

# SANDIA REPORT

SAND2016-8544 0 Unlimited Release  
Printed September, 2016

## Energy Storage Procurement Guidance Documents for Municipalities

---

Daniel Borneo (SNL)

With contributions from:

CESA/CEG: Todd Olinsky-Paul, Maria Blais Costello, and Sarah Galbraith

Bright Power: Henry Misas and Nick Turchak

Prepared by

Clean Energy Group

Clean Energy States Alliance

Prepared by

Sandia National Laboratories

Albuquerque, New Mexico 87185 and Livermore, California 94550

Sandia National Laboratories is a multi-mission laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Approved for public release; further dissemination unlimited.



**Sandia National Laboratories**

Issued by Sandia National Laboratories, operated for the United States Department of Energy by Sandia Corporation.

**NOTICE:** This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government, nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, make any warranty, express or implied, or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represent that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government, any agency thereof, or any of their contractors or subcontractors. The views and opinions expressed herein do not necessarily state or reflect those of the United States Government, any agency thereof, or any of their contractors.

Printed in the United States of America. This report has been reproduced directly from the best available copy.

Available to DOE and DOE contractors from  
U.S. Department of Energy  
Office of Scientific and Technical Information  
P.O. Box 62  
Oak Ridge, TN 37831

Telephone: (865) 576-8401  
Facsimile: (865) 576-5728  
E-Mail: [reports@osti.gov](mailto:reports@osti.gov)  
Online ordering: <http://www.osti.gov/scitech>

Available to the public from  
U.S. Department of Commerce  
National Technical Information Service  
5301 Shawnee Rd  
Alexandria, VA 22312

Telephone: (800) 553-6847  
Facsimile: (703) 605-6900  
E-Mail: [orders@ntis.gov](mailto:orders@ntis.gov)  
Online order: <http://www.ntis.gov/search>



This page intentionally left blank.

SAND2016-8544 0  
Unlimited Release  
Printed September, 2016

# Energy Storage Procurement Guidance Documents for Municipalities

---

Daniel Borneo (SNL)

With contributions from:

CESA/CEG: Todd Olinsky-Paul, Maria Blais Costello, and Sarah Galbraith

Bright Power: Henry Misas and Nick Turchak

Energy Storage Technologies and Systems  
Sandia National Laboratories  
P.O. Box 5800  
Albuquerque, New Mexico 87185-MS1108

Prepared by  
Clean Energy Group  
Clean Energy States Alliance

## Abstract

The attached guidance documents were produced by Clean Energy Group/Clean Energy States Alliance with Sandia National Laboratories and Bright Power. They are intended to support Massachusetts Department of Energy's Community Clean Energy Resilience Initiative awardees in energy storage procurement. Additionally, these materials offer useful information for other municipalities to consider as they develop solicitations for resilient, energy storage projects.

## **ACKNOWLEDGMENTS**

This resource is generously supported by U.S. Department of Energy – Office of Electricity, Sandia National Laboratories, and the Barr Foundation as part of Energy Storage Technology Advancement Partnership managed by Clean Energy States Alliance, and The Resilient Power Project, managed by Clean Energy Group.

# Procurement Guidance for Energy Storage Projects

---

The attached guidance documents were produced by Clean Energy Group/Clean Energy States Alliance with Sandia National Laboratories and Bright Power. They are intended to support Massachusetts Department of Energy's Community Clean Energy Resilience Initiative awardees in energy storage procurement. Additionally, these materials offer useful information for other municipalities to consider as they develop solicitations for resilient, energy storage projects.

The materials included are designed to give specific examples of the elements that should be included in a solicitation for the procurement and installation of a battery energy storage project that is designed to provide backup power during outages.

Included in this package are:

- 1) Section A: Matrix of elements to include in a Request for Proposals (pages A1-A6)
- 2) Section B: Template for Request for Proposals for behind-the-meter energy storage projects (pages B1-B23)
- 3) Section C: Template of a Request for Proposals for utility-scale energy storage projects (pages C1-C26)

The matrix serves as a checklist of items that should be included in your RFP. It also suggests information that should be provided in the RFP and questions that should be asked of potential vendors. Finally, the matrix includes what to look for in vendor responses.

The two templates serve as examples of the layout, language, and specifications that could be included in your RFP. Since the details are different depending on the scale of the project, there are two templates included to address the specifics of projects at each scale.

Clean Energy States Alliance previously produced a webinar on the topic of energy storage procurement. This webinar is archived and can be reviewed at <http://www.cleangroup.org/webinar/procurement-guidance-energy-storage-projects-help-rfis-rfqs-rfps/>.

We hope these materials will prove helpful in your project development process. If you have questions, please direct them to [Todd@cleangroup.org](mailto:Todd@cleangroup.org).

## Section A – ENERGY STORAGE PROCUREMENT MATRIX

# Energy Storage Procurement Matrix

Section Topic	Section Sub-Topic	Information the Initiator should provide or ask for in RFP	Questions the Bidder should answer in proposal	Evaluation Criteria (Industry standards)
Who		<p><b>Provide:</b> Details about who is initiating project. Background of initiating organization and project.</p> <p><b>Ask:</b> Who is bidder, including subcontractors/partners</p>	Company and partners, contact information, details of experience of key participants, roles and responsibilities of all partners, resumes of principle project team.	Proven track record with solar+storage projects in municipal settings including references to completed projects. Include safety performance record at previous projects.
Why		<p><b>Provide:</b> Describe the overall goal of the project. Detail if the project fits within a larger state or municipal context; for example, state if the goal is emissions reduction, renewables integration, or resiliency.</p> <p><b>Ask:</b> How will bidder’s proposed project solve the problem or help to reach the goal(s) of the project? How will it fit within the larger context?</p>	How does your project provide the best solution? What are the most compelling features of the system? How does the project solve the problem, meet the goal, or fit within the larger context?	<p>For new solar &amp; storage projects: check for monitoring systems that are able to obtain federal 30% Investment Tax Credit.</p> <p>For Behind the Meter projects: additional opportunities to monetize the project via delivery or supply rate changes or participation in specific utility or statewide incentive programs.</p> <p>For utility scale projects: scalability, replicability and LCOE/LCOS metrics</p>
What	Project description	<p><b>Provide:</b> Project description. Describe the problem that needs to be solved; include power and energy minimums throughout project (if known).</p> <p><b>Ask:</b> How will bidder solve the</p>	What is the solution to the problem? What are the specifications of the system? Operating conditions – cycle life. How will the system meet the specifications and requirements set forth by the owner?	Look at how available energy is specified in the response: Nameplate capacity (kWh or MWh).

Section Topic	Section Sub-Topic	Information the Initiator should provide or ask for in RFP	Questions the Bidder should answer in proposal	Evaluation Criteria (Industry standards)
		<p>problem? What are the specifications of proposed system? How will proposed system meet the requirements of the project?</p>		
	Scope of work	<p><b>Provide:</b> Detailed Statement/Scope of Work (SOW). Scope should delineate who will do what and when. Include timelines, milestones, roles, what applicant will be responsible for and what bidder will NOT be responsible for.</p> <p><b>Ask:</b> How will bidder satisfy the SOW?</p>	How does applicant propose to implement scope of work and meet project requirements?	<p>Make sure response contains all assumptions from provider in their plan to complete Scope of Work, including items that may warrant a Change Order.</p> <p>Make sure that scope of work and exclusions from SOW are well aligned with project type (utility-scale or behind the meter). Behind the meter projects should not include medium voltage and SCADA/data integration, but should have more specifics about utility rates, integrations with on-site generation and revenue streams.</p>
	Operational Specifications	<p><b>Provide:</b> Operational specifications – Load data, predetermined or required ramp rates, charge and discharge profiles and cycles, applications to be served and modes of operation. Control and monitoring requirements.</p> <p><b>Ask:</b> How will bidder’s proposed system meet these operational requirements? Who will own and operate the system?</p>	How does applicant propose to meet all operational specifications? Are there any ways in which bidder’s proposed system would not meet or would exceed operational specifications? Who does the bidder propose will own and operate the system?	<p>Power purchase details and permitting requirements, where applicable.</p> <p>Look for how bidder describes operational metrics and relates them to financial and warranty metrics.</p> <p>Look for applications served and if system will be serving multiple applications how they will be handled and integrated.</p>

Section Topic	Section Sub-Topic	Information the Initiator should provide or ask for in RFP	Questions the Bidder should answer in proposal	Evaluation Criteria (Industry standards)
	System Specifications	<p><b>Provide:</b> System requirements – System size in both power (KW) and energy (KWh), round trip efficiency, Type of energy storage technology, if it needs to be specified (not recommended), cycle life and project life required based on operational specifications, i.e. kW/kWh per year for how many years. Operating temperatures required, disposal requirements.</p> <p><b>Ask:</b> How will bidder’s system meet all required system specifications? If bidder’s proposed system meets operational specifications but diverges from system specifications, what are the relative costs and benefits of bidder’s proposed system? Request test data.</p>	<p>How does bidder propose to meet all required system specifications? Can bidder’s system meet all operational specifications if diverging from system specifications? If so, what are the relative costs and benefits of bidder’s system, compared with the prescribed system specifications? Provide detailed specification of all equipment. Include any system testing and performance data and how it was acquired.</p> <p>NOTE: It is recommended that system specifications not define a specific energy storage type of technology in an RFP or other solicitation unless absolutely necessary. Bidders should be free to propose any system that meets the operational and other project requirements, to provide for competition and allow innovative solutions to come to the fore. For example, don’t indicate that you want a flow battery vs. an electrochemical battery vs. a flywheel or something else.</p>	<p>Look at how round trip efficiency is defined if any kind of temperature control equipment is mentioned. For utility scale systems, be sure to double check that the proposed controls/SCADA architecture will fit well with the systems already in place.</p> <p>Make sure that testing data provided is applicable to the system/solution being proposed.</p> <p>Look for indication of energy storage degradation (number of expected cycles over ES lifetime).</p>

Section Topic	Section Sub-Topic	Information the Initiator should provide or ask for in RFP	Questions the Bidder should answer in proposal	Evaluation Criteria (Industry standards)
	Design Requirements	<p><b>Provide:</b> Design requirements and system/equipment parameters not covered in operational and/or system specifications. If possible, provide design package including standards and specifications for procurement and installation as required.</p> <p><b>Ask:</b> How does bidder propose to meet all design requirements?</p>	How does bidder propose to meet all design requirements? Provide shop drawings and/or schematic drawings, as necessary.	<p>If you require integration of new Solar PV and Storage, require that the type coupling (AC vs DC) be clearly indicated.</p> <p>Utility scale: make sure that a diagram detailing physical data and SCADA communication layers exist.</p> <p>Behind the Meter: one-line schematic drawing and a sequence of operations noted on a drawing or as a separate document is a plus.</p>
<b>Where</b>		<b>Provide:</b> The location of the work and factors such as emissions or other regulations that may be imposed upon the bidder.	How to install project at the specified location, especially if there are any constraints?	Make sure that any work necessary to prepare the location is included in the SOW.
<b>When</b>		<b>Provide:</b> The project timeline and completion deadline. Include RFP process, RFP review, interview, bidder selection, project timeframe including any post-commissioning period of data collection and monitoring.	Provide detailed schedule starting at award date. Include design, permitting, procurement (long lead items), engineering, construction, commissioning (DV, OAT, startup, FAT, shakedown), closeout, warranty period	<p>For labor intensive projects that include multiple sites (especially those that include solar PV), make sure that construction and commissioning are planned in phases.</p> <p>The warranty periods for various parts of the proposed solution should be clearly spelled out (workmanship, components, equipment).</p>
<b>How</b>		<p><b>Provide:</b> Define project deliverables and expectations.</p> <p>Address how the bidder be selected, i.e., selection criteria</p>	How will you conduct project construction contracting strategy, procurement strategy, detailed schedule, org chart including partners with detailed roles and	Operations and Maintenance strategy should be put forward with assumptions called out. O&M should be clearly priced and scoped out – approximate schedules should be provided.

