Exhibit D

Design-Build Contract

Bond Forms

HOOD RIVER COUNTY, OREGON

STANDARD PUBLIC IMPROVEMENT CONTRACT

PAYMENT BOND

Bond No. _____
Solicitation _____
Project Name Fairgrounds Improvement Project

_____(Surety #1)	Bond Amount No. 1:	$ _____
_____(Surety #2)*	Bond Amount No. 2:*	$ _____
* *If using multiple sureties*	Total Penal Sum of Bond:	$ _____

We, _____, as Principal, and the above identified Surety(ies), authorized to transact surety business in Oregon, as Surety, hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto Hood River County, Oregon the sum of (Total Penal Sum of Bond) _____

(Provided, that we the Sureties bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety), and

WHEREAS, the Principal has entered into a contract with Hood River County, Oregon, the plans, specifications, terms and conditions of which are contained in above-referenced Solicitation;

WHEREAS, the terms and conditions of the contract, together with applicable plans, standard specifications, special provisions, schedule of performance, and schedule of contract prices, are made a part of this Payment Bond by reference, whether or not attached to the contract (all hereafter called "Contract"); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, plans and specifications, and schedule of contract prices which are set forth in the Contract and any attachments, and all authorized modifications of the Contract which increase the amount of the work, or the cost of the Contract, or constitute authorized extensions of time for performance of the Contract, notice of any such modifications hereby being waived by the Surety:

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things by it undertaken to be performed under said Contract and any duly authorized modifications that are made, upon the terms set forth therein, and within the time prescribed therein, or as extended therein as provided in the Contract, with or without notice to the Sureties, and shall indemnify and save harmless Hood River County, Oregon and members thereof, its officers, employees and agents, against any claim for direct or indirect damages of every kind and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the

Contract by the Contractor or its subcontractors, and shall promptly pay all persons supplying labor, materials or both to the Principal or its subcontractors for prosecution of the work provided in the Contract; and shall promptly pay all contributions due the State Industrial Accident Fund and the State Unemployment Compensation Fund from the Principal or its subcontractors in connection with the performance of the Contract; and shall pay over to the Oregon Department of Revenue all sums required to be deducted and retained from the wages of employees of the Principal and its subcontractors pursuant to ORS 316.167, and shall permit no lien nor claim to be filed or prosecuted against the State on account of any labor or materials furnished; and shall do all things required of the Principal by the laws of this State, then this obligation shall be void; otherwise, it shall remain in full force and effect.

Nonpayment of the bond premium will not invalidate this bond nor shall Hood River County, Oregon be obligated for the payment of any premiums.

This bond is given and received under authority of ORS Chapter 279C, the provisions of which hereby are incorporated into this bond and made a part hereof.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES:

Dated this _____day of _____, 20__.

PRINCIPAL: _____

By _____
Signature

_____
Official Capacity

Attest: _____
Corporation Secretary

SURETY: _____
[Add signatures for each if using multiple bonds]

BY ATTORNEY-IN-FACT:
[Power-of-Attorney must accompany each bond]

_____
Name

_____
Signature

_____
Address

_____
City State Zip

_____
Phone Fax

HOOD RIVER COUNTY, OREGON

STANDARD PUBLIC IMPROVEMENT CONTRACT

PERFORMANCE BOND

Bond No._____
Solicitation _____
Project Name Fairgrounds Improvement Project

_____(Surety #1)	Bond Amount No. 1:	$_____
_____(Surety #2)*	Bond Amount No. 2:*	$_____
* *If using multiple sureties*	Total Penal Sum of Bond:	$_____

We, _____as Principal, and the above identified Surety(ies), authorized to transact surety business in Oregon, as Surety, hereby jointly and severally bind ourselves, our respective heirs, executors, administrators, successors and assigns firmly by these presents to pay unto Hood River County, Oregon the sum of (Total Penal Sum of Bond)

_____

(Provided, that we the Sureties bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us, and for all other purposes each Surety binds itself, jointly and severally with the Principal, for the payment of such sum only as is set forth opposite the name of such Surety), and

WHEREAS, the Principal has entered into a contract with Hood River County, Oregon, the plans, specifications, terms and conditions of which are contained in the above-referenced Solicitation;

WHEREAS, the terms and conditions of the contract, together with applicable plans, standard specifications, special provisions, schedule of performance, and schedule of contract prices, are made a part of this Performance Bond by reference, whether or not attached to the contract (all hereafter called "Contract"); and

WHEREAS, the Principal has agreed to perform the Contract in accordance with the terms, conditions, requirements, plans and specifications, and all authorized modifications of the Contract which increase the amount of the work, the amount of the Contract, or constitute an authorized extension of the time for performance, notice of any such modifications hereby being waived by the Surety:

NOW, THEREFORE, THE CONDITION OF THIS BOND IS SUCH that if the Principal herein shall faithfully and truly observe and comply with the terms, conditions and provisions of the Contract, in all respects, and shall well and truly and fully do and perform all matters and things undertaken by Contractor to be performed under the Contract, upon the terms set forth therein,

and within the time prescribed therein, or as extended as provided in the Contract, with or without notice to the Sureties, and shall indemnify and save harmless Hood River County , Oregon, its officers, employees and agents, against any direct or indirect damages or claim of every kind and description that shall be suffered or claimed to be suffered in connection with or arising out of the performance of the Contract by the Principal or its subcontractors, and shall in all respects perform said contract according to law, then this obligation is to be void; otherwise, it shall remain in full force and effect.

Nonpayment of the bond premium will not invalidate this bond nor shall Hood River County, Oregon, be obligated for the payment of any premiums.

This bond is given and received under authority of ORS Chapter 279C, the provisions of which hereby are incorporated into this bond and made a part hereof.

IN WITNESS WHEREOF, WE HAVE CAUSED THIS INSTRUMENT TO BE EXECUTED AND SEALED BY OUR DULY AUTHORIZED LEGAL REPRESENTATIVES.

Dated this _____ day of _____, 20__.

PRINCIPAL: _____

By_____
Signature

_____
Official Capacity

Attest: _____
Corporation Secretary

SURETY: _____
[Add signatures for each surety if using multiple bonds]

BY ATTORNEY-IN-FACT:
[Power-of-Attorney must accompany each surety bond]

_____
Name

_____
Signature

_____
Address

_____
City State Zip

_____ _____
Phone Fax

FIRST-TIER SUBCONTRACTOR DISCLOSURE

PROJECT NAME: _____

BID #: _____

BID CLOSING: Date: _____ Time: _____

This form must be submitted at the location specified in the Invitation to Bid on the advertised bid closing date and within two working hours after the advertised bid closing time.

List below the name of each subcontractor that will be furnishing labor or will be furnishing labor and materials and that is required to be disclosed, the category of work that the subcontractor will be performing and the dollar value of the subcontract. Enter "NONE" if there are no subcontractors that need to be disclosed. (ATTACH ADDITIONAL SHEETS IF NEEDED.)

NAME	DOLLAR VALUE	CATEGORY OF WORK
(1)	$	
(2)	$	
(3)	$	
(4)	$	
(5)	$	
(6)	$	
(7)	$	
(8)	$	
(9)	$	

Failure to submit this form by the disclosure deadline will result in a non-responsive bid. A non-responsive bid will not be considered for award.

Form submitted by (bidder name): _____

Contact name: _____ Phone no.: ( )

ORS 279C.370 First-tier subcontractor disclosure. (1)(a) Within two working hours after the date and time of the deadline when bids are due to a contracting agency for a public improvement contract, a bidder shall submit to the contracting agency a disclosure of the first-tier subcontractors that:

(A) Will be furnishing labor or will be furnishing labor and materials in connection with the public improvement contract; and

(B) Will have a contract value that is equal to or greater than five percent of the total project bid or $15,000, whichever is greater, or $350,000 regardless of the percentage of the total project bid.

(b) For each contract to which this subsection applies, the contracting agency shall designate a deadline for submission of bids that has a date on a Tuesday, Wednesday or Thursday and a time between 2 p.m. and 5 p.m., except that this paragraph does not apply to public contracts for maintenance or construction of highways, bridges or other transportation facilities.

(c) This subsection applies only to public improvement contracts **("projects")** with a value, estimated by the contracting agency, of more than **$100,000**.

(d) This subsection does not apply to public improvement contracts that have been exempted from competitive bidding requirements under ORS 279C.335 (2).

(2) The disclosure of first-tier subcontractors under subsection (1) of this section must include the name of each subcontractor, the category of work that each subcontractor will perform and the dollar value of each subcontract. The information shall be disclosed in substantially the following [above] form:

(3) A contracting agency shall accept the subcontractor disclosure. The contracting agency shall consider the bid of any contractor that does not submit a subcontractor disclosure to the contracting agency to be a non-responsive bid and may not award the contract to the contractor. A contracting agency is not required to determine the accuracy or the completeness of the subcontractor disclosure.

(4) After the bids are opened, the subcontractor disclosures must be made available for public inspection.

(5) A contractor may substitute a first-tier subcontractor under the provisions of ORS 279C.585.

(6) A subcontractor may file a complaint under ORS 279C.590 based on the disclosure requirements of subsection (1) of this section.

EMPLOYEE DRUG TESTING PROGRAM CERTIFICATION FORM

AS REQUIRED BY ORS 279C.505(2)

BIDDER'S NAME:

PROJECT NAME:

ORS 279C.505(2) provides that every public improvement contract contains a condition that the Contractor shall demonstrate that an employee drug testing program is in place. The award of the Contract for which this certification is required is conditioned, in part, upon the Bidder's demonstration of compliance with the provisions of ORS 279C.505.

If the Bidder named above is awarded the Contract, this certification shall become a part of, and shall constitute a continuing representation and warranty under, the Contract. To induce Hood River County to award the Contract to the Bidder, the undersigned, as the duly authorized representative of the Bidder, hereby represents and warrants, on behalf of the above-named Bidder:

1. The Bidder has and enforces, and all times during the term of the Contract will have and enforce, a written employee drug testing policy;

2. A copy of the Bidder's current written employee policy will be available for Inspection by Hood River County at any time upon the County's' request; and

3. The Bidder understands and agrees that its representations and warranties herein will become a continuing part of the Contract and that breach of any of the foregoing will be sufficient grounds for disqualification under 279C.440(2)(d).

4. The Contractor has provided each employee with a copy of the drug testing policy.

Hood River County shall not be liable, either directly or indirectly, in any dispute arising out of the substance or procedure of Bidder/Contractor's drug testing program. Nothing in this drug testing provision shall be construed as requiring Bidder/Contractor to violate any legal, including constitutional, rights of any employee, including but not limited to, selection of which employees to test and the manner of such testing. Hood River County shall not be liable for Bidder/Contractor's negligence in establishing or implementing, or failure to establish or implement, a drug testing policy, or for any damage or injury caused by the Bidder/Contractor's employees acting under the influence of drugs while performing work covered by the Contract. These are Bidder/Contractor's sole responsibilities.

In Witness Whereof, Bidder has caused this document to be executed by its duly authorized representative on the date shown below.

_____ _____

(Company Name) (Date) (Authorized Signature) (Title)

STATE OF OREGON

STATUTORY PUBLIC WORKS BOND

Surety bond#:_____ CCB # (if applicable):_____

We, _____, as principal, and _____, a corporation qualified and authorized to do business in the State of Oregon, as surety, are held and firmly bound unto the State of Oregon for the use and benefit of the Oregon Bureau of Labor and Industries (BOLI) in the sum of thirty thousand dollars ($30,000) lawful money of the United States of America to be paid as provided in ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360, for which payment well and truly to be made, we bind ourselves, our heirs, personal representatives, successors and assigns, jointly and severally, firmly by this agreement.

WHEREAS, the above-named principal wishes to be eligible to work on public works project(s) subject to the provisions of ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360, and is, therefore, required to obtain and file a statutory public works bond in the penal sum of $30,000 with good and sufficient surety as required pursuant to the provisions of section 2, chapter 360, Oregon Laws 2005, conditioned as herein set forth.

NOW, THEREFORE, the conditions of the foregoing obligations are that if said principal with regard to all work done by the principal as a contractor or subcontractor on public works project(s), shall pay all claims ordered by BOLI against the principal to workers performing labor upon public works projects for unpaid wages determined to be due, in accordance with ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360, and OAR Chapter 839, then this obligation shall be void; otherwise to remain in full force and effect.

This bond is for the exclusive purpose of payment of wage claims ordered by BOLI to workers performing labor upon public works projects in accordance with ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360.

This bond shall be one continuing obligation, and the liability of the surety for the aggregate of any and all claims which may arise hereunder shall in no event exceed the amount of the penalty of this bond.

This bond shall become effective on the date it is executed by both the principal and surety and shall continuously remain in effect until depleted by claims paid under ORS chapter 279C, as amended by Oregon Laws 2005, chapter 360, unless the surety sooner cancels the bond. This bond may be cancelled by the surety and the surety be relieved of further liability for work performed on contracts entered after cancellation by giving 30 days' written notice to the principal, the Construction Contractors Board, and BOLI. Cancellation shall not limit the responsibility of the surety for the payment of claims ordered by BOLI relating to work performed during the work period of a contract entered into before cancellation of this bond.

IN WITNESS WHEREOF, the principal and surety execute this agreement. The surety fully authorizes its representatives in the State of Oregon to enter into this obligation.

SIGNED, SEALED AND DATED this _____ day of _____, 20 _____

Surety by:	Principal by:
_____ (Seal)	_____
Company Name	*Name*
_____	_____
Signature	*Signature*
_____	_____
Title (e.g. Attorney-in-Fact)	*Title*
_____	_____
Address	*Address*
_____	_____
City State Zip	*City State Zip*

SEND BOND TO: **Construction Contractors Board**
PO Box 14140
Salem, OR 97305-5052
Telephone: (503) 378-4621

BUREAU OF LABOR AND INDUSTRIES
WAGE AND HOUR DIVISION

PAYROLL/CERTIFIED STATEMENT FORM WH-38
FOR USE IN COMPLYING WITH ORS 279C.845*

PRIME CONTRACTOR ☐ SUBCONTRACTOR ☐ PAYROLL NO.______________________ FINAL PAYROLL ☐

Business Name (DBA): Phone: ( ) CCB Registration Number:

Project Name: Project Number: Type of Work:

Street Address:

Mailing Address:

Project Location:

Project County:

Date Pay Period Began: Date Pay Period Ended:

THIS SECTION FOR PRIME CONTRACTORS ONLY

Public Contracting Agency Name:
Phone: ( )
Date Contract Specifications First Advertised for Bid:
Contract Amount:

THIS SECTION FOR SUBCONTRACTORS ONLY

Subcontract Amount:
Prime Contractor Business Name (DBA):
Prime Contractor Phone: ( )
Prime Contractor's CCB Registration Number:
Date You Began Work on the Project:

(1)	(2)		(3) DAY AND DATE							(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
NAME, ADDRESS AND EMPLOYEE'S IDENTIFICATION NUMBER	CLASSIFICATION (INCLUDE GROUP # AND APPRENTICESHIP STEP IF APPLICABLE)		HOURS WORKED EACH DAY							TOTAL HOURS	HOURLY BASE RATE	HOURLY FRINGE BENEFIT AMOUNTS PAID AS WAGES TO EMPLOYEE	GROSS AMOUNT EARNED (see directions)	ITEMIZED DEDUCTIONS FICA, FED, STATE, ETC.	NET WAGES PAID	HOURLY FRINGE BENEFITS PAID TO BENEFIT PARTY, PLAN, FUND, OR PROGRAM	NAME OF BENEFIT PARTY, PLAN, FUND, OR PROGRAM
		OT								0							
		ST								0							
		Schedule: 5/8 ☐ 4/10 ☐; Reg. Hrly. Schd: _ _ _ to _ _ _.															
		OT								0							
		ST								0							
		Schedule: 5/8 ☐ 4/10 ☐; Reg. Hrly. Schd: _ _ _ to _ _ _.															
		OT								0							
		ST								0							
		Schedule: 5/8 ☐ 4/10 ☐; Reg. Hrly. Schd: _ _ _ to _ _ _.															
		OT								0							
		ST								0							
		Schedule: 5/8 ☐ 4/10 ☐; Reg. Hrly. Schd: _ _ _ to _ _ _.															
		OT								0							
		ST								0							
		Schedule: 5/8 ☐ 4/10 ☐; Reg. Hrly. Schd: _ _ _ to _ _ _.															

*Although this form has not been officially approved by the U.S. Department of Labor, it is designed to meet the requirements of both the state PWR law and the federal Davis-Bacon Act.

THIS FORM CONTINUED ON REVERSE

CERTIFIED STATEMENT

Date: _____

I, _____, _____
(NAME OF SIGNATORY PARTY) (TITLE)
do hereby state:
(1) That I pay or supervise the payment of the persons employed by:

_____
(CONTRACTOR, SUBCONTRACTOR OR SURETY)
on the _____; that during the payroll period
(BUILDING OR WORK)
commencing on the _____ day of _____, _____, and ending the _____ day
(MONTH) (YEAR)
of _____, _____, all persons employed on said project have been paid the
(MONTH) (YEAR)
full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said _____
(CONTRACTOR, SUBCONTRACTOR OR SURETY)
from the full weekly wages earned by any person, and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as specified in ORS 652.610, and as defined in Regulations, Part 3 (29 CFR Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. 276c), and described below:

_____

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for workers contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each worker conform with work performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a state apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a state, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

I HAVE READ THIS CERTIFIED STATEMENT, KNOW THE CONTENTS THEREOF AND IT IS TRUE TO MY KNOWLEDGE:

_____
(NAME AND TITLE)

_____
(SIGNATURE AND DATE)

In addition to completing sections (1) - (3), if your project is subject to the federal Davis-Bacon Act requirements, complete the following section as well:

(4) That:
(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS OR PROGRAMS

☐ - In addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in Section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ - Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in Section 4(c) below.

(c) EXCEPTIONS:

EXCEPTION (CRAFT) EXPLANATION

REMARKS:

NAME AND TITLE SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

FILE THIS FORM WITH THE PUBLIC AGENCY ASSOCIATED WITH THE PROJECT
NOTE TO CONTRACTORS: YOU MUST ATTACH COPIES OF THIS FORM TO EACH OF YOUR PAYROLL SUBMISSIONS ON THIS PROJECT.
INSTRUCTIONS AND ADDITIONAL FORMS ARE AVAILABLE ON OUR WEBSITE: WWW.OREGON.GOV/BOLI.

BUREAU OF LABOR AND INDUSTRIES
Instructions for Public Works Project Linked Forms:
WH-81 = Notice of Public Works
WH-39 = Public Works Fee Information
WH-40 = Public Works Fee Adjustment

- Go to tab **WH-81 (Pg 1)** and fill in the applicable spaces in the **Public Agency Information** section on page 1 of the WH-81 form. Use the "TAB" key to advance to the next space. The other spaces are locked and cannot be altered.

- For public works projects in which a public agency awards a contract, fill in the applicable spaces in **Section A, Prime Contractor Information,** and the **bottom of page 1** of the **WH-81 form**.

- For public works projects in which no public agency awards a contract to a contractor, go to tab **WH-81 (Pg 2)** and complete page 2 of the WH-81 form. Fill out **Section B, C, D or E** on **WH-81 (Pg 2)** depending on the type of project. The corresponding WH-39A, WH-39B,C,D,E and WH-40 worksheets are linked and will be automatically updated with the information entered:
  - **WH-81 Pg 1**, Section A is linked to form **WH-39A**
  - **WH-81 Pg 2**, Sections B,C,D & E are linked to **WH-39 B,C,D,E**
  - **WH-81 Pg 1,** various fields are linked to **WH-40**

- Print out the WH-81 and appropriate WH-39. Sign the WH-81, then mail the **WH-81, WH-39, and the PWR fee payment** to BOLI. These should be submitted within 30 days after awarding a contract subject to the prevailing wage rate laws.

