

# 801 MILUK DR SOLAR PV & BATTERY INSTALLATION ELECTRICAL PLAN

# APPLICABLE SPECIFICATIONS AND CODES

-ELECTRICAL:	NEC-2020
-BUILDING:	ASCE 07-10
-WIND SPEED:	130 mph
-WIND EXPOSURE:	С
-RISK CAT:	II
-SNOW LOAD:	20 lbs/sqft

SITE -

SITE ADDRESS: 801 Miluk Dr. Coos Bay, OR 97420

EPC CONTRACTOR: GSC CONSTRUCTION

SHEET	
1	TITLE PAG
2	ELECTRIC
3	TOTAL SYS
4	ELECTRIC
5	ELECTRIC
6	PV STRING
7	SAFETY LA
8	DATA SHE



SCALE N.T.S.

SATTER: David Brueck, D.F. BATTERY BACK-UP BATTERY BACK-UP Coos Bay, OR 97420 Coos Bay, OR 97420 David Brueck bar and b	SCALE: N/A BC-2023-06 SHEET: 001 SCALE: N/A SCALE: N/A SCALE: N/A	Sourcessing of the second seco	ENCINEER: David Brueck, P.E. GA LICENSE # 038100 Certified NABCEP PV Installer# 042013–17 DAVID Brueck PROJECT # BC-2023-06 SHEET: 001 SCALE: N/A MA MA MA MA MA MA MA MA MA M	C	0	N	15	) 5	J	R		ر ا(	2	Γ		C	N
FOR CONSTRUCTION ENGINEER: David Brueck, P.E. GA LICENSE # 038102 Certified NABCEP PV Installer# 042013–17 DRAFTER: David Brueck PROJECT #: BC-2023-06 SHEET: 001 SCALE: N/A	FOR CONSTRUCTION ENGINEER: David Brueck, P.E. GA LICENSE # 038102 Certified NABCEP PV Installer# 042013–17 DRAFTER: David Brueck PROJECT #: BC-2023-06 SHEET: 001 SCALE: N/A	FOR CONSTRUCTION	FOR CONSTRUCTION			801 MILUK DR.		ROOF MOUNT SOLAR PV & BESS		BATTERY BACK-UP		Coos Bay, OR 9/420		IIILE PAUE			
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# **ELECTRICAL SPECIFICATIONS**

### **GENERAL DESIGN**

1. ALL AMPACITIES OF CONDUCTORS ENCLOSED IN CONDUIT SHALL BE CALCULATED AT A MAXIMUM OF 75°C INSULATION RATING OR THE TEMPERATURE RATING OF THE TERMINATION, WHICHEVER IS LOWER AS PER NEC TABLE 310.15(B)(16). 2. THE MAX AND MIN AMBIENT TEMPERATURES USED IN THIS DESIGN ARE 37°C AND (-)4°C AND ARE BASED ON DATA PROVIDED BY ASHRAE FOR CAPE ARAGO, OR.

### **NEW PHOTOVOLTAIC SYSTEM**

1. THE PROPOSED PHOTOVOLTAIC SYSTEM IS INTENDED TO OPERATE IN PARALLEL WITH THE UTILITY DISTRIBUTION SYSTEM.

2. THE PHOTOVOLTAIC SYSTEM IS INTENDED TO CONNECT TO THE EXISTING ELECTRICAL SYSTEM ON THE CUSTOMER'S SIDE OF THE METER FOR NET METERING THIS CONNECTION SHALL BE IN COMPLIANCE WITH THE NEC AND UTILITY STANDARDS. 3. PRIOR TO INSTALLATION, THE CONTRACTOR SHALL SUBMIT AN INTERCONNECTION APPLICATION TO THE UTILITY AND OBTAIN AN INTERCONNECTION AGREEMENT IN COORDINATION WITH LOCAL STANDARDS.

5. THE INVERTER FOR THE PROPOSED PHOTOVOLTAIC SYSTEM SHALL BE IDENTIFIED FOR USE IN SOLAR PHOTOVOLTAIC AND BATTERY BACK-UP SYSTEMS. 6. ALL SOURCE CIRCUITS SHALL HAVE INDIVIDUAL SOURCE CIRCUIT PROTECTION FOR TESTING AND ISOLATION. ALL COMBINER BOXES SHALL HAVE DISCONNECTION MEANS IN OR NEAR THE COMBINER FOR ISOLATION AND TESTING.

7. ALL DISCONNECTS, COMBINERS, PULL/SPLICE BOXES, AND ENCLOSURES SHALL BE UL LISTED FOR ITS PURPOSE.

### **INVERTER**

1. INVERTER SHALL BE HANDLED AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND DOCUMENTATION. ALL INSTRUCTIONS AND REFERENCE DOCUMENTS SHALL BE REVIEWED AND UNDERSTOOD BY THE CONTRACTOR PRIOR TO HANDLING AND UNPACKING THE EQUIPMENT.

2. CONTRACTOR SHALL INSPECT ALL PACKAGES FOR DAMAGE UPON DELIVERY. ANY DAMAGED PACKAGES SHALL BE OPENED SO THE INVERTER AND EQUIPMENT CAN BE INSPECTED. ANY DAMAGE TO THE PACKAGING OR EQUIPMENT SHALL BE DOCUMENTED AND REPORTED TO THE OWNER IMMEDIATELY. INVERTERS TO BE STORED SHALL BE PROPERLY REPLACED IN THE PACKAGING FOR STORAGE. 3. INVERTER SHALL BE STORED IN A SECURE AND CLEAN LOCATION PER THE MANUFACTURER'S RECOMMENDATIONS AND DOCUMENTATION. INVERTERS SHALL BE PROTECTED FROM THE ENVIRONMENT SUCH AS HEAT, COLD, MOISTURE, DUST, SNOW, ETC.

4. REFERENCE THE MANUFACTURER'S INSTRUCTIONS FOR UNPACKING THE EQUIPMENT, INVERTERS SHALL BE TRANSPORTED BY MEANS OUTLINED IN THE MANUFACTURER'S DOCUMENTATION ONLY.

5. THE CONTRACTOR IS TO ENSURE THAT WORKING CLEARANCES MEET THE REQUIREMENTS OF ALL APPLICABLE CODES AND THE MANUFACTURERS REQUIREMENT'S. ANY DISCREPANCIES SHALL BE REPORTED TO THE OWNER IMMEDIATELY.

