

May 16, 2017

Town of Leicester Planning Department
3 Washburn Square
Leicester, MA 01524



Re: **Site Plan Review and Special Permit Application
Proposed Photovoltaic Solar Project
Stafford Street, Leicester MA**

On behalf of Ameresco, Inc. (Ameresco), AMEC Massachusetts, Inc. (AMEC) submits this application for Site Plan Review and application for a Special Permit from the Town of Leicester Planning Board (the Board) for a proposed 1,360.80 kilowatt (kW) ground-mounted Photovoltaic (PV) Solar Project (the Project) off Stafford Street in Leicester (the Project Site). The **Site Plan Review / Special Permit Application Form** is provided in **Attachment A**. Supporting documents are also attached. The Project is a Large-Scale Ground-Mounted Solar Energy System as defined in the Town of Leicester Solar Bylaw Amendment (Article 24: Solar Energy Systems, as approved at Annual Town Meeting May 2, 2017) because it will occupy greater than 40,000 square feet (sq. ft.) of surface area. The Project consists of the construction of 3,888 solar photovoltaic (PV) modules on approximately 205,642 sq. ft. (4.7 acres) of land as well as 11,923 sq. ft. (0.3 acres) associated with an access road and electric interconnection.

Site Characteristics

The Project will be constructed on portions of a 45-acre parcel identified as Assessor's map and parcel number 34 A3 0, on the north side of Stafford Street near the town boundary with Worcester. **Site Plan Drawings** are provided in **Attachment B**. The portion of the parcel where the Project will take place is zoned SA – Suburban Agricultural and BI-A – Business Industrial-A. The parcel is bisected northwest-southeast by an overhead electric transmission corridor. The parcel and electric transmission corridor are owned by Massachusetts Electric Company (MEC) d/b/a National Grid. The proposed Project will occupy approximately 4.7 acres in the central-northeast part of the site, which is presently undeveloped and forested, as well as portions of the maintained transmission corridor and area adjacent to an existing solar development and access road. Approximately 341,915 sq. ft. (7.9 acres) of tree clearing is proposed to accommodate the array, access, and eliminate shading near the array. Access for construction and maintenance will be from a gravel driveway passing south of the existing solar energy project on the same parcel immediately southwest of the electric transmission corridor. Sufficient on-site parking will be provided for maintenance vehicles.

The Project Site is presently predominantly forested. Topography is rolling and slopes down to the south and east. Wetlands and intermittent streams are located elsewhere on the parcel, but will not be impacted by the Project. Parts of the project will be located in buffer zones to wetlands and streams. The perimeter fence will be located 25 feet from wetland and stream boundaries, and the array will be set a minimum of 40 feet from the boundaries. Residential properties are located along Stafford Street southeast of the project. The closest approach of the Project to residential properties will be approximately 500 feet. The solar array will be screened from these properties and from Stafford Street by undisturbed forest.

Project Description

The Project consists of the construction of an array of 3,888 solar PV modules. The modules will be mounted on racks supported by posts driven or drilled into the ground, and oriented linearly in an east-to-west direction tilted slightly (20°) toward the south in order to maximize annual energy output and minimize wind loading. The solar panels will extend approximately eight feet above the existing ground surface at their maximum height. The solar PV arrays will be connected through an AC electrical combiner panel and transformers to step up the voltage to match and allow interconnection to the electric utility grid. The system will be connected to the grid via an underground line approximately 935 feet beneath the transmission corridor, and then aboveground via two poles leading to the access driveway off Stafford Street. The system **Electrical One-Line Diagram and Equipment Specifications** for the solar modules, racks, inverters, and battery systems are provided in **Attachment C**.

A chain link security fence will be installed around the solar array totalling approximately 2,650 linear feet of fence. The fence will be seven feet high, set back approximately 15 feet from the solar modules, and contain a locked gate on the southwest side for maintenance vehicle access.

Construction and maintenance access will be from the existing solar project to the southwest, via a gravel driveway off Stafford Street, and a proposed continuation of the gravel driveway from the existing solar project across the transmission corridor to the proposed project. Temporary staging areas for construction equipment and materials for the solar PV installation will be located on existing cleared areas adjacent to the existing solar array.

Compliance with Applicable Municipal Regulations

The Project is required to comply with the Town of Leicester Zoning Bylaw, particularly Section 5.2 - Site Plan Review, the Solar Bylaw Amendment at Section 5.14 - Ground-Mounted Solar Energy Systems, and the Planning Board Site Plan Review Rules and Regulations. The Project as proposed meets the requirements of the bylaw and regulations. The following section lists particular requirements with Project-specific responses and the location of supporting documentation.

Zoning Bylaw

5.2.05 Standards for Site Plan Approval.

- A. The use complies with all the provisions of the Leicester Zoning By-Law. In particular, the use requires a Special Permit from the Planning Board for construction of a large-scale solar project in the SA zoning district (this application).
- B. The use will not materially endanger or constitute a hazard to the public health and safety.
- C. The use will not create undue traffic congestion or unduly impair pedestrian safety.
- D. Sufficient off-street parking will be provided for maintenance vehicles.
- E. The project will not require water, sewer, or other utilities.

- F. The use will not result in a substantial increase of volume or rate of surface water runoff to neighboring properties and streets, nor will it result in pollution or degradation to surface water or groundwater. No impervious surfaces other than a 29 foot by 48 foot concrete pad for electrical transformers will be created. Upon completion of construction, the project area will be seeded with an erosion control/grass seed mix. The **Stormwater Management Report** is contained in **Attachment D** (to be submitted separately).
- G. The use will not result in any undue disturbance to adjoining property owners or the Town caused by excessive or unreasonable noise, smoke, vapors, fumes, dust, glare, etc.

5.14 Ground-Mounted Solar Energy Systems.

The Project is proposed to occupy 5 acres of ground surface in the Zoning Districts SA and BI-A, and as such requires application for a Special Permit from the Planning Board, in addition to Site Plan Review required for a major project as more than two acres of tree clearing is proposed. All requirements of the underlying zoning districts, SA and BI-A, will be met by this project. Construction and operation will be consistent with applicable local, state, and federal requirements. Construction will begin only after obtaining a building permit.

6.1 Compliance with Laws, Ordinances, and Regulations

The construction and operation of the project will be consistent with all applicable local, state, and federal requirements. Ameresco will obtain a building permit prior to construction.

6.2 Dimensional Requirements

In accordance with Bylaw Section 6.2, all structures are set back from property lines a minimum of 100 feet as required. The maximum height of the array will be not more than 15 feet above the finished grade.

6.3 Utility Notification

The Site owner is MEC, the public utility in Leicester. Ameresco will provide evidence of agreement with the utility prior to construction.

6.4 Accessory Structures

Structures serving the array will be installed approximately 800 feet northwest of Stafford Street, across rolling topography, and uncleared land, and will not be visible from the street.

6.5 Lighting

The project will not include any lighting.

6.6 Signage

Signs will comply with zoning requirements. A sign will be mounted near the site access point identifying the owner and providing a 24-hour emergency contact. Additional small

signs will be mounted on the chain link fence surrounding the array indicating electrical hazard, trespassing prohibited.

6.7 Emergency services

The project owner will provide a copy of the project summary, electrical scheme, and site plan to the local emergency services, will clearly mark the means of shutting down the system, and will cooperate with emergency services in developing an emergency response plan, if required. The owner will also identify a responsible person for public inquiries.

6.8 Land Clearing, Habitat Protection, and Screening Requirements

A. Land Clearing

Clearing has been limited to the area necessary for construction, operation, and maintenance (access) of the solar energy system. Existing vegetation will remain in at least the outer 50 feet of the property setback areas, and will not take place closer than 25 feet to wetlands and streams, as required. Erosion controls will be installed as described in the Stormwater Management Report in Attachment D (to be submitted separately).

B. Protection of Natural Resources and Habitat

The project site is not located on agricultural land, is not identified by the Massachusetts Natural Heritage and Endangered Species Program (NHESP) as Priority Habitat, Biomap 2 Critical Natural Landscape Core Habitat, Important Wildlife Habitat, or other environmentally sensitive land, and is not permanently protected land. The access driveway will not require significant grading, no stone walls will be removed, and no roadside trees will be removed.

C. Screening/Buffering

The project will be screened year-round from adjoining residential properties by undisturbed native forest vegetation. This screening will be located in a 50-foot wide buffer within the required setback area along the eastern parcel boundary, and across a width of at least 400 feet along the southeastern site boundary parallel to Stafford Street.

6.9 Monitoring and Maintenance

Ameresco will comply with the requirements of this section. Ameresco's solar PV **Operations and Maintenance Service Procedures** are contained in **Attachment E**.

6.10 Liability Insurance

Ameresco's **Proof of Liability Insurance** is contained in **Attachment F**.

6.11 Abandonment or Decommissioning

Ameresco will comply with the requirements for removal and abandonment as described

in this section. MEC respectfully requests a waiver from the requirement to provide a form of financial surety for the project.

6.12 Special Permit Criteria for Ground-Mounted Solar Energy Systems

The proposed project conforms to all Town of Leicester requirements for ground-mounted solar energy systems. Land clearing has been minimized to the extent feasible and impacts of clearing have been mitigated by leaving the majority of the parcel undeveloped, including an area approximately 400 feet wide along the southeastern border nearest Stafford Street. The project is proposed in the SA and BI-A districts, and the visual impact of the installation on its immediate abutters and the nearby neighborhood has been effectively neutralized through distance from neighboring properties, natural topography, and screening by uncleared forest land.

Other Permits

The project requires the submittal of a Notice of Intent and receipt of an Order of Conditions from the Leicester Conservation Commission because portions of the project will be located within Buffer Zones to wetland resource areas.

Development Schedule

Ameresco anticipates construction to start on July 27 and be complete by December 5, 2017.

Certified Abutters List

The **Certified Abutters Lists** from the Towns of Leicester and Auburn are contained in **Attachment G**.

Fees

In accordance with the Planning Board's regulations, please find enclosed a check for the application fee of \$525 and the project review fee of \$2,100, totalling \$2,625.

Should you have any questions regarding this application, please contact us at (978) 392-5307; rob.bukowski@amefw.com or (978) 392-5370; ryan.hale@amecfw.com.

Sincerely,
AMEC Massachusetts, Inc.



Robert J. Bukowski, P.E.
Project Manager



Ryan Hale, PWS
Permitting Specialist

Attachments

cc: Peter Esselstyn, Ameresco, Inc.
Paul Makris, Ameresco, Inc.

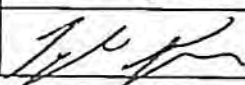
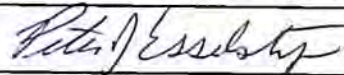
Attachment A
Site Plan Review / Special Permit Application Form

For Planning Office Use:
File #:

Leicester Planning Board
Site Plan Review & Special Permit Application Form

PERMIT TYPE: ☒ Special Permit ☒ Site Plan Review

CONTACT INFORMATION

Owner Information			
Name:	New England Power Co. d/b/a National Grid, Attn: Tyler Krupa		
Signature:			
Address:	40 Sylvan Road Waltham MA 02451		
Phone:	(781) 907-3906	Fax:	
Email:	Tyler.Krupa@nationalgrid.com		
Applicant Information			
Name:	Ameresco, Inc., Attn: Peter Esselstyn		
Signature:			
Address:	111 Speen Street Framingham, MA 01701		
Phone:	(508) 498-3083	Fax:	
Email:	pesselstyn@ameresco.com		
Primary Contact Person <i>(The person that will be contacted by Planning Board staff during the application process.)</i>			
Name:	Amec Foster Wheeler, Attn: Ryan Hale		
Address:	271 Mill Road Chelmsford, MA 01824		
Phone:	(978) 392-5370	Fax:	
Email:	ryan.hale@amecfw.com		

PROJECT INFORMATION

Project Address:	0 Stafford Street	Zoning District:	SA
Assessors Map & Parcel #	34 A3 0	Deed Reference (Book & Page):	
Applicable Zoning Bylaw Section(s):	5.14 Ground-Mounted Solar Energy Systems		
Proposed Land Use:	Large-scale ground-mounted solar energy system		
Existing Land Use:	Undeveloped forested		
Size of Proposed Structure(s):	3,888 solar modules, 8' fence, 16' wide access road		

For Planning Office Use:
File #:

PROJECT INFORMATION, Continued

Total Lot Area:	45 acres
Water Source: (If "public" water, identify applicable water district)	Not applicable
Sewer Source: (If "public" sewer, identify applicable sewer district)	Not applicable
Brief Project Description: Please include a description on this form (i.e. do not write "see attached"). Install a 1,361 kilowatt (kW) ground-mounted solar photovoltaic (PV) energy system and associated electric interconnection, access road, and security fence.	

