Portland General Electric
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May 02, 2019

Public Utility Commission of Oregon
Attn: Filing Center
201 High Street, S.E.
P.O. Box 1088
Salem, OR 97308-1088

RE: UM 1856 PGE's Energy Storage Request for Proposal Draft for a Microgrid Pilot Energy Storage System – Inviting Stakeholder and Commission Review

Pursuant to Oregon Public Utility Commission (OPUC or Commission) Order Nos. 16-504 and 18-290, enclosed is Portland General Electric Company's (PGE's) request for proposal (RFP) draft for one of the energy storage systems, located in Beaverton as part of the Microgrid pilot. By copy of this to the OPUC Docket No. UM 1856 service list, we invite stakeholders to review and offer comments to the RFP design by May 16, 2019.

History of Energy Storage Docket

The Commission opened Docket No. UM 1751, in September 2015, to implement recently passed legislation, House Bill 2193. House Bill 2193 requires PGE and PacifiCorp to submit proposals by January 1, 2018, for qualifying energy storage systems with capacity to store at least five megawatt hours. In Commission Order 16-504, the Commission adopted guidelines and requirements for energy storage project proposals, in late 2016, and a framework for PAC's and PGE's Energy Storage Potential Evaluations.

PGE filed its Energy Storage Proposal and Final Potential Evaluation on November 1, 2017, which were investigated in UM 1856. Pursuant to Commission Order No. 18-290, filed in UM 1856 on October 25, 2018, PGE filed its plan to advance its energy storage modeling cability. On April 9, 2019, Staff approved this filing via electronic mail, enabling the Microgrid pilot to move forward.

PGE now seeks stakeholder input to the RFP design for an energy storage system used in the Microgrid pilot. The Commission's competitive bidding requirements for House Bill 2193 projects are as follows:

1. An electric company may award a contract for a project without competition if it determines and presents justification that only a single vendor or contractor is capable of meeting the requirements of the project.
2. Where the requirements for sole source procurement are unmet, electric companies must use a competitive process to award contracts.

a. The electric companies will bear the burden of demonstrating that they followed a fair, competitive solicitation process to identify all vendors with the requisite expertise, experience, and capability to install viable projects.
b. *The electric companies must give the Commission and stakeholders the opportunity to review the electric companies' RFP design and offer nonbinding input* (emphasis added).
c. The electric companies must summarize and report to the Commission their solicitation process and scoring approach. The report should be included with the formal project proposal submitted to the Commission, or, if bidding occurs after Commission authorization, at a special public meeting to follow.

Enclosed is the draft RFP for one of the energy storage systems that will be used in the Microgrid pilot.

PGE is seeking stakeholder feedback within the next 30 days. Feedback should be directed to: puc.filingcenter@state.or.us

Should you have any questions or comments regarding this filing, please contact Kalia Savage at (503) 464-7432.

Please direct all formal correspondence and requests to the following email address pge.opuc.filings@pgn.com

Sincerely,

Karla Wenzel
Manager, Pricing and Tariffs

Enclosures

Draft Request for Proposal for a Microgrid Pilot Energy Storage System (Located in Beaverton)

May 2, 2019

PORTLAND GENERAL ELECTRIC COMPANY

Energy Storage System Customer Microgrid Project

DRAFT Microgrid Energy Storage System Specification

Contents

1 Scope

Portland General Electric Company (PGE and Owner) plans to procure and install an energy storage system behind a PGE customer's meter (Customer). The Customer is a municipality building, which is a new three-story office building in an urban area. The energy storage system will be owned by PGE although located on the Customer's property and connected to the Customer's 480VAC (nominal) main bus. This energy storage system will provide services to the Area Electric Power System (EPS) while grid connected and will provide reliability and microgrid functions when intentionally islanded. The Energy storage system must be capable of black start to recover the local EPS after an unscheduled intentional islanding event and must be capable of regulating voltage and frequency on the local EPS when intentionally islanded. The energy storage system must also be capable of switching to current regulation mode while islanded. In grid connected mode the energy storage system must be current regulating.

The Customer's microgrid also includes 320 kW of AC coupled photovoltaic (PV) solar and a 1,000kW synchronous diesel generator. All three of these energy resources must operate in either grid-connected mode or islanded mode, individually and in coordination according to site conditions. The PV must operate as part of the microgrid, but it is not a grid-forming resource. Only the energy storage system and the diesel generator can regulate voltage and frequency. The Customer's building load is approximately 200 kW peak.

