Greenskies
a Clean Focus company

TO: Ms. Kate Collins,
Planning Board Chair
Town of Royalston
Town Hall on the Common
Royalston, MA 01368
(978)249-4407

FROM: Gina Wolfman, Senior Developer

DATE: December 3, 2018

RE: Special Permit Application Package for a Ground Mounted Solar Project; 4 Bel Nel Road & 4 King Street

Enclosed you will find seven (7) copies of the Special Permit Application (attached after application checklist), with supporting documentation, for a proposed large scale, ground-mounted, solar photovoltaic project. We would like to be placed on the agenda for the December 11 Planning Board meeting.

We understand there is a peer/third party review process and applicant is required to cover the cost of such review, along with fees for abutters' notifications, certified abutters list, and public hearing notices. The drawing sets (7) will be sent to you directly under separate cover from the civil engineer, SWCA Environmental Consultants in Amherst, MA.

If you have any questions, I can be reached at: 860-398-5408 x328 or via email at: gina.wolfman@cleanfocus.us.

Thank you.

180 Johnson St
Middletown, CT 06457

Greenskies
a Clean Focus company

December 3, 2018

Clean Focus Renewables & Greenskies Renewable Energy

Special Permit Application for
Commercial Ground-Mounted Solar Project at
4 Bel Nel Road & 4 King Street, Royalston, MA

Developer & Installer Contact:

Gina Wolfman
Greenskies, A Clean Focus Company
180 Johnson Street
Middletown, CT 06457
(860) 398-5408 x328
gina.wolfman@cleanfocus.us

Clean Focus Renewables, Inc.
150 Mathilda Place, Suite 206
Sunnyvale, CA 94086

**Permit/Site Plan drawing set will be submitted under separate cover from civil engineer, SWCA Environmental Consultants (Amherst, MA)

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Royalston Planning Board Submission Checklist

Status	Submission Requirement	Notes
Included	Special Permit Application	• 7 copies of application and plans/package
	SOLAR BYLAW REQUIREMENTS	
Included	Plans and drawings of the solar energy facility signed and stamped by a P.E. licensed in Massachusetts showing the proposed layout of the system	
Included	*Electrical Drawing*: An electrical diagram detailing the solar energy facility, associated components, and electrical interconnection methods, with all National Electrical Code compliant disconnects and over current devices	
Included	*Technical Documentation*: specifications of the major system components, including the solar arrays, mounting system, and inverter	Equipment specifications attached
Included	*Contact Info*: The name, address, and contact information of the owner, proposed installer, and operator	
Included	*Site Control*: Proof of actual or proposed control of access ways and the project site sufficient to allow for installation and use of the proposed facility	Executed lease attached
Included	*Zoning map:* zoning district designation for the parcel(s) of land comprising the project site (submission of a copy of a zoning map with the parcel(s) identified is suitable for this purpose)	Attached
Included	*O & M Plan:* Measures for maintaining safe access, storm water controls, and general procedures for operating and maintaining the energy facility	O & M Plan and overview attached
Included	Proof of liability insurance	Certificate of Insurance Attached
Included	*Financial Surety: S*urety shall be submitted to the Planning Board/Building Inspector at time of application and shall be approved before special permit/building permit is issued.	Description of Financial Surety attached for approval
Included	*Utility Notification*: The applicant shall submit evidence satisfactory to the Planning Board that he has informed the utility company in writing of his intent to install a solar energy facility	Excerpts from Interconnection Application attached
	SITE PLAN REQUIREMENTS	
Included	Property lines and physical features, including roads, for the project site;	
Included	Proposed changes to the landscape of the site, grading, vegetation clearing and planting, exterior lighting, screening vegetation or structures	
Included	Drawings of the solar photovoltaic installation signed by a Professional Engineer licensed to practice in the Commonwealth of Massachusetts showing proposed layout of the system and any potential shading from nearby structures.	
Included	One or three line electrical diagrams detailing the solar photovoltaic installation, associated components, and electrical interconnection methods, with National Electrical Code compliant disconnects and overcurrent devices	Attached as 11" x 17" plan set

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Status	Submission Requirement	Notes
Included	Documentation of the major system components to be used, including the PV panels, mounting system, and inverter	
Included	Name, address, and contact information for proposed system installer	
Included	Name, address, phone number and signature of the project proponent, as well as all co-proponents or property owners, if any	
Included	The name, contact information and signature of any agents representing the project proponent;	
	DESIGN STANDARDS	
Included	*Dimension and Density Requirements.* Large Scale Solar Energy Systems shall comply with all standards within Intensity Requirements section of the Zoning Bylaw	
Included	*Lighting* shall be consistent any state and federal law. Lighting of the installation shall be limited to that required for safety and operational purposes, and shall be reasonably shielded from abutting properties. Where feasible, lighting shall be directed downward and shall incorporate full cut-off fixtures to reduce light pollution.	
Included	*Signage.* Solar photovoltaic installations shall not be used for displaying any advertising except for reasonable identification of the manufacturer or operator of the solar photovoltaic installation	
Included	*Screening/ Buffer Requirement.* If permitted by special permit in residential districts, the entire perimeter of the project shall have a vegetated buffer that will screen the view of the installation, sufficiently dense to block the view of the facility from all dwellings abutting the property. In all other districts where site plan approval is given, the project shall have a vegetative buffer that will screen the view of the installation from the boundary of any abutting residential premises and from the boundary of an abutting residential district and/or farm and forest district.	
Included	*Utility Connections.* Reasonable efforts, as determined by the Planning Board, shall be made to place all utility connections from the installation underground, depending on appropriate soil conditions, shape, and topography of the site and any requirements of the utility provider. Transformers for utility interconnections may be above ground if required by the utility provider.	
	SAFETY, EMERGENCY AND ENVIRONMENTAL STANDARDS	
To be provided	*Emergency Services.* Owner or operator shall provide a copy of the project summary, electrical schematic, and site plan to the fire chief. Owner or operator shall cooperate with local emergency services in developing an emergency response plan. All means of shutting down the solar photovoltaic installation shall be clearly marked. The owner or operator shall identify a responsible person for public inquiries throughout the life of the installation.	
Included	*Land Clearing, Soil Erosion and Habitat Impacts.* Clearing of natural vegetation shall be limited to what is necessary for the construction, operation and maintenance of the large – scale ground-mounted solar photovoltaic installation. . The applicant will implement Best Management Practices (BMPs) to help manage stormwater per the Zoning Bylaw requirements for Low Impact Development.	

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Planning Board/Special Permit Application

150 Mathilda Place
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The Commonwealth of Massachusetts

TOWN OF ROYALSTON
PLANNING BOARD
P.O. Box 125
Royalston, MA 01368

SPECIAL PERMIT APPLICATION

1. SPECIAL PERMIT NOTICE OF FILING TO:

ROYALSTON TOWN CLERK and TOWN OF ROYALSTON PLANNING BOARD

DATE: December 3, 2018

NAME OF OWNER/ APPLICANT:

Clean Focus Renewables/Greenskies Renewable Energy

MAIL ADDRESS: 180 Johnson Street, Middletown, CT 06457 TEL: 860-398-5408 X 328

ATTENTION TOWN CLERK AND PLANNING BOARD;

This is to notify you, pursuant to General Laws c.40A, s.9, that I have an Special Permit Application, to be filed with Town Clerk on (date) December 5, 2018 and the Royalston Planning Board on (date) December 5, 2018 .(Town Clerk, please verify this Date with the Planning Board.)

2. LAND LOCATION: (State the street address or other sufficient description (Map and Parcel Number) to readily identify land or building which is the subject of this application.)

4 Bel Nel Road; Map 017.0, Block 0002, Lot 0000.0; Parcel ID: 255/017.0-0002-0000.0

4 King Street; Map 022.0, Block 0010, Lot 0000.0; Parcel ID: 255/022.0-0010-0000.0

3. Name and address of each holder of legal title to the land which is the subject of this application? List each name exactly as it appears in the deed or petition and the book and page of the Worcester County Registry of Deeds. Please have available such deed or a copy if needed.

Derek D. & Sheena M. Butler; 4 Bel Nel Road, Royalston, MA; Deed 51646, p. 194

Anthony J. Basso; 4 King Street, Royalston, MA; Deed 36378, p. 391

BOOK: 51646 / 36378 PAGE: 194 / 391

4. State the name, mailing address and telephone number of each attorney, agent, or other representative of the applicant(s).

5. TOWN ZONING BYLAW DESIGNATION

The undersigned hereby appeals to the Royalston Planning Board for a Special Permit (Royalston Zoning Bylaw Section V.A.) to conduct a business/project in one of the Zoning Districts outlined in the Town of Royalston By-Laws as follows:
(Please check applicable use)

(X) Large Solar Installations 40 kW or greater (Royalston Zoning Bylaw Section VIII.B)
( ) Utilities greater than 40 kW
( ) Accessory Major Home Occupations (Royalston Zoning Bylaw Section III.E.4.b)
( ) Telecommunications & Wireless Towers (Royalston Zoning Bylaw Section VIII.A)
( ) Accessory Fixed Wireless Broadband Facilities over ten (10) feet in height
( ) Large Wind Energy System (LWES): (80) eighty feet and over in height

PROJECT/BUSINESS DESCRIPTION:

See attached site plan set for visual description of proposed work. Clean Focus Renewables/Greenskies Renewable Energy wishes to install, own, operate and maintain a large, ground-mounted solar array at 4 Bel Nel Road and 4 King Street, with proposed access from an existing gravel access road off King Street. No portion of the array will be installed within wetland resource areas or setback/buffer areas. A Request for Determination of Applicability (RDA) was submitted to the Conservation Commission on November 30, 2018. The properties are mostly forested with areas of cleared land and former agricultural fields. Both lots have residential homes and out-buildings along frontage. There is no 100-year flood zone on the property, no perennial streams and no Riverfront Area. Wetlands identified on-site include Bordering Vegetated Wetlands containing Bank and an Isolated Vegetated Wetland.

Gina L. Wolfman
Signature of Applicant

Date: December 4, 2018

Royalston Town Clerk Signature

Date:

Planning Board Clerk Signature or Representative

Date:

A Pre-application meeting with the Planning Board is encouraged to help facilitate the Special Permit Process. Please contact _____ to reserve a spot on the Planning Board's Agenda.

Please be advised that the Special Permit Applicant will be responsible for costs related to processing the Special Permit; including abutter's notification, abutter's list, and public hearing notices.

FOR YOUR MEETING WITH THE PLANNING BOARD, INCLUDE THE FOLLOWING:

1. Plans date stamped by the Town Clerk
2. Abutters list
3. Application/Notice of Filing signed and date stamped by the Town Clerk

Form Accepted Date _____

Greenskies
a Clean Focus company

Documentation/Specification Sheets of Major System Components

150 Mathilda Place
Suite 206
Sunnyvale, CA 94086

EQUIPMENT DATA SHEETS

NEO SOLAR POWER

POWER

D6M_B4A
330W - 365W
Mono-Crystalline Photovoltaic Module

Positive power tolerance
0~+4.99 watt

Withstand strong snow load 5400 Pa / wind load 2400 Pa

Excellent low light performance
3.5% relative eff. reduction at low-irradiance (200W/m²)

100% EL inline inspection
Better module reliability

Prolonged aging test
2000 hours damp heat test; 400 thermal cycles

Ammonia resistance
According to IEC 62716 Ed. 1

TÜVRheinland CERTIFIED
www.tuv.com
ID 0000039214

APPROVED PRODUCT
Certificate Number MCS PV0203 Technology

c UL us LISTED
PHOTOVOLTAIC MODULE
E330639

CE

Reliability & Certification

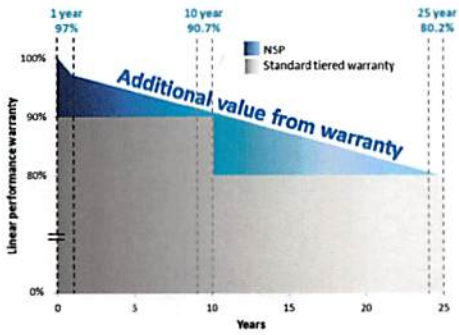
Product guarantee: 10-year

Linear Performance Warranty

- 1-year: 97% power output
  then power degradation 0.7% per year till 25th year
- 25-year: 80.2% power output
- 10-year: 90.7% power output

UL 1703, CEC, IEC 61215/IEC 61730, CE, MCS

* Please refer to NSP product warranty for details



For more information, please visit us at **www.nsp.com**

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Specifications are subject to change without notice.

NSP_1607_Power365_D6M_B4A_WS_T16A v.01

NEO SOLAR POWER

Electrical Data

MODEL	D6M 330 B4A	D6M 335 B4A	D6M 340 B4A	D6M 345 B4A	D6M 350 B4A	D6M 355 B4A	D6M 360 B4A	D6M 365 B4A
Maximum Rating Power (Pmax)	330 W	335 W	340 W	345 W	350 W	355 W	360 W	365 W
Module Efficiency	17.0%	17.3%	17.5%	17.8%	18.0%	18.3%	18.6%	18.8%
Open Circuit Voltage (Voc)	45.92 V	46.04 V	46.16 V	46.61 V	46.89 V	47.16 V	47.44 V	47.67 V
Maximum Power Voltage (Vmpp)	37.38 V	37.47 V	37.57 V	37.96 V	38.34 V	38.63 V	39.01 V	39.38 V
Short Circuit Current (Isc)	9.32 A	9.41 A	9.48 A	9.51 A	9.54 A	9.70 A	9.77 A	9.84 A
Maximum Power Current (Impp)	8.85 A	8.96 A	9.06 A	9.09 A	9.13 A	9.19 A	9.23 A	9.27 A

*Electrical data under Standard Test Conditions (STC): Cell Temperature of 25 °C, Irradiance 1000 W/m², AM 1.5
*Values w/o tolerance are typical numbers
*Specifications subject to change

Mechanical Data

Item	Specification
Dimension	1956mm (L)[1] x 992 mm (W)[1] x 35 mm (D)[2] / 77" (L)[1] x 39.1" (W)[1] x 1.38" (D)[2]
Weight	23 kg / 50.7 lbs
Solar Cell	72 monocrystalline 6" silicon cells
Front Glass	Anti-reflective tempered solar glass, 3.2 mm thickness
Cell Encapsulation	EVA (Ethylene-Vinyl-Acetate)
Back Cover	Composite film, white
Junction Box	IP 67 rated
Frame	Anodized aluminum frame, original or black
Packaging Configuration	30 pcs Per Pallet, 660pcs Per 40' HQ container

[1] : With assembly tolerance of ± 2 mm [± 0.08"]
[2] : With assembly tolerance of ± 0.8 mm [± 0.03"]

Operating Conditions

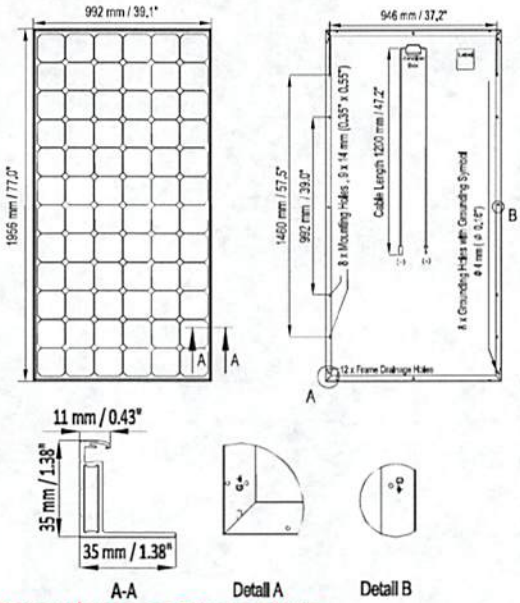
Item	Specification
Mechanical Load	5400 Pa (Certified by TÜV Rheinland)
Maximum System Voltage	1000 VDC
Series Fuse Rating	15 A
Operating Temperature	-40 to 85 °C

Temperature Characteristics

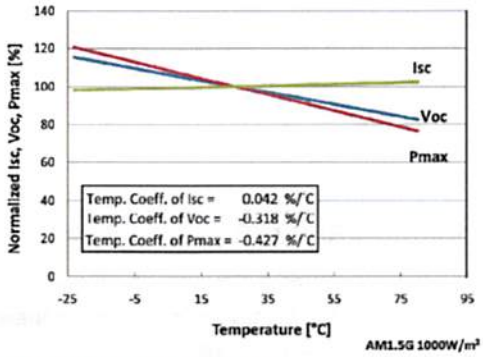
Item	Specification
Nominal Operating Cell Temperature	44 °C ± 2°C
Temperature Coefficient of Isc	0.042 % / °C
Temperature Coefficient of Voc	-0.318 % / °C
Temperature Coefficient of Pmax	-0.427 % / °C

* Nominal Operating Cell Temperature (NOCT): Irradiance 800W/m², Ambient Temperature 20 °C, Wind Speed 1 m/s
* Please refer to NSP's Standard Module Installation Manual before using the product
* Reduction in efficiency from 1000 W/m² to 200 W/m² at 25 °C: 3.5% ± 2 %

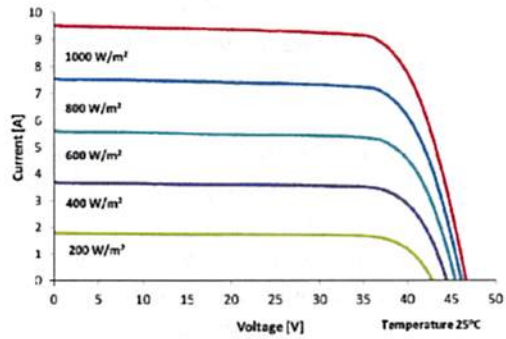
Front View & Back View



Dependence on Temperature



Dependence on Irradiance



Contact Us

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Neo Solar Power Corporation

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Specifications are subject to change without notice.

