

Martha's Vineyard Transit Authority

Request for Proposal:

Energy Storage Systems

Overview

The Martha's Vineyard Transit Authority (VTA) is seeking containerized AC energy storage systems (ESS) comprising a modular lithium-ion battery system, provisioned in a purpose-built enclosure with integrated battery management system, heating, ventilation and air-conditioning (HVAC) system, coupled with a bi-directional power conversion system and a data logging site-level controller capable and managing the scheduled charge and discharge of the system and configurable with an external energy management controls system or SCADA. Algorithmic control solutions - e.g. those using predictive analytics to govern dispatch - are not required at this time.

Background

The VTA is developing a clean energy transportation system that includes electric transit buses, energy storage, solar distributed generation (DG), demand management and a fully integrated micro-grid. Our vision includes connecting individual components to allow the VTA Maintenance and Operations Center to operate as a micro-grid optimized to charge electric vehicles. As the VTA transitions to a fully-electric bus fleet, in-route charging sites will be added, each of which will operate as an independent micro-grid, supported by energy storage.

Project Phases

VTA is seeking one or more providers capable of providing ESS for a series of potential projects over the coming years. All systems will be "behind the meter" and interconnected with onsite generation systems and electric vehicle charging stations. All systems will be deployed primarily to minimize energy costs to the VTA, and secondarily to provide resiliency in the event of a grid outage, in conjunction with onsite generation.

First Phase System

The first and largest system will be installed by VTA and its contractors at its Maintenance and Operations Center at 11 A Street in Edgartown, MA. The energy storage system will interconnect at 480V and will be electrically tied to a new 700 kW DC solar installation, electric vehicle charging stations, and a diesel generator. It is anticipated that the system at the Operations and Maintenance yard will be charged principally, though not exclusively, from on-site solar production.

Second Phase System

The second phase system will be installed at the bus depot at 29 Church Street in Edgartown, MA. This ESS will support several high-power in-route inductive vehicle charging stations. The system will interconnect at 480V, and is expected to charge principally, but not exclusively, from the grid.

Subsequent Phases

Subsequent energy storage systems will be installed to help power future in-route vehicle recharging stations at several points on the island. Proposers are encouraged to provide additional and equivalent information detailing the availability of smaller configurations; the subsequent bus project phases are expected to require units ranging in power capacity from 50 kW to 250 kW. At least one site may require power conversion; 480V three phase will be required for vehicle charging, but only 240V single phase is to the site. Proposers are encouraged to suggest possible solutions to this challenge.

Project Details

Proposals will be available at 12 noon on Wednesday, August 1, 2018 and can be obtained by going to the VTA's website www.vineyardtransit.com, by emailing angie@vineyardtransit.com or by calling 508-693-9440 ext. 110. Proposals will be accepted until 12 PM on Wednesday, August 29, 2018. No late, faxed or emailed proposals will be accepted. Written questions will be accepted until Thursday, August 16, 2018 at 12 noon.

One (1) original, one (1) hard copy and four (4) electronic copies (in Adobe Acrobat pdf format and on a CD-ROM or thumb drive) of the proposal must be submitted to the VTA in a sealed envelope marked as follows:

BID PROPOSAL FOR:	Energy Storage Systems
Project #:	VTA #2019-02
BID OPENING DATE:	August 29, 2018 - 12 noon
ATTENTION:	Angie Grant, Administrator

Responses must be submitted in a sealed outer package. The sealed envelope shall be marked with the respondent's company name plainly marked in the lower left hand corner:

Within each envelope or package, the respondent shall enclose a cover letter with the signature, name, and title of the person authorized to submit the response on behalf of the respondent.

All proposals must be written in ink or typed. If there is any correction with whiteout, the person signing the proposal must initial the correction.

A respondent filing a proposal thereby certifies that (1) no officer, agent, or employee of the VTA has a pecuniary interest in the proposal; (2) the proposal is made in good faith without fraud, collusion, or connection of any kind with any other prospective respondent for the same RFP, and (3) the prospective respondent is competing solely on its own behalf without connection with, or obligation to, any undisclosed person or firm. Respondents will be required to certify that they are not on the Comptroller General's list of ineligible contractors.