- If upon completion of the public works project the final contract/project amount is revised, complete the **WH-40 Fee Adjustment Form** to calculate the Public Works Fee balance/refund.

- Save a copy of the completed forms for your records.

BUREAU OF LABOR AND INDUSTRIES
NOTICE OF PUBLIC WORKS
(For use by public agencies in complying with ORS 279C.835)

For Office Use Only:
Project DB#: _____

NOTE: ORS 279C.835 requires that public contracting agencies include with this form a copy of the disclosure of first-tier subcontractors submitted pursuant to ORS 279C.370.

PUBLIC AGENCY INFORMATION:

Agency Name: _____

Agency Division: _____ Agency # (if known): _____

Agency Mailing Address: _____

City, State, Zip: _____

Email Address: _____

Agency Representative: _____ Phone: _____

SECTION A: To be completed when a public agency awards a contract to a contractor for a public works project, including CM/GC projects. (See pg 2 for public works projects in which no public agency awards a contract to a contractor.)

CONTRACT INFORMATION:

Project Name: _____

Contract Name (if part of larger project): _____

Project #: _____ Contract #: _____

Project Manager Name: _____ Phone: _____ Fax: _____

Project Location (Street(s), City): _____ Project County: _____

Date specifications first advertised for bid (if not advertised, date of RFP or first contact with contractor): _____

OR If CM/GC contract, date contract became a public works contract (see OAR 839-025-0020(8)): _____

Contract Amount: $ _____

Is this contract part of a larger project? (Yes/No) ☐ If Yes, total project amount: $ _____

If yes, **INITIAL** date specifications for project advertised for bid (see OAR 839-025-0020(6)(b)): _____

Will project use federal funds that require compliance with the Davis-Bacon Act? (Yes/No) ☐

Date contract awarded: _____ Date work expected to begin: _____ Date work expected to be complete: _____

PRIME CONTRACTOR INFORMATION:

Name: _____

Address: _____ Contruction Contractors Board Registration #: _____

City, State Zip: _____ Phone: _____

Name of Bonding Company for Payment Bond: _____

Address: _____

Agent Name: _____ Phone: _____ Payment Bond #: _____

☐ Copy of first-tier subcontractors attached **(see NOTE above)**.

Signature of agency representative completing form: _____

Printed Name: _____ Phone: _____ Date: _____

Email Address: _____

THIS FORM WILL BE RETURNED TO THE PUBLIC AGENCY FOR CORRECTION AND RESUBMITTAL IF INCOMPLETE .

CONTRACT FEE SECTION
PREVAILING WAGE RATE UNIT
BUREAU OF LABOR AND INDUSTRIES
800 NE OREGON ST., #1045
PORTLAND, OR 97232-3601
PHONE: (971) 353-6762
FAX: (971) 673-0769

For Office Use Only:

Project DB#:_____

PUBLIC WORKS FEE INFORMATION FORM

For use by public agencies that have contracted with a contractor on a public works project regulated by ORS 279C.800 to 279C.870, in compliance with ORS 279C.825. *(See form "WH-39 B, C, D, E" for public agencies that are a party to a public works project pursuant to* ORS 279C.800(6)(a)(B), (C), (D) or (E)*.)*

PUBLIC AGENCIES: Please complete and mail this form to BOLI at the above address, along with the public works fee of one-tenth of one percent of the contract price (contract amount x .001), payable to BOLI. **The minimum fee is $250.00; the maximum fee is $7,500.00.** Without the following completed information, the bureau may be unable to properly credit you for payment received.

PUBLIC AGENCY: 0 **AGENCY #:** 0

AGENCY MAILING ADDRESS: 0

CITY, STATE, ZIP: 0

AGENCY CONTACT PERSON: 0 **PHONE:** -

PROJECT MANAGER NAME: 0 **PHONE:** -

PROJECT NAME: 0

CONTRACT NAME (if part of larger project): 0

PROJECT LOCATION: 0

PROJECT NO: 0 **DATE CONTRACT FIRST ADVERTISED:** 1/0/1900

DATE CONTRACT AWARDED: 1/0/1900 **CONTRACTOR CCB#:** 0

CONTRACTOR BUSINESS NAME (DBA): 0

CONTRACTOR ADDRESS: 0

CITY, STATE, ZIP: 0

CONTRACT AMOUNT: $0.00 **FEE AMOUNT DUE/PAID:** $250.00

If less than $50K, is it part of a larger project? (yes/no) 0

Contract amount x .001 = fee due

Complete this page for public works projects in which NO PUBLIC AGENCY AWARDS A CONTRACT TO A CONTRACTOR. Complete the CONTRACT INFORMATION *AND* SECTION B, C, D or E, whichever applies to the project.

CONTRACT INFORMATION:

Name of Project Owner: _____ Phone: _____

Project Name: _____ Project #: _____

Project Location (Street(s), City): _____ Project County: _____

Total Project Cost: _____ Amount of public funds provided for the project: _____

Name(s) of public agency(ies) providing public funds: _____

Will project use federal funds that require compliance with the Davis-Bacon Act? Yes/No ☐

Date work expected to begin: _____ Date work expected to be complete: _____

SECTION B: **To be completed when a project is a public works pursuant to ORS 279C.800(6)(a)(B)** (a project for the construction, reconstruction, major renovation or painting on a road, highway, building, structure or improvement of any type **that uses $750,000 or more of funds of a public agency).**

Date the public agency or agencies committed to the provision of funds for the project: _____

SECTION C: **To be completed when a project is a public works pursuant to ORS 279C.800(6)(a)(C)** (a project for the construction of a privately owned road, highway, building, structure or improvement of any type **that uses funds of a private entity and in which 25 percent or more of the square footage of the completed project will be occupied or used by a public agency).**

Total square footage of privately owned road, highway, building, structure or improvement: _____ sq ft

Percent of total square footage of the completed project that will be occupied or used by a public agency: _____ %

Date the public agency or agencies entered into an agreement to occupy or use the completed project: _____

SECTION D: **To be completed when a project is a public works pursuant to ORS 279C.800(6)(a)(D)** (a project that includes the construction or installation of a **device, structure or mechanism that uses solar radiation** on public property, regardless of project cost or whether the project uses funds of a public agency).

Date the public agency entered into an agreement for the project: _____

SECTION E: **To be completed when a project is a public works pursuant to ORS 279C.800(6)(a)(E)** (a project for the construction, reconstruction, major renovation or painting of a road, highway, building, structure, or improvement of any type that occurs, with or without using funds of a public agency, **on real property that a public university listed in ORS 352.002 owns).**

Date the public agency entered into an agreement for the project: _____

Signature of agency representative completing form: _____

Printed Name: _____ Phone: _____ Date: _____

Email Address: _____

THIS FORM WILL BE RETURNED TO THE PUBLIC AGENCY FOR CORRECTION AND RESUBMITTAL IF INCOMPLETE.

RETURN THIS COMPLETED FORM TO:

Prevailing Wage Rate Unit · Bureau of Labor and Industries · 800 NE Oregon Street, #1045 · Portland, OR 97232-3601

Telephone (971) 353-6762 · FAX (971) 673-0769 · pwr.email@boli.oregon.gov

CONTRACT FEE SECTION
PREVAILING WAGE RATE UNIT
BUREAU OF LABOR AND INDUSTRIES
800 NE OREGON ST., #1045
PORTLAND, OR 97232-3601
PHONE: (971) 353-6762
FAX: (971) 673-0769

For Office Use Only:

Project DB#:_____

PUBLIC WORKS FEE INFORMATION FORM

For use by public agencies that have NOT AWARDED A CONTRACT TO A CONTRACTOR and that are a party to a public works project pursuant to ORS 279C.800(6)(a)(B), (C), (D) or (E).

PUBLIC AGENCIES: Please complete the **CONTRACT INFORMATION** *AND* **SECTION B, C, D or E** (whichever applies to the project) and mail this form to BOLI at the above address, along with the public works fee on one-tenth of one percent of the contract price (contract amount x .001), payable to BOLI. **The minimum fee is $250.00; the maximum fee is $7,500.00.** Without the following completed information, the bureau may be unable to properly credit you for payment received.

CONTRACT INFORMATION

PROJECT OWNER: 0 **PHONE:** -

PROJECT NAME: 0

PROJECT NUMBER: 0

PROJECT LOCATION: 0

NAME OF PUBLIC AGENCY(IES) PROVIDING PUBLIC FUNDS: 0

TOTAL PROJECT COST: $0.00 **FEE AMOUNT DUE/PAID:** $250.00

***SECTION B:** **Date the public agency(ies) committed to the provision of funds for the project:** 1/0/00

***SECTION C:** **Date the public agency(ies) entered into an agreement to occupy or use the completed project:** 1/0/00

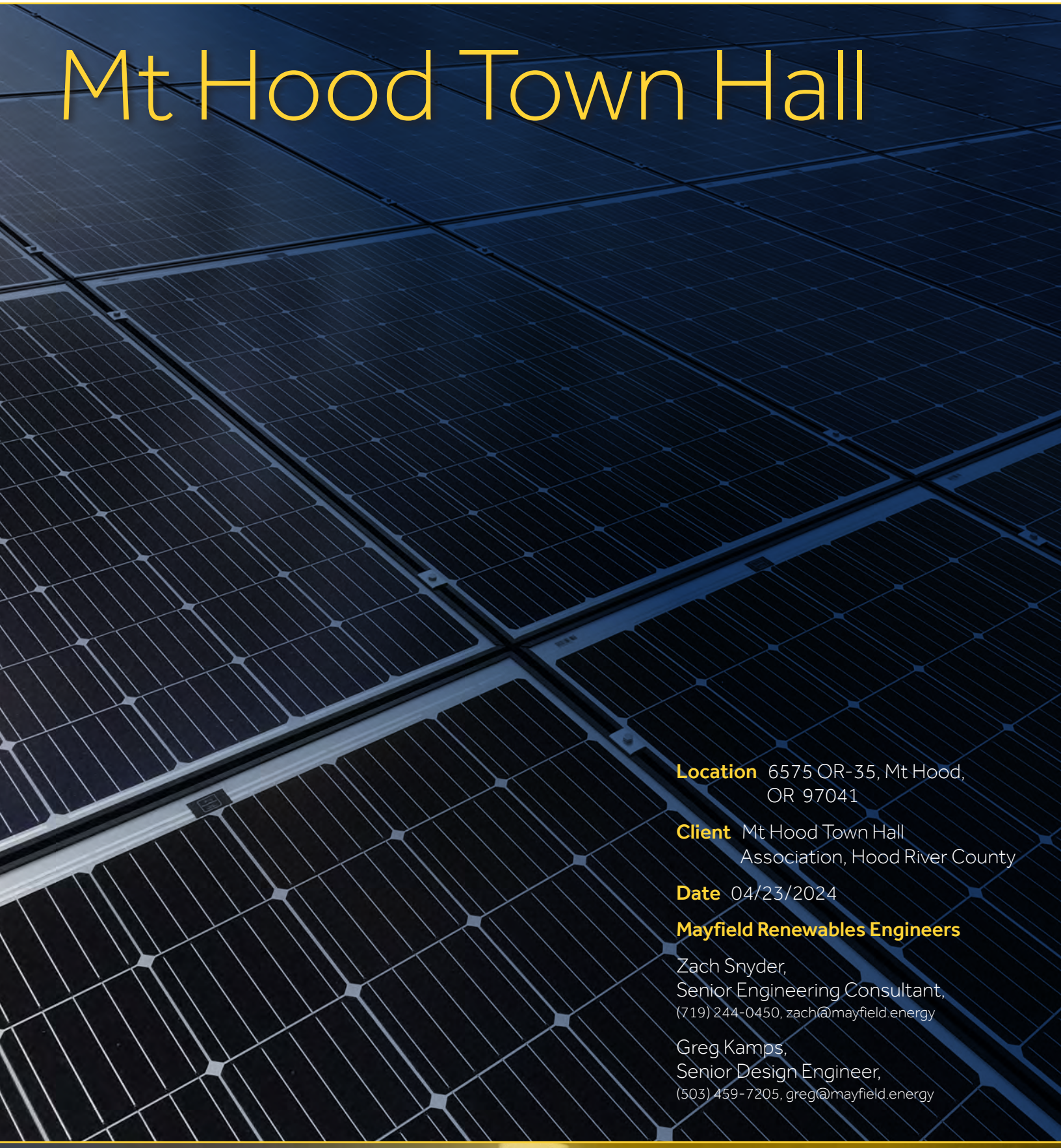
***SECTION D:** **Date the public agency entered into an agreement for the project:** 1/0/00

***SECTION E:** **Date the public agency entered into an agreement for the project:** 1/0/00

***See form WH-81 Pg. 2**

Microgrid Feasibility Report

Mt Hood Town Hall



Location 6575 OR-35, Mt Hood, OR 97041

Client Mt Hood Town Hall Association, Hood River County

Date 04/23/2024

Mayfield Renewables Engineers

Zach Snyder,
Senior Engineering Consultant,
(719) 244-0450, zach@mayfield.energy

Greg Kamps,
Senior Design Engineer,
(503) 459-7205, greg@mayfield.energy

Executive Summary

INTRODUCTION

Mt Hood Town Hall is a community gathering place in the Upper Hood River Valley that acts as a preschool for low-income families, recycling center, community meals distribution hub, and venue for special events and public classes. Originally built in 1914 and owned by the Mt Hood Town Hall Association (MHTHA), the facility is a registered Historic Building. In the past it has acted as a relief center during emergencies, and has supported public health activities.

Due to its geography, Hood River County (HRC) faces unique challenges to the resilience of its energy resources and infrastructure. Factors including wildfires, ice storms, earthquakes, high temperatures, and high winds are all potential causes of power outages for local residents and businesses. Much attention has been drawn to this by the 2018 Hood River County Energy Plan, developed by the Hood River County Energy Council (HREC) and HRC. HREC and the Hood River County Office of Emergency Management have identified Mt Hood Town Hall as a critical facility that is ideally configured and located to serve as a resilience hub for the Upper Hood River Valley.

This report presents the results of a microgrid feasibility study conducted by Mayfield Renewables for Hood River County to determine an optimal solar PV plus battery storage microgrid architecture to address stated resilience goals. As part of this process, Mayfield Renewables conducted the following activities:

- Site visits
- Month-long load study of key loads
- Preliminary equipment specification and layout
- Synthetic load profile construction from prioritized load table
- Iterative energy and financial modeling
- Development of preliminary system drawings

Proposed canopy solar arrays in the paved play area and near the fire hall.

SITE DESCRIPTION

- **6575 OR-35, Mt Hood, OR 97041**
- Beloved center of **cultural, educational, community, and civic activities** in the Upper Hood River Valley
- Identified by HREC and Hood River County Office of Emergency Management as a **critical facility**
- Registered historic building, **originally constructed in 1914**
- **Resilience services** planned in basement, including commercial kitchen and dining hall

PROJECT GOALS

- **Maximize resilience performance** to align with critical facility needs
- **Maximize inclusion of loads** to be backed up with consideration of electrical constraints
- Achieve **high performance and safety** with minimal budget
- **Avoid aesthetic impacts** to historic structure and surroundings
- **Consider auxiliary functional benefits,** such as rain shelter beneath solar canopies

SYSTEM ARCHITECTURE OVERVIEW

PHOTOVOLTAICS
55 KW

BATTERY SYSTEM
60 KW / 307.2 KWH

Methodology

Mayfield Renewables brings an extensive arsenal of tools and engineering experience to bear on the determination of an optimal microgrid architecture for our clients. Each feasibility project is different, though all follow the four major project stages listed below.

DISCOVERY

Mayfield analysts first gathered site information from MHTHA. During this stage, we conducted an interview with key representatives and stakeholders to define project goals and facility operational constraints. We collected key datasets, including utility consumption data and facility drawings. Mayfield analysts additionally performed multiple in-person site visits to assess the facility's existing electrical system, and identify potential locations for new microgrid equipment. Mayfield Renewables conducted a one-month load study, to gather load interval data. This analysis involved placing a specialized metering device at subpanel D, a key point in the electrical distribution system relevant to project goals.

DATA PREPARATION

Once discovery concluded, Mayfield analysts examined the collected information to identify initial constraints and select a strategy for full technical analysis. Due to the impracticality of a full backup of all facility loads, our analysis required the identification and prioritization of potential backup loads on an individual basis. Mayfield analysts generated a synthetic load profile, as described in the following section.

PRELIMINARY TECHNICAL ANALYSIS

Mayfield's modeling analyst and design engineer then conducted an iterative modeling and design process to specify a microgrid architecture. Modeling activities utilized the industry leading energy and financial modeling software tools Xendee and Helioscope, as well as proprietary Mayfield Renewables software. This preliminary analysis considered available equipment space, load profile, electrical interconnection constraints, client preferences, and stated project goals. Mayfield delivered a preliminary report to the project team for review.

FINAL TECHNICAL ANALYSIS

Based on the feedback provided by project stakeholders, Mayfield Renewables finalized the system architecture and updated our modeling analysis and preliminary design. This information is captured in the present, final report.

Mt Hood Town Hall Aerial View

"Mayfield Renewables conducted a one-month load study, to gather load interval data."

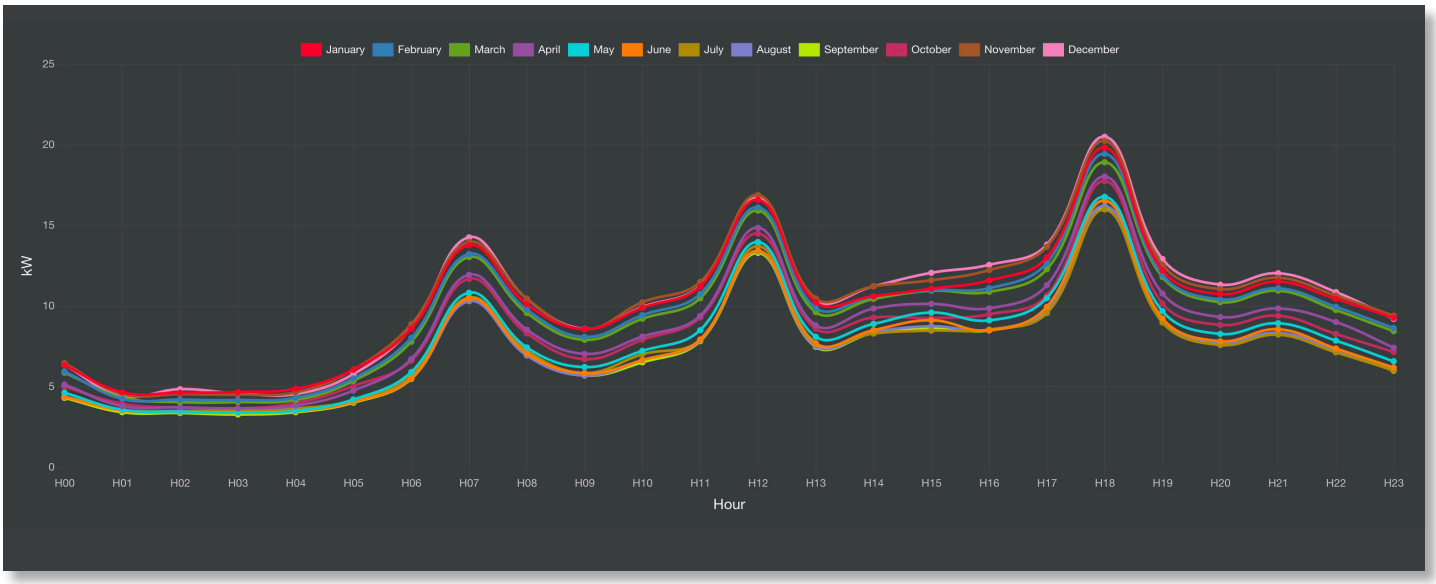
System Electrical Loads

MT HOOD TOWN HALL LOAD PROFILE

- Mt Hood Town Hall's electrical distribution is single phase (120/240V, 3W), with service provided by the Hood River Electric Cooperative. The Town Hall's main electric switchboard feeds five subpanels, named A through E. Subpanels A, B, and C are located in the same room as the main switchboard, and subpanels D and E are located in the lower level furnace room on the north side of the dining hall.
- Much of the Town Hall electrical system is not related to planned resilience hub functions, and many loads will be excluded from backup in the microgrid. MHTHA provided Mayfield Renewables with a list of priority loads, which was further refined through discussion between MHTHA and Mayfield analysts. This list (see Appendix F) includes 33 loads, ordered in terms of priority for inclusion in the microgrid.
- Mayfield Renewables analysts organized loads into four "load scenarios" (see table in Appendix F). Scenario #1 is the most inclusive, and Scenario #4 is the least inclusive. These scenarios are the basis of four corresponding synthetic load profiles (see images, below), which represent assumed electrical consumption patterns during resilience hub conditions. Energy modeling to determine the resilience performance of the microgrid during power outages is based on these four synthetic profiles.
- Mayfield analysts conducted a one-month load study using a Fluke energy meter placed on subpanel D.
- To construct each synthetic load profile, Mayfield analysts estimated the maximum continuous power draw of each load from nameplates located on individual appliances. Where this information was not available, we derived the maximum continuous power from breaker nameplate ratings. Next, subprofiles were constructed based on load categorization using representative load profiles published by the National Renewable Energy Laboratory (NREL) for a full-service restaurant built prior to 1980 in climate zone 4C (mixed-marine). Subprofiles include "electric only," "refrigeration," and "water heating." Mayfield created a fourth, custom subprofile to characterize high-energy kitchen appliances assumed to be used for short periods during meal prep three times per day.
- Overall synthetic load profiles are the sum of the relevant subprofiles, in addition to the interval data conducted in the one-month load study.
- Receptacle usage is assumed to be at most 30% of maximum, and surge currents are assumed to be 4x maximum continuous power.
- Estimated maximum continuous power of each load, as well as estimated maximum continuous power, surge power, and annualized energy consumption of each synthetic load profile for each scenario can be found in the table in Appendix F.
- Financial modeling is based on estimated total facility consumption. Mayfield constructed a separate synthetic profile using an NREL representative profile for a primary school built before 1980 in climate zone 4C (mixed-marine). The synthetic profile is scaled based on energy consumption data provided by Hood River Electric Cooperative for the Town Hall in 2022 and 2023.