Life Is On | Schneider Electric

Re-defining the utility-scale inverter

Conext SmartGen™

We believe in green energy—in the ability to meet and contribute to growing power demand while supporting a smart grid that serves a smart society.

Solution at a glance

Far more than an inverter, the Conext SmartGen™ is the new paradigm for large-scale renewable power installations. It combines the best in power conversion technology with the Industrial Internet of Things to provide a better Levelized Cost of Energy.

- **More power generation and longer service life:** 30+ year service life and conversion efficiency of 98.8% peak, 98.5% EU
- **Lower OPEX:** True Design for Service™ and cloud-connectivity for fewer and faster resolution of service events
- **Higher system availability:** fewer failures with predictive maintenance and faster time to repair with enhanced remote troubleshooting
- **Deploy everywhere:** designed and tested for any environment, NA and IEC codes and standards, and supported by a worldwide field service network
- **Secure:** backed by a bankable company with 180 years of history and two decades of experience in solar inverters

Global specialist in energy management

180 years of history

160,000+ total workforce in 100+ countries

5% of Group revenues devoted to annual R&D spend

True Bankability with Schneider Electric

€27 billion in consolidated revenue

€2.1 billion adjusted net income

More than 7 GW of Schneider Electric utility-scale inverters installed worldwide

Reliable and cloud-connected

Conext SmartGen™

Lifetime reliability

Through the most stringent selection and qualification of components, the Conext SmartGen™ is designed to have a 30-year lifespan with just one major preventive maintenance at mid-life in worst case conditions.

The most demanding reliability and environmental testing methodology, developed through 20 years experience in the PV industry, has been applied to ensure that the Conext SmartGen™ maintains adequate operating margins over its entire lifetime, in even the most severe environments.

- Built to last in the most severe environments (desert, tropical, continental, sea shore, high seismic)
- Greater uptime for increased power generation

Desert

Ocean

Continental

Tropical

True Design for Service™

Ease of service was the driving force behind big and small decisions that shaped the Conext SmartGen™.

From a comprehensive suite of diagnostics, troubleshooting and maintenance tools to quickly replaceable sub-assemblies, every step of servicing has been meticulously optimized to minimize operating expenses.

- Designed for one hour mean time to repair and first time fix rate >97%
- Advanced configuration and service tool with full local and remote functionality
- Immediate access to all field replaceable systems and components

Predictive maintenance

Advanced predictive maintenance algorithms running in the Conext™ PowerCloud enable remaining lifetime estimation of major components, as well as failure prediction.

- Predict when components or systems may fail, ensuring they can be replaced just in time (not too early, and not too late)
- Reduce and defer maintenance costs by making decisions based on actual operating conditions

Local and remote interface – the Conext Viewer™

The most advanced inverter interface yet, providing local Wi-Fi and Ethernet connectivity as well as remote data access to inverter operational data.

Advanced troubleshooting, lifetime service logging, remote firmware upgrades, online service documentation and help files—all the power and capabilities of the digital world supporting your Conext SmartGen™ inverter.

- Reduced learning curve that increases user satisfaction and minimizes risks
- Incorporated help mechanism that enables service personnel to do fast and accurate troubleshooting

Product options

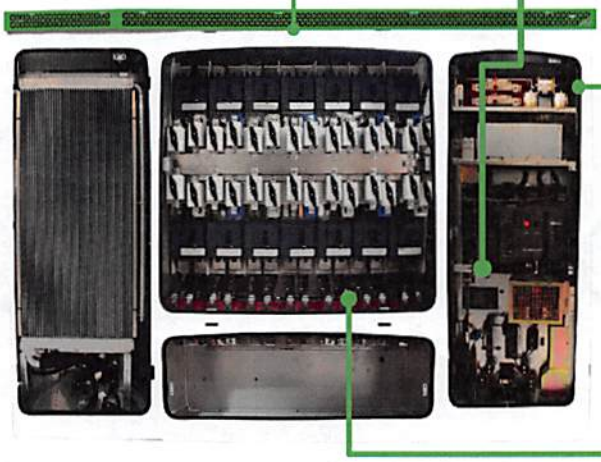
Conext SmartGen™

IEC and NA versions
- NA version includes optional NEC compliant DC disconnect switches

→ Reduced footprint
→ Easier fuse servicing

Multiple grounding options
- Floating with permanent insulation monitoring
- Negative grounding with pre-connection insulation check, and RCD

→ Enhanced personnel and equipment safety



Class I surge arrestors
- Selectable on DC and AC mains

→ Enhanced protection against lightning strikes

Integrated communications and control panel
- Modbus RTU and Modbus TCP
- Optional communications hub for all skid mounted and field equipment
- Conext™ Advisor 2 Programmable Logic Controller for fast controls of ES inverters
- Copper or fiber optic switch options available for the communications hub

→ Allows for integrated monitoring and control hardware

Auxiliary power distribution panel
- Selection of auxiliary AC voltage (100/110/120/200/220/230/240V)
- Input circuit breaker with under voltage release
- Auxiliary consumption metering

→ Elimination of external low voltage panel

Varied DC input configurations
- 10 to 14 inputs with 160 to 400A fusing
- Input channel current monitoring

→ Wide range of overpaneling ratio

Product specifications

Conext SmartGen™

Device short name	CS1800	CS2000	CS2200
Electrical specifications			
AC			
Nominal output power at 40°C	1800 kW / 2000 kVA	2000 kW / 2000 kVA	2200 kW / 2200 kVA
Nominal output power at 50°C	1800 kW / 2000 kVA	2000 kW / 2000 kVA	2060 kW / 2060 kVA
Nominal output voltage	575 V	575 V	600 V
Nominal frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Max. output current	2008 A	2008 A	2117 A
Continuous operation output voltage range	+/- 20% (460 - 690 V)	+/- 20% (460 - 690 V)	+15% / -20% (480 - 690 V)
Continuous operation frequency range	50 / 60 Hz +/- 10%	50 / 60 Hz +/- 10%	50 / 60 Hz +/- 10%
Power factor[1]	0 to 1 lead / lag	0 to 1 lead / lag	0 to 1 lead / lag
Harmonic distortion (THDI)	< 3% at rated power	< 3% at rated power	< 3% at rated power
Peak efficiency	98.8%	98.8%	98.8%
Weighted efficiency (EU weightings)[2]	98.5%	98.5%	98.5%
Weighted efficiency (CEC)[3]	98.5%	98.5%	98.5%
DC			
Max. input voltage range, MPPT[4]	865 - 1500 V	865 - 1500 V	905 - 1500 V
Max. input voltage, open circuit	1500 V	1500 V	1500 V
Max. input operating current	2123 A	2359 A	2481 A
DC breaker short-circuit current rating	6000 A	6000 A	6000 A
Max. rated short circuit current	With max. 14 DC inputs x 400 A fuse rating: 3584 A STC, 4480 A absolute max.		
DC combiner	Integrated	Integrated	Integrated
Number of DC inputs	10 to 14	10 to 14	10 to 14
DC fuse rating	160 A - 400 A	160 A - 400 A	160 A - 400 A
General specifications			
Service life[5]	30 years		
Power consumption, night time[6]	< 295 W		
Degree of protection[7]	Outdoor (Type 4X / IP65)		
Enclosure	Aluminium		
Seismic rating	IEEE 693-2005 qualification to high seismic performance levels (ZPA = 1.0g 2% damping) IBC ICC-ES AC156-2012 certification to a SDS equal to 1.78g and with a z/h equal to 0 and IP=1.5 UBC Zone 4		
Product weight (approx.)	2800 kg (6160 lb)		
Product dimensions (H x W x D)	220 x 300 x 130 cm (86.6 x 118.1 x 51.2 in)		
Ambient air temperature for operation	-30°C to 60°C (-22°F to 140°F)		
Operating altitude	2,000 m without derating, up to 4,000 m with derating		
Relative humidity	5% to 100% condensing		
Features			
Type of cooling	Temperature-dependent low pressure closed-loop liquid cooling		
Graphic user interface	Conext™ Viewer application for tablet and PC		
External communication interface	Modbus/RS485 standard, Modbus/TCP		
AC/DC disconnect	Load-break-rated DC and AC circuit breaker standard		
Ground fault detection/interruption	PV insulation monitoring and RCD (on grounded PV configurations)		
Options			
	Grounding (negative / floating), string current monitoring, class I surge arresters		
Standards			
Safety standards	IEC version: IEC62109-1, and -2 / NA version: UL 1741, CSA 107.1		
EMC standards	IEC/EN 61000-6-2 and -6-4, EN 55011:2016, CISPR 11 Ed. 6, FCC Class A		
Grid interconnection	IEEE1547 and 1547a, BDEW, CEI 0-16, French Decree 23-Apr-2008, IEC61727, PEA and more		

[1]Contact Schneider Electric for derating information.
[2]Auxiliary self consumption not included, measured at minimum Vdc.
[3]Auxiliary self consumption included.
[4]Contact Schneider Electric for derating information. MPPT for Power Factor 1.
[5]With preventative maintenance.
[6]295 W maximum is with all communication hub options.
[7]Heat exchanger is IP20 with IP65 components.

Product specifications

Conext SmartGen™

Device short name	CS1666-1-NA	CS1666-2-NA	CS1666-3-NA
Electrical specifications			
AC			
Nominal output power at 50°C	1666 kW / 1666 kVA	1666 kW / 1831 kVA	1666 kW / 1851 kVA
Nominal output voltage	575 V	575 V	575 V
Nominal frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Max. output current	1673 A	1838 A	1859 A
Continuous operation output voltage range	+/- 20% (460 - 690 V)	+/- 20% (460 - 690 V)	+/- 20% (460 - 690 V)
Continuous operation frequency range	50 / 60 Hz +/- 10%	50 / 60 Hz +/- 10%	50 / 60 Hz +/- 10%
Power factor[2]	0 to 1 lead / lag	0 to 1 lead / lag	0 to 1 lead / lag
Harmonic distortion (THDI)	<3% at rated power	<3% at rated power	<3% at rated power
Peak efficiency	98.8%	98.8%	98.8%
Weighted efficiency (CEC)[3]	98.5%	98.5%	98.5%
DC			
Max. input voltage range, MPPT[4]	865 V - 1500 V	865 V - 1500 V	865 V - 1500 V
Max. input voltage, open circuit	1500 V	1500 V	1500 V
Max. input operating current	1965 A	1965 A	1965 A
DC breaker short-circuit current rating	6000 A	6000 A	6000 A
Max. rated short circuit current	With max. 14 DC inputs x 400 A fuse rating: 3584 A STC, 4480 A absolute max.		
DC combiner	Integrated	Integrated	Integrated
Number of DC inputs	10 to 14	10 to 14	10 to 14
DC fuse rating	160 A - 400 A	160 A - 400 A	160 A - 400 A
General specifications			
Service life[5]	30 years		
Power consumption, night time[6]	295 W		
Degree of protection	Outdoor (Type 4X)		
Enclosure	Aluminium		
Seismic rating	Zone 4 per UBC		
Product weight (approx.)	2800 kg (6160 lb)		
Product dimensions (H x W x D)	220 x 300 x 130 cm (86.6 x 118.1 x 51.2 in)		
Ambient air temperature for operation	-30°C to 60°C (-22°F to 140°F)		
Operating altitude	2,000 m without derating, up to 4,000 m with derating		
Relative humidity	5% to 100% condensing		
Features			
Type of cooling	Temperature-dependent low pressure closed-loop liquid cooling		
Graphic user interface	Conext™ Viewer application for tablet and PC		
External communication interface	Modbus/RS485 standard, Modbus/TCP		
AC/DC disconnect	Load-break-rated DC and AC circuit breaker standard		
Ground fault detection/interruption	PV insulation monitoring and RCD (on grounded PV configurations)		
Options			
	Grounding (negative / floating), string current monitoring, class 1 surge arrestors		
Standards			
Safety standards	UL 1741, CSA 107.1		
EMC standards	FCC Class A		
Grid interconnection	IEEE 1547 and 1547a		

[1]Contact Schneider Electric for derating information.
[2]Auxiliary self consumption not included, measured at minimum Vdc.
[3]Auxiliary self consumption included.
[4]Contact Schneider Electric for derating information. MPPT for Power Factor 1.
[5]With preventative maintenance.
[6]295 W maximum is with all communication hub options.

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DS20180208 - Conext SmartGen_Consolidated

Life Is On | Schneider Electric

Life Is On | Schneider Electric

Re-defining the utility-scale inverter

Conext SmartGen™

We believe in green energy—in the ability to meet and contribute to growing power demands while supporting a smart grid that serves a smart society.

Solution at a glance

Far more than an inverter, the Conext SmartGen™ is the new paradigm for large-scale renewable power installations. It combines the best in power conversion technology with the Industrial Internet of Things to provide a better Levelized Cost of Energy.

- **More power generation and longer service life:** 30+ year service life and conversion efficiency of 98.8% Peak, 98.5% EU
- **Lower OPEX:** True Design for Service™ and cloud-connectivity for fewer and faster resolution of service events
- **Higher system availability:** fewer failures with predictive maintenance and faster time to repair with enhanced remote troubleshooting
- **Deploy everywhere:** designed and tested for any environment, NA and IEC codes and standards, and supported by worldwide field service network
- **Secure:** backed by a bankable company with 180 years of history and two decades of experience in solar inverters

Global specialist in energy management

180 years of history

160,000+ total workforce in 100+ countries

5% of Group revenues devoted to annual R&D spend

True Bankability with Schneider Electric

€27 billion in consolidated revenue

€2.1 billion adjusted net income

More than **7 GW** of Schneider Electric utility-scale inverters installed worldwide

Reliable and cloud-connected

Conext SmartGen™

Lifetime reliability

Through the most stringent selection and qualification of components, the Conext SmartGen™ is designed to have a 30-year lifespan with just one major preventive maintenance at mid-life in worst case conditions.

The most demanding reliability and environmental testing methodology, developed over 15 years experience in the PV industry, has been applied to ensure that the Conext SmartGen™ maintains adequate operating margins over its entire lifetime, in even the most severe environments.

Desert

Ocean

Continental

Tropical

- Built to last in the most severe environments (desert, tropical, continental, sea shore, high seismic)
- Greater uptime for increased power generation

True Design for Service™

Ease of service was the driving force behind big and small decisions that shaped the Conext SmartGen™.

From a comprehensive suite of diagnostics, troubleshooting and maintenance tools to quickly replaceable sub-assemblies, every step of servicing has been meticulously optimized to minimize operating expenses.

- Designed for one hour mean time to repair and first time fix rate >97%
- Advanced configuration and service tool with full local and remote functionality
- Immediate access to all field replaceable systems and components

Predictive maintenance

Advanced predictive maintenance algorithms running in the Conext™ PowerCloud enable remaining lifetime estimation of major components, as well as failure prediction.

- Predict when components or systems may fail, ensuring they can be replaced just in time (not too early, and not too late)
- Reduce and defer maintenance costs by making decisions based on actual operating conditions

Local and remote interface – the Conext Viewer™

The most advanced inverter interface yet, providing local Wi-Fi and Ethernet connectivity as well as remote data access to inverter operational data.

Advanced troubleshooting, lifetime service logging, remote firmware upgrades, online service documentation and help files—all the power and capabilities of the digital world supporting your Conext SmartGen inverter.

