factors that set iSolar's proposal apart from other installers:

1. **Unmatched Security.** iSolar is committed to serving its customers now and in the future. iSolar has invested in a partnership with a third party guarantor, Solar Insure, to warranty this project for 30 years. This warranty includes but is not limited to all materials incorporated into the solar project for the district, panels, inverters, and racking as well as iSolar's workmanship. The solar industry has seen many panel manufacturers go out of business, from locally made TenK Solar to Solar World. Other manufacturers, like LG Solar, have simply divested their solar divisions. While we source the highest quality materials from well-respected companies with the highest quality and longevity rankings, the fact remains if a manufacturer goes out of business, its warranty goes with it. That is why iSolar has made the decision to provide a third party warranty with Solar Insure and secure the district's investment for the next 30 years.



2. Unmatched Precision. iSolar is committed to the highest quality workmanship and customer service. Our project management team uses the most cutting-edge solar design software, Aurora, to build, model and layout our projects, pulling in data from numerous sources – NREL, NearMap, and others – to create the most accurate projections available. Our electricians and designers work for us in-house and provide the most efficient design available.
 3. Bankability. iSolar sits on firm fiscal ground. iSolar began its company by bootstrapping its growth and has acquired no significant debt. This allows iSolar to be nimble in the ever-changing solar marketplace. Last year’s interest rate hikes caused a few regional companies to shut their doors. There will likely be uneven roads in the solar industry ahead, but iSolar’s conservative financial plans will allow it to remain a viable and thriving company and one that will be available to continue to monitor and maintain the district’s solar system for the term of the agreement.
 4. Training, Experience and Commitment to Community. iSolar was chosen as the contractor of record for Solar United Neighbors in 2022 and 2023. iSolar is committed to providing solar to ALL Minnesotans, including non-profits and low-income residents. iSolar performs regular training for its field employees focused on industry and safety standards. iSolar also has extensive commercial experience in similar projects, interconnecting jobs with numerous utilities throughout the state, including Xcel Energy, Minnesota Power, East Central Electric, Kandiyohi Power Cooperative, Red River Valley Cooperative, Dakota Electric Cooperative, and North Star Electric Cooperative, and many more. iSolar is fully licensed and insured, is in good standing with the Minnesota Dept of Labor, and has never had an OSHA violation.
- I. Project Proposal and Overview of Project Elements
- a. iSolar will design, procure, and install all elements of a turn-key 40 kW AC solar photovoltaic system. iSolar’s proposal for the district is all-inclusive and includes planning, engineering, labor, materials, delivery, installation and commissioning. Please see the Appendix for rendering.
 - b. All equipment used in the project will be UL listed. If chosen for this project, iSolar will apply for interconnection with the local utility as well as any necessary permits for work and adhere to local government-approved building and electrical codes. The payment of any interconnection fees or permit applications will be the responsibility of iSolar.
 - c. iSolar will abide by a prevailing wage.

- d. iSolar will apply for an interconnection agreement and any available rebates with utility.
- e. iSolar will keep the district and its representatives apprised of any changes or alterations to its proposal, including meter location, system design, and material change orders, if needed.
- f. iSolar will not now nor any time in the future claim any of the Solar Renewable Energy Credits (RECs) or Certificates. iSolar will make reasonable efforts to assist district in securing RECs.

II. iSolar Qualifications

- a. iSolar holds all necessary licenses in good standing. Furthermore, iSolar, a residential and commercial solar installer, has a consumer review rating on the following independent platforms: Google Reviews of 4.9 stars (out of possible 5 stars, with 5 stars signifying excellence); Facebook reviews rating of 5 stars; Angie’s List rating of 5 stars.
- b. Minnesota Electrical License #EA761814 (attached in Appendix)
- c. NABCEP associate certification PVA-031422-014171 (attached in Appendix)
- d. Minnesota Contractor’s license #BC760638 (held by Ryan Ihle under Three Rivers Contracting also owned by Ryan Ihle, attached in Appendix)
- e. Personnel who will work on the project (work history attached in Appendix):
 - a. Robert Hoerauf, PE, engineer
 - b. John Ihle, Owner/Master Electrician and Master of Record
 - c. Ryan Ihle, Owner/Project Manager
 - d. Dan Kepros, IT/Operations
 - e. Field Team, listed with Work History in Appendix.
- f. Project Team Structure
 - a. All personnel are W-2 employees of iSolar. Ryan Ihle is the project manager and all employees will work through him. See Project Management timeline in Appendix.

