Technical Description and Impact

This proposal involves multiple project partners. This proposal combines technical, social, and financial aspects of energy efficiency and weatherization in a specific sub-community within one Massachusetts town. The technical aspect focuses on the weatherization testing and installation of weatherization materials in one specific mobile home park in Shrewsbury, Massachusetts. The social aspect focuses on proper client selection and subsequent communication and client education throughout the entire project. The financial aspect addresses the management and allocation of funds that will impact and reduce the energy burden faced by income-challenged residents of the mobile home park.

Mobile Home Weatherization Feasibility:

Energy staff at our partner Subgrantee SMOC have been performing mobile home weatherization for years and are keenly aware of the most cost-effective measures that can be achieved. SMOC has a track record of meeting production goals and attaining weatherization-related savings. The goal of this project is to fully weatherize as many income-eligible units in the mobile home park as possible while also leveraging a companion SERC grant to install air-source heat pumps in the same dwelling units. By undertaking this community-scale project, the units will be transformed into electrified energy efficient homes to help meet the Commonwealth's electrification and weatherization goals.

The full-scale, whole-house weatherization work will be similar to any other dwelling weatherized as part of the Massachusetts WAP. The mobile home priority list of measures or full-scale MHEA energy audit will be utilized in appropriate circumstances on all dwellings as part of this CSPP grant. All testing that is normally conducted as part of weatherization (i.e. blower door, CAZ, etc.) will be conducted at each dwelling unit. Since an ultra-efficient air-source heat pump heating/cooling system may be installed in the future, it is that much more critical that the dwelling be properly weatherized with significant CFM reduction in air movement. Weatherization measures will focus on insulation, air sealing, weatherstripping, as well as various health & safety measures and energy-related incidental repair measures.

The weatherization work will be funded by the CSPP weatherization funds. The selected dwellings will have little access to utility funds since Shrewsbury is a municipal electric utility service area, but if there are dwelling units that are eligible for either municipal utility funds or natural gas utility funds, those funds will be leveraged with CSPP funds for weatherization services.

The installation of measures will follow the approved Massachusetts mobile home priority list of measures as follows:

1. **HEALTH & SAFETY**
   Mandatory: Install all applicable Health & Safety (H&S) measures per Massachusetts DOE WAP approved H&S Plan.

2. **LED BULBS**
   Mandatory: Replacement of all existing screw-based incandescent, halogen, or compact fluorescent lighting used for a minimum of one (1) hour per day.

3. **AIR-SEALING**
   Mandatory: Air Sealing – seal the primary pressure boundary surfaces at the following locations: attic top-plates (if accessible); all penetrations and holes through the ceiling, exterior walls, and floor.

   a. Target value is 1 cfm/ft2 of conditioned area. Example: 2000 square foot home Post target should be 2000 cfm@50.

4. **DUCT SEALING**
   Mandatory: Duct Sealing – seal all accessible ducts. At a minimum, seal all end caps, crossovers, duct boot connections, holes or penetrations, and furnace connections.
   a. Target value is one (1) Pascal per register.

5. **CEILING INSULATION**
   Mandatory: Ceiling insulation (both flat and vaulted) – fill ceiling to capacity with blown in insulation (MA = fiberglass)

6. **FLOOR/BELLY INSULATION**
   Mandatory: Floor/Belly Insulation – Fill all belly cavities to capacity and proper density (1.25-1.75 pounds per cubic foot) with blown in insulation (MA=Fiberglass) after air sealing floor and ducts. Must include complete ground moisture barrier over any exposed dirt.

7. **WINDOW REPLACEMENT**
   Mandatory: Replace all single-paned metal framed windows with Low-E double-paned windows having a U-value of 0.33 or less. Single pane windows with storm windows are NOT eligible for replacement using DOE funds.

MEASURES TO INSTALL – OPTIONAL

These measures may be installed only if all mandatory measures have been addressed first. These measures do not have to be addressed under Massachusetts DOE WAP as the title notes OPTIONAL. If an agency so chooses to use any of these measures, this signed sheet must be in the client file.

8. **DOMESTIC HOT WATER MEASURES (DHW)**
   Optional: - (**$250** per dwelling unit cap with DOE WAP funds total)

a. DHW pipe insulation – which will always include 6' of cold-water nearest the DHW tank. Accessible hot water pipes to R-3 or greater. Note based on current pricing no more than 35' of pipe to be complete so maximum is not exceeded.
b. Faucet aerators (≤2.2 gpm)
c. Showerhead (≤2.5 gpm)
d. DWH tank insulation (R-10 minimum)

9. REFRIDGERATOR REPLACEMENT

Optional: Replace one (1) refrigerator per home, with a label rating of less than 400kWh/yr. and maximum installed cost of $850 per unit when existing refrigerator.

a. Was manufactured before 2001, OR
b. Uses greater than 1000kWh/yr. based upon energy metering or industry accepted resource.

10. PRIMARY HEATING AND AIR-CONDITIONING SYSTEMS REPLACEMENTS

Optional:

a. Replace existing window A/C manufactured before 2014 with a 12 SEER or higher unit of the same or lesser BTU capacity.
b. If the home has any other existing combination of heating/cooling systems other than as described above, then an energy model may be run that assumes items 1-7 have been completed and determine if an alternative heating/cooling system replacement is cost effective for this specific home.