Section Topic	Section Sub-Topic	Information the Initiator should provide or ask for in RFP	Questions the Bidder should answer in proposal	Evaluation Criteria (Industry standards)
		<p>including grading system.</p> <p>Detail the contracting strategy and timeframe.</p> <p>Include expectations for project team’s experience, testing and commissioning, training, operational support and warranty. Warranty should include needed maintenance service, spare parts for project lifetime.</p>	<p>responsibilities. Provide maintenance, spare parts and warranty information.</p> <p>If appropriate, explain how the system will be operated long-term, i.e. Power Purchase Agreement (PPA); Engineer, Procure, Construct (EPC); etc.</p>	<p>Large capital expenditures, like battery replacement, should be called out.</p>
<b>How Much</b>		<p><b>Provide:</b> Include details about any budget requirements, cost share. Include WBS breakdown worksheet for bid evaluation and comparison. Define methodology for computing LCOE.</p> <p><b>Ask:</b> What are the total costs for the proposed system or services, including cost breakdown for components, subcontracting, etc? What matching/outside funds are included? Is any part of the project to be financed? If so, does the bidder have a commitment from a financier or bank?</p>	<p>Cost of total project using provided WBS; include any replacement needed to meet project life cycle. In addition, provide levelized cost of energy (LCOE) for life of project. List any and all exclusion, assumptions, and risk of cost overruns. List any matching funds, outside funds, or other resources included in the bid. If financing is included, show evidence that the project is financeable.</p>	<p>Budget breakdowns should help to gain insight into project costs as well as expected payment schedule. Items that are additional should be clearly labeled as such. Items that are estimated or not yet priced should also be clearly labeled.</p> <p>If there is a known risk with accomplishing a desired technical goal (for instance, providing backup power to loads larger than the battery capacity, or structural concerns with battery location), then an engineering phase should be clearly separated from the construction scope of work. There should be an option to exit the contract if engineering determines that the project falls outside the scope originally proposed during the bid.</p>

Section Topic	Section Sub-Topic	Information the Initiator should provide or ask for in RFP	Questions the Bidder should answer in proposal	Evaluation Criteria (Industry standards)
				<p>If applicable, the requirements for obtaining all matching or outside funds should be clearly indicated.</p> <p>LCOE calculations are not necessary for BTM projects.</p>
<b>Boiler Plate</b>		<p><b>Provide:</b> All the terms and conditions that are required to be met. Certifications required. Bond requirements. Warranty requirements. ES systems installed and business bankability requirements, independent testing requirements for ES system.</p> <p><b>Ask:</b> How will bidder meet these requirements?</p>	Provide detail as to how company will meet boilerplate requirements.	

**Section B – BEHIND THE METER RFP TEMPLATE**

# Request for Proposals Template: Behind the Meter

---

[Title and Solicitation Number]

(Organization)

for The Town of (municipality),

Community Clean Energy Resiliency Initiative

Request for Proposals

Release Date: \_\_\_\_\_, 2016

Due Date: \_\_\_\_\_, 2016

(ORGANIZATION) FOR THE (MUNICIPALITY)  
REQUEST FOR PROPOSALS – ENERGY STORAGE SYSTEM  
FOR THE COMMUNITY CLEAN ENERGY RESILIENCY INITIATIVE

[Title and Solicitation Number]

**Table of Contents**

Acknowledgments..... 5

PART 1: INTRODUCTION ..... 6

    A: General ..... 6

PART 2: GENERAL ..... 8

    Background ..... 8

    Project Description..... 8

    Proposal Process and Schedule ..... 8

PART 3: SCOPE OF WORK / REQUIRMENTS ..... 9

    Scope of Supply..... 9

    Documentation Deliverables ..... 10

    Design Conditions ..... 10

    Electrical Design Parameters ..... 11

    Audible Noise ..... 11

    BESS Requirements ..... 11

    Modes of Operation..... 12

    Harmonics ..... 13

    Protection Requirements and Balance of System Components (BOS)..... 13

    Internet connection ..... 13

    Labeling ..... 13

    Grounding ..... 14

    Structural / Foundation Pads / Conduit..... 14

    Mounting System..... 14

    Spill Containment..... 14

    Personnel Safety ..... 14

    Fire Protection ..... 15

    Spare Parts and Equipment ..... 15

Battery Management System (BMS).....	15
Factory Testing - Battery.....	15
Commissioning - Acceptance and Performance Testing.....	15
Warranty.....	16
Utility Interconnection and Rates.....	16
Modifications.....	16
Additional Requirements.....	16
PART 4: EXCLUSIONS.....	16
PART 5: SCHEDULE.....	17
PART 6: COST PROPOSAL.....	17
PART 7: SELECTION PROCESS.....	17
General.....	17
PART 8: SELECTION CRITERIA.....	18
Participation Requirements.....	18
Evaluation Criteria.....	18
BESS Proposal Evaluation Matrix.....	19
PART 9: GENERAL PROVISIONS.....	20
General.....	20
PART 10: SUBMISSION REQUIREMENTS.....	20
Required Materials.....	20
PART 11: ATTACHED DOCUMENTS.....	23
Exhibit A Certification.....	24
Exhibit B Cost Proposal Worksheet.....	25
Section C – UTILITY SCALE RFP TEMPLATE.....	26
PART 1: INTRODUCTION.....	4
A: General.....	4
PART 2: GENERAL.....	6
Background.....	6
Project Description.....	6
Proposal Process and Schedule.....	6
PART 3: SCOPE OF WORK / REQUIRMENTS.....	7

Scope of Supply .....	7
Documentation Deliverables .....	8
Design Conditions .....	9
Electrical Design Parameters .....	9
Audible Noise .....	9
BESS Requirements [ALTER TO SUIT PROJECT REQUIREMENTS].....	9
Modes of Operation.....	10
Microgrid - Resiliency for Emergency Conditions .....	10
Peak Load Reduction.....	11
3MW PV Smoothing.....	11
Automatic Scheduling .....	12
Voltage Regulation.....	12
Harmonics .....	12
Protection Requirements.....	12
SCADA Integration .....	12
Internet connection .....	13
Grounding .....	13
Structural / Foundation Pads / Conduit.....	13
Spill Containment.....	14
Personnel Safety .....	14
Fire Protection .....	14
Spare Parts and Equipment .....	14
Factory Testing - Battery.....	14
Commissioning - Acceptance and Performance Testing.....	15
Warranty .....	15
Interconnection.....	15
Modifications .....	16
Additional Requirements .....	16
PART 4: EXCLUSIONS.....	16
PART 5: SCHEDULE .....	17
PART 6: COST PROPOSAL .....	18

PART 7: SELECTION PROCESS ..... 18  
    General..... 18  
PART 8: SELECTION CRITERIA ..... 19  
    Participation Requirements ..... 19  
    Evaluation Criteria..... 19  
    BESS Proposal Evaluation Matrix ..... 20  
PART 9: GENERAL PROVISIONS ..... 21  
    General..... 21  
PART 10: SUBMISSION REQUIREMENTS ..... 21  
    Required Materials ..... 21  
PART 11: ATTACHED DOCUMENTS ..... 24  
Exhibit A Certification ..... 25  
Exhibit B Cost Proposal Worksheet..... 26  
Distribution ..... 27

## PART 1: INTRODUCTION

### A: General

(Organization) (ORG), as the Awarding Authority (Known as Owner), invites the submission of proposals by responsible companies (known as Vendor) to design, procure, install, test and commission a minimum of (capacity) Battery Energy Storage System (BESS) to be located at the (location). The primary purpose of this Community Clean Energy Resiliency Initiative Project being performed in part with a grant from the Massachusetts Department of Energy Resources (DOER) is to provide resiliency through the use of energy storage for the (facility) using battery technology.

The successful vendor will work with the (ORG), Owner's Project Manager (OPM) and (Name of the Project Management Firm). Respondents must demonstrate successful completion of energy storage systems using the same technology proposed.

To be considered, all submissions must be prepared in accordance with the requirements specified in this Request for Proposals (RFP) document and in accordance with applicable provisions of Massachusetts General Laws.

The cost is to be negotiated with the company with the highest-ranked proposal based on their ability to meet or exceed all requirements outlined in the attached selection criteria. Any exceptions to the requirements of this RFP are to be identified on a separate form and clearly marked exceptions. If an agreement cannot be reached with the first choice, the Awarding Authority will negotiate with the next highest ranked firm. The cost for BESS maintenance and the performance degradation over the life of the project will be considered in the selection process. This is a total cost of ownership-based selection process.

The vendor's cost proposal is to be placed in a separate sealed envelope bearing the title "(RFP Title)" and included with the proposal. Bidders shall use the Work Breakdown Structure (WBS) provided in the RFP package. The contract will be awarded to the vendor with the most advantageous and responsive submittal taking into consideration both price and non-price submittals. **Copies of the full RFP documents and required forms are available at the (Building) building and on the (ORG) website.**

Seven (7) hard copies of all Submission Requirements must be submitted to:

(Title)  
(Address)  
(Organization)

Submissions are due on or before \_\_\_\_\_ at \_\_\_\_ pm. Any submission received after this time and date will not be considered and will be returned to the respondent unopened. The clock in the (Municipality) office shall represent the official time for purposes of this determination.

Copies of Submission Forms, and any inquiries regarding the information contained in this Request for Proposals, shall be directed to the (Title) at the address above, by telephone (\_\_\_\_\_) or by email (\_\_\_\_\_). **The deadline for written questions will be \_\_\_PM on \_\_\_\_\_.** Responses to questions will be posted \_\_\_\_\_. Interested parties are responsible for checking the website for addenda and responses to questions.

The (Organization) reserves the right to waive any informality in the submissions, to reject any or all submissions, or to accept any submission which it deems to be in the best interest of the (municipality name).

Interested parties are instructed to check the (ORG) website for addenda to this RFP. Submissions are to be sealed and properly identified on the outer envelope as “(RFP Title)” (Project Name). Price proposals are to be in a separate sealed envelope, appropriately identified.

(Name)  
(Title)  
(Organization)  
(Date)

## **PART 2: GENERAL**

### **Background**

(add project background and description of proposed sites for Behind-the-Meter battery storage systems)

### **Project Description**

In December, 2014 the (Organization) was awarded a grant by the Massachusetts Department of Energy Resources (DOER) Renewable and Alternative Energy Division for a project proposed in our Community Clean Energy Resiliency Initiative grant application, namely, implementing a Resiliency Plan through Clean Energy Storage for a Municipal Microgrid Project. This project looks to provide energy storage for the (Location) using battery technology. The (ORG)'s forward thinking approach is looking for ways to expand their investment into renewable energy technology solutions.

(Organization) intends to install integrated behind-the-meter (BTM) Battery Energy Storage System (BESS) to support the following facilities in the event of an extended grid outage:  
(add description of existing facilities and/or solar PV)

The BESS shall be sized for a minimum (Power) capable of operating for (hours) hours at nameplate rating.

(add specific requirements)

### **Proposal Process and Schedule**

(Organization) is requesting proposals from qualified Battery Energy Storage System (BESS) vendors to design, procure, install, test and commission an Energy Storage System to meet the requirements as described in this request for proposals (RFP) document for the (project name) as a turnkey system.

(ORG) will select a short list of (number) vendors. Interviews will then be held between (ORG) and the vendors selected to discuss the details of each vendor's proposal and to clarify the intent of the requirements. If required, the vendors may submit revised proposals including clarifications. (ORG) will then select a vendor and enter into contract negotiations.

The desired schedule for the BESS project is shown in the below table. Reasonable alternate schedules proposed by the BESS vendor will be considered:

RFP issued	(date)
Site Visit	(date, time and place)
Questions Due	(date)
Responses to Questions Posted	(date)
Bids Due	(date)
Shortlist selected and interviews conducted	(date)
Contract awarded	(date)
BESS startup	(date)
BESS accepted	(date)

### **PART 3: SCOPE OF WORK / REQUIRMENTS**

The purpose of this scope of work section is to provide qualified bidders with more detail on the description of the project, explanation of how it will be managed and to clarify what deliverables are to be provided by the successful BESS vendor.

#### **Scope of Supply**

The scope of supply for the BESS shall include the following principal elements. The vendor shall be responsible for identifying and providing any and all other additional equipment, components, and services necessary to install a fully functional BESS.

