



## 2023 EWEB Greenpower Grant Application

### Contact Information:

McKenzie Fire & Rescue

NAME OF ORGANIZATION

Darren Bucich

CONTACT NAME

Fire Chief

CONTACT TITLE

42870 McKenzie Highway

STREET ADDRESS

Leaburg, OR 97489

CITY/STATE/ZIP

541-896-3311

TELEPHONE

541-896-3191

FAX

dbucich@mckenziefire.com

E-MAIL

www.mckenziefire.com

WEBSITE

McKenzie Fire & Rescue Solar Project

PROPOSAL TITLE

\$50,000

GRANT AMOUNT REQUESTED

*D Bucich*

SIGNATURE

03/28/2023

DATE

### 1. Background:

- Mission of the organization
- The needs your organization addresses
- The population your organization serves
- A brief description of your current programs and operating budget

### 2. Project Description:

- Statement of the primary purpose of the project and its relationship to EWEB's mission
- The population you plan to serve and how they will benefit from the project
- Strategies you will employ to implement the project

### 3. Project Evaluation

- Your criteria for a successful project
- The results you hope to achieve by the end of the funding period
- The method by which you will measure effectiveness

### 4. Budget and Timeline

- A budget for the project for which funds are requested, **including any additional funding which has been secured at the time of application.**
- Timeline of the project

### 5. Attachments

- Proof of nonprofit status (copy of IRS letter)\*
- List of board of directors\*
- One-paragraph resumes of key staff working on the project
- Amount and source of any other funding support previously received from EWEB (if applicable)
- Proof of ownership or authority to install equipment at or otherwise modify building, if request for facility construction project

\*Optional or not needed for public and academic institutions.

Email completed application and proposal to:

Cheryl Froehlich

[Cheryl.Froehlich@eweb.org](mailto:Cheryl.Froehlich@eweb.org)

Application deadline: Must be submitted no later than March 31, 2023

Questions? Contact Cheryl Froehlich, [Cheryl.froehlich@eweb.org](mailto:Cheryl.froehlich@eweb.org), 541-685-7676



# McKenzie Fire & Rescue

## 2023 EWEB GreenPower Grant Program

### 1. BACKGROUND

**Mission:** To Prevent, Protect, and Preserve.

McKenzie Fire & Rescue is a combination District with five stations located six to eight miles apart in the McKenzie Valley, east of Eugene and Springfield, Oregon. A combination District has minimal staffing and relies on a volunteer base during an emergency response.

**Population Served:** Approximately 10,000 people populate our District, which encompasses 47 square miles. The population is diverse and includes retirees, senior parks, and homesteading families of multiple generations.

The McKenzie River runs through the length of the District, considered the McKenzie corridor, and supplies drinking water for the 250,000 people in the cities of Eugene and Springfield. Because of the mountainous terrain, the McKenzie corridor frequently experiences power outages. Currently the station is generator-run during these outages.

**Needs the Organization Addresses:** McKenzie Fire & Rescue meets the needs of the community during an emergency, responding to more than 800 emergency dispatches annually.

During large scale emergencies, our headquarters in Leaburg becomes a community center, until relief organizations can gather for response. The District has aligned itself to meet the basic needs of the community: shelter, food, heat/cool system, sleeping bags, hygiene supplies, etc.

During the 2019 snow event, most community members sought a place to warm up, charge their devices, get a hot cup of coffee, and returned to their homes at night. In previous years, residents have begun to experience water issues with their wells. We have opened our bays and provided water.

More recently, our fire District suffered devastating losses from an unprecedented wind driven fire event. Over 173,000 acres were lost. Community members in our District lost over 270 homes and twice as many outbuildings, and tragically, one life was lost.

During the Holiday Farm Fire our building was used as an FOB – Forward Operating Base. Task forces would meet there twice a day to exchange information. Response crews were forced off of the fire line to escort fuel trucks into an active fire area to refuel generators that serviced the FOB so that operations could continue uninterrupted.



# McKenzie Fire & Rescue

## Current Programs Managed by McKenzie Fire & Rescue:

- Life Jacket Lending Program: Life jackets are placed, seasonally, at eight locations along the McKenzie River for recreationalists to use and return daily.
- Community CPR Program: Public education program for those desiring to learn and refresh lifesaving CPR skills.
- Address Sign Program: Reflective address signs are available to residents. Time is critical in an emergency, so we encourage proper identification and placement of address signs.
- Defensible Space Program: The District offers free defensible space inspections to residents and is continually seeking grant resources for the work portion so the residents receive the work at no charge.
- Junior & Adult Volunteer Programs: The District manages both Junior and Adult Volunteer programs, providing required training during weekly drills. Training includes fire and medical responses, motor vehicle accidents, water rescue, logging accidents, and wildland fires.
- Student Program with the partnership of Lane Community College: McKenzie Fire & Rescue works with up to six full-time students each school year. Students receive free tuition and fees, and in return intern with the District on a 48/96 shift, receiving the benefits of on-the-job training. Our program is competitive, and our students sought after by large departments.
- Chimney Brush Lending Program: McKenzie Fire & Rescue provides a Chimney Brush lending program for wood fireplaces, wood stoves, and pellet stoves to residents.

**Operating Budget:** We are a tax-based District and operate on a budget of \$1,068,844. We have seen a sharp decrease to our tax revenue following the Holiday Farm Fire. While this seems an adequate annual amount, the inflation increases coupled with the loss of tax revenue is creating a deficit.

## PROJECT DESCRIPTION

### **Project's Primary Purpose and relationship to EWEB's Mission**

McKenzie Fire & Rescue would like to install solar panels on the headquarter station in Leaburg, OR. The installation of the solar panels will reduce operating costs and contribute to the preservation of natural resources. As discussed in the previous section, our building is a community focal point, and not just in emergencies. Currently, the headquarter station manages with a diesel generator during power outages, which is functional while diesel is available but not necessarily eco-friendly.

The current generator has a 250-gallon tank and can run for 72 hours, burning approximately 80 gallons per day.



# McKenzie Fire & Rescue

Just as EWEB invests in communities and sustainability, community members know they are welcome in our facility during emergencies and extreme weather conditions (heating and cooling shelter) and are invested in McKenzie Fire & Rescue. In turn, McKenzie Fire & Rescue is invested in the future of the District, the ecological and sustainability aspects of energy, and the carbon footprint left for generations to come.

We share EWEB's mission to enhance the community's vitality by delivering drinking water and electric services, primarily the drinking water. The McKenzie River is considered critical infrastructure in the District and is a consideration in most decisions. Our staff and volunteers train regularly and earnestly to protect the river and areas around it. Aside from being a water source, the McKenzie River is known for its world class rafting, fishing, and hiking. Community members are invested in maintain the purity of the river.

## **The Population Served and Benefits Received**

[electricrate.com](http://electricrate.com) reported that Oregon ranks 19<sup>th</sup> in the United States for solar capacity. McKenzie Fire & Rescue joins with Oregon's commitment to the Renewable Portfolio Standard in seeking to bring the state closer to a carbon-neutral economy. Solar is the safest of all electricity sources. As a response agency in emergencies, we aren't going away, and our building needs to be fully functional when nothing else is.

Solar power is an effective, environmentally effective way to keep our headquarters sustainable and the reduction in operating expenses is a benefit to community members who pay their taxes. In addition to having a central and safe location to gather in a large-scale emergency, the tax dollars received will go further as our energy savings increase making more of our operating budget available for critical equipment and supplies.

## **Strategies We Will Employ to Implement the Project**

Solar energy has been on the minds of key staff members at McKenzie Fire & Rescue for several years. However, the deficits encountered as a result of the Holiday Farm Fire in September of 2020 pushed the pursuit of this project down on the list. Between the loss of acreage, property, homes, and tragically, one life, our operating budget has seen a sharp reduction in tax revenue. We will continue to see the reduction until community members are back in their homes and on their property.

Advanced Energy Systems has helped McKenzie Fire & Rescue to identify goals, determine the best options to achieve those goals, and provided steps to achieve sustainability success. We are seeking the installation of a 9.6KW Solar Electric System with extreme weather rating, that will not require any modification to the roof at our headquarter station. Instead, it will simply be installed (Attachment #1).



# McKenzie Fire & Rescue

## PROJECT EVALUATION

### Criteria for a Successful Project, Results We are Hoping to Achieve, Method to Measure Effectiveness

Criteria for a successful project include installation with no interference to the services and day-to-day operations of McKenzie Fire & Rescue, a reduction in the monthly electrical expense, and increased operating funds (based on the electricity savings) that can be applied to other critical areas in the budget. According to the Shading Report, provided by Advanced Energy Systems, our headquarters average for 97.4% rating for annual

We are hoping to see a reduction in our annual expenses. During the 2021-2022, electricity costs for our headquarters was over \$6,100. The recordkeeping would allow McKenzie Fire & Rescue an easy-to-manage way to measure the effectiveness of the solar energy system.

## BUDGET & TIMELINE

The cost of this project, as described, is \$50,000. If funded, McKenzie Fire & Rescue would assume responsibility for any expenses accrued outside of the estimate. As a rural District who has experienced financial trauma, we are continually seeking grant opportunities for a variety of purposes. If awarded, Advanced Energy Systems estimates a 2-week installation period. The start date will be determined once the required supplies are assembled and in hand. There is nothing that would prohibit the project start from McKenzie Fire & Rescue's perspective.

