



**Request for Proposals for
Technical and Financial Feasibility Assessment of
Community Microgrid Projects in Massachusetts
(RFP FY2017MKTDEV-02)
Deadline for Applications: Wednesday, June 28, 2017**

I. OPPORTUNITY SUMMARY

Through this Request for Proposals (“RFP”), MassCEC seeks applications from consultants or professionals with significant experience in community microgrids and energy project development to serve as a technical consultant (“Technical Consultant” or “Applicant”) under MassCEC’s Community Microgrids Program (the “Program”). The Technical Consultant will develop preliminary designs of specific multi-user community microgrids that serve the needs of communities across Massachusetts, and perform technical and financial feasibility assessments (“Assessments”) to evaluate their viability.

MassCEC anticipates selecting one (1) Technical Consultant under this RFP.

II. PROGRAM BACKGROUND

MassCEC’s Community Microgrids Program seeks to catalyze the development of community microgrids throughout Massachusetts to lower customer energy costs, reduce greenhouse gas (“GHG”) emissions, and provide increased energy resilience. For the purposes of the Program, community microgrids are defined as multi-user microgrids supported by the local community, relevant utility(ies), and relevant building or site owners. Funding for Assessments awarded through the Program will advance microgrid projects through the early project origination stages and attract third party investment to these opportunities. Community Microgrid Feasibility Assessment Grant Applicants (“Grant Applicants”) must either have the capacity to carry out the feasibility study with a pre-identified team of their own, or may opt to receive a technical and financial assessment from the Technical Consultant contracted through this RFP.

MassCEC seeks to support Assessments for prospective community microgrid projects that have the following characteristics:

- Are community, multi-user microgrids (as opposed to single owner or campus-style microgrids) located in Massachusetts;
- Demonstrate significant potential to reduce GHG emissions through the integration of energy efficiency, Combined Heat and Power (“CHP”), renewable energy systems, electric and/or thermal storage technologies, demand management, and other relevant technologies;
- Have the active and engaged support of the local utility (either investor-owned or municipal light plants) and other relevant stakeholders;

- Encompass a public or private critical facility¹, including but not limited to schools, hospitals, shelters, libraries, grocery stores, service (gas) stations, fire/police stations, or water or wastewater treatment plants or pumping stations;
- Demonstrate potential to support the distribution system by addressing capacity concerns, providing black start capability, facilitating renewables integration, or providing other services that are meaningful to the local utility;
- Demonstrate potential to attract third party investment; and
- Highlight Massachusetts-based clean energy/microgrid technology.

REQUEST FOR EXPRESSIONS OF INTEREST

In April 2017, MassCEC solicited Expressions of Interest from groups interested in participating in feasibility assessments for community microgrid projects across the Commonwealth. MassCEC and a team of external reviewers will review the Expressions of Interest and identify selected respondents to complete a detailed viability assessment questionnaire to be provided by MassCEC at the time of selection. Those respondents will be invited to interview with MassCEC to provide further details on their proposed project and its viability characteristics. Projects that meet the review criteria and have the active and engaged support of both the local community and utility will be selected to receive free Assessments through the Program (conducted by the Technical Consultant selected under this RFP) or will be awarded funding to conduct an Assessment in line with MassCEC’s specifications.

Applicants to this RFP are encouraged to review MassCEC’s [Request for Expressions of Interest: MassCEC Community Microgrid Feasibility Study Participants](#) in advance of responding to this RFP.

TECHNICAL AND FINANCIAL FEASIBILITY ASSESSMENTS

For selected community microgrid projects, the Assessments developed under this Program will identify site constraints and opportunities, develop a preliminary assessment of the technical design and system configuration, develop a preliminary assessment of the microgrid’s commercial and financial viability, and evaluate the microgrid’s value proposition for relevant stakeholders. These Assessments will allow communities, relevant utilities, and potential investors to determine whether a project is feasible and should be further considered.

III. DESCRIPTION OF SERVICES

The Technical Consultant will conduct technical and financial feasibility assessments for Community Microgrid Projects selected by MassCEC through a separate solicitation process (the “Projects”). The Technical Consultant will work with stakeholders and decision-makers from each selected microgrid project (the “Project Team”) to complete each Assessment.

¹ A critical facility is a structure that – because of its function, size, service area, or uniqueness – has the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if it is destroyed or damaged or if its functionality is impaired. It is incumbent upon respondents to adequately justify that a facility included in the response serves a vital function to the community in the event of an emergency and is thus a “critical facility.”

MassCEC has provided a sample Scope of Services in Appendix 1. Applicants may elect to leave the sample Scope of Work unchanged or provide suggested modifications that could better address the goals of the project. Such changes may include the addition or removal of relevant tasks and/or deliverables.

BUDGET

MassCEC will pay up to \$75,000 per Assessment. Community microgrid projects receiving an Assessment will be selected by MassCEC through a separate solicitation process.

IV. REQUIRED RESPONSE COMPONENTS AND EVALUATION CRITERIA

To respond to this Request for Proposals, submit a completed Proposal of up to ten (10) single-spaced pages, not including recommendation letters.