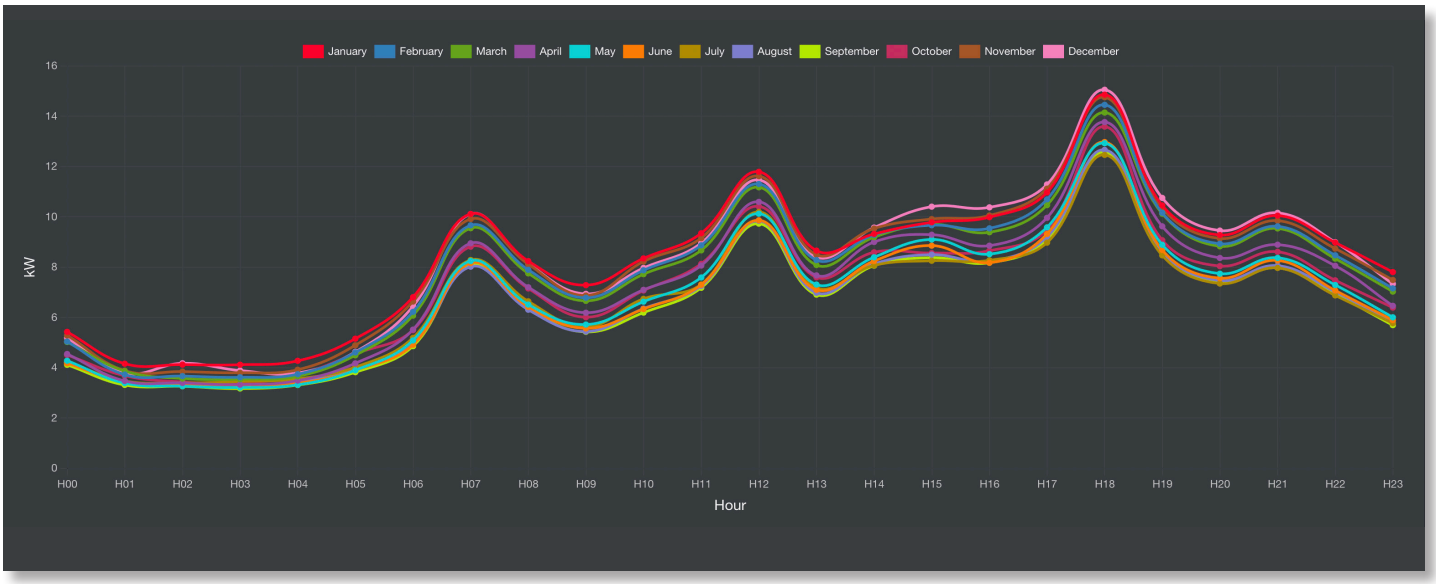
System Electrical Loads

SCENARIO #1



This scenario includes the largest number of loads, and therefore represents both the greatest functionality as well as the highest power draw on the microgrid. All loads involved in scenario #2 are included, as well as the Moffat Turbofan electric oven and lights and receptacles in the multipurpose room.

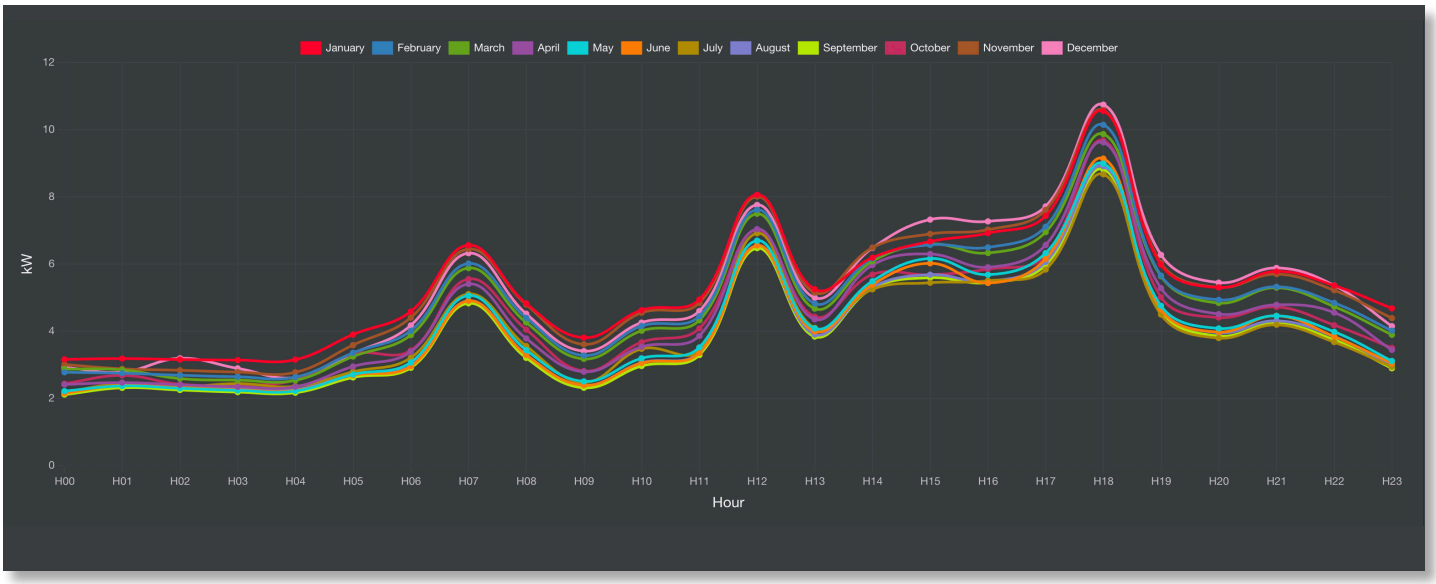
SCENARIO #2



This scenario is smaller than #1. It includes all loads in scenario #3, as well as water heaters for the kitchen and shower room, shower room lights, two extra refrigerators, and one extra freezer.

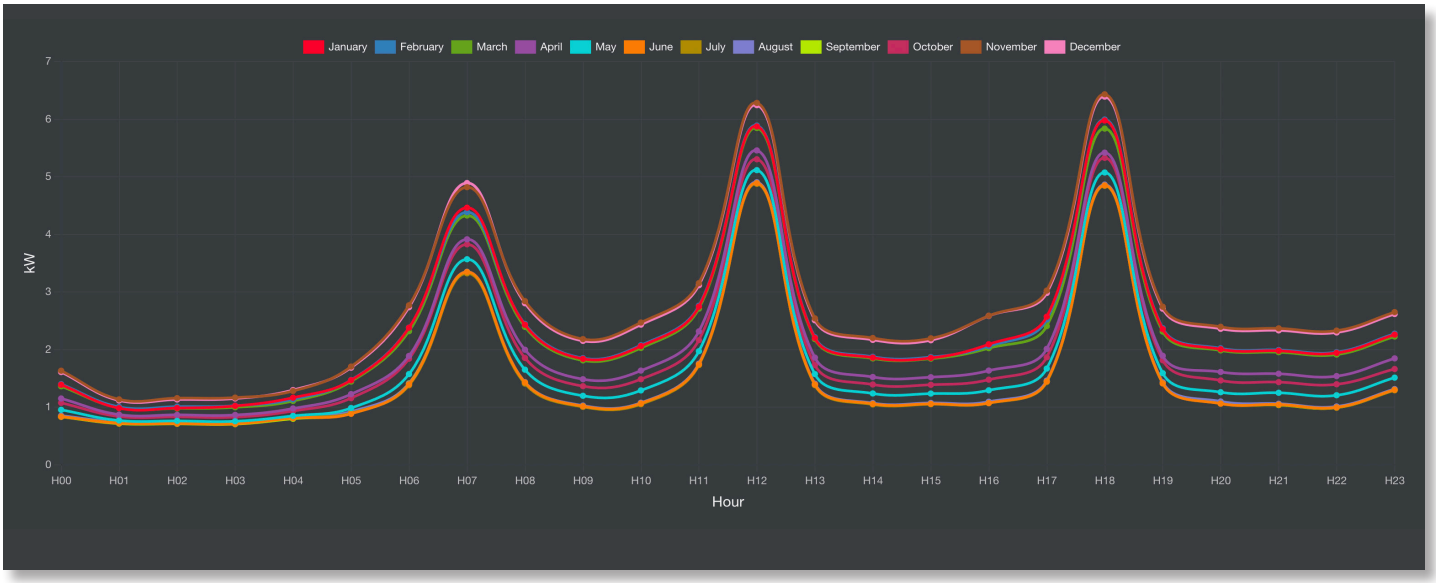
System Electrical Loads

SCENARIO #3



Load Scenario #3: This scenario is smaller than #2, and the smallest suggested load scenario. It includes space heating, lights, and receptacles in the kitchen and dining hall areas and bathrooms, as well as the wifi modem, commercial dishwasher, one refrigerator, and one freezer.

SCENARIO #4



This scenario is identical to scenario #3, except that it excludes space heating. Since space heating is a critical function during a resilience event, this scenario is not recommended. However, it is included as a useful comparison to inform how alternate heating strategies may improve microgrid resilience performance.

System Architecture

PHOTOVOLTAICS 55 KW

BATTERY SYSTEM 60 KW / 307.2 KWH

The system architecture presented here represents optimal resource sizing, given identified constraints and stated project goals. Two PowerShingle solar canopies to the northwest and northest of the Town Hall provide rain shelter and shade, enabling various uses by community members. These simple steel frame structures may be painted, and are expected to have minimal aesthetic impact at this historic site.

- **Battery Operation:** Battery dispatch strategy is limited to **backup power** and does not contribute to energy savings
- **Resilience:** Powering load scenario #3, this system is expected to be able to endure **a 32 hour winter outage**, and can **operate continuously from April through August**. See Appendix D for a chart of the estimated monthly resilience periods for all four load scenarios.
- **Energy Savings:** This system has an estimated initial **capital expense** of **$950k** and a **lifetime net present value**

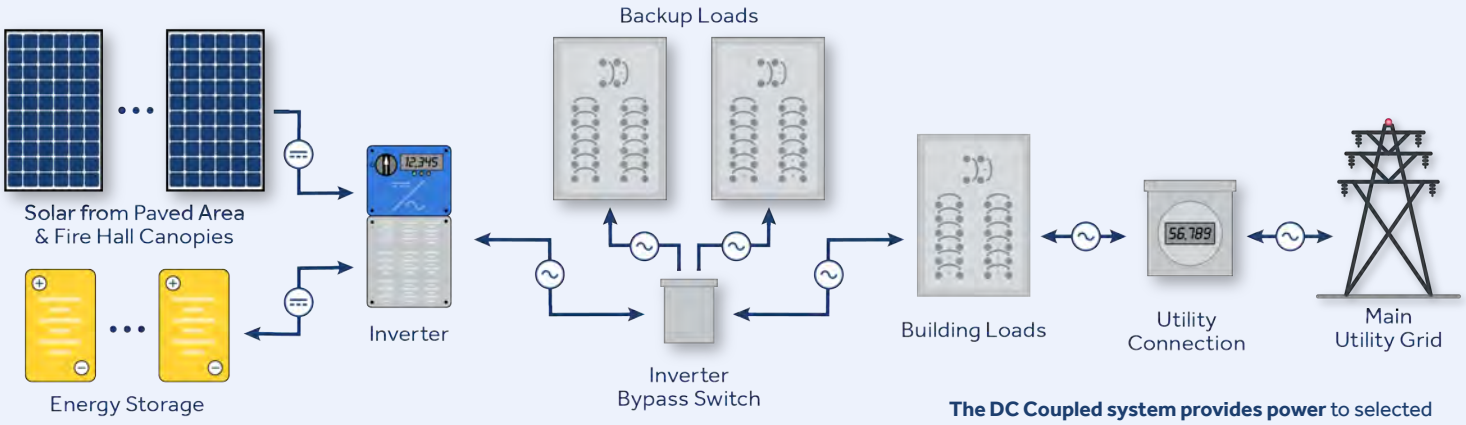
Sol-Ark 15k Inverter

HomeGrid Cube BESS

KEY EQUIPMENT

COMPONENT	MANUFACTURER
Integrated PV & Racking	PowerShingle (Auxin Solar)
DC Coupled Inverter	Sol-Ark, 15K-2P
BESS	HomeGrid Cube

BLOCK DIAGRAM



The DC Coupled system provides power to selected backup loads placed in existing electrical subpanels.

Important Considerations

Important considerations are captured below, and should be addressed in subsequent engineering stages:

- Mayfield Renewables assessed additional PV locations beyond canopies shown, including on the roof of the Town Hall and the roof of the fire hall. However, these locations were rejected based on discussion with MHTHA, due to aesthetics, cost, and potential executive and administrative hurdles including expected preferences of the State Historic Preservation Office.
- Sol-Ark inverters utilized in the design presented in this report may allow for easy subsequent integration of a generator after construction of this PV plus battery storage microgrid. Energy modeling presented here does not reflect integration of any on-site fossil fuel generation assets.
- The design presented here assumes that loads intended for backup in the microgrid system will be collected in some configuration of existing subpanels, and that loads not intended for backup will be moved to other nearby subpanels. If necessary, existing subpanels may be replaced, but not relocated. This strategy is expected to significantly reduce installation costs, compared to relocating existing loads to a new load aggregation panel, since existing subpanels are spread across disparate locations within the facility.
- Based on the assumed load scenarios modeled in this study, the microgrid presented in this report is capable of blackstart.
- The results of this analysis assume that the batteries maintain full reserve charge during normal operation to maximize resilience benefits–excluding necessarily cycling to maintain battery health. As a result, the battery will not yield any financial benefit through mechanisms such as peak shaving or energy arbitrage.
- This analysis did not determine the structural feasibility of the proposed microgrid architecture. Structural engineering will be required during complete system engineering, and is typically performed by the racking manufacturer for ground-based canopy systems.
- Financial modeling performed in this study assumes that MHTHA will receive a 30% federal tax credit using the direct payment mechanism. Mayfield Renewables is not a tax expert and cannot advise on rules or procedures related to the ITC incentive. As a non-profit, MHTHA is not eligible for the MACRS tax incentive. Financial modeling assumes all construction costs up to the $1M budget limit will be covered by an Oregon CREP construction grant.

Mt Hood Town Hall Street View

PowerShingle integrated solar and racking is specified for this system.

Appendix List

Appendix A

PRELIMINARY DRAWINGS

The preliminary drawings provide an overview of the electrical equipment location and configuration. Major equipment sizing and selection are informed by the performance modeling outputs from Helioscope and Xendee. The electrical design is intended to integrate with the existing building design, as detailed in the drawings. These preliminary drawings are not for construction.

MT HOOD TOWN HALL
GRID-TIE SOLAR + STORAGE SYSTEM
6575 OR-35
MT HOOD, OR, 97041

SCOPE OF WORK

THE PROJECT SCOPE INCLUDES THE INSTALLATION OF A GRID-TIED SOLAR PHOTOVOLTAIC SYSTEM WITH ENERGY STORAGE AT THE MT HOOD TOWN HALL COMMERCIAL PROPERTY IN MT HOOD, OR.

THE INSTALLATION CONSISTS OF A SHADE STRUCTURE SOLAR ARRAY, 4 STRING-INVERTER(S), AND RELATED ELECTRICAL METERING AND SAFETY EQUIPMENT. ALL EQUIPMENT WILL BE INSTALLED AS REQUIRED BY APPLICABLE CODES AND THE LOCAL UTILITY COMPANY. DURING DAYLIGHT HOURS THIS PHOTOVOLTAIC SYSTEM (SOLAR ELECTRIC) WILL PROVIDE ELECTRICITY IN PARALLEL WITH THE LOCAL UTILITY SERVICE PROVIDER. DURING A GRID OUTAGE, THE ENERGY STORAGE SYSTEM WILL PROVIDE THE FACILITY ELECTRICAL SYSTEM WITH BACKUP POWER.

SYSTEM DESCRIPTION

FACILITY SERVICE VOLTAGE: 120/240V, 1 PHASE, 3 WIRE
(175) AUXIN SOLAR, AXN6M610B 315, 315WDC, , CEC PTC RATING: WDC
(4) SOL-ARK, LIMITLESS 15K-LV [240V], 15kVA, STRING-INVERTER(S), 240VAC, 1ϕ

55.125kW DC - SOLAR PV
60.000kW AC - SOLAR PV

(2) HOMEGRID, POWER CUBE, 153.5kWh, EACH, 307kWh TOTAL STORAGE CAPACITY, 48.0VDC

GENERAL NOTES

ALL ELECTRICAL WORK TO BE INSTALLED BY A QUALIFIED AND LICENSED ELECTRICAL CONTRACTOR.

ALL SOLAR MODULES SHALL BE UL LISTED 1703 & CEC APPROVED. ALL INVERTERS SHALL BE UL LISTED 1741 CERTIFIED & CEC APPROVED. ALL ELECTRICAL COMPONENTS AND MATERIALS SHALL BE LISTED FOR ITS PURPOSE AND INSTALLED IN A WORKMAN LIKE MANNER. ALL OUTDOOR EQUIPMENT SHALL MEET APPROPRIATE NEMA STANDARDS.

THE ELECTRICAL CONTRACTOR IS ADVISED THAT ALL DRAWINGS AND COMPONENT MANUALS ARE TO BE UNDERSTOOD PRIOR TO INSTALLATION. THE CONTRACTOR IS ADVISED TO HAVE ALL SWITCHES IN THE "OFF" POSITION AND FUSES REMOVED PRIOR TO INSTALLATION OF FUSE-BEARING COMPONENTS.

