

APPENDIX A - Supporting Documentation

Included below is a list of PV inverters and Backup Generators available for consideration to be connected to the EMS. Additional information may be provided by US Ignite or EWOC staff as available, and additional information may need to be collected by the successful bidder to this solicitation during the execution of the scope of work. Manuals are available for most of the inverters associated with the PV systems described below, and locations, manufacturers, model numbers and serial numbers are available for most backup generators included in the scope of this project. If there are challenges or if it is not feasible to integrate any of the below resources, the Project team can look for alternative options. A map of the 5G node locations, as well as a network diagram including the IPEM will also be provided to the successful bidder following execution of a non-disclosure agreement.

Table 4. List of PV Inverters to be Considered for Integration with EMS				
Manufacturer	Model No.	Count	Protocol	Data Sheet Available
SMA	SB 7.0-1SP-US-40	4		
PV Powered	PVP 100kW	3	Modbus	http://www.solarvu.net/green/doc/PVP75-100KW.pdf
SMA	STP 15000TL-US-10	2		
SMA	SB 7.0-1SP-US-41	2		
SMA	SB3000US	1		
SMA	STP 30000TL-US-10	1		
SMA	STP 24000TL-US-10	1		
SMA	STP 20000TL-US-10	1	Modbus	https://files.sma.de/downloads/STPTL-US12-30-DUS173127W.PDF
PV Powered	PVP 30kW	1	Modbus	
SATCON	PVS-250	1	Modbus	http://www.satcon.com/uploads/products/en/250kW-PG-US-UL.pdf



SATCON	PVS-135	1	Modbus	http://www.satcon.com/temp_foreign/downloads/solutions/135kW-PG-US.pdf
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Table 5. Backup Generators to be Considered for Integration with EMS				
Manufacturer	Model Number	Count	Protocol	Data Sheet available
KOHLER	4045TF270E	4		https://resources.kohler.com/power/kohler/industrial/pdf/tp6290.pdf
KOHLER	50REOZJD	2		
ONAN	200RD	2		
CAT	3306	1		
CAT	D100-6	1		
CAT	DP0P3	1		
CAT	S9L01309	1		
CAT	YCEXL0239AAA	1		
CUMMINS	150ROZ281	1		
GENERAC	18 DTA/SD500	1		
GENERAC	F3AE9685A-E	1		
GENERAC	SD350	1	Modbus	https://legacy.genconnect.generac.com/Media/vwDoc.axd?d=c007e205-2881-4af4-93a0-1036994f27e2
KOHLER	100REOZJF	1		
KOHLER	10REOZDB	1		
KOHLER	20REOZJC	1		
KOHLER	20ROZJ21	1		
KOHLER	20ROZJB	1		
KOHLER	230REOZV	1		



KOHLER	30REOZJB	1		
KOHLER	350REOZJ	1		
KOHLER	40REOZJC	1		
KOHLER	50REOZJB	1		
KOHLER	50REOZJC	1		
KOHLER	50REOZJD	1		
KOHLER	50ROZJ	1		
KOHLER	600REOZVB	1		
KOHLER	60R0Z281	1		
KOHLER	80REOZJF	1		
KOHLER	RG6068L008985	1		
KOHLER	RG6090L0022231	1		
KOHLER	4045TG150	1		

Existing Energy Management System

Raytheon has developed a Microgrid Controller Software Architecture called IPEM (Intelligent Power and Energy Management), for use in various microgrid programs. With a history of development going back over 10 years, IPEM has been deployed at multiple different facilities, and is the central focus of Raytheon's many Microgrid Integration efforts, for which Raytheon is the Prime. IPEM's design is built upon the following pillars: real-time subsystem control and status, long-term data collection, modular and flexible functionality, fully-integrated data visualization HMI, and multi-level security protocols. IPEM has algorithms that enable high-level microgrid operations capabilities such as Black start and Seamless transition scenarios. These modes of operation range from ESS State of Charge Management, to Peak-Shaving, Load-Shedding, Frequency Regulation, and Islanding. IPEM has already successfully interfaced with multiple devices and protocols within the microgrid industry: inverters, batteries, meters, JACE devices, Modbus, Moxa, MPower, ChargePoint, and OPC. IPEM is a robust solution for controlling and maintaining microgrid integrity in a variety of scenarios and configurations.

IPEM (including the HMI) is written in C++, with Qt as the cross-platform framework. Windows has been the focus platform for recent development but it will run on Linux with some additional effort to ensure proper behavior.

Table 6. Energy Management System Equipment Sheet			
Item	Hardware with configuration	P/N	Data Sheet
1	HPE ProLiant DL20 Gen10 E-2224 1P 16GB-U S100i 2LFF 290W PS Server	DL20	https://www.hpe.com/psnow/doc/PSN1012180693IEEN.pdf
2	HPE ProLiant DL20 Gen10 E-2224 1P 16GB-U S100i 2LFF 290W PS Server	DL20	https://www.hpe.com/psnow/doc/PSN1012180693IEN.pdf
3	Cisco FirePOWER Firewall	ASA5506-K9	https://www.cisco.com/c/en/us/products/collateral/security/asa-firepower-services/datasheet-c78-742475.html
4	Cisco 2960-CX Switch 8 GE	WS-C2960CX-8TC-L	https://www.cisco.com/c/en/us/products/collateral/switches/catalyst-3560-cx-series-switches/datasheet-c78-733229.html