- Design, fabricate, procure, ship, assemble, test, startup, commission, warrant and make ready for service a fully functional turnkey BESS and balance of system equipment that meets or exceeds all requirements.
- All required equipment / materials labor and tools required to install, test, and commission the BESS
- Design, install and make ready for the electrical connection from the BESS to the AC point of connection as determined by the owner. Vendor is responsible for the low voltage AC connections, cable, and protection, back to BESS
- Design install and test a Human Machine Interface (HMI) onsite.
- Provide on-site training classes for (ORG) operators, engineers, technicians and maintenance personnel
- Supply any special equipment and tools required for the operation and maintenance of the project
- Supply an initial complement of spare parts
- Provide at minimum a five-year warranty for all BESS components, and a separate cost breakdown for additional years
- Submit for (ORG) review and comment all design drawings, O&M manuals, and miscellaneous documentation required to provide a complete installation. Provide all

as-built documentation including calculations, software, design drawings, equipment drawings required for the BESS

- Provide and maintain a Schedule for all design, fabrication, procurement, installation and testing activities for the project

### **Documentation Deliverables**

The Contractor shall furnish complete documentation that will be used for determination of contract compliance, as well as, operation and maintenance of the BESS. The documentation shall be in English, well detailed and instructive.

At a minimum, the Contractor's documentation shall consist of the following:

- Conceptual design package for (ORG) review
- Stability and system integration study for the microgrid application
- ESS performance specifications and application-specific specification/operation
- Complete design package, BOM and calculations for (ORG) review
- Complete design package, BOM and calculations issued for construction
- Network diagram of the BESS system
- Complete commissioning plan including test and startup procedures for (ORG) review
- Complete set of as built drawings post construction
- Complete set of test results package for record
- Statement of completion
- Installation manuals, instruction manuals and operation guides for all equipment and subsystems. Specific instruction manuals for operation of the BESS controller are required.
- Other project documentation that would reasonably be required for (ORG) to document the construction of the BESS and operate the BESS in the future.
- BESS Control and protective settings
- Maintenance Schedule
- Project Schedule
- Software Documentation
- As-built drawing and documentation upon final Project acceptance

All documentation shall be provided in:

- Paper hard copy (two copies)
- PDF format, all documents are to be provided in PDF format
- Native file format when applicable, in addition to PDF format documents shall be provided in native file format. Drawing shall be provided in AutoCAD format. Documents that were created in Word or Excel, etc. shall also be provided in those formats in addition to PDF.

### **Design Conditions**

- Design Temperature Range: (insert appropriate temperature range depending on location of the ESS – inside or outside)
- Peak Wind Gust: (insert appropriate depending on location of the ESS – inside or outside)

- Seismic Zone: (insert relevant)

### Electrical Design Parameters

- Nominal voltage at (location) = (insert voltage at the building)
- Normal frequency = 60 Hz with normal deviation of +/- 0.2 Hz
- Frequency design tolerance = 59.0Hz – 61.0Hz

### Audible Noise

The maximum sound level generated from the BESS system and any associated equipment supplied by the BESS vendor under any output level within the BESS operating range, shall be limited to 65 dBA at 50 feet in any direction.

### BESS Requirements

- (Power) / capable of operating at nameplate rating for (hours) hours. The system must maintain this capability over the expected lifetime (identified in the vendor's proposal)
- Full power discharge, for (insert specific requirements)
- 50% maximum output power, for (insert specific requirements)
- Shallow discharge, 70% power for (insert specific requirements)
- BESS Efficiency –
  - o Minimum 90% AC round trip for Li-Ion and Lead Acid technologies
  - o Minimum 70% AC round trip for flow battery technology
- THD < 5% as per inverter spec 519.
- Ambient temperature range (insert appropriate temperature range, may not be necessary to include if batteries are installed inside).
  - o It is the responsibility of the BESS vendor to design all components to operate at safe rated sustainable operating temperatures over the required ambient temperature range.
- Monitoring requirements to include Voltage, Current, Power, PF. Data Acquisition System shall have (30/60/90) days on site data storage and capability to be remotely accessed and data downloaded.
- Data Acquisition / Monitoring / Alarms

The Data Acquisition/monitoring/alarm system or procedures shall have a minimum of the following capabilities

- o Alert (ORG), when the number of failed or inadequately performing cells or other vendor determined conditions indicate that;
  - Preventative maintenance should be performed to keep the BESS at the specified performance levels.
  - The BESS is in imminent danger of failing to meet specified performance levels or potential safety hazards exist.
  - The BESS can no longer meet the specified performance criteria or safety hazards exist.
  - The BESS vendor shall have the capability to remotely monitor the BESS and independently and be automatically alerted to BESS alarm conditions

- without relying on (ORG) personnel to communicate that such alarm conditions exist.
  - The BESS vendor shall have the capability to respond to alarm conditions and provide required service to correct such alarm conditions within four hours from the inception of the alarm condition.
  - The vendor shall include, in the Operation and Maintenance Manual, the recommended corrective action and maintenance procedures for each alarm level or observed condition provided.
- Monitor Points shall include but not be limited to: AC – Voltage, Current, Power factor, KW, KVA, KVAR; DC – DC voltage and current. Points of monitoring TBD during design. Also, system temperature shall be monitored at a minimum of 2 points
  - System should have the ability to remotely access and monitor the data as well as have a 30-day on-site memory storage capacity.
  - Data points shall have the ability be recorded at a minimum of 1 minute, with the capability for instantaneous collection of data when data is outside of set parameters.
- Meet the existing (ORG) Cyber security Requirements
- The BESS control system shall be designed to provide for automatic, unattended operation of the BESS. However, the control system design shall also provide for local manual operation or remote operation.

## **Modes of Operation**

### Microgrid - Resiliency for Emergency Conditions

In the event of an extended grid outage due to a natural disaster, the BESS shall be used to power the emergency panel of the critical load circuit.

(add specific requirements – see example below)

The BESS shall be designed to provide backup power to a set of critical loads. The BESS contractor shall include the creation of a critical power circuit, including re-wiring of the critical loads and installation of critical power switchgear, in the scope of work.

List of Critical Loads: TBD, following are some examples

- Water booster pump station
- 1x Elevator
- Fire Alarm
- Hallway and stairwell lighting
- 1<sup>st</sup> Floor Office and Lobby Lighting
- Boiler room panel

Location of New Critical Power Switchgear: Electric Room.

### Peak Load Reduction

A promising advantage for (ORG) is the reduction of peak load. One operational mode is to have the energy storage discharge during expected peak load hours. The BESS shall have a method for forecasting the peak load and automatically dispatching the battery or scheduling the charge/discharge in advance.

(add more requirements as needed)

## Harmonics

The BESS must meet the harmonic specifications of IEEE 519.

## Protection Requirements and Balance of System Components (BOS)

The BESS system shall contain protective relaying features, circuit breakers or fuses which self-protect the BESS in the case of internal electrical faults.

BESS vendor shall procure and install BOS components with the following requirements:

- Follow requirements described on three-line diagram.
- Make and Model of BOS components is allowed to be chosen by ESS contractor.
- Provide the functionality described elsewhere in the specification documents.
- DC disconnect switches: UL listed, blade-type, heavy duty fused safety switches on the output of the Battery array in NEMA enclosure rating as required by installation location or may be integrated to the Inverters.
- AC disconnect switches: UL listed, blade-type, heavy duty fused safety switches on the output of Inverter(s) in NEMA enclosure as required by installation location or may be integrated to the Inverter.

## Internet connection

(add specific requirements)

## Labeling

Install signage posted at site, including at least the following but also any signage required by the NEC or other applicable codes:

- Laminated Diagrams including:
  - o AC and DC disconnect locations for the system indicated on a site plan.
  - o Electrical one-line diagram of system
  - o All signage required shall be mounted in appropriate and visible locations
- All equipment shall be appropriately identified with permanent, self-adhesive labels.
  - o Each DC disconnect shall be labeled with label material described above for operating DC current ( $I_{mp}$ ), system operating DC voltage ( $V_{mp}$ ), maximum string DC voltage ( $V_{oc}$ ), and maximum system DC current ( $I_{sc}$ ).

The ESS interconnection point (as described in Single Line Diagram, attachment #2) shall be labeled as such indicating the system AC voltage, current, and the ESS rating in kW-ac and kWh.

## **Grounding**

A suitable equipment grounding system shall be designed and installed for the BESS system. This system shall be tied to the (location) grounding system. The grounding system shall provide personnel protection for step and touch potential in accordance with IEEE 80. The system also shall be adequate for the detection and clearing of ground faults within the BESS. The vendor shall determine, design and install the required interconnections between the BESS and (location) grounding systems.

(ORG) shall self-perform the alterations needed to the existing (location) grounding and install the connections from the existing ground grid to the external grounding locations of the BESS. The appropriate external grounding locations for the BESS shall be determined and provided by the BESS vendor.

## **Structural / Foundation Pads / Conduit**

The vendor shall furnish the design for the structural components of the BESS, concrete pads/foundations as required, and conduit required for the complete BESS. All BESS foundations and structures, if required, shall be designed by a qualified registered professional engineer licensed in the state of Massachusetts. All final (Issued for Construction) drawings, specifications and calculations shall be wet-stamped by a Registered Civil/Structural Engineer licensed in the state of Massachusetts. The vendor is responsible for Geotechnical surveying if required.

(ORG) will self-perform the installation of the concrete pad/foundation and buried conduit installation based on the design provided by the BESS vendor.

## **Mounting System**

BESS vendor shall install BESS components per manufacturer requirements:

- a. All components shall be secured to floor or walls.
- b. Include structural load design calculations signed and sealed by a qualified professional engineer licensed in the state of Massachusetts.
- c. All structural components shall be installed in a manner commensurate with attaining a minimum 25-year design life.

## **Spill Containment**

The BESS design shall mitigate against electrolyte spills that are credible for the types of cells used. The design shall include features that contain electrolyte spills (to be emptied by contracted chemical disposal company in the event of a spill) and prevent discharge to surrounding site soils.

## **Personnel Safety**

The BESS shall include eyewash stations in the battery area as applicable. In general, the BESS shall be designed with personnel safety as the top priority.

## **Fire Protection**

The vendor shall design and install a fire protection system that conforms to national and local codes. The fire protection system design and associated alarms shall take into account that the BESS will be unattended at most times. In the event that codes do not exist for the proposed BESS, current industry-accepted best practices shall be employed.

## **Spare Parts and Equipment**

The vendor shall evaluate its design with regard to failure rates, effects and BESS reliability. The vendor shall provide a recommended spare parts list, including prices and availability, as part of his proposal.

## **Battery Management System (BMS)**

The vendor shall install BMS capable of protecting and monitoring individual battery modules.

## **Factory Testing - Battery**

The vendor shall test and submit test data for the cells designated for use on this project. At a minimum, the following tests shall be performed.

- Capacities, Amp-hour and Watt-hour
- Ramp rate
- Heat Generated
- Efficiencies
- As applicable, maximum noxious and toxic material release rates
- Application simulations as required by (ORG)

The vendor shall capacity test 100% of the production cells to ensure compliance with design requirements. The vendor may propose optional alternate testing programs that result in a benefit to (ORG). However, the base proposal shall include capacity testing of 100% of the cells. All proposals for alternate testing shall include details of the proposed plan and the cost benefit to (ORG).

The vendor shall include in their proposal, factory witness testing for three (ORG) representatives at the cost of the vendor. (ORG) shall witness performance and modes of operation testing.