III. Reference Projects

(All projects listed were built within the last 5 years and financed, designed, installed, interconnected, and are currently maintained by iSolar)

- a. Bald Beaver Lodge, Big Falls, MN
 - i. Darby Miller, owner
 - 1. Email: che@arvig.net
 - 2. Phone: 218-204-0308
 - 3. Address: 6881 County Road 31, Big Falls, MN 56627

- ii. Year built: 2021
 - iii. Utility: North Star Electric
 - iv. System size: 57.8 kW DC; 38 kW AC
 - v. Inversion: Solar Edge
 - 1. SE11400H (2), SE7600H (2)
 - 2. P505 (136)
 - vi. Modules: Hanwha Q Celll
 - 1. Q. Peak DUO L-G8.2 425w (136)
- b. Braten Project, Barnesville, MN
- i. Jon Braten, owner
 - 1. Email: braten@rrt.net
 - 2. Phone: 218-329-6983
 - 3. Address: 1282 230th Avenue, Barnesville, MN 56514
 - ii. Year built: 2019
 - iii. Utility: Lake Region Electric Cooperative
 - iv. System size: 55.2 kW DC; 38 kW AC
 - v. Inversion: Solar Edge
 - 1. SE7600H (5)
 - 2. P400 (160)
 - vi. Modules: Longi
 - 1. LR6-72 (160)
- c. Hidden Green Golf Course Project, Hastings, MN
- i. Contact
 - 1. Email: hiddengreensgolf@gmail.com
 - 2. Phone: 651-329-9088
 - 3. Address: 12977 200th Street East, Hastings MN 55033
 - ii. Year built: 2022
 - iii. Utility: Dakota Electric Cooperative
 - iv. System size: 51.85 kW DC; 38 kW AC
 - v. Inversion: Solar Edge
 - 1. SE11400H (2); SE7600H (2)
 - 2. S440 (128); P960 (62)
 - vi. Modules: Hanwha Q Cell
 - 1. Q. Peak DUO L-G8.2 430w (252)
- d. Savageau Project, Glyndon, MN
- i. Contact: Kim Savageau
 - 1. Email: ks3savage@gmail.com
 - 2. Phone: 701-429-7338
 - 3. Address: 3312 110th Street South, Glyndon, MN 56547
 - ii. Year built: 2019
 - iii. Utility: Red River Valley Electric Cooperative

- iv. System size: 54.75kW DC; 38 kW AC
 - v. Inversion: Solar Edge
 - 1. SE7600H (5)
 - 2. S400 (150)
 - vi. Modules: Longi
 - 1. LR6-72PH-365M (150)
- e. Arnold Project, Mora, MN
- i. Contact, Jerome Arnold
 - 1. Email: jeremy20a@yahoo.com
 - 2. Phone: 952-240-8596
 - 3. Address: 1775 Minnesota 23 Mora, MN 55051
 - ii. Year built: 2021
 - iii. Utility: Dakota Electric Cooperative
 - iv. System size: 108.36kW DC; 77.6 kW AC
 - v. Inversion
 - 1. Solar Edge
 - a. SE20K (2); SE10000H (3); SE7600H
 - b. S440 (128); P960 (62)
 - vi. Modules
 - a. Hanwha Q Cell
 - i. Q. Peak DUO L-G8.2 430w (252)
- IV. Technical Specifications for Solar Project
- a. iSolar proposes to build a 40kW AC system on the flat roof of Barnesville Public School building (rendering attached). The system will consist of 90 commercial Qcell bifacial panels and use SolarEdge three-phase inverters and optimizers and Sun Ballast racking. Conduit run will run down side of building and enter at or near the main service panel.
 - b. Description of technology and configuration:
 - i. Project size: 40kW AC (43.6kWp DC)
 - ii. Solar Panels: Ninety (90) Hanwha Q-Cell bi-facial solar modules (panels), model Q.Peak Duo XL-G10 BFG
 - iii. Inverters: Solar Edge
 - 1. Solar Edge three-phase string inverter model SE40K (1)
 - 2. Solar Edge optimizers P1101 (45)
 - iv. Racking: Sun Ballast
 - 1. No roof penetrations
 - 2. Tilted at 20 degrees
 - c. AC and DC “balance of system” equipment to meet NEC standards for interconnection, including all PV wire and connectors.