- Reduced learning curve that increases user satisfaction and minimizes risks
- Incorporated help mechanism that enables service personnel to do fast and accurate troubleshooting

Product options

Conext SmartGen™

IEC and NA versions

- NA version includes NEC compliant DC disconnect switches

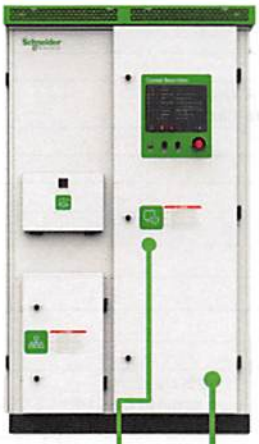
→ Reduced footprint

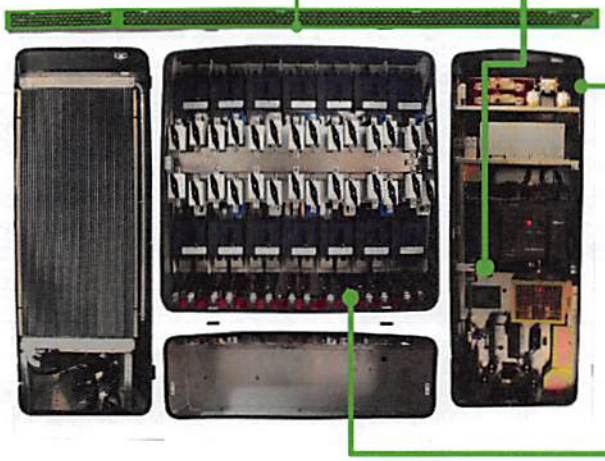
→ Easier fuse servicing

Multiple grounding options

- Floating with permanent insulation monitoring
- Negative or positive grounding with pre-connection insulation check, and RCD
- Optional AC insulation monitoring

→ Enhanced personnel and equipment safety





Class I surge arrestors

- Selectable on DC mains, AC mains and AC auxiliary inputs

→ Enhanced protection against lightning strikes

Integrated communications and control panel

- Modbus / TCP or Ethernet / IP gateway
- Optional communications hub for all skid mounted and field equipment
- Conext™ Advisor 2 Programmable Logic Controller for fast controls of PV and ES inverters
- Copper or fiber optic switch options available for the communications hub

→ Allows for integrated monitoring and control hardware

Auxiliary power distribution panel

- Selection of auxiliary AC voltage (100/110/120/200/220/230/240V)
- Input circuit breaker with under voltage release
- Auxiliary consumption metering
- Power supply to string combiners

→ Elimination of external low voltage panel

Varied DC input configurations

- 10 to 14 inputs with 160 to 400A fusing
- Input channel current monitoring

→ Wide range of overpaneling ratio

Product specifications

Conext SmartGen™

Device short name	CS2400 (Preliminary)
Electrical specifications	
AC	
Nominal output power at at 40°C / 50°C	2200 kW (2400 kVA) / 2060 kW (2180 kVA)
Nominal output voltage	600 V
Nominal frequency	50/60 Hz
Max. output current	2309 A
Continuous operation output voltage range	+15% / -20% (480 - 690 V)
Continuous operation frequency range	50 / 60 Hz +/- 10%
Power factor[1]	0 to 1 lead/lag
Harmonic distortion (THDI)	< 3% at rated power
Peak efficiency[2]	98.8%
Weighted efficiency (EU weightings)[2]	98.5%
Weighted efficiency (CEC)[3]	98.5%
DC	
Max. input voltage range, MPPT[4]	905 V - 1500 V
Max. input voltage, open circuit	1500 V
Max. input operating current	2481 A
DC breaker short-circuit current (rated)	6000 A
Max. rated short circuit current	Limited by DC inputs and fuse ratings. With max. 14 DC inputs x 400 A fuse rating: 4480 A STC, 5600 A absolute max (IEC) / 3584 A STC, 4480 A absolute max (NA).
DC combiner	Integrated
Number of DC inputs	10 to 14
DC fuse rating	160A to 400A
General specifications	
Service life	30 years[5]
Power consumption, night time	< 295 W[6]
Degree of protection	Outdoor (Type 4X / IP65)[7]
Enclosure	Aluminium
Seismic rating	IEEE 693-2005 qualification to high seismic performance levels (ZPA = 1.0g 2% damping) IBC ICC-ES AC156-2012 certification to a SDS equal to 1.78g and with a z/h equal to 0 and IP=1.5 UBC Zone 4
Product weight (approx.)	2800 kg (6160 lb)
Product dimensions (H x W x D)	220 x 300 x 130 cm (86.6 x 118.1 x 51.2 in)
Ambient air temperature for operation	-30°C to 60°C (-22°F to 140°F)
Operating altitude	2,000 m without derating, up to 4,000 m with derating
Relative humidity	5% to 100% condensing
Features	
Type of cooling	Temperature-dependent low pressure closed-loop liquid cooling
Graphic user interface	Conext™ Viewer application for tablet and PC
External communication interface	RS485/Modbus standard, Modbus over TCP/IP, and Ethernet/IP™ optional
AC/DC disconnect	Integrated load-break-rated DC and AC circuit breaker standard
Ground fault detection/interruption	PV insulation monitoring and RCD (on grounded PV configurations)
Options	
	Grounding (floating, positive grounding, negative grounding), string current monitoring, class I surge arresters, AC insulation monitoring
Standards (pending)	
Safety standards	IEC62109-1, and -2
EMC standards	IEC/EN 61000-6-2 and -6-4, EN 55011:2016, CISPR 11 Ed. 6, FCC Class A
Grid interconnection	IEEE1547 and 1547a, IEC61727

[*] Up to 35°C Reactive power capability of 2200kVA leading and 2400kVA lagging.
[1] Contact Schneider Electric for derating information.
[2] Auxiliary self consumption not included, measured at minimum Vdc. Auxiliary self
[3] consumption included.
[4] MPPT for power factor 1. Contact Schneider Electric for derating information.
[5] Designed for a service life of 30 years with preventative maintenance.
[6] 295 W maximum is with all communication hub options.
[7] Heat exchanger is IP20 with IP65 components.

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All information is preliminary and will need to be confirmed at the time of order.

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PowinEnergy

Powin Energy
BESS Technical Description

www.powinenergy.com

Appendix A: Technology Description

Hardware Topology

The Powin Energy base architecture is both flexible and robust, allowing deployments optimized for specific project performance requirements at minimal project cost. The base architecture can accommodate any cylindrical or prismatic cell chemistry, and cell-level battery management software (BMS) and auxiliary cell conditioning ensure that each individual cell will perform at its full potential while collecting sub-second data on each along the way.

The battery energy storage system (BESS) is an integrated system of battery arrays, power conversion systems (PCS), transformers, and energy management controls. At the core of the BESS is the battery module, a collection of cylindrical or prismatic cells housing the chemistry where charge and discharge originate from. The proposed BESS employs lithium iron phosphate chemistry in the battery cells, the safest lithium ion chemistry on the market. Lithium iron phosphate batteries offer the most balanced optimization between cost, energy density, cycle life, safety and stability making it an optimal choice for stationary energy storage solutions. Each cell has a cycle-life of 4500 cycles, provided the BESS is operated within product specifications.

The module boasts industry leading cell management through its auxiliary power supply, parallel wiring to each cell, and cell-level management and diagnostic software. These design features combine to provide sub-second recording of cell voltage, temperature and state of charge (SOC) and ensure that each cell remains within 10 mV of optimal state at all times.

The modules are arranged in racks totaling 140 kWh to create the Stack140, the workhorse of the Powin Energy fleet (Figure A.1). Stack140s are wired in parallel in arrays to achieve the desired project energy capacity. Each array is managed by the Powin Energy Array Cabinet, which has a maximum capacity of fifteen Stack140s per array cabinet totaling approximately 2 MWh of maximum capacity per array (Figure A.2). Arrays can be multiplied as needed to achieve the overall desired site energy capacity for sites requiring greater than 2 MWh of capacity (Figure A.3).

Figure A.1 – Powin Energy next generation Stack140 modular DC battery system.

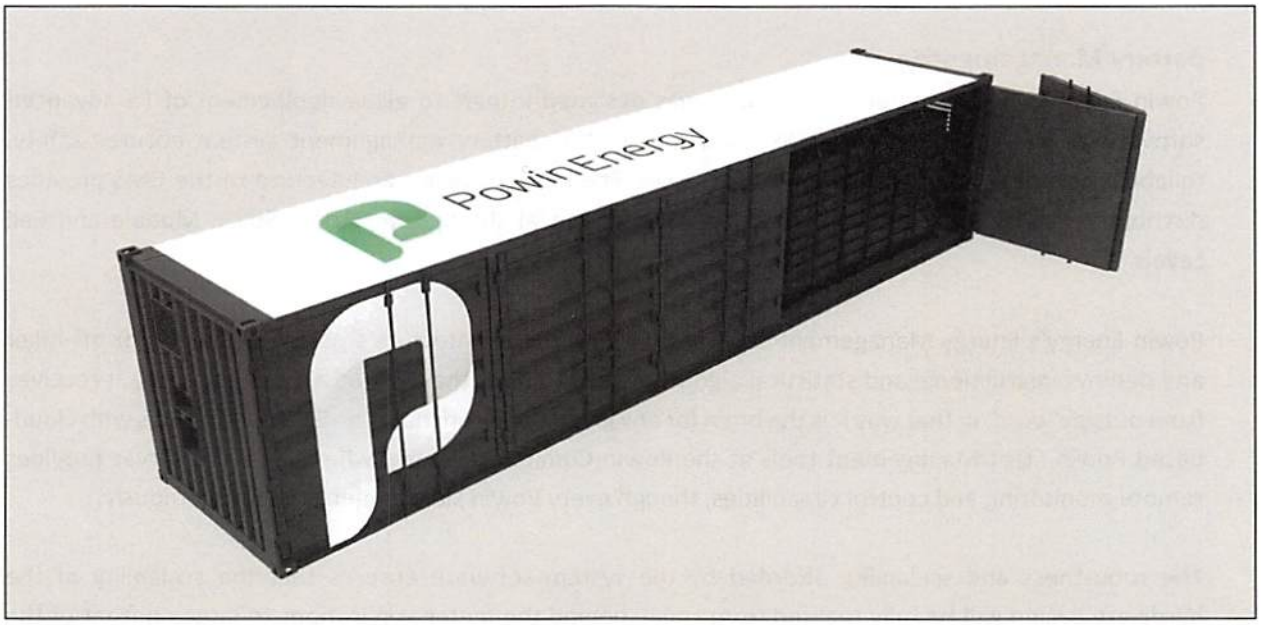

Figure A.2 – Powin Energy 2.5 MWh outdoor product with a portion of the array visible

Figure A.3 – Powin Energy first generation indoor battery energy storage system project operating in Irvine, California.

The system presents an average round-trip efficiency of 92%, though exact efficiencies will depend upon ambient temperatures, charge and discharge rates, and other local factors. Though the BESS operates and collects system data autonomously, it is remotely monitored by Powin Energy at all times.

Battery Management System

Powin Energy's next generation hardware was designed in part to allow deployment of its advanced software at every level of the BESS. In doing so, this battery management system ensures safety, reliability, efficiency and scalability at each level. The basic software architecture of the BMS provides distributed intelligence, controls and data management at the System, Array, Stack, Module and Cell Levels.

Powin Energy's Energy Management Software (EMS) is the architecture's portal to the grid or off-taker and deploys instructional and statistical algorithms to and from the BESS based on the signals it receives from outside word; in that way it is the brain for any given site. From here the EMS coordinates with cloud-based Powin Fleet Management tools at the Powin Command Center, where a secure server provides remote monitoring and control capabilities, though every Powin site can perform autonomously.

The robustness and scalability afforded by the system software ensures that the scalability of the hardware design will be fully realized from small, behind the meter applications to large, in front of the meter applications. Site communications are performed through MODBUS via a hardline connection with 4G wireless backup.

System Control Layer

The system control layer is the interface with the EMS. The bi-directional interface is used to transmit aggregated data to the cloud where query and response communications are managed. System control scripts deploy commands and, when necessary alarms, both from the cloud and natively if cloud connectivity is compromised.

The system control layer at the top of the hierarchy has primary functionality for monitoring and managing the battery arrays, strings, packs and modules individually and as a system. This layer also communicates with the EMS, and provides automatic system protection, including environmental monitoring with fire detection and suppression. The system controller electronics are housed in a standard 19" rack-mountable enclosure.

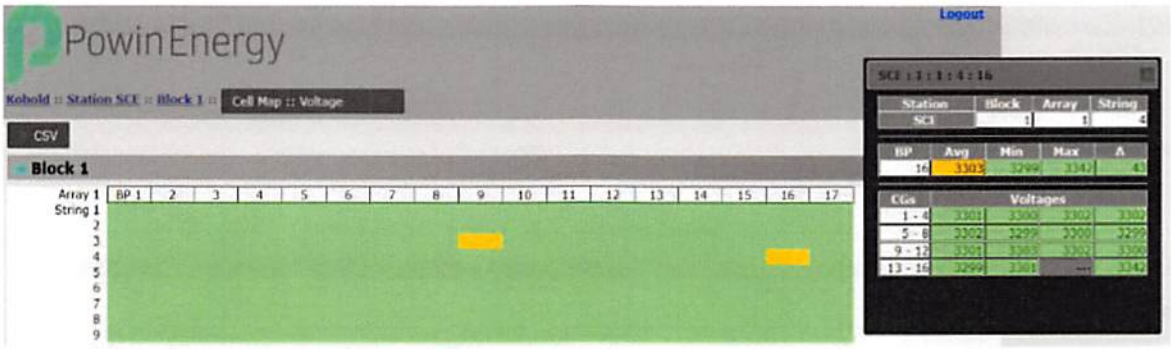

Figure A.5: Screenshot of our cell level voltage monitoring data user interface

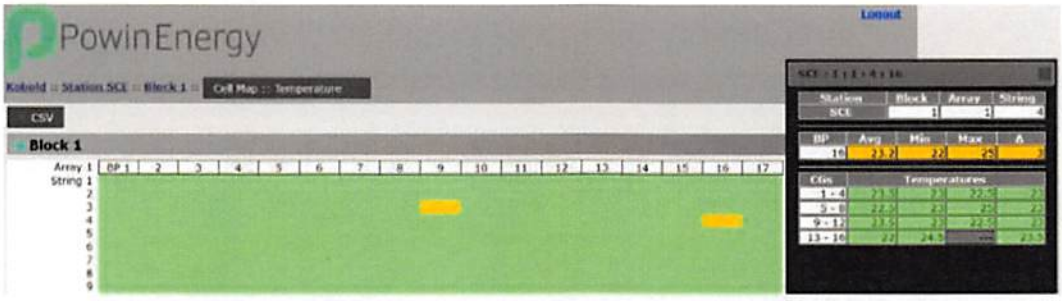

Figure A.6: Screenshot of our cell level temperature monitoring data user interface

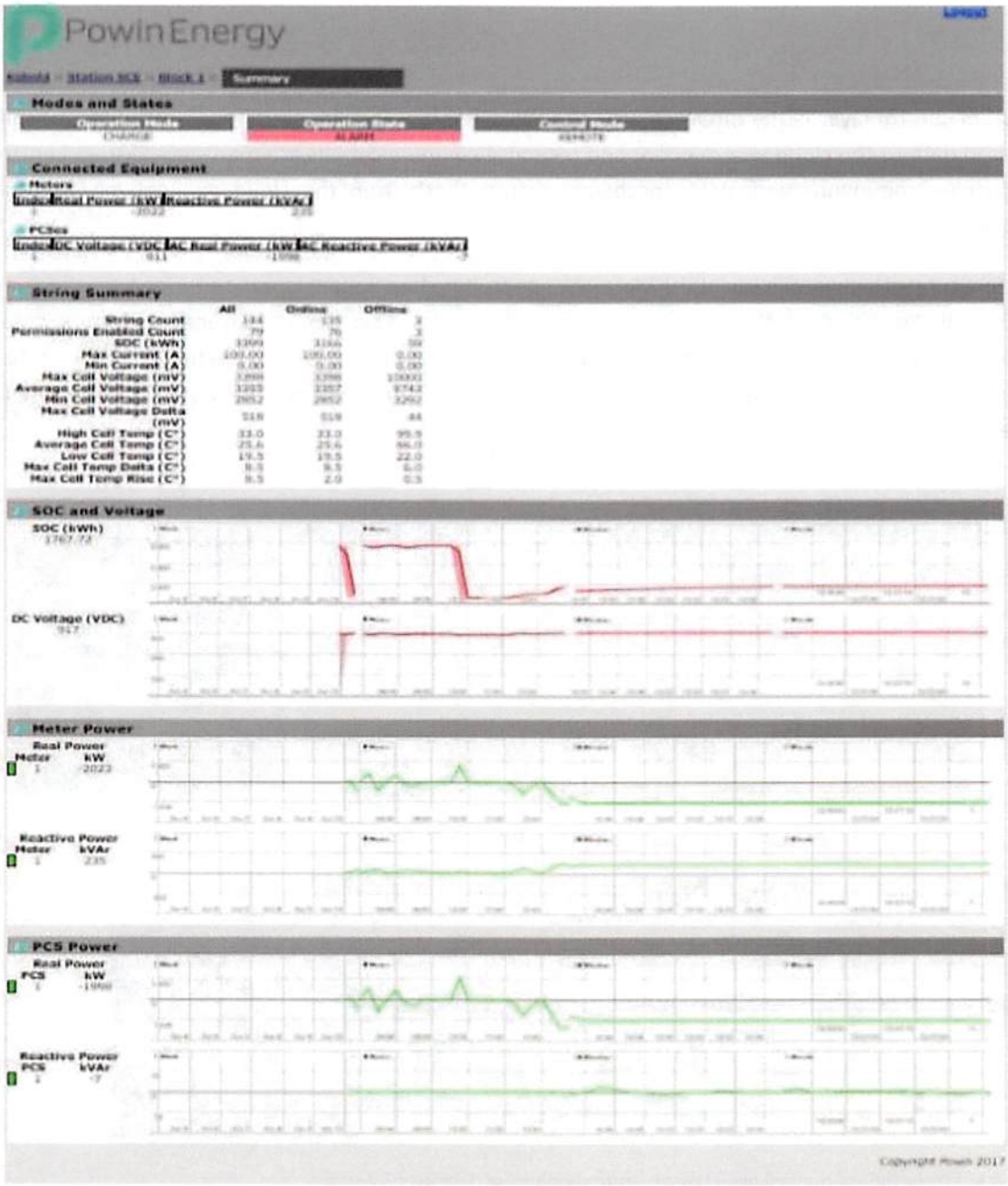

Figure A.7: Screenshot of the dashboard of the control and monitoring interface for our EMS (System Controller)

Array Control Layer

The array control layer monitors DC voltage and current, and determines the amp-hour capacity of the battery strings needed to increase the DC voltage to the level required by the power conversion system (PCS). The battery string controller electronics are housed in a standard 19" rack enclosure, which can also house the system controller in smaller configurations.

Module Control Layer

The battery pack control layer passively and actively balances voltage, temperature, state of charge (SOC) across all battery cells. This layer also monitors and records charge and discharge history of individual packs, as well as the balance state across all cells and packs.

This layer is also responsible for charge protection, which detects and alerts conditions such as:

- over and under voltage,
- high and low temperature,
- excessive temperature change,
- fire risk,
- over charge and discharge,
- and weak cell conditions.