6. ALL DISCONNECT SWITCHES SHALL BE IN THE OPEN POSITION DURING INSTALLATION AND SHALL REMAIN IN THE OPEN POSITION UNTIL PROPER TESTING, INSPECTION, AND COMMISSIONING HAS BEEN COMPLETED. 7. DO NOT OPEN THE INVERTER OR ELECTRICAL CABINETS WHEN IT IS RAINING OR HUMIDITY EXCEEDS 95%.

8. ALL FASTENERS SHALL BE TORQUED PER THE MANUFACTURER'S DOCUMENTATION.

9. IT IS PROHIBITED TO MODIFY THE INVERTER OR INSTALL EQUIPMENT NOT EXPLICITLY RECOMMENDED BY THE MANUFACTURER. DO NOT STORE DOCUMENTS, INSTRUCTIONS, PLANS, OR ANY OTHER FOREIGN MATERIAL NOT INTENDED TO BE PART OF THE SYSTEM INSIDE THE INVERTER CABINETS. 10. COMPONENTS OF THE INVERTER MAY BE DAMAGED BY ELECTROSTATIC DISCHARGE (ESD). WHEN HANDLING THE ELECTRICAL COMPONENTS, OBSERVE ALL ESD SAFETY REGULATIONS.

11. ALL CONDUCTORS SHALL BE CONNECTED TO THE INVERTER PER THE MANUFACTURER'S DOCUMENTATION, MAKING NOTE OF RECOMMENDED TERMINATIONS, TORQUE VALUES, AND BOLT STACK UP DETAILS IF PROVIDED. ALL BUSS BARS, CONDUCTORS, AND TERMINATIONS SHALL BE CLEAN PRIOR TO MAKING THE CONNECTION.

12. PHOTOVOLTAIC SYSTEM DC GROUNDING CONFIGURATIONS MAY VARY BY MANUFACTURER AND TECHNOLOGY. THE GROUNDING CONFIGURATION SHALL BE NOTED BY THE CONTRACTOR FOR SAFETY AND PROPER INSTALLATION. 13. CONTRACTOR IS TO OBTAIN ALL ELECTRICAL APPROVALS BY THE AUTHORITIES HAVING JURISDICTION, APPROVAL FROM THE ELECTRIC UTILITY SERVICE PROVIDER, AND APPROVAL FROM THE OWNER PRIOR TO ENERGIZING ANY INVERTERS.

14. COMMISSIONING, INSPECTION, AND TESTING OF THE INVERTER SHALL BE PROPERLY DOCUMENTED AND SUBMITTED TO THE OWNER PRIOR TO ENERGIZING THE INVERTER.

### WIRING AND WIRING METHODS

1. SEE ELECTRICAL DIAGRAM AND ELECTRICAL DETAILS FOR MORE GROUNDING 1. ALL WIRING METHODS AND INSTALLATION PRACTICES SHALL CONFORM TO THE NATIONAL ELECTRIC CODE. INFORMATION. 2. EXPOSED PV SOLAR PANEL WIRING WILL BE PV WIRE, 90 DEGREE C, 1000V, 2. ONLY ONE CONNECTION TO AC CIRCUITS SHALL BE USED FOR SYSTEM GROUNDING WET RATED. ALL EXPOSED CABLES, SUCH AS MODULE LEADS SHALL BE SECURED WITH 3. EQUIPMENT GROUNDING CONDUCTORS AND SYSTEM GROUNDING CONDUCTORS SHALL HAVE AS SHORT A DISTANCE TO GROUND AS POSSIBLE AND A MINIMUM MECHANICAL OR OTHER SUN-LIGHT RESISTANT MEANS. 3. ALL CONDUCTORS SHALL BE COPPER AND HAVE INSULATION RATING 1000 V, 90 NUMBER OF TURNS. DEGREE C, UNLESS OTHERWISE NOTED. 4. NON-CURRENT CARRYING METAL PARTS SHALL BE CHECKED FOR PROPER 4. USE THE FOLLOWING COLOR CONVENTION FOR DC CONDUCTORS: GROUNDING; NOTING THAT TERMINAL LUGS BOLTED ON AN ENCLOSURE'S **RED - POSITIVE** FINISHED SURFACE MAY BE INSULATED BECAUSE OF PAINT/FINISH. PAINT/FINISH AT POINT OF CONTACT SHALL BE PROPERLY REMOVED AND TREATED FOR RUST **BLACK - NEGATIVE GREEN - GROUND** PREVENTION.

WITH PERMANENT WIRE MARKERS TO IDENTIFY POLARITY AND GROUND. FACE TAPE SHALL NOT BE USED. 6. FLEXIBLE METAL CONDUIT IS GENERALLY SUITABLE FOR INSTALLATION IN DRY LOCATIONS. SHOULD IT BE EMPLOYED, SUPPORTS WILL BE NO MORE THAN 12 INCHES FROM BOXES (JUNCTION BOX, CABINETS OR CONDUIT FITTING) AND NO MORE THAN 54

INCHES APART 7. LIQUID TIGHT FLEXIBLE NON-METALLIC CONDUIT SHALL NOT BE USED.

8. EXPOSED PVC CONDUIT SHALL BE SCH 80. 9. LONG STRAIGHT METALLIC AND/OR PVC CONDUIT RUNS, 100 FEET OR MORE, SHALL HAVE EXPANSION FITTINGS.

10. IF USED, ALL WIRENUTS ARE TO BE SILICONE FILLED, EQUIVALENT TO IDEAL BLUE, AND INSTALLED PER MANUFACTURER'S SPECIFICATIONS BY A QUALIFIED/CERTIFIED PERSON. WIRENUTS SHALL NOT BE INSTALLED ALONG THE PATH OF PV POWER GENERATION, OR FOR ANY EQUIPMENT NECESSARY FOR THE GENERATION OF PV POWER, WIRENUTS ARE ONLY ALLOWED FOR AUXILIARY EQUIPMENT. 11. FUSES AND WIRES SUBJECT TO TRANSFORMER INRUSH CURRENT SHALL BE SIZED ACCORDINGLY.