PROPOSAL REQUIREMENTS

Proposals must contain the following:

Executive Summary: Applicants should provide a summary of their organization, qualifications, and their proposed approach for working with MassCEC and with the range of stakeholders participating in the Program, including community representatives, utilities, and critical facilities.

Statement of Qualifications: All responses must include a statement of qualifications, experience, and description of the Applicant, including:

- A brief description of organization(s) involved in the proposing team, including major subcontractors. Include date founded, history, size, product portfolio and location.
- Include an explanation of why the proposed organization or team is the best qualified to perform the Assessments under the Program from a technical and business perspective. Identify other organizational qualifications relevant to the proposed work. Include examples of related past work, particularly related to microgrid feasibility assessments, energy distribution system engineering and design, or community energy projects, and the current status of those projects.
- Describe the team's ability to manage multiple client expectations to ensure that Assessments align with the community's needs and goals as well as MassCEC's Community Microgrids Program goals.
- Identify key individuals who will be involved in the Assessments. Provide one- to two-paragraph summaries of relevant technical and business expertise of these individuals. Submit resumes (as appendices) of all key applicant team members. Resumes should include education and experience that are relevant to the proposed work.
- If applicable, list MassCEC and other state or federal contracts awarded to the Applicant and/or any subcontractors in the past five years.

Workplan Narrative: The Workplan describes work activities, deliverables and timeline associated with delivering an Assessment for each selected Project, and should consider the sample Scope of Services outlined in Appendix 1. The Workplan shall describe each step or procedure required to accomplish each task, including who will perform it, how it will be performed and its intended result. Provide a project

plan for working collaboratively with relevant stakeholders (e.g., sharing data, conducting public outreach and organization) and enlisting other sources of technical and financial expertise. Identify which Tasks will require coordination with the Project Team. Any changes to the sample Scope of Services, including additions or omissions of certain tasks and deliverables, should be adequately justified in the Workplan.

Project Schedule: All responses must include an estimated project schedule which lays out all project milestones and deliverables and length or date of completion. Identify any seasonal constraints or specific requirements for work scheduling. Indicate where travel will be required. Propose a progress reporting schedule. Each Assessment is preferred to be completed within 6-9 months. Applicants should consider that multiple Assessments may occur concurrently.

Draft Participant Letter of Commitment: Responses must include a copy of the Draft Participant Letter of Commitment with any relevant comments or mark-up from the Applicant, including more insight into the Applicant's approach to working with Project Teams.

Budget and Rate Sheet: Responses must include a detailed budget, including information on rates of all team members working on the project². Rates for travel should also be included and may not exceed half the consultant's usual hourly rate. Where Applicants anticipate using outside expertise for a task, the Applicant should include estimated rates. Budgets should be broken out by task and service provided, and must be proposed on a per-Assessment basis.

References: All responses must include references from at least three (3) clients of the Applicant, and preferably clients who have utilized the Applicant on matters related to the proposed technical services. These references must include a contact person, a full address, an email address, and a phone number. Current and former MassCEC staff may be included as supplementary references for previous work conducted on behalf of MassCEC, but do not count toward the three reference requirement.

REQUIRED ATTACHMENTS

Attachment A: Proposal Cover Sheet

Attachment B: Completed Signature and Acceptance Form

Attachment C: Draft Participant Letter of Commitment

PROPOSAL EVALUATION

MassCEC is seeking the most comprehensive proposal from qualified entities to fulfil the roles described above. All proposals must be responsive to the relevant scope of work and proposal requirements outlined in this RFP.

Applicant proposals will be evaluated on the following criteria:

² Please note that contractor rates are not considered confidential in the case of a public records request. Please see Section VI for additional information on the Massachusetts Public Records law.

	Criteria
Range of Services to be Provided	<ol style="list-style-type: none"> 1. Does the Applicant plan to provide services commensurate with the services requested by MassCEC? 2. Does the Applicant demonstrate an understanding of the concepts and motivators underlying the Program? 3. Has the Applicant clearly outlined a proposed approach for working with MassCEC and the selected Projects? 4. If the Applicant has suggested changes to the Scope of Services (additions, alterations or deletions), are those changes aligned with the overall goals of the Program?
Qualifications	<ol style="list-style-type: none"> 1. What is the quality of the Applicant’s performance on similar past consulting assignments or their achievements related to proposed work? How were their efforts evaluated? 2. What is the Applicant’s experience in microgrid project feasibility assessments? Do all individuals proposed as key team members have relevant technical and business expertise? 3. What is the Applicant’s plan for acquiring technical knowledge that it may not have in-house? 4. Has the Applicant demonstrated successful performance under previous MassCEC, state, or federal contracts? 5. Has the Applicant provided strong references and recommendations? 6. Does the Applicant demonstrate strong communication and interpersonal skills which would enable the Applicant to communicate Program goals, deadlines and expectations with the MassCEC team?
Project Workplan	<ol style="list-style-type: none"> 1. Does the proposed Workplan meet the objectives of the Scope of Services outlined in Appendix 1? 2. Will the proposed Workplan fulfil the goals of each task? 3. Is the proposed Workplan clear and specific regarding how tasks will be carried out and by whom? 4. Are any changes to the sample Scope of Services adequately justified in the Project Workplan? 5. Is the proposed Schedule both reasonable and realistic?
Overall Quality of Proposal	<ol style="list-style-type: none"> 1. Has the Applicant presented their qualifications clearly, completely and in adherence to the proposal format? 2. Has the Applicant demonstrated sufficient time resources and flexibility to participate in the Program?
Value Demonstration	<ol style="list-style-type: none"> 1. Is the Applicant’s proposal cost-competitive and within the budget requirements? 2. Does the range of services proposed align with the requirements of this RFP? 3. Comparison of range of services to other Applicants’ proposals.