Advanced algorithms are used to detect weak or defective battery cells, and this information is then used by Powin Energy's Warranty Tracker™ to submit a warranty claim and triggers a mitigation action onsite.

Powin Energy's patented architecture is designed to achieve true battery cell agnosticism. While other DC system providers in the market falsely claim similar functionality, Powin can integrate a new battery cell technology into its base architecture without disrupting the critical path of most projects. This empowers Powin to give its customer more of what they want whether it is a lower price, higher energy density or any other performance metric derived from any cylindrical or prismatic battery cell. This proposal features lithium iron phosphate chemistry, configured into 8.2 kWh battery packs, which provides industry leading safety, high energy density, rapid charging and discharging capacity, and other characteristics needed in demanding applications.

Cell Control Layer

At the bottom of the hierarchy is the cell control layer, which monitors and records the voltage and temperature of the individual cells connected in parallel within each module, and provides this information to the module control layer. Every battery module consists of a group of battery cells connected in parallel, and each module has its own, dedicated controller that is also responsible for implementing cell balancing commands, as well as taking any actions necessary to protect the cells.

Passive and Active Balancing

Powin Energy battery modules provide both passive and active balancing. Passive balancing can be programmed to maintain the voltages of individual battery pack cells to within a specified range of each other during battery charging and discharging. Passive balancing can also be used to maintain the states

of charge of all battery pack cells to within a specified percentage of each other. Active balancing is used primarily to maintain voltage and state of charge balances across different battery packs, and optionally for the cells in each pack when operated in conjunction with passive balancing. A combination of active and passive balancing normally provides the most cost-effective for scaling battery storage.

Battery Pack Warranty Tracker

The Powin Energy Warranty Tracker™ is an innovative and valuable capability of the battery pack control layer. The Warranty Tracker monitors the status and records the history of all battery pack activities, including the module voltages and temperatures, charging and discharging, and the balance state of the battery pack modules. The Warranty Tracker then reports any conditions that infringe on the warranty, and this information is used to help troubleshoot problems in the battery cells or the operation of the battery cells.

Below is a general specification for a standard Powin Energy BESS unit. Component and system ratings may vary due to project requirements.

Powin Energy – Stack Product Data & Specification for Battery Energy Storage System (DC Only)

BESS Product Data	
Nominal Energy Storage Capacity (MWh)	See Stack Data Sheet
Output Voltage (VAC)	LV/MV based on transformer
Operating Temperature (°C)	10°C to 35°C
Roundtrip Efficiency	DC – 94%
	AC (inc. inverter) – 91%
Battery Technology	LFP Li-ion power cells
Calendar Life (yr)	20 Years
Dimensions per array	40' L x 8'W x 8'6" H

Advanced Features

First class battery pack warranty

Battery management system with built in warranty tracker and battery odometer

Adaptable energy management system

Locally programmable & remotely controlled through RS485

Single Point of Connection for Power and Communication wiring

General Specification & Technical Data

Battery-Based Storage Technology	
Battery Technology	Lithium iron phosphate
Battery Chemistry	LFP
Cycles at 80% DOD (cycles)	3650 @ C/4

Battery Pack	
Weight (lbs)	82 lbs (approximate)
Nominal Energy (kWh)	See Stack165 Data Sheet
Nominal Pack Capacity (Ah)	See Stack165 Data Sheet
Nominal Voltage (VDC)	51.2VDC
Cell Cycle Life	Maximum 4500 cycles >80% of original capacity (1C/4C, 25˚C, 100% DOD)
Storage Temperature	-20˚C ~ 45˚C for 3 months, -20˚C ~ 35˚C for 12 months
Operating Temperature	5˚C ~ 45˚C, charge, 0˚C ~ 45˚C, discharge
Dimensions (L x W x H)	20.71"L x 18.09"W x 7.01"H (4U rack mount)

Battery Management System (BMS)	
Cell Level	Module control protects cells
Pack Level	Pack control balances cell pack
Array Level	String control equalizes current
System Level	Main control layer manages charging and discharging

Powin Controls System

Standard Features

Web based user interface

Server and communications package

Designed for multiple use-cases throughout a single day responding to ISO dispatch signals including peak demand reduction, load-shifting, solar firming, solar smoothing, demand response, frequency regulation, voltage control, energy arbitrage and more.

Appendix B: Brief Company Profile

Founded in 1990 Powin Corporation has been a consistent leader in the manufacturing and commercial goods sector. With annual revenues exceeding $60 million they supplied quality products to such familiar US brands as Daimler Benz, Camp Chef and NordicTrak. That success allowed Powin to enter the energy space, and in 2011 Powin Energy was formed to research, develop and patent the unique battery management and operating system that currently forms the basis of our bp-OS. With this development and testing work completed by mid-2016, Powin Corporation shed its heritage businesses to become the pure-play, energy storage product company Powin Energy is today.

From our headquarters in Greater Portland, Oregon and factory in Yangzhao, China, Powin is delivering the next generation of safe and scalable battery energy storage systems (BESS) purpose-built for the demands of utility-scale applications. Leveraging our bp-OS battery management system, vertically-integrated manufacturing capabilities, decades of procurement expertise in Asia, and deep experience in the US energy domain, we are delivering today the lowest cost and most reliable BESS available on the market. Powin's BESS is also the only battery storage system on the market today that gives its customers multi-layer dynamic control and rich visibility into the health of their energy storage system down to the cell level, empowering more efficient system operation and simpler maintenance and warranty claim resolution.

As evidence of the capabilities and competitiveness of our offering, since entering commercialization in late 2016, Powin has built a pipeline of over 100 MWh of contracted energy projects. Our first utility-scale project was delivered on-time to support local capacity concerns stemming from Southern California's Aliso Canyon disaster. We are following this up by delivering Canada's largest energy storage project in Stratford Ontario which will be operational by March, 2018.

Our team's diverse background gives us unique understanding of the financial, operational, and cost challenges presented by utility-scale energy projects. We see it as our job to reduce the procurement, execution, and integration challenge of energy storage projects which we believe will result in on-time, under budget projects with superior ROI.

Powin Energy is a registered Minority Business Enterprise (MBE/DBE) and publicly listed as PWON on OTC-QB exchange.

Appendix D: Project Experience

Project: Powin Stratford 8.8 MW/40.8 MWh
COD: March 2018

Powin Energy products and services were selected by Hecate Energy to build, deliver, and install six projects at two sites totaling 12.8 MW/52.8 MWh in Ontario, Canada. The projects were all contracted with Independent Electricity System Operator (IESO) as part of their long-term energy plan. Though not all six were taken forward, those that remained total to 40.8 MWh and comprise the largest contract for energy storage in Canada. The project is located in Stratford, Ontario and will be housed inside of a newly constructed building specifically designed to support twenty Powin Energy 2 MWh battery arrays. The project is contracted to provide reactive service voltage control for the IESO.

Project: SCE Aliso Canyon Millikan 2 MW/9 MWh
COD: December 2016

Powin Energy's 2 MW/9 MWh project was selected through a competitive solicitation initiated in response to the California Public Utilities Commission's (CPUC) Aliso Canyon Energy Storage (ACES) request for energy storage systems that could be operational by the beginning of 2017. The Powin Energy BESS is interconnected on the Virgo 12 kV distribution line out of the Estrella 66/12 kV substation and can deliver 2 MW of power for over four continuous hours, providing a reliable and continuous source of energy during peak demand events. In addition, the system will supply frequency regulation and flexible capacity support as needed.

Project: BPA Technology Innovation Project # 260

This project deployed a 120 kW/500 kWh energy storage unit and multiple computer simulated storage units, which together make up a utility scale battery energy storage system. The project sought to establish costs and benefits, verify technical performance, and validate the reliability and durability of a scalable, modular, dispatchable battery storage system and to determine and evaluate how best to deploy and control the battery storage system to meet a number of demand response applications as well as the operational challenges facing BPA with regards to operational reserve and capacity constraints caused by increased wind integration, Federal Columbia River Power System management, and transmission expansion challenges.

Project: Energy Northwest Demand Response Aggregated Controls Systems (ENDRACS)

Powin Energy and Energy Northwest executed an Aggregated Demand Response Pilot Project Aggregated-Asset Agreement where Powin Energy was considered a "Utility". The scope of the pilot project (Pilot) tested demand response integration and management of resources between the Utility's Asset (BESS unit) and Energy Northwest/BPA. The Pilot allowed Energy Northwest and BPA to use the experience gained and data collected to help determine the applicability of utilizing load flexibility to manage a variety of transmission and utility-scale conditions via aggregated demand response. For each event Energy Northwest notified Powin Energy with an event request notice and an event termination notice.

Appendix E: References

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+1.509.377.4547
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Greenskies
a Clean Focus company

Proof of Site Control/Executed Lease

150 Mathilda Place
Suite 206
Sunnyvale, CA 94086

Land Lease Option and Lease Agreement (Solar Farm)

BETWEEN:

Derek D. Butler & Sheena M. Butler, LANDLORD

AND

GREENSKIES RENEWABLE ENERGY LLC, TENANT

LAND LEASE OPTION AND LEASE AGREEMENT
(SOLAR FARM)

This Land Lease Option and Lease Agreement (the "Agreement") is made this _____, **2018**, by and between **Derek D. Butler & Sheena M Butler, each a Landowner**, having an address of **4 Bel-nel Road, Royalston, MA 01368-9497** ("Landlord"), and **Greenskies Renewable Energy LLC**(or assigns), a **CT Limited Liability Company**, having an office at **180 Johnson St., Middletown, CT 06457** ("Tenant").

1. **The Option**.

a. For the sum of [redacted] (the "Option Fee") to be paid to Landlord by Tenant upon execution of this Agreement and in consideration of the mutual promises contained herein and other good and valuable consideration, the receipt and sufficiency thereof is hereby acknowledged, Landlord hereby grants to Tenant the exclusive and irrevocable right and option to lease the Leased Premises (as defined below) on the terms and conditions set forth below (the "Option").

b. The term of the Option shall commence on the date hereof and shall continue in full force and effect for eighteen (18) months from the date of this agreement (the "Initial Option Period").

c. Extension Option Periods. The option period may be extended by Tenant for two (2) six (6) month periods (the "Extension Option Period(s)") upon Tenant's written notice to Landlord before the end of the Initial Option Period or prior Extension Option Period, as applicable, together with payment of [redacted] for each option period (the Initial Option Period and Extension Option Periods are hereinafter collectively referred to as the "Option Period").

d. During the Option Period, Landlord shall permit Tenant and its authorized agents and representatives to enter upon the Landlord Property (as defined below) at reasonable times during normal business hours to inspect the Landlord Property and perform surveys. Tenant shall notify Landlord of its intention, or the intention of its agents or representatives, to enter the Landlord Property at least twenty-four (24) hours prior to such intended entry. Tenant shall bear the cost of all inspections

e. Exercise of the Option. No later than 5:00 p.m. on the last day of the Option Period, Tenant shall have the right, in its sole and absolute discretion, to exercise the Option by giving Landlord written notice of such exercise in accordance with the Notice provision set forth in Section 15 (the "Option Notice").

f. Upon Tenant's exercise of the Option, the terms of this Agreement relating to the lease of the Leased Premises (the "Lease") that follows

shall take effect. The date that the Option Notice is delivered shall be considered the "Lease Commencement Date".

g. In the event Landlord fails to perform its obligations under this Agreement for any reason other than Tenant's breach, Tenant may pursue all remedies available at law and in equity. Landlord hereby acknowledges that Tenant will incur significant expenses in reliance on this Agreement.

2. **Leased Premises**. Upon Tenant's exercise of the Option, Landlord shall lease to Tenant and Tenant shall lease from Landlord pursuant to the terms of this Agreement, an approximately 7 acre parcel of real property, which is a portion of the real property located at **4 Bel-Nel Road, Royalston, MA**, which property is more particularly described in Exhibit A-1 attached hereto ("Landlord Property"), together with ingress, egress, and utility easements approximately as shown on Exhibit A-1 providing access to and from a public road and the point of utility interconnection, as described in Sections 5 and 6 below (that portion of the Landlord Property being referred to herein as the "Leased Premises"). A legal description of the Leased Premises is attached hereto and incorporated herein as Exhibit A-2.

3. **Term** The lease term (collectively, the "Term") shall be as follows:

a. The initial Term of the Lease shall comment on the Lease Commencement Date and continue until the date that is 21 years following the commercial operation date of the solar facility to be located on the Leased Premises (the "COD"), such period of time being referred to as the "Primary Term", provided however, such COD shall not be later than 48 months following the Lease Commitment Date.

b. Tenant shall have the option and right to elect to extend this lease for up to Two (2) five (5) year extensions (each such extension referred to as a "Renewal Term", or collectively as the "Renewal Terms"). Tenant shall give Landlord written notice of its election to extend the Lease on or before the commencement of the **final** year of the Primary Term, or the end of the then-current Renewal Term, whichever is later.

c. A final term commencing upon expiration of the Primary Term, or expiration of the last Renewal Term, whichever is later, to allow for Tenant's decommissioning and removal of the Solar Farm (as defined below) (the "Final Term"). The Final Term shall last no longer the six (6) months, unless extended per mutual written agreement of Tenant and Landlord.

4. **Rent**. In consideration for Landlord leasing the Leased Premises to Tenant, Tenant agrees to pay during the Term to Landlord in lawful money of the United States of America, basic rent as follows (collectively, the "Basic Rent"):

a. Primary Term Rent. Commencing on the Lease Commencement Date and continuing on each anniversary thereafter (the "Payment Due Date"), with

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, as a sealed instrument, as of the day and year first above written.

LANDLORD:

Derek D. Butler & Sheena M. Butler

By: _____

By: _____

Date: 8/2/18

TENANT:

Greenskies Renewable Energy LLC (or Assigns)

By: _____

Title: CEO

Date: 8/3/18

COMMONWEALTH OF Massachusetts)
) ss
COUNTY OF Worcester)

On this 2nd day of August, 20___, before me, the undersigned notary public in and for said Commonwealth/State, personally appeared Derek D. Butler + Sheena M. Butler proved to me on the basis of satisfactory evidence of identification, which were Mass Drivers license, to be the persons whose names are signed on the preceding or attached document, and acknowledged to me that they signed such document voluntarily for its stated purpose (as Landlord) as their free act and deed.

WITNESS my hand and official seal.

Notary Public

PAUL M. CRANSTON
MY COMM. EXPIRES MARCH 27, 2020
NOTARY PUBLIC
COMMONWEALTH OF MASSACHUSETTS

COMMONWEALTH / STATE OF Connecticut)
) ss
COUNTY OF Middlesex)

On this 3rd day of August, 2018, before me, the undersigned notary public in and for said Commonwealth/State, personally appeared Stanley Chin proved to me on the basis of satisfactory evidence of identification, which were personally known, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that (he)(she) signed such document voluntarily for its stated purpose (as Landlord).

WITNESS my hand and official seal.

Notary Public

SARAH C. SMITH
NOTARY PUBLIC
State of Connecticut
My Commission Expires
July 31, 2020

EXHIBIT A-1

LEGAL DESCRIPTION OF THE LANDLORD PROPERTY

EXHIBIT A-2

LEGAL DESCRIPTION OF THE LEASED PREMISES

Green line: leasable area

All access easements and/or transmission easements shall take place on the abutting property to the north.

Land Lease Option and Lease Agreement (Solar Farm)

BETWEEN:

Anthony J. Basso, LANDLORD

AND

GREENSKIES RENEWABLE ENERGY LLC, TENANT

LAND LEASE OPTION AND LEASE AGREEMENT
(SOLAR FARM)

This Land Lease Option and Lease Agreement (the "Agreement") is made this_____, **2018**, by and between **Anthony J. Basso, a Landowner**, having an address of **4 King Street, Royalston MA** ("Landlord"), and **Greenskies Renewable Energy LLC**(or assigns), a **CT Limited Liability Company**, having an office at **180 Johnson St., Middletown, CT 06457** ("Tenant").

1. <u>The Option</u>.

a. For the sum of [redacted] (the "Option Fee") to be paid to Landlord by Tenant upon execution of this Agreement and in consideration of the mutual promises contained herein and other good and valuable consideration, the receipt and sufficiency thereof is hereby acknowledged, Landlord hereby grants to Tenant the exclusive and irrevocable right and option to lease the Leased Premises (as defined below) on the terms and conditions set forth below (the "Option").

b. The term of the Option shall commence on the date hereof and shall continue in full force and effect for eighteen (18) months from the date of this agreement (the "Initial Option Period").

c. Extension Option Periods. The option period may be extended by Tenant for two (2) six (6) month periods (the "Extension Option Period(s)") upon Tenant's written notice to Landlord before the end of the Initial Option Period or prior Extension Option Period, as applicable, together with payment of [redacted] for each option period (the Initial Option Period and Extension Option Periods are hereinafter collectively referred to as the "Option Period").

d. During the Option Period, Landlord shall permit Tenant and its authorized agents and representatives to enter upon the Landlord Property (as defined below) at reasonable times during normal business hours to inspect the Landlord Property and perform surveys. Tenant shall notify Landlord of its intention, or the intention of its agents or representatives, to enter the Landlord Property at least twenty-four (24) hours prior to such intended entry. Tenant shall bear the cost of all inspections

e. Exercise of the Option. No later than 5:00 p.m. on the last day of the Option Period, Tenant shall have the right, in its sole and absolute discretion, to exercise the Option by giving Landlord written notice of such exercise in accordance with the Notice provision set forth in Section 15 (the "Option Notice").

f. Upon Tenant's exercise of the Option, the terms of this Agreement relating to the lease of the Leased Premises (the "Lease") that follows

shall take effect. The date that the Option Notice is delivered shall be considered the "Lease Commencement Date".

g. In the event Landlord fails to perform its obligations under this Agreement for any reason other than Tenant's breach, Tenant may pursue all remedies available at law and in equity. Landlord hereby acknowledges that Tenant will incur significant expenses in reliance on this Agreement.