Application Checklist

Use this checklist to ensure you have provided all required information See Planning Board Site Plan Review & Special Permit Regulations for details.

- | | | |
|--|--|--|
| <input checked="" type="checkbox"/> 13 copies of plans (3-full-size & 10- 11"x17") | <input checked="" type="checkbox"/> Full Project Narrative including any waiver requests (13 copies) | <input checked="" type="checkbox"/> Drainage Analysis/ Stormwater Report, (3 copies) |
| <input type="checkbox"/> Documentation of Availability of Water & Sewer | <input checked="" type="checkbox"/> Certified Abutters List* | <input type="checkbox"/> Traffic Study (3 copies) |

* certified abutters lists are required for all Special Permits applications and for Site Plan Review Application for projects involving new construction over 30,000 s.f.

Applications will not be accepted without the applicable Application Fee (please refer to the Planning Board's Fee Regulations).

For Planning Board Use:			
Date of Submittal:			
Public Hearing/Meeting Date(s):			
Date of Planning Board Vote:			
Date Decision Filed with Town Clerk:			

Attachment B
Site Plan Drawings

TOWN OF LEICESTER

1,360.8 KW DC SOLAR PV DEVELOPMENT
STAFFORD STREET
LEICESTER, MASSACHUSETTS
MAY, 2017

ISSUED FOR LOCAL PERMITTING/NOT FOR CONSTRUCTION



DRAWING INDEX

SHEET NUMBER	DRAWING TITLE	DRAWING NUMBER
	COVER SHEET	
1	EXISTING CONDITIONS PLAN	V-101
2	PROPOSED SITE PLAN	C-101
3	CONSTRUCTION, EROSION AND SEDIMENTATION CONTROL DETAILS	C-501

DEVELOPED BY

AMERESCO, INC.
AMERESCO
GREEN + CREATIVE SOLUTIONS
115 ELM STREET
FRAMINGHAM, MA 01701

PREPARED BY

amec foster wheeler

AMEC MASSACHUSETTS, INC.
271 MILL ROAD
CHELMSFORD, MASSACHUSETTS 01824

Attachment C
Electrical One-Line Diagram and Equipment Specifications

NEC Energy Solution's Distributed Storage Solution (DSS™) enables advanced energy management and resiliency services for commercial & industrial customers and the utilities that serve them.

The relationship between utilities and commercial & industrial customers is being transformed as enterprises produce as well as consume electricity and actively manage the amount and timing of their energy use. The fully integrated DSS™ platform enables next-generation energy storage-based services on both sides of the electricity meter: reducing energy costs and increasing resiliency for commercial & industrial enterprises, while improving efficiency, predictability, and distributed resource dispatchability for utilities.

The DSS™ platform integrates energy storage, power conversion and system controls into a range of flexible outdoor-rated configurations that are simpler, smarter, and safer than other point products. DSS systems may operate autonomously, within an enterprise energy management system, under utility or local SCADA control, as part of an aggregator's virtual power plant, or any combination of these.



EXAMPLE APPLICATIONS




The DSS™ platform allows integrators and service providers to deliver advanced energy management services to enterprises and/or utilities.

For commercial & industrial enterprises, DSS systems support emerging 'behind-the-meter' services including:

- Demand charge management
- Demand response
- Power quality and resiliency
- Distributed/renewable generation integration
- Time-of-use management

For utilities, DSS™ systems deliver distribution grid 'front-of-the-meter' services including:

- Dispatchable load and demand management
- T&D congestion relief and upgrade deferral
- Voltage support
- Renewable capacity firming/ramp management
- Distributed ancillary services

							
Energy Options		85 kWh	170 kWh	255 kWh	340 kWh	425 kWh	510 kWh
PCS Options	Pre-Integrated ¹	30 ² or 100 kW	30, 100 or 280 kW		100, 280 or 710 kW		
	Separate ³	Up to 170 kW	Up to 340 kW	Up to 510 kW	Up to 680 kW	Up to 850 kW	Up to 1000 kW
Dimensions ⁴	W x D X H (mm) (in)	1683 x 2037 x 2492 (66 x 80 x 98)		2388 x 2037 x 2492 (94 x 80 x 98)		3093 x 2037 x 2492 (122 x 80 x 98)	
Weight ⁴		2,821 kg (6,219 lbs)	3,751 kg (8,269 lbs)	5,004 kg (11,033 lbs)	5,821 kg (12,833 lbs)	7,063 kg (15,571 lbs)	7,880 kg (17,371 lbs)

Notes:

- 1) 'Pre-Integrated PCS' options are provided as complete systems from the factory. The 30kW PCS is shipped integral to the DSS™ system enclosure; other sizes include a separate PCS cabinet. The 100kW and 280kW PCS options include built-in isolation transformer. The 710kW option includes separate external transformer.
- 2) Note in 50Hz applications, the 30kW PCS is de-rated to 25kW maximum.
- 3) 'Custom PCS' options assume customer supplied and integrated PCS or DC-only use. Only selected PCSs qualified by NEC are supported by AEROS® controls. Peak power capacity is up to 2CP (Constant Power) rate of the DC battery system. Thermal restrictions may limit duration and frequency of peak discharge power.
- 4) Dimensions and weights include HVAC; do not include integral PCS; do not include optional fire suppression system.
- 5) All specifications are preliminary and subject to change without notice.

KEY FEATURES

Proven Battery Technology

The DSS™ platform uses proven industry-leading lithium-ion battery storage technologies, leveraging years of operational experience of NEC Energy Solution's leading GSS® product lines. In the DSS™ system, NEC Energy Solutions offers the optimal technology for typical demand charge management and similar peak shaving applications.

Flexible Power Conversion

Pre-integrated, 4 quadrant, bi-directional inverters are available within the DSS™ systems. Choose from integral 30kW (provided as one unit) or remote-mounted 100kW, 280kW, or 710W component PCS options, all provided as fully integrated, ready-to-install systems.

Powerful AEROS® Controls

NEC Energy Solution's AEROS® Controls, with C&I optimized Demand Charge Reduction, Peak Shaving, and Load Limiting applications, is provided with every DSS system. The complete AEROS® application suite, including functions for grid ancillary services, volt/VAR control, ramp rate management, and other applications is also available.

Pre-Engineered Environmental Control

Mechanical system optimization and serviceability is key to maximizing overall system life and availability. DSS pre-engineered systems leverage NEC Energy's years of experience developing systems used in harsh environments around the world.

Robust Safety

System safety can never be compromised, and DSS™ systems use the same multi-level safety approach — at the cell, module, rack, and system level — for which NEC Energy Solutions is known. Integrated fire suppression is also available as an option.

Installation Simplicity

DSS™ systems are designed for fast, straightforward installation by typical commercial electrical contractors. Power and communications connections are conventional and common to standard industrial grade facility products.

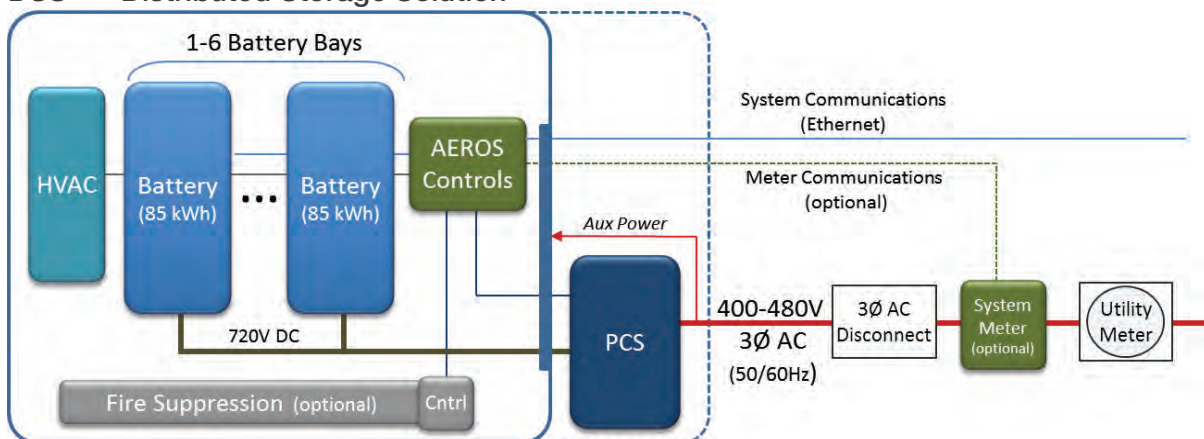
System Characteristics

Energy Options	85, 170, 255, 340, 425 and 510 kWh
Power Conversion Options	30 kW (25 kW) ¹ 100, 280, and 710 kW
DC Voltage	720 V
Controls	AEROS® Applications Suite
AC Interfaces	480V / 60Hz or 400VAC / 50Hz 3Ø, 3 or 4 wire
Communications	Ethernet/IP HTTP/HTTPS Modbus (serial or TCP/IP) Options for DNP3.0, IEC61850
Enclosures	NEMA 4 / IP65, in 2, 4 and 6 bay configurations
Operating Temp	-25°C to 50°C
Standards and Compliance (partial list)	UL 1642, 1741, 1973, 9540 UN 3480 IEC 61000-6-2, 4, & 5 IEC 62133, IEEE P1547 Seismic (International and CA) NFPA 70

1. 30 kW PCS option is factory mounted with energy storage unit. In 50Hz applications, power is derated to 25kW.
2. 100, 280 and 710 kW PCS options provided in separate, pre-integrated, remotely mounted cabinets.

EXAMPLE INSTALLATION

DSS™ - Distributed Storage Solution



HEC-US_{v1500}

UTILITY SCALE SOLAR INVERTER



NEXT GENERATION

1500
V_{DC}



HEC-US V1500

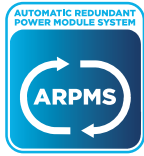
The new Power Electronics HEC-US V1500 outdoor inverters are powerful and reliable 1500Vdc utility scale PV units for the US market. The HEC-US V1500 inverter family has 20 different UL-1741 certified models ranging from 1MW to 3MW with no derating at 50°C and a 98.5% CEC rated efficiency.

Power Electronics designs and manufactures 1700Vdc power converters for market leading customers in the mining, oil & gas and water industries and for the most demanding environments. With up to 7 425KW power modules connected in parallel, the HEC-US V1500 is a multilevel 1500Vdc system built on the Power Electronics expertise in >1,000Vdc systems and the proven Freesun HEC modular topology. The HEC-US V1500 has a standard stainless steel enclosure and best-in-class cooling at 50°C without derating to ensure reliable performance in the most demanding conditions.

Power Electronics offers customized NEC2014 compliant FSDK15 external DC Recombiner cabinets. The FSDK15 includes user specified overcurrent protection up to 400 Amps with 16 or 32 inputs to support higher ratio DC:AC PV designs. FSDK15 cabinets include current monitoring.

Power Electronics continues to evolve with the solar industry and the HEC-US V1500 is designed specifically to meet the new demand for 1500Vdc PV systems.