Any agreement resulting from this RFP shall be subject to any and all applicable laws, rules, regulations and guidelines for project administration issued by the FTA of the DOT of the U.S. Government and the Commonwealth of Massachusetts. The VTA reserves the right to reject any or all proposals, in part or whole, if the VTA deems it in its best interest to do so.

Logistics

Martha's Vineyard is an island reachable by air, ferry and barge only. Please identify potential challenges associated with transporting the ESS to the island, and proposed solutions. Provide a detailed estimate of the anticipated cost of delivery.

Delivery

Installation, including all site-specific engineering and construction costs, is not within the scope of this proposal. Delivery shall be considered complete when each ESS and corresponding PCS have been physically delivered to the site of the VTA's choosing on Martha's Vineyard.

Commissioning

Upon delivery and subsequent completion of electrical installation by the VTA's contractor, the proposer shall be responsible for energizing the ESS and completing a full range of capacity, performance, and safety testing. Proposer shall re-test as needed if faults are discovered and corrected, and deliver all test results to the VTA upon completion of commissioning.

Commissioning testing shall include Operational Acceptance Testing to verify: electrical, mechanical components of the system are ready for start-up, controls are in place and test operation, electrical protection and relays are coordinated and operational, all safety systems are installed and operating, all communication systems are operating, and emergency procedures are in place and lock/out tag out process implemented. Commissioning testing shall include start-up procedures to initiate the system and operate all components. Commissioning testing shall include Functional Acceptance Testing using agreed upon testing plans and procedures to see if the system performs the functions and applications for which it was designed. Commissioning shall be completed in accordance with NFPA 855, provided that standard is in place at the time of commissioning.

Training

The vendor will be responsible for delivering a comprehensive safety and operation manual. Vendor will also provide a safety briefing upon delivery, and comprehensive on-site training in ESS safety and operation for VTA's staff and contractors once the ESS has been commissioned. Please describe the scope, format, and duration of the training.

Warranty Support

Provide full warranty terms for all components of the ESS. Describe the availability of warranty support for hardware and software, including location of nearest service technicians, and expected maximum time from warranty call to a technician's arrival on site.

Vendor Experience

Describe the number, size, and capacity of ESS deployed in the United States as well as the length of time each ESS model has been in service. Provide a description and references for up to three clients with similar or relevant use cases.

Specifications

The VTA is seeking proposals for an integrated energy storage system for each project phase that meets the minimum characteristics in the tables below.

Required System Characteristics			
	First Phase System at VTA Headquarters	Second Phase System	Subsequent Phases
Energy Rating (kWh-AC)	1400	250 to 500	100 to 250
Power Rating (kW-AC)	500	250	50 to 250
Battery Chemistry/Technology	Lithium-ion (NMC, NMO, NCA, or LFP)		
Battery Standard & Certifications	UN 38.3, UL 1642, UL 1973		
Power Conversion System Standards	IEEE 1547, UL 1741, UL 1741 SA		
System	UL 9540 Required		
Enclosure(s) Rating	Outdoor/ NEMA 3R or Higher		
Fire Detection & Suppression System	Included in Battery Container		
Maximum Battery Container Footprint (W,L)	10' by 40'	Please Provide Dimensions of Available Units	Please Provide Dimensions of Available Units
Maximum PCS Footprint (W,L)	4' by 16'	Please Provide Dimensions of Available Options	Please Provide Dimensions of Available Options

Controls System Characteristics

Energy Management System Included	Not required		
Communications Protocols	Modbus TCP, DNP 3.0 over Ethernet		
Required Controls	Peak Shaving Manual P/Q Dispatch Scheduled P/Q Dispatch Solar Firming Ramp Rate Control Power Factor Control Reactive Power Compensation	Manual P/Q Dispatch Power Factor Control Reactive Power Compensation	Manual P/Q Dispatch Power Factor Control Reactive Power Compensation
Required Data Logging Parameters	State of charge AC voltage and current Power factor Real Power kVA Reactive power kVAR DC voltage and current Rate and quantity of charge and discharge (in kW/kWh) Net energy charged and discharged (kWh) Net real power charged and discharged (kW)	State of charge AC voltage and current Power factor DC voltage and current Rate and quantity of charge and discharge (in kW/kWh)	State of charge AC voltage and current Power factor DC voltage and current Rate and quantity of charge and discharge (in kW/kWh)
Maximum Data Logging Interval	1 Minute		