## IRS STATUS

McKenzie Fire & Rescue is a Special District, which we believe qualifies us for this grant opportunity through ORS 174.109. ORS 174.109 defines a public body as "government bodies, local government bodies, and special government bodies". Special districts are a form of local government created by a local community to meet a specific need.



# McKenzie Fire & Rescue

March 27, 2023

EWEB Greenpower Grant Application

RE: IRS Tax-Exempt Letter

We have requested the letter of tax exemption from the Internal Revenue Service. We received phone confirmation of the letter from Miss Peters, #100571752 that the letter has been prepared and will be mailed to McKenzie Fire & Rescue, 42870 McKenzie Highway, Leaburg, OR. She estimated we would receive the letter in 10 business days.

We are including a business report from [www.infoUSA.gov](http://www.infoUSA.gov) at this time and will forward the tax exemption letter immediately upon receipt.

We hope that this does not remove us from consideration.

Sincerely,

Darren Bucich  
Fire Chief



## Business Report<sup>1</sup>

### Business Profile Summary

|   |   |
|---|---|
| <b>Business Name</b><br>Mckenzie Fire & Rescue                    | <b>Contact Information</b><br>Darren Ducich, Manager  |
| <b>Address</b><br>2870 Mckenzie Hwy<br>Valterville, OR 97489-9631 | <b>Toll-free Phone</b><br>Phone (541) 896-3311<br>Fax<br>Web <a href="http://Mckenziefire.Com">Mckenziefire.Com</a><br>Twitter <a href="http://twitter.com/mckenziefandr">http://twitter.com/mckenziefandr</a><br>Facebook <a href="https://www.facebook.com/mckenziefire">https://www.facebook.com/mckenziefire</a><br>LinkedIn<br>Google+ |

### Additional Business Location Information

|                        |
|------------------------|
| <b>Mailing Address</b> |
|------------------------|

### NAICS

| NAICS Industry Description | NAICS  | NAICS Description |
|----------------------------|--------|-------------------|
| Public Administration (92) | 922160 | Fire Protection   |

### SIC

| Primary SIC | Secondary SIC | Industry         |
|-------------|---------------|------------------|
|             | 922404        | Fire Departments |

### Corporate Information

|                                |        |
|--------------------------------|--------|
| Franchise Description          |        |
| Year Established               | 1959   |
| Location Employment Size Range | 5 to 9 |
| Location Sales Volume Range    |        |
| Credit Score Alpha             | I      |
| Home Business                  | No     |

Source: infoGroup/Government Division, 5711 S 86th Circle, Omaha, NE 68127, [www.infoUSA.gov](http://www.infoUSA.gov)



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### Business Data

#### Business Address Information

RLID does not identify "primary" and "secondary" addresses. These indicators are provided by infoUSA. The "primary" and "secondary" addresses displaying on this report may or may not be associated with the same taxlot in RLID.

#### SIC and NAICS Information

The North American Industry Classification System (NAICS) and Standard Industrial Classification (SIC) are standard systems for classifying business establishments by type of economic activity. The classifications were developed to facilitate the collection, presentation, and analysis of data and to promote uniformity and comparability in the presentation of statistical data collected by government and private agencies. For additional background and explanation of these systems see <http://www.census.gov/eos/www/naics/faqs/faqs.html>.

For additional NAICS and SIC resources see also:

<http://www.osha.gov/oshstats/naics-manual.html>

<http://www.naics.com/search.htm>

<http://www.census.gov/eos/www/naics/>

#### Credit Score Information

##### CREDIT DISCLAIMER

Business Credit Score data are indicators of probable ability to pay. They are based on business demographic factors such as number of employees, years in business, industry stability, barriers to entry, and government data. The data provider (infoUSA) recommends that these ratings be used primarily as a starting point and should not be the sole factor used in making a credit decision. You must obtain more information from bank and trade references, local credit bureaus, or other sources before extending credit. infoUSA are not a financial advisor and makes no representations or warranties as to the accuracy, timeliness or completeness of the rating codes, and we will not be responsible for any losses resulting from the use of this information.

Generated by McKenzie Fire & Rescue on Mar 24, 2023 at 4:29pm using Regional Land Information Database, <https://www.rlid.org/>



# McKenzie Fire & Rescue

## 2022-2023

### Board of Directors

|                   |                     |             |
|-------------------|---------------------|-------------|
| Raymond Byrne, Jr | President           | Position #1 |
| Lee Means         | Vice-President      | Position #2 |
| Derek Wing        | Secretary/Treasurer | Position #4 |
| John Sullivan     | Director            | Position #5 |
| Bruce Daniel      | Director            | Position #3 |





# McKenzie Fire & Rescue

## 2023 EWEB Greenpower Grant Application

### Key Project Personnel

#### Darren Bucich Fire Chief

Darren Bucich was hired as the Fire Chief of McKenzie Fire & Rescue in February, 2009. He works tirelessly for the fire district, community members, and staff and volunteers. In addition to his work in-district, Darren has also served as President of the Oregon Fire Chiefs Association, and several State Boards that are by appointment only. Darren will oversee the installation of the solar panels on the station and work as the liaison between EWEB, Advanced Energy Systems, and McKenzie Fire & Rescue.

#### Bart Thompson Deputy Chief

Bart Thompson became a volunteer with McKenzie Fire & Rescue in 2004. He was initially hired as a Maintenance Officer in 2010, and through his commitment and dedication, was promoted to Deputy Chief in 2016. In addition to his in-district work, Bart also serves on Radio Committee, working in conjunction with the Lane County Fire Defense Board. Bart will oversee the day-to-day operations and coordinate with Advanced Energy Systems and any other entity required during the installation process.

#### Dulcy Pierce Administrative Assistant

Dulcy Pierce was hired as the Administrative Assistant for McKenzie Fire & Rescue in 2014. Dulcy is the grant administrator for any grants received by the district. Dulcy will also manage this grant from the administrative level, ensuring all financial guidelines are met. In addition to her in-district work, Dulcy has also served on the Board of Directors for the Lane County Fire Prevention Cooperative, and is the current President of the Oregon Fire Service Office Administrators (OFSOA) Board.

As you can see, each key project personnel is committed not only to McKenzie Fire & Rescue (a combined total of 36 years of project management experience) but they are civic minded, serving outside of their roles for the benefit of the district, surrounding communities, and local, state, and regional organizations.

Address 42870 McKenzie Hwy Leaburg, OR 97489-9631

Map & Taxlot# 17-15-10-24-02200

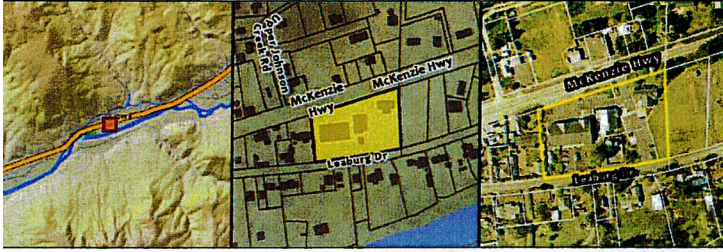
Account# 0547545 a

Additional site address(es) are associated with this tax account

**Property Owner 1**  
 McKenzie Rural Fire Dist  
 42870 McKenzie Hwy  
 Leaburg, OR 97489  
 Tax account acreage 1.74  
 Mapped taxlot acreage 2.54

\* Mapped Taxlot Acreage is the estimated size of a taxlot as derived from the county GIS taxlot layer, and is not to be used for legal purposes.

Map & Taxlot # 17-15-10-24-02200



Business Information

Business Profile Summary

Business Name  
 McKenzie Fire & Rescue  
 Address  
 370 McKenzie Hwy  
 Clatskanie, OR 97489-9631  
 Contact Information

Toll-free Phone  
 Phone (541) 896-3311

Website [mckenziefire.com](http://mckenziefire.com)

SIC and NAICS

NAICS Code 922160  
 NAICS Description Fire Protection  
 Primary SIC Code 922404  
 Primary SIC Description Fire Departments

Corporate Information

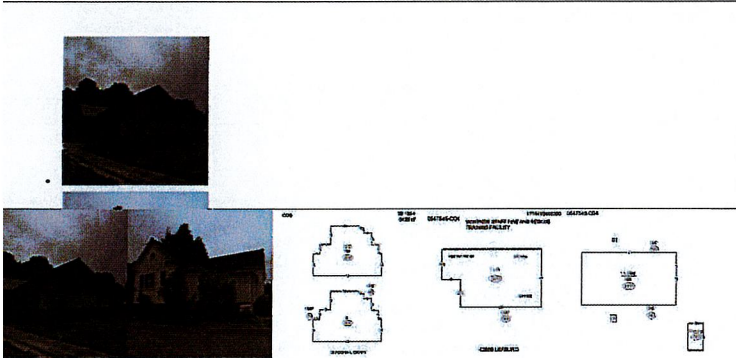
Location Employment Size 5 to 9 (range) | 5 (actual)  
 Location Sales Volume (range) | 0 (actual)

Source: InfoGroup/Government Division, 5711 S 26th Circle, Omaha, NE 68127, [www.infoUSA.gov](http://www.infoUSA.gov)



Improvements

Photos & Sketches for Tax Account



Improvement Part: Co1

|                         |                   |                            |      |
|-------------------------|-------------------|----------------------------|------|
| Improvement Number      | 1                 | Sq Ft                      | 3470 |
| Improvement Description | Clubhouse         | Fireproof Steel Sq Ft      | 0    |
| Improvement Description | TRAINING FACILITY | Reinforced Concrete Sq Ft  | 0    |
| Year Built              | 2007              | Fire Resistant Sq Ft       | 0    |
| Effective Year Built    | 2007              | Wood Joist Sq Ft           | 3470 |
| Code                    | 4                 | Pole Frame Sq Ft           | 0    |
| Height Ft               | 10                | Pre-engineered Steel Sq Ft | 0    |