- d. Arc Flash personal protective equipment, short-circuit and protective device equipment to be used when testing.
- e. Production/Output:
 - i. System is expected to produce 56,347 kWh in year one, with lifetime production estimated at 1,543,344. These calculations were produced using Aurora Solar software and PV Watts (see monthly graph attached in Appendix).
- f. Efficiency: Production estimates include 16.3% losses for connectors, wiring, snow, dust, and lifetime degradation (30 years)
- g. Site limitations and constraints: iSolar Master Electrician visited the site and saw no limitations or constraints at that time. Possible future constraints or limitations include force majeure events such as wind, hail, or other damage to the roof or electrical system. iSolar agrees to inform school district officials in a timely manner of any heretofore unforeseen limitations or constraints that might impede construction of the project.
- h. Communication will be hardwired to ethernet port or router.
- i. Evidence of Viability of Materials
 - i. Q-Cell panels are approved materials for solar programs currently being run by Xcel Energy in Minnesota and Minnesota Power.
 - ii. Solar Edge inverters and optimizers are approved materials for solar programs currently being operated by Xcel Energy in Minnesota and Minnesota Power.
 - iii. iSolar financed, designed, installed, interconnected, and currently maintain, a 38kW solar energy system using Hanwha Q-Cell panels and Solar Edge inverters in Glyndon, MN.
- j. In the event that a component or other material is damaged and replaced with new materials, iSolar agrees to make a concerted effort to recycle, reuse, or repurpose the damaged material. Most often, however, once solar photovoltaic equipment is replaced it is unusable and therefore will be recycled. Currently, iSolar recycles its equipment at a facility in Blaine.
- k. None of the equipment in this project proposal is proprietary. All equipment, where applicable, is UL listed and meets current local and state of Minnesota fire code.

- I. Monitoring: Solar Edge monitoring allows for continuous, panel level monitoring.

- V. Warranties/Guarantees
 - a. Manufacturer Warranties
 - i. Hanwha Qcell (NASDAQ: HQCL) is a tier-one solar module. Based in Seoul, South Korea, Hanwha was founded in Germany in 1999 where it still has its offices. The Q.Peak Duo XL-G10 BFG is a commercial bifacial panel with a 12-year product warranty and a 30-year production warranty with at least 84.95% of nominal power up to 30 years. (Data sheet attached in Appendix)
 - ii. Solar Edge (NASDAQ: SEDG) is a leading manufacturer of solar energy inverters. The inverter has a 12-year warranty and the optimizers each have a 25-year warranty. (Data sheet attached in Appendix)
 - iii. Sun Ballast is a leading flat-roof ballasted mounting system. It is a low-profile racking system that uses weights to hold the array in place. Self-ballasted racking is common practice for flat roofs where penetrations are more likely to cause leaks. The system comes with a 25-year manufacturers warranty.
 - iv. Solar Insure. iSolar is pleased to provide a third-party warranty called Solar Insure. Solar Insure is backed by Farmers Insurance. iSolar uses Solar Edge online monitoring to remotely monitor, support, and troubleshoot any potential issues with the system. In the event that any of manufacturers or iSolar ceases to operate in the next 30 years, Solar Insure will continue to warranty the system and replace any faulty components.

- VI. Operations and Maintenance
 - a. iSolar will monitor and maintain the project remotely through Solar Edge monitoring portal. Solar arrays require very little maintenance. iSolar will alert the district of any poor performing panel or inverter and repair or replace the faulty equipment.

- VII. Other Considerations
 - a. Local Economic Development
 - i. iSolar regularly hires local companies for on-site services at construction sites. iSolar will likely engage multiple local businesses, including local waste management services, lodging for employees not living within driving distance of the job site, food services, and equipment rental businesses. iSolar's Master Electrician, John Ihle, lives in Barnesville.
 - b. Environmental Impact
 - i. 28,174 trees would need to be planted for an equivalent reduction in CO2 emissions

- ii. 2,555 barrels of oil that would be burned to produce the equivalent amount of energy as this proposal for the district
- c. iSolar will clean up worksite daily.
- d. All products used in the construction project will be as listed unless unavailable and will be replaced with equivalent material. Any changes to material products will be communicated to the district.
- e. No roof penetrations
- f. Savings. The projected savings are based on if the district qualifies for a Solar for Schools grant of \$84,000 and receives an ITC direct payment of \$36,000. With those savings and potential energy savings, the district could save \$232,000 over the life of the system (see breakdown in Appendix).

VIII. Cost Breakdown

iSolar expects this project and all scope and work involved to cost \$120,000*. The payment plan is as follows:

Down payment: 5% (\$6,000) due within 15 days of selection

Progress payment: 45% (\$54,000) due when permits are pulled w

Construction payment: 45% (\$54,000) due when the panels are placed

Final payment: 5% (\$6,000) due when the utility grants PTO

*Bid is valid for 60 days.