The scope of supply for Bidders on this Request for Proposals (RFPs) includes:

1. Four-hour modular battery system with Battery Management System (BMS).
2. 250 kW (nominal) Power Conversion System (PCS).
3. Microgrid Energy Management System (MEMS) capable of coordinating the operation of the grid, the energy storage system, the PV and the diesel generator in either grid-tied operation or islanded operation.
4. Fire detection and suppression related to the energy storage system equipment (see Section V. for details).
5. Disconnecting and lock-out means for the energy storage system equipment.
6. Environmental containment in accordance with Environmental Protection Agency (EPA) and Oregon Department of Environmental Quality (ODEQ) requirements.
7. Heating, cooling or other environmental controls required by the energy storage system.
8. All shipping, freight and delivery to Customer's site in Beaverton, Oregon.
9. Installation consultation and supervision as necessary.
10. Bidder will assemble any components on-site that are shipped separately.
11. Installation quality inspection and certification.

12. System commissioning and testing.
13. Demonstration of all functions of the energy storage system and MEMS.
14. Ongoing system maintenance including both preventative corrective maintenances.
15. Ten-year full-coverage warranty of system operation and performance specifications.

2 Basic Energy Storage System Electrical Requirements

Specification Parameter	**Definition**	**Units**	**Value**
Rated Continuous Discharge Power	The rate at which the energy storage system can continuously deliver energy for the energy storage component's entire *specified State of Charge (SOC)* range.	kW	250
Rated Apparent Power	The real or reactive power (leading and lagging) that the energy storage system can provide into the AC grid continuously without exceeding the maximum operating temperature of the energy storage system.	kVA	Bidder shall state the rated kVA that allows for 250kW and 250kVAR
Rated Continuous Charge Power	The rate at which the energy storage system can capture energy for the energy storage component's entire SOC range.	kW	250
Rated Continuous AC Current	The AC current that the energy storage system can provide into the grid continuously and can be charged by the grid continuously without exceeding the maximum operating temperature of the energy storage system.	A	Cannot exceed 320A
Output Voltage Operating Range	The range of AC grid voltage under which the energy storage system will operate in accordance with the energy storage system specification.	V	422V to 528V
Enter-Service Voltage	The range of voltage in which the inverter may enter service	V	422V to 509V (adjustable)
Enter-Service Frequency	The range of frequency in which the inverter may enter service	Hz	59.0 to 61.0Hz (adjustable)
Total Response Time	The response time measured in accordance with figure below starting when the signal (command) is received at the energy storage system boundary and continuing until the energy storage system discharge power output (electrical or thermal) reaches 100 ± 2% of its rated power.	seconds	< 1 second
System Round Trip Efficiency	Total round trip efficiency from beginning of life to end of life, defined as the ratio of the delivered output	%	No less than 89%

Specification Parameter	Definition	Units	Value
	energy of the energy storage system to the absorbed input energy required to restore it to the initial state of charge under specified conditions.		
Ramp Rate	The maximum rate that the energy storage system can change its input and output power.	kW/sec	100
Enclosure Type	A description of the system enclosure including that supplied with the system, provided as a part of the site installation and/or comprised of building assemblies associated with the installation. Examples include building, containerized–both stationary and transportable.	n/a	All enclosures related to the system shall be outdoor rated (National Electrical Manufacturers Association [NEMA] 3R minimum). This includes the BMS, PCS and MEMS enclosures.
Equipment Footprint	Length x Width (LxW) of equipment only (Includes energy storage system and all ancillary units as required) in intended layout.	$Ft.^2$	Total equipment footprint shall not exceed 300 sq. ft. (10' X 30')
Height	Equipment height plus safe clearance distances above the equipment.	Feet	10
Weight	Weight per individual sub-system (e.g. PCS, energy storage system, accessories), including maximum shipping weight of largest item that will be transported to the project site.	Pounds	20,000
Grid Communication Protocols/Standards	List of codes/standards with which the energy storage system is compliant.	MEMS must be capable of communicating via Sunspec Modbus to PGE's plant Programmable Logic Controller (PLC). Within the plant, the system may communicate via Modbus protocol. Entire system must be compliant with Underwriters Laboratories (UL) UL1741SA.	

Specification Parameter	Definition	Units	Value
General Description of Energy Storage	Energy storage technology type (e.g. battery type, flywheel, etc.).	Energy storage shall be via Lithium-ion battery technology (Lithium-Nickel Manganese Cobalt Oxide, LiFePO4 or Nickel-Cobalt-Aluminum)	
Rated Discharge Energy	Specify the accessible energy that can be provided by the energy storage system at its AC terminals when discharged at its beginning of life and end of life.	kWh	1,000
Minimum Charge Time	The minimum amount of time required for the energy storage system to be charged from minimum SOC to its rated maximum SOC.	Hr	4
Typical Recharge Time	This should include any time for rest a period needed between a full or partial charge or discharge cycle.	Hr	4
Expected Availability of System	Percentage of time that the system is in full operation performing application specific functions (including standby) considering both planned and unplanned down-time.	Hr/yr (%)	8670 (99%) of at least partial availability (>50%)
Synchronization voltage step change	The allowable amount of step change in voltage during synchronization	V (pu)	5%

Energy storage systems shall be Category B.1 as defined by Institute of Electrical and Electronics Engineers (IEEE) 1547-2018.