Improvement Part: Co3

|                         |                  |                            |      |
|-------------------------|------------------|----------------------------|------|
| Improvement Number      | B                | Sq Ft                      | 3219 |
| Improvement Description | Library - Public | Fireproof Steel Sq Ft      | 0    |
| Improvement Description | LIBRARY          | Reinforced Concrete Sq Ft  | 0    |
| Year Built              | 1914             | Fire Resistant Sq Ft       | 0    |
| Effective Year Built    | 1980             | Wood Joist Sq Ft           | 3219 |
| Code                    | 4                | Pole Frame Sq Ft           | 0    |
| Height Ft               | 9                | Pre-engineered Steel Sq Ft | 0    |

Improvement Part: Co3

|                         |                  |                            |      |
|-------------------------|------------------|----------------------------|------|
| Improvement Number      | 1                | Sq Ft                      | 3219 |
| Improvement Description | Library - Public | Fireproof Steel Sq Ft      | 0    |
| Improvement Description | LIBRARY          | Reinforced Concrete Sq Ft  | 0    |
| Year Built              | 1914             | Fire Resistant Sq Ft       | 0    |
| Effective Year Built    | 1980             | Wood Joist Sq Ft           | 3219 |
| Code                    | 4                | Pole Frame Sq Ft           | 0    |
| Height Ft               | 9                | Pre-engineered Steel Sq Ft | 0    |

Improvement Part: Co4

|                         |                          |                            |      |
|-------------------------|--------------------------|----------------------------|------|
| Improvement Number      | 1                        | Sq Ft                      | 9100 |
| Improvement Description | Fire Station (Volunteer) | Fireproof Steel Sq Ft      | 0    |
| Improvement Description | MCKENZIE FIRE STATION    | Reinforced Concrete Sq Ft  | 0    |
| Year Built              | 2012                     | Fire Resistant Sq Ft       | 0    |
| Effective Year Built    | 2012                     | Wood Joist Sq Ft           | 0    |
| Code                    | 4                        | Pole Frame Sq Ft           | 0    |
| Height Ft               | 18                       | Pre-engineered Steel Sq Ft | 9100 |

Commercial Appraisal Card 1715102402200

Address Information

70 McKenzie Hwy  
 Leaburg, OR 97489-9631

|             |          |             |     |                 |       |
|-------------|----------|-------------|-----|-----------------|-------|
| House #     | 42870    | Suffix      | N/A | Pre-directional | N/A   |
| Street Name | McKenzie | Street Type | Hwy | Unit type / #   | N/A   |
| Mail City   | Leaburg  | State       | OR  | Zip Code        | 97489 |
| Zip = 4     | 9631     |             |     |                 |       |

Land Use 6722 Fire Stations, Community Fire Protection  
 USPS Carrier Route H045

Additional site address(es) attached to this tax account

- 42888 McKenzie Hwy

**General Taxlot Characteristics**

Geographic Coordinates  
 X 4349726 Y 896709 (State Plane X,Y)  
 Latitude 44.1066 Longitude -122.6760

Zoning  
**Zoning Jurisdiction** Lane County  
 Lane County  
**Parent Zone** RPF Rural Public Facility

Land Use  
**General Land Use**  
 Code Description  
 data not available data not available

**Detailed Land Use**  
 Code Description  
 data not available data not available

**Taxlot Characteristics**

|                               |                    |
|-------------------------------|--------------------|
| Incorporated City Limits      | none               |
| Urban Growth Boundary         | none               |
| Year Annexed                  | N/A                |
| Annexation #                  | N/A                |
| Approximate Taxlot Acreage    | 2.54               |
| Approx Taxlot Sq Footage      | 110,642            |
| Plan Designation              | Public Facility    |
| Eugene Neighborhood           | N/A                |
| Metro Area Nodal Dev Area     | No                 |
| Septic                        | data not available |
| Well                          | data not available |
| Landscaping Quality           | data not available |
| Historic Property Name        | N/A                |
| City Historic Landmark?       | No                 |
| National Historical Register? | No                 |

**Service Providers**

Fire Protection Provider McKenzie Fire & Rescue  
 Ambulance Provider Eugene Springfield Fire  
 Ambulance District EC  
 Ambulance Service Area East/Central  
 .TD Service Area? Yes  
 .TD Ride Source? Yes

**Environmental Data**

**FEMA Flood Hazard Zone**  
 Code Description  
 4 Areas determined to be outside of 500-year flood.  
 5 Areas of 500-year flood, areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile, and areas protected by levees from 100-year flood.  
 FIRM Map Number 41039C1210F  
 Community Number 039C  
 Post-FIRM Date data not available  
 Panel Printed? Yes

**Soils**

| Soil Map Unit# | Soil Type       | Description | % of Taxlot | Ag Class | Hydric % |
|----------------|-----------------|-------------|-------------|----------|----------|
| 01             | Jimbo Silt Loam |             | 100%        | 1        | 0        |

**Schools**

|                   | Code | Name        |
|-------------------|------|-------------|
| School District   | 19   | Springfield |
| Elementary School | 558  | Walterville |
| Middle School     | 557  | Thurston    |
| High School       | 561  | Thurston    |

**Political Districts**

|  |              |                                     |                                 |                      |
|--|--------------|-------------------------------------|---------------------------------|----------------------|
| Election Precinct                          | 751          | State Representative District 12    | Emerald PUD Board Zone          | N/A                  |
| City Council Ward                          | N/A          | State Representative Charlie Conrad | Heceta PUD Board Zone           | N/A                  |
| City Councilor                             | N/A          | State Senate District 6             | Central Lincoln PUD Board Zone  | N/A                  |
| County Commissioner District 5 (East Lane) |              | State Senator Cedric Hayden         | Soil Water Cons. Dist./Zone     | Upper Willamette / 5 |
| County Commissioner                        | Heather Buch |                                     | Creswell Water Control District | No                   |
| EWEB Commissioner                          | N/A          |                                     |                                 |                      |
| LCC Board Zone                             | 4            |                                     |                                 |                      |
| Lane ESD Board Zone                        | 3            |                                     |                                 |                      |

**census Information**

census data have been removed from this report. To obtain Census data, please visit [www.census.gov](http://www.census.gov). For questions or concerns, please contact [support@rlid.org](mailto:support@rlid.org).

**Permits**

**Building Permits**  
**Land Use Applications**

**Applications**

**Financial Statements & Tax Receipts**

Account #: 0547545

View tax statement(s) for:

- 2022
- 2021

**Tax Receipts**

| Receipt Date | Amount Received | Tax    | Discount | Interest | Applied Amount |
|--------------|-----------------|--------|----------|----------|----------------|
|              | \$0.00          | \$0.00 | \$0.00   | \$0.00   | \$0.00         |

Data source: Lane County Assessment and Taxation

**Owner/Taxpayer**

| Owner                    | Address            | City/State/Zip    |
|--------------------------|--------------------|-------------------|
| McKenzie Rural Fire Dist | 42870 McKenzie Hwy | Leaburg, OR 97489 |

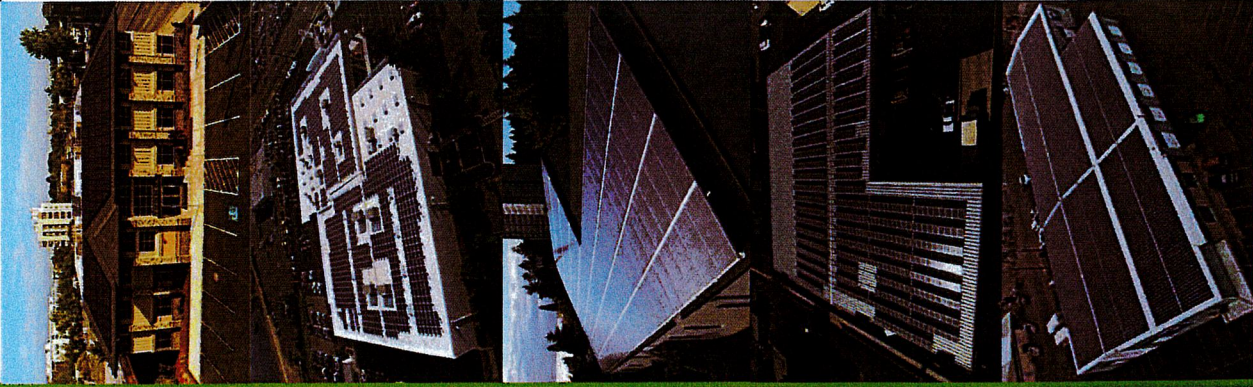
| Taxpayer                 | Address            | City/State/Zip    |
|--------------------------|--------------------|-------------------|
| McKenzie Rural Fire Dist | 42870 McKenzie Hwy | Leaburg, OR 97489 |

Data source: Lane County Assessment and Taxation

**Account Status**

Status Active Account Current Tax Year

ADVANCED  
ENERGY  
SYSTEMS



*Turning tax liability into renewable energy*

# Mckenzie Fire & Rescue

Site Location: 42870 McKenzie Hwy  
Walterville, Oregon 97489

## 9.6 KW Solar Electric System

Presented by  
Justin Wilbur  
Wednesday, March 15, 2023

Since 2002 Advanced Energy Systems has completed hundreds of solar energy installations throughout the state. Our clients include private commercial, industrial, and residential customers, as well as local, state and federal agencies. We provide a turn-key solution including site evaluation, energy analysis, grant writing, tax incentive analysis, engineering, custom design, project management, installation, and service. Advanced Energy Systems is an Oregon-based company. [www.AESrenew.com](http://www.AESrenew.com)