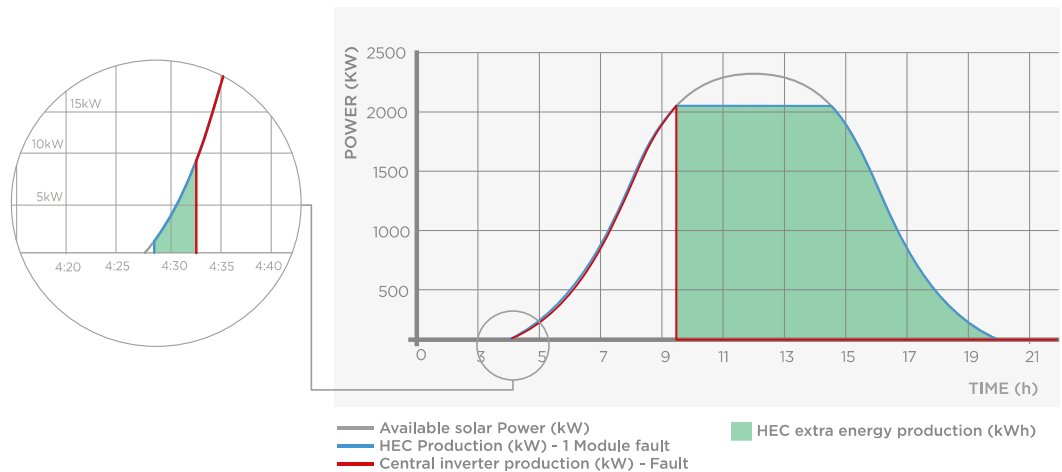
THE MOST POWERFUL AND
RELIABLE 1500V_{DC} UL-1741
CERTIFIED UTILITY-SCALE PV
INVERTER IN THE MARKET



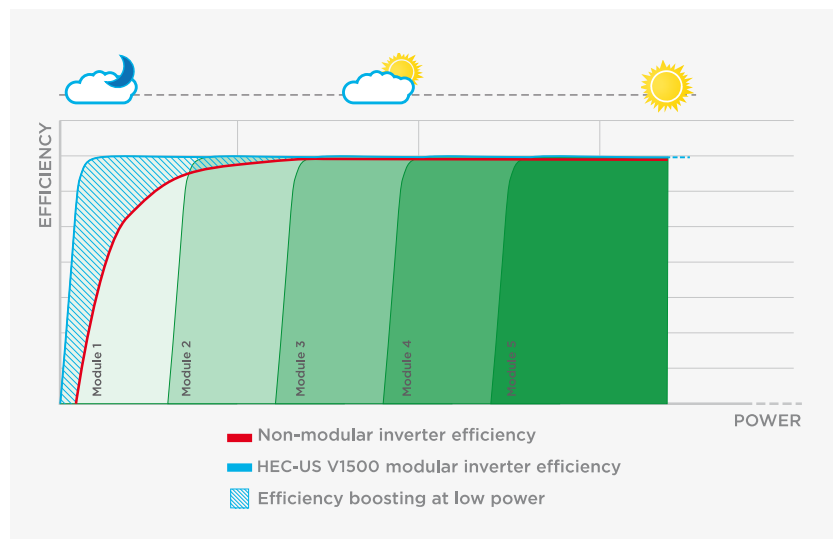
AUTOMATIC REDUNDANT POWER MODULE SYSTEM (ARPMS)

The HEC-US V1500 topology combines the advantages of a central inverter with the availability of string inverters. HEC-US V1500 is a modular central inverter based on an Automatic Redundant Power Module (350kVA to 500kVA per stage).

If there is a fault in one power module, it is taken off-line and its output power is distributed evenly among the remaining functioning modules. All power modules work in parallel controlled by a dual redundant main control. As the main governor of the system it is responsible for the MPPT tracking, synchronization sequence and overall protection. The automatic redundant capability based on our industrial systems is able to shift the main control in the event of a fault, restoring the backup control and restarting the station to guarantee high availability. (patent pending)



A modular inverter is more efficient than a standard central inverter. During low radiation conditions, a modular architecture uses the correct number of power modules to provide power, while a central inverter must consume power internally to support the entire system. With lower losses, a modular inverter can provide power earlier in the morning and stop later at the end of the day. As a result, throughout the entire service life of the PV plant, the HEC-US V1500 inverter generates higher yields than a standard central inverter with a higher reliability than string inverters.



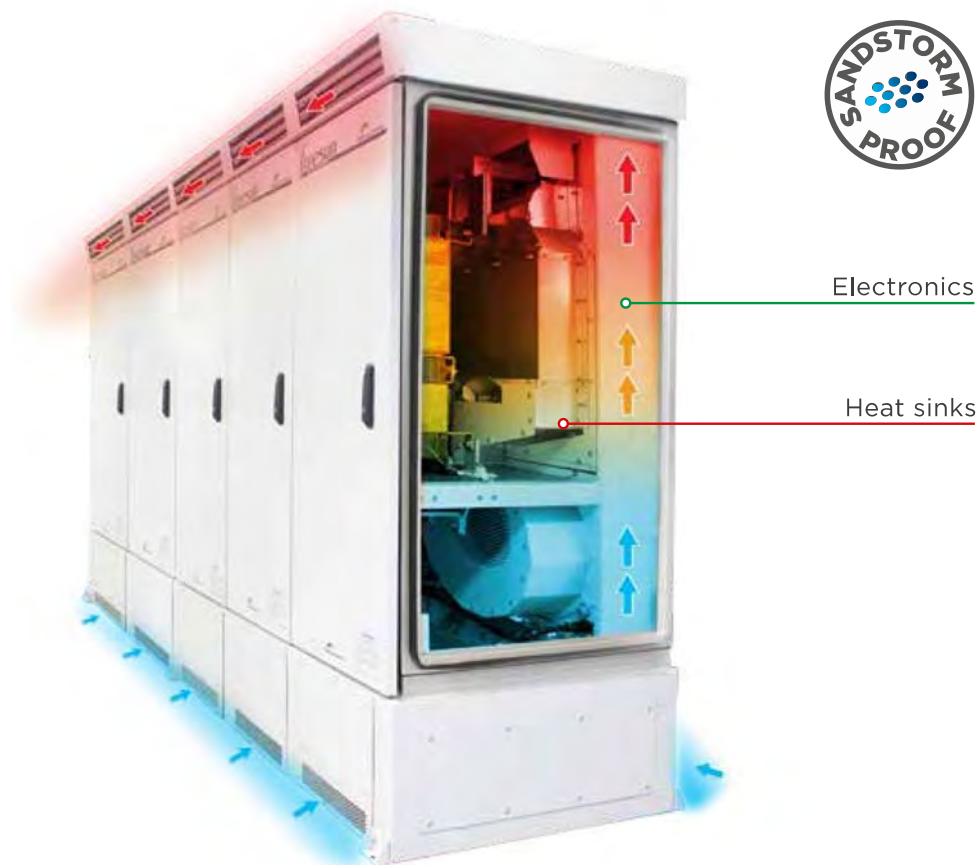


REVOLUTIONARY COOLING SYSTEM

The Power Electronics HEC-US V1500 series includes the innovative and sophisticated iCOOL V performance that allows HEC-US V1500 to work up to 140°F (60°C) at nominal power. The cooling system iCOOL V smartly cools the inverter, regulating the cooling system capacity depending on data from the temperature sensors.

HEC-US V1500 modules are divided into two main areas: clean area (electronics) and hot area (heat sink). The electronics are totally sealed in a NEMA4 area and use a temperature control low flow cooling system that reduces filters clogging and maintenance intervals. The hot area integrates a speed controlled fan for each module, simplifying the cooling system and reducing the maintenance tasks.

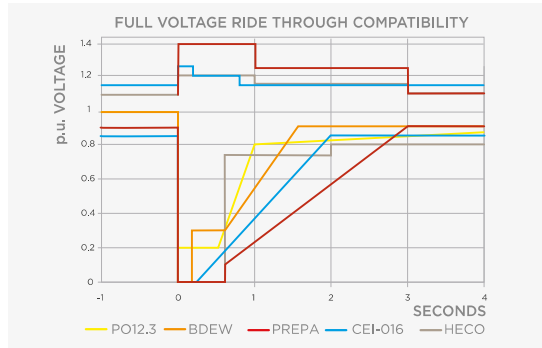
Furthermore, due to the modular topology, the iCOOL V reduces the Stand-by consumption at low capacity to the maximum, boosting the cooling capacity for photovoltaic installations situated up to 4000 meters above sea level. (patent pending)



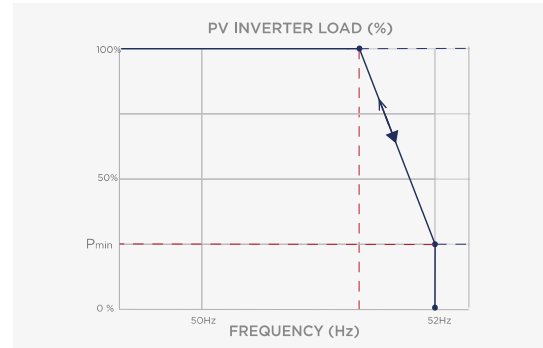


DYNAMIC GRID SUPPORT

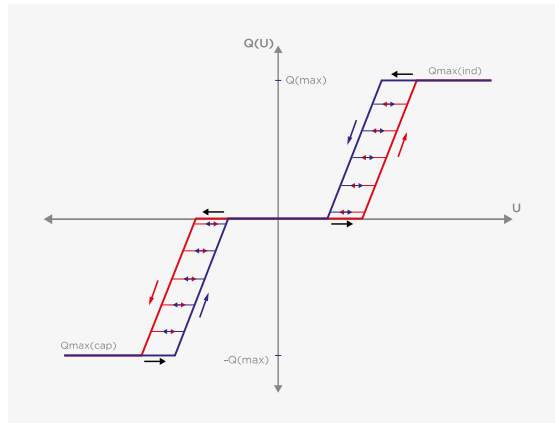
HEC-US V1500 firmware includes the latest utility interactive features (LVRT, OVRT, FRS, FRT, Anti-islanding, active and reactive power curtailment...), and is compatible with all the specific requirements of the utilities.



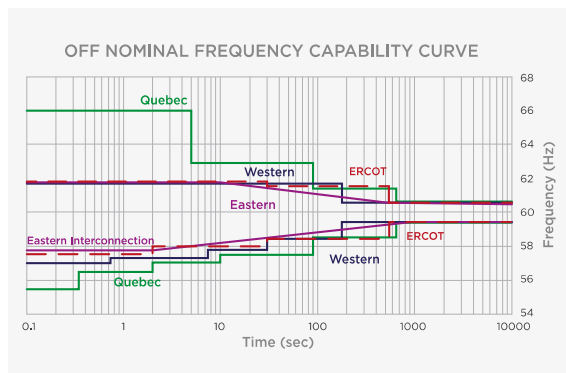
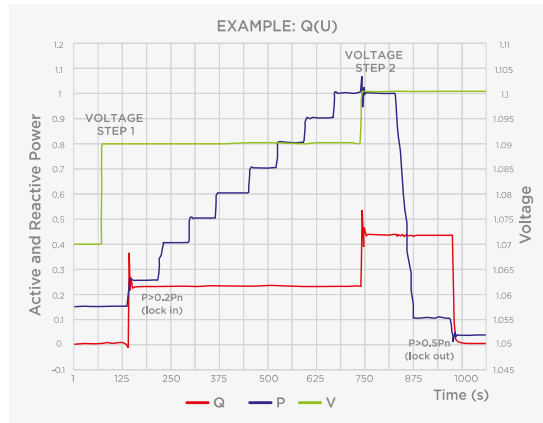
▲ **LVRT or ZVRT (Low Voltage Ride Through).** Inverters can withstand any voltage dip or profile required by the local utility. The inverter can immediately feed the fault with full reactive power, as long as the protection limits are not exceeded.



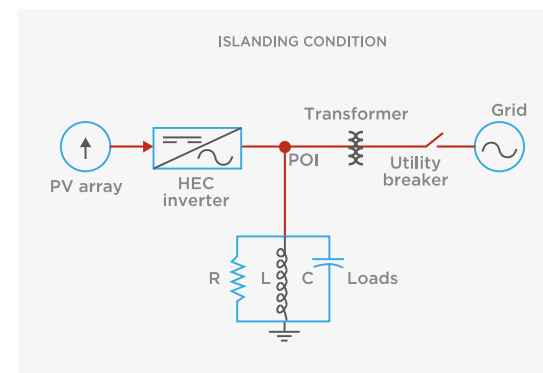
▲ **FRS (Frequency Regulation System).** Frequency droop algorithm curtails the active power along a preset characteristic curve supporting grid stabilization.