V. HOW TO RESPOND

It is the sole responsibility of the Applicant to ensure that the proposal is complete and properly submitted, including all necessary attachments, letters or other supporting documentation. At its sole discretion, MassCEC may request supplemental materials from the Applicant and such materials must be submitted within 10 days of the request or the application may be rejected without further review.

Responses must be submitted to MassCEC by 4:00 PM EDT on Wednesday, June 28th. Only timely, complete responses will be considered. MassCEC, at its sole discretion, may determine whether an application is complete.

The submission must be in electronic form, including a scanned *Signature and Acceptance Form* (Attachment B), via email to microgrids@masscec.com. “**Community Microgrids Feasibility Assessments – Technical Consultant**” must appear in the email subject line.

QUESTIONS

Please submit all questions in writing to microgrids@masscec.com no later than Friday, June 16th at 5:00 PM. “**Community Microgrids Feasibility Assessments – Technical Consultant**” must appear in the email subject line. Questions and responses will be posted to the RFP webpage on a rolling basis.

ANTICIPATED TIMELINE

Release RFP	Tuesday, May 16th
Questions due to MassCEC	Friday, June 16th at 5:00 PM
Applications due to MassCEC	Wednesday, June 28th at 4:00 PM
Notification of Selected Consultant	Friday, September 1st, 2017

The above timeline is subject to change at MassCEC’s sole discretion.

VI. GENERAL REQUEST FOR PROPOSAL CONDITIONS

NOTICE OF PUBLIC DISCLOSURE AND OPEN CHECKBOOK

General Statement

As a public entity, MassCEC is subject to Massachusetts’ Public Records Law, codified at Chapter 66 of the Massachusetts General Laws. Thus, any documentary material, data, or other information received by MassCEC from an applicant is a public record subject to disclosure. Applicants shall not send MassCEC any confidential or sensitive information in response to this RFP.

CONTRACTUAL REQUIREMENTS

Upon MassCEC’s authorization to proceed with the proposal, MassCEC and the Technical Consultant will execute a contract which will set forth the respective roles and responsibilities of the parties.

DISCLAIMER

This RFP does not commit MassCEC to award any funds, pay any costs incurred in preparing an application, or procure or contract for services or supplies. MassCEC reserves the right to accept or reject any or all applications received, negotiate with all qualified applicants, cancel or modify the RFP in part or in its entirety, , to waive minor irregularities in submittal requirements, or change the application guidelines.

This RFP has been distributed electronically using MassCEC's website. It is the responsibility of applicants to check the website for any addenda or modifications to a RFP to which they intend to respond.

MassCEC accepts no liability and will provide no accommodation to applicants who submit an application based on an out-of-date RFP document.

ATTACHMENT A: PROPOSAL COVER SHEET

Please fill out the following cover sheet and attach it as the first page of the proposal. Do not leave any sections blank.

Applicant Details	
Entity Name	
Entity Address	
Main Contact(s) for the purpose of this Proposal (name, title, phone and email)	
I am applying as the Primary Consultant	<input type="checkbox"/>
I am applying to conduct an Assessment for a specific project	<input type="checkbox"/> Project Name:
Sub-Contractor Details (If Applicable; add rows as necessary)	
Entity Name	
Entity Address	
Main Contact(s) for the purpose of this Proposal (name, title, phone and email)	
Task(s) to be completed by Sub-Contractor	

ATTACHMENT B: AUTHORIZED APPLICANT'S SIGNATURE AND ACCEPTANCE FORM

**MassCEC Community Microgrids Program
RFP FY2017MKTDEV-02 (the "RFP")**

The undersigned is a duly authorized representative of the applicant named below. The undersigned has read and understands the RFP requirements and acknowledges and confirms that each member of the applicant team has read and understands the RFP requirements. The undersigned acknowledges and agrees that all of the terms and conditions of the RFP are mandatory.

The undersigned and each member of the applicant team acknowledges and agrees that (i) all materials submitted as part of the application are subject to disclosure under the Massachusetts Public Records Law, as explained in the RFP; (ii) that the Massachusetts Clean Energy Technology Center ("MassCEC") has no obligation, and retains the sole discretion to fund or choose not to fund the application set forth herein; and (iii) that MassCEC's receipt of the application does not imply any promise of funding at any time.