12. ALL DC MATERIALS SHALL BE UL LISTED FOR 1000VDC MINIMUM. 13. WIRING SHALL BE INSTALLED IN APPROVED METAL OR PVC CONDUITS OR RACEWAYS WITH LISTED FITTINGS, AS APPLICABLE, ADEQUATELY STRAP AND SUPPORT ALL CONDUIT WORK PER NEC. IN GENERAL SUPPORT ALL CONDUIT WITHIN THREE FEET (3') OF OUTLET BOX, CABINET OR PANEL AND MAXIMUM OF TEN FEET (10') ON CENTER THEREAFTER, EMT CONDUIT IS TO BE LISTED FOR WET LOCATION, IF USED. 14. THE PHOTOVOLTAIC SOURCE CIRCUITS AND PHOTOVOLTAIC OUTPUT CIRCUITS OF THIS PROPOSED SOLAR SYSTEM SHALL NOT BE CONTAINED IN THE SAME RACEWAY CABLE TRAY, CABLE, OUTLET BOX, JUNCTION BOX, OR SIMILAR FITTING AS FEEDERS OR BRANCH CIRCUITS OF OTHER SYSTEMS UNLESS THE CONDUCTORS OF THE DIFFERENT SYSTEMS ARE SEPARATED BY A PARTITION OR

ARE CONNECTED TOGETHER.

15. CONNECTORS TO BE TORQUED PER DEVICE LISTING, OR MANUFACTURERS RECOMMENDATIONS. ONLY 60 TON HYDRAULIC CRIMPS WITH HIGH VOLTAGE HEAT-SHRINK INSULATION ARE ACCEPTABLE. 16. SPLIT BOLTS / SPLICES / CONNECTORS SHALL BE INSULATED WITH APPROVED MEANS. UL LISTED ELECTRICAL TAPE ALONE IS NOT SUITABLE AS THE ONLY INSULATION MEANS. FOLLOW MANUFACTURERS INSTRUCTIONS FOR APPLICATION OF INSULATING PRODUCT.

#### MARKINGS

1. ALL INTERACTIVE SYSTEM POINTS OF INTERCONNECTION WITH OTHER SOURCES SHALL BE MARKED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTION MEANS. 2. A PERMANENT PLAQUE OR DIRECTORY SHALL BE PROVIDED IDENTIFYING THE LOCATION OF THE SERVICE DISCONNECTION MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTION MEANS, IF NOT LOCATED AT THE SAME LOCATION. 3. PHOTOVOLTAIC MODULES SHALL BE MARKED TO IDENTIFY LEAD POLARITY, DEVICE RATINGS, AND SPECIFICATIONS FOR VOLTAGES, CURRENTS, AND POWER.

### **REQUIRED SAFETY SIGNS AND LABELS**

REQUIRED SAFETY SIGNS AND LABELS SHALL BE PERMANENTLY ATTACHED BY ADHESIVE, OR OTHER MECHANICAL MEANS. LABELS SHALL COMPLY WITH ARTICLE 690 OF THE NEC OR OTHER APPLICABLE STATE, AND UTILITY CODES. SEE LABELS AND MARKING PAGE FOR MORE INFORMATION. 1. ANY SWITCH, FUSES, OR CIRCUIT BREAKERS THAT CAN BE ENERGIZED IN EITHER DIRECTION SHALL BE LABELED AS FOLLOWS WARNING:

ELECTRICAL SHOCK HAZARD DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION 2. THIS PHOTOVOLTAIC SYSTEM WILL BE EQUIPPED WITH A DC DISCONNECT WHICH

WILL BE LABELED AS FOLLOWS: PHOTOVOLTAIC MAINTENANCE

DC DISCONNECT SWITCH

3. THIS PHOTOVOLTAIC SYSTEM WILL BE EQUIPPED WITH AN AC DISCONNECT WHICH WILL BE LABELED AS FOLLOWS: PHOTOVOLTAIC AC DISCONNECT 4. A MARKING SPECIFYING THE PHOTOVOLTAIC POWER SOURCE RATED AS FOLLOWS SHALL BE PROVIDED AT AN ACCESSIBLE LOCATION AT THE DISCONNECTION MEANS FOR THE POWER SOURCE: **OPERATING CURRENT (##) AMPS OPERATING VOLTAGE (##) VOLTS** MAXIMUM SYSTEM VOLTAGE (##) VOLTS SHORT CIRCUIT CURRENT (##) AMPS NOTE: ## VALUES TO BE PROVIDED BY CONTRACTOR PER ACTUAL INSTALLATION. 5. ALL MAJOR EQUIPMENT SHALL BE PROPERLY LABELED WITH ARC-FLASH HAZARD SIGNS AS REQUIRED BY NFPA 70E.

5. ALL FIELD WIRING THAT IS NOT COLOR CODED SHALL BE TAGGED AT BOTH ENDS

### GROUNDING

5. 'PV' MODULE FRAMES SHALL BE BONDED TO RACKING STRUCTURE USING A METHOD APPROVED BY THE MODULE MANUFACTURER AND WITH A MEANS OF BONDING LISTED FOR THIS PURPOSE

6. THE CONNECTION TO THE MODULE OR PANEL OF THIS PROPOSED SOLAR ELECTRIC SYSTEM SHALL BE SO ARRANGED THAT REMOVAL OF A MODULE OR A PANEL FROM THE PHOTOVOLTAIC SOURCE CIRCUIT DOES NOT INTERRUPT A GROUNDED CONDUCTOR TO ANOTHER PHOTOVOLTAIC SOURCE CIRCUIT. SETS OF MODULES INTERCONNECTED AS SYSTEMS RATED AT 50 VOLTS OR HIGHER, WITH OR WITHOUT BLOCKING DIODES, AND HAVING A SINGLE OVER CURRENT DEVICE SHALL BE CONSIDERED AS A SINGLE SOURCE CIRCUIT.

7. GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, INCLUDING BUT NOT LIMITED TO GROUND RODS, GROUNDING LUGS, GROUNDING CLAMPS, ETC. GROUNDING DEVICES EXPOSED TO THE ENVIRONMENT SHALL BE RATED FOR DIRECT BURIAL. GROUNDING LUGS SHALL BE LISTED FOR DIRECT-BURIAL, ILSCO GBL4-DBT OR EQUAL.

8. ALL FLEXIBLE CONDUITS SHALL HAVE AN EXTERIOR GROUND WIRE BETWEEN THE CONNECTORS AT BOTH ENDS. GROUND WIRE SHALL RUN ALONG THE CONDUIT. 9. ALL GROUNDING SYSTEMS FOR THE SOLAR PV INSTALLATION SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE, AND LOCAL STANDARDS.

### PROTECTION

1. PHOTOVOLTAIC INVERTERS SHALL BE EQUIPPED WITH DC GROUND FAULT PROTECTION TO REDUCE FIRE HAZARDS. INVERTERS ARE ALSO EQUIPPED WITH ANTI-ISLANDING CIRCUITRY.