We appreciate the opportunity to submit a project proposal for the district. As you can see, our experience, expertise, and unique point of view make us a great fit for this project. Also, when factoring in a 30-year independent warranty for the project, we feel our project will provide three decades of peace of mind and the best value for your district.

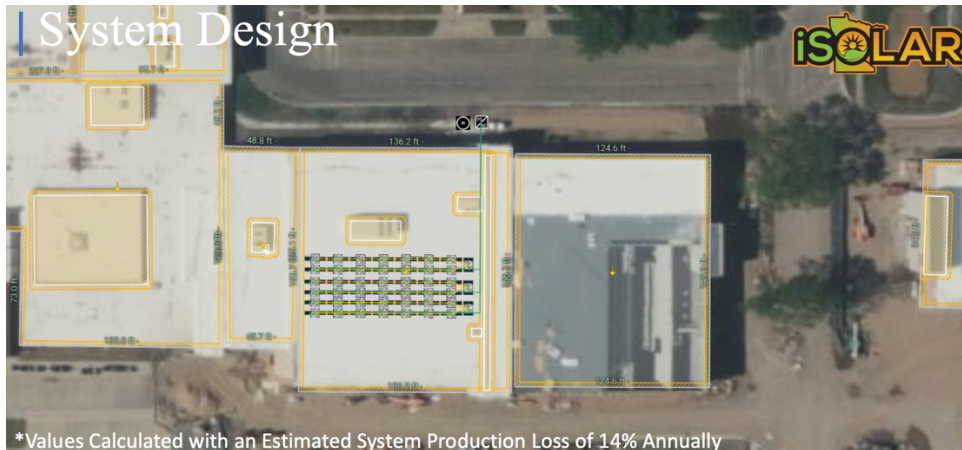
If you require any more information, don't hesitate to contact myself or my team.

Sincerely,



Ryan Ihle
iSolar, LLC
455 Broadway Ave
St. Paul Park, MN 55071
ryan@isolarmn.com
651-214-6640

Appendix:



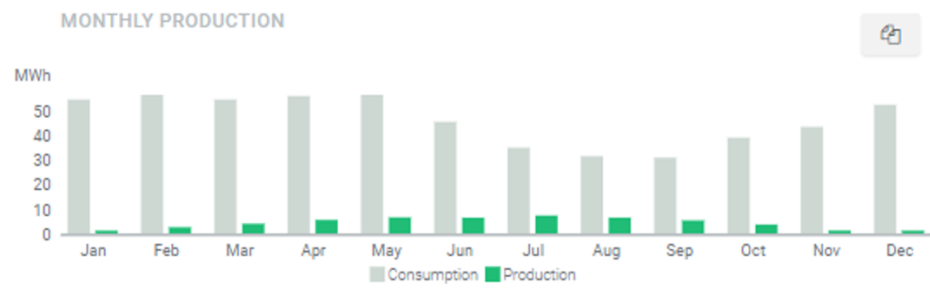
Solar Panels	Inverter(s)	System Size	43.6 kW
(90)	SolarEdge	Annual Production	56,347 kWh
Q-Cell BiFacial 485W	40 kW	Solar Offset	10%

Usage vs Production

ANNUAL PRODUCTION

56,347 kWh
Energy

10%
Energy Offset



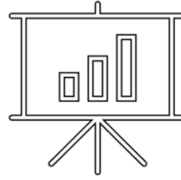
Estimated Yearly Usage: 564,480 kWh

Total System Value	\$120,000
Additional Items <small>(Included in Total System Value)</small>	\$0
Federal ITC Direct Payment	\$36,000
MN Solar For Schools Grant	\$84,000

NET SYSTEM COST \$0

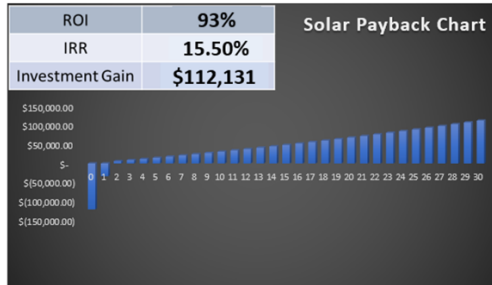
Net-Metering (Over 30 Years) \$0

System Details



Investment Insights

- 30 years of guaranteed production with Solar Insure
- Maximize your savings by owning a secure long-term investment
- Use Federal Investment Tax Credit to reduce your tax liability.
- Increase the market value of your home



Qualification

Finance qualification, complete install agreement



Site Assessment

Schedule Site-Visit, Make \$3,000 Interconnection payment.