Energy storage systems shall comply with UL1741SA with the interoperability features of that standard fully enabled.

The energy storage system PCS shall be capable of operation in all four quadrants of the power circle. The PCS shall produce at least 250kVA at any location of the power circle and real power output of 250kW anywhere between +0.9pf and -0.9pf. For all angles θ, where pf = -0.9 to +0.9, S=250kW/0.9=278kVA. For all other angles, 0 to 359^{o}, P = 250kVA*Cosθ, where P = energy storage system real power output and θ is the phase angle between current and voltage; and Q=250kVA*Sinθ.

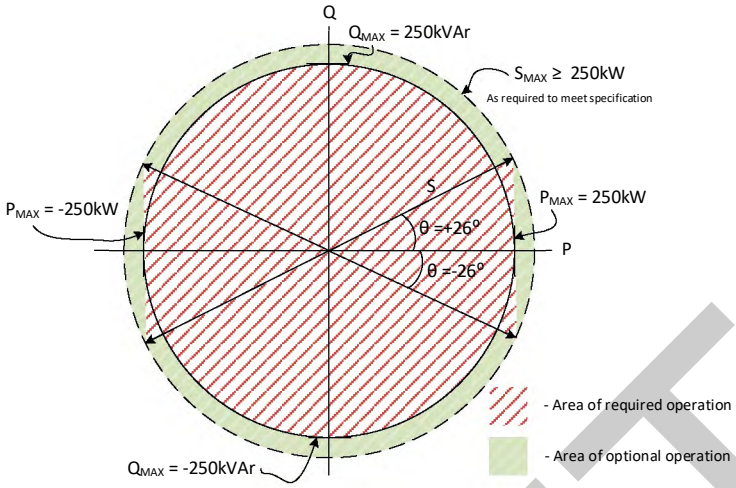


Illustration of Power Quadrants

3 Microgrid Energy Management System (MEMS) Capability

The MEMS may be a standalone controller or may be integrated into the Bidder's Plant Controller. It must be interoperable with the utility grid, the Customer's PV system, the energy storage system, the diesel generator's control system and the Customer's building energy management system.

The MEMS will optimize the operation of all the energy resources according to dispatch priorities provided by the Owner's plant PLC. The MEMS shall communicate with the Owner's plant PLC via Sunspec Modbus protocol utilizing Category 6 ethernet cable and RJ45 connections. The MEMS will reside on a network with various other components such as the PGE plant PLC, diesel generator controller, various meters such as Ion 8,650 revenue meters, PV inverter, Human Machine Interface (HMI), protective relays and the Customer's building energy management system. Owner will provide a switch for the connection of these devices.

The Bidder shall provide a MEMS containing a full color HMI with minimum dimensions of 16"X16" and a touch screen. The HMI may be built onto the controller enclosure or may be a separate console. The HMI shall display the operating status of all energy resources including on/off status, breaker position, power flow (real and reactive), voltage, current related to all nodes. The HMI shall display basic power quality information about the local area EPS (frequency and voltage).

The HMI shall display in graphical format the historical and real-time values for power flows from the energy resources and status of the grid connection (connected or islanded).

The HMI shall clearly display the optimization program being executed and the service being performed in real time and historical.

The HMI shall have no greater than a one second update time.

The HMI shall provide a login screen according to security level:

1. Viewing – no login required
2. Local Operator – Ability to move between basic states such as entering Storm Avoidance mode or Maximum Energy Reservation, placing the system in standby.
3. Owner operations – All Local Operator functions plus ability to change basic operating constants and parameters
4. Developer – highest level security allowing access to modify all parameters and program functions`

All security levels shall have an inactivity time-out.

In addition to the local HMI, the Customer is providing a large screen high-resolution monitor in a public space. Bidder will provide a connection to this monitor to display live screens illustrating and interpreting the MEMS for laypersons visiting the building. These screens are within the Bidder's scope, and the screens must be reviewed and approved by the Customer and Owner.

MEMS shall employ a watchdog system to the Owner's plant PLC, the diesel generator controller, the energy storage system, the Customer's PV system and the Customer's building energy management system to alarm upon loss of communications.