This Proposal is valid until 4/14/2023

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Advanced Energy Systems • 65 Centennial Loop, Eugene, OR 97401 • 541-683-2345 • [www.aesrenew.com](http://www.aesrenew.com) • CCB 160523



Turning tax liability into renewable energy

To: Darren Bucich  
Re: Mckenzie Fire & Rescue  
42870 McKenzie Hwy  
Walterville, Oregon 97489

## 9.6 KW Solar Electric System

### System Description:

A 9.6 KW PV power system, including Qcell 480 watt solar modules, a customized racking system, stainless steel module fastening hardware, SMA SB7.7-1SP-US-41 inverter(s), live solar monitoring web page and all necessary conduit, wire, fuses and disconnects for an NEC-compliant system. Permit fees and utility paperwork included.

|  |                          |
|--|--------------------------|
| <b>Total Cost Installed</b>              | <b>\$50,000</b>          |
| <b>Less Tax Credit &amp; Incentives:</b> |                          |
| EWEB Grant                               | (50,000)                 |
| Total Tax Credit & Incentives            | <u>(\$50,000)</u>        |
| <b>Installed Net Cost Sub-Total</b>      | <b>\$0</b>               |
| <b>Income Benefit</b>                    |                          |
| 35 Year Energy Savings                   | <u>(68,147)</u>          |
| <b>Net System Balance</b>                | <b><u>(\$68,146)</u></b> |

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Turning tax liability into renewable energy

### Energy Savings



First Year Savings  
 12,096 kWh First Year Savings  
 x \$0.106 From EWEB  
 = **\$1,197.10 Savings**



35 Year Energy Savings  
 389,277 kWh  
 at 3.7% Energy Rate Inflation  
 = **\$68,147 Total Savings**

### Environmental Benefits

During its lifetime, this system will offset:



5.5 Tons of CO2

Which is the equivalent to the conservation of:



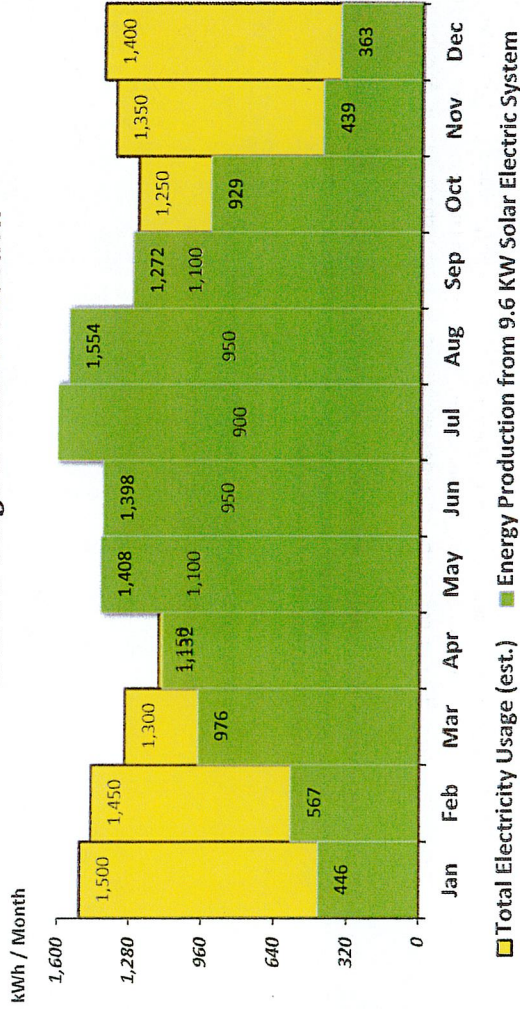
4,070 Trees

or . . .

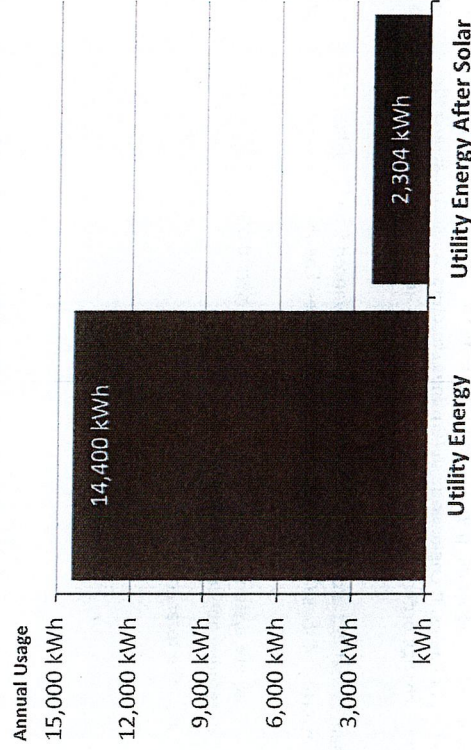


17,870 Gallons of Gasoline

### Electrical Usage & Solar Production



### Utility Provided Energy Offset by Solar: 84%



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Advanced Energy Systems • 65 Centennial Loop, Eugene, OR 97401 • 541-683-2345 • [www.aesrenew.com](http://www.aesrenew.com) • CCB 160523



**Notes:**

1. The system will require electrical and structural engineering reports to verify feasibility. These reports are required for obtaining permits. The costs of these reports are included in the total system cost quoted above. The cost estimates in this proposal assume standard installation techniques applicable to most buildings. If engineering determines structural or electrical upgrades are necessary to meet current building codes, the cost of the upgrades will be presented as a change order. Additional cost from change orders is also eligible for tax credits and depreciation benefits to the system owner.
2. Live web based monitoring requires an accessible owner supplied connection to the internet no farther than 25 feet distance from the Solar Inverter. Advanced Energy Systems will either run an ethernet jumper or use ethernet power over wire (pow) "bricks" to make the final ethernet connection to the inverter. If these methods do not work Advanced Energy Systems LLC will change additional labor and materials at Time and Material rates.
3. Utility or Energy Trust incentives are limited and available on a "first come first served" basis. These incentives require systems to remain operational for a period of time, failure to do so may result in repayment of the prorated grant amount. Cash grants are taxable, check with your financial advisor to determine applicable rates.
4. Specialized roofing procedures, if required by roofing contractor or roofing manufacturer of record, may increase the total cost.

# SUNNY BOY

## 3.0-US / 3.8-US / 5.0-US / 6.0-US / 7.0-US / 7.7-US



SB3.0-1SP-US-41 / SB3.8-1SP-US-41 / SB5.0-1SP-US-41 / SB6.0-1SP-US-41 / SB7.0-1SP-US-41 / SB7.7-1SP-US-41 / SB3.0-1TP-US-41 / SB3.8-1TP-US-41 / SB5.0-1TP-US-41 / SB6.0-1TP-US-41 / SB7.0-1TP-US-41 / SB7.7-1TP-US-41



### Value-Added Improvements

- SunSpec certified technology for cost-effective module-level shutdown
- Advanced AFCI compliant to UL 1699B for arc fault protection

### Reduced Labor

- New Installation Assistant with direct access via smartphone minimizes time in the field
- Advanced communication interface with fewer components creates 50% faster setup and commissioning

### Optimized Power Production

- ShadeFix, SMA's proprietary shade management solution, produces more power than alternatives
- Reduced component count provides maximum system reliability

### Trouble-Free Service

- SMA Service Mobile App provides simplified, expedited field service
- Equipped with SMA Smart Connected, a proactive service solution that is integrated into Sunny Portal

## SUNNY BOY 3.0-US / 3.8-US / 5.0-US / 6.0-US / 7.0-US / 7.7-US

Power with a purpose

The residential PV market is changing rapidly. Your bottom line matters more than ever—so we've designed a superior residential solution to help you decrease costs at every stage of your business operations. The Sunny Boy 3.0-US/3.8-US/5.0-US/6.0-US/7.0-US/7.7-US join the SMA lineup of field-proven solar technology backed by the world's #1 service team. This improved residential solution features ShadeFix, SMA's proprietary technology that optimizes system performance. ShadeFix also provides superior power production with a reduced component count versus competitors, which provides maximum reliability. No other optimized solution generates more power or is as easy as systems featuring SMA ShadeFix and SunSpec certified devices. Finally, SMA Smart Connected will automatically detect errors and initiate the repair and replacement process so that installers can reduce service calls and save time and money.