THIS SYSTEM IS INTENDED TO BE OPERATED IN PARALLEL WITH THE UTILITY SERVICE PROVIDER. ANTI-ISLANDING PROTECTION IS A REQUIREMENT OF UL 1741 AND IS INTENDED TO PREVENT THE OPERATION OF THE PV SYSTEM WHEN THE UTILITY GRID IS NOT OPERATIONAL.

PERMISSION TO OPERATE THE SYSTEM IS NOT AUTHORIZED UNTIL FINAL INSPECTIONS AND APPROVALS ARE OBTAINED FROM THE LOCAL AUTHORITY HAVING JURISDICTION AND THE LOCAL UTILITY SERVICE PROVIDER.

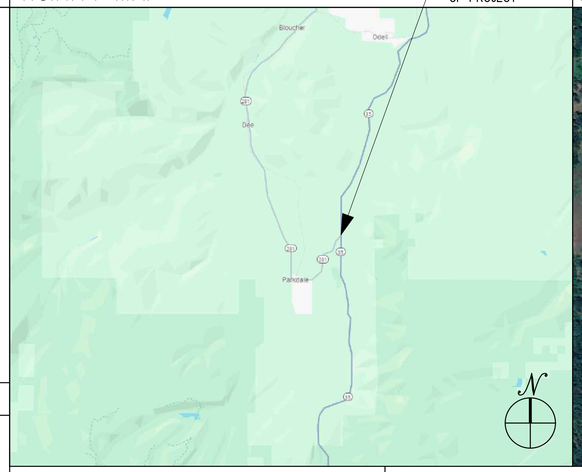
ALL FASTENERS SHALL BE CORROSION RESISTANT APPROPRIATE FOR SITE CONDITIONS. CONNECTORS SHALL BE TORQUED PER DEVICE LISTING OR ENGINEERING RECOMMENDATIONS.

ALL LAYOUT DIMENSIONS ARE SHOWN TO THE NEAREST 1 INCH U.O.N.

APPLICABLE CODES AND STANDARDS

OREGON ELECTRICAL SPECIALTY CODE, 2023
OREGON STRUCTURAL SPECIALTY CODE, 2022
UL-1703 - SOLAR MODULES
UL-1741 SB - INVERTERS, COMBINER BOXES
UL-2703 - RACKING MOUNTING SYSTEMS AND CLAMPING DEVICES FOR PV MODULES
UL-9540A - ENERGY STORAGE SYSTEMS AND EQUIPMENT

VICINITY MAP



AERIAL IMAGE

GENERAL ABBREVIATIONS

(E)	EXISTING
ACI	AMERICAN CONCRETE INSTITUTE
AHJ	AUTHORITY HAVING JURISDICTION
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AL	ALUMINUM
APPROX	APPROXIMATE
ARY	ARRAY
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASHRAE	AMERICAN SOCIETY OF HEATING REFRIGERATING AND AIR CONDITIONING ENGINEERS
AZ	AZIMUTH
BLDG	BUILDING
CL	CENTERLINE
DAS	DATA ACQUISITION SYSTEM
DIA	DIAMETER
E-W	EAST-TO-WEST
FBO	FURNISHED BY OTHERS
FF	FORWARD FACING
GALV	GALVANIZED
HDG	HOT DIP GALVANIZED
HVAC	HEATING VENTILATION AND AIR CONDITIONING
IBC	INTERNATIONAL BUILDING CODE
ID	INSIDE DIAMETER
IEEE	INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
MFR	MANUFACTURER
MOD	SOLAR MODULE
NEC	NATIONAL ELECTRICAL CODE
N-S	NORTH-TO-SOUTH
NTS	NOT TO SCALE
OAE	OR APPROVED EQUIVALENT
O.C.	ON CENTER
OD	OUTSIDE DIAMETER
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
(P)	PROPOSED
PV	PHOTOVOLTAIC
PVC	POLY VINYL CHLORIDE
SCH	SCHEDULE
SS	STAINLESS STEEL
SSS	SOLAR SUPPORT STRUCTURE
STC	STANDARD TEST CONDITIONS
TBD	TO BE DETERMINED
TOF	TILT AND ORIENTATION FACTOR
TP	TAMPER PROOF
TSRF	TOTAL SOLAR RESOURCE FACTOR
TYP.	TYPICAL
UL	UNDERWRITERS LABORATORIES
U.O.N.	UNLESS OTHERWISE NOTED
VIF	VERIFY IN FIELD
WP	WEATHER PROOF

PROJECT DIRECTORY

OWNER
MT HOOD TOWN HALL

(541)-352-1078

UTILITY
HOOD RIVER ELECTRIC COOP

PROJECT TEAM

SYSTEM DESIGNER
FIRM: MAYFIELD RENEWABLES
CONTACT: GREG KAMPS
PHONE: (541)-754-2001

SHEET INDEX

SHEET NUMBER	SHEET TITLE
T-1	TITLE PAGE
ELECTRICAL	
E-1.0	OVERALL SITE PLAN
E-2.0	SINGLE LINE DIAGRAM
E-2.1	AC SINGLE LINE DIAGRAM
E-2.2	WIRE SCHEDULE
E-6.0	DATA SHEETS
E-6.1	DATA SHEETS

Mayfield Renewables
2210 NW Hayes Ave
Corvallis, OR 97330
541.754.2001

STAMP:

NOT FOR CONSTRUCTION

GRID-TIE SOLAR + STORAGE SYSTEM
MT HOOD TOWN HALL
6575 OR-35
MT HOOD, OR, 97041

PROJECT NUMBER:
24-3782T

SCALE
NTS
ORIGINAL SIZE 24"X36"
SHEET SIZE ARCH "D"
0 ½" 1"

REV	ISSUED	PM	ENG	CHK	REVISION DESCRIPTION
	3/25/24	ZS	GK	BB	30% IFR - ISSUED FOR REVIEW
	4/22/24	ZS	GK	BB	30% IFR - ISSUED FOR REVIEW

SHEET NO. & NAME:
T-1
TITLE PAGE

OVERALL SITE PLAN

SCALE: 1/16" = 1'-0"

0 16' 32'

SHEET NOTES

1. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO HAVE ALL UNDERGROUND UTILITIES MARKED PRIOR TO CONSTRUCTION.
2. CONNECTORS SHALL BE BY THE SAME MANUFACTURER AS THOSE ON THE MODULES.
3. CONDUIT RUNS SHOWN ARE INDICATIVE OF PATH AND CONVEY ORIGIN AND TERMINATION. CONTRACTOR TO DETERMINE BEST ROUTE PER FIELD CONDITIONS. FINAL CONDUIT PATH SHALL BE APPROVED WITH CONTRACTOR SITE SUPERVISOR PRIOR TO INSTALLATION.
4. CONTRACTOR SHALL ENSURE THE EXACT OUTER DIAMETER OF THE PROVIDED HOME RUN WIRING MEETS CONNECTOR SPECIFICATIONS.
5. ALL DIMENSIONS ARE FOR REFERENCE ONLY. PLEASE REFER TO MANUFACTURERS DRAWINGS TO CONFIRM ALL DIMENSIONS. ALL DIMENSIONS DISPLAYED ON THIS SHEET ARE ROUNDED TO THE NEAREST 1" U.O.N.

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GRID-TIE SOLAR + STORAGE SYSTEM
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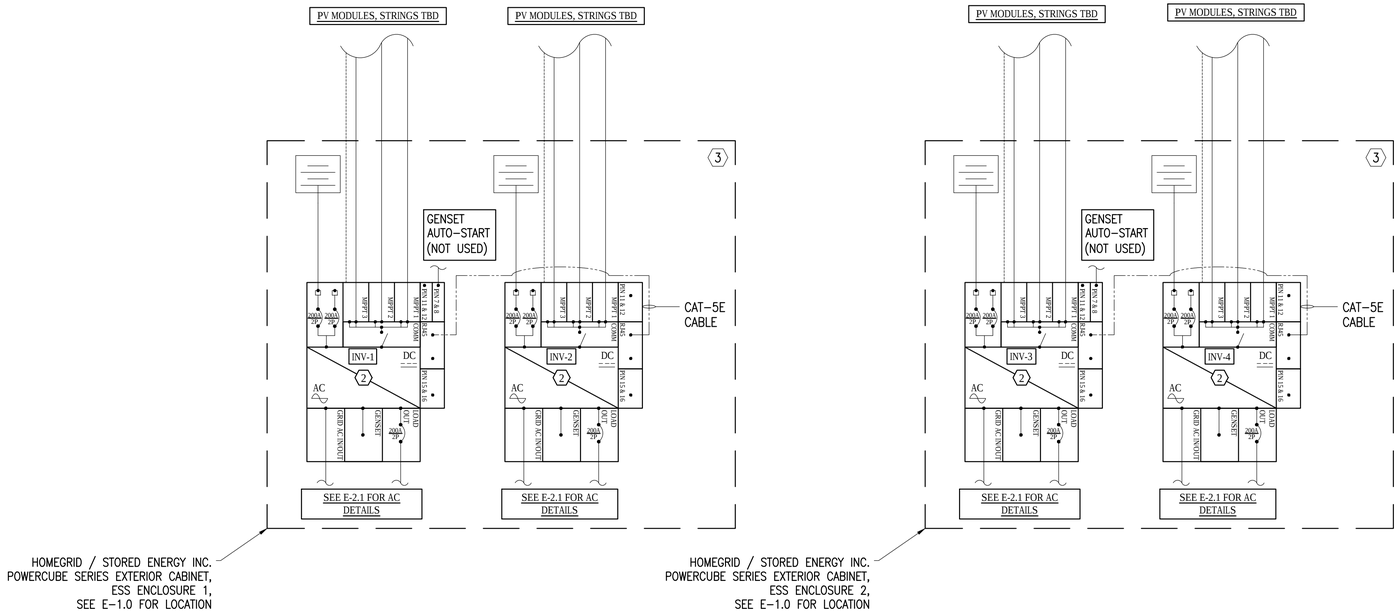
SHEET NO. & NAME:
E-1.0
OVERALL SITE PLAN



ELECTRICAL EQUIPMENT SCHEDULE

TAG	QTY.	DESCRIPTION
1	175	AUXIN SOLAR AXN6M610B 315 315WDC SOLAR MODULE
2	4	SOL-ARK LIMITLESS 15K-LV [240V] STRING-INVERTER, 120/240VAC, 62.50AAC, 1ϕ, 3W, NEMA 3R
3	2	HOMEGRID, POWERCUBE SERIES BATTERIES AND ENCLOSURE, 48VDC, 153.5kWH, NEMA 3R

SHEET NOTES

1. ALL DC WIRING SHALL BE 2000V RATED. INSTALLATION SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE NEC REGARDING VOLTAGE CLASS.
2. ALL DC CONDUCTORS TO BE COPPER (CU), ALL AC CONDUCTORS TO BE ALUMINUM (AL) UNLESS OTHERWISE NOTED.
3. ALL CONDUIT TO BE EMT, SCHD 40/80 PVC OR RIGID METAL. MIN. 7/8" OFF OF ROOF SURFACE. EXTERIOR FITTINGS TO BE WATER TIGHT.
4. REFERENCE ELECTRICAL EQUIPMENT MANUALS FOR CONDUIT OPENINGS AS CONDUITS ARE SIZED TO NEC MINIMUMS.
5. SEE E-2.2 FOR WIRING SCHEDULES.

Mayfield Renewables

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Corvallis, OR 97330
541.754.2001

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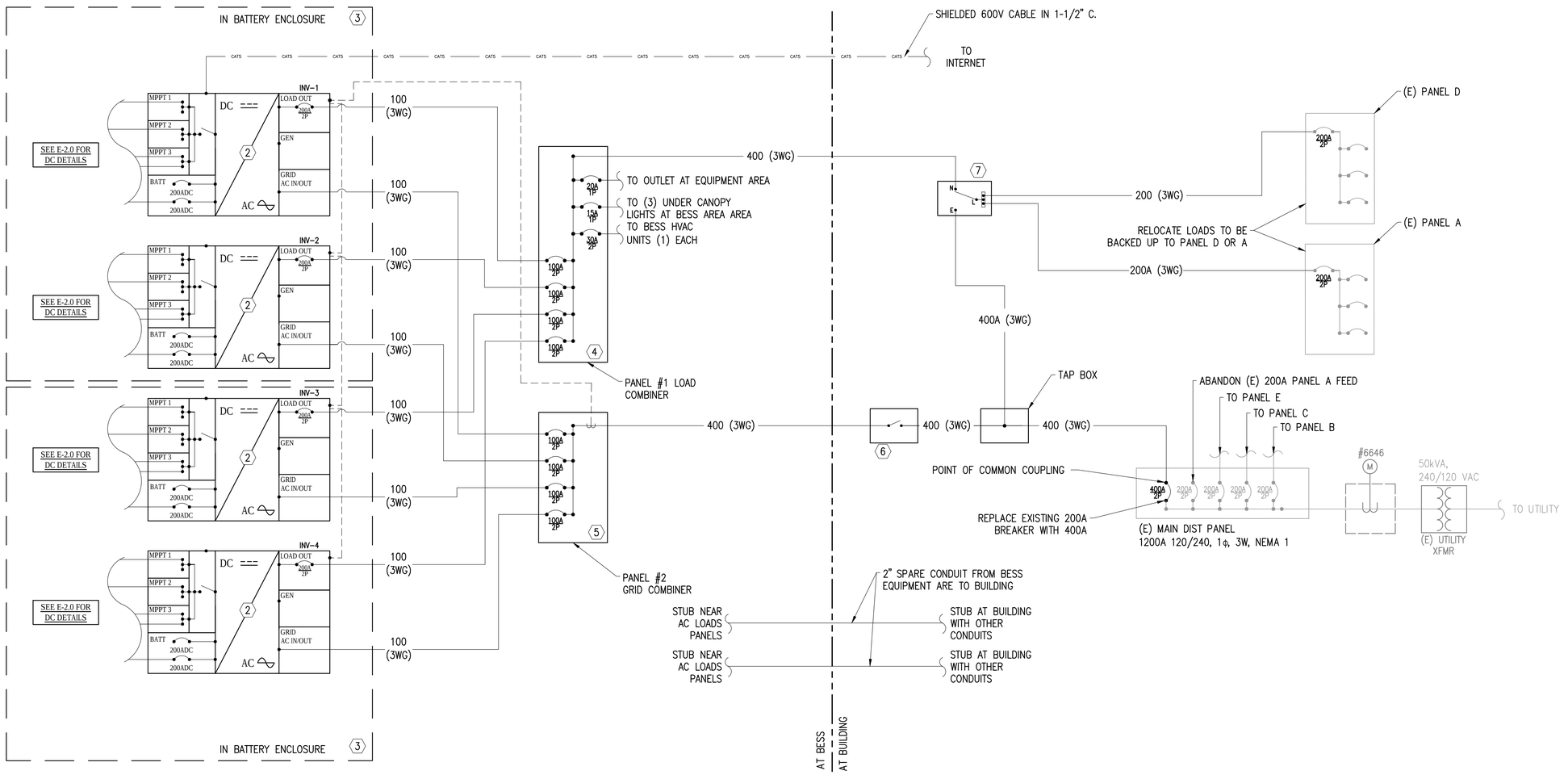
	4/22/24	ZS	GK	BB	30% IFR - ISSUED FOR REVIEW

SHEET NO. & NAME:
E-2.0
SINGLE LINE DIAGRAM



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3	2	HOMEGRID, POWERCUBE SERIES BATTERIES AND ENCLOSURE, 48VDC, 153.5kWH, NEMA 3R
4	1	AC COMBINER, PANEL #1, LOAD COMBINER, 120/240V, 400A, NEMA 3R, MLO, 1ϕ, 3 WIRE
5	1	AC COMBINER, PANEL #2, GRID COMBINER, 120/240V, 400A, NEMA 3R, MLO, 1ϕ, 3 WIRE
6	1	SERVICE DISCONNECT #1, UTILITY LOCKABLE OPEN & VISIBLE LOAD-BREAK DISCONNECT, 400A, NON-FUSED, 120/240V, 2 POLE, 1ϕ, 3 WIRE, NEMA 3R, READILY ACCESSIBLE TO UTILITY PERSONNEL
7	1	400A, 240V, NEMA 3R, 2 POLE, 2 THROW, INVERTER BYPASS SWITCH

Mayfield Renewables
2210 NW Hayes Ave
Corvallis, OR 97330
541.754.2001

STAMP:

NOT FOR CONSTRUCTION

GRID-TIE SOLAR + STORAGE SYSTEM
MT HOOD TOWN HALL
6575 OR-35
MT HOOD, OR, 97041

PROJECT NUMBER: 24-3782T

SCALE: NTS
ORIGINAL SIZE 24"X36"
SHEET SIZE ARCH "D"
0 ½" 1"

v.2.0

REV	ISSUED	PM	ENG	CHK	REVISION DESCRIPTION
	3/25/24	ZS	GK	BB	30% IFR - ISSUED FOR REVIEW
	4/22/24	ZS	GK	BB	30% IFR - ISSUED FOR REVIEW

SHEET NO. & NAME:
E-2.1
AC SINGLE LINE DIAGRAM

WIRING SCHEDULE – COPPER			
AMPS	(2WG) 1Ø, 2 WIRE, GROUND	(3WG) 1Ø, 3 WIRE, GROUND OR 3Ø, 3 WIRE, GROUND	(4WG) 3Ø, 4 WIRE, GROUND
20	(2#12 & 1#12 G) 3/4"C	(3#12 & 1#12 G) 3/4"C	(4#12 & 1#12 G) 3/4"C
30	(2#10 & 1#10 G) 3/4"C	(3#10 & 1#10 G) 3/4"C	(4#10 & 1#10 G) 3/4"C
40	(2#8 & 1#10 G) 3/4"C	(3#8 & 1#10 G) 3/4"C	(4#8 & 1#10 G) 1"C
50	(2#6 & 1#10 G) 3/4"C	(3#6 & 1#10 G) 1"C	(4#6 & 1#10 G) 1"C
60	(2#6 & 1#10 G) 3/4"C	(3#6 & 1#10 G) 1"C	(4#6 & 1#10 G) 1"C
70	(2#4 & 1#8 G) 1"C	(3#4 & 1#8 G) 1 1/4"C	(4#4 & 1#8 G) 1 1/4"C
80	(2#2 & 1#8 G) 1"C	(3#2 & 1#8 G) 1 1/4"C	(4#2 & 1#8 G) 1 1/2"C
90	(2#2 & 1#8 G) 1"C	(3#2 & 1#8 G) 1 1/4"C	(4#2 & 1#8 G) 1 1/2"C
100	(2#1 & 1#8 G) 1 1/4"C	(3#1 & 1#8 G) 1 1/2"C	(4#1 & 1#8 G) 1 1/2"C
110	(2#1 & 1#6 G) 1 1/4"C	(3#1 & 1#6 G) 1 1/2"C	(4#1 & 1#6 G) 1 1/2"C
125	(2#1 & 1#6 G) 1 1/4"C	(3#1 & 1#6 G) 1 1/2"C	(4#1 & 1#6 G) 1 1/2"C
150	(2#1/0 & 1#6 G) 1 1/4"C	(3#1/0 & 1#6 G) 1 1/2"C	(4#1/0 & 1#6 G) 2"C
175	(2#2/0 & 1#6 G) 1 1/2"C	(3#2/0 & 1#6 G) 2"C	(4#2/0 & 1#6 G) 2"C
200	(2#3/0 & 1#6 G) 1 1/2"C	(3#3/0 & 1#6 G) 2"C	(4#3/0 & 1#6 G) 2"C
225	(2#4/0 & 1#4 G) 2"C	(3#4/0 & 1#4 G) 2"C	(4#4/0 & 1#4 G) 2 1/2"C
250	(2–250 KCMIL & 1#4 G) 2"C	(3–250 KCMIL & 1#4 G) 2 1/2"C	(4–250 KCMIL & 1#4 G) 3"C
300	(2–350 KCMIL & 1#4 G) 2"C	(3–350 KCMIL & 1#4 G) 3"C	(4–350 KCMIL & 1#4 G) 3"C
380	(2–500 KCMIL & 1#3 G) 2 1/2"C	(3–500 KCMIL & 1#3 G) 3"C	(4–500 KCMIL & 1#3 G) 3 1/2"C
400	2[(2#3/0 & 1#3 G) 1 1/2"C]	2[(3#3/0 & 1#3 G) 2"C]	2[(4#3/0 & 1#3 G) 2 1/2"C]
450	2[(2#4/0 & 1#2 G) 2"C]	2[(3#4/0 & 1#2 G) 2"C]	2[(4#4/0 & 1#2 G) 2 1/2"C]
500	2[(2–250 KCMIL & 1#2 G) 2"C]	2[(3–250 KCMIL & 1#2 G) 2 1/2"C]	2[(4–250 KCMIL & 1#2 G) 3"C]
600	2[(2–350 KCMIL & 1#1 G) 2 1/2"C]	2[(3–350 KCMIL & 1#1 G) 3"C]	2[(4–350 KCMIL & 1#1 G) 3"C]
700	2[(2–500 KCMIL & 1#1/0 G) 2 1/2"C]	2[(3–500 KCMIL & 1#1/0 G) 3"C]	2[(4–500 KCMIL & 1#1/0 G) 3 1/2"C]
760	2[(2–500 KCMIL & 1#1/0 G) 2 1/2"C]	2[(3–500 KCMIL & 1#1/0 G) 3"C]	2[(4–500 KCMIL & 1#1/0 G) 3 1/2"C]
800	3[(2–300 KCMIL & 1#1/0 G) 2"C]	3[(3–300 KCMIL & 1#1/0 G) 2 1/2"C]	3[(4–300 KCMIL & 1#1/0 G) 3"C]
1000	3[(2–400 KCMIL & 1#2/0 G) 2 1/2"C]	3[(3–400 KCMIL & 1#2/0 G) 3"C]	3[(4–400 KCMIL & 1#2/0 G) 3"C]