The undersigned and each member of the applicant team understands that, if the application is selected by MassCEC pursuant to this RFP, the applicant will execute and deliver an agreement to be provided by MassCEC that shall set forth the terms and conditions, together the respective roles and responsibilities of the applicant team and MassCEC, with respect to the services described in the RFP.

I certify that the statements made in this application, including all attachments and exhibits, are true and correct and that I agree with and acknowledge all terms of the RFP.

Applicant: _____

(Printed Name of Applicant)

By: _____

(Signature of Applicant or Authorized Representative)

Title: _____

Date: _____

ATTACHMENT C: DRAFT PARTICIPANT LETTER OF COMMITMENT

Month XX, 2017

Attn: Contact Name

Entity Name

Address Line 1

Address Line 2

RE: Offer to participate in the Massachusetts Clean Energy Center's Technical and Financial Assessment of Community Microgrids in Massachusetts

Dear **Contact Name**,

On behalf of the Massachusetts Clean Energy Center ("MassCEC"), I am pleased to inform you that **Entity Name** (the "**Entity**") has been selected to participate in the Community Microgrids Program (the "Program"). Your project entitled **Project Name** (the "Project" or the "Microgrid") has been selected as a feasibility assessment site. This letter ("Letter of Commitment") along with the General Terms and Conditions attached as Exhibit 1, provide an overview of the Program and set out the terms and conditions governing the **Entity's** participation in the Program.

Under the Program, a consultant engaged by MassCEC (the "Consultant") will evaluate the technical and financial feasibility of the Project. The **Consultant** will be in direct contact with the **Entity** to request energy usage information, which will be used to complete a site-specific technical and financial feasibility assessment.

By executing this Letter of Commitment, the **Entity** hereby agrees to the following:

- The undersigned has the authority to sign on behalf of and bind the **Entity** to the terms and conditions contained in Exhibit 1;
- The **Entity** will designate a main contact person for the Program who will coordinate with the Consultant and MassCEC as needed;
- The **Entity** will coordinate with stakeholders within the proposed Microgrid to gather and disseminate information as necessary;
- The **Entity** will lead efforts to engage with the local utility over the course of the project;
- The **Entity** shall provide energy use data, as requested by the Consultant, including, but not limited to, the procurement of such data via a standard release form provided by the utility serving each public facility within the Microgrid or other Consultant data collection method ;
- The **Entity** shall provide the aforementioned energy use information and/or other authorized forms and signatures required to obtain such information within four (4) weeks of Consultant's request;
- The **Entity** shall ensure that the information provided to the Consultant pursuant to the Program is accurate and complete;
- The **Entity** acknowledges that at no time will it provide MassCEC any sensitive data or confidential information, and that all such communication will be made directly and solely with the Consultant;

- In exchange for **Entity's** cooperation in the Program, the Consultant, on behalf of MassCEC, will deliver the site-specific feasibility study produced under the Program to the **Entity**, which will constitute the full consideration to be received by the **Entity**;
- The feasibility study provided by the Consultant will be made publicly available by MassCEC.
- The **Entity** agrees and acknowledges that with regard to any report or recommendation made by the Consultant under the Program: (i) the data , findings, conclusions, opinions, recommendations of any such report and/or recommendation are solely those of the Consultant and shall not be attributed in any way to MassCEC or any of its directors, officers, employees, agents and representatives; (ii) MassCEC has not verified the accuracy, completeness or veracity of any such data , findings, conclusions, opinions, recommendations of any such report or recommendation; and (iii) MassCEC does not make any representations and warranties or guarantees of any nature or kind with respect to the findings, conclusions, opinions, recommendations of the content of any such report and/or recommendation.

If you accept these terms, as well as the General Terms and Conditions listed in Exhibit 1, please sign below, fill out the Site Contact information, and e-mail a copy of this Letter of Commitment in PDF format **within 1 week of the date of the email in which this Letter of Commitment was received** to microgrids@masscec.com. This Letter of Commitment shall be effective upon your execution and delivery of the same until **DATE**.

Sincerely,

Massachusetts Clean Energy Technology Center
By: _____

Jennifer Daloisio
Chief Financial Officer

Accepted & Agreed

By:

Printed Name: _____

Title: _____

Date: _____

Project Contact Information

Printed Name: _____

Telephone Number: _____

Email Address: _____

APPENDIX 1: SAMPLE SCOPE OF SERVICES

TASK 1 – PROGRAM MANAGEMENT AND PROGRESS REPORTING

The Technical Consultant shall provide all project management activities necessary to complete this Scope of Work, including the following activities:

- Coordinate the work of the Technical Consultant’s employees and those of sub-contractors and equipment vendors that are undertaking tasks described in this Scope of Work;
- Coordinate with relevant Project stakeholders and decision-makers (the “Project Team”) to collect relevant data;
- Ensure control over project budget and adherence to the project schedule; and
- Provide all necessary reporting to MassCEC as specified in this Scope of Work.

In addition, the Technical Consultant will conduct a Project Kick-Off Meeting with MassCEC staff and Project Team to review overall Project goals, discuss and confirm work scope (including adding or altering components as necessary), and timeline. At the conclusion of the Assessment, the Technical Consultant will conduct a Project Completion Meeting to review findings and outcomes.