Interconnection (6-8 Weeks)

We handle all permitting and interconnection applications.



Installation (10-14 days After Permitting/Interconnection is Complete)

Actual Install (2-4 Days Depending on Size & Scope)



Inspection & Utility Witness Test (Depending on Utility 7-20 days)

We close permits and finalize utility requirements.



Power On!

What's Next



**Timeframes are close estimates and can vary from project to project.*



June 15, 2023
455 Broadway Ave,
St Paul Park, MN. 55071
Office 651-214-3621
<https://isolarmn.com>

iSolar Team Bio

Robert Hoerauf, PE

EDUCATION Bachelor of Science – Power Engineering North Dakota State University, 1979 MBA - University of St. Thomas, 1991 REGISTRATION Registered Professional Engineer in twenty states.

MEMBERSHIP Institute of Electrical and Electronic Engineers (IEEE) Rob serves as a contributing author on a number of national IEEE electrical standards writing committees. Rob has conducted a number of conference technical presentations and has had work published in IEEE publications. Rob served as a contributor and balloter of the recently released IEEE 1584-2018 Arc Flash Standard and is serving on IEEE standards working groups dedicated to battery storage.

EXPERIENCE SUMMARY Rob has over 40 years of experience in engineering and project management involving industrial, municipal, and utility clients and other related energy projects. Currently, Rob is president of Hoerauf Consulting, Inc. which provides electrical engineering design and energy consulting for industrial and utility clients. Projects include high voltage substations, protective relaying, systems analysis, distributed generation, electrical distribution system design, power quality investigations, and alternative energy projects including wind farms, solar farms, and BESS battery storage. Power systems analysis work includes short circuit, coordination, and arc flash studies. Renewable energy experience includes the electrical design of: utility and commercial sized wind projects; utility, commercial, and community sized solar projects; and utility and community sized BESS battery storage projects. Rob also performs third party evaluations of electrical equipment that is not certified to a Nationally Recognized Testing Laboratory (NRTL) certification. Evaluated equipment includes control/power panels, electrical switchgear, and industrial machines.

John Ihle – Master Electrician and Master of Record

EDUCATION. Graduated from the Red Wing Energy Center 1981-1983. Specialized in renewable energy systems, wind systems.

NABCEP Certified.

WORK RELATED EXPERIENCE. John has worked in the renewable energy industry since 1983 in the areas of wind and solar. Projects include turnkey solar and wind electrical design, procurement, and installation and terminations for all phases of electrical construction including dc circuits. John was the master electrician of record for a 138 MW project, at the time, was the largest solar project in the state

1



June 15, 2023
455 Broadway Ave,
St Paul Park, MN. 55071
Office 651-214-3621
<https://isolarmn.com>

(North Branch). John has worked with Rob Hoerauf on several 20 MW substations for wind projects, ie community based energy projects, since 2002.

Ryan Ihle – Project Manager

EDUCATION. Graduated from UW Eau Claire with a Physics Degree in 2005.

Qualifying Builder for licensed general contractor in Minnesota.

WORK RELATED EXPERIENCE. Ryan has worked in the renewable energy industry since 2016. Worked on large scale utility and small rooftop solar projects. Ryan has designed, modeled financing, completed electrical plans, worked the tools, and commissioned solar projects.

Dan Kepros – IT/Operations

Education: Graduated with an AAS Degree in Microcomputer Support in 2007. Been working in the Renewable Energy industry for the last 4 years.

WORK RELATED EXPERIENCE: Dan has become an expert in many different Solar Modeling Softwares. He has built thousands of designs using tools such as Aurora Solar, Helioscope, Energy Toolbase, Solar Edge Designer, Unirac's U-Builder. He has worked with numerous Utilities in the state to model Demand Usage properly and has deep understanding of the different situational Net-Metering Rates across the state. He has written hundreds of plans sets and pulled electrical and building permits for all jobs iSolar has done over the last 4 Years. Dan also has knowledge of different equipment options and Energy Storage Options and Demand Shaving Capabilities.

