SUN FOR ALL

Solar Empowerment Grants

Request for Proposals
from Solar Contractors (RFPSC)
Response Requirements & Guidelines

Issued: July 22, 2020
Responses Due: 6:00 pm EDT on August 12, 2020

SECTION 1. SUN FOR ALL PROGRAM INTRODUCTION

Thank you for your interest in bidding on the opportunity to install one or more solar photovoltaic (PV) systems for selected finalists with funds from the SUN FOR ALL Solar Empowerment Grant Program. We are pleased you are interested in capturing the energy from the sun to energize your community!

Solar project funding totaling approximately $450,000, as well as some funding from the finalists, is available for installations of less than 0.5 MW for organizations that serve low income and vulnerable populations in Indiana with a preference for applicants in the AEP Energy Indiana & Michigan electric service territory.

The SUN FOR ALL Review and Selection Committee consists of representatives of Environmental and Community Development interests in Indiana, and it has narrowed the list of eligible candidate projects to participate in this RFP for solar contractors. This means that, provided that there are no technical issues identified in this bidding process that would create a significant obstacle for an installation at the sites listed in Appendix A, each of these eligible candidates should proceed with the installation of projects. Due to our limited budget, the listed projects must be bid at not more than +/- 10% of the kWdc presented in the Helioscopes in Appendix A.

This RFP is designed to solicit firm proposals from solar installers (“Installers”) interested in bidding on one or more of these projects.

SECTION 2. SUN FOR ALL PROGRAM BACKGROUND

1. Settlement Agreement with AEP Energy

The funding for the creation of the SUN FOR ALL Solar Empowerment Grant Program was provided by American Electric Power (AEP), I&M's parent company under a legal settlement with the U.S. Environmental Protection Agency, eight states, and 13 citizen groups. [1] The settlement included an agreement by AEP to invest $3.5 million to improve air quality and to reduce pollution in Indiana through various projects. The AEP settlement monies are being overseen by an oversight committee that includes Citizens Action Coalition, Clean Air Council, and Indiana Wildlife Federation, with the Sierra Club as a non-voting member and Environmental Law & Policy Center as a non-voting legal advisor and facilitator. The fiscal agent for the SUN FOR ALL grant program is the Citizens Action Coalition Educational Fund (CACEF).

2. SUN FOR ALL Program Partner for Technical Assistance

Chatham Energy Consulting, LLC ("CEC") has been retained by the SUN FOR ALL grant program for technical assistance and to perform feasibility studies on several potential sites that the Selection Committee identified. These studies included, but were not limited to, preliminary desktop solar assessments in support of the screening, development and operation of the proposed solar systems.

[1] These groups are Ohio Citizen Action, Citizens Action Coalition of Indiana, Hoosier Environmental Council, Ohio Valley Environmental Coalition, West Virginia Environmental Council, Clean Air Council, Izaak Walton League of America, Environment America, National Wildlife Federation, Indiana Wildlife Federation, League of Ohio Sportsmen, Sierra Club, and Natural Resources Defense Council, Inc.

3. The anticipated 2020 timeline for the SUN FOR ALL Program is as follows:

June 15:	Announce Program, Release Request For Grant Applications (RFGA)
July 10:	Deadline for Responses to RFGA; application review begins
July 22:	Release Request for Proposals from Solar Contractors (RFPSC), Announce Finalists for SUN FOR ALL Grant funding
July 29:	Deadline for questions related to this RFPSC
Aug. 5:	Responses to questions posted
Aug. 12:	Responses to RFPSC due 6:00pm EDT (Proposals will be reviewed for completeness, and proposals that do not include the information requirements will be notified and allowed 5 days to conform)
Aug. 12-19:	Final Review and Grantee Selection by Application Review Committee
Aug. 21:	Announce Installers selected to install solar PV systems on recipient properties
Aug. 22:	Execution of Grant Agreements begins
Sept. 4:	Deadline for the negotiation and execution of contracts with Installers
Sept. 8:	Project installations begin
Dec. 31:	Project installations completed, fully operational and approved by local permitting authorities including sign-off by grant recipient's electric utility, if applicable

SECTION 3. BID INFORMATION

SUN FOR ALL is inviting qualified and experienced Installers to submit firm proposals for one or more of the eligible candidate projects listed in Appendix A.

Submittals must be in the form of:

(1) one PDF document (including Appendix B spreadsheets), and
(2) Appendix B completed and returned in Excel spreadsheet format.

The PDF submittal must be:

- in 11-point Aerial font
- with numbered pages
- with clear appendices
- no more than 20 pages, excluding cover page and supplemental documents included as attachments or appendices (i.e. supplemental documents, such as product specification sheets, experience, resume, Excel Spreadsheets, array layout within the appendices will not count toward the page limit of 20 pages)

Wednesday, July 29, 2020, 6 pm EDT is the deadline to submit all questions related to this RFPSC to SUNFORALL2020@gmail.com by email with subject line "SUNFORALL question." Responses to questions will be available to all companies here: https://docs.google.com/document/d/1e6NDqez6nF40hgMX6vY7TvWJoFOlpPB6-w8zbGjrdLI/edit?usp=sharing

Wednesday, August 12, 2020, 6 pm EDT, is the deadline for submitting final proposals for any projects to SUNFORALL2020@gmail.com by email with subject line "SUNFORALL solar final bid."

1. Funding Projects at Nonprofits Serving Low Income and Vulnerable Populations in Indiana

Solar project funding totaling approximately $450,000, as well as some funding from the finalists, is available for installations of solar energy systems of less than 0.5 MW for organizations who serve low income and vulnerable populations in Indiana with a preference for applicants in the AEP Energy Indiana electric service territory. The SUN FOR ALL Selection Committee has narrowed the list of eligible candidate projects to those listed in Appendix A which will participate in this RFP for solar contractors ("Installers"). This means that, provided that there are no technical issues identified in this bidding process that would present a significant obstacle for an installation at the sites listed in Appendix A, each of these eligible candidates should proceed with the installation of projects not more than +/- 10% of the kWdc presented in the Helioscope in Appendix A. This RFP is designed to solicit firm proposals from Installers interested in bidding on one or more of these projects.

Appendix A contains a list of the finalists and a desktop screening (preliminary Helioscope Reports) for each project that was prepared based on each finalist's application. The desktop

screenings were prepared to determine initial sizing and to stay within the budget available for this initiative. Each funding recipient's proposal has been evaluated by Chatham Energy Consulting ("CEC"), a solar consultant selected to evaluate the technical aspects of the proposed projects on behalf of SUN FOR ALL and the Selection Committee. Therefore, CEC is not eligible to submit a response to this RFPSC.

Due to budget constraints, do not make a bid for a project that is more than +/- 10% of the kWdc that is presented in the Helioscope in Appendix A.

2. Disclaimer

- SUN FOR ALL reserves the right to award each project or group of projects on an all-or-none basis, award to one or multiple companies, accept or reject any or all proposals received, negotiate with all qualified applicants, cancel or modify the RFPSC in part or in its entirety, or change the application guidelines, at its sole discretion.
- SUN FOR ALL reserves the right to rescind any award if it determines the offer is not in the best interest of SUN FOR ALL or the potential solar customers, or if errors, omissions, inaccuracies, non-compliance, or any deficiencies are discovered after the award has been issued. Any minor informality or non-conformance with the RFPSC may be waived.
- If SUN FOR ALL determines that all proposals received should be rejected, bidders shall be notified accordingly, and the Invitation may or may not be resubmitted.
- SUN FOR ALL reserves the right to solicit or award additional Installers should such action be deemed necessary, at its sole discretion, to meet program goals.
- This RFPSC does not commit to award any funds, pay any costs incurred in preparing an RFPSC response, or procure or contract for services or supplies.
- Nothing in this solicitation process, RFPSC, or any contemplated or final agreement relieves any qualified Installer from complying with all applicable laws and regulations.
- Owners are not obligated to use the Installers for any services and may choose other contractors.
- The Installer or their affiliate/sub-contractor agrees to the terms and conditions of this RFPSC by submitting a proposal.
- All proposals submitted shall become the exclusive property of the SUN FOR ALL program and may be used for reasonable purpose by the SUN FOR ALL program.

3. Confidentiality

Pricing proposals of Installers will be shared with the relevant SUN FOR ALL finalist/s and Chatham Energy Consulting ("CEC"). Proposal documents may be shared with public entities that are subject to the Freedom of Information Law providing for public access to information; therefore, proposal documents may be subject to public disclosure. SUN FOR ALL cannot guarantee the confidentiality of any information submitted.

