

MUNICIPAL VULNERABILITY PREPAREDNESS PROGRAM ACTION GRANT CASE STUDY

Municipality: Town of Shirley

Project Title: Microgrid Feasibility

Award Year (FY): FY20

Grant Award: \$ 58,794 (FY21 \$49,822.00)

Match: \$ 20,455.10 (FY21 \$20,299.74)

Match Source: Town Staff Resources

One or Two Year Project: One Year

Municipal Department Leading Project: Town Administrator

Project Website URL: [Project Webpage On Shirley's Website](#)

Community Overview:

- What is the population size of your community and where is it located? 5,459
- Do you have any [Environmental Justice](#) or other Climate Vulnerable communities? (Think about both those who live and work in your town.)

Block Group 3, Census Tract 3882, Middlesex County, Massachusetts

This 2020 blockgroup in **Shirley** is an EJ population with the criteria: **Minority**

In 2019 this block group had a population of 3,655 in 1,045 households:

EJ characteristics:

Median household income: \$67,264:

this is **78.4 %** of the MA median.

Total minority population: **36.0 %**

Households with language isolation: **1.6 %**

- Other unique traits of your municipality like who the top employers are, geography, history, etc.

Shirley is approximately thirty miles west-northwest of Boston. The town has a well-preserved historic New England town center.

Bemis Associates and Thermofab are the town two largest non-government employers, totaling approximately 500 employees.

It is home to the Massachusetts Correctional Institution – Shirley, a medium-security state prison. (The neighboring maximum-security Souza-Baranowski Correctional Center.

The town has a total area of 15.9 square miles. It is bounded by the Squannacook and Nashua rivers and contains Mulpus Brook and Catecunemaug Brook. There are approximately 812 acres of public conservation land in Shirley.

There are four community parks in Shirley, the Shirley Historical Society Museum, Shirley Shaker Village, and historic Town Center. The Town is located on the MBTA commuter rail service to North Station in Boston. The Massachusetts Regional Transit Authority supplies bus service.

The Town is part of the Ayer Shirley Regional School District, with an elementary school, the Lura A. White, and the Shirley Middle School. The high school is located in the Town of Ayer.

Project Description and Goals:

- Where was the project located?
 - Shirley, MA, Keading Way Town Complex. The project was located at the Town Complex, which encompassed town hall, the library, and the police station. The middle school is located across the street from the complex, which be an additional benefactor in the future.
- What climate change impacts did the project address?
 - Extreme weather impacts and reduction and green house emissions.
- What were the specific goals and tasks of the project as stated in your application?
 - Address the growing concern of power loss and associated public health issues due to severe weather incidents, the maturing electrical infrastructure, and the aging mechanical and electrical systems at existing critical facilities of the town.
 - Provide design options for maintaining the critical operations/facilities independently from the utility electrical grid via digitized renewable energy Microgrid during loss of utility power incidents
- Did your project meet the goals set forth in your application in terms of:
 - Employing nature-based solutions
 - Yes, provided design options for utilizing Photovoltaic System for alternative energy source. Battery storage and PV system will decrease the need to rely on fossil fuel burning generators.
 - Improving equitable outcomes for and fostering strong partnerships with EJ and other Climate Vulnerable Populations
 - Yes, microgrid provides a reliable and resilient electrical infrastructure at the Town Complex to maintain the Town’s Police Station and therefore,

emergency response during climate change related disasters or loss of power.

- Providing regional benefits
 - No
- Implementing the public involvement and community engagement plan set forth in your application
 - Yes, we had very little community engagement planned in the application except for a Town meeting to present the project. We completed this presentation virtually during the Board of Selectmen meeting and creating a project webpage on the Town's website.
- Finishing the project on time
 - No, we were severely delayed due COVID pandemic and local and federal restrictions. Priorities of the Town had to shift to accommodate and support the Town members during the pandemic.

Results and Deliverables:

- Describe, and quantify (where possible) project results (e.g. square footage of habitat restored or created, increase in tree canopy coverage, etc.). Report out on the metrics outlined in your application.
 - The project was completed at the end of June 2021. The final feasibility study was submitted to the Town on May 5, 2021 and a final meeting with the Town about the study was conducted on June 24, 2021
 - The project included a total of five (5) tasks with four (4) of them each having three (3) or more sub-tasks. All tasks and sub-tasks were completed in full.
 - Task 1: Site investigation
 - The site investigation was implemented by the study team of engineers, Town's Project Manager, and associated facility staff.
 - Site visits conducted at each facility determined existing site conditions and identified the geographical locations of the facilities, identify potential paths to join the facilities to a common grid, and gathered load data for each facility,
 - Sub-Task 1.1: Town Complex Site Visit
 - Sub-Task 1.2: Regional Middle School Site Visit
 - Sub-Task 1.3: Review of Data
 - Review of all historical data/information associated with the critical facilities, as record drawings, equipment information, maintenance services and testing, utility bills, etc.
 - Task 2: Research
 - Task had four (4) sub-tasks; Sub-Task 2.1 Analysis of Existing Facilities, Sub-Task 2.2 Incentives/Rebates, Sub-Task 2.3 Microgrid-Distribution Generation Equipment Options, Sub-task 2.4 Microgrid – Distribution Storage Equipment Options, and Sub-Task 2.5 Utility Integration.