Field Team

Jamie Brown – Master Electrician

Matt Ihle – Apprentice Electrician

Ian Davis – Apprentice Electrician

Daniel Andrus – Apprentice Electrician

LICENSE/CERTIFICATE/REGISTRATION DETAIL

Class Type: CLASS A ELECTRICAL CONTRACTOR Number: EA761814
Application No: 472658 Status: ISSUED
Expire Date: 2/29/2024 Effect Date: 3/1/2022
Orig Date: 10/2/2019 Print Date: 1/24/2022
Enforcement Action: NO
Workplace Experience: N/A

Name: ISOLAR LLC
Address: ISOLAR
455 BROADWAY AVE ST PAUL PARK , MN 55071
Phone:

Business Relationship Requirements

Name: IHLE, JOHN M Lic/Reg No: AM005101 [\[View license/registration\]](#)
Status: ISSUED Application No: 177091
Expire Date: 2/28/2025 Effect Date: 3/15/2023
Orig Date: 2/12/1994



Photovoltaic

John Ihle








PVA-031422-014171



WHAT'S INCLUDED?

- ✔ Replacement, removal and installation of new panels & inverters with \$0 cost or deductible
- ✔ Gap insurance in the event that the manufacturer goes out of business
- ✔ Extends 100% original manufacturer warranty coverage for up to 30 years
- ✔ Enhanced roofing warranty guarantees that any roof penetrations will be watertight

SolarInsure

Features & Benefits	30 Years
 Parts & Labor Covered Parts, labor, and even roof penetrations are covered ensuring that system owners will enjoy zero deductibles for 30 years.	✔
 Component Monitoring* Our monitoring technology reports component failures so that we can respond to issues quickly.	✔
 Transferable Ownership The Solar Insure Monitoring & Warranty transfers freely from owner to owner, following whoever is on title without fees, enhancing the property value.	✔
 Hassle-Free Online Claims Your installer is able to file claims quickly and easily with our online claims portal which helps streamline the claims process.	✔
 Sweeping Coverage Solar Insure's 30-year insurance-backed warranty is available to system owners across the U.S. and even U.S. territories.	✔
 Third-Party Backed Solar manufacturer warranty default is backed by insurance coverage provided by an A.M. Best A+ Rated insurance carrier.	✔
 5 Star Customer Service Our customers are our number one priority, so whether system owners have a simple question or are in crisis, we'll be there.	✔

Q.PEAK DUO XL-G10 SERIES



475-490 Wp | 156 Cells
21.2% Maximum Module Efficiency

MODEL Q.PEAK DUO XL-10.3/BFG



6 busbar
cell technology



12 busbar
cell technology



Bifacial energy yield gain of up to 20%

Bifacial Q.ANTUM solar cells with zero gap cell layout make efficient use of light shining on the module rear-side for radically improved LCOE.



Low electricity generation costs

Q.ANTUM DUO Z combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology for higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 21.2%.



A reliable investment

Double glass module design enables extended lifetime with 12-year product warranty and improved 30-year performance warranty¹.



Enduring high performance

Long-term yield security with Anti LeTID Technology, Anti PID Technology², Hot-Spot Protect.



Frame for versatile mounting options

High-tech aluminum alloy frame protects from damage, enables use of a wide range of mounting structures and is certified regarding IEC for high snow (5400 Pa) and wind loads (2400 Pa).



Innovative all-weather technology

Optimal yields, whatever the weather with excellent low-light and temperature behavior.

¹ See data sheet on rear for further information.

² APT test conditions according to IEC/TS 62804-1:2015 method B (-1500V, 168h) including post treatment according to IEC 61215-1 Ed. 2.0 (CD)

The ideal solution for:



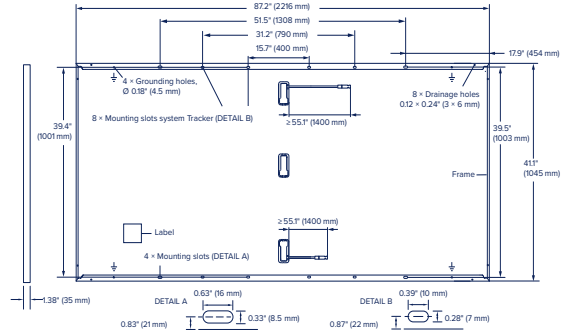
Ground mounted
solar panels



Q.PEAK DUO XL-G10 SERIES

Mechanical Specification

Format	87.2 in × 41.1 in × 1.38 in (including frame) (2216 mm × 1045 mm × 35 mm)
Weight	64.2 lbs (29.1kg)
Front Cover	0.08 in (2.0 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	0.08 in (2.0 mm) semi-tempered glass
Frame	Anodized aluminum
Cell	6 × 26 monocrystalline Q.ANTUM solar half cells
Junction box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥55.1 in (1400 mm), (-) ≥55.1 in (1400 mm)
Connector	Stäubli MC4, Stäubli MC4-Evo2, Hanwha Q CELLS HQC4, IP68