4. Proposal Organization Overview

Proposals must contain the following:

a. Executive Summary of highlights in your proposal, key features and distinguishing points of your proposal, and/or any problems with this program perceived by your company and your proposed solutions.
b. Proposal Limitations in reasonable detail about any economic, operational or system conditions that might affect the Installer's ability to deliver capacity, energy and SRECs.
c. Recent Experience. List recent solar projects your company has installed each year in 2018, 2019 and 2020 YTD by categories of residential and commercial including size and location (i.e., provide references from three (3) recent solar projects, including location, size and date of installation. Include a contact name, email, and phone number for each reference. In addition, identify any recent municipal solar projects and/or nonprofit solar projects).
d. Team Experience. Identify all applicable members of your team, including sub-contractors with a job description and address of each, identify licenses and certifications, if applicable, and provide resumes of key individuals as attachments.
e. Insurance. Provide evidence of your liability coverage and other insurance as attachments. Identify the process for honoring workmanship and product warranties
f. Proposal Narrative. Outline a detailed strategy as explained in #5 immediately below.
g. Completion of the Two Tabs in Appendix B Excel Spreadsheet

5. Project Narrative Requirements

Please provide the following information:

a. Contact: Provide the name of your contact person including phone number and email address.
b. Program Plan: Provide a plan for implementation that describes the company's ability to provide solar PV installation services during the program period. Specifically, the proposal should describe the Installer's ability to provide site assessments, site visits, and customer firm-price proposals, installation, and customer service/maintenance after the installation.
c. Business Practices: Provide a sample customer contract as an attachment that includes a description of your terms of payment and timeline from initial deposit to final payment.
    i. NOTE: All contracts between the property owner and the Installers will state that SUN FOR ALL and its affiliates and Program Partners are not a party to the contract, and that the Installer will be solely liable for any claims, losses, or damages arising out of the contract.
    ii. NOTE: SUN FOR ALL will provide grant funding for the listed finalists' projects provided that this RFP process does not identify technical issues or unforeseen circumstances that would make a project impractical, uneconomical, or otherwise inconsistent with the objectives of the Selection Committee. SUN

FOR ALL will provide grant funding with one lump sum payment to the successful grant applicant who will make payment arrangements with the selected Installer. However, we are asking that Installers agree to the following payment schedule and to notify us in your application if you are not able to agree to these terms:

1) 25% is paid once proof of equipment has been ordered, local permit(s) and approvals have been obtained and copies provided to Finalist
2) 25% is paid once equipment has arrived at job site
3) 40% paid once all equipment has been installed and is fully operational
4) 10%, final payment, is paid once Finalist has verified system is installed as planned and is fully operational/approved and SREC registration and application has been sent to applicable agency/company

d. Meeting Demand: Describe your ability to begin work immediately upon selection by specifying the earliest date you can begin providing site assessments. If you are selected, the same firm-price proposal provided through this RFP shall also be provided to the grantee selected to receive funding. Provide an estimated time-line and strategy to complete all installations (i.e., address capacity and capability while maintaining quality). Please note the following anticipated dates provided earlier in this RFP:

Aug. 22:	Execution of Grant Agreements begins
Sept. 4:	Deadline for the negotiation and Grantee's execution of contracts with Installers
Sept. 8:	Project installations begin
Dec 31:	Project installations completed, fully operational and approved by local permitting authorities including sign-off by the Grantee's electric utility.

e. Proposal Dates: Confirm that your proposal is valid for 90 days or until a contract has been executed, whichever comes first.

f. Project Information: Individual site proposals shall include the following information for each project that is bid on:

i. Array size in number of panels and total rated kilowatt dc size. Due to budget constraints, do not make a bid for a project that is more than +/-10% of the kWdc that is presented in the Desktop Review/Preliminary Helioscope Report in Appendix A.
ii. Total cost, cost per wattdc
iii. Payback period
iv. Estimated annual kWh ac production for 25-year period
v. Ratio of estimated annual kWhac per kWattdc, e.g. 1,300 kWh ac per KW dc installed
vi. For each Project provide annual energy usage history (see link here for any bills and annual usage history submitted by applicant:

https://citizensactioncoalitioneducati.box.com/s/gm7sr9fkv671rr0l22ru8n8810ra5alx)

vii. Estimated percent reduction of annual energy usage
viii. An image showing location of the solar array on the property
ix. Product specification sheets for panels, inverter and racking
x. Product warranties
xi. Expected financial savings and assumptions for its calculation, including utility price per kWh. For the purposes of this program use a 3 percent annual utility kWhac price escalator
xii. Exceptions
xiii. Observations or Opportunities for Improvement (i.e.; using micro-inverters or optimizers; utility rebates)
xiv. System design: The Installer shall design each system by considering the preferences of the Selection Committee while minimizing project costs and maximizing solar energy production. Sites with partial shade or limited space may require high performance panels and/or power optimizers or micro-inverters.

g. Financial Analysis: For each project you are bidding on, provide a financial analysis estimate showing PV module and inverter type, system size, projected energy production and expected financial savings. Clearly state all assumptions, including utility kWh price and annual utility kwh price escalator (use 3%). Clearly label which project this information applies to.
    i. For example: a 5 kWdc array could be 17 x 290 watts or 15 x 330 watts. Your pricing for nominal size arrays will be an indicator of the range of total expected cost with variation for site specifics system size and availability. It is understood that some sites will have higher or lower costs, and pricing for system should include, but not be limited to:
        1) Central inverters shall be transformerless.
        2) Electrical connection shall be on the load side of the meter.
        3) Metal conduit shall be used for all above ground wiring.
        4) Surface mounted metal conduit is acceptable, except in finished interior areas.
        5) Only copper wire shall be used.
        6) Include a lightning suppressor and revenue grade PV performance meter for selling SREC
        7) Complete Recipient's application for registering and selling SRECs
        8) Provide online, real-time performance monitoring & reporting
        9) Provide a solar system compliant with NEC 2017 Article 690 or current version (e.g.; rapid shutdown, labeling).
    ii. Provide solar pricing as a price per wattdc of installed capacity that is inclusive of materials, labor, permitting/approvals and all other expenses involved in the installation. Prices should exclude any eligible incentives or tax credits. The price is to apply to all work described in Supplement A: Solar Scope of Work.

iii. **Note: Assume the Recipients do not qualify for the Federal Investment Tax Credit or depreciation.**

iv. **Due to budget constraints, do not make a bid for a project that is more than +/- 10% of the kWdc presented in the Desktop Review/Preliminary Helioscope Report in Appendix A.**

h. All inclusive (lump-sum) pricing:

i. Your costs of customer development and communication, site assessments, system design and bid preparation should be factored into the proposal price.

ii. Identify any factors or special conditions that would result in additional costs (such as roof condition, structural engineering evaluation, roof slope, roof access, improvements to existing service/wiring, interconnection, permitting, shading, installation schedule, etc.) and provide dollar estimates or ranges of additional charges for each such factor or condition. To the extent possible, minimize the amount of special pricing by anticipating these factors in your overall per-watt price to reduce the uncertainty for individual installations.

iii. Your choices of system design and components will be used to evaluate customer proposals and executing the final contract. We expect all Installers to use products as listed in Appendix C. If this requirement presents a significant constraint to your proposal, please explain.

6. Appendix B and Appendix C Requirements

You must completely fill out the two Tabs in the Excel Sheet provided as Appendix B, including:

a. Identify Projects: You can bid on just one or more of the projects identified in Appendix A. Also, use the Appendix B Excel spreadsheets to (1) identify which projects you are bidding on and (2) fill in the relevant information about your bid on that project/s. To view a map of the geographic locations of the proposed project sites, visit: https://j.mp/3eNHyF6.

b. System Specifications: In Appendix B Excel sheets, provide a summary of the system specifications for equipment that will be used, including equipment manufacturer, models, and warranties for modules, inverters, racking, lightning surge suppressor, SREC/revenue grade meter and data acquisition/monitoring systems. Include as an attachment to your proposal the manufacturer data sheets, as applicable. **Note**: Appendix C has a list of pre-qualified equipment suppliers. We ask that your proposal only include equipment from this list. If this requirement presents a significant constraint to your proposal, then explain.

7. Site Visits

In Appendix A, SUN FOR ALL has provided to Installers the contact information for finalist projects, as well as energy usage history (see link here which has any billing information and annual usage history submitted by the finalist applicants: https://citizensactioncoalitioneducati.box.com/s/gm7sr9fkv671rr0l22ru8n8810ra5alx). An on-site inspection shall be conducted before accepting a contract from each Finalist. The Installer is responsible for contacting the Finalist to schedule the site visit, identifying features that may result in lower or higher costs, and providing associated cost estimates for them in their proposal.

8. Process

After the proposal deadline, the Selection Committee will review all responses for completeness and responsiveness. The Selection Committee may request that an Installer provide additional information or clarification to its initial proposal. Failure to provide the requested information or clarification within 5 calendar days of notice may result in disqualification of the proposal for that site. The Selection Team will not guarantee evaluation of proposals associated with this Request if submitted after the August 12, 2020, deadline.

9. Expectations

The Installers will prepare a proposal narrative for each project site the Installer would like to bid on. Each proposal shall also include the information identified in Appendix B and Appendix C. Friday, August 12, 2020, 6 pm EDT is the deadline for submitting final proposals for any projects to SUNFORALL2020@gmail.com by email with subject line "SUN FOR ALL solar final bid."

If selected, a copy of the final accepted contract shall be sent by the Installer to (1) the Grantee's primary point of contact (or the property owner if different from applicant), and (2) via email to SUNFORALL2020@gmail.com with "SUN FOR ALL-final contract" in the subject line.

Installers are expected to provide the following services:

a. Be familiar with and abide by the SEIA Solar Business Code: https://www.seia.org/initiatives/seia-solar-business-code
b. An on-site assessment and individual proposal for each selected funding recipient project, as assigned to the individual Installer.
c. Installation of a complete, fully functional, inspected, approved and commissioned photovoltaic system on each site.
d. Report work progress on a regular basis (only Start of Install date & Operation date), include the project name, status comments, dates of the following: contact, site visit, customer proposal, signed contract, job completed, system kWdc size and cost.
e. Work includes all design services, permits, materials, labor, equipment, commissioning, and incidentals necessary to install a complete photovoltaic system with online reporting

as specified hereinafter, including, but not limited to, the work included in this specification.

f. Installer shall include (1) a structural and roofing integrity review for roof installed systems and (2) an electrical service review.
g. The photovoltaic system shall be connected to the utility grid following the design and installation standards for the Grantee's electric service provider.
h. Prepare applications for interconnection and net metering (if available) with the Grantee's electric utility, any local building or electrical applications and register the system with applicable SREC agency and company (SRECTrade or another solar renewable energy certificate broker).
i. Photovoltaic system components shall minimize the number of roof penetrations for roof mounted systems.
j. Provide the owner with adequate training including maintenance and warranty information for photovoltaic modules, equipment and system components, mounting system and inverters.
k. Provide an owner's manual including equipment specifications, warranties, system documentation and drawings, shading analysis and an annual kwh production forecast specified by month (year one) and annually thereafter.
l. Maintain a safe workplace environment.
m. Comply with all applicable laws and regulations.