WIRING SCHEDULE – ALUMINUM			
AMPS	(2WG) 1Ø, 2 WIRE, GROUND	(3WG) 1Ø, 3 WIRE, GROUND OR 3Ø, 3 WIRE, GROUND	(4WG) 3Ø, 4 WIRE, GROUND
20			
30			
40			
50			
60	(2#4 & 1#8 G) 1"C	(3#4 & 1#8 G) 1 1/4"C	(4#4 & 1#8 G) 1 1/4"C
70	(2#2 & 1#6 G) 1 1/4"C	(3#2 & 1#6 G) 1 1/4"C	(4#2 & 1#6 G) 1 1/2"C
80	(2#2 & 1#6 G) 1 1/4"C	(3#2 & 1#6 G) 1 1/4"C	(4#2 & 1#6 G) 1 1/2"C
90	(2#2 & 1#6 G) 1 1/4"C	(3#2 & 1#6 G) 1 1/4"C	(4#2 & 1#6 G) 1 1/2"C
100	(2#1 & 1#6 G) 1 1/4"C	(3#1 & 1#6 G) 1 1/2"C	(4#1 & 1#6 G) 1 1/2"C
110	(2#1/0 & 1#4 G) 1 1/4"C	(3#1/0 & 1#4 G) 1 1/2"C	(4#1/0 & 1#4 G) 2"C
125	(2#2/0 & 1#4 G) 1 1/2"C	(3#2/0 & 1#4 G) 2"C	(4#2/0 & 1#4 G) 2"C
150	(2#3/0 & 1#4 G) 1 1/2"C	(3#3/0 & 1#4 G) 2"C	(4#3/0 & 1#4 G) 2 1/2"C
175	(2#4/0 & 1#4 G) 2"C	(3#4/0 & 1#4 G) 2"C	(4#4/0 & 1#4 G) 2 1/2"C
200	(2–250 KCMIL & 1#4 G) 2"C	(3–250 KCMIL & 1#4 G) 2 1/2"C	(4–250 KCMIL & 1#4 G) 3"C
225	(2–300 KCMIL & 1#2 G) 2"C	(3–300 KCMIL & 1#2 G) 2 1/2"C	(4–300 KCMIL & 1#2 G) 3"C
250	(2–350 KCMIL & 1#2 G) 2 1/2"C	(3–350 KCMIL & 1#2 G) 3"C	(4–350 KCMIL & 1#2 G) 3"C
300	(2–500 KCMIL & 1#2 G) 2 1/2"C	(3–500 KCMIL & 1#2 G) 3"C	(4–500 KCMIL & 1#2 G) 3 1/2"C
380	(2–750 KCMIL & 1#1 G) 3"C	(3–750 KCMIL & 1#1 G) 3 1/2"	(4–750 KCMIL & 1#1 G) 4"
400	2[(2–250 KCMIL & 1#1 G) 2"C]	2[(3–250 KCMIL & 1#1 G) 2 1/2"C]	2[(4–250 KCMIL & 1#1 G) 3"C]
450	2[(2–300 KCMIL & 1#1/0 G) 2"C]	2[(3–300 KCMIL & 1#1/0 G) 2 1/2"C]	2[(4–300 KCMIL & 1#1/0 G) 3"C]
500	2[(2–350 KCMIL & 1#2/0 G) 2 1/2"C]	2[(3–350 KCMIL & 1#1/0 G) 3"C]	2[(4–350 KCMIL & 1#1/0 G) 3"C]
600	2[(2–500 KCMIL & 1#2/0 G) 2 1/2"C]	2[(3–500 KCMIL & 1#2/0 G) 3"C]	2[(4–500 KCMIL & 1#2/0 G) 3 1/2"C]
700	2[(2–700 KCMIL & 1#3/0 G) 3"C]	2[(3–700 KCMIL & 1#3/0 G) 3 1/2"C]	2[(4–700 KCMIL & 1#3/0 G) 4"C]
760	2[(2–750 KCMIL & 1#3/0 G) 3"C]	2[(3–750 KCMIL & 1#3/0 G) 3 1/2"C]	2[(4–750 KCMIL & 1#3/0 G) 4"C]
800	3[(2–400 KCMIL & 1#3/0 G) 2 1/2"C]	3[(3–400 KCMIL & 1#3/0 G) 3"C]	3[(4–400 KCMIL & 1#3/0 G) 3 1/2"C]
1000	3[(2–600 KCMIL & 1#4/0 G) 3"C]	3[(3–600 KCMIL & 1#4/0 G) 3 1/2"C]	3[(4–600 KCMIL & 1#4/0 G) 4"C]

CONDUCTOR SIZES ARE BASED ON 60° TERMINATIONS LESS THAN 100A AND 75° TERMINATIONS GREATER THAN 100A

CONDUIT SIZES ARE BASED ON NEC TABLE 4 (PVC) AND TABLE 5 (THHN INSULATION).

1 WIRE SCHEDULE

SCALE: NTS

Mayfield Renewables

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GRID-TIE SOLAR + STORAGE SYSTEM
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6575 OR-35
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PROJECT NUMBER:
24-3782T

SCALE
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ORIGINAL SIZE 24"X36"
SHEET SIZE ARCH "D"
0 ½" 1"

REV	ISSUED	PM	ENG	CHK	REVISION DESCRIPTION
	3/25/24	ZS	GK	BB	30% IFR - ISSUED FOR REVIEW
	4/22/24	ZS	GK	BB	30% IFR - ISSUED FOR REVIEW

SHEET NO. & NAME:

E–2.2
WIRE SCHEDULE

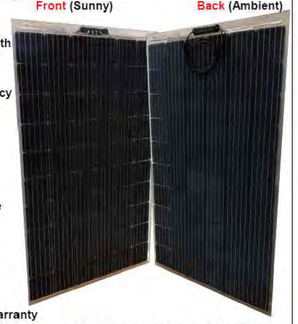
AXN6M BI-FACIAL SERIES

Auxin Solar — TOWARDS THE SUN

305 – 325 WATT
60 CELL BI-FACIAL MONO-CRYSTALLINE PV MODULES

- Proudly Manufactured in the USA
- Higher system performance with bi-facial technology
- Industry Leading High Efficiency Modules up to 19.7%
- Industry Leading PTC Rating UL 1703 Type Designation 3
- Modules Shipped with Positive Tolerance
- Junction box optimized for bi-facial performance
- 30 Year Linear Performance Warranty
  10 Year Workmanship Warranty
  3rd Party Reliability Testing
- Frameless modules with Anti-reflective coating on glass

Front (Sunny) / Back (Ambient)



- ✓ Generate power on front and back
- ✓ Increase low-light performance
- ✓ Increase system performance

c UL us LISTED · TÜVRheinland CERTIFIED www.tuv.com ID 9000240238 · MADE IN THE USA With Domestic and Global Materials

Specifications subject to change without notice.

Auxin Solar, 8835 Via Del Oro, San Jose, CA 95119, USA
+1 408 225-4380(office), +1 408 889 4933(fax)
salesusa@auxinsolar.com
www.auxinsolar.com

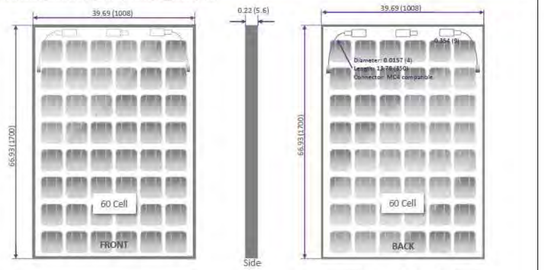
AXN6M BI-FACIAL SERIES

AXN6M610Bxxx	Front side performance					Bi-Facial performance(30% irradiance on reverse side)				
Maximum Power (+3%)	305	310	315	320	325	371	377	383	389	395
Voc (V)	40.79	41.14	41.49	41.84	42.20	40.49	40.83	41.18	41.53	41.88
Isc (A)	10.06	10.21	10.37	10.52	10.68	12.14	12.33	12.51	12.70	12.89
Vmp (V)	32.73	32.97	33.22	33.47	33.72	33.38	33.63	33.89	34.14	34.40
Imp (A)	9.32	9.40	9.48	9.56	9.64	11.11	11.21	11.30	11.40	11.49
Module Efficiency (%)	18.5%	18.8%	19.1%	19.4%	19.7%	22.4%	22.8%	23.2%	23.5%	23.9%

Bi-Facial modules produce power on both front and back. Nominal bi-facial module gain coefficient can run from 10% to 30%, depending on the installation and the amount of indirect irradiance. It is recommended to design the electrical circuits with safety factor that accounts for the additional power in order to protect electrical hardware.

Series Fuse Rating	20A
Junction Box Protection	IP65/IP67
Maximum System Voltage	VDC1000
Operating Temperature	-40°C to 85°C
Number of Cells	60 (6* Bi-Facial Mono)
Connector Type	MC4/Tyco compatible - based on customer request
Fire Rating	UL1703 Type Designation 3

Electrical measurements at STC. Electrical parameter tolerance +/-10%



Units provided as: inches (mm)

Mechanical Characteristics	
Frame	Frameless
Dimension (L x W x D)	66.93" x 39.69" x 0.22" /1700mm x 1008mm x 5.6mm
Weight/pc	22.6kg/49.8lbs
Pallet	40 pcs
Loading/container	360pcs/40'; 520pcs/53'
Maximum wind load	5400Pa (snow)/3600Pa (wind) with 4-point mount

Temperature Coefficients		Standard Test Conditions (STC)	
NOCT	43.78°C	Irradiance	1000W/m²
Short circuit current	+0.044%/°C	Module Temperature	25 °C
Open circuit voltage	-0.277%/°C	AM	1.5
Max power output	-0.376%/°C		

Specifications subject to change without notice.

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+1 408 225-4380(office), +1 408 889 4933(fax)
salesusa@auxinsolar.com
www.auxinsolar.com

HOMEGRID

POWERCUBE SERIES

- **Upgradeable** — 9.6kWh to 153.6kWh. Flexible design with each unit.
- **Live Communications** — Real time display, mobile access
- **10 year Warranty** — 20 year serviceable
- **All-In-One Solution** — Easily connect solar, grid, loads, and generators. Batteries/inverters pre-wired.

POWERCUBE SERIES SPECIFICATIONS

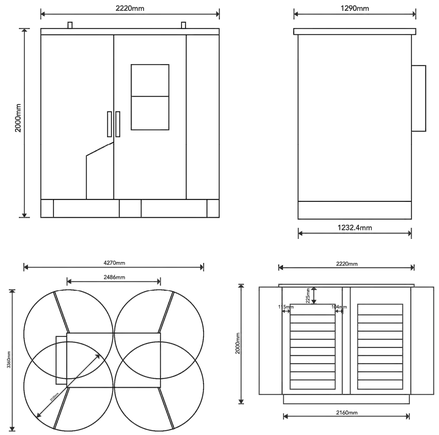
Battery Chemistry	LFP
Nominal DC Voltage	48 V DC
Capacity	9.6kWh - 153.6kWh
Max Systems in Parallel	2 (307.2kWh)
Discharge	9 - 45kW
Charge	9 - 45kW
Warranty	10 year warranty
Service Plan	20 year serviceable
Temp Range	0C - 55C* charging, -20C - 55C*discharging (*external temp has internal heating/cooling)
Certifications	UN 38.3, UL 1642, UL 1973, UL 9540, UL 9540A
Product Dimensions	On diagram

HOMEGRID — POWERCUBE SERIES

POWERCUBE SERIES DIMENSIONS

ORDERING OPTIONS

Each PowerCube can fit 1-4 full Stacks of our Stack'd Series battery (9.6 - 153.6 kWh). It can be configured with 1-3 Sol-Ark 12Ks or 15Ks, or with just batteries as an expansion unit. The configuration chosen will affect both the capacity, output, and supported amount of PV/Generator.



POWERED BY LITHION

Sol-Ark®

15K-2P-N

UL Model: "Limitless 15K-LV"

Solar	Input Power 19,500W
Max Allowed PV Power	19,500W
Max PV Power Delivered to Battery & AC Outputs	15,000W
Max DC Voltage (Voc)	500V @ 26A
MPPT Voltage Range	125-425V
Starting Voltage	125V
Number of MPPT	3
Max Solar Strings Per MPPT	2
Max DC Current per MPPT (Self Limiting)	26A
Max AC Coupled Input (Micro/String Inverters)	19,200W

AC	Output Power 15kW On-Grid & Off-Grid
Connections	120/240/208V Split Phase
Continuous AC Power with PV	15,000W 62.5A-L (240V)
Continuous AC Power from Batteries	12,000W 50A-L (240V)
Total Harmonic Distortion (THD)	≤ 3%
Surge AC Power 10sec Surge AC Power 100ms	24,000VA L-L (240V) 30,000VA L-L (240V)
Fault Current 5sec Fault Current 100ms	94A w/ PV | 75A w/o PV 120A
Parallel Stacking	Yes - Up to 12
Frequency	60/50Hz
Continuous AC Power with Grid or Generator	48,000W 200A L-L (240V) 24,000W 200A L-N (120V)
CEC Efficiency	96.5% (Peak 97.5%)
Idle Consumption Typical—No Load	90W
Sell Back Power Modes	Limited to Household/Fully Grid-Tied
Design (DC to AC)	Transformerless DC
Response Time (Grid-Tied to Off-Grid)	5ms
Power Factor	+/- 0.9 - 1.0

Battery (optional)	Output Power 12,000W
Type	Lead-Acid or Li-Ion
Nominal DC Input	48V
Capacity	50 — 9900Ah
Voltage Range	43.0 — 63.0V
Continuous Battery Charging Output	275A
Charging Curve	3-Stage w/ Equalization
Grid to Batt Charging Efficiency	96.0%
External Temperature Sensor	Included
Current Shunt for Accurate % SOC	Integrated
External Gen Start Based on Voltage or %SOC	Integrated
Communication to Lithium Battery	CanBus & RS485

General	
Dimensions (H x W x D)	31.8" x 18.3" x 10.9"
Weight (package)	135 lbs
Enclosure	IP65 / NEMA 3R
Ambient Temperature	-40~60°C, >45°C Derating
Installation Style	Wall-Mounted
Wi-Fi & LAN Communication	Included
Standard Warranty (verified by HALT Testing)	10 Years

Protections & Certifications	
Electronics Certified Safety by SGS Labs to NEC & UL Specs - NEC 690.4B & NEC 705.4/6	Yes
Grid Sell Back — UL1741-2010/2018, IEEE1547a -2003/2014, FCC 15 Class B, UL1741SB, CA Rule 21, HECO Rule 14H	Yes
PV DC Disconnect Switch — NEC 240.15	Integrated
Ground Fault Detection — NEC 690.5	Integrated
PV Rapid Shutdown Control — NEC 690.12	Integrated
PV Arc Fault Detection — NEC 690.11	Integrated
PV Input Lightning Protection	Integrated
PV String Input Reverse Polarity Protection	Integrated
AC Output Breakers - 200A	Integrated
200A x 2 Battery Breaker / Disconnect	Integrated
Surge Protection	DC Type II / AC Type II

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PROJECT NUMBER: 24-3782T

SCALE: NTS
ORIGINAL SIZE 24"X36"
SHEET SIZE ARCH "D"
0 ½" 1"

SHEET NO. & NAME:
E-6.0
DATA SHEETS

PRT30N

RAB

Technical Specifications (continued)

Power Factor:
99.2% at 120V, 90.9% at 277V

Performance

Lifespan:
100,000-Hour LED lifespan based on IES LM-80 results and TM-21 calculations

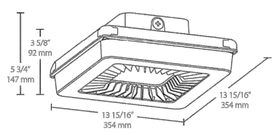
Wattage Equivalency:
Equivalent to 100W Metal Halide

Other

Warranty:
RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish. RAB's warranty is subject to all terms and conditions found at rablighting.com/warranty.

Buy American Act Compliance:
RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

Dimensions



Features

- Ultra-high efficiency
- Pendant or surface mount
- Low glare, vandal-resistant polycarbonate lens
- 20% uplight eliminates "cave effect"
- 100,000-Hour LED lifespan
- 5-Year, No-Compromise Warranty

PRT30N

RAB

Ordering Matrix

Family	Wattage	Color Temp	Finish	Driver Options	Options	Other Options
PRT	30	N				
	30 = 30W (14" x 14") **42** = 42W (14" x 14") **55** = 55W (14" x 14") **70** = 70W (18" x 18") **80** = 80W (18" x 18") **105** = 105W (18" x 18")	**Blank** = 5000K Cool **N** = 4000K Neutral **Y** = 3000K Warm	**Blank** = Bronze **W** = White	**Blank** = 120-277V, 0-10V Dimming **/480** = 480V, 0-10V Dimming	**Blank** = No Option **/E** = Battery Backup **/WS** = Multi-Level Motion Sensor for 14' **/WS2** = Multi-Level Motion Sensor for 18' **/PCS** = 120V Swivel Photocell **/PCS2** = 277V Swivel Photocell **/PCS4** = 480V Swivel Photocell **/LC** = Lightcloud Controller **/LCS** = Lightcloud Sensor	**USA** = BAA Compliant **Blank** = Standard

[1] *Only available for 120-277V.*

Need help? Tech help line: **(888) 722-1000** Email: **sales@rablighting.com** Website: **www.rablighting.com**
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	4/22/24	ZS	GK	BB	30% IFR - ISSUED FOR REVIEW

SHEET NO. & NAME:
E-6.1
DATA SHEETS

Appendix B

EQUIPMENT DATASHEETS

The equipment datasheets are provided for equipment specified in the preliminary drawing. Where necessary, ensure consideration is provided for the specific equipment as identified in the preliminary drawings.