Task 1.1 – Progress Reporting

The Technical Consultant shall submit regular progress reports to MassCEC. The Progress Reports shall include information on the following for each assigned Assessment:

- Title of Project;
- Reporting Period;
- Summary of Assessment progress and tasks conducted in the covered reporting period;
- Planned work for the next reporting period;
- Identification of any problems and planned or proposed solutions to address identified problems;
- Updated schedule of progress, including percentage of Assessment completed (may be presented as a bar chart or milestone chart); and
- Costs incurred under Assessment through current reporting period.

The Technical Consultant may submit Progress Reports that contain the specified information for all assigned Assessments.

Deliverable: Regular Progress Reports

TASK 2 – SITE ASSESSMENT AND DESCRIPTION OF MICROGRID CHARACTERISTICS

Task 2.1 – Site Assessment

The Technical Consultant shall identify the size and scope of the Project, including an inventory of the existing and planned buildings and assets included within the microgrid. This assessment may include, but is not limited to: electric and heating/cooling loads, generation resources or other relevant technologies, distribution system infrastructure, utility assets including metering and interconnection, and existing energy efficiency programs.

Task 2.2 – Minimum Required & Preferable Microgrid Characteristics

The Technical Consultant, in consultation with the Project Team, shall identify which characteristics and capabilities are required of the microgrid, as well as those which are preferable but not required. The Technical Consultant shall ensure that the Project Team’s goals and objectives align with the goals of MassCEC’s Community Microgrids Program. The Technical Consultant shall advise the Project Team where goals and required or preferable characteristics may be in conflict.

Required characteristics include:

- Serves at least one, but preferably more, physically separated critical facilities located on one or more properties;
- The primary generation source capacity cannot be totally diesel-fueled generators and must include clean or renewable energy;
- Includes energy efficiency upgrades to minimize new microgrid generation requirements;
- Provides power to critical facilities and a diverse group of customers connected directly to the microgrid (diversity should apply to both customer type, e.g., residential, small commercial, industrial, institutional, and overall demand and load profile);
- Demonstrates that critical facilities and generation are resilient to the forces of nature that are typical to and pose the highest risk to the location/facilities within the microgrid; and
- Provides one or more services to the distribution system, including, but not limited to, addressing capacity concerns, providing black start capability, facilitating renewables integration, or providing other services that are meaningful to the local utility.

Preferable characteristics may include, but are not limited to:

- Integrates and demonstrates operation of advanced, innovative technologies in electric system design and operations, including, but not limited to, technologies that enable customer interaction with the grid (such as microgrid logic controllers, smart grid technologies, smart meters, and distributed automation);
- Integrates energy storage technologies;
- Integrates relevant technologies designed and/or manufactured in Massachusetts;
- Leverages significant third-party investment, including private capital.

Project characteristics should be informed by the Project Team’s Expression of Interest and viability assessment. Project Teams may provide additional required and/or preferable characteristics, as relevant, to the Technical Consultant.

Deliverable: Written report containing the detailed site assessment and the required and preferable microgrid characteristics. The report shall explain how these characteristics may be achieved under the constraints imposed by the site.

TASK 3 – DEVELOP PRELIMINARY TECHNICAL DESIGN COSTS AND CONFIGURATION

The Technical Consultant shall propose a preliminary technical design and system configuration for the proposed community microgrid in accordance with the findings of the site assessment and characteristics identified in Task 2, then conduct a preliminary assessment of that system using DER-

CAM or an equivalent tool. The information outlined under this Task shall be included in the Final Report.

Task 3.1 – Proposed Microgrid Infrastructure and Operations

- Provide a simplified equipment layout diagram and a simplified one-line diagram of the proposed microgrid, including location of the distributed energy resources (“DERs”) and utility interconnection point(s).
- Identify existing and planned (new) infrastructure that will be part of the microgrid.
- Provide a brief narrative describing how the proposed microgrid will operate under normal and emergency conditions.
- Include description of normal and emergency operations.
- Provide a written description of how the microgrid will be interconnected to the grid. Will there be multiple points of interconnection with the grid? What additional investments in utility infrastructure may be required to allow the proposed MG to separate and isolate from the utility grid? Provide a written description of the basic protection mechanism within the microgrid boundary.

Task 3.2 – Load Characterization

- Fully describe the electrical and thermal loads served by the microgrid when operating in islanded and parallel modes: Peak kW, Average kW, annual/monthly/weekly kWh, annual/monthly/weekly BTU (consumed and recovered) and identify the location of the electrical loads on the simplified equipment layout and one-line diagrams.
- Provide hourly load profile of the loads included in the microgrid and identify the source of the data. If hourly loads are not available, best alternative information shall be provided.
- Provide a written description of the sizing of the loads to be served by the microgrid including a description of any redundancy opportunities (ex: n-1) to account for equipment downtime.