▲ **Q(V) curve:** It is a dynamic voltage control function which provides reactive power in order to maintain the voltage as close as possible to its nominal value.



▲ **FRT (Frequency Ride Through):** Freesun solar inverters have flexible frequency protection settings, and can be easily adjusted to comply with future requirements.



▲ **Anti-islanding:** This protection combines passive and active methods that eliminates nuisance tripping and reduces grid distortion according to IEC 62116 and IEEE1547.



VAR AT NIGHT

At night, the HEC-US V1500 inverter can shift to reactive power compensation mode. The inverter can respond to an external dynamic signal, a Power Plant Controller command or pre-set reactive power level (kVAr).



EASY TO MONITOR

The Freesun app is the easiest way to monitor the status of our inverters. All our inverters come with built-in wifi, allowing remote connectivity to any smart device for detailed updates and information without the need to open cabinet doors. The app user friendly interface allows quick and easy access to critical information (energy registers, production and events).



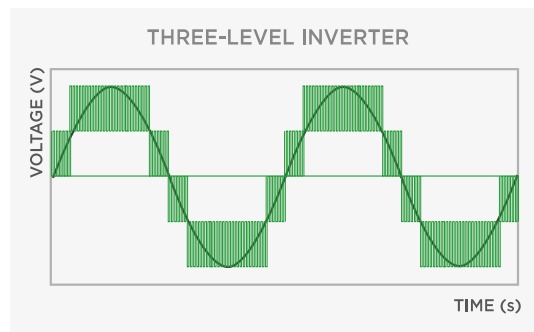
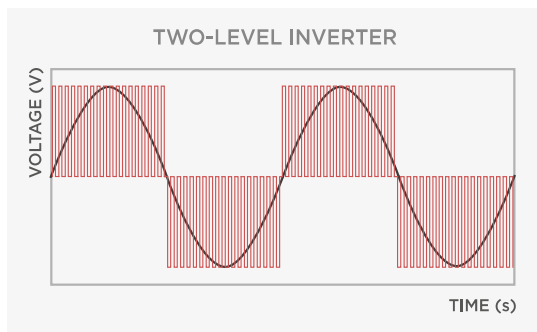
ACTIVE HEATING

At night, when the unit is not actively exporting power, the inverter can import a small amount of power to keep the inverter internal ambient temperature above -20°C , without using external resistors. This autonomous heating system is the most efficient and homogeneous way to prevent condensation, increasing the inverters availability and reducing the maintenance. (patent pending)



MULTILEVEL TOPOLOGY

The multilevel IGBT topology makes the difference in the 1500Vdc technology, being the most efficient way to manage high DC link voltages. Based in our long IGBT experience components used in the HEC PLUS series, the HEC-US V1500 takes profit of the three level IGBT topology reducing the power stage losses, increasing the efficiency and offering a very low total harmonic distortion.



HEC-US^{v1500}

TECHNICAL CHARACTERISTICS

		690VAC - MPpt Window 976V-1310V				
		FRAME 3	FRAME 4	FRAME 5	FRAME 6	FRAME 7
NUMBER OF MODULES		3	4	5	6	7
REFERENCE		FS1275CU15	FS1700CU15	FS2125CU15	FS2550CU15	FS3000CU15
OUTPUT	AC Output Power(kVA/kW) @50°C ^[1]	1275	1700	2125	2550	3000
	AC Output Power(kVA/kW) @25°C ^[1]	1530	2040	2550	3060	3500
	AC Output Power(kW) @50°C; PF=0.9	1150	1530	1910	2250	2700
	Max. AC Output Current (A) @25°C	1285	1710	2140	2570	3000
	Operating Grid Voltage (VAC)	690V ±10%				
	Operating Grid Frequency (Hz)	60Hz				
	Current Harmonic Distortion (THDi)	< 3% per IEEE519				
	Power Factor (cosine phi) ^[2]	0.0 leading ... 0.0 lagging / Reactive Power injection at night				
	Power Curtailment (kVA)	0...100% / 0.1% Steps				
INPUT	MPpt @full power (VDC) ^[1]	976V - 1310V				
	Maximum DC voltage	1500V				
	Minimum Start Voltage	1100V - User configurable				
	Max. DC continuous current (A)	1600	2140	2675	3210	3745
	Max. DC short circuit current (A)	2320	3100	3880	4650	5450
EFFICIENCY & AUX. SUPPLY	Efficiency (Max) (η)	98.5%	98.7%	98.7%	98.7%	98.7%
	CEC (η)	98.0%	98.5%	98.5%	98.5%	98.5%
	Max. Standby Consumption (Pnight)	< approx. 50W/per module				
	Control Power Supply	120V / 208VAC-6kVA power supply available for external equipment (optional)				
CABINET	Dimensions [WxDxH] [inches]	119.6"x37.2"x86.5"	147.6"x37.2"x86.5"	175.7"x37.2"x86.5"	203.8"x37.2"x86.5"	231.9"x37.2"x86.5"
	Dimensions [WxDxH] [mm]	3038x945x2198	3751x945x2198	4464x945x2198	5177x945x2198	5890x945x2198
	Weight (kg)	2635	3290	3945	4600	5255
	Weight (lbs)	5809	7253	8697	10141	11585
	Air Flow	Bottom intake. Exhaust top rear vent.				
ENVIRON- MENT	Type of ventilation	Forced air cooling				
	Degree of protection	NEMA 3R				
	Permissible Ambient Temperature	-31°F to +140°F, -35°C ^[3] to +60°C / Active Power derating >50°C/122°F				
	Relative Humidity	0% to 100% non condensing				
	Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)				
CONTROL INTERFACE	Noise level ^[4]	< 79 dBA				
	Interface	Graphic Display (inside cabinet) / Optional Freesun App				
	Communication protocol	Modbus TCP				
	Power Plant Controller	Optional				
	Keyed ON/OFF switch	Standard				
PROTECTIONS	Digital I/O	User configurable				
	Analog I/O	User configurable				
	Ground Fault Protection	Floating PV array: Isolation Monitoring per MPP NEC2014 Grounded PV Array: GFDI protection Optional PV Array transfer kit: GFDI and Isolation monitoring device				
	Humidity control	Active Heating				
	General AC Protection & Disconn.	Circuit Breaker				
CERTI- FICA- TIONS	General DC Protection & Disconn.	External Disconnecting Unit Cabinet				
	Module AC Protection & Disconn.	AC contactor & fuses				
	Module DC Protection	DC fuses				
	Overvoltage Protection	AC and DC protection (type 2)				
	Safety	UL 1741; CSA 22.2 No.107.1-01				
	Utility interconnect	IEEE 1547 with Utility Interactive Control functions				

NOTES [1] Values at 1,00•Vac nom and cos Φ= 1. Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: $Q(kVar) = \sqrt{(S(kVA))^2 - P(kW)^2}$

[3] Heating kit option required below -20°C.

[4] Sound pressure level at a distance of 1m from the rear part.

HEC-US^{v1500}

TECHNICAL CHARACTERISTICS

		645VAC - MPpt Window 913V-1310V				
		FRAME 3	FRAME 4	FRAME 5	FRAME 6	FRAME 7
NUMBER OF MODULES		3	4	5	6	7
REFERENCE		FS1200CU15	FS1600CU15	FS2000CU15	FS2400CU15	FS2800CU15
OUTPUT	AC Output Power(kVA/kW) @50°C ^[1]	1200	1600	2000	2400	2800
	AC Output Power(kVA/kW) @25°C ^[1]	1430	1910	2390	2860	3345
	AC Output Power(kW) @50°C; PF=0.9	1080	1440	1800	2160	2520
	Max. AC Output Current (A) @25°C	1285	1710	2140	2570	3000
	Operating Grid Voltage (VAC)	645V ±10%				
	Operating Grid Frequency (Hz)	60Hz				
	Current Harmonic Distortion (THDi)	< 3% per IEEE519				
	Power Factor (cosine phi) ^[2]	0.0 leading ... 0.0 lagging / Reactive Power injection at night				
INPUT	Power Curtailment (kVA)	0...100% / 0.1% Steps				
	MPpt @full power (VDC) ^[3]	913V - 1310V				
	Maximum DC voltage	1500V				
	Minimum Start Voltage	1075V - User configurable				
	Max. DC continuous current (A)	1600	2140	2675	3210	3745
EFFICIENCY & AUX. SUPPLY	Max. DC short circuit current (A)	2320	3100	3880	4650	5450
	Efficiency (Max) (η)	98.4%	98.5%	98.6%	98.6%	98.6%
	CEC (η)	98.0%	98.0%	98.5%	98.5%	98.5%
	Max. Standby Consumption (Pnight)	< approx. 50W/per module				
CABINET	Control Power Supply	120V / 208VAC-6kVA power supply available for external equipment (optional)				
	Dimensions [WxDxH] [inches]	119.6"x37.2"x86.5"	147.6"x37.2"x86.5"	175.7"x37.2"x86.5"	203.8"x37.2"x86.5"	231.9"x37.2"x86.5"
	Dimensions [WxDxH] [mm]	3038x945x2198	3751x945x2198	4464x945x2198	5177x945x2198	5890x945x2198
	Weight (kg)	2635	3290	3945	4600	5255
	Weight (lbs)	5809	7253	8697	10141	11585
ENVIRON- MENT	Air Flow	Bottom intake. Exhaust top rear vent.				
	Type of ventilation	Forced air cooling				
	Degree of protection	NEMA 3R				
	Permissible Ambient Temperature	-31°F to +140°F, -35°C ^[3] to +60°C / Active Power derating >50°C/122°F				
	Relative Humidity	0% to 100% non condensing				
CONTROL INTERFACE	Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)				
	Noise level ^[4]	< 79 dBA				
	Interface	Graphic Display (inside cabinet) / Optional Fresun App display				
PROTECTIONS	Communication protocol	Modbus TCP				
	Power Plant Controller	Optional				
	Keyed ON/OFF switch	Standard				
	Digital I/O	User configurable				
	Analog I/O	User configurable				
CERTI- FICA- TIONS	Ground Fault Protection	Floating PV array: Isolation Monitoring per MPP NEC2014 Grounded PV Array: GFDI protection Optional PV Array transfer kit: GFDI and Isolation monitoring device				
	Humidity control	Active Heating				
	General AC Protection & Disconn.	Circuit Breaker				
	General DC Protection & Disconn.	External Disconnecting Unit Cabinet				
	Module AC Protection & Disconn.	AC contactor & fuses				
	Module DC Protection	DC fuses				
CERTI- FICA- TIONS	Overvoltage Protection	AC and DC protection (type 2)				
	Safety	UL 1741; CSA 22.2 No.107.1-01				
	Utility interconnect	IEEE 1547 with Utility Interactive Control functions				

NOTES [1] Values at 1,00•Vac nom and cos Φ= 1. Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: Q(kVar)=√(S(kVA)²-P(kW)²)

[3] Heating kit option required below -20°C.

[4] Sound pressure level at a distance of 1m from the rear part.