## **Commissioning - Acceptance and Performance Testing**

The vendor shall develop and perform a commissioning program that will include but not be limited to procedures for design verification, operational acceptance testing, Start-up procedures, functional acceptance testing and safety testing. This commissioning program will assure that the BESS will perform as designed and that the system meets the performance criteria specified elsewhere in these specifications. All modes of operation as described in these specifications shall be tested. The vendor shall determine that the BESS is fully operational and suitable for acceptance testing witnessed by (ORG). The vendor shall document all acceptance and performance tests performed. The vendor shall submit documentation, analyses, and a summary in a test report for (ORG)'s records. The commissioning program will be developed by

the vendor (approved by (ORG) and shall demonstrate to (ORG) that the BESS is operational and performs as specified. These tests shall include, as a minimum:

- Grounding and electrical resistance testing
- Verification of sensors, metering and alarms
- Verification of all control functions, including automatic, local and remote control
- Verification of performance criteria

### **Warranty**

Vendor warrants (ORG) that the equipment and materials furnished hereunder and the completed BESS project are fit for the purpose of producing and storing electricity in accordance with the requirements and are free from defects in workmanship and materials. Vendor makes all such warranties for a period of five (5) years after the date of acceptance of the project by (ORG). In addition vendor shall clearly indicate life expectancy given discharge profiles provided in this RFP.

### **Utility Interconnection and Rates**

(add specific utility interconnection/integration and rate details)

Vendor should coordinate with the (ORG's) Utility Company (name here) and file all forms required for Interconnection between the utility grid and BESS.

Contractor should coordinate with the Utility Company and be able to negotiate the rate that aligns best with BESS' capability to generate savings and/or revenue for (ORG). Contractor should immediately notify the (ORG) if the proposed BESS design limits the site's capability to switch between utility rates.

### **Modifications**

Modifications to the (ORG) conceptual design may be made. As these changes affect the BESS vendor, they will be communicated and coordinated with the successful BESS vendor. The BESS vendor shall work in cooperation with any (ORG)-hired engineering firm to exchange information as needed so that each party can complete the design of their required scope of work.

### **Additional Requirements**

The project design shall meet all applicable industry standards and codes including but not limited to NEC, NESC, ASCE, IEEE, standard utility practice. In the event specific codes are not available for the BESS, current industry accepted best practices shall be employed.

The BESS vendor's project manager shall be asked to attend bi-weekly phone meetings with (ORG) representatives during certain portions of the design process. The purpose of these meeting is to receive a status report on the progress of the design package and to discuss any open items or requests for information each party may have submitted to the others.

## **PART 4: EXCLUSIONS**

(add specific exclusions below)

## PART 5: SCHEDULE

The BESS vendor shall provide a proposed schedule with their proposal. The schedule shall include design, fabrication, delivery, on site construction and testing phases with subtasks as needed. The schedule will be discussed and finalized in conjunction with the Owner's Project Manager (OPM) prior to the final award of this project.

## PART 6: COST PROPOSAL

- A. The Energy Storage System (BESS) contract will be paid as a fixed price contract. Travel time to and from the site will not be reimbursed.
- B. Respondent shall complete the attached Exhibit B, Cost Proposal. Clearly indicate each job category and rate on this form. All hourly rates shall meet the prevailing wage schedule that includes overhead and labor burden.
- C. The final total indicated on the cost proposal shall include all costs associated with completing the work, for the staff and manpower projections provided.
- D. The cost proposal is to be placed in a separate sealed envelope bearing the title "Cost Proposal (project title)" and included with the proposal. Respondents shall include cost proposals that as a minimum include the following line items.
  - Energy Storage system equipment itself, designed, delivered, installed, tested and commissioned
  - Maintenance service schedule and cost estimates; service contract terms
  - Extended warranty offering (in addition to 5-year base warranty)
  - Recommended spare parts, including typical replacement schedule
  - Uptime guarantee
  - Training and support for (ORG) operations personnel

Include cost for witness testing as required: "The vendor shall include in their proposal, factory witness testing for three (ORG) representatives **at the cost of the vendor**. (ORG) shall witness performance and modes of operation testing."

## PART 7: SELECTION PROCESS

### General

1. The (municipal committee), the (ORG) Chairman and General Manager in consultation with (consultant name) (the OPM) will form the ("Selection Committee"). They will utilize the SELECTION CRITERIA (see below) to evaluate submissions. The evaluation will be based upon the information submitted and information solicited by the Selection Committee from various sources and references.

2. Interviews will be held for the top three BESS providers.
3. During the evaluation or review process, the Selection Committee reserves the right to request additional information or clarification from any bidder, or to allow corrections of errors or omissions.
4. The Selection Committee shall make a recommendation to the (ORG) Board of Directors. The (ORG) reserves the right to reject any or all proposals and to waive any informalities or irregularities should it deem it to be in the best interest of the (municipality name).
5. All firms or individuals submitting proposals will be notified of the Awarding Authority's final selection.

## **PART 8: SELECTION CRITERIA**

### **Participation Requirements**

In order for a bid to be submitted, the BESS vendor must have the following minimum qualifications. Qualifications shall be included in writing as part of the vendor's proposal.

1. BESS vendor has experience successfully installing and integrating battery projects using the same or similar OEM equipment as is being proposed. References for these projects may be contacted.
2. Engineering subcontractors must have 3 years of experience on similar type projects

### **Evaluation Criteria**

The Selection Committee will consider the following comparative criteria provided as part of each vendor's proposal when ranking the proposals submitted.

1. Microgrid Operation - The BESS proposed must be able to satisfy the economic and critical power requirements as described in this RFP.
2. Financial Stability - The vendor and major equipment subcontractors must be financially stable companies capable of providing long term service of the BESS and meeting warrantee obligations.
3. Technical Feasibility – Points will be awarded by examining a number of factors, including technology, operational, and resource feasibility. Note: There should be adequate and appropriate data to describe the energy storage technology and its intended operation, including the physical storage mechanism, size, operational and maintenance needs of the technology, and warranties. This information should be presented in a clear and orderly fashion to demonstrate that the project is feasible.
4. Total Cost of Ownership - Total cost of ownership (5-years) of the BESS taking into consideration, initial cost, maintenance costs, warranty costs, guarantee costs, spare parts costs, and degradation over time, replacement costs and schedule, efficiencies, and other costs as identified. (Include only if this applies.)
5. Vendor DAS / HMI - Points will be awarded by examining the level of development, functionality and robustness offered by the BESS HMI and the ability for the BESS HMI.
6. Project Plan - Points will be awarded based on the completeness and description of a well thought-out and well-presented project plan tailored to the specific (ORG) project

objectives. The proposal shall clearly explain that the BESS meets the (ORG) requirements and, as needed, shall explain how the requirements are met.

7. Previous Project Experience - Points will be awarded based on the amount of successfully implemented previous project experience presented that is of similar size and technology. The experience of the specific project manager and project team / subcontractors proposed will be factored into the evaluation. Feedback from past customers shall be taken into consideration. (ORG) may reach out to references provided by the vendors.
8. Service - Points will be awarded based on the vendor’s ability to provide emergency response service in a short amount of time after an issue with the BESS is detected. Service organization, infrastructure, location and response time will be taken into consideration.
9. Schedule - Points will be awarded based on the BESS lead time and vendor's ability to meet the (ORG) proposed schedule. Some flexibility may be taken into consideration by (ORG).
10. Interview Performance - The Vendor demonstrates an understanding of the key issues of the (ORG) project and an ability to work with (ORG) in order to successfully complete the project in the best interest of (ORG).

The following weighted evaluation matrix will be used as a tool to compare the responses to this RFP. The total weighted score calculated for each of the proposals will be compared by the selection committee to determine which proposal are classified as “highly advantageous”, “advantageous”, “not advantageous” or “unacceptable”.

### BESS Proposal Evaluation Matrix

Item #	Gating Criteria Description		Score (0 or 1)	
1	Microgrid Operation		1	
2	Financial Stability		1	
Item #	Evaluated Criteria Description	Assigned Weight	Score (1-10)	Weighted Score
3	Technical Feasibility	20.00%	10	2
4	Total Cost of Ownership	20.00%	10	2
5	Vendor DAS / HMI	10.00%	10	1
6	Project Plan	10.00%	10	1
7	Previous Project Experience	15.00%	10	1.5
8	Service	15.00%	10	1
9	Schedule	5.00%	10	0.5
10	Interview Performance	5.00%	10	1
	Total	100.00%	80	10

## **PART 9: GENERAL PROVISIONS**

### **General**

1. The Awarding Authority reserves the right to reject any and all proposals and to waive any informalities or irregularities as it deems in the best interest of the (municipality name).
2. All submittals, materials, drawings, plans, etc., submitted for consideration shall be considered public information unless clearly marked as PROPRIETARY by the responder.
3. The selected responder, and any sub-consultants of the selected responder, shall be expected to comply with all federal, state, and local rules, regulations, and laws applicable to the project(s) without limitation including all federal, state, and local bidding, environmental, building and safety rules, regulations, and laws in the performance of services.
4. The consideration of all submittals and the subsequent selection of the successful responder shall be made without regard to race, color, sex, age, handicap, religion, political affiliation or national origin.
5. The selected responder, and all sub-consultants of the successful respondent, shall adhere to the provisions of the Fair Employment Practices Law of the Commonwealth (Chapter 151B of the Massachusetts General Laws).
6. The successful responder, and all sub-consultants of the successful responder, shall assure the Awarding Authority that it will carry out the performance of services in full compliance with all requirements imposed by or pursuant to Title VI of the Civil Rights Act of 1964 (78 Stat.252), and any executive orders of the Governor of the Commonwealth as such may from time to time be amended.
7. The provisions related to non-discrimination and affirmative action in employment shall flow through all contracts and subcontracts that the successful responder may receive or award as a result of this contract on behalf of the Awarding Authority.

## **PART 10: SUBMISSION REQUIREMENTS**

### **Required Materials**

1. Cover letter outlining vendor's contact person including title, telephone, and e-mail address.
2. Names and addresses of all partners, officers, directors and owners, i.e., persons with an ownership interest in the firm of more than five percent.
3. A full listing of all persons to be assigned to the project, including all sub consultants, including the following:

- a. Individuals' resumes including work performed on all projects of similar scope and scale over the past five (5) years.
  - b. Each Individual's qualifications for the project including a listing of all Massachusetts Registrations by discipline, licenses, or other documentation of qualifications. The skill sets of the engineering team should cover the entire scope of work required.
  - c. The BESS vendor shall state which of these team members are direct employees of the vendor and which are subcontracted or casual resources. It is required that the team presented in the proposal will be the team assigned to the project if the engineering firm is awarded the project unless changes are agreed to by (ORG) in writing.
4. Respondents must demonstrate successful completion of energy storage systems using the same technology proposed. Provide a complete listing of and contact information for all similar projects performed by your firm over the past three (3) years. For each such project, provide a complete project description, including project size, completion date, major equipment vendors used, warranty claims, uptime percentage, as well as client name and contact person, including address, telephone and email addresses. The Awarding Authority reserves the right to contact any client listed for the purpose of obtaining reference information.
  5. Evidence that the BESS vendor possess the knowledge and skill to:
    - a. Recommend solutions to problems encountered during the work and direct field changes.
    - b. Provide the Awarding Authority with periodic status reports, as agreed upon by the parties, with respect to the overall status of the work.
  6. Completion and signing of Certification attached as Exhibit A.
  7. Documentation of financial stability, documentation of bonding capacity, credit references, or other documentation to demonstrate financial solvency of the firm or individual responder.
  8. Additional information related to the responder's (and subcontractors', if any) qualifications and experience to perform the work (letters of reference, description of project methods utilized for comparable projects, etc.), and similar supplementary information may be provided.
  9. A cost proposal will be submitted in a separate, sealed envelope, clearly marked "(RFP Title)" (*project name*).
  10. Provide list of exceptions and clarifications to the technical proposal and commercial terms and conditions, or written verification that no exceptions or clarifications are taken.
  11. The BESS vendor shall provide a proposed time schedule with their proposal. The schedule shall include design, fabrication, delivery, on site construction and testing phases with subtasks as needed. The schedule shall include a two-week review duration by (ORG) for each submitted design package. The schedule shall also include the following: "The vendor shall include in their proposal, factory witness testing for three (ORG) representatives at the cost of the vendor. (ORG) shall witness performance and modes of operation testing.