10. Contractual Obligations and SUN FOR ALL

SUN FOR ALL, its fiscal agent CACEF, its affiliates and program partners have no financial obligation to any Installer participating in the SUN FOR ALL program. All contracts will be executed between the property owner and the Installer. The contract between the property owner and the Installer will state that SUN FOR ALL, the SUN FOR ALL fiscal agent CACEF, its affiliates and program partners are not a party to the contract and that the Installer will be solely liable for any claims, losses or damages arising out of the contract. The Installer agrees to the terms and conditions of this Request for Proposals from Solar Contractors by submitting a response to this Invitation.

APPENDIX A

PART 1: Basic Information about SUN FOR ALL Finalist Projects

PART 2: Technical Information about Each Project Finalist (i.e., Desktop Solar Assessment/Preliminary Helioscope Reports by Project from Chatham Energy Consulting (CEC))

APPENDIX A, PART 1

BASIC INFO ABOUT SUN FOR ALL FINALIST PROJECTS

A map of these project sites is available here for your convenience:
https://www.zeemaps.com/view?group=3859206&x=-86.696045&y=40.594290&z=11

Check here for any available billing information by applicant in our possession:
https://citizensactioncoalitioneducati.box.com/s/gm7sr9fkv671rr0l22ru8n8810ra5alx

	Site	Project Site Address	Contact Information	Approximate Age of Roof	Annual Electric Usage[1]	Target kW Size
1	**Boys and Girls Clubs of Fort Wayne**	2609 Fairfield Avenue, Fort Wayne, IN 46807	Valarie Magana, Grant Director, vmagana@bgcfw.org, (260) 744-0998 ext 119	2 years	302,270 kWh	40kW
2	**Building and Impacting Communities Scholar House**	4135 Joshua Ln., Fort Wayne, IN (Only funding one building)	Vincent L. Smith, Executive Director, vsmith@bwillc.com, (317) 377-1790 ext.1139	2 years	71,008 kWh	16kW
3	**Church Community Services, Inc.**	907 Oakland Avenue, Elkhart, IN 46516	Hayley Tessier, Development Associate, htessier@churchcommunityservices.org, (574) 295-3673	2 years	101,240 kWh	15kW
4	**Community Harvest Food Bank**	999 E. Tillman Road, Fort Wayne, IN 46816	Katie Savoie, Director of Development, ksavoie@communityharvest.org, (260) 447-3996, Ext. 324	7 years	700,000 kWh	51kW
5	**Good Shepherd Montessori School, Inc.**	1101 E Jefferson Blvd, South Bend, IN 46617	Dan Driscoll, Head of School, ddriscoll@gsms.org (574) 288-0098	3 years	142,425 kWh	11kW

[1] Check here for any available billing information by applicant in our possession:
https://citizensactioncoalitioneducati.box.com/s/gm7sr9fkv671rr0l22ru8n8810ra5alx

6	**Heartland Communities, Inc.**	501 Rose Ave., New Haven, IN 46774	Jain Young, Administrator (425) 213-7516; David Green, President, (425) 633-0953; Heartland.Community@yahoo.com	Ground mount	27,000 kWh	10kW
7	**Jerusalem Missionary Baptist Church of Gary**	1737 Fillmore St., Gary, IN 46407	Pastor Isaac Culver, culverisaacjr@gmail.com, (219) 805-6871	15 years	9,299 kWh	7kW
8	**Lacasa Inc.**	2745 Benham Ave., Elkhart, IN 46517	Brad Hunsberger, VP Real Estate Development, Brad.hunsberger@lacasainc.net, (574) 370-3985	New, May 2020	42,720 kWh	13kW
9	**Monroe County United Ministries**	828 W. 14 Ct, Bloomington, IN 47404	Mary Jean Holwager, Development Director, mjholwager@mcum.org, (812) 339-3429 x18	8 years	112,024 kWh	15kW
10	**Second Harvest Food Bank of East Central Indiana**	6621 N. Old SR 3, Muncie, IN 47303	Molly Harty, Grant Writer, mharty@curehunger.org, (765) 287-8698 ext.109	Ground mount	22,752 kWh	8kW
11	**Unity Gardens, Inc.**	3701 Prast Blvd., South Bend, IN 46628	Sara Stewart, Executive Director, growunitygardens@yahoo.com, (574) 315-4361	1 year	6.366 kWh	5kW

APPENDIX A, PART 2

Technical Information about Each Project Finalist (i.e., Desktop Solar Assessment/Preliminary Helioscope Reports by Project from Chatham Energy Consulting (CEC))

PLEASE NOTE: This CEC Solar Analysis is preliminary information to give the bidding installer a place to start compiling a project bid. The installer needs to propose what they would recommend to provide the most cost-effective system and best location, which should be based on a site visit.

40kW Array SFA Boys and Girls of Fort Wayne, 2609 Fairfield Avenue, Fort Wayne, IN 46807

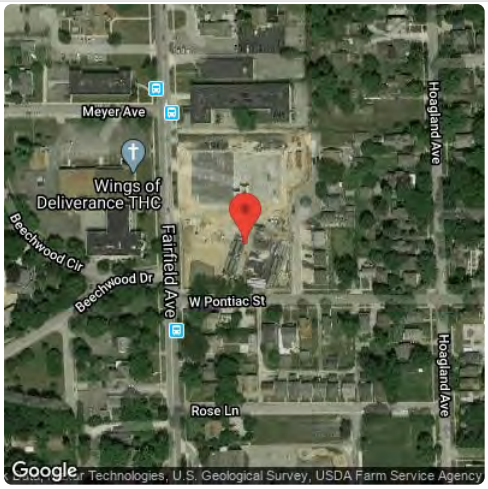
Report

Project Name	SFA Boys and Girls of Fort Wayne
Project Description	2 yr old metal roof, 4 degrees
Project Address	2609 Fairfield Avenue, Fort Wayne, IN 46807
Prepared By	Robert Chatham chathamenergyconsulting@gmail.com

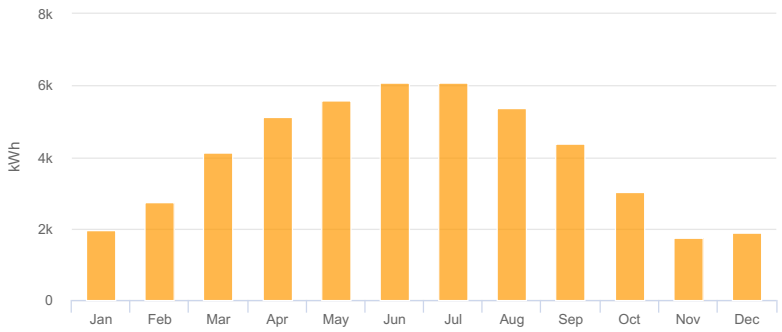
System Metrics

Design	40kW Array
Module DC Nameplate	39.9 kW
Inverter AC Nameplate	34.0 kW Load Ratio: 1.17
Annual Production	48.11 MWh
Performance Ratio	80.9%
kWh/kWp	1,205.8
Weather Dataset	TMY, 10km grid (41.05,-85.15), NREL (prospector)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

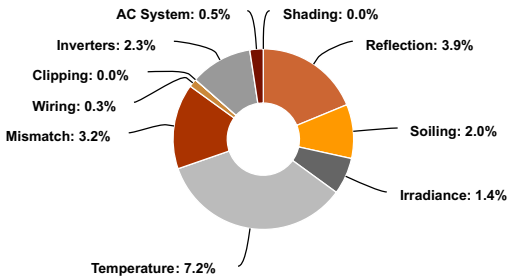
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,443.6	
	POA Irradiance	1,489.7	3.2%
	Shaded Irradiance	1,489.7	0.0%
	Irradiance after Reflection	1,431.8	-3.9%
	Irradiance after Soiling	1,403.2	-2.0%
	Total Collector Irradiance	**1,403.2**	**0.0%**
Energy (kWh)	Nameplate	55,987.4	
	Output at Irradiance Levels	55,224.5	-1.4%
	Output at Cell Temperature Derate	51,265.6	-7.2%
	Output After Mismatch	49,642.4	-3.2%
	Optimal DC Output	49,492.3	-0.3%
	Constrained DC Output	49,491.9	0.0%
	Inverter Output	48,352.1	-2.3%
	Energy to Grid	**48,110.4**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.4 °C
	Avg. Operating Cell Temp		27.1 °C
Simulation Metrics			
	Operating Hours		4664
	Solved Hours		4664

Condition Set

Description	Condition Set 1
Weather Dataset	TMY, 10km grid (41.05,-85.15), NREL (prospector)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Sandia Model

Temperature Model Parameters

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

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
2	2	2	2	2	2	2	2	2	2	2	2

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

Module Characterizations

Module	Uploaded By	Characterization
CS3U-380MS (Canadian Solar Inc.)	Folsom Labs	CS3U-380MS_MIX_CSI_EXT_V6_64_2017Q4.PAN, PAN

Component Characterizations

Device	Uploaded By	Characterization
Symo 17.5-3-M (Fronius)	Folsom Labs	Spec Sheet Efficiency

Components

Component	Name	Count
Inverters	Symo 17.5-3-M (Fronius)	2 (34.0 kW)
Strings	10 AWG (Copper)	6 (1,203.1 ft)
Module	Canadian Solar Inc., CS3U-380MS (380W)	105 (39.9 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	10-18	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Landscape (Horizontal)	4°	179.457°	0.0 ft	1x1	105	105	39.9 kW