2. PHOTOVOLTAIC INVERTERS SHALL BE EQUIPPED WITH PV ARC FAULT PROTECTION TO REDUCE FIRE HAZARDS.

3. PHOTOVOLTAIC SYSTEM SHALL BE EQUIPPED WITH RAPID SHUTDOWN.

### EQUIPMENT

1. EQUIPMENT AND COMPONENTS SHALL BE UL LISTED AND LABELED. OSHA STANDARDS ON EQUIPMENT ENCLOSURES, DOORS, ACCESS PLATES, AND BARRIERS AND LABEL ALL LOW VOLTAGE EQUIPMENT WITH THE OPERATING VOLTAGE.

PER MANUFACTURER'S INSTRUCTIONS. 4. EQUIPMENT SHALL BE INSTALLED IN APPROPRIATE ENVIRONMENT PER ITS NEMA RATING.

5. ALL OPENINGS INTO EQUIPMENT SHALL BE SEALED WITH GALVANIZED STEEL PLATE OR SCREEN TO PREVENT ENTRY OF INSECTS AND RODENTS.

### DISCONNECTING MEANS

1. MEANS SHALL BE PROVIDED TO DISCONNECT ALL CURRENT CARRYING CONDUCTORS OF THE PHOTOVOLTAIC POWER SOURCE FROM ALL OTHER CONDUCTORS.

2. WHERE A CIRCUIT GROUNDING CONNECTION IS NOT DESIGNED TO BE AUTOMATICALLY INTERRUPTED AS PART OF THE GROUND-FAULT PROTECTION SYSTEM REQUIRED BY NEC ARTICLE 690-5, A SWITCH OR CIRCUIT BREAKER USED AS A DISCONNECTING MEANS SHALL NOT HAVE A POLE IN THE GROUNDED CONDUCTOR.

3. THE GROUNDED CONDUCTOR MAY HAVE A BOLTED OR TERMINAL DISCONNECTING MEANS TO ALLOW MAINTENANCE OR TROUBLESHOOTING BY QUALIFIED PERSONNEL.

4. THE DISCONNECTING MEANS SHALL NOT BE REQUIRED TO BE SUITABLE AS SERVICE EQUIPMENT AND SHALL BE RATED IN ACCORDANCE WITH NEC ARTICLE 690-17.

5. EQUIPMENT SUCH AS PHOTOVOLTAIC SOURCE CIRCUITS, OVER CURRENT DEVICES, AND BLOCKING DIODES SHALL BE PERMITTED ON THE PHOTOVOLTAIC SIDE OF THE PHOTOVOLTAIC DISCONNECTING MEANS. 6. MEANS SHALL BE PROVIDED TO DISCONNECT EQUIPMENT SUCH AS INVERTERS BATTERIES, CHARGE CONTROLLERS, AND THE LIKE FROM ALL UNGROUNDED CONDUCTORS OF ALL SOURCES. IF THE EQUIPMENT IS ENERGIZED FROM MORE THAN ONE SOURCE, THE DISCONNECTING MEANS SHALL BE GROUPED AND IDENTIFIED.

7. A SINGLE DISCONNECTING MEANS SHALL BE PERMITTED FOR THE COMBINED AC OUTPUT OF ONE OR MORE INVERTERS IN AN INTERACTIVE SYSTEM. 8. NEC 690-16. FUSES. DISCONNECTING MEANS SHALL BE PROVIDED TO DISCONNECT A FUSE FROM ALL SOURCES OF SUPPLY IF THE FUSE IS ENERGIZED FROM BOTH DIRECTIONS AND IS ACCESSIBLE TO OTHER THAN QUALIFIED PERSONS. SUCH A FUSE IN A PHOTOVOLTAIC SOURCE CIRCUIT SHALL BE CAPABLE OF BEING DISCONNECTED INDEPENDENTLY OF FUSES IN OTHER PHOTOVOLTAIC SOURCE CIRCUITS.



2. PROVIDE DANGER, WARNING, AND CAUTION LABELS AS REQUIRED BY NEC, NFPA, OR

3. EQUIPMENT SHALL BE ANCHORED TO CONCRETE PADS, FOUNDATIONS, OR WALLS



ELECTRICAL ROOM: 800A, 120/208V, 3PH, 4W MDP

SUB PANEL 'P1' LOCATED INSIDE BUILDING ON GROUND FLOOD. INVERTERS AND BATTERIES LOCATED ON SECOND FLOOR DIRECTLY ABOVE 'P1': -(2) × SOL-ARK 15kW INVERTERS -(1) × EG4-LL LITHIUM BATTERIES KIT (V2) 30.72kWh, 6 BATTERY RACK IN PRE-ASSEMBLED ENCLOSURE

(180) x 370W PV MODULES

SUB PANEL 'P2', INVERTERS AND BATTERIES LOCATED INSIDE BUILDING ON GROUND FLOOR: -(2) × SOL-ARK 15kW INVERTERS -(1) × EG4-LL LITHIUM BATTERIES KIT (V2) 30.72kWh, 6 BATTERY RACK IN PRE-ASSEMBLED ENCLOSURE



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No





CONDUIT FILL CALCULATION (DC CIRCUITS ONLY)

PER NEC ART. 352.22 FOR PVC AND 358.22 FOR EMT AREA OF 1000 VOLT #10PV WIRE = 0.0543 SQ. IN. AREA OF 1000 VOLT #6PV WIRE = 0.0956 SQ. IN.

### EXAMPLE:

 $(12) \times 0.0543$  (#10 PV WIRES) = 0.66 SQ. IN. (1)  $\times$  0.0956 (#6 PV WIRES) = 0.0956 SQ. IN. TOTAL = 0.76 SQ. IN.