12. This schedule shall be tracked and maintained by the BESS vendor throughout the project.
13. The vendor shall submit with its proposal a list of information that the firm will require from (ORG) at the kickoff of the project in order to be able to proceed with design.
14. Typical degradation curve information for the battery system proposed.
15. If it is recommended by the battery supplier that cells be changed out at regular intervals given a proposed battery replacement schedule, provide battery replacement costs and a description of escalation factors used to determine actual battery costs at the time of replacement. Provide information on battery replacement procedure, including estimated time to complete replacement.
16. Provide warranty terms and conditions document.
17. Provide recommended spare parts list and prices.
18. Provide a description of all required maintenance activities, including estimated man-hours and frequency of occurrence and cost for each activity. Describe the service contract terms.
19. Provide information on AC/AC round trip efficiencies.
20. Provide information showing the length of time the battery can maintain constant output at demand levels less than rated output.
21. Provide information showing the length of time the battery can maintain rated output at a reduced state of charge.
22. Provide information on guaranteed life expectancy to maintain rated capacity as number of discharges or total energy delivered varies.
23. Provide information on the controlling parameters that determine life expectancy for the proposed system.
24. Provide information on required environmental conditions or maintenance procedures (if any) that performance guarantees are based on.
25. Provide Power Conversion System (PCS) manufacturer specifications.
26. Provide information on how the charging cycle changes as maximum demand is reduced.
27. Provide information on the state of charge of the battery as a function of time during the charge cycle.
28. Provide proposed factory and commissioning plans to include performance and "Modes of Operation" testing.
29. Provide a performance curve indicating # of cycles vs. depth of discharge.
30. Provide a description of the BESS vendor's remote alarm monitoring capabilities and service dispatch capability including estimated response time to (municipality name) after automatically receiving an alarm.

## **PART 11: ATTACHED DOCUMENTS**

1. Exhibit A Certification
2. Exhibit B Proposal Financial Worksheet
3. Exhibit C Certificate of Authority
4. Exhibit D Tax Compliance Certification
5. One Line diagram ((ORG) Conceptual design for RFP)
6. One Line relaying and metering diagram ((ORG) Conceptual design for RFP)
7. Electrical Arrangement Plan

## Exhibit A Certification

The applicant hereby certifies that:

1. The applicant has not given, offered, or agreed to give any gift, contribution, or offer of employment as an inducement for, or in connection with, the award of contract for these services.
2. No consultant to, or subcontractor for, the applicant has given, offered, or agreed to give any gift, contribution, or offer of employment to the applicant, or, to any other person, corporation, or entity as an inducement for, or, in connection with, the award of the consultant or subcontractor of a contract by the applicant.
3. No person, corporation, or other entity, other than a bona fide full-time employee to the applicant has been retained or hired to solicit for or in any way assist the applicant in obtaining the contract for services upon an agreement or understanding that such person, corporation, or entity be paid a fee or other compensation contingent upon the award of the contract to the applicant.

I hereby attest with full knowledge of the penalties for perjury, as in accordance with Massachusetts G.L.c.7, § 38E, that all information provided in this application for services is correct.

---

Firm

---

Signed (Typed)

---

Signed (Written)

---

Title

---

Date

## Exhibit B Cost Proposal Worksheet

The vendor is to fill out and return the separate Exhibit B – Proposal Financial Worksheet as part of the cost proposal. Exhibit B is to be provided in hard copy and MS excel format. It is expected that not all line items will be required for this project by all vendors. It is acceptable and expected to have \$0 cost line items. A \$0 cost line item does not equal a formal exception taken of a requirement of this RFP. All exceptions must still be listed in an exception section.

[Add remaining attachments as applicable]

## Section C – UTILITY SCALE RFP TEMPLATE

# Request for Proposals Template: Utility Scale

---

[Title and Solicitation Number]

(Organization)

for The Town of (municipality),

Community Clean Energy Resiliency Initiative

Request for Proposals

Release Date: \_\_\_\_\_, 2016

Due Date: \_\_\_\_\_, 2016

(ORGANIZATION) FOR THE (MUNICIPALITY)  
REQUEST FOR PROPOSALS – ENERGY STORAGE SYSTEM  
FOR THE COMMUNITY CLEAN ENERGY RESILIENCY INITIATIVE

[Title and Solicitation Number]

**Table of Contents**

Acknowledgments..... 5

PART 1: INTRODUCTION ..... 6

    A: General ..... 6

PART 2: GENERAL ..... 8

    Background ..... 8

    Project Description..... 8

    Proposal Process and Schedule ..... 8

PART 3: SCOPE OF WORK / REQUIRMENTS ..... 9

    Scope of Supply..... 9

    Documentation Deliverables ..... 10

    Design Conditions ..... 10

    Electrical Design Parameters ..... 11

    Audible Noise ..... 11

    BESS Requirements ..... 11

    Modes of Operation..... 12

    Harmonics ..... 13

    Protection Requirements and Balance of System Components (BOS)..... 13

    Internet connection ..... 13

    Labeling ..... 13

    Grounding ..... 14

    Structural / Foundation Pads / Conduit..... 14

    Mounting System..... 14

    Spill Containment..... 14

    Personnel Safety ..... 14

    Fire Protection ..... 15

    Spare Parts and Equipment ..... 15

Battery Management System (BMS).....	15
Factory Testing - Battery.....	15
Commissioning - Acceptance and Performance Testing.....	15
Warranty.....	16
Utility Interconnection and Rates.....	16
Modifications.....	16
Additional Requirements.....	16
PART 4: EXCLUSIONS.....	16
PART 5: SCHEDULE.....	17
PART 6: COST PROPOSAL.....	17
PART 7: SELECTION PROCESS.....	17
General.....	17
PART 8: SELECTION CRITERIA.....	18
Participation Requirements.....	18
Evaluation Criteria.....	18
BESS Proposal Evaluation Matrix.....	19
PART 9: GENERAL PROVISIONS.....	20
General.....	20
PART 10: SUBMISSION REQUIREMENTS.....	20
Required Materials.....	20
PART 11: ATTACHED DOCUMENTS.....	23
Exhibit A Certification.....	24
Exhibit B Cost Proposal Worksheet.....	25
Section C – UTILITY SCALE RFP TEMPLATE.....	26
PART 1: INTRODUCTION.....	6
A: General.....	6
PART 2: GENERAL.....	8
Background.....	8
Project Description.....	8
Proposal Process and Schedule.....	8
PART 3: SCOPE OF WORK / REQUIRMENTS.....	9

Scope of Supply .....	9
Documentation Deliverables .....	10
Design Conditions .....	11
Electrical Design Parameters .....	11
Audible Noise .....	11
BESS Requirements [ALTER TO SUIT PROJECT REQUIREMENTS].....	11
Modes of Operation.....	12
Microgrid - Resiliency for Emergency Conditions .....	12
Peak Load Reduction.....	13
3MW PV Smoothing.....	13
Automatic Scheduling .....	14
Voltage Regulation.....	14
Harmonics .....	14
Protection Requirements.....	14
SCADA Integration .....	14
Internet connection .....	15
Grounding .....	15
Structural / Foundation Pads / Conduit.....	15
Spill Containment.....	16
Personnel Safety .....	16
Fire Protection .....	16
Spare Parts and Equipment .....	16
Factory Testing - Battery.....	16
Commissioning - Acceptance and Performance Testing.....	17
Warranty .....	17
Interconnection.....	17
Modifications .....	18
Additional Requirements .....	18
PART 4: EXCLUSIONS.....	18
PART 5: SCHEDULE .....	19
PART 6: COST PROPOSAL .....	20

PART 7: SELECTION PROCESS ..... 20

    General..... 20

PART 8: SELECTION CRITERIA ..... 21

    Participation Requirements ..... 21

    Evaluation Criteria..... 21

    BESS Proposal Evaluation Matrix ..... 22

PART 9: GENERAL PROVISIONS ..... 23

    General..... 23

PART 10: SUBMISSION REQUIREMENTS ..... 23

    Required Materials ..... 23

PART 11: ATTACHED DOCUMENTS ..... 26

Exhibit A Certification ..... 27

Exhibit B Cost Proposal Worksheet..... 28

Distribution ..... 29

## PART 1: INTRODUCTION

### A: General

(Organization) (ORG), as the Awarding Authority (Known as Owner), invites the submission of proposals by responsible companies (known as Vendor) to design, procure, install, test and commission a minimum (capacity) Battery Energy Storage System (BESS) to be located at the (location). The primary purpose of this Community Clean Energy Resiliency Initiative Project, being performed in part with a grant from the Massachusetts Department of Energy Resources (DOER), is to provide resiliency through the use of energy storage at the (location) using battery technology.

The successful vendor will work with the (ORG), Owner's project Manager (OPM), (Name of the Project Management Firm). Respondents must demonstrate successful completion of energy storage systems using the same technology proposed.

All submissions, to be considered, must be prepared in accordance with the requirements specified in this Request for Proposals document and in accordance with applicable provisions of Massachusetts General Laws.

The cost is to be negotiated with the company having the number one ranked proposal based on their ability to meet or exceed all requirements outlined in the attached selection criteria. Any exceptions to the requirements of this RFP are to be identified on a separate form and clearly marked exceptions. If an agreement cannot be reached with the first choice, the Awarding Authority will negotiate with the next highest ranked firm. The cost for BESS maintenance and the performance degradation over the life of the project will be considered in the selection process. This is a total cost of ownership-based selection process.

The vendor's cost proposal is to be placed in a separate sealed envelope bearing the title "(RFP Title)" and included with the proposal. Bidders shall use the Work Breakdown Structure (WBS) provided in the RFP package. The contract will be awarded to the vendor with the most advantageous and responsive submittal taking into consideration both price and non-price submittals. **Copies of the full RFP documents and required forms are available at the (Building) building and on the (ORG) website.**

Seven (7) hard copies of all Submission Requirements must be submitted to:

(Title)  
(Address)  
(Organization)

Submissions are due on or before \_\_\_\_\_ at \_\_\_\_\_ pm. Any submission received after this time and date will not be considered and will be returned to the respondent unopened. The clock in the (Municipality) office shall represent the official time for purposes of this determination.

Copies of Submission Forms, and any inquiries regarding the information contained in this Request for Proposals, shall be directed to the General Manager at the address above, by telephone (\_\_\_\_\_) or by email (\_\_\_\_\_). **The deadline for written questions will be \_\_\_ PM on \_\_\_\_\_.** Responses to questions will be posted \_\_\_\_\_. Interested parties are responsible for checking the website for addenda and responses to questions. The (Organization) reserves the right to waive any informality in the submissions, to reject any or all submissions, or to accept any submission which it deems to be in the best interest of the (municipality name).

Interested parties are instructed to check the (ORG) website for addenda to this RFP. Submissions are to be sealed and properly identified on the outer envelope as “(RFP Title)” (Project Name). Price proposals are to be in a separate sealed envelope, appropriately identified, i.e., two separate envelopes for each proposal.

(Name)  
(Title)  
(Organization)  
(Date)

## **PART 2: GENERAL**

### **Background**

(add project background and description of proposed sites for Behind-the-Meter battery storage systems)

### **Project Description**

In December 2014 the (Organization) was awarded a grant by the Massachusetts Department of Energy Resources (DOER) Renewable and Alternative Energy Division for a project proposed in our Community Clean Energy Resiliency Initiative grant application, namely, (give name of the project). This project looks to provide energy storage for the (Location) using battery technology. The (ORG)'s forward thinking approach is looking for ways to expand their investment into renewable energy technology solutions.

(Organization) intends to install a utility scale Battery Energy Storage System (BESS) to support its distribution system in the event of an extended grid outage due to a natural disaster. (add description of existing facilities).

The BESS shall be sized for a minimum (Power) capable of operating for (hours) hours at nameplate rating. (add specific requirements)

### **Proposal Process and Schedule**

(Organization) is requesting proposals from qualified Battery Energy Storage System (BESS) vendors to design, procure, install, test and commission an Energy Storage System to meet the requirements as described in this request for proposals document for the (project name) as a turnkey system. Add here whether the Vendor will be expected to operate the system over X (5?) years, or to turn over operation to the utility following commissioning.

(ORG) will select a short list of three vendors. Interviews will then be held between (ORG) and the vendors selected to discuss the details of the vendor's proposal and to clarify the intent of the requirements. If required, the vendors may submit a revised proposal including clarifications. (ORG) will then select a vendor and enter into contract negotiations.

