

Project Overview and Goals

Objectives: This proposed SERC grant project will: 1) install air-source heat pump technology along with deep energy retrofit weatherization measures in single-family (1-4) dwellings, along with 2) a study/report that will determine the energy savings and environmental /climate benefits of the project. In addition, this project will serve both underserved communities and underserved clients throughout the Commonwealth of Massachusetts while achieving the goals of the Justice40 initiative. The main goals are to reduce the energy costs for these income-eligible clients as well as quantify the associated energy and environmental benefits that go along with energy efficiency weatherization and heating system measure installations.

In Massachusetts, there are forty-one (41) municipal light plants (MLPs) that provide electricity to citizens in all or part of fifty (50) municipalities. Unlike the investor-owned utilities in Massachusetts, the MLPs face limited regulations as they are regulated by municipal officials as opposed to the investor-owned utilities that are regulated by the Massachusetts Department of Public Utilities (DPU). Thus, citizens who live in an MPL service territory do not typically receive equal assistance for energy efficiency measure installation that citizens receive who live in an investor-owned service territory. DHCD classifies these MLP service territories as an underserved population in relation to energy efficiency measure installation.

This project will address income-eligible clients who reside in single-family (1-4) dwellings within an MLP service territory. Dwellings that heat with heating oil or propane receive no energy efficiency assistance in MLP service territories. Heating oil and propane are currently the most expensive delivered heating fuels in the Commonwealth. Thus, for low-income clients, this represents an added financial energy burden. In addition, most propane tanks are “dealer owned”, so consumers cannot shop around with other dealers for better prices.

Activities: The focus of this grant award will be to replace the existing heating system with air-source heat pump technology for qualified/selected income-eligible clients residing in single-family (1-4) dwellings. Air-source heat pumps have become a major focus of the investor-owned utilities’ efforts to capture energy savings in their 2022-2024 energy efficiency plans filed with the DPU. The Massachusetts 2050 Decarbonization Roadmap¹ references air-source heat pumps as being a critical element to meeting both the electrification needs of space heating across the Commonwealth as well as reaching climate related goals. Air-source heat pumps are 300%-350% efficient compared to high-efficiency oil and natural gas heating systems that are only 90%-98% efficient. The air-source heat pumps will be paid for with the SERC grant funds and HEARTWAP funds. The annual maintenance of the systems going forward will be paid for mostly with HEARTWAP funds. It is also likely that many of the electrical systems/panels in these dwellings will need to be added or replaced to accommodate the increased electrical

¹ Massachusetts 2050 Decarbonization Roadmap, Massachusetts Executive Office of Energy and Environmental Affairs, December 2020, page 46.

demand/usage in the dwelling. This major barrier to electrification will be addressed with these SERC funds by installing upgraded panels, when applicable, capable of supporting not only air-source heat pumps, but future capacity for additional renewable energy measures and/or electric vehicle charging stations at these residences.

In conjunction with the heating system replacement, additional energy saving weatherization measures will be installed so that these income-eligible clients in MLP service territories receive the full benefits of weatherization. Each dwelling unit will receive comprehensive insulation, air-sealing, and weather-stripping. To make such an investment in these dwellings, reducing air leakage is especially important in the overall goal to achieve maximum energy savings.

Project Outcomes: The impact of this project is significant as it will show the successes and challenges of installing air-source heat pump technology in income-eligible single-family dwellings. This funding will allow DHCD to conduct a comprehensive study of both energy savings and climate benefits such as greenhouse gas emission reductions. DHCD's intent is to issue an RFP for an energy/environmental consultant to manage the overall project, as well as coordinate and execute the study component of this project. The study will determine the overall pre and post energy consumption of each dwelling, the barriers to accomplishing the target goals, best practices in implementing air-source heat pump technology in single-family dwellings, as well as quantify greenhouse gas emission reductions at each dwelling. This information will be compiled and documented in a written final report to be submitted to DHCD at the end of the project period by the contracted consultant.