HEC-US^{v1500}

TECHNICAL CHARACTERISTICS

		600VAC - MPPT Window 849V-1310V				
		FRAME 3	FRAME 4	FRAME 5	FRAME 6	FRAME 7
NUMBER OF MODULES		3	4	5	6	7
REFERENCE		FS1100CU15	FS1475CU15	FS1850CU15	FS2225CU15	FS2600CU15
OUTPUT	AC Output Power(kVA/kW) @50°C ^[1]	1100	1475	1850	2225	2600
	AC Output Power(kVA/kW) @25°C ^[1]	1335	1780	2225	2660	3110
	AC Output Power(kW) @50°C; PF=0.9	990	1325	1665	2000	2340
	Max. AC Output Current (A) @25°C	1285	1710	2140	2570	3000
	Operating Grid Voltage (VAC)	600V ±10%				
	Operating Grid Frequency (Hz)	60Hz				
	Current Harmonic Distortion (THDi)	< 3% per IEEE519				
	Power Factor (cosine phi) ^[2]	0.0 leading ... 0.0 lagging / Reactive Power injection at night				
	Power Curtailment (kVA)	0...100% / 0.1% Steps				
INPUT	MPPT @full power (VDC) ^[1]	849V - 1310V				
	Maximum DC voltage	1500V				
	Minimum Start Voltage	1050V - User configurable				
	Max. DC continuous current (A)	1600	2140	2675	3210	3745
	Max. DC short circuit current (A)	2320	3100	3880	4650	5450
EFFICIENCY & AUX. SUPPLY	Efficiency (Max) (η)	98.4%	98.5%	98.6%	98.6%	98.6%
	CEC (η)	98.0%	98.0%	98.5%	98.5%	98.5%
	Max. Standby Consumption (Pnight)	< approx. 50W/per module				
	Control Power Supply	120V / 208VAC-6kVA power supply available for external equipment (optional)				
CABINET	Dimensions [WxDxH] [inches]	119.6"x37.2"x86.5"	147.6"x37.2"x86.5"	175.7"x37.2"x86.5"	203.8"x37.2"x86.5"	231.9"x37.2"x86.5"
	Dimensions [WxDxH] [mm]	3038x945x2198	3751x945x2198	4464x945x2198	5177x945x2198	5890x945x2198
	Weight (kg)	2635	3290	3945	4600	5255
	Weight (lbs)	5809	7253	8697	10141	11585
	Air Flow	Bottom intake. Exhaust top rear vent.				
ENVIRON- MENT	Type of ventilation	Forced air cooling				
	Degree of protection	NEMA 3R				
	Permissible Ambient Temperature	-31°F to +140°F, -35°C ^[3] to +60°C / Active Power derating >50°C/122°F				
	Relative Humidity	0% to 100% non condensing				
	Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)				
CONTROL INTERFACE	Noise level ^[4]	< 79 dBA				
	Interface	Graphic Display (inside cabinet) / Optional Freesun App				
	Communication protocol	Modbus TCP				
	Power Plant Controller	Optional				
	Keyed ON/OFF switch	Standard				
PROTECTIONS	Digital I/O	User configurable				
	Analog I/O	User configurable				
	Ground Fault Protection	Floating PV array: Isolation Monitoring per MPP NEC2014 Grounded PV Array: GFDI protection Optional PV Array transfer kit: GFDI and Isolation monitoring device				
	Humidity control	Active Heating				
	General AC Protection & Disconn.	Circuit Breaker				
CERTI- FICA- TIONS	General DC Protection & Disconn.	External Disconnecting Unit Cabinet				
	Module AC Protection & Disconn.	AC contactor & fuses				
	Module DC Protection	DC fuses				
	Overvoltage Protection	AC and DC protection (type 2)				
	Safety	UL 1741; CSA 22.2 No.107.1-01				
	Utility interconnect	IEEE 1547 with Utility Interactive Control functions				

NOTES [1] Values at 1,00•Vac nom and cos Φ= 1. Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: $Q(kVar) = \sqrt{(S(kVA))^2 - P(kW)^2}$

[3] Heating kit option required below -20°C.

[4] Sound pressure level at a distance of 1m from the rear part.

HEC-US^{v1500}

TECHNICAL CHARACTERISTICS

		565VAC - MPpt Window 800V-1310V				
		FRAME 3	FRAME 4	FRAME 5	FRAME 6	FRAME 7
NUMBER OF MODULES		3	4	5	6	7
REFERENCE		FS1050CU15	FS1400CU15	FS1750CU15	FS2100CU15	FS2450CU15
OUTPUT	AC Output Power(kVA/kW) @50°C ^[1]	1050	1400	1750	2100	2450
	AC Output Power(kVA/kW) @25°C ^[1]	1250	1675	2090	2510	2930
	AC Output Power(kW) @50°C; PF=0.9	945	1260	1575	1890	2205
	Max. AC Output Current (A) @25°C	1285	1710	2140	2570	3000
	Operating Grid Voltage (VAC)	565V ±10%				
	Operating Grid Frequency (Hz)	60Hz				
	Current Harmonic Distortion (THDi)	< 3% per IEEE519				
	Power Factor (cosine phi) ^[2]	0.0 leading ... 0.0 lagging / Reactive Power injection at night				
	Power Curtailment (kVA)	0...100% / 0.1% Steps				
INPUT	MPpt @full power (VDC) ^[3]	800V - 1310V				
	Maximum DC voltage	1500V				
	Minimum Start Voltage	1050V - User configurable				
	Max. DC continuous current (A)	1600	2140	2675	3210	3745
	Max. DC short circuit current (A)	2320	3100	3880	4650	5450
EFFICIENCY & AUX. SUPPLY	Efficiency (Max) (η)	98.2%	98.4%	98.5%	98.5%	98.5%
	CEC (η)	98.0%	98.0%	98.0%	98.5%	98.5%
	Max. Standby Consumption (Pnight)	< approx. 50W/per module				
	Control Power Supply	120V / 208VAC-6kVA power supply available for external equipment (optional)				
CABINET	Dimensions [WxDxH] [inches]	119.6"x37.2"x86.5"	147.6"x37.2"x86.5"	175.7"x37.2"x86.5"	203.8"x37.2"x86.5"	231.9"x37.2"x86.5"
	Dimensions [WxDxH] [mm]	3038x945x2198	3751x945x2198	4464x945x2198	5177x945x2198	5890x945x2198
	Weight (kg)	2635	3290	3945	4600	5255
	Weight (lbs)	5809	7253	8697	10141	11585
ENVIRON- MENT	Air Flow	Bottom intake. Exhaust top rear vent.				
	Type of ventilation	Forced air cooling				
	Degree of protection	NEMA 3R				
	Permissible Ambient Temperature	-31°F to +140°F, -35°C ^[3] to +60°C / Active Power derating >50°C/122°F				
	Relative Humidity	0% to 100% non condensing				
CONTROL INTERFACE	Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)				
	Noise level ^[4]	< 79 dBA				
	Interface	Graphic Display (inside cabinet) / Optional Fresun App				
PROTECTIONS	Communication protocol	Modbus TCP				
	Power Plant Controller	Optional				
	Keyed ON/OFF switch	Standard				
	Digital I/O	User configurable				
	Analog I/O	User configurable				
CERTI- FICA- TIONS	Ground Fault Protection	Floating PV array: Isolation Monitoring per MPP NEC2014 Grounded PV Array: GFDI protection Optional PV Array transfer kit: GFDI and Isolation monitoring device				
	Humidity control	Active Heating				
	General AC Protection & Disconn.	Circuit Breaker				
	General DC Protection & Disconn.	External Disconnecting Unit Cabinet				
	Module AC Protection & Disconn.	AC contactor & fuses				
	Module DC Protection	DC fuses				
	Overvoltage Protection	AC and DC protection (type 2)				
CERTI- FICA- TIONS	Safety	UL 1741; CSA 22.2 No.107.1-01				
	Utility interconnect	IEEE 1547 with Utility Interactive Control functions				

NOTES [1] Values at 1,00•Vac nom and cos Φ= 1. Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: Q(kVar)=√(S(kVA)²-P(kW)²)

[3] Heating kit option required below -20°C.

[4] Sound pressure level at a distance of 1m from the rear part.

TerraFarm Data Sheet



TerraFarm Ground Mount - Landscape

Application:	Commercial to Utility Scale
Grounding:	ETL listed, Electrically bonded system, verified Wiley
Panel Orientation:	Landscape
Array Configurations:	Up to 7 panels high and up to 12 panels long
Tilt Angle:	5 – 45 degrees
Lower Panel Clearance:	Up to 48 inches, standard
Loading Conditions:	Up to 160 mph wind speed, 80 psf snow load, Exposure C
Warranty:	20-year limited warranty
Engineering:	Professional Engineer Stamped Drawings Available in 50 States Custom Engineered to Exceed Applicable ASCE, IBC, and UL Standards.
Material:	Galvanized steel (G90 or Better)
East-West Slope:	20% maximum
North-South Slope:	60% maximum, limited by installation equipment
Max Fuse Rating:	30 Amp Fuse Rating



Max Capacity of PV modules:

12 High x 12 Wide (144 Panels):	Listed Frameless (Thin Film) PV Module (21"-26" x 47"-51")
7 High x 10 Wide (70 Panels):	54 Cell Listed Aluminum Framed PV Module (37"-41" x 56"-60")
7 High x 9 Wide (63 Panels):	60 Cell Listed Aluminum Framed Module (37"-41" x 63"-67")
7 High x 8 Wide (56 Panels):	72 Cell Listed Aluminum Framed Module (37"-41" x 75"x79")

Benefits

Minimal hardware to assemble

No in-field drilling, cutting, or welding

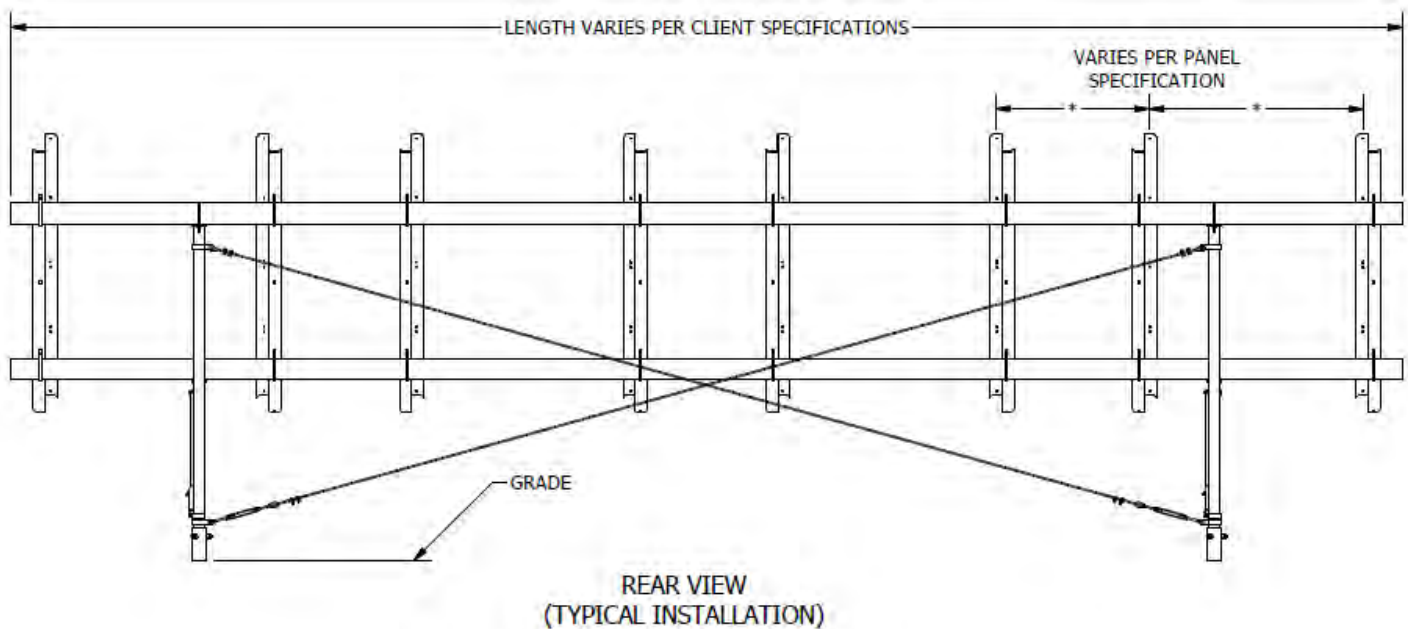
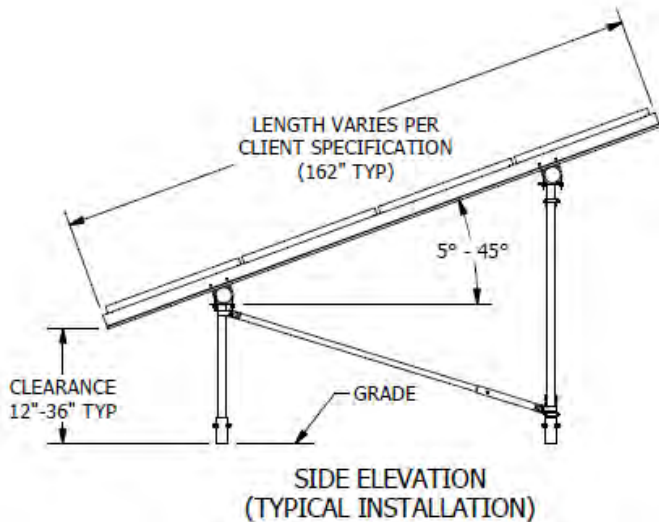
Significantly reduces installed labor costs