Auxin® Solar
TOWARDS THE SUN

AXN6M BI-FACIAL SERIES

305 – 325 WATT

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- Modules Shipped with Positive Tolerance
- Junction box optimized for bi-facial performance
- 30 Year Linear Performance Warranty
  10 Year Workmanship Warranty
  3rd Party Reliability Testing
- Frameless modules with Anti-reflective coating on glass

Front (Sunny) **Back** (Ambient)

- ✓ Generate power on front and back
- ✓ Increase low-light performance
- ✓ Increase system performance

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RECOVERY.GOV

CE

MADE IN THE USA
With Domestic and Global Materials

Specifications subject to change without notice.

Auxin Solar, 6835 Via Del Oro, San Jose, CA 95119, USA
+1 408 225-4380(office), +1 408 868 4933(fax)
salesusa@auxinsolar.com
www.auxinsolar.com

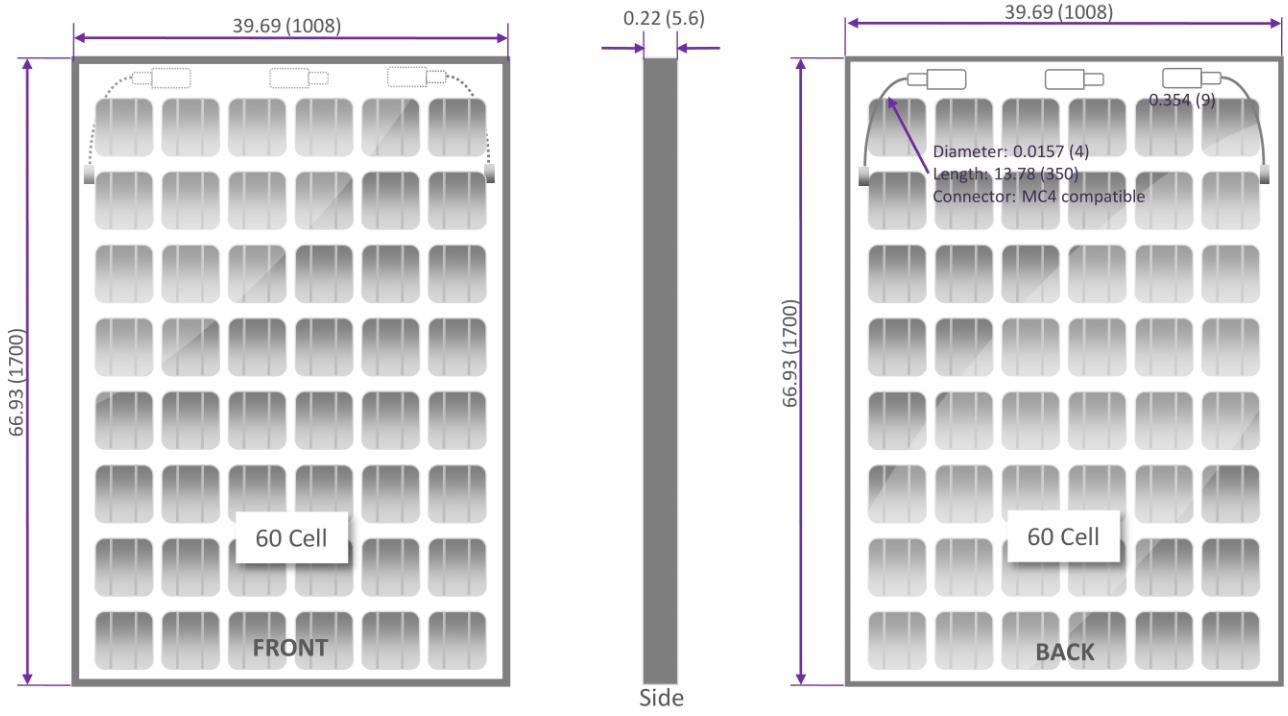
AXN6M BI-FACIAL SERIES

AXN6M610Bxxx	Front side performance					Bi-Facial performance(30% irradiance on reverse side)				
Maximum Power (+3%)	**305**	**310**	**315**	**320**	**325**	**371**	**377**	**383**	**389**	**395**
Voc (V)	40.79	41.14	41.49	41.84	42.20	40.49	40.83	41.18	41.53	41.88
Isc (A)	10.06	10.21	10.37	10.52	10.68	12.14	12.33	12.51	12.70	12.89
Vmp (V)	32.73	32.97	33.22	33.47	33.72	33.38	33.63	33.89	34.14	34.40
Imp (A)	9.32	9.40	9.48	9.56	9.64	11.11	11.21	11.30	11.40	11.49
Module Efficiency (%)	18.5%	18.8%	19.1%	19.4%	19.7%	22.4%	22.8%	23.2%	23.5%	23.9%

Series Fuse Rating	20A
Junction Box Protection	IP65/IP67
Maximum System Voltage	VDC1000
Operating Temperature	-40°C to 85°C
Number of Cells	60 (6" Bi-Facial Mono)
Connector Type	MC4/Tyco compatible - based on customer request
Fire Rating	UL1703 Type Designation 3

Bi-Facial modules produce power on both front and back. Nominal bi-facial module gain coefficient can run from 10% to 30%, depending on the installation and the amount of indirect irradiance. It is recommended to design the electrical circuits with safety factor that accounts for the additional power in order to protect electrical hardware.

Electrical measurements at STC. Electrical parameter tolerance +/-10%



Units provided as: inches (mm)

Mechanical Characteristics	
Frame	Frameless
Dimension (L x W x D)	66.93" x 39.69" x 0.22" /1700mm x 1008mm x 5.6mm
Weight/pc	22.6kg/49.8lbs
Pallet	40 pcs
Loading/container	360pcs/40'; 520pcs/53'
Maximum wind load	5400Pa (snow)/3600Pa (wind) with 4-point mount

Temperature Coefficients	
NOCT	43.78°C
Short circuit current	+0.044%/C
Open circuit voltage	-0.277%/C
Max power output	-0.376%/C

Standard Test Conditions (STC)	
Irradiance	1000W/m²
Module Temperature	25 °C
AM	1.5

Specifications subject to change without notice.

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Sol-Ark®

15K-2P-N

UL Model: "Limitless 15K-LV"

Solar	Input Power 19,500W
Max Allowed PV Power	19,500W
Max PV Power Delivered to Battery & AC Outputs	15,000W
Max DC Voltage (Voc)	500V @ 26A
MPPT Voltage Range	125-425V
Starting Voltage	125V
Number of MPPT	3
Max Solar Strings Per MPPT	2
Max DC Current per MPPT (Self Limiting)	26A
Max AC Coupled Input (Micro/String Inverters)	19,200W

AC	Output Power 15kW On-Grid & Off-Grid
Connections	120/240/208V Split Phase
Continuous AC Power with PV	15,000W 62.5A-L (240V)
Continuous AC Power from Batteries	12,000W 50A-L (240V)
Total Harmonic Distortion (THD)	≤ 3%
Surge AC Power 10sec Surge AC Power 100ms	24,000VA L-L (240V) 30,000VA L-L (240V)
Fault Current 5sec Fault Current 100ms	94A w/ PV | 75A w/o PV 120A
Parallel Stacking	Yes - Up to 12
Frequency	60/50Hz
Continuous AC Power with Grid or Generator	48,000W 200A L-L (240V) 24,000W 200A L-N (120V)
CEC Efficiency	96.5% (Peak 97.5%)
Idle Consumption Typical—No Load	90W
Sell Back Power Modes	Limited to Household/Fully Grid-Tied
Design (DC to AC)	Transformerless DC
Response Time (Grid-Tied to Off-Grid)	5ms
Power Factor	+/- 0.9 - 1.0

Battery (optional)	Output Power 12,000W
Type	Lead-Acid or Li-Ion
Nominal DC Input	48V
Capacity	50 — 9900Ah
Voltage Range	43.0 — 63.0V
Continuous Battery Charging Output	275A
Charging Curve	3-Stage w/ Equalization
Grid to Batt Charging Efficiency	96.0%
External Temperature Sensor	Included
Current Shunt for Accurate % SOC	Integrated
External Gen Start Based on Voltage or %SOC	Integrated
Communication to Lithium Battery	CanBus & RS485

General	
Dimensions (H x W x D)	31.8" x 18.3" x 10.9"
Weight (package)	135 lbs
Enclosure	IP65 / NEMA 3R
Ambient Temperature	-40~60°C, >45°C Derating
Installation Style	Wall-Mounted
Wi-Fi & LAN Communication	Included
Standard Warranty (verified by HALT Testing)	10 Years

Protections & Certifications	
Electronics Certified Safety by SGS Labs to NEC & UL Specs - NEC 690.4B & NEC 705.4/6	Yes
Grid Sell Back — UL1741-2010/2018, IEEE1547a -2003/2014, FCC 15 Class B, UL1741SB, CA Rule 21, HECO Rule 14H	Yes
PV DC Disconnect Switch — NEC 240.15	Integrated
Ground Fault Detection — NEC 690.5	Integrated
PV Rapid Shutdown Control — NEC 690.12	Integrated
PV Arc Fault Detection — NEC 690.11	Integrated
PV Input Lightning Protection	Integrated
PV String Input Reverse Polarity Protection	Integrated
AC Output Breakers - 200A	Integrated
200A x 2 Battery Breaker / Disconnect	Integrated
Surge Protection	DC Type II / AC Type II

PRT30N

Technical Specifications (continued)

Power Factor:
99.2% at 120V, 90.9% at 277V

Performance

Lifespan:
100,000-Hour LED lifespan based on IES LM-80 results and TM-21 calculations

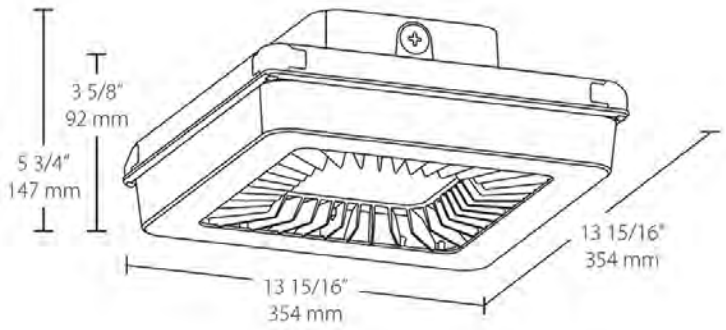
Wattage Equivalency:
Equivalent to 100W Metal Halide

Other

Warranty:
RAB warrants that our LED products will be free from defects in materials and workmanship for a period of five (5) years from the date of delivery to the end user, including coverage of light output, color stability, driver performance and fixture finish. RAB's warranty is subject to all terms and conditions found at rablighting.com/warranty.

Buy American Act Compliance:
RAB values USA manufacturing! Upon request, RAB may be able to manufacture this product to be compliant with the Buy American Act (BAA). Please contact customer service to request a quote for the product to be made BAA compliant.

Dimensions



Features

- Ultra-high efficiency
- Pendant or surface mount
- Low glare, vandal-resistant polycarbonate lens
- 20% uplight eliminates "cave effect"
- 100,000-Hour LED lifespan
- 5-Year, No-Compromise Warranty

PRT30N

Ordering Matrix

Family	Wattage	Color Temp	Finish	Driver Options	Options	Other Options
PRT	30	N				
	30 = 30W (14" x 14") **42 =** 42W (14" x 14") **55 =** 55W (14" x 14") **70 =** 70W (18" x 18") **80 =** 80W (18" x 18") **105 =** 105W (18" x 18")	**Blank =** 5000K Cool **N =** 4000K Neutral **Y =** 3000K Warm	**Blank =** Bronze **W =** White	**Blank =** 120-277V, 0-10V Dimming **/480 =** 480V, 0-10V Dimming	**Blank =** No Option **/E =** Battery Backup **/WS =** Multi-Level Motion Sensor for 14" **/WS2 =** Multi-Level Motion Sensor for 18" **/PCS =** 120V Swivel Photocell **/PCS2 =** 277V Swivel Photocell **/PCS4 =** 480V Swivel Photocell **/LC =** Lightcloud Controller **/LCS =** Lightcloud Sensor	**USA =** BAA Compliant **Blank =** Standard

[1] *Only available for 120-277V.*

HOMEGRID

POWERCUBE SERIES

Upgradeable
9.6kWh to 153.6kWh. Flexible design with each unit.

Live Communications
Real time display, mobile access

10 year Warranty
20 year serviceable

All-In-One Solution
Easily connect solar, grid, loads, and generators. Batteries/inverters pre-wired.

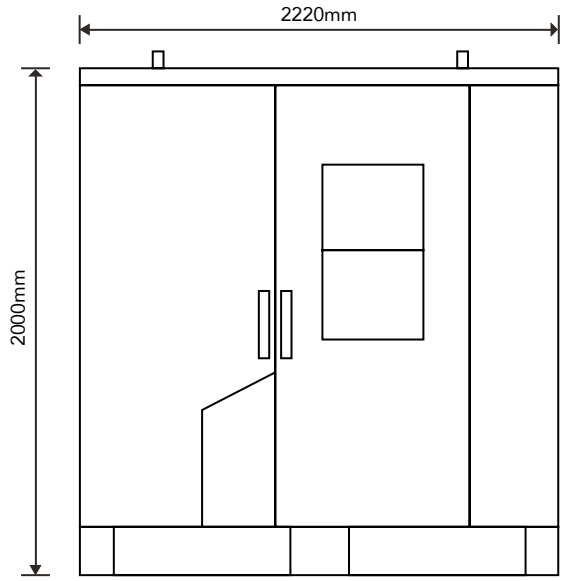
POWERCUBE SERIES SPECIFICATIONS

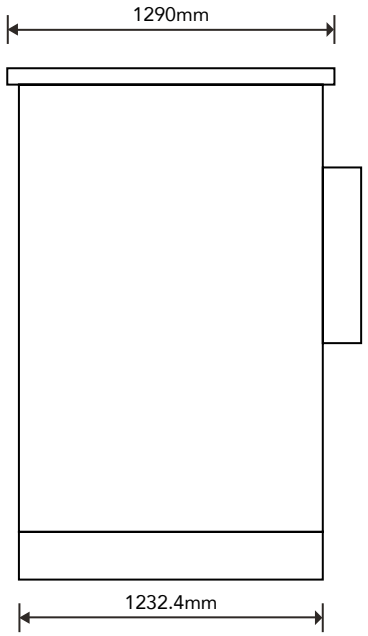
Battery Chemistry	LFP
Nominal DC Voltage	48 V DC
Capacity	9.6kWh - 153.6kWh
Max Systems in Parallel	2 (307.2kWh)
Discharge	9 - 45kW
Charge	9 - 45kW
Warranty	10 year warranty
Service Plan	20 year serviceable
Temp Range	0C - 55C* charging, -20C - 55C*discharging (*external temp has internal heating/cooling)
Certifications	UN 38.3, UL 1642, UL 1973, UL 9540, UL 9540A
Product Dimensions	On diagram

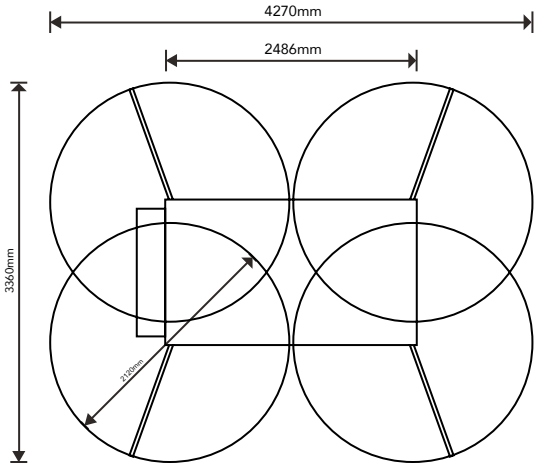
POWERCUBE SERIES DIMENSIONS

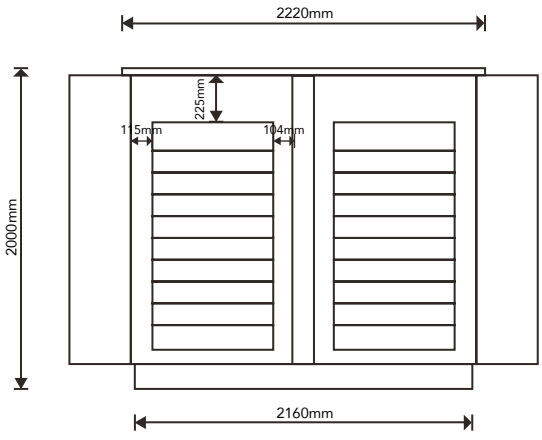
ORDERING OPTIONS

Each PowerCube can fit 1-4 full Stacks of our Stack'd Series battery (9.6 - 153.6 kWh). It can be configured with 1-3 Sol-Ark 12Ks or 15Ks, or with just batteries as an expansion unit. The configuration chosen will affect both the capacity, output, and supported amount of PV/Generator.









POWERED BY LITHION

Appendix C

HELIOSCOPE REPORT

Helioscope is an industry leading solar design tool used to optimize the solar configuration and predict solar energy generation profiles. This analysis estimates solar production at the specific site location and equipment, while considering shading from nearby structures or plants as well as adjacent modules, within one hour increments. The following report provides an overview of solar system design and expected annual production. The analysis details are imported to Xendee for the purposes of the microgrid analysis.