[www.SMA-America.com](http://www.SMA-America.com)



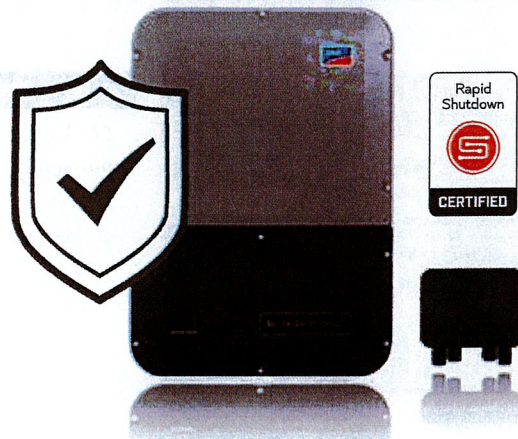
| Technical data  | Sunny Boy 6.0-US                  |             | Sunny Boy 7.0-US   |             | Sunny Boy 7.7-US                  |             |
|---|-----------------------------------|-------------|--|-------------|-----------------------------------|-------------|
|   | 208 V                             | 240 V       | 208 V  | 240 V       | 208 V                             | 240 V       |
| <b>Input (DC)</b>   |                                   |             |  |             |                                   |             |
| Max. PV power   | 9600 Wp                           |             | 11200 Wp   |             | 12320 Wp                          |             |
| Max. DC Voltage   | 600 V                             |             | 600 V  |             | 600 V                             |             |
| Rated MPP Voltage range   | 220 - 480 V                       |             | 245 - 480 V  |             | 270 - 480 V                       |             |
| MPPT operating voltage range  |                                   |             | 100 - 550 V  |             |                                   |             |
| Min. DC voltage / start voltage   |                                   |             | 100 V / 125 V  |             |                                   |             |
| Max. operating input current per MPPT   |                                   |             | 10 A   |             |                                   |             |
| Max. short circuit current per MPPT   |                                   |             | 18 A   |             |                                   |             |
| Number of MPPT tracker / string per MPPT tracker  |                                   |             | 3 / 1  |             |                                   |             |
| <b>Output (AC)</b>  |                                   |             |  |             |                                   |             |
| AC nominal power  | 5200 W                            | 6000 W      | 6660 W   | 7000 W      | 6660 W                            | 7680 W      |
| Max. AC apparent power  | 5200 VA                           | 6000 VA     | 6660 VA  | 7000 VA     | 6660 VA                           | 7680 VA     |
| Nominal voltage / adjustable  | 208 V / ●                         | 240 V / ●   | 208 V / ●  | 240 V / ●   | 208 V / ●                         | 240 V / ●   |
| AC voltage range  | 183 - 229 V                       | 211 - 264 V | 183 - 229 V  | 211 - 264 V | 183 - 229 V                       | 211 - 264 V |
| AC grid frequency   |                                   |             | 60 Hz / 50 Hz  |             |                                   |             |
| Max. output current   | 25.0 A                            | 25.0 A      | 32.0 A   | 29.2 A      | 32.0 A                            | 32.0 A      |
| Power factor (cos φ) / harmonics  |                                   |             | 1 / < 4 %  |             |                                   |             |
| Output phases / line connections  |                                   |             | 1 / 2  |             |                                   |             |
| <b>Efficiency</b>   |                                   |             |  |             |                                   |             |
| Max. efficiency   | 97.3 %                            | 97.7 %      | 97.3 %   | 97.9 %      | 97.3 %                            | 97.5 %      |
| CEC efficiency  | 96.5 %                            | 97.0 %      | 96.5 %   | 97.0 %      | 96.5 %                            | 97.0 %      |
| <b>Protection devices</b>   |                                   |             |  |             |                                   |             |
| DC disconnect device / DC reverse polarity protection   |                                   |             | ● / ●  |             |                                   |             |
| Ground fault monitoring / Grid monitoring   |                                   |             | ●  |             |                                   |             |
| AC short circuit protection   |                                   |             | ●  |             |                                   |             |
| All-pole sensitive residual current monitoring unit (RCMU)  |                                   |             | ●  |             |                                   |             |
| Arc fault circuit interrupter (AFCI)  |                                   |             | ●  |             |                                   |             |
| Protection class / overvoltage category   |                                   |             | I / IV   |             |                                   |             |
| <b>General data</b>   |                                   |             |  |             |                                   |             |
| Dimensions (W / H / D) in mm (in)   |                                   |             | 535 x 730 x 198 (21.1 x 28.5 x 7.8)  |             |                                   |             |
| Packaging Dimensions (W / H / D) in mm (in)   |                                   |             | 600 x 800 x 300 (23.6 x 31.5 x 11.8)   |             |                                   |             |
| Weight / packaging weight   |                                   |             | 26 kg (57 lb) / 30 kg (66 lb)  |             |                                   |             |
| Temperature range: operating / non-operating  |                                   |             | -25°C ...+60°C / -40°C ...+60°C  |             |                                   |             |
| Environmental protection rating   |                                   |             | NEMA 3R  |             |                                   |             |
| Noise emission (typical)  | 39 dB(A)                          |             |  |             | 45 dB(A)                          |             |
| Internal power consumption at night   |                                   |             | < 5 W  |             |                                   |             |
| Topology / cooling concept  | transformerless / convection      |             |  |             | transformerless / fan             |             |
| <b>Features</b>   |                                   |             |  |             |                                   |             |
| Ethernet ports  |                                   |             | 2  |             |                                   |             |
| Secure Power Supply   |                                   |             | ● 1)   |             |                                   |             |
| Display (2 x 16 characters)   |                                   |             | ●  |             |                                   |             |
| 2.4 GHz WLAN / External WLAN antenna  |                                   |             | ▲ / ○  |             |                                   |             |
| ShadeFix technology for string level optimization   |                                   |             | ●  |             |                                   |             |
| Cellular (4G / 3G) / Revenue Grade Meter  |                                   |             | ○ / ○ 2)   |             |                                   |             |
| Warranty: 10 / 15 / 20 years  |                                   |             | ● / ○ / ○ 3)   |             |                                   |             |
| Certificates and approvals  |                                   |             | UL 1741, UL 1741 SA incl. CA Rule 21 RSD, UL 1998, UL 1699B Ed. 1, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA V22.2 107.1-1, HECO Rule 14H, PV Rapid Shutdown System Equipment |             |                                   |             |
| ● Standard features ○ Optional features – Not available ▲ Subject to availability                         |                                   |             |  |             |                                   |             |
| Data at nominal conditions 1) Not compatible with SunSpec shutdown devices 2) Standard in SBX-X-1TP-US-41 |                                   |             |  |             |                                   |             |
| Type designation  | SB6.0-1SP-US-41 / SB6.0-1TP-US-41 |             | SB7.0-1SP-US-41 / SB7.0-1TP-US-41  |             | SB7.7-1SP-US-41 / SB7.7-1TP-US-41 |             |

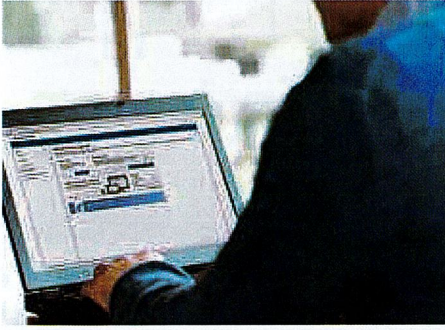
## THE SMA ENERGY SYSTEM HOME

The SMA Energy System Home combines legendary SMA inverter performance and SunSpec certified shutdown devices in one cost-effective, comprehensive package. In addition, SMA ShadeFix technology optimizes power production and provides greater reliability than alternatives.

This rapid shutdown solution fulfills UL 1741, NEC 2014, and NEC 2017 requirements and is certified to the power line-based SunSpec Rapid Shutdown communication signal over DC wires, making it the most simple and cost-effective rapid shutdown solution on the market.

Visit [www.SMA-America.com](http://www.SMA-America.com) for more information.





### SIMPLE, FLEXIBLE DESIGN

Speed the completion of customer proposals and maximize the efficiency of your design team with the Sunny Boy-US series, which provides a new level of flexibility in system design by offering:

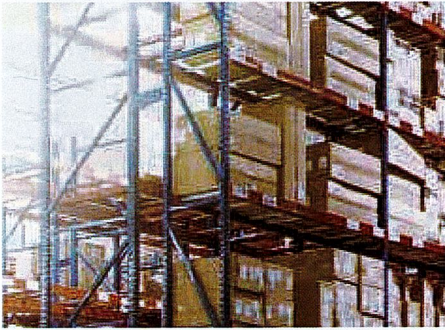
- » Hundreds of stringing configurations and multiple independent MPPTs
- » SMA's proprietary ShadeFix technology optimizes power production
- » Diverse application options including on- and off-grid compatibility



### VALUE-DRIVEN SALES ENABLEMENT

SMA wants to enable your sales team by arming them with an abundance of feature/benefit support. Show your customers the value of the Sunny Boy-US series by utilizing:

- » The opportunity to join the SMA PowerUP network of installers who receive in-depth training, enhanced service, and prioritized marketing support
- » SMA's 40 year history and status as the #1 global inverter manufacturer instills homeowners with peace of mind and the long-term security they demand from a PV investment
- » The most economical solution for shade mitigation with superior power production



### IMPROVED STOCKING AND ORDERING

Ensure that your back office business operations run smoothly and succinctly while mitigating potential errors. The Sunny Boy-US series can help achieve cost savings in these areas by providing:

- » An integrated DC disconnect that simplifies equipment stocking and allows for a single inverter part number
- » All communications integrated into the inverter, eliminating the need to order additional equipment



### STREAMLINED INSTALLATION AND COMMISSIONING

Expedite your operations in the field by taking advantage of the new Sunny Boy's installer-friendly feature set including:

- » Direct access via smartphone and utilization of SMA's Installation Assistant, which minimizes time/labor spent in the field and speeds the path to commissioning
- » Simple commissioning and monitoring setup in a single online portal
- » The fastest, easiest installation thanks to SMA ShadeFix and SunSpec certified shutdown devices



### SUPERIOR SERVICE

SMA understands the factors that contribute to lifetime PV ownership cost, that's why the Sunny Boy-US series was designed for maximum reliability and backstopped by an unmatched service offering. Benefit from:

- » SMA Smart Connected, a proactive service solution integrated into Sunny Portal that automatically detects errors and initiates the repair and replacement process
- » The SMA Service Mobile App, which provides simplified, expedited field service

powered by

**Q.ANTUM DUO Z**

# Q.PEAK DUO XL-G10.c

## 475-495

ENDURING HIGH  
PERFORMANCE



### BREAKING THE 21% EFFICIENCY BARRIER

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 21.6%.