Task 3.3 – Distributed Energy Resources Characterization

- Provide the following information regarding Distributed Energy Resources (DER) and thermal generation resources that are a part of the microgrid:
 - (i) Type (DG, CHP, PV, boiler, solar water heater etc.),
 - (ii) rating (kW/BTU), and,
 - (iii) Fuel (gas, oil etc.).
- If new DER or other thermal generation resources are a part of the microgrid, provide a written description of the approximate location(s) and space available. Identify the DERs on the simplified equipment layout and one-line diagrams. Differentiate between new and existing resources.
- Provide a written description of the adequacy of the DERs and thermal generation resources to continuously meet electrical and thermal demand in the microgrid.
- Describe how resilient the DERs and thermal generation resources will be to the forces of nature (severe weather) that are typical to and pose the highest risk to their operation (example, reduced or zero output due to snow cover over PV panels, potential flooding of low lying areas, etc.)

- Provide a description of the fuel sources for DER. Describe how many days of continuous operation of the microgrid can be achieved with current fuel storage capability. If additional fuel storage is required, provide a written description of needs required for this.
- Provide a written description of the capability of DERs including, but not limited to the following capabilities; black start, load-following, part-load operation, maintain voltage, maintain frequency, capability to ride-through voltage and frequency events in islanded mode, capability to meet interconnection standards in grid-connected mode.

Task 3.4 – Electrical and Thermal Infrastructure Characterization

- Provide a high-level written description of the electrical infrastructure (feeders, lines, relays, breakers, switches, current and potential transformers (CTs and PTs) and thermal infrastructure (steam, hot water, cold water pipes) that are a part of the microgrid. Identify the electrical and thermal infrastructure on the simplified equipment layout (with approximate routing) and one-line diagrams (electrical only). Differentiate between new, updated and existing infrastructure.
- Describe how resilient the electrical and thermal infrastructure will be to the forces of nature that are typical to and pose the highest risk to the location/facilities. Describe how the microgrid can remain resilient to disruption caused by such phenomenon and for what duration of time. Discuss the impact of severe weather on the electrical and thermal infrastructure.

Task 3.5 – Microgrid and Building Controls Characterization

- Provide a high-level written description of the microgrid control architecture and how it interacts with DER controls and Building Energy Management Systems (BEMS), if applicable.
- Identify the locations of microgrid and building controls on the simplified equipment layout diagram.
- Differentiate between new and existing controls.
- Provide a brief written description of the services that could be provided by the microgrid controls including, but not limited to the following:
 - Automatically connecting to and disconnecting from the grid
 - Load shedding schemes
 - Black start and load addition
 - Performing economic dispatch and load following
 - Demand response
 - Storage optimization
 - Maintaining frequency and voltage
 - PV observability and controllability; forecasting
 - Coordination of protection settings
 - Selling energy and ancillary services
 - Data logging features
- How resilient are the microgrid and building controls? Discuss the impact of severe weather on the microgrid and building controls.

Task 3.6 – Information Technology (IT)/Telecommunications Infrastructure Characterization

- Provide a high-level written description of the IT/Telecommunications Infrastructure (wide area networks, access point, ethernet switch, cables etc.) and protocols, including IT security. Identify

the IT and telecommunications infrastructure on the simplified equipment layout diagram. Differentiate between new and existing infrastructure.

- Provide a written brief description of communications within the microgrid and between the microgrid and the utility. Can the microgrid operate when there is a loss in communications with the utility? How resilient are the IT and telecommunications infrastructure?

Deliverable: Documentation of the work conducted under Task 3 included in the Monthly Progress Report.

TASK 4 – ASSESSMENT OF MICROGRID’S COMMERCIAL AND FINANCIAL FEASIBILITY

The Technical Consultant shall conduct an assessment of the commercial and financial feasibility of the proposed microgrid project in accordance with the following requirements. The information outlined under this Task shall be included in the Final Report.

Task 4.1 – Commercial Viability – Customers

The Technical Consultant shall describe the commercial terms/relationship between participants in the microgrid project, products expected to be produced by the microgrid and arrangements for sharing of benefits by addressing the following:

- Identify the number of individuals affected by/associated with critical loads should these loads go unserved (e.g. in a storm event with no microgrid).
- Identify any direct/paid services generated by microgrid operation, such as ancillary services, or indirect benefits, such as improved operation, to the utility or ISO New England.
- Identify each of the microgrid’s customers expected to purchase services from the microgrid.
- Identify other microgrid stakeholders; what customers will be *indirectly* affected (positively or negatively) by the microgrid?
- Describe the relationship between the microgrid owner and the purchaser of the power.
- Indicate which party/customers will purchase electricity during normal operation and during islanded operation. If these entities are different, describe why.
- What are the planned or executed contractual agreements with critical and non-critical load purchasers?
- How does the Project Team plan to solicit and register customers (i.e. purchasers of electricity) to be part of their project?
- What other energy commodities (such as steam, hot water, chilled water) will the microgrid provide to customers?

Task 4.2 – Commercial Viability - Value Proposition

The Technical Consultant shall describe the value the microgrid is expected to provide directly to its participants, to the community at large, to the local electric distribution utility and to Massachusetts by addressing no less than the following questions:

- What benefits and costs will the community realize by the construction and operation of this project?