Detailed Layout

16kW Array SFA Building & Impacting Communities, 4315 Joshua Ln., Fort Wayne, IN

Report

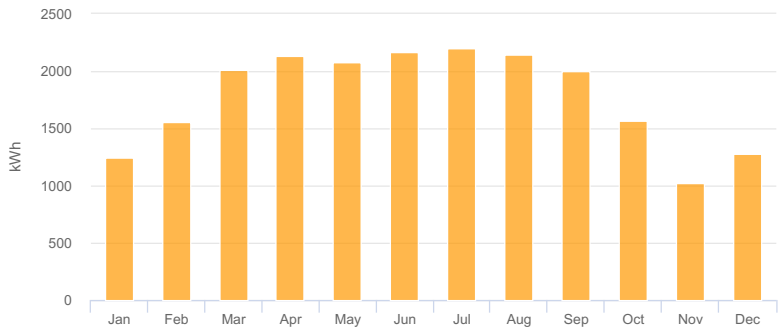
Project Name	SFA Building & Impacting Communities
Project Description	roof 2yrs, 45 degrees, several places to place the array, two main buildings
Project Address	4315 Joshua Ln., Fort Wayne, IN
Prepared By	Robert Chatham chathamenergyconsulting@gmail.com

System Metrics

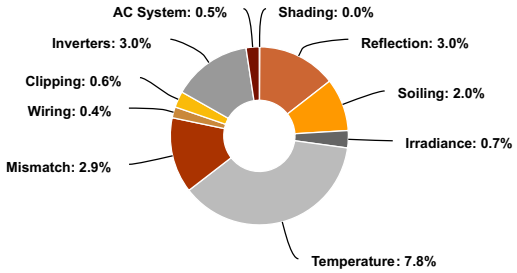
Design	16kW Array
Module DC Nameplate	16.2 kW
Inverter AC Nameplate	14.0 kW Load Ratio: 1.16
Annual Production	21.41 MWh
Performance Ratio	80.9%
kWh/kWp	1,321.6
Weather Dataset	TMY, 10km grid (41.05,-85.15), NREL (prospector)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

Project Location

Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,443.6	
	POA Irradiance	1,632.9	13.1%
	Shaded Irradiance	1,632.6	0.0%
	Irradiance after Reflection	1,583.7	-3.0%
	Irradiance after Soiling	1,552.0	-2.0%
	Total Collector Irradiance	**1,552.0**	**0.0%**
Energy (kWh)	Nameplate	25,188.5	
	Output at Irradiance Levels	25,024.2	-0.7%
	Output at Cell Temperature Derate	23,075.0	-7.8%
	Output After Mismatch	22,413.0	-2.9%
	Optimal DC Output	22,320.5	-0.4%
	Constrained DC Output	22,183.6	-0.6%
	Inverter Output	21,517.9	-3.0%
	Energy to Grid	**21,410.3**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.4 °C
	Avg. Operating Cell Temp		28.6 °C
Simulation Metrics			
	Operating Hours		4664
	Solved Hours		4664

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km grid (41.05,-85.15), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module	Uploaded By	Characterization									
	PowerXT 360R-PD (Solaria Corporation)	Folsom Labs	Spec Sheet Characterization, PAN									
Component Characterizations	Device	Uploaded By	Characterization									
	Sunny Boy 7.0-US (240V) (SMA)	Folsom Labs	Spec Sheet									

Components

Component	Name	Count
Inverters	Sunny Boy 7.0-US (240V) (SMA)	2 (14.0 kW)
Home Runs	12 AWG (Copper)	3 (90.8 ft)
Combiners	1 input Combiner	1
Combiners	2 input Combiner	2
Strings	10 AWG (Copper)	5 (295.2 ft)
Module	Solaria Corporation, PowerXT 360R-PD (360W)	45 (16.2 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	7-11	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Landscape (Horizontal)	45°	176.878°	0.0 ft	1x1	45	45	16.2 kW

Detailed Layout

15kW Array SFA Church Community Services Office Bldg, 907 Oakland Avenue, Elkhart, IN 46516

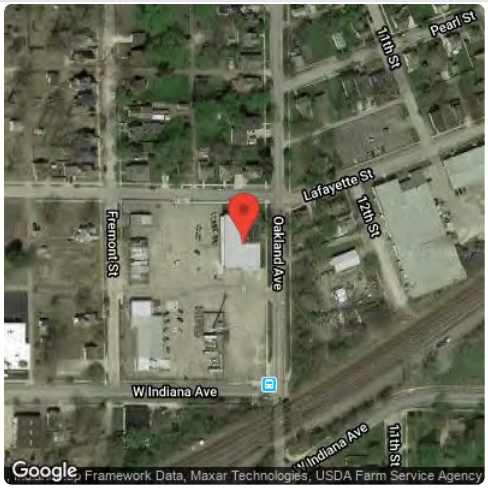
Report

Project Name	SFA Church Community Services Office Bldg
Project Description	6 degree, 2 years old, office bldg.
Project Address	907 Oakland Avenue, Elkhart, IN 46516
Prepared By	Robert Chatham chathamenergyconsulting@gmail.com

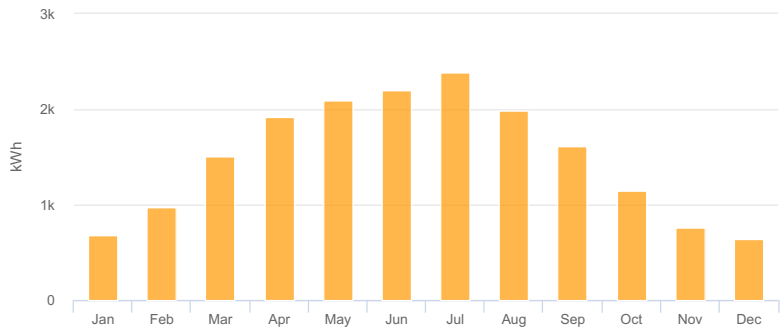
System Metrics

Design	15kW Array
Module DC Nameplate	14.9 kW
Inverter AC Nameplate	14.0 kW Load Ratio: 1.07
Annual Production	17.91 MWh
Performance Ratio	81.6%
kWh/kWp	1,201.3
Weather Dataset	TMY, 10km grid (41.65,-85.95), NREL (prospector)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

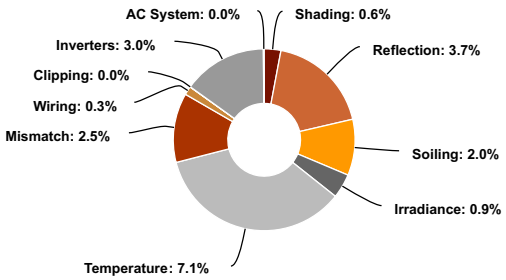
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,408.2	
	POA Irradiance	1,472.6	4.6%
	Shaded Irradiance	1,463.8	-0.6%
	Irradiance after Reflection	1,409.9	-3.7%
	Irradiance after Soiling	1,381.7	-2.0%
	Total Collector Irradiance	**1,381.6**	**0.0%**
Energy (kWh)	Nameplate	20,624.4	
	Output at Irradiance Levels	20,445.3	-0.9%
	Output at Cell Temperature Derate	18,998.7	-7.1%
	Output After Mismatch	18,528.1	-2.5%
	Optimal DC Output	18,471.4	-0.3%
	Constrained DC Output	18,470.7	0.0%
	Inverter Output	17,916.6	-3.0%
	Energy to Grid	**17,912.0**	**0.0%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.0 °C
	Avg. Operating Cell Temp		26.2 °C
Simulation Metrics			
	Operating Hours		4677
	Solved Hours		4677

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km grid (41.65,-85.95), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module	Uploaded By	Characterization									
	PowerXT-355R-PD (Solaria Corporation)	Folsom Labs	Spec Sheet Characterization, PAN									
Component Characterizations	Device	Uploaded By	Characterization									
	Sunny Boy 7.0-US (240V) (SMA)	Folsom Labs	Spec Sheet									

Components

Component	Name	Count
Inverters	Sunny Boy 7.0-US (240V) (SMA)	2 (14.0 kW)
AC Home Runs	1/0 AWG (Aluminum)	2 (81.8 ft)
Home Runs	12 AWG (Copper)	4 (384.7 ft)
Combiners	1 input Combiner	4
Strings	10 AWG (Copper)	4 (0.0 ft)
Module	Solaria Corporation, PowerXT-355R-PD (355W)	42 (14.9 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	7-11	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Landscape (Horizontal)	6°	180.398°	0.0 ft	1x1	42	42	14.9 kW

Detailed Layout

52kW Array SFA Community Harvest Food Bank, 999 E. Tillman Road, Fort Wayne, IN 46816

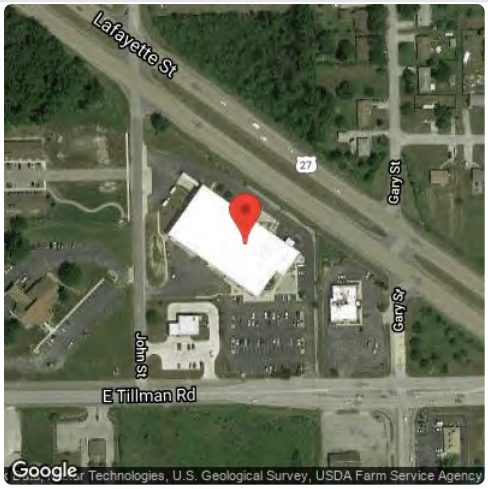
Report

Project Name	SFA Community Harvest Food Bank
Project Description	roof 6.5 yrs old, 5 degrees,
Project Address	999 E. Tillman Road, Fort Wayne, IN 46816
Prepared By	Robert Chatham chathamenergyconsulting@gmail.com