### LOW ELECTRICITY GENERATION COSTS

Higher yield per surface area, lower BOS costs and up to 80 watts more module power than standard 144 half-cell modules.



### ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology<sup>1</sup>, Hot-Spot Protect and Traceable Quality Tra.Q™.



### EXTREME WEATHER RATING

High-tech aluminum alloy frame, certified for high snow (5400Pa) and wind loads (3000Pa).



### A RELIABLE INVESTMENT

Inclusive 12-year product warranty and 25-year linear performance warranty<sup>2</sup>.



### STATE OF THE ART MODULE TECHNOLOGY

Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.

<sup>1</sup> APT test conditions according to IEC/TS 62804-1:2015, method A (-1500V, 96h)

<sup>2</sup> See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

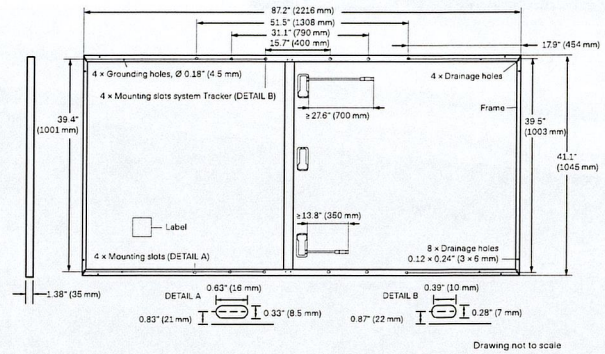


Ground-mounted  
solar power plants

## MECHANICAL SPECIFICATION

|              |   |
|--------------|---|
| Format       | 87.2in x 41.1in x 1.38in (including frame)<br>(2216mm x 1045mm x 35mm)                              |
| Weight       | 58.4lbs (26.5kg)  |
| Front Cover  | 0.13in (3.2mm) thermally pre-stressed glass with anti-reflection technology                         |
| Back Cover   | Composite film  |
| Frame        | Anodized aluminum   |
| Cell         | 6 x 26 monocrystalline Q.ANTUM solar half cells   |
| Junction Box | 2.09-3.98in x 1.26-2.36in x 0.59-0.71in<br>(53-101mm x 32-60mm x 15-18mm), IP67, with bypass diodes |
| Cable        | 4mm <sup>2</sup> Solar cable; (+) ≥27.6in (700mm), (-) ≥13.8in (350mm)*                             |
| Connector    | Stäubli MC4-Evo2, Hanwha Q CELLS HQC4; IP68   |

\*Long cables (+) ≥57.1in (1450mm), (-) ≥57.1in (1450mm) for landscape installation are available upon request.



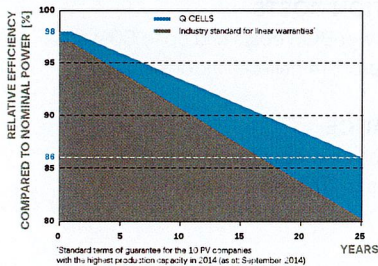
## ELECTRICAL CHARACTERISTICS

| POWER CLASS   |                                    | 475                  | 480   | 485   | 490   | 495   |       |
|---|------------------------------------|----------------------|-------|-------|-------|-------|-------|
| MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC <sup>1</sup> (POWER TOLERANCE +5W / -0W) |                                    |                      |       |       |       |       |       |
| Minimum   | Power at MPP <sup>1</sup>          | P <sub>MPP</sub> [W] | 475   | 480   | 485   | 490   | 495   |
|   | Short Circuit Current <sup>1</sup> | I <sub>SC</sub> [A]  | 11.24 | 11.26 | 11.29 | 11.31 | 11.34 |
|   | Open Circuit Voltage <sup>1</sup>  | V <sub>OC</sub> [V]  | 53.58 | 53.61 | 53.64 | 53.68 | 53.71 |
|   | Current at MPP                     | I <sub>MPP</sub> [A] | 10.66 | 10.71 | 10.76 | 10.81 | 10.86 |
|   | Voltage at MPP                     | V <sub>MPP</sub> [V] | 44.54 | 44.81 | 45.07 | 45.33 | 45.59 |
|   | Efficiency <sup>2</sup>            | η [%]                | ≥20.5 | ≥20.7 | ≥20.9 | ≥21.2 | ≥21.4 |
| MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT <sup>2</sup>                         |                                    |                      |       |       |       |       |       |
| Minimum   | Power at MPP                       | P <sub>MPP</sub> [W] | 356.4 | 360.1 | 363.9 | 367.6 | 371.4 |
|   | Short Circuit Current              | I <sub>SC</sub> [A]  | 9.05  | 9.07  | 9.09  | 9.12  | 9.14  |
|   | Open Circuit Voltage               | V <sub>OC</sub> [V]  | 50.53 | 50.56 | 50.59 | 50.62 | 50.65 |
|   | Current at MPP                     | I <sub>MPP</sub> [A] | 8.39  | 8.43  | 8.47  | 8.52  | 8.56  |
|   | Voltage at MPP                     | V <sub>MPP</sub> [V] | 42.49 | 42.72 | 42.94 | 43.17 | 43.39 |

<sup>1</sup>Measurement tolerances P<sub>MPP</sub> ±3%, I<sub>SC</sub>, V<sub>OC</sub> ±5% at STC: 1000W/m<sup>2</sup>, 25 ± 2°C, AM 1.5 according to IEC 60904-3 • 2800W/m<sup>2</sup>, NMOT, spectrum AM 1.5

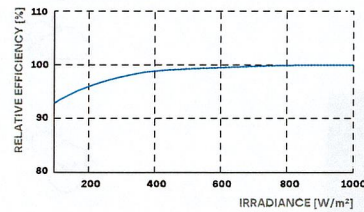
### Q CELLS PERFORMANCE WARRANTY

### PERFORMANCE AT LOW IRRADIANCE



At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

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



Typical module performance under low irradiance conditions in comparison to STC conditions (25°C, 1000W/m<sup>2</sup>)

### TEMPERATURE COEFFICIENTS

|   |         |       |  |           |                      |
|---|---------|-------|--|-----------|----------------------|
| Temperature Coefficient of I <sub>SC</sub>  | α [%/K] | +0.04 | Temperature Coefficient of V <sub>OC</sub> | β [%/K]   | -0.27                |
| Temperature Coefficient of P <sub>MPP</sub> | γ [%/K] | -0.34 | Nominal Module Operating Temperature       | NMOT [°F] | 109 ± 5.4 (43 ± 3°C) |

## PROPERTIES FOR SYSTEM DESIGN

|  |                        |                          |   |   |
|--|------------------------|--------------------------|---|---|
| Maximum System Voltage V <sub>sys</sub>  | [V]                    | 1500 (IEC)/1500 (UL)     | PV module classification                        | Class II                                  |
| Maximum Series Fuse Rating               | [A DC]                 | 20                       | Fire Rating based on ANSI/UL 61730              | TYPE I                                    |
| Max. Design Load, Push/Pull <sup>3</sup> | [lbs/ft <sup>2</sup> ] | 75 (3600Pa)/42 (2000Pa)  | Permitted Module Temperature on Continuous Duty | -40°F up to +185°F<br>(-40°C up to +85°C) |
| Max. Test Load, Push/Pull <sup>3</sup>   | [lbs/ft <sup>2</sup> ] | 113 (5400Pa)/63 (3000Pa) |   |   |

<sup>3</sup>See Installation Manual

## QUALIFICATIONS AND CERTIFICATES

UL 61730, CE-compliant,  
IEC 61215:2016,  
IEC 61730:2016,  
U.S. Patent No. 9,893,215  
(solar cells);  
Certification in process.



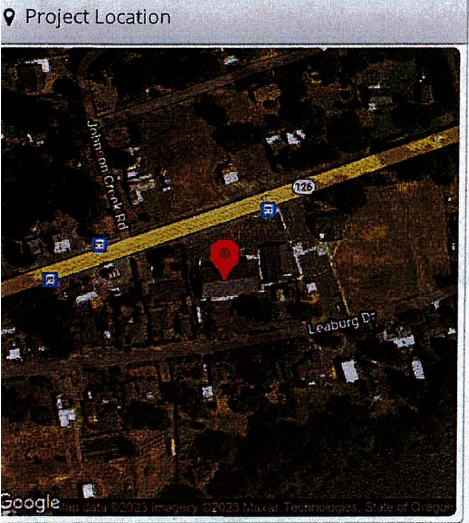
**Note:** Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS America Inc.