- How would installing this microgrid benefit the utility (e.g. reduce congestion or defer upgrades)? What costs would the utility incur as a result of this project?
- Describe the proposed business model for this project. Include an analysis of strengths, weaknesses, opportunities and threats (SWOT) for the proposed business model.
- Are there any characteristics of the site or technology (including, but not limited to, generation, storage, controls, information technology (IT), automated metering infrastructure (AMI), other) that make this project unique?
- What makes this project replicable? Scalable?
- What is the purpose and need for this project? Why is reliability/resiliency particularly important for this location? What types of disruptive phenomena (weather, other) will the microgrid be designed for? Describe how the microgrid can remain resilient to disruption caused by such phenomena and for what duration of time.
- Describe the project's overall value proposition to each of its identified customers and stakeholders (including, but not limited, the electricity purchaser, the community, the utility, the suppliers and partners, and Massachusetts).
- What added revenue streams, savings, and/or costs will this microgrid create for the purchaser of its power?
- How does the proposed project promote state policy objectives (e.g. RPS, Global Warming Solutions Act)?
- How would this project promote new technology or technologies developed or manufactured by Massachusetts-based companies (including, but not limited to, generation, storage, controls, IT, AMI, other)? What are they?

Task 4.3 – Commercial Viability - Project Team

The Technical Consultant shall address the following in describing the structure of the Project Team and the roles, strengths and resources of its members and other necessary partners:

- Describe the current status and approach to securing support from local partners such as municipal government, community groups, residents, and other relevant stakeholders.
- What role will each team member (including, but not limited to, applicant, microgrid owner, contractors, suppliers, partners) play in the development of the project? Construction? Operation?
- Are public/private partnerships used in this project? If yes, describe this relationship and why it will benefit the project.
- For identified Project Team members (including, but not limited to, applicant, microgrid owner, contractors, suppliers, partners), what are their qualifications and performance records?
- Are any of the contractors and suppliers identified? If yes, who are they, what services will each provide and what is the relationship to the applicant? If no, what types of team members will be required and what is the proposed approach to selecting and contracting?
- Are any of the project financiers or investors identified? If yes, who are they and what is their relationship to the applicant? If no, what is the proposed approach to securing proposed financing? Will other members of the Project Team contribute any financial resources?
- Are there legal and regulatory advisors on the team? If yes, please identify them and describe their qualifications. If no, what is the proposed approach to enlisting support in this subject area?

Task 4.4 – Commercial Viability - Creating and Delivering Value

The Contractor shall describe the mechanics of ensuring that expected value is delivered to project participants, by addressing the following questions:

- What specific microgrid technologies were chosen? Specifically discuss benefits and challenges of employing these technologies.
- What assets does the Project Team and/or microgrid owner already own that can be leveraged to complete this project?
- How do the design, technology choice, and/or contracts ensure that the system balances generation and load?
- What permits and/or special permissions will be required to construct this project? Are they unique or would they be required of any microgrid? Why?
- What are the recommended options for developing, constructing and operating the project?
- How are benefits of the microgrid passed to the community? Will the community incur any costs? If so, list the additional costs.
- What will be required of the utility to ensure this project creates value for the purchaser of the electricity and the community?
- Describe the recommended operational scheme (including, but not limited to, technical, financial, transactional and decision making responsibilities) that will be used to ensure this project operates as expected.
- How does the project owner plan to charge the purchasers of electricity services? How will the purchasers' use be metered?
- Are there business/commercialization and replication plans appropriate for the type of project?

Include a description of any assumptions necessary to address these questions.

Task 4.5 – Financial Viability

The Technical Consultant shall describe the case for financial viability for development and operation of the microgrid by addressing no less than the following questions:

- What are the categories and relative magnitudes of the revenue streams and/or savings that will flow to the microgrid owner? Will they be fixed or variable?
- What are the categories and relative magnitudes of the capital and operating costs that will be incurred by the microgrid owner? Will they be fixed or variable?
- How does the business model for this project ensure that it will be profitable?
- Describe the financing structure for this project during development, construction and operation.
- What incentives will be required or preferred for this project to proceed? How does the timing of those incentives affect the development and deployment of this project?

Deliverable: Documentation of the work conducted under Task 4 included in the Progress Report.

The Technical Consultant shall develop and provide the information required to support an independent evaluation of project costs and benefits for this stage of analysis. The information outlined under this Task shall be included in the Final Report.

Task 5.1 – Facility and Customer Description

The Technical Consultant shall list and describe all facilities that will be served by the microgrid. For each facility:

- Indicate the rate class to which the facility belongs (i.e., residential, small commercial/industrial, large commercial/industrial).
- Indicate the economic sector to which the facility belongs (e.g., manufacturing, wholesale and retail trade, etc.).
- Indicate whether multiple ratepayers are present at the facility (e.g., multi-family apartment buildings).
- Indicate whether there will be any financial criteria for prospective customers; if so, what are those criteria?
- Indicate the facility's average annual electricity demand (MWh) and peak electricity demand (MW). For facilities with multiple ratepayers, indicate average annual and peak demand per customer, rather than for the facility as a whole.
- Indicate the percentage of the facility's average demand the microgrid would be designed to support during a major power outage.
- In the event of a multi-day outage, indicate the number of hours per day, on average, the facility would require electricity from the microgrid.