The desired schedule for the BESS project is shown in the below table. Reasonable alternate schedules proposed by the BESS vendor will be considered:

RFP issued	(date)
Site Visit	(date, time and place)
Questions Due	(date)
Responses to Questions Posted	(date)
Bids Due	(date)
Shortlist selected and interviews conducted	(date)
Contract awarded	(date)
BESS startup	(date)
BESS accepted	(date)

### **PART 3: SCOPE OF WORK / REQUIRMENTS**

The purpose of this scope of work section is to provide qualified bidders with more detail on the description of the project, explanation of how it will be managed and to clarify what deliverables are to be provided by the successful BESS vendor.

#### **Scope of Supply**

The scope of supply for the BESS shall include the following principal elements. The vendor shall be responsible for identifying and providing any and all other additional equipment, components, and services necessary to install a fully functional BESS.

- Design, fabricate, procure, ship, assemble, test, startup, commission, warrant and make ready for service a fully functional turnkey BESS and balance of plant equipment that meets or exceeds all requirements delineated herein up to the BESS step-up transformer and SCADA interface. Step-up transformer and SCADA backbone will be provided by (ORG) and the connection will be completed by Vendor.
- All required equipment / materials labor and tools required to install, test, and commission the BESS
- Design, install and make ready for the electrical connection from the BESS to the AC point of connection as determined by the owner. Vendor is responsible for the low voltage AC connections, cable, and protection, back to BESS
- Design, install and make ready for the communication connection from the BESS to the (location) and (ORG) network switch located in the (location).
- Design install and test a Human Machine Interface (HMI) at the (ORG) offices which is remotely connected to the BESS over the (ORG) network that is currently extended to the (location) over fiber optic cable
- Provide on-site training classes for (ORG) operators, engineers, technicians and maintenance personnel

- Supply any special equipment and tools required for the operation and maintenance of the project
- Supply an initial complement of spare parts
- Provide at minimum a five-year warranty for all BESS components, and a separate cost breakdown for additional years
- Submit for (ORG) review and comment all design drawings, O&M manuals, and miscellaneous documentation required to provide a complete installation. Provide all as-built documentation including calculations, software, design drawings, equipment drawings required for the BESS
- Provide and maintain a Schedule for all design, fabrication, procurement, installation and testing activities for the project

### **Documentation Deliverables**

The vendor shall furnish complete documentation that will be used for determination of contract compliance, as well as operation and maintenance of the BESS. The documentation shall be in English, well detailed and instructive.

At a minimum, Contractor's documentation shall consist of the following:

- Conceptual design package for (ORG) review
- Stability and system integration study for the application
- ESS performance specifications and application-specific specification/operation
- Complete design package, BOM and calculations for (ORG) review
- Complete design package, BOM and calculations issued for construction
- Network diagram of the BESS system and SCADA points list
- Complete commissioning plan including test and startup procedures for (ORG) review
- Complete set of as built drawings post construction
- Complete set of test results package for record
- Statement of completion
- Installation manuals, instruction manuals and operation guides for all equipment and subsystems. Specific instruction manuals for operation of the BESS controller are required.
- Other project documentation that would reasonably be required for (ORG) to document the construction of the BESS and operate the BESS in the future.
- BESS Control and protective settings
- Maintenance Schedule
- Project Schedule
- Software Documentation
- As-built drawing and documentation upon final Project acceptance

All documentation shall be provided in:

- Paper hard copy (two copies)
- PDF format, all documents are to be provided in PDF format
- Native file format when applicable: In addition to PDF format documents shall be provided in native file format. Drawing shall be provided in AutoCAD format.

Documents that were created in Word or Excel, etc. shall also be provided in those formats in addition to PDF.

### Design Conditions

- Design Temperature Range: min -30 F, max 110 F
- Peak Wind Gust: 110 mph
- Seismic Zone: (insert appropriate)

### Electrical Design Parameters

- Nominal voltage at (location) = 13.8 kV (1.0 pu)
- Normal sustained voltage at (location) = 0.9 pu (min) and 1.1 pu (max)
- Normal frequency = 60 Hz with normal deviation of +/- 0.2 Hz
- Frequency design tolerance = 59.0Hz – 61.0Hz

### Audible Noise

The maximum sound level generated from the BESS system and any associated equipment supplied by the BESS vendor under any output level within the BESS operating range, shall be limited to 65 dBA at 50 feet in any direction from the substation fence.

### BESS Requirements [ALTER TO SUIT PROJECT REQUIREMENTS]

- (Power) / capable of operating at nameplate rating for \_ hours, base bid. The system must maintain this capability over the expected lifetime (identified in the vendor's proposal)
- Full power discharge, for 1.5hrs, 2 times / day, 2 days /week
- 50% maximum output power, for 2 hours, 2 times / day, 2 days/ week, 14 weeks/year
- Shallow discharge, 70% power for 2 minutes, 50 times/day
- PV and net load smoothing, partial state of charge, multiple hours per day
- BESS Efficiency –
  - o Minimum 90% AC round trip for Li-Ion and Lead Acid technologies
  - o Minimum 70% AC round trip for flow battery technology
- THD < 5% as per inverter spec 519.
- Ambient temperature range -30 degree F to 110 degree F.
  - o It is the responsibility of the BESS vendor to design all components to operate at safe rated sustainable operating temperatures over the required ambient temperature range.
- Monitoring requirements to include Voltage, Current, Power, PF. Data Acquisition System shall have 30 days on site data storage and capability to be remotely accessed and data downloaded.
- Data Acquisition / Monitoring / Alarms

The Data Acquisition/monitoring/alarm system or procedures shall have a minimum of the following capabilities

- o Alert (ORG), via SCADA, when the number of failed or inadequately performing cells or other vendor determined conditions indicate that;

- Preventative maintenance should be performed to keep the BESS at the specified performance levels.
- The BESS is in imminent danger of failing to meet specified performance levels or potential safety hazards exist.
- The BESS can no longer meet the specified performance criteria or safety hazards exist.
- The BESS vendor shall have the capability to remotely monitor the BESS and independently and automatically be alerted to BESS alarm conditions without relying on (ORG) personnel to communicate such an alarm condition exists. The BESS vendor shall have the capability to respond to alarm conditions and provide required service to correct such alarm conditions within four hours from the inception of the alarm condition.
- The vendor shall include, in the Operation and Maintenance Manual, the recommended corrective action and maintenance procedures for each alarm level or observed condition provided.
- Monitor Points shall include but not be limited to: AC – Voltage, Current, Power factor, KW, KVA, KVAR. DC – DC voltage and current. Points of monitoring TBD during design. Also, System temperature shall be monitored at a minimum of 4 points
  - System should have the ability to remotely access and monitor the data as well as have a 30-day on-site memory storage capacity.
  - Data points shall have the ability be recorded at a minimum of 1 minute, with the capability for instantaneous collection of data when data is outside of set parameters.
- Meet the existing (ORG) Cyber security Requirements, Virtual access to the BESS by the BESS vendor will be provided by (ORG) via a virtual private network (VPN) connection.
- The ramp rate of charging and discharging of the BESS shall be programmable or set to a defined value by manually entering a value into the BESS HMI or by the (ORG) SCADA system communicating a ramp rate set point.
- The BESS control system shall be designed to provide for automatic, unattended operation of the BESS. However, the control system design also shall provide for local manual operation, remote operation, or dispatch of the BESS from (ORG)'s SCADA system or remote access point. All modes of operation and its operational set-point functionality shall be remotely adjustable from the (ORG) offices to allow change in settings and to turn on/off all controls or modes when appropriate.

## Modes of Operation

### Microgrid - Resiliency for Emergency Conditions

In the event of an extended grid outage due to a natural disaster the BESS shall be used to power the local emergency response facilities. (add specific requirements)

### Peak Load Reduction

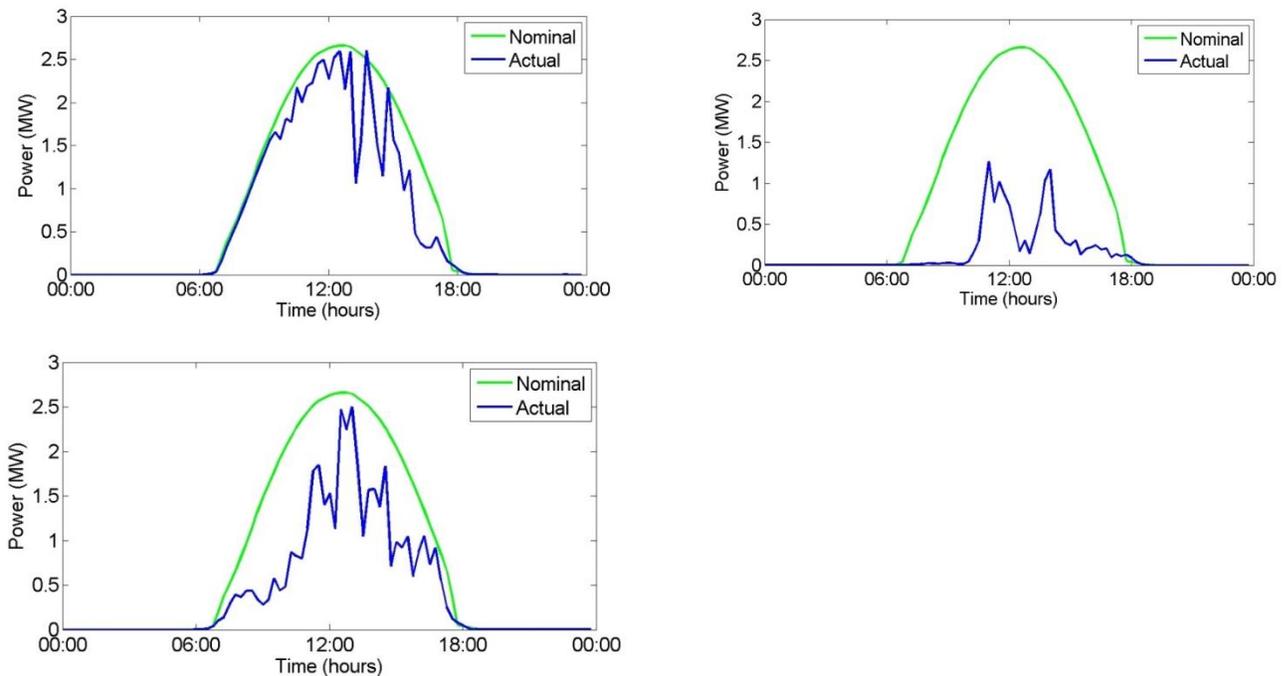
A promising advantage for (ORG) is the reduction of peak load, which is used to calculate transmission and capacity payments to ISO-NE. The monthly peak load is used to calculate payments for using the pool transmission facilities (Regional Network Service – RNS payment). The annual peak load is used to calculate the forward capacity payment. One operational mode is to have the energy storage discharge during expected peak load hours. The BESS shall have a method for scheduling the charge/discharge hours in advance, as well as a method to quickly be commanded into full discharge mode.

(add more requirements as needed – see examples below)

### 3MW PV Smoothing

The BESS shall manage (smooth) output of the 3MW PV array. The overall net power import or export of the mutually coupled BESS and 3 MW PV array shall not adversely affect (ORG) system stability, reliability, or operational activities. Operation in this mode will be automatically initiated by detection of active power flow from 3 MW PV array. The input to the control algorithm shall be a maximum acceptable ramp rate from the PV system. The BESS shall automatically charge and discharge so that the net ramp rate of change in power consumption from the connected utility does not exceed a programmable ramp rate. Examples of typical summer variability are found in the figure below.

Figure 1 - Typical summer PV variability



### **Automatic Scheduling**

In order to take advantage of the fast response time possible with the BESS, (ORG) desires the BESS to be capable of ramping to a predetermined output level as set by a remote signal from (ORG)'s SCADA system or by entering a ramp rate into the BESS HMI. The ramp rate and output level shall be selectable and the output level shall be programmable, on a continuous real time basis, by the remote signal from (ORG)'s SCADA system. Once initiated in this operating mode, the BESS shall remain at the designated output until terminated by a remote signal or the vendor specified discharge limit is reached.