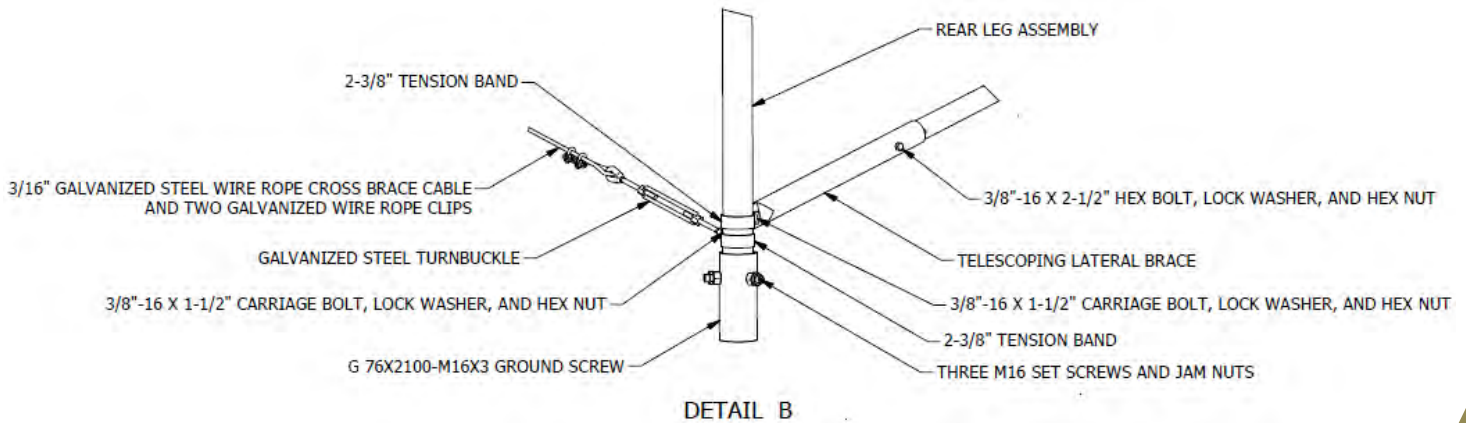
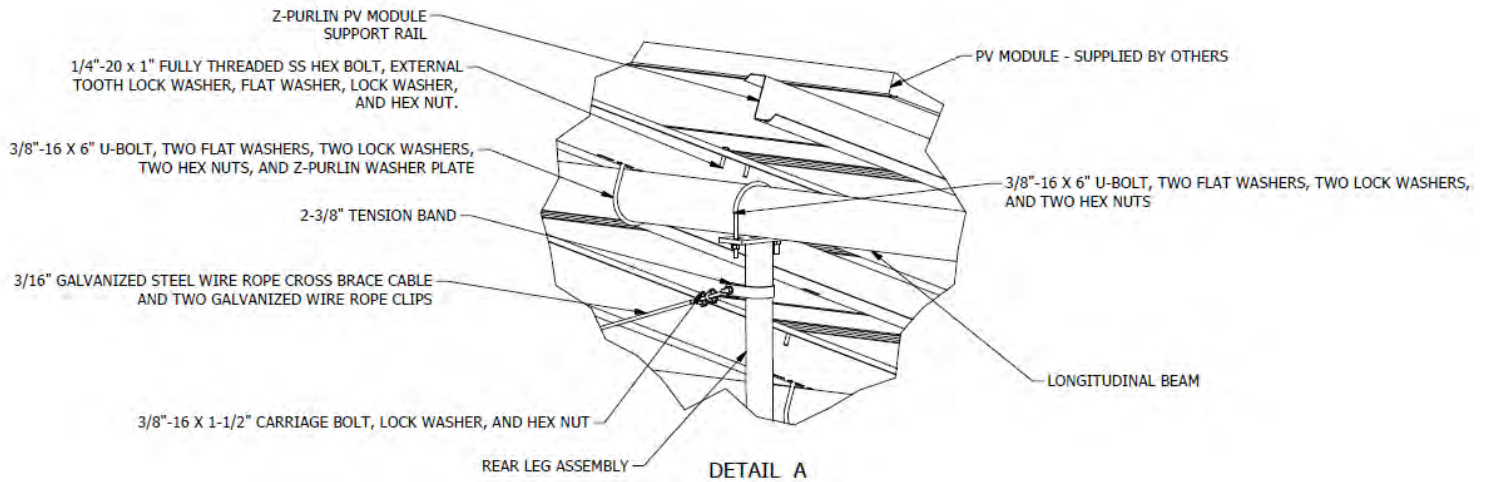
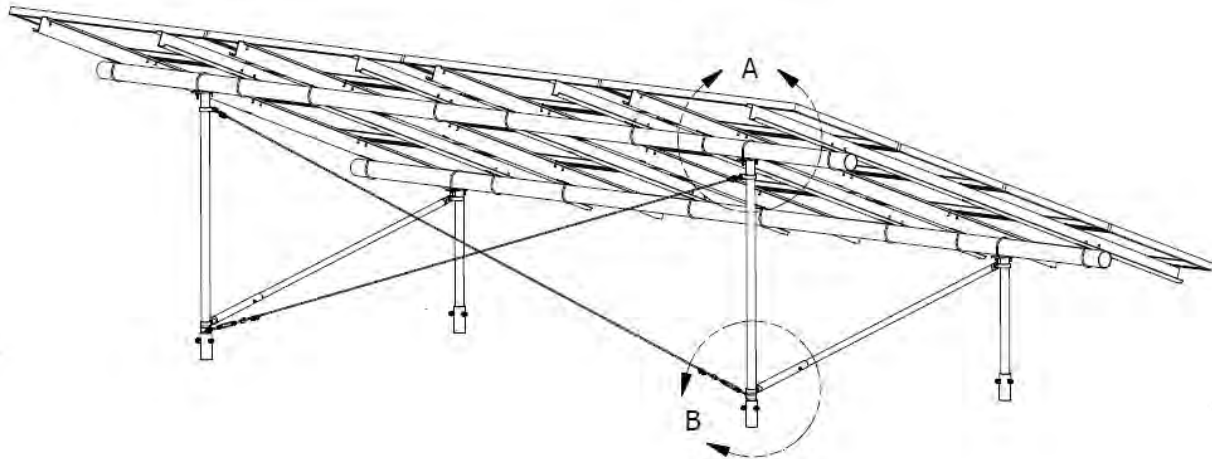
Integrated foundation solution

Turn-key installation service available, Foundation to Panels

Pre-assembly options available

Maximum adjustability for following grade







Hyundai Solar Module

Hyundai Heavy Industries was founded in 1972 and is a Fortune 500 company. The company employs more than 48,000 people, and has a global leading 7 business divisions with sales of 51.3 Billion USD in 2013. As one of our core businesses of the company, Hyundai Heavy Industries is committed to develop and invest heavily in the field of renewable energy.

Hyundai Solar is the largest and the longest standing PV cell and module manufacturer in South Korea. We have 600 MW of module production capacity and provide high-quality solar PV products to more than 3,000 customers worldwide. We strive to achieve one of the most efficient PV modules by establishing an R&D laboratory and investing more than 20 Million USD on innovative technologies.

TI-Series

Multi-crystalline Type

HiS-M310TI | HiS-M315TI | HiS-M320TI | HiS-M325TI

Mono-crystalline Type

HiS-S330TI | HiS-S335TI | HiS-S340TI | HiS-S345TI | HiS-S350TI

Mechanical Characteristics

※ Several models are under certification process.

Dimensions	998 mm (39.29")(W) × 1,960 mm (77.17")(L) × 40 mm (1.57")(H)
Weight	Approx. 23.0 kg (50.71 lbs)
Solar cells	72 cells in series (6 × 12 matrix) (Hyundai cell, Made in Korea)
Output cables	4 mm ² (12AWG) cables with polarized weatherproof connectors, IEC certified (UL listed and UL 4703 certified), Length 1.2 m (47.2")
Junction box	IP67, weatherproof, IEC certified (UL listed)
Bypass diodes	3 bypass diodes to prevent power decrease by partial shade
Construction	Front : Anti-reflection coated glass (Anti reflection coated), 3.2 mm (0.126") Encapsulant : EVA Back Sheet : Weatherproof film
Frame	Anodized aluminum alloy type 6063

High Quality

- UL listed (UL 1703), Type 1 for Class A Fire Rating
- Output power tolerance +3/-0 %
- ISO 9001:2000 and ISO 14001:2004 Certified
- Advanced Mechanical Test (5,400 Pa) Passed (IEC)
/ Mechanical Load Test (40 lbs/ft²) Passed (UL)
- IEC 62716 (Ammonia Corrosion Resistance Test) Passed
- IEC 61701 (Salt Mist Corrosion Test) Passed
- Potential-Induced Degradation (PID) Test Passed
(85°C / 85 % / 600 hr-PVEL)

Fast and Inexpensive Mounting

- Delivered ready for connection
- IEC (UL) certified and weatherproof connectors
- Integrated bypass diodes

Limited Warranty

- 10 years for product defect
- 10 years for 90 % of warranted min. power
- 25 years for 80 % of warranted min. power

※ Important Notice on Warranty

The warranties apply only to the PV modules with Hyundai Heavy Industries Co., Ltd.'s logo (shown below) and product serial number on it.



Electrical Characteristics

| Multi-crystalline Type |

		HIS-M□□□□□			
		310	315	320	325
Nominal output (Pmpp)	W	310	315	320	325
Voltage at Pmax (Vmpp)	V	36.0	36.2	36.4	36.6
Current at Pmax (Impp)	A	8.6	8.7	8.8	8.8
Open circuit voltage (Voc)	V	45.3	45.5	45.7	45.9
Short circuit current (Isc)	A	8.9	9.0	9.0	9.1
Output tolerance	%	+3/-0			
No. of cells & connections	pcs	72 in series			
Cell type	-	6" Multi-crystalline silicon (Hyundai cell, Made in Korea)			
Module efficiency	%	15.8	16.1	16.4	16.6
Temperature coefficient of Pmpp	%/K	-0.41			
Temperature coefficient of Voc	%/K	-0.32			
Temperature coefficient of Isc	%/K	0.039			

※ All data at STC (Standard Test Conditions). Above data may be changed without prior notice.