2. **Leased Premises**. Upon Tenant's exercise of the Option, Landlord shall lease to Tenant and Tenant shall lease from Landlord pursuant to the terms of this Agreement, an approximately **8.3** acre parcel of real property, which is a portion of the real property located at **4 King St, Royalston, MA**, which property is more particularly described in Exhibit A-1 attached hereto ("Landlord Property"), together with ingress, egress, and utility easements approximately as shown on Exhibit A-1 providing access to and from a public road and the point of utility interconnection, as described in Sections 5 and 6 below (that portion of the Landlord Property being referred to herein as the "Leased Premises"). A legal description of the Leased Premises is attached hereto and incorporated herein as Exhibit A-2.

3. **Term** The lease term (collectively, the "Term") shall be as follows:

a. The initial Term of the Lease shall comment on the Lease Commencement Date and continue until the date that is 21 years following the commercial operation date of the solar facility to be located on the Leased Premises (the "COD"), such period of time being referred to as the "Primary Term", provided however, such COD shall not be later than 48 months following the Lease Commitment Date.

b. Tenant shall have the option and right to elect to extend this lease for up to Two (2) five (5) year extensions (each such extension referred to as a "Renewal Term", or collectively as the "Renewal Terms"). Tenant shall give Landlord written notice of its election to extend the Lease on or before the commencement of the **final** year of the Primary Term, or the end of the then-current Renewal Term, whichever is later.

c. A final term commencing upon expiration of the Primary Term, or expiration of the last Renewal Term, whichever is later, to allow for Tenant's decommissioning and removal of the Solar Farm (as defined below) (the "Final Term"). The Final Term shall last no longer the six (6) months, unless extended per mutual written agreement of Tenant and Landlord.

4. **Rent**. In consideration for Landlord leasing the Leased Premises to Tenant, Tenant agrees to pay during the Term to Landlord in lawful money of the United States of America, basic rent as follows (collectively, the "Basic Rent"):

a. Primary Term Rent. Commencing on the Lease Commencement Date and continuing on each anniversary thereafter (the "Payment Due Date"), with

IN WITNESS WHEREOF, the parties hereto have executed this Agreement, as a sealed instrument, as of the day and year first above written.

LANDLORD:

Anthony J Basso

By: _____

Title: _____

Date: 08-02-18

TENANT:

Greenskies Renewable Energy LLC (or Assigns)

By: _____

Title: CEO

Date: 8/3/18

COMMONWEALTH / STATE OF Massachusetts)
) ss
COUNTY OF Worcester)

On this 2nd day of August, 2018, before me, the undersigned notary public in and for said Commonwealth/State, personally appeared Anthony J. Basso proved to me on the basis of satisfactory evidence of identification, which were Mass drivers license, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that (he)(she) signed such document voluntarily for its stated purpose (as Landlord).

WITNESS my hand and official seal.

_____
Notary Public

PAUL M. CRANSTON
MY COMM. EXPIRES MARCH 27, 2020
NOTARY PUBLIC
COMMONWEALTH OF MASSACHUSETTS

COMMONWEALTH / STATE OF ~~Middlesex~~ Connecticut)
) ss
COUNTY OF Middlesex)

On this 3rd day of August, 2018, before me, the undersigned notary public in and for said Commonwealth/State, personally appeared Stanley Chin proved to me on the basis of satisfactory evidence of identification, which were personally known, to be the person whose name is signed on the preceding or attached document, and acknowledged to me that (he)(she) signed such document voluntarily for its stated purpose (as Landlord).

WITNESS my hand and official seal.

_____
Notary Public

SARAH C. SMITH
NOTARY PUBLIC
State of Connecticut
My Commission Expires
July 31, 2020

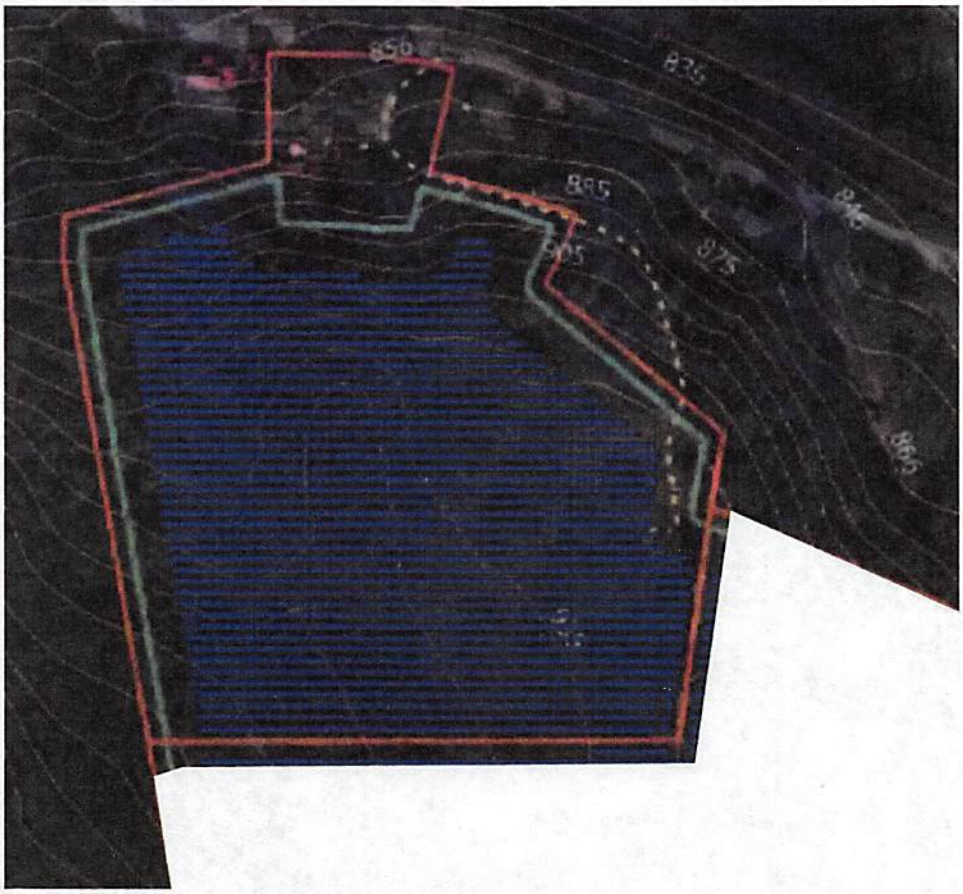
EXHIBIT A-1

LEGAL DESCRIPTION OF THE LANDLORD PROPERTY

EXHIBIT A-2

LEGAL DESCRIPTION OF THE LEASED PREMISES

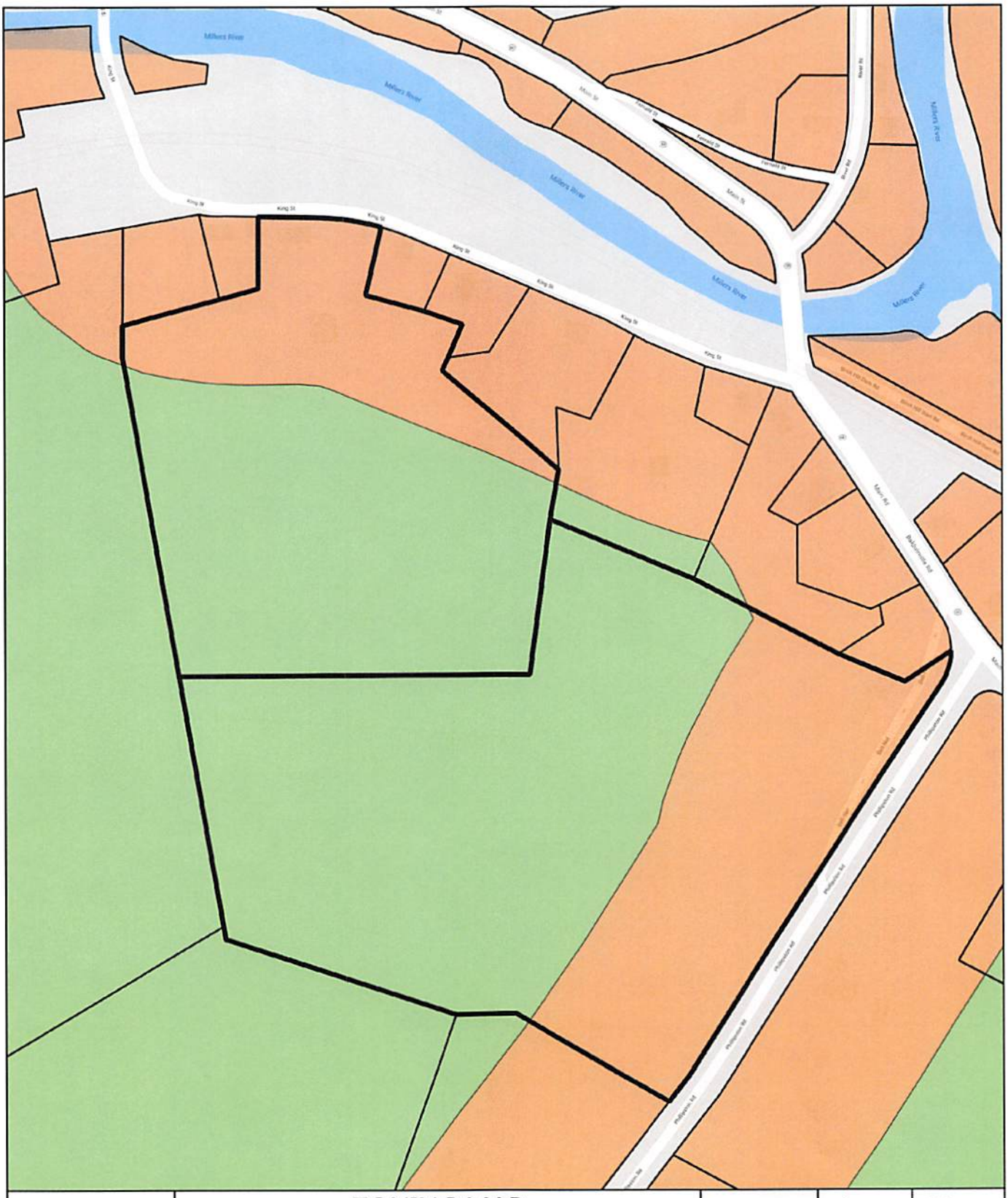
Green line: leasable area



Greenskies
a Clean Focus company

Zoning Map

150 Mathilda Place
Suite 206
Sunnyvale, CA 94086



ZONING MAP
4 KING ST, ROYALSTON MA

Greenskies
a Clean Focus company
180 Johnson St
Middletown, CT 06457
(860) 398-5408
www.greenskies.com

Residential

Rural & Agricultural

N

Scale:	1:3500
Produced By:	C Ross
Project No:	3262
Date Produced:	12/4/2018

0 100 200 300 400 ft

0 25 50 75 100 m

Basemap: Google Maps

Greenskies
a Clean Focus company

Operations and Maintenance Plan
Emergency Response Plan

150 Mathilda Place
Suite 206
Sunnyvale, CA 94086

Greenskies
a Clean Focus company

O&M AGREEMENTS

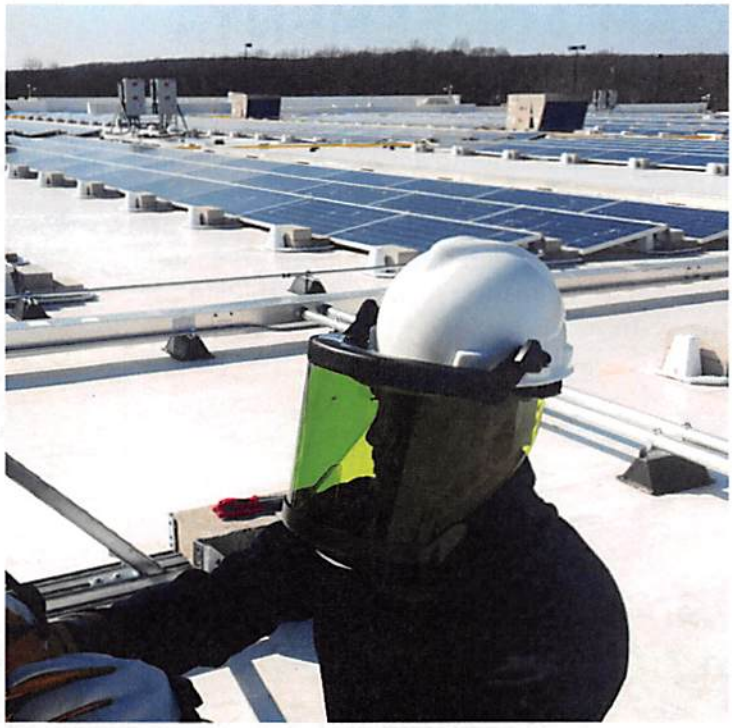
There are several ways to create a service agreement with us. One is time and materials, another is an on-going service agreement and last is a custom package that is designed to fit your service needs. Whether packaged or a la carte, we can help find a solution to protect your solar installation now and for the life of the system.

TARGET CYPRESS, CA **221.34 kW**

O&M SERVICE AGREEMENT OPTIONS & OFFERINGS	As Needed	Service Agreement
MONITORING		
24/7 assessment of systems in real-time		x
Integrated with existing systems		x
Work with systems no longer actively monitored		x
Custom alarm management		x
Customer monitoring & analytics identify smallest variances in production		x
Weekly system performance analytics		x
REPORTING		
Real-time		x
Monthly		x
Quarterly		x
Yearly		x
Annual bulk download from 3rd party non-integrated system	x	
FIELD OPERATIONS		
Certified electrician and solar technicians	x	x
Scheduled Maintenance		x
Emergency Maintenance	x	x
Warranty Services	x	x

For More Information: tel: 860.398.5408 • email: info@greenskies.com • www.greenskies.com

PROACTIVE MAINTENANCE STRATEGY



SOLAR TECHNICIAN INSPECTING ELECTRICAL WIRING

SCHEDULED MAINTENANCE PLAN

- Greenskies utilizes a semi-annual scheduled maintenance plan to identify and correct any issues. Reports are generated after each visit and performance data is analyzed and saved so that historical data can be used to track module performance vs. warrantied output.
- Spring Visits – allow teams to visually inspect the array and its components after they have been put through the physical rigors of the winter season and allow any issues to be corrected before the system enters into its most productive season.
- Fall Visits – allow teams to inspect the array and components after they have been through the most electrically demanding season and correct any issues that may have resulted during peak performance over this extended period.

EMERGENCY MAINTENANCE VISITS

- When a system is not producing or is under producing the Data Acquisition System will create an alarm. Once an alarm is created the production analyst will analyze the data. Subsequently, O&M trucks are dispatched to investigate and correct any issues.
- Greenskies O&M has a close working relationship with our major system component manufacturers, including modules, racking and electrical components/enclosures.
- We perform warranty work with our in house technicians. We have centrally located warehouses which store spare modules, inverters, wire and other components that can be used for on-site replacements.
- Deck Monitoring provides Greenskies with real-time production data and alarms to help manage system uptime. Automated dispatch to projects dependent on generation loss and location make our solar techs more efficient in correcting site issues.
- Greenskies O&M teams utilize cutting edge technology to test and inspect all major system components and connections on its arrays.

Greenskies
a Clean Focus company

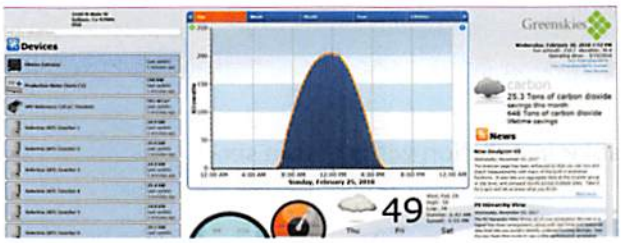
MAINTAINING YOUR SOLAR SYSTEM

We provide Operations and Maintenance (O&M) services for the duration of the service contract. We're able to monitor every system remotely, track production, and, through a team of field technicians, respond to alerts so your system stays up and running.

OPERATIONS CENTER MIDDLETOWN, CT

MONITORING

- Greenskies O&M currently monitors and maintains all of our operational assets in-house, along with third party clients.
- A team, including the system analysts and field operations coordinator, monitor our systems 24 hours a day, 7 days a week.
- The operations center utilizes Also Energy's platform for site monitoring and generation reporting, along with a custom built in-house platform designed specifically for improved site analytics and site issue prioritization.



- Custom alarm management provides instantaneous notifications to our Network Operating Center.
- Alarms verified by our analysts are put into the site issues docket. Custom algorithms determine each issue's prioritization score based on type of issue, kW impacted and duration of time.
- Custom monitoring and analytics identify the smallest production issues that usually go undetected, to maximize energy output.
- System performance analytics are completed weekly to better understand the health of each asset, and find trends in under producing systems.

FIELD OPERATIONS

- Each O&M field team consists of a certified electrician and a solar technician.
- Greenskies field crews perform two Preventative Maintenances visits per system each year.
- Regionally structured crews allow for a quicker response time to corrective maintenance tasks.
- O&M technicians are efficient in identifying and correcting any site issues that may arise.
- Working relationships with manufacturers provide faster for normal warranty work services.
- Greenskies field crews utilize the most advanced technology for PV testing and diagnostics of site issues.