Electrical Characteristics

POWER CLASS			475	480	485	490
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W/-0 W)						
Minimum	Power at MPP ¹	P_{MPP} [W]	475	480	485	490
	Short Circuit Current ¹	I_{SC} [A]	11.08	11.12	11.16	11.20
	Open Circuit Voltage ¹	V_{OC} [V]	53.15	53.34	53.63	53.86
	Current at MPP	I_{MPP} [A]	10.55	10.59	10.63	10.67
	Voltage at MPP	V_{MPP} [V]	45.03	45.33	45.63	45.93
	Efficiency ¹	η [%]	≥20.5	≥20.7	≥20.9	≥21.2

Bifaciality of P_{MPP} and I_{SC} 70% ± 5% • Bifaciality given for rear side irradiation on top of STC (front side) • According to IEC 60904-1-2

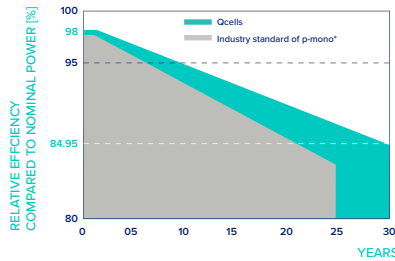
¹ Measurement tolerances P_{MPP} ± 3%; I_{SC} , V_{OC} ± 5% at STC; 1000 W/m²; *at BSC: 1000 W/m² + ϕ × 135 W/m², ϕ = 70% ± 5%, 25 ± 2°C, AM 1.5 according to IEC 60904-3

MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT²

Minimum	Power at MPP	P_{MPP} [W]	357.6	361.4	365.1	368.9
	Short Circuit Current	I_{SC} [A]	8.92	8.96	8.99	9.02
	Open Circuit Voltage	V_{OC} [V]	50.27	50.49	50.72	50.95
	Current at MPP	I_{MPP} [A]	8.30	8.34	8.37	8.40
	Voltage at MPP	V_{MPP} [V]	43.06	43.35	43.63	43.92

² 800 W/m², NMOT, spectrum AM 1.5

Qcells PERFORMANCE WARRANTY

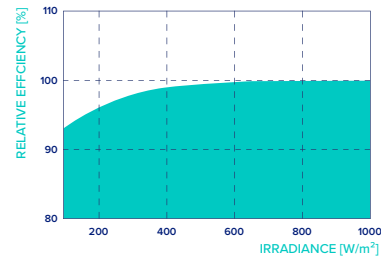


At least 98% of nominal power during first year. Thereafter max. 0.45% degradation per year. At least 93.95% of nominal power up to 10 years. At least 84.95% of nominal power up to 30 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Qcells sales organisation of your respective country.

*Standard terms of guarantee for the 5 PV companies with the highest production capacity in 2021 (February 2021)

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000 W/m²).

TEMPERATURE COEFFICIENTS

Temperature Coefficient of I_{SC}	α [%/K]	+0.04	Temperature Coefficient of V_{OC}	β [%/K]	-0.27
Temperature Coefficient of P_{MPP}	γ [%/K]	-0.34	Nominal Module Operating Temperature	NMOT [°F]	109 ± 5.4 (43 ± 3°C)

Properties for System Design

Maximum System Voltage	V_{SYS} [V]	1500	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI/UL 61730	TYPE 29 ⁴
Max. Design Load, Push/Pull ³	[lbs/ft ²]	75 (3600 Pa)/33 (1600 Pa)	Permitted Module Temperature on Continuous Duty	-40°F up to +185°F (-40°C up to +85°C)
Max. Test Load, Push/Pull ³	[lbs/ft ²]	113 (5400 Pa)/50 (2400 Pa)		

³ See Installation Manual

⁴ New Type is similar to Type 3 but with metallic frame

Qualifications and Certificates

Quality Controlled PV - TÜV Rheinland; UL 61730, CE-compliant, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cells)



Three Phase Inverter

SE25K / SE33.3K / SE40K

INVERTERS



Specifically designed to work with power optimizers

- Fixed voltage inverter for superior efficiency (98.3%) and longer strings
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Small, lightest in its class, and easy to install
- Optional RS485 and type 2 DC and AC Surge Protection, to better withstand surges caused by lightning or other events
- Built-in module-level monitoring with Ethernet, wireless or cellular communication (optional) for full system visibility
- IP65 Outdoor and indoor installation
- Optional integrated DC Safety Unit - eliminates the need for external DC isolators
- Future-ready for SolarEdge energy storage solution