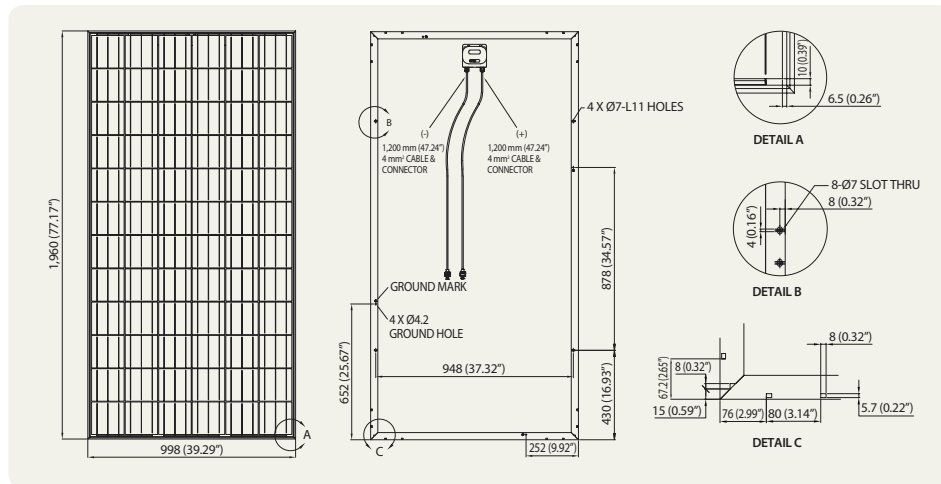
| Mono-crystalline Type |

		HIS-S□□□□□				
		330	335	340	345	350
Nominal output (Pmpp)	W	330	335	340	345	350
Voltage at Pmax (Vmpp)	V	38.0	38.2	38.4	38.6	38.7
Current at Pmax (Impp)	A	8.7	8.8	8.9	9.0	9.0
Open circuit voltage (Voc)	V	46.3	46.5	46.7	46.9	47.1
Short circuit current (Isc)	A	9.3	9.4	9.5	9.6	9.6
Output tolerance	%	+3/-0				
No. of cells & connections	pcs	72 in series				
Cell type	-	6" Mono-crystalline silicon (Hyundai cell, Made in Korea)				
Module efficiency	%	16.9	17.1	17.4	17.6	17.9
Temperature coefficient of Pmpp	%/K	-0.42				
Temperature coefficient of Voc	%/K	-0.30				
Temperature coefficient of Isc	%/K	0.047				

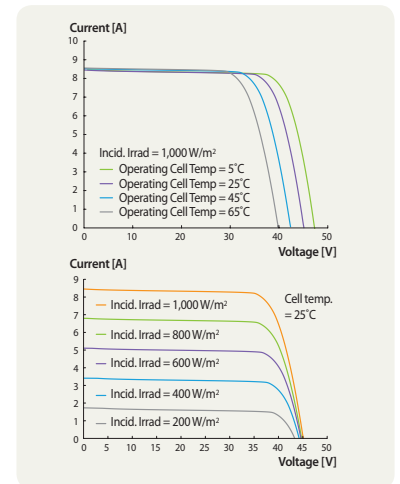
※ All data at STC (Standard Test Conditions). Above data may be changed without prior notice.

| Module Diagram |

(unit : mm, inch)



| I-V Curves |



| Installation Safety Guide |

- Only qualified personnel should install or perform maintenance.
- Be aware of dangerous high DC voltage.
- Do not damage or scratch the rear surface of the module.
- Do not handle or install modules when they are wet.

Nominal Operating Cell Temperature	46°C ± 2
Operating Temperature	-40 - 85°C
Maximum System Voltage	DC 1,000 V (IEC) DC 1,000 V (UL)
Maximum Reverse Current	15 A

[Printed Date : June 2016]

Attachment D
Stormwater Management Report

Attachment E
Operations and Maintenance Service Procedures

Solar PV - Operations and Maintenance Service Procedures



*Connect to Smarter
Energy Solutions.*

Integrity ■ Flexibility ■ Independence ■ Innovation

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Fax: (508) 661-2201

Program Overview

The purpose of this document is to outline Solar PV Operational and Maintenance Service Procedures for system monitoring, service response to alarms and performing annual Preventive Maintenance for the life of the Power Purchase Agreements (PPA) with our customers. The Operations and Maintenance Scope of Services outline included here within provides the guidelines for the monitoring and preventive maintenance program that will be followed throughout the life of the contract. The equipment operational date for each site shall be defined by the date of the signed the Certificate of Acceptance for each individual system.

Continuous monitoring and analytics as well as the annual preventive maintenance program are the tools that will be used in the effort to maintain complete functionality of the system. Included in these services are the following:

- Ongoing operational monitoring of the system, alarm analysis and appropriate service response as and when required.
- Perform an Annual Preventative Maintenance (PM) Inspection
- Record inspection results on Maintenance Checklist documents highlighting any deficiencies.
- Review PM inspection documents and develop a corrective action plan for any deficiencies noted during the PM inspection and perform any required repairs in a timely manner.
- Utilize monitoring and PM program to ensure that the system/equipment is functioning correctly and operating as intended.
- Perform regular reviews of current O&M practices to ensure efficient procedures are in place and program is in compliance with all safety, electrical code and contractual requirements.
- Regularly review current, past, and/or reoccurring problems with equipment/system especially those affecting system production. Perform root cause analysis and develop corrective action plan(s).

SOLAR O&M PREMIUM SCOPE OF SERVICES

SERVICE SCHEDULE	
Service Description	Frequency
Active Daily Monitoring and Alert Management	
○ Production analytics*	
○ Power Generation	Daily
○ Predicted Power	Daily
○ Irradiance vs. kW	Daily
○ PV string level analytics	Daily
○ Plant alert management*	
○ Device reporting alarms	Daily
○ Inverter fault code alarms	Daily
○ Irradiance vs. kW alarms	Daily
○ Monthly performance alarms	Monthly
○ Weather related alarms	Daily
○ Monthly plant reports*	
○ Relevant metrics with preceding month	Monthly
○ Relevant metrics with preceding year	Monthly
○ Plant alarm summary	Monthly
○ Corrective action summary	Monthly
* Analysis, alerts, and reports may vary and are dependent on monitoring system data available at each plant site.	
Annual Preventative Maintenance Reporting	
<u>REPORT DELIVERY TO SYSTEM OWNER</u>	Frequency
○ Overall system analysis	Annual
○ Annual Month by Month PV Production Report (a menu of reports available from monitoring system can be provided and included upon request)	Annual
○ Perform AC capacity check. With system at saturation measure AC system capacity using real time remote monitoring indicated value to ensure that system capacity is within 5% of system calculated capacity.	Annual
○ System visual inspection including readily accessible roof penetrations (if applicable)	Annual
○ Thermal image scans of all readily available electrical gear	Annual

o Thermal image scans of suspected problem array modules	As Required
o Itemized list of prescribed corrective maintenance items with supporting images	Annual
o Verification of monitoring system function including array sensors and firmware upgrades if necessary	Annual
Annual Preventative Maintenance Site Visit	
<u>INVERTER AREA</u>	Frequency
o Thermal image scans of all readily available PV related gear	Annual
o Voltage readings of AC and DC at inverter	Annual
o Cleaning interior of inverter and cleaning of inverter filters with compressed air	Annual
o All readily available terminations checked for torque	Annual
o Representative Photos	Annual
o Perform Manufacturers Annual Preventive Maintenance Requirements check list	Annual
<u>ELECTRICAL INTERCONNECTION</u>	
o Visual and thermal image scan of this area where possible without shutdown to building or creating an unsafe work environment	Annual
<u>CONDUIT RUNS</u>	
o Visual inspection of PV system conduit runs	Annual
o Spot check conduit coupler, connector, straps, and strut for integrity	Annual
<u>ARRAY LOCATION(S)</u>	
<i>Visual scan of entire array with focus to individual module level noting</i>	
o Broken module glass	Annual
Racking Damage	Annual
o Loose racking and module clamps	Annual
o Debris around or under array	Annual
o Roof damage from PV racking	Annual
o Spot checks of the following array items where readily accessible	
o Ground bushings	Annual
Racking Grounding	Annual
o Module grounding	Annual
o Combiner box grounding	Annual
o Module clamp torques	Annual
DC String Level Testing – When Required	
o I-V Curve Trace on any suspected problem strings or as may be indicated in AC capacity test	As Required
String level Predicted vs. Measured on suspected problem strings as indicated vis AC capacity testing	As Required
o Pmax (W)	As Required
o Vmp (V)	As Required
o Imp (A)	As Required

o Voc (V)	As Required
o Isc (A)	As Required
o Fuse continuity	As Required
o All string terminations checked for torque	As required
o All combined output terminations checked for torque	As Required
o Irradiance and cell temperatures	As Required
<u>MONITORING SYSTEM COMPONENTS</u>	
o Inspect data acquisition components ensure software upgrades if necessary and available are current	Annual
o Readily accessible array location sensors checked for function and calibration	Annual
o	
o	

AMERESCO Operations & Maintenance Personnel

	Name –Title	Office Phone	Cell Phone	E-mail
1	Will Bland – <i>Maintenance Services Manager</i>	(508) 598-3013	(603) 817-8007	wbland@ameresco.com
2	John Occhialini – <i>Asset Manager</i>		(781) 690-3800	jocchialini@ameresco.com
3	William Miller- <i>Electrical Project Manager</i>	(508) 661-2297	(508) 494-8654	bmiller@ameresco.com
5	Don LaDue – <i>Operations Technician</i>	(207) 438-9120	(603) 343-3640	dladue@ameresco.com
6	Brian Anderson- <i>Lead Operations Controls Specialist</i>		(508) 308-6329	banderson@ameresco.com
7	Michael Beaulieu – <i>Operations Controls Technician</i>		(860) 294-2309	mbeaulieu@ameresco.com
8	Steve Hennigar – <i>Project Manager</i>	(207) 438-9120	(603) 834-4369	shennigar@ameresco.com
9	Pete Christakis- <i>Vice President of Construction and Operations</i>	(508) 598-3028	(508)-308-5710	pchristakis@ameresco.com



Annual PV Systems Preventive Maintenance Checklist

Project #/Name _____

I. System Performance

a) AC Capacity Check

- ☐ WITH SYSTEM AT SATURATION MEASURE AC SYSTEM CAPACITY USING REAL TIME REMOTE MONITORING INDICATED VALUE TO ENSURE THAT SYSTEM CAPACITY IS WITHIN 5% OF SYSTEM CALCULATED CAPACITY. PERFORM TEST PRIOR TO SITE VISIT. AS MUCH AS POSSIBLE USE RESULTS TO DEFINE SITE PM APPROACH

Date of Test: _____

Notes: _____

II. Array

a) Panel Condition

- ☐ INSPECT FOR SHADED MODULES, NOTE LENGTH OF GROUND COVER
☐ CLEAR DEBRIS/FOLIAGE LYING ON MODULES
☐ INSPECT GLASS COVERS/REPORT ANY BROKEN OR CRACKED COVERS OR FRAMES

Note markings/chips/laminate inconsistencies, degree of damage, string & array number of damages, & position on module:

Notes: _____

b) Mounting

- ☐ INSPECT RACKS AND STRUCTURAL MOUNTS FOR BENDING, CORROSION
☐ SPOT CHECK MOUNTING FASTENERS TIGHTEN AS NECESSARY
☐ INSPECT ROOF FOR POSSIBLE CHAFING OR DAMAGE (IF APPLICABLE)
☐ INSPECT FOR DAMAGED OR SEVERELY RUSTED/CORRODED COMPONENTS

Note severe structural damage of components, extent of damage, & location within system:

Notes: _____

c) Electrical Components

- ☐ OPEN AND INSPECT ALL ELECTRICAL BOXES, PERFORM THERMAL SCAN AS NECESSARY
- ☐ INSPECT FOR DETERIORATED/CRACKED INTER-MODULE CONNECTIONS
- ☐ TIE-UP LOOSE WIRING, ENSURE PROTECTION FROM ANIMALS/INSECTS
- ☐ INSPECT WIRING FOR DAMAGED INSULATION, CORROSION, OR FRAYING
- ☐ INSPECT ELECTRICAL CONDUITS, COMBINER BOXES, AND JUNCTION BOXES FOR:
- ☐ BOX COVERS THAT DO NOT CLOSE TIGHTLY
- ☐ DEFORMED CONDUITS FOR LOOSE CONNECTION POINTS
- ☐ DEFORMED GASKETS AND SEALS

Notes: _____

III. Inverter

a) Air flow/heat removal equipment

- ☐ CLEAN HEAT SINKS OF DEBRIS/DUST WITH A DRY CLOTH OR BRUSH
- ☐ CLEAN EXTERNAL COOLING FANS OF DEBRIS/DUST
- ☐ CLEAN INTERNAL CIRCULATION FANS OF DEBRIS/DUST
- ☐ CLEAN INDUCTOR ENCLOSURE FANS OF DEBRIS/DUST
- ☐ ENSURE ALL FANS ARE OPERATING AND THAT AIR FLOWS IN THE PROPER DIRECTION

Note the severity of debris build-up, to determine the frequency of cleaning necessary:

Notes: _____

b) Operation

- ☐ CONFIRM OPERATION OF THE INVERTER; OBSERVE LED INDICATORS OR OTHER DISPLAYS
- ☐ CHECK FUNCTIONALITY OF THE STAND-BY MODE BY DISCONNECTING LOADS
- ☐ ENSURE CONSISTENCY OF AC LOADS

Note any additional loads added to the system:

Notes: _____



c) Enclosures, Electrical/Mechanical Components

- ☐ INSPECT THE SEAL OF THE ENCLOSURE ACCESS PANEL; REPLACE WITH EQUIVALENT CLOSED CELL FOAM GASKET IF NECESSARY
- ☐ REMOVE ACCESS PANELS ON THE INDUCTOR ENCLOSURE TO CLEAR DEBRIS/DUST
INSPECT COMPRESSION-TYPE CABLE TERMINATIONS AND BOX-TYPE CONNECTIONS WITHIN THE FOLLOWING ENCLOSURES FOR DAMAGE DUE TO HIGH TEMPERATURES:
 - ☐ AC AND DC INTERFACE ENCLOSURE
 - ☐ MAIN INVERTER ENCLOSURES
 - ☐ TRANSFORMER ENCLOSURE
- ☐ INSPECT FOR CORRODED/BURNT/FRAYED WIRING, TERMINATIONS, AND CONNECTIONS
- ☐ CONFIRM TIGHTNESS OF ELECTRICAL CONNECTIONS IN ACCORDANCE WITH TERMINATION TORQUE SPECS FOR AC AND DC CONNECTIONS.
- ☐ CONFIRM TIGHTNESS OF MECHANICAL CONNECTIONS, CHECK CONDUCTION SURFACES FOR CORROSION AND DUST
- ☐ PERFORM A THERMAL SCAN OF ELECTRICAL CONNECTIONS, NOTE INDICATIONS OF OVERHEATING, INSPECT SUSPECT CONNECTIONS, RE-TORQUE AS NECESSARY.