MEMS must be capable of remote monitoring via a web app. Communication to the web may be wireless or ethernet through the Customer's building network but will not communicate through the plant Modbus network.

The MEMS hardware platform may be either a PLC or an embedded fanless and diskless computer.

The Owner must be able to communicate directly with a Modbus connection to the MEMS. Access through a web application or API is not sufficient.

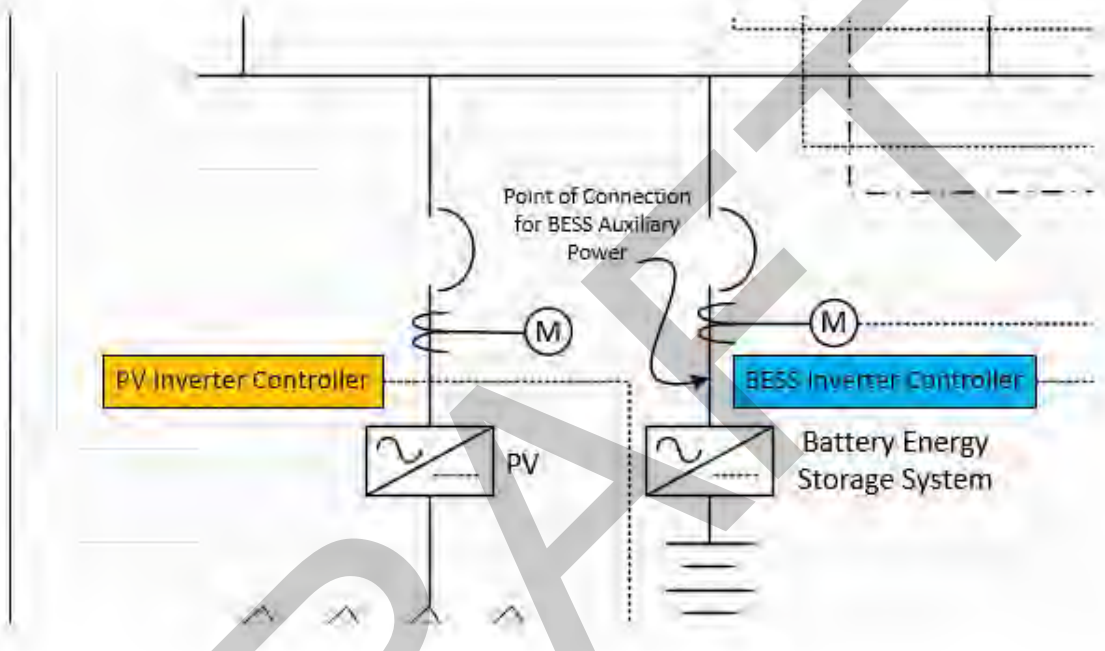
4 Auxiliary Power

The energy storage system auxiliary power system shall be 120/240Vor 480V. Auxiliary power must be provided within the Bidder's scope of supply. It must include provisions for the black start service which will require Uninterruptable Power Supply (UPS) standby power. Bidder may

provide a standalone UPS or utilize energy stored in the energy storage system batteries for this function. Neither the Customer nor the Owner will provide UPS power for black start.

Energy storage systems auxiliary power must consume less than 22,000kWh of energy annually.

Auxiliary power must be connected at a point between the energy storage system equipment and the Ion8650 revenue meter so that auxiliary power is unmetered and remains in the efficiency loss for billing.



Energy Storage System Aux. Power is Connected Between the Energy Storage System and the Revenue Meter

5 Fire Detection and Suppression

Bidder must provide an integral fire detection and suppression system. The detection must be capable of integration into the Customer's fire alarm panel. The suppression system must be capable of extinguishing the worst-case thermal runaway scenario, containing the fire within the battery enclosure. Fire detection and suppression system must automatically shut down and electrically disconnect the energy storage system from Customer's bus.

The fire detection and suppression system must meet the requirements of UBC and the local Authority Having Jurisdiction (AHJ). It also must meet the minimum best practices for the energy storage industry.

Bidder must provide an off-gas sensing system integrated with the energy storage system plant controller that will detect off-gassing at the individual cell level.