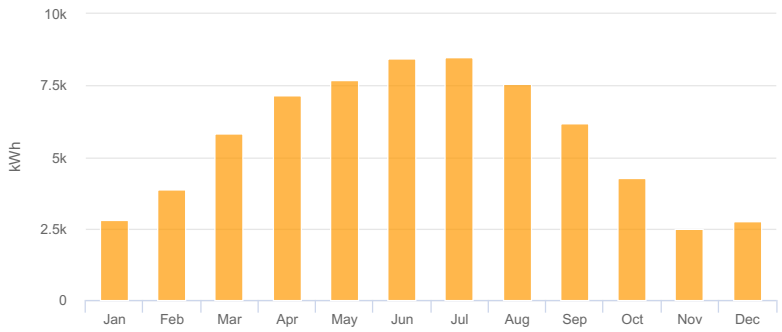
System Metrics

Design	52kW Array
Module DC Nameplate	51.2 kW
Inverter AC Nameplate	48.1 kW Load Ratio: 1.06
Annual Production	67.44 MWh
Performance Ratio	86.2%
kWh/kWp	1,317.1
Weather Dataset	TMY, 10km grid (41.05,-85.15), NREL (prospector)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

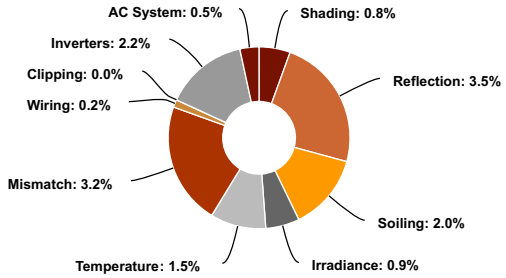
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,443.6	
	POA Irradiance	1,527.9	5.8%
	Shaded Irradiance	1,515.5	-0.8%
	Irradiance after Reflection	1,462.6	-3.5%
	Irradiance after Soiling	1,433.4	-2.0%
	Total Collector Irradiance	**1,433.4**	**0.0%**
Energy (kWh)	Nameplate	73,427.2	
	Output at Irradiance Levels	72,776.9	-0.9%
	Output at Cell Temperature Derate	71,716.3	-1.5%
	Output After Mismatch	69,417.5	-3.2%
	Optimal DC Output	69,278.4	-0.2%
	Constrained DC Output	69,278.3	0.0%
	Inverter Output	67,774.2	-2.2%
	Energy to Grid	**67,435.3**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.4 °C
	Avg. Operating Cell Temp		19.6 °C
Simulation Metrics			
	Operating Hours		4664
	Solved Hours		4664

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km grid (41.05,-85.15), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module	Uploaded By	Characterization									
	TSM-PD14 320 (May16) (Trina Solar)	Folsom Labs	Spec Sheet Characterization, PAN									
Component Characterizations	Device	Uploaded By	Characterization									
	Sunny Tripower 24000TL-US (SMA)	Folsom Labs	Modified CEC									

Components

Component	Name	Count
Inverters	Sunny Tripower 24000TL-US (SMA)	2 (48.1 kW)
Strings	10 AWG (Copper)	10 (748.6 ft)
Module	Trina Solar, TSM-PD14 320 (May16) (320W)	160 (51.2 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	5-18	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Fixed Tilt	Landscape (Horizontal)	10°	214.464°	2.0 ft	1x1	160	160	51.2 kW

Detailed Layout

11kW Higher Roof SFA Good Shepherd Montessori School, 1101 E Jefferson Blvd, South Bend, IN 46617

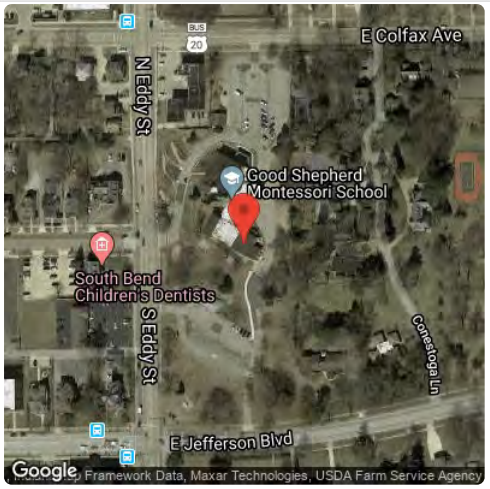
Report

Project Name	SFA Good Shepherd Montessori School
Project Description	roof 3 yrs old, 20 degrees
Project Address	1101 E Jefferson Blvd, South Bend, IN 46617
Prepared By	Robert Chatham chathamenergyconsulting@gmail.com

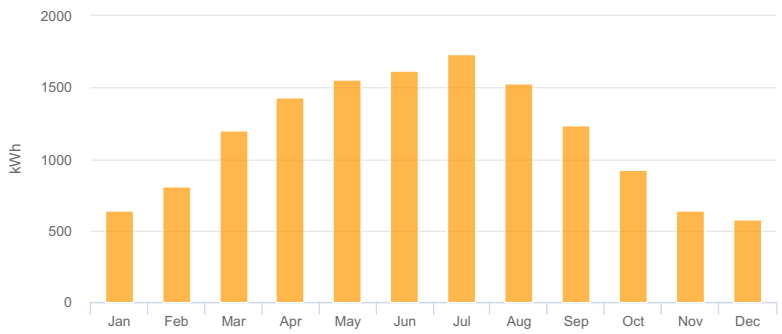
System Metrics

Design	11kW Higher Roof
Module DC Nameplate	10.9 kW
Inverter AC Nameplate	10.00 kW Load Ratio: 1.09
Annual Production	13.90 MWh
Performance Ratio	80.7%
kWh/kWp	1,277.8
Weather Dataset	TMY, 10km Grid (41.65,-86.25), NREL (prospector)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

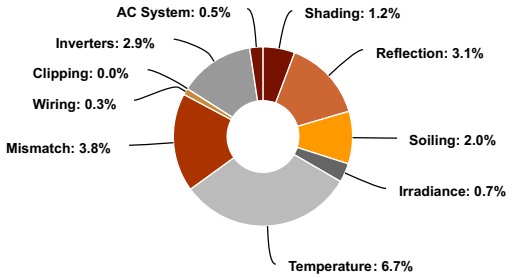
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,424.1	
	POA Irradiance	1,584.4	11.3%
	Shaded Irradiance	1,565.1	-1.2%
	Irradiance after Reflection	1,516.5	-3.1%
	Irradiance after Soiling	1,486.2	-2.0%
	Total Collector Irradiance	**1,486.0**	**0.0%**
Energy (kWh)	Nameplate	16,176.0	
	Output at Irradiance Levels	16,058.5	-0.7%
	Output at Cell Temperature Derate	14,986.0	-6.7%
	Output After Mismatch	14,423.5	-3.8%
	Optimal DC Output	14,387.3	-0.3%
	Constrained DC Output	14,387.1	0.0%
	Inverter Output	13,972.9	-2.9%
	Energy to Grid	**13,903.0**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.5 °C
	Avg. Operating Cell Temp		27.7 °C
Simulation Metrics			
	Operating Hours		4683
	Solved Hours		4683

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km Grid (41.65,-86.25), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module	Uploaded By	Characterization									
	Q.PEAK DUO L-G8 340 (Hanwha)	Folsom Labs	Spec Sheet Characterization, PAN									
Component Characterizations	Device	Uploaded By	Characterization									
	Symo 10.0-3-M (Fronius)	Folsom Labs	Spec Sheet Efficiency									

Components

Component	Name	Count
Inverters	Symo 10.0-3-M (Fronius)	1 (10.00 kW)
Strings	10 AWG (Copper)	2 (140.3 ft)
Module	Hanwha, Q.PEAK DUO L-G8 340 (340W)	32 (10.9 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	9-22	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Landscape (Horizontal)	20°	206°	0.0 ft	1x1	32	32	10.9 kW

Detailed Layout

10kW Array Ground Mount SFA Heartland Communities, 501 Rose Ave., New Haven, IN 46774

Report

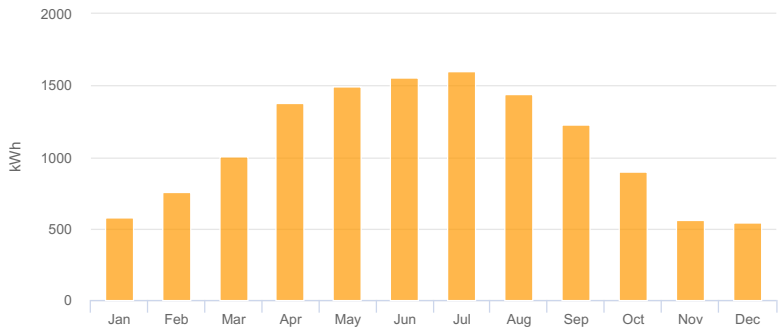
Project Name	SFA Heartland Communities
Project Description	10kW ground mount array
Project Address	501 Rose Ave., New Haven, IN 46774
Prepared By	Robert Chatham chathamenergyconsulting@gmail.com

System Metrics

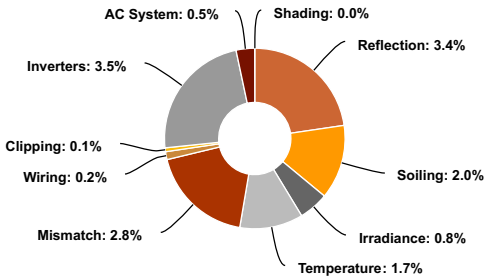
Design	10kW Array Ground Mount
Module DC Nameplate	9.66 kW
Inverter AC Nameplate	8.20 kW Load Ratio: 1.18
Annual Production	13.03 MWh
Performance Ratio	85.9%
kWh/kWp	1,348.5
Weather Dataset	TMY, 10km Grid (41.05,-85.05), NREL (prospector)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