For More Information: tel: 860.398.5408 • email: info@greenskies.com • www.greenskies.com

Greenskies
a Clean Focus company

OPERATIONS & MAINTENANCE (O&M) OVERVIEW

SERVICING OVER 170 MW AT 320+ SITES ACROSS THE UNITED STATES

Greenskies, a Clean Focus company, develops, constructs, operates, and maintains renewable-energy projects throughout the United States. We deliver high-quality solar projects to provide our clients with clean, reliable electricity.

WORRY FREE **MAINTENANCE**

ON-SITE MONITORING
Our on-site monitoring technology instantly recognizes a fault in production.

IN-HOUSE MONITORING
Our integrated in-house platform generates an auto-diagnostic rating and dispatches maintenance.

ON-CALL MAINTENANCE
Our regional maintenance facilities respond within 24-48 hours to keep your system running.

MAXIMIZE YOUR SOLAR INVESTMENT

To ensure maximum energy output over the life of your solar installation with custom service agreements:

- Guaranteed higher production
- Get more value from your system

Greenskies O&M Services include:

- Competitive pricing
- Regional teams of field technicians
- Guaranteed 24-hour response time for emergency maintenance requests
- Established relationships with manufacturing/production companies help ensure timely turnaround on warranty work
- Custom monitoring platform maximizes system output - finding lapses in production that other systems miss

Greenskies
a Clean Focus company

Visual-Mechanical Checklist for Annual Preventative Maintenance & Emergency Response Plan

1. **Monitoring System Data Review**
   - 1.1. Review and/or modify fault and performance alarms, thresholds, and notifications.
   - 1.2. Review activated alarms and provide feedback as necessary for further action.

   Completed 1x per year

2. **General Site Inspection**
   - 2.1. Verify safety and Identification labeling is present and legible.
   - 2.2. Inspect site access/egress locations are free of obstructions and hazards.
   - 2.3. Security means and installation methods (Surveillance equipment inspection not included).
   - 2.4. Equipment access lanes are free of obstructions and hazards.
   - 2.5. Inspect for changes of environmental conditions such as nearby construction activity, agricultural activities, bird migrations, water table changes, acts of vandalism, and shading.

   Completed 1x per year

3. **Mechanical System Inspection – (Racking, Modules)**
   - 3.1. Racking structures visual and mechanical inspection.
   - 3.2. Mechanical inspection 2% of Module-to-racking attachments for torque specification.
   - 3.3. Module visual inspection.
   - 3.4. Foundations, driven piers, mechanical attachments, and earth screw visual inspection.
   - 3.5. Equipment Grounding Conductor electrical continuity inspection.
   - 3.6. Equipment bonding to ground electrical continuity inspection.

   Completed 1x per year

4. **DC & AC Electrical System Inspection - (DC Collection Panels, AC Collection Panels, Safety Disconnect Switches)**
   - 4.1. Verify safety and Identification labeling is present and legible.

4.2. Enclosure mounting, gaskets, interior, and exterior visual inspection Equipment.
4.3. Grounding and bonding inspection.
4.4. Terminations (conductors) thermography scanning.
4.5. Visual inspection of conductor termination torque markings.
4.6. Fuse and breaker thermography scanning.
4.7. Visual inspection of conduits, fittings, junctions/splice boxes, and enclosures.

Completed 1x per year

5. Inverter Inspection

5.1. Verify safety and Identification labeling is present and legible.
5.2. Enclosure mounting, gaskets, interior, and exterior visual inspection.
5.3. Grounding and bonding inspection.
5.4. Inverter operation verification.
5.5. Thermography scanning of terminations, fuses, breakers, and electronics.
5.6. Vacuum clean interior.
5.7. Per manufacturer's recommendations, clean air intake/exhaust screens, fans, and filters.
5.8. Supply and install new inverter filters per manufacturer's requirements.
5.9. Complete all other manufacturer specific maintenance procedures not listed above.

Completed 1x per year

6. Data Acquisition System Inspection

6.1. Verify safety and Identification labeling is present and legible.
6.2. Battery health inspection (when applicable).
6.3. Meteorological data sensor cleaning, positioning, and operation.
6.4. Inverter communication (when applicable).

Completed 1x per year

7. Reporting

7.1. Provide digital commissioning report including results from all steps with responses noting Pass, Values, or Failure with explanation.
7.2. Photo report of deficiencies.
7.3. NABCEP PV Installation professional to review reports for completeness.

Completed 1x per year

Corrective Repairs

Repairs found by the O&M provider during inspection visits deemed readily repairable will be promptly attended to in the following steps:

- O&M provider will request CRE permission to execute work
- Upon approval, O&M provider will complete repairs and send work order report to CRE within two business days

The following steps will be taken if GWU or CRE finds a system component that needs repaired while O&M provider is not on site:

- O&M provider will confirm receipt of CRE's request with written response
- O&M provider will dispatch technician within guaranteed response time
- O&M provider will complete repairs and send work order report to owner within two business days

Emergency Response Plan

In case of an on-site emergency that calls for the immediate shutdown of the Solar System, please follow the below procedure. In the event of an emergency not caused by the Solar System, whereupon the client chooses to shut down the Solar System, the client shall be responsible for all lost generation during the time the System is inactive. The procedure for shutdown is as follows:

1. In the event of a fire or an emergency requiring emergency services, Call 911 immediately

2. Open AC Disconnects at the service location to de-energize AC power to the site.

3. Call Greenskies O&M

Contacting Greenskies O&M

- **Tier 1 Communications**
  - Contact the Greenskies Field Operations Office
    - Direct Phone Line 860-398-5408 ext 323
    - Email – OM_office@greenskies.com

- **Tier 2 Communications** – If you do not get an immediate response from Tier 1 contacts please contact the following:
  - Contact Greenskies Escalation
    - Direct Phone Line 860-598-4890

- **Tier 3 Communications** – If you do not get an immediate response from Tier 2 please contact the following:
  - Brandon Sheridan – Manager of Field Operations
    - Personal Phone - (203) 915-7722
    - Email – bsheridan@greenskies.com

- David Rutty – Vice President of Operations and Maintenance
  - Personal Phone – (203) 314-8382
  - Email – drutty@greenskies.com

Greenskies
a Clean Focus company

Proof of Liability Insurance

150 Mathilda Place
Suite 206
Sunnyvale, CA 94086

Client#: 198815 GREEN105

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 6/12/2018

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

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

PRODUCER
Couch Braunsdorf Insurance Grp
PO BOX 888
701 Martinsville Rd.
Liberty Corner, NJ 07938-0888

CONTACT NAME:
PHONE (A/C, No, Ext): 800 223-5433 FAX (A/C, No): 908-580-1274
E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : AXIS Specialty London	
INSURER B : (CNA) - Continental Casualty Company	20443
INSURER C : (CNA) - Valley Forge Insurance Company	20508
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
Greenskies Renewable Energy LLC
PO Box 251
Middletown, CT 06457

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

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

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	GENERAL LIABILITY			3762860118EN	03/18/2018	07/20/2018	EACH OCCURRENCE	$1,000,000
	X COMMERCIAL GENERAL LIABILITY						DAMAGE TO RENTED PREMISES (Ea occurrence)	$300,000
	CLAIMS-MADE X OCCUR						MED EXP (Any one person)	$10,000
							PERSONAL & ADV INJURY	$1,000,000
							GENERAL AGGREGATE	$2,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$2,000,000
	X POLICY PRO-JECT LOC							$
C	AUTOMOBILE LIABILITY			6057360317	03/18/2018	03/18/2019	COMBINED SINGLE LIMIT (Ea accident)	$1,000,000
	X ANY AUTO						BODILY INJURY (Per person)	$
	ALL OWNED AUTOS / SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	X HIRED AUTOS / X NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
								$
A	X UMBRELLA LIAB / X OCCUR			3762860118EN	03/18/2018	07/20/2018	EACH OCCURRENCE	$20,000,000
	EXCESS LIAB / CLAIMS-MADE						AGGREGATE	$20,000,000
	DED RETENTION $							$
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY			6057318231	03/18/2018	03/18/2019	WC STATU-TORY LIMITS X OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N N	N/A					E.L. EACH ACCIDENT	$1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$1,000,000
							E.L. DISEASE - POLICY LIMIT	$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)
EVIDENCE OF INSURANCE

CERTIFICATE HOLDER
FOR INFORMATIONAL PURPOSES

CANCELLATION
SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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Greenskies
a Clean Focus company

Description of Financial Surety

Prior to commencing operation of the facility, Clean Focus Renewables/Greenskies Renewable Energy will provide a form of surety. The form of surety that is acceptable to the Planning Board will cover the cost of removal in the event the town must remove the installation and remediate the landscape, in an amount and form determined to be reasonable by the Planning Board, but in no event to exceed more than 125 percent of the cost of removal.

In addition, Clean Focus Renewables/Greenskies Renewable Energy will submit a fully inclusive estimate of the costs associated with removal, prepared by a qualified engineer, including an escalator for calculating increased removal costs due to inflation.

CFR typically places the required/approved amount of money into an interest baring financial account, such as a Certificate of Deposit (CD), that would be payable to the requestor, Town of Royalston.

150 Mathilda Place
Suite 206
Sunnyvale, CA 94086

Greenskies
a Clean Focus company

Utility Notification

150 Mathilda Place
Suite 206
Sunnyvale, CA 94086

Exhibit C - Generating Facility Expedited/Standard Process Interconnection Application

Contact Information (TYPE or PRINT): Date Prepared: 9/25/2018

Legal Name and Address of Interconnecting Customer

Interconnecting Customer: Clean Focus Renewables Inc Contact Person: Jean-Paul La Marche

Mailing Address: 363 Centennial Parkway Suite 105

City: Louisville State: CO Zip Code: 80027

Telephone (Daytime): 720 638 6553 (Evening): _____

Facsimile Number: _____ E-Mail Address: _____

Ownership Information (include % ownership by any electric utility): _____

Site Control: Does the Interconnecting Customer have site control? ☒ Yes ☐ No

Confidentiality Statement: "I agree to allow information regarding the processing of my application (without my name and address) to be reviewed by the Massachusetts DG Working Group that is exploring ways to further expedite future interconnections." ☒ Yes ☐ No

Group Study Agreement: "I understand and agree if my project becomes part of a Group Study, the Company is authorized to share my contact information and project details with other parties that are also involved in the Group Study." ☒ Yes ☐ No

Host Retail Customer Contact Information (complete any that are different than Interconnecting Customer information above):

Retail Customer: _____ Contact Person: _____

E-Mail Address: _____ Telephone: _____

Landowner Name (if neither Interconnecting Customer nor Customer): _____

Landowner email: _____ Landowner telephone: _____

Landowner Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Alternative Contact Information (e.g., system installation contractor or coordinating company, if appropriate):

Company Name: None Contact Person: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Telephone (Daytime): _____ (Evening): _____

Facsimile Number: _____ E-Mail Address: _____

Electrical Contractor Contact Information (if appropriate):

Name: _____ E-mail Address: _____

Mailing Address: _____ Telephone: _____

City: _____ State: _____ Zip Code: _____

Interconnection Seminars: "I have attended one of the utility-hosted Interconnection Seminars." (Recommended) ☐ Yes ☒ No

Interconnection Tariff: "I have reviewed the entire MDPU 1248 Standards for Interconnection of DG." (Recommended) ☐ Yes ☒ No

Facility Information (TYPE or PRINT):

Please provide all Pre-Application Reports (either mandatory or optional as per MDPU 1248) as attachments.

Address of Facility: 4 King St & 4 Bel Nel Road

City: Royalston State: MA Zip Code: 01368

Single Parcel: Will the Facility be constructed on a single parcel of land? ☐ Yes ☐ No

Authorized/Proposed generation capacity already exists (check all that apply):

☐ On Current Account ☐ On Same Legal Parcel of Land ☐ In Same Building/Structure

If any apply, include existing generation capacity on design diagrams, and provide Application Number(s): _____

Electric Service Company: National Grid Account Number: _____ Meter Number: _____

Work Request Number (For Upgrades or New Service): _____ MTC ID: _____

System Design Capacity: Nominal 2400 (kW_{AC}) 2400 (kVA) Maximum 2400 (kW_{AC}) 2400 (kVA)

For Solar PV provide the DC-STC rating: 3110 (kW_{DC})

Exhibit C - Generating Facility Expedited/Standard Process Interconnection Application

Prime Mover: ☒ Photovoltaic ☐ Reciprocating Engine ☐ Fuel Cell ☐ Turbine ☐ Other: _____

Energy Source: ☒ Solar ☐ Wind ☐ Hydro ☐ Diesel ☐ Natural Gas ☐ Fuel Oil ☐ Other: _____

IEEE 1547.1 (UL 1741) Listed? ☐ Yes ☐ No

1) Generating Unit Type 1

Manufacturer: Schneider Electric Model Name and Number: CS2400 Quantity: 1

AC Rating:
Nominal: 2400 (kW) 2400 (kVA) 600 (AC Volts)
Maximum: _____ (kW) _____ (kVA) _____ (AC Volts) ☐ Single or ☒ Three Phase

2) Generating Unit Type 2 (if applicable)

Manufacturer: _____ Model Name and Number: _____ Quantity: _____

AC Rating:
Nominal: _____ (kW) _____ (kVA) _____ (AC Volts)
Maximum: _____ (kW) _____ (kVA) _____ (AC Volts) ☐ Single or ☐ Three Phase

3) Generating Unit Type 3 (if applicable)

Manufacturer: _____ Model Name and Number: _____ Quantity: _____

AC Rating:
Nominal: _____ (kW) _____ (kVA) _____ (AC Volts)
Maximum: _____ (kW) _____ (kVA) _____ (AC Volts) ☐ Single or ☐ Three Phase

Does this project need an air quality permit from the DEP? ☐ Yes ☐ No ☐ Not Sure

If "Yes", have you applied for it? ☐ Yes ☐ No

Planning to Export Power? ☐ Yes ☐ No Is this a Cogeneration Facility? ☐ Yes ☒ No

Anticipated Export Power Purchaser: _____

Export Form? ☐ Qualifying Facility (QF) ☐ Net Metering ☐ Other (explain): _____

Estimated Install Date: _____ Estimated. In-Service Date: _____

Agreement Need By: _____

If net metering, please refer to Schedule Z of the Standards for Interconnection of Distributed Generation. Please note that if under the public cap, all off-takers must be a Municipality or other Governmental Entity (as defined in 220 C.M.R. 18.02) and therefore be certified by the DPU.

Application Process

Interconnecting Customer Signature:

"I am opting to forego the Expedited Process. Please review this application under the Standard Process." ☐ Yes ☐ No

I hereby certify that, to the best of my knowledge, all of the information provided in this application is true:

Signature: _____ Title: _____ Date: _____

Please attach any documentation provided by the inverter manufacturer describing the inverter's UL 1741 listing.

All Application Materials Received (For Company use only):

The information provided in this application is complete, all attachments and supplemental application materials have been received, and the application may proceed to the initial/screening review stage of the interconnection process:

Signature: _____ Title: _____ Date: _____

Application ID number: _____

Exhibit C - Generating Facility Expedited/Standard Process Interconnection Application

Generating Facility Technical Detail

Information on components of the generating facility that are currently Listed

	Equipment Type	Manufacturer	Model	National Standard
1.	Photovoltaic Module	Neo Solar Power	D6M 360 H4A	UL 1703
2.	Inverter	Schneider Electric	CS2400	UL 1741 SA
3.	BESS Battery Stack	Powin Energy	Stack140	UL 1642, UL 1973 (Q318)
4.	DC - DC Converter	Dynapower Company	DPS-250	UL1741
5.				
6.				

Total Number of Generating Units in Facility? 1

Generator Unit Power Factor Rating: 1

Max Adjustable Leading Power Factor? 0 Max Adjustable Lagging Power Factor? 1

Generator Characteristic Data (for all inverter-based machines)

Max Design Fault Contribution Current? _____ ☐ Instantaneous or ☐ RMS

Harmonics Characteristics: Harmonic Distortion <3% at Rated Power

Start-up power requirements: Utility voltage required for 5-minute start-up of inverter

Generator Characteristic Data (for all rotating machines)

Rotating Frequency: _____ (rpm) Neutral Grounding Resistor (If Applicable): _____

Additional Information for Synchronous Generating Units

Synchronous Reactance, Xd: _____ (PU) Transient Reactance, X'd: _____ (PU)

Subtransient Reactance, X"d: _____ (PU) Neg Sequence Reactance, X2: _____ (PU)

Zero Sequence Reactance, Xo: _____ (PU) kVA Base: _____ (PU)

Field Voltage: _____ (Volts) Field Current: _____ (Amps)

Additional information for Induction Generating Units

Rotor Resistance, Rr: _____ Stator Resistance, Rs: _____

Rotor Reactance, Xr: _____ Stator Reactance, Xs: _____

Magnetizing Reactance, Xm: _____ Short Circuit Reactance, Xd": _____

Exciting Current: _____ Temperature Rise: _____

Frame Size: _____

Total Rotating Inertia, H: _____ Per Unit on kVA Base: _____

Reactive Power Required In Vars (No Load): _____

Reactive Power Required In Vars (Full Load): _____

Additional information for Induction Generating Units that are started by motoring

Motoring Power: _____(kW) Design Letter: _____

Exhibit C - Generating Facility Expedited/Standard Process Interconnection Application

Interconnection Equipment Technical Detail Date: _____

Will a transformer be used between the generator and the point of interconnection? [X] Yes [ ] No

Will the transformer be provided by Interconnecting Customer? [X] Yes [ ] No

Transformer Data (if applicable, for Interconnecting Customer-Owned Transformer):

Nameplate Rating: 2400 (kVA) [ ] Single or [X] Three Phase

Transformer Impedance: 5.75 (%) on a 2400 kVA Base

If Three Phase:

Transformer Primary: 13.8Y/7.97 kV (Volts) [ ] Delta [ ] Wye [X] Wye-Grounded [ ] Other: _____

Transformer Secondary: 600 (Volts) [X] Delta [ ] Wye [ ] Wye-Grounded [ ] Other: _____

Transformer Fuse Data (if applicable, for Interconnecting Customer-Owned Fuse):

(Attach copy of fuse manufacturer's Minimum Melt & Total Clearing Time-Current Curves)

Manufacturer: TBD Type: TBD Size: TBD Speed: TBD

Interconnecting Circuit Breaker (if applicable):

Manufacturer: Cooper Type: Recloser Load Rating: 600 (Amps)

Interrupting Rating: 600 Trip Speed: _____ (Cycles)

Interconnection Protective Relays (if applicable):

If microprocessor-controlled, List of Functions and Adjustable Setpoints for the protective equipment or software:

	Setpoint Function	Minimum	Maximum
1.	Voltage	< 6900V -	>=16560V
2.	Frequency	F > 60.5 HZ	F < 58.0Hz
3.	Current	TBD	TBD
4.			
5.			
6.			