/ Three Phase Inverter

SE25K / SE33.3K / SE40K

Applicable to inverters with part number	SEXK-RWXXIXXXX			
	SE25K	SE33.3K	SE40K	
OUTPUT				
Rated AC Active Power Output	25000	33300	40000	W
Maximum AC Apparent Output Power	25000	33300	40000	VA
AC Output Voltage - Line to Line / Line to Neutral (Nominal)	380 / 220 ; 400 / 230		480 / 277	Vac
AC Output Voltage - Line to Line / Line to Neutral	304 - 437 / 176 - 253 ; 320 - 478 / 184 - 264.5		422.5 - 529 / 244 - 305	Vac
AC Frequency	50/60 ± 5%			Hz
Maximum Continuous Output Current (per Phase)	36.25	48.25		Aac
AC Output Line Connections	3W + PE, 4W + PE			
Supported Grids	WYE: TN-C, TN-S, TN-C-S, TT, IT; Delta: IT			
Utility Monitoring, Islanding Protection, Configurable Power Factor, Country Configurable Thresholds	Yes			
Total Harmonic Distortion	≤ 3			%
Power Factor Range	+/-0.2 to 1			
Maximum Residual Current Injection ⁽¹⁾	100			mA
INPUT				
Maximum DC Power (Module STC)	43750	58275	70000	W
Transformer-less, Ungrounded	Yes			
Maximum Input Voltage DC+ to DC-	1000			Vdc
Operating Voltage Range	680 - 1000			Vdc
Maximum Input Current	36.25	48.25		Adc
Reverse-Polarity Protection	Yes			
Ground-Fault Isolation Detection	167kΩ Sensitivity ⁽²⁾			
Maximum Inverter Efficiency	98.3	98.1		%
European Weighted Efficiency	98			%
Nighttime Power Consumption	< 4			W
ADDITIONAL FEATURES				
Supported Communication Interfaces ⁽³⁾	2 x RS485, Wi-Fi (optional), Cellular (optional)			
Smart Energy Management	Export Limitation			
Inverter Commissioning	With the SetApp mobile application using built-in Wi-Fi access point for local connection			
Arc Fault Protection	Built-in, User Configurable (According to UL1699B)			
Rapid Shutdown	Optional ⁽⁴⁾ (Automatic upon AC Grid Disconnect)			
RS485 Surge Protection	Optional			
DC Surge Protection	Type II, field replaceable, optional			
AC Surge Protection	Type II, field replaceable, optional			
DC SAFETY UNIT (OPTIONAL)				
DC Disconnect	Integrated in the DC safety unit			
DC Fuses (Single Pole)	Optional, 25A			
STANDARD COMPLIANCE				
Safety	IEC-62109-1, IEC-62109-2			
Grid Connection Standards ⁽⁵⁾	VDE-AR-N-4105, VDE-AR-N-4110, AS-4777, EN 50549-1, EN 50549-2, CEI-021, VDE 0126-1-1, CEI-016			
Emissions	IEC61000-6-2, IEC61000-6-3 Class A, IEC61000-3-11, IEC61000-3-12			
RoHS	Yes			
INSTALLATION SPECIFICATIONS				
AC Output Gland Diameter / Line cross section / PE cross section	Cable diameter 19 - 28 mm / 4 - 16 mm ² / 4 - 16 mm ²			
DC Input ⁽⁶⁾	4 MC4 pairs			
DC Input with Safety Unit	4 Strings: Gland: Cable outer diameter 5 - 10 mm / Wire cross section 2.5 - 16mm ²			
Dimensions (H x W x D)	558 x 328 x 273			mm
Dimensions with Safety Unit (H x W x D)	839 x 328 x 300			mm
Weight	32			kg
Weight with Safety Unit	36.5			kg
Operating Temperature Range	-40 to +60 ⁽⁷⁾			°C
Cooling	Fan (user replaceable)			
Noise	< 62			dBA
Protection Rating	IP65 - outdoor and indoor			
Mounting	Brackets provided			

(1) If an external RCD is required, its trip value must be ≥ 100mA

(2) Where permitted by local regulations

(3) Refer to Datasheets -> Communications category on Downloads page for specifications of optional communication options: <https://www.solaredge.com/products/communication>

(4) Inverters with rapid shutdown part number: SExxK-xxRxxxxx

(5) For all standards refer to Certifications category in Downloads page: <https://www.solaredge.com/downloads/#/>

(6) Only MC4 connectors manufactured by Stäubli are approved for use

(7) For power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note.pdf>