Project Location

Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,428.5	
	POA Irradiance	1,569.3	9.9%
	Shaded Irradiance	1,569.3	0.0%
	Irradiance after Reflection	1,515.8	-3.4%
	Irradiance after Soiling	1,485.5	-2.0%
	Total Collector Irradiance	**1,485.5**	**0.0%**
Energy (kWh)	Nameplate	14,359.1	
	Output at Irradiance Levels	14,243.8	-0.8%
	Output at Cell Temperature Derate	14,001.0	-1.7%
	Output After Mismatch	13,610.4	-2.8%
	Optimal DC Output	13,581.4	-0.2%
	Constrained DC Output	13,567.3	-0.1%
	Inverter Output	13,092.0	-3.5%
	Energy to Grid	**13,026.5**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.8 °C
	Avg. Operating Cell Temp		20.2 °C
Simulation Metrics			
	Operating Hours		4669
	Solved Hours		4669

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km Grid (41.05,-85.05), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module	Uploaded By	Characterization									
	CS6U 345M (Canadian Solar)	Folsom Labs	Spec Sheet Characterization, PAN									
Component Characterizations	Device	Uploaded By	Characterization									
	PRIMO 8.2-1 (Fronius)	Folsom Labs	Spec Sheet									

Components

Component	Name	Count
Inverters	PRIMO 8.2-1 (Fronius)	1 (8.20 kW)
Strings	10 AWG (Copper)	3 (153.4 ft)
Module	Canadian Solar, CS6U 345M (345W)	28 (9.66 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	8-11	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Fixed Tilt	Landscape (Horizontal)	15°	180°	8.0 ft	4x1	7	28	9.66 kW

Detailed Layout

7.6kW Array SolarEdge w/ opt SFA Jerusalem Missionary Baptist Church, 1737 Fillmore St., Gary, IN 46407

Report

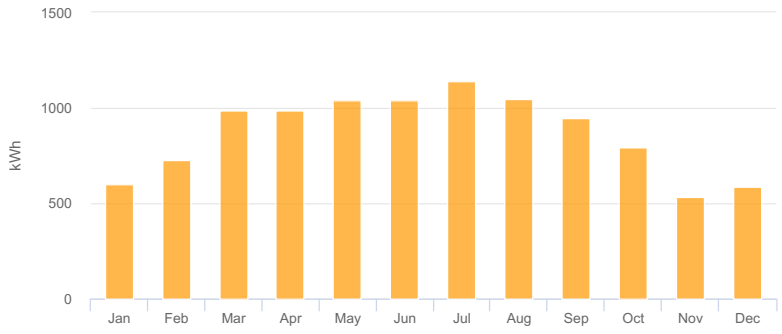
Project Name	SFA Jerusalem Missionary Baptist Church
Project Description	roof 15 yrs old, 41 degrees
Project Address	1737 Fillmore St., Gary, IN 46407
Prepared By	Robert Chatham chathamenergyconsulting@gmail.com

System Metrics

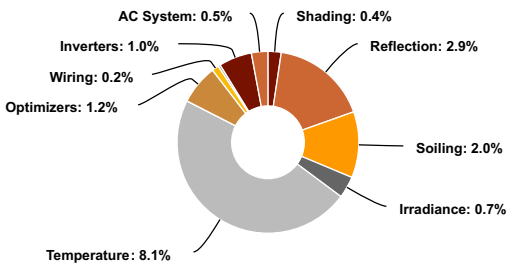
Design	7.6kW Array SolarEdge w/ opt
Module DC Nameplate	7.56 kW
Inverter AC Nameplate	7.60 kW Load Ratio: 0.99
Annual Production	10.42 MWh
Performance Ratio	84.1%
kWh/kWp	1,378.0
Weather Dataset	TMY, 10km Grid (41.55,-87.35), NREL (prospector)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

Project Location

Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,429.0	
	POA Irradiance	1,637.7	14.6%
	Shaded Irradiance	1,631.2	-0.4%
	Irradiance after Reflection	1,583.4	-2.9%
	Irradiance after Soiling	1,551.7	-2.0%
	Total Collector Irradiance	**1,551.7**	**0.0%**
Energy (kWh)	Nameplate	11,751.6	
	Output at Irradiance Levels	11,674.4	-0.7%
	Output at Cell Temperature Derate	10,734.0	-8.1%
	Output After Mismatch	10,734.0	0.0%
	Optimizer Output	10,605.1	-1.2%
	Optimal DC Output	10,582.7	-0.2%
	Constrained DC Output	10,576.0	-0.1%
	Inverter Output	10,470.2	-1.0%
	Energy to Grid	**10,417.9**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.8 °C
	Avg. Operating Cell Temp		28.7 °C
Simulation Metrics			
	Operating Hours		4685
	Solved Hours		4685

Condition Set

Description	Condition Set 1
Weather Dataset	TMY, 10km Grid (41.55,-87.35), NREL (prospector)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Sandia Model

Temperature Model Parameters

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

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
2	2	2	2	2	2	2	2	2	2	2	2

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

Module Characterizations

Module	Uploaded By	Characterization
PowerXT 360R-PD (Solaria Corporation)	Folsom Labs	Spec Sheet Characterization, PAN

Component Characterizations

Device	Uploaded By	Characterization
SE7600H-US (SolarEdge)	Folsom Labs	Spec Sheet
P370 (SolarEdge)	Folsom Labs	Mfg Spec Sheet

Components

Component	Name	Count
Inverters	SE7600H-US (SolarEdge)	1 (7.60 kW)
Strings	10 AWG (Copper)	2 (417.4 ft)
Optimizers	P370 (SolarEdge)	21 (7.77 kW)
Module	Solaria Corporation, PowerXT 360R-PD (360W)	21 (7.56 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	8-14	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Landscape (Horizontal)	42°	179.846°	0.0 ft	1x1	21	21	7.56 kW

Detailed Layout

West SFA Lacasa Inc., 2745 Benham Ave., Elkhart, IN 46517

Report

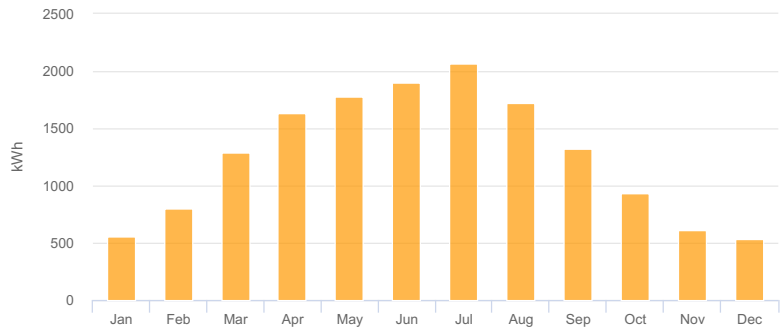
Project Name	SFA Lacasa Inc.
Project Description	18 degrees, 10kW Array on new building, does not show up on google map. facing west
Project Address	2745 Benham Ave., Elkhart, IN 46517
Prepared By	Robert Chatham chathamenergyconsulting@gmail.com

System Metrics

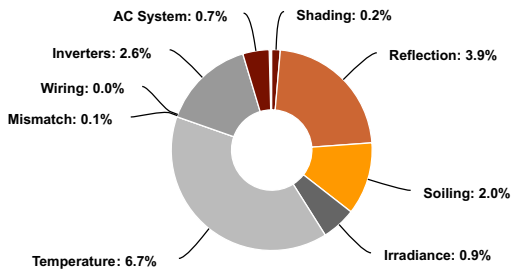
Design	West
Module DC Nameplate	13.0 kW
Inverter AC Nameplate	11.3 kW Load Ratio: 1.14
Annual Production	15.15 MWh
Performance Ratio	84.1%
kWh/kWp	1,169.1
Weather Dataset	TMY, 10km grid (41.65,-85.95), NREL (prospector)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

Project Location

Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,408.2	
	POA Irradiance	1,389.2	-1.3%
	Shaded Irradiance	1,386.0	-0.2%
	Irradiance after Reflection	1,332.6	-3.9%
	Irradiance after Soiling	1,305.9	-2.0%
	Total Collector Irradiance	**1,306.0**	**0.0%**
Energy (kWh)	Nameplate	16,956.6	
	Output at Irradiance Levels	16,796.0	-0.9%
	Output at Cell Temperature Derate	15,664.3	-6.7%
	Output After Mismatch	15,654.0	-0.1%
	Optimal DC Output	15,654.0	0.0%
	Constrained DC Output	15,664.2	0.1%
	Inverter Output	15,262.3	-2.5%
	Energy to Grid	**15,150.9**	**-0.7%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.0 °C
	Avg. Operating Cell Temp		25.4 °C
Simulation Metrics			
	Operating Hours		4677
	Solved Hours		4677

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km grid (41.65,-85.95), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module	Uploaded By	Characterization									
	PowerXT 360R-PD (Solaria Corporation)	Folsom Labs	Spec Sheet Characterization, PAN									
Component Characterizations	Device	Uploaded By	Characterization									
	IQ7X-96-2-US (240) (Enphase)	Folsom Labs	Spec Sheet									

Components

Component	Name	Count
Inverters	IQ7X-96-2-US (240) (Enphase)	36 (11.3 kW)
AC Branches	1/0 AWG (Aluminum)	2 (668.0 ft)
Module	Solaria Corporation, PowerXT 360R-PD (360W)	36 (13.0 kW)