400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL inquiry@us.q-cells.com | WEB www.q-cells.us

# GreenPower McKenzie Fire Dist., 42870 Mckenzie hwy Waltherville, OR 97489

| Design        |                               |
|---------------|-------------------------------|
| Design        | GreenPower                    |
| DC Nameplate  | 9.60 kW                       |
| AC Nameplate  | 7.68 kW (1.25 DC/AC)          |
| Last Modified | AES Design (Today at 5:19 PM) |



| Components |  |              |
|------------|--|--------------|
| Component  | Name   | Count        |
| Inverters  | SB7.7-15P-US-41 (240V) (SMA)                       | 1 (7.68 kW)  |
| Strings    | 10 AWG (Copper)                                    | 2 (75.5 ft)  |
| Module     | Hanwha Q Cells, Q.Peak DUO XL-G10.3/BFG 480 (480W) | 20 (9.60 kW) |

| Field Segments |             |                     |      |            |                  |            |        |         |         |
|----------------|-------------|---------------------|------|------------|------------------|------------|--------|---------|---------|
| Description    | Racking     | Orientation         | Tilt | Azimuth    | Intrarow Spacing | Frame Size | Frames | Modules | Power   |
| PV1            | Flush Mount | Portrait (Vertical) | 21°  | 172.45348° | 0.0 ft           | 1x1        | 20     | 20      | 9.60 kW |

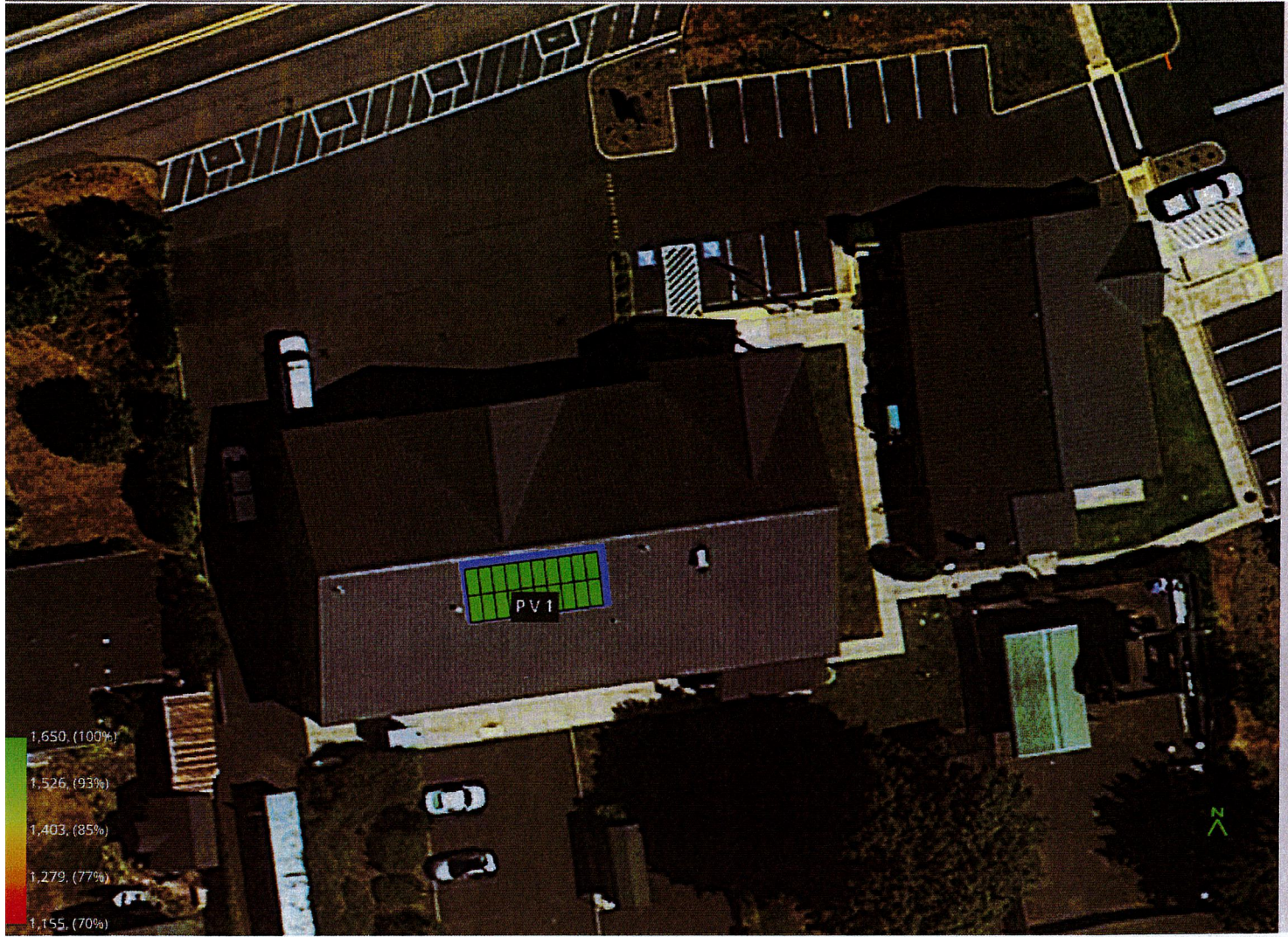
| Wiring Zones |                |             |                    |
|--------------|----------------|-------------|--------------------|
| Description  | Combiner Poles | String Size | Stringing Strategy |
| Wiring Zone  | -              | 7-10        | Along Racking      |

Detailed Layout



# GreenPower McKenzie Fire Dist., 42870 Mckenzie hwy Waltherville, OR 97489

## Shading Heatmap



### Shading by Field Segment

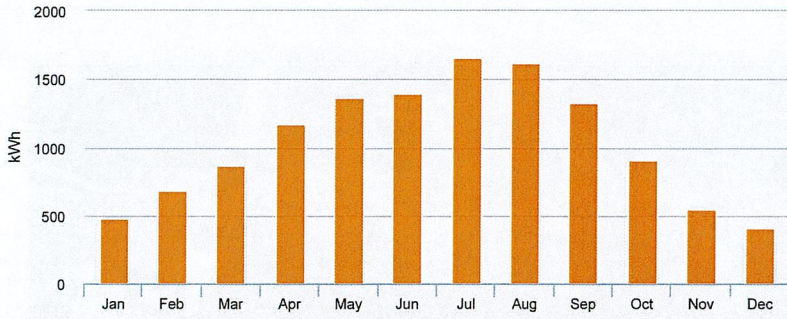
| Description             | Tilt  | Azimuth | Modules | Nameplate | Shaded Irradiance         | AC Energy             | TOF <sup>2</sup> | Solar Access | Avg TSRF <sup>2</sup> |
|-------------------------|-------|---------|---------|-----------|---------------------------|-----------------------|------------------|--------------|-----------------------|
| /1                      | 21.0° | 172.5°  | 20      | 9.60 kWp  | 1,607.4kWh/m <sup>2</sup> | 12.4 MWh <sup>1</sup> | 97.4%            | 100.0%       | 97.4%                 |
| Totals, weighted by kWp |       |         | 20      | 9.60 kWp  | 1,607.4kWh/m <sup>2</sup> | 12.4 MWh              | 97.4%            | 100.0%       | 97.4%                 |

<sup>1</sup> approximate, varies based on inverter performance  
<sup>2</sup> based on location Optimal POA Irradiance of 1,650.1kWh/m<sup>2</sup> at 34.9° tilt and 183.2° azimuth

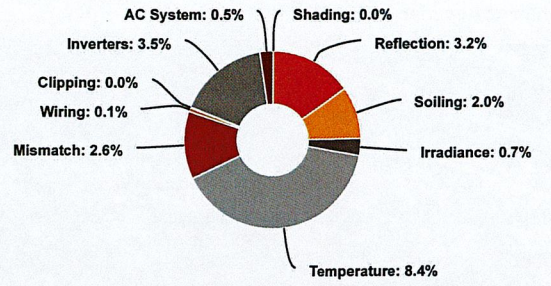
### Solar Access by Month

| Description                   | jan    | feb    | mar    | apr     | may     | jun     | jul     | aug     | sep     | oct    | nov    | dec   |
|-------------------------------|--------|--------|--------|---------|---------|---------|---------|---------|---------|--------|--------|-------|
| /1                            | 100%   | 100%   | 100%   | 100%    | 100%    | 100%    | 100%    | 100%    | 100%    | 100%   | 100%   | 100%  |
| Solar Access, weighted by kWp | 100.0% | 100.0% | 100.0% | 100.0%  | 100.0%  | 100.0%  | 100.0%  | 100.0%  | 100.0%  | 100.0% | 100.0% | 99.8% |
| AC Power (kWh)                | 476.9  | 680.7  | 870.4  | 1,173.3 | 1,369.3 | 1,392.7 | 1,659.1 | 1,617.0 | 1,326.9 | 907.7  | 544.4  | 413.6 |