Task 5.2 – Characterization of Distributed Energy Resources

The Technical Consultant shall describe the DERs the microgrid would incorporate, including for each:

- Energy/fuel source.
- Nameplate capacity.
- Estimated average annual production (MWh) under normal operating conditions.
- Average daily production (MWh/day) in the event of a major power outage.
- For fuel-based DER, fuel consumption per MWh generated (MMBtu/MWh).
- How much, if any, fuel would be stored on site?

Task 5.3 – Capacity Impacts and Ancillary Services

The Technical Consultant shall provide estimates of the following services/value the microgrid is expected to provide, as applicable:

- The impact of the expected provision of peak load support on generating capacity requirements (MW/year).
- Capacity (MW/year) of demand response that would be available by each facility the microgrid would serve.
- Associated impact (deferral or avoidance) on transmission capacity requirements (MW/year).
- Associated impact (deferral or avoidance) on distribution capacity requirements (MW/year).

- Ancillary services to the local utility (e.g., frequency or real power support, voltage or reactive power support, black start or system restoration support).
- Estimates of the projected annual energy savings from development of a new combined heat and power (CHP) system relative to the current heating system and current type of fuel being used by such system.
- Environmental regulations mandating the purchase of emissions allowances for the microgrid (e.g., due to system size thresholds).
- Emission rates of the microgrid for CO₂, SO₂, NO_x, and PM (emissions/MWh).

Task 5.4 – Project Costs

The Technical Consultant shall provide the following cost information for the microgrid:

- Fully installed costs and engineering lifespan of all capital equipment.
- Initial planning and design costs.
- Fixed operations and maintenance (O&M) costs (\$/year).
- Variable O&M costs, excluding fuel costs (\$/MWh).
- What is the maximum amount of time each DER would be able to operate in islanded mode without replenishing its fuel supply? How much fuel would the DER consume during this period?

Task 5.5 – Current Costs to Maintain Service During a Power Outage

For each facility the microgrid would serve, the Technical Consultant shall describe its current backup generation capabilities, if any, by providing the following information:

- Fuel/energy source of each existing backup generator.
- Nameplate capacity of each existing backup generator.
- The percentage of nameplate capacity at which each backup generator is likely to operate during an extended power outage.
- Average daily electricity production (MWh/day) for each generator in the event of a major power outage, and the associated amount of fuel (MMBtu/day) required to generate that electricity.
- Any one-time costs (e.g., labor or contract service costs) associated with connecting and starting each backup generator.
- Any daily costs (\$/day) (e.g., maintenance costs) associated with operating each backup generator, excluding fuel costs.
- Given a widespread power outage (i.e., a total loss of power in the surrounding area), describe and estimate the costs of any emergency measures that would be necessary for each facility to maintain operations, preserve property, and/or protect the health and safety of workers, residents, or the general public. Please include costs for one-time measures (e.g., total costs for connecting backup power) and any ongoing measures (expressed in terms of average costs per day). Specify these costs for two scenarios: (1) when the facility is operating on backup power, if applicable, and (2) when backup power is not available.

Task 5.6 – Services Supported by the Microgrid

For critical facilities, including those that provide fire, emergency medical, hospital, police, wastewater, or water services, the Technical Consultant shall:

- Estimate the population serviced by each facility.
- Describe how a power outage would impact each facility's ability to provide services. If possible, estimate a percentage loss in the facility's ability to serve its population during a power outage, relative to normal operations (e.g., 20% service loss during a power outage), both when the facility is operating on backup power and when backup power is not available.

For residential facilities, the Technical Consultant shall:

- Describe the type of housing the facility provides (e.g. group housing, apartments, dormitory, nursing home, assisted living, etc.).
- Estimate the number of residents that would be left without power during an outage.

Deliverable: Documentation of the work conducted under Task 5 included in the Progress Report.

TASK 6 – FINAL REPORT

The Technical Consultant shall prepare a detailed Final Report covering all aspects of the work performed for the Assessment. The Final Report shall provide the information from Tasks 3 – 5, with each Task representing a separate chapter or section of the Final Report. The Final Report shall also include information on the following subjects and synthesize all information into understandable and actionable findings:

- Discussions of the observations and findings and recommendations, if any, from all Tasks, and avenues for further improvements, as appropriate;
- Discussions of the Project results and lessons learned regarding configuration, capabilities and benefits of the Project; and
- Environmental and economic benefits, and implementation scenarios associated with such.

The Technical Consultant shall provide a Draft version of the Final Report in line with the Milestone Schedule associated with the Assessment. MassCEC will provide comments within 60 working days after receipt of the Draft Final Report. The Technical Consultant shall prepare the final version of the Final Report to reflect careful consideration of MassCEC's comments.

Deliverables: Draft Final Report & Approved version of the Final Report