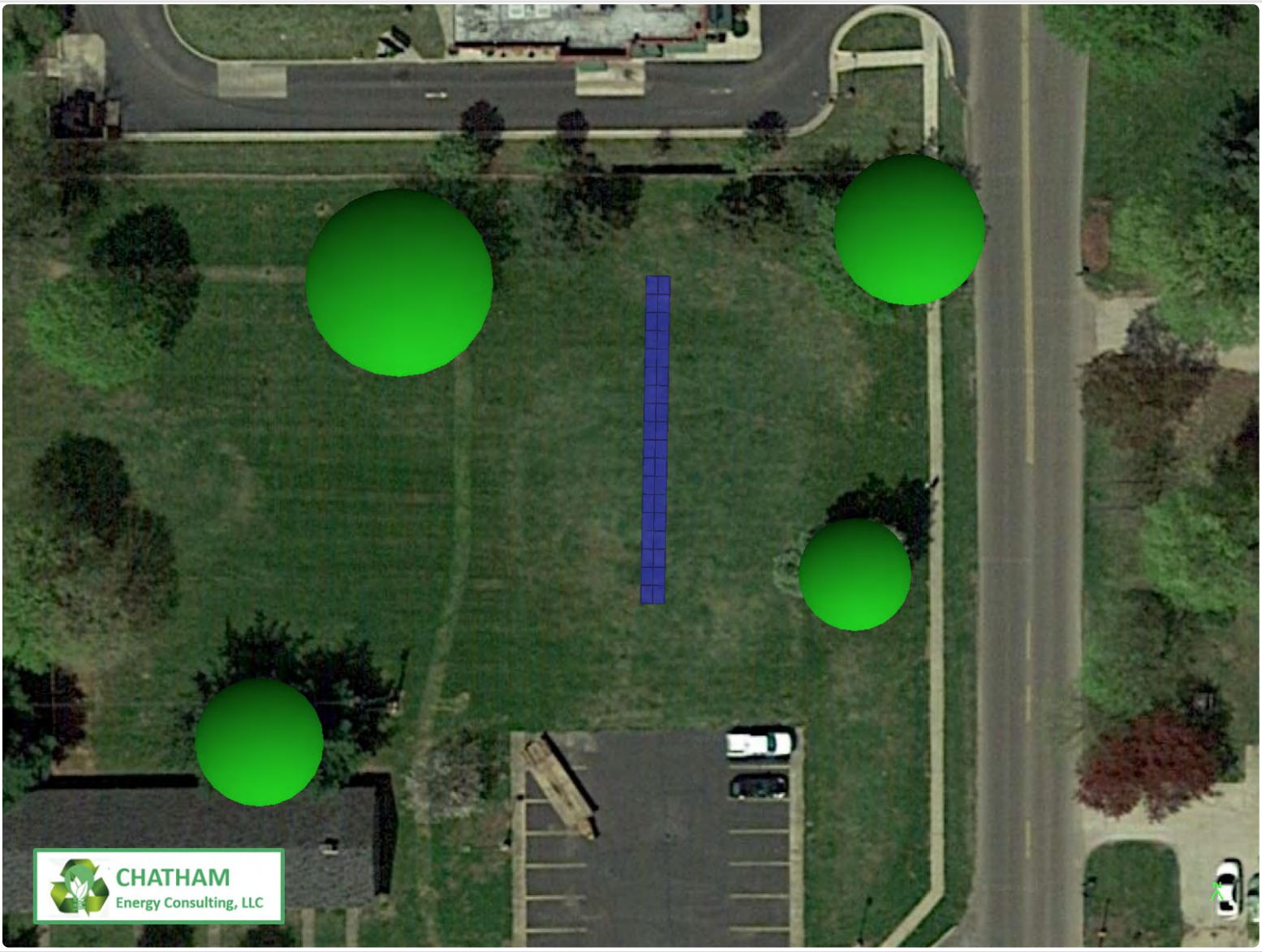
Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	1-2	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Landscape (Horizontal)	18°	270.991°	0.0 ft	1x1	36	36	13.0 kW

Detailed Layout



15kW Array SFA Monroe County United Ministries, 828 W. 14 Ct, Bloomington, IN 47404

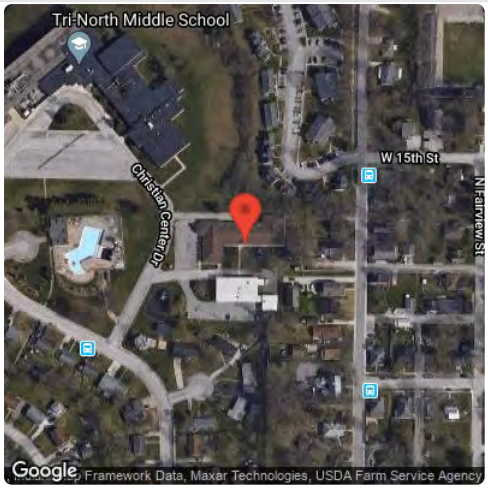
Report

Project Name	SFA Monroe County United Ministries
Project Description	20 degrees, need to avoid trees
Project Address	828 W. 14 Ct, Bloomington, IN 47404
Prepared By	Robert Chatham chathamenergyconsulting@gmail.com

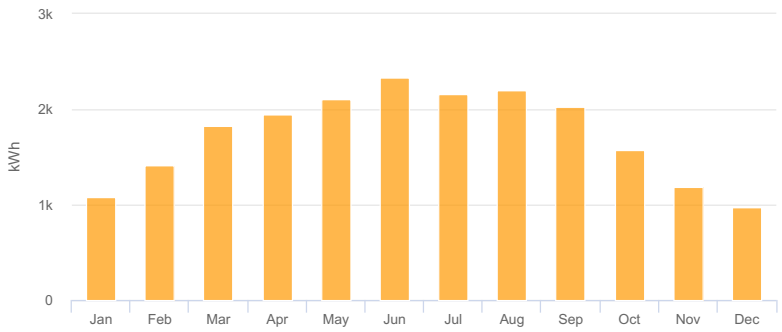
System Metrics

Design	15kW Array
Module DC Nameplate	14.8 kW
Inverter AC Nameplate	12.9 kW Load Ratio: 1.15
Annual Production	20.83 MWh
Performance Ratio	82.7%
kWh/kWp	1,407.7
Weather Dataset	TMY, 10km Grid (39.15,-86.55), NREL (prospector)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

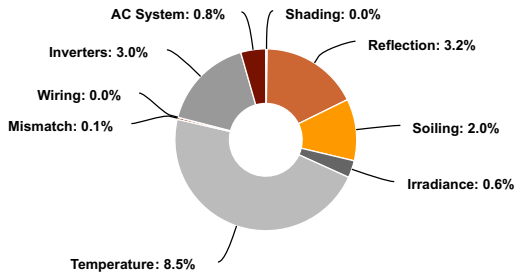
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,509.6	
	Adjusted Global Horizontal Irradiance	1,509.6	0.0%
	POA Irradiance	1,701.3	12.7%
	Shaded Irradiance	1,700.5	0.0%
	Irradiance after Reflection	1,646.5	-3.2%
	Irradiance after Soiling	1,613.6	-2.0%
	Total Collector Irradiance	**1,613.6**	**0.0%**
Energy (kWh)	Nameplate	23,820.2	
	Output at Irradiance Levels	23,687.4	-0.6%
	Output at Cell Temperature Derate	21,669.0	-8.5%
	Output After Mismatch	21,654.3	-0.1%
	Optimal DC Output	21,654.3	0.0%
	Constrained DC Output	21,654.8	0.0%
	Inverter Output	21,002.8	-3.0%
	Energy to Grid	**20,833.5**	**-0.8%**
Temperature Metrics			
	Avg. Operating Ambient Temp		14.6 °C
	Avg. Operating Cell Temp		31.8 °C
Simulation Metrics			
	Operating Hours		4667
	Solved Hours		4667

Condition Set

Description	Condition Set 1
Weather Dataset	TMY, 10km Grid (39.15,-86.55), NREL (prospector)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Sandia Model

Temperature Model Parameters

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

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
2	2	2	2	2	2	2	2	2	2	2	2

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

Module Characterizations

Module	Uploaded By	Characterization
PowerXT-400R-PM-AC (Solaria)	Folsom Labs	Spec Sheet Characterization, PAN

Component Characterizations

Device	Uploaded By	Characterization
IQ7A-72-2-US (240V) (2019) (Enphase)	Folsom Labs	Spec Sheet

Components

Component	Name	Count
Inverters	IQ7A-72-2-US (240V) (2019) (Enphase)	37 (12.9 kW)
AC Branches	1/0 AWG (Aluminum)	2 (580.0 ft)
Module	Solaria, PowerXT-400R-PM-AC (400W)	37 (14.8 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	1-1	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Landscape (Horizontal)	20°	178.998°	0.0 ft	1x1	37	37	14.8 kW

Detailed Layout

8kW Array Ground Mount SFA Second Harvest Food Bank, 6621 N. Old SR 3, Muncie, IN 47303

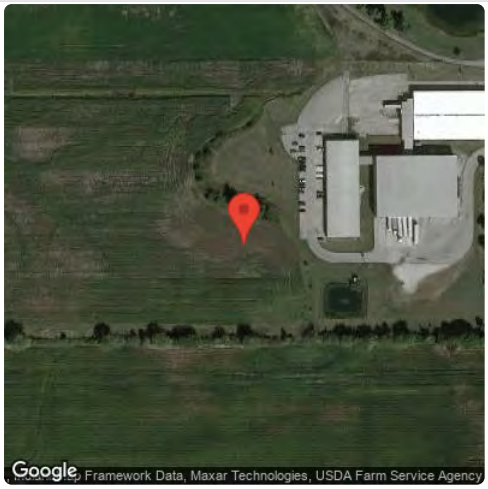
Report

Project Name	SFA Second Harvest Food Bank
Project Description	8kW ground mount
Project Address	6621 N. Old SR 3, Muncie, IN 47303
Prepared By	Robert Chatham chathamenergyconsulting@gmail.com