Technical Qualifications and Experience:

SMOC is an experienced weatherization Subgrantee with enough staff to be able to handle the added work with this Community-Scale Pilot Project. SMOC will coordinate all client eligibility requirements through LIHEAP as well as coordinate all field work from energy audits to installation of measures to inspections of completed dwelling units. SMOC will utilize its current list of weatherization contractors to perform testing and installation of measures. SMOC staff includes:

- Greg Tutuny / Business Officer
- Jamie Parr / WAP Program Director
- Mark LaPan / Technical Director / QCI
- Jack Barry / QCI
- Cora Graham / Energy Auditor
- Rob Zimmerman / Energy Auditor
- Josh Costigan / Energy Auditor
- Dave Bessette / HEARTWAP

Mark LaPan is also a certified BPI Proctor (1 of only 2 in the Massachusetts WAP network).

SMOC also operates and oversees the weatherization training center for Massachusetts and the surrounding states: The Green Jobs Academy. Thus, SMOC can draw upon expertise from the training center as well.

Equity Impacts and Benefits: As mentioned in the Project Overview section of this application, citizens who live in an MLP 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.

From an energy perspective, all income-eligible residents of the mobile home park will receive weatherization services if they desire. Clients will be first selected to have services provided based on who has the highest energy burden. Energy burden, as well as all other priority points, is determined during the client intake process in Massachusetts. Clients who are identified as "high energy burden" will be flagged for first priority consideration. Clients who heat their residence with oil and propane will be flagged for priority consideration as well. 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 fuel prices. Clients who heat with electric resistance heating will also be flagged next for consideration. Electric resistance heat is very costly per square foot of heated space and creates a burden for income-challenged clients. The central goal here is to identify income-challenged clients who are in the greatest need of a heating/cooling system that will reduce their energy costs and increase their comfort in a healthy, safe, and environmentally friendly manner.

According to the White House, "Justice40 is a whole-of-government effort to ensure that Federal agencies work with states and local communities to make good on President Biden's promise to deliver at least 40 percent of the overall benefits from Federal investments in climate and clean energy to disadvantaged communities."[1] As WAP Memorandum 084 notes, "DOE defines underserved communities as populations sharing a particular characteristic, as well as geographic communities that have been systematically denied a full opportunity to participate in aspects of economic, social, and civic life, as exemplified by the list in the definition of equity". DHCD feels that this project will attain the premises of the Justice40 initiative by meeting the following parameters:

1. DHCD considers any income-eligible client residing in an MLP service territory who does not have access to any utility energy efficiency funds to be "disadvantaged".
    a. DHCD plans to serve all income-eligible clients residing in the mobile home park at 151 Hartford Turnpike in SELCO's service territory.

[1] The Path to Achieving Justice40, https://www.whitehouse.gov/omb/briefing-room/2021/07/20/the-path-to-achieving-justice40/, July 20, 2021

Diversity Tracking and Reporting:

DHCD will track and ensure that income-eligible "minority clients" are sufficiently served and prioritized. DHCD defines "minority clients" as clients who self-identify as a race other than "Caucasian". DHCD will report client diversity numbers to DOE.

Similarly, DHCD will track and report to DOE the diversity of Subgrantee staff and contractors / staff that perform work on these dwelling units funded via CSPP.

Cost Savings and Environmental Impacts: Cost savings will be based on the WAP algorithm in the Annual Plan of 29.3 MBtus. If SELCO is able to gather the electric and fuel bills of clients served, the project team may be able to more accurately determine savings since the client base is on the smaller scale with this project. The access and experience possessed by SELCO staff and MMWEC staff will combine to add value to the project in determining actual savings.

According to the National Academy of Sciences, residential energy use is responsible for approximately twenty percent (20%) of total greenhouse gas (GHG) emissions in the United States. Growing housing stock and continued use of fossil fuels to heat homes is making it more challenging to meet emissions reduction targets set forth by various states. Still, approximately eighty percent (80%) of housing stock is "existing dwellings". In Massachusetts, the goal outlined in the 2050 Decarbonization Roadmap[2] is net zero greenhouse gas emissions by 2050. This project will attempt to quantify the reduction in greenhouse gases attained at each dwelling unit weatherized as part of this project. It is vital to know, as we move forward, what the impact of comprehensive weatherization will have on emissions and reductions in greenhouse gases such as carbon dioxide (CO2). The project will use an emissions calculator similar to the EPA's Carbon Footprint Calculator[3] to show the emissions reductions from dwelling's originally heated with fuel oil, propane, natural gas, and electricity.

DOE Impact:

A Massachusetts WAP Subgrantee cannot utilize its regular annual WAP funds to weatherize a majority of its annual WAP production goal in one community within its total service area. Thus, the CSPP will enable SMOC to weatherize multiple mobile homes within the mobile home park at 151 Hartford Turnpike in Shrewsbury, Massachusetts. Shrewsbury Electric and Cable Operations (SELCO) had approached DHCD earlier in 2022 about the possibility of obtaining funds to weatherize the units at this mobile home park. The selected dwellings will have little access to utility funds since Shrewsbury is a municipal electric utility service area (SELCO), and

[2] MA Decarbonization Roadmap, https://www.mass.gov/info-details/ma-decarbonization-roadmap
[3] EPA Carbon Footprint Calculator, https://www3.epa.gov/carbon-footprint-calculator/

leveraged funds are much harder to come by than in the investor-owned utility service areas across the Commonwealth.

In conclusion, DHCD believes this CSPP grant will be an important part of our work going forward to assist traditionally under-served clients with limited access to energy efficiency funds reduce both their energy burden and energy inefficiency while improving their household's environmental impact, comfort, and safety.