6 Warranty and Performance Guarantee

A. Bidder shall provide support to Owner during a twelve (12) month performance verification period, to begin after the energy storage system has been commissioned and has begun commercial operation. This support includes tuning of the optimization algorithms and consulting by phone, e-mail and web meeting regarding operations and maintenance of the energy storage system.
B. The energy storage system shall have an Equipment Warranty for a minimum of (3) years, and a Performance Guarantee for (10) years.
C. The Equipment Warranty shall include periodic evaluation of the energy storage system to identify any premature degradation and/or potential underperformance. Owner will be notified of evaluation results as soon as possible.
D. Bidder shall provide a (10) year minimum Performance Guarantee which will include replacement of battery modules as necessary to maintain guaranteed energy storage capacity and efficiency. At any time during the (10) year term that, as reasonably required to maintain guaranteed capacity or otherwise as defined by the technical specifications, the repair of the energy storage system requires a replacement component, Bidder will bear all the cost of replacement and any related equipment, materials, and/or parts.
E. Energy storage system Bidder shall perform all services in accordance with professional standards and skill, expertise, safety and diligence of professionals regularly involved in the maintenance of energy storage system projects and otherwise in full compliance with all requirements of this Agreement, and all Services shall be warranted against any defect or error whatsoever, including in design and workmanship.

7 Seismic Rating

The energy storage system will be installed in an area exposed to seismic hazards potentially exceeding 9.0. The energy storage system is intended for use in a microgrid after such an event. Therefore, the entire system including ancillary components must be designed to survive and function after an event of the following seismic criteria.

SEISMIC CRITERIA		
RISK CATEGORY	IV	
SEISMIC DESIGN CATEGORY	D	
SITE CLASS	D	
IMPORTANCE FACTOR	IE = 1.5	
MCE SPECTRAL ACCELERATION	Ss = 0.98	S1 = 0.43
SITE COEFFICIENT	Fa = 1.10	Fv = 1.56
DESIGN SPECTRAL ACCELERATION	SDS = 0.728	SD1 = 0.45
ANALYSIS PROCEDURE	EQUIVALENT LATERAL FORCE PER ASCE 7-10, SECTION 12.8	

8 Standards

The energy storage system must be designed, built and installed according to the following standards:

- IEEE 1547-2003
- UL 1741SA with interoperability features unlocked (capable of operation in accordance with California Rule 21)
- American National Standards Institute (ANSI)
- American Society of Mechanical Engineers (ASME)
- Institute of Electrical and Electronics Engineers (IEEE)
- Insulated Cable Engineers Association (ICEA)
- National Fire Protection Association (NFPA)
- National Electric Code (NEC)
- National Electrical Manufacturers Association (NEMA)
- Occupational Safety and Health Administration (OSHA)
- Underwriters Laboratories (UL)
- Uniform Building Code (UBC) or International Building Code as required by the local AHJ
- Cells, modules and racks must have undergone testing according to UL9540A and that report must be made available to Owner.

9 Sound Level

The maximum sound level of the energy storage system and any associated equipment is 65 dBA measured at 50 feet in any direction generated for the full range of the energy storage system's operation.

10 Modes of Operation

The energy storage system and MEMS must provide the following operations:

10.1 Grid connected:

10.1.1 General

Connecting and Disconnecting – energy storage system must be capable of automatically connecting and disconnecting from the grid based on a remote signal.

Standby – must be capable of remaining synchronized with and electrically connected to the grid neither charging nor discharging capable of responding to a remote command within one second. In standby mode (neither charging nor discharging), the energy storage system, not including auxiliary power, must maintain a power output or input below 5kVA.

Except for reserving 100kWh for customer reliability, the microgrid will give precedence to all utility services over customer services while grid connected. If customer services can be provided without interfering with utility services, then they will be performed as a second priority. Performing utility services shall have no detrimental effects on the Customer's bill beyond what billing would occur if no energy storage system were connected.

10.1.2 Customer Services

PV self-generation – energy storage system will maximize the local EPS utilization of Customer's PV generation.

Minimum energy reservation – in grid connected mode, the energy storage system will maintain 100kWh for the Customer in the event of an unscheduled intentional island (utility outage).

10.1.3 Utility Services

The energy storage system will provide each of the following utility services: Frequency Regulation, Contingency Reserve, Voltage and Var Support, Demand Response, and Mitigation of Cold Load Pick-up. Detailed descriptions of each utility service are included in Section 11.

11 Description of Utility Services

Utility services are only provided when the energy storage system is operating in parallel with the utility. Management of these services and setpoints are provided by Owner's Plant PLC. The Owner's Plant PLC will communicate with the MEMS via Modbus to send setpoints for real power, reactive power, ramp rates and state of charge (SOC). The descriptions of utility services below are intended for use by the bidder to develop performance specifications and warranty provisions.

11.1 Frequency Response

For this service, the energy storage system must respond from an idle state to a request for frequency response within two seconds of receiving the command. From that time, the battery output must ramp at a rate of 100kW per second until a full output of 250kW is achieved. 250kW output shall be maintained for three minutes and then the energy storage system output will ramp down at a rate of 25kW per second. When energy storage system output gets to less than or equal to 25kW, the energy storage system will recharge at a rate of 25kW until the SOC setpoint is achieved.