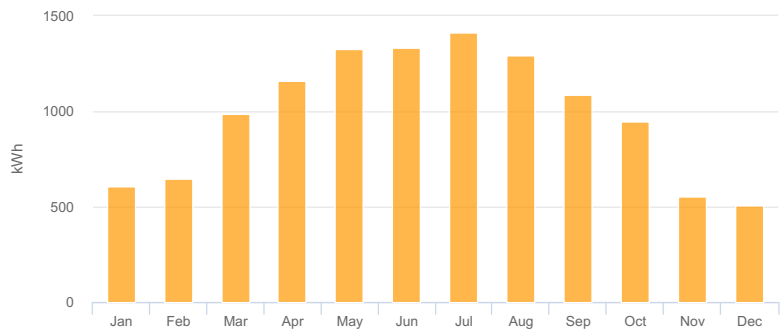
System Metrics

Design	8kW Array Ground Mount
Module DC Nameplate	8.28 kW
Inverter AC Nameplate	7.60 kW Load Ratio: 1.09
Annual Production	11.86 MWh
Performance Ratio	89.3%
kWh/kWp	1,432.3
Weather Dataset	TMY, 10km Grid (40.25,-85.35), NREL (prospector)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

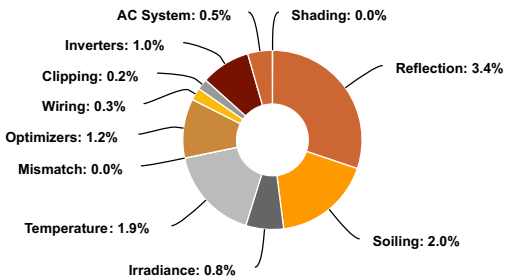
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,454.3	
	POA Irradiance	1,603.7	10.3%
	Shaded Irradiance	1,603.6	0.0%
	Irradiance after Reflection	1,549.4	-3.4%
	Irradiance after Soiling	1,518.4	-2.0%
	Total Collector Irradiance	**1,518.4**	**0.0%**
Energy (kWh)	Nameplate	12,577.4	
	Output at Irradiance Levels	12,481.1	-0.8%
	Output at Cell Temperature Derate	12,243.7	-1.9%
	Output After Mismatch	12,243.7	0.0%
	Optimizer Output	12,096.8	-1.2%
	Optimal DC Output	12,066.3	-0.3%
	Constrained DC Output	12,039.6	-0.2%
	Inverter Output	11,919.2	-1.0%
	Energy to Grid	**11,859.6**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		13.0 °C
	Avg. Operating Cell Temp		20.7 °C
Simulation Metrics			
	Operating Hours		4674
	Solved Hours		4674

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km Grid (40.25,-85.35), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module	Uploaded By	Characterization									
	CS6U 345M (Canadian Solar)	Folsom Labs	Spec Sheet Characterization, PAN									
Component Characterizations	Device	Uploaded By	Characterization									
	SE7600H-US (SolarEdge)	Folsom Labs	Spec Sheet									
	P340 (SolarEdge)	Folsom Labs	Mfg Spec Sheet									

Components

Component	Name	Count
Inverters	SE7600H-US (SolarEdge)	1 (7.60 kW)
Strings	10 AWG (Copper)	2 (660.5 ft)
Optimizers	P340 (SolarEdge)	24 (8.16 kW)
Module	Canadian Solar, CS6U 345M (345W)	24 (8.28 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	8-15	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Fixed Tilt	Landscape (Horizontal)	15°	180°	8.0 ft	4x1	6	24	8.28 kW

Detailed Layout

Outdoor Shaded Shelter microinverters SFA Unity Gardens, 3701 Prast Blvd., South Bend, IN 46628

Report

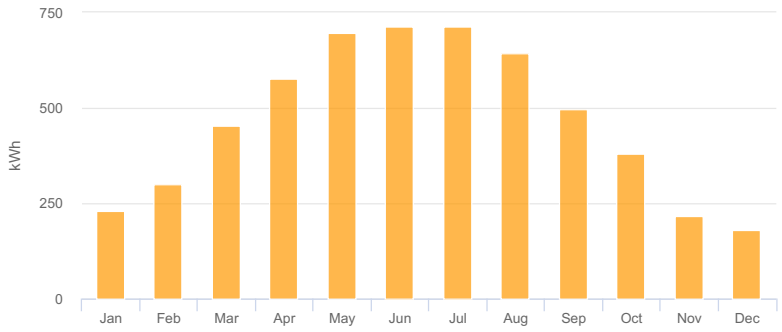
Project Name	SFA Unity Gardens
Project Description	0 degrees, on top of Shaded Shelter to be built
Project Address	3701 Prast Blvd., South Bend, IN 46628
Prepared By	Robert Chatham chathamenergyconsulting@gmail.com

System Metrics

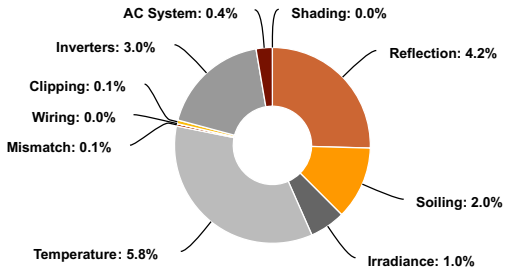
Design	Outdoor Shaded Shelter microinverters
Module DC Nameplate	4.80 kW
Inverter AC Nameplate	3.48 kW Load Ratio: 1.38
Annual Production	5.603 MWh
Performance Ratio	84.2%
kWh/kWp	1,167.2
Weather Dataset	TMY, SOUTH_BEND, NSRDB (tmy2)
Simulator Version	8df3ba8977-b5fd44241f-c7eec90fb7-0331dd75ba

Project Location

Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,386.7	
	POA Irradiance	1,385.7	-0.1%
	Shaded Irradiance	1,385.7	0.0%
	Irradiance after Reflection	1,327.3	-4.2%
	Irradiance after Soiling	1,300.7	-2.0%
	Total Collector Irradiance	**1,300.7**	**0.0%**
Energy (kWh)	Nameplate	6,228.0	
	Output at Irradiance Levels	6,167.2	-1.0%
	Output at Cell Temperature Derate	5,811.8	-5.8%
	Output After Mismatch	5,807.9	-0.1%
	Optimal DC Output	5,807.9	0.0%
	Constrained DC Output	5,802.1	-0.1%
	Inverter Output	5,627.6	-3.0%
	Energy to Grid	**5,602.7**	**-0.4%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.8 °C
	Avg. Operating Cell Temp		25.9 °C
Simulation Metrics			
	Operating Hours		4723
	Solved Hours		4723

Condition Set

Description	Condition Set 1
Weather Dataset	TMY, SOUTH_BEND, NSRDB (tmy2)
Solar Angle Location	Meteo Lat/Lng
Transposition Model	Perez Model
Temperature Model	Sandia Model

Temperature Model Parameters

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

Soiling (%)

J	F	M	A	M	J	J	A	S	O	N	D
2	2	2	2	2	2	2	2	2	2	2	2

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

Module Characterizations

Module	Uploaded By	Characterization
PowerXT-400R-PM-AC (Solaria)	Folsom Labs	Spec Sheet Characterization, PAN

Component Characterizations

Device	Uploaded By	Characterization
IQ7A-72-2-US (208V) (2019) (Enphase)	Folsom Labs	Spec Sheet

Components

Component	Name	Count
Inverters	IQ7A-72-2-US (208V) (2019) (Enphase)	12 (3.48 kW)
AC Branches	8 AWG (Copper)	1 (2.7 ft)
Module	Solaria, PowerXT-400R-PM-AC (400W)	12 (4.80 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	12	1-1	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Flush Mount	Portrait (Vertical)	0°	158.875°	0.0 ft	1x1	12	12	4.80 kW

Detailed Layout

APPENDIX B

Please fill out both tabs in the attached Excel Spreadsheet:

1. **Tab 1 requests your qualifications.**

2. **Tab 2 requests project-specific information about your bid/s and equipment specifications for each project.**

APPENDIX B: Solar Installer Qualifications--Please Complete

Installer's Name	NABCEP Installation Professional Certification on staff (Yes/No)	Licensed Electrician on staff (Yes/No)	Years of Experience in Installing PV Solar	Workers Comp & Liability Insurance Policy In Place (Yes/No)	Better Business Rating	Do you include free O&M support as part of your bid? (Yes/No)	If you provide O&M support with each bid; how long? (months)	Provide Workmanship Warranty (months)	Will the PV System be compliant with the current NEC Article 690	Proposed date the solar array will be operational	Will you be responsible for obtaining and paying for any necessary local permits/approvals? (Yes/No)	Will you be responsible for obtaining and paying for any necessary utility net metering application & approvals? (Yes/No)

APPENDIX B - Equipment specifications. Please fill out one row for each project you are bidding on.

Installer's Name	Recipient's Name (Please reference Appendix A)	Job Site Address (Please reference Appendix A)	Name of panel manufacturer	Panel Model Number	Name of the Data Montioring & Communication System	Name of inverter manufacturer	Model of Inverter

Name of microinverters & type, if applicable	Name of optimizer & type, if applicable	Name of racking manufacturer	Solar Array Size (kW dc)	First Year Annual Solar Array Production (kWh ac)	First Year Annual System Degradation Factor (%)	Annual System Degradation Factor therefafter (%)	All-in (lump sum) Installed Price ($)	All-in Installed Price / Watt dc ($/Wattdc)	Install Price vs First Year Annual Production ($ /Whr ac)

APPENDIX C

LIST OF PRE-QUALIFIED EQUIPMENT SUPPLIERS

SOLAR PANELS (alphabetical order)

1. BYD
2. Canadian Solar
3. DMEGC
4. Eging PV
5. First Solar
6. GCL
7. Hanwha Q Cells
8. Kyocera
9. LG
10. Panasonic
11. SunPower
12. Talesun
13. Trina

INVERTERS – string/central; microinverters or optimizers are preferred for smaller systems (alphabetical order)

1. ABB
2. Eaton
3. Enphase
4. Fronius
5. Scheidner
6. Siemens
7. SMA
8. Solar Edge
9. Solectira
10. SunGrow
11. SunPower