If discrete components (Enclose copy of any proposed Time-Overcurrent Coordination Curves):

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting: _____

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting: _____

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting: _____

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting: _____

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting: _____

Manufacturer: _____ Type: _____ Style/Catalog No.: _____ Proposed Setting: _____

Current Transformer Data (if applicable):

(Enclose copy of Manufacturer's Excitation & Ratio Correction Curves)

Manufacturer: TBD Type: TBD Accuracy Class: 0.3% Proposed Ratio Connection: 250/5

Manufacturer: TBD Type: TBD Accuracy Class: C200 Proposed Ratio Connection: 250/5

Potential Transformer Data (if applicable):

Manufacturer: TBD Type: TBD Accuracy Class: 0.3% Proposed Ratio Connection: 115:1

Manufacturer: _____ Type: _____ Accuracy Class: _____ Proposed Ratio Connection: _____

Exhibit C - Generating Facility Expedited/Standard Process Interconnection Application

General Technical Details

Submit all of the customer's Interconnection Application materials and proposed design diagrams using the following process:

1. Email the following materials to National Grid at Distributed.Generation@nationalgrid.com:
   a. ☐ P.E.-stamped One-Line Diagram (and ☐ Three-Line Diagram if applicable), including:
      i. ☐ Schematics for all (internal & redundant) protection and control circuits, relay current circuits, relay potential circuits, and alarm/monitoring circuits (if applicable)
   b. ☐ Site Plan, which indicates the precise physical location of the proposed:
      i. ☐ Generating Facility
      ii. ☐ AC Utility Disconnect Switch
      iii. ☐ All meters (utility- and customer-owned)
      iv. ☐ Related interconnection equipment
   c. ☐ Technical Specifications (pdf files only)
   d. ☐ Exhibit C (this form) – completed and signed (available on the website)
   e. ☐ Legal Information Document – completed (available on the website)
   f. ☐ Schedule Z (net metering only) – completed, initialed, and signed (available on the website)
   g. ☐ Copy of electric bill (if applicable)
   h. ☐ Copy of any Pre-Application Reports related to this application (if applicable)
   i. ☐ Copy of Interconnection Application fee check
   j. ☐ Any other information pertinent to this Interconnection Application (if applicable)
2. Mail the ☐ Interconnection Application fee check and the ☐ first two pages of the signed copy of this Interconnection Application form to:

   National Grid
   Attn: Distributed Generation
   40 Sylvan Rd
   Waltham, MA 02451

Note: The Schedule Z may be updated as needed at any point prior to the Authorization to Interconnect.

Refer to National Grid's Distributed Generation website for more detailed instructions:

Massachusetts:

Residential: http://www.nationalgridus.com/masselectric/home/energyeff/distributed_generation.asp

Commercial: http://www.nationalgridus.com/masselectric/business/energyeff/distributed_generation.asp

Nantucket:

Residential: http://www.nationalgridus.com/nantucket/home/energyeff/distributed_generation.asp

Commercial: http://www.nationalgridus.com/nantucket/business/energyeff/distributed_generation.asp

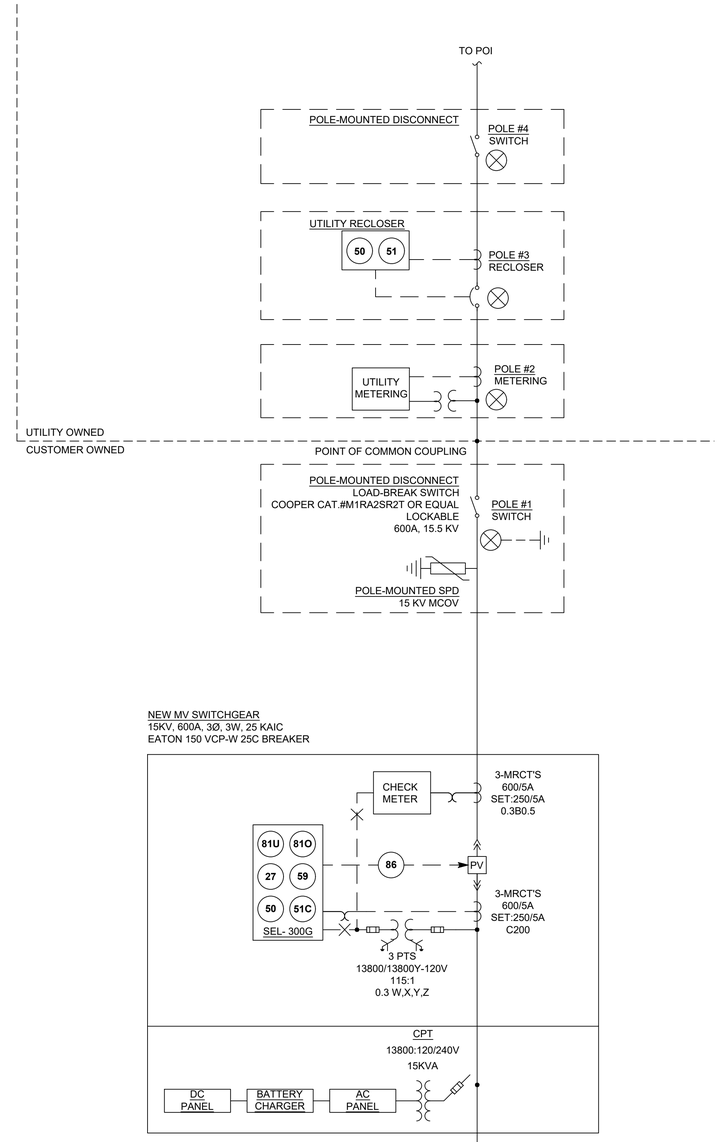
Greenskies
a Clean Focus company

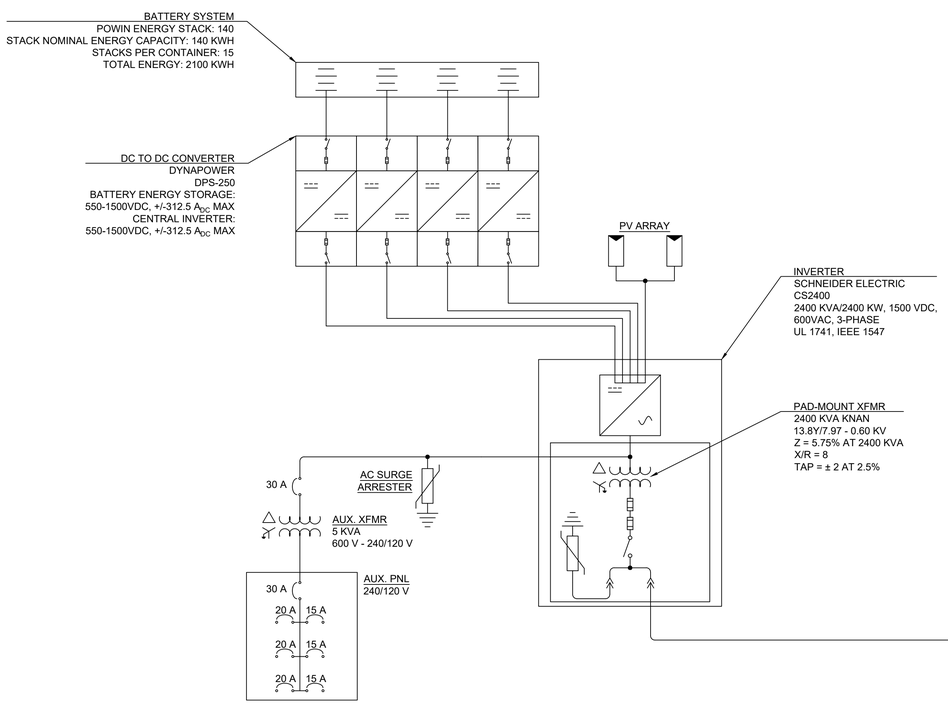
Electrical Drawings

150 Mathilda Place
Suite 206
Sunnyvale, CA 94086

SYSTEM SPECIFICATIONS:

SYSTEM STC DC RATING (kW)	3110
SYSTEM AC CAPACITY (kW)	2400
SYSTEM AC CAPACITY (kVA)	2400
DC/AC RATIO AT POI	1.30
MODULE MODEL	NSP 360W
MODULE STC DC RATING (W)	360
MODULE COUNT	8640
MODULES PER STRING	27
STRING COUNT	320
2 STRING TABLE	160
1 STRING TABLE	0
INVERTER MODEL	SCHNEIDER ELECTRIC CS2400
INVERTER RATING (kW)	2400
QUANTITY OF INVERTERS	1
TRANSFORMER RATING (kVA)	2400
QUANTITY OF TRANSFORMERS	1
DC SYSTEM VOLTAGE (V)	1500
SYSTEM DC CAPACITY (kW) FOR BESS	1000
SYSTEM ENERGY STORAGE (kWh)	2100
BESS BATTERY STACK MODEL	POWIN ENERGY STACK 140
BESS BATTERY STACK NOMINAL ENERGY CAPACITY (kWh)	140
BESS BATTERY STACKS PER CONTAINER	15
QUANTITY OF BESS CONTAINERS	1
DC-DC CONVERTER MODEL	DYNAPOWER DPS-250
DC-DC CONVERTER RATING (kW)	250
QUANTITY OF DC-DC CONVERTERS	4
NOMINAL USEFUL ENERGY CAPACITY (HRS)	2.10
NOMINAL RATED POWER CAPACITY OF BESS (%)	32.2%
INTERCONNECTION VOLTAGE (KV)	13.8





1 - AC SINGLE-LINE DIAGRAM

SCALE: N.T.S.

SHEET NOTES:

1. OVERCURRENT SETTINGS TO BE CONFIRMED BY COORDINATION STUDY DURING DETAIL DESIGN.

2. TRANSFORMER VENDOR TO SPECIFY QUANTITY AND TYPE OF FUSES.

3. CONTRACTOR TO SUBMIT ALL EQUIPMENT FOR EOR REVIEW AND APPROVAL.

4. INVERTER TO BE SET TO THE FOLLOWING SETTINGS:

	DEVICE NO.	PICKUP	MAX CLEARING TIME (SEC)
VOLTAGE	27-1	V < 300V (50%)	0.16
	27-2	300V ≤ V ≤ 528V (50% ≤ V ≤ 88%)	2.0
	59-1	660V < V < 720V (110% < V < 120%)	1.0
	59-2	V ≥ 720V (V ≥ 120%)	0.16
FREQUENCY	81O-1	F ≥ 61.8HZ	0.16
	81U-1	F ≤ 57.8HZ	0.16
	81U-2	F ≤ 59.5HZ	32

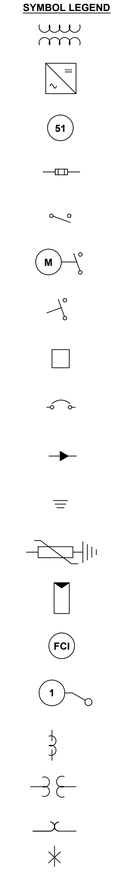
5. RELAY TO BE SET TO THE FOLLOWING SETTINGS:

RELAY DEVICE TABLE			
	DEVICE NO.	PICKUP	MAX CLEARING TIME (SEC)
VOLTAGE	27-1	< 6900V (50%)	0.16
	27-2	6900V ≤ V < 12144V (50% ≤ V< 88%)	2.0
	59-1	15180V < V < 16560V 110% < V < 120%	1.0
	59-2	16560V ≥ (120% ≥)	0.16
FREQUENCY	81O-1	F > 60.5HZ	0.16
	81U-1	F < 57.0HZ	0.16
	81U-2	F < 58.0HZ	32
CURRENT	50	TBD	TBD
	51	TBD	TBD
	51C	TBD	TBD
	51G	TBD	TBD

6. RELAY TO BE EQUIPPED WITH TWO TEST SWITCHES; 1 FOR VOLTAGE AND CURRENTS (ABB FT-1 STYLE NO. C188A523G01), 2 FOR DC INPUTS AND OUTPUTS (ABB FT-1 STYLE NO. 129A501G01).

7. PV CIRCUIT BREAKER TO BE UTILITY LOCKABLE DISCONNECT, BREAKER TO BE RACKABLE.

SYMBOL LEGEND



TRANSFORMER
DC-AC INVERTER
RELAY COMPONENT
FUSE
SWITCH
MOTORIZED SWITCH
GANG-OPERATED SWITCH
VACUUM BREAKER
LOW VOLTAGE CIRCUIT BREAKER
UNDERGROUND CABLE TERMINATION
GROUND
SURGE ARRESTER
PHOTOVOLTAIC MODULE
FAULTED CIRCUIT INDICATOR
CONDUIT OR CABLE NUMBER
CURRENT TRANSFORMER
POTENTIAL TRANSFORMER
CURRENT TEST SWITCH
POTENTIAL TEST SWITCH

PRELIMINARY - NOT FOR CONSTRUCTION

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Oakland, CA 94607
www.revamp-eng.com

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COMMONWEALTH OF MASSACHUSETTS
KAMALJIT BAGHA
ELECTRICAL
PROFESSIONAL ENGINEER

CLIENT

CLEAN FOCUS

PROJECT NAME
ROYALSTON SOLAR

SITE LOCATION
4 KING ST & 4 BEL NEL ROAD
ROYALSTON, MA 01368

DRAWING ISSUE		
	1	09/17/2018 PRELIMINARY
	2	09/28/2018 ISSUE FOR REVIEW

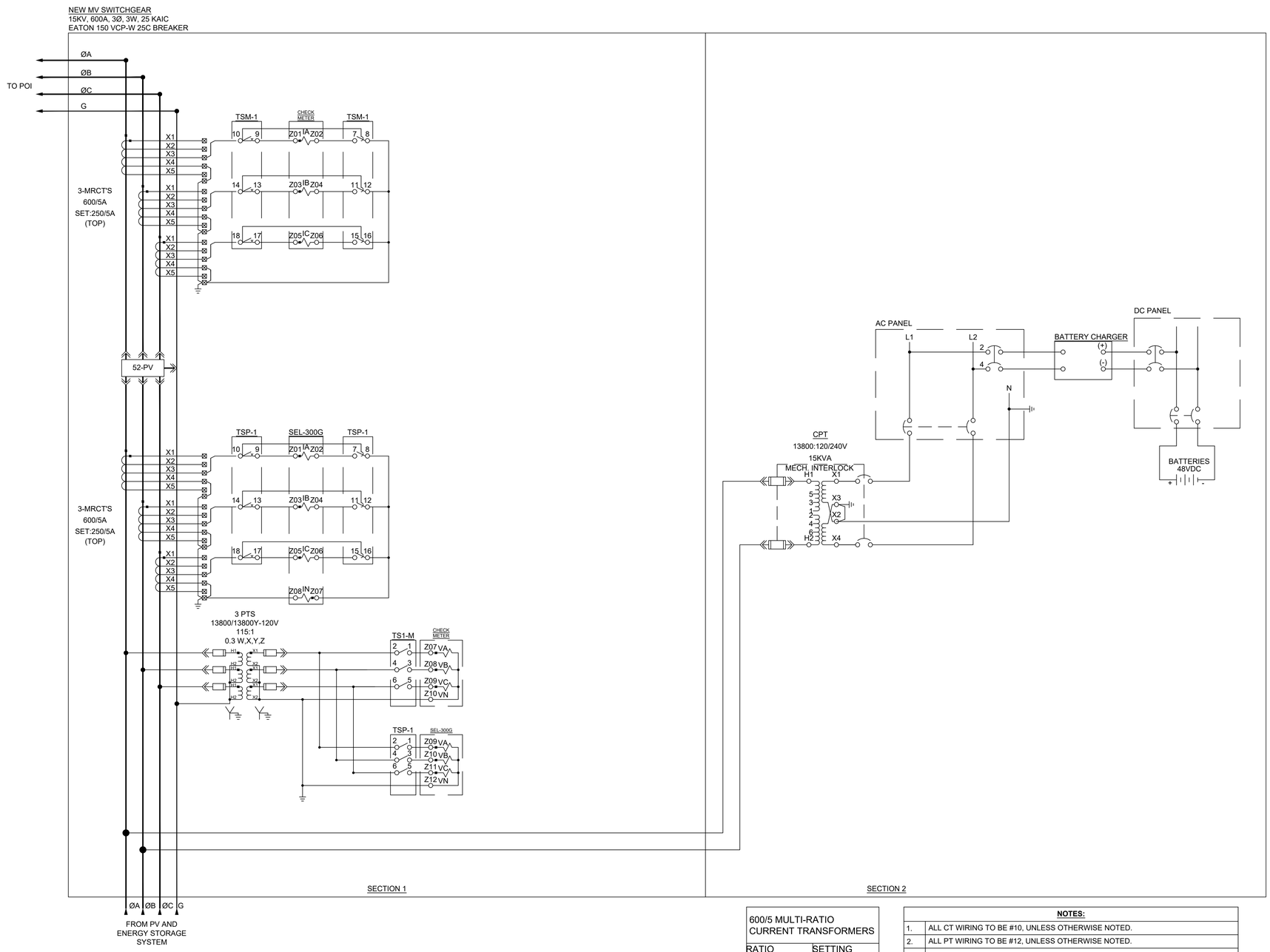
REVISION ISSUE

DRAWN BY: TR CHECKED BY: MH

PROJECT NO.: 18116

DRAWING TITLE
AC SINGLE-LINE DIAGRAM

DRAWING NUMBER
E100



600/5 MULTI-RATIO CURRENT TRANSFORMERS	
RATIO	SETTING
50/5	X2-X3
100/5	X1-X2
150/5	X1-X3
200/5	X4-X5
250/5	X3-X4
300/5	X2-X4
400/5	X1-X4
450/5	X3-X5
500/5	X2-X5
600/5	X1-X5

NOTES:	
1.	ALL CT WIRING TO BE #10, UNLESS OTHERWISE NOTED.
2.	ALL PT WIRING TO BE #12, UNLESS OTHERWISE NOTED.