### **Voltage Regulation**

The BESS will be required to provide VAR support for voltage regulation at the Chocksett substation 13.8kV bus under steady state operating conditions. The BESS voltage regulator controls shall include a selectable set point, via SCADA, on the Chocksett 13.8 kV distribution bus. BESS capacity for VAR support shall be a lower priority than all other described operating modes. The VAR output of the BESS may be limited based on remaining capacity used for real power output.

### **Harmonics**

The BESS must meet the harmonic specifications of IEEE 519.

### **Protection Requirements**

The BESS system shall contain protective relaying features, circuit breakers or fuses which self-protect the BESS in the case of internal electrical faults.

### **SCADA Integration**

The vendor's SCADA design and BESS control system interface shall be integrated with (ORG)'s existing SCADA system and associated RTU/substation communication network. The interface point will be to an (data hub name) and a (ORG) network switch located in the (location) control house. Existing hardware is available and useful, depending on final design, for interfacing to the new BESS control system into (ORG)'s SCADA system.

The engineering tasks shall include, but not be limited to, the following:

- Communication between BESS and data concentrator will be RS-485/Serial. Depending on final design (e.g., amount of monitored devices, equipment layout, distance, etc.), other communication methods may be recommended for approval that will provide the most efficient, reliable, and secure communication network. All signal/communication cable to be shielded to ensure signal integrity.
- DNP3 protocol to be utilized for all communications between BESS control system interface and data concentrator.
- DNP3 map of all I/O points and controls on local BESS control system HMI interface must be available and inclusive to SCADA system for monitoring and control.
- Additional and identifiable points or controls, if not provided initially through BESS control system interface base offering, must be programmed into interface for serial link

communications (e.g., but not limited to, fire system activation & integrity, BESS building entry, breaker status).

- A provided SCADA points list shall be prepared by the vendor and submitted to (ORG) for review and approval.
- BESS control system interface will have the ability to accept AGC control setpoint signals from SCADA master station via data concentrator.
- Vendor shall facilitate and ensure all BESS sensor calibrations and system testing to (ORG) SCADA.
- Provide monitoring access and control access to all proposed BESS modes of operation, state of charge, available duration at various output levels, kW/kVar setpoints, kW/kVar flow, local/remote control, misc BESS alarms/status.
- Work items shall include all labor, materials, test equipment, & engineering required to complete SCADA communication integration.
- The vendor shall prepare plan and section drawings for the SCADA/data concentrator integration showing the location of all equipment.
- The vendor shall provide complete testing procedures for the BESS equipment and control system and provide commissioning of the data concentrator/SCADA integration. The prepared testing procedures shall be submitted to (ORG) for review and approval before any testing work is done. A final report detailing the work completed, all test forms, and any marked-up drawings shall be submitted to (ORG).
- (ORG) to provide conduit and communication cabling from data concentrator to BESS Control.)

### **Internet connection**

(add specific requirements)

### **Grounding**

A suitable equipment grounding system shall be designed and installed for the BESS system. This system shall be tied to the (location) Substation grounding system. The grounding system shall provide personnel protection for step and touch potential in accordance with IEEE 80. The system also shall be adequate for the detection and clearing of ground faults within the BESS. The vendor shall determine, design and install the required interconnections between the BESS and (location)substation grounding systems.

(ORG) shall self-perform the alterations needed to the existing (location) Substation grounding grid and install the connections from the existing ground grid to the external grounding locations of the BESS. The appropriate external grounding locations for the BESS shall be determined and provided by the BESS vendor.

### **Structural / Foundation Pads / Conduit**

The vendor shall furnish the design for the structural components of the BESS, concrete pads/foundations as required, and buried conduit required for the complete BESS. All BESS foundations and structures, if required, shall be designed by a qualified registered professional engineer licensed in the state of Massachusetts. All final (Issued for Construction) drawings,

specifications and calculations shall be wet-stamped by a Registered Civil/Structural Engineer licensed in the state of Massachusetts. The vendor is responsible for Geotechnical surveying if required.

(ORG) will self-perform the installation of the concrete pad/foundation and buried conduit installation based on the design provided by the BESS vendor.

### **Spill Containment**

The BESS design shall mitigate against electrolyte spills that are credible for the types of cells used. The design shall include features that contain electrolyte spills (to be emptied by contracted chemical disposal company in the event of a spill) and prevent discharge to surrounding site soils.

### **Personnel Safety**

The BESS shall include eyewash stations in the battery area as applicable. In general, the BESS shall be designed with personnel safety as the top priority.

### **Fire Protection**

The vendor shall design and install a fire protection system that conforms to national and local codes. The fire protection system design and associated alarms shall take into account that the BESS will be unattended at most times. In the event codes do not exist for the proposed BESS, current industry accepted best practices shall be employed.

### **Spare Parts and Equipment**

The vendor shall evaluate its design with regard to failure rates, effects and BESS reliability. The vendor shall provide a recommended spare parts list, including prices and availability, as part of his proposal.

### **Factory Testing - Battery**

The vendor shall test and submit test data for the cells designated for use on this project. At a minimum, the following tests shall be performed.

- Capacities, Amp-hour and Watt-hour
- Ramp rate
- Heat Generated
- Efficiencies
- As applicable, maximum noxious and toxic material release rates
- Application simulations as required by (ORG)

The vendor shall capacity test 100% of the production cells to ensure compliance with design requirements. The vendor may propose optional alternate testing programs that result in a benefit to (ORG). However, the base proposal shall include capacity testing of 100% of the cells. All proposals for alternate testing shall include details of the proposed plan and the cost benefit to (ORG).

The vendor shall include in their proposal factory witness testing for three (ORG) representatives at the cost of the vendor. (ORG) shall witness performance and modes of operation testing.

### **Commissioning - Acceptance and Performance Testing**

The vendor shall develop and perform a commissioning program that will include, but not be limited to, procedures for design verification, operational acceptance testing, Start-up procedures, functional acceptance testing and safety testing. This commissioning program will assure that the BESS will perform as designed and that the system meets the performance criteria specified elsewhere in these specifications. All modes of operation as described in these specifications shall be tested. The vendor shall determine that the BESS is fully operational and suitable for acceptance testing witnessed by (ORG). The vendor shall document all acceptance and performance tests performed. The vendor shall submit documentation, analyses, and a summary in a test report for (ORG)'s records. The commissioning program will be developed by the vendor (approved by (ORG)) and shall demonstrate to (ORG) that the BESS is operational and performs as specified. These tests shall include, as a minimum:

- Verification of sensors, metering and alarms
- Verification of all control functions, including automatic, local and remote control
- Verification of performance criteria

### **Warranty**

Vendor warrants (ORG) that the equipment and materials furnished hereunder and the completed BESS project are fit for the purpose of producing and storing electricity in accordance with the requirements and are free from defects in workmanship and materials. Vendor makes all such warranties for a period of five (5) years after the date of acceptance of the project by (ORG). In addition vendor shall clearly indicate life expectancy given discharge profiles provided in this RFP.

### **Interconnection**

(add specific interconnection/integration details – sample below)

The BESS will be connected to the (ORG) medium voltage distribution system at Substation 13.8kV Bus #2. The (ORG) conceptual design as conceptual for bid purposes only. Please refer to the conceptual single line diagram included as part of the RFP, drawing number 8044-E101.1. The (ORG) substation is a two transformer 115kV / 13.8KV substation supplied by The Utility from two different 115kV lines. The two 13.8kV busses each currently have two medium voltage distribution circuits connected via reclosers. The substation has the ability to connect the two 13.8kV busses via a normally open bus tie recloser if one of the transformers is taken out of service. Transformers are not to be operated in parallel.

(ORG) has separately hired an independent engineering firm to design the substation modifications that will be required to interconnect the BESS to the (ORG) 13.8kV Bus #2. (ORG) will self-perform the installation of all interconnection equipment and materials required between the existing 13.8kV Bus #2 and the low voltage terminals of the step up transformer. The LV terminals of the step-up transformer will be considered the point of electrical

demarcation between (ORG) and the BESS vendor for the design and supply of equipment and materials. The BESS vendor is responsible for the installation of the LVAC cables between the step-up transformer and the BESS inverter, the BESS inverter, the DC cable between the BESS inverter and the BESS trailer and a self-contained BESS. The self-contained BESS shall include the battery cells and racking, DC interconnection cabling, an AC service transformer and distribution panels, HVAC systems, energy metering, data historian server, an HMI for energy management control and monitoring / diagnostics and all other materials and equipment needed to provide a fully functional battery system capable of being integrated to the distribution grid.

The design of the foundation pads for the BESS and the buried conduit raceways for LVAC and DC cabling shall be by the BESS vendor. (ORG) will self-perform the installation of the concrete pad/foundation and buried conduit installation based on the design provided by the BESS vendor. (ORG) will self-perform the modifications required to the existing substation ground grid and the connections from the existing ground grid to the grounding points of the BESS.

### **Modifications**

Modifications to the (ORG) conceptual design may be made. As these changes affect the BESS vendor, they will be communicated and coordinated with the successful BESS vendor. The BESS vendor shall work in cooperation with any (ORG)-hired engineering firm to exchange information as needed so that each party can complete the design of their required scope of work. Specific interface and coordination is expected between the (ORG) SCADA system and the BESS controller and monitoring systems.

### **Additional Requirements**

The project design shall meet all applicable industry standards and codes including but not limited to NEC, NESC, ASCE, IEEE, standard utility practice. In the event specific codes are not available for the BESS, current industry accepted best practices shall be employed.

The BESS vendor shall perform a site visit shortly after the award of the project in order to become familiar with the existing (location) substation. This site meeting will also serve as an opportunity for discussions, clarifications and exploration of any proposed design alternatives. (ORG) management, operations personnel and owner's engineer for the project will be in attendance.

The BESS vendor's project manager shall be required to attend bi-weekly phone meetings with (ORG) representatives during certain portions of the design process. The purpose of these meeting is to receive a status report on the progress of the design package and to discuss any open items or requests for information each party may have submitted to the others.

## **PART 4: EXCLUSIONS**

(add specific exclusions – samples below)

The design package provided by the BESS vendor shall not include the design of the 13.8kV interconnection substation expansion. Design of all equipment upstream from the LVAC cables shall be by a third party engineering firm hired by (ORG).

Site grading design shall not be required as the project is intended to be fully installed in an existing graded substation.

Installation of concrete pad/foundations and buried conduit at the Substation shall not be included. (ORG) will self-perform the installation of the concrete pad/foundation and buried conduit installation based on the design provided by the BESS vendor.

Alterations of the existing substation grounding grid to connect to the external grounding locations of the BESS shall not be included. This work will be self-performed by (ORG).

All exceptions to the specifications and/or deviations shall be clearly and separately itemized. It shall not be necessary for (ORG) to examine the standard literature and documents of vendors to determine the existence and extent of any exceptions and/or deviations from this specification.

## **PART 5: SCHEDULE**

The BESS vendor shall provide a proposed schedule with their proposal. The schedule shall include design, fabrication, delivery, on site construction and testing phases with subtasks as needed. The schedule will be discussed and finalized in conjunction with the OPM prior to the final award of this project.

## PART 6: COST PROPOSAL

- E. The Energy Storage System (BESS) contract will be paid as a fixed price contract. Travel time to and from the site will not be reimbursed.
- F. Respondent shall complete the attached Exhibit B, Cost Proposal. Clearly indicate each job category and rate on this form. All hourly rates shall meet the prevailing wage schedule that includes overhead and labor burden.
- G. The final total indicated on the cost proposal shall include all costs associated with completing the work, for the staff and manpower projections provided.
- H. The price proposal is to be placed in a separate sealed envelope bearing the title "Price Proposal (project title)" and included with the proposal. Respondents shall include price proposals, which at a minimum include the following line items.
  - Energy Storage system equipment itself, designed, delivered, installed, tested and commissioned
  - Maintenance service schedule and cost estimates
  - Extended warranty offering (in addition to 5-year base warranty)
  - Recommended spare parts, including typical replacement schedule
  - Uptime guarantee
  - Training and support for (ORG) operations personnel

## PART 7: SELECTION PROCESS

### General

The (municipal committee), the (ORG) Chairman and General Manager in consultation with (consultant name) (the OPM) will form the ("Selection Committee"), they will utilize the SELECTION CRITERIA (see below) to evaluate submissions. The evaluation will be based upon the information submitted and information solicited by the Selection Committee from various sources and references.