The study component of this project is slated to take between 2-3 years (including pre and post analysis). Clients will need to be identified, selected, and agree to convert their heating systems. Utility bills will need to be obtained and analyzed. Systems will need to be properly sized to each dwelling. Quality control inspections will be performed on all completed units, as well as follow-up annual maintenance visits, client education, and client satisfaction surveys.

This project will strive to meet the Justice40 initiative goals. One hundred percent (100%) of the client dwellings will be located in MLP service territories across the Commonwealth. A minimum of forty percent (40%) of the selected income-eligible clients will be clients who identify as “minority status” in the general population. Further preference regarding project dwelling selection will be for clients heating with heating oil and propane. DHCD will also coordinate with the Massachusetts Department of Energy Resources to ensure that at minimum forty percent (40%) of dwelling units served through this project will be conducted in the five (5) Massachusetts Gateway Cities that are served by MLPs. A Gateway municipality (M.G.L. Ch. 23A § 3A) is a municipality with:

- population greater than 35,000 and less than 250,000
- median household income below the state average
- rate of educational attainment of a bachelor’s degree or above that is below the state average

Lastly, DHCD recently completed a study of air-source heat pump technology in multi-family public housing units titled: Air Source Heat Pump Study for Local Housing Authorities². Given the results of this study, DHCD is very interested in seeing the results in single-family dwelling units. This project has the potential to yield significant findings for this technology, and increased replication within the WAP around the country.

Project Demographics: DHCD proposes to work on this SERC grant with four (4) WAP Subgrantee agencies across the state:

- ACTION, Inc. / Elliott Jacobsen, Brian Beote, Brendan Delaney, and Jon Daley
- Worcester Community Action Council Inc. (WCAC) / Mary Knittle and Richard Justice
- Springfield Partners for Community Action, Inc. (SPCA) / Craig Tomlinson
- Citizens For Citizens, Inc. (CFC) / Madeleine Cormier

These four (4) agencies were selected as project partners primarily because they have either Gateway Cities within their WAP service territory and/or they have staff that has significant experience installing air-source heat pump technology. These four (4) Massachusetts WAP Subgrantee agencies are very experienced in implementing the WAP and other types of energy-related and Health & Safety grants. All four (4) agencies have a good collaborative working relationship with DHCD and will be enthusiastic assets to this project in identifying appropriate clients for this project, conducting necessary client education, overseeing installation work, performing quality control inspections, and scheduling follow-up annual maintenance visits. ACTION and WCAC, in particular, have had experience with air-source heat pump installations as part of recent utility installations. Their staff will be instrumental in helping to guide this project through their expertise and experience melding funds from SERC, WAP, HEARTWAP, and possibly other funds.

The project will also hire an energy/environmental consultant who will be responsible for the overall management of the project, as well as the data collection and evaluation of the study data from both an energy and environmental standpoint. This study is a critical component of the project, as a central goal of obtaining SERC funding is to conduct a study and produce a written report which validates this project as replicable going forwards across the Commonwealth, and possibly other states, in terms of transforming the heating services market for vulnerable income-eligible clients.

Summary: This project will utilize funding from multiple programs: SERC, WAP, HEARTWAP, and possibly other funds. SERC funds are highly desired because the costs of converting a dwelling's heating system from fossil fuels or electric resistance to air-source heat pump technology is very expensive, and may require additional upgrades to the dwelling unit. By conducting projects like this, and coordinating evaluation studies, there will be tangible

² Air Source Heat Pump Study for Local Housing Authorities, Tighe & Bond, 11-2-21.

validation of results that will help to transform the market going forwards. Market transformation is a process that can only truly occur through efforts such as this SERC project. The more installations that are completed in the next couple of years will help to bring down the prices of air-source heat pump technology, and make the technology that much more cost-effective for both income-eligible programs and non-income-eligible residents of the Commonwealth and beyond.