FINAL - FOR 30% DESIGN 24-3782T Mt Hood Town Hall, 6575 OR-35, Mt Hood, OR 97041

Report

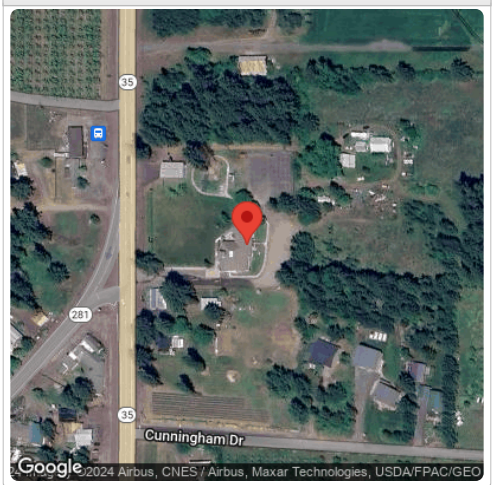
Project Name	24-3782T Mt Hood Town Hall
Project Description	24-3782T Mt Hood Town Hall - microgrid feasibility
Project Address	6575 OR-35, Mt Hood, OR 97041
Prepared By	Mayfield Renewables ryan@renewableassociates.com

Mayfield Renewables

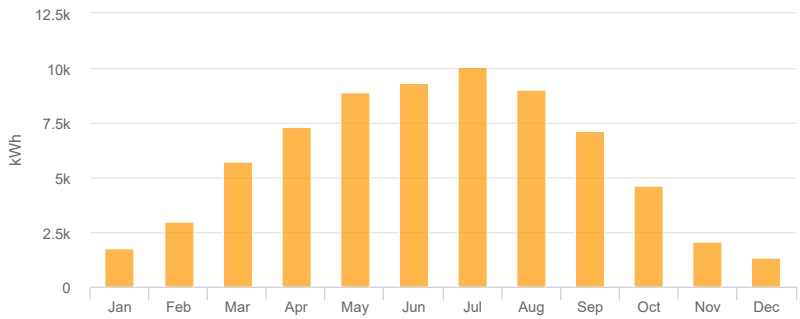
System Metrics

Design	FINAL - FOR 30% DESIGN
Module DC Nameplate	55.1 kW
Inverter AC Nameplate	60.0 kW Load Ratio: 0.92
Annual Production	70.32 MWh
Performance Ratio	80.5%
kWh/kWp	1,275.6
Weather Dataset	TMY, 10km Grid (45.55,-121.55), NREL (prospector)
Simulator Version	069a544e3c-4d51b3c320-9bc4e2924a-6639cf7654

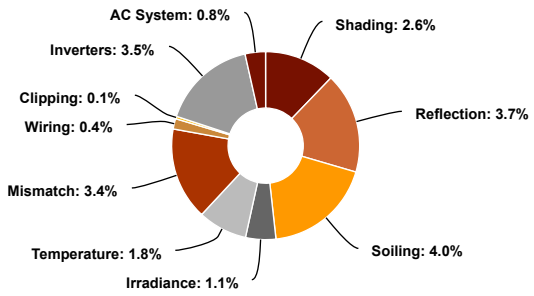
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,495.6	
	POA Irradiance	1,584.4	5.9%
	Shaded Irradiance	1,543.1	-2.6%
	Irradiance after Reflection	1,486.1	-3.7%
	Irradiance after Soiling	1,426.7	-4.0%
	Total Collector Irradiance	**1,426.7**	**0.0%**
Energy (kWh)	Nameplate	78,640.5	
	Output at Irradiance Levels	77,770.1	-1.1%
	Output at Cell Temperature Derate	76,364.9	-1.8%
	Output After Mismatch	73,770.4	-3.4%
	Optimal DC Output	73,488.2	-0.4%
	Constrained DC Output	73,421.3	-0.1%
	Inverter Output	70,851.5	-3.5%
	Energy to Grid	**70,320.1**	**-0.8%**
Temperature Metrics			
	Avg. Operating Ambient Temp		13.0 °C
	Avg. Operating Cell Temp		20.2 °C
Simulation Metrics			
	Operating Hours		4698
	Solved Hours		4698

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km Grid (45.55,-121.55), 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	3	5	5	6	6	3	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.75%											
Module Characterizations	Module	Uploaded By	Characterization									
	AXN6M610B315 (Auxin Solar)	HelioScope	Spec Sheet Characterization, PAN									
Component Characterizations	Device	Uploaded By	Characterization									
	Sol-Ark-15K-2P (Sol-Ark)	HelioScope	Spec Sheet									

Components

Component	Name	Count
Inverters	Sol-Ark-15K-2P (Sol-Ark)	4 (60.0 kW)
Strings	10 AWG (Copper)	16 (2,802.2 ft)
Module	Auxin Solar, AXN6M610B315 (315W)	175 (55.1 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	-	4-13	Along Racking

Field Segments

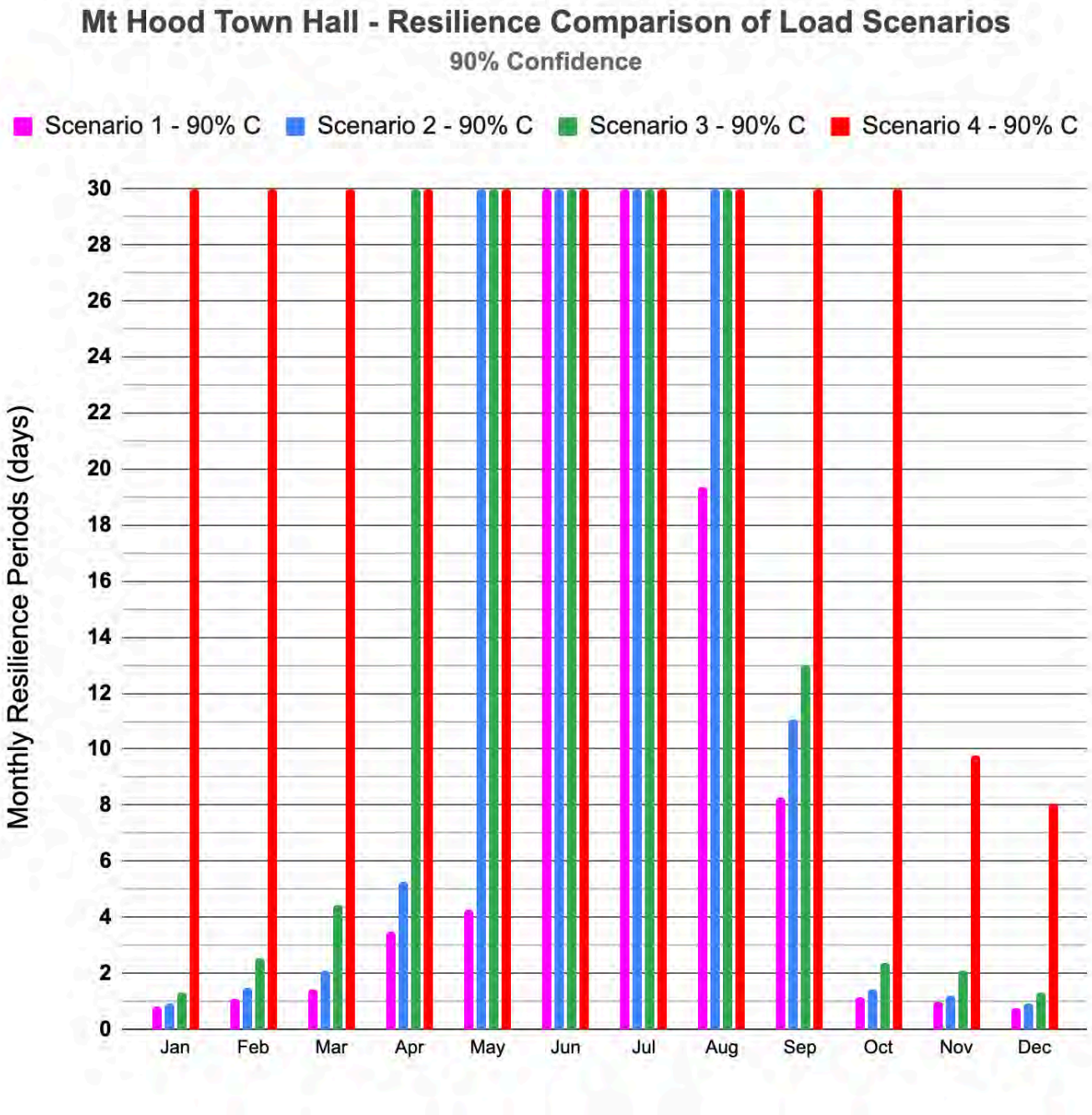
Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 2	Carport	Portrait (Vertical)	7°	147°	0.0 ft	1x1	40	40	12.6 kW
Field Segment 2	Carport	Portrait (Vertical)	7°	180°	0.0 ft	1x1	135	135	42.5 kW

Detailed Layout

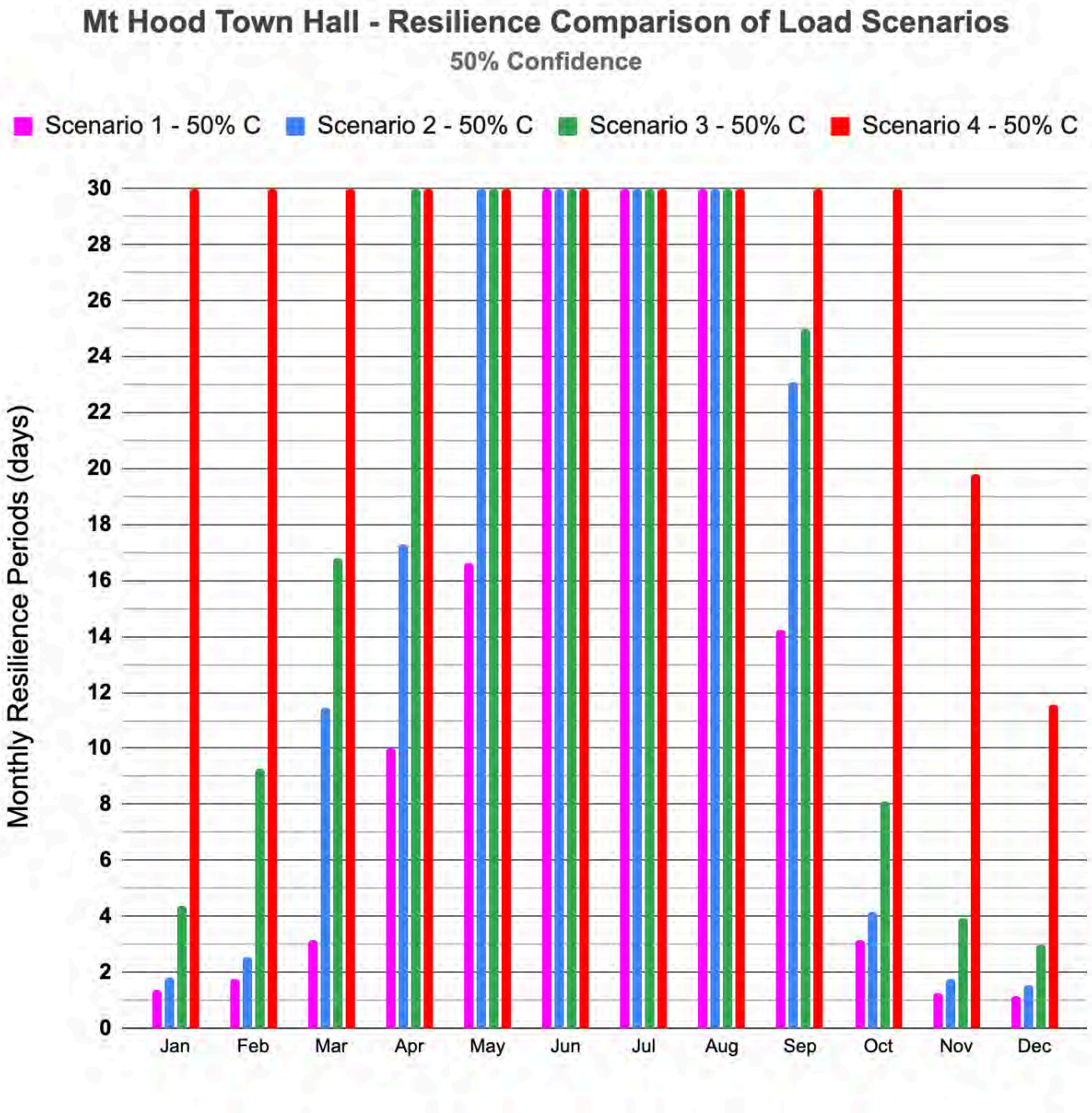
Appendix D

SYSTEM DISPATCH

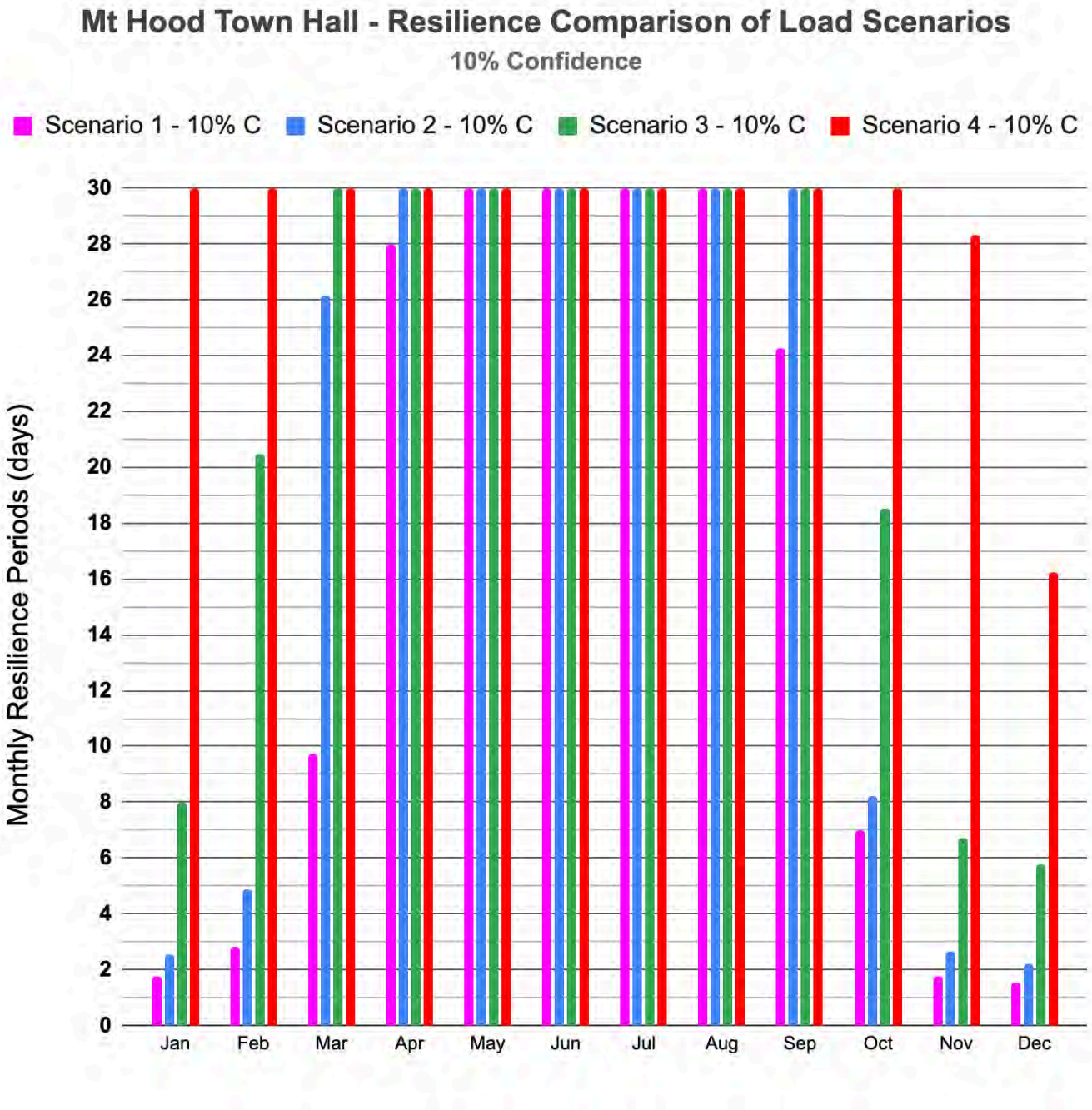
Evaluating the performance of a microgrid requires an understanding of how its energy resources–e.g. PV, battery, utility grid, and/or generator–work together to serve load. The performance of resilience focused systems can vary significantly on weekly, monthly, and annual timescales, based on patterns in PV generation and electrical load. Financial mechanisms like peak shaving or energy arbitrage can impact the level of reserves in a battery ready for an emergency situation. In this appendix you'll find visualizations that enable deeper insight into the dispatch of the modeled microgrid system.



Resilience Period by Month: 90% Confidence - This graph shows the expected length of time for which the microgrid can endure a power outage (the resilience period) during each calendar month at 90% confidence for all four load scenarios. The purple, blue, green, and red bars in each column represent the expected resilience period in each month during load scenarios 1, 2, 3, and 4, respectively. For example, in December the microgrid is expected to be able to endure a 19 hour outage in load scenario 1, with 90% confidence. An outage starting in June is expected to endure through July.



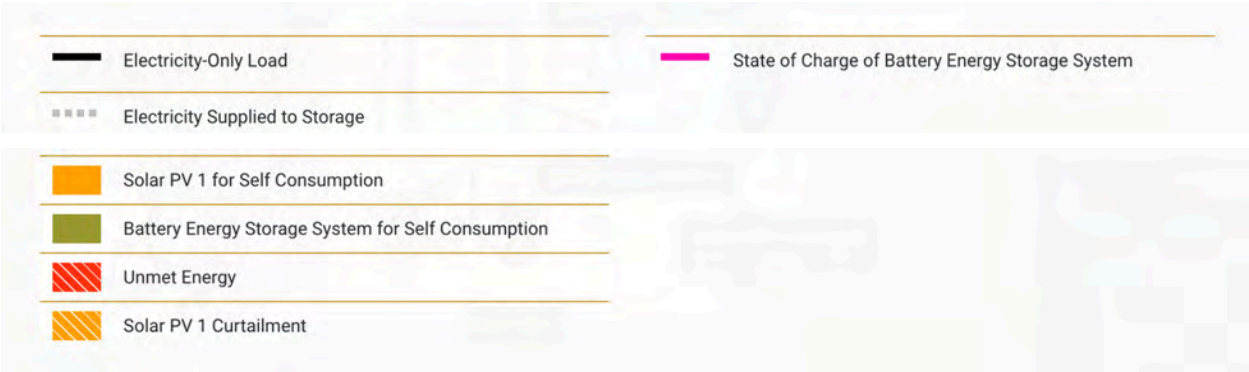
Resilience Period by Month: 50% Confidence - This graph shows expected resilience periods during each calendar month at 50% confidence for all four load scenarios.

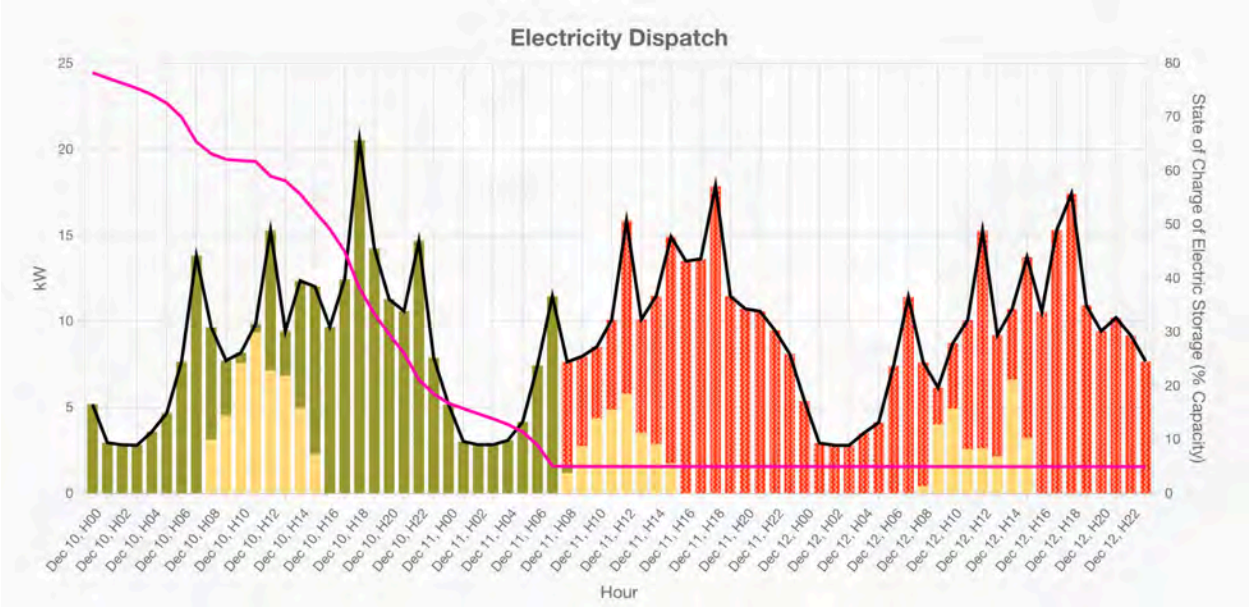


Resilience Period by Month: 10% Confidence - This graph shows expected resilience periods during each calendar month at 10% confidence for all four load scenarios.

The charts below show example dispatch curves during a grid outage on December 10th for each of the four load scenarios analyzed in this study. Use the legend below to interpret which resources are active at any given timestep, and how generation compares with system load.