Interviews will be held for the top three BESS providers.

During the evaluation or review process, the Selection Committee reserves the right to request additional information or clarification from any submitter, or to allow corrections of errors or omissions.

The Selection Committee shall make a recommendation to the (ORG) Board of Directors. The (ORG) reserves the right to reject any or all proposals and to waive any informalities or irregularities should it deem it to be in the best interest of the (municipality name).

All firms or individuals submitting proposals will be notified of the Awarding Authority's final selection.

## PART 8: SELECTION CRITERIA

### Participation Requirements

In order for a bid to be submitted the BESS vendor must have the following minimum qualifications. Qualifications shall be included in writing as part of the vendor's proposal.

BESS vendor has experience successfully installing and integrating MW scale battery projects using the same or similar OEM equipment as is being proposed. References for these projects may be contacted.

Engineering subcontractors must have 7 years of design experience on similar type projects

Contractors proposed to perform work on site must have an EMR rating of 1 or lower

### Evaluation Criteria

The Selection Committee will consider the following comparative criteria provided as part of each vendor's proposal when ranking the proposals submitted.

1. Microgrid Operation - The BESS proposed must be able to act as the reference source in a microgrid system as described in this RFP.
2. Financial Stability - The vendor and major equipment vendors must be financially stable companies capable of providing long term service of the BESS and meeting warranty obligations
3. Technical Feasibility – Points will be awarded by examining a number of factors, including technology, operational, and resource feasibility. Note: There should be adequate and appropriate data to describe the energy storage technology and its intended operation, including the physical storage mechanism, size, operational and maintenance needs of the technology and warranties. This information should be presented in a clear and orderly fashion to demonstrate that the project is feasible.
4. Total Cost of Ownership per MW and per MWhr - Total cost of ownership of the BESS taking into consideration, initial cost, maintenance costs, warranty costs, guarantee costs, spare parts costs, and degradation over time, replacement costs and schedule, efficiencies, and other costs as identified.
5. Vendor DAS / HMI and SCADA - Points will be awarded by examining the level of development, functionality and robustness offered by the BESS HMI and the ability for the BESS HMI and SCADA system to interface with the existing (ORG) network and SCADA system.
6. Project Plan - Points will be awarded based on the completeness and description of a well thought out and well-presented project plan tailored to the specific (ORG) project objectives. The proposal shall clearly explain that the BESS meets the (ORG) requirements and, as needed, shall explain how the requirements are met.
7. Previous Project Experience - Points will be awarded based on the amount of successfully implemented previous project experience presented that is of similar size and technology. The experience of the specific project manager and project team / subcontractors proposed will be factored into the evaluation. Feedback from past

customers shall be taken into consideration. (ORG) may reach out to references provided by the vendors.

8. Service - Points will be awarded based on the vendor’s ability to provide emergency response service in a short amount of time after an issue with the BESS is detected. Service organization, infrastructure, location and response time will be taken into consideration.
9. Schedule - Points will be awarded based on the BESS lead time and vendor's ability to meet the (ORG) proposed schedule. Some flexibility may be taken into consideration by (ORG).
10. Interview Performance - The Vendor demonstrates an understanding of the key issues of the (ORG) project and an ability to work with (ORG) in order to successfully complete the project in the best interest of (ORG).

The following weighted evaluation matrix will be used as a tool to compare the responses to this RFP. The total weighted score calculated for each of the proposals will be compared by the selection committee to determine which proposal are classified as “highly advantageous”, “advantageous”, “not advantageous” or “unacceptable”.

#### BESS Proposal Evaluation Matrix

Item #	Gating Criteria Description		Score (0 or 1)	
1	Microgrid Operation		1	
2	Financial Stability		1	
Item #	Evaluated Criteria Description	Assigned Weight	Score (1-10)	Weighted Score
3	Technical Feasibility	20.00%	10	2
4	Total Cost of Ownership per MW and per MWhr	20.00%	10	2
5	Vendor DAS / HMI and SCADA	10.00%	10	1
6	Project Plan	10.00%	10	1
7	Previous Project Experience	15.00%	10	1.5
8	Service	15.00%	10	1
9	Schedule	5.00%	10	0.5
10	Interview Performance	5.00%	10	1
	Total	100.00%	80	10

## **PART 9: GENERAL PROVISIONS**

### **General**

1. The Awarding Authority reserves the right to reject any and all proposals and to waive any informalities or irregularities as it deems in the best interest of the (municipality name).
2. All submittals, materials, drawings, plans, etc., submitted for consideration shall be considered public information unless clearly marked as PROPRIETARY by the responder.
3. The selected responder, and any sub-consultants of the selected responder, shall be expected to comply with all federal, state, and local rules, regulations, and laws applicable to the project(s) without limitation including all federal, state, and local bidding, environmental, building and safety rules, regulations, and laws in the performance of services.
4. The consideration of all submittals and the subsequent selection of the successful responder shall be made without regard to race, color, sex, age, handicap, religion, political affiliation or national origin.
5. The selected responder, and all sub-consultants of the successful respondent, shall adhere to the provisions of the Fair Employment Practices Law of the Commonwealth (Chapter 151B of the Massachusetts General Laws).
6. The successful responder, and all sub-consultants of the successful responder, shall assure the Awarding Authority that it will carry out the performance of services in full compliance with all requirements imposed by or pursuant to Title VI of the Civil Rights Act of 1964 (78 Stat.252), and any executive orders of the Governor of the Commonwealth as such may from time to time be amended.
7. The provisions related to non-discrimination and affirmative action in employment shall flow through all contracts and subcontracts that the successful responder may receive or award as a result of this contract on behalf of the Awarding Authority.

## **PART 10: SUBMISSION REQUIREMENTS**

### **Required Materials**

1. Cover letter outlining vendor's contact person including title, telephone, and e-mail address.
2. Names and addresses of all partners, officers, directors and owners, i.e., persons with an ownership interest in the firm of more than five percent.
3. A full listing of all persons to be assigned to the project, including all sub consultants, including the following:
  - a. Individuals' resumes including work performed on all projects of similar scope and scale over the past five (5) years.

- b. Each Individual's qualifications for the project including a listing of all Massachusetts Registrations by discipline, licenses, or other documentation of qualifications. The skill sets of the engineering team should cover the entire scope of work required.
    - c. The BESS vendor shall state which of these team members are direct employees of the vendor and which are subcontracted or casual resources. It is required that the team presented in the proposal will be the team assigned to the project if the engineering firm is awarded the project unless changes are agreed to by (ORG) in writing.
4. Respondents must demonstrate successful completion of energy storage systems using the same technology proposed. Provide a complete listing of and contact information for all similar projects performed by your firm over the past five (5) years. For each such project, provide a complete project description, including project size, completion date, major equipment vendors used, warranty claims, uptime percentage, as well as client name and contact person, including address, telephone and email addresses. The Awarding Authority reserves the right to contact any client listed for the purpose of obtaining reference information.
5. Evidence that the BESS vendor possess the knowledge and skill to:
  - a. Recommend solutions to problems encountered during the work and direct field changes.
  - b. Provide the Awarding Authority with periodic status reports, as agreed upon by the parties, with respect to the overall status of the work.
6. Completion and signing of Certification attached as Exhibit A.
7. Documentation of financial stability, documentation of bonding capacity, credit references, or other documentation to demonstrate financial solvency of the firm or individual responder.
8. Additional information related to the responder's (and sub-consultant's, if any) qualifications and experience to perform the work (letters of reference, description of project methods utilized for comparable projects, etc.), and similar supplementary information may be provided.
9. A cost proposal will be submitted in a separate, sealed envelope, clearly marked *Proposals for Energy Storage System for the (project name)*.
10. Provide list of exceptions and clarifications to the technical proposal and commercial terms and conditions, or written verification that no exceptions or clarifications are taken.
11. The BESS vendor shall provide a proposed schedule with their proposal. The schedule shall include design, fabrication, delivery, on site construction and testing phases with subtasks as needed. The schedule shall include a two-week review duration by (ORG) for

each submitted design package. This schedule shall be tracked and maintained by the BESS vendor throughout the project.

12. The vendor shall submit with its proposal a list of information that the firm will require from (ORG) at the kickoff of the project in order to be able to proceed with design.
13. Typical degradation curve information for the battery system proposed.
14. If it is recommended by the battery supplier that cells be changed out at regular intervals, provide proposed battery replacement schedule. Provide battery replacement costs and a description of escalation factors used to determine actual battery costs at the time of replacement. Provide information on battery replacement procedure, including estimated time to complete replacement.
15. Provide warranty terms and conditions document
16. Provide recommended spare parts list and prices.
17. Provide a description of all required maintenance activities, including estimated man-hours and frequency of occurrence and cost for each activity.
18. Provide information on AC/AC round trip efficiencies (excluding step-up transformer).
19. Provide information showing the length of time the battery can maintain constant output at demand levels less than rated output.
20. Provide information showing the length of time the battery can maintain rated output at a reduced state of charge.
21. Provide information on guaranteed life expectancy to maintain rated capacity as number of discharges or total energy delivered varies.
22. Provide information on the controlling parameters that determine life expectancy for the proposed system.
23. Provide information on required environmental conditions or maintenance procedures (if any) that performance guarantees are based on.
24. Provide Power Conversion System (PCS) manufacturer specifications.
25. Provide information on how the charging cycle changes as maximum demand is reduced.
26. Provide information on the state of charge of the battery as a function of time during the charge cycle.
27. Provide proposed factory and commissioning plans to include performance and "Modes of Operation" testing.
28. Provide a performance curve indicating # of cycles vs. depth of discharge.
29. Provide a description of the BESS vendor's remote alarm monitoring capabilities and service dispatch capability including estimated response time to (municipality name) after automatically receiving an alarm.

## **PART 11: ATTACHED DOCUMENTS**

8. Exhibit A Certification
9. Exhibit B Proposal Financial Worksheet
10. Exhibit C Certificate of Authority
11. Exhibit D Tax Compliance Certification
12. One Line diagram ((ORG) Conceptual design for RFP)
13. One Line relaying and metering diagram ((ORG) Conceptual design for RFP)
14. Electrical Arrangement Plan

## Exhibit A Certification

The applicant hereby certifies that:

1. The applicant has not given, offered, or agreed to give any gift, contribution, or offer of employment as an inducement for, or in connection with, the award of contract for these services.
2. No consultant to, or subcontractor for, the applicant has given, offered, or agreed to give any gift, contribution, or offer of employment to the applicant, or, to any other person, corporation, or entity as an inducement for, or, in connection with, the award of the consultant or subcontractor of a contract by the applicant.
3. No person, corporation, or other entity, other than a bona fide full-time employee to the applicant has been retained or hired to solicit for or in any way assist the applicant in obtaining the contract for services upon an agreement or understanding that such person, corporation, or entity be paid a fee or other compensation contingent upon the award of the contract to the applicant.

I hereby attest with full knowledge of the penalties for perjury, as in accordance with Massachusetts G.L.c.7, § 38E, that all information provided in this application for services is correct.

---

Firm

---

Signed (Typed)

---

Signed (Written)

---

Title

---

Date

## Exhibit B Cost Proposal Worksheet

The vendor is to fill out and return the separate Exhibit B – Proposal Financial Worksheet as part of the cost proposal. Exhibit B is to be provided in hard copy and MS excel format. It is expected that not all line items will be required for this project by all vendors. It is acceptable and expected to have \$0 cost line items. A \$0 cost line item does not equal a formal exception taken of a requirement of this RFP. All exceptions must still be listed in an exception section.

[Add remaining attachments as applicable]

[Blank page following section.]

## Distribution

Clean Energy Group/Clean Energy States Alliance  
50 State Street, Suite 1  
Montpelier, VT 05602

MS118	Dan Borneo	06111
MS1108	Babu Chalamala	06111
MS0899	Technical Library	9536 (electronic copy)

This page intentionally left blank.