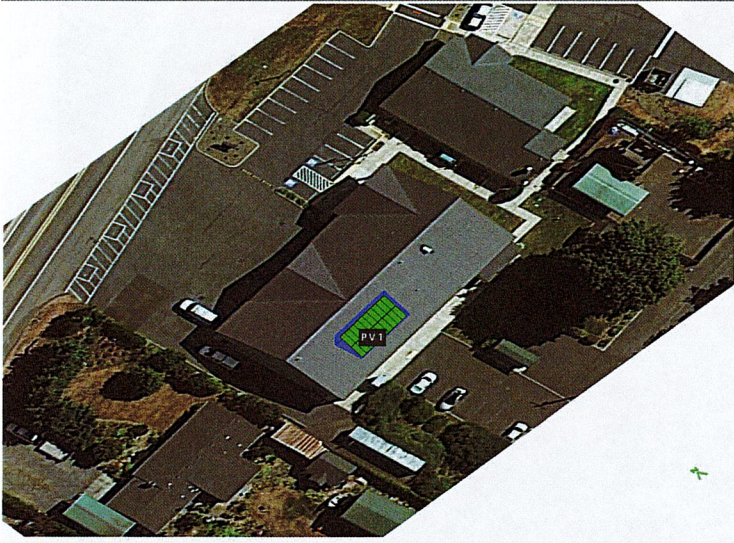
Monthly Production



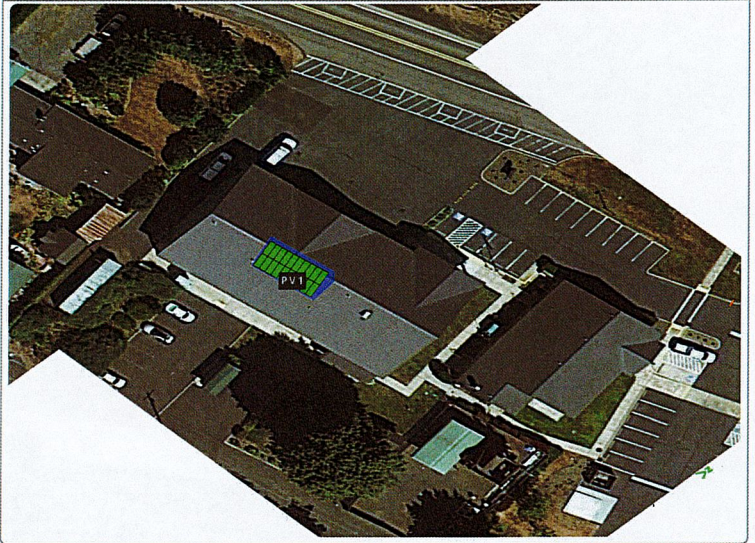
Sources of System Loss



Southwestern Angle



Southeastern Angle

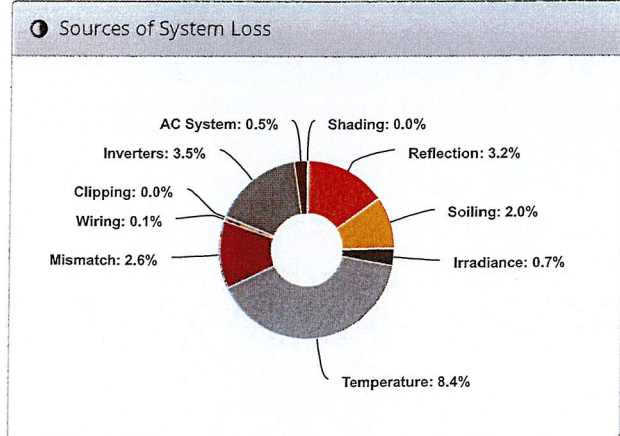
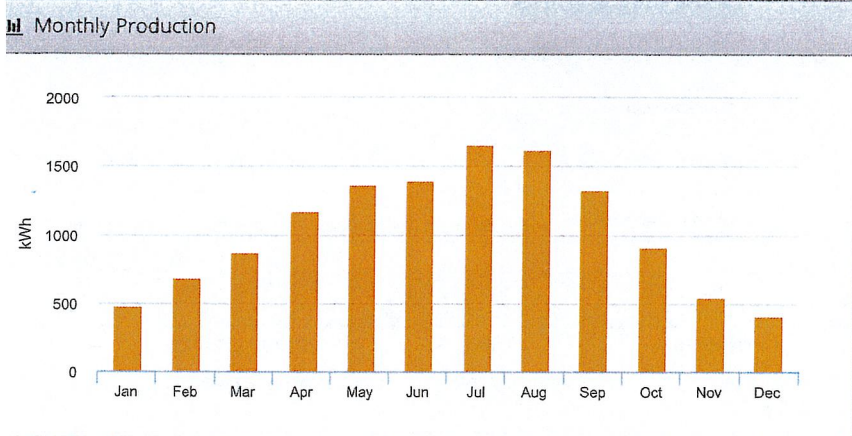
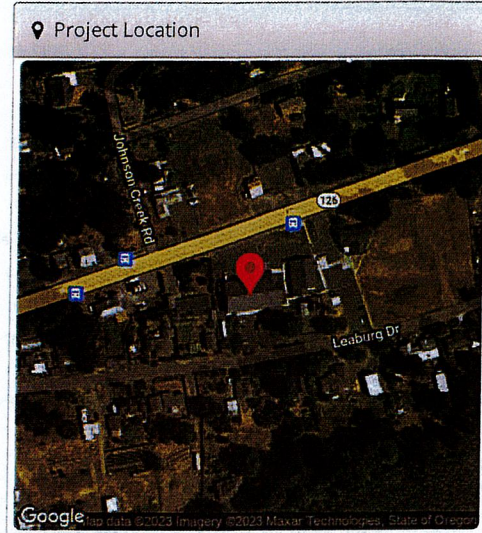




# GreenPower McKenzie Fire Dist., 42870 Mckenzie hwy Waltherville, OR 97489

| Report          |   |
|-----------------|---|
| Project Name    | McKenzie Fire Dist.                       |
| Project Address | 42870 Mckenzie hwy Waltherville, OR 97489 |
| Prepared By     | AES Design<br>info@aesrenew.com           |

| System Metrics        |   |
|-----------------------|---|
| Design                | GreenPower  |
| Module DC Nameplate   | 9.60 kW   |
| Inverter AC Nameplate | 7.68 kW<br>Load Ratio: 1.25                       |
| Annual Production     | 12.43 MWh   |
| Performance Ratio     | 80.6%   |
| kWh/kWp               | 1,295.0   |
| Weather Dataset       | TMY, 10km Grid (44.15,-122.65), NREL (prospector) |
| Simulator Version     | bd726797e3-c6dc798c02-b135fa1d14-3ecbdc96a0       |



| ⚡ Annual Production                 |                                     |                 |              |
|-------------------------------------|-------------------------------------|-----------------|--------------|
|                                     | Description                         | Output          | % Delta      |
| Irradiance<br>(kWh/m <sup>2</sup> ) | Annual Global Horizontal Irradiance | 1,415.2         |              |
|                                     | POA Irradiance                      | 1,607.6         | 13.6%        |
|                                     | Shaded Irradiance                   | 1,607.4         | 0.0%         |
|                                     | Irradiance after Reflection         | 1,556.0         | -3.2%        |
|                                     | Irradiance after Soiling            | 1,524.8         | -2.0%        |
|                                     | <b>Total Collector Irradiance</b>   | <b>1,524.8</b>  | <b>0.0%</b>  |
| Energy<br>(kWh)                     | Nameplate                           | 14,639.0        |              |
|                                     | Output at Irradiance Levels         | 14,542.2        | -0.7%        |
|                                     | Output at Cell Temperature Derate   | 13,315.7        | -8.4%        |
|                                     | Output After Mismatch               | 12,969.6        | -2.6%        |
|                                     | Optimal DC Output                   | 12,950.2        | -0.1%        |
|                                     | Constrained DC Output               | 12,947.8        | 0.0%         |
|                                     | Inverter Output                     | 12,494.5        | -3.5%        |
|                                     | <b>Energy to Grid</b>               | <b>12,432.0</b> | <b>-0.5%</b> |
|                                     | <b>Temperature Metrics</b>          |                 |              |
|                                     | Avg. Operating Ambient Temp         |                 | 12.6 °C      |
|                                     | Avg. Operating Cell Temp            |                 | 30.2 °C      |
| <b>Simulation Metrics</b>           |                                     |                 |              |
|                                     | Operating Hours                     |                 | 4678         |
|                                     | Solved Hours                        |                 | 4678         |

| ☁ Condition Set              |   |       |         |                   |   |   |             |   |                                  |   |   |   |
|------------------------------|---|-------|---------|-------------------|---|---|-------------|---|----------------------------------|---|---|---|
| Description                  | Condition Set 1                                   |       |         |                   |   |   |             |   |                                  |   |   |   |
| Weather Dataset              | TMY, 10km Grid (44.15,-122.65), 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               |   |   |             |   |                                  |   |   |   |
|                              | East-West   | -3.56 | -0.075  | 3°C               |   |   |             |   |                                  |   |   |   |
|                              | Carport   | -3.56 | -0.075  | 3°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 XL-G10.3/BFG 480 (Hanwha Q Cells)      |       |         |                   |   |   | HelioScope  |   | Spec Sheet Characterization, PAN |   |   |   |
| Component Characterizations  | Device  |       |         |                   |   |   | Uploaded By |   | Characterization                 |   |   |   |
|                              | SB7.7-1SP-US-41 (240V) (SMA)                      |       |         |                   |   |   | HelioScope  |   | Spec Sheet                       |   |   |   |

| 📦 Components |  |              |
|--------------|--|--------------|
| Component    | Name   | Count        |
| Inverters    | SB7.7-1SP-US-41 (240V) (SMA)                       | 1 (7.68 kW)  |
| Strings      | 10 AWG (Copper)                                    | 2 (75.5 ft)  |
| Module       | Hanwha Q Cells, Q.Peak DUO XL-G10.3/BFG 480 (480W) | 20 (9.60 kW) |

| 🏠 Wiring Zones |                |             |                    |
|----------------|----------------|-------------|--------------------|
| Description    | Combiner Poles | String Size | Stringing Strategy |
| Wiring Zone    | -              | 7-10        | Along Racking      |

| 🏠 Field Segments |             |                     |      |            |                  |            |        |         |         |
|------------------|-------------|---------------------|------|------------|------------------|------------|--------|---------|---------|
| Description      | Racking     | Orientation         | Tilt | Azimuth    | Intrarow Spacing | Frame Size | Frames | Modules | Power   |
| PV1              | Flush Mount | Portrait (Vertical) | 21°  | 172.45348° | 0.0 ft           | 1x1        | 20     | 20      | 9.60 kW |

Detailed Layout