Performance Characteristics			
System Round Trip Efficiency (AC-AC)	>87% measured at transformer high side		
Allowable Depth of Discharge	>95%		
Discharge Time (min) at Rated Power	168	60 to 120	60 to 120
System Warranty (years)	10 years parts & labor		
Guaranteed Energy Capacity Retention	85% after 10 years, assuming 180 full discharge cycles (95% DoD and 25% or above annual average Resting state of charge) per year		
Operating Characteristics			
Operating Temperature	-30C to 50C		
Equipment Storage Temperature	-30C to 60C		
Total Harmonic Distortion (THD)	Meets IEEE 519/1547 standard		
Primary System Protections	DC Contactors/Fuses at Battery Cell/Module/Rack DC Disconnect AC Disconnect Integrated in PCS		

Energy Storage Controls Requirements

The energy storage system will primarily be controlled to reduce the VTA's demand charges incurred from charging the electric bus fleet. The controller must be able to integrate with VTA's existing SCADA allowing for coordination of dispatch with bus charging schedules, real-time demand, as well as manual overrides.

Data Logging

The ESS at the VTA's MOC will include data acquisition systems capable of recording, transmitting, and storing, at minimum, the following parameters at 1-minute intervals. A minimum of seven days of data shall be stored within the DAS. The DAS shall be capable of integrating with the VTA's existing SCADA and communicating all parameters to an external Energy Management System. The DAS shall continue to record and retain data for a minimum of seven days in the event of a failure of the PCS, the battery, or the AC power supply to the ESS.

Proposal Response:

In addition to the general requirements above, for each ESS unit proposed, please provide the documentation and technical information specified below:

Documents Required

Certifications (UL 1642, UL 1973, UN 38.3, UL 1741, UL 1741 SA, UL 9540)

Battery spec sheet

Power Conversion System (PCS) Spec Sheet

HVAC Technical Sheet

Energy Capacity Retention curves including SOC and Resting state of charge assumptions

Electrical Design drawing including AC and DC SLD's

Civil drawings including layout, clearances, weight, conductor entrance/exit points, center of mass.

Photos or concept drawings of the proposed system

ESS installation and commissioning manual.

ESS Operations and maintenance manual.

Build-up calculation to support AC-AC round-trip efficiency assumptions at different ambient temperatures and over time, including HVAC loads.

Nameplate System AC Power Capacity

Nameplate System AC Energy Capacity

Battery Enclosure NEMA / IP Rating

Modules per Rack

Rack Voltage

Cells per Module

Module Cell Wiring (series/parallel configuration)

Nameplate Module Capacity (Ah)

Nominal Module Voltage

Cell Format/Shape (e.g. 18650, pouch)

Cell Chemistry (e.g. NMC-811)

Nameplate Cell Capacity (Ah)

Nominal Cell Voltage

Max Charge Rate

Max Discharge Rate

Calendar Life Provisions

Battery Management System(BMS) Manufacturer/Model

BMS Location (e.g. module, rack.)

Controller hardware spec sheets.

Control network architecture diagram.

Type of Thermal Management (e.g. passive, forced air, liquid)

Fire Detection Systems (describe sensors & controls)

Fire Suppression Systems (e.g. water, NOVEC 1230, N/A)

Maximum exterior noise levels produced during ESS and HVAC system operation

Ongoing asset monitoring/testing strategy (e.g. full-cycle SoH testing)

Decommissioning/recycling strategy

Evaluation Criteria

Proposal responses will be evaluated on each of the following criteria:

- Compliance to all the required certifications, system performance (e.g. roundtrip efficiency, capacity retention) – 25 points
- Strength of warranties and available guarantees -15 points
- Price – 15 points
- Ability to deliver ESS at requested timelines – 15 points

- Completeness of proposal response – 5 points
- Technical review of provided documentation – 5 points
- Vendor demonstrated experience/Customer references – 5 points
- Product demonstrated operational success (total roundtrip kWh delivered, number of installations, duration of installations, etc.) – 5 points
- Dimensions, site fit and aesthetic considerations – 5 points
- ESS meets Buy America Standards, not required but more favorable if met -5 points