The control for this service will reside in the PGE plant controller. The Bidder's controls must simply respond to a setpoint for kW.

This service shall be provided up to 50 times per year, and sometimes within the same eight-hour period.

Example of Frequency Response

11.2 Contingency Reserve

For this service, the energy storage system must respond from an idle state to a request for contingency reserve within two seconds of receiving the command. From that time, the battery output must ramp up at a rate of 100kW per second until a full output of 250kW is achieved. 250kW output shall be maintained until a ramp-down and stop command is issued. When ramp-down and stop is received, within two seconds the energy storage system will ramp down at a rate of 25kW per second until the kW output is less than or equal to 25kW.

Once the energy storage system output is less than or equal to 25kW, the energy storage system will be commanded by the PGE plant PLC to recharge at a rate of 25kW until the SOC setpoint is achieved.

The control for this service will reside in the PGE plant controller. The Bidder's controls must simply respond to a setpoint for kW, keep up with the requested ramp and manage SOC.

This service shall be provided up to eight times per year.

11.3 Voltage and VAr Support

In this service, the energy storage system will respond to a kVAr setpoint from the PGE plant controller. It may be a steady kVAr request or it may be regulating to maintain a voltage using

closed-loop proportion integral (PI) control. Depending on the service(s) being requested at any given time, the energy storage system may be asked to provide voltage or VAr support simultaneous with being in standby for another service such as frequency response or spinning reserve or voltage support may be operated simultaneously with other services providing that the kVA capacity of the system will allow it.

The only limitations on the energy storage system for providing this service must be the kVA rating of the system.

11.4 Demand Response

Demand Response (DR) is a service scheduled by the Owner normally a day in advance. DR occurs on days with the highest system load. A demand response event is scheduled for a preset number of hours, typically two. When this schedule is set in PGE's Plant Controller, PGE's Plant Controller will assume that 900kWh of energy will be available for that event. A setpoint of 250kW will be given to the MEMS for the DR service. If for some reason, available energy is less than 900kWh, then a lower kW setpoint will be calculated. For example, if 400kWh are expected to be available and two hours is the scheduled duration of the event, PGE's Plant Controller will calculate a kW setpoint of 400kWh/2h = 200kW and this setpoint will be given to the MEMS as a DR setpoint. If 900kWh of energy are available, but the duration of the event is scheduled to be four hours, then PGE's Plant Controller will calculate the kW setpoint to be 900kWh/4hrs. = 225kW.

This service will be dispatched 20 times per year.

11.5 Mitigation of Cold-Load Pick-up

Energy storage system must be able to reduce cold load pick-up after a utility outage. This is accomplished by the MEMS setting the return to grid timer to zero in both the energy storage system PCS and the PV inverter. The energy storage system must adjust to a kW output setpoint delivered by the Owner's plant controller. To mitigate cold load pick-up, the energy storage system will return to grid with no delay once utility power is restored and ramp up to a real power setpoint established by the Owner's plant controller. The MEMS will operate with the Customer's building energy management system to delay starting large loads such as chillers and other Heating, Ventilation, and Air Conditioning (HVAC) equipment until two minutes after the site returns to utility power. Bidder shall assume that the real power setpoint will be the full nameplate rating. This output is maintained for an hour and then the energy storage system will ramp down at a rate of 25kW/second and return to its normal operation.

This service will be dispatched once per year.

12 Intentionally Islanded:

12.1.1 General

Energy storage system will manage the microgrid for maximum reliability, maximum utilization of renewable energy and minimum operating cost. While intentionally islanded, the energy storage system must regulate voltage within nominal +/- 5% and frequency at 60Hz within +/- 0.2Hz.

12.1.2 Customer Services

The MEMS shall cause the diesel generator and/or the energy storage system to serve load as appropriate for optimization of on-site fuel consumption. PV is current regulating only and shall be utilized to the highest possible degree (maximized to serve either load or charge the energy storage system) during an unscheduled intentional island with the goal to minimize energy from the diesel generator.

The MEMS shall utilize the energy storage system to operate the diesel generator in baseload mode at a level recommended by the generator manufacturer to avoid wet-stacking.

During times of ample photonic insolation (meaning the PV and the battery together can serve load without diesel generation), the MEMS shall put the generator in standby mode and utilize only the solar and energy storage system to serve load.

The MEMS will automatically return to grid after an adjustable return-to-grid time. The return-to-grid timer shall be remotely adjustable from 0 to 600 seconds. Return to grid shall be a closed transition.