-FROM NEC CHAPTER 9, TABLE 4 FOR RMC CONDUIT @ 40% FILL: 1-1/2" CONDUIT = 0.829 SQ. IN. AVAILABLE. -0.76 SQ. IN. IS LESS THAN 0.829 SQ. IN., SO 1-1/2" CONDUIT WORKS FOR DC CONDUIT WITH UP TO (12) #10 CU PV WIRES. \*USE TABLE 4 IN NEC CHAPTER 9 FOR RMC CONDUIT. USE COLUMN FOR "OVER 2 WIRES 40%" TO DETERMINE MAX CROSS-SECTIONAL AREA AVAILABLE FOR WIRES AND MAKE SURE TOTAL WIRE CROSS-SECTIONAL AREA IS LESS THAN CONDUIT SIZE CROSS-SECTIONAL AREA AVAILABLE AT 40%

# **EQUIPMENT SCHEDULE**

EQUIPMENT DESIGNATION	MANUFACTURER	MODEL #	QTY	
A	BOVIET SOLAR	BVM6610M(S)-HC-BF	180	370W BI-FACIAL MONO SOLAR MOD
A	AP SMART	RSD-S-PLC	180	MODULE LEVEL RAPID SHUTDOWN
В	EG4	EG4-LL (V2)	2	EG4-LL (V2) Lithium Battery Bank (incl in Battery enclosure.
С	SOL-ARK	15K-2P-N	4	INVERTER WITH (3) x MPPTS WITH ( BATTERY CONNECTION. GENERAT 120/208V (L1,L2,N). (2) INVERTERS (
D	TBD	"LOAD SUB PANEL"	2	225A, 120/208V, 3 PHASE, 4 WIRE, P FROM SOL-ARK INVERTERS. NEUTF
E	TBD	"GRID AC COMBINER PANEL"	2	225A, 120/208V, 3 PHASE, 4 WIRE, P FOR FEED TO SOL-ARK INVERTERS
F	TBD	"AC DISCONNECT"	2	200A, 240VAC, 3 POLE, 4 WIRE, AC F INSTALLATION. NEUTRAL BUS, GRO

## **CONDUCTOR SCHEDULE - DC SIDE (PV STRINGS)**

GENERAL OCPD						VOLTAGE DROP CALCULATIONS					UCTOR	& CONDUIT SCI	HEDULE	DC Input	
	CIRCUIT DESCRIPTION	CIRCUIT ID #	Max One-Way Distance	Short Circuit Current (Isc)	Fuse/ Breaker	Distance(ft) x 2	Imp (A) x # of parallel strings	Conductor (Ohm/Kft) x 100	(Sys Nom. Voltage x # of modules in string) x 1000	Voltage Drop (%)	Wiı Size &	re Type	Ground Wire Size & Type	Conduit Size & Qty	
	PV STRING TO INV (MAX)	) 01	200 Ft	10.36A	20A	200 x 2 x	9.6 x 1 x	1.21 x 100	/ (*30.5V x 9 x 1000)	2.05%	2#10 CU F	PV WIRE	1#6 CU AWG	Max (12) #10 PV Wires in 1-1/2"	
	*30.05V	COMES FR	ROM LIFETIME M	IN VOLTAGE OF	MODULES A	AT HIGHEST RECOF	RD TEMP.		MAX TOTAL DC VOLT DROP:	2.05%					Ма

### **CONDUCTOR SCHEDULE - DC SIDE (BATTERY BANK)**

									•••				Output (A
GENER	AL		ОСРЕ			VOLT	AGE DROP (	CALCULATIONS		CONDUCTOR	& CONDUIT SC	HEDULE	
CIRCUIT DESCRIPTION	CIRCUIT ID #	Max One-Way Distance	Max (A) Circuit Current	Fuse/ Breaker	Distance(ft) x	2 Imp (A) x # of parallel strings	Conductor (Ohm/Kft) x 100	(Sys Nom. Voltage x # of modules in string) x 1000	Voltage Drop (%)	Wire Size & Type	Ground Wire Size & Type	Conduit Size & Qty	
INV TO BATTERY BANK (MAX)	02	20 Ft	160A	200A	20 x 2 x	160 x 1 x	0.0626 x 100	/ ( <mark>48∨</mark> x 1000)	0.83%	2#4/0 CU BATTERY CABLES	1#6 CU AWG	N/A	Max Max Out
*48V I	S THE BAT	TTERY BANK VC	DLTAGE. 160A IS	THE MAX CU	IRRENT SIZED F	DR 200A	•	MAX TOTAL DC VOLT DROP:	0.83%				Max (

## **CONDUCTOR SCHEDULE - AC SIDE**

					I					1			
GENERAL OCPD						VOLT	AGE DROP C	ALCULATIONS		CONDUCTOR 8	CONDUIT SCH	IEDULE	
CIRCUIT DESCRIPTION	CIRCUIT ID #	Max One-Way Distance	Max (A) Circuit Current	Fuse/ Breaker	Distance(ft) x 2	Max (A) / # AC parallel runs	Conductor (Ohm/Kft) x 100	System Nominal Voltage x1000	Voltage Drop (%)	Wire Size & Type	Ground Wire Size & Type	Conduit Size & Qty	PV I PV St
INV TO "LOAD SUB PANEL (EXISTING SUB PANEL 'P1') (MAX	) 03	50 Ft	160A	200A/2P	50 x 2 x	160 / 1	0.067 x 100	/ (208 x 1000)	0.51%	3#4/0 CU THWN-2	1#4 CU THWN-2	2" x (1)	
INV TO "GRID AC COMBINER" SUE PANEL (MAX	3 ) 04	50 Ft	160A	200A/2P	50 x 2 x	160 / 1	0.067 x 100	/ (208 x 1000)	0.51%	3#4/0 CU THWN-2	1#4 CU THWN-2	2" x (1)	
"GRID AC COMBINER" SUB PANEI TO "MDP" (MAX	05	200 Ft	160A	200A/3P	200 x 2 x	160 / 1	0.043 x 100	/ (208 x 1000)	1.32%	4#350 CU THWN-2	1#2 CU THWN-2	3" x (1)	
**MAX CURRENT OF	160A USED	) IS TO REPRES	ENT THE MAX LO	DAD THAT CAN	BE PULLED FRO	OM A 200A SUB F	PANEL.	MAX TOTAL AC VOLT DROP:	2.34%				

SUB S	YSTEM #1	
Ov	erview	
PV Module Manufacturer/Model:	BOVIET BVM6610M(S)-HC-BF	N
PV Module Size (W):	370 watts	Р
Total (#) of Modules:	90	Т
Inverter Manufacturer/Model:	Sol-Ark "Limitless 15kV-LV"	Ν
Inverter Size (VA):	15,000	
Total (#) of Inverters:	2	Т
Batteries Model:	EG4-LL Lithium Battery Rack (V2)	
Battery Bank Size:	(6) x 100Ah = 600Ah, 48V	
Total (#) Battery Banks:	1	Tota
PV System Size (DC):	33,300 W	P٧
System Size (AC):	30,000 W	