LEGEND:	
TS	- TEST SWITCH
☒	- INDICATES SHORTING TYPE TERMINAL POINT
☐	- INDICATES TERMINAL POINT
◪	- INDICATES CUSTOMER USE TERMINAL POINT

SYMBOL LEGEND

- TRANSFORMER
- DC-AC INVERTER
- 51 — RELAY COMPONENT
- FUSE
- SWITCH
- M — MOTORIZED SWITCH
- GANG-OPERATED SWITCH
- VACUUM BREAKER
- LOW VOLTAGE CIRCUIT BREAKER
- UNDERGROUND CABLE TERMINATION
- GROUND
- SURGE ARRESTER
- PHOTOVOLTAIC MODULE
- FCI — FAULTED CIRCUIT INDICATOR
- 1 — CONDUIT OR CABLE NUMBER
- CURRENT TRANSFORMER
- POTENTIAL TRANSFORMER
- CURRENT TEST SWITCH
- POTENTIAL TEST SWITCH

1 / - THREE LINE DIAGRAM

SCALE: N.T.S.

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ENGINEER'S STAMP

COMMONWEALTH OF MASSACHUSETTS — KAMALJIT BAGHA — ELECTRICAL — REGISTERED PROFESSIONAL ENGINEER

CLIENT: CLEAN FOCUS

PROJECT NAME: ROYALSTON SOLAR

SITE LOCATION: 4 KING ST & 4 BEL NEL ROAD, ROYALSTON, MA 01368

DRAWING ISSUE	
1	09/17/2018 PRELIMINARY
2	09/28/2018 ISSUE FOR REVIEW

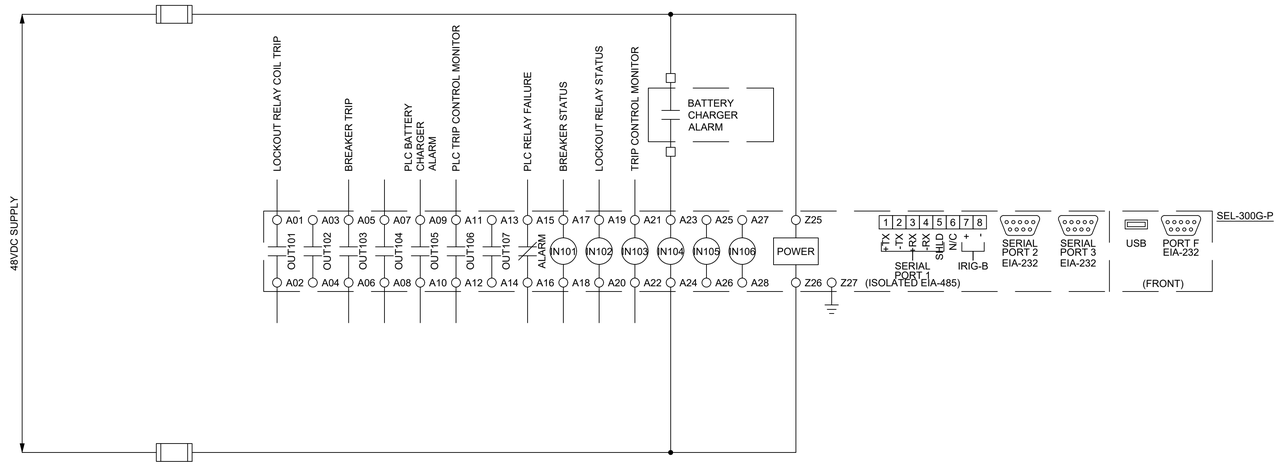
REVISION ISSUE

DRAWN BY: TR CHECKED BY: MH

PROJECT NO.: 18116

DRAWING TITLE: THREE LINE DIAGRAM

DRAWING NUMBER: E101



NOTES:	
1.	ALL WIRING TO BE #12, UNLESS OTHERWISE NOTED.
LEGEND:	
SEL-300G-P	- PRIMARY FEEDER PROTECTION RELAY

1 - CONTROL DIAGRAM

SCALE: N.T.S.

SYMBOL LEGEND

- TRANSFORMER
- DC-AC INVERTER
- RELAY COMPONENT
- FUSE
- SWITCH
- MOTORIZED SWITCH
- GANG-OPERATED SWITCH
- VACUUM BREAKER
- LOW VOLTAGE CIRCUIT BREAKER
- UNDERGROUND CABLE TERMINATION
- GROUND
- SURGE ARRESTER
- PHOTOVOLTAIC MODULE
- FAULTED CIRCUIT INDICATOR
- CONDUIT OR CABLE NUMBER
- CURRENT TRANSFORMER
- POTENTIAL TRANSFORMER
- CURRENT TEST SWITCH
- POTENTIAL TEST SWITCH

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REGISTERED PROFESSIONAL ENGINEER

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ROYALSTON SOLAR

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DRAWING ISSUE	
1	09/17/2018 PRELIMINARY
2	09/28/2018 ISSUE FOR REVIEW

REVISION ISSUE

DRAWN BY: TR CHECKED BY: MH

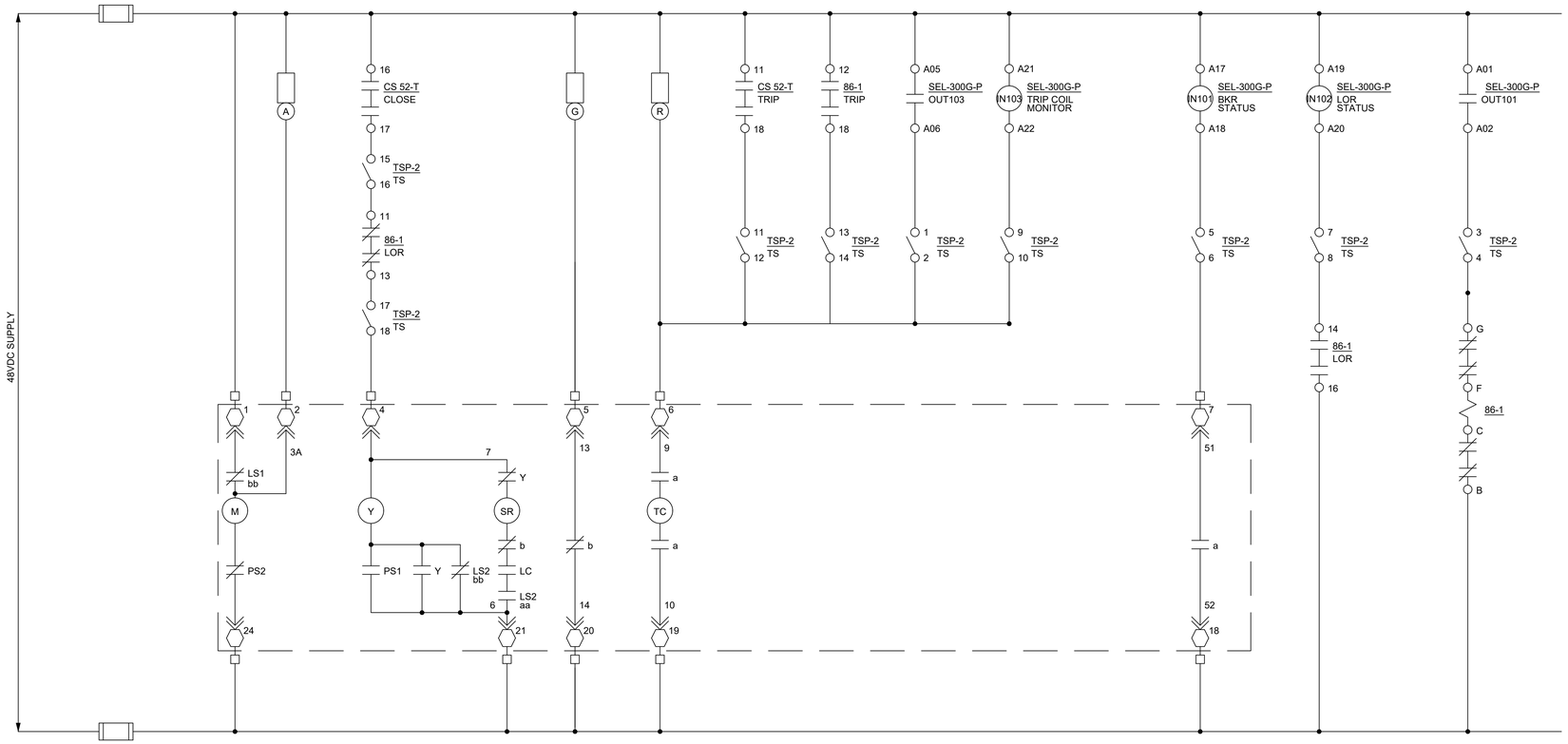
PROJECT NO.: 18116

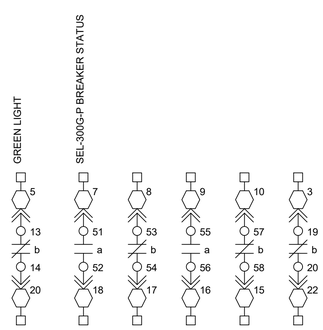
DRAWING TITLE

CONTROL DIAGRAM 1

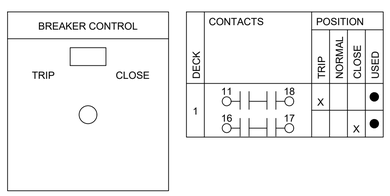
DRAWING NUMBER

E102



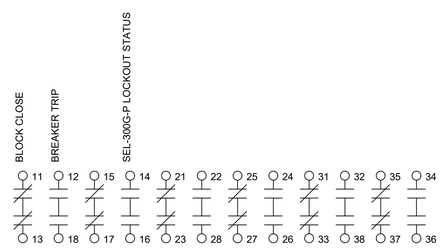


BREAKER AUXILIARY CONTACTS



DECK	CONTACTS	POSITION: TRIP	NORMAL	CLOSE	USED
1	11 — 18	X			●
	16 — 17			X	●

CS 52-T CIRCUIT BREAKER CONTROL SWITCH



86-1 LOCK OUT CONTROL SWITCH

NOTES:	
1.	ALL WIRING TO BE #14, UNLESS OTHERWISE NOTED.

LEGEND:	
52	- CIRCUIT BREAKER
a	- BREAKER AUX. CONTACT (OPEN WHEN BKR IS OPEN)
b	- BREAKER AUX. CONTACT (OPEN WHEN BKR IS CLOSED)
LC	- BREAKER LATCH CHECK SWITCH
LS	- BREAKER LIMIT SWITCH (MOTOR CUT-OFF)
M	- BREAKER SPRING CHARGING MOTOR
PS	- BREAKER POSITION SWITCH (OPEN IN ALL EXCEPT BETWEEN "TEST" CONNECTED POSITION
SR	- BREAKER SPRING RELEASE COIL (CLOSE COIL)
TC	- BREAKER SHUNT TRIP COIL
Y	- BREAKER ANTI-PUMP RELAY
86-1	- LOCK OUT CONTROL SWITCH
CS 52-T	- CIRCUIT BREAKER CONTROL SWITCH
SEL-300G-P	- PRIMARY FEEDER PROTECTION RELAY
G,A,R	- GREEN, AMBER AND RED INDICATING LIGHTS

1 CONTROL DIAGRAM

SCALE: N.T.S.

SYMBOL LEGEND

- TRANSFORMER
- DC-AC INVERTER
- RELAY COMPONENT
- FUSE
- SWITCH
- MOTORIZED SWITCH
- GANG-OPERATED SWITCH
- VACUUM BREAKER
- LOW VOLTAGE CIRCUIT BREAKER
- UNDERGROUND CABLE TERMINATION
- GROUND
- SURGE ARRESTER
- PHOTOVOLTAIC MODULE
- FAULTED CIRCUIT INDICATOR
- CONDUIT OR CABLE NUMBER
- CURRENT TRANSFORMER
- POTENTIAL TRANSFORMER
- CURRENT TEST SWITCH
- POTENTIAL TEST SWITCH

PRELIMINARY - NOT FOR CONSTRUCTION

REVAMP ENGINEERING, INC.
555 12th St, 5th Floor
Oakland, CA 94607
www.revamp-eng.com

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ENGINEER'S STAMP

COMMONWEALTH OF MASSACHUSETTS — KAMALJIT BAGHA — ELECTRICAL — REGISTERED PROFESSIONAL ENGINEER

CLIENT: CLEAN FOCUS

PROJECT NAME: ROYALSTON SOLAR

SITE LOCATION: 4 KING ST & 4 BEL NEL ROAD, ROYALSTON, MA 01368

DRAWING ISSUE	
1	09/17/2018 PRELIMINARY
2	09/28/2018 ISSUE FOR REVIEW

REVISION ISSUE

DRAWN BY: TR CHECKED BY: MH

PROJECT NO.: 18116

DRAWING TITLE: CONTROL DIAGRAM 2

DRAWING NUMBER: E103

1 OVERALL SITE LAYOUT
1" = 100' - 0"
0' 50' 100' 200'

SHEET NOTES:

1. LOCATIONS SHOWN ARE FOR GENERAL GUIDANCE ONLY. SLOPES OF THE SITE ARE NOT DEPICTED AND LOCATIONS MUST BE VERIFIED ON SITE BEFORE INSTALLATION.

SYSTEM SPECIFICATIONS:

SYSTEM STC DC RATING (kW)	3110
SYSTEM AC CAPACITY (kW)	2400
SYSTEM AC CAPACITY (kVA)	2400
DC/AC RATIO AT POI	1.30
MODULE MODEL	NSP 360W
MODULE STC DC RATING (W)	360
MODULE COUNT	8640
MODULES PER STRING	27
STRING COUNT	320
2 STRING TABLE	160
1 STRING TABLE	0
INVERTER MODEL	SCHNEIDER ELECTRIC CS2400
INVERTER RATING (kW)	2400
QUANTITY OF INVERTERS	1
TRANSFORMER RATING (kVA)	2400
QUANTITY OF TRANSFORMERS	1
DC SYSTEM VOLTAGE (V)	1500
SYSTEM DC CAPACITY (kW) FOR BESS	1000
SYSTEM ENERGY STORAGE (kWh)	2100
BESS BATTERY STACK MODEL	POWIN ENERGY STACK 140
BESS BATTERY STACK NOMINAL ENERGY CAPACITY (kWh)	140
BESS BATTERY STACKS PER CONTAINER	15
QUANTITY OF BESS CONTAINERS	1
DC-DC CONVERTER MODEL	DYNAPOWER DPS-250
DC-DC CONVERTER RATING (kW)	250
QUANTITY OF DC-DC CONVERTERS	4
NOMINAL USEFUL ENERGY CAPACITY (HRS)	2.10
NOMINAL RATED POWER CAPACITY OF BESS (%)	32.2%
INTERCONNECTION VOLTAGE (KV)	13.8
RACKING SYSTEM	FIXED TILT (2X10 PORTRAIT)
MODULE TILT	30°
AZIMUTH	180°
GCR	0.43
ROW-TO-ROW SPACING (LF, PROJECTED)	26.25
ASHRAE 2% DESIGN BULB TEMP MAX (°C)	29°
ASHRAE EXTREME ANNUAL MEAN MINIMUM DRY-BULB TEMP	-20°
PROPERTY AREA (ACRES)	15
FENCED AREA (ACRES)	12
FENCING LENGTH (L.F.)	2821
ROADS (L.F.)	984

LEGEND

- PROPERTY LINE
- FENCE LINE
- ROAD
- OVERHEAD ELECTRICAL
- SETBACK / WATERS
- RIGHT OF WAY (ROW)
- RAILROAD
- WETLANDS
- SHADE SETBACK

N

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DRAWING TITLE
OVERALL SITE LAYOUT

DRAWING NUMBER
E200