13 Interconnection

The energy storage system shall interconnect to the Customer's 480V main bus via a 400A, 480V 3-phase breaker located in the Customer's switchgear. The lugs on that breaker define the point of connection (POC) for the energy storage system and the reference point of applicability for performance measurements.

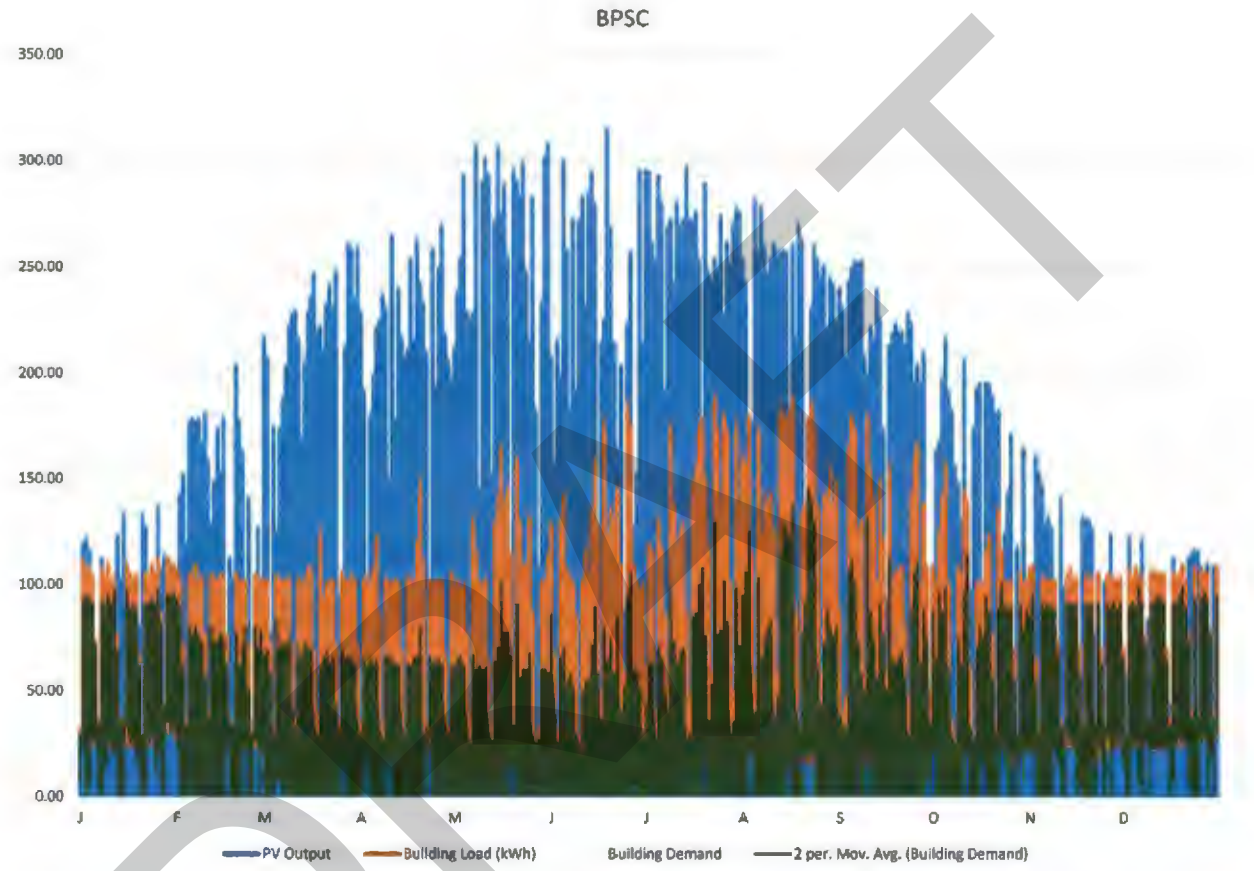
Energy storage system will be connected through a EUSERC rated metering enclosure per PGE service requirements. Metering section to be provided by others.

Bidder shall clearly state all site installation requirements such as pad dimensions and locations of mounting bolts; electrical connection requirements including conductor sizes and lug sizes.

Bidder will provide all electrical specifications of the system including available fault current, voltage ranges of operation and current ratings.

Refer to the drawing E-701, E702 and E-703 for a single-line drawing of the project.