SUB S	YSTEM #2	TOTAL SYSTEM					
Ov	erview	Ov	erview				
PV Module Manufacturer/Model:	BOVIET BVM6610M(S)-HC-BF	PV Module	BOVIET BVM6610M(S)-HC-BE				
PV Module Size (W):	370 watts	Manufacturer/Model:					
Total (#) of Modules:	90	PV Module Size (W):	370 watts				
Inverter Manufacturer/Model:	Sol-Ark "Limitless 15kV-LV"	Total (#) of Modules:	180				
Inverter Size (VA):	15,000	Inverter	Sol-Ark "Limitless 15k\/-1 \/"				
Total (#) of Inverters:	2	Manufacturer/Model:	SOFAR EIMILIESS ISKV-EV				
Batteries Model:	EG4-LL Lithium Battery Rack (V2)	Inverter Size (VA):	15,000				
Battery Bank Size:	(6) x 100Ah = 600Ah, 48V	Total (#) of Inverters:	4				
Total (#) Battery Banks:	1	Batteries Model	EG4-LL Lithium Battery Rack				
PV System Size (DC):	33,300 W	Batteries Model.	(V2)				
System Size (AC):	30,000 W	Battery Bank Size:	(6) x 100Ah = 600Ah, 48V				
		Total (#) Battery Banks:	2				
		PV System Size (DC):	66,600 W				
		System Size (AC):	60,000 W				

STC F

### DESCRIPTION

DULE RATED FOR 1500 VDC.

I DEVICE ON EACH MODULE.

cludes 6 Batteries). Each Battery is 100Ah, 48V. 6 Batteries connected in parallel

(2) INPUTS EACH AT 500VDC MAX FOR SOLAR PV. (2) x INPUTS FOR FOR CONNECTION IF NEEDED. 200A LOAD BREAKER. OUTPUT IS CONNECTED IN PARALLEL TO 3 PHASE 120/208V GRID AND LOAD.

PANELBOARD WITH MAIN LUGS AND (2) x 200A/2P BREAKERS FOR FEED RAL BUS, GROUND LUG KIT. BREAKERS FOR EXISTING LOADS.

PANELBOARD WITH 200A/3P MAIN BREAKER AND (2) x 200A/2P BREAKERS 6. NEUTRAL BUS, GROUND LUG KIT.

FUSED DISCONNECT (FUSED @ 200A), NEMA 3R FOR OUTSIDE OUND LUG KIT.



## **PV MODULE SPECIFICATIONS**

Module Name:	BOVIET BVM6610M(S)-HC-BF
Power Rating (W):	370 watts
Voc (V):	40.6
Vmp (V):	33.8
lsc (A):	11.54
Imp (A):	10.96
Module Efficiency:	19.70%

### **INVERTER ELECTRICAL SPECIFICATIONS**

Inverter Name:	Sol-Ark 15k-2P-N
Input (Solar PV)	
Max DC Voltage (Voc):	500V
MPPT Voltage Range (V):	125 - 425V
Starting Voltage (V):	125V
Number of MPPT:	3
Max Solar Strings per MPPT:	2
Max DC Current per MPPT (A):	26A
tput (AC)	
Rated Power (VA):	15,000
Nominal AC Voltage (V):	120/240/208V Split Phase
AC Frequency (Hz):	60
Max Output Current w/ PV (A):	72.2 L-L (208V)
ax Output Current w/ Battery (A):	58A L-L (208V)
Max Output Current w/ Grid (A):	200A L-L (208V)
PV DC Disconnect Switch:	Integrated
Ground Fault Detection:	Integrated
PV Rapid Shutdown:	Integrated
PV Arc Fault Detection:	Integrated
PV Input Lightening Protection:	Integrated
PV String Input Reverse Polarity Protection:	Integrated
AC Output Breakers:	Integrated
200A x 2 Battery Breaker / Disconnect:	Integrated
Surge Protection:	DC Type II / AC Type II





# INVERTER/STRING ID (REFERENCE SLD)











1. LABELS AND MARKINGS SHALL BE APPLIED TO THE APPROPRIATE COMPONENTS IN

3. THE INVERTER, DC RECOMBINER, AND DC DISCONNECT COMBINERS ARE SUPPLIED FROM THE MANUFACTURER WITH THE APPROPRIATE LABELS AND MARKINGS TO MEET

5. PROPERLY LABEL IN NUMERICAL ORDER ALL DC DISCONNECTS, INVERTERS, AND AC

6. REFER TO NATIONAL ELECTRIC CODE 2020 EDITION FOR APPROPRIATE SIZES OF

LABEL SCALE: HALF

### **DETAIL "5" NOTES:**

1. ARC FLASH AND SHOCK HAZARD WARNING LABEL TO BE PLACED ON ALL EQUIPMENT THAT HAS EXPOSED LIVE PARTS WHEN ENCLOSURE IS OPEN FOR SERVICING.

### 'PV' LABELS - ARC FLASH HAZARD

GSC CONSTRUCTION

801 MILUK DR. 801 MILUK DR. ROOF MOUNT SOLAR PV & BESS BATTERY BACK-UP Coos Bay, OR 97420 SAFETY LABELS							
FOR CONSTRUCTION							
ENGINEER: David Brueck, P.E. GA LICENSE # 038102 Certified NABCEP PV Installer# 042013-17							
Brueck	Br	-	id			AF1	DR
23-06	)2	S(	- <sup>2</sup>	3C-	E	EET	SHI
/A	<u>07</u> /	<u>N</u>			•	ALE	SC
D.BRUECK D.BRUECK							
UPDATED MODULE. FOR CONSTRUCTION FOR CONSTRUCTION							
D.BRUECK							
7/13/2023 3/16/2023							
					ľ		



360W

10.78A

33.40V

11.37A

40.21V

19.2%

0~+5W

286W

7.81A

36.7V

8.33A

-40°F~185°F

1000/1500V DC

20A

45.5V

Bifacial-Monocrystalline 6.54 x 3.27 inch, 120 (6 x 20) pcs. in series Pmax Temperature Coefficient

High transparency, low iron, AR coated tempered glass 3.2mm(0.13 inch) Voc Temperature Coefficient

Irradiance: AM 1.5, 1,000W/m³(365W)

-25 0 25 50 75 1

2107 N 1st Street Suite 550 San Jose, CA 95131

BOVIETSOLARUSA.COM + 877.253.2858 + SALES@BOVIETSOLARUSA.COM

370W

10.96A

33.76V

11.54A

40.56V

0~+5W

295W

7.93A

37.2V

8.47A

46.1V

-0.40%/K

-0.31%/K +0.06%/K

30

24

720

41.19

Pallet weight/size 1543.22 lb/ 72.05 x 43.31 x 45.88 inch

Grounding holes 8- \$0.17

Mounting holes 0.35x0.55

Junction Box

113±35.6°F

19.7%

BVM6610M-360S-H-HC-BF BVM6610M-365S-H-HC-BF BVM6610M-370S-H-HC-BF

365W

10.87A

33.58V

11.46A

40.38V

19.5%

0~+5W

BVM6610M-360S-H-HC-BF BVM6610M-365S-H-HC-BF BVM6610M-370S-H-HC-BF

290W

7.86A

36.9V

8.40A

45.8V

NOCT

Pieces per pallet

1.10

Pallets per container (40HQ)

Pieces per container (40HQ)

Isc Temperature Coefficient





Tech Brief

#### XR Rail<sup>©</sup> Family

The XR Rail<sup>®</sup> Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail® to match.