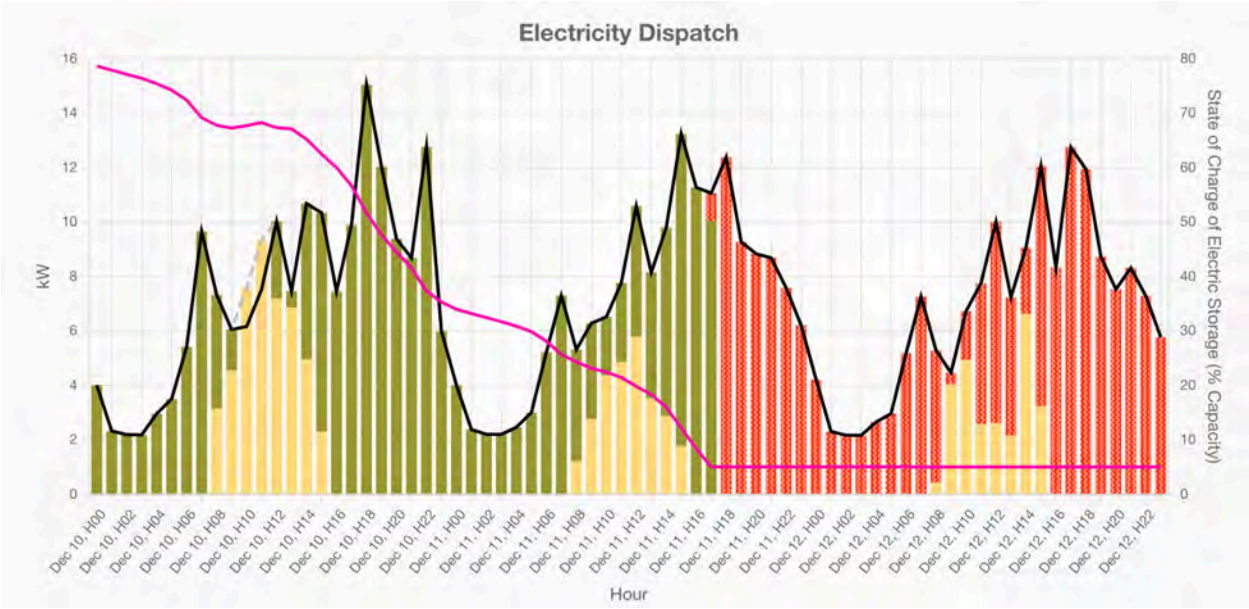
Legend





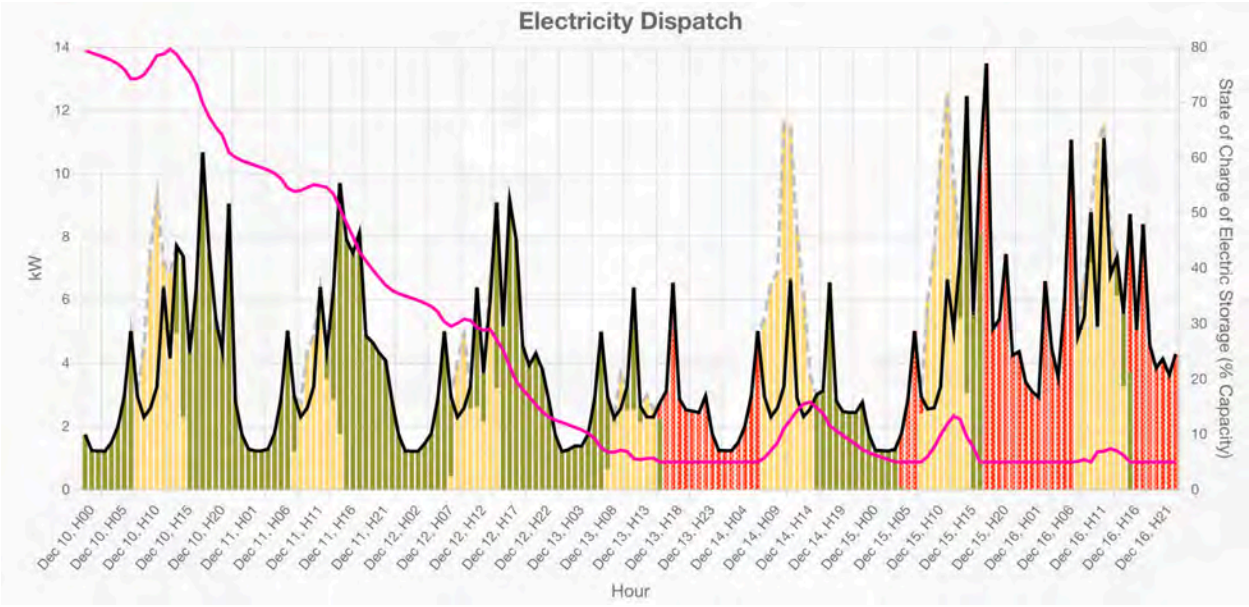
1. December 10th Grid Outage - Load Scenario 1

Description: The chart above shows how the microgrid is expected to dispatch during a modeled grid outage on December 10th. The black line represents the electrical load, and the green and yellow bars represent energy from the battery and solar resources that are serving that load. The pink line represents the battery state of charge, which declines over ~30 hours until the system runs out of stored energy. At that point, the microgrid can no longer meet electrical demand, and the facility loses power.



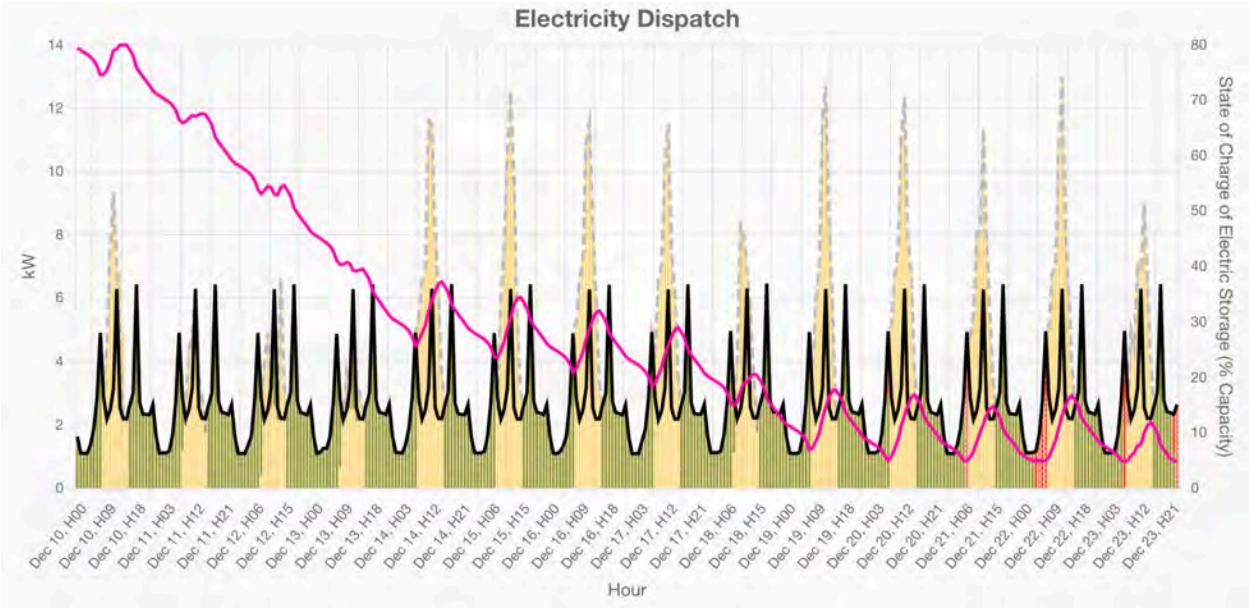
2. December 10th Grid Outage - Load Scenario 2

Description: Due to the lower demand of load scenario 2, the microgrid system can supply the facility with power for longer. In this case, it is serving the loads for ~40 hours.



3. December 10th Grid Outage - Load Scenario 3

Description: In this same scenario, the microgrid can supply power to load scenario 3 for up to three and a half days. After this point, it will lose power. However, on particularly sunny days the abundant solar energy may charge the battery sufficiently to enable the system to begin to supply power again, if only for a short duration–an operation called “black start.”



4. December 10th Grid Outage - Load Scenario 4

Description: Due to the omission of space heating in scenario 4–which is a large load–the microgrid can power the facility continuously for up to ten days. It loses power briefly for the first time on December 20th, after which abundant solar production allows recharging of the batteries and “blackstart” of the system.

Appendix E

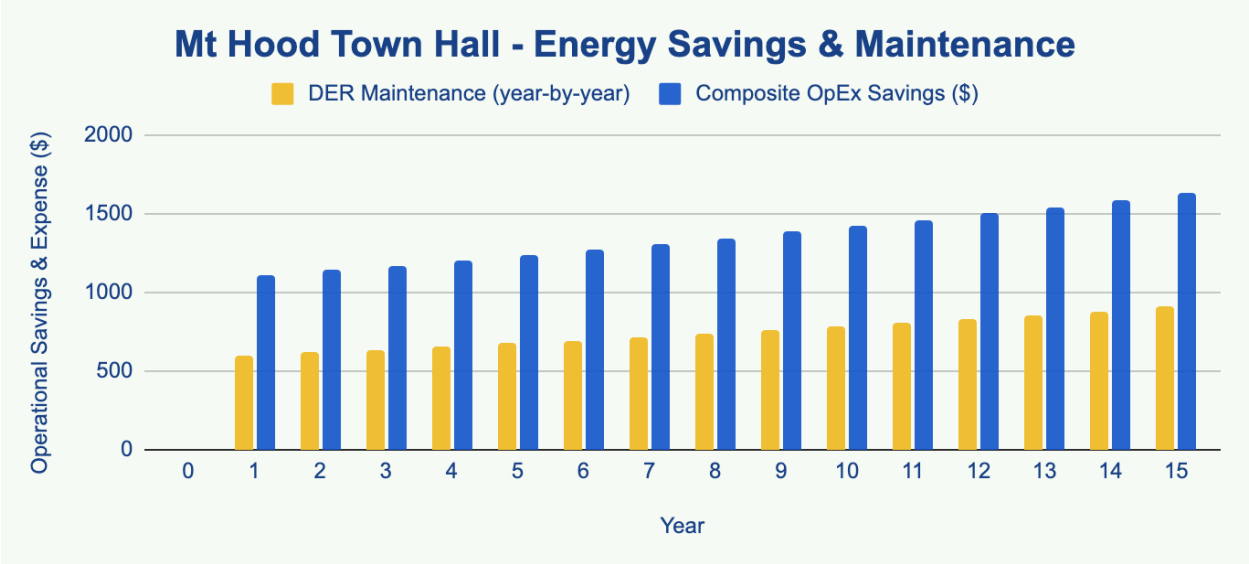
FINANCIAL REPORT

Evaluating the economic value of a microgrid means viewing it as an investment. In this appendix you will find the results of a multiyear financial modeling analysis that takes into account system degradation, utility charges, energy savings, maintenance costs, inflation, and the time-value of money.

Headline Financial Results			
Year One OpEx Savings	Lifetime Net Present Value	Internal Rate of Return (%)	Levelized Cost of Energy (LCOE)
$1,108	$13,703	Near Infinite	-$0.2264

Headline Results - See interpretation guide, next page.

Discounted Operational Savings - Shows accumulation of discounted operational savings throughout the 15-year period of this study, after maintenance costs have been deducted. Numbers here reflect a discount factor of 5%.



Energy Savings & Maintenance - Shows year-by-year expected energy savings and maintenance costs. Note: no discount factor applied.

Financial Metric Interpretation Guide

Lifetime Net Present Value (NPV) - Money is worth less in the future than it is right now. This is partially due to inflation, but also a result of the opportunity cost–you just have fewer years to live in the future than you do today. NPV is a way of viewing future cash flows that factors in these losses in the value of money over time. The “amount” of attenuation in the value is determined by a variable called the “discount rate.” We represent future cash flows in terms of NPV to help give you a more realistic sense of the value you can expect to derive from your microgrid investment. Given a discount rate, NPV values greater than zero signify a “good” investment, while values less than zero signify a “poor” investment.

Internal Rate of Return (IRR) - IRR helps to give a sense of “how good” or “how bad” an investment is, since it can be compared “apples-to-apples” with alternative investment choices.

Levelized Cost of Energy (LCOE) - Here, we are talking about the “load based” LCOE, or how much each kilowatt-hour of electricity produced by the microgrid costs when CapEx is levelized over the lifetime of the system.

Appendix F

LOAD TABLE

Careful consideration is often required when selecting which facility loads will be powered by the microgrid during a utility outage. Generally, this can be conceptualized as a trade-off between functionality and the length of the expected resilience period. The modeling performed in this analysis is based on assumptions outlined in this section.

Mt Hood Town Hall Microgrid Feasibility - Load Table

Priority	Load Name	Scenario #1	Scenario #2	Scenario #3	Scenario #4	Panelboard	Service Voltage	Power (kWac)
1	HVAC #2	x	x	x	excluded	D	240	(load study)
2	Mens room	x	x	x	x	D	120	(load study)
3	Womens room	x	x	x	x	D	120	(load study)
4	Fridge 1 (commercial)	x	x	x	x	B	120	0.59
5	Freezer 1 (household)	x	x	x	x	B	120	0.59
6	Receptacles - stage (a)	x	x	x	x	A	120	0.12
7	Receptacles - stage (b)	x	x	x	x	B	120	0.12
8	internet modem	x	x	x	x	B	120	0.40
9	Receptacles - dining area	x	x	x	x	D	120	(load study)
10	Receptacles - kitchen "post"	x	x	x	x	C	240	0.24
11	Receptacles - backsplash	x	x	x	x	C	240	2.50
12	Lights - dining area	x	x	x	x	E	120	0.40
13	Lights - kitchen	x	x	x	x	C	120	0.30
14	Receptacles - NW dining room	x	x	x	x	C	120	0.12
15	Receptacles - north wall	x	x	x	x	A	120	0.12
16	Receptacle - wash room sink	x	x	x	x	A	120	0.12
17	Kitchen hood	x	x	x	x	C	240	0.38
18	Dish washer	x	x	x	x	A	120	0.90
19	Water heater - wash rooom (1)	x	x			C	240	1.13
20	Water heater - wash rooom (2)	x	x			C	240	1.13
21	Fridge 2 (commercial)	x	x			B	120	0.59
22	Freezer 2 (commercial)	x	x			B	120	0.59
23	Fridge 3 (household)	x	x			B	120	0.59
24	Water heater - shower room	x	x			E	240	1.13
25	Lights & Receptacles - shower room	x	x			E	120	0.40
26	Moffat Turbofan Oven	x				-	-	3.25
27	Lights - craft area	x				E	120	0.40
28	Receptacles - craft area east	x				E	120	0.12
29	Receptacles - craft area west	x				E	120	0.12

30	Lights - basement furnace room	x				D	120	(load study)
31	Mystery breaker 1	x				A	120	0.80
32	Mystery breaker 2	x				A	120	0.80
Estimated Annual Energy (MWh)		75	64	39	17			
Max Continuous Power (kW)		25	19	15	6			
Max Surge Power (kW)		61	30	24	24			

This table shows the loads considered in this feasibility study, as prioritized by Mt Hood Town Hall Association. The columns labeled Scenario 1-4 indicate which loads are included in each of the four synthetic load profiles generated for this analysis.

Appendix G

ROM BUDGET

The analysis presented in this report is driven, in part, by budgeting assumptions outlined in this "rough-order-magnitude" (ROM) budget. Below you will find detailed itemized cost assumptions made at this preliminary stage. These figures are preliminary estimates, and should be constrained by quotes from installation contractors and equipment manufacturers prior to full construction planning.

Mt Hood Town Hall - ROM Constructrion Budget		
Line Item	**Price**	**Notes**
Materials - PV modules	$33,000	(175) Auxin Solar AXN6M610B315
Materials - PV racking	$121,000	PowerShingle
Materials - BESS	$307,200	(2) Homegrid Cube, comes integrated with (4) Sol-Ark 15K-2P-N inverters
Materials - BOS (PV)	$25,000	Including aggregation panels & breakers; conductors & conduit; disconnect(s)
Materials - BOS (BESS)	$25,000	Including isolation xfmr, conductors & conduit
Materials - fencing	$1,500	50 ft @ $30/ft
Freight (BESS)	$10,000	
Freight (PV)	$10,000	
Heavy equipment	$15,000	
Site Prep (PV)	$30,000	Including excavation & trenching; equipment pads; landscaping
Site Prep (BESS)	$30,000	Including excavation & trenching; equipment pads; landscaping
Labor (BESS)	$76,800	4 workers, 12. days, $175/hr
Labor (PV)	$96,000	4 workers, 15. days, $175/hr
Labor (Commissioning)	$16,000	2 workers, 4. days, $225/hr
Construction Subtotal	**$796,500**	
Design - elec eng, civil eng.	$31,860	4.% of Materials & Labor
Engineering Subtotal	**$31,860**	
Construction - contingency	$55,755	7.% of Materials & Labor
Contractor overhead	$39,825	5.% of Materials & Labor
Project Management	$24,851	3.% of Materials & Labor
Grants Management	$4,142	0.5% of Materials & Labor
Admin Subtotal	**$124,573**	
TOTAL	**$952,933**	

Appendix H

TABLE OF ASSUMPTIONS

Many assumptions are necessarily made in the course of the complex energy and financial modeling performed as part of a microgrid feasibility study. The below table serves as a record of assumptions made in this analysis, to give clarity to the results presented through this report.

Assumptions Table			
Parameter Name	**Units**	**Value**	**Description**
General Assumptions			
Project Goals	-	Resilience	Brief list of key project goals
Key Constraints	-	25 kW net metering limit	Brief list of key constraints
PV Considered?	-	TRUE	Is PV present as a resource in this analysis?
BESS Considered?	-	TRUE	Is BESS present as a resource in this analysis?
Financial Assumptions - Basic			
Study Length	Yrs	15	Years of duration of financial modeling
PV Cost	$/W	$7.32	From ROM construction budget
PV Maintenance	$/Yr	$300	Assumed annual PV maintenance costs
BESS Cost	$/kWh	$1,742	From ROM construction budget
BESS Maintenance	$/Yr	$300	Assumed annual BESS maintenance costs
ITC	%	30.00%	Percentage of total install cost claimed for federal tax credit
MACRS	-	FALSE	Is MACRS applicable?
Grants	$	$1,000,000	Total grant value that can be claimed
Discount Rate	%	5%	Discount rate for cashflow results
Investment Strategy	-	Up Front	"Up Front", "Loan", or "Amortized"
Multiyear Assumptions			
PV Degradation	%/Yr	-0.5%	Rate of annual PV degradation
BESS Degradation	%/Yr	-2%	Rate of annual BESS degradation
Utility Cost Inflation	%/Yr	3%	Rate of annual inflation of cost of energy purchased from utility
Technical Assumptions			
Utility Rate Class	String	Commercial & Industrial	Code of the utility rate class assumed for analysis
Max Export To Grid	kW	TBD	Maximum energy that can be exported to utility grid
PV Inverter Max Efficiency	%	97.5%	Max efficiency of PV inveter(s) - from spec sheet
BESS inverter Efficiency	%	97.5%	Max efficiency of BESS inverter(s) - from spec sheet
Max C Rate	-	0.195	Max Charge/discharge rate of BESS
Max BESS S.o.C.	%	80%	Maximum state of charge of battery
Min BESS S.o.C.	%	80%	Minimum state of charge - during normal grid operation
Emergency Min BESS S.o.C.	%	5%	Minimum state of charge - during resilience scenario

Design Criteria Hub Report ORSC 2023

Appendix E

6575 Highway 35, Mount Hood Parkdale, Oregon, 97041
Latitude / Longitude: 45.5393 -121.5668

Area of Interest

Site-Specific Climatic and Geographic Design Criteria

County	Hood River County
Adjusted Ground Snow Load	84 psf
Basic Wind Speed	98 mph
Seismic Design Category	C
Weathering Potential	Severe
Frost line depth	24 inches
Decay Potential	Moderate
Air Freezing Index	< 1,500

See Section R301.2 of the 2023 Oregon Residential Specialty Code for more information.