14 Projected Building Load And PV Output



15 Quality Assurance

The supplier shall use its established Quality Management System (QMS) for the design, production, packaging and shipping of its items and/or services to the PGE. The QMS may be either registered/accredited by an external agency or approved by PGE via an on-site assessment or review of supplier's proposal. Bidder shall state its proposed quality assurance program to the Owner clearly within the proposal. This program shall include procedures for quality assurance of all design, manufacturing and construction activities. As a minimum, it shall address the following:

1. Responsibilities and authorities

2. Document control
3. Design verifications
4. Subcontractor assessment and control
5. Calibration requirements
6. Traceability
7. Non-conformance control
8. Inspection and test plans
9. Internal audits
10. Records

16 Commercial

16.1 Bidder Information

Provide the following details regarding your company:

- Exact legal name of the firm
- Form of legal entity under which business is conducted
- Mailing address
- Federal Tax Identification Number
- Key contact information - the name, phone number, and email address of the individual who will serve as a primary point of contact with your company for the purposes of this RFP

16.2 Schedule

The RFP will be issued on May 16, 2019

Responses to this RFP are required no later than June 7, 2019.

A purchase order shall be issued by July 15, 2019.

The energy storage system with all its components will be delivered to the Customer's site no later than December 20, 2019.

The system will be commissioned (complete) no later than Feb. 28, 2020.

All punch list items will be corrected no later than April 15, 2020.

16.3 Transportation

Bidder shall be responsible for all transportation, shipping and loading associated with project to deliver a fully operational energy storage system to Owner's project site including any subsystems or components from sub-suppliers. Scheduling deliveries is the responsibility of the Bidder. Owner will not make special accommodation for storage based upon Bidder's scheduling needs.

All deliveries will be scheduled between 8:00 AM and 5:00 PM on weekdays. Owner (or Owner's representative) shall be given 24-hours' notice in advance of large truck deliveries. If a crane or other special equipment is required for unloading, seven-days' notice must be provided to the Owner.

The Bidder shall prepare materials and equipment for shipment to protect them from damage while in transit.

The delivery shall be coordinated with the PGE Project Manager. Unloading at the site will be by the Owner's contractor.

Construction will be performed by the Owner's electrical contractor according to drawings and installation instructions provided by the bidder. The Bidder will provide construction assistance as necessary for successful installation.

16.4 Expansion

Bidders should address in their proposal the capability of expanding the storage components of the system. With maintaining a power rating of 250kW nominal, bidders shall describe what features of the proposal would allow for easy expansion of storage beyond four hours. This should include provisions for electrical connection, controls, cooling systems, safety systems, mechanical connections, etc.

16.5 Information to Be Included in Proposal

Bidders must include a description of all components within the offering including:

- Basic system architecture
- Battery cell supplier quantity and chemistry
- PCS supplier and model number
- BMS supplier, basic architecture and control hardware
- DC ground fault protection hardware and design

- System dimensions including all ancillary equipment such as control cabinets and isolation transformer
- Weight of battery module container and mounting requirements
- Description of expansion provisions
- Clear description of major components that are sourced from a third party such as batteries, BMS, PCS, MEMS
- Specification sheets for all major system components
- A list of similarly sized systems operating in a microgrid configuration with a description of services provided (both grid services and customer services)
- One or more reference contacts from previous or current customers
- One or more operational sites where the owner would be agreeable to a site visit by PGE
- Basic pricing for conformance with the RFP
- Separate pricing for performance warranty, ongoing maintenance and shipping
- Pricing for any options that are offered
- Clearly describe any exceptions to the RFP

It is the Owner's preference to purchase a complete energy storage system and MEMS as a package. The Owner will consider proposals structured as a partnership if necessary. Owner will also consider proposals that include only the energy storage system or MEMS, but such a proposal must clearly explain how issues of integration will be dealt with. Owner will not consider purchasing a battery without a PCS.

17 Abbreviations

AC	Alternating Current
AHJ	Authority Having Jurisdiction
BMS	Battery Management System
DC	Direct Current
EPA	Environmental Protection Agency
EPS	Electric Power System
HMI	Human Machine Interface
IEEE	Institute of Electrical and Electronics Engineers
kV	Kilovolts
kVAr	Kilovar
kW	Kilowatt
kWh	Kilowatt Hours
MEMS	Microgrid Energy Management System
ODEQ	Oregon Department of Environmental Quality
PCS	Power Conversion System
PGE	Portland General Electric Company
PLC	Programmable Logic Controller
PV	Photovoltaic
RFP	Request for Proposal
SOC	State of Charge or Energy: Nominal Energy Remaining / Nominal Full Pack Energy Available
UL	Underwriters Laboratories
UPS	Uninterruptable Power Supply

18 Attachment A - Single-Line Drawings E-701, E-702 And E-703

19 Attachment B - A Graphic Depiction of The Microgrid Controls Hierarchy

20 Attachment C - Microgrid State Definitions