XR1000 XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans up to 12 feet for commercial applications. mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 10 feet. 12' spanning capability
Extreme load capability
Clear anodized finish
Internal splices available

10' spanning capability
Heavy load capability
Clear & black anodized finish
Internal splices available

Rail Selection

6' spanning capability
Moderate load capability
Clear & black anodized finish
Internal splices available

The table below was prepared in compliance with applicable engineering codes and standards.\* Values are based on the following criteria: ASCE 7-16, Gable Roof Flush Mount, Roof Zones 1 & 2e, Exposure B, Roof Slope of 8 to 20 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed certification letters.



r, Inc. All rights reserved. Visit www.ironridge.com or call 1-800-227-9523 for more informations Version 1.21

Maximum Power (Pmax)

Maximum Power Current (Imp)

Maximum Power Voltage (Vmp

Short Circuit Current (Isc)

Open Circuit Voltage (Voc)

STC: AM1.5, Irradiance 1000W/m, 25°C

Maximum Power (Pmax)

Short Circuit Current (Isc)

Solar Cell

Glass

Frame

Weight

20%

Open Circuit Voltage (Voc)

Maximum Power Current (Imp)

Maximum Power Voltage (Vmp)

NOCT: AM1.5, Irradiance 800W/m², 20°C, Wind speed 1m/s

Anodized aluminum alloy

 Pmax (W)
 396
 401
 407

 10%
 Module efficiency (%)
 21.10
 21.36
 21.69

 Pmax (W)
 432
 438
 444

 Module efficiency (%)
 23.02
 23.34
 23.66

Junction Box IP68 rated, with 3 bypass diode

Dimension 70.63x41.19x1.38 Inches

48.50 lb

Connector MC4 compatible

Operating Temperature

Maximum Series Fuse Rating

Bifacial Output-Backside Power Gain

Maximum System Voltage

I-V Curves at Different Irradiances (365W) Test Temperature: 25°C

10 15 20 25 30 35 40 45

Voltage (V)

1,000 W/m<sup>4</sup> 600 W/m<sup>4</sup>

Output Cable 4 mm<sup>2</sup> (EU)/12 AWG (US), 39.38 inch

Module Efficiency

Power Tolerance





Raising	the l	bar in	inno	vative
DC MLF	PE so	lar po	ower s	systems



- Meets NEC 2017 & 2020 (690.12)
- requirements Executes rapid shutdown of system
- when Transmitter-PLC signal is absent Meets SunSpec requirements

### RSD-S-PLC Technical Data 📃

Model	RSD-S-PLC
Input Data (DC)	
Input Operating Voltage Range	8-80V
Maximum Cont. Input Current (Imax)	15A
Output Data (DC)	
Output Operating Voltage Range	8-80V
Maximum System Voltage	1000V/1500V
Mechanical Data	
Operating Ambient Temperature Range	-40 °F to +185 °F (-40 °C to + 85 °C)
Dimensions (without cable & connectors)	5" x 1.2" x 0.6"(129 mm x 30 mm x 16 mm)
Cable Length	Input 250mm/Output 1200mm
Cable Cross Section Size	TUV:4mm²/UL:12AWG
Connector	MC4 or Customize
Enclosure Rating	NEMA Type 6P/IP68
Over Temperature Protection	Yes
Features & Compliance	
Communication	PLC
Safety Compliance	NEC 2017 & 2020 (690.12); UL1741; CSA C22.2 No. 330-17; IEC/EN62109-1; 2PFG2305
EMC Compliance	FCC Part15; ICES-003;IEC/EN61000-6-1/-2/-3/-4

REV 2.2 2021-3-27

Voltage	51.2V			
Capacity	100Ah			
Charging Voltage (Bulk/Absorb)	56.2V (+/-0.2V)			
Float	54V (+/-0.2V)			
Low DC Cutoff	47-44V (depending on load - start high, lower if needed)			
Charging Current	Max Constant Charge: 100A (30-50 recommended)			
Discharging Current	Max Constant Discharge: 100A			
Environmental Parameters				
Charging Range	32°	F to 113°F (0°C to	45°C)	
Discharging Range	-4° F	to 122°F (-20°C to	50°C)	
Storage Range	-4°F to 122°F (-20°C to 50°C)			
BMS Parameters				
Charge	Spec	Delay	Recovery	
Cell Voltage Protection	3.8V	1 sec	3.45V	
Module Voltage Protection	60.0V	1 sec	55.2 V	
Over Charging Current 1	>102A	10 sec	1	
Over Charging Current 2	≥120A	3 sec		
Temperature Protection	<-5°C or >70°C	1 sec	>-0°C or <60°C	
Discharge				
Cell Voltage Protection	2.3V	1 sec	3.1V	
Module Voltage Protection	44.8V	1 sec	48V	
Over Charging Current 1	>102A	10 sec	60 sec	
Over Charging Current 2	>150A	3 sec	60 sec	
Short-Circuit	>250A	<0.1 mS		
Temperature Protection	<-20°C or >75°C	1 sec	>-10°C or <65°C	
BMS	Para	Parameter		
PCB Temperature Protection	>105°C	Delay 1 sec	Recovery @ <80°C	
Cell Balance	120mA	Passive Balance	Cell Voltage Difference >40mV	
Temperature Accuracy	3%	Cycle Measurement	Measuring Range -40 to 100°C	
Voltage Accuracy	0.5%	Cycle Measurement	For Cells & Module	
Current Accuracy	3%	Cycle Measurement	Measuring Range -200 to +200	
SOC	5%		Integral Calculation	
Power Consumption - Sleep/Off Mode	<300uA		Storage/Transport	
Power Consumption - Operating Mode	<25mA		Charging/Discharging	
Communication Ports	RS48			

**EG4-LL 48V** 

**100AH BATTERY** 

support@eg4electronics.com January 2023 | Rev 1.0.0 | Specifications subject to change without notice.