Notes: _____

***** SEE INVERTER MANUFACTURE O&M MANUALS FOR ANY
ADDITIONAL REQUIREMENTS THAT APPLY.**



IV. Grounding Maintenance

- ☐ INSPECT GROUNDING OF ALL EQUIPMENT WITH SPECIAL ATTENTION TO:
 - ☐ FRAMES/RACKS
 - ☐ CONDUITS
 - ☐ JUNCTION/COMBINER BOXES
- ☐ USE AN OHMMETER TO CONFIRM SYSTEM COMPONENTS ARE PROPERLY ATTACHED TO THE GROUNDING LINE
- ☐ INSPECT GROUNDING LUGS; CHECK FOR CORROSION REPAIR AS NEEDED
- ☐ INSPECT EXPOSED COPPER CONDUCTORS FOR SIGNS OF SERIOUS CORROSION AND OXIDIZATION
- ☐ CONFIRM THAT THE GROUNDING CONDUCTOR IS COLORED WHITE, THE EQUIPMENT GROUNDING WIRE SHOULD BE GREEN OR BARE

Notes: _____

V. Monitoring System

- ☐ INSPECT DATA ACQUISITION COMPONENTS ARE OPERATING CORRECTLY, CHECK CALIBRATION AS NECESSARY
- ☐ CONFIRM THAT ALL SOFTWARE/FIRMWARE UPGRADES ARE CURRENT

Notes: _____

VI. String Level Testing

- ☐ INSPECT AND ANY SUSPECTED PROBLEM STRINGS OR AS MAY BE IDENTIFIED IN STRING CAPACITY TESTING:
 - ☐ CHECK TORQUE ON STRING TERMINATIONS
 - ☐ CHECK FUSE CONTINUITY
 - ☐ IV-CURVE TEST AS NECESSARY

Notes: _____

Date: _____

Technician: _____

Attachment F
Proof of Liability Insurance



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)
12/7/2016

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 have ADDITIONAL INSURED provisions or 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 Arthur J Gallagher Risk Management Services 470 Atlantic Avenue Boston MA 02210		CONTACT NAME: PHONE (A/C, No, Ext): 617-261-6700 FAX (A/C, No): 617-646-0400 E-MAIL ADDRESS:	
		INSURER(S) AFFORDING COVERAGE	NAIC #
		INSURER A: Zurich American Insurance Company o	27855
		INSURER B: National Union Fire Insurance Compa	19445
		INSURER C: Illinois Union Insurance Company	27960
		INSURER D: Navigators Insurance Company	42307
		INSURER E:	
		INSURER F:	

INSURED AMERINC-17

Ameresco, Inc.
111 Speen Street
Suite 410
Framingham MA 01701

COVERAGES

CERTIFICATE NUMBER: 1411878271

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 INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input checked="" type="checkbox"/> LOC OTHER:			GLO585238804	11/30/2016	11/30/2017	EACH OCCURRENCE \$2,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$500,000 MED EXP (Any one person) \$10,000 PERSONAL & ADV INJURY \$2,000,000 GENERAL AGGREGATE \$4,000,000 PRODUCTS - COMP/OP AGG \$4,000,000 \$
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input checked="" type="checkbox"/> HIRED AUTOS ONLY <input checked="" type="checkbox"/> NON-OWNED AUTOS ONLY			BAP585238704	11/30/2016	11/30/2017	COMBINED SINGLE LIMIT (Ea accident) \$1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
B	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED RETENTION \$			013791009	11/30/2016	11/30/2017	EACH OCCURRENCE \$25,000,000 AGGREGATE \$25,000,000 \$
A	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N <input checked="" type="checkbox"/> N	N/A	WC595394503	11/30/2016	11/30/2017	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$1,000,000 E.L. DISEASE - EA EMPLOYEE \$1,000,000 E.L. DISEASE - POLICY LIMIT \$1,000,000
A C D	Installation Floater Pollution Excess Liability			PWG455350513 PIG28190530001 NY16EXC7699821V	11/30/2016 11/30/2016 11/30/2016	11/30/2017 11/30/2019 11/30/2017	Per Claim:\$10,000,000 Occ: \$25,000,000 \$15,000,000 Agg: \$20,000,000 Agg: \$25,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Additional Coverage:
Professional Liability Policy #EOC669274306 - effective 11/30/16-17 - Limit: \$10,000,000
Crime Policy #028429839 - effective 11/30/16-17 - Limit: \$5,000,000
Cyber Policy #EONG23686466003 - effective 11/30/16-17 - Limit: \$5,000,000
Evidence of Insurance

CERTIFICATE HOLDER

CANCELLATION

Evidence of Insurance 111 Speen Street, Suite 410 Framingham MA 01701 USA	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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Attachment G
Certified Abutters Lists

Town of Auburn, Massachusetts

Julie A. Jacobson
Town Manager

Cynthia Cosgrove
Chief Assessor



May 9, 2017

Planning Board List of Abutters

The following attachment is a list of Abutters to the property identified. An abutter is defined as any person, whose property line touches the petitioner's property, including property directly opposite on public or Private Street or way, and owners of land within 300 feet of the property line as they appear on the most recent tax maps and list in the Town Of Auburn.

These are the Auburn, Ma abutters to the parcel located at the address below as determined by the assessor's office from information submitted by the applicant.

Map: 34 Parcel: 3 LEICESTER, MA

Location: 0 Stafford Street, Leicester, MA

Assessed to:

Signature:  Date: 5/9/17

104 Central Street
Auburn, MA 01501
Telephone: (508) 832-7708
Fax: (508) 832-5328
Email: ccosgrove@town.auburn.ma.us
Web site: www.auburnguide.com

0 Stafford Street Leicester, MA



Planning Department



2/ 2/ / /
OSOWSKA KRYSTYNA
172 FERRY AVE
WORCESTER, MA 01610

2/ 3/ / /
LAFLAMME RONALD W
LAFLAMME KATHLEEN
P O BOX 276
ROCHDALE, MA 01542-0276

2/ 5/ / /
AUBURN TOWN OF
104 CENTRAL ST
AUBURN, MA 01501

2/ 1/ / /
HUYGHUE WINTHROP III
6 SUNRISE AVE
AUBURN, MA 01501

2/ 4/ / /
BOROWY QUINN
5 SUNRISE AVE
AUBURN, MA 01501

Abutters Report

Abutters

<u>ACCOUNT NUMBER</u>	<u>OWNER NAME</u>	<u>LOCATION</u>
0000087	HUYGHUE WINTHROP III	6 SUNRISE AVE
0000088	OSOWSKA KRYSTYNA	4 SUNRISE AVE
0000089	LAFLAMME RONALD W	3 SUNRISE AVE
0000090	BOROWY QUINN	5 SUNRISE AVE
0000091	AUBURN TOWN OF	SUMMER ST

Town of Leicester

9:54:30AM

Abutters List

ParcelID	Location	Owner	Co-Owner	Mailing Address	City	State	Zip
33 A6 0	221 AUBURN ST	PETKIEWICZ JOSEPH P	MILLETTE MARIE	221 AUBURN ST	CERRY VALLEY MA	MA	01611
33 A6 0	100 TOBIN RD	SCOLA KERRY		25 BARNES AVENUE	WORCESTER MA	MA	01605
33B C7 0	30 TOBIN RD	BERGIN FRANCIS A		30 TOBIN RD	CERRY VALLEY MA	MA	01611
34 A1.1 0	STAFFORD ST	NEW ENGLAND POWER CO	ATTN: PROPERTY TAX DEP	40 SYLVAN ROAD	WALTHAM MA	MA	02451
34 A1.2 0	STAFFORD ST	HOEKSTRA MARY E		464 STAFFORD STREET	CERRY VALLEY MA	MA	01611
34 A1.3 0	STAFFORD ST	MARTIROS MICHAEL J		12 SHELTER RIDGE RD	LEICESTER MA	MA	01524
34 A2 0	STAFFORD ST	MARENGO JOHN		462 STAFFORD ST	CERRY VALLEY MA	MA	01611
34 A4 0	STAFFORD ST	MCCUE NANCY M	MARENGO JEAN A	402 STAFFORD ST	CERRY VALLEY MA	MA	01611
34 A5 0	STAFFORD ST	WILSON EARL G	WILSON JACQUELINE J	24 DOLGE COURT	CHARLTON MA	MA	01507
34 A6 0	STAFFORD ST	FLAGG ARTHUR C	FLAGG BARBARA A	392 STAFFORD ST	CERRY VALLEY MA	MA	01611
34 A7 0	STAFFORD ST	TUISKULA WAYNE A	TUISKULA AMY B	386 STAFFORD STREET	CERRY VALLEY MA	MA	01611
34 B10 0	STAFFORD ST	MELVIN ROBIN C		451 STAFFORD ST	CERRY VALLEY MA	MA	01611
34 B11 0	STAFFORD ST	REPEKTA DEBORAH S	REPEKTA MICHAEL	447 STAFFORD ST	CERRY VALLEY MA	MA	01611
34 B12 0	STAFFORD ST	DUSSAULT LAWRENCE M	MANHA BARRY J	441 STAFFORD STREET	CERRY VALLEY MA	MA	01611
34 B13 0	STAFFORD ST	AUDETE IRENE A		439 STAFFORD ST	CERRY VALLEY MA	MA	01611
34 B14 0	STAFFORD ST	FOLEY BRUCE M	FOLEY ELIZABETH M	425 STAFFORD ST	CERRY VALLEY MA	MA	01611
34 B9 0	STAFFORD ST	SOUTHWEST HOLDINGS LTD	C/O ROBERT W RICHARD	SUITE 255	NAPLES FL	FL	34119-3956
34B A1 0	STAFFORD ST	GORSKI RICHARD A JR	GORSKI LESLEY E	417 STAFFORD STREET	CERRY VALLEY MA	MA	01611
34B A2 0	STAFFORD ST	OSOWSKA KRISTYNA		172 PERRY AVE	WORCESTER MA	MA	01610
34B B1 0	STAFFORD ST	LAFLAMME RONALD W	LAFLAMME KATHLEEN	PO BOX 276	ROCHDALE MA	MA	01542-0276
34B B3 0	STAFFORD ST	AGARWAL SATYENDRA K	AGARWAL BRAHM K	11928 B DARNESTOWN ROA	N POTOMAC MD	MD	20878
34B B4 0	STAFFORD ST	TOWN OF LEICESTER	TOWN HALL	3 WASHBURN SQUARE	LEICESTER MA	MA	01524

End of Report

PLEASE NOTE: ABUTTERS IN THE TOWN OF AUBURN

Above is a certified list of abutters and abutters to abutters within 300 feet of subject.

Subject property: Stafford Street, Assessors Map 34-A3-0, Deed Ref. N/A

Subject owner(s): New England Power Co.

John Prescott, Principal Assessor

Prepared by: Kathleen Asquith, Assistant