- Task 1 Deliverables: Site investigation observation notes and findings were included in final study. Photographs from site visit were provided to MVP regional coordinator in monthly reporting and within the final study.
- Task 2 Deliverables: all research and information gathered was summarized in the final study.
- Task 3 Deliverables:
 - For sub-task 3.1 and 3.3, Meeting Minutes were submitted for to the meeting attendees and in the monthly progress report.
 - For sub-task 3.2, several meetings occurred with the Town's volunteer social media chair and the Assistant Town Administrator and Town Administrator. A presentation of project was conducted at the Board of Selectmen meeting on 2/22
 - [Meeting Minutes of the Board of Selectmen Meeting](#)
 - [Project Webpage On Shirley's Website](#)
- Task 4 Deliverables: the Draft and Final Report with cost estimate were submitted to Town and MVP Regional Manager. They were also included in the monthly progress reports.
- Task 5 Deliverables: Monthly Progress Reporting. Submitted one for each month starting March 2020 and ending June 2021.

Lessons Learned:

- What lessons were learned as a result of the project? Focus on both the technical matter of the project and process-oriented lessons learned.
 - Involving the utility company at the beginning of the project.
 - Focus on both the technical matter of the project and process-oriented lessons learned. The process was very educational from the Town of Shirley's perspective. I believe the biggest challenge we faced was trying to conduct this project during COVID. Ideally, we would have preferred more public involvement, unfortunately this was not possible. This was mine and the Town's first MVP process and we had a learning curve. For a town the size of Shirley, with very few staff members, many jobs are placed on people that may not typically fall under their expertise. In a non-COVID, more residents would have been involved on a volunteer basis, but once again this was not possible.

The Town applied for a few grants, one being an EV charging station and another being the Microgrid. We did not get funded for the EV station, but was funded for the microgrid.

Having written the above, the microgrid is a fantastic potential project. The challenges for a town the size of Shirley is funding and ability to take the project to the next level. As a former Assistant City Manager in Lowell, I look at this type of a project a home run for a larger community or a larger town such as a

Billerica, Tewksbury, or Chelmsford. The resources at their disposal are far greater.

The end project turned out very favorable in my opinion. From where we started in terms of thinking we were going to focus on an EV station, to getting funding for a microgrid and not fully understanding what that entailed was a great experience. While confusing at times due to the inexperience with the process, I do believe that the effort truly is what the purpose of a feasibility study is designed to accomplish. We went into the start of the project thinking one-way, which was an anaerobic digester to use as an alternative source of energy and ended up with a very valuable potential photovoltaic project that gives us a blueprint to possibly move forward with a real project.

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- What is the best way for other communities to learn from your project/process?
 - Understanding microgrids are not uniform in design.

Partners and Other Support:

- Include a list of all project partners and describe their role in supporting/assisting in the project.

Name	Title, Organization	Project Role
Michael McGovern	Town Administrator, Town of Shirley	Town Project Manager and overall Town liaison of the project. Was engaged in the overall conceptual design options.
Michael Gibbons	Former Assistant Town Administrator, Town of Shirley	Assisted in the first four months of the project. Helped in providing historical data related to the Town’s Complex. Coordinated overall project documentation required by MVP.
Aubrey Thomas	Assistant Town Administrator, Town of Shirley	Was engaged in the overall conceptual design options. Coordinated overall project documentation required by MVP. Helped with the social media/community outreach.
Brandon Kelly	Director of Public Works Dept., Town of Shirley	Resource for historical data related to the Town’s complex. Escorted Fuss and O’Neill during site visits. Was engaged in the overall conceptual design options.
Samuel Santiago	Chief of Police, Shirley Police Department	Was engaged in the overall Microgrid’s conceptual design options
Troy Cooley	Fire Chief, Shirley Fire Department	Was engaged in the overall Microgrid’s conceptual design options
Debra Roy	Director of Shirley’s Hazen Memorial Library	Provided historical documentation of the library. escorted Fuss and O’Neill during site visit.
Robert Briggs	Facilities Coordinator, Ayer Shirley Regional School District	Liaison to the school district and resource for historical data of Middle School. Escorted Fuss and O’Neill during site visit. Was engaged in the overall conceptual design options

Melissa Lynch	Volunteer, Chair of Social Media, Town of Shirley	Created project webpage on town's website. Coordinated with project team for social media community outreach.
Samantha Godin	Project Manager, Fuss and O'Neill, Inc.	Engineering Consultant conducting the feasibility study. Electrical Engineer and project manager
Kevin Sullivan	Vice President, Fuss and O'Neill, Inc.	Engineering Consultant, Quality Control of study.

Project Photos:

- In your electronic submission of this report, please attach (as .jpg or .png) a few high-resolution (at least 300 pixels per inch) representative photos of the project. Photos should not show persons who can be easily identified, and avoid inclusion of any copyrighted, trademarked, or branded logos in the images. MVP may use these images on its website or other promotional purposes, so please also let us know if there is someone who should receive credit for taking the photo.