				CONST	GSC RUCTION
Sol-/ 1,5K-2P-N UL Model: "Limitless 1,5K-LV" Solar Input Max Allowed PV Power Max Solar Strings Per MPPT Max Solar Strings Per MPPT Max Solar Strings Per MPPT Max DC Current per MPPT (Self Limiting)	Cover 19,500W 19,500W 19,500W 15,000W 15,000W 125-425V 125-425V 125V 3 2 2 26A	Battery (optional)       Out         Type       Nominal DC Input         Capacity       Voltage Range         Continuous Battery Charging Output       Charging Curve         Grid to Batt Charging Efficiency       External Temperature Sensor         Current Shunt for Accurate % SOC       External Gen Start Based on Voltage or %SOC         Communication to Lithium Battery         General       Dimensions (H x W x D)         Weight (package)       Enclosure         Ambient Temperature       Superature	Put Power 12,000W           Lead-Acid or Li-lon           48V           50 - 9900Ah           43.0 - 63.0V           275A           3-Stage w/ Equalization           96.0%           Included           Integrated           Integrated           CanBus & RS485           31.8" x 18.3" x 10.9"           135 lbs           IP65 / NEMA 3R           -40"60"C, >45"C           Derating	801 MILUK DR. JOUNT SOLAR PV & BESS	ATTERY BACK-UP Coos Bay, OR 97420 DATA SHEETS
Max AC Coupled Input (Micro/String Inverters)	19,200W Dn-Grid & Off-Grid 120/240/208V Split Phase 15,000W 62.5A-L (240V) 12,000W 50A-L (240V) ≤ 3% 24,000VA L-L (240V) 30,000VA L-L (240V) 94A w/ PV   75A w/o PV 120A Yes - Up to 12 60/50Hz 48,000W 200A L-L (240V) 24,000W 200A L-N (120V) 96.5% (Peak 97.5%) 90W Limited to Household/Fully Grid-Tied Transformerless DC 5ms +/- 0,9 - 1 0	Installation Style Wi-Fi & LAN Communication Standard Warranty (verified by HALT <b>Protections &amp; Certificati</b> Electronics Certified Safety by SGS Lat & UL Specs - NEC 690.4B & NEC 705.4 Grid Sell Back — UL1741-2010/2018, I -2003/2014, FCC 15 Class B, UL1741SE 21, HECO Rule 14H PV DC Disconnect Switch — NEC 240.3 Ground Fault Detection — NEC 690.5 PV Rapid Shutdown Control — NEC 690.11 PV Input Lightning Protection PV String Input Reverse Polarity Prote AC Output Breakers - 200A 200A x 2 Battery Breaker / Disconnect Surge Protection	Wall-Mounted       Included       Testing)     10 Years       Ons     Yes       Jons     Yes       Jons     Yes       Jons     Integrated       IEEE1547a     Yes       Jona     Integrated       Integrated     Integrated	A HOON TOONST	FOR
40 Grmm [15.98"] 40 Grmm [15.98"] 9 9 9 9 9 9 9 9 9 9 9 9 9				ENGINEER: David E GA LICEN Certifie PV Installe DRAFTER: David PROJECT #: BC-2 SHEET:	Brueck, P.E. ISE # 038102 ed NABCEP er# 042013-17 Brueck 2023-06
2" 2" 2" 2" Minimu 2" Minimu Sol-Ark Cover Screws Battery Connection	Merricontal Clearance Temperatur DC: 90C-100C Shu AC: 75C-82C Shu 15K Torque Va 62 IN 62 IN 62 IN 62 IN 62 IN 62 IN 62 IN 62 IN 62 IN 62 IN 63 IN 63 IN 64 IN 65 IN 6		e 7 NM 7 NM 7 NM 1.75 NM 1.75 NM 10 NM		N       A         NSTRUCTION       D.BRUECK         D.BRUECK       D.BRUECK         D.BRUECK       D.BRUECK
Do Not Us	e Impact Drivers to Tight December :	en Any Fasteners on the Sol-Ark. 19 <sup>th</sup> , 2022	6		13/2023     D.BRUECK     UPDATED MODULE. FOR CO       16/2023     D.BRUECK     FOR CONSTRUCTION       3ATE     BY     REVISION

ANSI-D 34"x22"

#### **Coquille IHA**

**Project Address** 

801 Miluk Dr Coos Bay Oregon 97420 801 Miluk Dr Coos Bay Oregon 97420

#### GSC Inc. will design and install:

66 Kilowatt Non-Penetrating Roof Mount Sytsem A solar photvoltaic (PV) Generator. The system will comply with or exceed OSISC, and local building codes. This estimate is for a Grid Tied System that is independent of utility power. 66 KW of Commercial Solar Photovoltaic modules.

Sol-Ark Hyrbrid Inverters (QTY 4) 15KW w/ (QTY 2) 30KWH LiFePo4 battery racks

Mounting Hardware designed to 130mph wind load.

25 year production warranty on PV Modules.

10 year warranty on inverter system.

5 year labor warranty.

Customer is responsible for providing Hi-Speed internet connection for monitoring system. This MOU does not include movement of fencing that may be required nor 3rd party electrical inspector fees. Standard 200 amp AC Disconnects included.

NonRefundable Engineer & Design Fee (Included in total cost		
of system)	PAID	\$2,000.00
Total cost including shipping and installation*	\$242,590.00	
Less potential Energy Trust Incentive	\$50,000.00 \$45,000.00 \$97,036.00	
Less potential ODE rebate		
Less potential Federal Tax Credit		
Estimated PV system net cost to buyer after credits	\$50,554.00	
Pay Schedule		
Equipment Draw to begin Project		\$194,072.00
Final Balance		\$46,518.00
Design Fee		\$2,000.00
	Total Cost	\$242,590.00

By placing your signature below this quote becomes a contract.

GSC Inc. Representative

Date

Signature of Client

Date

\*This proposal is based on material cost at the time of quote. GSC Inc. guarantees this price per watt for 30 days from the date above. Incentives are subject to change.

\*\*The tax credit information represented is not intended as tax advice. GSC Inc. suggests you contact a tax advisor with questions regarding your specific situation.